



**MEHRASL**  
MANUFACTURING CORPORATION



**MEHRASL**  
MANUFACTURING CORPORATION

HEAD OFFICE: No. 17 - ZOHREH St. - MOFATTEH Ave.  
TEHRAN 15485-2685 - IRAN  
TEL: (0098-21) 8830861 FAX: (0098-21) 88304147  
FACTORY: SALMI Industrial Zone - TABRIZ - IRAN  
TEL: (0098-41) 34328841-50 FAX: (0098-41) 34328855

دفتر مرکزی تهران: خیابان زهره، پلاک ۱۷ - بزرگراه موفاقیه  
تهران ۱۵۴۸۵-۲۶۸۵  
تلفن: ۰۲۱-۸۸۳۰۸۶۱ فکس: ۰۲۱-۸۸۳۰۴۱۴۷  
کارخانه تبریز: منطقه صنعتی سلمی - تبریز  
تلفن: ۰۴۱-۳۴۳۲۸۸۴۱-۵۰ فکس: ۰۴۱-۳۴۳۲۸۸۵۵

Email: headoffice@mehrasl.com http://www.mehrasl.ir



Under Licence of  
Kawasaki Thermal Engineering Co., Ltd. (Japan)

**ABSORPTION**  
**CHILLERS**

**GWM-OWM-GLB-OLB-SLB Series**

**توجه:** این مجلد برای اطلاعات عمومی کاربرد می‌باشد و استفاده غیر مجاز و نقل کلیه مطالب این مجلد بدون اخذ مجوز کتبی از شرکت مهر اصل غیر قانونی است. مشخصات فنی بدون اطلاع قبلی قابل تغییر هستند و در موارد قراردادی می‌بایستی برای هر موردی تاییده کتبی از مهر اصل اخذ شود.

**Attention:** This leaflet is for general information only. No claim can be driven from its contents. Any publication or unauthorized use of its material, in whole or in part, without the permission of MEHR ASL, will be prosecuted under law in details or brief and will result in severe civil penalties. All pictures and dimensions shown in this leaflet are for reference only. Data given is subject to change without notice. There is no warranty that product shown in this leaflet is of specified quality and it can be replaced by expert advice or customers preferences. MEHR ASL would be pleased to quote for any non- standard items. This service is available upon request at extra cost.

We are proud to introduce MahrAsl "Double Effect" Absorption Chiller/Heater Units Under Kawasaki Thermal Engineering (KTE) License.

KTE is world pioneer in most of innovations, designs and new concepts and improvements on "Absorption System" industry.

To name few:

- First manufacturer of "Double Effect Absorption Systems"
- First manufacturer of "Direct Fired Double Effect Absorption Systems"
- First manufacturer of "Marine Absorption Chillers"
- First manufacturer of "Triple Effect Absorption Systems"
- and so many other.

Our Absorption products are made in two different series:

"M series" which are using parallel cycle and powered by Gas and Oil

"L Series" which are using reverse cycle and powered by Gas and Oil and Steam

### Some of the most important features of our Units :

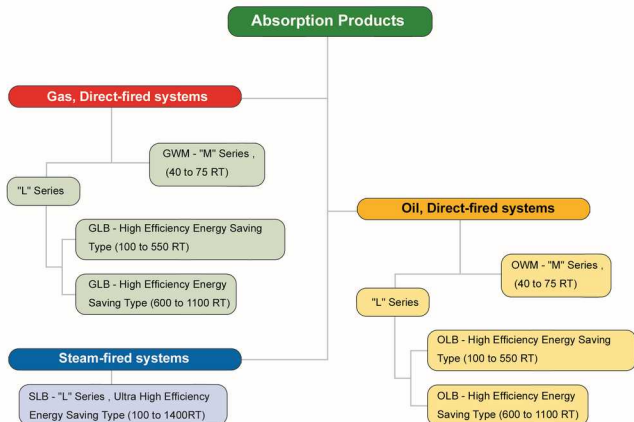
- **1) Reduction of fuel consumption:**  
Up to 30% for cooling and 15% for heating compared to conventional models
- **2) Smaller size:**  
Up to 50% of similar products
- **3) Low operating cost :**  
Due to simplicity of design and accessibility of different parts.
- **4) Saving on daily administration cost:**  
Automatic purging system reduces daily vacuuming and labor cost.
- **5) Designed for environmental considerations:**  
By using less fuel damage to environment is greatly reduced and minimized.
- **6) Saving of power cost for ancillary devices of unit:**  
Up to 50% of energy used for solution and refrigeration pumps due to special parts and design.

#### Oil consumption rate for cooling/heating operation

Saving Percents	Fuel	Cooling operation	Heating operation
26% Saving	Kerosene (Calorific Value: 34.8 MJ/l)	0.093 l/KW	0.109 l/KW
	Special Heavy oil (Calorific Value: 37.3 MJ/l)	0.087 l/KW	0.101 l/KW
30% Saving	Kerosene (Calorific Value: 34.8 MJ/l)	0.087 l/KW	0.109 l/KW
	Special heavy oil (Calorific Value: 37.3 MJ/l)	0.082 l/KW	0.101 l/KW

#### Specific Consumption of Fuel Gas for Cooling or Heating

Saving Percents	Fuel	Cooling operation	Heating operation
Standard Energy Saving Type	13A Gas (Higher Calorific Value : 11,000 Kcal/Nm <sup>3</sup> )	0.274 Nm <sup>3</sup> /RT	0.106 Nm <sup>3</sup> / 1,000 Kcal
High Efficiency Energy Saving Type	13A Gas (Higher Calorific Value : 11,000 Kcal/Nm <sup>3</sup> )	0.258 Nm <sup>3</sup> /RT	0.106 Nm <sup>3</sup> / 1,000 Kcal



All our Chiller/Heater Absorption Systems are of Double-Effect, Custom-Build, Indoor- Use.

"L" Stands for Larger capacities models and utilization of reverse cycle.

"M" Stands for Medium size models and utilization of parallel cycle.

"RT" Stand for Refrigeration Tonnage.

"High Efficiency" models are more economical in consumption of fuel and energy.

OWM - **A	M Series Oil Direct - Fired Chiller/Heaters
GWM - **A	M Series Gas Direct - Fired Chiller/Heaters
OLB - ****E	L Series Oil Direct - Fired Chiller/Heaters, High Efficiency Type
GLB - ****E	L Series GAS Direct - Fired Chiller/Heaters, High Efficiency Type
SLB - ****U	L Series Steam Driven Type , Steam consumption 4.3 kg/h .RT

\* stands for capacities



OLB



GLB

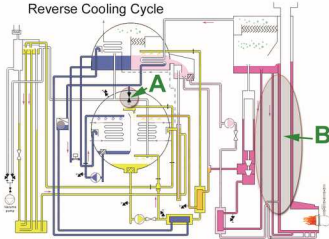


SLB

## Why our devices are better than others?

There are many unique devices used in our units, to name few:

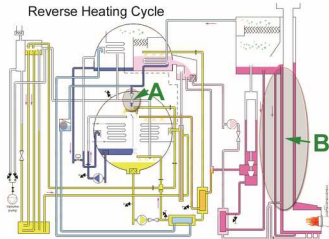
Reverse Cooling Cycle



### "Energy-Saving Reverse Cycle Device"

This device is unique to our products. By implanting this machine, we have greatly reduced energy consumption and due to its small size, our units are more compact than similar products in market. It also keeps density of circulating solution in high and stable level.

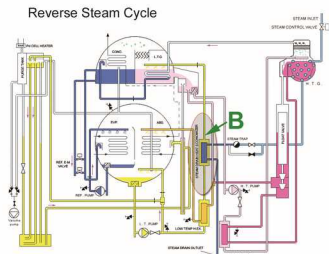
Reverse Heating Cycle



### "High Efficiency Heat Economizer Device"

This device is also unique to our products. It recovers thermal energy from both heating and cooling exhaust gas. By implanting this machine, thermal efficiency has been greatly increased.

Reverse Steam Cycle



### "Cooling/Heating Switch Valve"

By simply turning on and off the switch valve, this system takes out Chilled water in summer and hot water in winter from the same system line. This makes external complicated pipes and valves for cooling/heating unnecessary, thus cutting down the installation and maintenance cost.

A: Switch Valve

B: Economizer

MehrAsl is using both Gas and Oil burners in Absorption products.

Parameters	Units	Gas Line Type	Standards IGS - CH - 033(0) - 2004
Gross Heating Value (GHV)	Kcal/sm <sup>3</sup>	9133.25	8900 < GHV < 10500
Net Heating Value (NHV)	Kcal/sm <sup>3</sup>	8220.0	8000 < NHV < 9600

#### Oil fuel heating value is about 33577 Btu/L

For example : to calculate amount of gas or Oil fuel needed for models GLB-600E

(Referring to chart ) fuel consumption will be as follow:

$$\text{NHV} = 8220.0 \text{ Kcal/sm}^3 *$$

Fuel Consumption	Max. Cooling [Kcal/h]	1701400
	Max. Heating [Kcal/h]	1944000

**Gas consumption**



$$\text{Cooling : } 1701400 / 8220.0 = 206.98 \text{ sm}^3/\text{h}$$

$$\text{Heating : } 1944000 / 8220.0 = 236.50 \text{ sm}^3/\text{h}$$

$$\text{HV} = 33577 \text{ Btu/L} = 8462 \text{ Kcal/L}$$

**Oil fuel consumption**



$$\text{Cooling : } 1701400 / 8462.0 = 201.06 \text{ L/h}$$

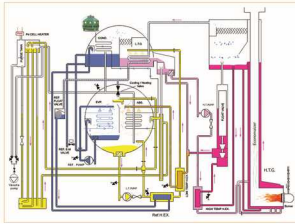
$$\text{Heating : } 1944000 / 8462.0 = 229.73 \text{ L/h}$$

Below chart is a specification of pipes used in Absorption products

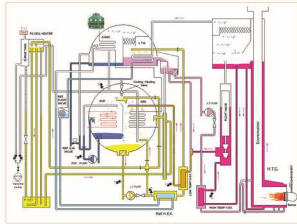
A	15	20	25	32	40	50	65	80	90	100	125	150	200	225	250	300	350	400
mm	21.7	27.2	34	42.7	48.6	60.5	76.3	89.1	101.6	114.3	139.8	165.2	216.3	241.8	267.4	318.5	355.6	406.4

\* Net heating value may vary depending on the geographic location which should be considered in calculation of fuel consumption.

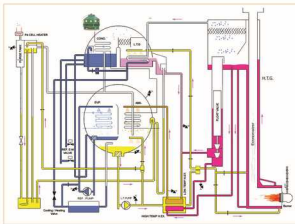
**Reverse L series Cooling Cycle(Direct Fired)**



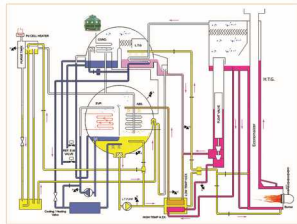
**Reverse L series Heating Cycle(Direct Fired)**



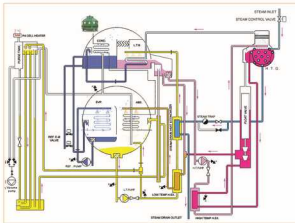
**Parallel M series Cooling Cycle(Direct Fired)**



**Parallel M series Heating Cycle(Direct Fired)**



**Reverse L series Cooling Cycle(Steam Fired)**



**Strong Solution**

**Refrigerant**

**Refrigerant Vapor**

**Middle Solution**

**weak Solution**

**Mixed Solution**



**Technical Data of Gas-Fired products:( capacity-fuel-dimension,...) (40 - 75 RT)**

Item			Type Of Machine			
			GWM-40 A	GWM-50 A	GWM-60 A	GWM-75 A
Capacity	Max. Cooling	kW	141	176	211	264
	Max. Heating	kW	128	160	193	241
Chilled/ Hot Water	Chilled Water Temp.	°C	Inlet 12°C		Outlet 7°C	
	Hot Water Temp.	°C	Inlet 55.4°C		Outlet 60°C	
	Flow Rate	m³/h	24	30	36	45
	Pressure Loss	kPa	29.4	53.9	29.4	49.0
	Temperature	°C	Inlet 32°C		Outlet 37.5°C	
Cooling Water	Flow Rate	m³/h	40	50	60	75
	Pressure Loss	kPa	58.8	98.1	68.6	98.1
	Fuel Consumption (*1)	MJ/h	543 (488.2)	678 (610.4)	814 (732.7)	1017 (915.7)
Fuel	6C gas (HH= 18.8 MJ/Nm³)	Nm³/h	28.8	36.0	43.2	54.0
	6B gas (HH= 20.9 MJ/Nm³)	Nm³/h	25.9	32.4	38.9	48.6
	13A gas (HH= 40.6 MJ/Nm³)	Nm³/h	11.8	14.7	17.7	22.1
	Required Air Rate (*2)	m³/h	170	220	260	320
	Exhaust Gas Rate (*3)	m³/h	290	360	430	530
	Electric Source		3 Phase 380V 50Hz			
Electricity	Consumption Electricity	kW	1.9	2.1	2.25	2.75
	Ampere	A	3.4	3.75	4.0	4.9
	Outlet/Inlet of Chilled/Hot Water	A	65	65	80	80
Caliber	Outlet/Inlet of Cooling Water	A	80	80	100	100
	Inlet Of Fuel	A	25	PT SCREW (*4)		
	Length (L)	mm	1,920	2,320	2,740	3,340
External Size	Width (W)	mm	1,120	1,120	1,120	1,120
	Height (H)	mm	1,780	1,780	1,780	1,780
Weight	Weight in Operation	ton	2.5	2.9	3.3	3.9
	Weight in Installation	ton	2.3	2.7	3.1	3.7
Noise (A characterisctic) (*8)		dB	62	64	64	64
NOx in Combustion Exhaust Gas (*9)		ppm(O <sub>2</sub> 5%)	55	55	55	55
High Temp. Generator Heating Surface		m²	1.5	1.8	2.1	2.1

\*1: Outside the ( ) is total calorific value. Inside the ( ) is net calorific value. Gas consumption is shown as total calorific. Fuel consumption rate on cooling operation is the average value. Maximum fuel consumption rate on cooling operation is the same as heating one.

\*2: Minimum required air flow rate at atmospheric temperature of 25°C.

\*3: Exhaust gas flow rate at the temperature of 180°C.

\*4: Sizes differ according to types of fuel.

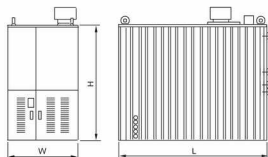
\*5: Ensure that the inlet temperature of cooling water is above 22°C.

\*6: Operation load range is from 10 to 100%.

\*7: Maximum pressure for chilled/hot water and cooling water piping is 490 kPa (Gauge).

\*8: Values measured at 1 m from the operation machine and 1.5 m from the foundation.

\*9: They are the aim values, not guaranteed values.

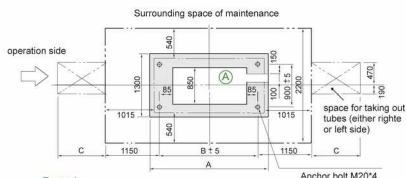




## Power Capacity:

Type Of The Machine		GWM-40A	GWM-50A	GWM-60A	GWM-75A
Power Supply		3 ∅ AC380V 50 Hz			
Power capacity	KW	1.9	2.1	2.25	2.75
	A	3.4	3.75	4.0	4.9
Diameter of wire	mm <sup>2</sup>	2.5			
Solution pump	KW	0.75		0.75	
Refrigerant pump	KW	0.1			
Burner motor	KW	0.25	0.4	0.75	

## Dimension of foundation and surrounding space



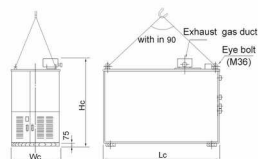
Type of Machine	Size [mm]		
	A	B	C
GWM-40A	2,100	1,650	620
GWM-50A	2,500	2,050	1,020
GWM-60A	2,920	2,470	1,420
GWM-75A	3,520	3,070	2,020

### Remark

1. This drawing shows dimensions of space necessary for foundation and maintenance.
2. Provide a space for taking out tubes either on the left or right side; it may be helpful for Future maintenance.
3. Provide a drainage ditch around the machine.
4. Finish the foundation work horizontally flat and smooth, at the horizontal grade of about 2/1000.
5. Prepare a for draining water

## Dimension for installation:

Type of Machine	Installation Max Size [mm]				Weight at installation (ton)	Weight at Special installation (option spec) (ton)
	Lc	Wc	Hc			
			outdoor	indoor		
GWM-40A	1,975	1,140	2,125	2,125	2.3	1.7
GWM-50A	2,375	1,140	2,125	2,125	2.7	2.0
GWM-60A	2,795	1,140	2,125	2,125	3.1	2.2
GWM-75A	3,395	1,140	2,125	2,125	3.7	2.8



### Remark)

1. Machine is shipped with the solution and refrigerant and sealed in vacuum
2. The chiller/heater is covered by casing and fully take care handling.
3. Prepare the maximum dimension above for installation. When using rollers add the heights of a roller and a board to the Hc size.
4. Since this machine has a high vacuum chamber containing solution and refrigerant, repair works for damage may be impracticable. Pay careful attention to the bottom part of the machine, which has delicate parts and devices such as pumps and pipes.
5. Additional optional specification enables weight at installation to be lighter. In this case, the parts except vacuum (water cover, combustion equipment of hot and cold insulation) are attached at site.
6. The height (Hc) can be shortened by 1,975mm detaching the exhaust gas duct.

**Technical Data of Gas-Fired products:( capacity-fuel-dimension,...) (100 - 240 RT)**

Item			Type Of Machine					
			GLB-100E	GLB-120E	GLB-150E	GLB-180E	GLB-200E	GLB-240E
Capacity	Maximum Cooling	USRT <sup>(1)</sup>	100	120	150	180	200	240
	Maximum Heating	Kcal/h	277,000	332,000	416,000	499,000	554,000	665,000
	Chilled Water Temp.	°C	Inlet 12°C Outlet 7°C					
Chilled /HotWater	Hot Water Temp.	°C	Inlet 55.4°C Outlet 60°C					
	Flow Rate	m³/h	60	73	91	109	121	145
	Pressure Loss	mAq	4.9	4.9	5.4	6.0	4.2	4.3
	Holding Water Quantity in Operation	m³	0.11	0.13	0.15	0.18	0.20	0.23
	Temperature	°C	Inlet 32°C Outlet 37.3°C					
Cooling Water	Flow Rate	m³/h	100	120	150	180	200	240
	Pressure Loss	mAq	5.3	8.1	6.1	9.3	6.6	10.0
	Holding Water Quantity in Operation	m³	0.27	0.31	0.36	0.42	0.45	0.53
	Maximum Cooling	kcal/h	283,500 (255,200)	340,200 (309,200)	425,300 (385,800)	510,300 (459,300)	567,300 (510,300)	680,400 (612,400)
Fuel Relations	Maximum Heating	kcal/h	324,000 (291,000)	388,800 (350,000)	486,000 (437,400)	583,200 (524,400)	648,000 (583,200)	777,600 (699,600)
	6C Gas (HH = 4,500kcal/Nm³)	Cooling	Nm³/h	63.0	75.6	94.6	113.4	126.0
		Heating	Nm³/h	72.0	86.4	108.0	129.6	144.0
	6B Gas (HH = 5,000kcal/Nm³)	Cooling	Nm³/h	56.7	68.1	85.1	102.1	113.4
		Heating	Nm³/h	64.8	77.8	97.2	116.7	129.6
	13A Gas (HH = 11,000kcal/Nm³)	Cooling	Nm³/h	25.8	31.0	38.7	46.4	51.6
		Heating	Nm³/h	29.5	35.4	44.2	53.1	59.0
	Combustion Air (*3)	m³/h	425	510	638	765	850	1,020
	Exhaust Gas (*4)	m³/h	700	840	1,050	1,260	1,400	1,680
	Electric Source		3 Phase 380 Volt 50 Hz					
Electric Requirements	Total Output of Motors	KW	2.8	3.15	3.15	4.2	4.95	4.95
	Ampere	A	5	5.6	5.6	7.5	8.8	8.8
	Electric Capa. For Control	KVA	0.6					
Piping Size	Inlet/Outlet of Chilled/Hot Water	A	100	100	125	125	150	150
	Inlet/Outlet of Cooling Water	A	125	125	150	150	200	200
	Inlet of Fuel (*5)	A	50	50	50	50	50	50
	Connection for Exhaust gas	mm	329X329	362X362	388X388	417X417	441X441	501X501
	Length (L)	mm	3,012	3,212	3,644	4,152	4,514	5,324
Dimensions	Width (W)	mm	1,485	1,485	1,485	1,610	1,610	1,610
	Height (H)	mm	2,184	2,184	2,184	2,250	2,250	2,250
Weight	Weight in Operation	ton	5.1	5.7	6.5	7.6	8.2	9.2
	Weight at Installation	ton	4.7	5.2	6.0	7.0	7.6	8.5
High Temp Generator Heating surface		m²	2.2	2.3	2.6	3.6	3.7	4.1

\*1. 1USRT Means 3,024kcal/h

\*2. Higher calorific value is shown without bracket and lower calorific value is shown in bracket. Each gas fuel consumption is based on the higher calorific value calculation.

\*3. The minimum required air flow rate at the atmospheric temperature of 25°C is shown. (this means the figure at the maximum heating condition.)

\*4. The exhaust gas flow rate at the temperature of 180°C is shown. (this means the figure at the maximum heating condition.)

\*5. This table shows the case of 13A gas low pressure supply.

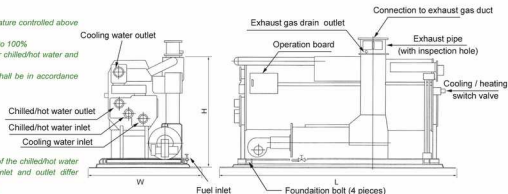
[remarks]

a) keep the cooling water inlet temperature controlled above 22°C

b) the operation load range is from 10 to 100%

c) the maximum pressure designed for chilled/hot water and cooling water pipings is 8 kg/cm G

d) the accuracy of the performance shall be in accordance with JISB9622-1986.



[remarks] The direction and position of the chilled/hot water inlet and outlet and cooling water inlet and outlet differ depending upon the machine models.

## Power capacity

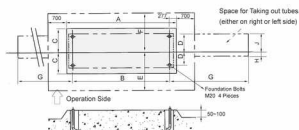
Type Of The Machine		GLB-100E	GLB-120E	GLB-150E	GLB-180E	GLB-200E	GLB-240E
Power Supply		3 ∅ AC380V 50 Hz					
Power capacity	KW	2.8	3.15	3.15	4.2	4.95	4.95
	A	5	5.6	5.6	7.5	8.8	8.8
Diameter of wire	mm <sup>2</sup>	2.5					
Low Temp.Solution pump	KW	1.5				2.2	
High Temp.Solution pump	KW	0.75				1.1	
Refrigerant pump	KW	0.15					
Burner motor	KW	0.4	0.75	0.75	0.75	1.5	1.5
Electric Capa. for control	KVA	0.6					

## Dimension of foundation and surrounding space

Type Of Machine	Size [mm]									Maximum Weight per FoundationBolt (ton)
	A	B	C	D	E	F	G	H	J	
GLB - 100E	3,160	2,077	973	723	1,792	1,508	2,145	220	630	1.4
GLB - 120E	3,360	2,477	973	723	1,792	1,508	2,545	220	630	1.6
GLB - 150E	3,710	3,042	973	723	1,792	1,508	3,115	220	630	1.8
GLB - 180E	4,218	3,642	1,035	785	1,860	1,570	3,710	158	692	2.1
GLB - 200E	4,580	4,004	1,035	785	1,860	1,570	4,072	158	692	2.2
GLB - 240E	5,390	4,804	1,035	785	1,860	1,570	4,872	158	692	2.5

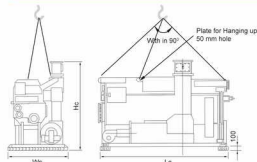
### [Remarks]

- This drawing shows dimensions of space necessary for foundation itself and for maintenance .
- provide a space for taking out tubes , either on the left or right side.
- also provide a drainage ditch around the machine.
- finish the foundation work horizontally flat and smooth , at the horizontal grade of about 2/1000



## Dimension for installation:

Type Of Machine	Max Dimension for Installation [mm]				Weight at installation time (ton)
	Lc	Wc	Hc		
			With Exhaust Pipe	Exhaust pipe is removed	
GLB - 100E	3,350	1,700	2,590	2,330	4.7
GLB - 120E	3,550	1,700	2,590	2,330	5.2
GLB - 150E	3,920	1,700	2,590	2,330	6.0
GLB - 180E	4,490	1,800	2,650	2,390	7.0
GLB - 200E	4,850	1,800	2,650	2,390	7.6
GLB - 240E	5,660	1,800	2,650	2,390	8.5



### [Remarks]

- Machines are shipped with the solution and refrigerant sealed in vacuum .
- Make sure that the space for installation is provided at the above maximum dimensions. when rollers are used under the machine for installation , provide an additional space to accommodate the whole machine plus the rollers.
- Since these machines have a high vacuum chamber containing solution and refrigerant, repair works may be impracticable in case of damage. Pay careful attention to the bottom part of the machine since it has delicate parts and devices such as pump, pipes, etc.

**Technical Data of Gas-Fired products:( capacity-fuel-dimension,...) (300 - 550 RT)**

Item			Type Of Machine					
			GLB-300E	GLB-350E	GLB-400E	GLB-450E	GLB-500E	GLB-550E
Capacity	Maximum Cooling	USRT <sup>(*)</sup>	300	350	400	450	500	550
	Maximum Heating	kcal/h	831,000	970,000	1,108,000	1,247,000	1,385,000	1,524,000
	Chilled Water Temp.	°C	Inlet 12°C Outlet 7°C					
Chilled /HotWater	Hot Water Temp.	°C	Inlet 55.4°C Outlet 60°C					
	Flow Rate	m <sup>3</sup> /h	181	211	241	272	302	332
	Pressure Loss	mAq	6.0	4.0	4.5	6.1	8.0	10.2
	Holding Water Quantity in Operation	m <sup>3</sup>	0.31	0.34	0.38	0.41	0.46	0.49
	Temperature	°C	Inlet 32°C Outlet 37.3°C					
Cooling Water	Flow Rate	m <sup>3</sup> /h	300	350	400	450	500	550
	Pressure Loss	mAq	7.7	4.1	5.7	7.5	9.8	12.2
	Holding Water Quantity in Operation	m <sup>3</sup>	1.11	1.23	1.35	1.47	1.62	1.74
	Maximum Cooling	kcal/h	805,700 (765,600)	892,500 (863,200)	1,134,300 (1,020,800)	1,278,000 (1,148,400)	1,417,800 (1,276,000)	1,559,600 (1,403,600)
Fuel Relations	Maximum Heating	kcal/h	871,900 (874,700)	1,134,500 (1,102,100)	1,296,800 (1,196,200)	1,458,400 (1,312,500)	1,619,800 (1,457,800)	1,782,400 (1,624,100)
	6C Gas (H <sub>2</sub> = 4,500kcal/Nm <sup>3</sup> )	Cooling	Nm <sup>3</sup> /h	189.1	220.6	252.1	283.6	315.1
		Heating	Nm <sup>3</sup> /h	216.0	252.1	288.0	324.1	360.0
	6B Gas (H <sub>2</sub> = 5,000kcal/Nm <sup>3</sup> )	Cooling	Nm <sup>3</sup> /h	170.2	198.5	226.9	255.2	283.6
		Heating	Nm <sup>3</sup> /h	194.4	226.9	259.2	291.7	324.0
	13A Gas (H <sub>2</sub> = 11,000kcal/Nm <sup>3</sup> )	Cooling	Nm <sup>3</sup> /h	77.4	90.3	103.2	116.0	128.9
		Heating	Nm <sup>3</sup> /h	88.4	103.2	117.8	132.6	147.3
	Combustion Air (*3)	m <sup>3</sup> /h	1,269	1,481	1,691	1,904	2,114	2,326
	Exhaust Gas (*4)	m <sup>3</sup> /h	2,090	2,439	2,786	3,135	3,482	3,832
	Electric Source		3 Phase 380 Volt 50 Hz					
Electric Requirements	Total Output of Motors (*5)	KW	5.7	5.7	6.4	6.8	8.3	8.3
	Ampere	A	10.1	10.1	11.4	12.1	14.8	14.8
	Electric Capa. For Control	KVA	0.6					
Piping Size	Inlet/Outlet of Chilled/Hot Water	A	200	200	200	200	200	200
	Inlet/Outlet of Cooling Water	A	250	250	250	250	250	250
	Inlet of Fuel (*6)	A	80	80	80	100	100	100
	Connection for Exhaust gas	mm	498x498	560x560	570x570	570x570	607x607	631x631
	Length (L)	mm	4,245	4,790	5,390	5,950	6,630	7,190
Dimensions	Width (W)	mm	2,045	2,045	2,045	2,210	2,210	2,210
	Height (H)	mm	2,740	2,740	2,740	2,740	2,740	2,740
Weight	Weight in Operation	ton	13.5	15.1	16.4	17.8	19.7	22.1
	Weight at Installation	ton	12.1	13.5	14.7	15.9	17.6	19.9
High Temp Generator Heating surface			m <sup>2</sup>	5.1	5.7	6.5	7.3	8.0

\*1. 1USRT means 3,024kcal/h.

\*2. Higher calorific value is shown without bracket and lower calorific value is shown in bracket. Each gas fuel consumption is based on the higher calorific value calculation.

\*3. The minimum required air flow rate at the atmospheric temperature of 25°C is shown. (This means the figure at the maximum heating condition.)

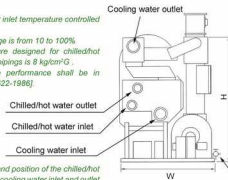
\*4. The exhaust gas flow rate at the temperature of 180°C is shown. (This means the figure at the maximum heating condition.)

\*5. The total output of motors shown the total KW of motors normally operated. Therefore the motor output of pump pump is excluded because of intermediate operation.

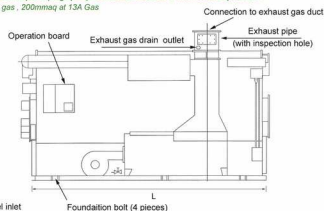
\*6. This table shows the case of standard specification gas supply pressure (800mmHg at 6B, 6c gas, 200mmHg at 13A Gas)

[remarks]

- keep the cooling water inlet temperature controlled above 22 °C
- the operation load range is from 10 to 100%
- the maximum pressure designed for chilled/hot water and cooling water pipings is 8 kg/cm<sup>2</sup> G.
- the accuracy of the performance shall be in accordance with JISB8822-1986.



[remarks] The direction and position of the chilled/hot water inlet and outlet and cooling water inlet and outlet differ depending upon the machine models.



## Power capacity

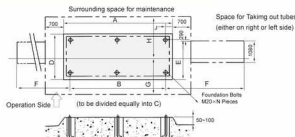
Type Of The Machine		GLB-300E	GLB-350E	GLB-400E	GLB-450E	GLB-500E	GLB-550E
Power Supply		3 $\phi$ AC380V 50 Hz					
Power capacity	KW	5.7	5.7	6.4	6.8	8.3	8.3
	A	10.1	10.1	11.4	12.1	14.8	14.8
Diameter of wire	mm <sup>2</sup>	2.5			4		
Low Temp.Solution pump	KW	1.8			2.2		
High Temp.Solution pump	KW	2.2			2.2		
Refrigerant pump	KW	0.2					
Burner motor	KW	1.5	1.5	2.2	2.2	3.7	3.7
Purge Pump	KW	0.4					
Electric Capa. For Control	KVA	0.6					

## Dimension of foundation and surrounding space

Type Of Machine	Size [mm]										Maximum Weight per FoundationBolt (ton)
	A	B	C	D	E	F	G	H	J	N	
GLB - 300E	4,585	3,155	2	2,380	1,840	4,010	1,890	1,690	690	6	2.3
GLB - 350E	5,100	3,720	2	2,380	1,840	4,575	1,890	1,690	690	6	2.6
GLB - 400E	5,700	4,320	2	2,380	1,840	5,175	1,890	1,690	690	6	2.8
GLB - 450E	5,880	4,880	3	2,520	1,980	5,735	1,960	1,760	500	8	2.3
GLB - 500E	6,560	5,560	3	2,520	1,980	6,415	1,960	1,760	500	8	2.5
GLB - 550E	7,120	6,120	3	2,520	1,980	6,975	1,960	1,760	500	8	2.8

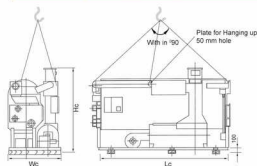
### [Remarks]

1. This drawing shows dimensions of space necessary for foundation itself and for maintenance .
2. provide a space for taking out tubes , either on the left or right side.
3. also provide a drainage ditch around the machine.
4. finish the foundation work horizontally flat and smooth , at the horizontal grade of about 2/1000



## Dimension for installation:

Type Of Machine	Installation Max Size [mm]				Weight at installation time (ton)
	Lc	Wc	Hc		
			With Exhaust Pipe	Exhaust pipe is removed	
GLB - 300E	4,545	2,220	3,190	2,890	12.1
GLB - 350E	5,090	2,220	3,190	2,890	13.5
GLB - 400E	5,690	2,220	3,190	2,890	14.7
GLB - 450E	6,250	2,380	3,190	2,890	15.9
GLB - 500E	6,930	2,380	3,190	2,890	17.6
GLB - 550E	7,490	2,380	3,190	2,890	19.9



### [Remarks]

1. Machines are shipped with the solution and refrigerant sealed in vacuum .
2. Make sure that the space for installation is provided at the above maximum dimension , when rollers are used under the machine for installation , provide an additional space to accommodate the whole machine plus the rollers.
3. Since these machine have a high vacuum chamber containing solution and refrigerant, repair works may be impracticable in case of damage. Pay careful attention to the bottom part of the machine since it has delicate parts and devices such as pump, pipes, etc.

**Technical Data of Gas-Fired products:( capacity-fuel-dimension,...) (600 - 1100 RT)**

Item			Type Of Machine					
			GLB-600E	GLB-700E	GLB-800E	GLB-900E	GLB-1000E	GLB-1100E
Capa.	Maximum Cooling	USRT <sup>(1)</sup>	600	700	800	900	1,000	1,100
	Maximum Heating	Kcal/h	1,662,000	1,939,000	2,216,000	2,493,000	2,770,000	3,047,000
	Chilled Water Temp.	°C	Inlet 13°C Outlet 7°C					
Chilled /HotWater	Hot Water Temp.	°C	Inlet 54.5°C Outlet 60°C					
	Flow Rate	m <sup>3</sup> /h	302.4	352.8	403.2	453.6	504.0	554.4
	Pressure Loss	mAq	7.0	10.0	5.0	6.6	4.0	5.0
	Holding Water Quantity in Operation	m <sup>3</sup>	1.1	1.2	1.4	1.5	1.7	1.8
	Temperature	°C	Inlet 32°C Outlet 37.3°C					
Cooling Water	Flow Rate	m <sup>3</sup> /h	600	700	800	900	1,000	1,100
	Pressure Loss	mAq	8.4	11.8	9.4	12.2	6.1	7.6
	Holding Water Quantity in Operation	m <sup>3</sup>	2.3	2.6	2.9	3.1	4.2	4.3
	Maximum Cooling	kcal/h	1,701,400 (1,531,200)	1,984,900 (1,786,400)	2,268,500 (2,041,600)	2,552,000 (2,341,600)	2,835,600 (2,592,000)	3,119,200 (2,807,200)
Fuel Relations	Maximum Heating	kcal/h	2,268,000 (2,041,200)	2,592,000 (2,332,800)	2,916,000 (2,624,400)	3,240,000 (2,916,000)	3,564,000 (3,207,600)	3,888,000 (3,507,600)
	6C Gas (HH = 4,500kcal/Nm <sup>3</sup> )	Cooling	Nm <sup>3</sup> /h	378.1	441.1	504.2	567.2	630.2
		Heating	Nm <sup>3</sup> /h	432.0	504.0	576.0	648.0	720.0
	6B Gas (HH = 5,000kcal/Nm <sup>3</sup> )	Cooling	Nm <sup>3</sup> /h	340.3	397.0	453.7	510.4	567.2
		Heating	Nm <sup>3</sup> /h	388.8	453.6	518.4	583.2	648.0
	13A Gas (HH = 11,000kcal/Nm <sup>3</sup> )	Cooling	Nm <sup>3</sup> /h	154.7	180.5	206.3	232.0	257.8
		Heating	Nm <sup>3</sup> /h	176.8	206.2	235.7	265.1	294.6
	Combustion Air (*3)	m <sup>3</sup> /h	2,538	2,960	3,384	3,806	4,229	4,651
	Exhaust Gas (*4)	m <sup>3</sup> /h	4,181	4,876	5,574	6,269	6,967	7,662
	Electric Source		3 Phase 380 Volt 50 Hz					
Electric Requirements	Total Output of Motors (*5)	KW	12.0	15.3	15.3	15.3	20.5	20.5
	Ampere	A	21.4	27.3	27.3	27.3	36.6	36.6
	Electric Capa. For Control	KVA	0.6					
Piping Size	Inlet/Outlet of Chilled/Hot Water	A	200	200	250	250	300	300
	Inlet/Outlet of Cooling Water	A	300	300	300	300	400	400
	Inlet of Fuel (*6)	A	80	80	80	80	80	80
	Connection for Exhaust gas	mm	700x700	730x730	810x810	855x855	885x885	980x980
Dimensions	Length (L)	mm	6,050	6,600	7,230	7,870	8,750	7,130
	Width (W)	mm	3,055	3,055	3,220	3,220	3,800	3,800
	Height (H)	mm	3,330	3,330	3,330	3,330	3,680	3,680
Weight	Weight in Operation	ton	29.3	32.0	36.0	39.9	45.5	49.0
	Weight at Installation	ton	25.8	28.2	31.7	35.4	34.1	36.5

\*1. 1USRT means 3.024kcal/h.

\*2. Higher calorific value is shown without bracket and lower calorific value is shown in bracket, each gas fuel consumption is based on the higher calorific value calculation.  
\*3. The minimum required air flow rate at the atmospheric temperature of 25°C is shown. (This means the figure at the maximum heating condition.)

\*4. The exhaust gas flow rate at the temperature of 180°C is shown. (This means the figure at the maximum heating condition.)

\*5. The total output of motors shown the total KW of motors normally operated. Therefore the motor output of purge pump is excluded because of intermediate operation.

\*6. This table shows the case of standard specification gas supply pressure (800mmHg at 6B, 6C gas, 200mmHg at 13A Gas)

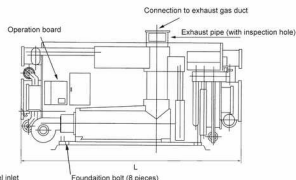
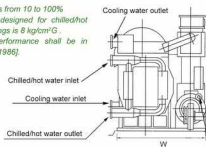
[remarks]

a) keep the cooling water inlet temperature controlled above 22 °C.

b) the operation load range is from 10 to 100%

c) the maximum pressure designed for chilled/hot water and cooling water pipings is 8 kg/cm<sup>2</sup>G.

d) the accuracy of the performance shall be in accordance with [JISB8622-1996].



[remarks] The direction and position of the chilled/hot water inlet and outlet and cooling water inlet and outlet differ depending upon the machine models.

## Power capacity

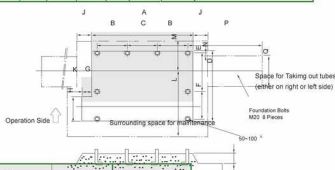
Type Of The Machine		GLB-600E	GLB-700E	GLB-800E	GLB-900E	GLB-1000E	GLB-1100E
Power Supply		3# AC380V 50 Hz					
Power capacity	KW	12.0	15.3	15.3	15.3	20.5	20.5
	A	21.4	27.3	27.3	27.3	36.6	36.6
Diameter of wire	mm <sup>2</sup>	10				16	
Low Temp.Solution pump	KW	3.7	4.5			5.5	
High Temp.Solution pump	KW	2.6	3.0			3.7	
Refrigerant pump	KW	0.2	0.3				
Burner motor	KW	5.5	7.5	7.5	7.5	11	11
Purge Pump	KW	0.4					
Electric Capa. For Control	KVA	0.6					

## Dimension of foundation and surrounding space

Type Of Machine	Size [mm]														Maximum Weight per Foundation Bolt (ton)
	A	B	C	D	E	F	G	H	J	K	L	M	P	Q	
GLB - 600 E	3,020	1,160	0	3,195	1,600	1,195	1,940	1,470	1,970	520	4,755	720	6,080	1,450	4.2
GLB - 700 E	4,185	1,160	1,165	3,195	1,600	1,195	1,645	1,470	1,705	465	4,755	720	6,280	1,450	4.0
GLB - 800 E	5,345	1,160	2,325	3,360	1,600	1,360	605	1,560	1,625	1,055	4,920	720	7,200	1,450	4.5
GLB - 900 E	5,345	1,160	2,325	3,360	1,600	1,360	215	1,560	1,945	1,765	4,920	720	8,100	1,450	5.0
GLB - 1000 E	4,185	1,160	1,165	3,860	1,900	1,560	1,350	1,600	1,890	725	5,500	720	6,790	1,705	5.7
GLB - 1100 E	4,185	1,160	1,165	3,860	1,900	1,560	1,550	1,600	2,130	665	5,500	720	7,510	1,705	6.2

### [Remarks]

1. This drawing shows dimensions of space necessary for foundation itself and for maintenance.
2. provide a space for taking out tubes, either on the left or right side.
3. also provide a drainage ditch around the machine.
4. finish the foundation work horizontally flat and smooth, at the horizontal grade of about 2/1000

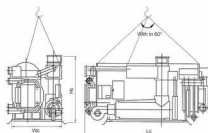


## Dimension for installation:

Type Of Machine	Max Dimension for Installation [mm]				Weight at installation time (ton)
	Lc	Wc	Hc		
			With Exhaust Pipe	Exhaust pipe is removed	
GLB - 600E	6,350	3,255	3,580	3,430	25.8
GLB - 700E	6,900	3,255	3,580	3,430	28.2
GLB - 800E	7,530	3,420	3,580	3,430	31.7
GLB - 900E	8,170	3,420	3,580	3,430	35.4
GLB - 1000E(**)	7,050	4,000	3,930	3,780	34.1
GLB - 1100E (**)	7,430	4,000	3,930	3,780	36.6

### [Remarks]

1. Absorbent and refrigerant are shipped separately in the machine which has mark " \* \* \* "
2. Refer to the dimension in the table above and be sure to provide the space needed for installation. When rollers are used under the machine, provide an additional space to Accommodate the whole machine and the rollers.
3. Since this machine has a high vacuum chamber, repair works maybe impracticable in case of damage. Pay careful attention to the bottom part of the machine since it has delicate parts and devices such as headers, piping, pumps, etc.
4. Machine is supplied as one standard specification package for installation. For partial split packages, discuss with our engineers, or sales staff.





**Technical Data of Oil-Fired products:( capacity-fuel-dimension,...) (40 - 75 RT)**

Item			Type Of Machine			
			OWM-40 A	OWM-50 A	OWM-60 A	OWM-75 A
Capacity	Max. Cooling	kW	141	176	211	264
	Max. Heating	kW	128	160	193	241
Chilled/ Hot Water	Chilled Water Temp.	°C	Inlet 12°C		Outlet 7°C	
	Hot Water Temp.	°C	Inlet 55.4°C		Outlet 60°C	
	Flow Rate	m³/h	24	30	36	45
	Pressure Loss	kPa	29.4	53.9	29.4	49.0
Cooling Water	Temperature	°C	Inlet 32°C		Outlet 37.5°C	
	Flow Rate	m³/h	40	50	60	75
	Pressure Loss	kPa	58.8	98.1	68.6	98.1
Fuel	Fuel Consumption Kerosene (*1)	l/h	14.0	17.5	21.0	26.3
	Fuel Consumption A-heavy Oil	l/h	13.1	16.4	19.7	24.6
	Required Air Rate (*2)	m³/h	170	220	260	320
	Exhaust Gas Rate (*3)	m³/h	290	360	430	530
Electricity	Electric Source		3 Phase 380V 50Hz			
	Consumption Electricity	kW	2.1	2.3	2.75	2.75
	Ampere	A	3.75	4.11	4.9	4.9
Caliber	Outlet/Inlet of Chilled/Hot Water	A	65	65	80	80
	Outlet/Inlet of Cooling Water	A	80	80	100	100
	Inlet Of Fuel	A	15(P.T SCREW )			
External Size	Length (L)	mm	1,920	2,320	2,740	3,340
	Width (W)	mm	1,120	1,120	1,120	1,120
	Height (H)	mm	1,780	1,780	1,780	1,780
Weight	Weight in Operation	ton	2.5	2.9	3.3	3.9
	Weight in Installation	ton	2.3	2.7	3.1	3.7
Noise (A characterisitic) (*7)		dB	62	64	64	64
NOx in Combustion Exhaust Gas (*8)		ppm(O <sub>2</sub> 4%)	90	90	90	90
High Temp. Generator Heating Surface		m²	1.5	1.8	2.1	2.1

Kerosene (sulfur 0.2 weight % or less) A-heavy Oil (JIS Type 1, No. 1) or Special A-heavy Oil (sulfur 0.3 weight % or less)

\*1: Fuel consumption is shown with the conversion ratio of net (low) calorific value below. Kerosene: 34.8 MJ/l specific gravity 0.8

A-heavy oil (JIS Type 1, No.1) or Special A - oil: 37.3 MJ/l specific gravity 0.89

\*2: Minimum required air flow rate at atmospheric temperature of 25 °C .

\*3: Exhaust gas flow rate at the temperature of 180 °C .

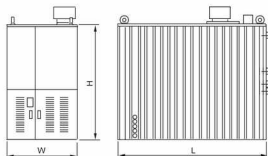
\*4: Ensure that the inlet temperature of cooling water is above 22 °C .

\*5: Operation load range is from 10 to 100%.

\*6:Maximum pressure for chilled/hot water and cooling water piping is 490 kPa (Gauge).

\*7: Values measured at 1 m from the operation machine and 1.5 m from the foundation. (They may change according to conditions of operation and environment. They are not guaranteed values).

\*8: They are the aim values, not guaranteed values.

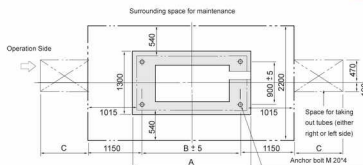




## Power Capacity:

Type Of The Machine		OWM-40A	OWM-50A	OWM-60A	OWM-75A
Power Supply		3 ∅ AC380V 50 Hz			
Power capacity	KW	2.1	2.3	2.75	2.75
	A	3.75	4.1	4.9	4.9
Diameter of wire	mm <sup>2</sup>	2.5			
Solution pump	KW	0.75		0.75	
Refrigerant pump	KW	0.1			
Burner motor	KW	0.4	0.75		

## Dimension of foundation and surrounding space



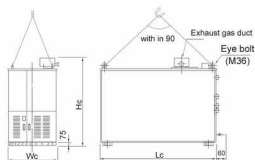
Type of Machine	Size [mm]		
	A	B	C
OWM-40A	2,100	1,650	620
OWM-50A	2,500	2,050	1,020
OWM-60A	2,920	2,470	1,420
OWM-75A	3,520	3,070	2,020

### Remark

1. This drawing shows dimensions of space necessary for foundation and maintenance.
2. Provide a space for taking out tubes either on the left or right side; it may be helpful for Future maintenance.
3. Provide a drainage ditch around the machine.
4. Finish the foundation work horizontally flat and smooth, at the horizontal grade of about 2/1000.

## Dimension for installation:

Type of Machine	Installation Max Size [mm]			Weight at installation (ton)	Weight at Special installation (option spec) (ton)
	Lc	Wc	Hc		
			outdoor indoor		
OWM-40A	2,030 (1,975)	1,140	2,125 2,125	2.3	1.7
OWM-50A	2,430 (2,375)	1,140	2,125 2,125	2.7	2.0
OWM-60A	2,850 (2,795)	1,140	2,125 2,125	3.1	2.2
OWM-75A	3,450 (3,395)	1,140	2,125 2,125	3.7	2.8



### Remark)

1. Machine is shipped with the solution and refrigerant and sealed in vacuum
2. The chiller/heater is covered by casing and fully take care handling.
3. Prepare the maximum dimension above for installation. When using rollers add the heights of a roller and a board to the Hc size.
4. Since this machine has a high vacuum chamber containing solution and refrigerant, repair works for damage may be impracticable. Pay careful attention to the bottom part of the machine, which has delicate parts and devices such as pumps and pipes.
5. Additional optional specification enables weight at installation to be lighter. In this case, the parts except vacuum (water cover, combustion equipment of hot and cold insulation) are attached at site.
6. The height (Hc) can be shortened by 1,975mm detaching the exhaust gas duct.
7. The length (Lc) can be shortened by ( ) detaching the fuel pipe at installation.

## Technical Data of Oil-Fired products:( capacity-fuel-dimension,...) (100 - 240 RT)

Item			Type Of Machine					
			OLB-100E	OLB-120E	OLB-150E	OLB-180E	OLB-200E	OLB-240E
Capacity	Max. Cooling	KW	352	422	527	633	703	844
	Max. Heating	KW	322	386	484	580	644	773
Chilled /HotWater	Chilled Water Temp.	°C	inlet 12 °C			outlet 7 °C		
	Hot Water Temp.	°C	inlet 55.4 °C			outlet 60 °C		
	Flow Rate	m <sup>3</sup> /h	60	73	91	109	121	145
	Pressure Loss	KPa	48.1	48.1	53.0	58.8	41.2	42.2
	Holding Water Rate	m <sup>3</sup>	0.11	0.13	0.15	0.18	0.20	0.23
Cooling Water	Temperature	°C	inlet 32 °C			outlet 37.3 °C		
	Flow Rate	m <sup>3</sup> /h	100	120	150	180	200	240
	Pressure Loss	KPa	52.0	79.4	59.8	91.2	64.7	98.1
	Holding Water Rate	m <sup>3</sup>	0.27	0.31	0.36	0.42	0.45	0.53
Fuel Relations	Max. Fuel Rate (*1)	l/h	30.7	36.8	46.0	55.3	61.4	73.6
	Cooling Special A-heavy Oil (sulfur 0.2 weight% or less)	l/h	28.7	34.4	43.1	51.7	57.4	68.9
	Max. Heating Special A-heavy Oil (sulfur 0.3 weight% or less)	l/h	35.1	42.1	52.6	63.1	70.1	84.1
	Heating Special A-heavy Oil (sulfur 0.3 weight% or less)	l/h	32.8	39.3	49.2	59.0	65.6	78.7
	Required Air Rate (*2)	m <sup>3</sup> /h	424	508	635	761	846	1,015
	Exhaust Gas Rate (*3)	m <sup>3</sup> /h	689	826	1,032	1,238	1,375	1,649
Electricity	Electric Source		3 Phase 380 Volt 50 Hz					
	Motors Total Output	KW	3.15	3.15	3.15	4.95	4.95	4.95
	Power Supply Current	A	5.6	5.6	5.6	8.8	8.8	8.8
	Power Supply Capacity for Control	KVA	0.6					
Caliber	Inlet/Outlet of Chilled/Hot Water	A	100	100	125	125	150	150
	Inlet/Outlet of Cooling Water	A	125	125	150	150	200	200
	Inlet of Fuel (*4)	A	15 (PT screw)					
	Exhaust Gas Connection Port	mm	329x329	362x362	388x388	417x417	441X441	501X501
External Size	Length (L)	mm	3,012	3,212	3,644	4,152	4,514	5,324
	Width (W)	mm	1,485	1,485	1,485	1,610	1,610	1,610
	Height (H)	mm	2,184	2,184	2,184	2,250	2,250	2,250
Weight	Weight in Operation	ton	5.1	5.7	6.5	7.6	8.2	9.2
	Weight at Installation	ton	4.7	5.2	6.0	7.0	7.6	8.5
High Temp Generator Heating surface		m <sup>2</sup>	2.2	2.3	2.6	3.6	3.7	4.1

### Remark )

\*1: Net calorific value of kerosene is shown at the following conditions. Kerosene: 34.8 MJ/l specific gravity 0.8 A -heavy oil (JIS Type 1, No.1) or Special A - oil: 37.3 MJ/l Specific gravity 0.89

\*2: Minimum required air flow rate at atmospheric temperature of 25 °C.

\*3: Exhaust gas flow rate at the temperature of 180 °C.

\*4: Kerosene -fired machine is two-way piping type and it has a fuel outlet.

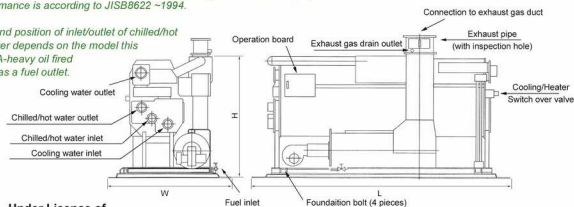
5. Ensure that the inlet temperature of cooling water is above 22 °C.

6. Operation load range is from 10 to 100%.

7. Maximum pressure for chilled/hot water and cooling water piping is 785 kPa (Gauge).

8. Tolerance of performance is according to JISB8622 ~1994.

[Remarks] Direction and position of inlet/outlet of chilled/hot water and cooling water depends on the model this figure shows special A-heavy oil fired type.kevosene type has a fuel outlet.



## Power capacity

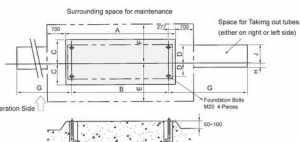
Type Of The Machine		OLB-100E	OLB-120E	OLB-150E	OLB-180E	OLB-200E	OLB-240E
Power Supply		3 $\phi$ AC380V 50 Hz					
Power capacity	KW	3.15	3.15	3.15	4.95	4.95	4.95
	A	5.6	5.6	5.6	8.8	8.8	8.8
Diameter of wire	mm <sup>2</sup>	2.5					
Low Temp.Solution pump	KW	1.5				2.2	
High Temp.Solution pump	KW	0.75				1.1	
Refrigerant pump	KW	0.15					
Burner motor	KW	1.0	1.0	1.0	1.5	1.5	1.5
Electric Capa. For Control	KVA	0.6					

## Dimension of foundation and surrounding space

Type Of Machine	Size [mm]									Maximum Weight per FoundationBolt (ton)
	A	B	C	D	E	F	G	H	J	
OLB - 100E	3,160	2,077	973	723	1,792	1,508	2,145	220	630	1.4
OLB - 120E	3,360	2,477	973	723	1,792	1,508	2,545	220	630	1.6
OLB - 150E	3,710	3,042	973	723	1,792	1,508	3,115	220	630	1.8
OLB - 180E	4,218	3,642	1,035	785	1,860	1,570	3,710	158	692	2.1
OLB - 200E	4,580	4,004	1,035	785	1,860	1,570	4,072	158	692	2.2
OLB - 240E	5,390	4,804	1,035	785	1,860	1,570	4,872	158	692	2.5

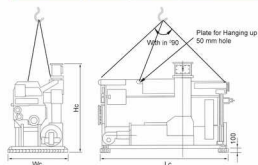
### [Remarks]

1. This drawing shows dimensions of space necessary for foundation itself and for maintenance.
2. provide a space for taking out tubes , either on the left or right side
3. also provide a drainage ditch around the machine.
4. finish the foundation work horizontally flat and smooth , at the horizontal grade of about 2/1000



## Dimension for installation:

Type Of Machine	Installation Max Size [mm]				Weight at installation time (ton)
	Lc	Wc	Hc		
			With Exhaust Gas Duct	Exhaust pipe Gas Duct	
OLB - 100E	3,350	1,700	2,590	2,330	4.7
OLB - 120E	3,550	1,700	2,590	2,330	5.2
OLB - 150E	3,920	1,700	2,590	2,330	6.0
OLB - 180E	4,490	1,800	2,650	2,390	7.0
OLB - 200E	4,850	1,800	2,650	2,390	7.6
OLB - 240E	5,660	1,800	2,650	2,390	8.5



### [Remarks]

1. Machines are shipped with the solution and refrigerant sealed in vacuum .
2. Make sure that the space for installation is provided at the above maximum dimensions. when rollers are used under the machine for installation , provide an additional space to accommodate the whole machine plus the rollers.
3. Since these machines have a high vacuum chamber containing solution and refrigerant, repair works may be impracticable in case of damage. Pay careful attention to the bottom part of the machine since it has delicate parts and devices such as pump, pipes, etc.

## Technical Data of Oil-Fired products:( capacity-fuel-dimension,...) (300 - 550 RT)

Item			Type Of Machine						
			OLB-300E	OLB-350E	OLB-400E	OLB-450E	OLB-500E	OLB-550E	
Capacity	Max. Cooling	KW	1,055	1,231	1,407	1,582	1,758	1,934	
	Max. Heating	KW	966	1,128	1,288	1,450	1,610	1,772	
Chilled /HotWater	Chilled Water Temp.	°C	inlet 12 °C outlet 7 °C						
	Hot Water Temp.	°C	inlet 55.4 °C outlet 60 °C						
	Flow Rate	m³/h	181	211	241	272	302	332	
	Pressure Loss	KPa	58.8	86.3	44.1	59.8	78.5	100.0	
	Holding Water Rate	m³	0.31	0.34	0.38	0.41	0.46	0.49	
Cooling Water	Temperature	°C	inlet 32 °C outlet 37.3 °C						
	Flow Rate	m³/h	300	350	400	450	500	550	
	Pressure Loss	KPa	75.5	40.2	55.9	73.5	96.1	119.6	
	Holding Water Rate	m³	1.11	1.23	1.35	1.47	1.62	1.74	
Fuel Relations	Fuel Ratio (*1)	Max. Cooling	Kcal/h	765,600	893,200	1,020,800	1,148,400	1,276,000	1,403,600
		Kerosene (sulfur 0.2 weight% less)	l/h	92.1	107.4	122.7	138.1	153.4	168.7
		Special A-heavy Oil (sulfur 0.3 weight% less)	l/h	86.1	100.4	114.7	129.1	143.4	157.8
		Max. Heating	Kcal/h	874,700	1,021,000	1,166,200	1,312,500	1,457,800	1,604,100
		Kerosene (sulfur 0.2 weight% less)	l/h	105.2	122.8	140.2	157.8	175.3	192.8
		Special A-heavy Oil (sulfur 0.3 weight% less)	l/h	98.3	114.8	131.1	147.5	163.8	180.3
	Required Air Rate (*2)	m³/h	1,269	1,481	1,691	1,904	2,114	2,326	
	Exhaust Gas Rate (*3)	m³/h	2,090	2,439	2,786	3,135	3,482	3,832	
Electricity	Electric Source		3 Phase 380V 50Hz						
	Motors Total Output (*4)	KW	6.4	6.8	8.3	8.7	9.05	10.85	
	Power Supply Current	A	11.4	12.1	14.8	15.5	16.1	19.3	
	Power Supply Capacity for Control	KVA	0.6						
Caliber	Inlet/Outlet of Chilled/Hot Water	A	200	200	200	200	200	200	
	Inlet/Outlet of Cooling Water	A	250	250	250	250	250	250	
	Inlet of Fuel (*5)	A	20	20	20	20	20	20	
	Exhaust Gas Connection Port	mm	498X498	560X560	572X572	572X572	608X608	632X632	
External Size	Length (L)	mm	4,265	4,790	5,390	5,950	6,630	7,190	
	Width (W)	mm	1,985	1,985	1,985	2,210	2,210	2,210	
	Height (H)	mm	2,740	2,740	2,740	2,740	2,740	2,740	
Weight	Weight in Operation	ton	13.5	15.1	16.4	17.8	19.7	22.1	
	Weight at Installation	ton	12.1	13.5	14.7	15.9	17.6	19.9	
High Temp Generator Heating surface			m²	5.1	5.7	6.5	7.3	8.0	8.8

### Remark)

\*1: Net calorific value of kerosene is shown at the following conditions. Kerosene: 34.8 MJ/l specific gravity 0.8 A-heavy oil (JIS Type

1, No. 1) or Special A - oil: 37.3 MJ/l Specific gravity 0.89

\*2: Minimum required air flow rate at atmospheric temperature of 25 °C.

\*3: Exhaust gas flow rate at the temperature of 180 °C.

\*4: Total output of motor is shown as total of full-time operating motor excluding the purge pump motor of intermittent operation

\*5: Kerosene-fired machine is two-way piping type and it has a fuel outlet.

\*6: Ensure that the inlet temperature of cooling water is above 22 °C.

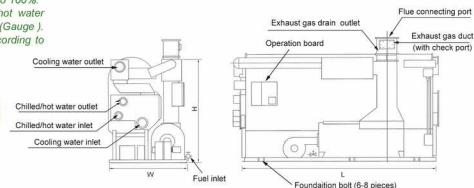
\*7: Operation load range is from 10 to 100%.

\*8: Maximum pressure for chilled/hot water

and cooling water piping is 785 kPa (Gauge).

\*9: Tolerance of performance is according to JISB8622 ~ 1994.

[Remarks] Direction and position of inlet/outlet of chilled/hot water and cooling water depends on the model this figure shows special A-heavy oil fired type. Kerosene type has a fuel outlet.



## Power capacity

Type Of The Machine		OLB-300E	OLB-350E	OLB-400E	OLB-450E	OLB-500E	OLB550E
Power Supply		3 $\phi$ AC380V 50 Hz					
Power capacity	KW	6.4	6.8	8.3	8.7	9.05	10.85
	A	11.4	12.1	14.8	12.1	16.1	19.3
Diameter of wire	mm <sup>2</sup>	4					6
Low Temp.Solution pump	KW	1.8			2.2		
High Temp.Solution pump	KW	2.2			2.2		
Refrigerant pump	KW	0.2					
Burner motor (*1)	KW	2.2	2.6	4.1	4.1	4.45	6.25
Purge Pump	KW	0.4					
Electric Capa. For Control	KVA	0.6					

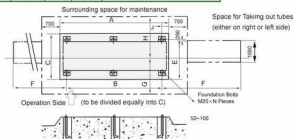
(\*1): Capacity of burner motor is including the value of fuel pump motor

## Dimension of foundation and surrounding space

Type Of Machine	Size [mm]										Maximum Weight per FoundationBolt (ton)
	A	B	C	D	E	F	G	H	J	N	
OLB - 300E	4,585	3,155	2	2,380	1,840	4,010	1,890	1,690	690	6	2.3
OLB - 350E	5,100	3,720	2	2,380	1,840	4,575	1,890	1,690	690	6	2.6
OLB - 400E	5,700	4,320	2	2,380	1,840	5,175	1,890	1,690	690	6	2.8
OLB - 450E	5,880	4,880	3	2,520	1,980	5,735	1,960	1,760	500	8	2.3
OLB - 500E	6,560	5,560	3	2,520	1,980	6,415	1,960	1,760	500	8	2.5
OLB - 550E	7,120	6,120	3	2,520	1,980	6,975	1,960	1,760	500	8	2.8

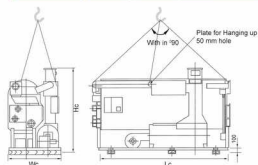
### [Remarks]

1. This drawing shows dimensions of space necessary for foundation itself and for maintenance .
2. provide a space for taking out tubes , either on the left or right side.
3. also provide a drainage ditch around the machine.
4. finish the foundation work horizontally flat and smooth , at the horizontal grade of about 2/1000



## Dimension of installation:

Type Of Machine	Installation Max Size [mm]				Weight at installation time (ton)
	Lc	Wc	Hc		
			With Exhaust Gas Duct	Exhaust pipe Gas Duct	
OLB - 300E	4,545	2,160	3,290	2,990	12.1
OLB - 350E	5,090	2,160	3,290	2,990	13.5
OLB - 400E	5,690	2,160	3,290	2,990	14.7
OLB - 450E	6,250	2,380	3,290	2,990	15.9
OLB - 500E	6,930	2,380	3,290	2,990	17.6
OLB - 550E	7,490	2,380	3,290	2,990	19.9



### [Remarks]

1. Machines are shipped with the solution and refrigerant sealed in vacuum .
2. Make sure that the space for installation is provided at the above maximum dimensions. when rollers are used under the machine for installation , provide an additional space to accommodate the whole machine plus the rollers.
3. Since these machines have a high vacuum chamber containing solution and refrigerant, repair works may be impracticable in case of damage. Pay careful attention to the bottom part of the machine since it has delicate parts and devices such as pump, pipes, etc.

**Technical Data of Oil-Fired products:( capacity-fuel-dimension,...) (600 - 1100 RT)**

Item			Type Of Machine					
			OLB-600E	OLB-700E	OLB-800E	OLB-900E	OLB-1000E	OLB-1100E
Capa.	Max. Cooling	USRT <sup>(*)</sup>	600	700	800	900	1,000	1,100
	Max. Heating	Kcal/h	1,662,000	1,939,000	2,216,000	2,493,000	2,770,000	3,047,000
Fuel Relations <sup>(*)</sup>	Fuel Consumption <sup>(*)</sup>	Max. Cooling	Kcal/h	1,531,200	1,786,400	2,041,600	2,296,800	2,552,000
		Kerosene (sulfur less than 0.2 weights)	l/h	184.1	214.8	245.4	276.1	306.8
		Special A-heavy Oil (sulfur less than 0.5 weights)	l/h	172.1	200.8	229.4	258.1	286.8
		Max. Heating	Kcal/h	1,749,600	2,041,200	2,332,800	2,624,400	2,916,000
		Kerosene (sulfur less than 0.2 weights)	l/h	210.3	245.4	280.4	315.5	350.5
		Special A-heavy Oil (sulfur less than 0.5 weights)	l/h	196.6	229.4	262.2	294.9	327.7
	Combustion Air <sup>(*)</sup>		m <sup>3</sup> /h	2,538	2,960	3,384	3,806	4,229
	Exhaust Gas <sup>(*)</sup>		m <sup>3</sup> /h	4,181	4,878	5,574	6,269	6,967
Electricity	Electric Source		3 Phase 380 v 50 Hz					
	Total Output of Motors <sup>(*)</sup> <sup>(*)</sup>		KW	12.8	14.1	16.1	18.1	22.0
	Ampere		A	22.8	25.2	28.75	28.75	39.3
	Electric Capacity for Control		KVA	0.6				
Piping Size	Inlet of Fuel <sup>(*)</sup>		A	25	25	25	25	25
	Connection for Exhaust Gas		mm	700X700	730X730	810X810	855X855	980X980
Dimensions	Length (L)		mm	6,150	6,700	7,330	7,970	7,310
	Width (W)		mm	3,155	3,155	3,320	3,320	3,800
	Height (H)		mm	3,330	3,330	3,330	3,330	3,680
Weight	Weight in Operation		ton	29.6	32.4	36.4	40.4	46.1
	Weight at Installation		ton	26.1	28.6	32.1	35.9	37.2

\*1. 1USRT means 3,024 kcal/h.

\*2. The capacity of cooling/heating and the data of chilled/hot water and cooling water, and gas fuel consumption are same as the gas-fired standard specification.

\*3. The lower calorific value of kerosene is 8,320 kcal/l at a specific gravity of 0.8 and that of the special heavy oil A is 8,900 kcal/l at a specific gravity of 0.89.

\*4. Shows the minimum required air flow at the atmospheric temperature of 25 °C, at the Maximum heating condition.

\*5. Shows the exhaust gas flow rate at 180 °C, at the maximum heating condition.

\*6. The total motor output shows the total KW of motors under normal operation, excluding the motor output of purge pump due to its intermittent operation.

\*7. The burner motor capacity includes the fan motor capacity.

\*8. The diameter of the gas fuel inlet is the same as the gas - firing standard specification.

**[Remarks]**

a) Keep the cooling inlet temperature controlled above 22 °C.

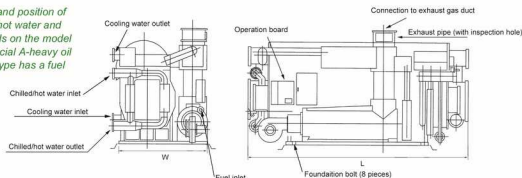
b) The operation load range is from 10 to 100%.

c) The maximum operating pressure for chilled/hot water and cooling water system is 8 kg/cm<sup>2</sup> G

d) The accuracy of performance as per JISB8622- 1986.

e) Keep the fuel oil supply pressure controlled at 0.1~0.5 kg/cm<sup>2</sup>G at the chiller/heater inlet. For gas fuel supply pressure, comply with the gas firing standard specification.

[Remarks] Direction and position of inlet/outlet of chilled/hot water and cooling water depends on the model this figure shows special A-heavy oil fired type. kerosene type has a fuel outlet.



## Power capacity

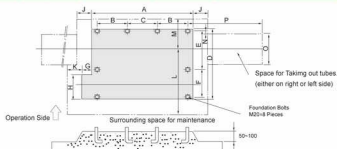
Type Of The Machine		OLB-600E	OLB-700E	OLB-800E	OLB-900E	OLB-1000E	OLB1100E
Power Supply		3 $\phi$ AC380V 50 Hz					
Power capacity	KW	12.8	14.1	16.1	16.1	22.0	22.0
	A	21.4	27.3	27.3	27.3	36.6	36.6
Diameter of wire	mm <sup>2</sup>	6				10	
Low Temp.Solution pump	KW	3.7	4.5			5.5	
High Temp.Solution pump	KW	2.6	3.0			3.7	
Refrigerant pump	KW	0.2	0.3				
Burner motor	KW	5.5	7.5	7.5	11.0	13.2	13.2
Purge Pump	KW	0.4					
Electric Capa. For Control	KVA	0.6					

## Dimension of foundation and surrounding space

Type Of Machine	Size [mm]															Maximum Weight per FoundationBolt (ton)
	A	B	C	D	E	F	G	H	J	K	L	N	M	P	Q	
OLB - 600 E	3,020	1,160	0	3,195	1,600	1,195	1,940	1,470	1,970	520	4,755	50	720	6,080	1,450	4.2
OLB - 700 E	4,185	1,160	1,165	3,195	1,600	1,195	1,645	1,470	1,705	465	4,755	50	720	6,280	1,450	4.0
OLB - 800 E	5,345	1,160	2,325	3,360	1,600	1,360	605	1,560	1,625	1,055	4,920	50	720	7,200	1,450	4.5
OLB - 900 E	5,345	1,160	2,325	3,360	1,600	1,360	215	1,560	1,945	1,765	4,920	50	720	8,100	1,450	5.0
OLB - 1000 E	4,185	1,160	1,165	3,860	1,900	1,560	1,350	1,600	1,890	725	5,500	100	720	6,790	1,705	5.7
OLB - 1100 E	4,185	1,160	1,165	3,860	1,900	1,560	1,550	1,600	2,130	665	5,500	100	720	7,510	1,705	6.2

### [Remarks]

1. This drawing shows dimensions of space necessary for foundation itself and for maintenance .
2. provide a space for taking out tubes , either on the left or right side.
3. also provide a drainage ditch around the machine.
4. finish the foundation work horizontally flat and smooth , at the horizontal grade of about 2/1000

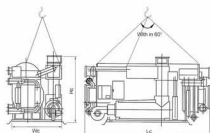


## Dimension for installation:

Type Of Machine	Max Dimension for Installation [mm]				Weight at installation time (ton)
	Lc	Wc	Hc		
			With Exhaust Pipe	Exhaust pipe is removed	
OLB - 600E	6,350	3,255	3,580	3,430	25.8
OLB - 700E	6,900	3,255	3,580	3,430	28.2
OLB - 800E	7,530	3,420	3,580	3,430	31.7
OLB - 900E	8,170	3,420	3,580	3,430	35.4
OLB - 1000E(**)	7,050	4,000	3,930	3,780	34.1
OLB - 1100E (**)	7,430	4,000	3,930	3,780	36.6

### [Remarks]

1. Absorbent and refrigerant are shipped separately in the machine which has mark " \* \* "
2. Refer to the dimension in the table above and be sure to provide the space needed for installation. When rollers are used under the machine , provide an additional space to Accommodate the whole machine and the rollers .
3. Since this machine has a high vacuum chamber, repair works maybe impracticable in Case of damage. Pay careful attention to the bottom part of the machine since it has delicate parts and devices such as headers, piping, pumps, etc.
4. Machine is supplied as one standard specification package for installation. For partial split packages, discuss with our engineers, or sales staff.

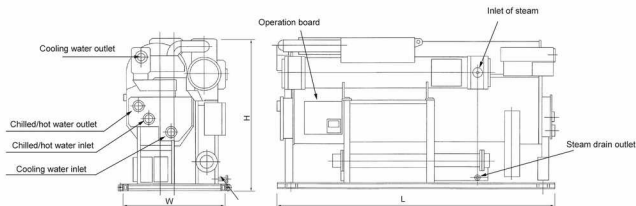




**Technical Data of Steam-Fired products:( capacity-fuel-dimension,...) (100 - 240 RT)**

Item			Type Of Machine						
			SLB-100 U	SLB-120 U	SLB-150 U	SLB-180 U	SLB-200 U	SLB-240 U	
Cooling Capacity			Kw	352	422	527	633	703	844
Chilled Water	Temperature	°C	Inlet 12°C			Outlet 7°C			
	Flow Rate	m³/h	60	72	90	108	120	145	
	Pressure Loss	KPa	49.0	49.0	53.0	58.8	41.2	42.2	
	Retained water volume	m³	0.11	0.13	0.15	0.18	0.20	0.23	
Cooling Water	Temperature	°C	Inlet 32°C			Outlet 37.3°C			
	Flow Rate	m³/h	104	125	156	188	208	250	
	Pressure Loss	KPa	56.9	86.3	64.7	98.1	70.6	106.9	
	Retained water volume	m³	0.27	0.31	0.36	0.42	0.45	0.53	
Steam Rate (*1)			Kg/h	430	516	645	774	860	1,032
Electricity	Electric Source		3 Phase 380V 50Hz						
	Motor Total Output	KW	2.4	2.4	2.4	3.45	3.45	3.45	
	Power Supply Current	A	4.3	4.3	4.3	6.1	6.1	6.1	
	Power Supply Capacity for Control	KVA	0.6						
Caliber	Outlet/Inlet of Chilled/Hot Water	A	100	100	125	125	150	150	
	Outlet/Inlet of Cooling Water	A	125	125	150	150	200	200	
	Inlet Of steam	A	50	50	50	65	65	65	
	Drain Outlet	A	25	25	25	32	32	32	
External Size	Length (L)	mm	3,012	3,212	3,644	4,152	4,514	5,324	
	Width (W)	mm	1,485	1,485	1,485	1,485	1,485	1,485	
	Height (H)	mm	2,155	2,155	2,155	2,215	2,215	2,215	
Weight	Weight in Operation	ton	5.4	6.0	6.9	8.2	8.8	10.0	
	Weight in Installation	ton	5	5.5	6.3	7.6	8.1	9.2	

- \*1: Inlet pressure of steam is 785kPa (Gauge), and drain temperature is 90°C Saturation, consumption rate is 1.28kg/kW · h.  
 2: Standard steam control valve is electricity control type. steam inlet pressure shown above table list is at the secondary side of the steam control of the chiller, there fore, please consider pressure drop(29KPa) between inlet and outlet of steam control valve.  
 3: Ensure that the inlet temperature of cooling water is above 22 °C .  
 4: Operation load range is from 10 to 100%.  
 5: Maximum pressure for chilled/hot water and cooling water piping is 785 kPa (Gauge) .  
 6: Tolerance of performance is according to JISB8622 -1994.  
 7: The back pressure at drain outlet shall not be more than 49KPa and the stop valve shall not be installed in the piping line.



[Remark] Direction and position of inlet / outlet of chilled water and cooling water depends on the model.

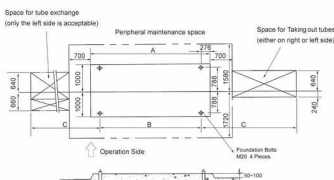


## Power capacity

Type Of The Machine		SLB-100U	SLB-120U	SLB-150U	SLB-180U	SLB-200U	SLB-240U
Power Supply		3 $\phi$ AC380V 50 Hz					
Power capacity	KW	2.4	2.4	2.4	3.45	3.45	3.45
	A	4.3	4.3	4.3	6.1	6.1	6.1
Diameter of wire	mm <sup>2</sup>	2.5					
Low Temp.Solution pump	KW	1.5			2.2		
High Temp.Solution pump	KW	0.75			1.1		
Refrigerant pump	KW	0.15					
Electric Capa. For Control	KVA	0.6					

## Dimension of foundation and surrounding space

Type Of Machine	Size [mm]			Maximum Mass per Anchor Bolt (ton)
	A	B	C	
SLB - 100U	3,160	2,077	2,130	1.4
SLB - 120U	3,360	2,477	2,530	1.6
SLB - 150U	3,710	3,042	3,095	1.8
SLB - 180U	4,220	3,642	3,625	2.1
SLB - 200U	4,580	4,004	4,055	2.3
SLB - 240U	5,390	4,804	4,855	2.6

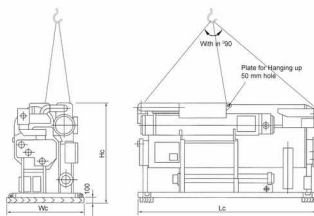


### [Remarks]

1. This drawing shows dimensions of space necessary for foundation itself and for maintenance.
2. provide a space for taking out tubes , either on the left or right side.
3. also provide a drainage ditch around the machine.
4. finish the foundation work horizontally flat and smooth , at the horizontal grade of about 2/1000

## Dimension of installation:

Type Of Machine	Installation Max Size [mm]			installation Mass (ton)
	Lc	Wc	Hc	
SLB - 100U	3,160	1,690	2,290	4.9
SLB - 120U	3,360	1,690	2,290	5.4
SLB - 150U	3,710	1,690	2,290	6.2
SLB - 180U	4,220	1,690	2,350	7.4
SLB - 200U	4,580	1,690	2,350	7.9
SLB - 240U	5,390	1,690	2,350	9.0



### [Remarks]

1. Machines are shipped with the solution and refrigerant sealed in vacuum .
2. Make sure that the space for installation is provided at the above maximum dimensions, when rollers are used under the machine for installation , provide an additional space to accommodate the whole machine plus the rollers.
3. Since these machines have a high vacuum chamber containing solution and refrigerant, repair works may be impracticable in case of damage. Pay careful attention to the bottom part of the machine since it has delicate parts and devices such as pump, pipes, etc.

**Technical Data of Steam-Fired products:( capacity-fuel-dimension,...) (300 - 550 RT)**

Item			Type Of Machine					
			SLB-300 U	SLB-350 U	SLB-400 U	SLB-450 U	SLB-500 U	SLB-550 U
Cooling Capacity		Kw	1,055	1,231	1,407	1,582	1,759	1,935
Chilled Water	Temperature	°C	Inlet 12°C			Outlet 7°C		
	Flow Rate	m³/h	181	211	242	272	302	332
	Pressure Loss	KPa	58.8	86.3	44.1	59.8	79.4	101.0
	Retained Water Volume	m³	0.31	0.34	0.38	0.41	0.46	0.49
Cooling Water	Temperature	°C	Inlet 32°C			Outlet 37.3°C		
	Flow Rate	m³/h	312	364	416	468	520	572
	Pressure Loss	KPa	80.4	44.1	59.8	79.4	103	128.5
	Retained Water Volume	m³	1.11	1.23	1.35	1.47	1.62	1.74
Steam Rate (*1)		Kg/h	1,290	1,505	1,720	1,935	2,150	2,365
Electricity	Electric Source		3 Phase 380V 50Hz					
	Motor Total Output	KW	4.2	4.2	4.2	4.6	4.6	4.6
	Power Supply Current	A	7.5	7.5	7.5	8.2	8.2	8.2
	Power Supply Capacity for Control	KVA	0.6					
Caliber	Outlet/Inlet of Chilled/Hot Water	A	200	200	200	200	200	200
	Outlet/Inlet of Cooling Water	A	250	250	250	250	250	250
	Inlet Of steam	A	65	65	80	80	100	100
	Drain Outlet	A	40	50	50	50	50	50
External Size	Length (L)	mm	4,235	4,790	5,390	5,950	6,630	7,190
	Width (W)	mm	1,900	1,985	1,900	2,110	2,110	2,110
	Height (H)	mm	2,740	2,740	2,740	2,740	2,740	2,740
Weight	Weight in Operation	ton	14.6	15.1	17.8	19.4	21.3	23.0
	Weight in Installation	ton	13.1	13.5	16.0	17.5	19.2	20.2

\*1: Inlet pressure of steam is 785kPa (Gauge), and drain temperature is 90°C Saturation, consumption rate is 1.28kg/kW · h.

2: Standard steam control valve is electricity control type. steam inlet pressure shown above table list is at the secondary side of the steam control of the chiller,there fore, please consider pressure drop(29KPa)between inlet and outlet of steam control valve.

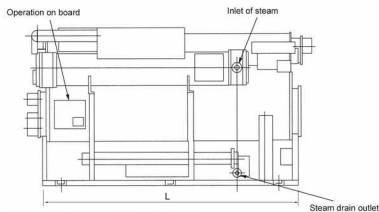
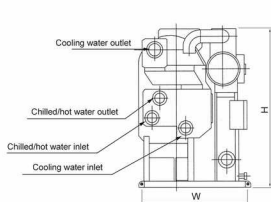
3: Ensure that the inlet temperature of cooling water is above 22 °C.

4: Operation load range is from 10 to 100%.

5: Maximum pressure for chilled/hot water and cooling water piping is 785 kPa (Gauge).

6: Tolerance of performance is according to JISB8622 ~1994.

7: The back pressure at drain outlet shall not be more than 49KPa and the stop valve shall not be installed in the piping line.



[Remark] Direction and position of inlet / outlet of chilled water and cooling water depends on the model.

## Power capacity

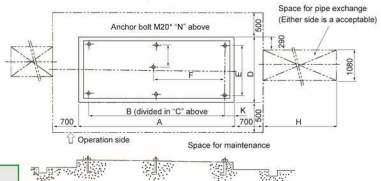
Type Of The Machine		SLB-300U	SLB-350U	SLB-400U	SLB-450U	SLB-500U	SLB-550U
Power Supply		3 $\phi$ AC380V 50 Hz					
Power capacity	KW	4.2	4.2	4.2	4.6	4.6	4.6
	A	7.5	7.5	7.5	8.2	8.2	8.2
Diameter of wire	mm <sup>2</sup>	2.5					
Low Temp. Solution pump	KW	1.8	1.8	1.8	2.2	2.2	2.2
High Temp. Solution pump	KW	2.2	2.2	2.2	2.2	2.2	2.2
Refrigerant pump	KW	0.2					
Purge pump	KVA	0.4					
Electric Capa. For Control		0.6					

## Dimension of foundation and surrounding space

Type Of Machine	Size [mm]										Maximum Mass per Anchor Bolt (ton)
SLB - 300U	4,585	3,155	2	2,380	1,840	1,526	657	2,620	690	6	2.3
SLB - 350U	5,100	3,720	2	2,380	1,840	1,706	657	3,185	690	6	2.5
SLB - 400U	5,700	4,320	2	2,380	1,840	1,901	657	3,785	690	6	2.8
SLB - 450U	5,880	4,880	3	2,520	1,980	2,191	707	4,535	500	6	2.3
SLB - 500U	6,560	5,560	3	2,520	1,980	2,406	707	5,215	500	6	2.5
SLB - 550U	7,120	6,120	3	2,520	1,980	2,611	707	5,775	500	6	2.8

### [Remarks]

1. This drawing shows dimensions of space necessary for foundation itself and for maintenance.
2. provide a space for taking out tubes , either on the left or right side.
3. also provide a drainage ditch around the machine.
4. finish the foundation work horizontally flat and smooth , at the horizontal grade of about 2/1000

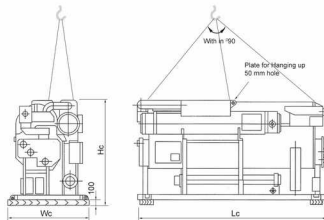


## Dimension of installation:

Type Of Machine	Installation Max Size [mm]			installation Mass (ton)
	Lc	Wc	Hc	
SLB - 300U	4,235	1,900	2,740	13.1
SLB - 350U	4,790	1,985	2,740	13.5
SLB - 400U	5,390	1,900	2,740	16.0
SLB - 450U	5,950	2,110	2,740	17.5
SLB - 500U	6,630	2,110	2,740	19.2
SLB - 550U	7,190	2,110	2,740	20.2

### [Remarks]

1. Machines are shipped with the solution and refrigerant sealed in vacuum .
2. Make sure that the space for installation is provided at the above maximum dimensions, when rollers are used under the machine for installation , provide an additional space to accommodate the whole machine plus the rollers.
3. Since these machines have a high vacuum chamber containing solution and refrigerant, repair works may be impracticable in case of damage. Pay careful attention to the bottom part of the machine since it has delicate parts and devices such as pump, pipes, etc.

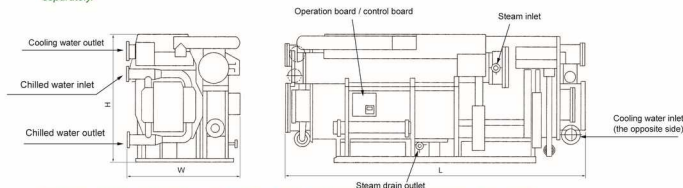


## Technical Data of Steam-Fired products:( capacity-fuel-dimension,...)(600 - 1400 RT)

Item		Type Of Machine								
		SLB-600 U	SLB-700 U	SLB-800 U	SLB-900 U	SLB-1000U	SLB-1100U	SLB-1200U	SLB-1300U	SLB-1400U
Cooling Capacity	Kw	2,110	2,462	2,814	3,165	3,517	3,869	4,220	4,572	4,924
Chilled Water	Temperature	Inlet 13°C      Outlet 7°C								
	Flow Rate	m <sup>3</sup> /h	302.4	352.8	403.2	453.6	504.0	554.4	604.8	655.2
	Pressure Loss	KPa	68.6	98.1	49.0	64.7	39.2	49.0	60.8	73.5
	Retained Water Volume	m <sup>3</sup>	1.1	1.2	1.4	1.5	1.7	1.8	1.9	2.0
Cooling Water	Temperature	Inlet 32°C      Outlet 37°C								
	Flow Rate	m <sup>3</sup> /h	600	700	800	900	1,000	1,100	1,200	1,300
	Pressure Loss	KPa	82.4	115.7	92.2	119.6	59.8	74.5	91.2	108.9
	Retained Water Volume	m <sup>3</sup>	2.3	2.6	2.9	3.1	4.2	4.3	4.3	4.3
	Steam Rate(†1)	Kg/h	2,580	3,010	3,440	3,870	4,300	4,730	5,160	5,590
Electricity	Electric Source	3 Phase   380V   50Hz								
	Motor Total Output	KW	6.5	7.8	7.8	7.8	9.5	9.5	9.5	9.5
	Power Supply Current	A	11.6	13.9	13.9	13.9	16.9	16.9	16.9	16.9
Caliber	Power Supply Capacity for Control	KVA	0.6							
	Outlet/Inlet of Chilled/Hot Water	A	200	200	250	250	300	300	300	300
	Outlet/Inlet of Cooling Water	A	300	300	300	300	400	400	400	400
	Inlet of steam	A	100	100	100	100	125	125	125	150
External Size	Drain outlet	A	65	65	65	65	80	80	80	80
	Length (L)	mm	5,670	6,190	7,180	7,820	6,740	7,180	7,595	8,045
	Width (W)	mm	3,450	3,450	3,450	3,450	3,550	3,550	3,550	3,550
	Height (H)	mm	3,330	3,330	3,330	3,330	3,680	3,680	3,680	3,680
Weight	Weight in Operation	ton	31.3	35.2	39.5	42.6	50.3	54.1	51.3	61.0
	Weight in Installation	ton	27.9	31.4	35.2	38.0	43.6	47.1	57.7	54.4

### REMARK:

- 1: Inlet pressure of steam is 785kpa(Gauge). Saturation, consumption rate is 1.28kg/kw.h.
- 2: Steam control valve should be electricity control type for 600-900 and air control type for 1000-1400. For air control type, supply clean dry air of 294.2~686.5kpa (gauge) ~50 NL/min.
- 3: ensure that the inlet temperature of cooling water is above 22 °C .
- 4: operation load range is from 10 to 100 %.
- 5: maximum pressure for chilled/hot water and cooling water piping is 785 kPa (Gauge).
- 6: Motor total output should be total of regular operating motors excluding purge pump motor of intermittent operation.
- 7: tolerance of performance is according to JISB8622-1994.
- 8: positions of outlet of chilled water and inlet of cooling water are different from the right figure. Depending type of machine.
- 9: shipping weight of SLB-1000U, SLB- 1200U, SLB-1300U & SLB-1400U is that in the case lib and Refrigerant shall be delivered separately.

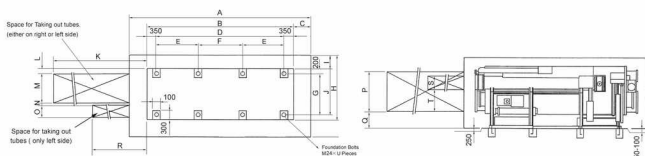


[Remark] Direction and position of inlet / outlet of chilled water and cooling water depends on the model.

## Power capacity

Type Of The Machine		SLB-600U	SLB-700U	SLB-800U	SLB-900U	SLB-1000U	SLB-1100U	SLB-1200U	SLB-1300U	SLB-1400U	
Power Supply		3ø AC380V 50 Hz									
Power capacity	KW	6.5	7.8	7.8	7.8	9.5	9.5	9.5	9.5	9.5	
	A	11.6	13.9	13.9	13.9	16.9	16.9	16.9	16.9	16.9	
Diameter of wire	mm <sup>2</sup>	4.0	6.0	6.0	6.0	10.0	10.0	10.0	10.0	10.0	
Low Temp.Solution pump	KW	3.7	4.5	4.5	4.5	5.5	5.5	5.5	5.5	5.5	
High Temp.Solution pump	KW	2.6	3.0	3.0	3.0	3.7	3.7	3.7	3.7	3.7	
Refrigerant pump	KW	0.2	0.3								
Purge pump	KW						0.4				
Electric Capa. For Control	KVA						0.6				

## Dimensions Of foundation and surrounding Space (SLB - 600~1400 )



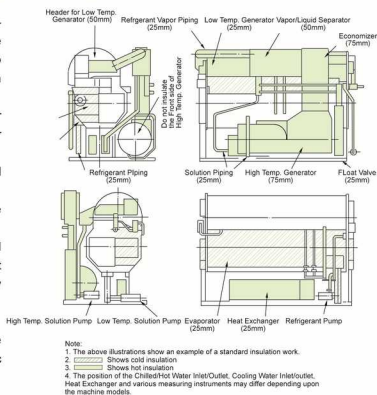
Size	Type of Machine								
	SLB 600 U	SLB 700 U	SLB 800 U	SLB900 U	SLB1000 U	SLB1100 U	SLB1200 U	SLB1300 U	SLB1400 U
A	7,070	7,590	8,580	9,220	8,140	8,580	8,995	9,445	9,882
B	3,020	4,180	5,345	5,345	3,930	4,180	5,220	5,220	6,200
C	1,940	1,620	1,540	1,860	1,970	2,090	1,840	2,035	1,725
D	2,320	3,480	4,645	4,645	3,230	3,480	4,520	4,520	5,500
E	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160	2,225
F	0	1,160	2,325	2,325	1,160	1,160	2,200	2,200	1,160
G	2,480	2,780	2,615	2,480	2,800	2,800	3,040	3,040	3,040
H	5,150	5,150	5,150	5,150	5,250	5,250	5,250	5,250	5,250
I	720	720	720	720	950	950	950	950	950
J	2,880	3,180	3,015	2,880	3,200	3,200	3,440	3,440	3,440
K	5,730	5,930	6,850	7,810	6,440	6,070	6,645	7,040	7,935
L	230	230	230	230	230	230	230	230	230
M	1,540	1,540	1,540	1,540	1,705	1,705	1,705	1,705	1,705
N	140	140	140	140	180	180	180	180	180
O	780	780	780	780	875	875	875	875	875
P	2,170	2,170	2,170	2,170	2,435	2,435	2,435	2,435	2,435
Q	910	910	910	910	985	985	985	985	985
R	4,445	4,720	5,165	6,055	5,240	4,670	5,200	5,645	6,810
S	480	480	480	480	590	590	590	590	590
T	2,135	2,135	2,135	2,135	2,350	2,350	2,350	2,350	2,350
U	6	8	8	8	8	8	8	8	8
Wt. per foundation bolt/kg	5.3	4.4	5.0	5.4	6.3	6.8	7.3	7.7	8.2

## Insulation and Painting Particulars:(GLB & OLB)

### Precautions for Insulation Works

Insulation works are not included in our installation works of Customs Type machines. Provide your machine with proper insulation works to prevent dew and burn, and to keep it at a high operating efficiency.

1. Our chiller-heater machines are shipped after undercoating with heat-resistant paint at our factory.
2. Provide the insulation works after successful completion of vacuum test after installation.
3. Make sure that the cover plates of the machine and flange parts are easily detachable.
4. Make the insulation material on the top and outside of the heat exchanger removable. Do not connect it with other insulation parts with screw drivers, etc.
5. Use nonflammable insulation materials!
6. Do not weld the metal insulation fittings. Use adhesives or bonds. (Otherwise, the electronic parts inside the board may be destroyed.)



## Surface Areas for Insulation and Painting

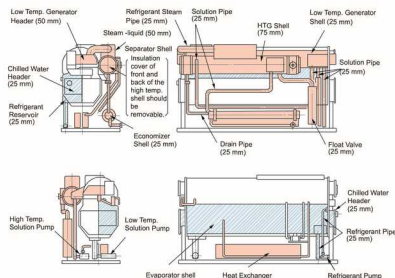
Classification	Surface Area for Hot insulation[m <sup>2</sup> ]			Surface Area for Cold insulation[m <sup>2</sup> ]		Paint Area [m <sup>2</sup> ]
	High Temp Generator Exhaust Gas Economizer	Vapor/Liquid Separator Header for low Temp Generator	Low Temp. Generator Heat Exchanger Solution Piping Refrigerant vapor Piping Float Valve	Evaporator Shell Chilled/hot Water Header Refrigerant Collector	Refrigerant Piping	
Material	Glasswool 75 mm (with Aluminium Leaf)	Glasswool 50 mm (with Aluminium leaf)	Glasswool 25 mm (with Aluminium leaf)	Hard polyurethane foam 25mm	Glasswool 25 mm	
Size of GLB						
100 E	5.0	2.1	6.8	3.6	1.3	44
120 E	5.5	2.1	7.4	4.1	1.2	48
150 E	6.3	2.1	8.3	4.8	1.1	54
180 E	7.1	2.7	11.3	5.5	1.1	60
200 E	7.7	2.7	12.3	5.9	1.2	64
240 E	8.3	2.7	14.2	6.8	1.3	70
300 E	9.5	4.0	13.6	8.9	1.4	78.4
350 E	10.4	4.0	16.0	10.0	1.5	86.1
400 E	11.5	4.0	17.1	11.2	1.6	93.5
450 E	12.5	4.5	20.1	12.2	1.7	107.5
500 E	13.6	4.5	22.2	13.5	1.8	116.5
550 E	14.8	4.5	23.1	14.6	1.9	123.2
600 E	13	7.5	40	22	5	117
700 E	18	9.5	46	27	5	140
800 E	22	11	50	30	5	150
900 E	24	12	55	33	6	160
1000 E	26	14	56	33	6	175
1100 E	28	16	57	34	6	196

## Hot / Cold Insulation and Paint Specification (only for Steam Custom Series)

**Precautions for hot/cold insulation construction**

Hot/cold insulation construction for custom type is out of our service but be sure to do it to increase the efficiency of the chiller and to prevent wet and danger.

1. Chiller is shipped after prime coat by heat - resistant paint.
2. Execute hot/cold insulation construction after installation and verification of vacuum leak.
3. Exterior, flange parts should be released easily.
4. When insulating hot the upper surface and the exterior of the heat exchanger, hot insulator should be removable. Do not connect it to the insulated part with screws.
5. Hot/cold insulators should be nonflammable.
6. When attaching the port of hot/cold insulation, use adhesive and do not weld.



Note:

1. This figure is an example of standard construction.
2. [Pattern] This part shows cold insulation.
3. [Pattern] This part shows hot insulation.
4. Positions of inlets/outlets of chilled water and cooling water piping, and economizer may differ according to the type of the machine.

**Surface Areas for Insulation and Painting**

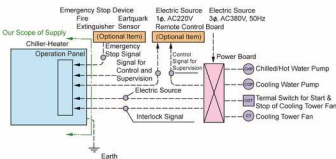
Classification	Surface Area for Hot insulation[m <sup>2</sup> ]			Cold insulation area[m <sup>2</sup> ]		Paint Area [m <sup>2</sup> ]
	HTG	Steam-liquid Separator Shell	Low Temp. Generator Header	Evaporator Shell Chilled/hot Water Header Refrigerant Reservoir	Refrigerant Pipe Refrigerant Pump	
Material	Glasswool 75 mm	Glasswool 50 mm	Glasswool 25 mm	Hard polyurethane foam 25mm	Glasswool 25 mm	
Size of SLB						
100 U	3.0	1.6	10.6	4.0	0.3	50
120 U	3.4	1.6	11.2	4.5	0.3	54
150 U	3.8	2.0	12.2	5.0	0.3	60
180 U	4.4	2.0	14.6	5.5	0.3	69
200 U	4.6	2.7	15.2	6.0	0.3	73
240 U	5.4	2.7	16.6	7.0	0.3	82
300 U	5.9	3.5	17.5	8.9	1.4	88
350 U	6.8	3.5	19.9	10.0	1.5	96
400 U	7.4	4.8	21.0	11.2	1.6	105
450 U	8.5	4.8	24.0	12.2	1.7	121
500 U	9.0	6.1	26.1	13.5	1.8	131
550 U	9.7	6.1	27.0	14.6	1.9	137
600 U	9	10.5	43	24	5	131
700 U	10	11.5	48	26	5	150
800 U	11	12.5	51	28.5	5	161
900 U	12	13.5	55	31.5	6	172
1000 U	12	13.5	55	32	5	170
1100 U	13	15	60	34	5.5	180
1200 U	14	16	60	36	6	190
1300 U	15	17.5	65	38	6.5	205
1400 U	16.5	19	70	41	7	220



## Electric Wiring Connection

These chiller/heaters are shipped out of our factory after passing our inspection according to our standards, with the electric wiring completed from the control panel to the machine.

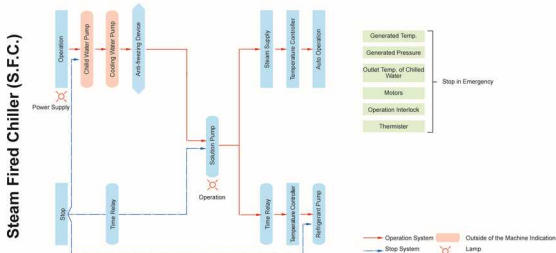
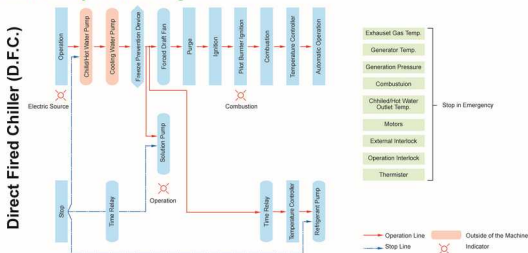
For proper power supply and unit operation after installation on site, follow the wiring diagram illustrated. Observe the connections of the interlock between the unit and supplemental facilities plus the remote control panel board which is an optional item.



## Combustion Safety Device

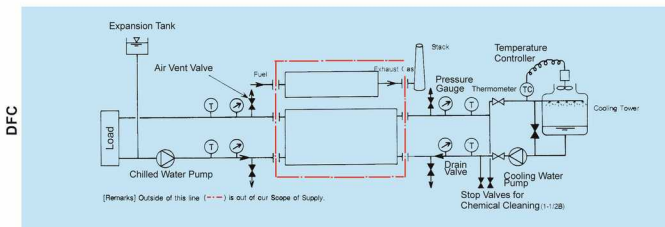
- a) The flame detector and combustion control device detect the ignition and combustion failure.
- b) The gas pressure switch immediately stops the combustion when the supply gas pressure is below normal.
- c) The air pressure switch stops the combustion when the air pressure of the forced draft fan is extremely below normal.
- d) Carry out enough purge operation of the furnace and exhaust gas duct is carried out at start-up and shut-down of the machine.
- e) For the combustion and control system, only those component and equipment approved by DIN, FIA, FM, UL or equivalent regulatory guideline are used.

### Operation Safety Device Diagram



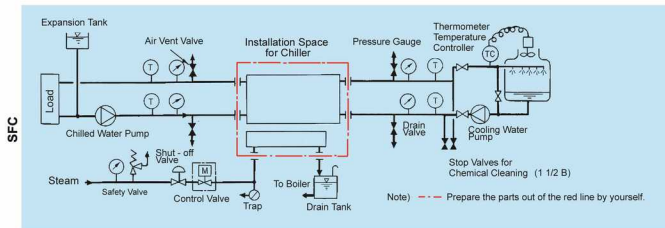


## Standard Piping Procedure



### Piping Procedure

1. For the pipe size and pressure loss, refer to the machine specification.
2. Since chilled/hot water is taken out of the same system line in cooling as well as heating operation, valve switch over operation is totally unnecessary.
3. Provide a chilled/hot water pump and a cooling water pump exclusively for each machine.
4. Install a pressure gauge and a thermometer at the chilled/hot water and cooling water inlets and outlets.
5. Plan the chilled/hot water and cooling water flow rate exactly according to the specification. When the chilled/hot water flow rate becomes lower than 70% chiller/heater stops automatically.
6. Keep the cooling water inlet temperature controlled above 22 °C.
7. Make sure that no water pressure of more than 8kg/cm<sup>2</sup> G is applied to the machine, in consideration of the machine's maximum operating pressure, pump head and static potential of water pressure.
8. Since the holding water inside the cooling system is heated up to about 80 °C in heating operation, provide heat-resistant measures if prefabricated lining pipes are used.
9. If cooling is required even in winter or in mid-season, please consult us in advance.



### Piping Procedure

1. Refer to the specification for piping diameter, pressure loss, etc.
2. Prepare a chilled/hot water pump and a cooling water pump for each machine.
3. Prepare a pressure gauge and a thermometer at the inlet/outlet of chilled/hot water and cooling water.
4. Flow rate of chilled/hot and cooling water should be fixed. When the flow rate of chilled water becomes lower than 70% of the specification value (See the specification value table), the machine stops automatically.
5. Ensure the inlet temperature of cooling water not to be below 22 °C.
6. Make sure that no water pressure of more than 785kPa (Gauge) is applied to the machine, in consideration of the machine's maximum operating pressure, stroke of the pump and static potential of water pressure.
7. Prepare steam shut-off valve to start/stop operation by remote control and load. Contact us for the details.

## Installation Recommendations of Exhaust Gas Duct & Stack for D.F.C. type

### 1. Exhaust Gas Temperature

Exhaust gas temperature at 100% load is about 180 °C. Design the exhaust gas duct and stack to be heat-resistant against 350 °C.

### 2. Necessary Combustion Air Quantity and Exhaust Gas Volume

Refer to the figures in our Specification.

### 3. Exhaust Gas Temperature and Pressure in Exhaust Gas Duct and Stack

When Planning make sure that the exhaust gas pressure at chiller/heater outlet is 0 ~ -5mmAq. Exhaust gas velocity of 5~6M/s is suitable.

### 4. Ventilation of Machine Room

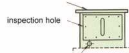
Provide ample fresh air from outside into the machine room, and keep the indoor pressure always positive while in operation. If the machine room pressure turns to negative, it may cause easy leakage of exhaust gas through the duct and normal machine operation may be interrupted.

#### [remarks]

1. For exhaust gas temperature of 100C and drafting power of about 0.4 mmAq per 1 m height.
2. Refer to HASS 111-1982 for detailed design of exhaust gas duct and stack.

### Exhaust Pipe in connection with Exhaust Gas Duct

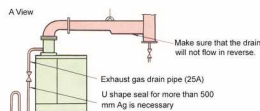
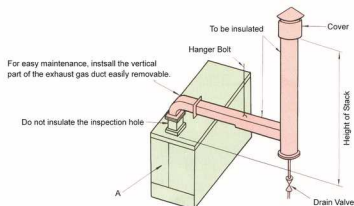
connection part of exhaust gas duct



Discharge hole for drain from exhaust gas

Refer to the example specification regarding size of exhaust gas duct connection.

### Example for Installation of Exhaust Gas Duct



This part is our scope of supply

### Exhaust Gas Duct Size & Stack Height ( For 40~75 RT)

Type of machine	GWM-40A	GWM-50A	GWM-60A	GWM-75A
Size of exhaust gas duct (mm)	320	130	320	130
Required height of stack	Required height of stack is 0.6 m per 1 m of horizontal exhaust gas duct			
Between exhaust gas outlet of chiller / heater and top of stack	Required height of stack is 1.2 m per a piece of 90° bending part			

(Combustion exhaust temp: 180 °C, draft power per 1 m height 3.9 pa)

### Exhaust Gas Duct Size & Stack Height ( For 100~240 RT)

Type(OLB)	Standard Spec.	100	120	150	180	200	240
	Special Spec. For Heating	80	100	120	150	180	200
Size of Exhaust Gas Duct (mm)		144 x 410	180 x 410	214 x 410	250 x 410	270 x 410	310 x 410
Required Height of stack		Required height of stack is 0.6 m per 1 m of horizontal exhaust gas duct					
Between exhaust gas Outlet of Chiller-Heater and Top of Stack		Required height of stack is 1.2 m per a piece of 90° bending part.					

### Exhaust gas duct size and stack height ( for 600 ~ 1100 RT)

Type(OLB)	Standard Spec.	600	700	800	900	1000	1100
	Special Spec. For Heating	850	800	700	800	900	1000
Size of Exhaust Gas Duct (mm)		700 x 700	730 x 730	810 x 810	855 x 855	885 x 885	980 x 980
Required Height of stack		Required height of stack is 0.6 m per 1 m of horizontal exhaust gas duct.					
From exhaust gas Outlet of Chiller-Heater to Top of Stack		Required height of stack is 1.2 m per a piece of 90° bending part.					

## Water Quality Control for Cooling Water

### Quality Control of Cooling Water

Deterioration of the cooling water results in corrosion or deposit of scale, and this will slow down the machine performance or may cause corrosion accidents. So always keep the water quality properly controlled.

- If water contains  $\text{CaCO}_3$  or  $\text{SiO}_2$ , scale may be generated by water concentration.
- Cooling water which absorbed oxygen or sulfur dioxide from the cooling tower may cause corrosion.
- Atmospheric dusts entering the cooling system through the cooling tower may generate scale.
- When using unprocessed raw water from a well, scale may be generated within a short time.

To prevent these corrosion accidents and generation of scale, and to operate the machine at its maximum efficiency for a longer product life, comply with the water quality standards as shown in the table.

### Quality Standard for Cooling Water (Circulating Water)

Item	Standard	Tendency	
		Corrosion	Scale Generator
PH [25°C]	6.5 ~ 8.0	○	○
Conductivity [25°C] ( $\mu\text{S/cm}$ )	≤ 800	○	○
Chloride Ion $\text{Cl}^-$ (mg $\text{Cl/l}$ )	≤ 200	○	
Sulfuric acid Ion $\text{SO}_4^{2-}$ (mg $\text{SO}_4^{2-}/\text{l}$ )	≤ 200	○	
Acid Consumption [PH4.8] (mg $\text{CaCO}_3/\text{l}$ ) [M Alkali Grade]	≤ 100		○
Total Hardness (mg $\text{CaCO}_3/\text{l}$ )	≤ 200		
Iron Fe (mg $\text{Fe/l}$ )	≤ 1.0	○	○
Sulfide Ion $\text{S}^{2-}$ (mg $\text{S}^{2-}/\text{l}$ )	Not detected	○	
Ammonium Ion $\text{NH}_4^+$ (mg $\text{NH}_4^+/\text{l}$ )	≤ 1.0	○	
Ionization Silica $\text{SiO}_2$ (mg $\text{SiO}_2/\text{l}$ )	≤ 50		○

(in accordance with Japan Air Conditioning Industrial Standard J.R.A.9001-1980)

### Water Quality Control method

- Conduct a water quality analysis at the time of the installation planning. If the quality is outside of the approved range, either change the water source or install a water treatment equipment.
- Install the cooling tower away from stacks and other water-deteriorating vicinity.
- Conduct a water quality analysis every operating week. If the water is deteriorated, exchange the water, increase the blow quantity, or use inhibitor.
- Before putting the machine to rest for a lengthy period, conduct an intra-tube cleaning and completely take the water out to prevent freezing.

### Water Quality Standard for Making up Water ( For Reference )

Item	Standard
PH [25°C]	6.0-8.0
Conductivity [25°C] ( $\mu\text{S/cm}$ )	≤ 200
Chloride Ion $\text{Cl}^-$ (mg $\text{Cl/l}$ )	≤ 50
Sulfuric acid Ion $\text{SO}_4^{2-}$ (mg $\text{SO}_4^{2-}/\text{l}$ )	≤ 50
Acid Consumption [PH4.8] (mg $\text{CaCO}_3/\text{l}$ ) [M Alkali Grade]	≤ 20
Total Hardness (mg $\text{CaCO}_3/\text{l}$ )	≤ 50
Iron Fe (mg $\text{Fe/l}$ )	≤ 0.3
Sulfide Ion $\text{S}^{2-}$ (mg $\text{S}^{2-}/\text{l}$ )	Not detected
Ammonium Ion $\text{NH}_4^+$ (mg $\text{NH}_4^+/\text{l}$ )	≤ 0.2
Ionization Silica $\text{SiO}_2$ (mg $\text{SiO}_2/\text{l}$ )	≤ 30

(in accordance with Japan Air Conditioning Industrial Standard J.R.A.9001-1980)

### Safety Precautions

Please pay attention to these very important safety precautions before installation of machine begins:

The Machines should not be installed in a place that flammable materials, such as Gas, Gasoline, Thinners and other material are or will be presented.

The Machines should not be installed in a place that corrosive materials and Gases could be generated.

All works on engine room, such as Installation, Constructions, Plumbing and Piping, Electrical Works, Insulation works and interlocking, Should be done by professional contractors. Faulty or improper work in any of mentioned area could affect the performance of machine. Faulty or improper work can also cause damages, such as fire electrical shock, water leakage and fuel leakage. Any of damages can be dangerous to the operators.

For engine room, Chimneys, Flues and Exhausted gas ducts and Air ducts are necessary and should be constructed according to safety standards. Faulty workmanship on these can cause fire and Oxygen deficiency and burn to the operators.

Water proof floor and trenches are needed for engine room. Faulty water proofing can cause damages to machine and lower floors.

Prepare ample space around machine in engine room to prevent injuries to personnel and also for easy maintenances.

Please pay attention to these very important safety precautions before operation of machine begins for first time:

The Machine should be put to operation after reading manuals very carefully and after consulting MEHRASL technical staff for instructions.

Experienced personnel are needed for maintenance of machines. Please contact MEHRASL for more information.