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EWWD-BJYNN

1 Specifications

1-1 TECHNICAL SPECIFICATIONS				EWWD380 BJYNN	EWWD460 BJYNN	EWWD550 BJYNN	EWWD750 BJYNN	EWWD850 BJYNN	EWWD900 BJYNN	EWWDC10 BJYNN	EWWDC11 BJYNN
Capacity (Eurovent)	Cooling	Nominal	kW	369	445	521	734	816	895	976	1050
Capacity Steps			%	stepless 25-100			stepless 12.5-100				
Nominal input (Eurovent)	Cooling		kW	65	77.9	90	129	142	155	167	180
EER				5.68	5.71	5.79	5.65	5.71	5.77	5.81	5.83
ESEER				6.44	6.47	6.56	7.16	7.23	7.32	7.37	7.40
Dimensions	Unit	Height	mm	2250			2300				
		Width	mm	3625	3860	3860	4145	4145	4145	4145	4145
		Depth	mm	1551	1551	1551	1743	1743	1808	1910	1910
Weight	Machine weight		kg	3089	3370	3603	5546	5636	6007	6448	6598
	Operating Weight		kg	3250	3588	3870	5911	6045	6460	6972	7163
Water Heat Exchanger	Minimum water volume in the system (Formula)			The minimum water content per unit should be calculated with a certain approximation using this simplified formula: Q= 35.83 X (P(kW) / Δ T(°C)) X (1/ N) where : Q = minimum water content per unit expressed in litres P = minimum cooling capacity of the unit expressed in kW ΔT = evaporator entering / leaving water temperature difference expressed in °C N = Number of compressors For more accurate determination of quantity of water, it is advisable to contact the designer of the plant.							
Water Heat Exchanger Evaporator	Type			Flooded shell and tube							
	Minimum water volume in the system		l	78	107	134	184	210	210	281	302
	Water flow rate	Min	l/min	565	615	776	932	1216	1209	1382	1632
		Nominal	l/min	1058	1276	1494	2104	2339	2566	2798	3010
		Max	l/min	1788	1945	2455	2946	3846	3825	4370	5162
	Nominal water pressure drop	Cooling	kPa	35	43	37	51	37	45	41	34
	Model	Quantity		1	1	1	1	1	1	1	1
Water Heat Exchanger Condenser	Minimum water volume in the system		l	83	111	133	181	199	243	243	263
	Water flow rate	Min	l/min	665	948	1086	1478	1703	1904	1924	2146
		Nominal	l/min	1244	1499	1752	2474	2746	3010	3277	3526
		Max	l/min	2103	2998	3435	4675	5386	6020	6085	6786
	Nominal water pressure drop	Heating	kPa	35	25	26	28	26	25	29	27
	Model	Quantity		1	1	1	1	1	1	1	1
	Type			Shell and tube							
Compressor	Type			Semi-hermetic single screw compressor							
	Refrigerant oil type			Mobil Artic 68							
	Refrigerant oil charge		l	30	30	30	60	60	60	60	60
	Model	Quantity		1	1	1	2	2	2	2	2
		Model		HSW205	HSW220	HSW235	HSW205	HSW205	HSW220	HSW220	HSW235
		Speed	rpm	2950	2950	2950	2950	2950	2950	2950	2950
		Crankcase Heater	W	400 (115V)							
Sound Level	Sound Pressure	Cooling	dBA	78	79	80	81	81.5	82	82.5	83
Refrigerant circuit	Refrigerant type			R-134a							
	Refrigerant charge		kg	210	190	180	220	250	300	300	300
	No of circuits			1	1	1	1	1	1	1	1
	Refrigerant control			Electronic expansion valve							
Piping connections	Evaporator water drain			1/2'' gas							

1 Specifications

1-1 TECHNICAL SPECIFICATIONS	EWWD380 BJYNN	EWWD460 BJYNN	EWWD550 BJYNN	EWWD750 BJYNN	EWWD850 BJYNN	EWWD900 BJYNN	EWWDC10 BJYNN	EWWDC11 BJYNN
Safety Devices	High pressure (pressure switch) 1/2 NPT - 24.5							
	Low pressure (pressure switch) 1/2 NPT - 14.5							
	Compressor thermal							
	High discharge temperature on the compressor							
	Phase monitor							
	Star/delta transition failed							
	Low delta pressure between suction and discharge							
Notes	Nominal cooling capacity and power input are based on: 12/7 °C entering/leaving evaporator water temperature; 30/35 °C entering/leaving condenser water temperature.							
	Unit length includes modulating condenser water flow valve.							

1-2 ELECTRICAL SPECIFICATIONS				EWWD380 BJYNN	EWWD460 BJYNN	EWWD550 BJYNN	EWWD750 BJYNN	EWWD850 BJYNN	EWWD900 BJYNN	EWWDC10 BJYNN	EWWDC11 BJYNN
Power Supply	Name			YN							
	Phase			3	3	3	3	3	3	3	3
	Frequency		Hz	50	50	50	50	50	50	50	50
	Voltage		V	400	400	400	400	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%							
		Maximum	%	+10%							
Unit	Starting Current		A	367	367	367	535	550	561	575	588
	Nominal Running Current Cooling		A	112	129	148	224	244	258	277	295
	Maximum Running Current		A	137	178	205	302	331	357	385	410
	Max unit current for wires sizing		A	142	183	210	307	336	362	390	415
Compressor	Starting method			Star-delta							
Notes	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.										
	Max unit starting current: Absorbed current of compressor n°1 at 75% + starting current of the other compressor.										
	Max unit current for wires sizing : compressor FLA (Full Load Ampere) + fans current.										

Notes:

1 Nominal cooling capacity at Eurovent conditions: Entering/Leaving water evaporator = 12°C/7°C; Condensing temperature = 45°C.

2 Nominal power input at Eurovent conditions: See Eurovent 6/C/003 Entering/Leaving water temperature = 12°C/7°C - condensing temperature = 45°C.

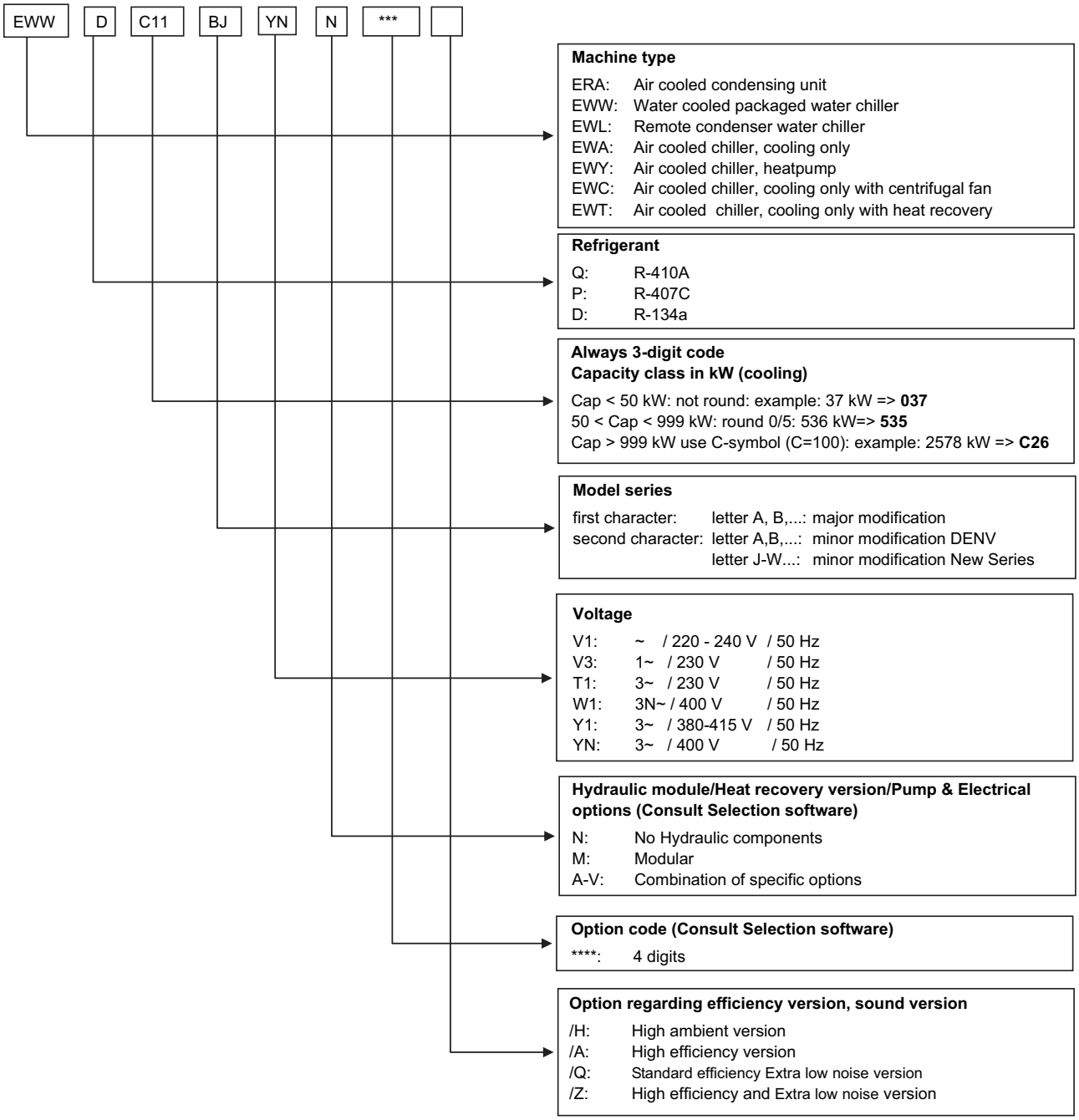
3 Minimum required water volume for standard thermostat settings and at nominal conditions.

4 Piping connections are delivered with vitaulic joints and counterpipe for welding.

5 Values between brackets including installation space of delivered filter.

2 Nomenclature

EWWD-BJYNN



3 Specification text

To supply and install, where specified in the project n ..... unit(s) water cooled chiller with cooling capacity of ..... kW, to cool ..... l/sec. of water from ..... °C to ....., condenser entering water temperature ….°C, condenser leaving water temperature ….°C. The unit should work with electricity at ..... V, 3ph, 50Hz. The electrical power absorbed should not exceed ..... kW. The units COP will be at least ..... at the working conditions of the project. Part load COP will be at least ..... at the working conditions of the project. For the units with 1 or 2 compressors the chillers will have only one refrigerant circuit, and the electronic microprocessor will allow the starting of the compressors. Each chiller will be factory assembled on a robust baseframe. 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, and the units will be filled with oil and refrigerant.

REFRIGERANT

Only R-134a will be accepted.

NOISE LEVEL AND VIBRATIONS

Sound pressure level at 1 meter distance in free field shall not exceed ……dBA
Vibration level should not exceed 2 mm/s.
Units will have the following components:

COMPRESSORS

The compressor should be single screw type with one main screw rotor that meshes with two diametrically opposed gaterotors. The two exactly opposed gaterotors create two exactly opposed compression cycles which results in balanced forces acting on the compressor. The gaterotors should be constructed of a carbon impregnated engineered composite material. The gaterotor supports will be constructed of cast iron. The semi-hermetic compressor should be gas-cooled.

Oil injection shall be used for this compressor in order to get high COP at high condensing pressure. The unit should be provided with an oil separator and it will be the high efficiency, augmented gas impingement type to maximise oil extraction.

EVAPORATOR

The units will be supplied with shell-and-tube flooded type evaporator (refrigerant flow in the shell and water flow in tubes). Replaceable tubes will be fabricated from integral finned copper and mechanically bonded to steel tube sheet. Refrigerant side will be PED designed, constructed, inspected and stamped. Water side working pressure should be designed for 10,5 bar. Vessels will include spring loaded pressure relief valves. Shell and non-connection water heads will be insulated with 3/4 ” thick closed cell insulation.

CONDENSER

Condenser will be shell-and-tube type operating with refrigerant in shell and water in tubes. Replaceable water tubes should be fabricated from integral finned copper and mechanically bonded to steel tube sheets. Condenser will be designed to conform PED. Water side working pressure should be designed for 10.5 bar.

SERVO CONTROLLED MODULATING LIQUID LEVEL REGULATORS

The refrigerant circuit will be equipped with a modulating servo-controlled main expansion valve type controlled by a pilot float valve type to perfectly modulate refrigerant flow to the evaporator, proportionally to the required capacity. This will ensure a stable regulation and economic operation, because pressure and temperature variations will be strongly reduced.

MODULATING CONDENSER WATER FLOW VALVE

It is factory mounted on condenser outlet water connection, in order to allow fast and safe unit starting. It is not supplied for condensers with water side pressures higher than 10 bar.

CONTROL PANEL

Field power connection, control interlock terminals, and unit control system should be centrally located in an electric panel (IP43). Power and starting controls should be separate from safety and operating controls in different compartments of the same panel. Starting will be star/delta type. Power and starting controls should include fuses and contactors for each compressor winding. Operating and safety controls should include energy saving control; emergency stop switch; overload protection for compressor motor; high and low pressure cut-out switch; compressor lead-lag switch (on 2 compressor units only); 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 calender and clock that will switch the unit ON/OFF during day time all year long.

REGULATION OF COOLING CAPACITY

Each unit will have a microprocessor for the control and operation of the unit that should have a infinitely variable capacity control down to 12,5% (two compressors) or to 25% (one compressor) of the cooling capacity.

REFRIGERANT PIPING

Refrigerant circuit should include a factory insulated suction line, manual liquid line shut-off valve with charging connection, refrigerant filter drier with replaceable core, sensor indicator, servo controlled liquid regulator and relief valve.

4 Options

OPTIONS

Ammeter and voltmeter (OP57) - Digital meters of unit drawn amperes and voltage values, installed on the electrical control panel.

Condenser power factor correction (OPPF) - Installed on the electrical control panel to ensure it conforms to the plant rules. (DAIKIN advices maximum 0,9).

Suction line shut off valve (OP12) - Suction shut-off valve installed on the suction port of the compressor to facilitate maintenance operation.

Cu-Ni 90-10 condenser (OPNI) - To work with sea water the heat exchangers are fitted with Cu-Ni tubes and special protection inside the end covers.

Witness tests - The units are normally 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).

Soft start (OPSS) - Electronic starting device to reduce inrush current.

5 Capacity tables

5 - 1 Cooling capacity tables

EWWD380-C11BJYNN

Unit size	LWE	ENTERING CONDENSER WATER TEMPERATURE - °C														
		25			30			35			40			45		
		CC	PI	COP	CC	PI	COP	CC	PI	COP	CC	PI	COP	CC	PI	COP
380	4	347	56	6,2	332	64	5,2	317	72	4,4	301	81	3,7	284	91	3,1
	5	359	57	6,3	344	64	5,4	329	72	4,5	312	81	3,8	295	91	3,2
	6	372	57	6,5	357	65	5,5	340	73	4,7	324	82	4,0	306	92	3,3
	7	385	57	6,7	369	65	5,7	353	73	4,8	335	82	4,1	318	92	3,5
	8	398	58	6,9	382	65	5,9	365	73	5,0	347	82	4,2	329	92	3,6
	9	411	58	7,1	395	65	6,0	377	74	5,1	359	83	4,4	341	92	3,7
	10	425	58	7,3	408	66	6,2	390	74	5,3	372	83	4,5	353	93	3,8
460	4	418	67	6,3	400	76	5,2	381	86	4,4	362	97	3,7	341	109	3,1
	5	433	67	6,4	415	77	5,4	395	87	4,6	375	98	3,8	354	110	3,2
	6	449	68	6,6	429	77	5,6	410	87	4,7	389	98	4,0	368	110	3,4
	7	464	68	6,8	445	78	5,7	424	88	4,8	403	98	4,1	381	110	3,5
	8	480	68	7,0	460	78	5,9	439	88	5,0	418	99	4,2	396	110	3,6
	9	497	69	7,2	476	78	6,1	455	88	5,2	433	99	4,4	410	111	3,7
	10	513	69	7,5	492	79	6,3	470	89	5,3	448	99	4,5	425	111	3,8
550	4	491	78	6,3	469	89	5,3	447	100	4,5	424	112	3,8	400	126	3,2
	5	508	79	6,5	486	89	5,4	463	100	4,6	440	113	3,9	416	126	3,3
	6	526	79	6,7	503	90	5,6	480	101	4,8	456	113	4,0	431	126	3,4
	7	544	79	6,9	521	90	5,8	497	101	4,9	473	113	4,2	447	127	3,5
	8	563	79	7,1	539	90	6,0	515	102	5,1	490	114	4,3	464	127	3,6
	9	582	80	7,3	558	91	6,2	533	102	5,2	507	114	4,4	481	128	3,8
	10	602	80	7,6	577	91	6,3	551	103	5,4	525	115	4,6	498	128	3,9
750	4	690	113	6,1	661	128	5,2	630	144	4,4	598	162	3,7	565	182	3,1
	5	715	114	6,3	685	129	5,3	653	145	4,5	621	163	3,8	587	183	3,2
	6	740	114	6,5	709	129	5,5	677	146	4,7	644	163	3,9	609	183	3,3
	7	766	115	6,7	734	130	5,7	701	146	4,8	667	164	4,1	631	184	3,4
	8	792	116	6,8	760	130	5,8	726	147	4,9	691	165	4,2	654	184	3,6
	9	818	116	7,0	785	131	6,0	751	147	5,1	715	165	4,3	678	185	3,7
	10	845	117	7,3	812	131	6,2	777	148	5,3	740	166	4,5	702	185	3,8
850	4	767	124	6,2	733	141	5,2	699	159	4,4	662	179	3,7	625	201	3,1
	5	795	125	6,4	760	142	5,4	724	160	4,5	688	180	3,8	649	202	3,2
	6	823	125	6,6	788	142	5,5	751	160	4,7	713	180	4,0	674	202	3,3
	7	852	126	6,8	816	143	5,7	778	161	4,8	739	181	4,1	699	203	3,5
	8	881	127	7,0	844	144	5,9	806	162	5,0	766	182	4,2	725	203	3,6
	9	911	127	7,2	874	144	6,1	834	162	5,1	794	182	4,4	752	204	3,7
	10	942	128	7,4	903	145	6,2	863	163	5,3	822	183	4,5	779	204	3,8
900	4	843	134	6,3	806	153	5,3	768	173	4,4	728	195	3,7	688	219	3,1
	5	873	135	6,5	835	154	5,4	796	174	4,6	756	195	3,9	714	219	3,3
	6	903	135	6,7	865	154	5,6	825	174	4,7	784	196	4,0	741	220	3,4
	7	935	136	6,9	895	155	5,8	854	175	4,9	812	197	4,1	768	220	3,5
	8	967	137	7,1	926	156	5,9	885	176	5,0	841	197	4,3	797	221	3,6
	9	1000	137	7,3	958	157	6,1	915	177	5,2	871	198	4,4	825	221	3,7
	10	1033	138	7,5	991	157	6,3	947	177	5,3	902	199	4,5	855	222	3,9
C10	4	918	146	6,3	878	166	5,3	836	187	4,5	793	210	3,8	749	236	3,2
	5	951	147	6,5	910	167	5,5	867	188	4,6	823	211	3,9	778	236	3,3
	6	984	147	6,7	942	168	5,6	899	189	4,8	854	212	4,0	807	237	3,4
	7	1019	148	6,9	976	168	5,8	931	190	4,9	885	213	4,2	837	238	3,5
	8	1054	149	7,1	1010	169	6,0	964	191	5,1	917	213	4,3	868	238	3,6
	9	1090	149	7,3	1045	170	6,2	998	191	5,2	950	214	4,4	900	239	3,8
	10	1126	149	7,5	1080	170	6,3	1032	192	5,4	983	215	4,6	932	240	3,9
C11	4	988	157	6,3	944	178	5,3	898	200	4,5	852	224	3,8	804	252	3,2
	5	1024	158	6,5	978	179	5,5	932	201	4,6	884	225	3,9	835	253	3,3
	6	1060	158	6,7	1014	180	5,6	966	202	4,8	917	226	4,1	867	253	3,4
	7	1097	159	6,9	1050	180	5,8	1001	203	4,9	951	227	4,2	900	254	3,5
	8	1135	159	7,1	1087	181	6,0	1037	204	5,1	986	228	4,3	934	255	3,7
	9	1174	159	7,4	1124	182	6,2	1074	205	5,2	1022	229	4,5	968	256	3,8
	10	1213	159	7,6	1163	182	6,4	1111	206	5,4	1058	230	4,6	1003	257	3,9

SYMBOLS

CC: Cooling Capacity (kW)
PI: Power input (kW)
LWE: Leaving Water Evaporator (°C)

NOTE

1 Nominal cooling capacity and power input are based on:
- ΔT=5°C entering/leaving condenser water temperature
- evaporator fouling factor=0,0176 m^2 °C/kW
- condenser fouling factor=0,0440 m^2 °C/kW.

5 Capacity tables

5 - 2 Capacity correction factor

Evaporator fouling factors

Fouling factors $m^2°C / kW$	Cooling capacity correction factor	Power input corretion factor	COP 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

Condenser fouling factors

Fouling factors $m^2°C / kW$	Cooling capacity correction factor	Power input corretion factor	COP correction factor
0,044	1,000	1,000	1,000
0,088	0,990	1,018	0,973
0,132	0,981	1,036	0,945

Ethylene glycol and low ambient temperature correction factors

Air ambient temperature °C	-3	-8	-15	-23	-35
% of ethylene glycol by weight	10	20	30	40	50
Cooling capacity correction factor	0,991	0,982	0,972	0,961	0,946
Power input correction factor	0,996	0,992	0,986	0,976	0,966
COP correction factor	0,995	0,990	0,986	0,985	0,979
Flow rate correction factor	1,013	1,040	1,074	1,121	1,178
Water pressure drops correction factor	1,070	1,129	1,181	1,263	1,308

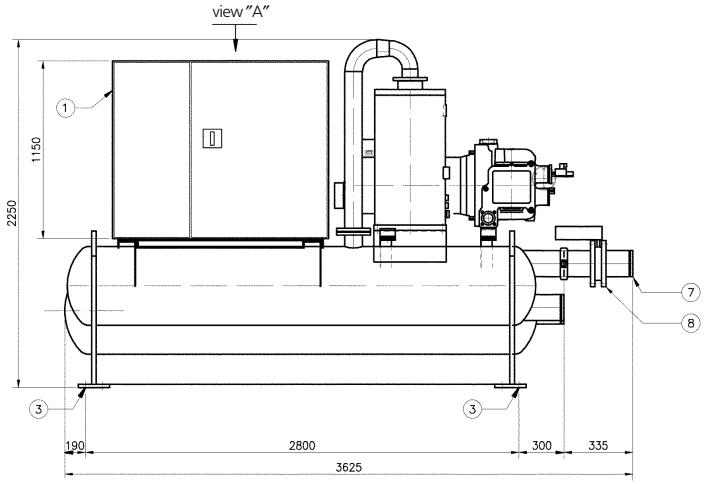
Low temperature operation performance factors

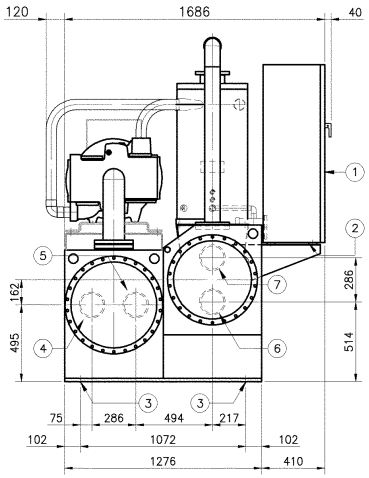
Ethylene glycol/water leaving temperature °C	2	0	-2	-4	-6	-8
Min. % of ethylene glycol	10	20	20	30	30	30
Cooling capacity correction factor	0,842	0,785	0,725	0,670	0,613	0,562
Power input compressors correction factor	0,95	0,94	0,92	0,89	0,87	0,84

6 Dimensional drawing

6 - 1 Dimensional drawing

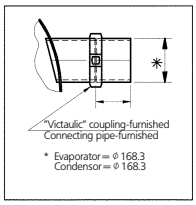
EWWD380BJYNN

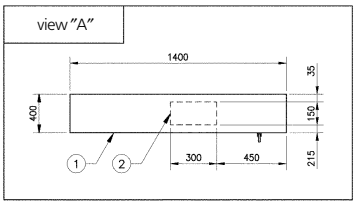




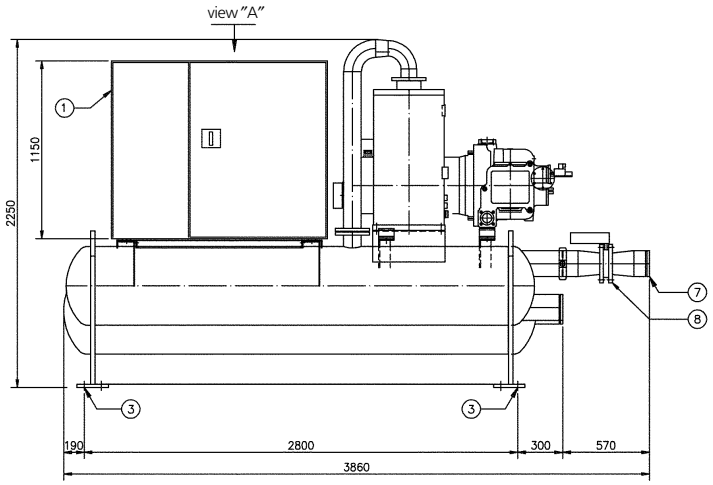
Legend

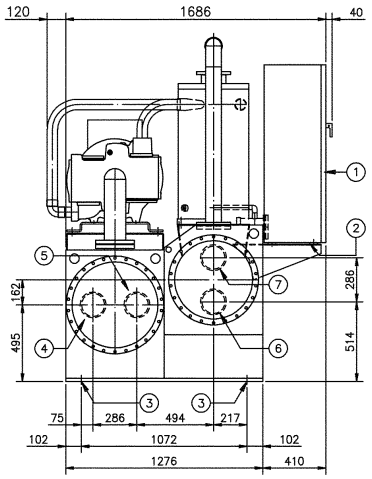
① Electrical panel
② Power connections slot 300x150
③ 4 Holes ϕ22 for isolator mounting
④ Evaporator water inlet (ϕe 168.3 victaulic connection)
⑤ Evaporator water outlet (ϕe 168.3 victaulic connection)
⑥ Condenser water inlet (ϕe 168.3 victaulic connection)
⑦ Condenser water outlet (ϕe 168.3 victaulic connection)
⑧ Condenser water outlet regulator valve





EWWD460-550BJYNN





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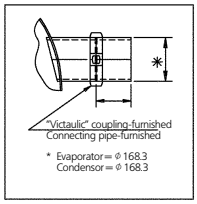
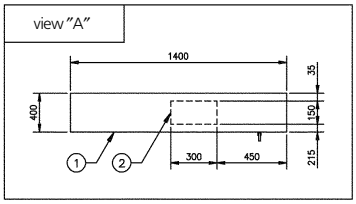
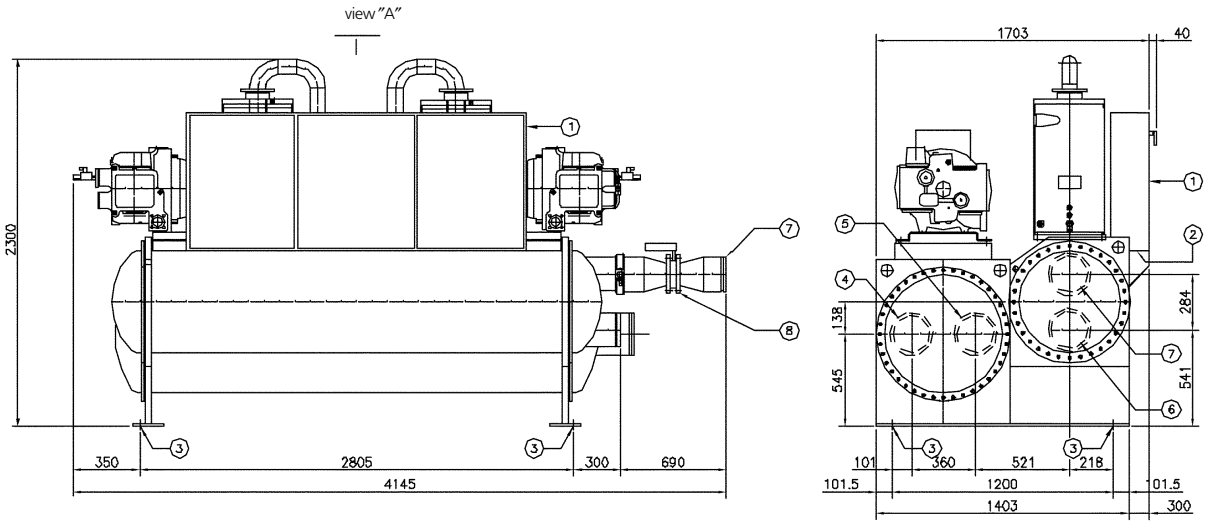




6 Dimensional drawing

6 - 1 Dimensional drawing

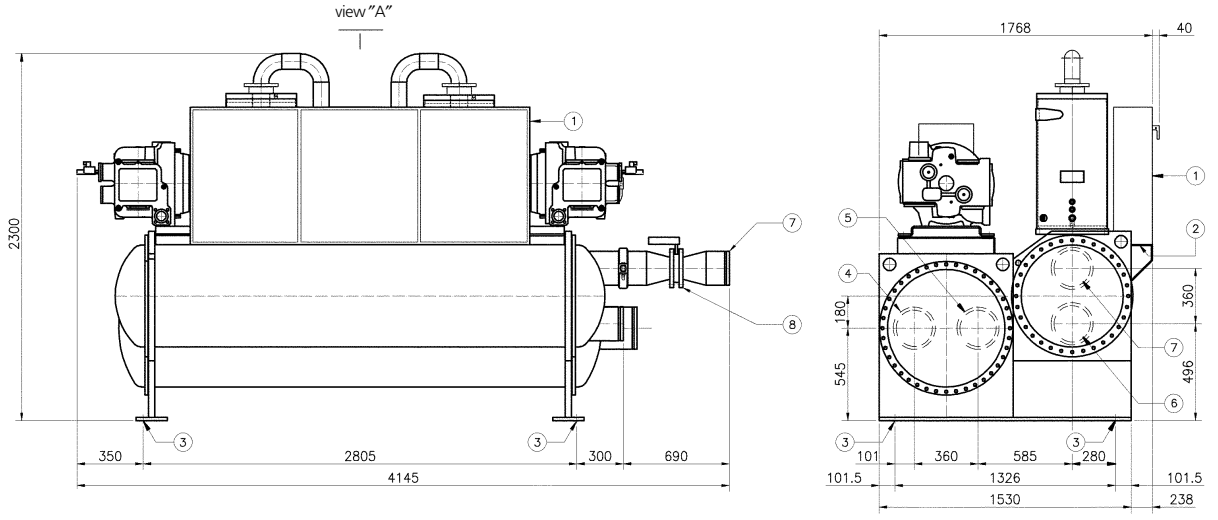
EWWD750-850BJYNN



Legend

① Electrical panel
② Power connections slot 300x150
③ 4 Holes Φ22 for isolator mounting
④ Evaporator water inlet (Φe 219.1 victaulic connection)
⑤ Evaporator water outlet (Φe 219.1 victaulic connection)
⑥ Condenser water inlet (Φe 219.1 victaulic connection)
⑦ Condenser water outlet (Φe 219.1 victaulic connection)
⑧ Condenser water outlet regulator valve

EWWD900BJYNN



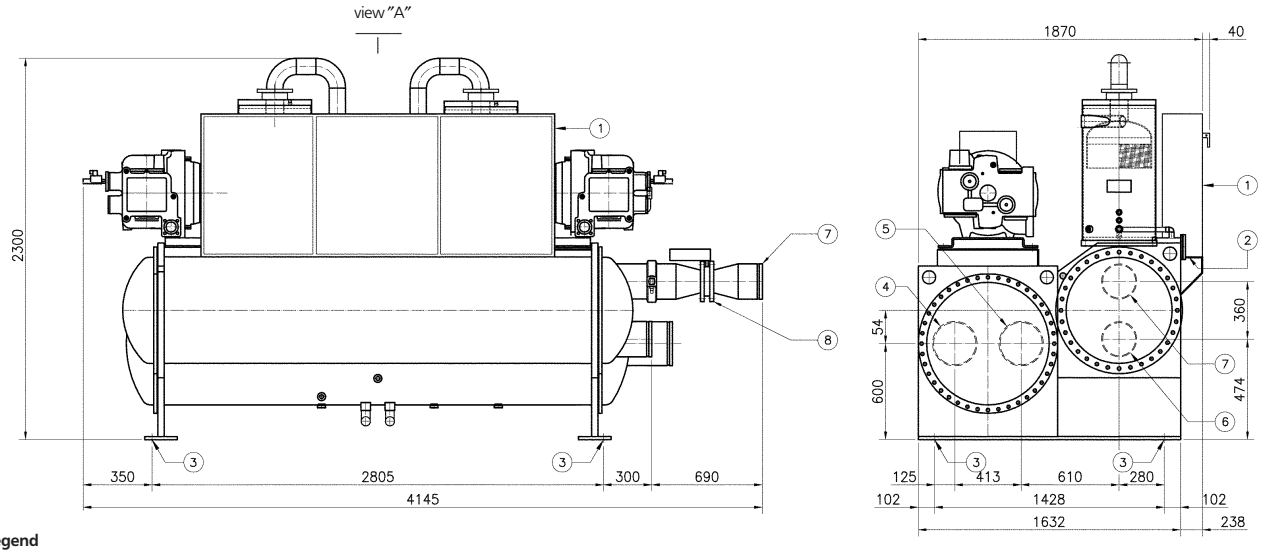
Legend

① Electrical panel
② Power connections slot 300x150
③ 4 Holes Φ22 for isolator mounting
④ Evaporator water inlet (Φe 219.1 victaulic connection)
⑤ Evaporator water outlet (Φe 219.1 victaulic connection)
⑥ Condenser water inlet (Φe 219.1 victaulic connection)
⑦ Condenser water outlet (Φe 219.1 victaulic connection)
⑧ Condenser water outlet regulator valve

6 Dimensional drawing

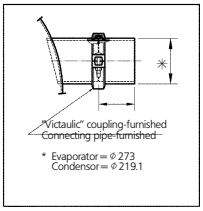
6 - 1 Dimensional drawing

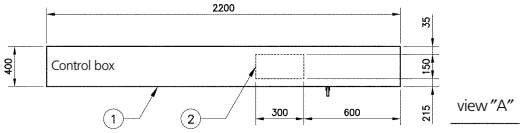
EWWDC10-C1BJYNN



Legend

① Electrical panel
② Power connections slot 300x150
③ 4 Holes Φ22 for isolator mounting
④ Evaporator water inlet (Φ 273 victaulic connection)
⑤ Evaporator water outlet (Φ 273 victaulic connection)
⑥ Condenser water inlet (Φe 219.1 victaulic connection)
⑦ Condenser water outlet (Φe 219.1 victaulic connection)
⑧ Condenser water outlet regulator valve





7 Sound data

7 - 1 Sound level data

Sound pressure level EWWD-BJYNN

Unit size	Sound pressure level at 1 m from the unit in free field (rif. 2 x 10^{-5})								
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
380	63,5	70,5	80,0	74,5	74,0	68,5	60,5	50,5	78,0
460	64,5	71,5	81,0	75,5	75,0	69,5	61,5	51,5	79,0
550	65,5	72,5	82,0	76,5	76,0	70,5	62,5	52,5	80,0
750	66,5	73,5	83,0	77,5	77,0	71,5	63,5	53,5	81,0
850	67,0	74,0	83,5	78,0	77,5	72,0	64,0	54,0	81,5
900	67,5	74,5	84,0	78,5	78,0	72,5	64,5	54,5	82,0
C10	68,0	75,0	84,5	79,0	78,5	73,0	65,0	55,0	82,5
C11	68,5	75,5	85,0	79,5	79,0	73,5	65,5	55,5	83,0

NOTES

1 Average sound pressure level rated in accordance to ISO 3744, free field semispheric conditions.
2 The values are according to ISO 3744 and are referred to units without pumps kit.
3 The sound pressure levels are calculated from the sound power levels as per the following formula:
- **Lp = Lw - 10logS**
- **Lp =** Sound pressure level **Lw =** Sound power level
- **S =** (**L** + 2**d**)(**W** + 2**d**) + 2(**L** + 2**d**)(**H** + **d**) + 2(**W** + 2**d**)(**H** + **d**)
- **L =** unit length in m **W =** unit width in m **H =** unit height in m **d =** distance from the unit in m
- Reference source 20 µPa

8 Installation

8 - 1 Installation method

EWWD-BJYNN

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.

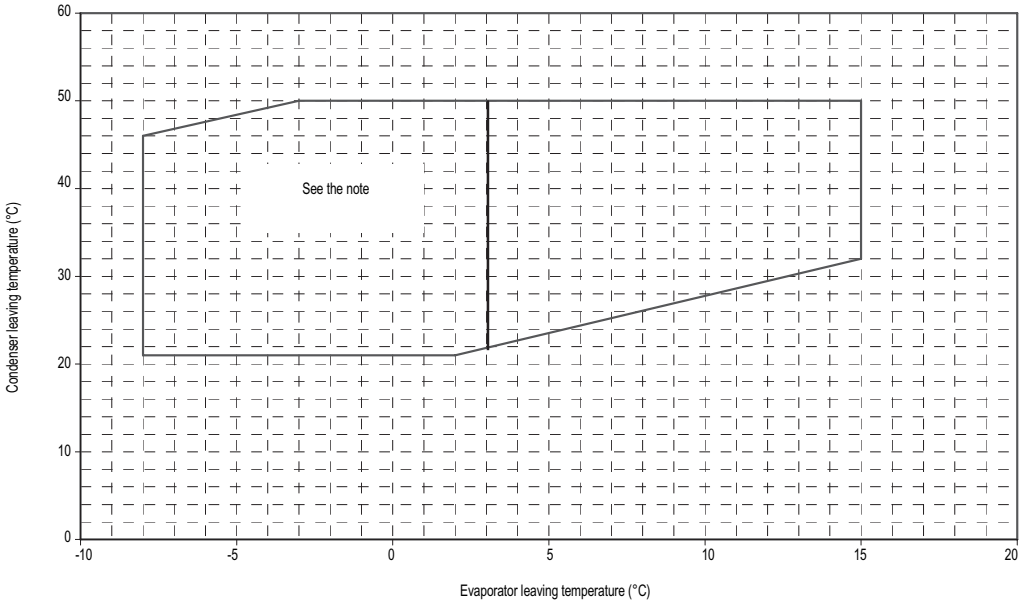
Location

A levelled 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 are 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 are recommended to avoid straining the piping and transmitting vibration and noise.

9 Operation range

EWWD-BJYNN



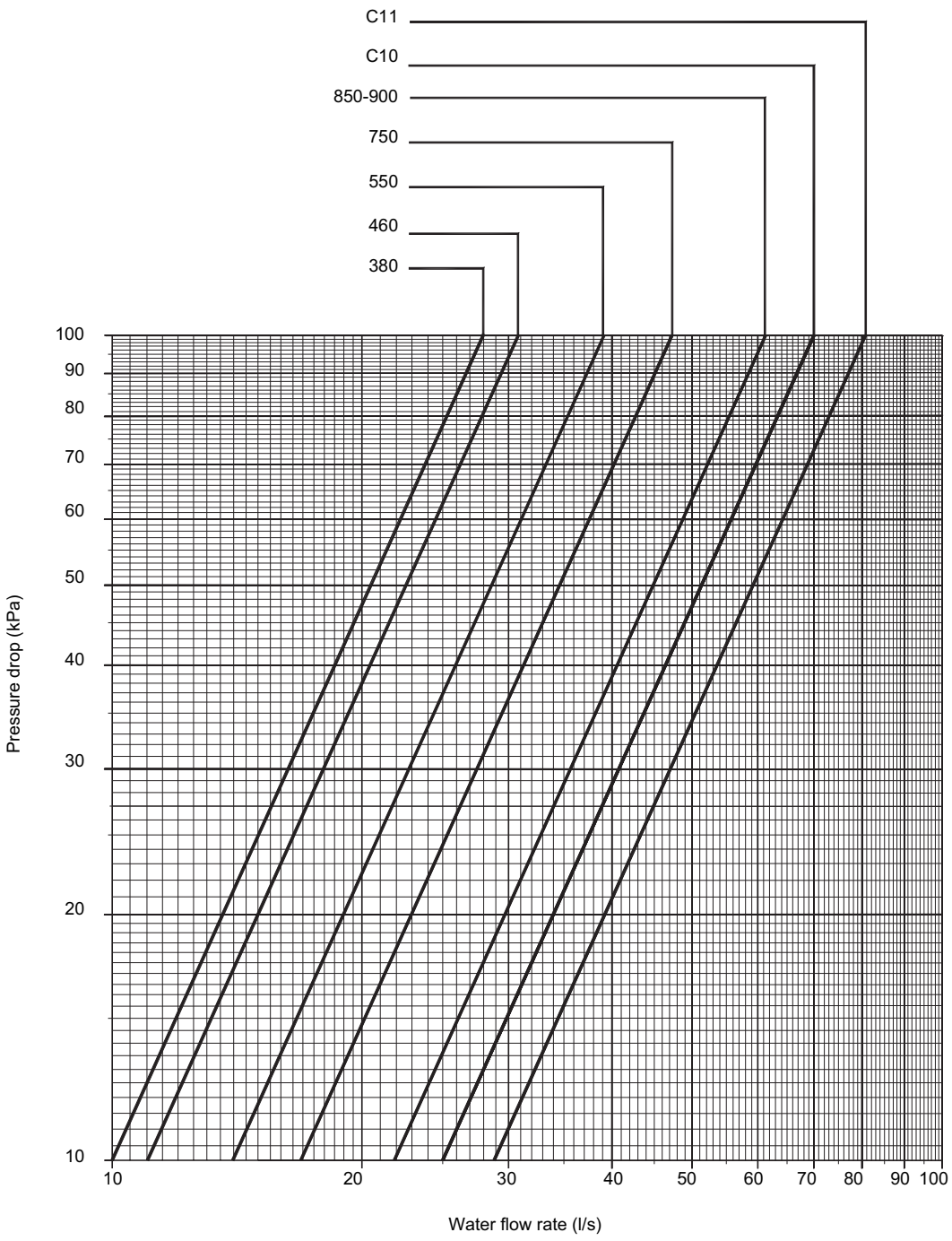
NOTE

1 The use of glycol is necessary for evaporator leaving water temperature below +3°C.

10 Hydraulic performance

10 - 1 Water pressure drop curve evaporator

EWWD380-C11BJYNN



10 Hydraulic performance

10 - 2 Water pressure drop curve condenser

EWWD380-C11BJYNN