HITACHI WATER-COOLED PACKAGED AIR-CONDITIONERS WITH SCREW TYPE COMPRESSORS

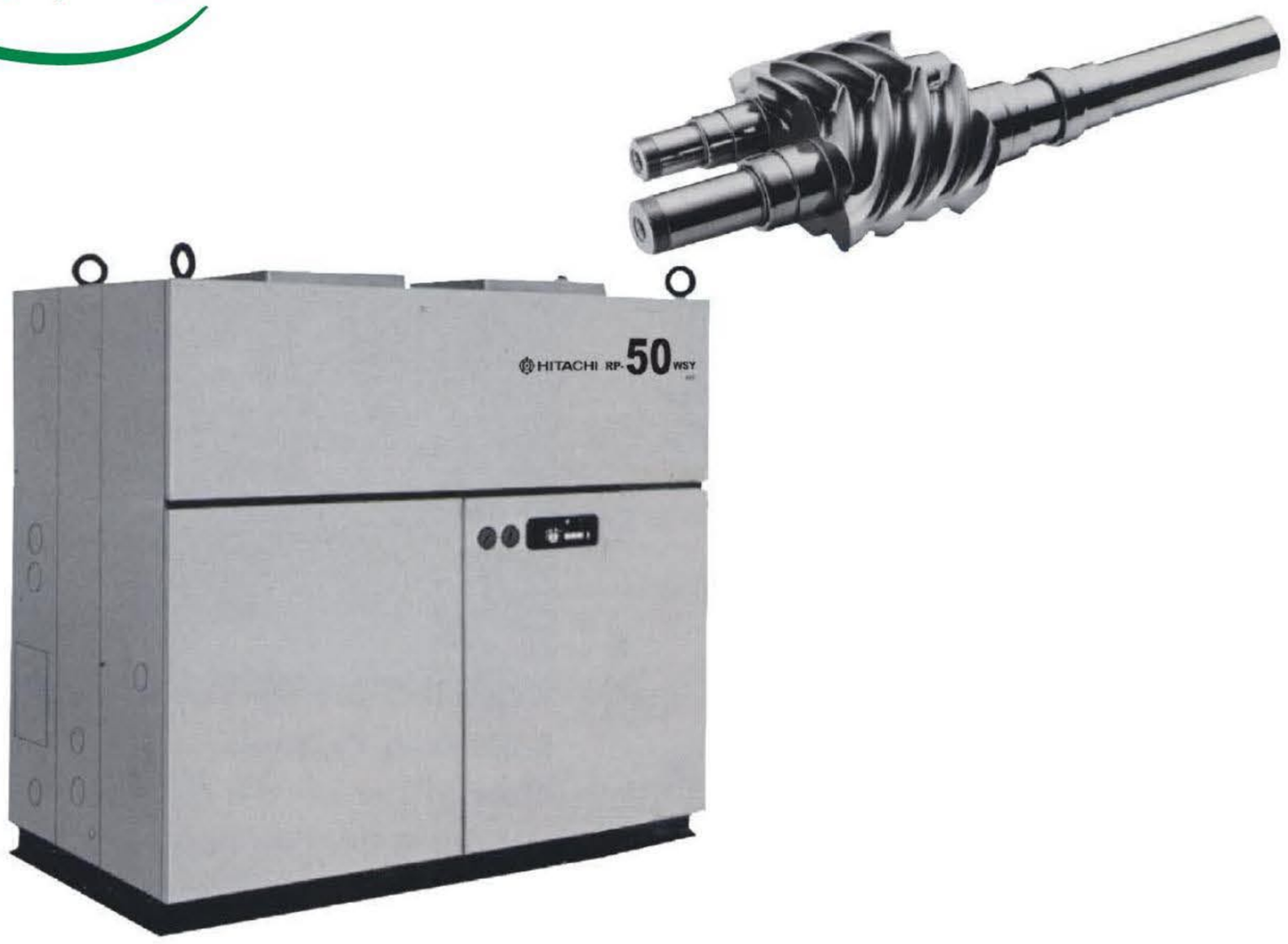
HITACHI
Inspire the Next

Technical Catalog

Model

RP-50WSYG

Zero Ozone Depletion Potential
R407C



This series of HITACHI large capacity water-cooled packaged air conditioners has been designed for direct-expansion and ducted system air conditioning with the latest technological features. The units are equipped with HITACHI screw type semi-hermetic compressor(s) which has been developed by HITACHI's own technology. These screw type compressors are provided with HITACHI's patented new profile rotors to achieve high efficiency and reliability.
HITACHI has introduced the screw compressors to the market for applied refrigeration equipment, water-cooled water chillers, air-cooled water chillers and heat pumps. These units have been highly evaluated in the engineering field of air conditioning, concerning low noise, less vibration, high efficiency and high reliability.

Based on these experiences and requirement of market demands, HITACHI has introduced packaged air conditioners with the screw type compressors.
The unit is completed in an enclosed cabinet, wired, charged and tested in our factory.
Several types of optional components are available to be provided with the unit, according to customer's request, such as increasing of fan revolution, mounting hot water or steam heaters, a spray type humidifier, an operation hour counter, a fuse-free breaker, phase-failure relay, an alarm buzzer, several pilot lamps, a failure indicator, a water failure relay and electric terminals connected for remote controls.

TC-09001, 2009

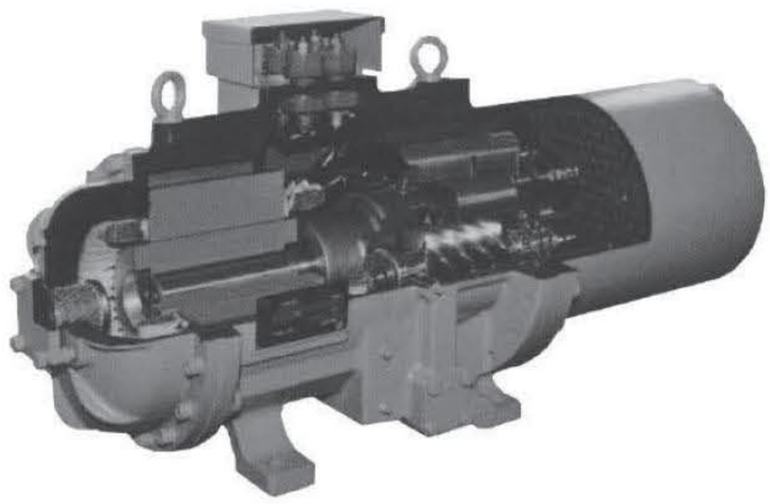
1. Features

Low Noise, Less Vibration and High Reliability

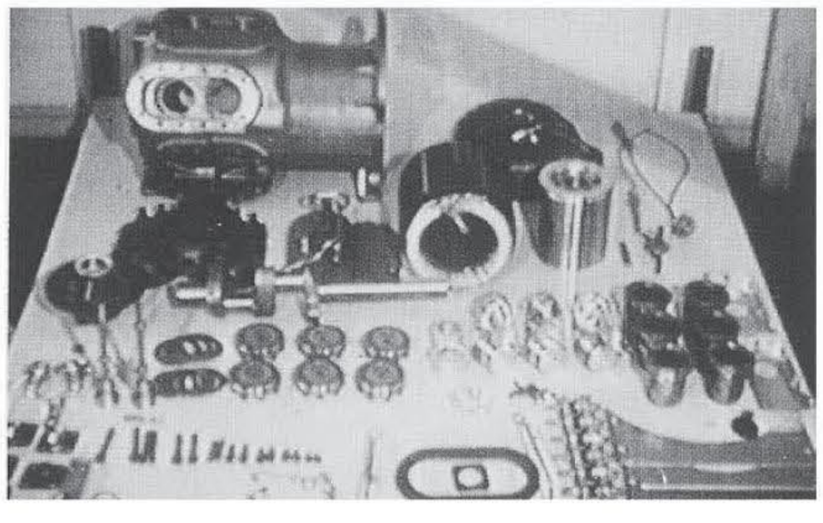
HITACHI's latest innovative technology is collected in the units, such as the screw compressors, THERMO-EXCEL tubes for condensers, super SLIT FINs with inner-grooved tubes for evaporators and solid state controls for operation and protection.

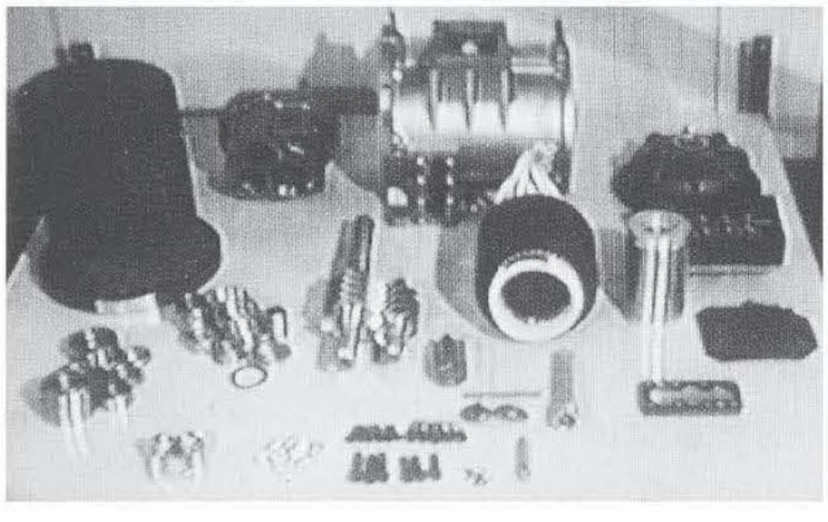
Screw Compressors

HITACHI semi-hermetic compressors, which are the screw type, are one of the most progressive compressors utilized throughout the world today. The compressor features very simple construction, comprising newly-developed patented profile rotors, which consist of a five-lobe male rotor and a six-interlobe female rotor, to achieve high efficiency and reliability.



* Less Vibration: The amplitude of the vibration is only 7 microns on the top of the compressor.
* Low Noise: The operation sound of the air conditioners is extremely low when compared with the sound of the reciprocating type.
* High Reliability: Reliability is based on the simplicity of construction, or elimination of components. The number of components utilized for our screw compressors are approximately one-tenth the number when compared with the number of components utilized for the HITACHI reciprocating compressors in the same capacity range. This fact indicates that the reliability of the screw compressor will be increased by, for example, as much as ten times when compared with the reciprocating compressor.



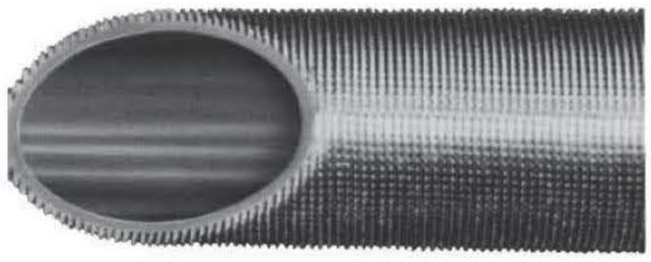


FEATURES

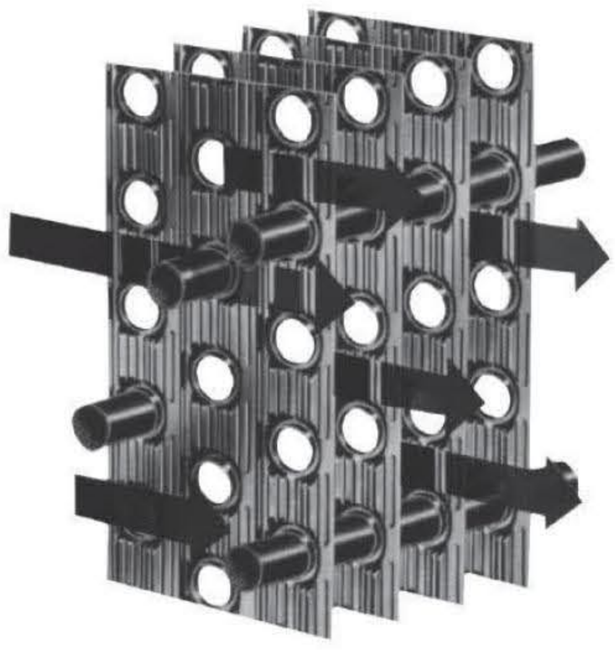
Heat Exchangers

The patented THERMO-EXCEL tube, super SLIT FIN and inner grooved tube have been developed by HITACHI and highly evaluated on the worldwide scale.

* Highly-Efficient THERMO-EXCEL Tube: HITACHI's patented THERMO-EXCEL tubes are equipped with our water-cooled condensers which have improved heat transfer efficiency.



* Highly-Efficient Super SLIT FIN: HITACHI's patented super SLIT FINs tubes are equipped with our evaporators which have improved heat transfer efficiency and have increased compactness.

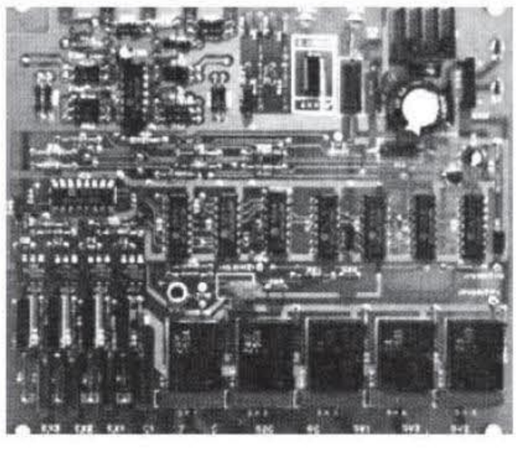


Solid State Controls

Most of the electric control devices have been replaced with electronic devices: multi-step thermostat, a star-delta starting timer, a short cycling operation protection timer, an unloaded starting timer and several relays have been replaced. These devices are mounted and connected in a printed circuit. The solid state controls have improved reliability of the units.

Partial Load Efficiency

The recent worldwide tendency for air conditioning system planning of large buildings is to consider partial load efficiency in the planning stage. The capacity of the air conditioning system is usually selected at the maximum required heat load of the building. However, mean heat load through a year or during a cooling operation period is far less than the system capacity. Therefore, efficiency of the system should not only be evaluated at the full-load point, but also the partial-load point.
The coefficient of performance or COP of our units at the partial-load points are excellent as well as at the full-load point.



2. General Data

Model			RP-50WSYG
Nominal Cooling Capacity		kcal/h W Btu/h	150,000 174,400 595,200
Capacity Control		%	100, 75, 50, 0
Starting Method			Star-Delta Starting
Cabinet Finishing			Synthetic Resin Paint Baked on Finished Steel Plate
Color	Front		Beige (MUNSELL Code: 2.5Y 8/2)
	Side		Feible Gray (MUNSELL Code: 10YR 7.5/0.5)
Outer Dimensions			
Height		mm (in.)	1,850 (72-13/16)
Width		mm (in.)	2,000 (78-3/4)
Depth		mm (in.)	1,250 + 90 (49-3/16 + 3-9/16)
Net Weight		kg (lbs.)	1,300 (2,870)
Refrigerant			R407C (Factory-Charged)
Flow Control			Thermal Expansion Valve
Number of Circuits			1
Compressor			Semi-Hermetic Screw Type
Model			4005SC-H
Quantity			1
Evaporator			Multi-Pass Cross-Finned Tube Type
Condenser			Shell-and-Tube Type
Evaporator Fan			Multi-Blade Centrifugal Fan
Nominal Air Flow		m^3/min. m^3/s (cfm)	450 7.5 (15,900)
Motor		kW (hp)	11 (15)
Quantity			1
Operation Control and Indication			Electronic Thermostat, Operation Switch (Ventilation, Cooling and Heating Operation), Pilot Lamps (White and Green Lamps)
Protection and Safety Control			Check Valve, High and Low Pressure Switch, Mercury Overcurrent Relay, Compressor Motor Internal Thermostat, Crankcase Heater, Pressure Relief Valve, Relay for Reverse Turn Protection, Discharge Gas Thermostat
Connections			
Condenser Water			Female Piping Thread Screw (Prepared on Both Sides)
Size	Inlet	FPT	3
	Outlet	FPT	3
Condensate Drain			Female Piping Thread Screw (Prepared on Both Sides)
Size		FPT	1-1/2
Emergency Drain			Female Piping Thread Screw (Prepared on Both Sides)
Size		FPT	1
Wiring Hole			Knockout Hole (Prepared on Both Sides)
Size		mm (in.)	112 (4-7/16)
Approximate Packing List			
Shipping Weight		kg (lbs.)	1,700 (3,750)
Height		mm (in.)	2,230 (87-13/16)
Width		mm (in.)	2,240 (88-3/16)
Depth		mm (in.)	1,520 (59-13/16)
Measurements		m^3	7.59

NOTES:

1. The nominal cooling capacity is based on the following conditions of JIS B 8616-1984.
   - Evaporator Air Inlet Temperature: 27°C DB (80°F DB), 19.5°C WB (67°F WB)
   - Condenser Water Inlet Temperature: 24°C (75°F)
   - Condenser Water Outlet Temperature: 35°C (95°F)
2. The numbers in the parentheses shall be the conversion values from the metric values.

Working Range

Evaporator Air Inlet Temperature at Standard Air Flow
- Maximum: 32°C DB/22.5°C WB (90°F DB/72.5°F WB)
- Minimum: 19.5°C DB/14°C WB (67°F DB/57°F WB)

Condenser Water Outlet Temperature
- Maximum: 38°C (100°F)
- Minimum: 21°C (70°F)

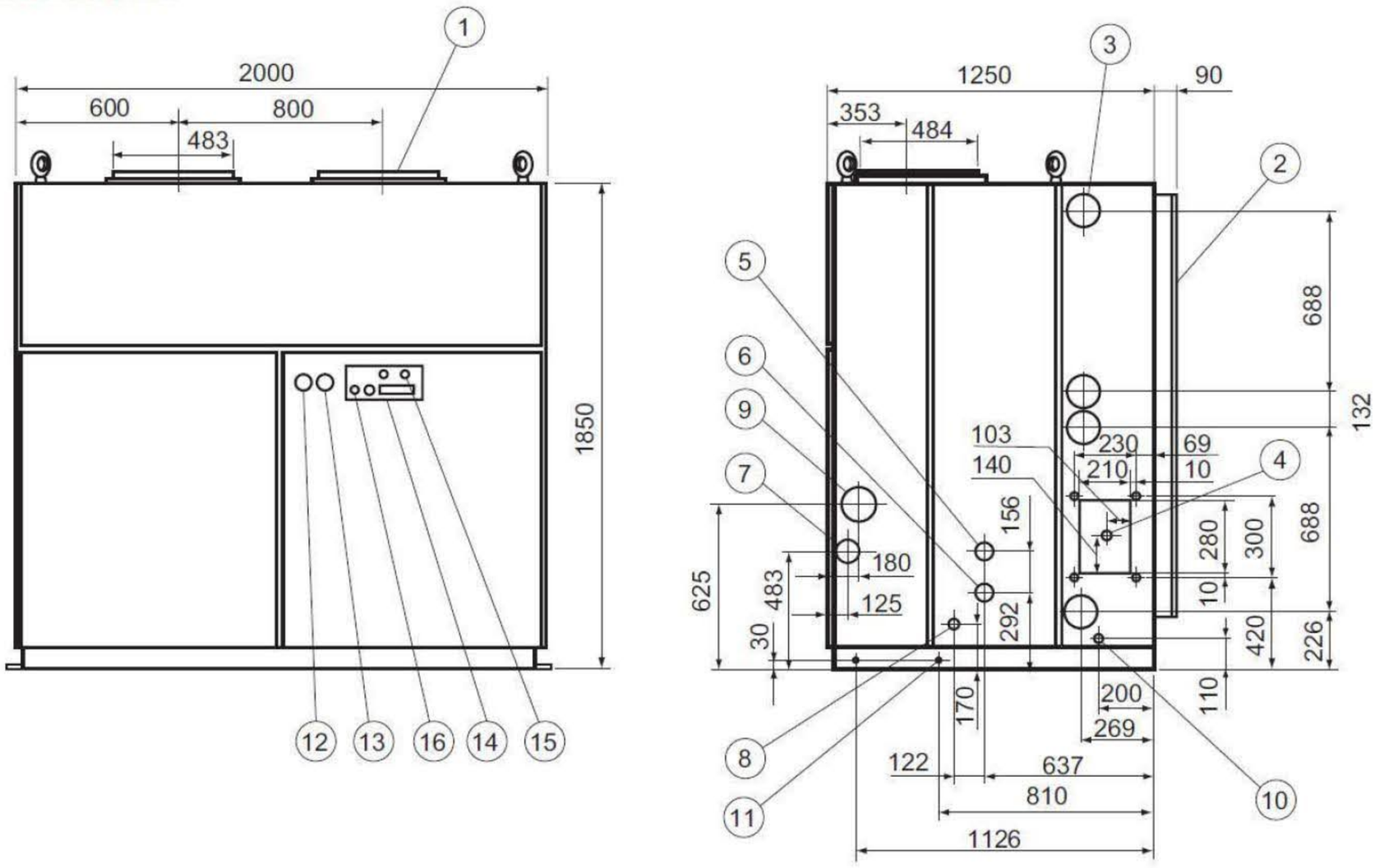
Standard Power Supply

Main (3φ)		Control (1φ)	
440V	60 Hz	220V	60 Hz

Units for 440V, 60 Hz are available as order basis.

3. Dimensional Data

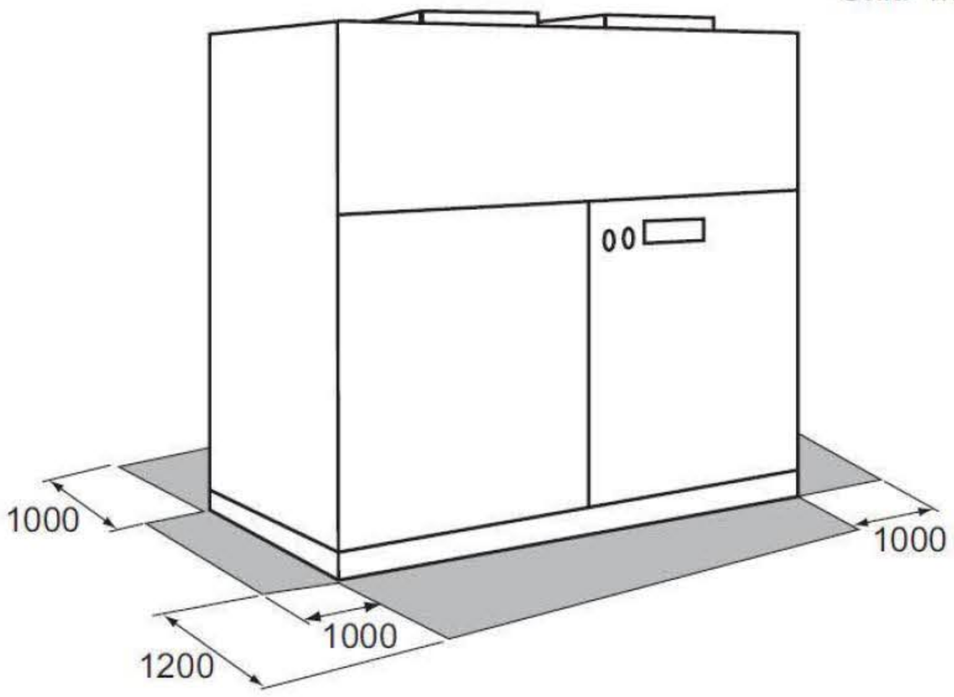
3.1 Unit Dimensions



Mark	Name	Mark	Name
1	Air Outlet (Duct Connection)	9	Connecting Hole for Refrigerant Exhaust from Pressure Relief Valve
2	Air Inlet (Duct Connection)	10	Condensate Drain Connection
3	Connecting Hole for Optional Heater	11	Emergency Drain Connection
4	Piping Connection Hole for Optional Humidifier	12	Compound Gauge (High Pressure)
5	Condenser Water Inlet	13	Compound Gauge (Low Pressure)
6	Condenser Water Outlet	14	Control Panel Cover
7	Connecting Hole for Power Source	15	Pilot Lamp
8	Connecting Hole for Refrigerant Exhaust from Fusible Plug	16	Reset Button for High Pressure Cut Out

3.2 Operation Space

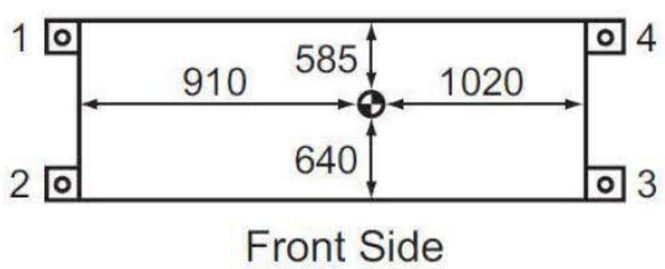
Unit: mm



NOTE:
Ducting space is not included.

3.3 Weight Balance

Unit: mm



⊕: Center of Gravity

Weight Distribution (kg)				Approximate Operating Weight (kg)
Location				
1	2	3	4	
375	340	330	305	1,350