DAIKIN

Applied Systems

Technical Data

Water cooled chiller, high efficiency

EEDEN13-421

EWWQ-B-XS

TABLE OF CONTENTS

EWWQ-B-XS

1 Features

- High efficiency
- All models are PED pressure vessel approved
- 1 or 2 stepless single-screw compressors
- 1 or 2 truly independent refrigerant circuits
- Shell and tube heat exchanger
- Optimised for use with R-410A
- Standard electronic expansion valve
- Compact design
- Partial heat recovery available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWWQ420B-XS	EWWQ520B-XS	EWWQ640B-XS	EWWQ730B-XS	EWWQ800B-XS	EWWQ970B-XS	EWWQC10B-XS	EWWQC11B-XS	EWWQC12B-XS
Cooling capacity	Nom.			kW	420 (1)	513 (1)	636 (1)	722 (1)	798 (1)	969 (1)	1,033 (1)	1,111 (1)	1,153 (1)
Capacity control	Method				Stepless								
	Minimum capacity			%	12.5						25.0	12.5	25.0
Power input	Cooling	Nom.		kW	88.7 (1)	107 (1)	131 (1)	149 (1)	166 (1)	201 (1)	213 (1)	239 (1)	238 (1)
EER					4.74 (1)	4.79 (1)	4.84 (1)	4.83 (1)	4.81 (1)		4.86 (1)	4.64 (1)	4.85 (1)
ESEER					5.19	5.22	5.28		5.22	5.06	5.53	4.85	5.45
IPLV					6.36		6.45	6.42	6.35	6.06	6.11	5.92	6.06
Casing	Colour				Ivory white								
	Material				Galvanized and painted steel sheet								
Dimensions	Unit	Height		mm	2,001				2,003		2,454	2,003	2,454
		Width		mm	1,276			1,268	1,314	1,446	1,350	1,446	1,350
		Depth		mm	3,863			3,878		3,919	5,219	3,919	5,219
Weight	Unit			kg	2,322	2,403	2,464	2,738	2,407	2,427	4,775	2,457	4,831
	Operation weight			kg	2,594	2,685	2,745	3,158	2,815	3,056	5,431	3,086	5,479
Water heat exchanger - evaporator	Type				Single pass shell and tube								
	Water volume			l	220	213	200	334	325	538	587	538	575
	Water flow rate	Nom.		l/s	20.1	24.6	30.5	34.6	38.2	46.4	49.5	53.2	55.2
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	55	68	71	64	57	53		68	64
	Insulation material				Closed cell foam elastomer								
Water heat exchanger - condenser	Type				Single pass shell and tube								
	Water flow rate	Nom.		l/s	24.4	29.8	36.8	41.8	46.3	56.2	29.9	64.7	30.2
	Nominal water pressure drop	Cooling		kPa	50	39	42	47	59	64	40	82	36
	Nominal water pressure drop 2	Cooling		kPa	-						40	-	47
	Insulation material				Expanded elastomer								
	Model	Quantity			1						2	1	2
Sound power level	Cooling	Nom.		dBA	101	102	103		102	103	105	104	106
Sound pressure level	Cooling	Nom.		dBA	82	83	84		83	84	86	85	86
Compressor	Type				Semi-hermetic single screw compressor								
	Quantity				1						2	1	2
	Oil	Charged volume		l	16						32	16	32
Operation range	Evaporator	Cooling	Min.	ºCDB	-4								
			Max.	ºCDB	10								
	Condenser	Cooling	Min.	ºCDB	25								
			Max.	ºCDB	45								
Refrigerant	Type				R-410A								
	Circuits	Quantity			1						2	1	2
Refrigerant circuit	Charge			kg	95				110	130	120	130	120
Refrigerant circuit 2	Charge			kg	-						120	-	120
Piping connections	Evaporator water inlet/outlet			mm	152.4			203.2		254	203.2	254	203.2
	Condenser water inlet/outlet			inch	8			6			5	6	5
Safety devices	Item	01			High pressure switch								
		02			Low pressure switch								
		03			Emergency stop								
		04			High discharge temperature on the compressor								
		05			Phase monitor								
		06			Low pressure ratio								
		07			High oil pressure drop								
		08			Low oil pressure								

2-2 Technical Specifications				EWWQC13B-XS	EWWQC14B-XS	EWWQC15B-XS	EWWQC16B-XS	EWWQC17B-XS	EWWQC19B-XS	EWWQC20BX-S	EWWQC21B-XS
Cooling capacity	Nom.		kW	1,265 (1)	1,363 (1)	1,442 (1)	1,580 (1)	1,740 (1)	1,870 (1)	2,025 (1)	2,156 (1)
Capacity control	Method			Stepless							
	Minimum capacity		%	25.0							
Power input	Cooling	Nom.	kW	262 (1)	281 (1)	299 (1)	324 (1)	361 (1)	397 (1)	436 (1)	474 (1)

2 Specifications

2-2 Technical Specifications					EWWQC13 B-XS	EWWQC14 B-XS	EWWQC15 B-XS	EWWQC16 B-XS	EWWQC17 B-XS	EWWQC19 B-XS	EWWQC20 BX-S	EWWQC21 B-XS
EER					4.83 (1)	4.85 (1)	4.83 (1)	4.88 (1)	4.81 (1)	4.71 (1)	4.64 (1)	4.55 (1)
ESEER					5.45	5.53	5.47	5.26	5.18	4.98	4.91	4.75
IPLV					6.07	6.23	6.19	5.82	5.93	6.03	5.82	5.93
Casing	Colour				Ivory white							
	Material				Galvanized and painted steel sheet							
Dimensions	Unit	Height		mm	2,454			2,495				
		Width		mm	1,350							
		Depth		mm	5,219			4,829			4,865	
Weight	Unit			kg	4,873	4,919	4,969	5,117		5,388	5,408	5,414
	Operation weight			kg	5,512	5,546	5,606	5,794	5,843	6,110	6,118	6,124
Water heat exchanger - evaporator	Type				Single pass shell and tube							
	Water volume			l	563	551		495	484	535	527	
	Water flow rate	Nom.		l/s	60.6	65.3	69.1	75.7	83.5	89.7	97.2	103.6
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	55	67	74	69	88	90	111	124
	Insulation material				Closed cell foam elastomer							
Water heat exchanger - condenser	Type				Single pass shell and tube							
	Water flow rate	Nom.		l/s	36.7	37.2	41.8	45.7	46.2	54.4	55.1	63.1
	Nominal water pressure drop	Cooling		kPa	48	49	46	44	45	60	61	78
	Nominal water pressure drop 2	Cooling		kPa	48	46		44	60		78	
	Insulation material				Expanded elastomer							
	Model	Quantity			2							
Sound power level	Cooling	Nom.		dBA	106	107		106		107		108
Sound pressure level	Cooling	Nom.		dBA	87			86	87		88	
Compressor	Type				Semi-hermetic single screw compressor							
	Quantity				2							
	Oil	Charged volume		l	32							
Operation range	Evaporator	Cooling	Min.	ºCDB	-4							
			Max.	ºCDB	10							
	Condenser	Cooling	Min.	ºCDB	25							
			Max.	ºCDB	45							
Refrigerant	Type				R-410A							
	Circuits	Quantity			2							
Refrigerant circuit	Charge			kg	120			130				
Refrigerant circuit 2	Charge			kg	120			130				
Piping connections	Evaporator water inlet/outlet			mm	203.2			254				
	Condenser water inlet/outlet			inch	5	6		8				
Safety devices	Item	01			High pressure switch							
		02			Low pressure switch							
		03			Emergency stop							
		04			High discharge temperature on the compressor							
		05			Phase monitor							
		06			Low pressure ratio							
		07			High oil pressure drop							
		08			Low oil pressure							

2-3 Electrical Specifications				EWWQ420B-XS	EWWQ520B-XS	EWWQ640B-XS	EWWQ730B-XS	EWWQ800B-XS	EWWQ970B-XS	EWWQC10B-XS	EWWQC11B-XS	EWWQC12B-XS
Compressor	Phase			3~								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
	Maximum running current		A	189	225	274	310	325	388	225	458	225
	Starting method			Wye-delta								
Compressor 2	Maximum running current		A	-						225	-	274

2 Specifications

2-3 Electrical Specifications				EWWQ420B-XS	EWWQ520B-XS	EWWQ640B-XS	EWWQ730B-XS	EWWQ800B-XS	EWWQ970B-XS	EWWQC100B-XS	EWWQC101B-XS	EWWQC102B-XS
Power supply	Phase			3~								
	Frequency		Hz	50								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
Unit	Maximum starting current		A	455				656		636	656	674
	Nominal running current (RLA)	Cooling	A	146	170	205	230	258	310	340	360	375
	Maximum running current		A	178	211	256	291	316	376	422	442	467
	Max unit current for wires sizing		A	195	232	282	320	348	414	464	486	514

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) 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

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

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

(5) 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.

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

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

(8) Maximum current for wires sizing: compressor full load ampere x 1.1

2-4 Electrical Specifications				EWWQC130B-XS	EWWQC140B-XS	EWWQC150B-XS	EWWQC160B-XS	EWWQC170B-XS	EWWQC190B-XS	EWWQC200B-XS	EWWQC210B-XS
Compressor	Phase			3~							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
	Maximum running current		A	274		310	325		388		458
	Starting method			Wye-delta							
Compressor 2	Maximum running current		A	274	310		325	388		458	
Power supply	Phase			3~							
	Frequency		Hz	50							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
Unit	Maximum starting current		A	674	702		925	979		1,032	
	Nominal running current (RLA)	Cooling	A	410	435	460	516	568	620	670	720
	Maximum running current		A	514		548	629	689	749	814	877
	Max unit current for wires sizing		A	566	603	639	692	758	824	895	965

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) 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

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

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

(5) 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.

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

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

(8) Maximum current for wires sizing: compressor full load ampere x 1.1

3 Capacity tables

3 - 1 Cooling Capacity Tables

EWWQ420-800B-XS

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																						
		5							6							7								
		CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc		
		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		
420	30	421	79.1	20.2	55	498	24	48	434	79.5	20.8	58	512	24.6	50	448	79.9	21.5	62	525	25.3	53		
	35	394	88	18.9	49	481	23.2	45	407	88.3	19.5	52	494	23.8	47	420	88.7	20.1	55	507	24.4	50		
	38	377	93.5	18	45	469	22.6	43	390	93.9	18.7	48	482	23.2	45	402	94.3	19.3	51	495	23.9	48		
	40	365	97.4	17.5	43	461	22.3	42	378	97.7	18.1	45	474	22.9	44	390	98	18.7	48	486	23.5	46		
	42	353	101	16.9	40	453	21.9	41	365	102	17.5	43	465	22.5	43	378	102	18.1	45	478	23.1	45		
	45	335	107	16	36	441	21.3	39	346	108	16.6	39	453	21.9	41	358	108	17.2	41	465	22.5	43		
520	30	514	95.5	24.6	68	608	29.2	38	530	95.9	25.4	72	624	30	40	546	96.3	26.2	76	640	30.8	42		
	35	482	106	23.1	61	587	28.3	36	498	107	23.8	64	603	29	38	513	107	24.6	68	619	29.8	39		
	38	462	113	22.1	56	573	27.6	34	477	113	22.8	59	589	28.4	36	492	114	23.6	63	604	29.2	38		
	40	447	118	21.4	53	563	27.2	33	462	118	22.1	56	579	27.9	35	478	119	22.9	60	594	28.7	37		
	42	433	122	20.7	50	554	26.8	32	447	123	21.4	53	569	27.5	34	462	123	22.2	56	584	28.2	36		
	45	410	130	19.6	45	539	26.1	31	425	130	20.3	48	553	26.8	32	439	131	21	51	568	27.5	34		
640	30	636	117	30.5	71	751	36.1	41	656	117	31.5	75	771	37.1	43	677	118	32.5	79	792	38.1	45		
	35	597	130	28.6	63	725	34.9	38	616	131	29.5	67	744	35.9	40	636	131	30.5	71	765	36.8	42		
	38	571	138	27.4	58	708	34.1	37	590	139	28.3	62	727	35.1	38	609	139	29.2	66	746	36	40		
	40	554	144	26.5	55	696	33.6	36	572	145	27.4	58	715	34.5	37	591	145	28.3	62	734	35.4	39		
	42	536	150	25.6	52	684	33.1	35	554	150	26.5	55	703	33.9	36	573	151	27.4	59	721	34.9	38		
	45	509	159	24.3	47	666	32.2	33	526	160	25.2	50	684	33.1	35	544	160	26.1	53	702	34	36		
730	30	722	133	34.6	64	853	41	45	745	134	35.7	67	876	42.1	47	768	134	36.8	71	899	43.3	49		
	35	677	148	32.4	57	823	39.7	42	699	149	33.5	60	845	40.7	44	722	149	34.6	64	868	41.8	47		
	38	648	157	31	52	803	38.8	41	670	158	32.1	55	825	39.8	43	692	159	33.1	59	847	40.9	45		
	40	628	164	30.1	49	790	38.1	39	649	164	31.1	52	811	39.2	41	671	165	32.1	56	833	40.2	43		
	42	608	171	29.1	47	776	37.5	38	629	171	30.1	49	797	38.5	40	650	172	31.1	53	819	39.6	42		
	45	577	181	27.6	42	756	36.5	37	597	182	28.5	45	776	37.5	38	617	182	29.5	48	797	38.5	40		
800	30	791	149	37.9	56	936	45	56	816	150	39.1	59	962	46.3	59	841	151	40.3	62	988	47.5	62		
	35	750	164	35.9	50	910	43.8	54	774	165	37	53	934	45	56	798	166	38.2	57	960	46.3	59		
	38	723	173	34.6	47	893	43.1	52	747	174	35.7	50	917	44.2	55	770	175	36.9	53	942	45.4	57		
	40	705	179	33.7	45	881	42.5	51	728	180	34.9	48	905	43.7	53	752	181	36	51	929	44.9	56		
	42	687	185	32.8	43	869	42	50	710	187	34	46	893	43.1	52	733	188	35.1	48	917	44.3	55		
	45	659	195	31.5	40	851	41.2	48	681	197	32.6	42	874	42.3	50	703	198	33.7	45	897	43.4	53		

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

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3 Capacity tables

3 - 1 Cooling Capacity Tables

EWWQ420-800B-XS

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																						
		8							9							10								
		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		
420	30																							
	35	433	89.1	20.8	58	520	25.1	52	447	89.6	21.4	62	534	25.7	55	461	89.9	22.1	65	548	26.4	57		
	38	415	94.7	19.9	54	508	24.5	50	428	95	20.6	57	521	25.2	52	442	95.4	21.2	60	535	25.8	55		
	40	403	98.4	19.3	51	499	24.1	48	416	98.8	19.9	54	513	24.7	51	429	99.2	20.6	57	526	25.4	53		
	42	390	102	18.7	48	491	23.7	47	403	103	19.3	51	504	24.3	49	416	103	20	54	517	25	52		
	45	370	108	17.8	44	477	23.1	45	383	109	18.4	47	490	23.7	47									
520	30																							
	35	529	108	25.4	72	635	30.6	41	546	108	26.2	76	652	31.4	43	562	108	27	80	669	32.2	45		
	38	508	114	24.4	67	620	29.9	40	524	115	25.1	71	636	30.7	42	540	115	25.9	75	653	31.5	43		
	40	493	119	23.6	63	610	29.5	39	509	119	24.4	67	626	30.2	40	525	120	25.2	71	642	31	42		
	42	478	124	22.9	60	600	29	37	493	124	23.7	63	615	29.7	39	509	125	24.4	67	631	30.5	41		
	45	454	131	21.8	54	583	28.2	36	469	131	22.5	58	599	29	37	485	132	23.3	61	614	29.7	39		
640	30																							
	35	656	132	31.5	75	785	37.8	44	676	132	32.5	79	806	38.8	46	697	133	33.5	84	827	39.9	48		
	38	629	140	30.2	69	766	37	42	649	141	31.2	74	787	38	44	669	141	32.2	78	808	39	46		
	40	610	146	29.3	66	754	36.4	41	630	146	30.2	70	774	37.4	43	650	147	31.2	74	794	38.3	45		
	42	591	152	28.4	62	741	35.8	40	611	152	29.3	66	760	36.7	42	630	153	30.3	70	780	37.7	44		
	45	562	161	27	57	721	34.9	38	581	161	27.9	60	740	35.8	40	600	162	28.8	64	759	36.7	42		
730	30																							
	35	744	150	35.7	67	891	43	49	768	151	36.8	71	915	44.1	51	791	151	38	75	939	45.2	54		
	38	714	159	34.2	62	870	42	47	736	160	35.3	66	893	43.1	49	759	161	36.5	70	917	44.2	51		
	40	693	166	33.2	59	856	41.3	45	715	166	34.3	63	878	42.4	48	738	167	35.4	66	901	43.5	50		
	42	671	172	32.2	56	841	40.6	44	693	173	33.2	59	863	41.7	46	715	174	34.3	63	886	42.8	48		
	45	638	183	30.6	51	818	39.6	42	659	183	31.6	54	840	40.6	44									
800	30																							
	35	822	167	39.4	60	985	47.5	62	848	168	40.7	63	1011	48.7	65	873	169	41.9	67	1037	50	68		
	38	795	176	38.1	56	967	46.6	60	819	177	39.3	59	992	47.9	63	844	178	40.5	63	1017	49.1	66		
	40	775	182	37.2	54	954	46.1	59	800	183	38.3	57	979	47.3	61	824	184	39.5	60	1004	48.5	64		
	42	756	189	36.2	51	941	45.5	57	780	190	37.4	54	965	46.6	60	804	190	38.6	57	990	47.8	63		
	45	726	199	34.8	48	921	44.6	55	749	200	35.9	51	945	45.7	58	773	200	37.1	53	969	46.9	60		

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

SRC_1-2_Rev.01_2_(2-6)

3 Capacity tables

3 - 1 Cooling Capacity Tables

EWWQ970-C13B-XS

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							6							7								
		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		
970	30	962	180	46	52	1137	54.7	61	993	182	47.6	56	1170	56.3	65	1024	183	49.1	59	1202	57.8	68		
	35	908	198	43.4	47	1102	53.1	58	938	200	44.9	50	1133	54.6	61	969	201	46.4	53	1166	56.2	64		
	38	875	209	41.8	44	1079	52.1	56	904	211	43.3	47	1110	53.6	59	934	212	44.7	50	1142	55.1	62		
	40	852	216	40.7	42	1064	51.4	55	881	218	42.1	45	1094	52.8	58	910	220	43.6	48	1125	54.3	60		
	42	828	224	39.6	40	1048	50.6	53	857	225	41	43	1078	52.1	56	886	227	42.4	45	1108	53.5	59		
	45	792	234	37.9	37	1023	49.5	51	820	236	39.2	39	1052	50.9	54	848	238	40.6	42	1081	52.3	56		
C10	30	1034	189	49.5	53	1220	29.4 29.4	38 38	1067	190	51.1	56	1253	30.1 30.1	40 40	1100	191	52.7	60	1287	31.0 31.0	42 42		
	35	969	211	46.4	47	1177	28.4 28.4	36 36	1001	212	47.9	50	1209	29.1 29.1	38 38	1033	213	49.5	53	1242	29.9 29.9	40 40		
	38	928	225	44.4	44	1149	27.7 27.7	35 35	958	225	45.9	46	1180	28.5 28.5	36 36	990	226	47.4	49	1212	29.2 29.2	38 38		
	40	899	234	43	41	1130	27.3 27.3	34 34	929	235	44.4	44	1161	28.0 28.0	35 35	960	236	46	47	1192	28.8 28.8	37 37		
	42	869	244	41.6	39	1110	26.8 26.8	33 33	899	244	43	41	1140	27.6 27.6	34 34	929	245	44.5	44	1171	28.3 28.3	36 36		
	45	824	259	39.4	35	1080	26.1 26.1	31 31	853	259	40.8	38	1110	26.8 26.8	33 33	882	260	42.2	40	1139	27.6 27.6	34 34		
C11	30	1104	214	52.78	67	1312	63.1	79	1138	216	54.5	71	1347	64.8	83	1174	219	56.3	75	1385	66.6	87		
	35	1045	235	50	61	1274	61.4	75	1078	237	51.6	64	1308	63.1	79	1111	239	53.2	68	1343	64.7	82		
	38	1008	248	48.2	57	1250	60.3	73	1040	250	49.8	60	1284	61.9	76	1073	252	51.4	64	1318	63.6	80		
	40	982	257	47	54	1233	59.5	71	1015	259	48.6	57	1267	61.2	74	1046	261	50.1	61	1301	62.8	78		
	42	956	265	45.7	51	1215	58.7	69	988	267	47.3	55	1249	60.4	73	1020	270	48.9	58	1283	62	76		
	45	883	271	42.2	45	1149	55.6	63	888	269	42.5	45	1152	55.7	63	884	264	42.3	45	1143	55.3	62		
C12	30	1154	212	55.2	64	1362	29.7 35.9	35 46	1191	213	57	67	1399	30.5 36.8	37 48	1227	214	58.8	71	1436	31.3 37.8	39 50		
	35	1082	236	51.8	57	1315	28.7 34.7	33 43	1117	237	53.5	60	1350	29.4 35.6	35 45	1153	238	55.2	64	1386	30.2 36.6	36 47		
	38	1036	251	49.6	52	1284	28.0 33.9	32 42	1070	252	51.2	55	1318	28.8 34.8	33 44	1105	253	52.9	59	1354	29.5 35.8	35 46		
	40	1004	262	48	49	1262	27.5 33.4	31 40	1038	262	49.7	52	1296	28.3 34.3	32 42	1072	263	51.3	56	1331	29.1 35.2	34 44		
	42	972	272	46.5	47	1240	27.1 32.9	30 39	1005	273	48.01	49	1274	27.8 33.7	31 41	1038	274	49.7	53	1308	28.6 34.6	33 43		
	45	922	289	44.1	42	1207	26.4 32.0	28 37	954	290	45.6	45	1240	27.1 32.9	30 39	986	290	47.2	48	1273	27.8 33.8	31 41		
C13	30	1267	233	60.6	55	1495	36.0 36.0	46 46	1307	234	62.5	58	1535	36.9 36.9	48 48	1347	235	64.5	61	1577	37.9 37.9	51 51		
	35	1188	260	56.8	49	1443	34.8 34.8	43 43	1226	261	58.7	51	1482	35.7 35.7	46 46	1265	262	60.6	55	1522	36.7 36.7	48 48		
	38	1137	277	54.4	45	1409	34.0 34.0	42 42	1175	278	56.2	48	1448	34.9 34.9	44 44	1213	279	58.1	50	1486	35.9 35.9	46 46		
	40	1102	288	52.7	42	1386	33.5 33.5	41 41	1139	289	54.5	45	1423	34.4 34.4	42 42	1176	290	56.3	48	1462	35.3 35.3	45 45		
	42	1066	300	51	40	1362	32.9 32.9	39 39	1102	301	52.7	42	1399	33.8 33.8	41 41	1139	302	54.5	45	1436	34.7 34.7	43 43		
	45	1012	319	48.3	36	1326	32.1 32.1	38 38	1046	319	50	39	1362	32.9 32.9	39 39	1082	320	51.8	41	1398	33.8 33.8	41 41		

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

SRC_1-2_Rev.01_2_(3-6)

3 Capacity tables

3 - 1 Cooling Capacity Tables

EWWQ970-C13B-XS

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																						
		8							9							10								
		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		
970	30																							
	35	1001	203	48	57	1198	57.8	68	1031	204	49.5	60	1230	59.3	71	1063	206	51	63	1262	60.8	74		
	38	965	214	46.2	53	1174	56.6	65	996	216	47.8	56	1206	58.2	68	1027	217	49.3	59	1238	59.7	72		
	40	940	222	45	51	1157	55.8	64	971	223	46.5	54	1189	57.4	67	1002	225	48.1	57	1221	58.9	70		
	42	915	229	43.8	48	1139	55	62	945	230	45.3	51	1170	56.5	65	976	232	46.8	54	1202	58.1	68		
	45	876	240	42	44	1111	53.8	59	905	241	43.4	47	1142	55.2	62									
C10	30																							
	35	1066	213	51.1	56	1275	30.7 30.7	42 42	1099	214	52.7	60	1309	31.5 31.5	44 44	1133	215	54.4	63	1343	32.4 32.4	46 46		
	38	1022	227	49	52	1245	30.0 30.0	40 40	1054	228	50.5	55	1278	30.8 30.8	42 42	1087	229	52.2	58	1312	31.6 31.6	44 44		
	40	991	236	47.5	49	1224	29.5 29.5	39 39	1023	237	49.1	52	1257	30.3 30.3	41 41	1056	238	50.6	55	1290	31.1 31.1	43 43		
	42	960	246	46	47	1202	29.1 29.1	38 38	992	247	47.5	49	1234	29.8 29.8	40 40	1024	247	49.1	52	1267	30.6 30.6	41 41		
	45	912	261	43.7	42	1170	28.3 28.3	36 36	943	261	45.2	45	1201	29.0 29.0	38 38									
C11	30																							
	35	1145	242	54.9	72	1380	66.5	86	1181	244	56.7	76	1417	68.3	91	1218	247	58.5	80	1456	70.2	95		
	38	1106	255	53	67	1353	65.3	84	1140	257	54.7	71	1389	67	88	1175	260	56.4	75	1426	68.8	92		
	40	1079	263	51.7	64	1335	64.5	82	1112	266	53.3	68	1370	66.2	86	1146	268	55	72	1406	67.9	90		
	42	1052	272	50.4	61	1317	63.6	80	1084	275	52	65	1352	65.3	84	1117	277	53.6	69	1386	67	88		
	45	887	260	42.5	45	1142	55.2	62	897	258	43	46	1151	55.7	63									
C12	30																							
	35	1189	239	57	67	1423	31.1 37.5	38 50	1226	240	58.8	71	1461	31.9 38.5	40 52	1264	241	60.7	75	1499	32.8 39.5	42 54		
	38	1141	254	54.7	62	1390	30.3 36.7	36 48	1177	255	56.4	66	1427	31.2 37.7	38 50	664	140	31.8	23	801	38.6	52		
	40	1107	264	53	59	1367	29.8 36.1	35 46	1142	265	54.8	63	1403	30.7 37.1	37 49	645	146	30.9	22	788	38.0	51		
	42	1072	275	51.4	56	1343	29.3 35.5	34 45	1107	276	53.1	59	1378	30.1 36.5	36 47	626	151	30	21	775	37.4	49		
	45	1019	291	48.8	51	1307	28.6 34.6	33 43	1053	292	50.5	54	1341	29.3 35.6	34 45	596	161	28.5	19	754	36.5	47		
C13	30																							
	35	1305	263	62.5	58	1562	37.7 37.7	50 50	1346	264	64.5	61	1604	38.6 38.6	52 52	1387	265	66.5	64	1646	39.7 39.7	55 55		
	38	1252	280	60	53	1526	36.8 36.8	48 48	1291	281	61.9	57	1566	37.8 37.8	50 50	1331	282	63.9	60	1607	38.8 38.8	53 53		
	40	1215	291	58.2	51	1500	36.2 36.2	47 47	1253	292	60.1	54	1540	37.2 37.2	49 49	1293	293	62	57	1580	38.1 38.1	51 51		
	42	1177	303	56.4	48	1475	35.6 35.6	45 45	1215	304	58.2	51	1513	36.6 36.6	47 47	1254	305	60.1	54	1553	37.5 37.5	50 50		
	45	1119	321	53.6	44	1435	34.7 34.7	43 43	1156	322	55.4	46	1473	35.6 35.6	45 45	1194	323	57.2	49	1511	36.6 36.6	47 47		

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

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

SRC_1-2_Rev.01_2_(4-6)

3 Capacity tables

3 - 1 Cooling Capacity Tables

EWWQC14-C21B-XS

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							6							7								
		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		
C14	30	1365	251	65.3	67	1610	36.5 41.0	47 45	1407	252	67.4	71	1653	37.5 42.1	50 47	1451	253	69.6	75	1698	38.5 43.2	52 49		
	35	1280	279	61.2	60	1554	35.2 39.6	44 42	1321	280	63.3	63	1596	36.2 40.7	47 44	1363	281	65.3	67	1639	37.2 41.8	49 46		
	38	1225	297	58.6	55	1517	34.4 38.7	43 41	1265	298	60.6	59	1558	35.4 39.8	45 42	1306	299	62.6	62	1600	36.3 40.9	47 45		
	40	1187	309	56.8	52	1491	33.9 38.1	41 39	1227	310	58.7	55	1532	34.8 39.2	43 41	1267	311	60.7	59	1573	35.7 40.2	45 43		
	42	1149	322	54.9	49	1466	33.3 37.5	40 38	1187	323	56.8	52	1505	34.2 38.5	42 40	1227	324	58.8	55	1546	35.1 39.5	44 42		
	45	1089	341	52.1	45	1426	32.4 36.6	38 36	1127	342	53.9	48	1465	33.3 37.5	40 38	1166	343	55.8	51	1504	34.2 38.5	42 40		
C15	30	1444	266	69.1	74	1704	41.0 41.0	45 45	1488	267	71.3	79	1750	42.1 42.1	47 47	1534	269	73.6	83	1796	43.2 43.2	49 49		
	35	1355	296	64.8	66	1645	39.7 39.7	42 42	1398	297	67	70	1690	40.7 40.7	44 44	1442	299	69.1	74	1735	41.8 41.8	46 46		
	38	1297	315	62.1	61	1607	38.8 38.8	41 41	1339	316	64.1	65	1650	39.8 39.8	42 42	1383	317	66.3	69	1694	40.9 40.9	45 45		
	40	1257	328	60.1	58	1580	38.1 38.1	39 39	1299	329	62.2	61	1623	39.2 39.2	41 41	1341	330	64.3	65	1666	40.2 40.2	43 43		
	42	1216	341	58.2	54	1553	37.5 37.5	38 38	1257	342	60.2	58	1595	38.5 38.5	40 40	1299	343	62.2	61	1637	39.6 39.6	42 42		
	45	1154	362	55.2	50	1512	36.6 36.6	36 36	1194	363	57.1	53	1552	37.5 37.5	38 38	1234	364	59.1	56	1594	38.5 38.5	40 40		
C16	30	1566	290	75	68	1850	44.5 44.5	42 42	1616	292	77.4	72	1902	45.8 45.8	44 44	1667	294	79.9	76	1955	47.0 47.0	46 46		
	35	1481	319	70.9	61	1795	43.3 43.3	40 40	1530	321	73.3	65	1846	44.5 44.5	42 42	1580	324	75.7	69	1897	45.7 45.7	44 44		
	38	1428	337	68.3	57	1760	42.5 42.5	38 38	1476	339	70.7	61	1810	43.7 43.7	40 40	1524	342	73	65	1860	44.9 44.9	42 42		
	40	1392	349	66.6	55	1736	41.9 41.9	37 37	1438	352	68.9	58	1785	43.1 43.1	39 39	1486	354	71.2	62	1835	44.3 44.3	41 41		
	42	1354	362	64.8	52	1711	41.3 41.3	37 37	1400	364	67	56	1760	42.5 42.5	38 38	1447	367	69.3	59	1809	43.7 43.7	40 40		
	45	1297	382	62	48	1674	40.5 40.5	35 35	1342	384	64.2	51	1721	41.6 41.6	37 37	1388	386	66.5	55	1769	42.8 42.8	39 39		
C17	30	1726	324	82.7	86	2042	45.0 53.3	43 58	1781	327	85.4	92	2099	46.3 54.7	45 61	1836	329	88.1	97	2157	47.6 56.2	47 64		
	35	1633	355	78.2	78	1981	43.7 51.8	40 55	1686	359	80.8	83	2037	44.9 53.2	42 58	1740	361	83.5	88	2093	46.2 54.7	45 60		
	38	1574	375	75.4	73	1942	42.9 50.9	39 53	1626	378	77.9	78	1997	44.1 52.3	41 56	1679	381	80.5	82	2053	45.3 53.7	43 59		
	40	1534	388	73.4	70	1916	42.3 50.2	38 52	1585	391	75.9	74	1970	43.5 51.6	40 54	1637	394	78.5	79	2024	44.7 53.0	42 57		
	42	1493	402	71.4	66	1888	41.7 49.5	37 51	1543	405	73.9	71	1941	42.9 50.9	39 53	1594	408	76.4	75	1995	44.1 52.3	41 56		
	45	1429	422	68.4	61	1845	40.8 48.4	36 49	1478	425	70.8	65	1897	42.0 49.8	38 51	1528	428	73.2	69	1950	43.2 51.1	39 54		
C21	30	2142	425	102.8	123	2555	61.5 61.5	74 74	2207	429	106	129	2622	63.1 63.1	78 78	2271	433	109.2	137	2691	64.7 64.7	81 81		
	35	2032	465	97.5	111	2485	59.9 59.9	71 71	2094	469	100.5	118	2550	61.5 61.5	74 74	2156	474	103.6	124	2617	63.1 63.1	78 78		
	38	1960	490	94	104	2439	58.8 58.8	69 69	2022	494	97.1	110	2505	60.4 60.4	72 72	2084	499	100.1	117	2570	62.0 62.0	75 75		
	40	1912	506	91.7	100	2407	58.1 58.1	67 67	1973	511	94.7	106	2472	59.7 59.7	70 70	2035	516	97.7	112	2538	61.3 61.3	74 74		
	42	1862	523	89.3	95	2375	57.4 57.4	66 66	1922	528	92.2	101	2439	58.9 58.9	69 69	1983	532	95.2	107	2504	60.5 60.5	72 72		
	45																							

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

1 Fluid: Water
Fluid: Wasser
Υγρό: Νερό
Líquido: agua
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Жидкость: Вода

SRC_1-2_Rev.01_2_(5-6)

3 Capacity tables

3 - 1 Cooling Capacity Tables

EWWQC14-C21B-XS

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																						
		8							9							10								
		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
C14	30																					
	35	1406	282	67.4	71	1682	38.2 42.9	51 49	1449	284	69.6	75	1727	39.2 44.0	54 51	1494	285	71.7	79	1772	40.2 45.2	56 53
	38	1348	300	64.6	66	1642	37.3 41.9	49 47	1391	301	66.7	70	1686	38.3 43.0	51 49	1434	303	68.8	74	1730	39.3 44.2	54 51
	40	1308	312	62.7	62	1615	36.7 41.3	48 45	1350	313	64.8	66	1658	37.7 42.4	50 48	738	165	35.3	*22*	900	43.5	50
	42	1267	325	60.7	59	1587	36.1 40.6	46 44	1309	326	62.8	62	1629	37.0 41.7	48 46	716	172	34.3	*21*	885	42.8	48
	45	1205	344	57.7	54	1544	35.1 39.6	44 42	1245	345	59.7	57	1585	36.1 40.6	46 44	682	182	32.6	*19*	861	41.7	46
C15	30																					
	35	1487	300	71.3	79	1781	42.9 42.9	49 49	1533	301	73.6	83	1827	44.0 44.0	51 51	1579	303	75.9	88	1874	45.2 45.2	53 53
	38	1427	319	68.4	73	1739	42.0 42.0	47 47	1471	320	70.6	77	1785	43.1 43.1	49 49	1516	321	72.8	82	1831	44.2 44.2	51 51
	40	1385	331	66.4	69	1710	41.3 41.3	45 45	1429	333	68.6	73	1755	42.4 42.4	48 48	1473	334	70.7	77	1801	43.5 43.5	50 50
	42	1342	345	64.3	65	1681	40.6 40.6	44 44	1385	346	66.5	69	1725	41.7 41.7	46 46	1429	347	68.6	73	1770	42.8 42.8	48 48
	45	1276	365	61.1	60	1636	39.6 39.6	42 42	1318	366	63.2	63	1679	40.6 40.6	44 44	1361	368	65.3	67	1723	41.7 41.7	46 46
C16	30																					
	35	1630	326	78.2	73	1949	47.0 47.0	46 46	1681	328	80.7	78	2002	48.2 48.2	48 48	1733	329	83.2	82	2055	49.5 49.5	50 50
	38	1574	344	75.5	69	1911	46.1 46.1	44 44	1624	346	77.9	73	1963	47.3 47.3	47 47	1674	348	80.4	77	2015	48.6 48.6	49 49
	40	1535	356	73.6	66	1885	45.5 45.5	43 43	1584	358	76	70	1936	46.7 46.7	46 46	1634	360	78.4	74	1987	48.0 48.0	48 48
	42	1495	369	71.7	63	1858	44.9 44.9	42 42	1544	371	74.1	66	1908	46.1 46.1	44 44	1593	372	76.5	70	1959	47.3 47.3	47 47
	45	1434	388	68.7	*58*	1817	43.9 43.9	41 41	1482	390	71	62	1866	45.1 45.1	43 43	1530	392	73.4	65	1916	46.3 46.3	45 45
C17	30																					
	35	1795	364	86.2	93	2151	47.5 56.2	47 63	1850	367	88.9	98	2208	48.8 57.7	49 66	1907	369	91.7	104	2267	50.1 59.1	52 70
	38	1733	384	83.2	87	2109	46.6 55.1	45 61	1787	387	85.8	92	2165	47.9 56.6	47 64	1843	389	88.6	98	2223	49.1 58.1	50 67
	40	1690	397	81.1	83	2080	46.0 54.4	44 60	1744	400	83.7	88	2136	47.2 55.9	46 63	1798	403	86.4	94	2192	48.5 57.4	49 66
	42	1646	411	79	80	2050	45.3 53.7	43 59	1699	413	81.6	84	2105	46.6 55.1	45 61	1753	416	84.2	89	2160	47.8 56.6	47 64
	45	1579	431	75.7	74	2003	44.3 52.5	41 56	1631	434	78.3	78	2057	45.6 53.9	43 59	1683	436	80.8	83	2111	46.8 55.3	46 62
C21	30																					
	35	2220	478	106.8	131	2685	64.7 64.7	81 81	2285	483	110	138	2753	66.4 66.4	85 85	2351	488	113.2	146	2823	68.0 68.0	89 89
	38	2147	504	103.2	123	2637	63.6 63.6	79 79	2210	509	106.3	130	2704	65.2 65.2	83 83	2275	513	109.5	137	2773	66.9 66.9	86 86
	40	2096	520	100.8	118	2604	62.9 62.9	77 77	2159	525	103.8	125	2670	64.5 64.5	81 81	2222	530	107	131	2738	66.1 66.1	84 84
	42	894	291	42.8	25	1184	28.6 28.6	19 19														
	45																					

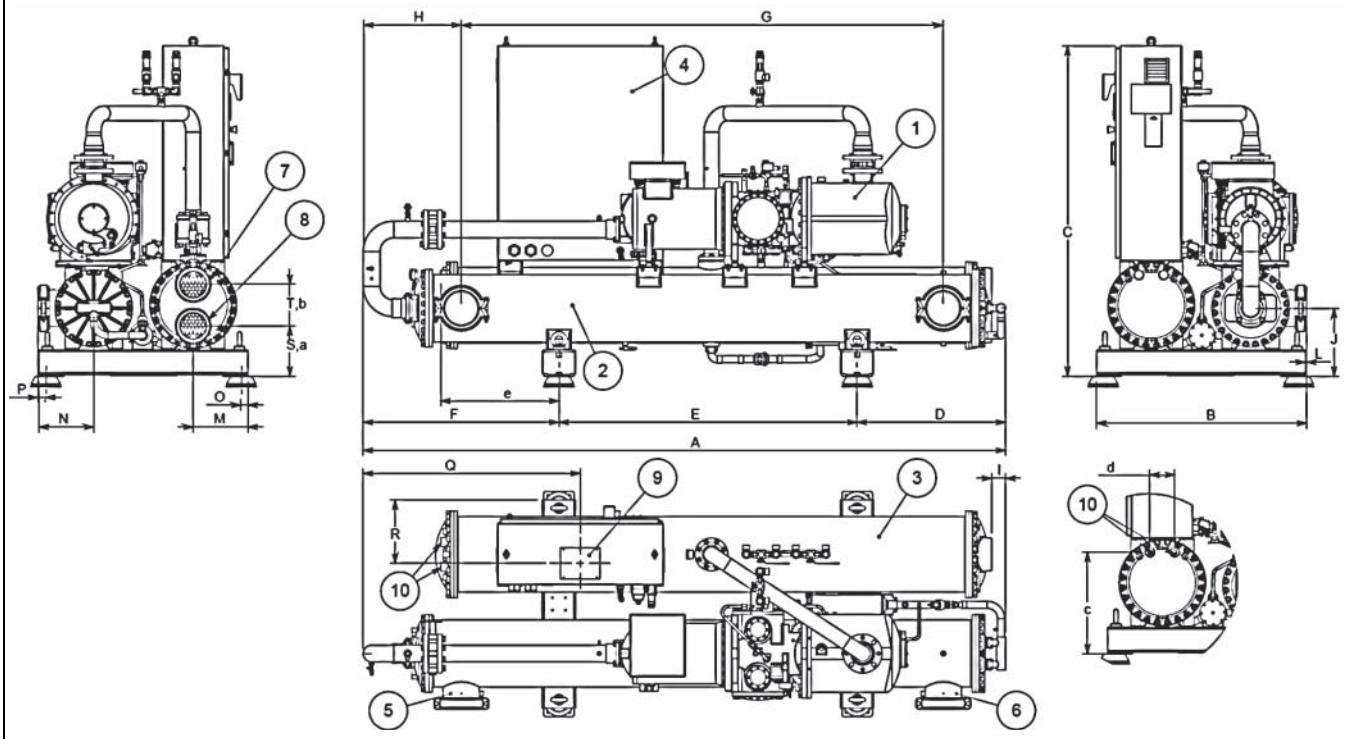
NOTES - ANMERKUNGEN - Σημειώσεις - NOTAS - REMARQUES - NOTE - OPMERKINGEN - примечания

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

SRC_1-2_Rev.01_2_(6-6)

4 Dimensional drawings

4 - 1 Dimensional Drawings



Models	Dimensions (mm)									
EWWQ~B-XS	A	B	C	D	E	F	G	H	I	J
420	3863	1276	2001	924	1800	1134	2920	579	112	342
520	3863	1276	2001	924	1800	1134	2920	579	112	342
640	3863	1276	2001	924	1800	1134	2920	579	112	342
730	3878	1268	2001	897	1800	1181	2910	592	84	412

EWWQ~B-XS	L	M	N	O	P	Q	R	S	T
420	16	330	346	40	56	1118	385	305	252
520	16	330	346	40	56	1118	385	305	252
640	16	330	346	40	56	1118	385	305	252
730	8	330	338	40	48	1310	385	305	252

LEGEND

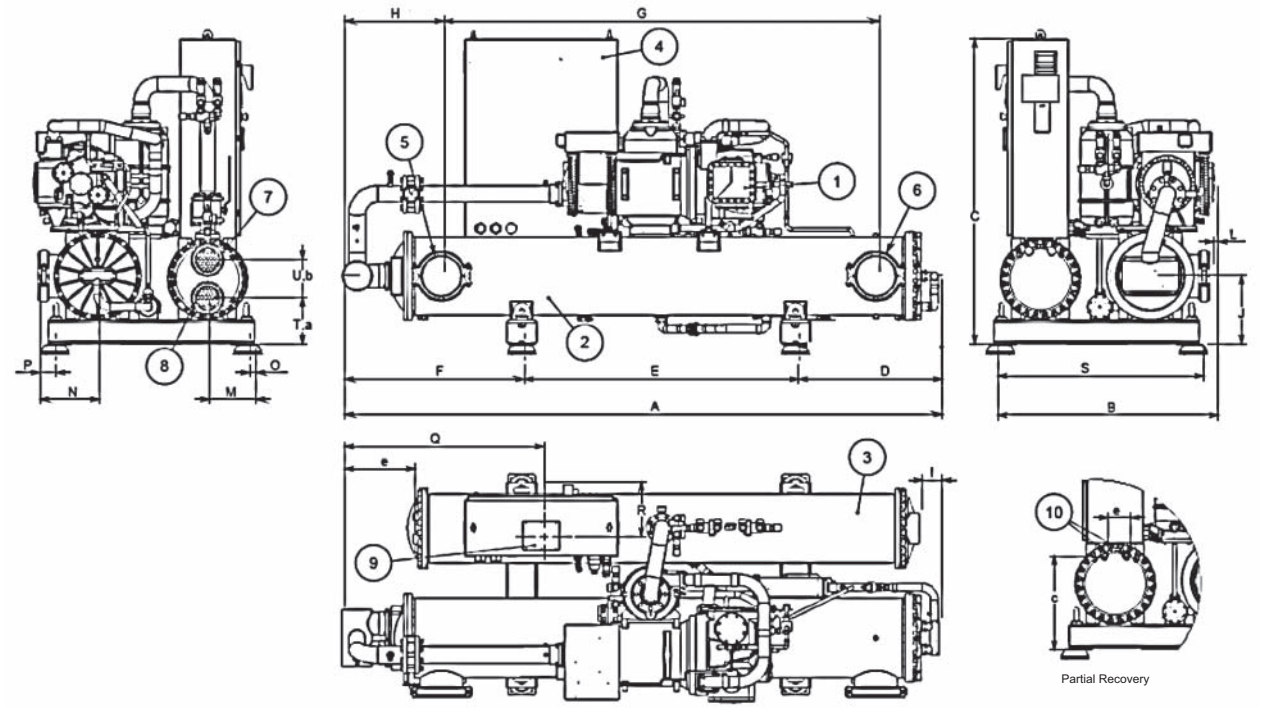
1. Compressor
2. Evaporator
3. Condenser
4. Electrical panel
5. Evaporator water inlet
6. Evaporator water outlet
7. Condenser water inlet
8. Condenser water outlet
9. Power connections slot
10. Partial heat recovery connection (optional)

Models	Partial heat recovery dimensions (mm)				
EWWQ~B-XS	a	b	c	d	e
420	301	210	615	150	715
520	301	210	615	150	715
640	301	210	615	150	715
730	301	210	615	150	715

DMN_1-2-3-4-5-6-7-8_Rev.00_5

4 Dimensional drawings

4 - 1 Dimensional Drawings



Models	Dimensions (mm)									
EWWQ~B-XS	A	B	C	D	E	F	G	H	I	J
800	3878	1314	2003	930	1800	1147	2910	592	119	412
970	3919	1446	2003	930	1800	1179	2856	651	128	450
C11	3919	1446	2003	941	1800	1179	2856	651	128	450

EWWQ~B-XS	L	M	N	O	P	Q	R	S	T	U
800	46	330	338	40	48	1140	385	1260	305	252
970	30	305	389	40	106	1307	360	1350	305	252
C11	30	305	389	40	106	1307	360	1350	305	252

LEGEND

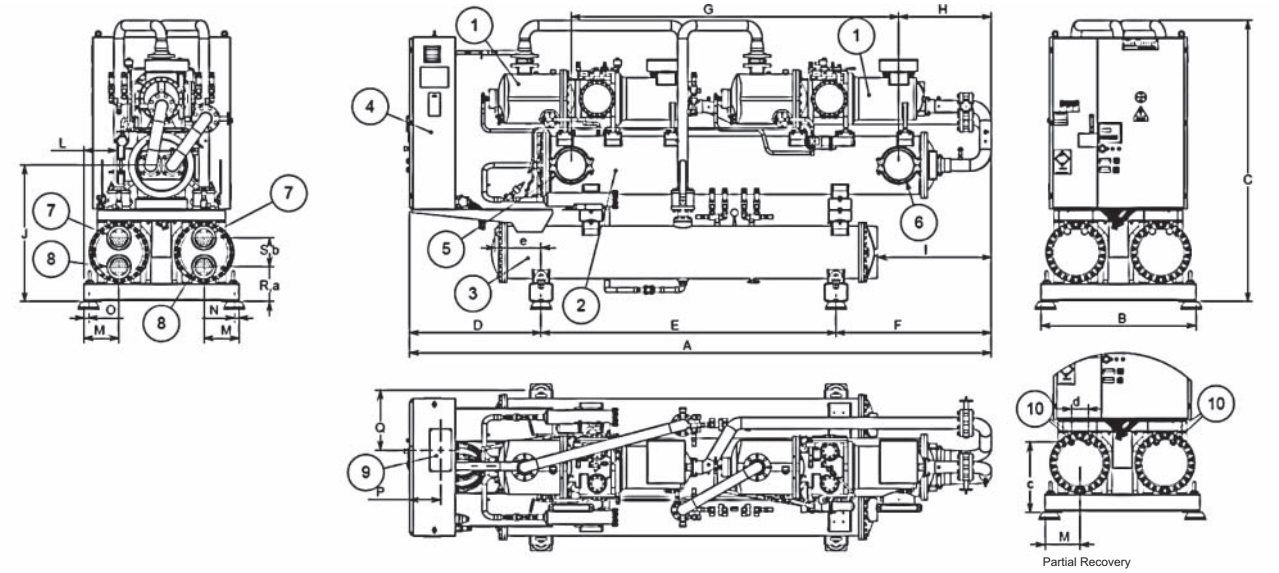
1. Compressor
2. Evaporator
3. Condenser
4. Electrical panel
5. Evaporator water inlet
6. Evaporator water outlet
7. Condenser water inlet
8. Condenser water outlet
9. Power connections slot
10. Partial heat recovery connection (optional)

Models	Partial heat recovery dimensions (mm)				
EWWQ~B-XS	a	b	c	d	e
800	301	210	497	112	200
970	301	210	615	150	464
C11	301	210	615	150	464

DMN_1-2-3-4-5-6-7-8_Rev.00_6

4 Dimensional drawings

4 - 1 Dimensional Drawings



Models	Dimensions (mm)									
EWWQ~B-XS	A	B	C	D	E	F	G	H	I	J
C10	5219	1350	2454	1147	2570	1503	3150	808	1146	1191
C12	5219	1350	2454	1147	2570	1503	3150	808	1146	1191
C13	5219	1350	2454	1147	2570	1503	3150	808	1146	1191
C14	5219	1350	2454	1147	2570	1503	3150	808	1146	1191
C15	5219	1350	2454	1147	2570	1503	3150	808	1146	1191

EWWQ~B-XS	L	M	N	O	P	Q	R	S
C10	337	305	40	40	272	525	305	252
C12	337	305	40	40	272	525	305	252
C13	337	305	40	40	272	525	305	252
C14	337	305	40	40	272	525	305	252
C15	286	305	40	40	272	525	305	252

LEGEND

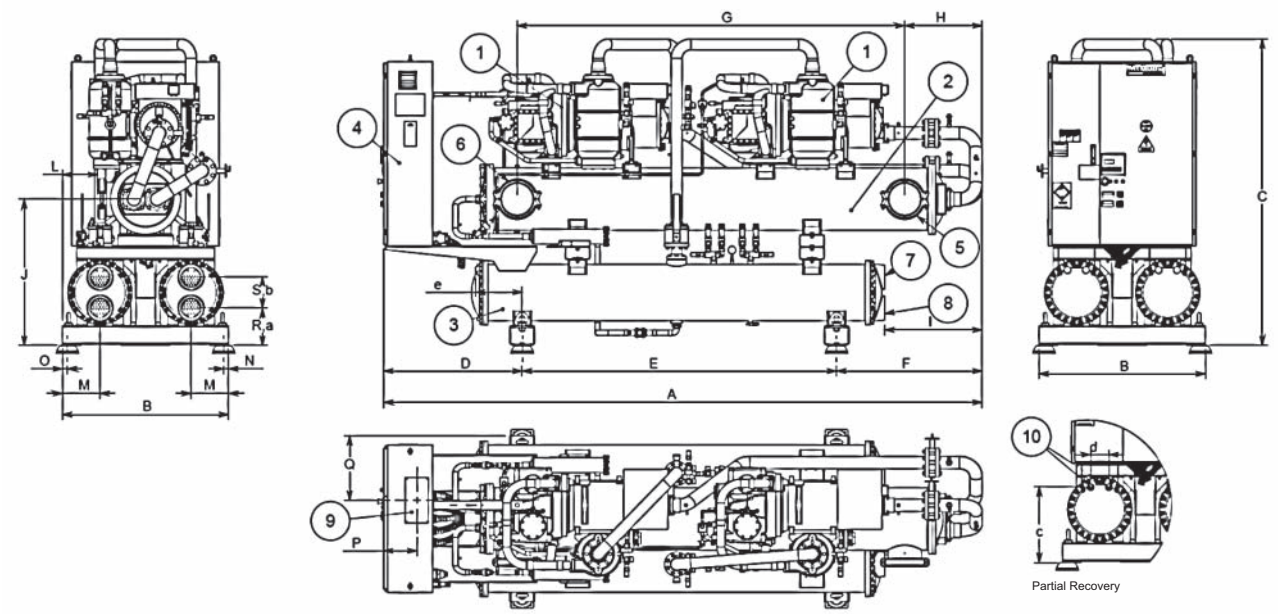
1. Compressor
2. Evaporator
3. Condenser
4. Electrical panel
5. Evaporator water inlet
6. Evaporator water outlet
7. Condenser water inlet
8. Condenser water outlet
9. Power connections slot
10. Partial heat recovery connection (optional)

Models	Partial heat recovery dimensions (mm)				
EWWQ~B-XS	a	b	c	d	e
C10	300	210	615	150	400
C12	300	210	615	150	400
C13	300	210	615	150	400
C14	300	210	615	150	400
C15	300	210	615	150	400

DMN_1-2-3-4-5-6-7-8_Rev.00_7

4 Dimensional drawings

4 - 1 Dimensional Drawings



Models	Dimensions (mm)									
EWWQ~B-XS	A	B	C	D	E	F	G	H	I	J
C16	4829	1350	2495	1056	2555	1218	2856	626	824	1191
C17	4829	1350	2495	1056	2555	1218	2856	626	824	1191
C19	4829	1350	2495	1056	2555	1218	2856	626	824	1191
C20	4829	1350	2495	1127	2555	1183	3150	629	789	1191
C21	4829	1350	2495	1127	2555	1183	3150	629	789	1191

EWWQ~B-XS	L	M	N	O	P	Q	R	S
C16	286	305	40	40	272	525	305	252
C17	286	305	40	40	272	525	305	252
C19	286	305	40	40	272	525	305	252
C20	286	305	40	40	272	525	305	252
C21	286	305	40	40	272	525	305	252

LEGEND

1. Compressor
2. Evaporator
3. Condenser
4. Electrical panel
5. Evaporator water inlet
6. Evaporator water outlet
7. Condenser water inlet
8. Condenser water outlet
9. Power connections slot
10. Partial heat recovery connection (optional)

Models	Partial heat recovery dimensions (mm)				
EWWQ~B-XS	a	b	c	d	e
C16	301	210	615	150	380
C17	301	210	615	150	380
C19	301	210	615	150	380
C20	301	210	615	150	380
C21	301	210	615	150	380

DMN_1-2-3-4-5-6-7-8_Rev.00_8

5 Sound data

5 - 1 Sound Level Data

Sound Level

EWWQ~B-SS

Unit size	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)
380	55.1	59.4	71.6	84.1	71.9	72.5	58.5	53.2	**82.2**	**100.2**
460	55.9	60.2	72.4	84.9	72.7	73.3	59.3	54.0	**83.0**	**101.2**
560	56.8	61.1	73.3	85.8	73.6	74.2	60.2	54.9	**83.9**	**102.3**
640	56.8	61.1	73.3	85.8	73.6	74.2	60.2	54.9	**83.9**	**102.3**
730	56.1	60.4	72.6	85.1	72.9	73.5	59.5	54.2	**83.2**	**101.5**
800	56.9	61.2	73.4	85.9	73.7	74.3	60.3	55.0	**84.0**	**104.7**
860	57.8	62.1	74.3	86.8	74.6	75.2	61.2	55.9	**84.9**	**102.3**
870	58.1	62.4	74.6	87.1	74.9	75.5	61.5	56.2	**85.2**	**104.7**
960	58.1	62.4	74.6	87.1	74.9	75.5	61.5	56.2	**85.2**	**105.1**
C10	58.5	62.8	75.0	87.5	75.3	75.9	61.9	56.6	**85.6**	**103.2**
C11	58.9	63.2	75.4	87.9	75.7	76.3	62.3	57.0	**86.0**	**104.7**
C12	59.4	63.7	75.9	88.4	76.2	76.8	62.8	57.5	**86.5**	**105.2**
C13	59.8	64.1	76.3	88.8	76.6	77.2	63.2	57.9	**86.9**	**106.5**
C14	59.8	64.1	76.3	88.8	76.6	77.2	63.2	57.9	**86.9**	**106.5**
C15	59.1	63.4	75.6	88.1	75.9	76.5	62.5	57.2	**86.2**	**105.8**
C16	59.5	63.8	76.0	88.5	76.3	76.9	62.9	57.6	**86.6**	**106.2**
C17	59.9	64.2	76.4	88.9	76.7	77.3	63.3	58.0	**87.0**	**106.6**
C19	60.4	64.7	76.9	89.4	77.2	77.8	63.8	58.5	**87.5**	**107.1**
C20	60.8	65.1	77.3	89.8	77.6	78.2	64.2	58.9	**87.9**	**107.5**

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

EWWQ~B-XS

Unit size	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)
420	55.1	59.4	71.6	84.1	71.9	72.5	58.5	53.2	**82.2**	**100.9**
520	55.9	60.2	72.4	84.9	72.7	73.3	59.3	54.0	**83.0**	**101.7**
640	56.8	61.1	73.3	85.8	73.6	74.2	60.2	54.9	**83.9**	**102.6**
730	56.8	61.1	73.3	85.8	73.6	74.2	60.2	54.9	**83.9**	**102.7**
800	56.1	60.4	72.6	85.1	72.9	73.5	59.5	54.2	**83.2**	**102.0**
970	56.9	61.2	73.4	85.9	73.7	74.3	60.3	55.0	**84.0**	**102.9**
C10	58.5	62.8	75.0	87.5	75.3	75.9	61.9	56.6	**85.6**	**105.2**
C11	57.8	62.1	74.3	86.8	74.6	75.2	61.2	55.9	**84.9**	**103.8**
C12	58.9	63.2	75.4	87.9	75.7	76.3	62.3	57.0	**86.0**	**105.6**
C13	59.4	63.7	75.9	88.4	76.2	76.8	62.8	57.5	**86.5**	**106.1**
C14	59.8	64.1	76.3	88.8	76.6	77.2	63.2	57.9	**86.9**	**106.5**
C15	59.8	64.1	76.3	88.8	76.6	77.2	63.2	57.9	**86.9**	**106.5**
C16	59.1	63.4	75.6	88.1	75.9	76.5	62.5	57.2	**86.2**	**105.8**
C17	59.5	63.8	76.0	88.5	76.3	76.9	62.9	57.6	**86.6**	**106.2**
C19	59.9	64.2	76.4	88.9	76.7	77.3	63.3	58.0	**87.0**	**106.6**
C20	60.4	64.7	76.9	89.4	77.2	77.8	63.8	58.5	**87.5**	**107.1**
C21	60.8	65.1	77.3	89.8	77.6	78.2	64.2	58.9	**87.9**	**107.5**

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

5 Sound data

5 - 1 Sound Level Data

Sound Level

EWWQ~B-SS

Unit size	Distance					
	1m	5m	10m	15m	20m	25m
380	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
460	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
560	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
640	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
730	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
800	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
860	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
870	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
960	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C10	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
C11	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C12	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C13	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C14	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C15	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C16	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C17	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C19	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C20	0.0	-7.5	-12.2	-15.3	-17.5	-19.3

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

EWWQ~B-XS

Unit size	Distance					
	1m	5m	10m	15m	20m	25m
420	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
520	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
640	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
730	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
800	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
970	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
C10	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C11	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
C12	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C13	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C14	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C15	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C16	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C17	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C19	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C20	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
C21	0.0	-7.5	-12.2	-15.3	-17.5	-19.3

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

NSL_1-2_Rev.00_2

6 Installation

6 - 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.

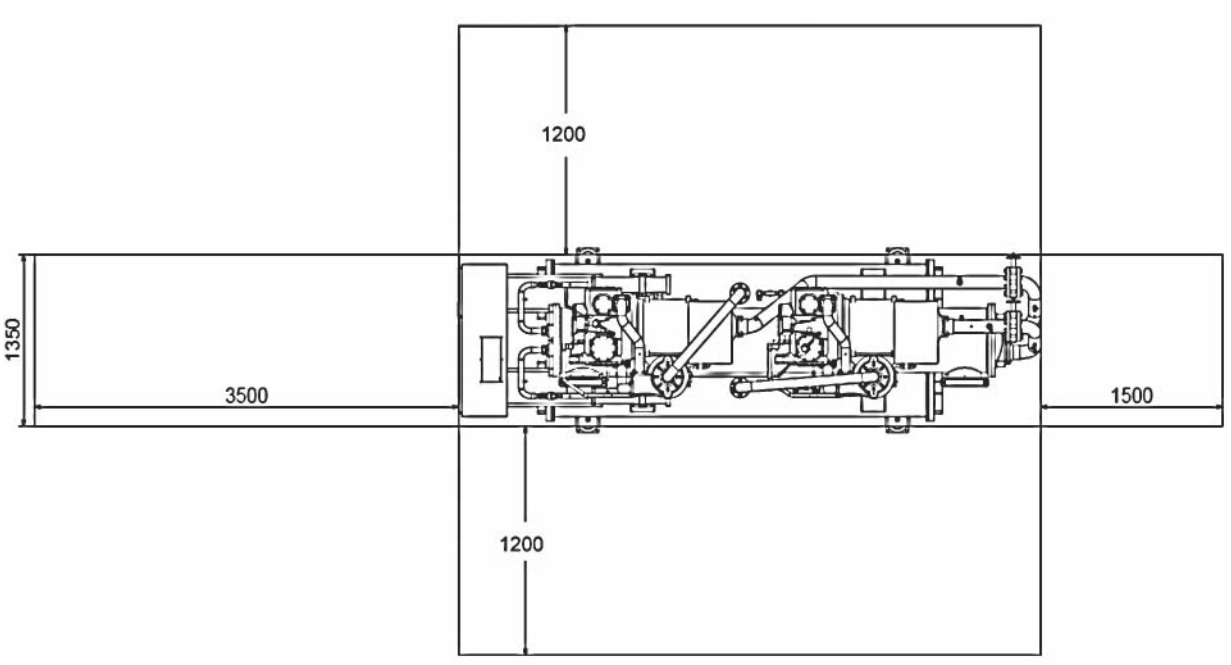
Location

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:

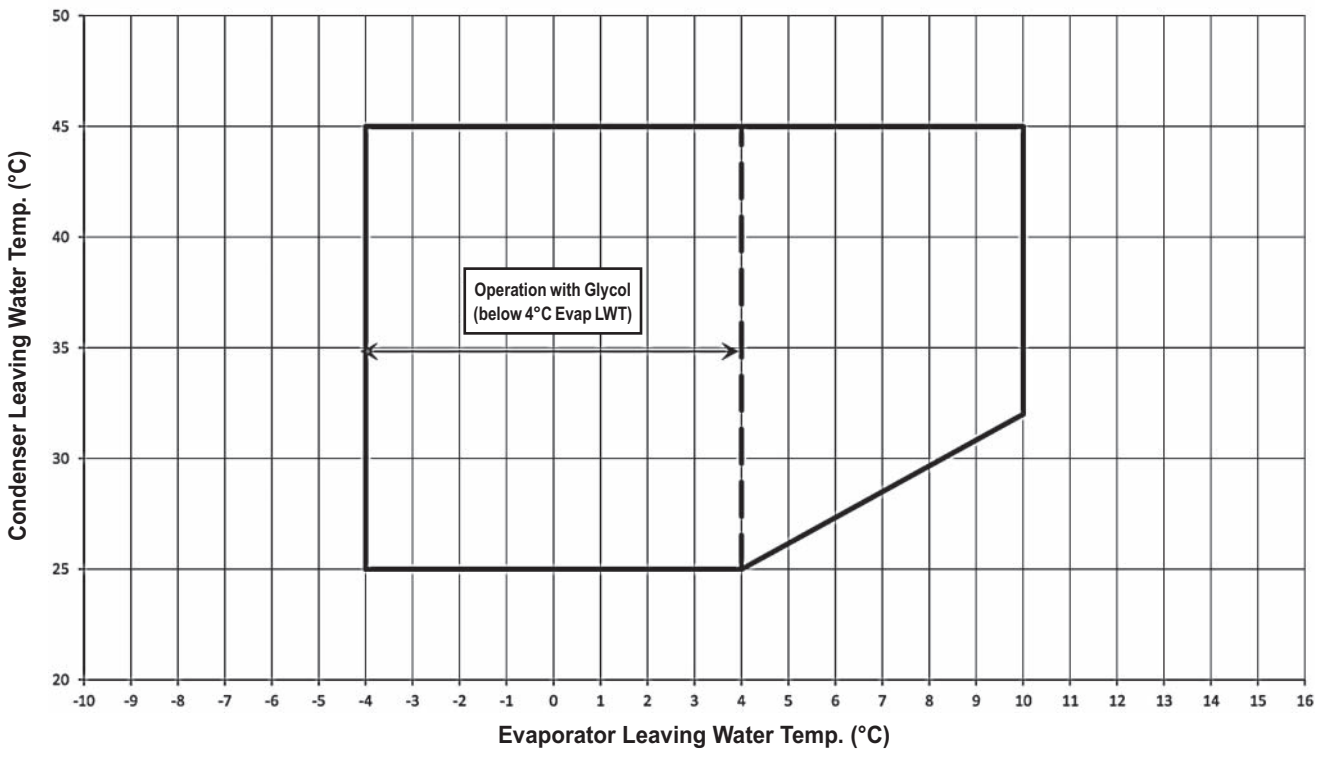


Minimum clearance requirements for machine maintenance

INN_Rev.00_1

7 Operation range

7 - 1 Operation Range



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

7 Operation range

7 - 1 Operation Range

Table 1 - Evaporator minimum and maximum water Δt

Max evaporator water Δt	°C	6
Min evaporator water Δt	°C	4
Min condenser water Δt	°C	4
Max condenser water Δt	°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 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

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7 Operation range

7 - 1 Operation Range

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 Evaporatore 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:	**EWWQ380B-SS**
Mixture:	Water
Working condition:	ELWT 12/7°C – CLWT 30/35°C
- Cooling capacity:	380 kW
- Power input:	84.5 kW
- Flow rate (Δt 5°C):	18.2 l/s
- Evaporator pressure drop:	47 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:	380 x 0.972 = 369 kW
- Power input:	84.5 x 0.986 = 83.3 kW
- Flow rate (Δt 5°C):	17.6 (referred to 369 kW) x 1.074 = 18.9 l/s
- Evaporator pressure drop:	44 (referred to 17.6 l/s) x 1.181 = 52kPa

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 Evaporatore 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:	**EWWQ380B-SS**
Mixture:	Water
Standard working condition	ELWT 12/7°C – CLWT 35/40°C
- Cooling capacity:	354 kW
- Power input:	94.2 kW
- Flow rate (Δt 5°C):	16.9 l/s
- Evaporator pressure drop:	41 kPa
Mixture:	Water + Glycol 30% (for a low evaporator leaving temperature of -1/-6°C)
Working condition:	ELWT 2/-3°C – CLWT 35/40°C
- Cooling capacity:	354 x 0.670 x 0.932 = 221 kW
- Power input:	94.2 x 0.890 x 0.969 = 81 kW
- Flow rate (Δt 5°C):	10.56 l/s (referred to 221 kW) x 1.056 = 11.2 l/s
- Evaporator pressure drop:	19 kPa (referred to 11.2 l/s) x 1.496 = 29 kPa

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7 Operation range

7 - 1 Operation Range

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	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO3/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO2/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	[mgS2-/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH+4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO2/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.

OPL_1-2-3-4-5_Rev.00_4

7 Operation range

7 - 1 Operation Range

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 compressor unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressor 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

8 Hydraulic performance

8 - 1 Water Pressure Drop Curve Evaporator

EWWQ~B-SS

	380	460	560	640	730	800	860	870	960	C10	C11	C12	C13	C14	C15	C16	C17	C19	C20
Cooling Capacity (kW)	380	464	562	637	727	796	862	872	960	1007	1055	1185	1255	1325	1460	1584	1748	1888	2050
Water Flow (l/s) - Evaporator	18.2	22.2	26.8	30.4	34.7	38.0	41.2	41.7	45.9	48.1	50.4	56.6	60.0	63.3	69.8	75.7	83.5	90.2	98.0
Evaporator Pressure Drops (kPa)	47	63	43	46	53	52	48	62	57	55	67	43	48	53	58	67	86	95	119
Water Flow (l/s) - Condenser	22.2	27.2	32.9	37.3	42.7	1) 23.1 2) 23.1	50.87	1) 23.4 2) 27.4	1) 27.9 2) 27.9	59.6	1) 27.6 2) 33.6	1) 34.3 2) 34.3	1) 33.4 2) 39.2	1) 38.4 2) 38.4	1) 42.6 2) 42.6	1) 42.7 2) 50.2	1) 51.0 2) 51.0	1) 50.8 2) 59.8	1) 59.8 2) 59.8
Condenser Pressure Drops (kPa)	58	62	66	63	15	1) 62 2) 62	19	1) 62 2) 65	1) 65 2) 65	25	1) 65 2) 67	1) 70 2) 70	1) 70 2) 67	1) 67 2) 67	1) 16 2) 16	1) 16 2) 18	1) 16 2) 16	1) 16 2) 14	1) 14 2) 14

NOTES

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

EWWQ~B-XS

	420	520	640	730	800	970	C10	C11	C12	C13	C14	C15	C16	C17	C19	C20	C21
Cooling Capacity (kW)	422	516	639	725	801	973	1037	1116	1158	1270	1369	1449	1573	1733	1863	2020	2152
Water Flow (l/s) - Evaporator	20.2	24.6	30.5	34.6	38.3	46.5	49.6	53.3	55.3	60.7	65.4	69.2	75.1	82.8	89.0	96.5	102.8
Evaporator Pressure Drops (kPa)	56.8	70.2	73.1	65.5	57.8	54.9	54.9	70.3	64.5	55.9	68.4	76.2	71.3	90.6	92.6	114.7	129.2
Water Flow (l/s) - Condenser	24.2	29.5	36.5	41.4	45.8	55.7	1) 29.5 2) 29.5	64.2	1) 29.6 2) 36.3	1) 36.3 2) 36.3	1) 36.7 2) 41.2	1) 41.2 2) 41.2	1) 44.9 2) 44.9	1) 44.6 2) 54.4	1) 53.3 2) 53.3	1) 53.2 2) 62.6	1) 61.9 2) 61.9
Condenser Pressure Drops (kPa)	50	40	41	46	60	64	1) 39 2) 39	84	1) 35 2) 48	1) 48 2) 48	1) 49 2) 46	1) 46 2) 46	1) 43 2) 43	1) 43 2) 62	1) 60 2) 60	1) 52 2) 79	1) 78 2) 78

NOTES

Water flow and pressure drop referred to nominal condition: evaporator water in/out: 12/7°C – condenser water inlet: 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 conditions, 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 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 (evaporator)

The unit EWWQ380B-SS has been selected for working at the following conditions:
- evaporator water in/out: 11/6°C
- condenser water in/out: 30/35°C

The cooling capacity at these working conditions is: 369 kW
The evaporator water flow at these working conditions is: 17.6 l/s

The unit EWWQ380B-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: 380 kW
The evaporator water flow at these working conditions is: 18.2 l/s
The evaporator pressure drop at these working conditions is: 47 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 47\ (kPa) \times \left(\frac{17.6\ (l/s)}{18.2\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 44\ (kPa)$$

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

8 Hydraulic performance

8 - 2 Pump Characteristics

EWWQ~B-XS

	Heat Recovery Leaving Water Temperature (Δ=5°C)		
	45	50	55
	Hc (kW)	Hc (kW)	Hc (kW)
420	54.4	37.5	21.3
520	65.5	45.9	27.1
640	77.4	52.4	28.5
730	93.6	65.3	38.3
800	106	76.0	47.1
970	125	86.0	48.5
C10	132	89.7	50.0
C11	152	110	69.1
C12	149	104	60.4
C13	163	112	63.0
C14	175	122	71.5
C15	183	124	67.5
C16	203	140	79.6
C17	228	162	98.1
C19	253	178	106
C20	276	199	126
C21	302	217	136

NOTES

- Evaporator Leaving Water Temperature 7°C - ΔT = 5°C
- Condenser Leaving Water Temperature 35°C -ΔT= 5°C

OPT_1-2-3-4_Rev.00_2

EWWQ~B-SS

	380	460	560	640	730	800	860	870	960	C10	C11	C12	C13	C14	C15	C16	C17	C19	C20
Heating Capacity (kW)	54.2	66.2	83.0	89	119	114	146	129	137	175	157	172	185.3	194	254.4	282	301	318.7	344.4
Water Flow (l/s)	2.59	3.16	3.97	4.25	5.70	5.46	6.95	6.18	6.56	8.34	7.52	8.23	8.85	9.27	12.2	13.5	14.4	15.2	16.5
Heat Recovery Pressure Drops (kPa)	34	45	32	34	39	38	35	45	41	40	49	32	35	39	42	49	62	69	86

NOTE

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

EWWQ~B-XS

	420	520	640	730	800	970	C10	C11	C12	C13	C14	C15	C16	C17	C19	C20	C21
Heating Capacity (kW)	54.4	65.5	77.4	93.6	106	125	132	152	149	163	175	183	203	228	253	276	302
Water Flow (l/s)	2.60	3.13	3.70	4.47	5.08	5.99	6.28	7.28	7.11	7.80	8.38	8.72	9.71	10.9	12.1	13.2	14.4
Heat Recovery Pressure Drops (kPa)	41	51	53	47	42	40	40	51	47	41	50	55	52	66	67	84	94

NOTE

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_Rev.00_3

8 Hydraulic performance

8 - 2 Pump Characteristics

To determinate the pressure drop for different versions or at different working conditions, 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:

8

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 EWWQ380B-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: 38.5 Kw
The water flow at these working conditions is: 1.84 l/s

The unit EWWQ380B-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: 54.2 kW
The water flow at these working conditions is: 2.59 l/s
The pressure drop at these working conditions is: 34 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = \mathbf{34}\ (kPa) \times \left(\frac{\mathbf{1.84}\ (l/s)}{\mathbf{2.59}\ (l/s)} \right)^{1.80}$$

$$PD_2\ (kPa) = \mathbf{18}\ (kPa)$$

OPT_1-2-3-4_Rev.00_4

9 Specification text

9 - 1 Specification Text

The EWWQ~B- water cooled chillers, featuring 1 or 2 single screw compressors, 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 EWWQ~B- chiller unmatched in the industry.

Seasonal quietness

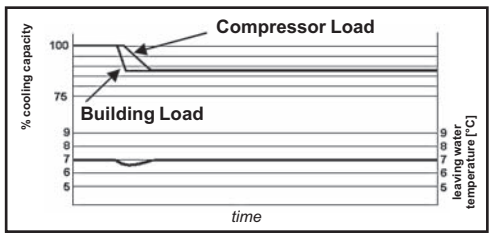
The compressor design with a single screw and twin rotors allows a constant gas flow. This compression process completely eliminates gas pulsations. The oil injection also results in significant mechanical noise reduction.

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 EWWQ~B- chiller for all applications.

The reduced number of vibrations produced from the EWWQ~B- chiller offers a surprisingly quiet operation eliminating the noise transmission through the structure and the chilled water piping system.

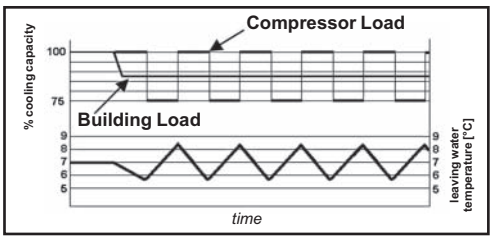
Infinitely capacity control

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

Outstanding reliability features

- Zero clearance fit between the gaterotor/s 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 III controller's control logic provides excellent operating efficiencies both at full and part load operation.
- Infinite unloading matches compressor capacity to load.

FTA_1-2_Rev.00_1

9 Specification text

9 - 1 Specification Text

- Full factory testing of the unit with water hookups helps provide 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.
- The rugged design of the single-screw compressor allows it to be tolerant of liquid slugging. Screw chiller will start and operate under conditions that would often destroy other compressors.
- Very low loading enhances the bearing and compressor reliability. Balanced forces result in the elimination of the high loads inherent in twin-screw compressors.
- Integral to the basic design of the single-screw compressor, the main screw rotor shaft and the gaterotor shaft/s 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.

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.).

Versions

EWWQ~B- is available in two different Efficiency Versions:

S: Standard Efficiency

19 sizes, covering a cooling capacity range from 380 up to 2050 kW, EER up to 4.64 and ESEER up to 5.64.

X: High Efficiency

17 sizes, covering a cooling capacity range from 422 up to 2152 kW, EER up to 5.09 and ESEER up to 6.28.

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 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%)
Air inlet condenser temperature (°C)	30	26	22	18

Sound configuration

EWWQ~B- is available in standard sound level configuration:

S: Standard Noise

FTA_1-2_Rev.00_2

9 Specification text

9 - 1 Specification Text

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. EWWQ~B- 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-410A refrigerant
The compressors have been designed to operate with R-410A, 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. is manufactured in accordance to PED approval. The condenser water outlet connections are provided with Victaulic Kit (as standard).
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

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- (Common) Evaporator
- Condenser
- Oil pressure transducer
- High and low pressure switches
- 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

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

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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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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)
Wye-Delta Compressor starter (Y-Δ) - For low inrush current and reduced starting torque.
Double set-point - Dual leaving water temperature set-points.
Phase monitor - The phase monitor controls that phases sequence is correct and controls phase loss.
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 Valve
High Pressure Side Manometers
Hour Run meter - Digital compressors hour run meter
General fault contactor - Alarm relay.
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).
Double pressure relief valve with diverter (standard on high pressure side, available as option on low pressure side)

Options (on request)
Partial heat recovery - enabled through a shell & tube exchanger sited between the compressor and the condenser, completely dedicated to the heat recovery. These allow hot water to be produced up to a maximum temperature of 58°C.
Soft start - Electronic starting device to reduce the mechanical stress during compressor start-up
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Compressor thermal overload relays - Safety devices against compressor motor overloading in addition to the normal protection envisaged by the electrical windings.
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
Condenser power factor correction - Installed on the electrical control panel to ensure it conforms to the plant rules. (Daikin advices maximum 0.9).
Current limit / display - this option allows monitoring the chiller absorbed current with possibility to set a limit value. This option excludes the Demand Limit.
Compressors circuit breakers
20mm Evaporator/ Condenser Insulation
Condenser Victaulic Kit

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Condenser / evaporator double flange 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.
Evaporator electric heater - electric heater controlled by a thermostat to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.
Evaporator flow switch supplied separately to be wired and installed on the evaporator water piping (by the customer).
Discharge line shut-off valves - installed on the discharge port of the compressor to facilitate maintenance operations.
Suction line shut off valve - installed on the suction port of the compressor to facilitate maintenance operation.
Container kit
Rubber type antivibration mounts - Supplied separately, these are positioned under the base of the unit during installation to reduce vibrations.
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.
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 – On request, a test can be carried out at customer’s presence (not available for units with glycol mixtures)

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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-410A 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, electronic expansion device (EEXV), refrigerant direct expansion shell & tube heat exchangers, R-410A refrigerant, lubrication system, motor starting components, control system and all components necessary for safe and stable unit operation.

Chiller will be factory assembled on a robust base-frame made of zinc coated steel, protected by an epoxy paint.

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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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 through service replaceable, 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 not be 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.
- ✓ The compressor shall be equipped with an electric oil-crankcase heater.
- ✓ Compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

Cooling capacity control system

- ✓ Each unit will have a microprocessor for the control of compressor 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 manage frequency level of the compressor electric motor to exactly match plant load request in order to keep the set point constant 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:
  - ○ High condenser pressure
  - ○ Low evaporating refrigerant temperature
  - ○ 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.

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9 Specification text

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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, compressor discharge shut-off valve, 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.

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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"

BARCODE

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