Address Book of Branch Offices in China

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No.1210A2BGHE01

Panasonic

DG-H Series

G series direct-fired LiBr absorption chiller/heater

China · Dalian Sanyo Refrigeration Co.,Ltd.

Sanyo LiBr absorption chiller/heater DG-H series

Dalian Sanyo G Series Enhancement Model

Energy saving nonesuch · Safe guarantee

Business scope:

Designs, productions, manufactures, sales, installations, and after-sale services for chillers featuring environmental protection and energy-integrated utilization, for air-conditioning machinery, and for related environmental protection machinery, etc.

Product kinds:

- Central air-conditioning equipment: absorption chiller/heater — sole refrigeration or refrigeration and heating (70~23256kW).Steam-fired, direct-fired, hot water-fired, modular type, packaged type, heat pump type, etc.
  Electric refrigeration screw chiller — air conditioning refrigeration and ice storage (281~2461kW).
- Commercial air-conditioning equipment: GHP gas heat pump and chiller unit — refrigeration and heating (10HP-60HP).
  VRF variable refrigerant flow unit — refrigeration and heating (8HP-60HP).
- Heating equipment: vacuum boiler — heating and hot water supplying (80,000~6,000,000kcal/h).

Application:

- Central air-conditioning equipment: mainly provide heating and cooling source for large scale central air conditioning system and other places needing chilled or hot water, widely applied in building, hotel, department store, cinema, stadium, factory and oil field, etc.
- Commercial air-conditioning equipment: widely applied in places needing air conditioning equipments, such as small and middle scale department store, hotel, building, entertainment place, hospital, factory, domitory, residence,school,etc.
- Heating equipment: widely applied in hotel, department store, residence, villa, bath house , advanced swimming pool, etc., where needing heating and hot water, used with absorption chiller, it will be ideal for cooling, heating and hot water supplying.

Advantages

★ **Brand advantage**

International well-known brand, create the new epoch that China LiBr absorption chiller technology develop.

★ **Technology advantage**

It is the accumulation that Japan Sanyo's technology,design, manufacturing and quality in the past 50 years.

★ **Quality advantage**

The unique enterprise in the industry that have the honor to get "National Quality Management Surpassing Enterprise" award, which is the approval of quality management and the guarantee of high quality for Sanyo products, and only have nine enterprises to get this honor in China.

★ **Service advantage**

Super express after-sales service mode. Preventive service instead of previous emergency service.

Characteristics

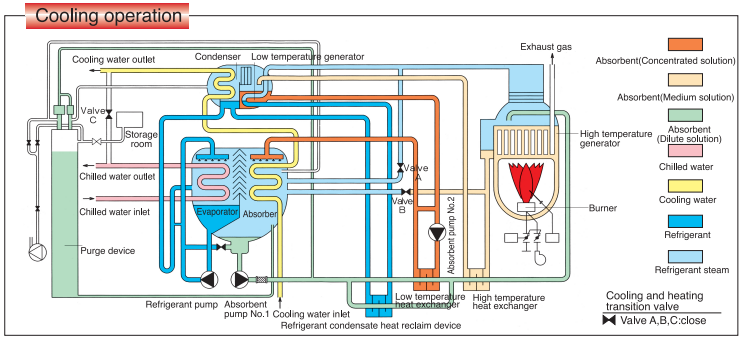
High efficiency & Energy saving
Run economy
Environment friendly
Safe and reliable
Intelligent design
Network management

ISO9001 Quality Control System Certificate
ISO14001 Environment Control System Certificate
GB/T28001 Vocation Health Safety Certificate
CRAA Certificate
ASME Certificate
UL Certificate
CE Certificate
JIS B 8622 Technical Standard
PED Certificate
JIS B 8622-2002 Technical Standard
China Mechanical Safety Certificate
China Environment Mark
National new hi-tech corporation
Core member of China Coalition for Decentralized Energy
National quality management surpassing enterprise
National customer satisfactory product
Postdoctoral scientific effort station
Energy-saving products in government procurement list

Strong Technology and Quality Guarantee

Absorption chiller/heater flow diagram

Cooling operation



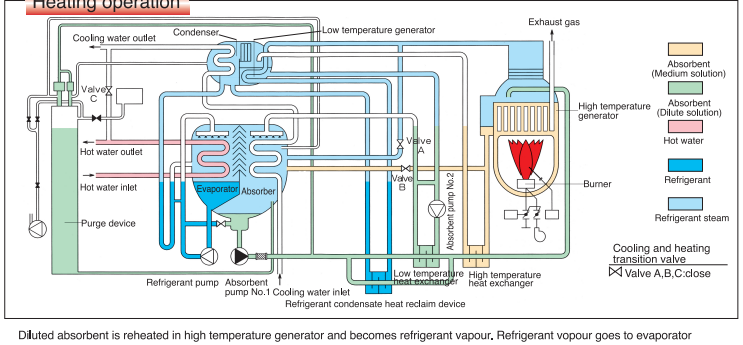
Our G series direct-fired LiBr absorption chiller/heater is made of evaporator, absorber, condenser, low temperature generator, high temperature generator, refrigerant condensate heat reclaim device heat exchanger, solution pump and refrigerant pump etc.

Principle of operation: chilled water is cooled in evaporator by low temperature refrigerant which has been decompressed and throttled from condenser, and the refrigerant is turned into vapour after absorbing the heat of chilled water, then is absorbed into absorber where the concentrated solution is turned into dilute solution.

The dilute solution in the absorber is pumped through refrigerant condensate heat reclaim device, low temperature heat exchanger, high temperature heat exchanger where the solution temperature goes up, to the high temperature generator at last, where the dilute solution is heated and condensed into medium solution.

The medium solution flows through high temperature heat exchanger, into low temperature generator where the medium solution is heated by the refrigerant vapour which from high temperature generator and turned into final concentrated solution. The concentrated solution flows through low temperature heat exchanger where the temperature goes down, then into the absorber and is sprayed on the cooling water tubes where it absorbs the refrigerant vapour from evaporator and is turned into dilute solution. On the other hand, the vapour in the high temperature generator produced by heating lithium-bromide solution, floats into low temperature generator where it heats the medium solution and itself is coagulated into refrigerant through the refrigerant condensate heat reclaim device where the temperature goes down. Then the refrigerant floats into condenser with refrigerant vapour from low temperature generator and is cooled into refrigerant after being decompressed and throttled in the condenser. After that, the refrigerant flows into evaporator where it is sprayed on the condensed coils, cool the chilled water in the evaporator. Above process circles again and again for producing chilled water continuously.

Heating operation



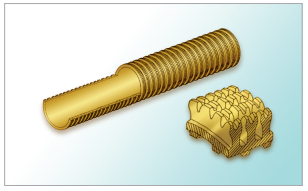
Diluted absorbent is reheated in high temperature generator and becomes refrigerant vapour. Refrigerant vapour goes to evaporator and absorber and exchange heat in evaporator to get hot water. And, medium absorbent goes into absorber and mixes with refrigerant and is diluted. Then it passes refrigerant condensate heat reclaim device, low. high temperature heat exchanger and goes back to high temperature generator.

Above process circles again and again for producing hot water continuously.

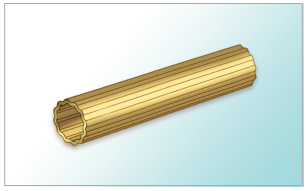
Energy saving technology new nonesuch

Adopt new style high efficient heat exchange tube

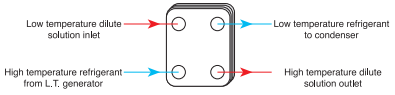
Evaporator: Enlarge heat exchange area, strengthen heat exchange effect, and increase the heat efficiency by 10%



Absorber: Strengthen the external absorbing of pipe and increase turbulent disturbance in the pipe to prevent scaling.



Adopt new style patent refrigerant condensate heat reclaim device



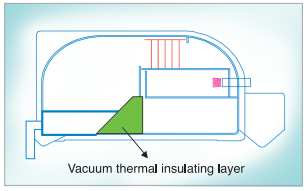
- Fully utilize the heat quantity of refrigerant condensate to increase the heat efficiency by 10% and decrease the heat load of cooling water.
- Increase the dilute solution temperature of the low temperature heat exchanger outlet to make solution circuit far from crystal area, so make sure the machine operation is more safe and reliable.

Adopt new style high efficient heat exchanger

- Low temperature heat exchanger adopts plate-type heat exchanger to increase the heat efficiency of the machine.
- High temperature heat exchanger adopts new style multipaths heat exchanger to increase the heat exchanger greatly.

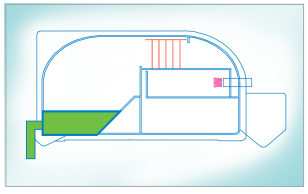
H.T. generator cold-state regeneration technology. Temperature is low and heat exchange efficiency is high

Inside of the upper shell is installed the vacuum thermal insulating layer to decrease inside loss



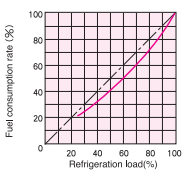
Internal refrigerant self-adapting cold storage device

- Adapt change in load and supply the refrigerant of evaporator automatically.
- "Cold storage", save energy running farthest.
- Shorten the starting time of machine.
- Shorten the dilution running time.
- Adapt the more lower cooling water inlet temperature.
- Prevent "cavitation" of the refrigerant pump to prolong the pump operating life.



Design tailored for partial load, the machine realizing high efficient energy saving operation

Suits low load operation of 40-80%, adopts new frequency conversion control system, internal refrigerant self-adjusting cooling storage device, quick heat state balance circulation technology, obviously saves partial load and start time energy consumption, Integrated Partial Load Value (IPLV) rises greatly.

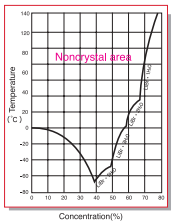


Test condition
1.Chilled water outlet temperature 7℃ fixed
2.Cooling water inlet temperature

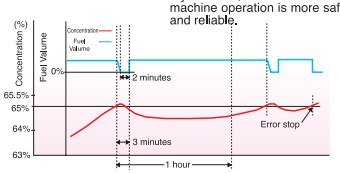
Load (%)	Temperature ℃
100	32
50	27
30	25

Energy saving technology new nonesuch

Multi crystallization prevention safety control



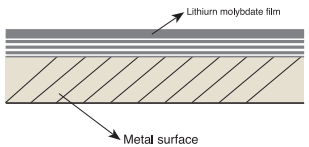
Micro-computer monitors and calculates the solution concentration automatically to make the solution circuit far from crystal area, and adjust solution flowrate and fuel volume automatically to prevent crystallization completely.
High temperature generator cold-state regenerator technology. Temperature is low and running is safe.
Adopt new style patent refrige rant condensate heat reclaim device to increase the dilute solution temperature of the low temperature heat exchanger to make solution circuit far from crystal area, so make sure the machine operation is more safe and reliable.



Overall anti-corrosion safety design

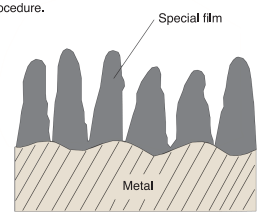
- Adopt Sanyo patent LiBr solution
- Adopt lithium molybdate as inhibitor

Lithium molybdate inhibitor is safe and no harm to environment, and form protection film on the surface of copper tube and steel plate and not easily resolved even in high temperature condition.



- Material processing use Sanyo patent Pachuca technology

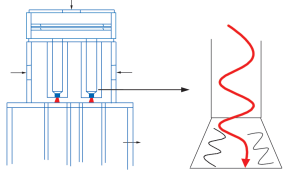
Remove the grease and rusty spot of material surface completely to form compact and uniform safety film through eighteen different procedure.



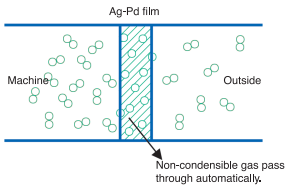
New bow wave spray Ag-Pd automatic purge device

- Five vacuum keeping design

1. Bow wave type spiral spray nozzle.
2. New patented upper/down shell factional pressure gas/steam separator, utilizing lowering pressure de-air technology.
3. Ag-Pd tube automatic exhaust.
4. Storage room lowering-pressure to enlarge capacity design.
5. Upper/down shell two purge system.



Spray nozzle structure



Ag-Pd tube working principle

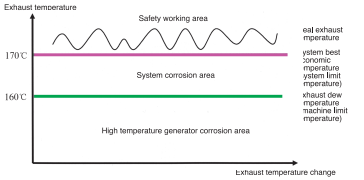
H.T.Generator adopts more capacity splitter design to prevent refrigerant pollution

Cooling water safe operation scope is more extensive

Micro-computer monitors the cooling water temperature to adjust the fuel consumption and solution circulation automatically, which make the cooling water operate even in the temperature range of 15～34℃.

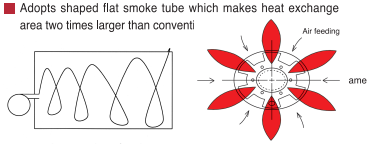
Cross limit exhaust temperature design

Chiller's exhaust lowers to combine operation cost and life of machine and system in a best way.



Adopt special structure to lower exhaust temperature

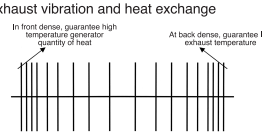
- Adopt new combustion mode to raise heat exchange affect and lower NOx exhaust.
- Tailored burner design, modulation,and self-diagnosis function.
- Adopts shaped flat smoke tube which makes heat exchange area two times larger than conventi



Whirl wind air feeding combustion (Oil-fired)

Partitioned flame combustion(Gas-fired)

- Adopt new uneven spacing spoiler to enhance exhaust vibration and heat exchange



Uneven spacing

Unique high temperature generator process, safe and reliable operation

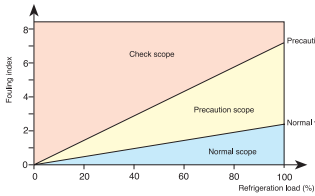
- Use negative pressure fixing resistant steel to prevent high temperature generator sinking down.
- Smoke tube is treated by Parca process to resist corrosion.
- Smoke tube is welded from both sides to prevent effectively electric-chemical corrosion.

New speed type PID control, accuracy much higher

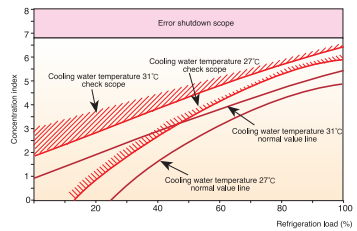
Replace the original position-type PID control to make the accuracy much more higher and can be quick responsive to sudden load change.

Self-diagnosis professional function on the machine

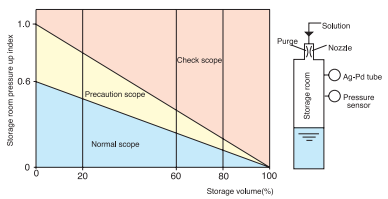
① Cooling water system heat transfer tube fouling state



② Absorbent concentration up trend



③ Vacuum state time monitor



④ Sweeping signal of combustion room

According to exhaust temperature of combustion room, precast whether there is necessary to sweep burning system of high temperature gererator.

Intelligent micro-computer control system

Adopt Japan Sanyo patent micro-computer intelligent control system, which broke through the traditional control system. Sanyo is the first enterprise that introduces the fuzzy control and expert control technology to the LiBr absorption central air-conditioning control system, which include many intelligent softwares, such as automatic load regulator, self-diagnosis, maintenance precognition, expert save energy software,etc.

Specification

Model				DG-E11H	DG-E12H	DG-E13H	DG-E14H	DG-E21H	DG-E22H	DG-E23H	DG-E24H	DG-E31H
Refrigeration capacity			USRT	100	120	150	180	210	240	280	320	360
			kW	352	422	527	633	738	844	985	1,125	1,266
Heating capacity			kW	294	353	441	530	618	706	824	941	1,059
Chilled water system	Inlet/Outlet temperature:		℃	12→7								
	Flow rate		m^3/h	60.5	72.6	90.7	109	127	145	169	194	218
	Pressure drop		mH_2O	8.5	8.7	11.1	11.6	10.4	11.0	7.4	7.9	8.4
	Inlet/outlet connection		A	100	100	100	100	125	125	150	150	150
Hot water system	Inlet/Outlet temperature:		℃	55.8→60								
	Flow rate		m^3/h	60.5	72.6	90.7	109	127	145	169	194	218
	Pressure drop		mH_2O	8.5	8.7	11.1	11.6	10.4	11.0	7.4	7.9	8.4
	Inlet/outlet connection		A	100	100	100	100	125	125	150	150	150
Cooling water system	Inlet/Outlet temperature:		℃	32→37.5 (Gas)				32→37.6 (Oil)				
	Flow rate		m^3/h	93.5	112	140	168	196	224	262	299	337
	Pressure drop		mH_2O	4.2	4.7	6.5	7.5	5.7	6.3	11.5	12.4	9.5
	Inlet/outlet connection		A	125	125	125	125	150	150	200	200	200
Power 3φ.380V.50Hz	Total electric currency	Oil	A	14.7	14.7	20.3	20.3	20.4	21.8	24.7	27.6	27.6
		Gas	A	12.4	12.4	15.7	15.7	17.3	17.3	20.2	21.5	21.5
	Wire area	Oil	mm^2	3.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
		Gas	mm^2	3.5	3.5	3.5	3.5	3.5	3.5	5.5	5.5	5.5
	Power consumption	Oil	kVA	11.7	11.7	16.3	16.3	16.4	17.5	19.9	22.3	22.3
		Gas	kVA	9.8	9.8	12.5	12.5	13.8	13.8	16.2	17.2	17.2
Motor	No.1 absorbent pump		kW(A)	1.3(3.5)	1.3(3.5)	2.5(6.8)	2.5(6.8)	2.5(6.8)	2.5(6.8)	3.4(9.1)	3.4(9.1)	3.4(9.1)
	No.2 absorbent pump		kW(A)	1.1(3.9)	1.1(3.9)	1.1(3.9)	1.1(3.9)	1.3(4)	1.3(4)	1.3(4)	1.3(4)	1.3(4)
	Refrigerant pump		kW(A)	0.2(1.3)	0.2(1.3)	0.2(1.3)	0.2(1.3)	0.2(1.3)	0.2(1.3)	0.4(1.8)	0.4(1.8)	0.4(1.8)
	Purge pump		kW(A)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)
	Blower	Oil	kW(A)	0.75(1.7)	0.75(1.7)	1.5(3.3)	1.5(3.3)	1.5(3.3)	2.2(4.7)	2.2(4.7)	3.7(7.6)	3.7(7.6)
		Gas	kW(A)	0.75(1.7)	0.75(1.7)	0.75(1.7)	0.75(1.7)	1.5(3.2)	1.5(3.2)	1.5(3.2)	2.2(4.5)	2.2(4.5)
	Oil pump (oil)		kW(A)	*****	*****	*****	*****	*****	*****	*****	*****	*****
	Oil preheater (oil)		kW(A)	1.5(2.3)	1.5(2.3)	2.0(3.0)	2.0(3.0)	2.0(3.0)	2.0(3.0)	2.0(3.0)	2.0(3.0)	2.0(3.0)
Overall dimension	Length		mm	2,670	2,670	3,690	3,690	3,710	3,710	4,760	4,760	4,830
	Width		mm	1,810	1,810	1,910	1,910	2,070	2,070	2,090	2,090	2,280
	Height		mm	1,960	1,960	1,960	1,960	2,160	2,160	2,160	2,160	2,390
Weight	Operation weight		ton	5.1	5.4	6.5	7.0	8.2	8.7	10.0	10.6	13.1
	Max. moving weight		ton	4.7	5.0	6.0	6.4	7.5	7.9	9.1	9.6	11.9
	Total weight		ton	4.7	5.0	6.0	6.4	7.5	7.9	9.1	9.6	11.9
	Moving state			One-section								
Fuel	Consumption Refrigeration	Light oil	kg/h	23.3	27.9	34.9	41.9	48.9	55.8	65.2	74.5	83.8
		City gas	Nm^3/h	60.2	72.4	90.3	108.6	126.5	144.7	168.8	192.8	217.1
		Natural gas	Nm^3/h	20.8	25.0	31.2	37.5	43.7	50.0	58.3	66.6	75.0
	Consumption Heating	Light oil	kg/h	26.0	31.2	38.9	46.7	54.5	62.3	72.7	83.1	93.5
		City gas	Nm^3/h	70.9	85.4	106.5	127.9	149.1	170.5	198.9	227.2	255.9
		Natural gas	Nm^3/h	24.5	29.5	36.8	44.2	51.5	58.9	68.7	78.5	88.4
	Fuel connection size	Oil	A	15×2	15×2	15×2	15×2	15×2	15×2	15×2	20×2	20×2
		Gas	A	50	50	50	50	50	50	80	80	80
Flue connection			mm	280×210	280×210	280×210	280×210	310×310	310×310	310×310	310×310	360×310
Clearance			mm	2,400	2,400	3,400	3,400	3,400	3,400	4,500	4,500	4,500

Note: (1) 1 USRT=3,024kcal/h=3.52kW

(2) Max. working pressure for chilled/hot water and cooling water system: 8kg/cm^2 · G. High pressure model is available, dimension and foundation may be changed,so please enquire with the manufacturer.

(3) Range of chilled/hot/cooling water flow:50～120%.

(4) The burner parameter listed in the table vary with the burner model. For the detail parameter, please see the ex-works file.

(5) The burner will affect the overall dimension of the chiller/heater. For the actual overall dimension, please refer to the ex-works file.

(6) The heat values in the table are low heat values:light oil 43.53MJ/kg,city gas 15.91MJ/Nm^3,natural gas 46.05MJ/Nm^3

The consumption of fuel of heat values not specified in the table= $\frac{\text{low heat valule specified in the table}}{\text{low heat value of the fuel}}$ × consumption in the table.

Specification

DG-E32H	DG-E41H	DG-E42H	DG-E51H	DG-E52H	DG-E53H	DG-E61H	DG-E62H	DG-E63H	DG-E71H	DG-E72H	DG-E73H	DG-E81H	DG-E82H
400	450	500	560	630	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
1,407	1,582	1,758	1,969	2,215	2,461	2,813	3,165	3,516	3,868	4,220	4,571	4,923	5,274
1,177	1,324	1,471	1,647	1,853	2,059	2,353	2,648	2,942	3,236	3,530	3,824	4,119	4,413
12→7													
242	272	302	339	381	423	484	544	605	665	726	786	847	907
8.8	8.1	7.1	6.2	8.4	11.0	7.7	10.3	13.5	9.1	11.5	14.2	11.5	14.0
150	200	200	200	200	200	250	250	250	300	300	300	350	350
55.8→60													
242	272	302	339	381	423	484	544	605	665	726	786	847	907
8.8	8.1	7.1	6.2	8.4	11.0	7.7	10.3	13.5	9.1	11.5	14.2	11.5	14.0
150	200	200	200	200	200	250	250	250	300	300	300	350	350
32→37.5 (Gas)						32→37.6 (Oil)							
374	421	468	524	589	655	748	842	935	1,029	1,122	1,216	1,309	1,403
10.1	10.7	11.1	8.3	11.1	14.5	10.0	13.3	17.3	10.9	13.8	17.0	14.3	17.2
200	250	250	300	300	300	350	350	350	400	400	400	400	400
29.2	30.6	32.3	43.9	43.9	43.9	50.3	54.3	60.6	71.2	84.6	84.6	97.1	97.1
21.5	22.9	25.7	31.8	31.8	35.3	36.3	43.8	43.8	61.6	61.6	61.6	69.5	69.5
5.5	8.0	8.0	14	14	14	14	14	22	22	38	38	38	38
5.5	5.5	5.5	8	8	8	8	14	14	22	22	22	22	22
23.6	24.7	26.1	35.6	35.6	35.6	40.9	44.1	49.3	58.0	69.0	69.0	79.3	79.3
17.2	18.4	20.7	25.6	25.6	28.5	29.3	35.5	35.5	50.1	50.1	50.1	56.6	56.6
3.4(9.1)	3.4(9.1)	3.4(9.1)	3.7(15.0)	3.7(15.0)	3.7(15.0)	5.5(15.0)	5.5(19.0)	5.5(19.0)	7.5(23.0)	7.5(23.0)	7.5(23.0)	7.5(23.0)	7.5(23.0)
1.3(4)	1.8(5.4)	1.8(5.4)	1.8(5.4)	1.8(5.4)	1.8(5.4)	1.8(6.4)	1.8(6.4)	1.8(6.4)	3.7(12.0)	3.7(12.0)	3.7(12.0)	3.7(12.0)	3.7(12.0)
0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)	0.4(1.8)
0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.4(1.1)	0.75(1.9)	0.75(1.9)	0.75(1.9)	0.75(1.9)	0.75(1.9)
3.7(7.6)	3.7(7.6)	3.7(7.6)	5.5(11.6)	5.5(11.6)	5.5(11.6)	7.5(15.3)	7.5(15.3)	11.0(21.6)	11.0(21.6)	15.0(29.0)	15.0(29.0)	22.0(40.0)	22.0(40.0)
2.2(4.5)	2.2(4.5)	3.7(7.3)	3.7(7.3)	3.7(7.3)	5.5(10.8)	5.5(10.8)	7.5(14.3)	7.5(14.3)	11.0(21.5)	11.0(21.5)	11.0(21.5	15.0(29.4)	15.0(29.4)
*****	*****	0.75(1.7)	0.75(1.7)	0.75(1.7)	0.75(1.7)	0.75(1.9)	0.75(1.9)	0.75(1.9)	0.75(1.9)	1.5(3.3)	1.5(3.3)	1.5(3.3)	1.5(3.3)
3.0(4.6)	3.0(4.6)	3.0(4.6)	4.0(6.1)	4.0(6.1)	4.0(6.1)	5.0(7.6)	5.0(7.6)	5.0(7.6)	5.0(7.6)	8.0(12.2)	8.0(12.2)	9.0(13.7)	9.0(13.7)
4,830	4,850	4,850	5,040	5,590	6,080	5,690	6,190	6,710	6,430	6,960	7,460	6,960	7,460
2,280	2,490	2,490	2,990	2,990	2,990	3,240	3,240	3,240	4,100	4,100	4,100	4,450	4,450
2,390	2,600	2,600	2,900	2,900	2,900	3,330	3,330	3,330	3,450	3,450	3,450	3,650	3,650
13.8	16.3	17.1	22.5	24.3	26.0	32.6	35.1	37.8	45.4	48.8	51.8	56.5	59.5
12.5	14.7	15.4	19.8	21.4	23.0	15.8	16.8	18.0	21.5	23.0	24.3	26.0	27.5
12.5	14.7	15.4	19.8	21.4	23.0	28.8	31.1	33.5	40.3	43.3	46.1	50.1	52.7
One-section						Moving separately							
93.1	104.7	116.3	130.3	146.6	162.9	186.2	209.4	232.7	256.0	279.2	302.5	325.8	349.0
241.1	271.2	301.3	337.5	379.8	422.1	482.3	542.5	603.0	663.2	723.4	783.9	844.1	904.3
83.3	93.7	104.1	116.6	131.2	145.8	166.6	187.4	208.3	229.1	249.9	270.8	291.6	312.4
103.9	116.8	129.8	145.4	163.6	181.7	207.7	233.7	259.6	285.6	311.6	337.5	363.5	389.4
284.2	319.9	355.2	398.0	447.5	497.3	568.5	639.4	710.7	781.6	852.8	923.7	994.6	1,065.8
98.2	110.5	122.7	137.5	154.6	171.8	196.4	220.9	245.5	270.0	294.6	319.1	343.6	368.2
20×2	20×2	20×2	25×2	25×2	25×2	25×2	25×2	25×2	25×2	32×2	32×2	32×2	32×2
80	80	80	100	100	100	100	100	100	100	100	100	100	100
360×310	410×310	410×310	350×500	350×500	350×500	400×620	400×620	400×620	400×900	400×900	400×900	400×900	400×900
4,500	4,500	4,500	4,600	5,200	5,700	5,200	5,700	6,200	5,700	6,200	6,700	6,200	6,700

(7) Heating capacity can be enlarged by 4 ranks as required.

(8) "A" stands for nominal diameter, unit is mm.

(9) Gas pipe dimension is changing with gas heat value, pressure etc. The value specified in the table is for natural gas, heat value 46.05MJ/Nm^3, specific gravity 0.64, DG-E11H~E42H low pressure 200mmH_2O, DG-E51H~E82H middle pressure 1kg/cm^2 · G, If there is any deviation, please contact Dalian Sanyo when placing order. For specific details, refer to Ex-works File.

(10) Implementation standard JISB8622.

(11) And, the values in above table may be modified without notice.

Order scope

Item		Standard specification	Option
Chilled water System	Flow rate	0.605m³/h · RT (△t=5℃ constant quantity)	Range of variable flow: 50～120%
	Temperature	12 / 7℃	Special inlet/outlet temperature of chilled water
	Water quality	Tap water (according to JRA9001)	Industrial water, well water
	Max. working pressure	8kg/cm² · G	Pressure1…10kg/cm² · G Pressure2…14kg/cm² · G Pressure3…16kg/cm² · G Pressure4…18kg/cm² · G Pressure5…20kg/cm² · G
Cooling water system	Flow rate	For the detail information, please see the specification table.	Range of variable flow: 50～120%
	Temperature	32/37.5℃(Lower temperature limit: 15℃)	Inlet temperature:15~34℃
	Water quality	Tap water (according to JRA9001)	Industrial water, well water
	Max. working pressure	8kg/cm² · G	Pressure1…10kg/cm² · G Pressure2…14kg/cm² · G Pressure3…16kg/cm² · G Pressure4…18kg/cm² · G Pressure5…20kg/cm² · G
Hot water system	Flow rate	0.605m³/h · RT (△t=4.2℃ constant quantity)	Range of variable flow: 50～120%
	Temperature	55.8/60℃ (40~65℃)	Outlet tempereture above 60℃, please enquire with the manufacturer.
	Water quality	Tap water (according to JRA9001)	
	Max. working pressure	8kg/cm² · G	Pressure1…10kg/cm² · G Pressure2…14kg/cm² · G Pressure3…16kg/cm² · G Pressure4…18kg/cm² · G Pressure5…20kg/cm² · G
Installation place	Place	In machine room	Storage of equipment shall be in accordance with the standard,details refer to factory documents.
	Installation	Body anti-rusting paint (exclusive of heat or cooling insulation,final paint).	
	Ambient Temperature	5～40℃	
	Ambient Humidity	Relative humidity: below 90%	
Package	DG-E11H~E53H	One-section	
	DG-E61H~E82H	Moving separately	
Power	Frequency, Voltage	3φ / 380V / 50Hz	Special voltage
	Voltage regulation	Within ± 10%	
Electric wiring	Electric allocation	Control: cable	
		Power: cable	
Main body safety device	Type	· Refrigerant supervision function · Chilled water freezing protection function · H.T. generator temperature supervision function · H.T. generator pressure supervision function · Exhaust temperature supervision function · H.T. generator solution level supervision function · Motor protection function · Extreme low temperature of cooling water · Chilled/hot water flow switch · Crystal protection function	Cooling water flow switch
Capacity control device	Mode	Digital PID control by chilled/hot water inlet temperature Inventer control of No.1 absorbent pump	
Control panel	Paint color	Munsell 5Y-7/1 (half smooth)	
	Display	LCD Chinese display	
	Outside wiring terminals	Operation indication ····· point a. Stop indication ····· point a. Alarm indication ····· point a. Auxiliary equipment operation ····· point a. Start confirmation ····· point a. Burn confirmation ····· point a. Cooling operation indication ····· point a. Heating operation indication ····· point a.	
Purge device	Mode	Liquid injector make non-condensible gas be stored in the slot and palladium pipe exhaust continuously hydrogen	Fully automatic purge
Burning device	Safety stop valve	Full automatically double stop	
	Fuel scope	Gas: 25%~100% Oil: 30%~100%	
Fuel	Oil	Light oil	
	City gas	Low pressure: 100~200mmH₂O DG-E11GH~E22GH Intermediate pressure: 500~2000mmH₂O DG-E11GH~E42GH Middle pressure: 1~3kg/cm² · G DG-E11GH~E82GH	
	Natural gas	Low pressure: 200mmH₂O DG-E11GH~E42GH Intermediate pressure: 500~2000mmH₂O DG-E11GH~E82GH Middle pressure: 1~3kg/cm² · G DG-E11GH~E82GH	
	Customer support	Please provide heat value, pressure, specific gravity, component, ect. of gas when placing order.	
Water system	Frequency conversion		Frequency controller

Supply scope

Item		Deliver construction	Customer construction	Note
Body	Absorption Chiller/Heater	○		Reference to the caption below the chart
Transportation and Installation	From the factory to the building		○	
	From the building to the foundation site		○	
	Installation of chiller/heater		○	
	Testing and adjusting at site	●	○	
	Operating direction	○		
Electric Construction	External electric allocation		○	Please wire to the terminal inside the control panel
	Cooling water temperature control device		○	Please install and wire for the thermostat used by start-stop fan of cooling tower or for the thermostat of cooling water control valve.
Other Construction	Foundation construction		○	Exclusive of foundation bolts, weld the frame and washer when fixing foundation bolts.
	External pipe construction		○	Exclusive of coordinate flanges
	Pipe anti-freezing	○		Take anti-freezing of pipe and water into consideration at rest in winter
	Water quality management of cooling water		○	Install water drainage device in order to have a proper water quality management
	Heat or cooling insulation construction		○	
Painting	Main body primary coat	○		Anti-rusting primary coat
	Control panel painting	○		Munsell No.5Y-7/1(half-smooth)
Others	Assembly power,water, etc. at site		○	
	Power, water and fuel, etc. used during trail run		○	
	Lithium-Bromide solution,refrigerant	○		

Absorption chiller/heater main body includes

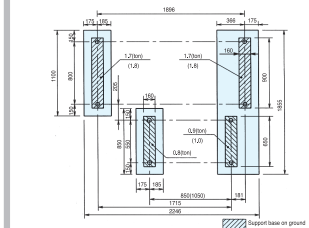
1. Absorption chiller/heater:
(a) Machine of refrigeration and heating cycle including evaporator, absorber, high temperature generator, low temperature generator, condenser, refrigerant condensate heat reclaim device, heat exchanger, and pump, etc.
(b) Purge device
(c) Capacity control device
(d) Combustion equipment including burner, air blower and safety-burning device, etc.
(e) Safety device
(f) Control panel
(g) Absorbent and refrigerant
(h) Internal piping and electric wiring
2. Accessory
a. Foundation bolts and washers……1 set
b. Instruction manual……1 set
● Extra charge should be calculated separately if required.

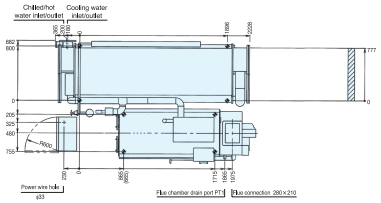
Overall dimension diagram
Base diagram

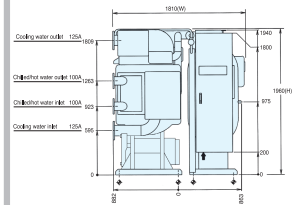
● Overall dimension diagram

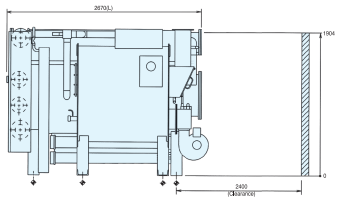
Note: 1. Overall dimension value (L),(W),(H) is example value.
2. Mark ✪ denotes the position of foundation bolts of chiller/heater.
3. Clearance space must be saved for either side of the chiller/heater.
4. Mark ↑ is the power wire hole.
5. Maintenance space must be saved around the chiller/heater.
Length direction·····1m Above·····0.2m
Control panel direction·····1.2m Others·····0.5m
6. "A" stands for nominal diameter, unit is mm.

DG-E11H/E12H ∗In ( ) is Model E12H

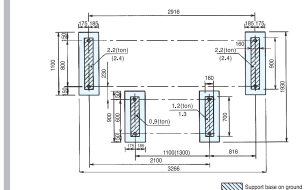


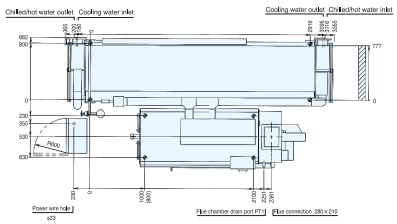


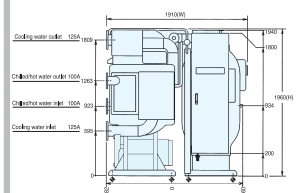


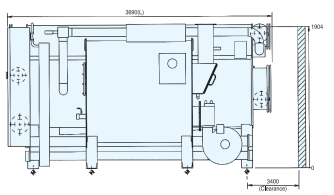


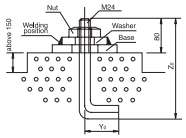
DG-E13H/E14H ∗In ( ) is Model E14H









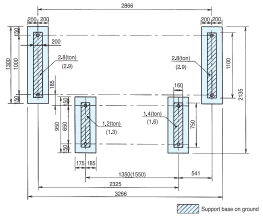


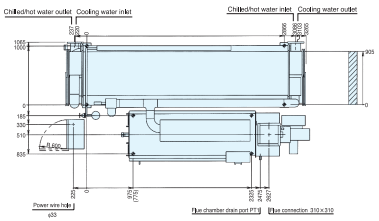
● Base diagram

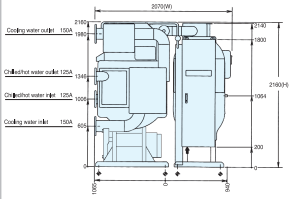
Note: 1. There are φ50 holes under the chiller/heater for foundation bolts.
2. When fastening foundation bolts, please weld base and washer together with reference to left diagram
3. Please make a drainage ditch around the chiller/heater.
4. Please make the ground water proof in order to maintain the chiller/heater.
5. The base must be smooth and horizontal(The levelness should be below 2mm for 1,000mm).

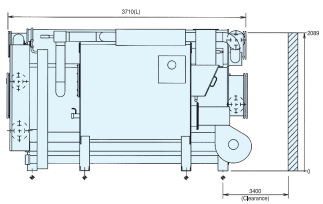
	Y_0	Z_0
DG-E11~E31H	80	260
DG-E32~E52H	80	340
DG-E53~E82H	90	440

DG-E21H/E22H ∗In ( ) is Model E22H

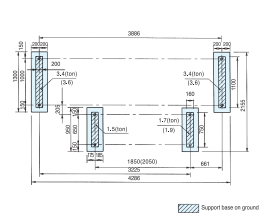


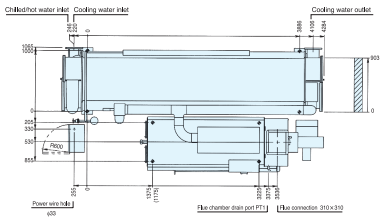


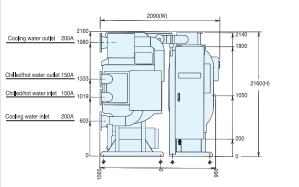


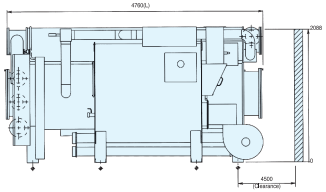


DG-E23H/E24H ∗In ( ) is Model E24H





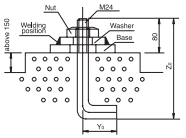




Overall dimension diagram
Base diagram

● Overall dimension diagram

Note: 1. Overall dimension value (L),(W),(H) is example value.
2. Mark ❂ denotes the position of foundation bolts of chiller/heater.
3. Clearance space must be saved for either side of the chiller/heater.
4. Mark ↑ is the power wire hole.
5. Maintenance space must be saved around the chiller/heater.
Length direction·····1m　　Above·····0.2m
Control panel direction·····1.2m　　Others·····0.5m
6. "A" stands for nominal diameter, unit is mm.

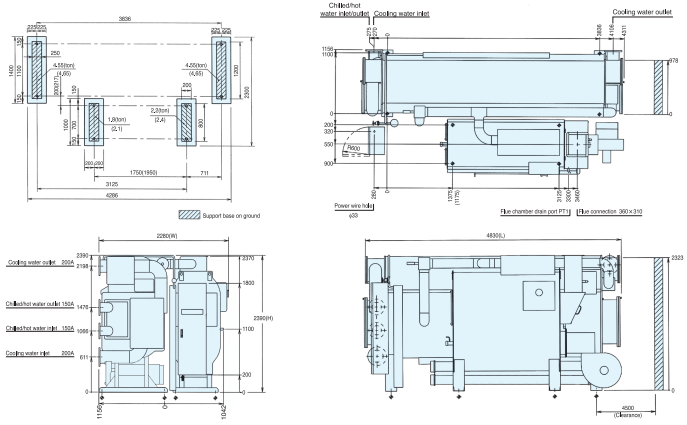


● Base diagram

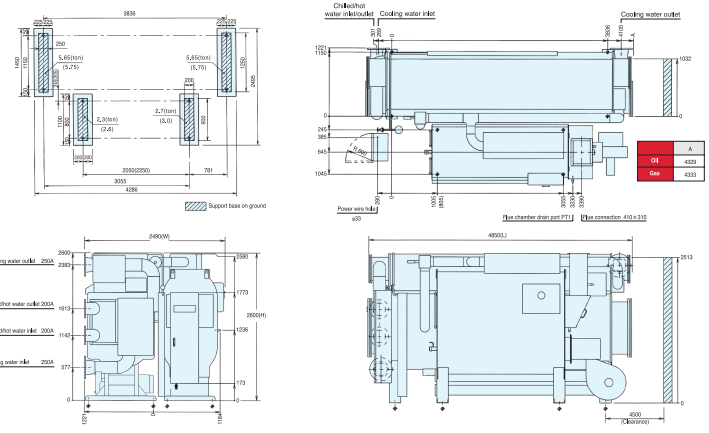
Note: 1. There are φ50 holes under the chiller/heater for foundation bolts.
2. When fastening foundation bolts, please weld base and washer together with reference to left diagram
3. Please make a drainage ditch around the chiller/heater.
4. Please make the ground water proof in order to maintain the chiller/heater.
5. The base must be smooth and horizontal(The levelness should be below 2mm for 1,000mm).

	Y_0	Z_0
DG-E11~E31H	80	260
DG-E32~E52H	80	340
DG-E53~E82H	90	440

DG-E31H/E32H ∗In (　) is Model E32H

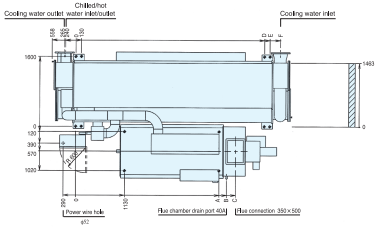


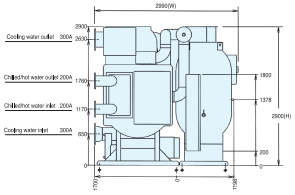
DG-E41H/E42H ∗In (　) is Model E42H

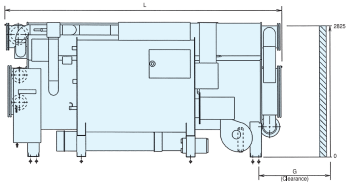


DG-E51H/E52H/E53H

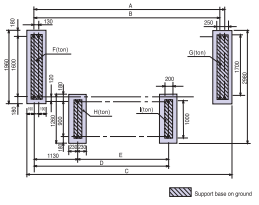
	A	B	C	D	E	F	G	L
DG-E51H	3130	3305	3511	3836	3966	4205	4600	5040
DG-E52H	3330	3505	3711	4378	4508	4748	5200	5590
DG-E53H	3530	3705	3911	4876	5006	5246	5700	6080



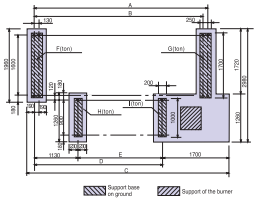




DG-E51GH/E52GH/E53GH



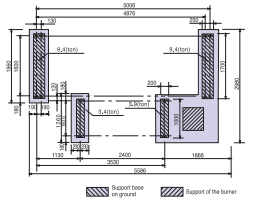
DG-E51KH/E52KH



	A	B	C	D	E	F	G	H	I
DG-E51GH	3966	3836	4346	3130	2000	8.2	8.2	2.9	3.3
DG-E52GH	4508	4378	4888	3330	2200	8.8	8.8	3.2	3.6
DG-E53GH	5006	4876	5386	3530	2400	9.4	9.4	3.4	3.9

	A	B	C	D	E	F	G	H	I
DG-E51KH	3966	3836	5020	3130	2000	8.2	8.2	2.9	3.3
DG-E52KH	4508	4378	5220	3330	2200	8.8	8.8	3.2	3.6

DG-E53KH



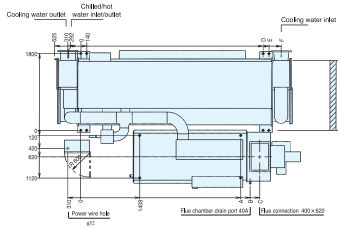
Overall dimension diagram
Base diagram

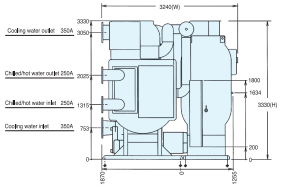
● Overall dimension diagram

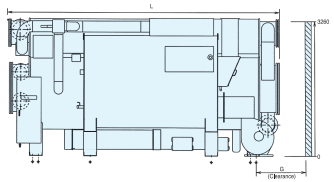
Note: 1. Overall dimension value (L),(W),(H) is example value.
2. Mark ✪ denotes the position of foundation bolts of chiller/heater.
3. Clearance space must be saved for either side of the chiller/heater.
4. Mark ↑ is the power wire hole.
5. Maintenance space must be saved around the chiller/heater.
Length direction·····1m Above·····0.2m
Control panel direction·····1.2m Others·····0.5m
6. "A" stands for nominal diameter, unit is mm.

DG-E61H/E62H/E63H

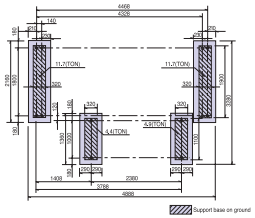
	A	B	C	D	E	F	G	L
DG - E61H	3788	4023	4252	4328	4468	4758	5200	5690
DG - E62H	4088	4323	4552	4828	4966	5256	5700	6190
DG - E63H	4388	4623	4852	5351	5491	5781	6200	6710



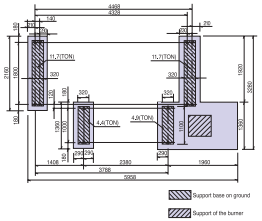




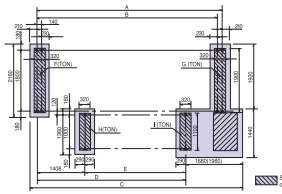
DG-E61GH



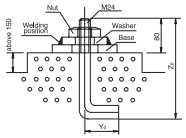
DG-E61KH



DG-E62H/E63H ∗In ( ) is Model E63H



	A	B	C	D	E	F	G	H	I
DG-E62H	4966	4826	5958(6258)	4088	2680	12.5	12.5	4.8	4.9
DG-E63H	5491	5351	6258(6558)	4388	2980	13.4	13.4	5.3	5.3



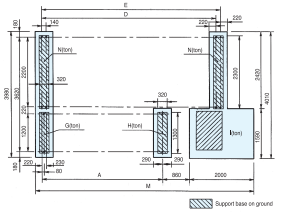
● Base diagram

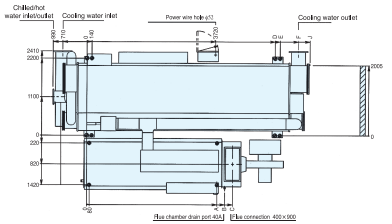
Note: 1. There are φ50 holes under the chiller/heater for foundation bolts.
2. When fastening foundation bolts, please weld base and washer together with reference to left diagram
3. Please make a drainage ditch around the chiller/heater.
4. Please make the ground water proof in order to maintain the chiller/heater.
5. The base must be smooth and horizontal(The levelness should be below 2mm for 1,000mm).

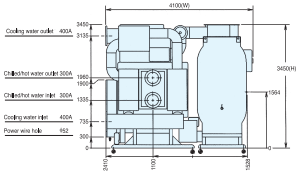
	Y_0	Z_0
DG-E11~E31H	80	260
DG-E32~E52H	80	340
DG-E53~E82H	90	440

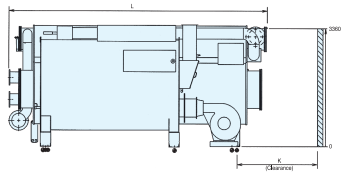
DG-E71H/E72H/E73H

	A	B	C	D	E	F	J	K	L	M	N	G	H	I
DG - E71H	3160	3395	3620	4426	4566	5096	5440	5700	6430	6230	16.1	6.4	6.4	0.5
DG - E72H	3460	3695	3920	4951	5091	5621	5970	6200	6960	6540	17.2	6.9	7.0	0.6
DG - E73H	3760	3995	4220	5451	5591	6121	6470	6700	7460	6840	18.2	7.4	7.5	0.6



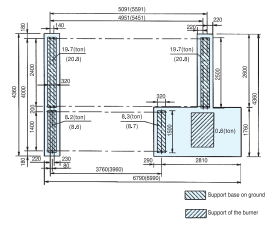


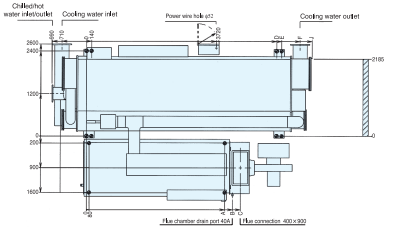


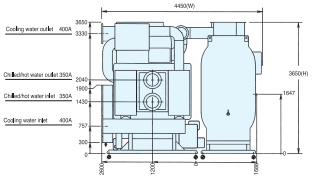


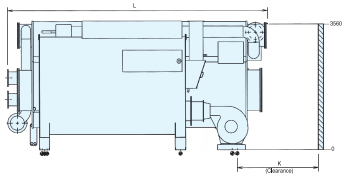
DG-E81H/E82H ∗In ( ) is Model E82H

	A	B	C	D	E	F	J	K	L
DG - E81H	3760	3995	4220	4951	5091	5621	5970	6200	6960
DG - E82H	3960	4195	4420	5451	5591	6121	6470	6700	7460



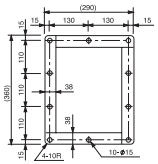




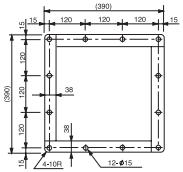


Flue connection overall dimension diagram

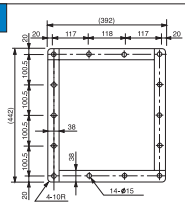
DG-E11H~E14H



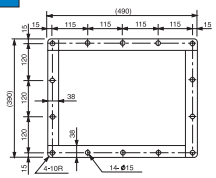
DG-E21H~E24H



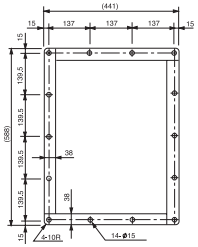
DG-E31H~E32H



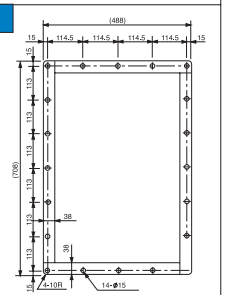
DG-E41H~E42H



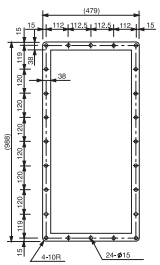
DG-E51H~E53H



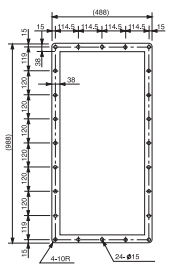
DG-E61H~E63H



DG-E71H~E73H

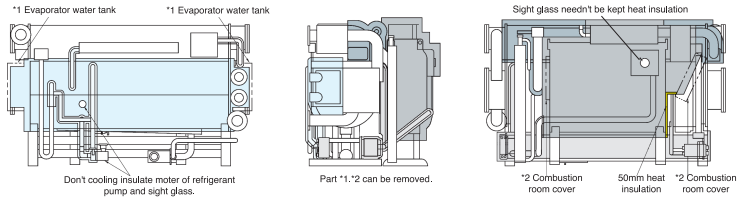


DG-E81H~E82H



Heat/cooling insulation area

Heat/cooling insulation area



Part *1, *2 can be removed

100mm heat insulation: high temperature generator.

75mm heat insulation: low temperature generator, steam pipe, etc.

30mm heat insulation: heat exchanger, connecting pipes, etc.

50mm cooling insulation: evaporator, evaporator water tank, etc.

30mm cooling insulation: upper part of refrigerant pump, connecting pipes, etc.

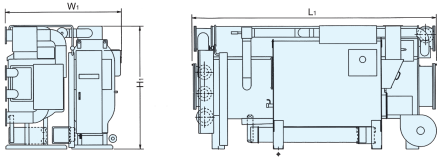
- Heat insulation material: glass fibre, asbestos and the like.
- Cooling insulation material: polythene foam and the like.
- Heat/cooling insulation total area includes machine pipe area .
- Please use non-combustible as heat/cooling material.
- In above drawing, DG-E11H～E63H is indicated. For others detail, see ex-works file.

Partition / Insulation thickness / Model	Heat insulation area(m^2)			Cooling insulation area(m^2)	
	100mm	75mm	30mm	50mm	30mm
DG-E11H	5.8	2.2	3.1	4.0	0.4
DG-E12H	6.2	2.2	3.5	4.0	0.4
DG-E13H	7.8	3.2	4.5	5.5	0.4
DG-E14H	8.0	3.2	4.6	5.5	0.4
DG-E21H	10.1	3.8	4.8	6.1	0.5
DG-E22H	10.4	3.8	4.9	6.1	0.5
DG-E23H	11.8	4.8	5.4	7.6	0.5
DG-E24H	12.5	4.8	5.6	7.6	0.5
DG-E31H	14.5	5.5	6.0	8.5	0.7
DG-E32H	15.2	5.5	6.4	8.5	0.7
DG-E41H	17.5	5.7	7.3	9.9	0.7
DG-E42H	18.1	5.7	7.7	9.9	0.7

Partition / Insulation thickness / Model	Heat insulation area(m^2)			Cooling insulation area(m^2)	
	100mm	75mm	30mm	50mm	30mm
DG-E51H	19.6	5.4	7.6	13.8	1.1
DG-E52H	20.7	5.9	8.1	15.0	1.1
DG-E53H	21.7	6.2	8.8	16.1	1.1
DG-E61H	25.4	7.2	11.8	17.5	1.2
DG-E62H	27.2	7.7	12.1	18.7	1.2
DG-E63H	28.9	8.2	12.9	20.0	1.2
DG-E71H	35.4	10.4	13.6	10.9	1.4
DG-E72H	37.4	10.7	13.9	11.4	1.4
DG-E73H	39.4	11.0	14.4	11.8	1.4
DG-E81H	42.5	11.0	15.4	13.1	1.5
DG-E82H	44.0	11.3	15.5	13.6	1.5

Moving dimension

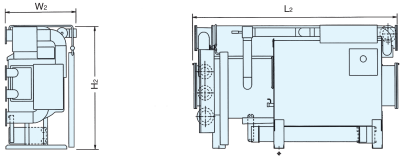
Moving wholly



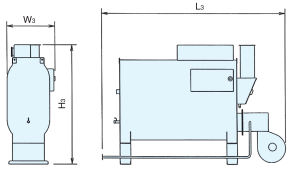
Note:

1. When moving the machine separately, remove the control panel and discharge the solution before ex-works.
2. When calculating inlet height, add height of support and rolling log to the H.
3. When hoisting, keep as horizontal as possible.

Moving separately (Low temperature part)



Moving separately (High temperature part)



Moving dimension

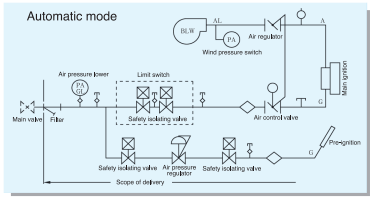
Model	Moving wholly				Moving separately									
					Low temperature part				High temperature part					
	Length	Width	Height	Weight	Length	Width	Height	Weight	Length L_3(mm)		Width	Height	Weight
	L_1(mm)	W_2(mm)	H_1(mm)	Ton	L_2(mm)	W_2(mm)	H_2(mm)	Ton	Oil	Gas	W_3(mm)	H_3(mm)	Ton
DG-E11H	2720	1860	2010	4,5	2720	1220	2010	2,4	2030	2080	1000	2010	1,2
DG-E12H	2720	1860	2010	4,8	2720	1220	2010	2,5	2120	2190	1000	2010	1,3
DG-E13H	3740	1960	2010	5,8	3740	1250	2010	3,1	2320	2340	1000	2010	1,5
DG-E14H	3740	1960	2010	6,2	3740	1250	2010	3,2	2460	2680	1000	2010	1,6
DG-E21H	3760	2130	2210	7,3	3760	1430	2220	3,9	2660	2990	1030	2190	1,9
DG-E22H	3760	2130	2210	7,7	3760	1430	2220	4,0	2870	3190	1030	2190	2,0
DG-E23H	4820	2140	2210	8,9	4820	1450	2220	4,7	3410	2530	1030	2190	2,2
DG-E24H	4820	2140	2210	9,4	4820	1450	2220	4,9	3410	3850	1030	2190	2,4
DG-E31H	4880	2330	2440	11.6	4880	1480	2440	6,2	3460	3710	1100	2420	3,0
DG-E32H	4880	2330	2440	12,2	4880	1480	2440	6,4	3510	3770	1100	2420	3,2
DG-E41H	4900	2540	2650	14,2	4900	1620	2650	7,5	3720	3910	1190	2630	3,7
DG-E42H	4900	2540	2650	14,9	4900	1620	2650	7,8	4000	4060	1190	2630	3,9
DG-E51H	5090	3040	2950	19,5	5090	2200	2950	11,1	2990	4180	1460	2950	4,7
DG-E52H	5640	3040	2950	21.1	5640	2200	2950	12.0	3190	4380	1460	2950	5.1
DG-E53H	6130	3040	2950	22.7	6130	2200	2950	12.8	3390	4580	1460	2950	5.5
DG-E61H	-	-	-	-	5740	2450	3380	15,5	3500	3800	1380	3380	5,9
DG-E62H	-	-	-	-	6240	2450	3380	16,4	3800	4100	1380	3380	6,4
DG-E63H	-	-	-	-	6760	2450	3380	17,7	4100	4400	1380	3380	7,0
DG-E71H	-	-	-	-	6480	2800	3500	21,5	4220	5790	1650	3500	9,8
DG-E72H	-	-	-	-	7010	2800	3500	23.0	4520	6090	1650	3500	10.5
DG-E73H	-	-	-	-	7510	2800	3500	24,3	4820	6640	1650	3500	11,2
DG-E81H	-	-	-	-	7010	3000	3700	26,0	4840	6440	1820	3700	12,3
DG-E82H	-	-	-	-	7510	3000	3700	27,5	4840	6640	1820	3700	12,8

Note: Above values are for reference, contact Dalian Sanyo for specific requirement.

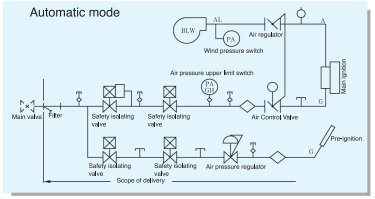
Combustion system scheme

Gas-fired

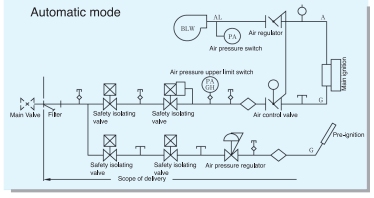
Suitable gas pressure:low



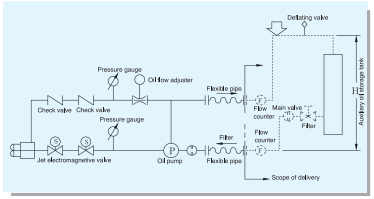
Suitable gas pressure: intermediate



Suitable gas pressure: medium



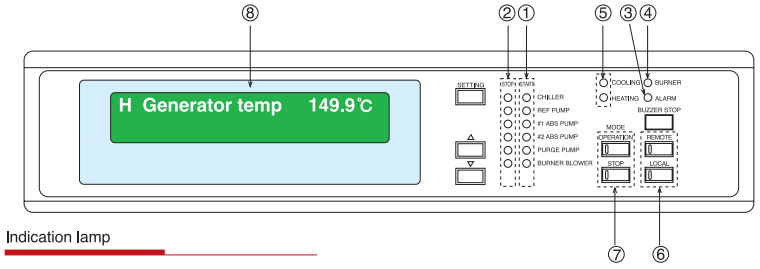
Oil-fired



Note:

1. Exit filter of auxiliary oil storage tank should be set above 80 gride-holes.
2. Deflating valve should be installed in the pipe where air is stored.
3. Backflow pipe of auxiliary oil storage tank must be installed.
4. Valves must not be set in backflow pipe.
5. Oil level of auxiliary storage tank should be set not lower than 4 meters below pump site.
   * Pump pressure on absorbing side should be set $0 \sim 0.35 kg/cm^2 \cdot G$.
   * Height of backflow pipe (H) should be set below 5 meters.
6. Flow counter must be installed both in the feed side pipe and the backflow pipe.
7. Linkage pipe from auxiliary oil tank to oil joint should be heat , corrosion resistant and suitable for climate.

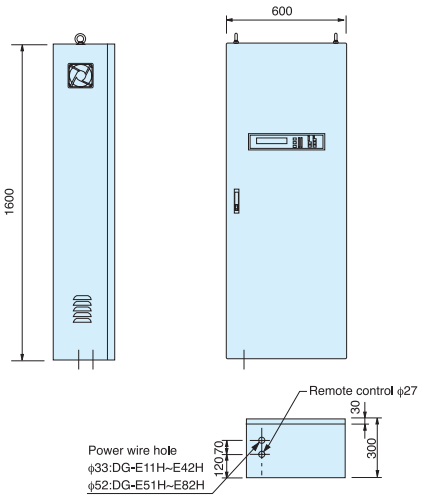
Control panel



Indication lamp

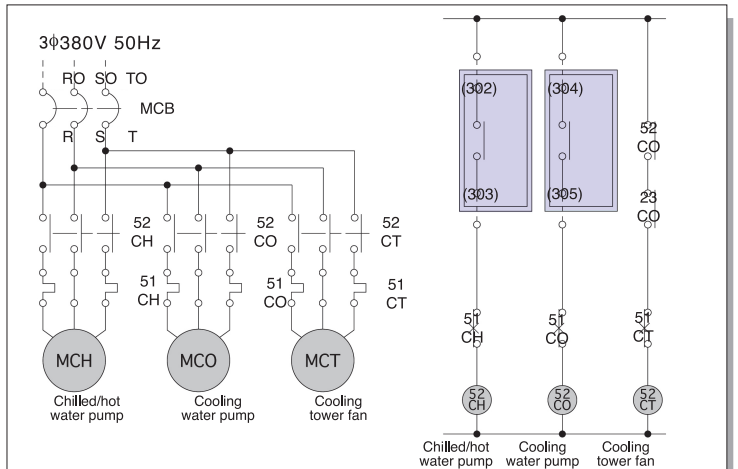
symbol	Name	Lamp color
①	Running(Operation) indication lamp	Red
②	Stop indication lamp	Green
③	Alarm indication lamp	Orange
④	Burner combustion indication lamp	Red
⑤	Cooling / Heating indication lamp	Orange
⑥	Remote / Local select button with lamp	Red
⑦	Mode select button with lamp	Red
⑧	Data display	LCD

Control panel dimension diagram



Accessory equipment electric circuit essential

Accessory equipment electric circuit reference example

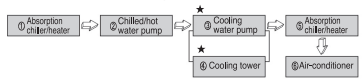


Note:

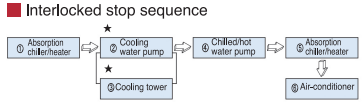
1. 23CO (cooling water thermostat) must be installed at the inlet of cooling water.
2. In ▭ are terminals on absorption chiller/heater control panel. So conduct interlocked start/stop from absorption chiller.
   * Use terminals 302-303 on absorption chiller/heater for chilled/hot water pump.
   * Use terminals 304-305 on absorption chiller/heater for cooling water pump.

Accessory equipment start/stop sequence

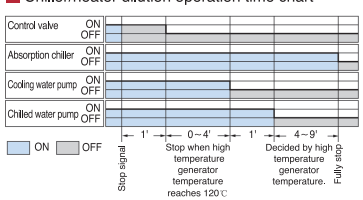
Interlocked start sequence



Interlocked stop sequence



Chiller/heater dilution operation time chart



Note:

1.Mark ★ means they don't start in heating operation

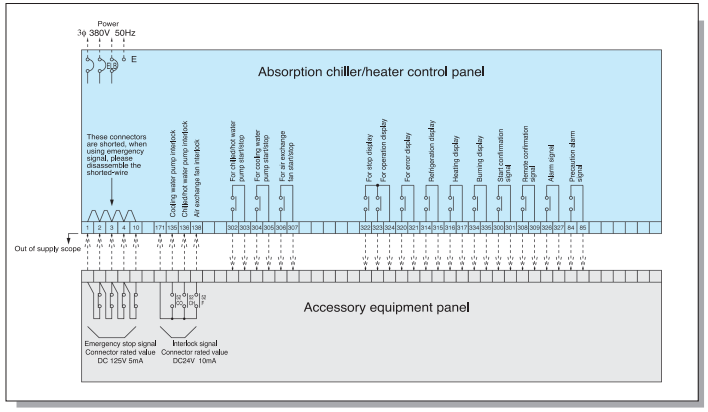
2.Please stop ⑥ Air-conditioner after absorption chiller/heater fully stopped.

1.In cooling operation shortest dilution operation time is 6 minutes, longest 15 minutes.

2.In heating operation dilution operation time is 5 minutes.

Electric wiring diagram

Electric wiring diagram



Note: ＊ Start confirmation signal: the display after receiving the control signal from "Start" button
＊ Operation display signal: the display when the machine or the pump is running

Outside wiring

Accessory equipment wiring
Please connect user's power wire to the electric leakage breaker in the control panel, power wire earth line to earth terminals in the control panel

	Kinds	Terminal No.	Note
Accessory equipment interlock signal	Chilled/hot water pump interlock	171-136	DC24V 10mA
	Cooling water pump interlock	171-135	DC24V 10mA
	Chilled water pump operation	302-303	Connector specification AC250V 0.1A
	Cooling water pump operation	304-305	Connector specification AC250V 0.1A
	Air exchange fan	306-307	Connector specification AC250V 0.1A

Wiring of remote start/stop signal.

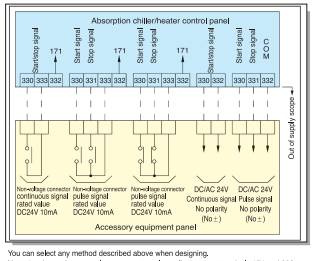
For remote start/stop, there are signals as follows, select when designing. When using non-voltage connector, please first connect terminals 171 and 332.

	Kinds	Input signal	Terminal No.	Note
1	Non-voltage connector continuous signal	ON/OFF	330-333	
2	Non-voltage connector pulse signal	ON	330-333	Use connector A
		ON	331-333	Use connector A
3	Non-voltage connector pulse signal	ON	330-333	Use connector A
		OFF	331-333	Use connector B
4	DC24V continuous signal	ON/OFF	330-332	No polarity (No ±)
5	DC24V pulse signal	ON	330-332	No polarity (No ±)
		ON	331-332	
6	AC24V continuous signal	ON/OFF	330-332	
7	AC24V pulse signal	ON	330-332	
		ON	331-332	

State display connector wiring.
Please prepare the following six state display connector.

	Kinds	Terminal No.	Note
1	Stop display connector	323-324	Connector specification AC250V 0.1A
2	Operation display connector	322-324	Connector specification AC250V 0.1A
3	Error display connector	320-321	Connector specification AC250V 0.1A
4	Start confirmation connector	300-301	Connector specification AC250V 0.1A
5	Alarm signal	326-327	Connector specification AC250V 0.1A
6	Precaution alarm signal	84-85	Connector specification AC250V 0.1A

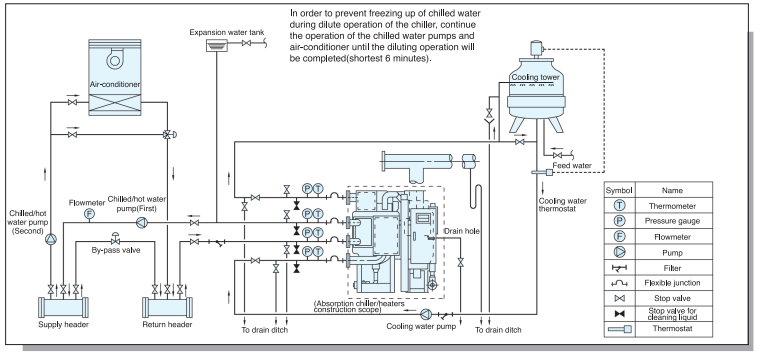
Remote start/stop signal connection example



You can select any method described above when designing.
Note: 1. when using non-voltage connector, please first connect terminals 171 and 332.
2. Connector rated value of non-voltage connector is DC24V, 10mA.

Piping system diagram

Piping system diagram (Reference example)



Attentions to pipe construction

1. Prepare external pipes connecting to the absorption chiller/heaters (dashed line) on your own.
2. Refer to the overall dimensions diagram and specifications table for pipe connections and diameters.
3. Try to make sure the chilled/hot/cooling water flowrate in conformity with standard value. Please keep the range of chilled/hot/cooling water flow between 50%～120% of specified value to prevent freezing, corrosion and leakage.
4. Please properly positioned the chilled/hot water pump, cooling water pump, expansion water tank in order to make the pressure on the body not exceed the set value.
5. Set special chilled/hot water pump and cooling water pump for each refrigerator with their capacity meeting the specifications.
6. Please make sure to install the flexible junction between the machine and the inlet/outlet of the chilled/hot water pump and cooling water pump, and make sure to have a straight tube on the chilled/hot water inlet/outlet pipe, which length is at least decuple pipe diameter.
7. Clean and descale the pipes through by-pass pipeline after installing the whole pipe system, then connect with the machine. Please make sure that the cleaning water cannot pass the machine.
8. The bad water quality could cause corrosion and fouling phenomenon, so please make sure to treat and manage strictly the water quality of chilled/hot water and cooling water system.
9. Install a cooling water flow regulate valve at the cooling tower inlet in order to manage the water quality.
10. Install filter in the chilled/hot, cooling water pipes(No. 10 filter screen).
11. Following devices should be equipped around the chilled/hot, cooling water inlet and outlet. exclusive of all kinds of stop valves in order to maintain and supervise chilled/hot water.

(1) Install thermometer and pressure gauge around the inlet and outlet of chilled/hot water and cooling water.
(2) Install deflating valve above water tank.
(3) Install drain valves at the lowest positions between the absorption chiller/heaters and the stop valves of chilled/hot water and cooling water,then pipe to the drain ditch.
(4) Install stop valves between the absorption chiller/heaters and stop valves of all inlets and outlets to clean the water circuit system with clean liquid.

12. Install the gas leakage detection alarm device for gas-fired type chiller/heater in the machine room. Make sure that the gas shut-off valve can close immediately when alarming and the exhaust fan of the machine room can automatically run when alarming.
13. When air flue and funnel is connected:

(1) Make insulate construction and drain holes.
(2) Avoid exhaust gas leak into the room and causing poisoning. Please confirm that the exhaust drain from the machine and the condensate pipe from the indoor units are not commonly connected.
(3) Avoid using the same chimney with garbage burning furance.
(4) Avoid backflowing to the machine at rest when common chimney is used by two more machine.
(5) Install vent regulator when static pressure in the flue is easy to change.
(6) Make the outlet of chimney far from the cooling tower.

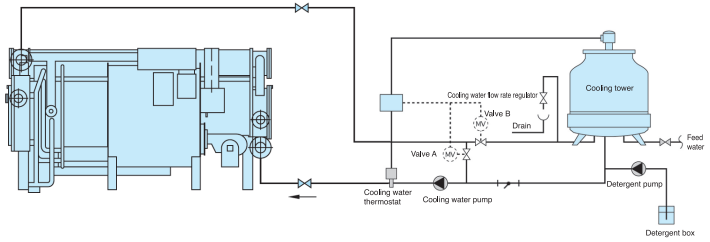
14. Please be sure to keep the foundation level (levelness within 2/1000mm)during installation of chiller.

Note: For the design and construction of the system and the machine room. Please follow the national relative air-conditioner design code, gas/oil-fired design and safety code,building fire-protection design code and fire requirements,etc.

Cooling water management essentials

Cooling water temperature control essential (Reference example)

Cooling water temperature can't drop 13℃ lower than design temperature.
For example, when cooling water inlet temperature is 32℃, cooling water temperature can't drop below 19℃.
However, it is no matter even the temperature below above value between start and normal run.



Prevention of cooling water temperature from droping too low:

1. Be sure to start and stop the fan by means of the cooling water thermostat.
2. Only in the cooling operation in summer, valve A can be used as hand-operated butterfly valve.
3. In the cooling operation in the middle region and in winter, valve A and valve B should be used as automatic valve(three-throw valve also can be used).The setting value of cooling water thermostat such as: below 22℃ shut down the valve, above 25℃ open the valve.

Manufacturer	Model	Temperature scope	Temperature difference	Switch
Yamatake Honeywell	T675A	-15℃～35℃	1.7℃～5.6℃	SPDT×1
SAGINOMIYA	TNS-C1034CW	−20～+35℃	4～20℃	SPDT×1

Cooling water quality supervise essential

- Moisture in the cooling water is vaporized and dispersed into the atmosphere when flowing through the cooling tower,therefore cooling water is continuously concentrated and deteriorated.
- If the cooling water quality deteriorated corrosion and dirt accumulation will arise, therefore the unit will be troubled with capacity declination and heat-transfer pipe corrosion.Please install cooling water overflow device to supervise the water quality properly. In addition, proper water quality treatment will have better effect.
- Water quality standard for water used in common air-conditioner and refrigerator, has been formulated by Japanese Industry Association of Refrigerator and air-conditioner, for detail reference following table.

Cooling water quality standard

	Item	Circulation		Direct-used mode	Trend	
		Circulation water	Feed water	Direct-used water	Corrosion	Dirt
Standard item	PH(25℃)	6.5～8.2	6.0～8.0	6.8~8.0	○	○
	Electrical conductivity(25℃)(mS/m)	80 below	30 below	40 below	○	○
	Electrical conductivity(25℃)(μS/cm)	800 below	300 below	400 below	○	○
	Cl^-(mgCl^-/)	200 below	50 below	50 below	○	
	$SO^2_4{}^-$(mg$SO^2_4{}^-$/)	200 below	50 below	50 below	○	
	Acid consumption (PH4.8)(mgCaCO₃/)(Malkalinity)	100 below	50 below	50 below		○
	Total hardness (mgCaCO₃/)	200 below	70 below	70 below		○
	SiO_2(mgSiO_2/)	50 below	30 below	30 below		○
Reference item	Fe(mgFe/)	1.0 below	0.3 below	1.0 below	○	○
	S^{2-}(mgS^{2-}/)	Beyond measure	Beyond measure	Beyond measure	○	
	NH^+_4(mgNH^+_4/)	1.0 below	0.1 below	1.0 below	○	

Note before order

Note before order

If the following contents are supplied, we can offer proper plan to satisfy your requirement.

1	Refrigeration capacity	USRT or	kW		
2	Heating capacity		kW		
3	Quantity	Unit			
4	Application (Air-conditioning, process, etc.)				
5	Special application(Simultaneous chilled and hot water, etc.)				
6	Chilled water inlet temperature	℃	Working pressure	MPa	$kg/cm^2 \cdot G$
7	Chilled water outlet temperature or flow rate	℃ or	m^3/h		
8	Cooling water inlet temperature	℃	Working pressure	MPa	$kg/cm^2 \cdot G$
9	Cooling water outlet temperature or flow rate	℃ or	m^3/h		
10	Hot water inlet temperature	℃	Working pressure	MPa	$kg/cm^2 \cdot G$
11	Hot water outlet temperature or flow rate	℃ or	m^3/h		
12	Fuel kinds				
13	Fuel high heat value or low heat value				
14	If fuel is gas				
	Gas supply pressure	mmH_2O or	$kg/cm^2 \cdot G$		
	Gas specific gravity	(Air's specifc gravity 1)			
	Gas component and others				
15	Power voltage				
16	Installation place (roof, ground, under ground, etc.)				