Carrier
SANYO

Single-Effect Hot Water-Fired Absorption Chillers

GB/T-19001-2000 to ISO9001/2000

SUPER ABSORPTION

16LJ 11-53

Nominal cooling capacity 264-1846 kW

The Carrier Corporation has more than 100 years experience in providing HVAC systems and equipment around the world. Sanyo is a leading manufacturer in the field of high-efficiency absorption chillers. Carrier-Sanyo absorption chillers, produced by Sanyo for Carrier, provide a unique choice of models for all absorption chiller applications.

Features

- The Carrier-Sanyo 16LJ single-effect absorption chillers are designed to provide chilled water from waste heat sources generated from industrial processes and cogeneration systems.
- Carrier-Sanyo absorption chillers allow diversification of critical cooling requirements. Critical cooling loads are met **with minimal electrical power input**.
- They allow smaller emergency generators compared to an electrical driven chiller.
- The units are ozone-safe and CFC-free. Cooling requirements are met without chlorine-based refrigerants.
- They reduce the contribution to global warming and minimize the global impact by greatly reducing electricity consumption and production of greenhouse gases.
- The solution inhibitor has no impact on the environment.
- An absorption chiller does not utilize a large motor-compressor, and this leads to quiet, vibration-free operation.
- The use of high-efficiency heat transfer surfaces has reduced the space required for installation of the absorption chiller, resulting in a smaller footprint.

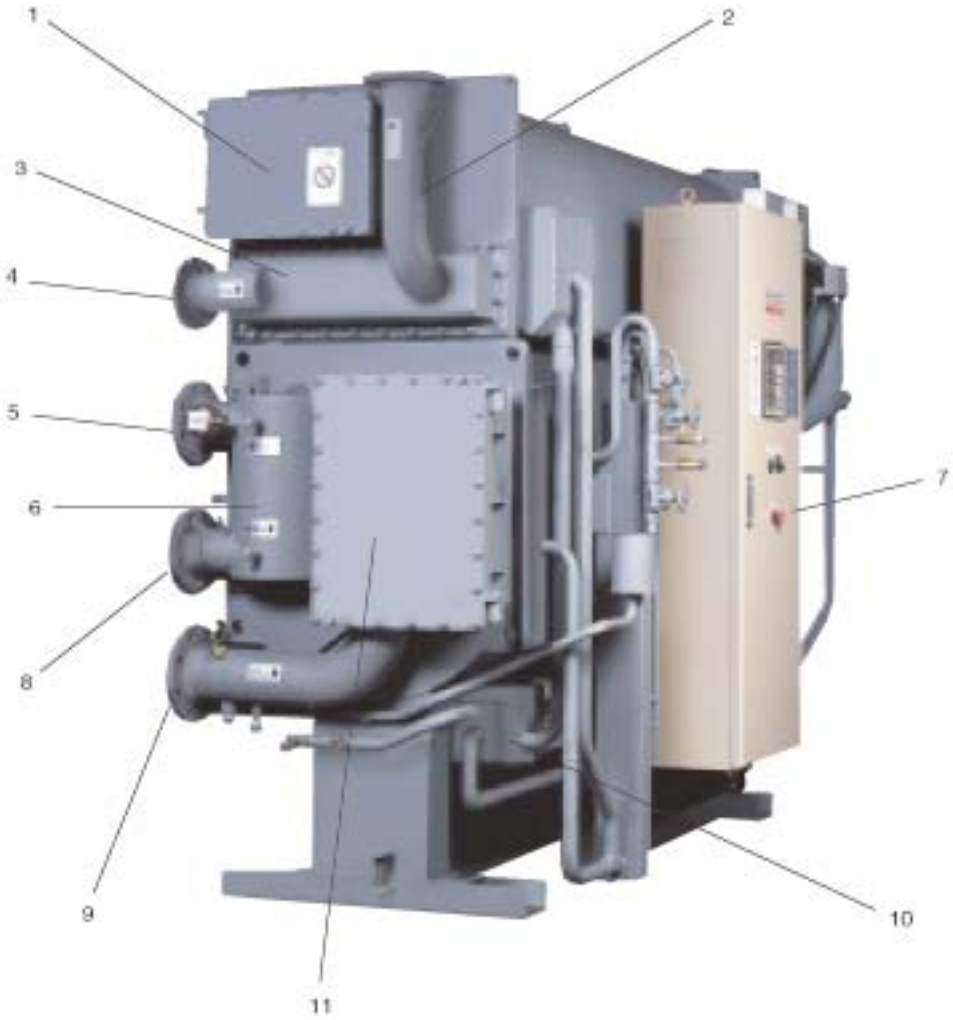
Carrier-Sanyo is the industry leader in compact absorption units.

Nomenclature

16LJ - 11

- 11 — Capacity code
- 16LJ — Unit type: single-effect, hot water-fired absorption chillers

Component identification



Legend

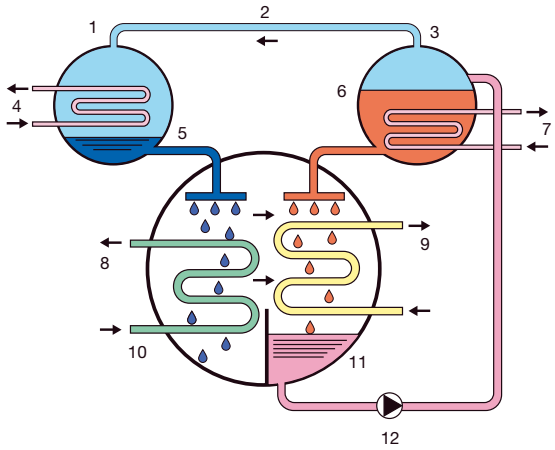
1. Condenser
2. Hot-water outlet
3. Generator
4. Hot-water inlet
5. Chilled-water outlet
6. Evaporator
7. Control panel
8. Chilled-water inlet
9. Cooling water inlet
10. Heat exchanger
11. Absorber

The absorption cycle

The absorption cooling cycle, like the mechanical vapour compression refrigeration cycle, utilizes the latent heat of evaporation of a refrigerant to remove heat from the entering chilled water. Vapour compression refrigeration systems use a chlorine-based refrigerant and a compressor to transport the refrigerant vapour to be condensed in the condenser. The absorption cycle, however, uses water as the refrigerant and an absorbent lithium bromide solution to absorb the vaporized refrigerant. Heat is then applied to the solution to release the refrigerant vapour from the absorbent. The refrigerant vapour is then condensed in the condenser.

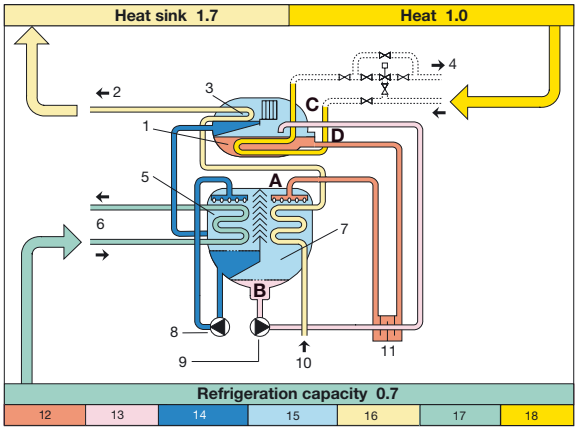
The basic single-effect absorption cycle (see Figure 1) includes generator, condenser, evaporator and absorber with refrigerant (liquid) and lithium bromide as the working solutions. The generator utilizes a heat source (burner, steam or hot water) to vaporize the diluted lithium bromide solution. The water vapour that is released travels to the condenser where it is condensed back into a liquid, transferring the heat to the cooling tower water. Once condensed, the liquid refrigerant is distributed over the evaporator tubes, removing the heat from the chilled water and vaporizing the liquid refrigerant. The concentrated lithium bromide solution from the generator passes into the absorber, absorbs the refrigerant vapour solution from the evaporator and dilutes itself. The diluted lithium bromide solution is then pumped back to the generator where the cycle is started again.

Figure 1 - Simplified absorption cycle

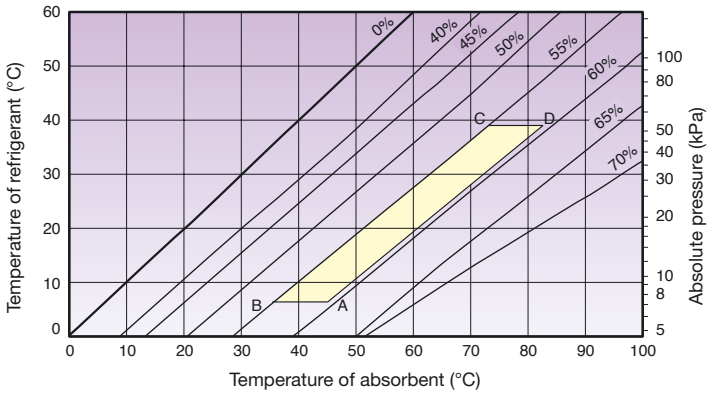


Legend
1. Condenser
2. Refrigerant vapour
3. Generator
4. Cooling water
5. Liquid refrigerant
6. Concentrated solution
7. Heat source
8. Chilled water
9. Cooling water
10. Evaporator
11. Absorber
12. Absorbent pump

Cooling cycle schematic



Legend
1. Generator
2. Cooling water
3. Condenser
4. Hot water
5. Evaporator
6. Chilled water
7. Absorber
8. Refrigerant pump
9. Absorbent pump
10. Heat exchanger
11. Cooling water
12. Concentrated solution
13. Diluted solution
14. Liquid solution
15. Refrigerant vapour
16. Cooling water
17. Chilled water
18. Hot water



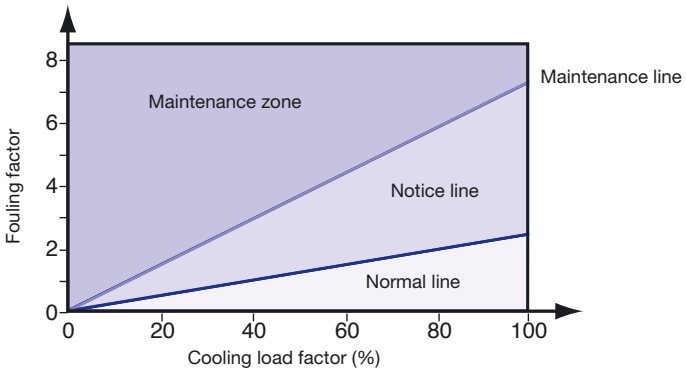
Chiller features

Expert self-diagnosis function

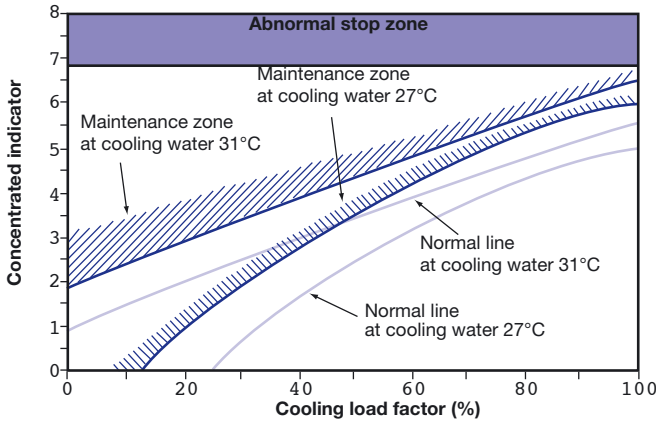
- The expert function is provided to monitor operating conditions, predict chiller information and maintain stable operation.

Predictive maintenance information

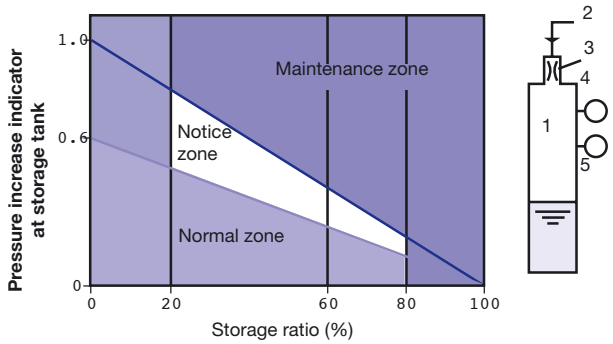
Graph 1 - Fouling of heat transfer tubes in cooling water system



Graph 2 - Trend of absorbent concentration



Graph 3 - Vacuum condition monitoring



Legend

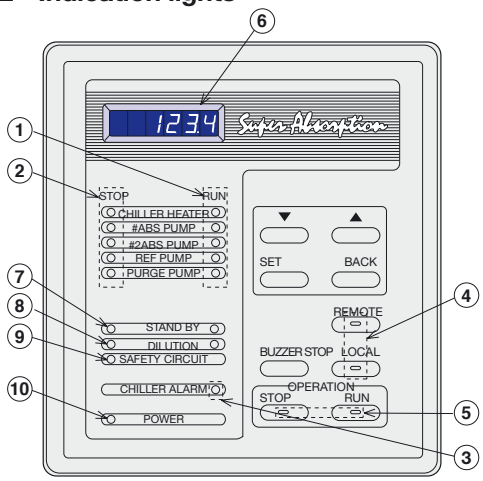
1. Storage tank
2. Diluted solution
3. Purge nozzle
4. Pd cell
5. Pressure sensor

Carrier-Sanyo control system

- The Carrier-Sanyo control system surpasses other proportional only control systems available today. The digital PID (proportional plus integral plus derivative) control maximizes unit performance by maintaining a ±0.5 K variance in leaving chilled-water temperature from the setpoint. Proportional controls can typically only maintain a ±1 K variance from the setpoint. The controller's innovative design also incorporates the ability to start and stop the system chilled/hot and cooling water pumps. During shutdown these pumps are sequenced to ensure a complete dilution cycle.
- The leaving chilled-water temperature is measured every five seconds and steam input is changed according to the gradient of the leaving chilled-water temperature curve. System temperatures, setpoints, and operational records are displayed along with indicator lights for the chiller and pumps.
- The Carrier-Sanyo control system offers its users self-diagnostics by constantly monitoring the chiller status and will automatically shut the chiller down should a fault occur. The cause of shutdown will be retained in the memory and can be displayed for immediate operator review. The controller's memory will also retain and display the cause of the last three system fault conditions. This method of retaining fault conditions is extremely useful for maintaining an accurate record of unit performance and fault history.

Display and control board

Figure 2 - Indication lights



Legend

	Name	LED colour
1.	Operation indication light	Green
2.	Stop indication light	Orange
3.	Alarm indication light	Red
4.	Remote/local select button with LED	Green
5.	Operation select button with LED	Green
6.	Data display	7 segment LED (red)
7.	Stand-by indication light	Green
8.	Dilution indication light	Green
9.	Safety circuit indication light	Green
10.	Power indication light	Orange
GL*.	Purge indication light	Green
43P*.	Purge pump on-off switch	
43ES*.	Emergency stop switch	

* On the control panel door, see p.16

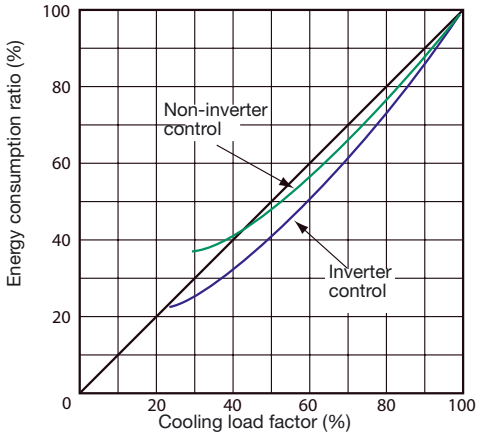
Fast digital PID control

- The introduction of new digital PID control to the J-model stabilizes the chilled/hot-water temperature with higher accuracy than the previous E-model. It quickly responds to the load fluctuation and supplies stable chilled/hot-water temperature. It is suitable for air-conditioning intelligent buildings which require sophisticated control.

Saving energy with the inverter (option)

- Balancing the load and flow rate with the absorbent pump's inverter control enables efficient and energy-saving operation. As a result, it reduces input energy and electric power consumption. Running cost is decreased by 5% compared to non-inverter control.

Graph 4 - Running cost curve



Notes:
1. Chilled-water leaving temperature 7°C constant
2. Cooling water entering temperature:

Load factor (%)	Temperature (°C)
100	32
50	27
30	25

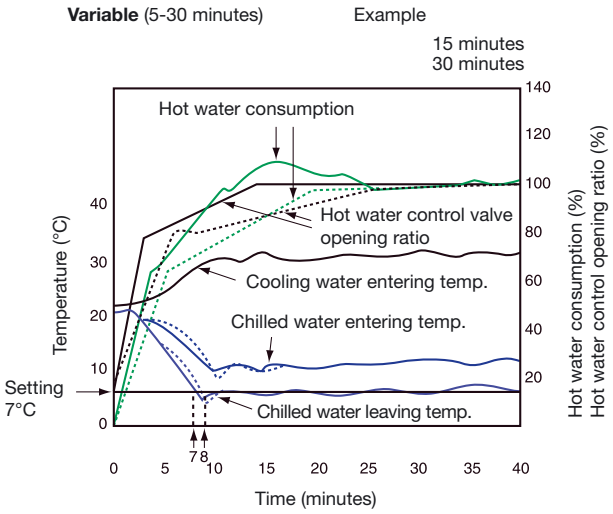
Purge system

- The high-performance purge system maintains the required operating pressure, preserves chiller performance characteristics, minimizes chiller maintenance to one purge operation per season (for year-round operation).

Hot-water valve opening control

- At the start-up the opening angle of the hot-water control valve is controlled in three stages, reducing the amount of hot water and the time needed to reach the desired level, compared with the previous model.
- Adjusting the opening speed of the hot-water control valve at the second and third stage, it is possible to set up the most suitable conditions for the site auxiliary equipment.

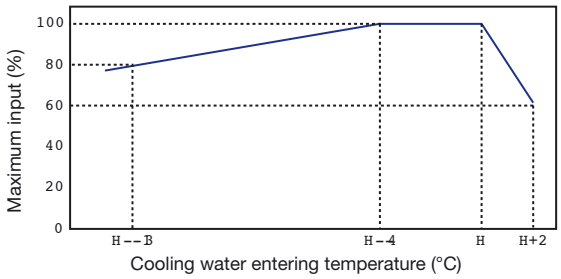
Graph 5 - Hot water valve opening control



Expansion of safe operating zone

- This ensures quick response to rapid changes and maintains stable operation.
- The safe operating zone is between 19°C and 34°C cooling water temperature (for a nominal cooling water entering temperature of 32°C)

Graph 6 - Safe operating zone chart



H = 32°C (variable from 20°C to 33°C)

Crystallization protection

- A microprocessor monitors the absorbent concentration. Steam supply is stopped, and the unit is returned to normal operation, when the concentration is over a certain limit, to prevent the crystallization of absorbent.

Technical data

Hot-water absorption chillers

16LJ		11	12	13	14	21	22	23	24	31	32	41	42	51	52	53
Cooling capacity	kW	264	316	387	475	545	633	738	844	949	1055	1178	1319	1477	1653	1846
Chilled water system*																
Flow rate	l/s	11.4	13.6	16.7	20.4	23.5	27.3	31.8	36.3	40.9	45.4	50.7	56.8	63.6	71.2	79.5
Pressure drop	kPa	55	60	36	39	35	37	74	79	76	80	75	75	62	32	42
Connection (ANSI)	inch	3	3	4	4	5	5	5	5	6	6	8	8	8	8	8
Retention volume	m^3	0.12	0.13	0.15	0.17	0.22	0.24	0.28	0.30	0.34	0.36	0.46	0.48	0.65	0.71	0.77
Cooling water system*																
Flow rate	l/s	17.0	20.4	25.0	30.7	35.2	40.9	47.7	54.4	61.3	68.1	76.1	85.2	95.4	106.7	119.2
Pressure drop	kPa	36	39	105	111	108	112	103	106	97	98	98	102	146	88	117
Connection (ANSI)	inch	5	5	5	5	6	6	8	8	8	8	10	10	12	12	12
Retention volume	m^3	0.35	0.38	0.43	0.48	0.60	0.65	0.72	0.79	0.99	1.06	1.25	1.35	2.03	2.18	2.32
Hot-water system*																
Flow rate	l/s	10.4	12.4	15.2	18.7	21.4	24.9	29	33	37	41	46	52	58	65	73
Pressure drop	kPa	31	12	29	32	30	31	30	30	29	29	28	28	28	37	49
Connection (ANSI)	inch	4	4	4	4	5	5	6	6	6	6	8	8	8	8	8
Retention volume	m^3	0.09	0.10	0.12	0.13	0.17	0.18	0.20	0.22	0.27	0.29	0.34	0.36	0.44	0.48	0.51
Rupture disk connection	inch	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3
Length (L)	mm	2720	2720	3740	3740	3830	3830	4860	4860	4990	4990	5070	5070	5200	5740	6240
Width (W)	mm	1295	1295	1295	1295	1455	1455	1455	1455	1515	1515	1615	1615	1950	1950	1950
Height (H)	mm	2215	2215	2215	2215	2350	2350	2350	2350	2620	2620	2870	2870	3200	3200	3200
Tube removal space	mm	2400	2400	3400	3400	3400	3400	4500	4500	4500	4500	4500	4500	4600	5200	5700
Operating weight	kg	4000	4200	5200	5500	6700	7100	8200	8700	10600	11100	12900	13400	18200	19700	21100
Max. shipping weight	kg	3500	3600	4500	4700	5700	6000	7000	7300	9000	9400	10800	11200	15100	16400	17600
Total shipping weight	kg	3500	3600	4500	4700	5700	6000	7000	7300	9000	9400	10800	11200	15100	16400	17600
Shipping method		One-piece														
Power supply		400 V-3 ph-50 Hz														
Apparent power	kVA	4.0	4.0	4.0	4.0	5,8	5,8	5,9	5,9	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Total electric current	A	6.2	6.2	6.2	6.2	8.9	8.9	9.0	9.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Absorbent pump	kW	1.1	1.1	1.1	1.1	2.2	2.2	2.2	2.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	A	2.8	2.8	2.8	2.8	5.5	5.5	5.5	5.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Refrigerant pump	kW	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	A	1.25	1.25	1.25	1.25	1.25	1.25	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
Purge pump	kW	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	A	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pd cell heater	W	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
Control circuit	W	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400

Legend

* In accordance with ARI 560 - 2000
12.2—> 6.7°C (Fouling factor = 0.0176 m^2 K/kW)
29.4—>38.4°C (Fouling factor = 0.044 m^2 K/kW)
95.0—>86.0°C (Fouling factor = 0.0176 m^2 K/kW)

Note: For selection outside ARI operating conditions please contact Carrier.

Scope of supply

1. **Standards met**
   The units comply with the following standards:
   - ARI 560-2000
   - 89/392/EEC (machine directive)
   - 73/23/EEC (low-voltage directive)
   - 89/336/EEC (electromagnetic compatibility directive)
   - 97/23/EC (pressure equipment directive)

2. **Absorption chiller, comprising:**
   1. Lower shell
      - Evaporator and refrigerant dispersion tray
      - Absorber and absorbent dispersion tray
      - Eliminators
      - Bases

   2. Upper shell
      - Generator
      - Condenser
      - Low temperature (LT) generator
      - Eliminators
      - Rupture disk mounting flange

   3. Heat exchangers

   4. Pumps
      - Absorbent pump with isolating valves
      - Refrigerant pump with isolating valves
      - Purge pump

   5. Purge unit
      - Purge tank
      - Ejector and liquid trap
      - Piping and various manual valves
      - Palladium cell with heater

   6. Control panel
      - Controller with data display
        LEDs and operation buttons
      - Inverter for absorbent pump (option)
      - Circuit breaker
      - Transformer
      - Relays and terminal blocks
      - Purge pump operation switch

   7. Locally mounted parts
      - Temperature sensors
      - Chilled-water flow switch
      - Generator pressure switch

   8. Interconnecting piping and wiring
      - Refrigerant and absorbent piping
      - Internal power and control wiring

   9. Initial charge
      - Absorbent (lithium bromide)
      - Refrigerant (water)
      - Inhibitor (lithium molybdate)

   10. Painting
      - Main unit: Rust-preventive paint
      - Control panel: Finish paint

   11. Accessories
      - Operation manual: One set
      - Washer (for fixing foundation bolts): One set
      - Gasket and sealant for rupture disk: One set

3. **Factory test**
   1. Check of external dimensions
   2. Hydraulic pressure test of water headers
      Test pressure is 1.5 times of maximum working pressure
   3. Vacuum-side leak test
   4. Electric insulation resistance test
   5. Dielectric breakdown test
   6. Function test of electric circuit and safety devices

4. **Scope of supply of the purchaser**
   1. Building and foundations
   2. External chilled water, cooling water and hot water piping work including various safety valves, isolation valves, mating flanges, gaskets, bolts and nuts, etc.
   3. External wiring and piping for the chillers including necessary parts
   4. Insulation for the chillers including necessary parts.
   5. Finish painting of the chillers (if needed)
   6. Cooling water entering temperature control device
   7. Cooling water treatment device
   8. Various temperature/pressure gauges for steam and water lines.
   9. Cooling tower(s), chilled-water pump(s) and hot-water three-way control valve
   10. Electric power supply (as specified)
   11. Supply of chilled water, cooling water, steam and air* at rated conditions
   12. Maintenance of the chiller
   13. Necessary tools, labour and materials for installation and site test operation
   14. Any other item not specifically mentioned in the scope of supply

   ** If pneumatic hot-water valve control is used*

Scope of order

Item	Standard	Option
Chilled water		
Temperature	Entering: 12.2°C, leaving: 6°C through 12°C Leaving: 6.7°C, temperature difference 3 K through 10 K	
Flow rate	0.043 l/s x kW - Temperature difference (min. 50 %)	
Max. working pressure	1034 kPa	1540 kPa, 2068 kPa
Hydraulic test pressure	Max.working pressure x 1.5	Max working pressure x 1.5
Fouling factor	0.018 m^2 K/kW Max. 0.18 m^2 K/kW	
Tube material	Copper tube	Cu Ni tube
Water quality	Refer to JRA-GL02E-1994	No option
Structure of water header	Removable type and epoxy treated	No option
Manufacturing standard of water header	Carrier-SANYO standard	No option
Cooling water		
Temperature	Entering: 29.4°C, entering: 20°C through 33°C Leaving: 38.4°C	
Flow rate	0.065 l/s x kW, within water flow rate range of each model	
Max. working pressure	1034 kPa	1540 kPa, 2068 kPa
Hydraulic test pressure	Max. working pressure x 1.5	
Fouling factor	0.044 m^2 K/kW	Max. 0.18m^2 K/kW
Tube material	Copper tube	Cu Ni tube
Water quality	Refer to JRA-GL02E-1994	No option
Structure of water header	Hinged type and epoxy treated	No option
Manufacturing standard of water header	Flanges ANSI	No option
Hot water		
Temperature	Entering: 95.0°C, entering: 80°C through 98°C Leaving: 86.0°C, leaving: min. 75°C	
Flow rate	0.039 l/s x kW, within water flow rate range of each model	
Max. working pressure	1034 kPa	No option
Hydraulic test pressure	Max. working pressure x 1.5	No option
Fouling factor	0.018m^2 K/kW	No option
Tube material	Copper tube	No option
Water quality	Refer to JRA-GL02E-1994	No option
Structure of water header	Removable type	No option
Manufacturing standard of water header	Flanged ANSI	No option
Electricity		
Power supply	400 V - 3 phase - 50 Hz (Voltage control within ±10%, frequency control within ±5%)	No option
Shipment	One section	Multi-shipment
Control		
Safety functions	Refrigerant temperature Chilled water freeze protection Chilled water flow switch Cooling water temperature Generator temperature Generator pressure Crystallization protection Motor protection	Cooling water flow switch
Capacity control	Digital PID control by chilled-water temperature	No option
Parts	Selected by Carrier-SANYO	No option
Control panel		
Paint finish	Munsell 5Y-7/1	No option
Indication lights	Operation	No option
	Stop	No option
	Alarm	No option
Display	LED	No option
External terminals (volt-free normally open contact)	Operation indication Stop indication Alarm indication Feedback indication Cooling mode indication	No option
Structure	Indoor type	No option
Parts	Selected by Carrier-SANYO	No option
Electrical wiring and piping		
	Wire: 600 V polyvinyl grade chloride-insulated wires	No option
	Pipe: Plicatube (flexible metal conduits)	No option
Insulation condition		
Place	Indoor	No option
Ambient temperature	5°C through 40°C	No option
Ambient humidity	Relative humidity: max. 90 % at 45°C	No option
Atmosphere	Be sure the following are not present - Corrosive gas - Explosive gas - Poisonous gas	No option
Factory test		
	Vacuum-side leak test Electric insulation resistance test Dielectric breakdown test Function test of electric circuit	Performance test at full load

Pass arrangement

16LJ	Evaporator			Absorber			Condenser			Hot water		
	Minimum	Standard	Maximum	Minimum	Standard	Maximum	Minimum	Standard	Maximum	Minimum	Standard	Maximum
11	2	5	6	2	4	4	1	2	2	2	6	6
12	2	5	6	2	4	4	1	2	2	2	4	4
13	2	3	4	2	4	4	1	2	2	2	4	4
14	2	3	4	2	4	4	1	2	2	2	4	4
21	2	3	4	2	4	4	1	2	2	2	4	4
22	2	3	4	2	4	4	1	2	2	2	4	4
23	2	3	4	2	2	3	1	2	2	2	3	4
24	2	3	4	2	2	3	1	2	2	2	3	4
31	2	3	4	2	2	3	1	2	2	2	3	4
32	2	3	4	2	2	3	1	2	2	2	3	4
41	2	3	4	2	2	3	1	2	2	2	3	4
42	2	3	4	2	2	3	1	2	2	2	3	4
51	2	3	4	2	4	4	1	2	2	2	3	4
52	2	2	4	2	2	3	1	2	2	2	3	4
53	2	2	4	2	2	3	1	2	2	2	3	4

NOTE: The drawings shown on the following pages are for the standard number of passes. For applications outside the nominal conditions of this catalogue, computer selection software can automatically select the most appropriate number of passes.

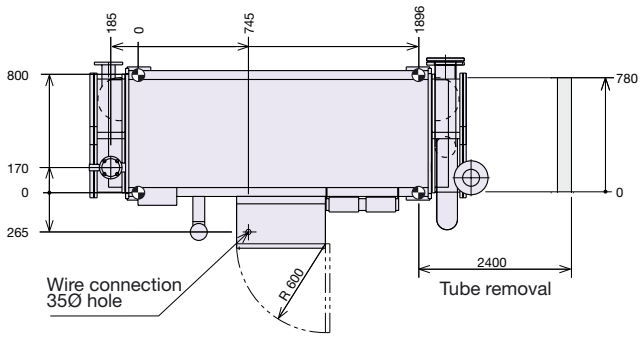
Dimensional drawings, mm

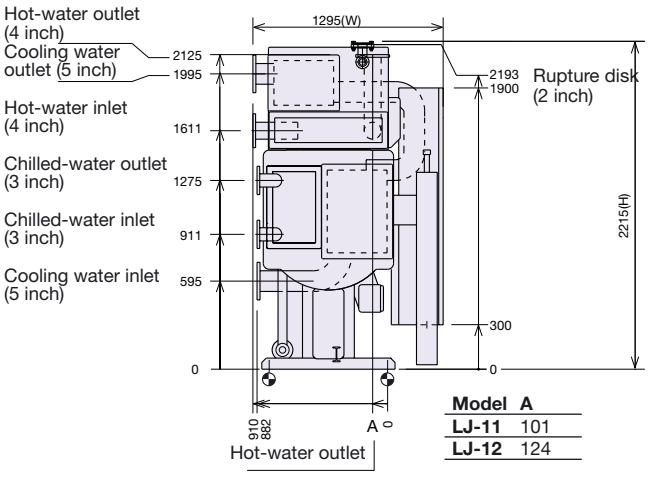
16LJ 11 through 16LJ 12

NOTES

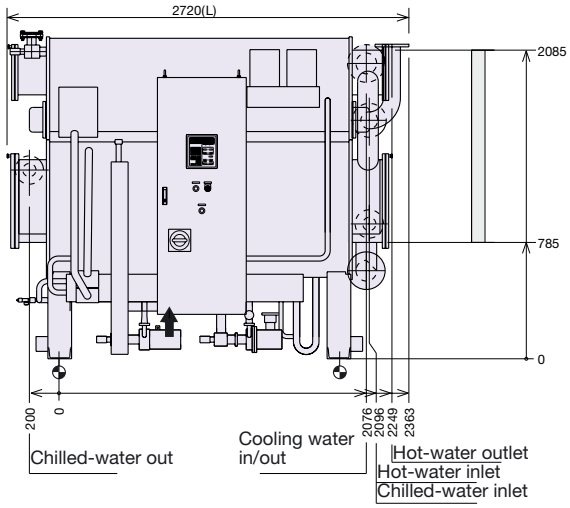
1. Dimensions (L), (W), (H) are for a standard machine. The dimensions are changed by parts added.
2. ⊕ indicates the position of anchor bolts.
3. Clearance space must be available at the front and rear of the chiller.
4. All external water piping must be provided with welded ANSI 150 LB flanges by the customer.
5. ⬆ indicates the position of the power supply connection on the control panel (diameter 35 mm)
6. Installation clearance:

Ends	1000 mm
Top	200 mm
Others	500 mm

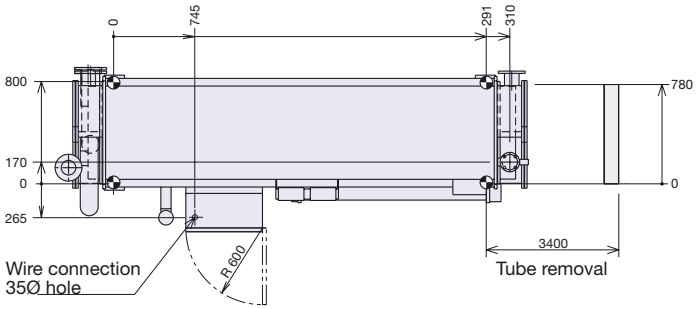


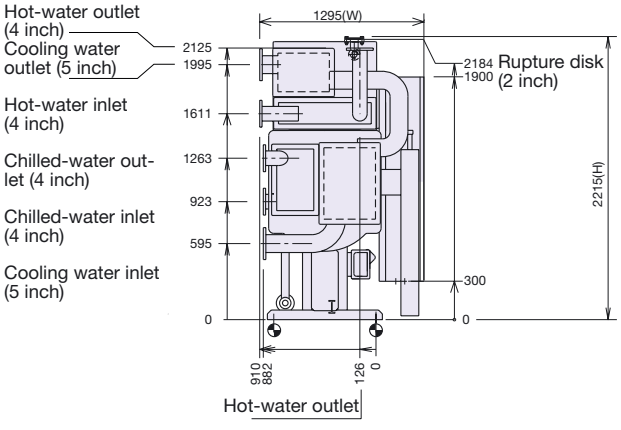


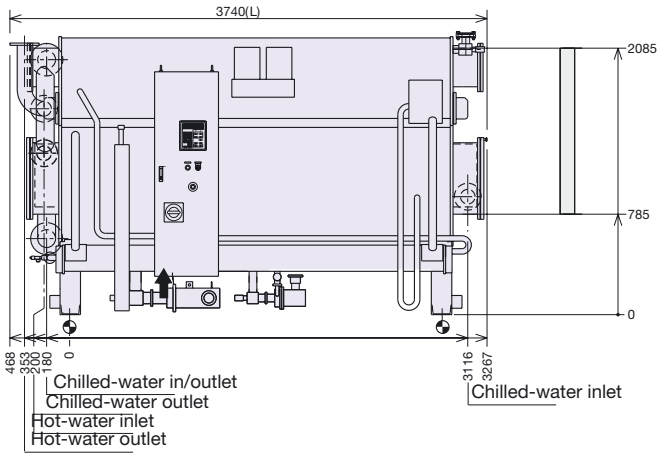
Model	A
LJ-11	101
LJ-12	124



16LJ 13 through 16LJ 14







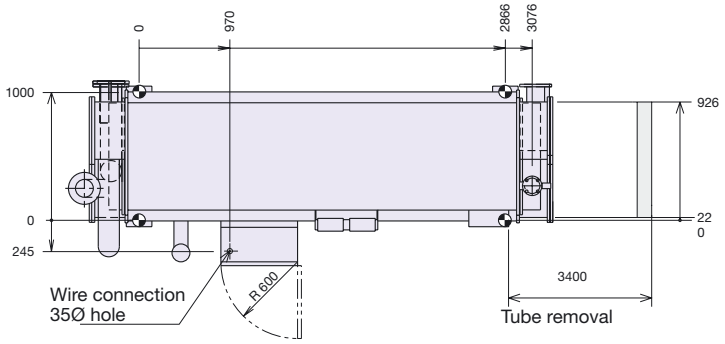
NOTE: Dimensions are for guidance only. Always refer to the certified drawings supplied upon request when designing an installation.

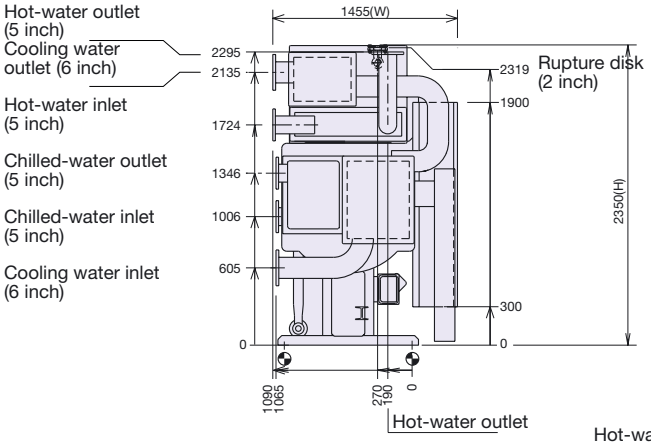
16LJ 21 through 16LJ 22

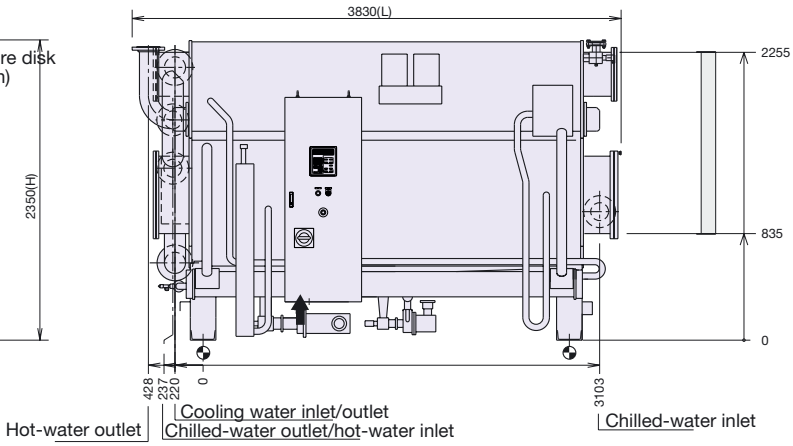
NOTES

1. Dimensions (L), (W), (H) are for a standard machine.
   The dimensions are changed by parts added.
2. ◔ indicates the position of anchor bolts.
3. Clearance space must be available at the front and rear of the chiller.
4. All external water piping must be provided with welded ANSI 150 LB flanges by the customer.
5. ⬆ indicates the position of the power supply connection on the control panel (diameter 35 mm)
6. Installation clearance:

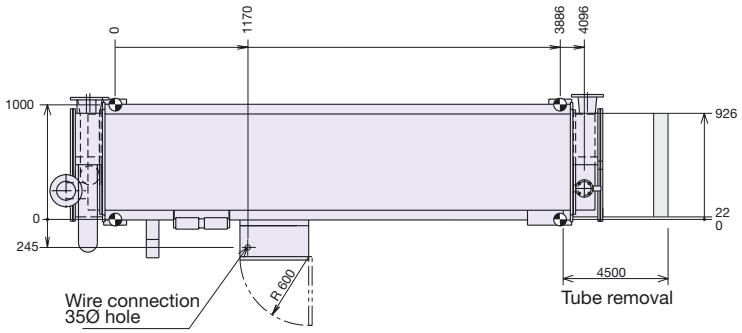
Ends	1000 mm
Top	200 mm
Others	500 mm

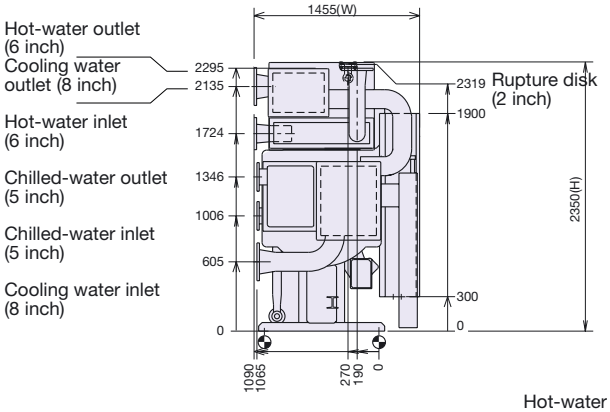


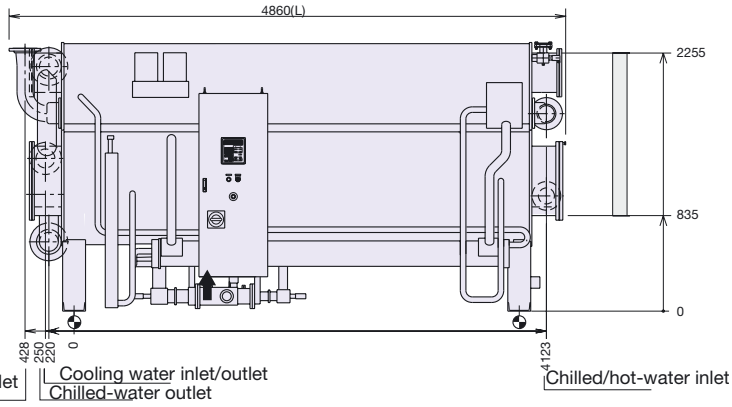




16LJ 23 through 16LJ 24







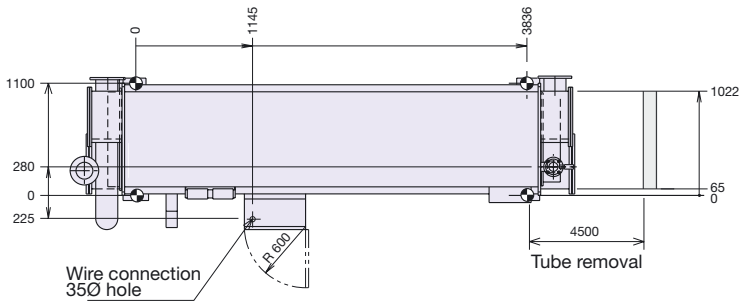
NOTE: Dimensions are for guidance only. Always refer to the certified drawings supplied upon request when designing an installation.

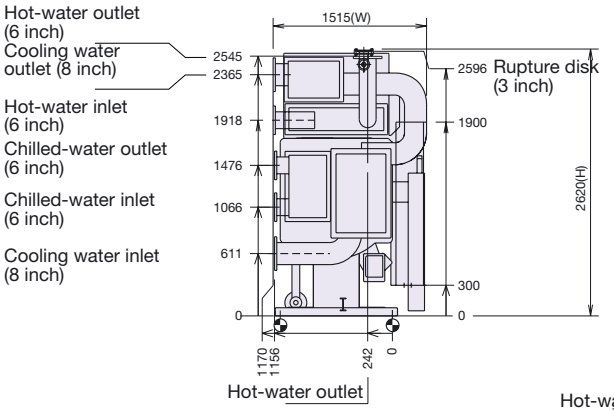
16LJ 31 through 16LJ 32

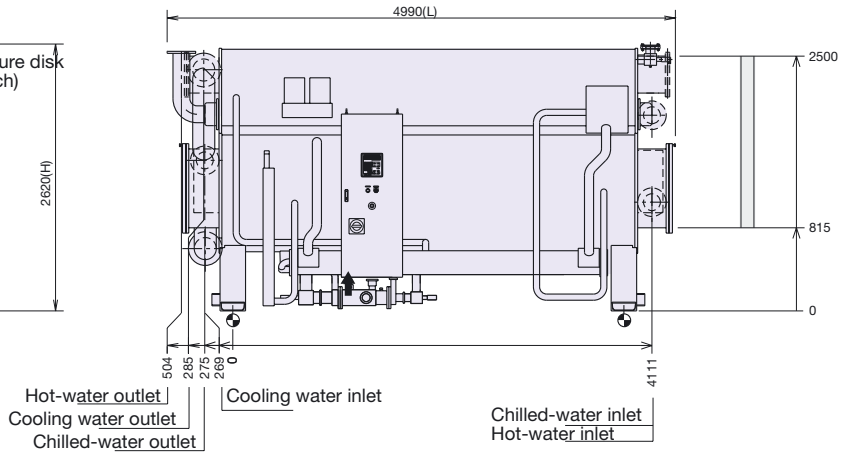
NOTES

1. Dimensions (L), (W), (H) are for a standard machine. The dimensions are changed by parts added.
2. ⊕ indicates the position of anchor bolts.
3. Clearance space must be available at the front and rear of the chiller.
4. All external water piping must be provided with welded ANSI 150 LB flanges by the customer.
5. ⬆ indicates the position of the power supply connection on the control panel (diameter 35 mm)
6. Installation clearance:

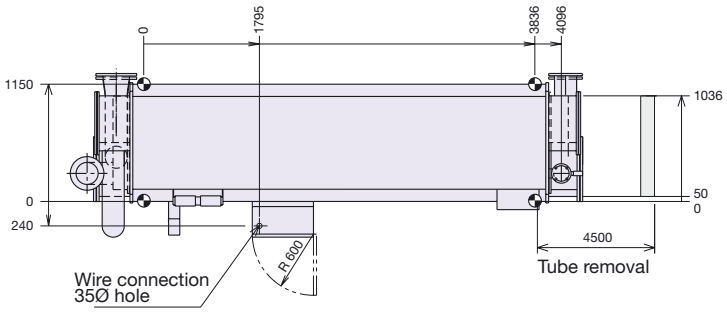
Ends	1000 mm
Top	200 mm
Others	500 mm

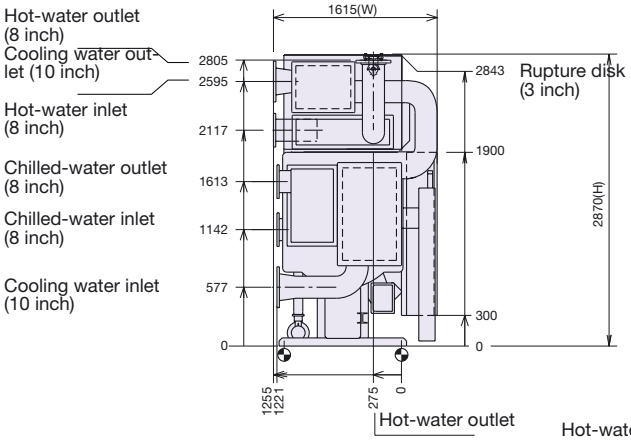


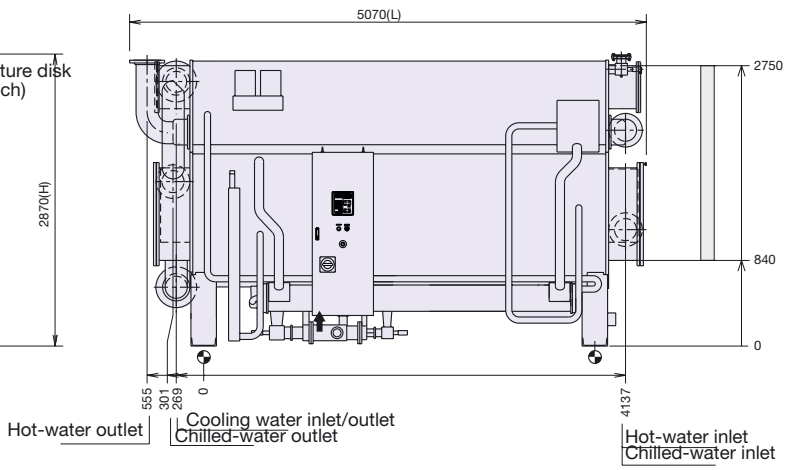




16LJ 41 through 16LJ 42







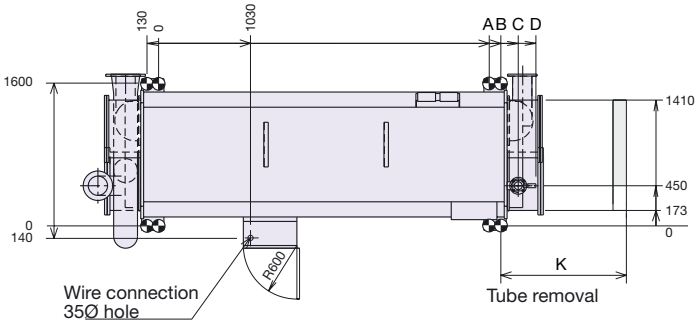
NOTE: Dimensions are for guidance only. Always refer to the certified drawings supplied upon request when designing an installation.

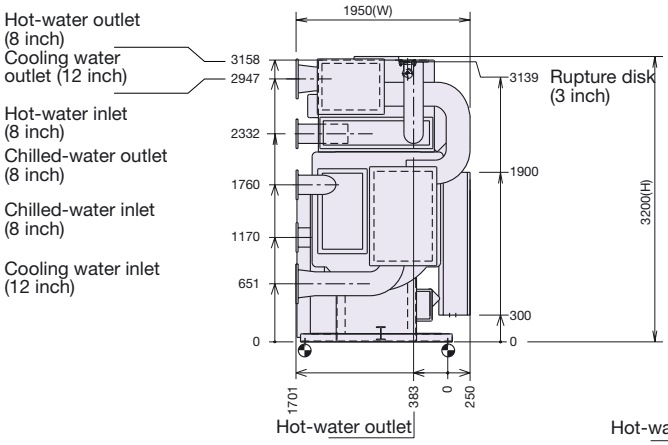
16LJ 51 through 16LJ 53

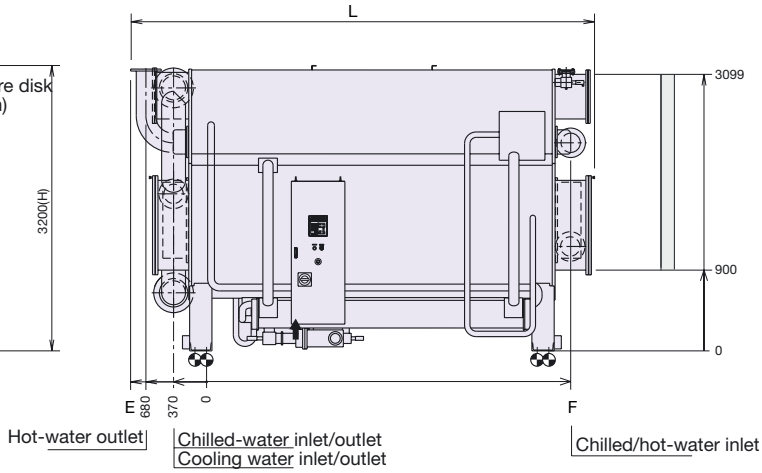
NOTES

1. Dimensions (L), (W), (H) are for a standard machine.
   The dimensions are changed by parts added.
2. ◔ indicates the position of anchor bolts.
3. Clearance space must be available at the front and rear of the chiller.
4. All external water piping must be provided with welded ANSI 150 LB flanges by the customer.
5. ⬆ indicates the position of the power supply connection on the control panel (diameter 35 mm)
6. Installation clearance:

Ends	1000 mm
Top	200 mm
Others	500 mm







16LJ	A	B	C	D	E	F	K	L
51	3706	3836	4031	4229	851	4081	4600	5200
52	4248	4378	4573	4771	845	4623	5200	5740
53	4746	4876	5071	5269	845	5121	5700	6240

NOTE: Dimensions are for guidance only. Always refer to the certified drawings supplied upon request when designing an installation.

Foundation dimensions, mm

Figure 3 - LJ 11 to LJ 42

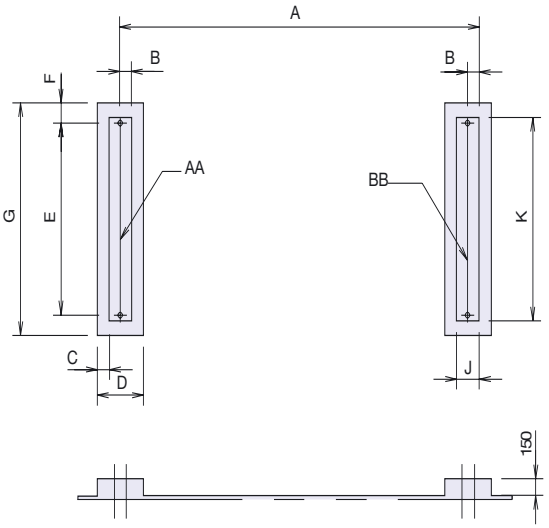


Figure 5 - LJ 51 to LJ 53

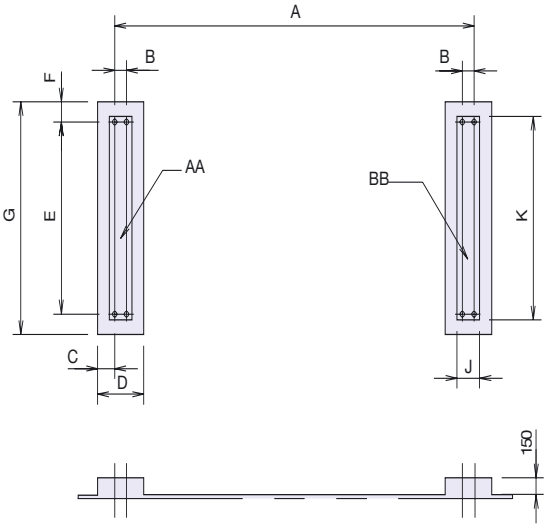
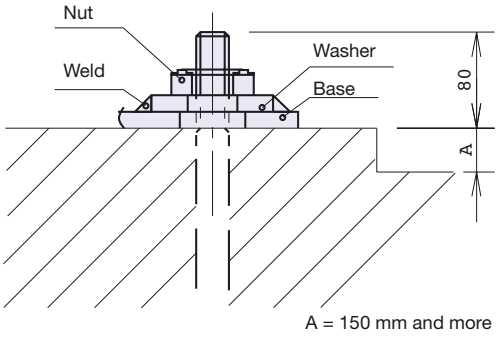


Figure 4 - Details of weld



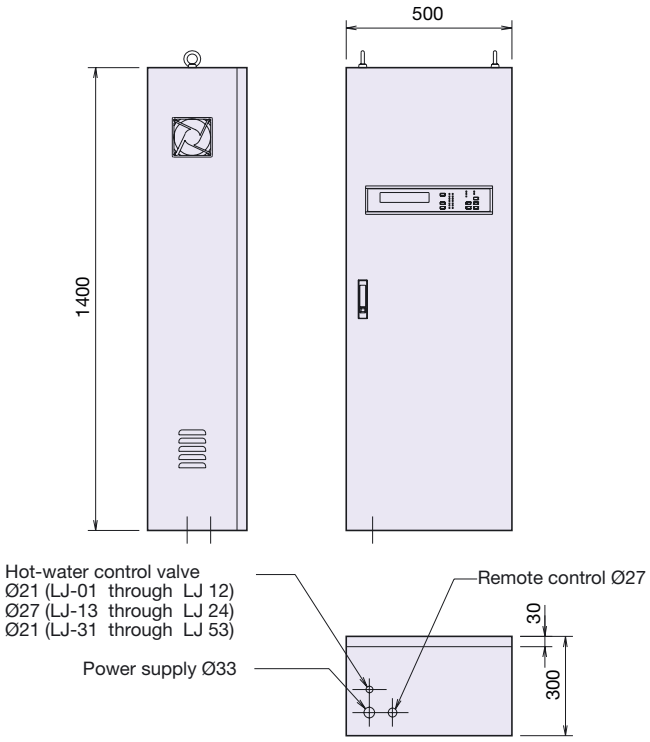
NOTES:

1. *The machine base has ø50-mm hole for the anchor bolt.*
2. *The anchor bolt should be fixed as shown in the detail drawing. Washer should be welded to the base (see Fig. 4)*
3. *There should be a drain channel around the foundation.*
4. *The floor surface should be made waterproof to facilitate maintenance work.*
5. *The surface of the foundation should be made flat.*
6. *Anchor bolts and nuts are to be supplied by customer.*

Table 1 - Dimensional data

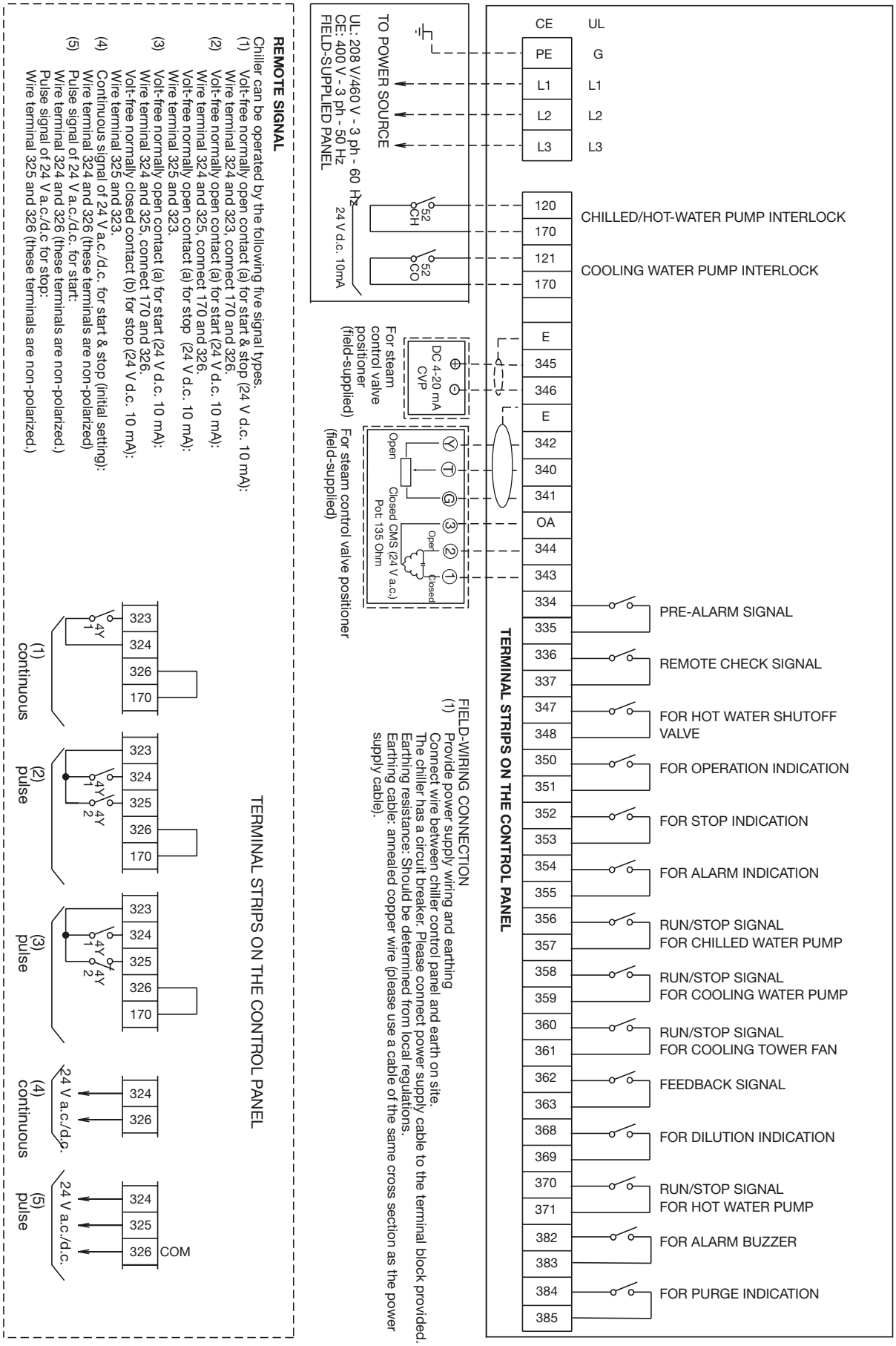
16LJ	Weight, kg	Dimensions. mm									
	AA + BB	AA	BB	A	B	C	D	E	F	G	J	K
11	4000	2000	2000	1896	-	185	360	800	150	1100	160	900
12	4200	2100	2100	1896	-	185	360	800	150	1100	160	900
13	5200	2600	2600	2916	-	185	360	800	150	1100	160	900
14	5500	2750	2750	2916	-	185	360	800	150	1100	160	900
21	6700	3350	3350	2866	-	200	400	1000	150	1300	200	1100
22	7100	3550	3550	2866	-	200	400	1000	150	1300	200	1100
23	8200	4100	4100	3886	-	200	400	1000	150	1300	200	1100
24	8700	4350	4350	3886	-	200	400	1000	150	1300	200	1100
31	10600	5300	5300	3836	-	225	450	1100	150	1400	250	1200
32	11100	5550	5550	3836	-	225	450	1100	150	1400	250	1200
41	12900	6450	6450	3836	-	225	450	1150	150	1450	250	1250
42	13400	6700	6700	3836	-	225	450	1150	150	1450	250	1250
51	18200	9100	9100	3706	130	190	510	1600	180	1960	250	1700
52	19700	9850	9850	4248	130	190	510	1600	180	1960	250	1700
53	21100	10550	10550	4746	130	190	510	1600	180	1960	250	1700

Control panel dimensions, mm

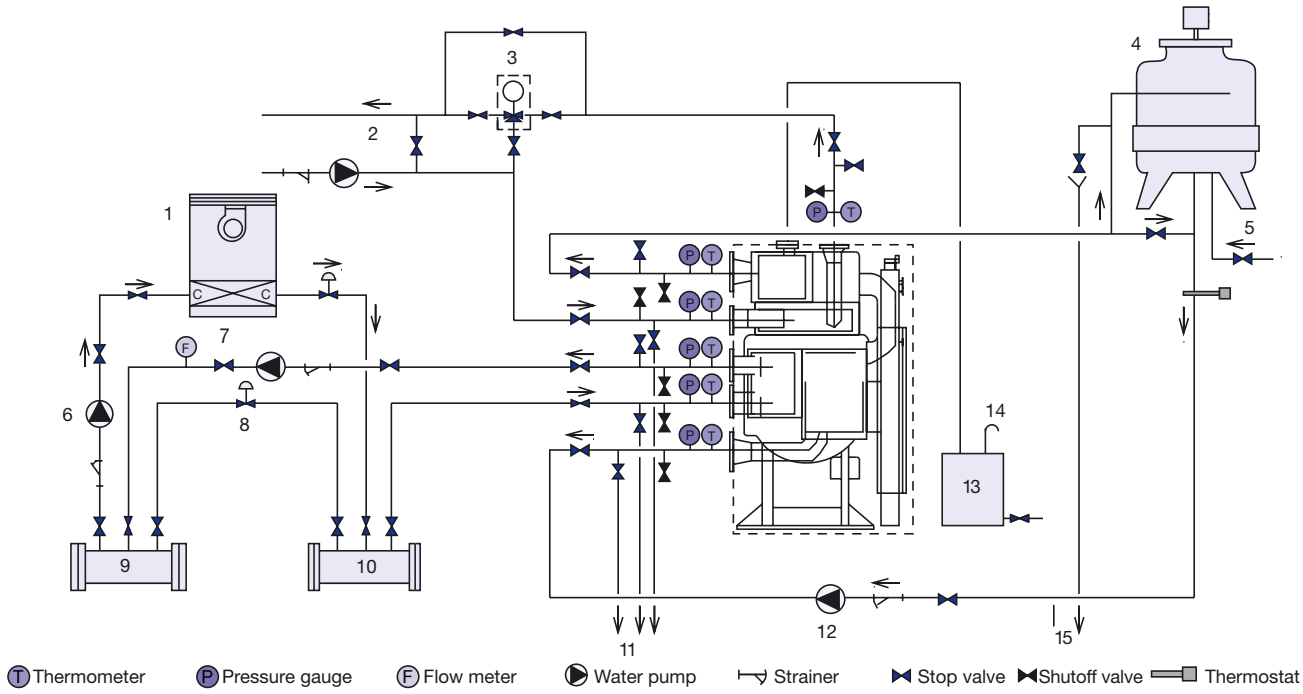


Field wiring

Figure 6 - Typical electrical field connection diagram - hot water-fired absorption chillers (LJ)



Typical piping diagram



Legend

1. Cooling load
2. Hot-water pump
3. Hot-water 3-way valve
4. Cooling tower
5. Make-up water
6. Secondary chilled-water pump
7. Primary chilled-water pump
8. Bypass valve
9. Supply header
10. Return header
11. To drain
12. Cooling water pump
13. Min. tank capacity 1 m^3
14. Air vent
15. To drain

NOTE: In order to prevent freezing of the chilled water ensure continued operation of the primary and secondary chilled-water pumps during dilution cycle operation of the chillers.

General remarks on piping

1. Work outside the area surrounded by this line - - - - shall be undertaken at the expense of the owner.
2. For pipe connections and diameters refer to the dimensional drawings and specification tables.
3. Determine the location of the chilled, cooling and hot-water pumps with due consideration of the pump's hydrostatic head.
   The machine should not be subject to a pressure larger than 1030 kPa at any water headers.
4. Cooling water minimum entering control has to be supplied (please refer to the Installation Manual).
5. Provide a thermometer and a pressure gauge at the cooling water outlet and inlet.
6. Provide an air vent valve in each of the chilled, cooling and hot-water lines at a point higher than the header for chilled, cooling and hot water.
7. Drain pipes from the evaporator, absorber and generator should be piped to the drain channel.
8. Provide a blow-down valve in the cooling water line for water quality control.
9. All external water piping is to be designed for maximum unit water-side pressure (to cover any options used).
10. Be sure to design the location of the cooling tower to prevent contamination of cooling water by exhaust gas from flues.

⚠ Safety considerations

Before operating the unit

- Before operating the unit be sure to read the operation manual carefully.
- Installation should conform to all applicable local codes and regulations.

During the installation

- Read the installation manual carefully before offloading and installing the unit.
- All work must be carried out by qualified personnel to prevent injuries and damage to the equipment.
- Waterproof the unit foundation and provide a drain channel to prevent water damage to the surrounding equipment.
- Provide adequate space around the unit for maintenance work to ensure safe working conditions.

Maintenance

- In addition to daily inspection periodical maintenance is required. Insufficient or incorrect maintenance may cause fire, electric shock and injuries.
- Please consult your local service office for further guidance.

Avoiding hazardous places

- Keep the units away from dangerous inflammable substances such as gasoline, thinner and combustible gases, as these may result in a fire.

GB/T-24001 to ISO14001:1996

Order No. 11615-20, 05.2006. Supersedes: New.
Manufacturer reserves the right to change any product specifications without notice.

Manufacturer: Sanyo Electric Co. Ltd., Dalian, PR China.
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