DAIKIN

Applied Systems

Technical Data

Water cooled chiller, standard efficiency

EEDEN13-418

EWWD-G-SS

TABLE OF CONTENTS

EWWD-G-SS

1 Features

- All models are PED pressure vessel approved
- Stepless single-screw compressor
- Optimised for use with R-134a
- 1-2 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side for easy oil circulation and return
- Partial and total heat recovery option available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWWD170G-SS	EWWD210G-SS	EWWD260G-SS	EWWD300G-SS	EWWD320G-SS	EWWD380G-SS	EWWD420G-SS	EWWD460G-SS	EWWD500G-SS	EWWD600G-SS
Cooling capacity	Nom.			kW	165 (1)	200 (1)	252 (1)	279 (1)	332 (1)	370 (1)	401 (1)	446 (1)	492 (1)	554 (1)
Heating capacity	Nom.			kW	209 (2)	253 (2)	319 (2)	357 (2)	420 (2)	467 (2)	506 (2)	566 (2)	626 (2)	710 (2)
Capacity control	Method				Stepless									
	Minimum capacity			%	25				13					
Power input	Cooling	Nom.		kW	43.8 (1)	52.6 (1)	67.4 (1)	78.5 (1)	87.5 (1)	96.4 (1)	105.4 (1)	119.3 (1)	133.9 (1)	157 (1)
	Heating	Nom.		kW	43.8 (2)	52.6 (2)	67.4 (2)	78.5 (2)	87.5 (2)	96.4 (2)	105 (2)	119 (2)	134 (2)	157 (2)
EER					3.77 (1)	3.80 (1)	3.74 (1)	3.55 (1)	3.80 (1)	3.84 (1)	3.80 (1)	3.74 (1)	3.68 (1)	3.53 (1)
ESEER					4.46	4.47	4.41	4.15	4.66	4.71	4.65	4.60	4.50	4.29
COP					4.77 (2)	4.80 (2)	4.74 (2)	4.55 (2)	4.80 (2)	4.84 (2)	4.80 (2)	4.74 (2)	4.68 (2)	4.53 (2)
IPLV					5.36	5.35	5.30	5.04	5.52	5.55		5.60	5.31	5.16
Casing	Colour				Ivory white									
	Material				Galvanized and painted steel sheet									
Dimensions	Unit	Height		mm	1,860				1,880					
		Width		mm	920				860					
		Depth		mm	3,435				4,305					
Weight	Unit			kg	1,393	1,410	1,503		2,687	2,697	2,702	2,757	2,762	
	Operation weight			kg	1,470	1,480	1,650		2,840	2,850	2,860	2,970		
Water heat exchanger - evaporator	Type				Single pass shell and tube									
	Water volume			l	60	56	123		118	113		173	168	
	Water flow rate	Nom.		l/s	7.9	9.6	12.1	13.4	15.9	17.7	19.2	21.4	23.6	26.5
	Nominal water pressure drop	Cooling	Total	kPa	45	61	41	49	58	57	66	50		59
	Insulation material				Closed cell									
Water heat exchanger - condenser	Type				Single pass shell and tube									
	Water flow rate	Nom.		l/s	10.0	12.1	15.3	17.1	10.1	10.2	12.2	12.4	15.0	17.0
	Nominal water pressure drop	Cooling		kPa	38	39	60	73	37	38	39	41	57	70
	Nominal water pressure drop 2	Cooling		kPa	-				37	39		56	57	70
	Insulation material				Closed cell									
	Model	Quantity			1				2					
Sound power level	Cooling	Nom.		dBA	88				90					
Sound pressure level	Cooling	Nom.		dBA	70				72					
Compressor	Type				Semi-hermetic single screw compressor									
	Quantity				1				2					
	Oil	Charged volume		l	16				32					
Operation range	Evaporator	Cooling	Min.	°CDB	-8									
			Max.	°CDB	15									
	Condenser	Cooling	Min.	°CDB	20									
			Max.	°CDB	55									
Refrigerant	Type				R-134a									
	Charge			kg	50		55		110	50		55		110
	Control				Electronic expansion valve									
	Circuits	Quantity			1				2					
Piping connections	Evaporator water inlet/outlet (OD)				88.9		114.3					139.7mm		
	Condenser water inlet/outlet (OD)				5"									

2 Specifications

2-1 Technical Specifications			EWWD170G-SS	EWWD210G-SS	EWWD260G-SS	EWWD300G-SS	EWWD320G-SS	EWWD380G-SS	EWWD420G-SS	EWWD460G-SS	EWWD500G-SS	EWWD600G-SS
Safety devices	Item	01	High discharge pressure (pressure switch)									
		02	High discharge pressure (pressure transducer)									
		03	Low suction pressure (pressure transducer)									
		04	Compressor motor protection									
		05	High discharge temperature									
		06	Refrigerant in oil sump									
		07	Low oil pressure									
		08	Low pressure ratio									
		09	High oil filter pressure drop									
		10	Phase monitor									
		11	Flowswitch									
		12	Emergency stop									
		13	Water freeze protection controller									

2-2 Electrical Specifications				EWWD170G-SS	EWWD210G-SS	EWWD260G-SS	EWWD300G-SS	EWWD320G-SS	EWWD380G-SS	EWWD420G-SS	EWWD460G-SS	EWWD500G-SS	EWWD600G-SS
Compressor	Phase			3~									
	Voltage		V	400									
	Voltage range	Min.	%	-10									
		Max.	%	10									
	Maximum running current		A	112	134	161	182	112	134		161	182	
	Starting method			Wye-delta									
Compressor 2	Maximum running current		A	-				112	134		161	182	
Power supply	Phase			3~									
	Frequency		Hz	50									
	Voltage		V	400									
	Voltage range	Min.	%	-10									
		Max.	%	10									
Unit	Maximum starting current		A	288				378	395		417	434	
	Nominal running current (RLA)	Cooling	A	81	92	111	131	16	174	184	202	221	260
	Maximum running current		A	112	134	161	182	224	246	268	295	343	364
	Max unit current for wires sizing		A	123	147	177	200	246	271	295	325	377	400

Notes

(1) Cooling: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; entering condenser water temp. 30ºC; leaving condenser water temp. 35ºC; full load operation.

(2) Heating capacity, unit power input and COP are based on the following conditions: evaporator 15/10ºC; condensor 40/45ºC, unit at full load operation

(3) Sound level data are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; entering condenser water temp. 30ºC; leaving condenser water temp. 35ºC; full load operation; standard: ISO3744

(4) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(5) Maximum starting current: starting current of biggest compressor + current of the other compressor at 75 % of maximum load

(6) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; entering condenser water temp. 30ºC; leaving condenser water temp. 35ºC; compressors.

(7) Maximum running current is based on max compressor absorbed current in its envelope

(8) Maximum unit current for wires sizing is based on minimum allowed voltage.

(9) Maximum current for wires sizing: (compressors full load ampere + fans current) x 1.1

3 Features and advantages

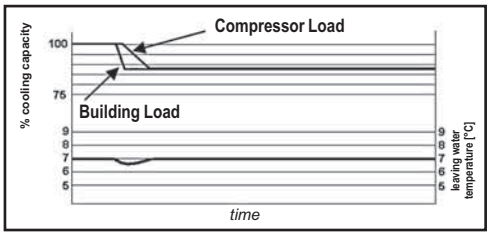
3 - 1 Features and Advantages

Features and advantages

The water cooled screw chillers EWWD~G- are equipped with single screw compressors.
They are manufactured to satisfy the requirements of the consultants and the end user. Units are designed to minimise energy costs while maximising the refrigeration capacities.
Daikin's chiller design experience combined with outstanding features makes the EWWD~G- chiller unmatched in the industry.

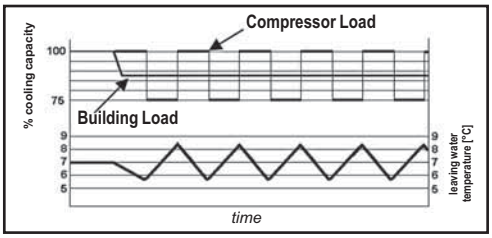
Seasonal quietness
The compressor design with a single screw and twin rotors allows a constant gas flow. This compression process completely eliminates gas pulsations. The oil injection also results in significant mechanical noise reduction.
The twin gas compressor discharge chambers are designed to act as attenuators, based on the harmonic wave principle with destructive interference, thus always resulting equal to zero. The extremely low noise compressor performance affords the use of EWWD~G- chiller for all applications.
The reduced number of vibrations produced from the EWWD~G- chiller offers a surprisingly quiet operation eliminating the noise transmission through the structure and the chilled water piping system.

Infinitely capacity control
Cooling capacity control is infinitely variable by means of a screw compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 25% (one compressor unit), down to 12.5% (two compressors units). 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 only with a stepless control.



ELWT fluctuation with stepless capacity control

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.



ELWT fluctuation with steps capacity control (4 steps)

Units with stepless regulation offer benefits that the units with step regulation are unable to match. The ability to follow the system energy demand at any time and the possibility to provide steady outlet water temperature without deviations from the set-point, are the two points that allow you to understand how the optimum operating conditions of a system can be met only through the use of a unit with stepless regulation.

Unmatched serviceability
Field serviceability has not been sacrificed. Inspection covers allows visual inspection of the main screw and gaterotors.

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3 Features and advantages

3 - 1 Features and Advantages

Outstanding reliability features

Unsurpassed Efficiency

• Zero clearance fit between the two gaterotors and main screw rotor virtually eliminates leakage between the high and low-pressure sides during compression. Special gaterotor material made from an advanced composite, temperature stable material makes a zero clearance design possible.

• The chiller is equipped with the most advanced means of refrigerant flow control available. An electronic expansion valve coupled with the MicroTech II C Plus controller's control logic provides excellent operating efficiencies both at full and part load operation.

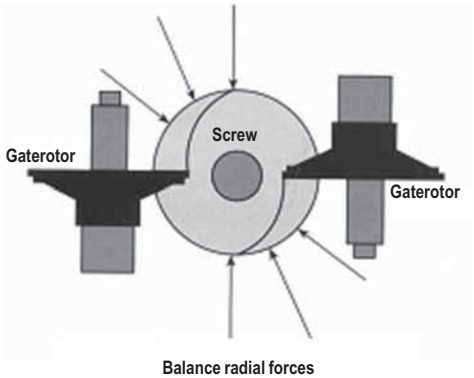
• Infinite unloading matches compressor capacity to load.

• Full factory testing of the unit with water hookups helps provides a trouble-free start-up. Extensive quality control checks during testing means that each equipment protection and operating control is properly adjusted and operates correctly before it leaves the factory. Factory-installed options minimize field expenses and startup labor.

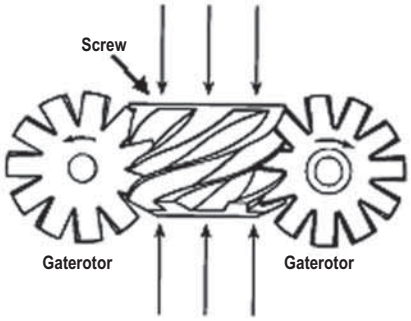
• The rugged design of the single-screw compressor allows it to be tolerant of liquid slugging.

• Very low loading enhances the bearing and compressor reliability. Due to symmetrical compression taking place on both sides of the main screw rotor, balanced forces result in the elimination of the large radial force loads inherent in twin-screw compressors.

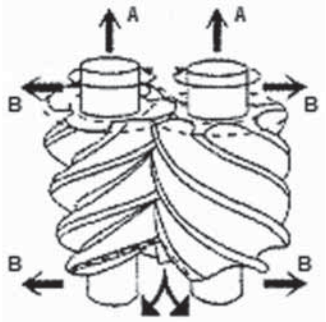
• Integral to the basic design of the single-screw compressor, the main screw rotor shaft and the gaterotor shafts cross at right angles in the compressor. The result is ample space to locate heavy duty bearings and increase compressor reliability since no limitations are placed on bearing design as found in twin-screw compressors.



Balance radial forces



Balanced axial forces



High Axial and Radial thrusts in TwinScrew Compressor

Code requirements – Safety and observant of laws/directives

All water cooled 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

All units manufactured 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.).

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3 Features and advantages

3 - 1 Features and Advantages

Versions

EWWD~G- is available in two different Efficiency Versions:

S: Standard Efficiency

10 sizes to cover a range from 166 up to 556 kW with an EER up to 4.00 and an ESEER up to 5.33

X: High Efficiency

10 sizes to cover a range from 186 up to 604 kW with an EER up to 4.73 and an ESEER up to 6.31

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 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 water inlet condenser temperature.

$ESEER = A \times EER_{100\%} + B \times EER_{75\%} + C \times EER_{50\%} + D \times EER_{25\%}$

	A	B	C	D
Coefficient	0.03 (3%)	0.33 (33%)	0.41 (41%)	0.23 (23%)
Condenser water inlet temperature (°C)	30	26	22	18

Sound Configuration

EWWD~G- is available in Standard sound level configurations:

S: Standard Noise

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4 General Characteristics

4 - 1 General characteristics

General characteristics

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 eye-hook for lifting 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

The single-screw compressor has a well balanced compression mechanism which cancels the screw rotor load in both the radial and axial directions. Inherent to the basic single-screw compressor design is the virtually load-free operation that gives main bearing design life of 3-4 times greater than twin-screws, and eliminates expensive and complicated thrust balancing schemes. The two exactly opposed gate rotors create two exactly opposed compression cycles. Compression is made at the lower and upper parts of the screw rotor at the same time, thus cancelling the radial loads. Also, both ends of the screw rotor are subjected to suction pressure only, which cancels the axial loads and eliminates the huge thrust loads inherent in twin-screw compressors.

Oil injection is used for these compressors in order to get EER at high condensing pressure. The units are provided with a high efficiency oil separator to maximise oil extraction.

Compressors have an infinitely variable capacity control down to 25% of its total capacity. This control is made by means of capacity slides controlled by microprocessors.

Standard start is star-delta type; soft start type is available as option.

Ecological R-134a 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) that means 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 1 circuit for each compressor and is manufactured in accordance to PED approval. The evaporator water outlet connections are provided with Victaulic Kit (as standard).

Condensers

The units are equipped with Direct Expansion shell&tube condensers, with copper tubes rolled into steel tubesheets. The unit has independent condensers, one per circuit. The condenser is manufactured in accordance to PED approval.

Condensers are provided with liquid shut-off valve and spring loaded relief valve.

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 valve proposes features that make it unique: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, highly linear flow capacity, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.

EEXV strength point is the capacity to work 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 independent refrigerant circuits and each one includes:

- Single screw compressor with external cyclonic oil separator
- (Common) Evaporator

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4 General Characteristics

4 - 1 General characteristics

- Condenser
- Oil pressure transducer
- High pressure switches
- High pressure transducer
- Low pressure transducer
- Moisture liquid indicator
- High efficiency oil separator
- Replaceable core filter-drier
- Electronic expansion valve

Electrical control panel

Power and control are located in 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 compressors fuses and control circuit transformer.

MicroTech III controller

MicroTech III controller is installed as standard; it can be used to modify unit set-points and check control parameters. A built-in display shows chiller operating status plus temperatures and pressures of water, refrigerant, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors and EEXV to keep stable operating conditions to maximise chiller energy efficiency and reliability.
MicroTech III is able to protect critical components based on external signs from its system (such as motor temperatures, refrigerant gas and oil pressures, correct phase sequence, pressure switches and evaporator). The input coming from the high pressure switch cuts all digital output from the controller in less than 50ms, this is an additional security for the equipment.
Fast program cycle (200ms) for a precise monitoring of the system. Floating point calculations supported for increased accuracy in P/T conversions.

Control section - main features

- Management of the compressor stepless capacity.
- Chiller 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 temperatures.
- Display of condensing-evaporating temperatures and pressures, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation. Temperature tolerance = 0.1°C.
- Compressor and evaporator pumps hour counters.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Re-start in case of power failure (automatic / manual).
- Soft Load (optimized management of the compressor load during the start-up).
- Start at high evaporator water temperature.
- Return Reset (Set Point Reset based on return water temperature).
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers

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4 General Characteristics

4 - 1 General characteristics

- Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit

- High pressure (pressure switch).
- High pressure (transducer).
- Low pressure (transducer).
- High compressor discharge temperature.
- High motor winding temperature.
- Phase Monitor.
- Low pressure ratio.
- High oil pressure drop
- Low oil pressure.
- No pressure change at start.

System security

- Phase monitor.
- Low Ambient temperature lock-out.
- Freeze protection.

Regulation type

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

MicroTech III

MicroTech III built-in terminal has the following features.

- 164x44 dots liquid crystal display with white back lighting. Supports Unicode fonts for multi-lingual.
- Key-pad consisting of 3 keys.
- Push'n'Roll control for an increased usability.
- Memory to protect the data.
- General faults alarm relays.
- Password access to modify the setting.
- Application security to prevent application tampering or hardware usability with third party applications.
- Service report displaying all running hours and general conditions.
- Alarm history memory to allow an easy fault analysis.

Supervising systems (on request)

MicroTech III remote control

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

- 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) (Native)

Chiller Sequencing

MicroTech III controller allows an easy plug-in sequencing technology based on digital or serial panel

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4 General Characteristics

4 - 1 General characteristics

Digital Sequencing Panel
This panel is basically a step inserter that switches ON/OFF up to 11 units (chillers or heat pumps operating in the same cooling/heating mode) depending on the selected set point; the units are connected with the panel through standard cables and no serial card is requested.

Serial Sequencing Panel
Basically this panel sequences a chiller plant by switching on/off the units (up to 7 chillers) taking into account their running hours and the requested plant load, in order to optimise the number of working units for each condition; serial cards and shielded cables are requested to connect the panel with the units and, if installed, a BMS.

Standard accessories (supplied on basic unit)

Evaporator Victaulic Kit - Hydraulic joint with gasket for an easy and quick water connection.
Evaporator Water side design pressure 10 bar
Condenser Water side design pressure 16 bar
Electronic Expansion Device
Suction line shut off valve - Suction shut-off valve installed on the suction of the compressor to facilitate maintenance operation.
Y-D starter - Star Delta starter is the standard type
Double set-point - Dual leaving water temperature set-points.
Phase monitor - The phase monitor controls that phases sequence is correct and controls phase loss.
High Pressure Side Manometers
Hour Run meter - Digital compressors hour run meter
General fault contactor - Contactor for alarm warning.
Set-point reset, demand limit and alarm from external device - The leaving water temperature set-point can be overwritten with the following options: 4-20mA from external source (by user); outside ambient temperature; evaporator water temperature Δt. Moreover the device allow the user to limit the load of the unit by 4-20mA signal or by network system and the microprocessor is able to receive an alarm signal from an external device (pump etc… - user can decide if this alarm signal will stop the unit or not).

Options (on request)

100% total heat recovery - Produced with tube bundle placed in a single shell with the water condensers. Heat exchangers heads are provided with 2 connections for entering/leaving heat recovery water and 2 separate connections for condensing water.
Partial heat recovery - Produced with plate to plate heat exchangers installed on discharge side of compressor hot gas. These allow hot water to be produced up to a maximum temperature of +50°C.
Heat pump version
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Condenser double flanges kit
20mm Evaporator/ Condenser Insulation
Condenser Victaulic Kit
Cu-Ni 90-10 exchangers - to work with sea water the heat exchangers are fitted with Cu-Ni tubes and special protection inside the end covers.
Sound proof system - Made of sheet metal and internally insulated, the cabinet is “integral kind” (around the whole chiller, not only around the compressors) to reach the best performance in noise reduction.
Dual pressure relief valve on evaporator
Soft start - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading in addition to the normal protection envisaged by the electrical windings.

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4 General Characteristics

4 - 1 General characteristics

Under/Over Voltage - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.
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.
Capacitors Cosfi 0.9 - Installed on the electrical control panel to ensure it conforms to the plant rules (advise: maximum 0,9).
Current Limit - To limit maximum absorbed current of the unit whenever is required.
Evaporator / Condenser flow switch for the water piping
Rubber type antivibration 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.
Forklift kit
Witness test - Every unit is always tested at the test bench prior to the shipment. On request, a second test can be carried out, at customer's presence, in accordance with the procedures indicated on the test form. (Not available for units with glycol mixtures).
Acoustic test

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5 Nomenclature

5 - 1 Nomenclature

Name	E W W	D	1 7 0	G	-	S	S	0	0 1
Digits	1 2 3	4	5 6 7	8	9	10	11	12	13 14

Machine type
EWA = Air-cooled chiller, cooling only
EWY = Air-cooled chiller, heat pump
EWL = Remote condenser chiller
ERA = Air cooled condensing unit
EWW = Water-cooled chiller, cooling only
EWC = Air-cooled chiller, cooling only with centrifugal fan
EWT = Air-cooled chiller, cooling only with heat recovery

Refrigerant
D = R-134a
P = R-407c
Q = R-410a

Capacity class in kW (Cooling)
Always 3-digit code
Idem as previous

Model series
Letter A, B,… : major modification

Inverter
- = Non-inverter
Z = Inverter

Efficiency level
S = Standard efficiency
X = High efficiency
P = Premium efficiency (N.A for this range)

Sound level
S = Standard noise
L = Low noise (N.A for this range)
R = Reduced noise (N.A for this range)
X = Extra low noise (N.A for this range)
C = Cabinet (N.A for this range)

Warranty
0 = 1 year of warranty
B = 2 years of warranty
C = 3 years of warranty
= ... years of warranty

Sequential number
000 = Base model
001 = First order for this model (1 or more units)
002 = Second order for this model (1 or more units)
... = ... order for this model
B01 = First order for this model + 1 year warranty
B02 = Second order for this model (1 or more units)
... = ... order for this model

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6 Capacity tables

6 - 1 Capacity Table Legend

English - English - αγγλικά - Inglés	Deutsch	Ελληνικά	Español
Ta: Condenser inlet air temperature	Ta: Verflüssiger-Einlasslufttemperatur	Ta: Θερμοκρασία αέρα εισαγωγής συμπυκνωτή	Ta: temperatura del aire de entrada al condensador
Twout: Evaporator leaving water temperature (Δt 5°C)	Twout: Verdampfer-Austrittswassertemperatur (Δt = 5 K)	Twout: Θερμοκρασία νερού εξόδου στον εξατμιστή (Δt 5°C)	Twout: temperatura de agua de salida del evaporador (Δt 5 °C)
CC: Cooling capacity	CC: Kühlleistung	CC: Απόδοση ψύξης	CC: capacidad de refrigeración
qw: Fluid flow rate	qw: Fluidvolumenstrom	qw: Ταχύτητα ροής υγρού	qw: caudal de líquido
dpw: Fluid pressure drop	dpw: Fluiddruckabfall	dpw: Πτώση πίεσης υγρού	dpw: caída de presión de líquido
Size	Größe	Μέγεθος	Tamaño
qwe: Fluid flow rate at evaporator	qwe: Fluidvolumenstrom am Verdampfer	qwe: Ταχύτητα ροής υγρού στον εξατμιστή	qwe: caudal de líquido en el evaporador
dpwe: Fluid pressure drop at evaporator	dpwe: Fluiddruckabfall am Verdampfer	dpwe: Πτώση πίεσης υγρού στον εξατμιστή	dpwe: caída de presión de líquido en el evaporador
Twc: Condenser leaving water temperature (Δt 5°C)	Twc: Verflüssiger-Austrittswassertemperatur (Δt = 5 K)	Twc: Θερμοκρασία νερού εξόδου στο συμπυκνωτή (Δt 5°C)	Twc: temperatura de agua de salida del condensador (Δt 5 °C)
Twe: Evaporator leaving water temperature (Δt 5°C)	Twe: Verdampfer-Austrittswassertemperatur (Δt = 5 K)	Twe: Θερμοκρασία νερού εξόδου στον εξατμιστή (Δt 5°C)	Twe: temperatura de agua de salida del evaporador (Δt 5 °C)
HC: Heat capacity at condenser	HC: Heizleistung am Verflüssiger	HC: Θερμαντική ικανότητα στο συμπυκνωτή	HC: capacidad de calefacción en el condensador
qwc: Fluid flow rate at condenser	qwc: Fluidvolumenstrom am Verdampfer	qwc: Ταχύτητα ροής υγρού στο συμπυκνωτή	qwc: caudal de líquido en el condensador
dpwc: Fluid pressure drop at condenser	dpwc: Fluiddruckabfall am Verflüssiger	dpwc: Πτώση πίεσης υγρού στο συμπυκνωτή	dpwc: caída de presión de líquido en el condensador

English - Anglais - Inglese - Engels	Français	Italiano	Nederlands
Ta: Condenser inlet air temperature	Ta : Température de l'air d'admission du condenseur	Ta: Temperatura aria in ingresso nel condensatore	Ta: Luchtinlaattemperatuur condensor
Twout: Evaporator leaving water temperature (Δt 5°C)	Twout : Température de l'eau à la sortie de l'évaporateur (Δt 5°C)	Twout: Temperatura acqua in uscita dall'evaporatore (Δt 5°C)	Twout: Wateruittredetemperatuur verdamper (Δt 5°C)
CC: Cooling capacity	CC : Puissance frigorifique	CC: Capacità di raffrescamento	CC: Koelcapaciteit
qw: Fluid flow rate	qw : Débit du liquide	qw: Portata fluido	qw: Vloeistofdebiet
dpw: Fluid pressure drop	dpw : Chute de pression du liquide	dpw: Perdita di carico del fluido	dpw: Vloeistofdrukverlies
Size	Dimension	Dimensione	Afmeting
qwe: Fluid flow rate at evaporator	qwe : Débit du liquide au niveau de l'évaporateur	qwe: Portata fluido all'evaporatore	qwe: Vloeistofdebiet bij verdamper
dpwe: Fluid pressure drop at evaporator	dpwe : Chute de pression du liquide au niveau de l'évaporateur	dpwe: Perdita di carico del fluido all'evaporatore	dpwe: Vloeistofdrukverlies bij verdamper
Twc: Condenser leaving water temperature (Δt 5°C)	Twc : Température de l'eau à la sortie du condenseur (Δt 5°C)	Twc: Temperatura acqua in uscita dal condensatore (ΔT 5°C)	Twc: Wateruittredetemperatuur condensor (Δt 5°C)
Twe: Evaporator leaving water temperature (Δt 5°C)	Twe : Température de l'eau à la sortie de l'évaporateur (Δt 5°C)	Twe: Temperatura acqua in uscita dall'evaporatore (Δt 5°C)	Twe: Wateruittredetemperatuur verdamper (Δt 5°C)
HC: Heat capacity at condenser	HC : Capacité calorifique au niveau du condenseur	HC: Capacità termica al condensatore	HC: Warmtecapaciteit bij condensor
qwc: Fluid flow rate at condenser	qwc : Débit du liquide au niveau du condenseur	qwc: Portata fluido al condensatore	qwc: Vloeistofdebiet bij condensor
dpwc: Fluid pressure drop at condenser	dpwc : Chute de pression du liquide au niveau du condenseur	dpwc: Perdita di carico del fluido al condensatore	dpwc: Vloeistofdrukverlies bij condensor

English - английский	Русский
Ta: Condenser inlet air temperature	Ta: Температура воздуха на входе конденсатора
Twout: Evaporator leaving water temperature (Δt 5°C)	Twout: Температура воды на выходе испарителя (Δt 5°C)
CC: Cooling capacity	CC: Производительность по охлаждению
qw: Fluid flow rate	qw: Скорость потока жидкости
dpw: Fluid pressure drop	dpw: Падение давления жидкости
Size	Размер
qwe: Fluid flow rate at evaporator	qwe: Скорость потока жидкости в испарителе
dpwe: Fluid pressure drop at evaporator	dpwe: Падение давления жидкости в испарителе
Twc: Condenser leaving water temperature (Δt 5°C)	Twc: Температура воды на выходе конденсатора (Δt 5°C)
Twe: Evaporator leaving water temperature (Δt 5°C)	Twe: Температура воды на выходе испарителя (Δt 5°C)
HC: Heat capacity at condenser	HC: Теплоемкость конденсатора
qwc: Fluid flow rate at condenser	qwc: Скорость потока жидкости в конденсаторе
dpwc: Fluid pressure drop at condenser	dpwc: Падение давления жидкости в конденсаторе

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6 Capacity tables

6 - 2 Cooling/Heating Capacity Tables

EWWD170-320G-SS

Twe: Evaporator leaving water temperature (Δt 5°C); Twc: Condenser leaving water temperature (Δt 5°C)
qwe: Fluid flow rate at evaporator; dpwe: Fluid pressure drop at evaporator
HC: Heat capacity at condenser; qwc: Fluid flow rate at condenser; dpwc: Fluid pressure drop at condenser

	Condenser inlet air temperature	Twout																						
		5							7							9								
		CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc
Size	Ta	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa
170	30	162	38.4	7.8	43	200	9.6	35	173	39.1	8.3	48	211	10.2	39	184	39.9	8.8	54	223	10.7	43
	35	155	43	7.4	40	197	9.5	35	165	43.8	7.9	45	208	10	38	176	44.6	8.4	50	220	10.6	42
	40	148	48	7.1	37	195	9.4	34	158	48.8	7.6	41	206	9.9	37	168	49.7	8.1	46	217	10.5	41
	45	140	53.4	6.7	33	193	9.3	33	150	54.3	7.2	38	203	9.8	37	160	55.2	7.7	42	214	10.4	40
	50	133	59.3	6.3	30	191	9.3	33	142	60.1	6.8	34	201	9.8	36	152	61.1	7.3	38	212	10.3	39
	55	124	65.6	6.0	27	189	9.2	32	133	66.5	6.4	30	199	9.7	35	143	67.5	6.8	34	209	10.2	39
210	30	196	46.2	9.4	59	241	11.6	36	209	47.1	10.0	66	255	12.3	40	222	48.1	10.7	74	269	12.9	44
	35	188	51.7	9.0	54	238	11.5	35	200	52.6	9.6	61	252	12.1	39	213	53.7	10.2	68	265	12.8	43
	40	179	57.6	8.6	50	236	11.4	35	191	58.6	9.2	56	249	12	38	203	59.7	9.8	63	262	12.7	42
	45	170	64.1	8.1	45	233	11.3	34	181	65.1	8.7	51	246	11.9	37	193	66.2	9.3	57	259	12.5	41
	50	160	71.1	7.7	41	230	11.2	34	171	72.1	8.2	46	242	11.8	37	183	73.2	8.8	52	255	12.4	40
	55	150	78.6	7.2	36	228	11.1	33	161	79.6	7.7	41	239	11.6	36	172	80.7	8.2	46	251	12.2	39
260	30	247	59.1	11.8	39	305	14.7	56	264	60.5	12.6	44	322	15.5	62	280	61.9	13.4	50	340	16.4	68
	35	236	65.9	11.3	36	301	14.5	55	252	67.4	12.1	41	318	15.3	60	268	69	12.9	46	336	16.2	66
	40	225	73.3	10.8	33	297	14.3	54	240	74.9	11.5	37	313	15.1	59	256	76.5	12.3	42	331	16	65
	45	214	81.4	10.2	30	294	14.2	53	227	82.9	10.9	34	309	14.9	58	243	84.5	11.6	38	326	15.7	63
	50	201	90.1	9.6	27	290	14.1	52	215	91.6	10.3	31	305	14.8	57	229	93.2	11.0	34	320	15.5	62
	55	189	99.5	9.0	24	287	13.9	51	201	101	9.6	27	301	14.6	55	215	103	10.3	31	316	15.3	60
300	30	274	68.8	13.1	47	341	16.4	68	291	70.6	14.0	53	360	17.3	75	310	72.5	14.9	59	380	18.3	83
	35	262	76.6	12.5	43	337	16.2	67	279	78.5	13.4	49	355	17.1	73	296	80.4	14.2	54	375	18.1	81
	40	249	85.1	11.9	40	332	16.1	65	266	87	12.7	45	351	16.9	72	283	89	13.5	50	369	17.8	79
	45	236	94.3	11.3	36	328	15.9	64	252	96.2	12.0	40	346	16.7	70	268	98.2	12.8	45	364	17.6	77
	50	222	104	10.6	32	324	15.7	63	237	106	11.3	36	341	16.5	69	252	108	12.1	41	358	17.4	75
	55	198	111	9.5	26	308	14.9	58	221	117	10.6	32	336	16.3	67	232	117	11.1	35	348	16.9	72
320	30	326	76.7	15.6	56	401	9.7 9.7	35 35	347	78.2	16.6	63	424	10.2 10.2	38 38	369	79.8	17.7	71	447	10.8 10.8	42 42
	35	312	85.9	14.9	52	396	9.6 9.6	34 34	332	87.5	15.9	58	418	10.1 10.1	37 37	354	89.2	17.0	65	441	10.6 10.6	41 41
	40	297	95.8	14.2	48	392	9.5 9.5	33 33	317	97.5	15.2	54	413	10.0 10.0	37 37	338	99.3	16.2	60	436	10.5 10.5	40 40
	45	283	107	13.5	43	388	9.4 9.4	33 33	302	108	14.4	49	408	9.9 9.9	36 36	322	110	15.4	55	430	10.4 10.4	40 40
	50	267	118	12.8	39	384	9.3 9.3	32 32	286	120	13.7	44	404	9.8 9.8	36 36	305	122	14.6	50	425	10.3 10.3	39 39
	55	251	131	12.0	35	381	9.3 9.3	32 32	269	133	12.9	40	400	9.7 9.7	35 35	287	135	13.8	45	420	10.2 10.2	38 38

NOTES - ANMERKUNGEN - Σημειώσεις - NOTAS - REMARQUES - NOTE - OPMERKINGEN - примечания

1 Fluid: Water
Fluid: Wasser
Υγρό: Νερό
Líquido: agua
Liquide: Eau
Fluido: Acqua
Vloeistof: Water
Жидкость: Вода

2 For working conditions where dpw values are in italic, please contact factory.
Für Arbeitsbedingungen mit kursiv gedruckten dpw-Werten, wenden Sie sich bitte an den Hersteller.
Για τις συνθήκες εργασίας όπου οι τιμές dpw είναι σε πλάγια γραφή, παρακαλούμε επικοινωνήστε με το εργοστάσιο.
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Если условия работы соответствуют значениям dpw, указанным курсивом, обратитесь на завод-изготовитель.

SRC_1-2_Rev.01_1_(1-4)

6 Capacity tables

6 - 2 Cooling/Heating Capacity Tables

EWWD170-320G-SS

Twe: Evaporator leaving water temperature (Δt 5°C); Twc: Condenser leaving water temperature (Δt 5°C)
qwe: Fluid flow rate at evaporator; dpwe: Fluid pressure drop at evaporator
HC: Heat capacity at condenser; qwc: Fluid flow rate at condenser; dpwc: Fluid pressure drop at condenser

	Condenser inlet air temperature	Twout																						
		11							13							15								
		CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc		
Size	Ta	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa		
170	30	195	40.7	9.4	61	235	11.3	47	207	41.6	10.0	68	248	11.9	52	220	42.5	10.6	76	261	12.6	57		
	35	187	45.5	9.0	56	232	11.2	46	199	46.5	9.6	63	244	11.8	51	211	47.5	10.2	70	257	12.4	56		
	40	179	50.7	8.6	52	229	11	45	190	51.6	9.2	58	241	11.6	50	202	52.7	9.7	65	254	12.3	54		
	45	170	56.1	8.2	47	226	10.9	44	181	57.2	8.7	53	238	11.5	48	193	58.3	9.3	59	250	12.1	53		
	50	162	62.1	7.8	43	223	10.8	43	172	63.1	8.3	48	234	11.4	47	183	64.3	8.8	54	246	11.9	52		
	55																							
210	30	236	49.1	11.3	82	283	13.6	48	250	50.2	12.0	92	299	14.4	53	264	51.4	12.8	102	314	15.1	58		
	35	226	54.8	10.9	76	280	13.5	47	240	56	11.5	85	294	14.2	52	254	57.2	12.2	95	310	14.9	56		
	40	216	60.9	10.4	70	276	13.3	46	229	62.1	11.0	79	290	14	50	243	63.5	11.7	88	305	14.7	55		
	45	206	67.4	9.9	64	272	13.2	45	219	68.7	10.5	72	286	13.8	49	232	70.1	11.2	80	301	14.5	54		
	50	195	74.4	9.4	58	268	13	44	207	75.7	10.0	65	282	13.7	48	220	77.1	10.6	73	296	14.4	53		
	55																							
260	30	298	63.5	14.3	55	359	17.3	75	316	65.2	15.2	62	379	18.2	82	335	66.9	16.1	69	399	19.2	90		
	35	285	70.6	13.7	51	354	17	73	303	72.4	14.5	57	373	18	80	321	74.3	15.4	64	393	18.9	88		
	40	272	78.2	13.1	47	348	16.8	71	289	80	13.9	52	367	17.7	78	306	82	14.7	58	386	18.6	86		
	45	258	86.3	12.4	43	343	16.6	69	275	88.2	13.2	48	361	17.4	76	291	90.2	14.0	53	379	18.3	83		
	50	244	95	11.7	39	337	16.3	68	260	96.9	12.5	43	354	17.2	74	276	98.9	13.2	48	372	18	81		
	55																							
300	30	329	74.5	15.8	66	401	19.3	91	349	76.6	16.8	73	422	20.3	100	369	78.8	17.8	81	445	21.4	109		
	35	315	82.6	15.1	61	395	19	89	334	84.8	16.1	68	416	20	97	354	87.1	17.0	75	438	21.1	107		
	40	300	91.2	14.4	56	389	18.8	87	319	93.5	15.3	62	409	19.8	95	338	95.9	16.3	69	430	20.8	104		
	45	285	100	13.7	51	383	18.5	84	302	103	14.5	56	402	19.5	92	321	105	15.4	63	423	20.4	101		
	50	269	110	12.9	46	377	18.3	82	285	113	13.7	51	395	19.2	90	287	109	13.8	52	394	19.1	89		
	55																							
320	30	392	81.5	18.9	79	472	11.4 11.4	46 46	416	83.3	20.0	88	497	12.0 12.0	51 51	441	85.2	21.3	98	524	12.6 12.6	56 56		
	35	376	91	18.1	73	465	11.2 11.2	45 45	400	93	19.2	82	490	11.8 11.8	50 50	424	95	20.4	91	516	12.4 12.4	55 55		
	40	360	101	17.3	67	459	11.1 11.1	44 44	382	103	18.4	75	484	11.7 11.7	49 49	406	105	19.5	84	509	12.3 12.3	53 53		
	45	343	112	16.5	62	453	11.0 11.0	43 43	365	114	17.5	69	477	11.5 11.5	48 48	387	117	18.6	77	501	12.1 12.1	52 52		
	50	325	124	15.6	56	447	10.8 10.8	43 43	346	126	16.6	63	470	11.4 11.4	47 47	368	128	17.7	71	494	12.0 12.0	51 51		
	55																							

NOTES - ANMERKUNGEN - Σημειώσεις - NOTAS - REMARQUES - NOTE - OPMERKINGEN - примечания

1 Fluid: Water
Fluid: Wasser
Υγρό: Νερό
Líquido: agua
Liquide: Eau
Fluido: Acqua
Vloeistof: Water
Жидкость: Вода

2 For working conditions where dpw values are in italic, please contact factory.
Für Arbeitsbedingungen mit kursiv gedruckten dpw-Werten, wenden Sie sich bitte an den Hersteller.
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6 Capacity tables

6 - 2 Cooling/Heating Capacity Tables

EWWD380-600G-SS

Twe: Evaporator leaving water temperature (Δt 5°C); Twc: Condenser leaving water temperature (Δt 5°C)
qwe: Fluid flow rate at evaporator; dpwe: Fluid pressure drop at evaporator
HC: Heat capacity at condenser; qwc: Fluid flow rate at condenser; dpwc: Fluid pressure drop at condenser

	Condenser inlet air temperature	Twout																						
		5							7							9								
		CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc
Size	Ta	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa
380	30	363	84.6	17.4	55	446	9.8 11.7	36 36	387	86.2	18.5	61	471	10.4 12.3	39 40	411	88	19.8	69	497	10.9 13.0	43 44
	35	347	94.6	16.6	50	440	9.7 11.5	35 36	370	96.4	17.7	57	465	10.2 12.2	38 39	394	98.3	18.9	64	491	10.8 12.9	42 43
	40	331	106	15.8	46	435	9.6 11.4	34 35	353	107	16.9	52	459	10.1 12.1	38 39	377	109	18.1	58.0	484	10.7 12.7	41 42
	45	314	117	15.0	42	430	9.5 11.3	34 34	336	119	16.1	47	454	10.0 11.9	37 38	358	121	17.2	53.0	478	10.6 12.6	41 42
	50	297	130	14.2	38	426	9.4 11.2	33 34	317	132	15.2	43	448	9.9 11.8	36 37	339	134	16.3	48.0	471	10.4 12.4	40 41
	55	279	144	13.3	34	421	9.4 11.1	33 33	298	146	14.3	38	443	9.8 11.7	36 36	319	148	15.3	43.0	465	10.3 12.3	39 40
420	30	419	94.3	20.1	71	511	11.6 11.6	36 36	419	94.3	20.1	71	511	12.3 12.3	40 40	445	96.3	21.4	80	539	13.0 13.0	44 44
	35	401	105	19.2	66	505	11.5 11.5	36 36	401	105	19.2	66	505	12.2 12.2	39 39	427	108	20.5	74	532	12.8 12.8	43 43
	40	383	117	18.3	60	498	11.4 11.4	35 35	383	117	18.3	60	498	12.0 12.0	39 39	408	120	19.6	68	525	12.7 12.7	42 42
	45	363	130	17.4	55	492	11.3 11.3	34 34	363	130	17.4	55	492	11.9 11.9	38 38	388	133	18.6	62	518	12.5 12.5	42 42
	50	343	144	16.4	50	486	11.2 11.2	34 34	343	144	16.4	50	486	11.8 11.8	37 37	367	147	17.6	56	511	12.4 12.4	41 41
	55	322	159	15.4	44	480	11.1 11.1	33 33	322	159	15.4	44	480	11.7 11.7	36 36	344	162	16.5	50	504	12.2 12.2	40 40
460	30	438	105	20.9	48	540	11.8 14.1	37 52	466	107	22.3	54	570	12.5 14.9	41 57	496	109	23.8	61	602	13.2 15.7	46 63
	35	419	117	20.0	44	534	11.7 14.0	37 51	446	119	21.4	50	563	12.4 14.8	41 56	475	122	22.8	56	594	13.1 15.6	45 61
	40	399	130	19.1	41	527	11.6 13.9	36 50	426	133	20.4	46	556	12.2 14.6	40 55	453	135	21.7	51	586	12.9 15.4	44 60
	45	379	145	18.1	37	521	11.5 13.7	35 49	404	147	19.4	42	549	12.1 14.5	39 54	431	150	20.7	47	578	12.7 15.2	43 59
	50	357	161	17.1	33	515	11.4 13.6	35 48	381	163	18.3	38	542	12.0 14.3	38 53	407	166	19.5	42	570	12.6 15.1	42 58
	55	323	173	15.4	28	494	11.2 12.8	34 43	357	180	17.1	33	535	11.8 14.2	37 52	382	183	18.3	38	562	12.4 14.9	41 56
500	30	483	117	23.1	48	597	14.4 14.4	53 53	514	120	24.6	54	631	15.2 15.2	58 58	547	123	26.2	60	666	16.0 16.0	64 64
	35	462	131	22.1	44	590	14.2 14.2	52 52	492	134	23.6	50	623	15.0 15.0	57 57	524	137	25.1	56	657	15.8 15.8	63 63
	40	440	146	21.0	41	583	14.1 14.1	51 51	469	149	22.5	46	615	14.8 14.8	56 56	500	152	24.0	51	648	15.7 15.7	62 62
	45	417	162	20.0	37	577	14.0 14.0	50 50	445	165	21.3	41	607	14.7 14.7	55 55	474	168	22.7	47	639	15.5 15.5	60 60
	50	393	179	18.8	33	570	13.8 13.8	49 49	420	182	20.1	37	600	14.5 14.5	54 54	448	185	21.5	42	630	15.3 15.3	59 59
	55	353	193	16.9	27	544	13.2 13.2	45 45	393	201	18.8	33	592	14.4 14.4	53 53	420	204	20.1	37	621	15.1 15.1	58 58
600	30	544	137	26.0	57	678	16.3 16.3	64 64	578	141	27.7	64	715	17.2 17.2	71 71	614	144	29.5	71	754	18.1 18.1	78 78
	35	520	153	24.9	53	670	16.1 16.1	63 63	554	157	26.5	59	706	17.0 17.0	70 70	588	160	28.2	66	744	17.9 17.9	76 76
	40	495	170	23.7	48	662	16.0 16.0	62 62	527	174	25.3	54	697	16.8 16.8	68 68	561	178	26.9	61	734	17.7 17.7	75 75
	45	469	189	22.4	44	654	15.8 15.8	61 61	500	192	23.9	49	689	16.7 16.7	67 67	532	196	25.5	55	724	17.5 17.5	73 73
	50	441	209	21.1	39	647	15.7 15.7	60 60	471	212	22.5	44	679	16.5 16.5	66 66	502	216	24.1	49	714	17.3 17.3	72 72
	55	364	210	17.4	28	571	13.9 13.9	49 49	440	234	21.1	39	670	16.3 16.3	65 65	469	238	22.5	44	703	17.1 17.1	70 70

NOTES - ANMERKUNGEN - Σημειώσεις - NOTAS - REMARQUES - NOTE - OPMERKINGEN - примечания

1 Fluid: Water
Fluid: Wasser
Υγρό: Νερό
Líquido: agua
Liquide: Eau
Fluido: Acqua
Vloeistof: Water
Жидкость: Вода

2 For working conditions where dpw values are in italic, please contact factory.
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6 Capacity tables

6 - 2 Cooling/Heating Capacity Tables

EWWD380-600G-SS

Twe: Evaporator leaving water temperature (Δt 5°C); Twc: Condenser leaving water temperature (Δt 5°C)
qwe: Fluid flow rate at evaporator; dpwe: Fluid pressure drop at evaporator
HC: Heat capacity at condenser; qwc: Fluid flow rate at condenser; dpwc: Fluid pressure drop at condenser

Size	Condenser inlet air temperature Ta	Twout 11 CC kW	11 PI kW	11 qwe l/s	11 dpwe kPa	11 HC kW	11 qwc l/s	11 dpwc kPa	13 CC kW	13 PI kW	13 qwe l/s	13 dpwe kPa	13 HC kW	13 qwc l/s	13 dpwc kPa	15 CC kW	15 PI kW	15 qwe l/s	15 dpwe kPa	15 HC kW	15 qwc l/s	15 dpwc kPa
380	30	437	89.9	21.0	77	525	11.5 13.7	48 49	464	91.9	22.3	86	553	12.2 14.4	52 53	491	94	23.7	95	583	12.8 15.2	58 58
	35	419	100	20.1	71	517	11.4 13.5	47 48	445	103	21.4	79	545	12.0 14.3	51 52	472	105	22.7	88	574	12.7 15.0	56 57
	40	401	112	19.2	66	510	11.3 13.4	46 47	426	114	20.5	73	537	11.9 14.1	50 51	452	116	21.8	82	565	12.5 14.8	55 56
	45	381	124	18.3	60	503	11.1 13.2	45 46	406	126	19.5	67	529	11.7 13.9	49 50	431	129	20.7	75	557	12.3 14.6	54 54
	50	361	137	17.4	54	496	11.0 13.1	44 44	385	139	18.5	61	521	11.6 13.7	48 49	409	142	19.7	68	548	12.2 14.4	52 53
	55																					
420	30	473	98.4	22.7	89	569	13.7 13.7	49 49	501	101	24.1	99	599	14.4 14.4	53 53	531	103	25.6	110	631	15.2 15.2	58 58
	35	454	110	21.8	82	561	13.5 13.5	48 48	481	112	23.2	92	591	14.2 14.2	52 52	510	115	24.6	102	622	15.0 15.0	57 57
	40	434	122	20.8	76	553	13.4 13.4	47 47	460	125	22.2	85	582	14.1 14.1	51 51	488	127	23.5	94	612	14.8 14.8	56 56
	45	413	135	19.8	70	546	13.2 13.2	46 46	439	138	21.1	78	574	13.9 13.9	50 50	466	140	22.4	87	603	14.6 14.6	54 54
	50	391	149	18.8	63	538	13.0 13.0	44 44	416	152	20.0	71	565	13.7 13.7	49 49	442	155	21.3	79	594	14.4 14.4	53 53
	55																					
460	30	526	112	25.3	68	635	14.0 16.6	50 69	558	114	26.8	75	669	14.7 17.5	55 75	591	117	28.4	84	704	15.5 18.4	61 82
	35	505	125	24.2	63	626	13.8 16.4	49 67	535	127	25.7	70	659	14.5 17.3	54 74	567	130	27.3	78	694	15.3 18.1	59 81
	40	482	138	23.1	58	617	13.6 16.2	48 66	512	141	24.6	64	650	14.3 17.0	53 72	543	144	26.1	72	683	15.1 17.9	58 79
	45	458	153	22.0	53	609	13.4 16.0	47 64	487	156	23.4	59	640	14.1 16.8	51 70	517	159	24.9	66	673	14.9 17.7	56 77
	50	434	169	20.8	48	600	13.2 15.8	46 63	461	172	22.2	53	630	13.9 16.6	50 69	490	175	23.6	59	661	14.6 17.4	55 75
	55																					
500	30	580	126	27.9	67	702	16.9 16.9	71 71	615	129	29.6	75	740	17.8 17.8	78 78	651	133	31.4	83	779	18.7 18.7	85 85
	35	556	140	26.7	62	693	16.7 16.7	69 69	590	144	28.4	69	729	17.6 17.6	76 76	625	147	30.1	77	767	18.5 18.5	83 83
	40	531	155	25.5	57	683	16.5 16.5	68 68	564	159	27.1	64	719	17.3 17.3	74 74	598	163	28.8	71	755	18.2 18.2	81 81
	45	505	172	24.2	52	673	16.3 16.3	66 66	536	175	25.8	58	707	17.1 17.1	72 72	569	179	27.4	65	743	18.0 18.0	79 79
	50	477	189	22.9	47	662	16.0 16.0	64 64	507	193	24.4	53	696	16.9 16.9	70 70	538	197	25.9	59	730	17.7 17.7	77 77
	55																					
600	30	651	148	31.3	80	795	19.1 19.1	85 85	690	152	33.2	88	836	20.1 20.1	94 94	729	157	35.1	98	879	21.2 21.2	102 102
	35	624	165	30.0	74	784	18.9 18.9	84 84	661	169	31.8	82	824	19.9 19.9	92 92	699	173	33.7	91	866	20.9 20.9	100 100
	40	596	182	28.6	68	773	18.7 18.7	82 82	632	186	30.4	75	812	19.6 19.6	90 90	668	191	32.2	84	853	20.6 20.6	98 98
	45	566	201	27.2	62	762	18.4 18.4	80 80	600	205	28.9	69	800	19.3 19.3	88 88	636	210	30.6	76	840	20.3 20.3	95 95
	50	534	220	25.6	55	750	18.2 18.2	78 78	567	225	27.2	62	787	19.1 19.1	85 85	601	230	28.9	69	825	20.0 20.0	93 93
	55																					

NOTES - ANMERKUNGEN - Σημειώσεις - NOTAS - REMARQUES - NOTE - OPMERKINGEN - примечания

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2 For working conditions where dpw values are in italic, please contact factory.
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SRC_1-2_Rev.01_1_(4-4)

6 Capacity tables

6 - 3 Partial Heat Recovery Capacity tables

Partial Heat Recovery Ratings

EWWD~G-SS	EWWD~G-XS	Leaving desuper-heater water temp.°C	Leaving Condenser Water Temperature (°C)				
			35	40	45	50	55
			Hc (kW)	Hc (kW)	Hc (kW)	Hc (kW)	Hc (kW)
170	190	45	21.0	22.0	23.0	24.0	25.0
		50	10.0	18.0	22.0	23.0	24.0
		55	6.00	11.0	17.0	20.0	21.0
210	230	45	22.0	29.0	30.0	31.0	32.0
		50	17.0	23.0	28.0	29.0	30.0
		55	10.0	16.0	24.0	26.0	27.0
260	280	45	35.0	36.0	37.0	38.0	39.0
		50	28.0	34.0	35.0	36.0	37.0
		55	19.0	30.0	31.0	32.0	33.0
300	320	45	48.0	43.0	44.0	45.0	46.0
		50	39.0	45.0	42.0	43.0	44.0
		55	28.0	44.0	38.0	38.0	39.0
320	380	45	42.0	44.0	46.0	48.0	50.0
		50	20.0	36.0	44.0	46.0	48.0
		55	12.0	22.0	34.0	40.0	42.0
380	400	45	43.0	51.0	53.0	55.0	57.0
		50	27.0	41.0	50.0	52.0	54.0
		55	16.0	27.0	41.0	46.0	48.0
420	460	45	44.0	58.0	60.0	62.0	64.0
		50	34.0	46.0	56.0	58.0	60.0
		55	20.0	32.0	48.0	52.0	54.0
460	500	45	57.0	65.0	67.0	69.0	71.0
		50	45.0	57.0	63.0	65.0	67.0
		55	29.0	46.0	55.0	58.0	60.0
500	550	45	70.0	72.0	74.0	76.0	78.0
		50	56.0	68.0	70.0	72.0	74.0
		55	38.0	60.0	62.0	64.0	66.0
600	650	45	96.0	86.0	88.0	90.0	92.0
		50	78.0	90.0	84.0	86.0	88.0
		55	56.0	88.0	76.0	76.0	78.0

NOTES

Leaving Evaporator Water Temperature 7°C. ΔT 5°C; ΔT Condenser Water Temperature 5°C
Hc (heating heat recovery capacity)

OPT_1-2-3-4-5-6_Rev.00_3

6 Capacity tables

6 - 4 Total Heat Recovery Capacity Tables

Total Heat Recovery Ratings
EWWD170~320G-SS

Size	ELWT (°C)	Heat Recovery Water Temperature (°C)											
		30/35			35/40			40/45			45/50		
		Cc (kW)	Pi (kW)	Hc (kW)	Cc (kW)	Pi (kW)	Hc (kW)	Cc (kW)	Pi (kW)	Hc (kW)	Cc (kW)	Pi (kW)	Hc (kW)
170	4	152	37.5	189	145	42.3	188	139	47.5	186	132	53.1	185
	5	156	37.7	194	150	42.5	192	143	47.6	191	136	53.3	189
	6	161	37.8	199	155	42.6	197	148	47.8	196	141	53.5	194
	7	166	38.0	204	160	42.8	202	153	48.0	201	145	53.7	199
	8	172	38.1	210	165	43.0	208	157	48.2	206	150	53.9	204
	9	177	38.3	215	170	43.2	213	162	48.5	211	155	54.1	209
210	4	185	45.0	230	177	50.8	228	169	57.0	226	160	63.7	224
	5	190	45.2	236	183	51.0	234	174	57.2	232	166	64.0	230
	6	196	45.4	242	188	51.2	240	180	57.5	238	171	64.2	235
	7	203	45.6	248	194	51.4	246	186	57.7	244	177	64.5	241
	8	209	45.8	255	200	51.7	252	192	58.0	250	183	64.7	247
	9	215	46.0	261	207	51.9	258	198	58.2	256	188	65.0	253
260	4	234	55.9	290	224	63.0	287	214	70.6	284	203	78.8	282
	5	242	56.2	298	232	63.3	295	221	70.9	292	210	79.1	289
	6	250	56.5	306	239	63.6	303	228	71.3	300	217	79.5	296
	7	258	56.8	314	247	63.9	311	236	71.6	307	224	79.9	304
	8	266	57.0	323	255	64.3	319	243	72.0	315	231	80.3	312
	9	274	57.3	331	263	64.6	327	251	72.4	323	239	80.7	320
300	4	270	65.4	335	257	71.1	329	245	77.7	323	232	85.1	318
	5	279	66.3	345	266	72.0	338	253	78.5	332	240	85.9	326
	6	288	67.3	356	275	72.9	348	262	79.4	341	249	86.7	335
	7	298	68.3	366	285	73.9	359	271	80.3	351	257	87.5	344
	8	308	69.3	377	294	74.9	369	280	81.2	361	265	88.4	354
	9	317	70.3	388	304	75.9	380	289	82.2	371	274	89.3	364
320	4	306	75.1	381	293	84.7	378	280	95.0	375	266	106	372
	5	316	75.4	391	303	85.0	388	289	95.4	384	275	107	381
	6	326	75.7	401	312	85.4	398	298	95.8	394	284	107	391
	7	336	76.0	412	322	85.7	408	308	96.2	404	293	108	401
	8	346	76.3	423	332	86.1	418	318	96.6	414	303	108	411
	9	357	76.6	433	343	86.5	429	328	97.0	425	312	108	421

NOTES

Nominal cooling capacity and power input are based on ΔT = 5°C entering/leaving evaporator and heat recovery condenser water temperature; evaporator fouling factor = 0.0176 m² °C/kW; condenser fouling factor = 0.0440 m² °C/kW
Cc (cooling capacity
Pi (unit power input)
Hc (heating heat recovery capacity)

OPT_1-2-3-4-5-6_Rev.00_1 (1-2)

6 Capacity tables

6 - 4 Total Heat Recovery Capacity Tables

Total Heat Recovery Ratings
EWWD380~600G-SS

Size	ELWT (°C)	Heat Recovery Water Temperature (°C)											
		30/35			35/40			40/45			45/50		
		Cc (kW)	Pi (kW)	Hc (kW)	Cc (kW)	Pi (kW)	Hc (kW)	Cc (kW)	Pi (kW)	Hc (kW)	Cc (kW)	Pi (kW)	Hc (kW)
380	4	341	82.7	424	327	93.2	420	312	105	416	296	117	413
	5	352	83.1	435	338	93.6	431	322	105	427	306	117	423
	6	363	83.4	447	348	94.1	443	333	106	438	316	118	434
	7	375	83.8	459	360	94.5	454	344	106	450	327	118	445
	8	387	84.1	471	371	94.9	466	355	106	461	338	119	456
	9	398	84.4	483	382	95.3	478	366	107	473	348	119	468
420	4	369	90.1	459	354	102	455	338	114	452	321	128	448
	5	381	90.5	472	365	102	467	349	115	463	331	128	459
	6	393	90.8	484	377	102	479	360	115	475	343	128	471
	7	405	91.2	496	389	103	492	372	115	487	354	129	483
	8	418	91.6	509	401	103	504	384	116	499	365	130	495
	9	430	92.0	522	413	104	517	396	116	512	377	130	507
460	4	413	101	514	396	114	509	378	127	505	359	142	501
	5	427	101	528	409	114	523	390	128	518	371	143	514
	6	440	102	542	422	115	537	403	129	532	383	144	527
	7	454	102	556	435	115	550	416	129	545	396	144	540
	8	468	103	570	449	116	564	429	130	559	409	145	553
	9	482	103	585	463	116	579	443	130	573	422	145	567
500	4	457	111	569	438	126	564	418	141	559	397	157	554
	5	472	112	584	452	126	578	432	141	573	410	158	568
	6	487	113	599	467	127	594	446	142	588	424	159	582
	7	502	113	615	482	127	609	460	143	603	438	159	597
	8	517	114	631	497	128	625	475	143	618	452	160	612
	9	533	114	647	512	129	640	490	144	634	466	161	627
600	4	530	130	659	505	141	647	481	155	635	454	169	624
	5	547	132	679	523	143	666	497	156	653	470	171	641
	6	565	133	698	540	145	685	514	158	672	487	172	659
	7	583	135	718	558	147	705	531	160	691	504	174	678
	8	602	137	739	576	148	724	549	161	710	521	176	696
	9	621	139	760	594	150	745	567	163	730	538	178	716

NOTES

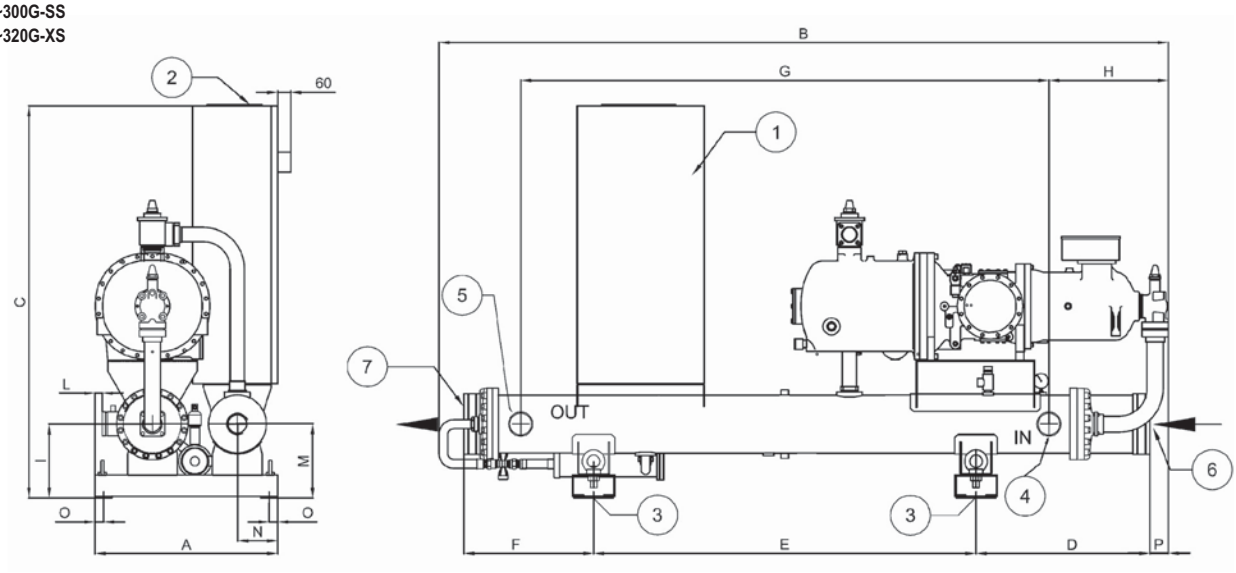
Nominal cooling capacity and power input are based on ΔT = 5°C entering/leaving evaporator and heat recovery condenser water temperature; evaporator fouling factor = 0.0440 m² °C/kW; condenser fouling factor = 0.0440 m² °C/kW
Cc (cooling capacity
Pi (unit power input)
Hc (heating heat recovery capacity)

OPT_1-2-3-4-5-6_Rev.00_1 (2-2)

7 Dimensional drawings

7 - 1 Dimensional Drawings

EWWD170~300G-SS
EWWD190~320G-XS



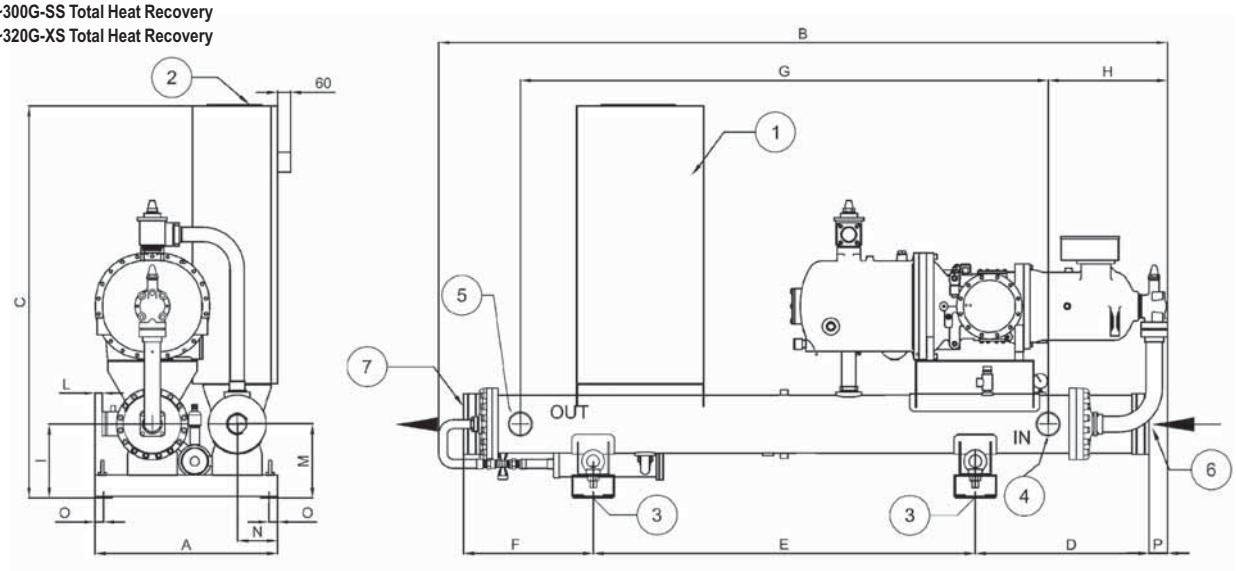
	Dimensions													
EWWD~G-	A	B	C	D	E	F	G	H	I	L	M	N	O	P
170-210G-SS	860	3435	1860	818	1800	610	2526	564	350	77	350	190	40	87
260-300G-SS	860	3435	1860	818	1800	610	2486	564	350	33	350	190	40	87
190-320G-XS	860	3435	1860	850	1800	580	2486	564	350	33	350	190	40	87

LEGEND

1 - Electrical Panel
2 - Power connections slot 150x260
3 - Four (4) holes Ø25 for isolator mounting
4 - Evaporator water inlet (Victaulic connection)
5 - Evaporator water outlet (Victaulic connection)
6 - Condenser water inlet connection
7 - Condenser water oulet connection

DMN_1-2-3-4-5-6_Rev.00_1

EWWD170~300G-SS Total Heat Recovery
EWWD190~320G-XS Total Heat Recovery



	Dimensions														
EWWD~G-	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q
170-210G-SS	860	3435	1860	818	1800	610	2526	554	350	77	350	115	40	87	150
260-300G-SS	860	3435	1860	818	1800	610	2486	554	350	33	350	115	40	87	150
190-320G-XS	860	3435	1860	818	1800	580	2486	554	350	33	350	115	40	87	150

LEGEND

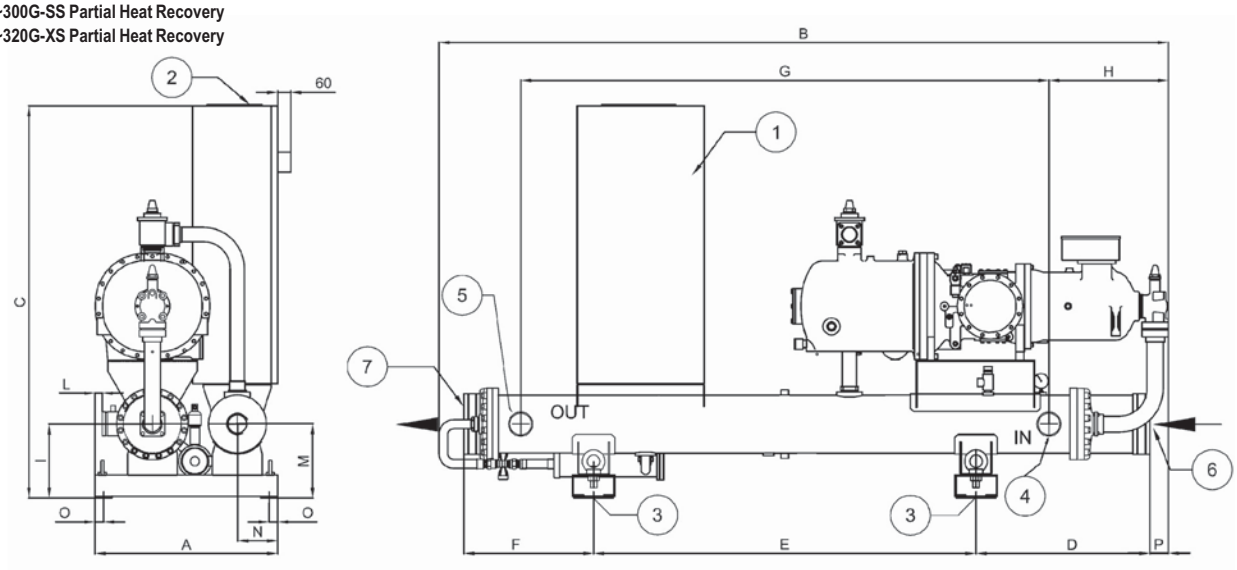
1 - Electrical Panel
2 - Power connections slot 150x260
3 - Four (4) holes Ø25 for isolator mounting
4 - Evaporator water inlet (Victaulic connection)
5 - Evaporator water outlet (Victaulic connection)
6 - Condenser water inlet connection
7 - Condenser water oulet connection

DMN_1-2-3-4-5-6_Rev.00_3

7 Dimensional drawings

7 - 1 Dimensional Drawings

EWWD170~300G-SS Partial Heat Recovery
EWWD190~320G-XS Partial Heat Recovery



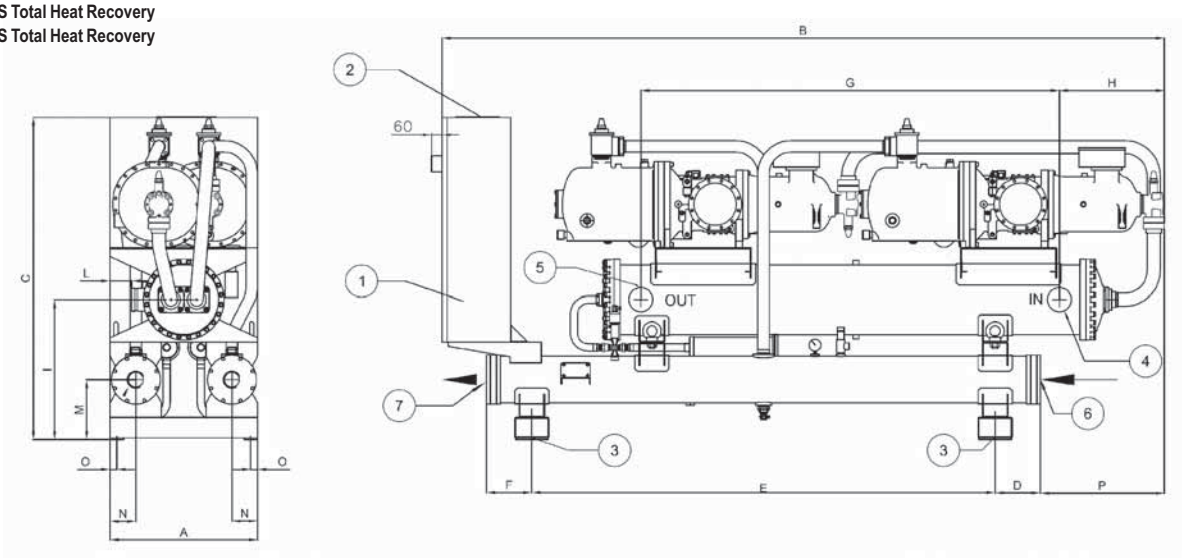
	Dimensions													
EWWD~G-	A	B	C	D	E	F	G	H	I	L	M	N	O	P
170-210G-SS	860	3435	1860	818	1800	610	2526	564	350	77	350	190	40	87
260-300G-SS	860	3435	1860	818	1800	610	2486	564	350	33	350	190	40	87
190-320G-XS	860	3435	1860	850	1800	580	2486	564	350	33	350	190	40	57

LEGEND

1 - Electrical Panel
2 - Power connections slot 150x260
3 - Four (4) holes Ø25 for isolator mounting
4 - Evaporator water inlet (Victaulic connection)
5 - Evaporator water outlet (Victaulic connection)
6 - Condenser water inlet connection
7 - Condenser water oulet connection

DMN_1-2-3-4-5-6_Rev.00_5

EWWD320~600G-SS Total Heat Recovery
EWWD380~460G-XS Total Heat Recovery



	Dimensions														
EWWD~G-	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q
320-420G-SS	860	4220	1880	264	2700	264	2486	564	815	127	350	75	40	612	150
460-600G-SS, 380G-XS	860	4220	1880	264	2700	264	2450	582	815	127	350	75	40	612	150
400-460G-XS	1020	4245	1935	264	2700	264	2412	601	815	187	350	110	40	612	200

LEGEND

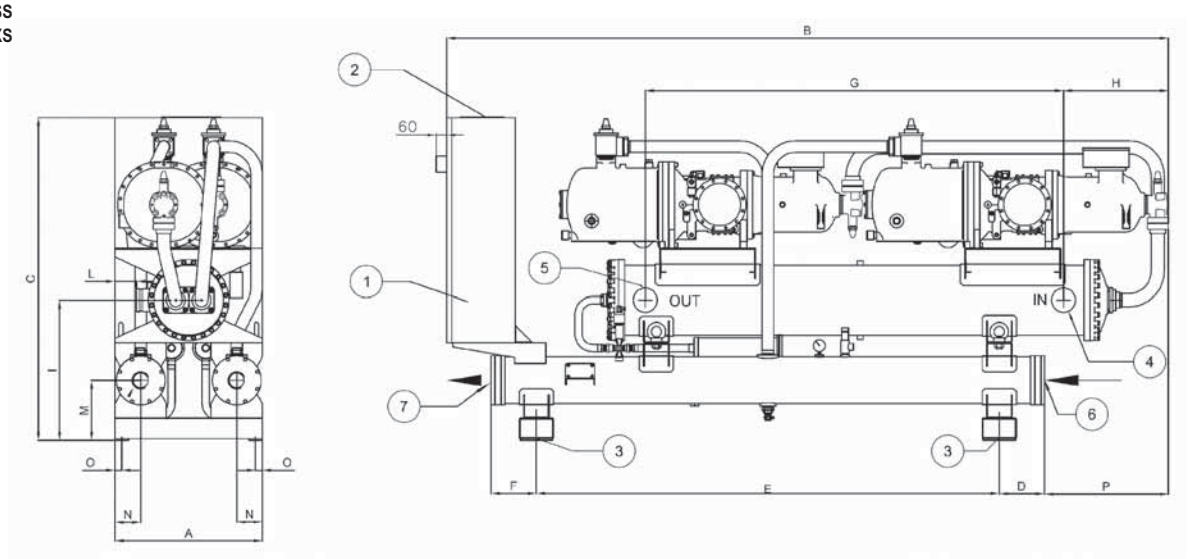
1 - Electrical Panel
2 - Power connections slot 150x260
3 - Four (4) holes Ø25 for isolator mounting
4 - Evaporator water inlet (Victaulic connection)
5 - Evaporator water outlet (Victaulic connection)
6 - Condenser water inlet connection
7 - Condenser water oulet connection

DMN_1-2-3-4-5-6_Rev.00_4

7 Dimensional drawings

7 - 1 Dimensional Drawings

EWWD320~600G-SS
EWWD380~650G-XS



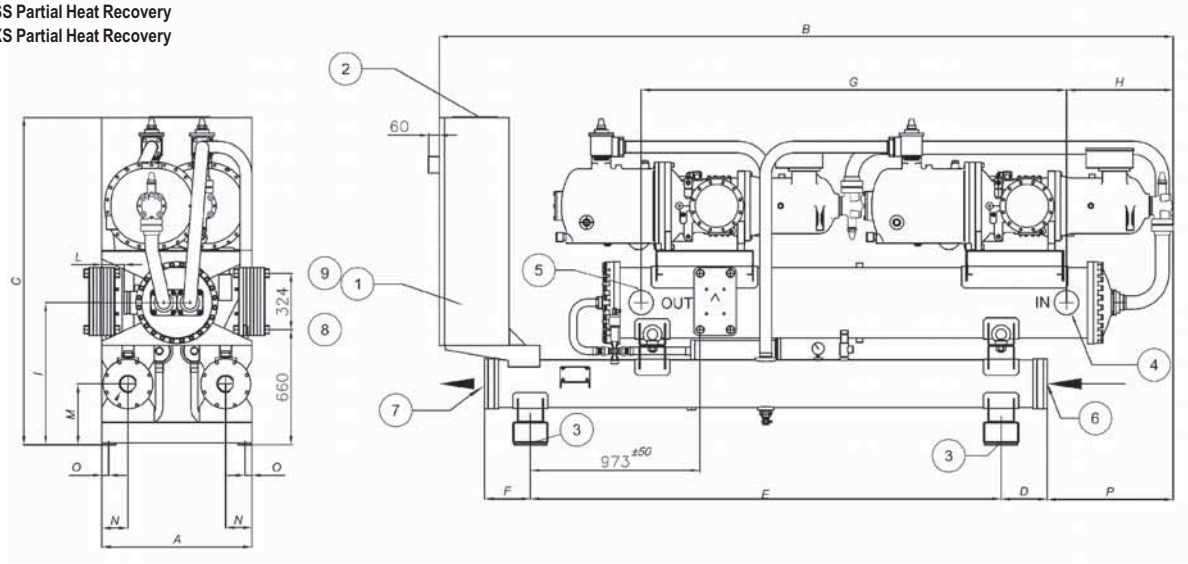
	Dimensions													
EWWD~G-	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**L**	**M**	**N**	**O**	**P**
320-420G-SS	860	4245	1880	264	2700	264	2486	564	815	127	350	190	40	723
460-600G-SS, 380G-XS	860	4245	1880	264	2700	264	2450	582	815	122	350	190	40	723
400-460G-XS	860	4245	1880	264	2700	264	2412	601	815	122	350	190	40	723
500-650G-XS	860	4245	1880	264	2700	264	2412	601	815	110	350	190	40	723

LEGEND

1 - Electrical Panel
2 - Power connections slot 150x260
3 - Four (4) holes Ø25 for isolator mounting
4 - Evaporator water inlet (Victaulic connection)
5 - Evaporator water outlet (Victaulic connection)
6 - Condenser water inlet connection
7 - Condenser water oulet connection

DMN_1-2-3-4-5-6_Rev.00_2

EWWD320~600G-SS Partial Heat Recovery
EWWD380~650G-XS Partial Heat Recovery



	Dimensions													
EWWD~G-	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**L**	**M**	**N**	**O**	**P**
320-420G-SS	860	4245	1880	264	2700	264	2486	564	815	127	350	190	40	723
460-600G-SS, 380G-XS	860	4245	1880	264	2700	264	2450	582	815	122	350	190	40	723
400-460G-XS	860	4245	1880	264	2700	264	2412	601	815	122	350	190	40	723
500-650G-XS	860	4245	1880	264	2700	264	2412	601	815	110	350	190	40	723

LEGEND

1 - Electrical Panel
2 - Power connections slot 150x260
3 - Four (4) holes Ø25 for isolator mounting
4 - Evaporator water inlet (Victaulic connection)
5 - Evaporator water outlet (Victaulic connection)
6 - Condenser water inlet connection
7 - Condenser water oulet connection

DMN_1-2-3-4-5-6_Rev.00_6

8 Sound data

8 - 1 Sound Level Data

Noise Level

EWWD~G-SS	EWWD~G-XS	Sound pressure level at 1 m from the unit in semispheric free field (rif. 2 x 10^{-5} Pa)									Power
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
170	190	58.0	58.0	63.5	68.5	63.0	64.0	53.0	49.5	**69.7**	**87.7**
210	230	58.0	58.0	63.5	68.5	63.0	64.0	53.0	49.5	**69.7**	**87.7**
260	280	58.0	58.0	63.5	68.5	63.0	64.0	53.0	49.5	**69.7**	**87.7**
300	320	58.0	58.0	63.5	68.5	63.0	64.0	53.0	49.5	**69.7**	**87.7**
320	380	60.0	60.0	65.5	70.5	65.0	66.0	55.0	51.5	**71.7**	**90.2**
380	400	60.0	60.0	65.5	70.5	65.0	66.0	55.0	51.5	**71.7**	**90.2**
420	460	60.0	60.0	65.5	70.5	65.0	66.0	55.0	51.5	**71.7**	**90.2**
460	500	60.0	60.0	65.5	70.5	65.0	66.0	55.0	51.5	**71.7**	**90.2**
500	550	60.0	60.0	65.5	70.5	65.0	66.0	55.0	51.5	**71.7**	**90.2**
600	650	60.0	60.0	65.5	70.5	65.0	66.0	55.0	51.5	**71.7**	**90.2**

NOTES

Note: The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation

EWWD~G-SS +OPLN	EWWD~G-XS +OPLN	Sound pressure level at 1 m from the unit in semispheric free field (rif. 2 x 10^{-5} Pa)									Power
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
170	190	55.9	55.2	59.6	63.9	57.7	58.5	47.7	44.2	**64.7**	**82.7**
210	230	55.9	55.2	59.6	63.9	57.7	58.5	47.7	44.2	**64.7**	**82.7**
260	280	55.9	55.2	59.6	63.9	57.7	58.5	47.7	44.2	**64.7**	**82.7**
300	320	55.9	55.2	59.6	63.9	57.7	58.5	47.7	44.2	**64.7**	**82.7**
320	380	57.9	57.2	61.6	65.9	59.7	60.5	49.7	46.2	**66.7**	**85.2**
380	400	57.9	57.2	61.6	65.9	59.7	60.5	49.7	46.2	**66.7**	**85.2**
420	460	57.9	57.2	61.6	65.9	59.7	60.5	49.7	46.2	**66.7**	**85.2**
460	500	57.9	57.2	61.6	65.9	59.7	60.5	49.7	46.2	**66.7**	**85.2**
500	550	57.9	57.2	61.6	65.9	59.7	60.5	49.7	46.2	**66.7**	**85.2**
600	650	57.9	57.2	61.6	65.9	59.7	60.5	49.7	46.2	**66.7**	**85.2**

NOTES

Note: The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation

NSL_1-2_Rev.00_1

8 Sound data

8 - 1 Sound Level Data

Sound pressure reduction values for different distances

EWWD~G-SS	EWWD~G-XS	Distance					
		1m	5m	10m	15m	20m	25m
170	190	0.0	-8.7	-13.7	-16.9	-19.2	-21.1
210	230	0.0	-8.7	-13.7	-16.9	-19.2	-21.1
260	280	0.0	-8.7	-13.7	-16.9	-19.2	-21.1
300	320	0.0	-8.7	-13.7	-16.9	-19.2	-21.1
320	380	0.0	-8.7	-13.7	-16.9	-19.2	-21.1
380	400	0.0	-8.4	-13.4	-16.5	-18.8	-20.6
420	460	0.0	-8.3	-13.3	-16.4	-18.7	-20.5
460	500	0.0	-8.3	-13.3	-16.4	-18.7	-20.5
500	550	0.0	-8.3	-13.3	-16.4	-18.7	-20.5
600	650	0.0	-8.3	-13.3	-16.4	-18.7	-20.5

NOTES

The values are dB(A) (pressure level).

NSL_1-2_Rev.00_2

9 Installation

9 - 1 Installation Method

Installation notes

Warning

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

Handling

The chiller is mounted on heavy wooden skids to protect the unit from accidental damage and to permit easy handling and moving. It is recommended that all moving and handling be performed with the skids under the unit when possible and that the skids not be removed until the unit is in the final location.

If the unit must be hoisted, it is necessary to lift the unit by attaching cables or chains at the lifting holes in the evaporator tube sheets. Spreader bars must be used to protect the control cabinet and the other areas of the chiller.

Location

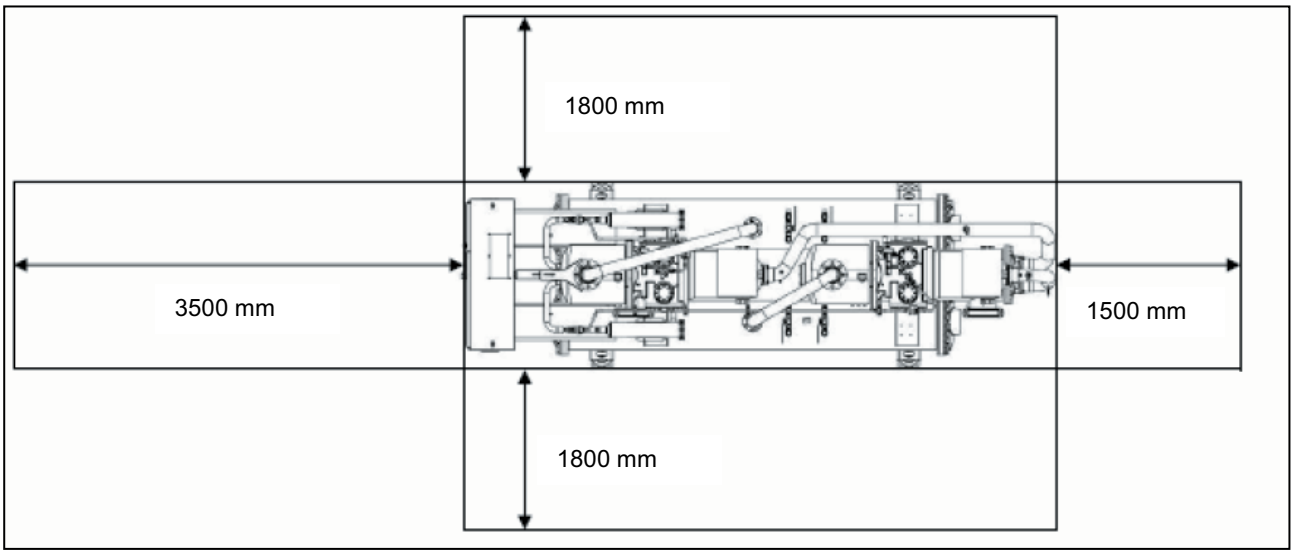
A leveled and sufficiently strong floor is required. If necessary, additional structural members should be provided to transfer the weight of the unit to the nearest beams.

Rubber-in-shear isolators can be furnished and field placed under each corner of the package. A rubber anti–skid pad should be used under isolators if hold-down bolts are not used. Vibration isolator in all water piping connected to the chiller is recommended to avoid straining the piping and transmitting vibration and noise.

Minimum space requirements

Every side of the machine must be accessible for all post-installation maintenance activities. The minimum space required is shown on the following drawing.

Minimum clearance requirements for machine maintenance

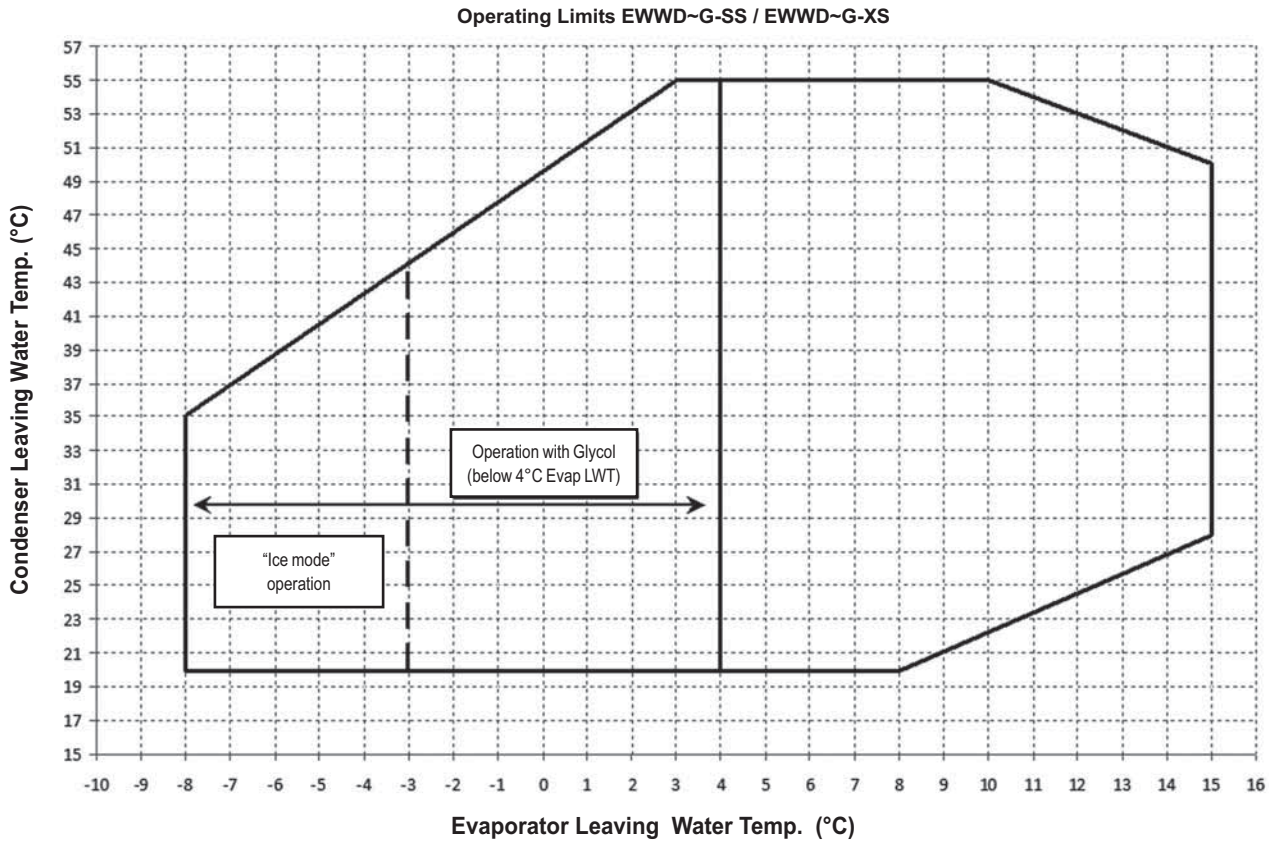


INN_1_Rev.00_1

10 Operation range

10 - 1 Operation Range

EWWD~G-SS / XS



OPL_1-2-3-4-5_Rev.00_1

10 Operation range

10 - 1 Operation Range

Table 1 - Evaporator minimum and maximum water Δt

Max evaporator water Δt	°C	8
Min evaporator water Δt	°C	4
Min condenser water Δt (1 pass, 2 passes, Δt 4÷8°C)	°C	4
Max condenser water Δt (1 pass, 2 passes, Δt 4÷8°C)	°C	8

Table 2 - Evaporator fouling factors

Fouling factors m² °C / kW	Cooling capacity correction factor	Power input correction factor	EER correction factor
0.0176	1.000	1.000	1.000
0.0440	0.978	0.986	0.992
0.0880	0.957	0.974	0.983
0.1320	0.938	0.962	0.975

Table 3 - Condenser fouling factors

Fouling factors m² °C / kW	Cooling capacity correction factor	Power input correction factor	EER correction factor
0.0176	1.000	1.000	1.000
0.0440	0.978	0.986	0.992
0.0880	0.957	0.974	0.983
0.1320	0.938	0.962	0.975

Table 4.1 - Minimum glycol percentage for low water temperature

Evaporator Leaving Water Temperature (°C)	2	0	-2	-4	-6	-8
Ethylene glycol (%)	10	20	20	20	30	30
Propylene glycol (%)	10	20	20	30	30	30

Note: Minimum glycol percentage to be used with evaporator leaving water temperature below 4°C to prevent freezing of water circuit.

Table 4.2 Minimum glycol percentage for low air ambient temperature

Air Ambient Temperature (°C) (2)	-3	-8	-15	-23	-35
Ethylene glycol (%) (1)	10%	20%	30%	40%	50%
Air Ambient Temperature (°C) (2)	-3	-7	-12	-20	-32
Propylene glycol (%) (1)	10%	20%	30%	40%	50%

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

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

Table 5 - Correction factors for low evaporator leaving water temperature

Evaporator Leaving Water Temperature (°C)	2	0	-2	-4	-6	-8
Cooling Capacity	0.842	0.785	0.725	0.670	0.613	0.562
Compressor Power Input	0.950	0.940	0.920	0.890	0.870	0.840

Note: Correction factors have to be applied at working conditions: evaporator leaving water temperature 7°C.

Table 6 - Correction factors for water and glycol mixture

	Ethylene Glycol (%)	10%	20%	30%	40%	50%
Ethylene Glycol	Cooling Capacity	0.991	0.982	0.972	0.961	0.946
	Compressor Power Input	0.996	0.992	0.986	0.976	0.966
	Flow Rate (Δt)	1.013	1.04	1.074	1.121	1.178
	Evaporator Pressure Drop	1.070	1.129	1.181	1.263	1.308
Propylene Glycol	Cooling Capacity	0.985	0.964	0.932	0.889	0.846
	Compressor Power Input	0.993	0.983	0.969	0.948	0.929
	Flow Rate (Δt)	1.017	1.032	1.056	1.092	1.139
	Evaporator Pressure Drop	1.120	1.272	1.496	1.792	2.128

OPL_1-2-3-4-5_Rev.00_2

10 Operation range

10 - 1 Operation Range

How to use the Correction factors proposed in the previous tables

A) Mixture Water and Glycol --- Evaporator leaving water temperature > 4°C

- depending from the type and percentage (%) of glycol filled in the circuit (see table 4.2 and 6)
- multiply the Cooling Capacity, the Compressor Power Input by the Correction factor of Table 6
- starting from this new value of Cooling Capacity, calculate the Flow Rate (l/s) and the Evaporator Pressure Drop (kPa)
- now multiply the new Flow Rate and the new Evaporator Pressure Drop by the Correction Factors of Table 6

Example

Unit Size:	**EWWD170G-SS**
Mixture:	Water
Working condition:	ELWT 12/7°C – CLWT30/35°C
- Cooling capacity:	166 kW
- Power input:	42 kW
- Flow rate (Δt 5°C):	7.91 l/s
- Evaporator pressure drop:	48 kPa
Mixture:	Water + Ethylene Glycol 30% (for a winter air temperature up to -15°C)
Working condition:	ELWT 12/7°C – CLWT 30/35°C
- Cooling capacity:	166 x 0.972 = 161 kW
- Power input:	42 x 0.986 = 41.4 kW
- Flow rate (Δt 5°C):	7.69 (referred to 161 kW) x 1.074 = 8.25 l/s
- Evaporator pressure drop:	52 (referred to 8.25 l/s) x 1.181 =61 kPa

B) Mixture Water and Glycol --- Evaporator leaving water temperature < 4°C

- depending from the type and percentage (%) of glycol filled in the circuit (see table 4.1 and 4.2 and table 6)
- depending from the evaporator leaving water temperature (see table 5)
- multiply the Cooling Capacity, the Compressor Power Input by the Correction factor of Table 5 and Table 6
- starting from this new value of Cooling Capacity, calculate the Flow Rate (l/s) and the Evaporator Pressure Drop (kPa)
- now multiply the new Flow Rate and the new Evaporator Pressure Drop by the Correction Factors of Table 6

Example

Unit Size:	**EWWD170G-SS**
Mixture:	Water
Standard working condition	ELWT 12/7°C – CLWT 35/40°C
- Cooling capacity:	158 kW
- Power input:	47 kW
- Flow rate (Δt 5°C):	7.57 l/s
- Evaporator pressure drop:	44
Mixture:	Water + Glycol 30% (for a low evaporator leaving temperature of -1/-6°C)
Working condition:	ELWT 0/-5°C – CLWT 35/40°C
- Cooling capacity:	158 x 0.670 x 0.972 = 103 kW
- Power input:	47 x 0.890 x 0.986 = 41.2 kW
- Flow rate (Δt 5°C):	4.92 l/s (referred to103 kW) x 1.074 = 5.29 l/s
- Evaporator pressure drop:	23 kPa (referred to 5.29 l/s) x 1.181 = 27kPa

OPL_1-2-3-4-5_Rev.00_3

10 Operation range

10 - 1 Operation Range

Water charge, flow and quality

Items (1) (5)			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	6.0 ~ 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 40	Below 30	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 400)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl^{2}-/l]	Below 200	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO^{2}-4/l]	Below 200	Below 50	Below 50	Below 50	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 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mg$CaCO_3$/l]	Below 200	Below 70	Below 70	Below 70	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
Items to be referred to	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	[mg$NH+_4$/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

NOTES

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.

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10 Operation range

10 - 1 Operation Range

Water content in cooling circuits

The cooled water distribution circuits should have minimum water content to avoid excessive compressors start and stop.
In fact, each time the compressor starts up, an excessive quantity of oil goes from the compressor sump and simultaneously there is a rise in the temperature of the compressor motor's stator due to the inrush current during the start-up.
To prevent damage to the compressors, it has been envisaged the application of a device to limit frequent stops and restarts.

During the span of one hour there will be no more than 6 starts of the compressor. The plant side should therefore ensure that the overall water content allows a more constant functioning of the unit and consequently greater environmental comfort.
The minimum water content per unit should be calculated using this simplified formula:

For 1 compressor unit
M (liters) = (0.94 x ΔT(°C) + 5.87) x P(kW)

For 2 compressors unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(kW)

where:

M	minimum water content per unit expressed in litres
P	Cooling Capacity of the unit expressed in kW
ΔT	evaporator entering / leaving water temperature difference expressed in °C

This formula is valid for:
- standard microprocessor parameters

For more accurate determination of quantity of water, it is advisable to contact the designer of the plant.

OPL_1-2-3-4-5_Rev.00_5

11 Hydraulic performance

11 - 1 Water Pressure Drop Curve Evaporator/Condenser

Evaporating Pressure Drops

EWWD~G-SS

Size	170	210	260	300	320	380	420	460	500	600
Cooling Capacity (kW)	166	201	253	280	334	372	403	448	494	556
Water Flow (l/s) - Evaporator	7.93	9.60	12.1	13.4	16.0	17.8	19.3	21.4	23.6	26.6
Evaporator Pressure Drops (kPa)	48	69	43	53	64	63	72	54	54	68
Water Flow (l/s) - Condenser	9.95	12.0	15.2	17.0	20.0	22.2	24.1	26.9	29.8	33.7
Condenser Pressure Drops (kPa)	39	41	63	77	40	41	41	50	60	75

Water flow and pressure drop referred to nominal condition: evaporator water in/out: 12/7°C – condenser water in/out: 30/35°C

EWWD~G-XS

Size	190	230	280	320	380	400	460	500	550	650
Cooling Capacity (kW)	186	223	277	307	366	408	444	496	541	604
Water Flow (l/s) - Evaporator	8.89	10.7	13.2	14.7	17.5	19.5	21.2	23.7	25.8	28.9
Evaporator Pressure Drops (kPa)	25	35	35	44	30	24	28	39	46	57
Water Flow (l/s) - Condenser	10.8	13.0	16.1	18.1	21.3	23.7	25.8	28.7	31.3	35.4
Condenser Pressure Drops (kPa)	17	20	25	28	17	17	17	16	15	19

Water flow and pressure drop referred to nominal condition: evaporator water in/out: 12/7°C – condenser water in/out: 30/35°C

EPD_1-2_Rev.00_1

Evaporator and Condenser Pressure Drops

To determinate the evaporator or condenser pressure drop for different versions or at different working condition, please refer to the following formula:

$$PD_2\ (kPa) = PD_1\ (kPa) \times \left(\frac{Q_2\ (l/s)}{Q_1\ (l/s)} \right)^{1.8}$$

where:

PD_2 Pressure drop to be determinated (kPa)
PD_1 Pressure drop at nominal condition (kPa)
Q_2 water flow at new working condition (l/s)
Q_1 water flow at nominal condition (l/s)

How to use the formula: Example (evaporator)

The unit EWWD170G-SS has been selected for working at the following conditions:
- evaporator water in/out: 11/6°C
- condenser water in/out: 28/33°C

The cooling capacity at these working conditions is: 163 kW
The water flow at these working conditions is: 9.71 l/s

The unit EWWD170G-SS at nominal working conditions has the following data:
- evaporator water in/out: 12/7°C
- condenser water in/out: 30/35°C

The cooling capacity at these working conditions is: 166 kW
The water flow at these working conditions is: 7.90 l/s
The pressure drop at these working conditions is: 48 kPa

The evaporator pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 48\ (kPa) \times \left(\frac{7.80\ (l/s)}{7.91\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 47\ (kPa)$$

NOTE - Important
If the calculated evaporator water pressure drop is below 10 kPa or above 100 kPa please contact the factory for dedicated evaporator.

EPD_1-2_Rev.00_2

11 Hydraulic performance

11 - 2 Partial Heat Recovery Pressure Drop

Partial Heat Recovery pressure drops

EWWD~G-SS	170	200	250	280	330	370	400	450	490	560
EWWD~G-XS	190	220	280	310	370	410	440	500	540	600
Heating Capacity (kW)	21	22	35	48	42	43	44	57	70	96
Water Flow (l/s)	1.00	1.05	1.7	2.3	2.0	2.1	2.1	2.7	3.3	4.6
Heat Recovery Pressure Drops (kPa)	2	1	2	3	2	1	1	1	2	3

NOTES

Water flow and pressure drop referred to nominal codition: evaporator water in/out: 12/7°C – condenser water in/out:30/35°C – water heat recovery in/out 40/45°C

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11 Hydraulic performance

11 - 3 Total Heat Recovery Pressure Drop

Total Heat Recovery pressure drops

EWWD~G-SS

EWWD~G-SS	170	200	250	280	330	370	400	450	490	560
Heating Capacity (kW)	201	244	307	351	404	450	487	545	603	691
Water Flow (l/s)	9.58	11.63	14.7	16.8	19.3	21.5	23.3	26.0	28.8	33.0
Heat Recovery Pressure Drops (kPa)	36	39	59	76	37	39	38	47	56	72

NOTES

Water flow and pressure drop referred to nominal codition: evaporator water in/out: 12/7°C – condenser water in/out:30/35°C – water heat recovery in/out 40/45°C

EWWD~G-XS

EWWD~G-XS	190	220	280	310	370	410	440	500	540	600
Heating Capacity (kW)	216	260	321	368	426	474	516	575	627	720
Water Flow (l/s)	10.32	12.4	15.4	17.6	20.4	22.6	24.6	27.5	30.0	34.4
Heat Recovery Pressure Drops (kPa)	16	18	23	29	15	16	15	15	14	18

NOTES

Water flow and pressure drop referred to nominal codition: evaporator water in/out: 12/7°C – condenser water in/out:30/35°C – water heat recovery in/out 40/45°C

OPT_1-2-3-4-5-6_Rev.00_4

Total and Partial Heat Recovery Pressure Drops

To determinate the pressure drop for different versions or at different working condition, please refer to the following formula:

$$PD_2\ (kPa) = PD_1\ (kPa) \times \left(\frac{Q_2\ (l/s)}{Q_1\ (l/s)} \right)^{1.80}$$

where:

PD_2 Pressure drop to be determinate (kPa)
PD_1 Pressure drop at nominal condition (kPa)
Q_2 water flow at new working condition (l/s)
Q_1 water flow at nominal condition (l/s)

How to use the formula: Example

The unit EWWD170G-SS has been selected for working at the following conditions:
- evaporator water in/out: 12/7°C
- condenser water in/out: 30/35°C
- Partial heat recovery leaving water temperature 45/50°C

The heating capacity at these working conditions is: 10 kW
The water flow at these working conditions is: 0.48 l/s

The unit EWWD170G-SS at nominal working conditions has the following data:
- evaporator water in/out: 12/7°C
- condenser water in/out: 30/35°C
- Partial heat recovery leaving water temperature 40/45°C

The heating capacity at these working conditions is: 21 kW
The water flow at these working conditions is: 1.00 l/s
The pressure drop at these working conditions is: 2 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 2\ (kPa) \times \left(\frac{0.48\ (l/s)}{1.0\ (l/s)} \right)^{1.80}$$

$$PD_2\ (kPa) = 1\ (kPa)$$

OPT_1-2-3-4-5-6_Rev.00_6

12 Specification text

12 - 1 Specification Text

Technical Specification for Water Cooled Screw Chiller

GENERAL

The water cooled screw chiller will be designed and manufactured in accordance with 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 Stds	UNI – EN ISO 9001:2004

The unit will be tested at full load in the factory at the nominal working conditions and water temperatures. Before shipment a full test will be held to avoid any losses.

Chiller will be delivered to the job site completely assembled and charged with right refrigerant and oil quantity.
Comply with the manufacturer instructions for rigging and handling equipment.

The unit will be able to start up and operate as standard at full load and condenser entering fluid temperature from …. °C to …. °C with an evaporator leaving fluid temperature between …. °C and …. °C.

All units published performances have to be certified by **Eurovent**.

REFRIGERANT

Only R-134a will be accepted.

PERFORMANCE

- ✓ Number of water cooled screw chiller: .....
- ✓ Cooling capacity for single water cooled screw chiller: ..... kW
- ✓ Power input for single water cooled screw chiller in cooling mode: ..... kW
- ✓ Shell & tube evaporator entering water temperature in cooling mode: ..... °C
- ✓ Shell & tube evaporator leaving water temperature in cooling mode: ..... °C
- ✓ Shell & tube evaporator water flow: ..... l/s
- ✓ Shell & tube condenser entering water temperature in cooling mode: ..... °C
- ✓ Shell & tube condenser leaving water temperature in cooling mode: ..... °C
- ✓ Shell & tube condenser water flow: ..... l/s
- ✓ The unit should work with electricity in range 400V ±10%, 3ph, 50Hz without neutral and shall only have one power connection point.

UNIT DESCRIPTION

Chiller shall include as standard: 1 or 2 independent refrigerant circuits, semi-hermetic rotary single screw compressors, refrigerant direct expansion shell & tube heat exchangers, R-134a refrigerant, lubrication system, motor starting components, control system and all components necessary for safe and stable unit operation.

NOISE 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 unacceptable. Vibration level should not exceed 2 mm/s.

DIMENSIONS

Unit dimensions shall not exceed following indications:

- ✓ unit length ..... mm,
- ✓ unit width ..... mm,
- ✓ unit height ..... mm.

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12 Specification text

12 - 1 Specification Text

CHILLER 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 external, 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.
- ✓ 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.
- ✓ 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 slide valve's position and the instantaneous RPM value of the motor.
- ✓ The unit capacity control shall be infinitely modulating, from 100% down to 25% for each circuit (from 100% down to 12.5% of full load for unit with 2 compressors). The chiller shall be capable of stable operation to a minimum of 12.5% of full load without hot gas bypass.
- ✓ 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 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:
    - o High condenser pressure
    - o Low evaporation refrigerant temperature
    - o High compressor motor amps

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 evaporator will have 2 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.

SPC_1-2-3_Rev.00_2

12 Specification text

12 - 1 Specification Text

Condensers

- ✓ Condensers will be shell and cleanable, through-tube type.
- ✓ The unit will have one condenser per circuit.
- ✓ Each condenser shall have a carbon steel and seamless, integrally finned high efficiency copper tubes, roll expanded into heavy carbon steel tube sheets.
- ✓ Water heads shall be removable and include vent and drain plugs.
- ✓ Condensers will come complete with liquid shut-off valve, spring loaded relief valve.

Refrigerant circuit

Each circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, suction line shut-off valve, replaceable core filter-drier, sight glass with moisture indicator and insulated suction line.

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 shall be Wye-Delta type as standard.
- ✓ 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, using the following options:

- RS485 Serial card
- RS232 Serial card
- LonWorks interface to FTT10A Transceiver.
- Bacnet Compatible
- Use of Compass Points (manufactured by North Communications) to allow communications with such as Honeywell, Satchwell, Johnson Controls, Trend etc.

SPC_1-2-3_Rev.00_3

Daikin's unique position as a manufacturer of air conditioning equipment, compressors and refrigerants has led to its close involvement in environmental issues. For several years Daikin has had the intention to become a leader in the provision of products that have limited impact on the environment. This challenge demands the eco design and development of a wide range of products and an energy management system, resulting in energy conservation and a reduction of waste.

Daikin Europe N.V. participates in the Eurovent Certification programme for Air conditioners (AC), Liquid Chilling Packages (LCP) and Fan coil units (FCU). Check ongoing validity of certificate online: www.eurovent-certification.com or using: www.certiflash.com"

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