COOLPOINT™

DELIVERING. INNOVATION

www.coolpoint.net.pk

WATER-COOLED FLOODED SCREW CHILLER

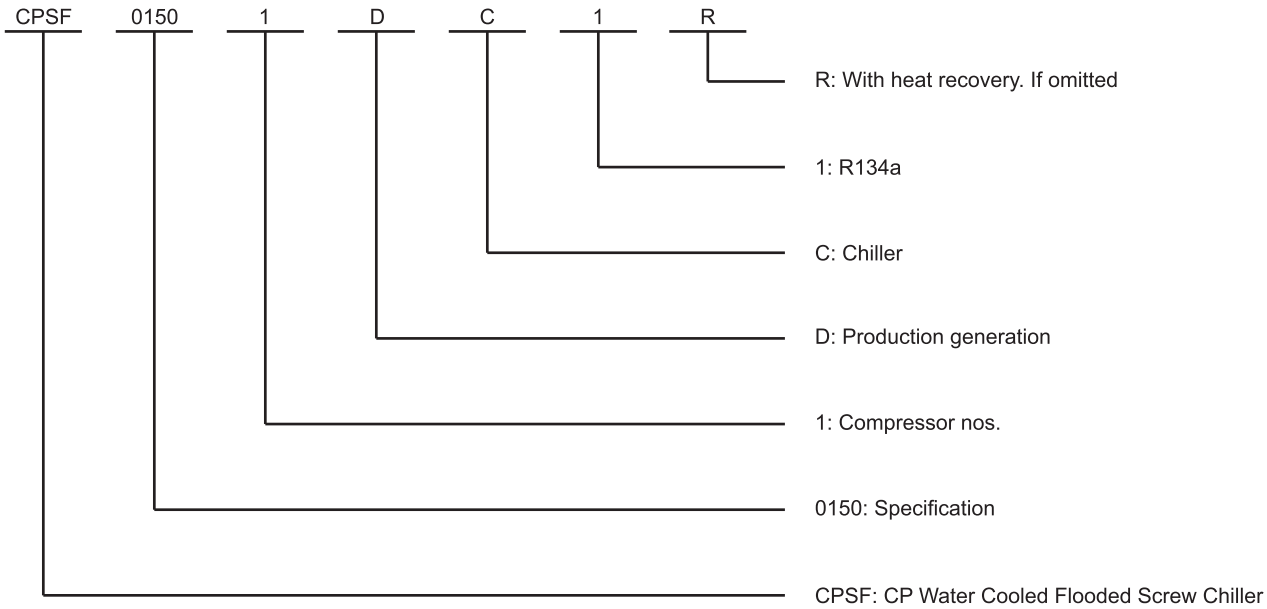
COOL POINT CENTRAL AIR-CONDITIONING

More than engineering we are about **innovative** partnerships

Overview

CPSF water cooled flooded screw chiller has a compact design, using flooded evaporator and two semi hermetic screw compressors. Also, it is combined with high efficient heat exchanger and microcomputer control technology. With continuous improvement of products, it has excellent quality, such as great stability, high efficient operating and low noise. It is widely used in all kinds of comfortable and technological occasions, its cooling capacity ranges from 16-RT to 509-RT.

Water Cooled Screw Chiller



FEATURE

Stability

The system is equipped with refrigerant control technique support by oil inducing mechanism that will ensure compressor to have sufficient oil supply all the time. The system is adopting multiple compressor with circuits design that will eliminate that needs for oil balancing and as a result, a more reliable and stable performance.

High Efficiency

The compressors used in the system are specially designed for floored type chiller and from renowned compressor producer. The compressor comes with a built in 2nd stage oil separator that greatly enhance the reliability of the compressor. When cooperated with enhanced performance evaporator, the system is able to deliver high efficiency performance with reliability.

Energy conservation

The system is equipped with multiple capacity staging screw compressor controlled PLC through temperature and pressure transducers. It is able to precisely control the system to adjust output capacity according to load. As a result, the system is able to save energy by performing efficiently and at the same time satisfy the load requirement.

Flexibility Wide range of products range from 106-509 RT is able to satisfy the needs of any installation and application.

Protection Protections is provided from refrigerant system, electrical system and water system to ensure safe operation and to provide easy assessment of errors through effective alarm system. Examples of protections are compressors motor over current, unusual phase sequence, low oil position. High discharge temperature, high pressure, low pressure freezing, Power Down, etc.

Intelligent The system is controlled through PLC and user is able to monitor and change the system setting through user friendly touch screen panel. Connection to BMS through Ethernet, wired or wireless is possible through different type of gateways; Thus, providing the capability to monitor system operation and performance remotely.

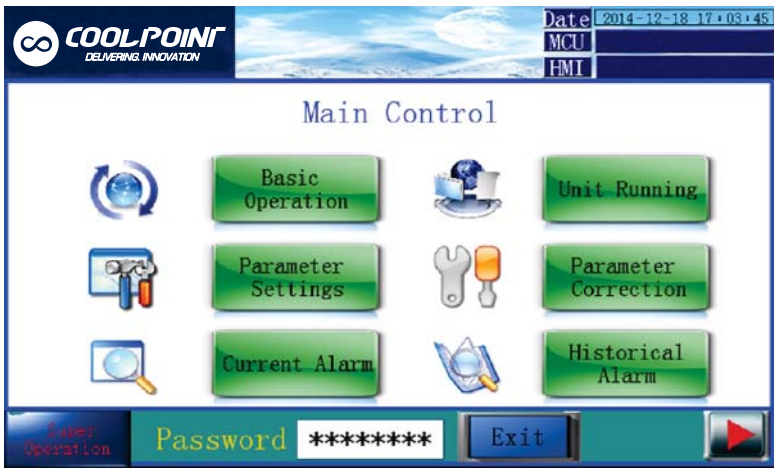
CONTROL SYSTEM
Advanced control system

COOL POINT water cooled flooded screw chiller uses Tm218 series PLC as a microcomputer controller, which has high reliability and good anti-interference ability. Well design and advanced microcomputer program can achieve accurate control and perfect protection for units, ensuring units run more efficiently, stably and safely. In order to meet the growing needs of users, it provides a flexible and powerful information exchange way, which can connect with various building control system (BAS) easily and perfectly.

Friendly man-machine interface

Unit uses advanced and colorful LCD touch screen technology. Users can control unit operation entirely by pass touch screen according to the prompt information, rather than refer to intricacy and heavy manual. The operation is more convenient, wand the display is more intuitive.

- Temperature of chilled water inlet and outlet
- Temperature of cooling water inlet and outlet
- Environment temperature
- Suction and exhaust pressure of the compressor
- Working current of the compressor
- Unit operating load
- Condition of water pressure difference switch
- Fault state of the unit and alarm record
- Exhaust temperature and exhaust over-heat of compressor
- Total operating time of the compressor
- Time clock.



General Data CPSF-DC1 Series (134a) Standard Series

Unit Model CWFS - DC1			109.1	134.1	149.1	169.1	199.1	219.1	239.1	264.1	279.2	299.2
Cooling Capacity		RT	106	129	145	167	197	213	235	258	275	291
		10^4kcal/h	32	39	44	50	59	64	71	78	83	88
		KW	371	455	509	586	691	748	828	908	966	1023
		COP	5.8	5.83	5.85	5.8	5.81	5.84	5.83	5.82	5.82	5.85
Input Power (KW)			64	78	87	101	119	128	142	156	166	175
Current (Standard Condition) [A]			118	136	140	163	212	215	233	259	291	293
Max. Running Current [A]			214	245	245	280	263	263	298	433	490	490
Starter Current [A]			378	415	415	479	650	650	683	845	660	660
Power Supply			380 V - 3 Ph - 50 Hz									
Refrigerant			R-134a									
Energy Control			Stepless Control									
Compressor Quantity			1	1	1	1	1	1	1	1	2	2
Evaporator	Desig. Water Pressure	MPa	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Water Flow Rate	m^3/h	64	78	88	101	119	129	142	156	166	176
	Water Press. Drop	kPa	66	71	58	56	66	54	58	69	84	75
	Pipe Diameter	DN	150	150	150	150	150	150	150	150	200	200
Condenser	Desig. Water Pressure	MPa	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Water Flow Rate	m^3/h	75	92	103	118	139	151	167	183	195	206
	Water Press. Drop.	kPa	64	65	66	64	64	64	63	64	76	76
	Pipe Diameter	DN	150	150	150	150	200	200	200	200	150	150
Dimension	Length	mm	3097	3097	3097	3097	3124	3124	3124	3124	4854	4854
	Width	mm	1530	1530	1530	153	1660	1660	1660	1660	1670	1670
	Height	mm	1820	1820	1820	1820	1920	1920	1920	1920	2070	2070
Shipping Weight		kg	2770	3220	3250	3325	3735	3780	3905	4020	6428	6460
Operating Weight		kg	2960	3410	3470	3575	4035	4080	4205	4320	6838	6870

Note:

1. Nominal cooling capacity condition: Chilled water inlet/outlet temp. is 12/7 °C. Cooling water inlet/outlet temp. is 30/35 °C
2. It there is non standard working conditions technical data please contact COOL POINT each branch.
3. Start mode of max. starting current: Y - Δ
4. The allowable voltage fluctuation is 10%.
5. COOL POINT reserve the right to make changes to the above without notice.
6. Heat recovery capacity of some units is about 10%-18% of cooling capacity, other requirement need to contact factory.

General Data CPSF-DC1 Series (134a) Standard Series

Unit Model CWFS - DC1			324.2	349.2	369.2	389.2	409.2	429.2	449.2	464.2	494.2	509.2
Cooling Capacity		RT	314	338	367	391	408	425	441	460	486	506
		10^4kcal/h	95	102	111	118	123	129	133	139	147	153
		KW	1103	1190	1290	1375	1435	1495	1550	1618	1710	1780
		COP	5.84	5.86	5.84	5.85	5.88	5.86	5.85	5.84	5.86	5.9
Input Power (KW)			189	203	221	235	224	255	265	277	292	303
Current (Standard Condition) [A]			305	325	355	386	388	420	445	468	495	520
Max. Running Current [A]			525	560	644	685	685	726	761	796	831	866
Starter Current [A]			724	759	828	972	972	1013	1048	1081	1243	1278
Power Supply			380 V - 3 Ph - 50 Hz									
Refrigerant			R-134a									
Energy Control			Stepless Control									
Compressor Quantity			2	2	2	2	2	2	2	2	2	2
Evaporator	Desig. Water Pressure	MPa	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Water Flow Rate	m^3/h	190	205	222	236	247	257	267	278	294	306
	Water Press. Drop	kPa	73	68	86	85	78	75	83	83	82	80
	Pipe Diameter	DN	200	200	200	200	200	200	200	200	200	200
Condenser	Desig. Water Pressure	MPa	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Water Flow Rate	m^3/h	222	240	260	277	289	301	312	326	344	358
	Water Press. Drop.	kPa	72	72	75	73	73	74	72	73	73	72
	Pipe Diameter	DN	150	150	200	200	200	200	200	200	200	200
Dimension	Length	mm	4854	4854	4854	4854	4854	4854	5024	5024	5024	5024
	Width	mm	1670	1670	1800	1800	1800	1800	1800	1800	1800	1800
	Height	mm	2070	2070	2250	2250	2250	2250	2250	2250	2250	2250
Shipping Weight		kg	6564	6646	7016	7064	7130	7238	7362	7474	7582	7640
Operating Weight		kg	6994	7076	7466	7524	7610	7728	7972	8094	8302	8260

Note:

1. Nominal cooling capacity condition: Chilled water inlet/outlet temp. is 12/7 °C. Cooling water inlet/outlet temp. is 30/35 °C
2. It there is non standard working conditions technical data please contact COOL POINT each branch.
3. Start mode of max. starting current: Y - Δ
4. The allowable voltage fluctuation is 10%.
5. COOL POINT reserve the right to make changes to the above without notice.
6. Heat recovery capacity of some units is about 10%-18% of cooling capacity, other requirement need to contact factory.

General Data CPSF-DC1 Series (134a) Special Model

Unit Model CWFS - DC1			110.1	135.1	150.1	170.1	200.1	220.1	240.1	265.1	280.2	300.2
Cooling Capacity		RT	108	131	147	169	199	215	237	260	277	293
		10^4kcal/h	33	40	44	51	60	65	72	79	84	89
		KW	378	462	516	593	698	755	835	915	973	1030
		COP	6.00	6.04	6.24	6.11	5.87	5.90	5.92	5.90	5.97	6.06
Input Power (KW)			63	77	83	97	119	128	141	155	163	170
Current (Standard Condition) [A]			117	135	138	161	212	215	232	258	290	292
Max. Running Current [A]			214	245	245	280	263	263	398	433	490	490
Starter Current [A]			378	415	415	479	650	650	683	845	660	660
Power Supply			380 V - 3 Ph - 50 Hz									
Refrigerant			R-134a									
Energy Control			Stepless Control									
Compressor Quantity			1	1	1	1	1	1	1	1	2	2
Evaporator	Desig. Water Pressure	MPa	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Water Flow Rate	m^3/h	65	79	89	102	120	130	144	157	167	177
	Water Press. Drop	kPa	52	55	44	43	50	42	44	53	64	59
	Pipe Diameter	DN	150	150	150	150	150	150	150	150	200	200
Condenser	Desig. Water Pressure	MPa	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Water Flow Rate	m^3/h	76	93	103	119	141	152	168	184	195	206
	Water Press. Drop.	kPa	50	50	5	49	49	49	48	49	59	58
	Pipe Diameter	DN	150	150	150	150	200	200	200	200	150	150
Dimension	Length	mm	3097	3097	3097	3097	3124	3124	3124	3124	4854	4854
	Width	mm	1530	1530	1530	1530	1660	1660	1660	1660	1670	1670
	Height	mm	1820	1820	1820	1820	1920	1920	1920	1920	2070	2070
Shipping Weight		kg	2800	3260	3300	3385	3805	3855	3990	4115	6528	6570
Operating Weight		kg	2990	3450	3520	3635	4105	4155	4290	4415	6938	6980

Note:

1. Nominal cooling capacity condition: Chilled water inlet/outlet temp. is 12/7 °C. Cooling water inlet/outlet temp. is 30/35 °C
2. It there is non standard working conditions technical data please contact COOL POINT each branch.
3. Start mode of max. starting current: Y - Δ
4. The allowable voltage fluctuation is 10%.
5. COOL POINT reserve the right to make changes to the above without notice.
6. Heat recovery capacity of some units is about 10%-18% of cooling capacity, other requirement need to contact factory.

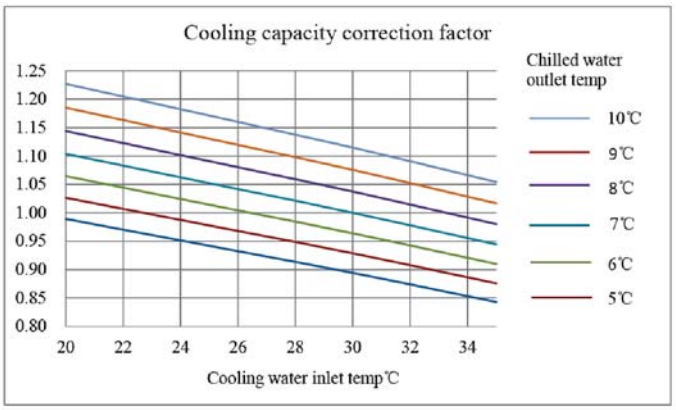
General Data CPSF-DC1 Series (134a) Special Model

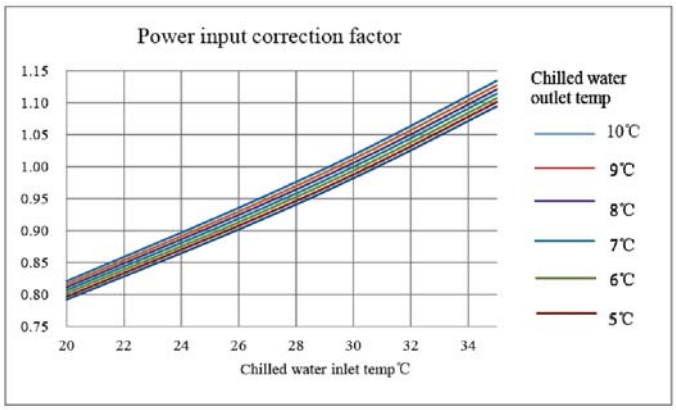
Unit Model CWFS - DC1			235.2	350.2	370.2	390.2	410.2	430.2	450.2	465.2	495.2	510.2
Cooling Capacity		RT	316	340	370	398	410	427	444	465	489	509
		10^4kcal/h	95	103	112	119	124	129	134	140	148	154
		KW	1110	1197	1300	1382	1442	1502	1561	1630	1719	1790
		COP	6.00	6.14	6.10	6.12	6.11	6.13	6.12	6.10	6.12	6.11
Input Power (KW)			185	195	213	226	236	245	255	267	281	293
Current (Standard Condition) [A]			303	322	353	383	385	416	440	464	490	516
Max. Running Current [A]			525	560	644	685	685	726	761	796	831	866
Starter Current [A]			724	759	828	972	972	1013	1048	1081	1243	1278
Power Supply			380 V - 3 Ph - 50 Hz									
Refrigerant			R-134a									
Energy Control			Stepless Control									
Compressor Quantity			2	2	2	2	2	2	2	2	2	2
Evaporator	Desig. Water Pressure	MPa	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Water Flow Rate	m^3/h	191	206	224	238	248	258	268	280	296	308
	Water Press. Drop	kPa	57	52	66	65	60	57	63	63	63	62
	Pipe Diameter	DN	200	200	200	200	200	200	200	200	200	200
Condenser	Desig. Water Pressure	MPa	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Water Flow Rate	m^3/h	223	239	260	277	289	300	312	326	344	358
	Water Press. Drop.	kPa	56	55	57	56	56	56	59	61	60	62
	Pipe Diameter	DN	150	150	200	200	200	200	200	200	200	200
Dimension	Length	mm	4854	4854	4854	4854	4854	4854	5024	5024	5024	5024
	Width	mm	1670	1970	1800	1800	1800	1800	1800	1800	1800	1800
	Height	mm	2070	2070	2250	2250	2250	2250	2250	2250	2250	2250
Shipping Weight		kg	6679	671	7146	7204	7275	7388	7522	7644	7757	7820
Operating Weight		kg	7109	7201	7596	7664	7755	7878	8132	8264	8477	8440

Note:

1. Nominal cooling capacity condition: Chilled water inlet/outlet temp. is 12/7 °C. Cooling water inlet/outlet temp. is 30/35 °C
2. It there is non standard working conditions technical data please contact COOL POINT each branch.
3. Start mode of max. starting current: Y - Δ
4. The allowable voltage fluctuation is 10%.
5. COOL POINT reserve the right to make changes to the above without notice.
6. Heat recovery capacity of some units is about 10%-18% of cooling capacity, other requirement need to contact factory.

Correction Factor (Variable Working Condition)

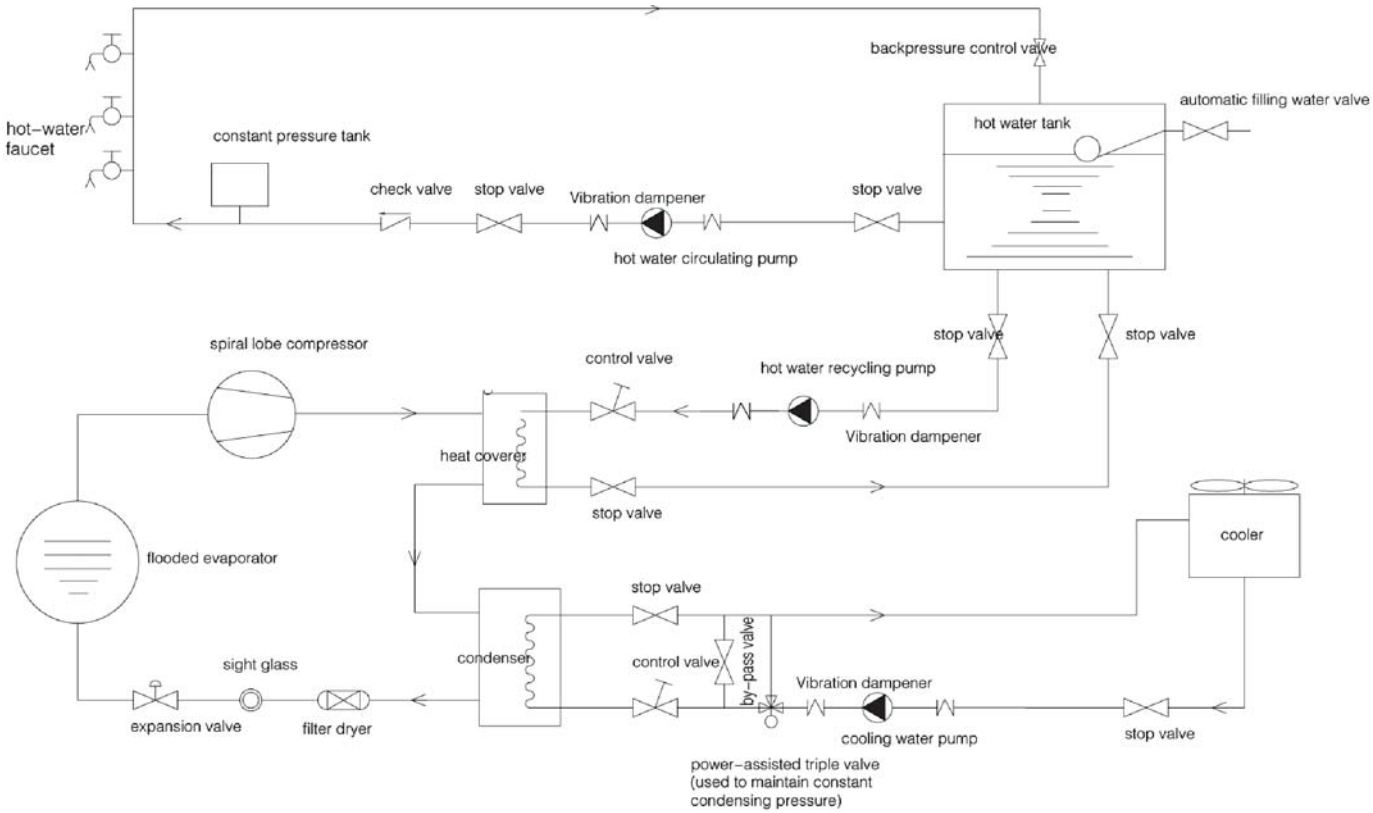




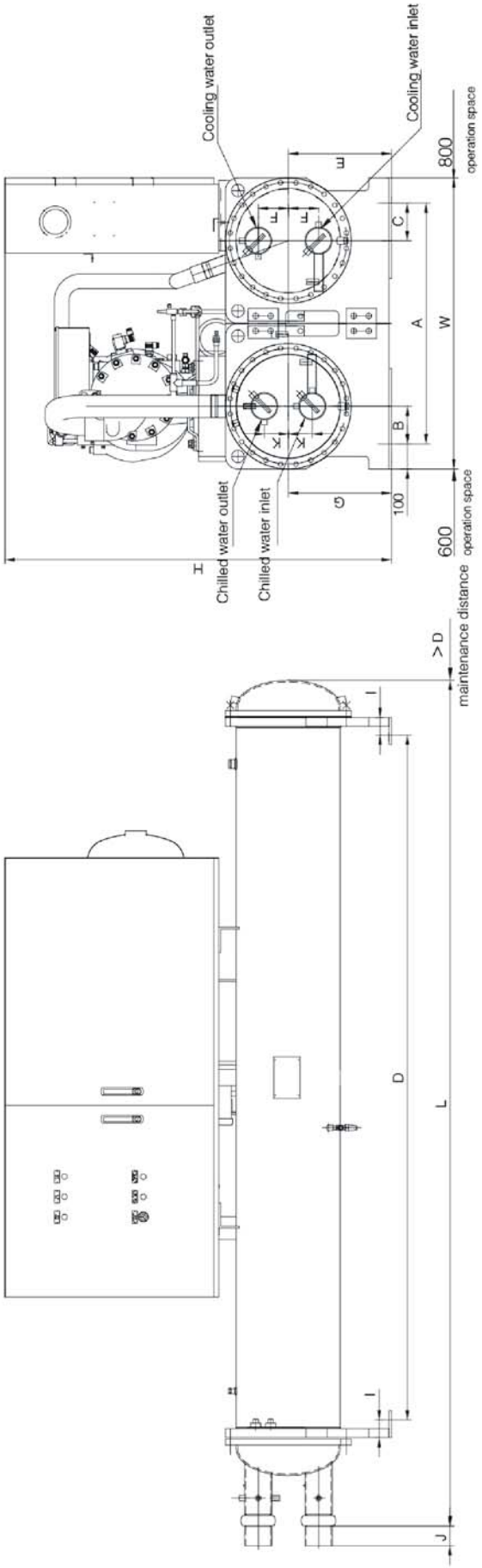
Heat Recovery (Optional)

The condenser heat recovery in chiller means to recycle the waste heat of condenser in the refrigerating system with heat changing equipment. The high temperature refrigerant discharged by the compressor first enter the heat recovery section, exchange heat with the running water for residential or industry use, and then enter the condenser for heat with the running water for residential or industry use, and then enter the condenser for heat exchanging, This method not only provides hot water but also improve operating condition, greatly reducing the operation cost.

The following is a flow diagram of the heat recovery system of domestic hot water



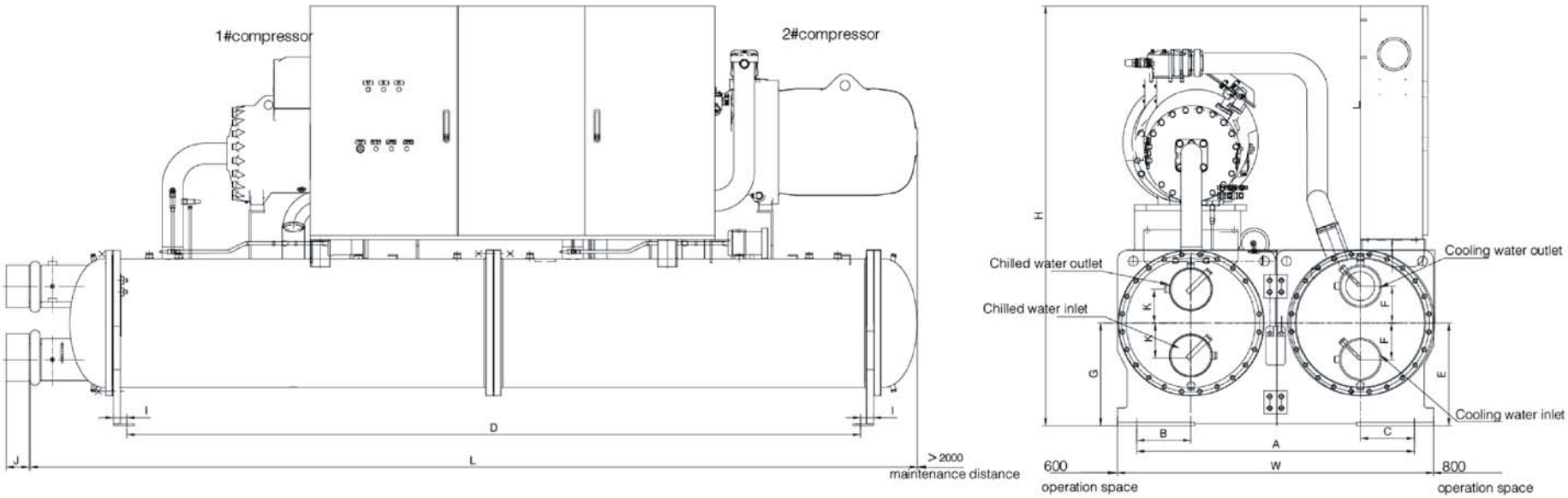
Unit Dimension - Single compressor



Model		Evaporator Pipe	Condenser Pipe	A	B	C	D	E	F	G	L	W	H	K	I	J
Standard Model	Special Model															
109.1-DC1	110.1-DC1	DN150	DN150	1330	280	285	2330	535	165	507	3097	1530	1820	130	70	180
134.1-DC1	135.1-DC1	DN150	DN150	1330	280	285	2330	535	165	507	3097	1530	1820	130		
149.1-DC1	150.1-DC1	DN150	DN150	1330	280	285	2330	535	165	507	3097	1530	1820	130		
169.1-DC1	170.1-DC1	DN150	DN150	1330	280	285	2330	535	165	507	3097	1530	1820	130		
199.1-DC1	200.1-DC1	DN150	DN150	1460	280	350	2330	585	180	507	3124	1660	1920	130		
219.1-DC1	220.1-DC1	DN150	DN150	1460	280	350	2330	585	180	507	3124	1660	1920	130		
239.1-DC1	240.1-DC1	DN150	DN150	1460	280	350	2330	585	180	507	3124	1660	1920	130		
264.1-DC1	264.1-DC1	DN150	DN150	1460	280	350	2330	585	180	507	3124	1660	1920	130		

Note:

1. Pipes of evaporator and condenser should be supported to avoid the external force extend on the unit.
2. Space of machine room should be big enough to maintain the evaporator and condenser.

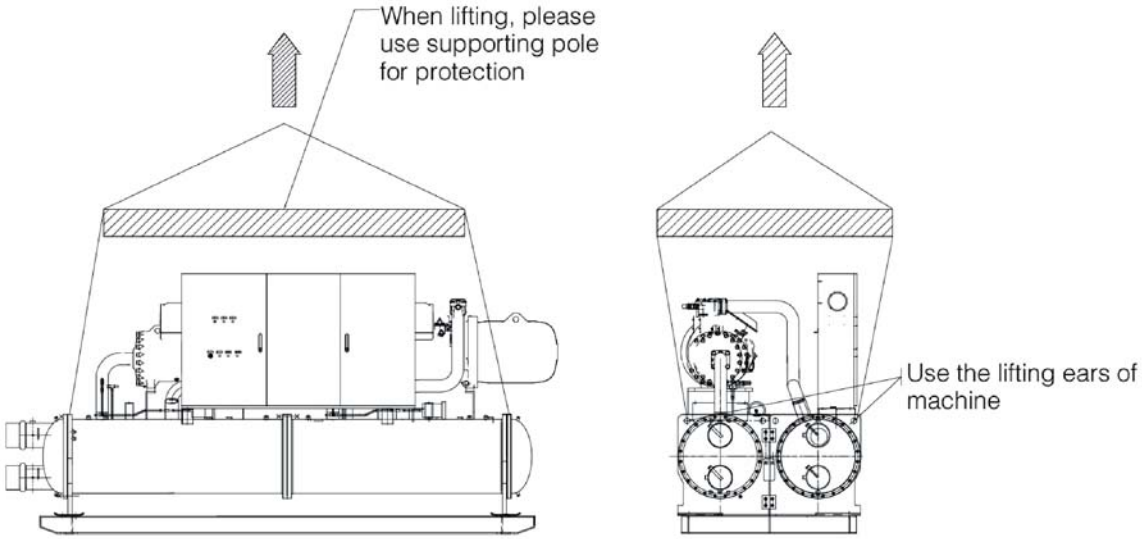


Model		Evaporator Pipe	Condenser Pipe	A	B	C	D	E	F	G	L	W	H	K	I	J
Standard Model	Special Model															
279.2-DC1	280.2-DC1	DN200	DN150	1470	350	285	3860	535	165	585	4854	1670	2070	180		
299.2-DC1	300.2-DC1	DN200	DN150	1470	350	285	3860	535	165	585	4854	1670	2070	180		
324.2-DC1	325.2-DC1	DN200	DN150	1470	350	285	3860	535	165	585	4854	1670	2070	180		
349.2-DC1	350.2-DC1	DN200	DN150	1470	350	285	3860	535	165	585	4854	1670	2070	180		
369.2-DC1	370.2-DC1	DN200	DN200	1470	350	350	3860	585	180	585	4854	1800	2250	180		
389.2-DC1	390.2-DC1	DN200	DN200	1600	350	350	3860	585	180	585	4854	1800	2250	180		
409.2-DC1	410.2-DC1	DN200	DN200	1600	350	350	3860	585	180	585	4854	1800	2250	180	70	180
429.2-DC1	430.2-DC1	DN200	DN200	1600	350	350	3860	585	180	585	4854	1800	2250	180		
449.2-DC1	450.2-DC1	DN200	DN200	1600	350	350	4060	585	180	585	5024	1800	2250	180		
464.2-DC1	465.2-DC1	DN200	DN200	1600	350	350	4060	585	180	585	5024	1800	2250	180		
494.2-DC1	495.2-DC1	DN200	DN200	1600	350	350	4060	585	180	585	5024	1800	2250	180		
509.2-DC1	510.2-DC1	DN200	DN200	1600	350	350	4060	585	180	585	5024	1800	2250	180		

Note:

1. Pipes of evaporator and condenser should be supported to avoid the external force extend on the unit.
2. Space of machine room should be big enough to maintain the evaporator and condenser.

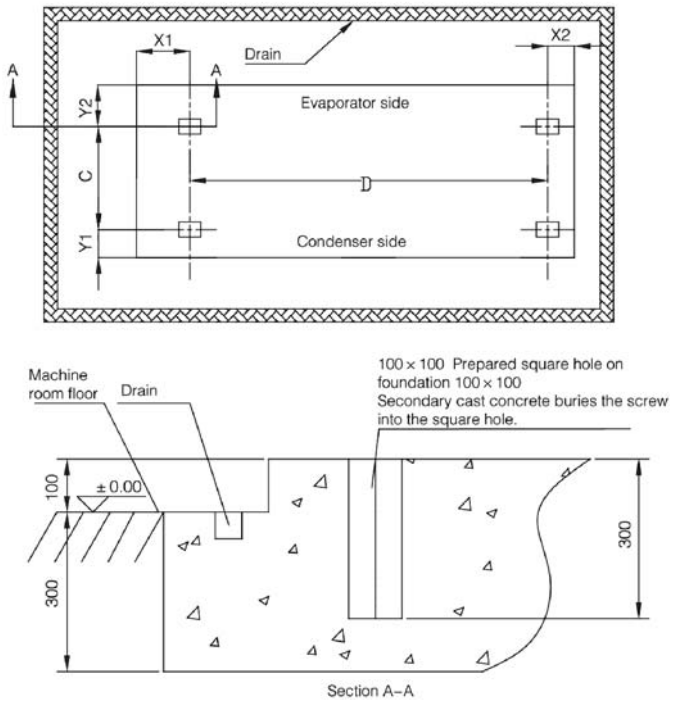
Schematic plot for lifting assembly



Note:

1. This is merely a schematic plot please refer to related unit data for specific type size.
2. The external size of the unit may vary, but this lifting method is suitable for any COOL POINT flooded chilling unit.

Foundation drawing



Model		D	C	X1	X2	Y1	Y2
Standard Model	Special Model						
109.1-DC1	110.1-DC1	2330	1330	850	530	150	200
134.1-DC1	135.1-DC1	2330	1330	850	530	150	200
149.1-DC1	150.1-DC1	2330	1330	870	550	150	200
169.1-DC1	170.1-DC1	2330	1330	870	550	150	200
199.1-DC1	200.1-DC1	2330	1460	870	550	150	200
219.1-DC1	220.1-DC1	2330	1460	870	550	150	200
239.1-DC1	240.1-DC1	2330	1460	870	550	150	200
264.1-DC1	265.1-DC1	2330	1460	870	550	150	200
279.2-DC1	280.2-DC1	3860	1470	890	570	150	200
299.2-DC1	300.2-DC1	3860	1470	890	570	150	200
324.2-DC1	325.2-DC1	3860	1470	890	570	150	200
349.2-DC1	350.2-DC1	3860	1470	890	570	150	200
369.2-DC1	370.2-DC1	3860	1600	890	570	150	200
389.2-DC1	390.2-DC1	3860	1600	890	570	150	200
409.2-DC1	410.2-DC1	3860	1600	890	570	150	200
429.2-DC1	430.2-DC1	3860	1600	890	570	150	200
449.2-DC1	450.2-DC1	4060	1600	890	570	150	200
464.2-DC1	465.2-DC1	4060	1600	890	570	150	200
494.2-DC1	495.2-DC1	4060	1600	890	570	150	200
509.2-DC1	610.2-DC1	4060	1600	890	570	150	200

Machine Operation Control

Start / Stop Water Pump

The operation and stop of the cooling water pump / chilled pump / submerged pump should be carried out by the operations according to starting requirement. The operation of the chilled water pump is decided by the outlet water temperature from the evaporator. When it is below 0 Deg C, the pump should be started. Also, the controller regulates other actions according to the signal of whether the pump is in operation.

Start / Stop Water Chiller

When switched on and operation command deployed, all the conditions are met, the machine will start.

A: The input of protection device are on (Normal)

Emergency stop switch is ON

The stop conditions of water pump

During operation, when any of the following conditions occurs, the machine stops.

A: receiving the stop instruction. the unit stops: receiving reset instruction, the unit initializes all the protection devices and then restart the unit.

B:When processing the abnormal shut down caused by abnormity (such as high temperature of the motor, low suction pressure, high discharge pressure), the contactor will cut off power and stop the motor.

C: The emergency stop switch on the control cabinet panel is OFF.

Start/stop water pump

The possible setting range of temperature controller,

The refrigerant conditions of the outlet water temperature of CHW: 4-15 deg C.

Start/stop water pump

Take the equalizing running conditions of compressors into condensation, when several compressors are required, the less running time one start first.

Installation and maintenance

The installation and maintenance of the units should be carried out by professionals who have received professional training, having a good knowledge of local standards and rules and enjoying practical experience and and qualification towards chiller plants. The first funning should be conducted by professional service departments or the quality of the units can not be guaranteed.

Inspection of incoming merchandise

When the equipment arrives, please check whether all the items are included according to the packing list and whether the components are damaged in the process of transportation. Please contact the forwarding agent and claim for damages in writing once the components are damaged. Before installation, check the suitability of local supply voltage and frequency. COOL POINT will not assume compensation liability of any damage after the acceptance of goods.

Lifting of the units

When lifting the units, the mooring rope or chain that can ensure the bearing should be firmly trapped into the lifting hole and professionals must lift in strict accordance with the schematic plot for lifting and ensure that the control cabinet and other parts of the units and intact. (You can refer to the previous schematic plot of lifting.)

Water quality requirement

The water composition varies with regions. If use any water that is not ordinary (such as industrial sewage or underground water), you should check the water quality before it enters heat - exchanging unit. If it can not meet the requirements of water for air conditioners, water treatment is needed. Related water treatment can consult industrial circulating cooling water treatment design specification or other related standards. The data in the following table can be used as reference index.

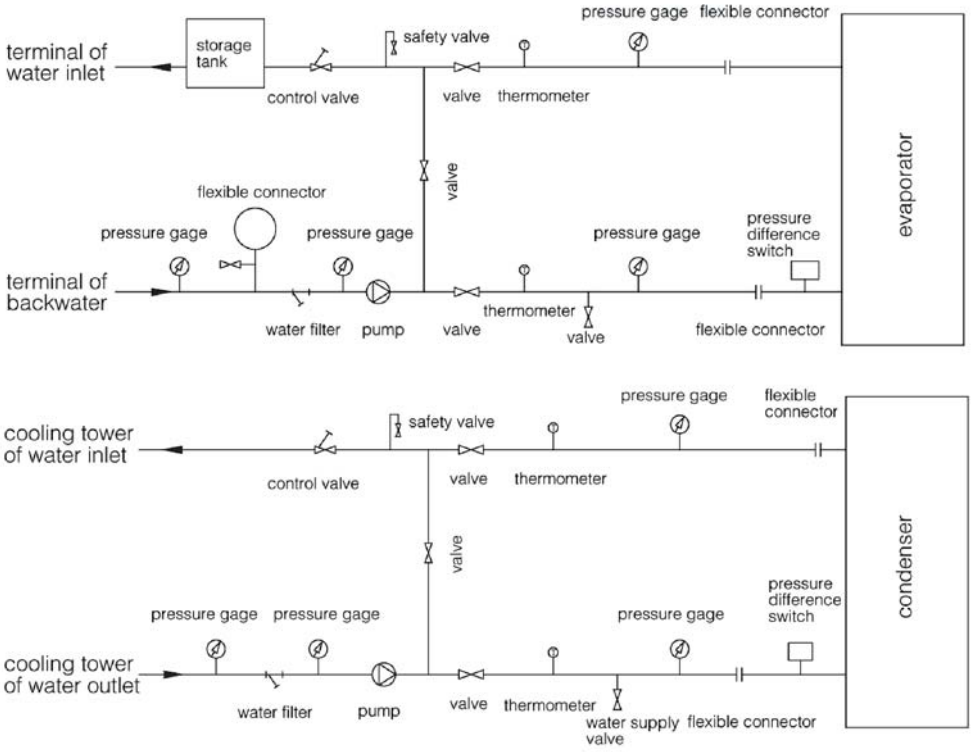
Items	Unit	Chilled Waqter Requirements	Cooling Water Requirements
		Permissive values	Permissive values
Suspended solids	mg/L	< 10	< 10
pH value (25 deg C)	mg/L	6.5 - 8.0	6.5 - 8.0
Electric conductivity (25 deg C)	u S/L	< 800	< 800
Methyl orange alkalinity	mg/L	< 150	< 150
Acid consumption (pH = 4.8)	mg/L	< 100	< 100
Full hardness $CaCO_2$	mg/L	< 200	< 200
Fe^{2+}	mg/L	< 1.0	< 1.0
Cl^-	mg/L	< 200	< 200
SO_4^{2-}	mg/L	< 200	< 200
SiO_2	mg/L	< 50	< 50
NH_4^+	mg/L	< 1.0	< 1.0
S^{2-}	mg/L	negative	negative

Installation of pipes

Stop valves must be installed in the inlet and outlet of the unit for the sake of routine maintenance of the water system. It suggested that thermometer and pressure gauge are installed in the heat exchanging device's water inlet and outlet for the purpose of routine check and maintenance., Water filter should be installed in the water inlet of the water pump so that impurities will not enter water pump and heat exchanging device.

Check the sealing of the pipes before the pipes are insulated and water injected into the unit. All the pipes connected with the unit should be installed with damping device. Acceptable flow controllers such as water switches should be installed. When sewage discharge devices are to be installed, they should avoid the water pipes of the water inlet and outlet of the heat exchanging device or the operation of the unit will be abnormal.

Schematic plot of the external water pipe of the unit.



introducing to the design and installation of the pipe line

- The design of water cycle system should be as concise as possible, avoiding too many bent pipes and putting straight pipe line on the same level as possible.
- Pay attention to the water inlet and outlet of condenser and evaporator and avoid connection error.
- Install manual or automatic vent valves on all the highest points of the water cycling system.
- The expansion tank which should be anti corrosive and anti rust must installed on the highest points of the whole pipe line.
- thermometer and pressure page should be installed in both cool water and cooling water inlet and outlet.
- Drainage valve should be installed in the bottom of all local bent pipes in order to drain the water of the whole system.
- Stop valve should be installed in the pipe line of chilled water and cooling water which connects the heat exchanging device and service pipe.
- By-pass valve should be installed in heat exchanging device's water inlet and outlet pipe line for the sake of inspection and flush of pipe line.
- Install flexible connector to reduce the vibration of pipe line.
- Since the impurities of the water system will lead to the scaling of the heat exchanging device. a water filter should be installed before the pump.
- To enhance the effect of cooling (or heating), and save energy, the pipe line should be very insulated.
- To prevent the unit from tripping off due to low load. Its advisable to install storage tank.
- The water flow should never excess the max flow of the unit (30% above the fixed water flow.)
- It should be easy to dismantle the pipe line and connectors that are directly related to the content for the sake of cleaning and external check of the connectors of the heat exchanging device.

Selection of water system components

1. Stop valve: select the size of the valve according to the diameter of the pipe.
2 Strainer: Use 60 mesh and above.
3. Check Valve: installed at the pump outlet to avoid damage of the pump due to backflow of the water select according to the joint diameter.
4. By-pass valve: installed between the pipe connected inlet and outlet of the chiller, open it before pipe cleaning.
5. Thermometer: for chiller overhaul, maintenance, and operation observation, range between 0~100 C.
6. Water pump: water pump flow rate is chosen according to the parameters of chiller water flow.
   Water pump flow rate = L 1.1 (L - Chiller water flow rate)
7. Auto air vent: to release air in the water system, install at the highest point of the system.
8. Expansion Tank: to stabilize the pressure of the water system by storing and replenishing water, installed at the return water pipe and above the piping path in the water system. The volume is calculate as below.
   Volume of expansion tank, V = (0.03 - 0.034) Vc where.
   Vc - Water volume of the system
9. Water tank: to regulate the system capacity and act as storage of energy. It will reduce the number of time the chiller cycling between ON and OFF due to changing of load. Increase the efficiency of the chiller and at same time enhances the lifespan.
   The calculation of volume of water tank is as following.
   V = (Q/27.9n)-Vs
   where,
   V = water tank volume (m3)
   Q = cooling capacity (kW)
   n = number of chiller
   Vs = volume of water for internal piping and heat exchanger

CAUTION:

1 Pressure used for pipeline pressure testing should be more than 1.25 times of working pressure and not less than 0.6 Mpa. Pressure have to be held for 5 minutes and pressure decay should not be more than 0.02 Mpa. Water system can only be approved if no leakage is found.
2. Water pressure testing: cannot be conducted when the temperature is lower than 5 deg C. Used only approved pressure gauge with appropriate precision, the maximum pressure scale should be 1.5 ~ 2 times of pressure to be tested.
3. During pressure testing, water should be added from lower point and air to be drawn out at higher point. Water need to be added slowly and constantly. Stop the pump after the test pressure level is reached and commence the pressure test. No work is allowed when the piping system is pressurised.
4. After qualifying the pressure test, the water piping need to be clean throughly until the water is clear and free from impurities like soil or metal debris.

Pre-start checking items

Hydraulic line

Check all the water system pipe line. Ensure that the evaporator and condenser are correctly connected and the water flow direction is right. Check whether the water inlet and outlet pipes of the heat exchanging device are correctly connected and then open all the valves and related pumps. Flush the pumps to ensure that the water system is clean. Check whether all the pipes and connectors are in sound condition and then exhaust the air in evaporator and condenser. The hydraulic line should be free from rust stairs. Detect the water side resistance loss of evaporator and condenser and check the water quality. make sure the temperature sensor is correctly connected.

Circuit

Disconnect the isolator and check all the bootstrap circuit of the control cabinet. Make sure all the switches are off and check the power of the supply unit, whose fluctuation should be within 10% of the related voltage that is marked on the Name board of the compressor and voltage unbalance should be within 2%. Make sure the necessary electric power is enough to meet the start and full load operation of the unit ensure that all the wires and safety fuses are suitable to the operation of the unit and finish all the chain control circuits in line with related circuit drawing. Make sure that normal operation of accessory equipment and control devices and have enough cooling capacity to meet the needs of the first operation.

Unit

Make sure the oil heater of the compressor has been powered on for over 3 hours. Observe the oil level through sight glass; if the level is not seen, oil should be filled completely open the exhaust stop valve and then back half circle clockwise, opening liquid supply valve. Start accessory devices condensate pump and chilled water pump. Check whether all the safety control devices in initial state and the correctness of their setting. More details checking items can refer to table 1.

Safety device

The unit is equipped with safety protection device to ensure its safe operation. When one safety device is in operation, if MIL is on, this section stops working while others are still normal. We suggest to shut down the machine and check even if one part is abnormal lest it should cause more serious accidents. (Table 2)

Operation check list

Frequency	Item	Checking Method	Requirement (R-134a)
Daily	Discharge line pressure	Check the discharge line pressure	0.6 - 1.2 Mpa
	Suction line pressure	Check the discharge line pressure	0.1 - 0.3 Mpa
	Superheat	Check the superheat valve	12 - 20 deg C
	Power supply	Check with voltmeter	Nominal Valve ±10%
	Cooling water outlet temperature	Check with thermometer	30 ~ 45 deg C
	Chilled water outlet temperature	Check with thermometer	5 - 10 deg C
	Variation and noise	Touch and listen	No unusual vibration and sounds
	Room temperature	Check with thermometer	? 40 deg C
Monthly	Main loop joint	Spanner, Wrench	All the joints are helfd firmly and not loosenening
	Contactor joint	Self test	Not Seriously corroded, smooth surface
Quarterly	Refrigerant Injection	Check the refrigerant piping	No gas bubles
	Oil Injection	Check the oil level	within specified area

Protections and Possible Causes

Protection	Possible Causes
High pressure protection	Cooling water not circulating or water level too low
	Leaving water temperature for cooling is too high
	Condensor Scaling
	Presence of non condensable gas
Anti freeze protection	Temperature of chilled water is too low
	Setting temperature is too low
Discharge temperature protection	Leaack of refrigerant due to leakage
	Solenoid valve at the compressor cooling pipelines failed and closed
	stop valve at condenser outlet
Motor overheat protection (Compressor motor protection)	Same as high pressure protection
Low pressure protection	Expansion valve faulty and closed
	Stop valve at condenser outlet closed
	Chilled water flow rate not enough
	Scaling of evaporator
Reverse phase protector	Wrong wiring
Over-current relay (Compressor motor)	Same as high pressure protection
Safety valve	Refrigerant system high pressure

Operating conditions

Unit should be located at indoor with ambient temperature above 0 deg C and relative humidity < 95%. Installation site should be level and strong enough to support the operating weight of the unit (please refer to foundation diagram and maintenance space diagram).

Recommended maintenance schedule

	1000 hr	2500 hr	5000 hr	20000 hr	40000 hr
Bearing					O
Motor		Δ	Δ	Δ	Δ
Liquid injection control valve				Δ	Δ
Electronic valve				Δ	Δ
Suction filter	Δ	Δ	Δ	Δ	
Oil filter	Δ	Δ	Δ	Δ	O
Liquid line filter -drier				Δ	Δ
Lubricant					O

DATE	NOTES

DATE	NOTES

COOLPOINT™

DELIVERING. INNOVATION

Lahore Office:
Adda Plot, Sharaiz Avenue,
Jatti Umra Road,
Raiwind Road, Lahore.
Ph: 0092-42-35322612-7
Fax: 0092-42-35322618
Email: info@coolpoint.net.pk
URL: www.coolpoint.net.pk

Islamabad Office:
Office No. 11, Ist Floor,
Zaki Center, I-8 Markaz,
Islamabad.
Ph: 051-4861371
Fax: 051-4861372
Email: isboffice@coolpoint.net.pk
URL: www.coolpoint.net.pk

Karachi Office:
Office No. 201-A, 2nd Floor,
Plot No. DC-4, Clifton Center,
Clifton Block No. 5, Karachi.
Ph: 021-5810981, 5810982
Fax: 021-5821219
Email: khioffice@coolpoint.net.pk
URL: www.coolpoint.net.pk