EBARA

# DIRECT-FIRED ABSORPTION CHILLER-HEATER

## Model RGD
## Model RGDA

*"Model ○○○" in this catalog is our model code.

# A New Standard Chiller Released for Seeking High

## 1 Light-weight & Compact Design

Compared with our previous model (Model RED), the product's weight is decreased 15% on average, so the chillers are easy to carry into the machine room.

## 2 Excellent Energy-saving Control & Various Functions

### Energy-saving Operation Mode

During the low cooling load period in the intermediate stage, the lower cooling water temperature & the higher chilled water target temperature will make a higher efficiency. When turned to the energy-saving operation mode, the chiller will set up the chilled water target temperature automatically adjusted by the cooling water temperature, to ensure the chiller's high efficiency operation and decrease the gas consumption.
The lowest cooling water temperature will be 15degC.

### Cooling Water Variable Flow Rate

In the intermediate stage, it can decrease the cooling water circulation power during the partial load time. Moreover, it can control the cooling water inlet temp.

### Link-less Burner

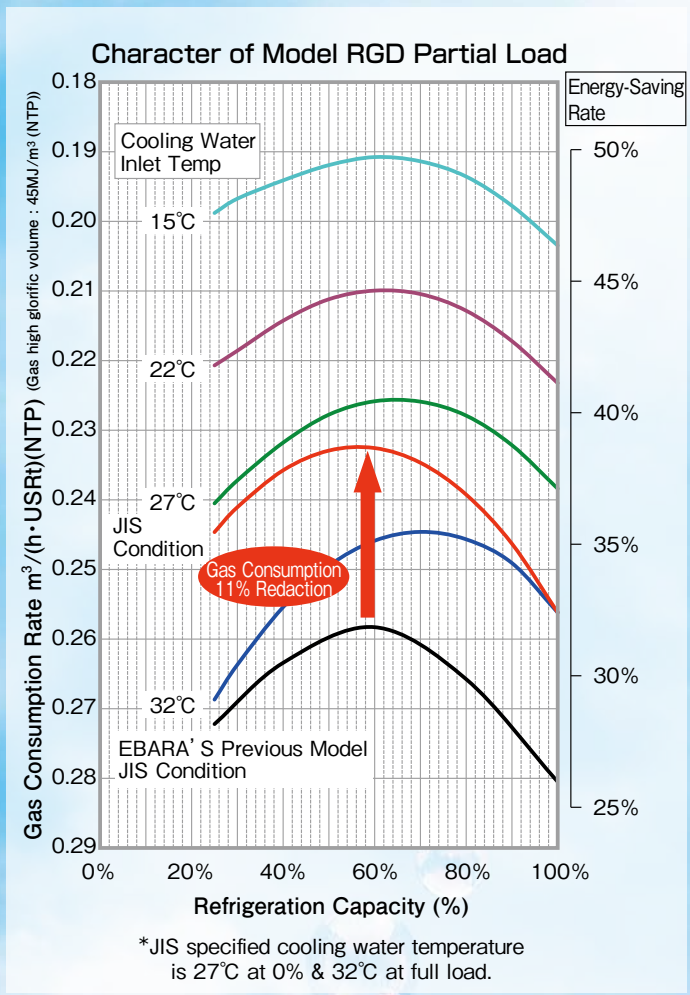
The EBARA independent developed link-less burner control system, individually control the fuel valve & air valve. In the full operation range, from low to high, it can keep the optimum A/F ratio, and make the operation safe and clean.

### Solution Pump Inverter Control

Use inverter to control the weak & strong solution pump, to keep the optimum solution flow rate and increase the partial load efficiency.

### Measure for Power Failure

If the power failure time is within 10 minutes, the chiller can restart automatically while the power recovery. If the power failure time is more than 10 minutes, the chiller will stop & alarm while the power recovery.




*JIS specified cooling water temperature is 27℃ at 0% & 32℃ at full load.

# Function & Relieving Customer's Equipment Burden

## 3 To Win The High Reliability And Strengthen The Safety Function Depending on Experience & Reference

### Failure Avoidance Function

*Avoid overload operation *Avoid crystallization *Fuel auto check
The sensors, that installed in the chiller, to monitor the chiller's operating condition all the time, will limit or decrease chiller's capacity before the overload failure occur.
Foreknow the crystallization of circulating solution inside the chiller in advance, and avoid it automatically.
During the 24 hours continuous operation, the flame detect function check trouble automatically.

### Safety Precaution Via Pre-alarm Function

With this function, magnitude of scale/slime fouling in the cooling water tubes and timing for replacing some parts of the chiller are informed well in advance.

### Enhanced Customer Communication Ability (Option)

**Adopt BMS (Building Management System) communication protocol***
Optional communication protocol for customer to monitor the chiller in local equipment control room by the data communication with chiller's control panel is available.
The chiller's internal temp. or burning operation time etc. can be monitored through central control facility.

## 4 Good Maintenance System

The marine type water box is used for both chilled water & cooling water, while checking the water box, it's easy to open the water box without removing any piping.

# Model RGD　COP1.22 (Based on Low Calorific Value)

Gas fired　Diesel fired

| Model | | | RGDL015 | RGDL018 | RGDL021 | RGDL025 | RGDL028 | RGDL032 | RGDL036 |
|---|---|---|---|---|---|---|---|---|---|
| Cooling Capacity | | kW | 527 | 633 | 738 | 879 | 985 | 1,125 | 1,266 |
| | | {USRt} | 150 | 180 | 210 | 250 | 280 | 320 | 360 |
| Heating Capacity | | kW | 441 | 530 | 617 | 735 | 824 | 941 | 1,059 |
| | | {Mcal/h} | 380 | 455 | 531 | 633 | 708 | 810 | 911 |
| Chilled Water | Temperature | ℃ | 12→7 | | | | | | |
| | Flow Rate | L/min | 1,512 | 1,814 | 2,117 | 2,520 | 2,822 | 3,226 | 3,629 |
| | Press. Drop | kPa | 96 | 98 | 95 | 97 | 91 | 92 | 94 |
| | Pass | — | 4 | | | | 3 | | |
| | Connection | A(mm) | 100 | | 125 | | 150 | | |
| Cooling Water | Temperature | ℃ | 32→37.3 | | | | | | |
| | Flow Rate | L/min | 2,501 | 3,001 | 3,501 | 4,168 | 4,668 | 5,334 | 6,001 |
| | Press. Drop | kPa | 81 | 87 | 81 | 86 | 71 | 73 | 76 |
| | Pass | — | 3+1 | | | | 2+1 | | |
| | Connection | A(mm) | 125 | | 150 | | 200 | | |
| Hot Water | Temperature | ℃ | 55.8→60 | | | | | | |
| | Flow Rate | L/min | 1,512 | 1,814 | 2,117 | 2,520 | 2,822 | 3,226 | 3,629 |
| | Press. Drop | kPa | 96 | 98 | 95 | 97 | 91 | 92 | 94 |
| | Pass | — | 4 | | | | 3 | | |
| | Connection | A(mm) | 100 | | 125 | | 150 | | |
| Fuel Gas | Chilling Mode | kW | 479 | 575 | 671 | 799 | 895 | 1,023 | 1,151 |
| | (High Calory) | {Mcal/h} | 412 | 495 | 577 | 687 | 770 | 880 | 990 |
| | Heating Mode | kW | 525 | 631 | 735 | 875 | 981 | 1,120 | 1,261 |
| | (High Calory) | {Mcal/h} | 452 | 543 | 632 | 753 | 844 | 963 | 1,084 |
| | Standard Gas Press. | kPa | 2.0 | | | | | | |
| | Connection | A(mm) | 50 | | | | 65 | | 80 |
| Deisel Oil Consumption | Chilling Mode | L/h | 44.8 | 53.7 | 62.7 | 74.6 | 83.5 | 95.5 | 107.4 |
| | Heating Mode | L/h | 49.0 | 58.9 | 68.6 | 81.7 | 91.6 | 104.6 | 117.7 |
| Power | Refrigerant Pump | kW | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 1.5 | 1.5 |
| | Solution Pump | kW | 2.2+1.1 | 2.2+1.1 | 2.2+1.1 | 2.2+1.8 | 2.2+1.8 | 3+1.8 | 3+1.8 |
| | Spray back up pump | kW | 1.1 | 1.1 | 1.3 | 1.3 | 1.3 | 1.3 | 1.8 |
| | Burner Fan(Gas) | kW | 0.75 | 1.5 | 1.5 | 1.5 | 2.2 | 2.2 | 3.7 |
| | Burner Fan(Deisel Oil) | kW | 1.5+0.4 | 1.5+0.4 | 1.5+0.4 | 1.5+0.4 | 2.2+0.4 | 2.2+0.75 | 2.2+0.75 |
| | Purge Pump | kW | 0.02 | | | | | | |
| Power Capacity (Gas) | 3φAC200V/50Hz | kVA | 11.4 | 12.1 | 12.2 | 13.7 | 14.7 | 17.4 | 20.8 |
| | 3φAC200V/60Hz | | 11.3 | 12.0 | 12.1 | 13.6 | 14.5 | 17.2 | 20.6 |
| Power Capacity (Deisel Oil) | 3φAC200V/50Hz | kVA | 12.9 | 12.9 | 13.0 | 15.5 | 15.5 | 18.6 | 22.0 |
| | 3φAC200V/60Hz | | 12.8 | 12.8 | 12.9 | 14.4 | 15.3 | 18.4 | 21.7 |
| Exhaust Gas | Temperature | ℃ | 220 | | | | | | |
| | Connection Size | mm | 310×350 | 310×450 | 370×450 | 370×480 | 430×450 | 430×480 | 460×515 |
| General Dimension | Length | mm | 3,550 | 3,550 | 3,600 | 3,600 | 4,700 | 4,700 | 4,700 |
| | Width | mm | 2,050 | 2,050 | 2,100 | 2,350 | 2,350 | 2,400 | 2,450 |
| | Hight | mm | 2,000 | 2,050 | 2,150 | 2,200 | 2,130 | 2,250 | 2,300 |
| Weight | Shipping | t | 6.1 | 6.8 | 7.5 | 8.1 | 9.7 | 10.8 | 11.7 |
| | Operation | t | 6.5 | 7.4 | 8.2 | 8.9 | 10.6 | 11.8 | 12.8 |

Notes:
1) The fouling factor of chilled water and cooling water is 0.086m$^2$K/kW.
2) The burner fan's capacity may change in accordance with different burning capacity, fuel type.
3) Gas high calorific Value 13A: 45.00MJ/m$^3$ (NTP).
4) Standard gas supply pressure: NG 13A low pressure 2kPa.
5) Chilled/hot water, cooling water max. working pressure is 0.78MPa.
6) Performance tolerance: according to JIS B 8622-2009.
7) Diesel low calorific value is 34.8MJ/L (density 0.8kg/L).

Gas fired Diesel fired

| Model | | | RGDL040 | RGDL045 | RGDL056 |
|---|---|---|---|---|---|
| Cooling Capacity | | kW | 1,407 | 1,582 | 1,969 |
| | | {USRt} | 400 | 450 | 560 |
| Heating Capacity | | kW | 1,177 | 1,324 | 1,647 |
| | | {Mcal/h} | 1,012 | 1,139 | 1,417 |
| Chilled Water | Temperature | ℃ | 12→7 | | |
| | Flow Rate | L/min | 4,032 | 4,536 | 5,645 |
| | Press. Drop | kPa | 95 | 90 | 89 |
| | Pass | — | 3 | | |
| | Connection | A(mm) | 150 | 200 | |
| Cooling Water | Temperature | ℃ | 32→37.3 | | |
| | Flow Rate | L/min | 6,668 | 7,502 | 9,335 |
| | Press. Drop | kPa | 80 | 71 | 80 |
| | Pass | — | 2+1 | | |
| | Connection | A(mm) | 200 | 250 | |
| Hot Water | Temperature | ℃ | 55.8→60 | | |
| | Flow Rate | L/min | 4,032 | 4,536 | 5,645 |
| | Press. Drop | kPa | 95 | 90 | 89 |
| | Pass | — | 3 | | |
| | Connection | A(mm) | 150 | 200 | |
| Fuel Gas | Chilling Mode | kW | 1,279 | 1,438 | 1,790 |
| | (High Calory) | {Mcal/h} | 1,100 | 1,237 | 1,539 |
| | Heating Mode | kW | 1,401 | 1,576 | 1,961 |
| | (High Calory) | {Mcal/h} | 1,205 | 1,356 | 1,686 |
| | Standard Gas Press. | kPa | 2.0 | | 9.8 |
| | Connection | A(mm) | 80 | | 50 |
| Deisel Oil Consumption | Chilling Mode | L/h | 119.3 | 134.3 | 167.1 |
| | Heating Mode | L/h | 130.8 | 147.1 | 183.0 |
| Power | Refrigerant Pump | kW | 1.5 | 1.5 | 1.5 |
| | Solution Pump | kW | 3+1.8 | 3+3 | 3.7+3 |
| | Spray back up pump | kW | 1.8 | 1.8 | 3 |
| | Burner Fan(Gas) | kW | 3.7 | 3.7 | 5.5 |
| | Burner Fan(Deisel Oil) | kW | 3.7+0.75 | 3.7+0.75 | 5.5+0.75 |
| | Purge Pump | kW | 0.02 | | |
| Power Capacity (Gas) | 3φAC200V/50Hz | kVA | 20.8 | 21.7 | 26.0 |
| | 3φAC200V/60Hz | | 20.6 | 21.4 | 25.8 |
| Power Capacity (Deisel Oil) | 3φAC200V/50Hz | kVA | 22.0 | 22.8 | 27.2 |
| | 3φAC200V/60Hz | | 21.7 | 22.5 | 26.9 |
| Exhaust Gas | Temperature | ℃ | 220 | | |
| | Connection Size | mm | 460×568 | 550×515 | 545×616 |
| General Dimension | Length | mm | 4,700 | 4,900 | 6,000 |
| | Width | mm | 2,550 | 2,640 | 2,850 |
| | Hight | mm | 2,400 | 2,500 | 2,750 |
| Weight | Shipping | t | 12.8 | 13.9 | 18.6 |
| | Operation | t | 14.0 | 15.4 | 21.0 |

Notes:
1) The fouling factor of chilled water and cooling water is 0.086$m^2$K/kW.
2) The burner fan's capacity may change in accordance with different burning capacity, fuel type.
3) Gas high calorific Value 13A: 45.00MJ/$m^3$ (NTP).
4) Standard gas supply pressure: NG 13A low pressure 2kPa or midium pressure 9.8kPa for bigger than RGDGL056.
5) Chilled/hot water, cooling water max. working pressure is 0.78MPa.
6) Performance tolerance: according to JIS B 8622-2009.
7) Diesel low calorific value is 34.8MJ/L (density 0.8kg/L).

# Model RGD　COP1.33 for RGD015E-70E, COP 1.29 for RGDA100-150

Gas fired

| Model | | | RGDGL015E | RGDGL018E | RGDGL021E | RGDGL025E | RGDGL028E | RGDGL032E | RGDGL036E | RGDGL040E | RGDGL045E |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cooling Capacity | | kW | 527 | 633 | 738 | 879 | 985 | 1,125 | 1,266 | 1,407 | 1,582 |
| | | {USRt} | 150 | 180 | 210 | 250 | 280 | 320 | 360 | 400 | 450 |
| Heating Capacity | | kW | 441 | 530 | 617 | 735 | 824 | 941 | 1,059 | 1,177 | 1,324 |
| | | {Mcal/h} | 380 | 455 | 531 | 633 | 708 | 810 | 911 | 1,012 | 1,139 |
| Chilled Water | Temperature | ℃ | 12→7 | | | | | | | | |
| | Flow Rate | L/min | 1,512 | 1,814 | 2,117 | 2,520 | 2,822 | 3,226 | 3,629 | 4,032 | 4,536 |
| | Press. Drop | kPa | 96 | 98 | 95 | 97 | 91 | 92 | 94 | 95 | 90 |
| | Pass | — | 4 | | | | 3 | | | | |
| | Connection | A(mm) | 100 | | 125 | | 150 | | | | 200 |
| Cooling Water | Temperature | ℃ | 32→37.2 | | | | | | | | |
| | Flow Rate | L/min | 2,501 | 3,001 | 3,501 | 4,168 | 4,668 | 5,334 | 6,001 | 6,668 | 7,502 |
| | Press. Drop | kPa | 81 | 87 | 81 | 86 | 71 | 73 | 76 | 80 | 71 |
| | Pass | — | 3+1 | | | | 2+1 | | | | |
| | Connection | A(mm) | 125 | | 150 | | 200 | | | | 250 |
| Hot Water | Temperature | ℃ | 55.8→60 | | | | | | | | |
| | Flow Rate | L/min | 1,512 | 1,814 | 2,117 | 2,520 | 2,822 | 3,226 | 3,629 | 4,032 | 4,536 |
| | Press. Drop | kPa | 96 | 98 | 95 | 97 | 91 | 92 | 94 | 95 | 90 |
| | Pass | — | 4 | | | | 3 | | | | |
| | Connection | A(mm) | 100 | | 125 | | 150 | | | | 200 |
| Fuel Gas | Chilling Mode (High Calory) | kW | 440 | 527 | 615 | 733 | 820 | 938 | 1,055 | 1,172 | 1,319 |
| | | {Mcal/h} | 378 | 454 | 529 | 630 | 706 | 806 | 907 | 1,008 | 1,134 |
| | Heating Mode (High Calory) | kW | 507 | 609 | 709 | 845 | 947 | 1,082 | 1,217 | 1,353 | 1,522 |
| | | {Mcal/h} | 436 | 524 | 610 | 727 | 815 | 930 | 1,047 | 1,163 | 1,309 |
| | Standard Gas Press. | kPa | 2.0 | | | | | | | | |
| | Connection | A(mm) | 50 | | | 65 | | | 80 | | |
| Power | Refrigerant Pump | kW | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 1.5 | 1.5 | 1.5 | 1.5 |
| | Solution Pump | kW | 2.2+1.1 | 2.2+1.1 | 2.2+1.1 | 2.2+1.8 | 2.2+1.8 | 3+1.8 | 3+1.8 | 3+1.8 | 3+3 |
| | Spray Pump | kW | 1.1 | 1.1 | 1.3 | 1.3 | 1.3 | 1.3 | 1.8 | 1.8 | 1.8 |
| | Burner Fan(Gas) | kW | 1.5 | 1.5 | 2.2 | 2.2 | 2.2 | 3.7 | 5.5 | 5.5 | 5.5 |
| | Purge Pump | kW | 0.02 | | | | | | | | |
| Power Capacity (Gas) | 3φAC200V/50Hz | kVA | 12.1 | 12.1 | 13.2 | 14.7 | 14.7 | 19.3 | 23.0 | 23.0 | 23.8 |
| | 3φAC200V/60Hz | | 12.1 | 12.1 | 13.1 | 14.6 | 14.6 | 19.2 | 22.9 | 22.9 | 23.7 |
| Exhaust Gas | Temperature | ℃ | 120 | | | | | | | | |
| | Connection Size | mm | 310×350 | 310×450 | 370×450 | 370×480 | 430×450 | 430×480 | 460×515 | 460×568 | 550×515 |
| General Dimension | Length | mm | 3,550 | 3,550 | 3,600 | 3,600 | 4,700 | 4,700 | 4,700 | 4,700 | 4,900 |
| | Width | mm | 2,050 | 2,050 | 2,100 | 2,350 | 2,350 | 2,400 | 2,450 | 2,550 | 2,640 |
| | Hight | mm | 2,320 | 2,310 | 2,365 | 2,450 | 2,425 | 2,505 | 2,585 | 2,645 | 2,665 |
| Weight | Shipping | t | 6.2 | 7.0 | 7.7 | 8.3 | 9.9 | 11.1 | 12.0 | 13.1 | 14.3 |
| | Operation | t | 6.6 | 7.6 | 8.4 | 9.1 | 10.8 | 12.1 | 13.1 | 14.3 | 15.8 |

Notes:
1) The fouling factor of chilled water and cooling water is 0.086m$^2$K/kW.
2) The burner fan's capacity may change in accordance with different burning capacity, fuel type.
3) Gas high calorific Value 13A: 45.00MJ/m$^3$ (NTP).
4) Standard gas supply pressure: NG 13A low pressure 2kPa.
5) Chilled/hot water, cooling water max. working pressure is 0.78MPa.
6) Performance tolerance: according to JIS B 8622-2009.

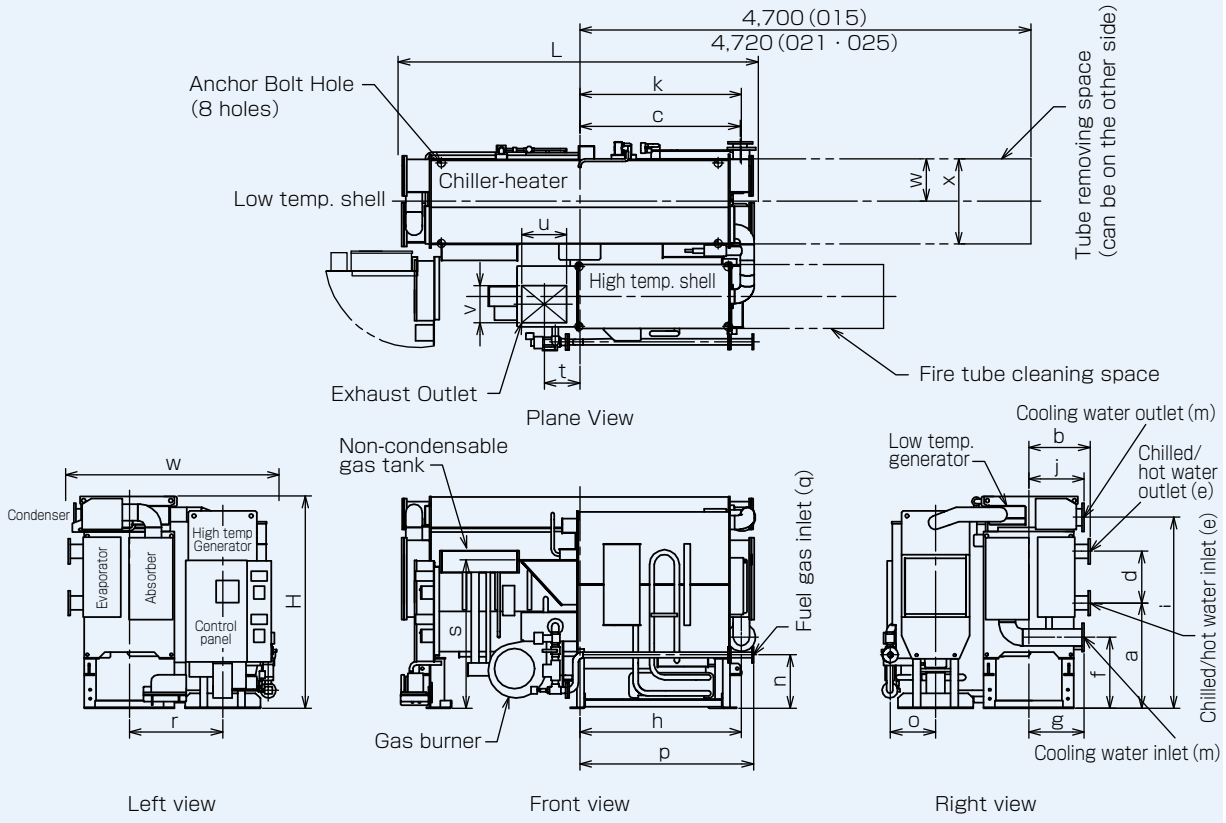
Gas fired

| Model | | | RGDGL056E | RGDAGL100 | RGDAGL120 | RGDAGL135 | RGDAGL150 |
|---|---|---|---|---|---|---|---|
| Colling Capacity | | kW | 1,969 | 3,516 | 4,220 | 4,747 | 5,274 |
| | | {USRt} | 560 | 1,000 | 1,200 | 1,350 | 1,500 |
| Heating Capacity | | kW | 1,647 | 2,814 | 3,378 | 5,798 | 4,220 |
| | | {Mcal/h} | 1,417 | 2,420 | 2,905 | 4,986 | 3,629 |
| Chilled Water | Temperature | ℃ | 12→7 | | | | |
| | Flow Rate | L/min | 5,645 | 10,080 | 12,096 | 13,608 | 15,120 |
| | Press. Drop | kPa | 89 | 77 | 74 | 78 | 77 |
| | Pass | — | 3 | 2 | | | |
| | Connection | A(mm) | 200 | 250 | 300 | | |
| Cooling Water | Temperature | ℃ | 32→37.2 | 32→37.5 | | | |
| | Flow Rate | L/min | 9,335 | 15,500 | 18,600 | 20,925 | 23,250 |
| | Press. Drop | kPa | 80 | 92 | 98 | 91 | 94 |
| | Pass | — | 2+1 | | | | |
| | Connection | A(mm) | 250 | 350 | | 400 | |
| Hot Water | Temperature | ℃ | 55.8→60 | 56→60 | | | |
| | Flow Rate | L/min | 5,645 | 10,080 | 12,096 | 13,608 | 15,120 |
| | Press. Drop | kPa | 89 | 77 | 74 | 78 | 77 |
| | Pass | — | 3 | 2 | | | |
| | Connection | A(mm) | 200 | 250 | 300 | | |
| Fuel Gas | Chilling Mode | kW | 1,641 | 3,016 | 3,619 | 4,071 | 4,524 |
| | (High Calory) | {Mcal/h} | 1,411 | 2,594 | 3,112 | 3,501 | 3,890 |
| | Heating Mode | kW | 1,893 | 3,392 | 4,071 | 4,580 | 5,089 |
| | (High Calory) | {Mcal/h} | 1,628 | 2,917 | 3,501 | 3,939 | 4,376 |
| | Standard Gas Press. | kPa | 9.8 | | | | |
| | Connection | A(mm) | 50 | 80 | | | |
| Power | Refrigerant Pump | kW | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| | Solution Pump | kW | 3.7+3 | 3.7+3 | 3.7+3.7 | 4.5+3.7 | 4.5+3.7 |
| | Spray Pump | kW | 3 | 2.2+3.7 | 3.7+3.7 | 3.7+4.5 | 3.7+4.5 |
| | Burner Fan(Gas) | kW | 5.5 | 7.5 | 7.5 | 11 | 11 |
| | Purge Pump | kW | 0.02 | 0.75 | | | |
| Power Capacity (Gas) | 3φAC200V/50Hz | kVA | 26.0 | 40.5 | 45.8 | 56.1 | 56.1 |
| | 3φAC200V/60Hz | | 25.9 | 40.5 | 45.8 | 56.1 | 56.1 |
| Exhaust Gas | Temperature | ℃ | 120 | 220 | | | |
| | Connection Size | mm | 545×616 | 660×1,087 | 720×1,168 | 730×1,240 | 750×1,360 |
| General Dimension | Length | mm | 6,000 | 7,125 | 7,150 | 7,250 | 7,250 |
| | Width | mm | 2,850 | 4,050 | 4,255 | 4,730 | 5,050 |
| | Hight | mm | 2,800 | 3,300 | 3,560 | 3,795 | 3,925 |
| Weight | Shipping | t | 19.1 | 37.9 | 44.9 | 49.7 | 54.8 |
| | Operation | t | 21.5 | 43.6 | 51.7 | 57.5 | 63.4 |

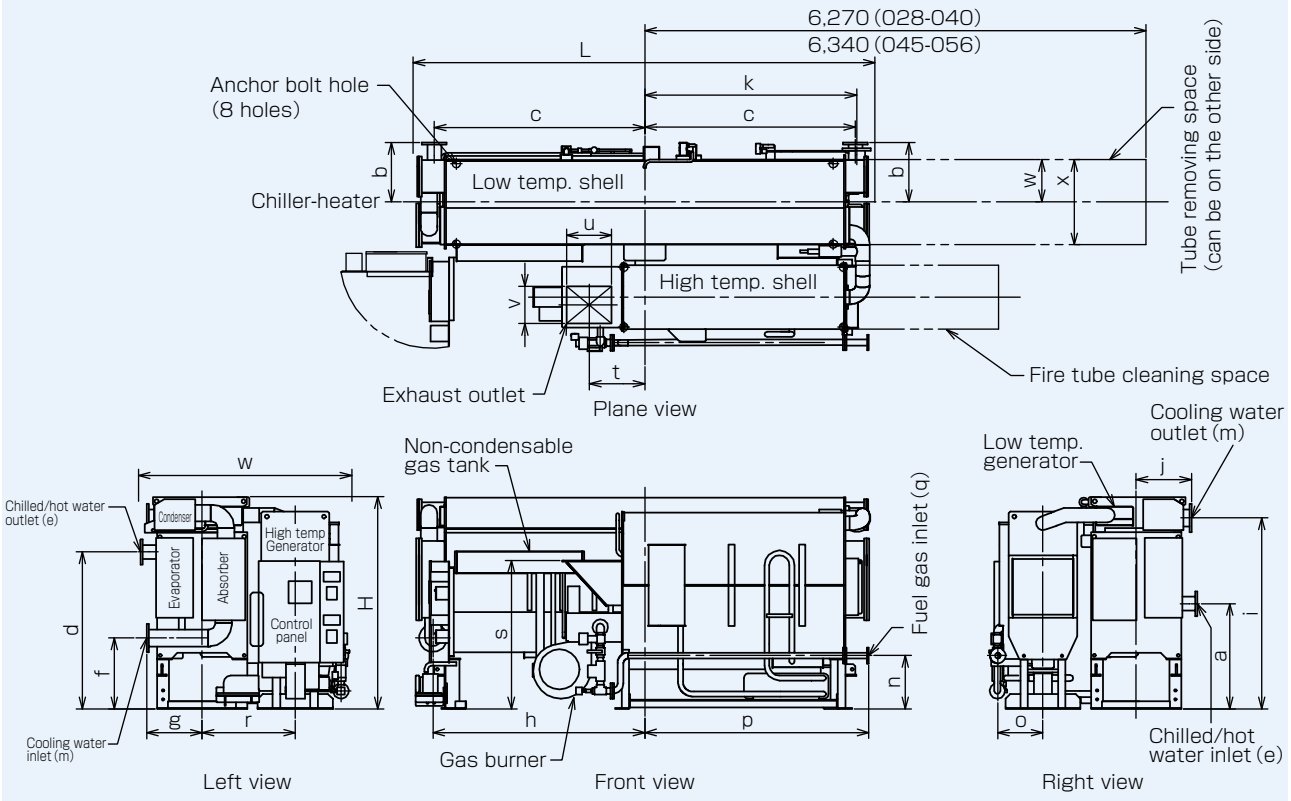
Notes:
1) The fouling factor of chilled water and cooling water is 0.086$m^2$K/kW.
2) The burner fan's capacity may change in accordance with different burning capacity, fuel type.
3) Gas high calorific Value 13A: 45.00MJ/$m^3$ (NTP).
4) Standard gas supply pressure: NG 13A low pressure 2kPa or midium pressure 9.8kPa for bigger than RGDGL056.
5) Chilled/hot water, cooling water max. working pressure is 0.78MPa.
6) Performance tolerance: according to JIS B 8622-2009.

# Outline Drawing

## Outline Drawing 015-025

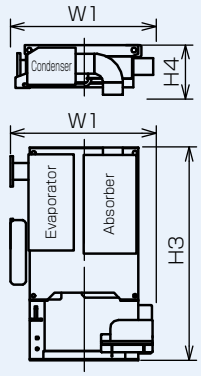



## Outline Drawing 028-056

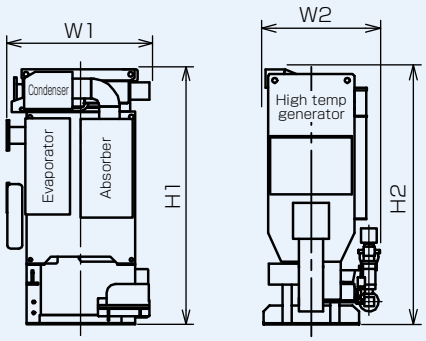


## Separate Drawing

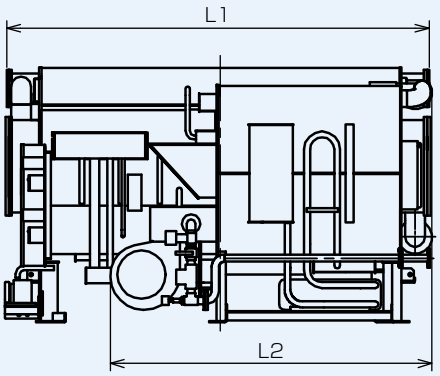
Dimensions of 3 pieces shipment




Dimensions of 2 pieces shipment




Left view




Front view

## Dimensions

**Same for L type & H type**

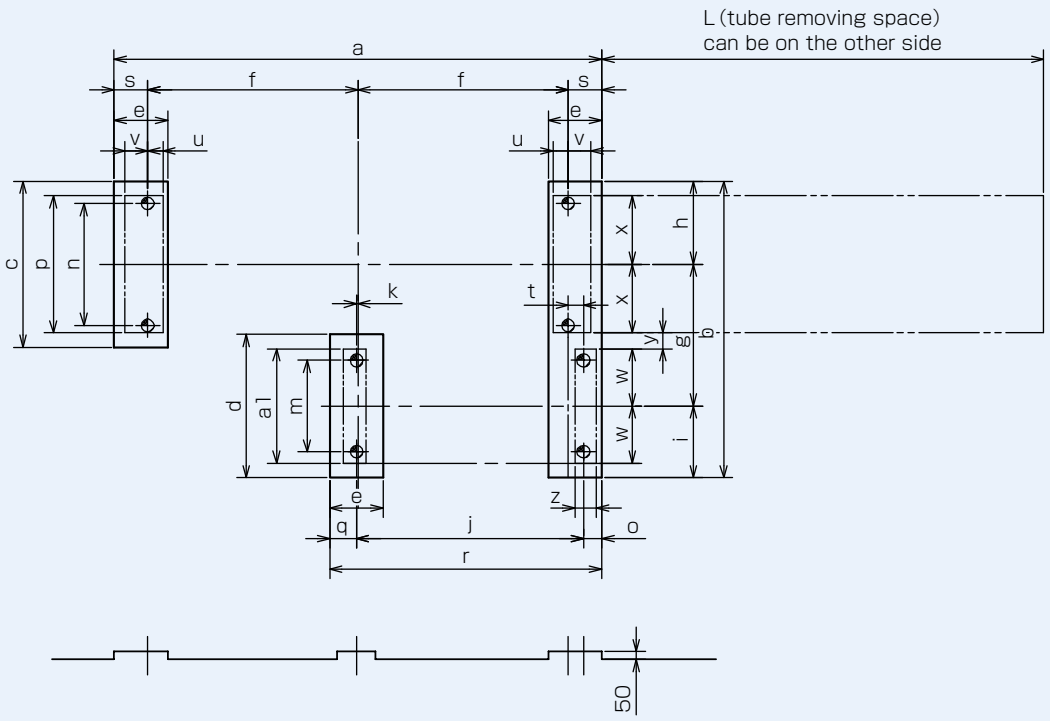
| Model | | | 015 | 018 | 021 | 025 | 028 | 032 | 036 | 040 | 045 | 056 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chilled/ Hot Water | a | mm | 1,009 | 1,029 | 1,049 | 1,055 | 1,042 | 1,071 | 1,114 | 1,185 | 1,202 | 1,310 |
| | b | mm | 574 | 593 | 611 | 651 | 660 | 674 | 717 | 706 | 718 | 813 |
| | c | mm | 1,589 | 1,589 | 1,600 | 1,600 | 2,113 | 2,113 | 2,113 | 2,113 | 2,139 | 2,639 |
| | d | mm | 470 | 474 | 516 | 600 | 1,521 | 1,630 | 1,708 | 1,723 | 1,776 | 1,985 |
| | e | A | 100 | 100 | 125 | 125 | 150 | 150 | 150 | 150 | 200 | 200 |
| Cooling Water | f | mm | 683 | 705 | 707 | 688 | 602 | 568 | 625 | 662 | 611 | 760 |
| | g | mm | 456 | 505 | 553 | 589 | 483 | 459 | 527 | 611 | 620 | 673 |
| | h | mm | 1,600 | 1,600 | 1,613 | 1,614 | 2,192 | 2,179 | 2,179 | 2,179 | 2,204 | 2,704 |
| | i | mm | 1,789 | 1,848 | 1,904 | 2,017 | 1,882 | 1,969 | 2,072 | 2,134 | 2,251 | 2,460 |
| | j | mm | 496 | 525 | 553 | 583 | 562 | 565 | 610 | 646 | 669 | 755 |
| | k | mm | 1,600 | 1,600 | 1,613 | 1,614 | 2,152 | 2,139 | 2,139 | 2,139 | 2,164 | 2,664 |
| | m | A | 125 | 125 | 150 | 150 | 175 | 200 | 200 | 200 | 250 | 250 |
| Gas | n | mm | 506 | 506 | 532 | 521 | 550 | 500 | 570 | 570 | 570 | 600 |
| | o | mm | 486 | 486 | 450 | 515 | 525 | 545 | 560 | 525 | 550 | 580 |
| | p | mm | 1,743 | 1,743 | 1,735 | 1,788 | 2,250 | 2,250 | 2,320 | 2,320 | 2,320 | 2,770 |
| | q | A | 50 | 50 | 50 | 65 | 65 | 65 | 80 | 80 | 80 | 50 |
| | r | mm | 898 | 923 | 930 | 1,055 | 1,031 | 1,050 | 1,083 | 1,128 | 1,167 | 1,282 |
| Exhaust | s | mm | 1,374 | 1,426 | 1,478 | 1,550 | 1,604 | 1,610 | 1,718 | 1,783 | 1,808 | 1,913 |
| | t | mm | 305 | 355 | 355 | 370 | 305 | 320 | 338 | 364 | 488 | 571 |
| | u | mm | 350 | 450 | 450 | 480 | 450 | 480 | 515 | 568 | 515 | 616 |
| | v | mm | 310 | 310 | 370 | 370 | 430 | 430 | 460 | 460 | 550 | 585 |
| Maintenance Space | w | mm | 363 | 388 | 411 | 447 | 408 | 422 | 464 | 501 | 510 | |
| | x | mm | 701 | 742 | 783 | 850 | 780 | 788 | 850 | 941 | 977 | 1,155 |
| Dimension | L | mm | 3,550 | 3,550 | 3,600 | 3,600 | 4,700 | 4,700 | 4,700 | 4,700 | 4,900 | 6,000 |
| | W | mm | 2,050 | 2,050 | 2,100 | 2,350 | 2,350 | 2,400 | 2,450 | 2,550 | 2,640 | 2,850 |
| | H | mm | 2,000 | 2,050 | 2,150 | 2,200 | 2,130 | 2,250 | 2,300 | 2,400 | 2,500 | 2,750 |
| MAX. Shipping Mass | | t | 6.1 | 6.8 | 7.5 | 8.1 | 9.7 | 10.8 | 11.7 | 12.8 | 13.9 | 10 |
| Running Mass | | t | 6.5 | 7.4 | 8.2 | 8.9 | 10.6 | 11.8 | 12.8 | 14.0 | 15.4 | 21 |

**Separate Dimension**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low Temp. Shell | L1 | mm | 3,550 | 3,550 | 3,600 | 3,600 | 4,700 | 4,700 | 4,700 | 4,700 | 4,900 | 6,050 |
| | W1 | mm | 1,150 | 1,200 | 1,230 | 1,350 | 1,330 | 1,370 | 1,440 | 1,480 | 1,510 | 1,830 |
| | H1 | mm | 2,000 | 2,050 | 2,150 | 2,200 | 2,130 | 2,250 | 2,300 | 2,400 | 2,500 | 2,790 |
| | H3 | mm | 1,650 | 1,720 | 1,770 | 1,840 | 1,730 | 1,840 | 1,910 | 1,970 | 2,050 | 2,270 |
| | H4 | mm | 750 | 730 | 780 | 760 | 1,000 | 1,010 | 990 | 1,030 | 1,050 | 970 |
| High Temp. Shell | L2 | mm | 2,720 | 2,720 | 2,730 | 2,750 | 3,400 | 3,450 | 3,430 | 3,430 | 3,630 | 4,200 |
| | W2 | mm | 960 | 960 | 960 | 1,070 | 1,130 | 1,200 | 1,180 | 1,160 | 1,180 | 1,240 |
| | H2 | mm | 1,920 | 1,960 | 2,040 | 2,130 | 2,130 | 2,160 | 2,270 | 2,340 | 2,460 | 2,650 |

# Foundation

## Foundation Drawing




## Dimensions

| Model | | 015 | 018 | 021 | 025 | 028 | 032 | 036 | 040 | 045 | 056 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| a | mm | 3,200 | 3,200 | 3,200 | 3,200 | 4,180 | 4,180 | 4,180 | 4,180 | 4,180 | 5,180 |
| b | mm | 1,835 | 1,885 | 1,945 | 2,100 | 2,082 | 2,115 | 2,211 | 2,281 | 2,323 | 2,554 |
| c | mm | 995 | 1,045 | 1,090 | 1,150 | 1,132 | 1,160 | 1,230 | 1,280 | 1,287 | 1,418 |
| d | mm | 880 | 880 | 940 | 940 | 970 | 970 | 1,026 | 1,026 | 1,026 | 1,126 |
| e | mm | 350 | 350 | 350 | 350 | 400 | 400 | 400 | 400 | 400 | 400 |
| f | mm | 1,380 | 1,380 | 1,380 | 1,380 | 1,880 | 1,880 | 1,880 | 1,860 | 1,860 | 2,360 |
| g | mm | 898 | 923 | 930 | 1,055 | 1,031 | 1,050 | 1,083 | 1,128 | 1,167 | 1,282 |
| h | mm | 498 | 523 | 545 | 575 | 566 | 580 | 615 | 640 | 644 | 709 |
| i | mm | 440 | 440 | 470 | 470 | 485 | 485 | 513 | 513 | 513 | 563 |
| j | mm | 1,490 | 1,490 | 1,490 | 1,490 | 1,906 | 1,906 | 1,906 | 1,920 | 2,070 | 2,600 |
| k | mm | 10 | 10 | 10 | 10 | −57 | −57 | −57 | −50 | 100 | 130 |
| m | mm | 540 | 540 | 600 | 600 | 630 | 630 | 686 | 686 | 686 | 786 |
| n | mm | 705 | 755 | 800 | 860 | 842 | 870 | 940 | 990 | 997 | 1,128 |
| o | mm | 120 | 120 | 120 | 120 | 127 | 127 | 127 | 120 | 120 | 120 |
| p | mm | 805 | 855 | 900 | 960 | 942 | 970 | 1,040 | 1,090 | 1,097 | 1,228 |
| q | mm | 175 | 175 | 175 | 175 | 200 | 200 | 200 | 200 | 200 | 200 |
| r | mm | 1,785 | 1,785 | 1,785 | 1,785 | 2,233 | 2,233 | 2,333 | 2,240 | 2,390 | 2,920 |
| s | mm | 220 | 220 | 220 | 220 | 210 | 210 | 210 | 230 | 230 | 400 |
| t | mm | 100 | 100 | 100 | 100 | 83 | 83 | 83 | 110 | 110 | 110 |
| u | mm | 100 | 100 | 100 | 100 | 150 | 150 | 150 | 130 | 130 | 130 |
| v | mm | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 170 | 170 | 170 |
| w | mm | 345 | 345 | 375 | 375 | 390 | 390 | 418 | 418 | 418 | 468 |
| x | mm | 403 | 428 | 450 | 480 | 471 | 485 | 520 | 545 | 549 | 614 |
| y | mm | 150 | 150 | 105 | 200 | 170 | 175 | 145 | 165 | 200 | 200 |
| z | mm | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| a1 | mm | 690 | 690 | 750 | 750 | 780 | 780 | 836 | 836 | 836 | 936 |
| L | mm | 3,100 | 3,110 | 3,120 | 3,120 | 4,180 | 4,180 | 4,180 | 4,180 | 4,250 | 4,890 |

# Scope of Supply & Cooling Water Quality Standard

## Scope of Supply

| No. | Item | Scope of supply | | Content |
|---|---|---|---|---|
| | | EBARA | Customer | |
| 1 | Absorption Chiller-Heater Main body | ○ | — | Chiller-heater main body, solution, refrigerant, anchor bolt with washer |
| 2 | Transport | — | — | Per as the condition of contract |
| 3 | Carry in ( I ) | — | — | Per as the condition of contract |
| 4 | Solution/Refrigerant Move-in | — | ○ | Unload & move them to the chiller side |
| 5 | Foundation | — | ○ | Chiller-heater main body foundation construction |
| 6 | Main Body Install Supervisor | — | — | Per as the condition of contract |
| 7 | Separate Piping Reassembling on Site | ○ | — | Chiller reassembling & piping connection for separate shipment |
| 8 | Management After Installation | — | ○ | Chiller-heater accessories' keeping & management |
| 9 | Anchor Bolt Construction | — | ○ | Anchor bolt for chiller-heater main body |
| 10 | Piping | — | ○ | Chilled water, cooling water, gas piping (not include the flange) |
| | | — | ○ | Chilled/hot water, cooling water, thermometer and pressure gage |
| | | — | ○ | Chilled/hot water, cooling water, gas flow meter |
| | | — | ○ | Drain, air vent valve |
| 11 | Flue pipe/Chimney | — | ○ | Flue pipe and chimney construction |
| 12 | Wiring | — | ○ | Wiring between power source and local control panel |
| | | ○ | — | Wiring between power local control and machine |
| | | — | ○ | Ground connection, pump's interlock |
| 13 | Painting | ○ | — | Rust prevention paint of machine |
| | | ○ | — | Finishing paint of control panel |
| | | — | ○ | Finishing paint of machine |
| 14 | Insulation | — | ○ | Chiller-heater main body insulation |
| 15 | Start-up & Commissioning | — | — | Per as the condition of contract |
| 16 | Start-up Supervisor | — | — | Per as the condition of contract |
| 17 | Collection of Waste Materials | — | ○ | Packing material etc. |
| 18 | Cooling Water Quality Management | — | ○ | Quality of chilled water, cooling water and hot water shall be controlled according to JRA-GL-02-1994 |
| 19 | Cooling Water Temp. Control | — | ○ | Settle from 32~15℃ Note) |

Note) Controllable by selection of the rotation speed of cooling water pump or the bi-pass volume of cooling water 3 way valve or the rotation speed of cooling tower fan from machine control panel (standard specification).
Cooling water temp. control should be required if the cooling water inlet temp. become below 15℃.

## Quality standard for cooling water

For efficient operation of the unit for a long term, the water quality control is necessary. The following table shows a quality guideline of the cooling water complied with Japan Refrigeration and Air conditioning Association. (JRA GL-02-1994)

| Item | | Cooling water system | | Tendencies | |
|---|---|---|---|---|---|
| | | Circulating water | | | |
| | | Circulating water | Make-up water | Corrosion | Scale/Slime |
| Standard items | pH (25℃) | 6.5~8.2 | 6.0~8.0 | ○ | ○ |
| | Electric conductivity (25℃) (mS/m) | 80 or less | 30 or less | ○ | ○ |
| | Chloride ions (mg$Cl^-$/L) | 200 or less | 50 or less | ○ | |
| | Sulfate ions (mg$SO_4^{2-}$/L) | 200 or less | 50 or less | ○ | |
| | Acid consumption (pH4.8) (mg$CaCO_3$/L) | 100 or less | 50 or less | | ○ |
| | Total hardness (mg$CaCO_3$/L) | 200 or less | 70 or less | | ○ |
| | Calcium hardness (ma$CaCO_3$/L) | 150 or less | 50 or less | | ○ |
| | Ionized silica (mg$SiO_2$/L) | 50 or less | 30 or less | | ○ |

Note) As the JRA standard, other items are also listed for your reference.

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