DAIKIN

Chillers

Commercial and Technical Data

Water cooled chiller

- **Wide capacity range (330kW – 1,500kW)**
- **Indoor installations**
- **Independent refrigerant circuits with single screw compressor**
- **Water supply down to -8°C (optional)**
- **Two efficiency versions available**
- **New Microtech III controller**

ECDEN12-424

EWWD-I-XS
330~1,500 kW

R-134a

Daikin Europe N.V.

About Daikin

Daikin has a worldwide reputation based on over 85 years' experience in the successful manufacture of high quality air conditioning equipment for industrial, commercial and residential use. Daikin's much envied quality quite simply stems from the close attention paid to design, production and testing, as well as aftersales support. To this end, every component is carefully selected and rigorously tested to verify its contribution to product quality and reliability.

New Daikin EWWD-I- water cooled chiller range with upgraded controller

In order to upgrade the chiller portfolio with a superior control logic, Daikin enhances today the EWWD-I- series incorporating the new Microtech III controller.

Microtech III ensures maximum efficiency and reliability, stable operating conditions and protection of critical components.

The new range is composed of 18 sizes and available in two efficiency versions (standard and high), with EER up to 5.12 and ESEER up to 6.31. Each unit is equipped with one, two or three R-134a refrigerant circuits, featuring shell & tube heat exchangers and single screw compressors with stepless capacity control, allowing the chiller to modulate its capacity from 100% to 8.33%.

Moreover, the range features an extensive option list including the heat recovery and the low water leaving temperature version, to provide water down to -8°C.

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Chiller features

Application flexibility

The EWWD-I- series is available in a wide range of capacities (330 - 1,500kW), allowing project solutions for an extensive range of applications.
The most commonly serviced parts are easily accessible, simplifying maintenance and service. Moreover, the new chillers allow flexible integration into a wide range of control and building management systems.

Large operation range

With the 'brine' option the new range is able to provide water down to -8°C, making the chiller models suitable also for some typical industrial applications.

Compact design for indoor installations

Water cooled units are typically intended for indoor installation and operation, resulting in acoustic isolation and also zero impact on the building layout.
The EWWD-I-series features a compact design, ideal for easy replacement, retrofit or new constructions.

Superior control logic

The new Microtech III controller provides an easy to use control environmental. The control logic is designed to provide maximum efficiency, to continue operation in unusual operating conditions and to provide a history of unit operation. One of the greatest benefits is the easy interface with Lonwork, BACnet, Ethernet TCP/IP or Modbus communications.

Extensive option list

The base model includes several standard factory mounted options such as: electronic expansion valve, phase monitor, wye – delta starter, etc. Moreover, the new range features an extensive option list, including heat recovery, brine version, soft starter, energy meter, etc.

1 Features

- High efficiency
- All models are PED pressure vessel approved
- Stepless single-screw compressor
- Optimised for use with R-134a
- Cooling range: 362–1,134kW
- EER range from 4.73 to 5.10
- 1 or 2 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side to minimize pressure drops
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWWD360I-XS	EWWD440I-XS	EWWD500I-XS	EWWD600I-XS	EWWD750I-XS	EWWD800I-XS
Cooling capacity	Nom.			kW	362 (1)	433 (1)	506 (1)	573 (1)	720 (1)	795 (1)
Heating capacity	Nom.			kW	411 (2)	493 (2)	577 (2)	660 (2)	823 (2)	908 (2)
Capacity control	Method				Stepless					
	Minimum capacity			%	25.0				12.5	
Power input	Cooling	Nom.		kW	71.0 (1)	85.4 (1)	100 (1)	121 (1)	141 (1)	156 (1)
	Heating	Nom.		kW	85.9 (2)	103 (2)	121 (2)	143 (2)	172 (2)	189 (2)
EER					5.10 (1)	5.07 (1)	5.06 (1)	4.75 (1)	5.09 (1)	5.10 (1)
ESEER					5.34	5.27	5.22	5.11	6.13	6.31
COP					4.78 (2)	4.79 (2)	4.77 (2)	4.62 (2)	4.78 (2)	4.80 (2)
IPLV					5.72	5.63	5.57	5.47	6.45	6.89
Casing	Colour				Ivory white					
	Material				Galvanized and painted steel sheet					
Dimensions	Unit	Height		mm	1,883				2,245	
		Width		mm	1,430				1,350	
		Depth		mm	4,012				4,782	
Weight	Unit			kg	2,594	2,667	2,704		4,964	4,997
	Operation weight			kg	2,998	3,078	3,116		5,582	5,615
Water heat exchanger - evaporator	Type				Single pass shell and tube					
	Water volume			l	326	317	308		539	
	Water flow rate	Nom.		l/s	17.3	20.7	24.1	27.3	34.4	37.9
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	64		54	68	58	68
	Insulation material				Closed cell					
Water heat exchanger - condenser	Type				Single pass shell and tube					
	Water flow rate	Nom.		l/s	20.9	25.0	29.2	33.4	20.8	21.0
	Nominal water pressure drop	Cooling		kPa	48	67	51	66	48	
	Nominal water pressure drop 2	Cooling		kPa	-				48	66
	Model	Quantity			1				2	
Sound power level	Cooling	Nom.		dBA	94	97				
Sound pressure level	Cooling	Nom.		dBA	75 (3)	76 (3)	78 (3)			
Compressor	Type				Single screw compressor					
	Quantity				1				2	
	Oil	Charged volume		l	16				32	
Operation range	Evaporator	Cooling	Min.	ºCDB	-8					
			Max.	ºCDB	15					
	Condenser	Cooling	Min.	ºCDB	20					
			Max.	ºCDB	55					
Refrigerant	Type				R-134a					
	Circuits	Quantity			1				2	
Refrigerant circuit	Charge			kg	90	87	85		180	177
Piping connections	Evaporator water inlet/outlet (OD)				168.3mm				219.1mm	
	Condenser water inlet/outlet (OD)				5"					
Safety devices	Item	01			High discharge pressure (pressure switch)					
		02			High discharge pressure (pressure transducer)					
		03			Low suction pressure (pressure transducer)					
		04			Compressor motor protection					
		05			High discharge temperature					
		06			Low oil pressure					
		07			Low pressure ratio					
		08			High oil filter pressure drop					
		09			Phase monitor					
		10			Emergency stop					
		11			Water freeze protection controller					

2 Specifications

2-1 Technical Specifications					EWWD850I-XS	EWWD950I-XS	EWWDC10I-XS	EWWDC11I-XS	EWWDC12I-XS
Cooling capacity	Nom.			kW	866 (1)	933 (1)	976 (1)	1,038 (1)	1,134 (1)
Heating capacity	Nom.			kW	990 (2)	1,069 (2)	1,126 (2)	1,203 (2)	1,313 (2)
Capacity control	Method				Stepless				
	Minimum capacity			%	12.5				
Power input	Cooling	Nom.		kW	170 (1)	185 (1)	199 (1)	219 (1)	240 (1)
	Heating	Nom.		kW	206 (2)	223 (2)	240 (2)	263 (2)	285 (2)
EER					5.08 (1)	5.05 (1)	4.90 (1)	4.73 (1)	
ESEER					6.01	6.14	5.9	6.05	5.67
COP					4.81 (2)	4.79 (2)	4.69 (2)	4.57 (2)	4.61 (2)
IPLV					6.33	6.63	6.19	6.35	5.97
Casing	Colour				Ivory white				
	Material				Galvanized and painted steel sheet				
Dimensions	Unit	Height		mm	2,245				
		Width		mm	1,350				
		Depth		mm	4,782				
Weight	Unit			kg	5,049	5,073	5,097	5,132	
	Operation weight			kg	5,671	5,695	5,729	5,741	
Water heat exchanger - evaporator	Type				Single pass shell and tube				
	Water volume			l	528			504	
	Water flow rate	Nom.		l/s	41.3	44.5	46.6	49.5	54.1
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	56	64	72	46	52
	Insulation material				Closed cell				
Water heat exchanger - condenser	Type				Single pass shell and tube				
	Water flow rate	Nom.		l/s	25.0		28.3		33.1
	Nominal water pressure drop	Cooling		kPa	67		50	51	65
	Nominal water pressure drop 2	Cooling		kPa	67	50		65	
	Model	Quantity			2				
Sound power level	Cooling	Nom.		dBA	98	99	100		
Sound pressure level	Cooling	Nom.		dBA	79 (3)	80 (3)	81 (3)		
Compressor	Type				Single screw compressor				
	Quantity				2				
	Oil	Charged volume		l	32				
Operation range	Evaporator	Cooling	Min.	ºCDB	-8				
			Max.	ºCDB	15				
	Condenser	Cooling	Min.	ºCDB	20				
			Max.	ºCDB	55				
Refrigerant	Type				R-134a				
	Circuits	Quantity			2				
Refrigerant circuit	Charge			kg	174	172	170		
Piping connections	Evaporator water inlet/outlet (OD)				219.1mm				
	Condenser water inlet/outlet (OD)				5"				
Safety devices	Item	01			High discharge pressure (pressure switch)				
		02			High discharge pressure (pressure transducer)				
		03			Low suction pressure (pressure transducer)				
		04			Compressor motor protection				
		05			High discharge temperature				
		06			Low oil pressure				
		07			Low pressure ratio				
		08			High oil pressure drop	High oil filter pressure drop			High oil pressure drop
		09			Phase monitor				
		10			Emergency stop				
		11			Water freeze protection controller				

2 Specifications

2-2 Electrical Specifications				EWWD360I-XS	EWWD440I-XS	EWWD500I-XS	EWWD600I-XS	EWWD750I-XS	EWWD800I-XS
Compressor	Phase			3~					
	Voltage		V	400					
	Voltage range	Min.	%	-10					
		Max.	%	10					
	Maximum running current		A	204	233	271	299	204	
	Starting method			Wye-delta					
Compressor 2	Maximum running current		A	-				204	233
Power supply	Phase			3~					
	Frequency		Hz	50					
	Voltage		V	400					
	Voltage range	Min.	%	-10					
		Max.	%	10					
Unit	Maximum starting current		A	330	464			493	627
	Nominal running current (RLA)	Cooling	A	117	144	164	194	235	261
	Maximum running current		A	204	233	271	299	407	436
	Max unit current for wires sizing		A	224	256	298	328	448	480

2-2 Electrical Specifications				EWWD850I-XS	EWWD950I-XS	EWWDC10I-XS	EWWDC11I-XS	EWWDC12I-XS
Compressor	Phase			3~				
	Voltage		V	400				
	Voltage range	Min.	%	-10				
		Max.	%	10				
	Maximum running current		A	233		271		299
	Starting method			Wye-delta				
Compressor 2	Maximum running current		A	233	271		299	
Power supply	Phase			3~				
	Frequency		Hz	50				
	Voltage		V	400				
	Voltage range	Min.	%	-10				
		Max.	%	10				
Unit	Maximum starting current		A	650	681		703	
	Nominal running current (RLA)	Cooling	A	287	307	327	358	388
	Maximum running current		A	465	504	542	570	597
	Max unit current for wires sizing		A	512	554	597	627	657

Notes

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

(2) Heating: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; entering condenser water temp. 40ºC; leaving condenser water temp. 45ºC; unit at full load operation

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

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

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

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

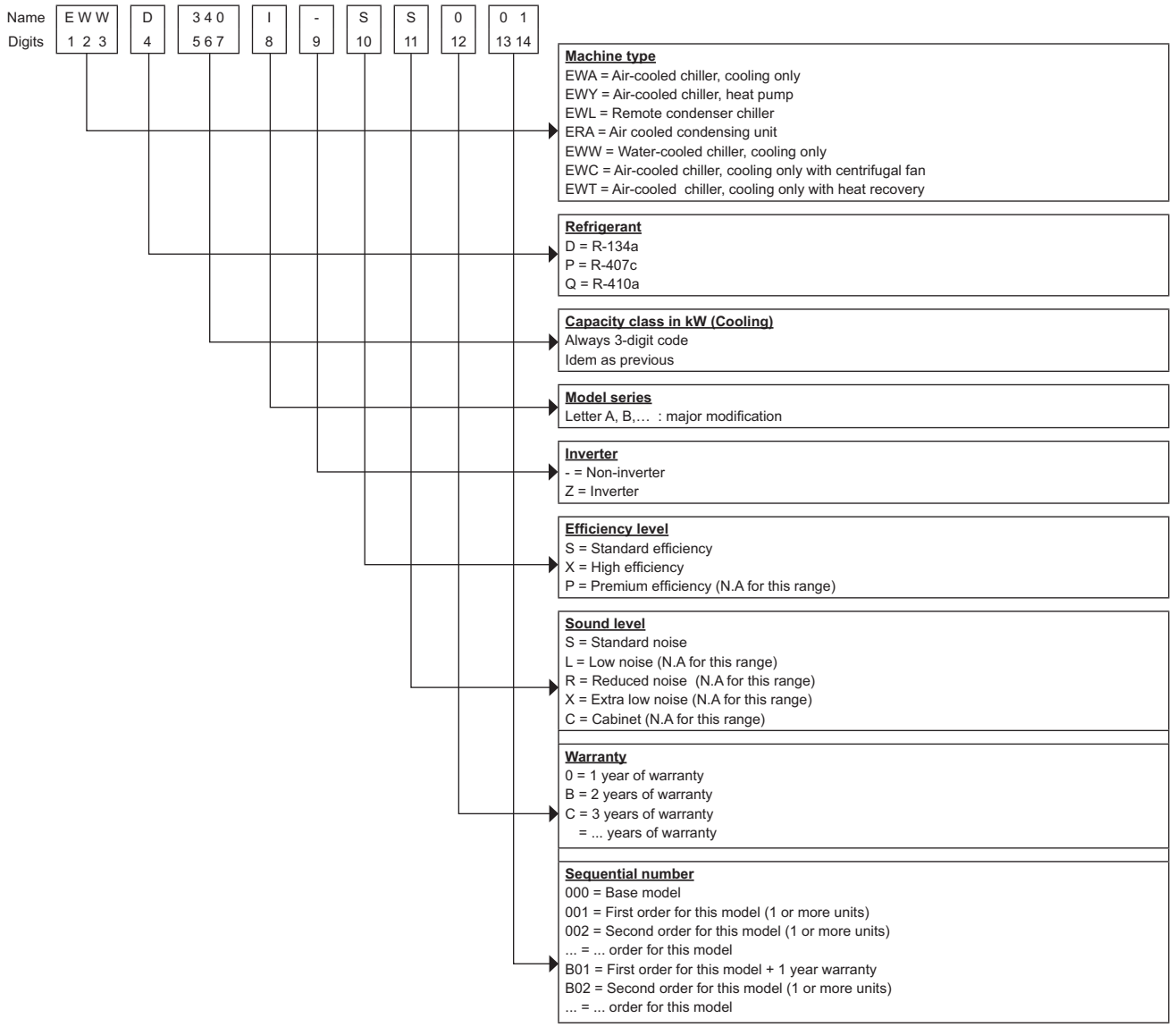
(7) Maximum running current is based on max compressor absorbed current in its envelope

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

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

3 Nomenclature

3 - 1 Nomenclature



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4 Capacity tables

4 - 1 Cooling Capacity Tables

EWWD360~950I-XS

Size	Twe	5							7						
	Twc	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)
360	30	353	63.2	16.8	61	416	20	45	379	64.5	18.1	70	443	21.3	50
	35	337	69.7	16.0	56	406	19.6	43	362	71	17.3	64	433	20.9	48
	40	320	77	15.2	51	397	19.2	41	344	78.2	16.4	59	423	20.4	46
	45	303	85.3	14.4	46	388	18.8	40	326	86.3	15.6	53	413	20	44
	50	285	94.9	13.6	42	380	18.4	38	308	95.6	14.7	48	403	19.6	43
	55	267	106	12.7	37	373	18.1	37	289	106	13.8	43	395	19.2	41
440	30	422	76.1	20.1	61	498	24	62	453	77.9	21.6	70	531	25.6	70
	35	403	83.6	19.2	56	486	23.4	60	433	85.4	20.7	64	518	25	67
	40	383	91.9	18.3	51	475	22.9	57	412	93.6	19.7	59	506	24.4	64
	45	362	101	17.3	46	464	22.4	55	391	103	18.6	53	493	23.9	62
	50	341	112	16.3	42	453	22	53	368	113	17.6	48	481	23.3	59
	55	319	124	15.2	37	443	21.5	51	345	125	16.5	43	470	22.8	57
500	30	493	89.1	23.5	51	582	28.0	48	530	91.2	25.3	58	621	29.9	54
	35	471	97.9	22.4	47	569	27.4	46	506	100	24.1	54	606	29.2	51
	40	448	108	21.3	43	555	26.8	44	482	110	23.0	49	591	28.6	49
	45	424	119	20.2	39	542	26.2	42	457	120	21.8	45	577	27.9	47
	50	399	131	19.0	35	530	25.7	41	431	133	20.5	40	563	27.3	45
	55	374	145	17.8	31	519	25.2	39	404	146	19.3	36	550	26.7	44
600	30	559	108	26.6	65	666	32.1	61	600	110	28.6	74	710	34.1	69
	35	534	118	25.4	60	652	31.4	59	573	121	27.3	68	694	33.4	66
	40	508	129	24.2	54	636	30.7	57	546	132	26.0	62	677	32.7	64
	45	481	140	22.9	49	621	30	54	517	143	24.7	56	660	31.9	61
	50	453	152	21.6	44	604	29.3	52	488	155	23.3	51	643	31.2	58
	55	424	164	20.2	39	588	28.5	50	458	168	21.8	45	625	30.4	55
750	30	702	126	33.5	55	828	19.9 19.9	45 45	752	128	35.9	63	881	21.2 21.2	50 50
	35	672	139	32.0	51	810	19.5 19.5	43 43	720	141	34.4	58	861	20.8 20.8	48 48
	40	640	153	30.5	47	793	19.1 19.1	42 42	687	156	32.8	53	843	20.3 20.3	47 47
	45	607	170	28.9	43	777	18.8 18.8	40 40	652	172	31.1	49	824	19.9 19.9	45 45
	50	573	189	27.3	38	762	18.5 18.5	39 39	616	191	29.4	44	807	19.6 19.6	43 43
	55	537	211	25.6	34	748	18.2 18.2	38 38	579	212	27.6	39	791	19.2 19.2	42 42
800	30	776	139	37.0	65	915	20.1 23.9	45 61	830	142	39.6	73	972	21.4 25.4	50 68
	35	742	153	35.4	60	895	19.7 23.4	43 59	795	156	37.9	68	951	21.0 24.9	48 66
	40	707	169	33.7	55	876	19.3 23.0	42 57	758	172	36.2	62	930	20.5 24.4	47 64
	45	671	186	32.0	50	857	19.0 22.5	40 55	721	189	34.4	57	910	20.1 23.9	45 61
	50	633	206	30.2	45	840	18.6 22.1	39 53	681	209	32.5	51	890	19.7 23.4	43 59
	55	594	229	28.3	40	824	18.3 21.7	38 52	641	231	30.6	46	872	19.4 23.0	42 57
850	30	845	152	40.3	54	997	24.0 24.0	62 62	905	155	43.2	61	1060	25.5 25.5	69 69
	35	808	167	38.5	50	975	23.5 23.5	60 60	866	170	41.3	56	1036	25.0 25.0	67 67
	40	770	184	36.7	45	954	23.0 23.0	58 58	826	187	39.4	52	1013	24.5 24.5	64 64
	45	731	202	34.8	41	933	22.6 22.6	55 55	785	205	37.4	47	990	24.0 24.0	62 62
	50	690	224	32.9	37	913	22.1 22.1	54 54	742	226	35.4	43	968	23.5 23.5	59 59
	55	647	247	30.8	33	895	21.7 21.7	52 52	698	250	33.3	38	947	23.0 23.0	57 57
950	30	911	165	43.4	61	1075	24.1 27.7	62 46	974	168	46.5	69	1143	25.6 29.4	69 52
	35	871	181	41.5	56	1052	23.6 27.2	60 45	933	185	44.5	64	1118	25.0 28.8	67 50
	40	831	199	39.6	52	1030	23.1 26.6	58 43	890	203	42.5	59	1093	24.5 28.3	64 48
	45	788	220	37.6	47	1008	22.6 26.1	55 42	846	223	40.4	54	1069	24.0 27.7	62 46
	50	744	243	35.5	42	987	22.2 25.7	54 40	800	246	38.2	49	1046	23.5 27.2	59 45
	55	699	269	33.3	38	968	21.8 25.2	52 39	753	271	35.9	43	1024	23.1 26.7	57 43

NOTES

Twe: Evaporator leaving water temperature (Δt 5°C) - Twc: Condenser leaving water temperature (Δt 5°C)
HC: Heat capacity at condenser - qwc: Fluid flow rate at condenser - dpwc: Fluid pressure drop at condenser
* For working condition where dpw value is Italic please contact factory

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4 Capacity tables

4 - 1 Cooling Capacity Tables

EWWD360~950I-XS

Size	Twe	9							11						
	Twc	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)
360	30	407	65.8	19.4	79	472	22.7	56	436	67.1	20.8	90	503	24.2	63
	35	389	72.4	18.6	73	461	22.2	54	417	73.9	19.9	83	491	23.6	60
	40	370	79.6	17.7	67	450	21.7	52	397	81.1	19.0	76	478	23.1	58
	45	351	87.6	16.8	61	439	21.2	49	377	89	18.0	69	466	22.6	55
	50	332	96.6	15.8	55	428	20.8	47	357	97.9	17.1	63	455	22	53
	55	311	107	14.9	49	418	20.3	46	335	108	16.0	56	443	21.5	51
440	30	486	79.8	23.2	79	566	27.2	78	520	81.7	24.9	90	602	29	87
	35	465	87.3	22.2	73	552	26.6	75	498	89.3	23.8	83	587	28.3	84
	40	443	95.5	21.1	67	538	26	72	475	97.5	22.7	76	572	27.6	80
	45	420	105	20.1	61	525	25.4	69	451	106	21.6	69	558	27	77
	50	397	115	18.9	55	511	24.8	66	427	117	20.4	63	543	26.3	73
	55	373	126	17.8	49	499	24.2	63	401	128	19.2	56	529	25.7	70
500	30	568	93.4	27.1	66	661	31.8	60	608	95.6	29.0	75	703	33.8	67
	35	543	102	25.9	61	645	31.1	58	582	105	27.8	69	686	33.1	64
	40	517	112	24.7	56	629	30.4	55	555	114	26.5	64	669	32.3	62
	45	491	122	23.4	51	613	29.7	53	527	125	25.2	58	652	31.5	59
	50	464	134	22.1	46	598	29	51	498	136	23.8	52	635	30.8	56
	55	435	148	20.8	41	583	28.3	49	469	150	22.4	47	618	30	54
600	30	641	112	30.6	*83*	754	36.3	77	684	115	32.7	*94*	799	38.4	85
	35	614	123	29.3	77	738	35.6	74	656	126	31.4	*87*	782	37.7	82
	40	585	135	28.0	71	720	34.8	71	627	138	30.0	80	765	36.9	79
	45	556	147	26.5	64	702	34	68	596	150	28.5	73	746	36.1	76
	50	525	159	25.1	58	684	33.1	65	564	162	27.0	66	726	35.2	72
	55	493	171	23.6	52	665	32.3	62	531	175	25.4	59	706	34.3	69
750	30	804	131	38.4	71	935	22.5 22.5	56 56	859	133	41.1	80	992	23.9 23.9	62 62
	35	771	144	36.8	66	915	22.0 22.0	54 54	824	147	39.4	74	971	23.4 23.4	60 60
	40	736	158	35.1	60	894	21.6 21.6	52 52	787	161	37.6	68	948	22.9 22.9	58 58
	45	700	174	33.4	55	874	21.1 21.1	50 50	749	177	35.8	62	926	22.4 22.4	55 55
	50	662	193	31.6	50	855	20.7 20.7	48 48	710	195	33.9	57	905	21.9 21.9	53 53
	55	623	213	29.8	45	836	20.3 20.3	46 46	669	215	32.0	51	884	21.5 21.5	51 51
800	30	887	145	42.4	83	1032	22.7 26.9	56 76	947	148	45.2	93	1094	24.1 28.6	62 84
	35	850	159	40.6	77	1009	22.3 26.4	54 73	908	162	43.4	87	1070	23.6 28.0	60 81
	40	812	175	38.8	71	987	21.8 25.9	52 71	868	178	41.5	80	1046	23.1 27.4	58 78
	45	773	192	36.9	65	964	21.3 25.3	50 68	827	195	39.5	73	1022	22.6 26.8	55 75
	50	732	211	34.9	59	943	20.9 24.8	48 65	784	214	37.5	66	998	22.1 26.2	53 72
	55	689	233	32.9	53	922	20.5 24.3	46 63	739	235	35.3	60	975	21.7 25.7	51 70
850	30	967	159	46.2	69	1125	27.1 27.1	77 77	1031	162	49.3	77	1194	28.7 28.7	86 86
	35	926	174	44.2	64	1100	26.5 26.5	74 74	989	178	47.3	72	1167	28.1 28.1	82 82
	40	885	191	42.2	58	1075	26.0 26.0	71 71	946	194	45.2	66	1140	27.5 27.5	79 79
	45	841	209	40.2	53	1050	25.4 25.4	69 69	901	212	43.0	60	1113	26.9 26.9	76 76
	50	797	229	38.0	48	1026	24.9 24.9	66 66	854	233	40.8	55	1086	26.3 26.3	73 73
	55	750	252	35.8	43	1002	24.3 24.3	63 63	805	255	38.5	49	1060	25.8 25.8	70 70
950	30	1040	172	49.7	78	1212	27.2 31.2	77 57	1109	176	53.0	*87*	1285	28.8 33.0	86 64
	35	997	189	47.6	72	1186	26.6 30.6	74 55	1064	193	50.9	81	1257	28.2 32.4	82 61
	40	953	207	45.5	66	1159	26.0 30.0	71 53	1018	211	48.7	75	1228	27.6 31.7	79 59
	45	907	226	43.3	61	1133	25.5 29.3	69 51	970	230	46.4	69	1200	27.0 31.1	76 57
	50	859	249	41.0	55	1108	24.9 28.8	66 50	920	252	44.0	62	1172	26.4 30.4	73 55
	55	809	274	38.6	50	1083	24.4 28.2	63 48	868	277	41.5	56	1145	25.8 29.8	70 53

NOTES

Twe: Evaporator leaving water temperature (Δt 5°C) - Twc: Condenser leaving water temperature (Δt 5°C)
HC: Heat capacity at condenser - qwc: Fluid flow rate at condenser - dpwc: Fluid pressure drop at condenser
* For working condition where dpw value is Italic please contact factory

SRC_1a-3a_Rev.01_3a_(2-3)

4 Capacity tables

4 - 1 Cooling Capacity Tables

EWWD360~950I-XS

Size	Twe	13							15						
	Twc	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)
360	30	466	68.5	22.3	102	534	25.7	70	402	60.9	19.3	78	463	22.3	54
	35	446	75.4	21.3	94	522	25.1	67	477	77	22.8	106	554	26.7	75
	40	426	82.7	20.4	86	508	24.5	64	455	84.4	21.8	98	540	26.1	71
	45	405	90.6	19.4	79	495	24	61	433	92.3	20.8	89	526	25.4	68
	50	383	99.3	18.3	71	482	23.4	59	411	101	19.7	81	512	24.8	65
	55	361	109	17.3	64	470	22.8	56	387	111	18.5	73	498	24.2	62
440	30	556	83.7	26.6	*101*	640	30.8	98	508	77.5	24.3	86	586	28.2	83
	35	533	91.4	25.5	94	624	30.1	93	569	93.5	27.2	*105*	662	31.9	104
	40	509	99.6	24.3	86	608	29.4	89	544	102	26.0	97	646	31.2	100
	45	484	109	23.1	79	592	28.6	85	518	111	24.8	89	628	30.4	95
	50	458	118	21.9	71	576	27.9	82	491	121	23.5	81	611	29.6	91
	55	431	130	20.6	64	561	27.2	78	463	132	22.2	73	594	28.9	86
500	30	649	97.9	31.0	*84*	746	35.9	75	607	92	29.0	75	699	33.6	66
	35	622	107	29.8	78	729	35.1	72	663	109	31.7	*88*	772	37.2	80
	40	594	117	28.4	72	711	34.3	69	634	119	30.4	*81*	754	36.4	76
	45	565	127	27.0	66	692	33.5	66	604	130	28.9	74	734	35.5	73
	50	535	139	25.6	60	674	32.6	63	573	141	27.4	68	714	34.6	70
	55	504	152	24.1	54	656	31.8	60	540	154	25.9	61	695	33.7	66
600	30	729	117	34.9	*105*	846	40.7	94	775	119	37.1	*118*	895	43.1	104
	35	700	129	33.5	*98*	828	39.9	91	745	131	35.7	*109*	876	42.2	101
	40	669	141	32.0	*90*	810	39.1	87	713	144	34.1	*101*	857	41.4	97
	45	638	153	30.5	*83*	791	38.2	84	680	156	32.6	*93*	836	40.5	93
	50	604	166	28.9	75	770	37.3	80	646	170	30.9	*85*	816	39.5	89
	55	570	179	27.2	67	749	36.4	77	610	183	29.2	76	794	38.5	85
750	30	916	136	43.8	90	1052	25.3 25.3	69 69	796	121	38.1	70	917	22.1 22.1	54 54
	35	879	150	42.0	83	1029	24.8 24.8	67 67	936	153	44.8	93	1089	26.2 26.2	74 74
	40	841	164	40.2	77	1005	24.3 24.3	64 64	896	168	42.9	86	1064	25.7 25.7	71 71
	45	801	180	38.3	71	981	23.7 23.7	61 61	855	183	40.9	79	1039	25.1 25.1	68 68
	50	760	198	36.4	64	958	23.2 23.2	59 59	812	201	38.9	72	1013	24.6 24.6	65 65
	55	718	217	34.3	58	935	22.7 22.7	57 57	768	220	36.8	65	988	24.0 24.0	62 62
800	30	1008	151	48.2	*105*	1159	25.6 30.2	69 93	943	142	45.2	93	1085	22.3 29.9	54 92
	35	968	166	46.3	*97*	1134	25.0 29.6	67 90	1030	169	49.3	*109*	1199	26.5 31.3	74 99
	40	927	181	44.3	90	1108	24.5 29.0	64 87	987	185	47.2	*101*	1172	25.9 30.6	71 96
	45	883	198	42.3	82	1082	24.0 28.4	61 83	942	202	45.1	93	1144	25.4 30.0	68 92
	50	839	217	40.1	75	1056	23.4 27.7	59 80	896	221	42.9	85	1116	24.8 29.3	65 88
	55	792	238	37.9	68	1030	22.9 27.1	57 77	847	241	40.6	77	1088	24.2 28.7	62 85
850	30	1098	166	52.5	*87*	1265	30.4 30.4	95 95	1050	158	50.3	80	1208	29.1 29.1	87 87
	35	1055	182	50.5	80	1236	29.8 29.8	91 91	1122	186	53.7	!	1308	31.5 31.5	101 101
	40	1009	198	48.3	74	1208	29.2 29.2	88 88	1075	202	51.5	!	1278	30.8 30.8	97 97
	45	962	216	46.0	68	1179	28.5 28.5	84 84	1026	221	49.1	77	1247	30.2 30.2	93 93
	50	913	236	43.7	62	1150	27.9 27.9	81 81	975	240	46.7	70	1216	29.5 29.5	89 89
	55	863	259	41.3	56	1121	27.2 27.2	77 77	922	262	44.2	63	1185	28.8 28.8	86 86
950	30	1180	180	56.4	*98*	1359	30.5 34.9	95 70	1193	178	57.1	*100*	1371	29.2 36.8	87 78
	35	1133	197	54.2	*91*	1330	29.9 34.2	91 68	1205	201	57.7	*102*	1406	31.6 36.1	101 75
	40	1085	215	51.9	*84*	1300	29.2 33.5	88 65	1155	219	55.3	*94*	1374	30.9 35.4	97 72
	45	1035	234	49.5	77	1270	28.6 32.9	84 63	1103	239	52.8	*87*	1342	30.2 34.7	93 69
	50	983	256	47.0	71	1240	27.9 32.2	81 61	1049	261	50.2	79	1310	29.5 34.0	89 67
	55	929	281	44.5	64	1210	27.3 31.5	77 58	993	285	47.5	72	1278	28.8 33.2	86 64

NOTES

Twe: Evaporator leaving water temperature (Δt 5°C) - Twc: Condenser leaving water temperature (Δt 5°C)
HC: Heat capacity at condenser - qwc: Fluid flow rate at condenser - dpwc: Fluid pressure drop at condenser
* For working condition where dpw value is Italic please contact factory

SRC_1a-3a_Rev.01_3a_(3-3)

4 Capacity tables

4 - 1 Cooling Capacity Tables

EWWDC10~C12I-XS

Size	Twe	5							7						
	Twc	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)
C10	30	953	178	45.4	69	1130	27.2 27.2	46 46	1019	181	48.6	78	1200	28.9 28.9	52 52
	35	912	195	43.5	64	1107	26.7 26.7	45 45	976	199	46.6	72	1175	28.3 28.3	50 50
	40	870	215	41.4	58	1085	26.2 26.2	43 43	932	219	44.5	66	1150	27.8 27.8	48 48
	45	826	237	39.3	53	1063	25.7 25.7	42 42	886	241	42.3	61	1126	27.2 27.2	46 46
	50	780	262	37.2	48	1042	25.2 25.2	40 40	838	265	40.0	55	1103	26.7 26.7	45 45
	55	732	290	34.9	43	1023	24.8 24.8	39 39	788	293	37.6	49	1081	26.3 26.3	43 43
C11	30	1014	196	48.3	44	1209	27.2 31.0	48 61	1084	200	51.7	50	1284	28.9 32.9	53 67
	35	970	215	46.2	41	1185	26.6 30.5	46 59	1038	219	49.5	46	1257	28.3 32.3	51 65
	40	924	236	44.1	38	1160	26.1 29.9	44 56	991	240	47.3	43	1231	27.7 31.7	49 63
	45	877	258	41.8	34	1135	25.6 29.3	43 54	941	263	44.9	39	1204	27.2 31.1	47 60
	50	829	282	39.5	31	1110	25.2 28.7	41 52	890	287	42.5	35	1177	26.7 30.4	46 58
	55	778	308	37.1	28	1086	24.7 28.0	40 50	837	313	40.0	32	1150	26.2 29.7	44 55
C12	30	1108	214	52.8	49	1321	31.8 31.8	61 61	1184	218	56.5	56	1402	33.7 33.7	67 67
	35	1060	235	50.5	46	1295	31.2 31.2	59 59	1134	240	54.1	52	1374	33.1 33.1	65 65
	40	1011	256	48.2	42	1267	30.6 30.6	56 56	1082	262	51.6	48	1344	32.5 32.5	63 63
	45	959	279	45.7	38	1238	29.9 29.9	54 54	1029	285	49.1	43	1314	31.8 31.8	60 60
	50	906	302	43.2	34	1209	29.3 29.3	52 52	974	309	46.4	39	1283	31.1 31.1	58 58
	55	851	327	40.6	31	1178	28.6 28.6	50 50	916	334	43.7	35	1250	30.4 30.4	55 55

NOTES

Twe: Evaporator leaving water temperature (Δt 5°C) - Twc: Condenser leaving water temperature (Δt 5°C)
HC: Heat capacity at condenser - qwc: Fluid flow rate at condenser - dpwc: Fluid pressure drop at condenser
* For working condition where dpw value is Italic please contact factory

SRC_1a-3a_Rev.01_3a_(1-3)

4 Capacity tables

4 - 1 Cooling Capacity Tables

EWWDC10~C12I-XS

Size	Twe	9							11						
	Twc	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)
C10	30	1087	185	51.9	*88*	1273	30.6 30.6	57 57	1158	189	55.3	*98*	1347	32.4 32.4	64 64
	35	1043	203	49.8	81	1246	30.0 30.0	55 55	1112	207	53.1	*91*	1319	31.8 31.8	61 61
	40	997	223	47.6	75	1219	29.4 29.4	53 53	1064	227	50.9	*84*	1291	31.2 31.2	59 59
	45	949	244	45.3	69	1193	28.9 28.9	51 51	1014	248	48.5	77	1263	30.5 30.5	57 57
	50	899	268	42.9	62	1167	28.3 28.3	50 50	962	272	46.0	70	1235	29.9 29.9	55 55
	55	847	296	40.5	56	1143	27.7 27.7	48 48	908	299	43.4	64	1207	29.3 29.3	53 53
C11	30	1157	204	55.2	57	1361	30.6 34.9	59 75	1233	209	58.9	63	1441	32.5 36.9	66 83
	35	1109	224	53.0	52	1333	30.0 34.3	57 72	1183	229	56.5	59	1412	31.8 36.2	63 80
	40	1060	245	50.6	48	1305	29.4 33.6	55 70	1132	250	54.1	54	1382	31.2 35.6	61 77
	45	1008	268	48.2	44	1276	28.8 32.9	53 67	1078	273	51.5	50	1351	30.5 34.9	58 74
	50	955	292	45.6	40	1247	28.2 32.2	51 64	1023	297	48.9	45	1320	29.9 34.1	56 71
	55	900	318	43.0	36	1218	27.7 31.5	49 62	965	324	46.1	41	1289	29.2 33.3	54 68
C12	30	1263	223	60.3	63	1485	35.7 35.7	75 75	1344	227	64.2	*70*	1571	37.8 37.8	83 83
	35	1211	245	57.8	58	1456	35.1 35.1	72 72	1290	250	61.7	65	1540	37.1 37.1	80 80
	40	1157	268	55.3	54	1425	34.4 34.4	70 70	1235	273	59.0	60	1508	36.4 36.4	77 77
	45	1102	291	52.6	49	1393	33.7 33.7	67 67	1177	298	56.3	55	1475	35.7 35.7	74 74
	50	1044	316	49.8	45	1360	32.9 32.9	64 64	1117	323	53.4	50	1440	34.9 34.9	71 71
	55	983	341	47.0	40	1325	32.2 32.2	62 62	1054	349	50.4	45	1403	34.1 34.1	68 68

NOTES

Twe: Evaporator leaving water temperature (Δt 5°C) - Twc: Condenser leaving water temperature (Δt 5°C)
HC: Heat capacity at condenser - qwc: Fluid flow rate at condenser - dpwc: Fluid pressure drop at condenser
* For working condition where dpw value is Italic please contact factory

SRC_1a-3a_Rev.01_3a_(2-3)

4 Capacity tables

4 - 1 Cooling Capacity Tables

EWWDC10~C12I-XS

Size	Twe	13							15						
	Twc	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)	Cc (kW)	Pi (kW)	qwe (l/s)	dpwe (kPa)	HC (kW)	qwc (l/s)	dpwc (kPa)
C10	30	1231	194	58.9	*110*	1424	34.3 34.3	70 70	1305	198	62.5	*122*	1503	36.2 36.2	78 78
	35	1183	212	56.6	*102*	1395	33.6 33.6	68 68	1256	216	60.1	*114*	1473	35.5 35.5	75 75
	40	1134	231	54.2	*95*	1365	33.0 33.0	65 65	1205	236	57.7	*106*	1441	34.8 34.8	72 72
	45	1082	253	51.8	*87*	1335	32.3 32.3	63 63	1152	257	55.2	*98*	1410	34.1 34.1	69 69
	50	1028	276	49.2	79	1305	31.6 31.6	61 61	1097	281	52.5	*89*	1378	33.4 33.4	67 67
	55	972	303	46.5	72	1275	31.0 31.0	58 58	1038	307	49.7	81	1345	32.7 32.7	64 64
C11	30	1311	213	62.7	*71*	1524	34.4 38.9	73 91	1348	213	64.5	*75*	1561	34.0 41.1	72 100
	35	1259	234	60.2	66	1493	33.7 38.3	70 88	1338	238	64.1	*74*	1576	35.6 40.4	77 97
	40	1206	255	57.7	61	1461	33.0 37.6	67 85	1283	260	61.4	*68*	1544	34.9 39.6	74 94
	45	1151	278	55.0	56	1429	32.3 36.8	65 82	1226	284	58.7	63	1510	34.1 38.9	72 90
	50	1093	303	52.3	51	1396	31.6 36.1	62 79	1166	309	55.8	58	1475	33.4 38.1	69 87
	55	1033	329	49.4	46	1362	30.9 35.2	60 75	1104	335	52.8	52	1439	32.6 37.2	66 83
C12	30	1428	232	68.3	*79*	1659	39.9 39.9	91 91	1514	236	72.5	*87*	1750	42.1 42.1	100 100
	35	1373	255	65.7	*73*	1627	39.2 39.2	88 88	1457	260	69.8	*82*	1717	41.4 41.4	97 97
	40	1315	279	62.9	68	1594	38.5 38.5	85 85	1398	284	66.9	*76*	1682	40.6 40.6	94 94
	45	1255	304	60.1	62	1559	37.7 37.7	82 82	1336	310	64.0	*70*	1646	39.8 39.8	90 90
	50	1193	330	57.1	57	1523	36.9 36.9	79 79	1271	336	60.9	64	1608	39.0 39.0	87 87
	55	1128	356	53.9	51	1484	36.0 36.0	75 75	1204	364	57.6	58	1568	38.1 38.1	83 83

NOTES

Twe: Evaporator leaving water temperature (Δt 5°C) - Twc: Condenser leaving water temperature (Δt 5°C)
HC: Heat capacity at condenser - qwc: Fluid flow rate at condenser - dpwc: Fluid pressure drop at condenser
* For working condition where dpw value is Italic please contact factory

SRC_1a-3a_Rev.01_3a_(3-3)

4 Capacity tables

4 - 2 Partial Heat Recovery Capacity tables

Partial Heat Recovery Ratings
EWWD~I-XS

Size	ELWT (°C)	Leaving Condenser Water Temperature (°C)				
		35	**40**	**45**	**50**	**55**
		Hc (kW)	Hc (kW)	Hc (kW)	Hc (kW)	Hc (kW)
340	40	35	46	58	59	60
	45	24	35	46	54	56
	50	13	23	33	42	50
400	40	42	56	70	71	73
	45	29	42	55	65	68
	50	16	28	40	50	60
460	40	49	65	82	83	85
	45	34	49	65	76	79
	50	19	33	47	59	70
550	40	57	76	94	96	98
	45	40	57	74	88	91
	50	23	39	54	67	81
650	40	69	93	117	119	120
	45	48	70	92	109	113
	50	27	47	67	84	100
700	40	77	102	128	130	132
	45	53	77	101	119	124
	50	30	51	73	92	110
800	40	85	112	140	142	144
	45	58	84	110	130	135
	50	32	56	80	100	120
850	40	89	120	151	153	155
	45	62	90	118	140	145
	50	34	60	86	108	129
900	40	96	129	161	164	166
	45	66	97	127	150	156
	50	37	65	92	115	138
950	40	106	140	175	178	180
	45	73	106	138	163	169
	50	42	71	100	125	150
C10	40	114	150	187	190	192
	45	80	113	147	174	180
	50	46	76	107	134	160

NOTES

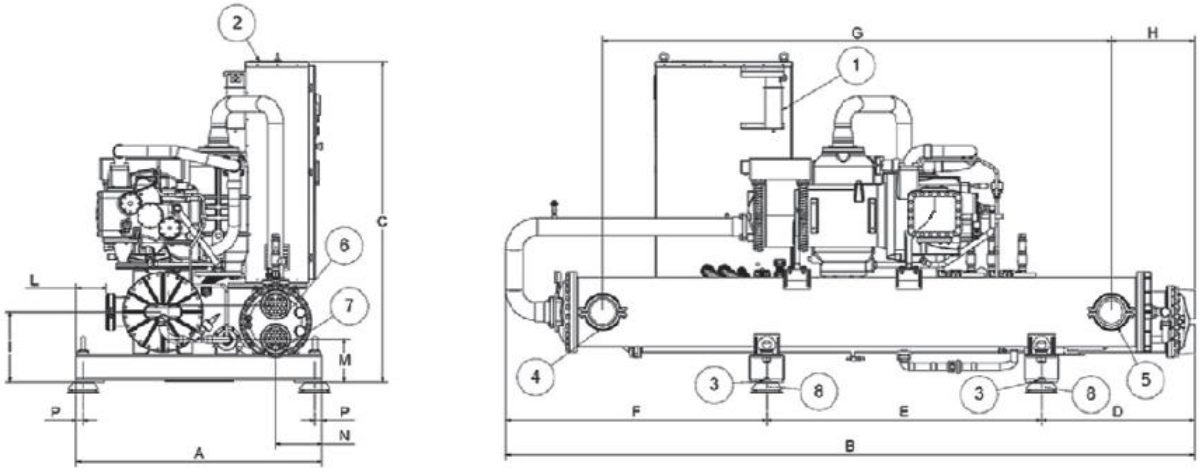
Leaving Evaporator Water Temperature 7°C, ΔT 5°C; ΔT Condenser Water Temperature 5°C

OPT_1-2-3-4-5-6-7-8_Rev.00_5

5 Dimensional drawings

5 - 1 Dimensional Drawings

EWWD360~600I-XS



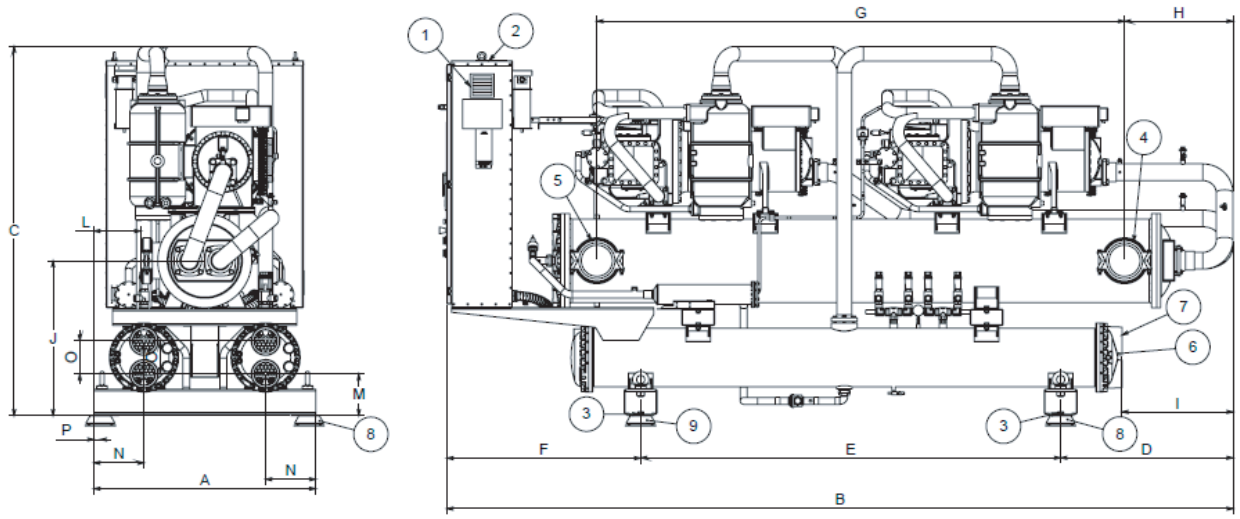
	Dimensions													
EWWD~I-	A	B	C	D	E	F	G	H	I	L	M	N	O	P
EWWD360~600I-XS	1430	4012	1883	890	1600	1522	2962	484	412	176	354	169	200	40

LEGEND

1 - Electrical Panel
2 - Power connections slot 150x200
3 - Four (4) holes Ø21 for isolator mounting
4 - Evaporator water inlet (Victaulic connection) [168.3mm]
5 - Evaporator water outlet (Victaulic connection) [168.3mm]
6 - Condenser water inlet connection [Ø5"]
7 - Condenser water outlet connection [Ø5"]
8 - Isolators (optional)

DMN_1-2-3a-4a-5a-6a-7-8a_Rev.01_7

EWWD750~C12I-XS



	Dimensions														
EWWD~I-	A	B	C	D	E	F	G	H	I	J	L	M	N	O	P
750~C12I-XS	1350	4782	2245	1048	2555	1179	3210	660	645	942	286	354	305	200	40

LEGEND

1 - Electrical Panel
2 - Power connections slot 150x200
3 - Four (4) holes Ø21 for isolator mounting
4 - Evaporator water inlet (Victaulic connection)
5 - Evaporator water outlet (Victaulic connection)
6 - Condenser water inlet connection
7 - Condenser water outlet connection
8 - Isolators (optional)

DMN_1-2-3a-4a-5a-6a-7-8a_Rev.01_8a

6 Sound data

6 - 1 Sound Level Data

Sound levels

EWWD~I-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)
340	53.6	56.2	71.1	74.5	69.7	65.6	63.9	59.5	**75.2**	**93.7**
400	54.6	57.2	72.1	75.5	70.7	66.6	64.9	60.5	**76.2**	**96.6**
460	56.6	59.2	74.1	77.5	72.7	68.6	66.9	62.5	**78.2**	**96.7**
550	56.6	59.2	74.1	77.5	72.7	68.6	66.9	62.5	**78.2**	**96.7**
650	56.2	58.8	73.7	77.1	72.3	68.2	66.5	62.1	**77.8**	**96.9**
700	56.6	59.2	74.1	77.5	72.7	68.6	66.9	62.5	**78.2**	**97.3**
800	57.1	59.7	74.6	78.0	73.2	69.1	67.4	63.0	**78.7**	**97.8**
850	58.2	60.8	75.7	79.1	74.3	70.2	68.5	64.1	**79.8**	**98.9**
900	59.1	61.7	76.6	80.0	75.2	71.1	69.4	65.0	**80.7**	**99.8**
950	59.1	61.7	76.6	80.0	75.2	71.1	69.4	65.0	**80.7**	**99.8**
C10	59.1	61.7	76.6	80.0	75.2	71.1	69.4	65.0	**80.7**	**99.8**
C12	58.8	61.4	76.3	79.7	74.9	70.8	69.1	64.7	**80.4**	**100.4**
C13	59.2	61.8	76.7	80.1	75.3	71.2	69.5	65.1	**80.8**	**100.8**
C14	59.6	62.2	77.1	80.5	75.7	71.6	69.9	65.5	**81.2**	**101.2**
C15	61.4	64.0	78.9	82.3	77.5	73.4	71.7	67.3	**83.0**	**103.0**
C16	61.4	64.0	78.9	82.3	77.5	73.4	71.7	67.3	**83.0**	**103.0**
C17	61.4	64.0	78.9	82.3	77.5	73.4	71.7	67.3	**83.0**	**103.0**
C18	61.4	64.0	78.9	82.3	77.5	73.4	71.7	67.3	**83.0**	**103.0**

NOTES

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

EWWD~I-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)
360	53.6	56.2	71.1	74.5	69.7	65.6	63.9	59.5	**75.2**	**93.7**
440	54.6	57.2	72.1	75.5	70.7	66.6	64.9	60.5	**76.2**	**96.6**
500	56.6	59.2	74.1	77.5	72.7	68.6	66.9	62.5	**78.2**	**96.7**
600	56.6	59.2	74.1	77.5	72.7	68.6	66.9	62.5	**78.2**	**96.7**
750	56.2	58.8	73.7	77.1	72.3	68.2	66.5	62.1	**77.8**	**96.9**
800	56.6	59.2	74.1	77.5	72.7	68.6	66.9	62.5	**78.2**	**97.3**
850	57.1	59.7	74.6	78.0	73.2	69.1	67.4	63.0	**78.7**	**97.8**
950	58.2	60.8	75.7	79.1	74.3	70.2	68.5	64.1	**79.8**	**98.9**
C10	59.1	61.7	76.6	80.0	75.2	71.1	69.4	65.0	**80.7**	**99.8**
C11	59.1	61.7	76.6	80.0	75.2	71.1	69.4	65.0	**80.7**	**99.8**
C12	59.1	61.7	76.6	80.0	75.2	71.1	69.4	65.0	**80.7**	**99.8**

NOTES

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

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6 Sound data

6 - 1 Sound Level Data

Sound pressure level correction factors for different distances

EWWD-I-SS

Unit size	Distance					
	1m	5m	10m	15m	20m	25m
340	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
400	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
550	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
650	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
700	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
800	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
850	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
900	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
950	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
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
C18	0.0	-7.5	-12.2	-15.3	-17.5	-19.3

EWWD-I-XS

Unit size	Distance					
	1m	5m	10m	15m	20m	25m
360	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
440	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
500	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
600	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
750	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
850	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
950	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
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

NSL_1-2_Rev.00_2

7 Installation

7 - 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.

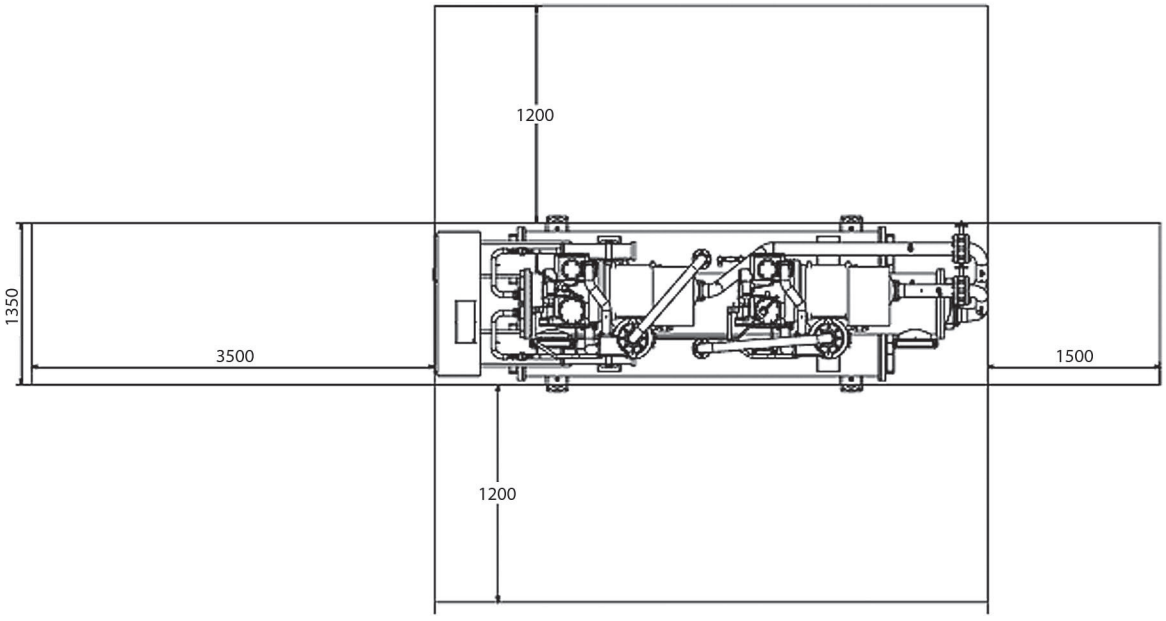
Location

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

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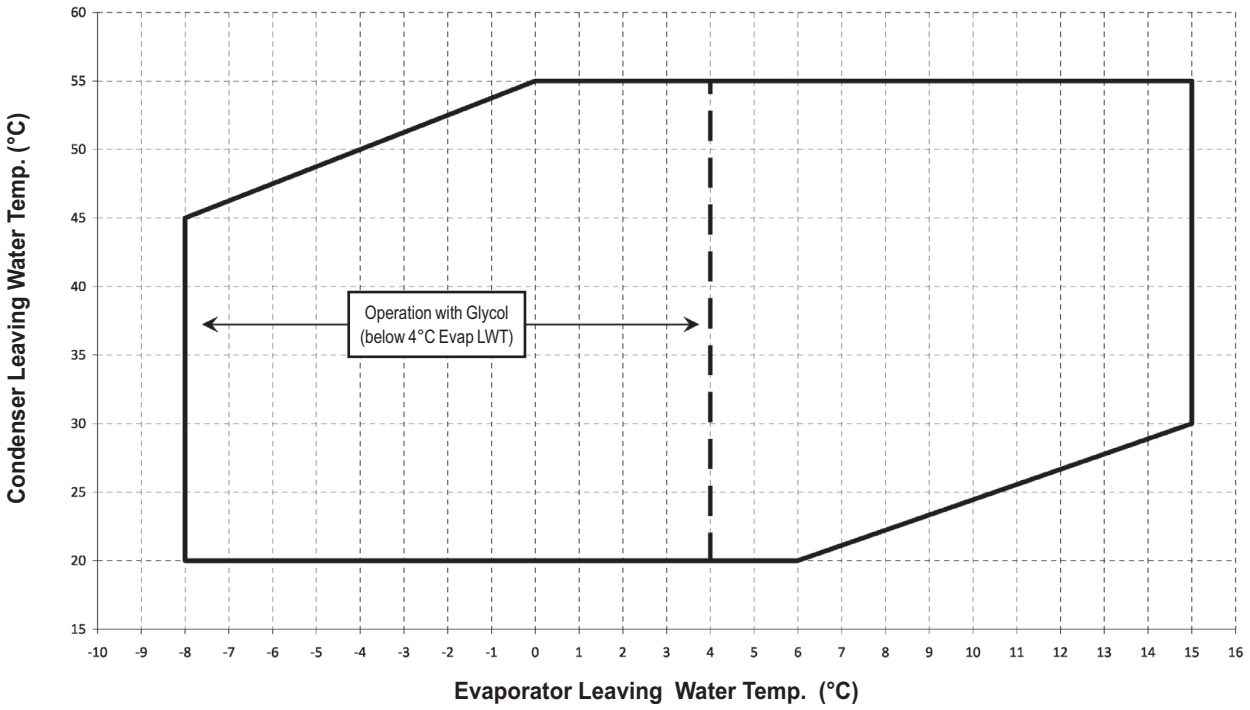
8 Operation range

8 - 1 Operation Range

Operating Limits
EWWD~I-SS --- EWWD~I-XS



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8 Operation range

8 - 1 Operation Range

Table 1 - Evaporator minimum and maximum water Δt

Max evaporator water Δt	°C	8
Min evaporator water Δt	°C	4
Min condenser water Δt (1 pass, 2 passes, Δt 4÷8°C)	°C	4
Max condenser water Δt (1 pass, 2 passes, Δt 4÷8°C)	°C	8
Min condenser water ΔtT (2 passes, Δt 9÷15°C)	°C	9
Max condenser water ΔtT (2 passes, Δt 9÷15°C)	°C	15
Min condenser water ΔtT (4 passes, Δt 9÷15°C)	°C	9
Max condenser water ΔtT (4 passes, Δt 9÷15°C)	°C	15

Table 2 - Evaporator fouling factors

Fouling factors m^2 °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 m^2 °C / kW	Cooling capacity correction factor	Power input correction factor	EER correction factor
0.0176	1.000	1.000	1.000
0.0440	0.978	0.986	0.992
0.0880	0.957	0.974	0.983
0.1320	0.938	0.962	0.975

Table 4.1 - Minimum glycol percentage for low water temperature

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

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

Table 4.2 Minimum glycol percentage for low air ambient temperature

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

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

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

Table 5 - Correction factors for low evaporator leaving water temperature

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

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

Table 6 - Correction factors for water and glycol mixture

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

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8 Operation range

8 - 1 Operation Range

How to use the Correction factors proposed in the previous tables

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

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

Example

Unit Size:	**EWWD340I-SS**
Mixture:	Water
Working condition:	ELWT 12/7°C – CLWT 30/35°C
- Cooling capacity:	333 kW
- Power input:	71.5 kW
- Flow rate (Δt 5°C):	15.90 l/s
- Evaporator pressure drop:	37kPa
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:	333 x 0.972 = 324 kW
- Power input:	71.5 x 0.986 = 70.5 kW
- Flow rate (Δt 5°C):	15.48 (referred to 324 kW) x 1.074 = 16.63 l/s
- Evaporator pressure drop:	40 (referred to 16.63 l/s) x 1.181 = 47kPa

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

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

Example

Unit Size:	**EWWD340I-SS**
Mixture:	Water
Standard working condition	ELWT 12/7°C – CLWT 35/40°C
- Cooling capacity:	317 kW
- Power input:	78.9 kW
- Flow rate (Δt 5°C):	15.15 l/s
- Evaporator pressure drop:	34 kPa
Mixture:	Water + Glycol 30% (for a low evaporator leaving temperature of -1/-6°C)
Working condition:	ELWT -1/-6°C – CLWT 35/40°C
- Cooling capacity:	317 x 0.613 x 0.972 = 189 kW
- Power input:	78.9 x 0.870 x 0.986 = 67.7 kW
- Flow rate (Δt 5°C):	9.03 l/s (referred to 189 kW) x 1.074 = 9.70 l/s
- Evaporator pressure drop:	15 kPa (referred to 9.70 l/s) x 1.181 = 18 kPa

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8 Operation range

8 - 1 Operation Range

Water charge, flow and quality

Items (1) (6)			Cooling Water			Cooled Water		Heated water (2)				Tendency if out of criteria
			Circulating System		Once Flow			Low temperature		High temperature		
			Circulating water	Supply water (4)	Flowing water	Circulating water [Below 20°C]	Supply water (4)	Circulating water [20°C ~ 60°C]	Supply water (4)	Circulating water [60°C ~ 80°C]	Supply water (4)	
Items to be controlled	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 200	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
	Oxygen	(mg O2 /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Corrosion
	Particole size	(mm)	Below 0.5	Below 0.5	Below 0.5	Below 0.5	Below 0.6	Below 0.5	Below 0.6	Below 0.5	Below 0.6	Erosion
	Total dissolved solids	(mg / l)	Below 1000	Below 1000	Below 1000	Below 1000	Below 1001	Below 1000	Below 1001	Below 1000	Below 1001	Erosion
	Ethykene, Propylene Glycol (weight conc.)		Below 60%	Below 60%	---	Below 60%	Below 60%	Below 60%	Below 60%	Below 60%	Below 60%	--
Items to be referred to	Nitrate ion	(mg NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[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.
6. The limits above have to be considered as a general prescription and con not totally assure the absence of corrosion and erosion.
   Some particular combinations of elements or the presence of components not listed in the table or factors not considered may trigger corrosion phenomena.

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8 Operation range

8 - 1 Operation Range

Water content in cooling circuits

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

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

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

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

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

where:

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

This formula is valid for:
- standard microprocessor parameters

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

OPL_1-2-3-4a-5_Rev.01_5

9 Hydraulic performance

9 - 1 Water Pressure Drop Curve Evaporator/Condenser

Pressure Drops

EWWD~I-SS

Size	340	400	460	550	650	700	800	850	900	950	C10	C12	C13	C14	C15	C16	C17	C18
Cooling Capacity (kW)	333	394	460	538	640	705	782	844	910	986	1027	1155	1204	1274	1346	1401	1455	1510
Water Flow (l/s) - Evaporator	15.91	18.82	21.98	25.70	30.58	33.68	37.36	40.32	43.48	47.11	49.07	55.18	57.52	60.87	64.31	66.94	69.52	72.14
Evaporator Pressure Drops (kPa)	37	50	54	62	55	44	58	53	53	66	51	52	56	47	58	62	66	71
Water Flow (l/s) - Condenser	19.33	22.92	26.80	31.44	37.31	41.14	45.53	49.21	53.03	57.52	60.39	67.32	70.33	74.34	78.55	82.08	85.52	89.01
Condenser Pressure Drops (kPa)	26	28	30	26	25	25	28	28	26	23	24	24	24	25	24	24	24	23

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

EWWD~I-XS

Size	360	440	500	600	750	800	850	950	C10	C11	C12
Cooling Capacity (kW)	362	433	506	573	720	795	866	933	976	1038	1134
Water Flow (l/s) - Evaporator	17.30	20.69	24.18	27.38	34.40	37.98	41.38	44.58	46.63	49.59	54.18
Evaporator Pressure Drops (kPa)	64	48	54	68	48	48	47	50	72	46	52
Water Flow (l/s) - Condenser	20.69	24.77	28.95	33.16	41.16	45.42	49.50	51.79	56.14	60.22	65.64
Condenser Pressure Drops (kPa)	48	47	51	66	48	48	47	50	50	65	65

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

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Evaporator and Condenser Pressure Drops

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

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

where:

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

How to use the formula: Example (evaporator)

The unit EWWD340I-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: 322 kW
The evaporator water flow at these working conditions is: 15.38 l/s

The unit EWWD340I-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: 333 kW
The evaporator water flow at these working conditions is: 15.90 l/s
The evaporator pressure drop at these working conditions is: 37 kPa

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

$$PD_2\ (kPa) = 37\ (kPa) \times \left(\frac{15{,}38\ (l/s)}{15.90\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 35\ (kPa)$$

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

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9 Hydraulic performance

9 - 2 Partial Heat Recovery Pressure Drop

Partial Heat Recovery pressure drops

EWWD~I-SS

Size EWWD~I-SS	340	400	460	550	650	700	800	850	900	950	C10	C12	C13	C14	C15	C16	C17	C18
Heating Capacity (kW)	24.5	27.5	35.5	40	48	51	54	62	70	73	76	92	94.3	97.9	102	105	109	126
Water Flow (l/s)	1.17	1.31	1.70	1.89	2.30	2.43	2.59	2.95	3.33	3.50	3.63	4.38	4.51	4.68	4.87	5.02	5.21	6.02
Heat Recovery Pressure Drops (kPa)	97	103	88	106	90	99	111	91	87	96	98	65	68	73	79	83	89	115

NOTES

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

EWWD~I-XS

Size EWWD~I-XS	360	440	500	600	750	800	850	950	C10	C11	C12
Heating Capacity (kW)	23.8	29.2	33.7	40.2	47.8	52.9	58.3	61.6	66.4	73.4	79.6
Water Flow (l/s)	1.14	1.40	1.61	1.92	2.28	2.53	2.79	2.94	3.17	3.51	3.80
Heat Recovery Pressure Drops (kPa)	17	25	31	44	17	20	25	27	31	37	43

NOTES

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

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9 Hydraulic performance

9 - 3 Total Heat Recovery Pressure Drop

Total and Partial Heat Recovery Pressure Drops

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

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

where:

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

How to use the formula: Example

The unit EWWD360I-XS 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: 13.2 kW
The water flow at these working conditions is: 0.63 l/s

The unit EWWD360I-XS 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: 23.8 kW
The water flow at these working conditions is: 1.14 l/s
The pressure drop at these working conditions is: 17 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 17\ (kPa) \times \left(\frac{0.63\ (l/s)}{1.14\ (l/s)} \right)^{1.80}$$

$$PD_2\ (kPa) = 6\ (kPa)$$

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10 Specification text

10 - 1 Specification Text

Features and advantages

The EWWD~I- water cooled chillers, featuring 1, 2 or 3 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 EWWD~I- chiller unmatched in the industry.

Seasonal quietness

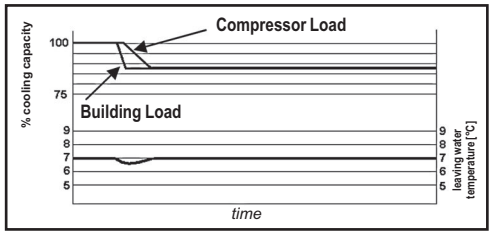
The compressor design with a single screw and twin rotors allows a constant gas flow. This compression process completely eliminates gas pulsations. The oil injection also results in significant mechanical noise reduction.

The twin gas compressor discharge chambers are designed to act as attenuators, based on the harmonic wave principle with destructive interference, thus always resulting equal to zero. The extremely low noise compressor performance affords the use of EWWD~I- chiller for all applications.

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

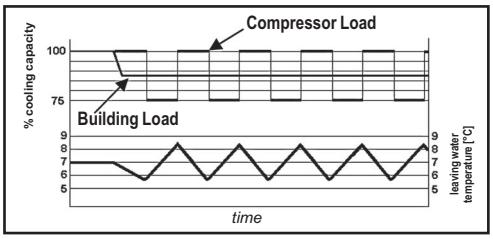
Infinitely capacity control

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) and down to 8.3% (three 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.

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

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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

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

S: Standard Efficiency

18 sizes, covering a cooling capacity range from 333 up to 1510 kW, EER up to 4.66 and ESEER up to 5.75.

X: High Efficiency

11 sizes, covering a cooling capacity range from 362 up to 1134 kW, EER up to 5.10 and ESEER up to 6.31.

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

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

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

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

Sound Configuration

EWWD~I- is available in standard sound level configuration:

S: Standard Noise

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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. EWWD~I- units are provided with a high efficiency oil separator to maximise oil extraction.
Compressors have an infinitely variable capacity control down to 25% of its total capacity. This control is made by means of capacity slides controlled by microprocessors.
Standard start is star-delta type; soft start type is available as option.

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

Evaporator
The units are equipped with a Direct Expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency.
The external shell is covered with a 10mm closed cell insulation material. Each evaporator has 1 circuit for each compressor and is manufactured in accordance to PED approval. The evaporator water outlet connections are provided with Victaulic Kit (as standard).

Condensers
The units are equipped with Direct Expansion shell&tube condensers, with copper tubes rolled into steel tubesheets. The unit has independent condensers, one per circuit. is manufactured in accordance to PED approval. Condensers are provided with liquid shut-off valve and spring loaded relief valve.
On the standard efficiency units, condensers are provided in 1 pass configuration as standard and 2 pass configuration is available as option; on the high efficiency units 2 pass configuration is provided as standard and 4 pass configuration is available as option.
With 2-4 pass condensers the option heat recovery is not available.

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.

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Refrigerant Circuit

Each unit has independent refrigerant circuits and each one includes:

- Single screw compressor with external cyclonic oil separator
- (Common) Evaporator
- Condenser
- Oil pressure transducer
- High pressure switches
- High pressure transducer
- Low pressure transducer
- Moisture liquid indicator
- High efficiency oil separator
- Replaceable core filter-drier
- Electronic expansion valve

Electrical control panel

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

Power Section

The power section includes compressors fuses and control circuit transformer.

MicroTech III controller

MicroTech III controller is installed as standard; it can be used to modify unit set-points and check control parameters. A built-in display shows chiller operating status plus temperatures and pressures of water, refrigerant, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors and EEXV to keep stable operating conditions to maximise chiller energy efficiency and reliability.

MicroTech III is able to protect critical components based on external signs from its system (such as motor temperatures, refrigerant gas and oil pressures, correct phase sequence, pressure switches and evaporator). The input coming from the high pressure switch cuts all digital output from the controller in less than 50ms, this is an additional security for the equipment.

Fast program cycle (200ms) for a precise monitoring of the system. Floating point calculations supported for increased accuracy in P/T conversions.

Control section - main features

- Management of the compressor stepless capacity.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperatures.
- Display of condensing-evaporating temperatures and pressures, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation. Temperature tolerance = 0.1°C.
- Compressor and evaporator pumps hour counters.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Re-start in case of power failure (automatic / manual).
- Soft Load (optimized management of the compressor load during the start-up).
- Start at high evaporator water temperature.

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10 Specification text

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- 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.

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 certified over IP and MS/TP (class 4) (Native)

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Chiller Sequencing

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

Digital Sequencing Panel

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

Serial Sequencing Panel

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

Standard accessories (supplied on basic unit)

Evaporator Victaulic Kit - Hydraulic joint with gasket for an easy and quick water connection.
Evaporator Water side design pressure 10 bar
Condenser Water side design pressure 16 bar
Condenser 1 pass (DT 4-8°C) on standard efficiency units, 2 passes (DT 4-8°C) on high efficiency units
Y-D starter - Star Delta starter is the standard type.
Double set-point - Dual leaving water temperature set-points.
Phase monitor - The phase monitor controls that phases sequence is correct and controls phase loss.
High Pressure Side Manometers
Hour Run meter - Digital compressors hour run meter.
General fault contactor - Contactor for alarm warning.
Set-point reset, demand limit and alarm from external device – The leaving water temperature set-point can be overwritten with the following options: 4-20mA from external source (by user); outside ambient temperature; evaporator water temperature Δt. Moreover the device allow the user to limit the load of the unit by 4-20mA signal or by network system and the microprocessor is able to receive an alarm signal from an external device (pump etc… - user can decide if this alarm signal will stop or not the unit).
Electronic Expansion Valve

Options (on request)

100% total heat recovery (available on EWWD~I-SS, condenser 1or 2 passes) - Produced with tube bundle placed in a single shell with the water condensers. Heat exchangers heads are provided with 2 connections for entering/leaving heat recovery water and 2 separate connections for condensing water.
Partial heat recovery (available on EWWD~I-SS and -XS, condenser 1 or 2 passes) – The upper portion of the condenser has cooling tubes through which about 10% of heat rejection (mainly discharge gas superheat) of the unit is recovered. These condensers, with partial heat recovery tubes, have crowns with special couplings by which they can be connected to the hot water pipes.
Brine version – Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Heat pump version
Condenser double flanges kit
20mm Evaporator/Condenser Insulation
Condenser Victaulic Kit
Cu-Ni 90-10 exchangers - to work with sea water the heat exchangers are fitted with Cu-Ni tubes and special protection inside the end covers.
Condenser 2 passes (DT 9-15°C) for EWWD~I-SS units, 4 passes (DT 9-15°C) for EWWD~I-XS units

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10 Specification text

10 - 1 Specification Text

Suction line shut off valve - Suction shut-off valve installed on the suction of the compressor to facilitate maintenance operation.
Discharge line shut-off valves - Discharge shut-off valve installed on the discharge of the compressor to facilitate maintenance operations.
Sound Proof System - Made of sheet metal and internally insulated, the cabinet is “integral kind” (around the whole chiller, not only around the compressors) to reach the best performance in noise reduction.
Dual Pressure Relief Valve on evaporator
Soft start - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading in addition to the normal protection envisaged by the electrical windings.
Under/Over Voltage – This device controls the voltage value of power supply and stops 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 shows 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).
Evaporator / condenser flow switch for the water piping.
Rubber type antivibration mounts – Supplied separately, these are positioned under the base of the unit during installation. Ideal to reduce the vibrations when the unit is floor mounted.
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).
Container kit
Acoustic test

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10 Specification text

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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-134a will be accepted.

PERFORMANCE

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

UNIT DESCRIPTION

Chiller shall include as standard: 1, 2 or 3 independent refrigerant circuits, semi-hermetic rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion shell & tube heat exchangers, R134a 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 throught service replaceble, 0.5 micron, full flow, cartridge type oil filter internal to compressor.
- ✓ Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not acceptable.
- ✓ The compressor's oil cooling must be realized, when necessary, by refrigerant liquid injection. External dedicated heat exchanger and additional piping to carry the oil from the compressor to heat exchanger and viceversa will 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 and 8.3% for units with 3 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 constant the set point for delivered chilled water temperature. In this operating condition unit control logic shall modulate electrical frequency level in a range lower and upper the nominal electrical network value fixed at 50 Hz.
- ✓ The microprocessor unit control shall detect conditions that approach protective limits and take self-corrective action prior to an alarm occurring. The system shall automatically reduce chiller capacity when any of the following parameters are outside their normal operating range:
    - o High condenser pressure
    - o Low evaporation refrigerant temperature
    - o High compressor motor amps

Evaporator

- ✓ The units shall be supplied with shell and tubes counter-flow heat exchanger with single refrigerant pass. It will be refrigerant direct expansion type with refrigerant inside the tubes and water outside (shell side). It will include carbon steel tube sheets, with straight copper tubes internally wound for higher efficiencies, expanded on the tube plates.
- ✓ The evaporator will have 2 circuits, one for each compressor and shall be single refrigerant pass.
- ✓ The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- ✓ Evaporator is manufactured in accordance to PED approval.

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10 Specification text

10 - 1 Specification Text

Condensers

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

Refrigerant circuit

Each circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, 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-start 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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Notes

In all of us,
a green heart

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 products are distributed by:

Daikin Europe N.V. participates in the Eurovent Certification Programme for Air Conditioners (AC), Liquid Chilling Packages (LCP) and Fan Coil Units (FC); the certified data of certified models are listed in the Eurovent Directory. Multi units are Eurovent certified for combinations up to 2 indoor units.

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