

HITACHI WATER-COOLED WATER CHILLERS

-SCREW TYPE-

HITACH

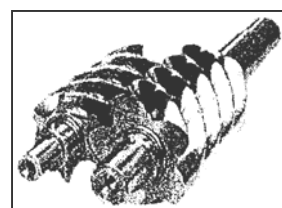
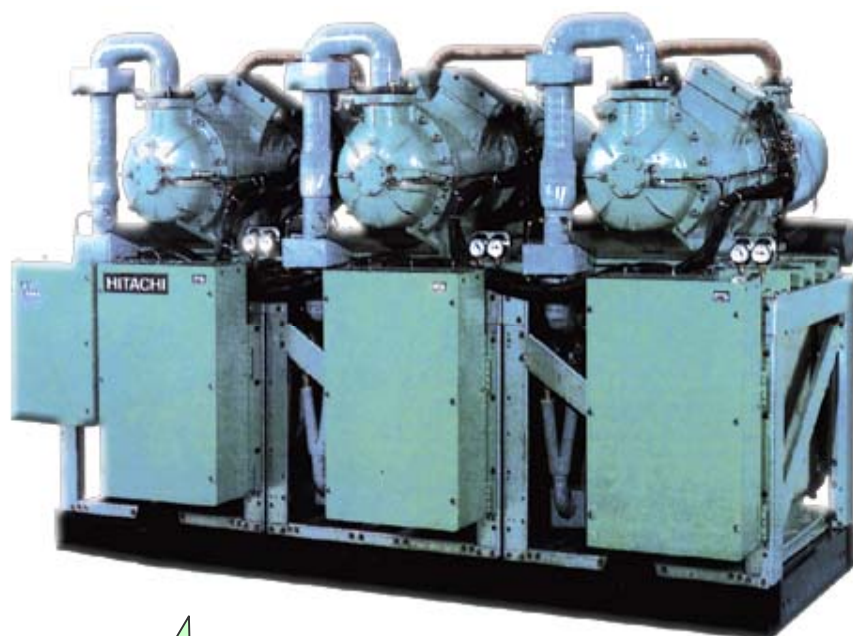
Nominal Capacity Range:

126kW to 1,233kW
108,500kcal/h to 1,060,000kcal/h

Technical Catalog I

—Design Information—

Models: RCU40SYCZ(1)
RCU50SYCZ(1)
RCU60SYCZ(1)
RCU80SYCZ(1)
RCU100SYCZ(1)
RCU120SYCZ(1)
RCU150SYCZ(1)
RCU180SYCZ(1)
RCU200SYCZ(1)
RCU240SYCZ(1)
RCU300SYCZ(1)
RCU400SYCZ(1)

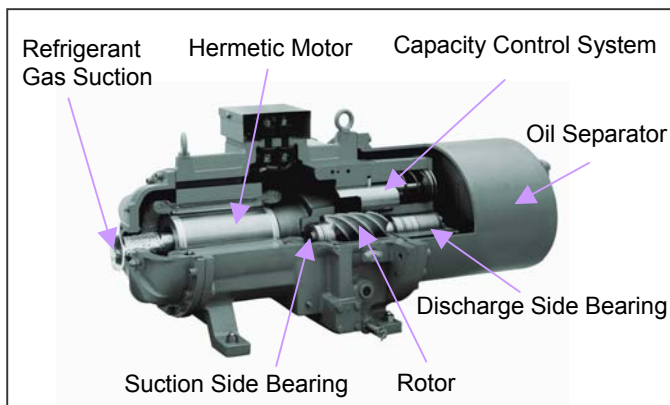


These HITACHI water-cooled water chillers are designed for all the conveniences of chilled water air-conditioning systems, especially for hotels, stores, hospitals and process cooling applications of modern manufacturing industries. HITACHI water-cooled water chillers are equipped with newly-developed HITACHI-SRM semi-hermetic screw compressors which feature simplicity of construction by eliminating such items as pistons, connecting rods, valve plates, oil pumps and mechanical

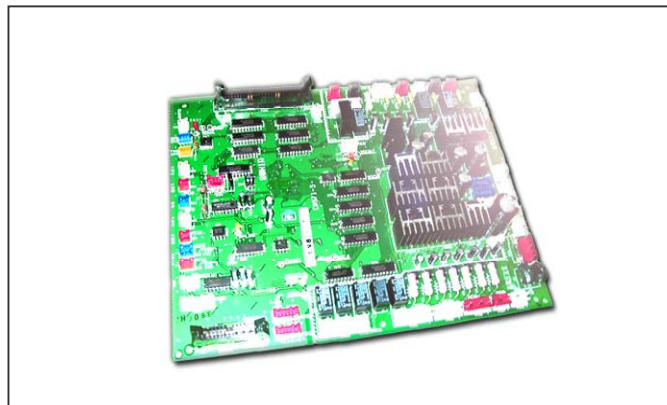
linkages for capacity controls in the reciprocating compressors. These features result in lower noise and lower vibration, reliable long period operation, and installation on any floor of the building. The units are composed of a compressor(s), a condenser(s), a direct-expansion water cooler, a thermal expansion valve(s), and auxiliary and control equipment. The units can be operated with the utmost simplicity.

FEATURE

The Combination of HITACHI Screw Compressor and Microcomputer Makes HITACHI Water-Cooled Water Chillers Inclining to Perfect.



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High Efficiency

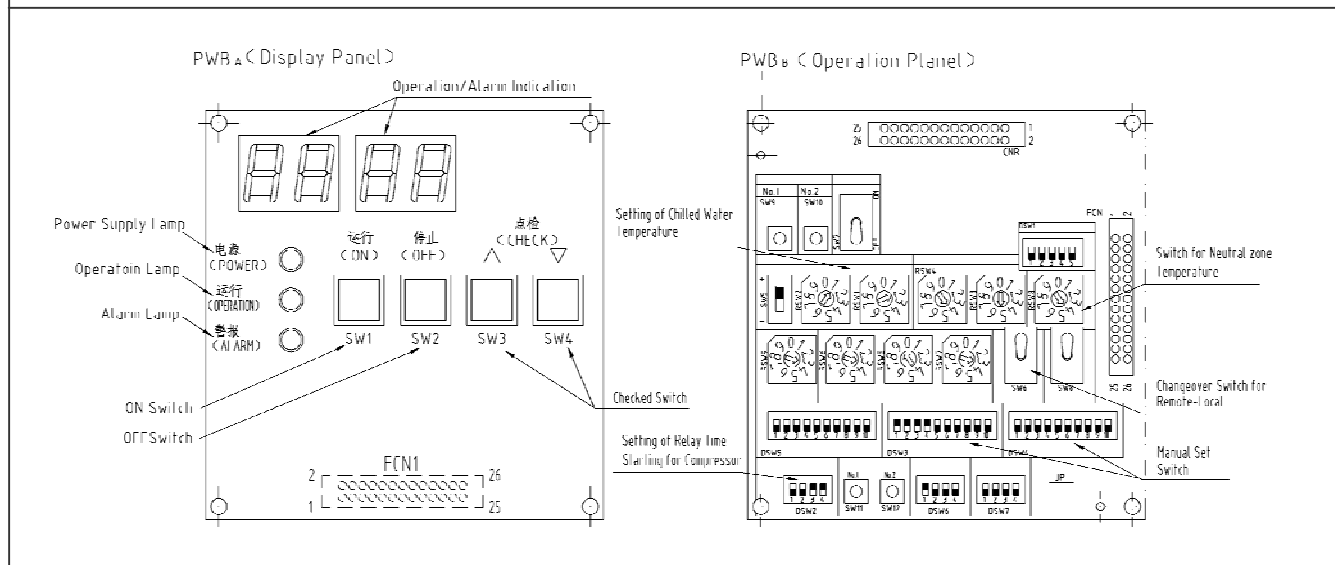
Precise Temperature Control

Various Functions

Micro-processor control for various functions

A micro-processor has been applied to the new models for following various functions.

- Alarm indication for each cycle by 7-segment
- Rotating control of compressor starting order
- Current limitation control
- Automatic start after instantaneous power failure.
- Remote /location switch.
- Communication adapter connecting the unit to BMS (Building Management System) is a optional accessory, for the details, please refer to technology catalog I.



Liquid crystal screen display

- Big colorful liquid crystal touch panel(option)
- Provides English and Chinese display interfaces.
- Leave-word board function(for shift)
- Real time Information
- Return to factory setting
- Time starting function
- Communication adapter provides communication with RS485 physics connection to BMS. (Building Management System)



NEW!

HITACHI

Lower Noise、 Lower Vibration and Reliable Long Period Operation... The Hitachi Screw Water Chiller Can Meet Your Requirements !!

HITACHI'S Semi-Hermetic Screw Compressors

The newly-developed HITACHI semi-hermetic screw compressors feature long life and quiet operation due to simplicity of construction when compared with the conventional reciprocating compressors.

A Symmetrical Rotor Profile and Other Features.

This profile of the compressor rotor, five-six (male and female) type, assures excellent efficiency even in high compression ranges, in addition to these uniquely-profile rotors, the following features are incorporated.

- Use of special bearing, resulting in long life and high reliability
- Patented capacity control system, enabling simple control system.
- High precision and high-grade finishing rotors, enabling no oil-cooling system.

Automatic Capacity Control

An Automatic capacity control mechanism enables the unit to perform economical and energy-saving operation depending on various conditions.

Additionally, two(2) independent refrigeration cycles are provided for model RCU80SYCZ(1)、RCU100SYCZ(1) and RCU120SYCZ(1), Three(3) independent refrigeration cycles are provided for model RCU150SYCZ(1)、RCU180SYCZ(1) and RCU300SYCZ(1), Four(4) independent refrigeration cycles are provided for model RCU200SYCZ(1)、RCU240SYCZ(1) and RCU400SYCZ(1), to avoid complete shutdown and ensure 50% of capacity provided at the less even in maintenance.

Easy for Maintenance

Equipped with accessibility components such as Pressure Relief Valve and Oil Sight Glass, easy maintenance is obtained. For RCU40SYCZ(1)~240SYCZ(1), the end plate of the condenser is removable.

Only One Power Source Required

The Unit equipped with Two (2) compressors needs only one (1) power supply, this system can reduce customer's cost on the power supply equipment.

Factory-Charged

The refrigeration cycle is charged with refrigerant and sealed under the strict quality control, therefore installation and operation can be performed in a short period of time.

Factory-Wires

Only power wiring and water piping are required in the field. for RCU400SYCZ(1) the common water piping and control circuit wiring between two units are required in the field.

Most Reliable Protective and Ancillary Components

The units are protected against any assumed failure of operation, based on the following components:

Electronic Timer for Compressors, Three-Phase Quick Response Overcurrent Relay, Internal Thermostats for Compressor Motors, Freeze Protection Thermostats. Pressure Relief Valve, Oil Sight Glass, Oil Heater, Fusible Plug and Reverse-Phase Protection Relays for Compressors.

Timer Counter

This timer counter indicates the operation hour of the screw compressor; therefore, accurate maintenance time can be checked with this timer counter.

Standard Accessories

The following accessories are supplied with the unit:

1. Vibration-Proof Rubber Mats
2. Foundation Bolts

The combination of these mats and bolts effectively minimizes noise and vibration, and is coupled with facilitated installation procedures.

- 3 For RCU300SYCZ (1), RCU400SYCZ (1), Water strainers for the inlets of the chilled and condenser water

(1) These strainers shall be used at the inlets of the chilled and condenser water.

(2) The internal filters of these strainers can be washed without removing the strainer bodies.

GENERAL DATA

Model		Standard		RCU40SYCZ	RCU50SYCZ	RCU60SYCZ	RCU80SYCZ	RCU100SYCZ	RCU120SYCZ
		Liquid Crystal Display		RCU40SYCZ1	RCU50SYCZ1	RCU60SYCZ1	RCU80SYCZ1	RCU100SYCZ1	RCU120SYCZ1
Nominal Cooling Capacity		50Hz	W	125,000	156,000	189,000	250,000	312,000	378,000
			kcal/h	107,500	134,000	162,000	215,000	268,000	324,000
Capacity Control			—	Continuous Capacity Control					
			%	100-33, 0	100-25, 0		100-13.5, 0	100-12.5, 0	
Outer Dimensions	Depth	mm	1,667	1,667	1,667	2,836	2,836	2,836	
	Width	mm	881	881	881	935	935	935	
	Height	mm	1,482	1,507	1,507	1,482	1,507	1,507	
Net Weight		kg	850	970	1,000	1,650	1,850	1,950	
Refrigerant	Type	—	R-22						
	Flow Control	—	Thermal Expansion Valve						
	Number of Circuits	—	1				2		
Compressor	Type	—	Semi-Hermetic Screw Type						
	Model	—	4005SCC-Z	5005SCC-Z	6005SCC-Z	4005SCC-Z	5005SCC-Z	6005SCC-Z	
	Quantity	—	1	1	1	2	2	2	
Condenser		—	Shell-and-Tube Type						
Water Cooler		—	Shell-and-Tube, Dry Expansion Type						
Safety Devices		—	Three-Phase Quick Response Overcurrent Relay, High-Pressure Switch, Low-Pressure Switch, Oil Heater, Internal Thermostat for Compressor Motor, Fusible Plug, Freeze Protection Thermostat, Reverse Phase Protection Relay, Discharge Gas Thermostat, Operation Hour-Meter and Pressure Relief Valve						
Piping Connections for Condenser	Inlet	Rc	3	3	3	4	4	4	
	Outlet	Rc	3	3	3	4	4	4	
Piping Connections for Water Cooler	Inlet	R	3	3	3	With φ142 Inner Diameter Companion Flange			
	Outlet	R	3	3	3				
Wiring Holes(φ)		Main	mm	64.5			115		
		Control Circuit	mm	32.5			32.5		
Shipping Weight		kg	970	1,090	1,120	1,818	2,018	2,118	
Shipping Dimension	Depth	mm	1,810			2,960			
	Width	mm	1,080			1,130			
	Height	mm	1,735			1,765			

Notes:

1. The nominal cooling capacities are based on the following conditions:

Chilled Water Inlet/Outlet Temperature 12 /7
Condenser Water Inlet/Outlet Temperature 30 /35

2. Applicable power supplies

Main Power Source (3 ϕ) Control Power Supplies (1 ϕ)
380V 50Hz 220V 50Hz
415V 50Hz 240V 50Hz

3. Working range

Condenser Water Outlet Temperature 22 to 37
Condenser Water Temperature Difference 3.5 to 10
Chilled Water Outlet Temperature 5 to 20
Chilled Water Temperature Difference 2.5 to 10

- 4 Companion flanges are factory supplied.

- 5 Communication adapter connecting the unit to BMS (Building Management System) is an optional accessory, please get in touch with HITACHI or HITACHI distributor if required. For details, please refer to Technical Catalog I.

- 6 The unit with liquid crystal screen display differs from the unit with segment code display in electric box, however, both have the same outer dimensions.

Model	Standard		RCU150SYCZ	RCU180SYCZ	RCU200SYCZ	RCU240SYCZ	
	Liquid Crystal Display		RCU150SYCZ1	RCU180SYCZ1	RCU200SYCZ1	RCU240SYCZ1	
Nominal Cooling Capacity		50Hz	W	467,000	565,000	623,000	756,000
			kcal/h	402,000	486,000	536,000	648,000
Capacity Control			—	Continuous Capacity Control			
			%	100-8.3, 0		100-12.5, 0	
Outer Dimensions	Depth	mm	3,110	3,110	2,940	2,940	
	Width	mm	1,171	1,171	1,714	1,714	
	Height	mm	1,688	1,688	2,210	2,210	
Net Weight		kg	3,000	3,150	4,300	4,550	
Refrigerant	Type	—	R-22				
	Flow Control	—	Thermal Expansion Valve				
	Number of Circuits	—	3			4	
Compressor	Type	—	Semi-Hermetic Screw Type				
	Model	—	5005SCC-Z	6005SCC-Z	5005SCC-Z	6005SCC-Z	
	Quantity	—	3	3	4	4	
Condenser		—	Shell-and-Tube Type				
Water Cooler		—	Shell-and-Tube ,Dry Expansion Valve				
Safety Devices		—	Three-Phase Quick Response Overcurrent Relay, High-Pressure Switch, Low-Pressure Switch, Oil Heater, Internal Thermostat for Compressor Motor, Fusible Plug, Freeze Protection Thermostat, Reverse Phase Protection Relay, Discharge Gas Thermostat, Operation Hour-Meter and Pressure Relief Valve.				
Piping Connections for Condenser	Inlet	Rc	With φ142 Inner Diameter Companion Flange				
	Outlet	Rc					
Piping Connections for Water Cooler	Inlet	R	With φ142 Inner Diameter Companion Flange		With φ 167 Inner Diameter Companion Flange		
	Outlet	R					
Wiring Holes (φ)	Main	mm	3×64.5		2×115		
	Control Circuit	mm	32.5		32.5		
Shipping Weight		kg	3,270	3,420	4,658	4,908	
Shipping Dimension	Depth	mm	3,250		3,130		
	Width	mm	1,320		1,923		
	Height	mm	2,000		2,550		

Notes:

1. The nominal cooling capacities are based on the following conditions:

Chilled Water Inlet/Outlet Temperature 12 /7
 Condenser Water Inlet/Outlet Temperature 30 /35

2. Applicable power supplies

Main Power Source (3 ϕ)	Control Power Supplies (1 ϕ)
380V 50Hz	220V 50Hz
415V 50Hz	240V 50Hz

3. Working range

Condenser Water Outlet Temperature	22 to 37
Condenser Water Temperature Difference	3.5 to 10
Chilled Water Temperature Difference	2.5 to 10
Chilled Water Outlet Temperature	5 to 20

- 4 Companion flanges are factory supplied.

- 5 Communication adapter connecting the unit to BMS (Building Management System) is an optional accessory, please get in touch with HITACHI or HITACHI distributor if required. For the details, please refer to Technical Catalog I.

- 6 The unit with liquid crystal screen display differs from the unit with segment code display in electric box, however, both have the same outer dimensions

GENERAL DATA

Model	Standard		RCU300SYCZ		RCU400SYCZ		
	Liquid Crystal Display		RCU300SYCZ1		RCU400SYCZ1		
Nominal Cooling Control		50Hz	W	924,400	1,232,600		
			kcal/h	795,000	1,060,000		
Capacity Control			—	Continuous Capacity Control			
			%	100～8.3, 0		100～12.5, 0	
Outer Dimensions	Depth	mm	2,850		3,880		
	Width	mm	1,750		1,750 (Without Common Field-Supplied Water Piping)		
	Height	mm	1,860		1,860		
Net Weight		kg	4,500		6,000		
Refrigerant	Type	—	R-22				
	Flow Control	—	Thermal Expansion				
	Number of Circuits	—	3		4		
Compressor	Type	—	Semi-Hermetic Screw Type				
	Model	—	10001SCC-Z		10001SCC-Z		
	Quantity	—	3		4		
Condenser		—	Plate Type				
Water Cooler		—	Plate Type				
Safety Devices		—	Three-Phase Quick Response Overcurrent Relay, High-Pressure Switch, Low-Pressure Switch, Oil Heater, Internal Thermostat for Compressor Motor, Fusible Plug, Freeze Protection Thermostat. Reverse Phase Protection Relay, Discharge Gas Thermostat, Suction Gas Temperature Control, Operation Hour-Meter and Pressure Relief Valve.				
Piping Connections for Condenser		Inlet	Rc	Withφ221 Inner Diameter Companion Flange		With Two φ167 Inner Diameter Companion Flanges	
		Outlet	Rc				
Piping Connections for Water cooler		Inlet	R	Withφ221 Inner Diameter Companion Flange		With Two φ167 Inner Diameter Companion Flanges	
		Outlet	R				
Wiring Holes (φ)		Main	mm	3×77.5		4×77.5	
		Control Circuit	mm	32.5		32.5	
Shipping Weight		kg	4,950		3,245×2		
Shipping Dimension	Depth	mm	2,980		2,040		2 modules
	Width	mm	1,930		1,930		
	Height	mm	2,200		2,200		

Notes:

- 1 The nominal cooling capacities are based on the following conditions:

Chilled Water Inlet/Outlet Temperature 12 / 7
 Condenser Water Inlet/Outlet Temperature 30 / 35

- 2 Applicable power supplies

Main Power Source (3φ) Control Power Supplies (1φ)
 380V 50Hz 220V 50Hz
 415V 50Hz 240V 50Hz

- 3 Working range

Condenser Water Outlet Temperature 22 to 37
 Condenser Water Temperature Difference 3.5 to 10
 Chilled Water Outlet Temperature 5 to 20
 Chilled Water Temperature Difference 2.5 to 10

- 4 Companion flanges are factory supplied.

- 5 RCU400SYCZ (1) consists of two modules and makes separate shipping, it is necessary to connect the field-supplied common water piping and control circuitries.

- 6 Chilled and condenser water inlet strainers are the factory-supplied standard accessories for RCU400SYCZ (1) .

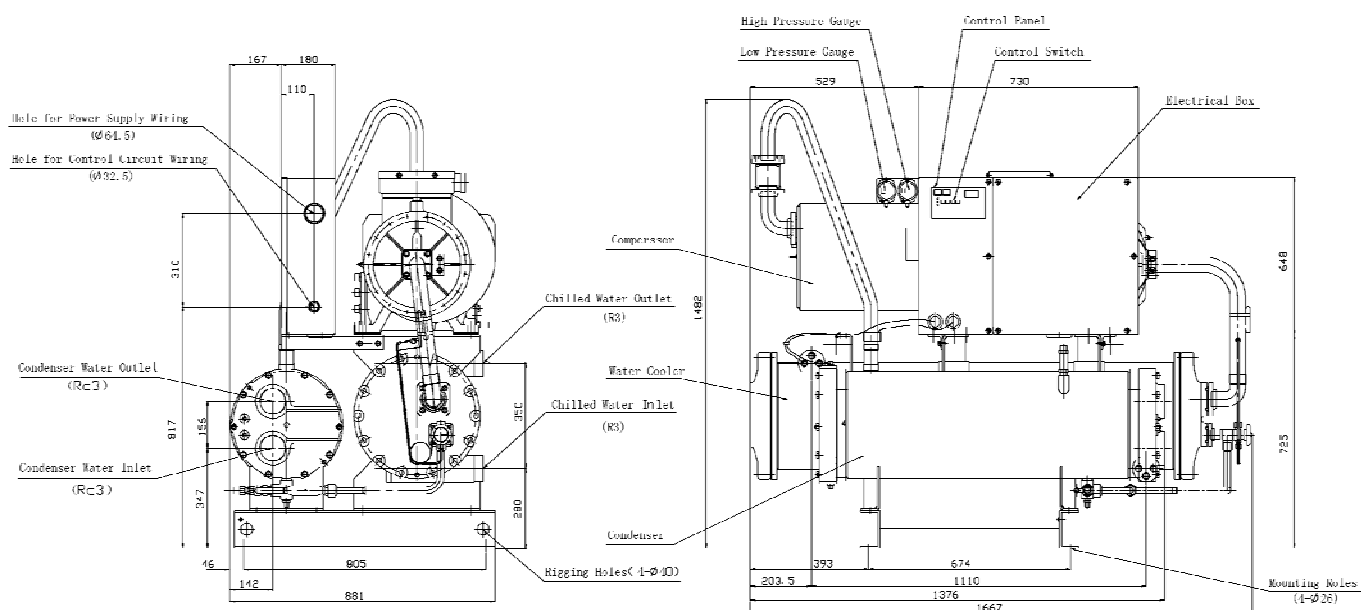
(1) These strainers shall be used at the inlets of chilled and condenser water.

(1)The internal filters of these strainers can be cleaned without removing the strainer bodies.

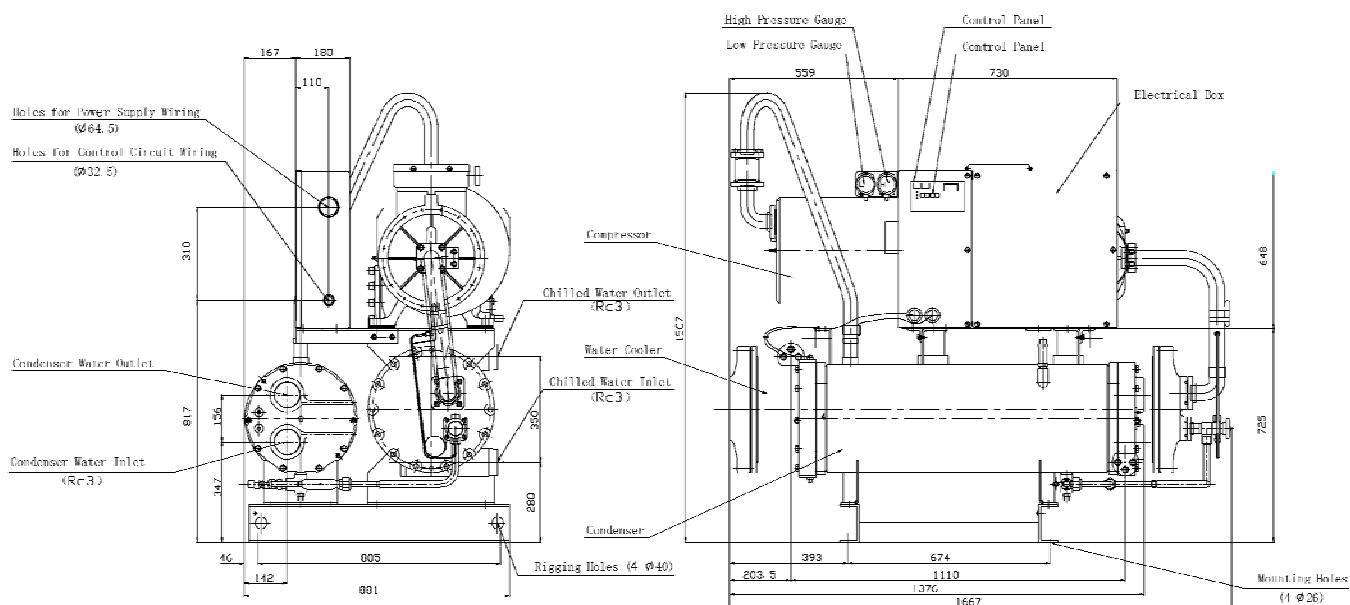
- 7 Communication adapter connecting the unit to BMS (Building Management System) is an optional accessory, please get in touch with HITACHI or HITACHI distributor if required. For the details, please refer to Technical Catalog I.

- 8 The Unit with Liquid crystal screen display differs from the unit with segment code display in electric box, however, both have the same outer dimensions.

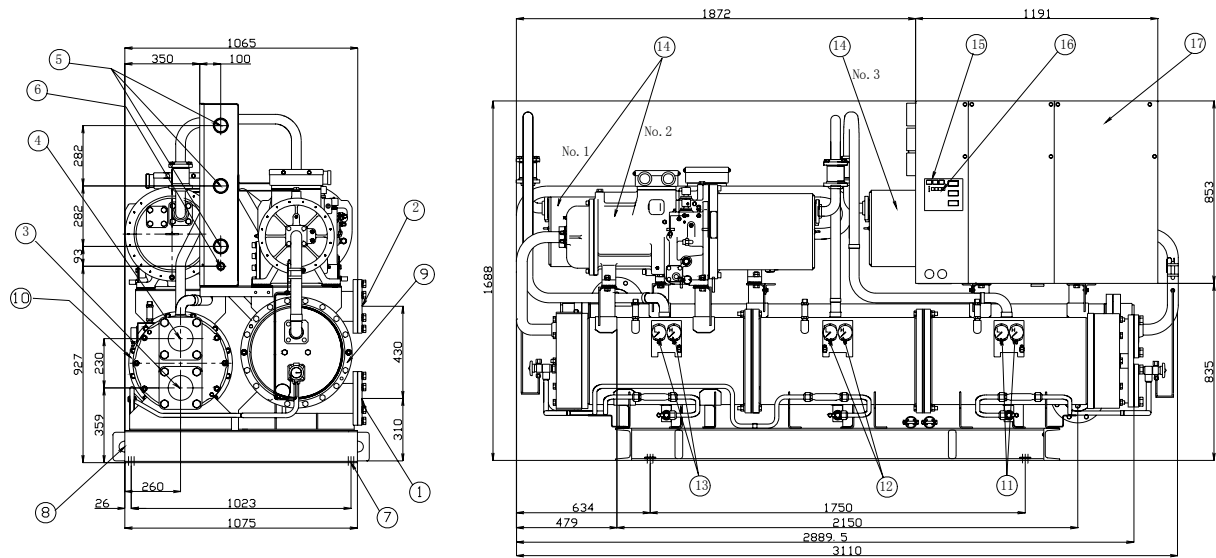
RCU40SYCZ (1)



RCU50、60SYCZ (1)



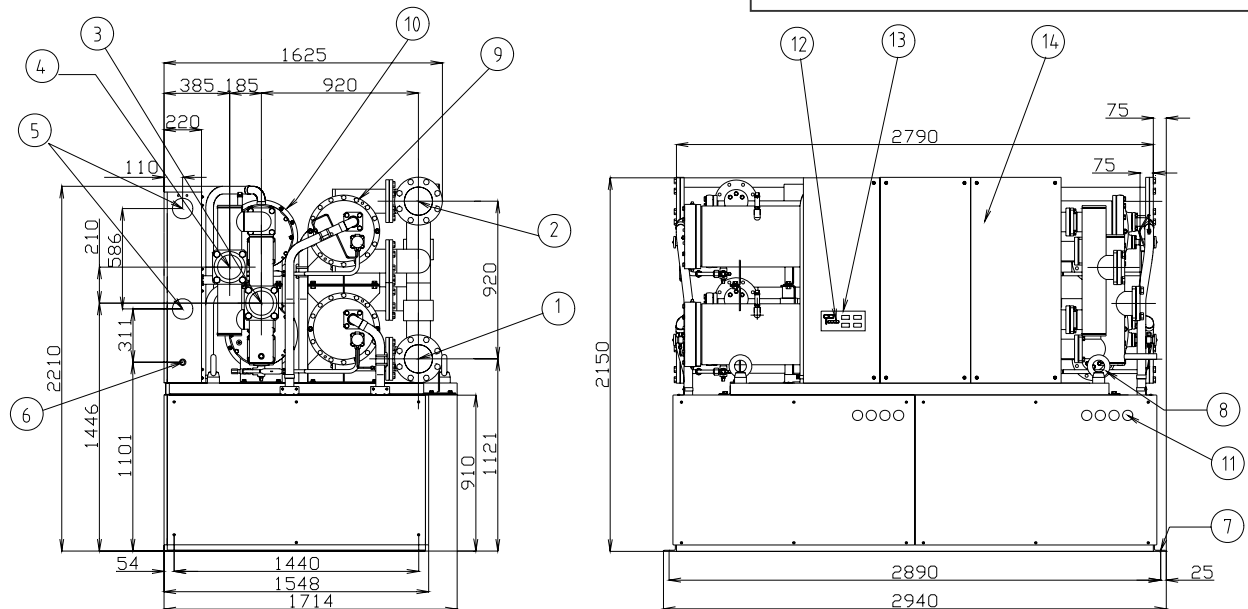
RCU150、180SYCZ (1)



Mark	Name	Remarks
①	Chilled Water Inlet	with $\phi 142$ Inner Diameter Flange
②	Chilled Water Outlet	with $\phi 142$ Inner Diameter Flange
③	Condenser Water Inlet	with $\phi 142$ Inner Diameter Flange
④	Condenser Water Outlet	with $\phi 142$ Inner Diameter Flange
⑤	Holes for Power Supply Wiring	3 $\times \phi 64.5$
⑥	Holes for Control Circuit Wiring	$\phi 32.5$
⑦	Mounting Holes	4- $\phi 26$
⑧	Rigging Holes	4- $\phi 40$
⑨	Water Cooler	
⑩	Condenser	

Mark	Name	Remarks
⑪	No. 3 Pressure Gauges	Low/High Pressure
⑫	No. 2 Pressure Gauges	Low/High Pressure
⑬	No. 1 Pressure Gauges	Low/High Pressure
⑭	Compressor	No. 1, No. 2, No. 3 cycle
⑮	Control Switch	
⑯	Control Panel	
⑰	Electrical Box	

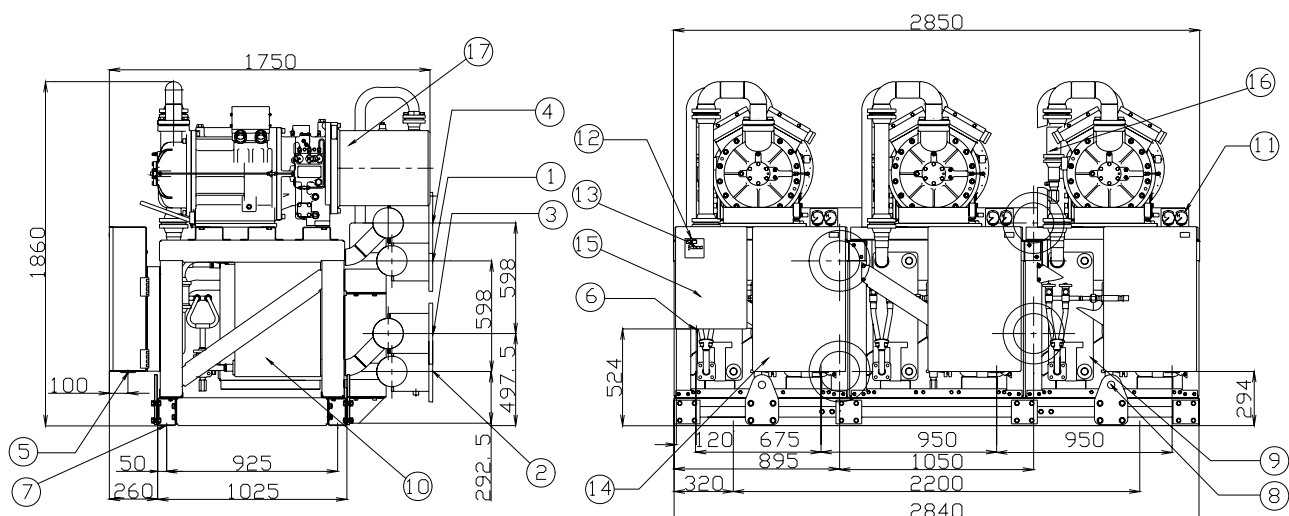
RCU200、240SYCZ (1)



Mark	Name	Remarks
①	Chilled Water Inlet	with $\phi 167$ Inner Diameter Flange
②	Chilled Water Outlet	with $\phi 167$ Inner Diameter Flange
③	Condenser Water Inlet	with $\phi 142$ Inner Diameter Flange
④	Condenser Water Outlet	with $\phi 142$ Inner Diameter Flange
⑤	Holes for Power Supply Wiring	3 $\times \phi 115$
⑥	Holes for Control Circuit Wiring	$\phi 32.5$
⑦	Mounting Holes	4- $\phi 26$
⑧	Eye Bolt	
⑨	Water Cooler	
⑩	Condenser	

Mark	Name	Remarks
⑪	Pressure Compound Gauges	Low/High Pressure
⑫	Control Switch	
⑬	Control Panel	
⑭	Electrical Box	

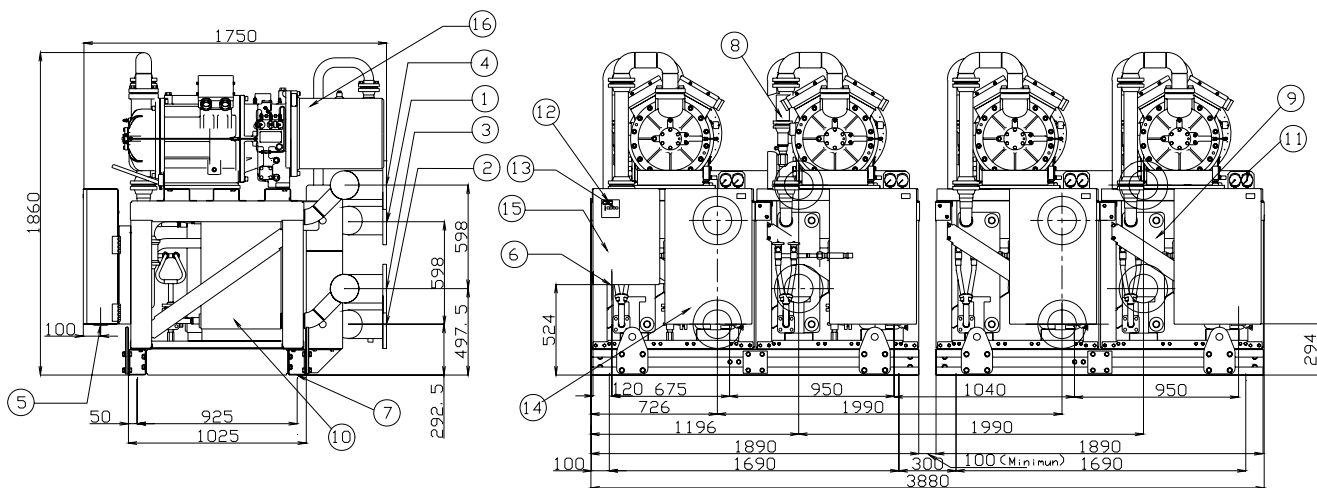
RCU300SYCZ (1)



Mark	Name	Remarks
①	Chilled Water Inlet	with $\varnothing 221$ Inner Diameter Flange
②	Chilled Water Outlet	with $\varnothing 221$ Inner Diameter Flange
③	Condenser Water Inlet	with $\varnothing 221$ Inner Diameter Flange
④	Condenser Water Outlet	with $\varnothing 221$ Inner Diameter Flange
⑤	Holes for Power Supply Wiring	$\varnothing 77.5$
⑥	Holes for Control Circuit Wiring	$\varnothing 32.5$
⑦	Mounting Holes	4- $\varnothing 26$
⑧	Rigging holes	4- $\varnothing 40$
⑨	Water Cooler	
⑩	Condenser	

Mark	Name	Remarks
⑪	Pressure Compound Gauges	Low/High Pressure
⑫	Control Panel	
⑬	Push Button Switch	
⑭	Electrical Box	Main Circuit
⑮	Electrical Box	Control Circuit
⑯	Safety Valve	
⑰	Semi-hermetic Screw Compressors	

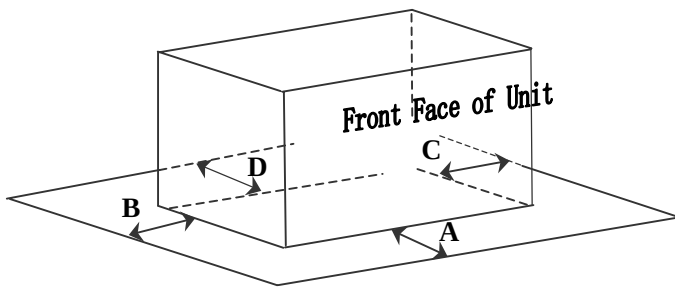
RCU400SYCZ (1)



Mark	Name	Remarks
①	Chilled Water Inlet	with $\varnothing 167$ Inner Diameter Flange
②	Chilled Water Outlet	with $\varnothing 167$ Inner Diameter Flange
③	Condenser Water Inlet	with $\varnothing 167$ Inner Diameter Flange
④	Condenser Water Outlet	with $\varnothing 167$ Inner Diameter Flange
⑤	Holes for Power Supply Wiring	4- $\varnothing 77.5$
⑥	Holes for Control Circuit Wiring	$\varnothing 32.5$
⑦	Mounting Holes	8- $\varnothing 26$
⑧	Safety Valve	
⑨	Water Cooler	
⑩	Condenser	

Mark	Name	Remarks
⑪	Pressure Compound Gauges	Low/High Pressure
⑫	Control Panel	
⑬	Push Button Switch	
⑭	Electrical Box	Main Circuit
⑮	Electrical Box	Control Circuit
⑯	Semi-hermetic Screw Compressors	

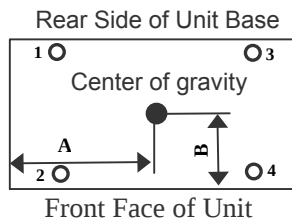
Operation Space



Note: * Rear side operation space depends on connection of field-piping.

Model	Dimensions (mm)			
	A	B	C	D
RCU40SYCZ (1)	1,200	600	600	600
RCU50SYCZ (1)	1,200	600	600	600
RCU60 SYCZ (1)	1,200	600	600	600
RCU80 SYCZ (1)	1,200	600	600	600
RCU100 SYCZ (1)	1,200	600	600	600
RCU120 SYCZ (1)	1,200	600	600	600
RCU150 SYCZ (1)	1,200	600	600	600
RCU180 SYCZ (1)	1,200	600	600	600
RCU200 SYCZ (1)	1,200	600	600	600
RCU240 SYCZ (1)	1,200	600	600	600
RCU300 SYCZ (1)	1,200	600	600	600*
RCU400 SYCZ (1)	1,200	600	600	600*

Weight balance 、 center of gravity and operation weight

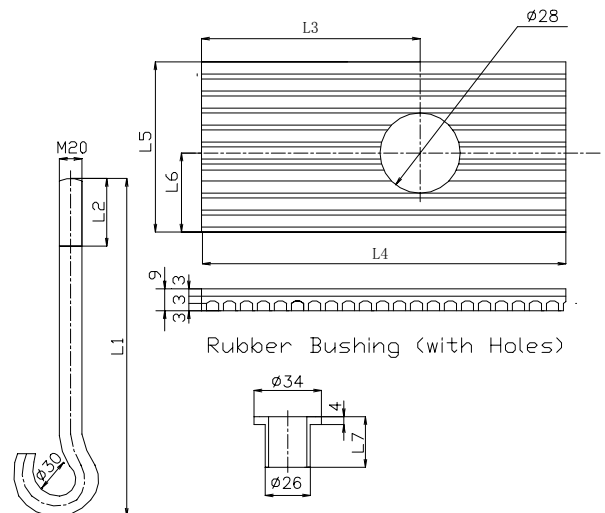


○: Location of Foundation Bolt

Model	Weight Distribution (kg)				Center of Gravity		Operation
	Location				Location		Weight (kg)
	1	2	3	4	A	B	
RCU40 SYCZ (1)	220	195	285	260	830	500	960
RCU50 SYCZ (1)	245	215	325	295	820	500	1,080
RCU60 SYCZ (1)	250	220	330	300	820	500	1,100
RCU80 SYCZ (1)	500	400	530	420	1,480	530	1,850
RCU100 SYCZ (1)	530	420	620	470	1,520	530	2,040
RCU120 SYCZ (1)	550	450	640	490	1,520	530	2,130
RCU150 SYCZ (1)	900	810	830	760	1,475	570	3,300
RCU180 SYCZ (1)	940	840	870	800	1,475	570	3,450
RCU200 SYCZ (1)	1,160	1,250	1,140	1,253	1,460	745	4,785
RCU240 SYCZ (1)	1,205	1,305	1,190	1,285	1,460	745	4,985
RCU300 SYCZ (1)	888	1,536	869	1,507	1,440	650	4,800
RCU400 SYCZ (1)	630	1,036	617	1,017	957	638	3,300×2

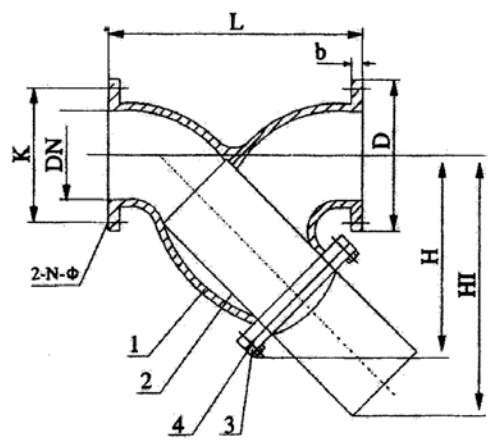
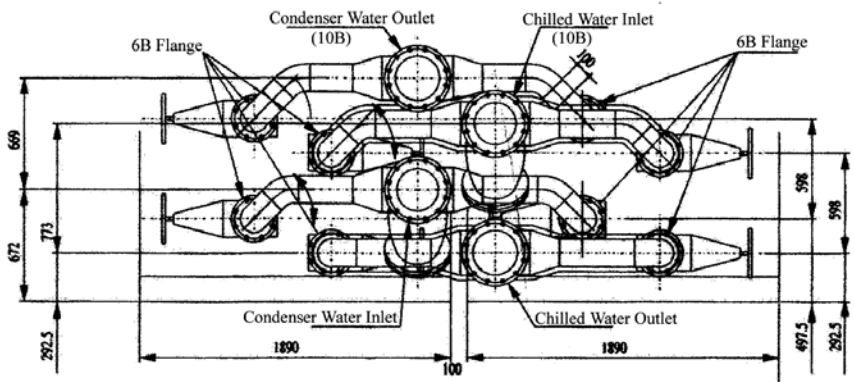
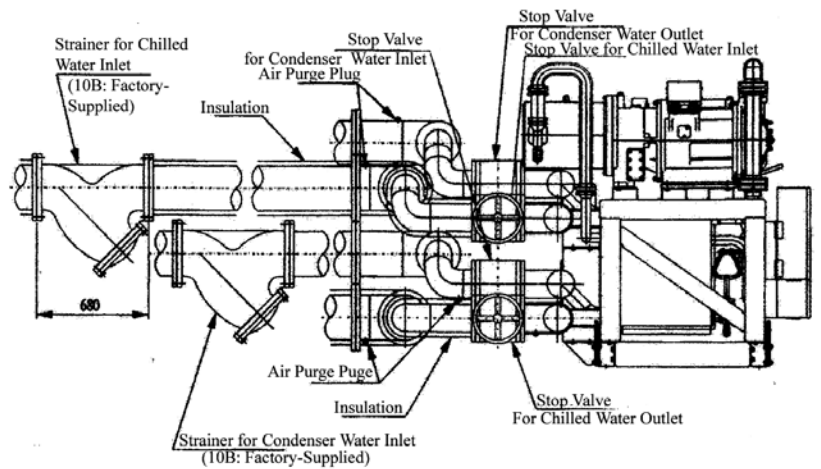
Foundation Bolt and Rubber Mat (Factory-Supplied)

Model	Dimensions(mm)						
	L1	L2	L3	L4	L5	L6	L7
RCU40 SYCZ (1)	300	58	25	150	70	35	17
RCU50 SYCZ (1)	300	58	25	150	70	35	17
RCU60 SYCZ (1)	300	58	25	150	70	35	17
RCU80 SYCZ (1)	300	58	25	150	70	35	17
RCU100 SYCZ (1)	300	58	25	150	70	35	17
RCU120 SYCZ (1)	300	58	25	150	70	35	17
RCU150 SYCZ (1)	300	58	25	230	70	35	17
RCU180 SYCZ (1)	300	58	25	230	70	35	17
RCU200 SYCZ (1)	300	58	25	230	70	35	17
RCU240 SYCZ (1)	300	58	25	230	70	35	17
RCU300 SYCZ (1)	300	58	100	300	50	25	27
RCU400 SYCZ (1)	300	58	100	300	50	25	27



Typical Water Piping for Model RCU400SYCZ(1) (Field-Supply) and Water Strainer

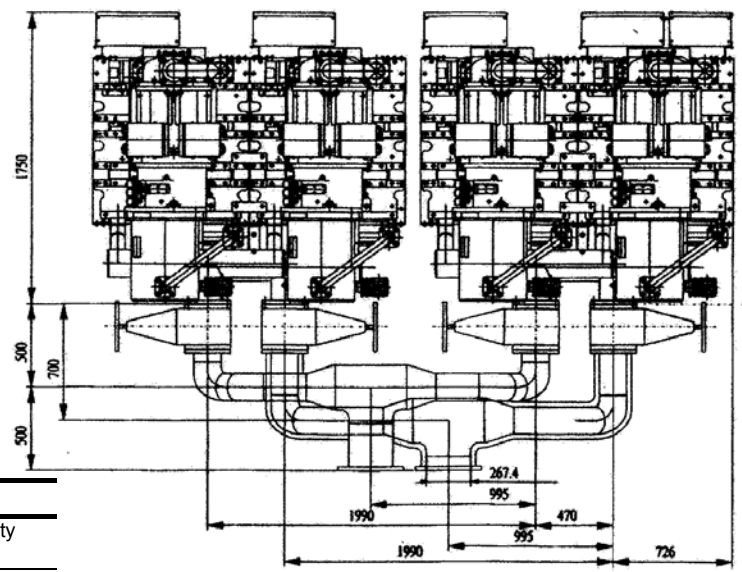
HITACHI



- 1.Valve
- 2.Stainless Steel Strainer
- 3.Valve Cover
- 4.Asbestos Rubber Plate

Figure、Connection、structure Dimension table

Maximum Permissible Pressure: 1.6MPa									
Dimension (mm)	L	K	D	b	N-φ	H	HI	Remark	Quantity
Diameter									
DN200	590	295	340	30	12-22	442	747	RCU300SYCZ(1)	2
DN250	640	355	405	32	12-26	530	875	RCU400SYCZ(1)	2



HITACHI Standard Field Piping (Field Supply)

Water Strainer for RCU300ACZ(1)、RCU400ACZ(1) (Factory-Supplied)

Selection Example

1 Determination the System Requirements.

Calculate the total Load under design conditions.

Given conditions:

Power Source Frequency 50Hz
 Cooling Load 120kW (103,200kcal/h)
 Condenser Water Inlet Temperature 32
 Condenser Water Outlet Temperature 37
 Chilled Water Inlet Temperature 12
 Chilled Water Outlet Temperature 7
 Fouling Factor of Water Cooler $0.86 \times 10^{-4} \text{ m}^2 \cdot /W$
 Fouling Factor of Condenser $0.86 \times 10^{-4} \text{ m}^2 \cdot /W$

2 Select a Matching Model and Read

Performance of the Unit

Select unit model RCU40SYCZ ,according to the conditions mentioned above :condenser water outlet temperature (CDOT) of 37 and chilled water outlet temperature (CLOT) of 7 .

3 Read the Unit Performance of the Model.

The compressor Inlet (IPT), cooling capacity (CCAP),Chilled water follow rate (CFR), water cooler pressure drop (CPD), condenser follow rater (HFR) and condenser pressure drop (HPD) can directly be determined from the table and the figure.In the case where the data cannot directly be determined from the table,the data can be determined by interpolation.

Compressor Input (IPT) 29.6kW
 Cooling Capacity(CCAP) 123kW (105,800 kcal/h)
 Chilled Water Follow Rate (CFR) 21.1m³/h
 Water Cooler Pressure Drop (CPD) 23kPa
 Cooled Water Follow Rate (HFR) 26.2 m³/h
 Condenser Pressure Drop (HPD) 39 kPa
 Condenser Heat Discharge. 152kW

4 Correct the Data

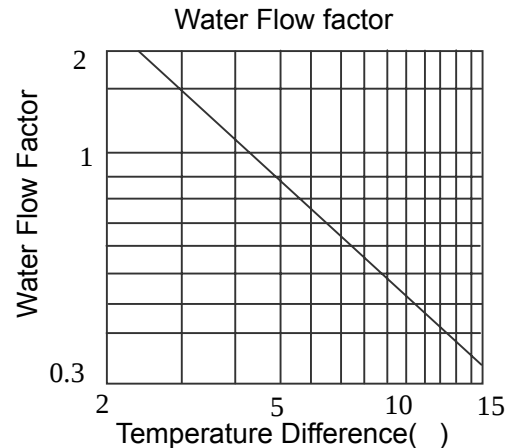
Flow Rate

when the water temperature difference between the inlet and outlet of the condenser or the water cooler is different from 5 temperature difference ,correct the water flow rater of the condenser or water cooler utilizing follow formulas.

$$\text{Corrected Flow Rate} = \frac{5}{\text{Given Temperature Difference (} ^\circ \text{)}} \times \text{Flow Rate From the Table}$$

or

$$\text{Corrected Flow Rate} = \text{Water Flow Factor} \times \text{Flow Rate from the Table}$$



Cooling Capacity and Compressor Input

When the fouling factor is different from $0.86 \times 10^{-4} \text{ m}^2 \cdot /W$.

$/W$,cooling capacity or compressor input will also be different from the value indicated in the cooling capacity table.

The correction formulas are as follow:

$$\text{Corrected Cooling Capacity} = \text{Correction Factor} \times \text{Cooling Capacity Indicated in Table}$$

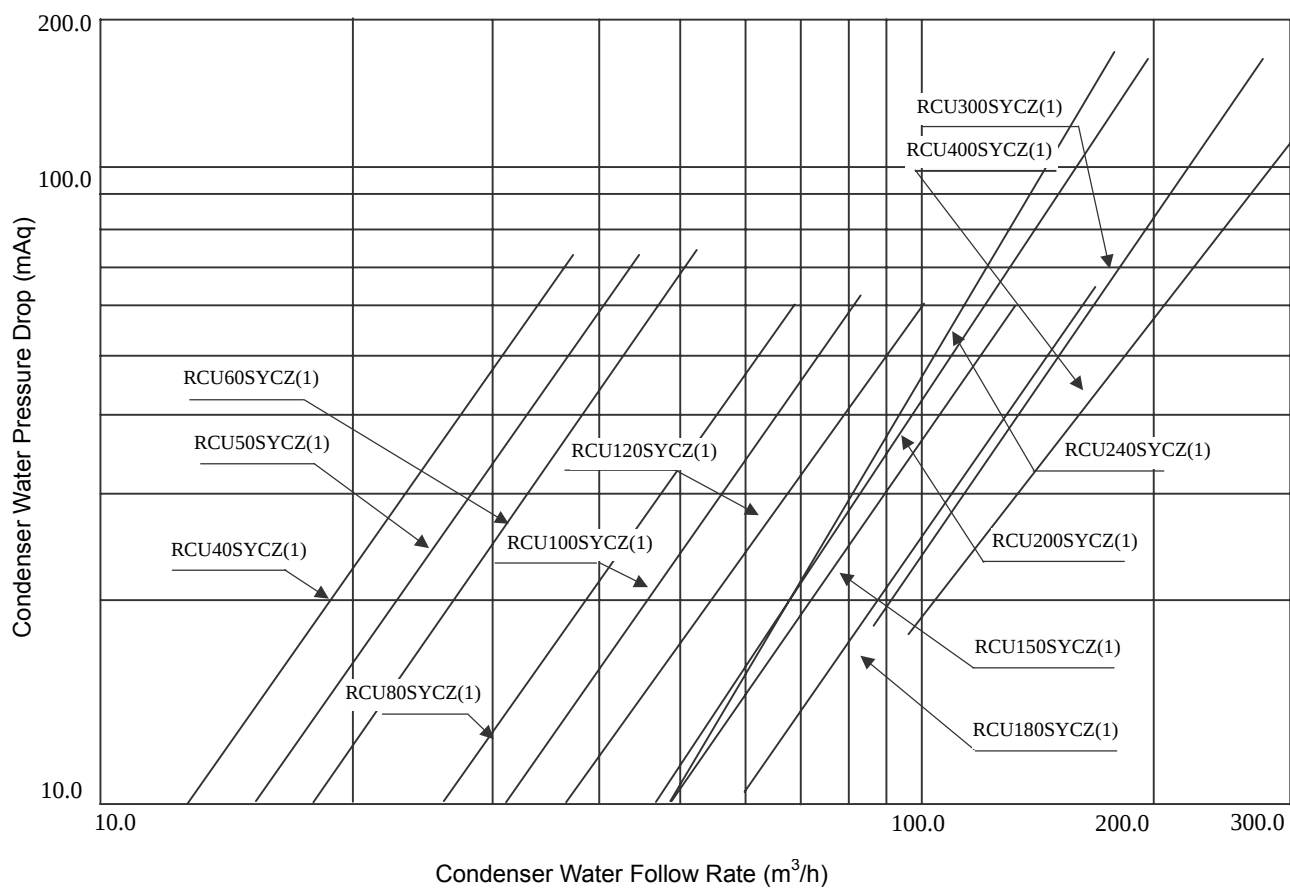
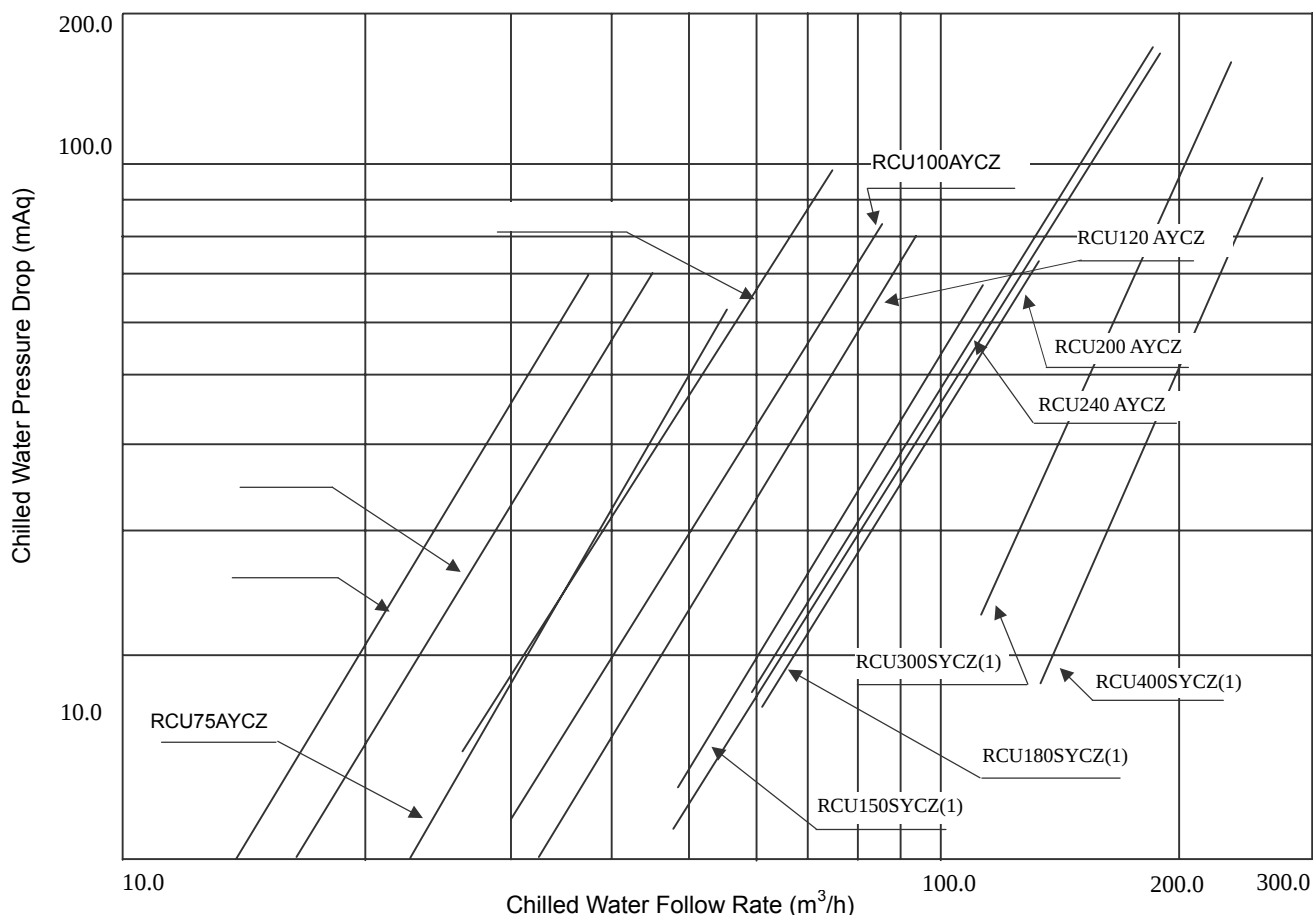
and

$$\text{Corrected Compressor Input} = \text{Correction Factor} \times \text{Compressor Input indicated in Table}$$

Correction Factor for Cooling Capacity and Compressor Input Regarding Fouling Factor

	Fouling Factor $\text{m}^2 \cdot /W$	Cooling Capacity	Compressor Input
Water Cooler	0(0)	1.02	1.00
	0.86×10^{-4}	1.00	1.00
Condenser	0(0)	1.00	1.00
	0.86×10^{-4}	0.98	1.03
	1.72×10^{-4}	0.96	1.06

SELECTION DATA



Cooling Capacities

SELECTION DATA

Conversion Multiplier: 1kW = 860kcal/h
= 3412Btu/h
1kPa = 0.102mAq

-50Hz-

CDOT	CLOT	RCU40SYCZ (1)							RCU50SYCZ (1)						
		IPT	CCAP	CFR	CPD	HCAP	HFR	HPD	IPT	CCAP	CFR	CPD	HCAP	HFR	HPD
22.0	5.0	20.5	132	22.7	27	153	26.3	39	25.6	165	28.4	29	190	32.8	41
	6.0	20.8	136	23.4	28	157	26.9	40	25.9	170	29.2	30	195	33.6	43
	7.0	21.1	140	24.0	29	161	27.6	42	26.3	174	30.0	32	201	34.5	45
	8.0	21.4	143	24.7	31	165	28.3	44	26.6	179	30.8	34	206	35.4	47
	9.0	21.7	147	25.3	33	169	29.0	46	27.0	184	31.6	35	211	36.2	49
	10.0	21.9	151	26.0	34	173	29.7	48	27.3	188	32.4	37	216	37.1	51
	11.0	22.2	155	26.6	36	177	30.4	50	27.7	193	33.2	39	221	38.0	53
25.0	5.0	22.2	129	22.1	25	151	26.0	38	27.7	161	27.6	27	188	32.4	40
	6.0	22.5	133	22.8	27	155	26.7	40	28.0	165	28.4	29	193	33.3	42
	7.0	22.8	136	23.4	28	159	27.4	42	28.4	170	29.2	30	198	34.1	44
	8.0	23.1	140	24.1	30	163	28.1	44	28.8	175	30.1	32	203	35.0	46
	9.0	23.4	144	24.7	31	167	28.7	45	29.1	179	30.9	34	209	35.9	48
	10.0	23.7	148	25.4	33	171	29.4	47	29.5	184	31.7	36	214	36.7	50
	11.0	23.9	151	26.0	34	175	30.1	50	29.8	189	32.5	37	219	37.6	52
30.0	5.0	25.1	123	21.2	23	148	25.5	37	31.2	154	26.4	25	185	31.8	39
	6.0	25.4	127	21.8	25	152	26.2	39	31.6	158	27.2	27	190	32.7	41
	7.0	25.7	131	22.5	26	156	26.9	40	32.0	163	28.0	28	195	33.5	43
	8.0	25.9	134	23.1	27	160	27.6	42	32.3	168	28.8	30	200	34.4	45
	9.0	26.2	138	23.8	29	164	28.3	44	32.7	172	29.6	31	205	35.3	47
	10.0	26.5	142	24.4	30	168	29.0	46	33.0	177	30.5	33	210	36.1	49
	11.0	26.8	146	25.0	32	172	29.7	48	33.4	182	31.3	35	215	37.0	51
35.0	5.0	27.9	118	20.2	21	145	25.0	35	34.8	147	25.0	23	181	31.2	37
	6.0	28.2	121	20.9	22	149	25.7	37	35.1	151	26.0	24	186	32.1	39
	7.0	28.5	126	21.5	24	155	26.4	39	35.5	157	26.8	26	193	32.9	41
	8.0	28.8	129	22.1	25	158	27.1	41	35.9	161	27.6	27	197	33.8	43
	9.0	29.1	133	22.8	27	162	27.8	43	36.2	165	28.4	29	202	34.7	45
	10.0	29.4	136	23.4	28	166	28.5	45	36.6	170	29.2	30	207	35.5	47
	11.0	29.6	140	24.1	30	170	29.2	47	36.9	175	30.1	32	212	36.4	49
37.0	5.0	29.1	115	19.8	20	144	24.8	35	36.2	144	24.7	22	180	31.0	37
	6.0	29.4	119	20.5	22	148	25.5	37	36.6	149	25.5	24	185	31.8	39
	7.0	29.6	123	21.1	23	152	26.2	39	36.9	153	26.3	25	190	32.7	41
	8.0	29.9	127	21.8	24	156	26.9	40	37.3	158	27.7	26	195	33.6	43
	9.0	30.2	130	22.4	26	160	27.6	42	37.6	163	28.0	28	200	34.4	45
	10.0	30.5	134	23.0	27	164	28.3	44	38.0	167	28.8	30	205	35.3	47
	11.0	30.8	138	23.7	29	169	29.0	46	38.3	172	29.6	31	210	36.2	49

CDOT	CLOT	RCU60SYCZ (1)							RCU80SYCZ (1)						
		IPT	CCAP	CFR	CPD	HCAP	HFR	HPD	IPT	CCAP	CFR	CPD	HCAP	HFR	HPD
22.0	5.0	30.6	199	34.2	23	229	39.4	42	41.0	264	45.5	39	305	52.5	36
	6.0	31.0	204	35.1	24	235	40.5	45	41.6	272	46.7	41	313	53.9	38
	7.0	31.5	210	36.1	25	241	41.5	46	42.2	279	48.0	43	321	55.3	39
	8.0	31.9	216	37.1	27	248	42.6	49	42.8	287	49.3	45	330	56.7	41
	9.0	32.3	221	38.1	28	254	43.6	51	43.3	294	50.6	48	338	58.1	43
	10.0	32.7	227	39.0	30	260	44.7	53	43.9	302	51.9	50	346	59.5	45
	11.0	33.2	233	40.0	31	266	45.7	55	44.5	309	53.2	52	354	60.8	47
25.0	5.0	33.2	194	33.3	22	227	39.0	42	44.5	258	44.3	37	302	51.9	35
	6.0	33.6	199	34.3	23	233	40.1	44	45.0	265	45.6	39	310	53.3	38
	7.0	34.0	205	35.2	24	239	41.1	46	45.6	273	46.9	41	318	54.7	39
	8.0	34.4	211	36.2	26	245	42.1	48	46.2	280	48.2	43	326	56.1	40
	9.0	34.9	216	37.2	27	251	43.2	50	46.7	288	49.5	46	334	57.5	42
	10.0	35.3	222	38.2	28	257	44.2	52	47.3	295	50.7	48	342	58.9	44
	11.0	35.7	227	39.1	30	263	45.3	54	47.9	303	52.0	50	350	60.3	46
30.0	5.0	37.4	185	31.9	20	223	38.3	40	50.2	246	42.4	34	296	51.0	34
	6.0	37.8	191	32.8	21	229	39.3	42	50.7	254	43.6	36	304	52.4	36
	7.0	38.3	196	33.8	22	235	40.4	44	51.3	261	44.9	38	313	53.8	37
	8.0	38.7	202	34.8	24	241	41.4	46	51.9	269	46.2	40	321	55.1	39
	9.0	39.1	208	35.7	25	247	42.5	49	52.4	276	47.5	42	329	56.5	41
	10.0	39.5	213	36.7	26	253	43.5	51	53.0	284	48.8	45	337	57.9	43
	11.0	40.0	219	37.7	28	259	44.5	53	53.6	291	50.1	47	345	59.3	45
35.0	5.0	41.7	177	30.4	18	218	37.6	39	55.9	235	40.4	31	291	50.0	33
	6.0	42.1	182	31.4	19	224	38.6	41	56.4	243	41.7	33	299	51.4	34
	7.0	42.5	191	32.3	21	234	39.6	43	57.0	252	43.0	35	309	52.8	36
	8.0	42.9	194	33.3	22	237	40.7	45	57.6	258	44.3	37	315	54.2	38
	9.0	43.4	199	34.3	23	243	41.7	47	58.1	265	45.6	39	323	55.6	40
	10.0	43.8	205	35.2	24	249	42.8	49	58.7	273	46.9	41	331	57.0	42
	11.0	44.2	211	36.2	26	255	43.8	51	59.3	280	48.2	43	339	58.4	43
37.0	5.0	43.2	173	29.8	18	217	37.3	38	58.1	231	39.6	30	289	49.6	32
	6.0	43.8	179	30.8	19	223	38.3	40	58.7	238	40.9	32	297	51.0	34
	7.0	44.2	185	31.8	20	229	39.4	42	59.3	246	42.2	34	305	52.4	36
	8.0	44.6	190	32.7	21	235	40.4	44	59.9	253	43.5	36	313	53.8	37
	9.0	45.1	196	33.7	22	241	41.4	46	60.4	261	44.8	38	321	55.2	39
	10.0	45.5	202	34.7	24	247	42.5	49	61.0	268	46.1	40	329	56.6	41
	11.0	45.9	207	35.6	25	253	43.5	51	61.6	276	47.4	42	337	58.0	43

CDOT: Condenser Water Outlet Temperature ()
CLOT: Chilled Water Outlet Temperature ()
IPT: Compressor Power Input (kW)
CCAP: Cooling Capacity (kW)
CFR: Chilled Water Flow Rate (m³/h)

CPD: Cooler Pressure Drop (kPa)
HCAP: Condenser Heat Rejection (kW)
HFR: Condenser Water Flow Rate (m³/h)
HPD: Condenser Pressure Drop (kPa)

Note:

1 The chilled water flow rate and the condenser water flow rate are based on 5 of temperature difference between the outlet and inlet of the water cooler or the condenser.

2 The data circled by lines at 35 of CDOT and 7 of CLOT are based on the condition indicated in the "General Data"

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SELECTION DATA

Cooling Capacities

Conversion Multiplier: 1kW = 860kcal/h
= 3412Btu/h
1kPa = 0.102mAq

-50Hz-

CDOT	CLOT	RCU100SYCZ (1)							RCU120SYCZ (1)						
		IPT	CCAP	CFR	CPD	HCAP	HFR	HPD	IPT	CCAP	CFR	CPD	HCAP	HFR	HPD
22.0	5.0	51.1	330	56.7	38	381	65.5	39	61.2	400	68.7	43	461	79.2	41
	6.0	51.8	339	58.3	40	391	67.2	41	62.1	411	70.7	46	473	81.3	43
	7.0	52.5	349	59.9	42	401	69.0	43	62.9	422	72.6	48	485	83.4	45
	8.0	53.3	358	61.6	44	411	70.7	45	63.8	434	74.6	51	497	85.5	47
	9.0	54.0	367	63.2	46	421	72.4	46	64.6	445	76.5	53	510	87.6	49
	10.0	54.7	377	64.8	48	431	74.2	49	65.5	456	78.5	56	522	89.7	51
25.0	5.0	55.4	321	55.3	36	377	64.8	38	66.3	389	67.0	41	456	78.4	40
	6.0	56.1	331	56.9	38	387	66.5	40	67.2	401	68.9	44	468	80.5	42
	7.0	56.8	340	58.5	40	397	68.3	42	68.0	412	70.9	46	480	82.6	44
	8.0	57.5	349	60.1	42	407	70.0	44	68.9	423	72.8	48	492	84.8	46
	9.0	58.2	359	61.7	44	417	71.7	46	69.7	435	74.8	51	504	86.8	48
	10.0	58.9	368	63.3	46	427	73.5	48	70.6	446	76.7	53	517	88.9	50
30.0	5.0	59.6	378	64.9	48	437	75.2	50	71.4	457	78.7	56	529	91.0	52
	5.0	62.5	307	52.9	33	370	63.6	37	74.8	372	64.0	38	447	76.9	39
	6.0	63.2	317	54.5	35	380	65.3	39	75.7	384	66.0	40	459	79.0	41
	7.0	63.9	326	56.1	37	390	67.1	41	76.5	395	67.9	42	472	81.1	43
	8.0	64.6	335	57.7	39	400	68.8	42	77.4	406	69.9	45	484	83.2	45
	9.0	65.3	345	59.3	41	410	70.5	44	78.2	418	71.8	47	496	85.3	47
35.0	5.0	66.0	354	60.9	43	420	72.3	46	79.1	429	73.8	50	508	87.4	49
	5.0	69.6	293	50.4	30	363	62.4	36	83.3	355	61.1	35	439	75.4	37
	6.0	70.3	303	52.1	32	373	64.1	37	84.2	367	63.1	37	451	77.5	39
	7.0	71.0	314	53.7	34	385	65.9	39	85.0	381	65.0	39	466	79.6	41
	8.0	71.7	321	55.3	36	393	67.6	41	85.9	389	67.0	41	475	81.7	43
	9.0	72.4	331	56.9	38	403	69.3	43	86.7	401	68.9	44	487	83.8	45
37.0	5.0	73.1	340	58.5	40	413	71.1	45	87.6	412	70.9	46	500	85.9	47
	5.0	72.4	288	49.5	29	360	61.9	35	86.7	349	59.9	33	435	74.9	37
	6.0	73.1	297	51.1	31	370	63.7	37	87.6	360	61.9	36	447	77.0	39
	7.0	73.8	306	52.7	33	380	65.4	39	88.4	371	63.8	38	460	79.1	41
	8.0	74.6	316	54.3	35	390	67.1	41	89.3	383	65.8	40	472	81.1	43
	9.0	75.3	325	55.9	37	400	68.9	43	90.1	394	67.7	42	484	83.2	45
37.0	5.0	76.0	334	57.5	39	410	70.6	44	91.0	405	69.7	44	496	85.8	47
	5.0	76.7	344	59.1	41	421	72.3	46	91.8	417	71.6	47	508	87.4	49

CDOT	CLOT	RCU150SYCZ (1)							RCU180SYCZ (1)						
		IPT	CCAP	CFR	CPD	HCAP	HFR	HPD	IPT	CCAP	CFR	CPD	HCAP	HFR	HPD
22.0	5.0	76.7	494	84.9	38	570	98.1	36	91.8	597	102.7	45	689	118.5	35
	6.0	77.7	508	87.3	40	585	100.7	38	93.1	614	105.6	48	707	121.6	37
	7.0	78.8	522	89.7	42	600	103.3	39	94.4	631	108.7	50	725	124.8	39
	8.0	79.9	536	92.1	44	616	105.9	41	95.6	648	111.5	53	744	127.9	41
	9.0	80.9	550	94.5	46	631	108.5	43	96.9	665	114.4	55	762	131.0	42
	10.0	82.0	564	97.0	49	646	111.1	45	98.2	682	117.3	58	780	134.2	44
25.0	5.0	83.1	578	99.4	51	661	113.6	47	99.5	699	120.2	61	798	137.3	46
	5.0	83.1	481	82.7	36	564	97.0	35	99.5	582	100.1	43	681	117.2	35
	6.0	84.1	495	85.1	38	579	99.6	37	100.7	599	103.0	46	700	120.3	36
	7.0	85.2	509	87.6	40	594	102.2	39	102.0	616	105.9	48	718	123.5	38
	8.0	86.3	523	90.0	42	609	104.8	40	103.3	633	108.8	50	736	126.6	40
	9.0	87.3	537	92.4	44	624	107.4	42	104.6	650	111.8	53	754	129.7	42
30.0	5.0	88.4	551	94.8	47	639	110.0	44	105.8	667	114.7	56	773	132.9	44
	5.0	89.5	565	97.2	49	655	112.6	46	107.1	684	117.6	58	791	136.0	45
	6.0	93.7	460	79.1	33	554	95.2	34	112.2	557	95.7	40	669	115.0	33
	6.0	94.8	474	81.5	35	569	97.8	36	113.5	573	98.6	42	687	118.2	35
	7.0	95.9	488	83.9	37	584	100.4	37	114.8	590	101.6	44	705	121.3	37
	8.0	96.9	502	86.3	39	599	103.0	39	116.0	607	104.5	47	723	124.4	39
35.0	5.0	98.0	516	88.8	41	614	105.6	41	117.3	624	107.4	49	742	127.6	40
	5.0	99.0	530	91.2	43	629	108.2	43	118.6	641	110.3	52	760	130.7	42
	5.0	100.1	544	93.6	45	644	110.8	45	119.9	658	113.2	54	778	133.8	44
	5.0	104.4	439	75.5	30	543	93.5	33	125.0	531	91.3	36	656	112.8	32
	6.0	105.4	453	77.9	32	558	96.0	34	126.2	548	94.3	39	674	116.0	34
	7.0	106.5	471	80.3	34	578	98.6	36	127.5	572	97.2	41	700	119.1	36
37.0	5.0	107.6	481	82.7	36	589	101.2	38	128.8	582	100.1	43	711	122.2	37
	5.0	108.6	495	85.1	38	604	103.8	40	130.1	599	103.0	46	729	125.4	39
	5.0	109.7	509	87.6	40	619	106.4	42	131.3	616	105.9	48	747	128.5	41
	5.0	110.8	523	90.0	42	634	109.0	43	132.6	633	108.8	50	765	131.6	43
	5.0	108.6	431	74.1	29	539	92.7	32	130.1	521	89.6	35	651	112.0	32
	6.0	109.7	445	76.5	31	554	95.3	34	131.3	538	92.5	38	669	115.1	33
37.0	7.0	110.8	459	78.9	33	569	97.9	36	132.6	555	95.4	40	687	118.2	35
	8.0	111.8	473	81.3	35	584	100.5	37	133.9	572	98.3	42	706	121.4	37
	9.0	112.9	487	83.7	37	600	103.1	39	135.2	589	101.3	44	724	124.5	39
	10.0	114.0	501	86.1	39	615	105.7	41	136.4	606	104.2	47	742	127.6	40
	5.0	115.0	515	88.5	41	630	108.3	43	137.7	623	107.1	49	760	130.8	42

CDOT: Condenser Water Outlet Temperature (□)
CLOT: Chilled Water Outlet Temperature (□)
IPT: Compressor Power Input (kW)
CCAP: Cooling Capacity (kW)
CFR: Chilled Water Flow Rate (m³/h)
Note:

CPD: Cooler Pressure Drop (kPa)
HCAP: Condenser Heat Rejection (kW)
HFR: Condenser Water Flow Rate (m³/h)
HPD: Condenser Pressure Drop (kPa)

1 The chilled water flow rate and the condenser water flow rate are based on 5□ of temperature difference between the outlet and inlet of the water cooler or the condenser.

2 The data circled by lines at 35□ of CDOT and 7□ of CLOT are based on the condition indicated in the "General Data"

HITACHI

Cooling Capacities

Conversion Multiplier: 1kW = 860kcal/h
= 3412Btu/h
1kPa = 0.102mPa

-50Hz-

CDOT	CLOT	RCU200SYCZ (1)							RCU240SYCZ (1)						
		IPT	CCAP	CFR	CPD	HCAP	HFR	HPD	IPT	CCAP	CFR	CPD	HCAP	HFR	HPD
22.0	5.0	113.6	643	113.2	54	757	131	82	135.6	782	137.4	82	917	158.4	100
	6.0	114.8	664	116.6	57	779	134.4	86	137.2	807	141.4	87	944	162.6	105
	7.0	116.4	685	119.8	60	801	138	91	139.2	833	145.2	91	972	166.8	110
	8.0	118	705	123.2	63	823	140.8	96	140.8	856	149.2	96	997	171	116
	9.0	119.6	724	126.4	66	844	144.8	101	142.8	880	153	101	1023	175.2	121
	10.0	121.6	745	129.6	69	867	148.4	106	144.4	905	157	106	1050	179.4	127
25.0	11.0	122.8	766	132.8	73	889	151.8	111	146.4	931	160.8	111	1076	183.6	132
	5.0	120.4	636	110.6	51	756	129.6	80	143.2	771	134	79	913	156.8	98
	6.0	122	655	113.8	54	777	133	84	144.8	796	137.8	83	941	161	103
	7.0	123.2	676	117	57	799	136.6	89	146.8	821	141.8	87	967	165.2	108
	8.0	124.8	695	120.2	60	820	140	94	148.8	844	145.6	92	993	169.4	114
	9.0	126.4	715	123.4	63	842	143.4	99	150.8	868	149.6	97	1018	173.6	119
30.0	10.0	128.4	735	126.6	66	863	147	104	152.4	893	153.4	101	1045	177.8	125
	11.0	130	756	129.8	70	886	150.4	109	154.4	917	157.4	107	1072	182	130
	5.0	130.8	615	105.8	47	746	127.2	77	156.4	747	128	72	903	153.8	94
	6.0	132.8	635	109	50	768	130.6	81	158.4	771	132	76	929	158	99
	7.0	134.4	655	112.2	53	789	134.2	86	160.4	796	135.6	80	956	162.2	105
	8.0	136.4	674	115.4	56	810	137.6	91	162.4	818	139.8	85	980	166.4	110
35.0	9.0	138	692	118.6	59	830	141	95	164.4	841	143.6	90	1006	170.6	115
	10.0	140	712	121.8	62	852	144.6	100	167.2	865	147.6	94	1033	174.6	121
	11.0	141.6	732	125	65	874	148	106	168.8	890	151.4	99	1058	179	126
	5.0	142	591	100.8	43	733	124.8	74	169.2	716	122.2	66	886	150.8	91
	6.0	144	609	104.2	46	753	128.2	78	171.6	740	126.2	70	912	155	96
	7.0	142	628	107.4	48	770	131.8	83	170	763	130	74	933	159.2	101
37.0	8.0	147.6	647	110.6	51	795	135.2	87	175.6	786	134	79	962	163.4	106
	9.0	149.2	665	113.8	54	814	138.6	92	178.4	809	137.8	83	987	167.6	111
	10.0	151.6	684	117	57	836	142.2	97	180.8	833	141.8	87	1014	171.8	117
	11.0	153.6	703	120.2	60	857	145.6	102	183.2	856	145.6	92	1040	176	122
	5.0	146.4	577	99	42	723	123.8	72	174.4	689	119.8	64	863	149.8	90
	6.0	148.4	596	102.2	44	744	127.4	77	176.8	712	123.8	68	888	154	95
	7.0	150.4	614	105.4	47	764	130.8	81	179.2	735	127.6	72	914	158.2	100
	8.0	152.4	633	108.6	50	785	134.2	86	181.6	758	131.6	76	940	162.2	105
	9.0	154.4	656	111.8	52	810	137.8	91	184	782	135.4	80	965	166.1	110
	10.0	156.4	675	115	55	831	141.2	96	186.4	805	139.4	85	991	170.6	115
	11.0	158.4	693	118.2	58	851	144.6	100	188.8	828	143.2	89	1016	174.8	121

CDOT	CLOT	RCU300SYCZ (1)							RCU400SYCZ (1)						
		IPT	CCAP	CFR	CPD	HCAP	HFR	HPD	IPT	CCAP	CFR	CPD	HCAP	HFR	HPD
22.0	5.0	152.0	946.6	162.8	48.0	1098.6	189.0	82.0	202.7	1262.1	217.1	48.0	1464.8	251.9	81.9
	6.0	153.6	977.3	168.1	50.9	1130.9	194.5	86.5	204.8	1303.0	224.1	51.0	1507.9	259.4	86.5
	7.0	155.7	1008.1	173.4	54.0	1163.8	200.2	91.3	207.6	1344.2	231.1	54.0	1551.8	266.9	91.3
	8.0	157.9	1037.0	178.4	57.0	1194.9	205.5	95.9	210.5	1382.6	237.8	56.9	1593.2	274.0	95.9
	9.0	160.0	1065.7	183.3	59.9	1225.7	210.8	100.5	213.3	1420.9	244.4	59.9	1634.2	281.1	100.5
	10.0	162.7	1096.4	188.6	63.3	1259.1	216.6	105.8	216.9	1461.9	251.4	63.2	1678.8	288.7	105.7
25.0	11.0	164.3	1127.3	193.9	66.6	1291.6	222.2	110.9	219.1	1503.0	258.5	66.6	1722.2	296.2	110.9
	5.0	161.0	933.5	160.6	46.8	1094.5	188.3	81.4	214.7	1244.7	214.1	46.8	1459.4	251.0	81.4
	6.0	163.2	963.7	165.8	49.7	1127.0	193.8	85.9	217.6	1284.9	221.0	49.6	1502.6	258.5	86.0
	7.0	164.9	994.5	171.1	52.7	1159.4	199.4	90.6	219.9	1326.0	228.1	52.7	1545.9	265.9	90.6
	8.0	166.9	1022.4	175.9	55.5	1189.3	204.6	95.1	222.5	1363.3	234.5	55.5	1585.8	272.7	95.0
	9.0	169.2	1051.3	180.8	58.4	1220.5	209.9	99.7	225.6	1401.6	241.1	58.4	1627.3	279.9	99.7
30.0	10.0	171.8	1081.4	186.0	61.6	1253.1	215.5	104.8	229.1	1441.9	248.0	61.6	1670.9	287.4	104.8
	11.0	173.9	1111.6	191.2	64.9	1285.6	221.1	109.9	231.9	1482.1	254.9	64.9	1714.1	294.8	109.9
	5.0	174.9	904.9	155.6	44.1	1079.8	185.7	79.3	233.2	1206.5	207.5	44.1	1439.7	247.6	79.3
	6.0	177.7	934.2	160.7	46.8	1111.9	191.2	83.8	236.9	1245.6	214.2	46.8	1482.5	255.0	83.8
	7.0	179.8	963.7	165.8	49.7	1143.5	196.7	88.3	239.7	1284.9	221.0	49.6	1524.7	262.2	88.3
	8.0	182.5	991.0	170.5	52.3	1173.6	201.9	92.7	243.3	1321.4	227.3	52.3	1564.8	269.1	92.7
35.0	9.0	184.7	1018.5	175.2	55.1	1203.1	206.9	97.1	246.3	1357.9	233.6	55.1	1604.2	275.9	97.1
	10.0	187.4	1047.9	180.2	58.1	1235.3	212.5	102.0	249.9	1397.2	240.3	58.1	1647.1	283.6	102.2
	11.0	189.4	1077.2	185.3	61.2	1266.6	217.9	106.9	252.5	1436.3	247.0	61.1	1688.8	290.5	106.9
	5.0	190.0	869.2	149.5	40.9	1059.2	182.2	76.5	253.3	1158.8	199.3	40.9	1412.2	242.9	76.5
	6.0	192.7	896.5	154.2	43.3	1089.2	187.3	80.6	256.9	1195.3	205.6	43.4	1452.2	249.8	80.6
	7.0	194.0	924.4	159.0	45.9	1118.6	192.4	84.8	258.7	1232.6	212.0	45.9	1491.5	256.5	84.7
37.0	8.0	197.4	951.3	163.6	48.4	1148.7	197.6	89.1	263.2	1268.4	218.2	48.5	1531.6	263.4	89.0
	9.0	199.7	978.7	168.3	51.1	1178.4	202.7	93.4	266.3	1304.9	224.4	51.1	1571.2	270.2	93.4
	10.0	202.8	1006.0	173.0	53.8	1208.8	207.9	98.0	270.4	1341.4	230.7	53.8	1611.8	277.2	98.0
	11.0	205.6	1033.5	177.8	56.6	1239.1	213.1	102.6	274.1	1377.9	237.0	56.6	1652.1	284.2	102.6
	5.0	195.8	849.4	146.1	39.2	1045.2	179.8	74.7	261.1	1132.6	194.8	39.2	1393.6	239.7	74.7
	6.0	198.6	876.2	150.7	41.5	1074.8	184.9	78.7	264.8	1168.1	200.9	41.5	1433.0	246.5	78.7
	7.0	202.0	909.3	156.4	44.5	1111.6	191.2	83.8	269.3	1204.7	207.2	44.0	1474.0	254.9	83.7
	8.0	203.9	930.9	160.1	46.5	1134.9	195.2	87.1	271.9	1241.2	213.5	46.5	1513.2	260.3	87.1
	9.0	206.6	964.5	165.9	49.7	1171.2	201.4	92.3	275.5	1286.0	221.2	49.7	1561.6	268.6	92.4
	10.0	209.3	902.4	170.7	52.4	1201.7	206.7	96.9	279.1	1323.3	227.6	52.5	1602.3	275.6	96.9
	11.0	211.9	1020.3	175.5	55.3	1232.2	211.9	101.5	282.5	1360.5	234.0	55.3	1642.9	282.6	101.6

CDOT: Condenser Water Outlet Temperature ()

CLOT: Chilled Water Outlet Temperature ()

IPT: Compressor Power Input (kW)

CCAP: Cooling Capacity (kW)

CFR: Chilled Water Flow Rate (m³/h)

CPD: Cooler Pressure Drop (kPa)

HCAP: Condenser Heat Rejection (kW)

HFR: Condenser Water Flow Rate (m³/h)

HPD: Condenser Pressure Drop (kPa)

Note:

1 The chilled water flow rate and the condenser water flow rate are based on 5 of temperature difference between the outlet and inlet of the water cooler or the condenser.

2 The data circled by lines at 35 of CDOT and 7 of CLOT are based on the condition indicated in the "General Data"

Electrical Data

Model	Unit Main Power		Application Voltage		Compressor (Three-phase)			Maximum Unit Current
	VOL	Hz	Maximum	Minimum	STC	RNC	IPT	A
RCU40SYCZ (1)	380	50	418	342	140	53	28.5	73
RCU50 SYCZ (1)	380	50	418	342	180	64	35.5	88
RCU60 SYCZ (1)	380	50	418	342	222	75	42.5	104
RCU80 SYCZ (1)	380	50	418	342	140	106	57.0	146
RCU100 SYCZ (1)	380	50	418	342	180	128	71.0	176
RCU120 SYCZ (1)	380	50	418	342	222	150	85.0	208
RCU150 SYCZ (1)	380	50	418	342	180	192	106.5	264
RCU180 SYCZ (1)	380	50	418	342	222	225	127.5	312
RCU200 SYCZ (1)	380	50	418	342	180	256	142	352
RCU240 SYCZ (1)	380	50	418	342	222	300	170	416
RCU300 SYCZ (1)	380	50	418	342	325	328	194	466
RCU400 SYCZ (1)	380	50	418	342	325	437	258.7	622

VOL: Unit Power Supply (Rated)

Hz: Frequency (Hz)

STC: Starting Current (A)

RNC: Running Current (A)

IPT: Input (kW)

Notes:

1. These data are based on the following conditions:

Chilled Water Inlet Temperature : 12

Chilled Water Outlet Temperature : 7

Condenser Water Outlet Temperature : 35

2. The above mentioned in the "maximum Unit Current" indicates the total running current of the unit under the following conditions. The design of power supply line should be decided referring to these current:

Supplied Voltage : 90% of Rated Voltage

Condenser Water Outlet Temperature : 37

Chilled Water Outlet Temperature : 20

Capacity Control : 100%

Working Range

Power supply

The applicable voltage range for each unit is given in the electrical data. The working voltage among the three phases must be balanced within a 3% deviation from each voltage at the compressor terminals. The starting voltage must be higher than 85% of the Rated voltage.

Temperature Range

Condenser Water Outlet Temperature	22 to 37
Condenser Water Temperature Difference	3.5 to 10
Chilled Water Outlet Temperature	5 to 20
Chilled Water Temperature Difference	2.5 to 10

Maximum Water Flow Rate and Minimum Water Flow Rate (m³/h)

Model	MCF	MEF	mef	Model	MCF	MEF	mef
RCU40SYCZ(1)	37	38	11	RCU150SYCZ(1)	131	115	47
RCU50SYCZ(1)	44	45	13	RCU180SYCZ(1)	155	130	47
RCU60SYCZ(1)	53	57	16	RCU200SYCZ(1)	170	176	60
RCU80SYCZ(1)	69	75	26	RCU240SYCZ(1)	200	190	60
RCU100SYCZ(1)	85	88	30	RCU300SYCZ(1)	234	234	119
RCU120SYCZ(1)	100	95	30	RCU400SYCZ(1)	312	312	159

MCF: Maximum Condenser Water Flow Rate, (m³/h)

MEF: Maximum Chilled Water Flow Rate (m³/h)

mef: Minimum Chilled Water Flow Rate (m³/h)

Minimum internal system water volume (m³)

Model	Volume(m ³) (50Hz)	Model	Volume(m ³) (50Hz)
RCU40SYCZ(1)	0.50	RCU150SYCZ(1)	0.62
RCU50SYCZ(1)	0.62	RCU180SYCZ(1)	0.75
RCU60SYCZ(1)	0.75	RCU200SYCZ(1)	1.19
RCU80SYCZ(1)	0.50	RCU240SYCZ(1)	1.44
RCU100SYCZ(1)	0.62	RCU300SYCZ(1)	3.97
RCU120SYCZ(1)	0.75	RCU400SYCZ(1)	5.28

Note: The above minimum internal system water volume is based on the standard water temperature difference ON/OFF..

Internal Water volume of water cooler (m³)

Model	RCU40SYCZ(1)	RCU50SYCZ(1)	RCU60SYCZ(1)	RCU80SYCZ(1)	RCU100SYCZ(1)	RCU120SYCZ(1)
Volume(m ³)	0.09	0.08	0.07	0.16	0.14	0.13
Model	RCU150SYCZ(1)	RCU180SYCZ(1)	RCU200SYCZ(1)	RCU240SYCZ(1)	RCU300SYCZ(1)	RCU400SYCZ(1)
Volume(m ³)	0.21	0.20	0.43	0.42	0.19	0.25

Sound Data

Model	Unit Power Supply: 50Hz								
	Frequency Band (Hz)								
	45~90	90~180	180~355	355~710	710~1400	1400~2800	2800~5600	5600~11200	Overall
RCU40SYCZ (1)	48.5	50.1	58.9	56.3	58.4	58.8	51.8	36.4	64.7
RCU50 SYCZ (1)	47.2	50.8	58.2	63.2	59.0	60.9	48.8	37.9	67.0
RCU60 SYCZ (1)	50.4	52.7	58.4	60.9	63.7	64.8	52.8	37.7	68.9
RCU80 SYCZ (1)	52.4	53.6	63.1	60.9	62.8	63.1	55.8	39.9	69.0
RCU100 SYCZ (1)	52.2	56.2	63.4	66.6	64.3	66.8	54.4	43.6	71.8
RCU120 SYCZ (1)	52.4	55.7	60.8	53.2	67.8	67.2	56.5	39.9	71.9
RCU150 SYCZ (1)	56.2	59.8	66.8	71.8	68.1	70.9	57.9	46.9	76.1
RCU180 SYCZ (1)	56.7	60.8	67.5	69.8	73.4	74.0	61.5	45.9	78.1
RCU200 SYCZ (1)	46.3	52.3	54.3	72.3	66.3	61.3	58.3	42.3	73.8
RCU240 SYCZ (1)	46.5	47.0	66.0	70.0	61.0	44.0	52.5	37.5	71.9
RCU300 SYCZ (1)	47.2	54.7	55.0	71.4	73.9	75.7	63.5	61.1	79.0
RCU400 SYCZ (1)	49.2	56.7	67.0	73.4	75.9	77.7	65.5	63.1	81.0

Notes:

- 1 The above uses (SPL-A) A scale sound pressure level data (dB)
- 2 The measuring point is 1.0 meter from the center of the machine surface and 1.5 meter from the floor level.
- 3 the units are operating under a standard working conditions.

Component Detailed Data

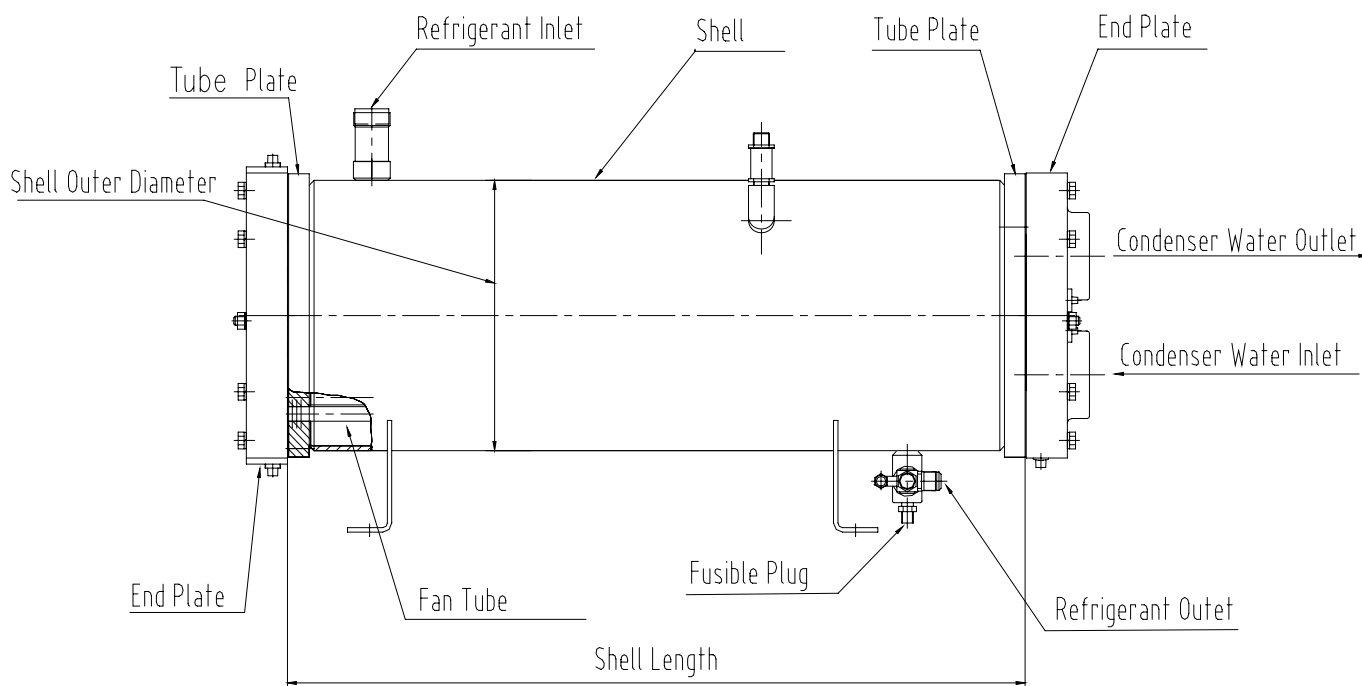
Compressor

Compressor Model			4005SCC-Z	5005SCC-Z	600SCC-Z	10001SCC-Z
Compressor Type Number of Rotors		set	Semi-Hermetic 1	Semi-Hermetic 1	Semi-Hermetic 1	Semi-Hermetic 1
Revolutions	50Hz	r/min.	2,880	2,880	2,880	2,880
Displacement	50Hz	m ³ /h	137.4	169.5	208.7	328
Capacity Control		%	100-33, 0	100-25, 0	100-25, 0	100~25, 0
Air-Tight Pressure	Discharge	MPa	3.0	3.0	3.0	2.8
	Suction	MPa	2.0	2.0	2.0	1.9
Motor type			Special Squirrel-Cage Three-Phase Motor			
Starting Method			Star-Delta Starting			
Number of Poles Insulation Class Input		kW	2 E 30	2 E 37	2 E 45	2 E 75
Oil Type Charge		liters	SW220HT 6	SW220HT 7	SW220HT 7	SW220HT 10

Component Detailed Data (Continued)

Condenser

For Models: RCU40SYCZ(1) to RCU240SYCZ(1)



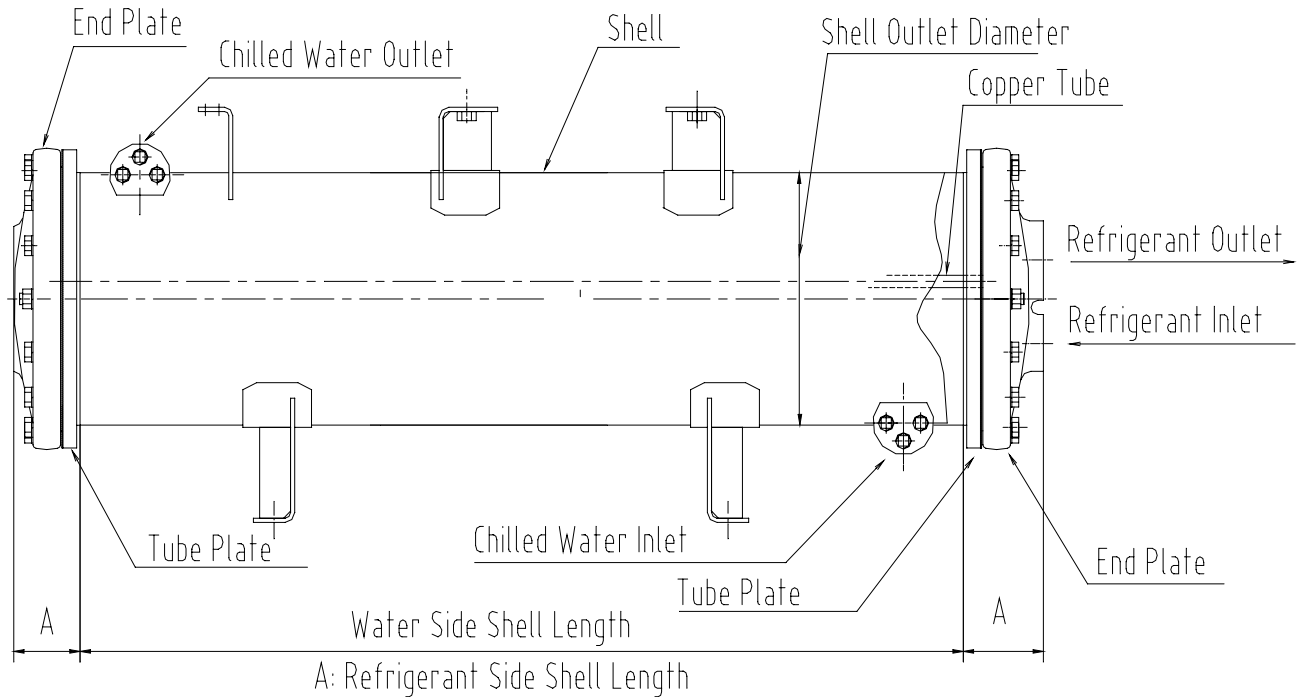
Condenser Dimensions

Model		RCU40SYCZ(1)	RCU50SYCZ(1)	RCU60SYCZ(1)	RCU80SYCZ(1)	RCU100SYCZ(1)
Shell	Outer Diameter	mm	mm	mm	mm	mm
	Length	mm	mm	mm	mm	mm
	Thickness	mm	mm	mm	mm	mm
Tube		Copper				
Material		76	92	112	76×2	92×2
Number		4	4	4	2	2
Number of Water Pass		4	4	4	2	2
Maximum Permissible Pressure	Refrigerant Side	MPa	MPa	MPa	MPa	MPa
	Water Side	MPa	MPa	MPa	MPa	MPa
		2.2 0.8	2.2 0.8	2.2 0.8	2.2 0.8	2.2 0.8
Model		RCU120SYCZ(1)	RCU150SYCZ(1)	RCU180SYCZ(1)	RCU200SYCZ(1)	RCU240SYCZ(1)
Shell	Outer Diameter	mm	mm	mm	mm	mm
	Length	mm	mm	mm	mm	mm
	Thickness	mm	mm	mm	mm	mm
Tube		Copper				
Material		112×2	138×3	168×3	92×2×2	112×2×2
Number		2	2	2	2	2
Number of Water Pass		2	2	2	2	2
Maximum Permissible pressure	Refrigerant Side	MPa	MPa	MPa	MPa	MPa
	Water Side	MPa	MPa	MPa	MPa	MPa
		2.2 0.8	2.2 0.8	2.2 0.8	2.2 0.8	2.2 0.8

Component Detailed Data (Continuous)

Cooler

For models: RCU40SYCZ(1) to RCU240SYCZ(1)



Cooler Dimensions

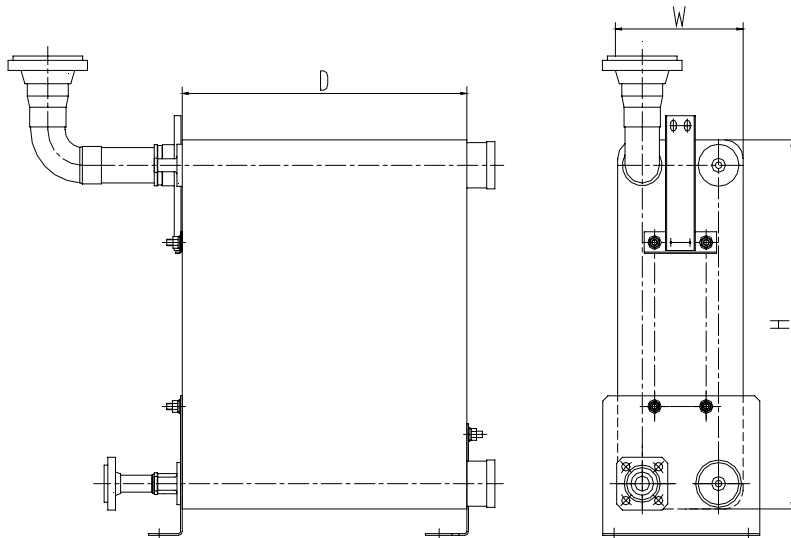
Model		RCU40 SYCZ	RCU50 SYCZ	RCU60 SYCZ	RCU80 SYCZ	RCU100 SYCZ	RCU120 SYCZ	RCU150 SYCZ	RCU180 SYCZ	RCU200 SYCZ	RCU240 SYCZ
		RCU40 SYCZ1	RCU50 SYCZ1	RCU60 SYCZ1	RCU80 SYCZ1	RCU100 SYCZ1	RCU120 SYCZ1	RCU150 SYCZ1	RCU180 SYCZ1	RCU200 SYCZ1	RCU240 SYCZ1
Shell (Water Side) Shell Material Outer Diameter Length	mm	Steel									
	mm	356.2 1,276	356.2 1,276	356.2 1,276	356.2 2,296	356.2 2,296	356.2 2,296	431.8 2,400	431.8 2,400	356.2 2,296	356.2 2,296
(Refrigerant Side) Shell Material Outer Diameter Length Thickness	mm	steel									
	mm	420	420	420	420	420	420	435	435	420	420
	mm	101	101	101	101	101	101	139	139	101	101
Tube Tube Material Outer Diameter Number of Tube	mm	copper									
	mm	16 144	16 180	16 208	16 144	16 180	16 208	16 270	16 298	16 180×2	16 208×2
Number of Pass		4	4	4	2	2	2	2	2	2×2	2×2
Maximum Permissible Pressure Refrigerant Side Water Side	Mpa										
	Mpa	1.3 1.05	1.3 1.05	1.3 1.05	1.3 1.05	1.3 1.05	1.3 1.05	1.3 1.05	1.3 1.05	1.3 1.05	1.3 1.05
Insulation		Polyethylene Foam (19mm)									

Component Detailed Data

COMPONENT DATA

Condenser

For Models: RCU300SYCZ(1) and RCU400SYCZ(1)

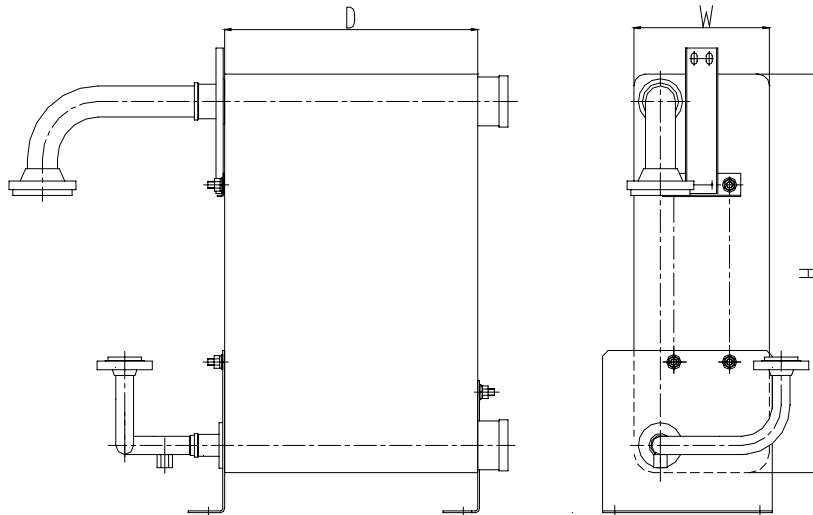


Condenser Dimension

Model		RCU300SYCZ(1)	RCU400SYCZ(1)
Plate Type Heat Exchanger			
Height	mm	693	693
Width	mm	243	243
Depth	mm	454	454
Maximum Permission Pressure			
Refrigerant Side	MPa	2.2	2.2
Water Side	MPa	1.05	1.05
Number of Condensers/Unit		3	2×2

Cooler

For Models: RCU300SYCZ (1) and RCU400SYCZ (1)



Water Cooler Dimension

Model		RCU300SYCZ(1)	RCU400SYCZ(1)
Plate Type Heat Exchanger			
Height	mm	693	693
Width	mm	243	243
Depth	mm	552	552
Maximum Permission Pressure			
Refrigerant Side	MPa	1.3	1.3
Water Side	MPa	1.05	1.05
Insulation		Polyethylene Foam (19mm)	
Number of Water Coolers/Unit		3	2×2

Electrical Operation Control

Standard Operation Sequence RCU40SYCZ (1) 、RCU50SYCZ(1)and RCU60SYCZ (1)

Control Stage		Starting Control										Capacity Control				Safety Devices			Shut Down			
Control Devices		OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF
Main Power Switch		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF
Chilled Water Pump		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF
Condenser Water Pump		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF
Operation Switch (ON/OFF)		—	—	—	ON	—	—	—	—	—	—	—	—	—	—	—	—	OFF	—	OFF	—	—
Controller	Load up	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Neutral	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Load down	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Safety Devices		No.1	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	CLS	CLS	CLS	CLS	CLS
Power Supply Lamp			OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF
Operation Lamp			OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF	OFF
Alarm Lamp			OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
Oil Heater		CH1	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON	ON	OFF
Motor For Compressor	MC1	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	DLT	OFF	OFF	DLT	OFF	OFF
						(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)			(ULD)			(FLD)		
						※1	※1	※1-99%	100%	100%	※1-99%	※1-99%	※1			※1-99%			※100%			
Solenoid Valve	SV11	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV12	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV13	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Time Schedule																						
												RCU40SYCZ(1)				RCU50SYCZ(1)			RCU60SYCZ(1)			
												※1 33%				25%			25%			

CLS: Close, OPN: Open, STA: Star, DLT: Delta
ULD: Unload, FLD: Full Load

Standard Operation Sequence RCU80SYCZ (1)、RCU100SYCZ (1) and RCU120SYCZ (1)

Control Stage		Starting Control										Capacity Control				Safety Devices			Shut Down			
Control Devices		OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF
Main Power Switch		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF
Chilled Water Pump		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF
Condenser Water Pump		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF
Operation Switch (ON/OFF)		—	—	—	ON	—	—	—	—	—	—	—	—	—	—	—	—	OFF	—	OFF	—	—
Controller	Load up	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Neutral	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Load down	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Safety Devices		No.1	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	OPN	CLS	CLS	CLS	CLS
Power Supply Lamp			OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF
Operation Lamp			OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF
Alarm Lamp			OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	ON		OFF	ON	OFF	OFF	OFF
Oil Heater	CH1	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON	ON	OFF
	CH2	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	ON	ON	OFF
Motor For Compressor	MC1	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	DLT	OFF	OFF	DLT	OFF	OFF
						(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)			(ULD)			(FLD)		
						※1	※1	※1	※1	※1-99%	100%	100%	※1-99%	※1-99%	※1		※1-99%			100%		
Motor For Compressor	MC2	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	DLT	DLT	OFF	DLT	OFF	OFF
						(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)			(ULD)	(ULD)		(FLD)		
						※1	※1	※1	※1-99%	100%	100%	※1-99%	※1-99%	※1			※1-99%	※1-99%		100%		
Solenoid Valve	SV11	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV12	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV13	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV21	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV22	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Time Schedule																						
												RCU80SYCZ(1)				RCU100SYCZ(1)			RCU100SYCZ(1)			
												※1 33%				25%			25%			

CLS: Close, OPN: Open, STA: Star, DLT: Delta

Control Stage		Starting Control												Capacity Control				Safety Devices				Shut Down						
Control Devices		OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF			
Main Power Switch		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF			
Chilled Water Pump		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF			
Condenser Water Pump		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF			
Operation Switch (ON/OFF)		—	—	—	ON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	OFF	—	OFF	—			
Controller	Load up	—	—	—	—	—	—	—	—	—	—	○	○	—	—	—	—	—	—	—	○	○	—	—	—			
	Neutral	—	—	—	—	—	—	—	—	—	—	—	—	○	—	○	—	—	—	○	○	—	—	○	—			
	Load down	—	—	—	—	—	—	—	—	—	—	—	—	—	○	—	○	—	—	—	—	—	—	—	—			
Safety Devices	No.1	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	OPN	OPN	CLS	CLS	CLS			
	No.2	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	OPN	OPN	CLS	CLS	CLS			
	No.3	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	CLS	CLS	CLS	CLS	CLS			
Power Supply Lamp		OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF			
Operation Lamp		—	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF			
Alarm Lamp		—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	ON	OFF			
Oil Heater	CH1	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON	OFF	ON			
	CH2	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	OFF	ON			
	CH3	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	OFF	ON			
Motor For Compressor	MC1	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	DLT	DLT	DLT	DLT	DLT	DLT				
						(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)		
						※1	※1	※1	※1	※1	※1	※1-99%	100%	100%	※1-99%	※1-99%	※1	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	
	MC2	OFF	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	DLT	DLT	DLT	DLT	DLT	DLT				
							(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	
							※1	※1	※1	※1	※1	※1-99%	100%	100%	※1-99%	※1-99%	※1	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%
	MC3	OFF	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	DLT	DLT	DLT	DLT	DLT	DLT				
							(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	(FLD)	
							※1	※1	※1-99%	100%	100%	※1-99%	※1-99%	※1	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%
Solenoid Valve	SV11	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF			
	SV12	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV13	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV21	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF				
	SV22	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV23	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV31	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF				
	SV32	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV33	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF				
Time Schedule		3 min. 5 sec. 60 sec. 5 sec. 60 sec. 5 sec. 60 sec. Minimum 3min. The compressor which started finally will be started first.																							RCU150SYCZ(1) ※1 25%		RCU180SYCZ(1) 25%	
		CLS: Close, OPN: Open, STA: Star, DLT: Delta ULD: Unload, FLD: Full Load																										

Standard Operation Sequence RCU200SYCZ (1) and RCU240SYCZ (1)

Control Stage		Starting Control																Capacity Control				Safety Devices								Shut Down																									
Control Devices																																																							
Main Power Switch		OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF																								
Chilled Water Pump		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF																							
Condenser Water Pump		—	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF																							
Operation Switch (ON/OFF)		—	—	—	ON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	OFF	—	OFF	—																							
Controller	Load up	—	—	—	—	—	—	—	—	—	—	—	—	○	○	—	—	—	—	—	—	—	—	—	○	○	○	—	—	—	—																								
	Neutral	—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	—	○	—	—	○	○	—	—	—	—	—	—	—	○	—	—																							
	Load down	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	—	○	○	—	—	—	—	—	—	—	—	—	—	—	—																							
Safety Devices	No.1	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS																								
	No.2	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS																								
	No.3	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS																								
	No.4	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS																								
Power Supply Lamp		OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF																							
Operation Lamp		—	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF																							
Alarm Lamp		—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	ON	OFF	OFF																								
Oil Heater	CH1	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF																							
	CH2	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF																							
	CH3	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF																							
	CH4	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF																						
Motor For Compressor	MC1	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
						(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)	OFF	(ULD)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																						
						※1	※1	※1	※1	※1	※1	※1	※1	※1	※1	※1-99%	100%	100%	※1-99%	※1-99%	※1	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%																					
	MC2	OFF	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	DLT	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
							(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)	OFF	(ULD)	(ULD)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																					
							※1	※1	※1	※1	※1	※1	※1	※1	※1	※1-99%	100%	100%	※1-99%	※1-99%	※1	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%																				
	MC3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	DLT	DLT	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
									(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)	OFF	(ULD)	(ULD)	(ULD)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																			
									※1	※1	※1	※1	※1	※1	※1	※1	※1	※1-99%	100%	100%	※1-99%	※1-99%	※1	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%																		
	MC4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	DLT	DLT	DLT	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
										(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)	OFF	(ULD)	(ULD)	(ULD)	(ULD)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																		
										※1	※1	※1	※1	※1	※1	※1	※1	※1	※1-99%	100%	100%	※1-99%	※1-99%	※1	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%	※1-99%																	
Solenoid Valve	SV11	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
	SV12	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
	SV13	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
	SV21	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
	SV22	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
	SV23	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
	SV31	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
	SV32	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
	SV33	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
	SV41	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																						
	SV42	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF																						
	SV43	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF																							
Time Schedule		3 min. 5 sec. 60 sec. 5 sec. 60 sec. 5 sec. 60 sec. 5 sec. 30 sec. Minimum 3min. The compressor which started finally will be started first																												<table><tr><td></td><td colspan="4">RCU200SYCZ(1)</td><td colspan="4">RCU240SYCZ(1)</td></tr><tr><td>※1</td><td colspan="4">25%</td><td colspan="4">25%</td></tr></table> CLS: Close, OPN: Open, STA: Star, DLT: Delta ULD: Unload, FLD: Full Load									RCU200SYCZ(1)				RCU240SYCZ(1)				※1	25%				25%			
			RCU200SYCZ(1)				RCU240SYCZ(1)																																																
※1	25%				25%																																																		

Control Stage		Starting Control												Capacity Control								Safety Devices				Shut Down		
Control Devices		OFF	ON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ON	ON	OFF
Main Power Switch		—	—	ON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	OFF	—	OFF	—
Operation Switch (ON/OFF)		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Controller	Load up	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Neutral	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Load down	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Safety Devices	No.1	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	OPN	CLS	CLS	CLS
	No.2	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	OPN	OPN	CLS	CLS
	No.3	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	CLS	CLS	
Chilled Water Pump		OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF
Condenser Water Pump		OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF
Operation Lamp		OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	PLK	PLK	PLK	OFF	ON
Oil Heater	CH1	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	ON	
	CH2	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	ON	
	CH3	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	ON	
Motor For Compressor	MC1	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	OFF	STA	DLT	DLT	DLT	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF
					(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)			(ULD)	(ULD)	(ULD)									
					25%	25%	25%	25%	25%	25-99%	100%	100%	25-99%	25%			25-99%	25-99%	25-99%	25-99%								
	MC2	OFF	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	OFF	STA	DLT	DLT	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF
							(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)			(ULD)	(ULD)	(ULD)	(ULD)							
							25%	25%	25%	25%	25-99%	100%	100%	25-99%	25%			25-99%	25-99%	25-99%	25-99%							
	MC3	OFF	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	STA	OFF	OFF	STA	DLT	DLT	DLT	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF
							(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)			(ULD)	(ULD)	(ULD)	(ULD)	(ULD)							
							25%	25%	25-99%	100%	100%	25-99%	25%	25%			25-99%	25-99%	25-99%	25-99%	25-99%							
Solenoid Valve	SV11	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
	SV12	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
	SV13	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
	SV21	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
	SV22	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
	SV23	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
	SV31	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
	SV32	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
SV33	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF		
Time Schedule		3 min. 60 sec. 5 sec. 60 sec. 5 sec. 60 Minimum 3min.																										RCU300SYCZ(1) ※1 25%
		The compressor which started finally will be started first																										
CLS: Close,OPN:Open,STA:Star,DLT:Delta ULD:Unload,FLD:Full Load FLK:Flicker																												

CLS: Close, OPN: Open, STA: Star, DLT: Delta
ULD: Unload, FLD: Full Load FLK: Flicker

Control Stage		Starting Control														Capacity Control								Safety Devices								Shut Down		
Control Devices		OFF	ON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ON	ON	OFF				
Main Power Switch		OFF	ON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ON	ON	OFF				
Operation Switch (ON/OFF)		—	—	ON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	OFF	—	OFF	—				
Controller	Load up	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
	Neutral	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
	Load down	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
Safety Devices	No.1	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS				
	No.2	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS				
	No.3	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS				
	No.4	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS				
Chilled Water Pump		OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF			
Condenser Water Pump		OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF			
Operation Lamp			OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	PLK	PLK	PLK	PLK	OFF		
Oil Heater	CH1	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON	OFF	ON	OFF				
	CH2	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	ON	OFF				
	CH3	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	OFF	ON	OFF				
	CH4	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	OFF	ON	OFF			
Motor For Compressor	MC1	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	OFF	STA	DLT	DLT	DLT	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		
					(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)			(ULD)	(ULD)	(ULD)												
					25%	25%	25%	25%	25%	25%	25%	25-99%	100%	100%	25-99%	25%	25%			25-99%	25-99%	25-99%	25-99%											
					25%	25%	25%	25%	25%	25%	25-99%	100%	100%	25-99%	25%	25%	25-99%			25-99%	25-99%	25-99%												
	MC2	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	OFF	STA	DLT	DLT	DLT	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		
						(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)			(ULD)	(ULD)	(ULD)	(ULD)											
						25%	25%	25%	25%	25%	25%	25-99%	100%	100%	25-99%	25%	25%			25-99%	25-99%	25-99%	25-99%											
						25%	25%	25%	25%	25%	25%	25-99%	100%	100%	25-99%	25%	25%			25-99%	25-99%	25-99%	25-99%											
	MC3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
									(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)			(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)									(ULD)
									25%	25%	25%	25%	25%	25%	25-99%	100%	100%			25-99%	25%	25%	25-99%	25-99%	25-99%									25-99%
									25%	25%	25%	25%	25%	25%	25-99%	100%	100%			25-99%	25%	25%	25-99%	25-99%	25-99%									25-99%
	MC4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	DLT	OFF	OFF	STA	DLT	DLT	DLT	DLT	DLT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
										(ULD)	(ULD)	(ULD)	(ULD)	(FLD)	(FLD)	(ULD)	(ULD)	(ULD)			(ULD)	(ULD)	(ULD)	(ULD)	(ULD)	(ULD)								(ULD)
										25%	25%	25%	25%	25%	25%	25-99%	100%	100%			25-99%	25%	25%	25-99%	25-99%	25-99%								25-99%
										25%	25%	25%	25%	25%	25%	25-99%	100%	100%			25-99%	25%	25%	25-99%	25-99%	25-99%								25-99%
Solenoid Valve	SV11	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF			
	SV12	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV13	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV21	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV22	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV23	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV31	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV32	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV33	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	SV41	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
SV42	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
SV43	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
Time Schedule		3 min. 5 sec. 60 sec. 5 sec. 60 sec. 5 sec. 60 sec. 5 sec. 60 sec. 3 min. Minimum 3min. The compressor which started finally will be started first																														RCU400SYCZ(1) ※125%		
		CLS: Close,OPN:Open,STA:Star,DLT:Delta ULD: Unload,FLD:Full Load FLK:Flicker																																

CLS: Close,OPN:Open,STA:Star,DLT:Delta

ULD: Unload,FLD:Full Load FLK:Flicker

Electrical Wiring

Tool and Instruments—One Set of Wiring Tools and Electrical Tester (Clamp Meter)

Schedule Check—Confirm that the field-selected electrical components (main power switch, fuses, wires, conduit connections and wire terminals) are properly selected according to the “Electrical Data” in Technical Catalog I and ensure that they comply with national and local codes. It is recommended that the main power switch be locked on the “OFF” position, to prevent against accidental supply of power during unit servicing.

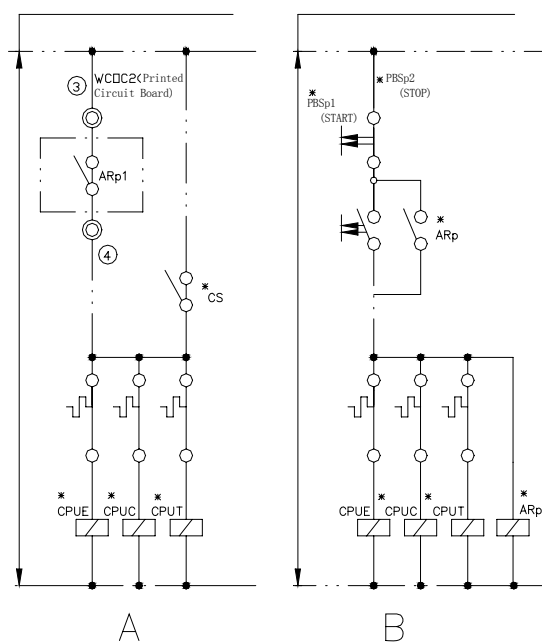
Main Power Wiring Procedures—Confirm that electrical power is not being supplied to the installation location prior to any electrical installation work.

1. Install the field-supplied main switch box in the properly selected location.
2. Install conduit connectors in the hole for power wiring.
3. Lead main power wires and earthing wire through connector to the screw terminals for main power and earthing in the electrical box. The neutral wire for 380V and 415V power supplies should also be led through the connector.
4. Firmly connect the wires with wire terminals to unit screw terminals T, S and T (and also Mp for 380V and 415V power supply) according to the following figures.

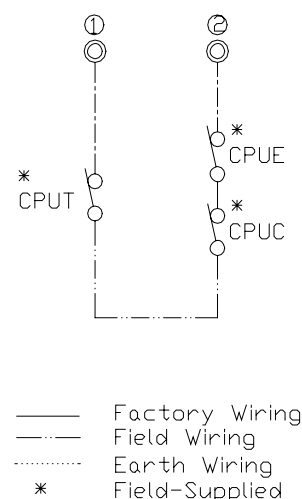
Control Wiring—Connect the interlock wiring between the unit terminals and the pump, the unit and the cooling tower starter according to the following figures or the wiring labels.

Control wiring

1、 Pump Operation Wiring



2、 Pumps Interlock



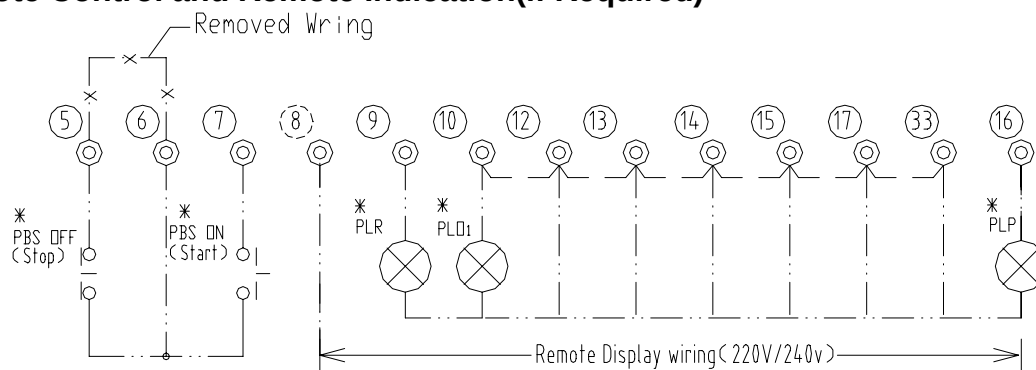
NOTE:

1. Select A or B for the required operation method and perform the wiring according to the above wiring diagram.
A : for build-in operation switch
B: for remote push button switch.
2. In case of applying the remote indication as shown in the above figure, shielded wires shall be used in order to avoid misindication.
3. The maximum current value for contactor “APp1” shall be lower than 5A.

Mark	Name
*CPUE	Magnetic Switch for Chilled Water Pump
*CPUC	Magnetic Switch for Condenser Water Pump
*CPUT	Magnetic Switch for Water Cooling Tower
*AR _p	Assistant Breaker for Operation Check
*PBS _{p1}	ON/OFF Button for Pump Control
*CS	Changeover Switch for Field-Wiring

CONTROL SYSTEM

3、 Remote Control and Remote Indication(if Required)



Model	RCU40SYCZ 11	RCU80SYCZ 11	RCU150SYCZ 11	RCU200SYCZ 11
	RCU50SYCZ 11	RCU100SYCZ 11	RCU180SYCZ 11	RCU240SYCZ 11
	RCU60SYCZ 11	RCU120SYCZ 11	RCU300SYCZ 11	RCU400SYCZ 11
Corresponding Joint	(8 9 10 16)	(8 9 10 12) (16)	(8 9 10 12) (13 16)	(8 9 10 12) (13 12 16)

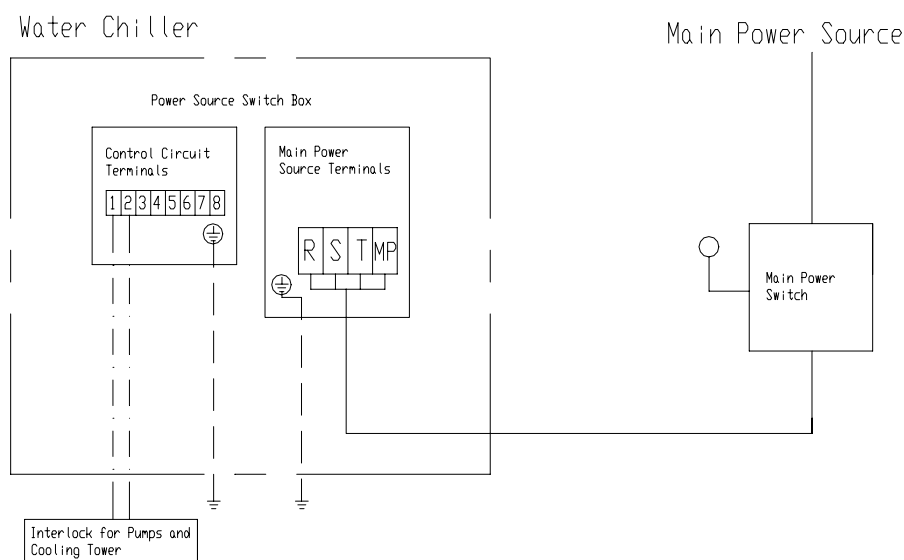
NOTE:

1. In the case of applying the remote indication as shown in the above figure, shielded wiring should be used in order to avoid misindication.
2. The maximum current value for remote indicator should be lower than 5A.
- | | |
|-------|----------------|
| ———— | Factory wiring |
| ----- | Field wiring |
| ----- | Earth wiring |
| * | Field-supplied |

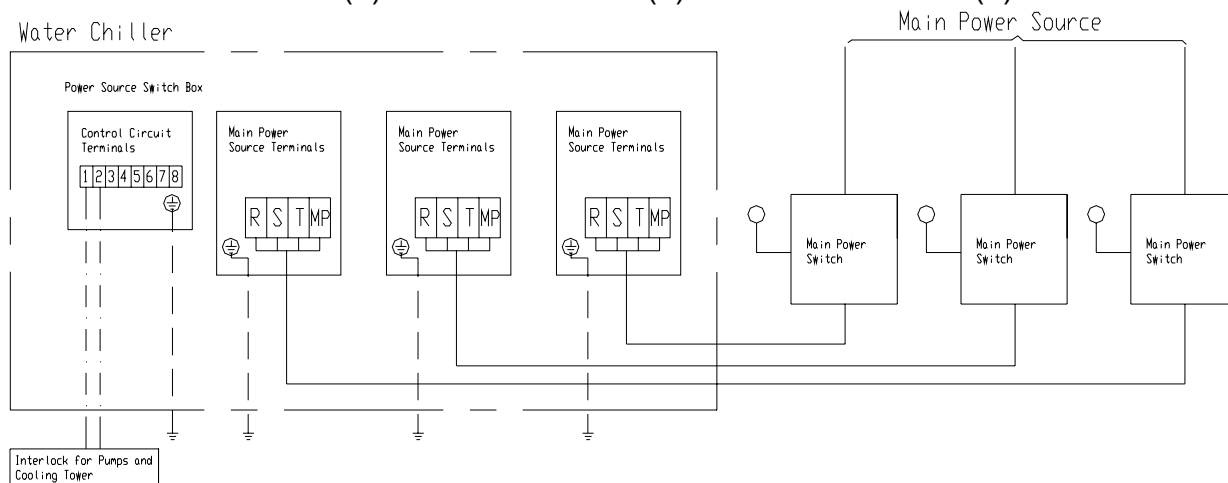
Mark	Name
*PBS	Bush-Button Switch for Remote Unit
ON.OFF	
*PLR	Pilot Lamp for Remote Operation
*PLO	Pilot Lamp for Remote Alarm
*PLP	pilot Lamp for Remote Pump
*PLO ₁₋₄	pilot Lamp for Remote Alarm 1-4
*PLR _p	pilot Lamp for Pump Operation

Main Power Wiring

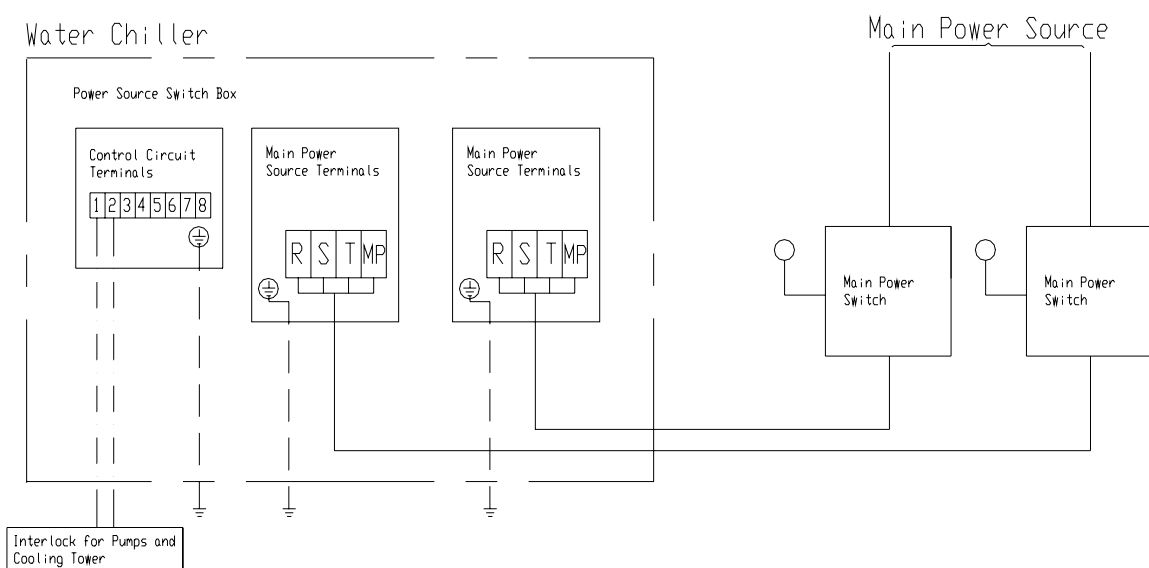
For Models: RCU40SYCZ (1) to RCU120SYCZ (1)



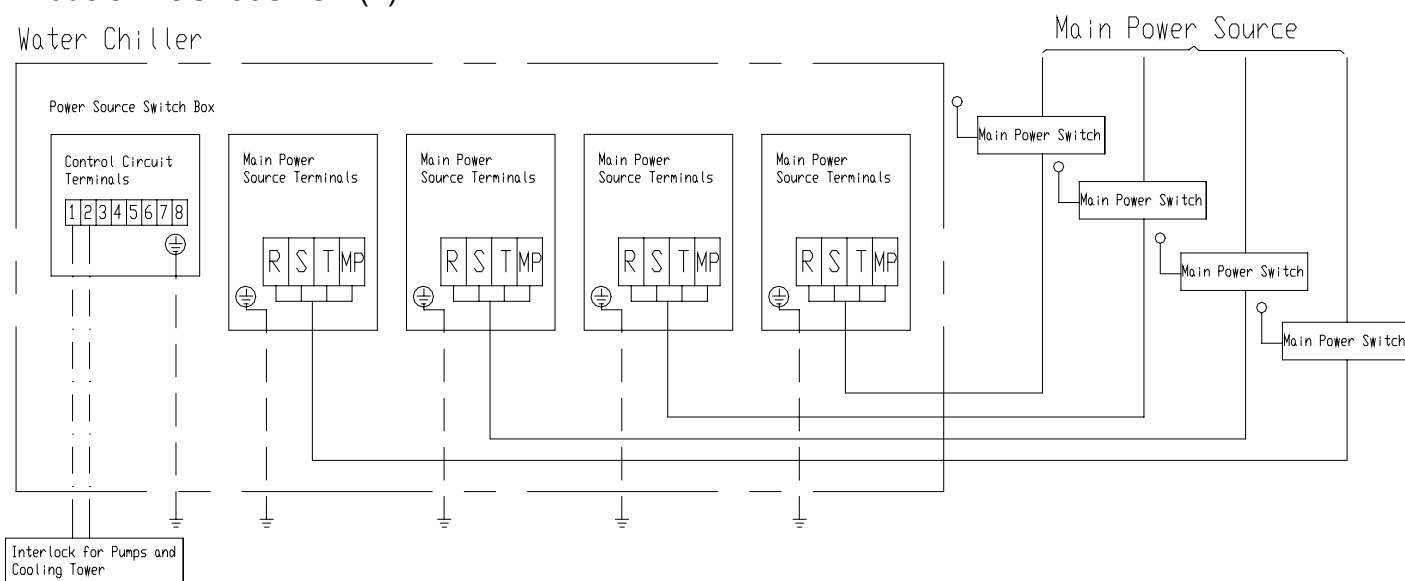
For Models: RCU150SYCZ (1) 、RCU180SYCZ (1) and RCU300SYCZ (1)



For Models: RCU200SYCZ (1) and RCU240SYCZ (1)

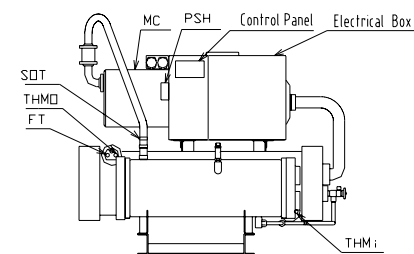
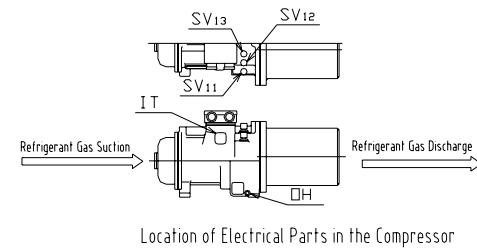
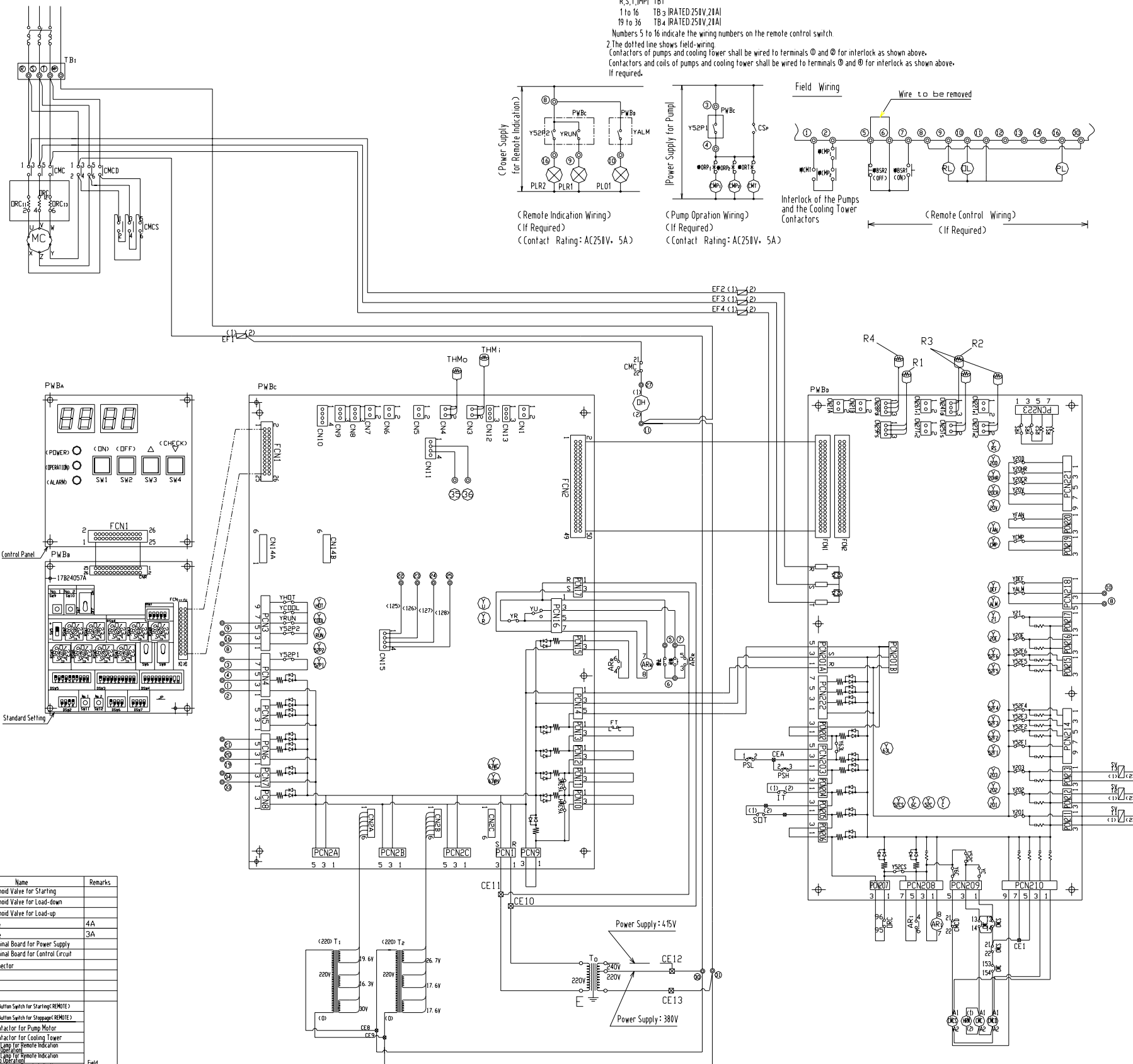


For Models: RCU400SYCZ (1)

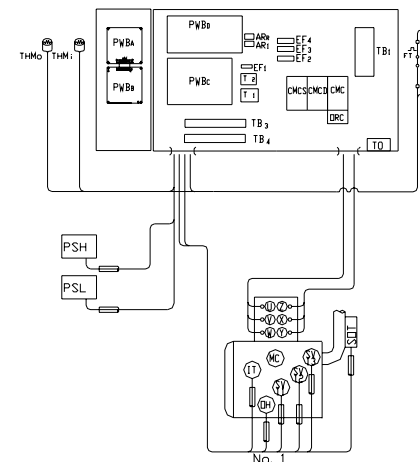


ELECTRICAL WIRING DIAGRAM OF HITACHI WATER-COOLED WATER CHILLERS (MODELS : RCU40SYCZ, RCU50SYCZ, RCU60SYCZ)

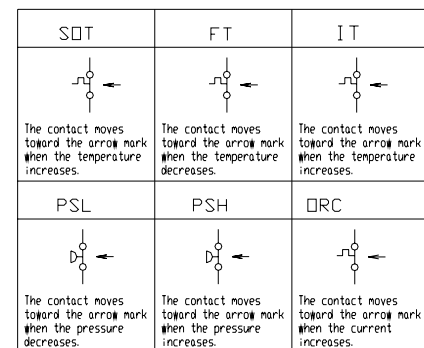
Power Supply 3 ϕ MP: 380V, 415V
(50Hz)



Location of Electrical Parts in the Electrical Box



Activation of Switches

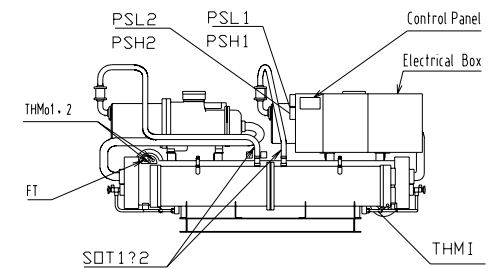


Code	Content
C1-H1	Activation of High Pressure Switch (PSH)
C1-L1	Activation of Low Pressure Switch (PSL)
C1-71	Activation of Internal Thermostat for Compressor Motor (T)
C1-61	Activation of Thermostat for Supplying Oil Protection (SOT)
C1-51	Activation of Overcurrent Relay for Compressor Motor (ORC)
5P	Abnormal Condition of Feed back Signal from CMP and CM1
O5	Alarm by Reverse Phase or Single Phase
11	Alarm of Thermostat (THM)
13	Activation of Freeze Protection Thermostat (FT)
40	Alarm for Operation Error
BB	Power Supply
Co	Cooling Operation
oF	Stoppage by Thermostat
PU	Waiting of Pump Feed Back or Pump Operation

Table of Mark

Mark	Name	Remarks	Mark	Name	Remarks
MC	Motor for Compressor		SV 11	Solenoid Valve for Starting	
CMC	Contact for Compressor Motor		SV 12	Solenoid Valve for Load-down	
CMCS	Contact for Compressor Motor		SV 13	Solenoid Valve for Load-up	
CMCD	Contact for Compressor Motor		EF 1	Fuse	4A
DRC	Overcurrent Relay for Compressor Motor		EF 2-4	Fuse	3A
IT	Internal Thermostat for Compressor (OFF/ON: 15/43°C)		TB 1	Terminal Board for Power Supply	
AR 11	Auxiliary Relay		TB 3	Terminal Board for Control Circuit	
PSH	High Pressure Switch		CE	Connector	
PSL	Low Pressure Switch		BSR 1	Push Button Switch for Starting (REMOTE)	
SOT	Thermostat for Supplying Oil Protection		BSR 2	Push Button Switch for Stoppage (REMOTE)	
FT	Freeze Protection Thermostat		CMC 1, 2	Contact for Pump Motor	
OH	Oil Heater		CMT	Contact for Cooling Tower	
PWBa	Printed Circuit Board for Indication		PLR 1	Relay for Remote Indication	
PWBb	Printed Circuit Board for Setting		PLR 2	Relay for Remote Indication	
PWBc	Printed Circuit Board for Control		PLD 1	Relay for Remote Indication	
PWBd	Printed Circuit Board for Relay		ORP 1, 2	Overcurrent Relay for Pump Motor	
T 0.1, 2	Transformer		ORT	Overcurrent Relay for Cooling Tower	
THM 1	Thermostat for Inlet Water Temperature (Chilling Water)		CSP	Changeover Switch for Pump Operation	
THM 2	Thermostat for Outlet Water Temperature for control		RL	Relay for Remote Indication	
HRM	Hour Meter		DL	Relay for Remote Indication	
R1	variable resistance	1k Ω	PL	Relay for Remote Indication	
R2	variable resistance	25 Ω			
R3	variable resistance	2k Ω			
R4	variable resistance	5k Ω			

ELECTRICAL WIRING DIAGRAM OF HITACHI WATER-COOLED WATER CHILLERS (MODELS: RCU80SYCZ, RCU100SYCZ, RCU120SYCZ)



SV12.22

SV13.23

SV11.21

SOT1. 2	FT	IT1. 2
		
The contact moves toward the arrow mark when the temperature increases.	The contact moves toward the arrow mark when the temperature decreases.	The contact moves toward the arrow mark when the temperature increases.
PSL1. 2	PSH1. 2	ORC1. 2
		
The contact moves toward the arrow mark when the pressure decreases.	The contact moves toward the arrow mark when the pressure increases.	The contact moves toward the arrow mark when the current increases.

Alarm Indication	
Code	Content
C1-H1	Activation of High Pressure Switch(PSH1)
C2-H2	Activation of High Pressure Switch(PSH2)
C1-L1	Activation of Low Pressure Switch(PSL1)
C2-L2	Activation of Low Pressure Switch(PSL2)
C1-M1	Activation of Internal Thermal for (Compressor Motor1)
C2-M2	Activation of Internal Thermal for (Compressor Motor2)
C1-P1	Activation of Thermal for Supplying Oil Protection(SO1)
C2-P2	Activation of Thermal for Supplying Oil Protection(SO2)
C1-S1	Activation of Overcurrent Relay for Compressor Motor(ORC11-13)
C2-S2	Activation of Overcurrent Relay for Compressor Motor(ORC21-23)
SP	Abnormal Condition of Feed back Signal from (NP and MT)
O5	Alarm by Reverse Phase or Simple Phase
I1	Alarm of Thermistor(11TH1)
I3	Activation of Gas Protection Thermal(J1P1)
I4	Activation of Operation Error
C0	Power Supply
B0	Cooling Operation
oF	Stoppage by Thermal
PI1	Warning at Pump Feed Back or Pump Operation

1. The terminal numbers in the figure indicate the number on the following terminal boards:

R, S, T, (MP)	TB 1
1 to 16	TB 3 (RATED 250V, 20A)
19 to 36	TB 4 (RATED 250V, 20A)

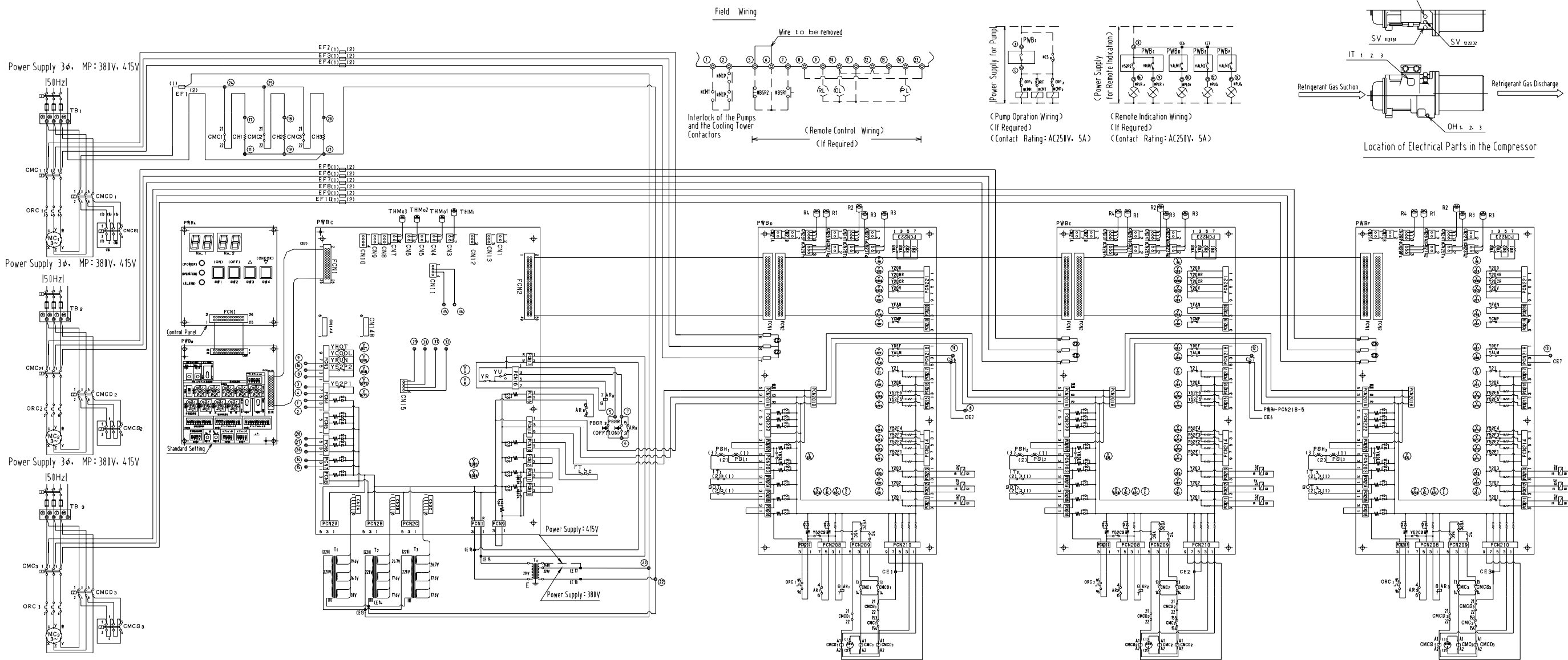
Numbers 5 to 16 indicate the wiring numbers on the remote control switch.

2. The dotted line shows field-wiring.

Contactors of pumps and cooling tower shall be wired to terminals ⓐ and ⓑ for interlock as shown above.

Contactors and coils of pumps and cooling tower shall be wired to terminals ⓐ and ⓑ for interlock as shown above, if required.

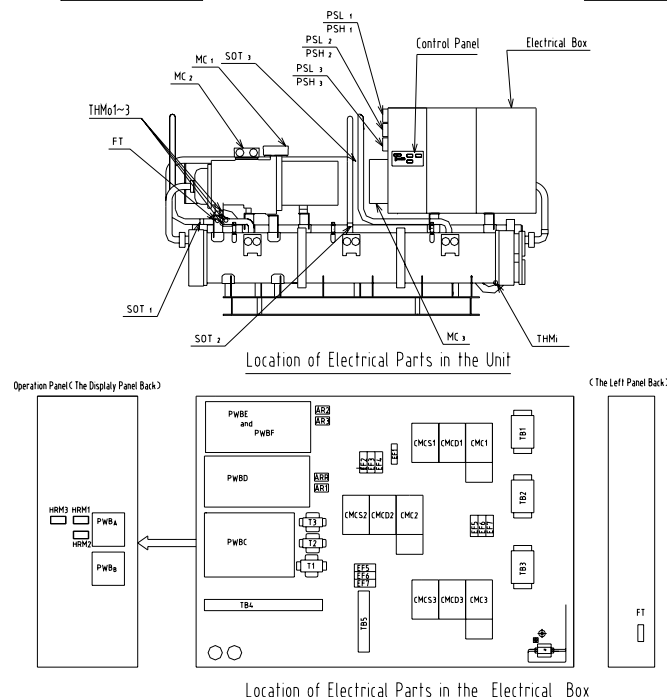
ELECTRICAL WIRING DIAGRAM OF HITACHI WATER-COOLED WATER CHILLERS (MODELS : RCU150SYCZ,RCU180SYCZ)



Code	Content
C1-H1	Activation of High Pressure Switch(PSH1)
C2-H2	Activation of High Pressure Switch(PSH2)
C3-H3	Activation of High Pressure Switch(PSH3)
C1-L1	Activation of Low Pressure Switch(PSL1)
C2-L2	Activation of Low Pressure Switch(PSL2)
C3-L3	Activation of Low Pressure Switch(PSL3)
C1-T1	Activation of Internal Thermostat for Compressor Motor(ITT1)
C2-T2	Activation of Internal Thermostat for Compressor Motor(ITT2)
C3-T3	Activation of Internal Thermostat for Compressor Motor(ITT3)
C1-A1	Activation of Thermal for Supplying Oil Protection(SOT1)
C2-A2	Activation of Thermal for Supplying Oil Protection(SOT2)
C3-A3	Activation of Thermal for Supplying Oil Protection(SOT3)
C1-S1	Activation of Overcurrent Relay for Compressor Motor(ORC1~3)
C2-S2	Activation of Overcurrent Relay for Compressor Motor(ORC2~3)
C3-S3	Activation of Overcurrent Relay for Compressor Motor(ORC3~3)
SP	Abnormal Condition of Feedback Signal from CMP and CMT
R5	Alarm by Reverse Phase or Single Phase
IT	Alarm of Thermostat(HIT/HTM)
IT3	Activation of Freeze Protection Thermostat(FT)
AL	Alarm for Operation Error
B8	Power Supply
Co	Cooling Operation
oF	Stoppage by Thermostat
PU	Warning of Pump Feed Back or Pump Operation

Mark	Name	Remarks
MC 1,2,3	Meter for Compressor	
CMC 1,2,3	Contactor for Compressor Motor	
CMCS 1,2,3	Contactor for Compressor Motor	
CMCD 1,2,3	Contactor for Compressor Motor	
ORC 1,2,3	Overcurrent Relay for Compressor Motor	
IT 1,2,3	Internal Thermostat for Compressor Motor	OFF/ON: 15/93
AR 1,2,3	Auxiliary Relay	AC220V 24V
PSH 1,2,3	High Pressure Switch	24V 10A
PSL 1,2,3	Low Pressure Switch	24V 10A
SOT 1,2,3	Thermal for Supplying Oil Protection	24V 10A
FT	Freeze Protection Thermostat	24V 10A
OH 1,2,3	Oil Heater	24V 10A
PWB A	Printed Circuit Board	for Indication
PWB B	Printed Circuit Board	for setting
PWB C	Printed Circuit Board	for control
PWB D	Printed Circuit Board	for Relay(No1)
PWB E	Printed Circuit Board	for Relay(No2)
PWB F	Printed Circuit Board	for Relay(No3)
T	Transformer	
THM	Thermistor for Inlet Water Temperature	Chilling Water
THMo1,2,3	Thermistor for Outlet Water Temperature	for control
HIM 1,2,3	Hour Meter	
R1	virtual resistance	2kΩ
R2	virtual resistance	25kΩ

Mark	Name	Remarks
R3	virtual resistance	2kΩ
R4	virtual resistance	5kΩ
SV 1~3	Solenoid Valve for Starting	
SV 4~6	Solenoid Valve for Load-down	
SV 7~9	Solenoid Valve for Load-up	
EF 1	Fuse	6A
EF 2~4	Fuse	3A
TB 1~3	Terminal Board for Power Supply	
TB 4,5	Terminal Board for Control Circuit	
CE	Connector	
BSR 1	Push Button Switch for Starting(REMOTE)	
BSR 2	Push Button Switch for Stoppage(REMOTE)	
CMP 1,2	Contactor for Pump Motor	
CMT	Contactor for Cooling Tower	
PLR1	Push Lamp for Remote Indication	
PLR2	Push Lamp for Remote Indication	
PLR3	Push Lamp for Remote Indication	
PLR4	Push Lamp for Remote Indication	
ORP 1,2	Overcurrent Relay for Pump Motor	
ORT	Overcurrent Relay for Cooling Tower	
CSP	Changeover Switch for Pump Operation	
RL	Relay for Remote Indication	
OL	Relay for Remote Indication	
PL	Relay for Remote Indication	



SOT 1~3	FT	IT 1~3
The contact moves toward the arrow mark when the temperature increases.	The contact moves toward the arrow mark when the temperature decreases.	The contact moves toward the arrow mark when the temperature increases.
PSL 1~3	PSH 1~3	ORC 1~3
The contact moves toward the arrow mark when the pressure decreases.	The contact moves toward the arrow mark when the pressure increases.	The contact moves toward the arrow mark when the current increases.

NOTES

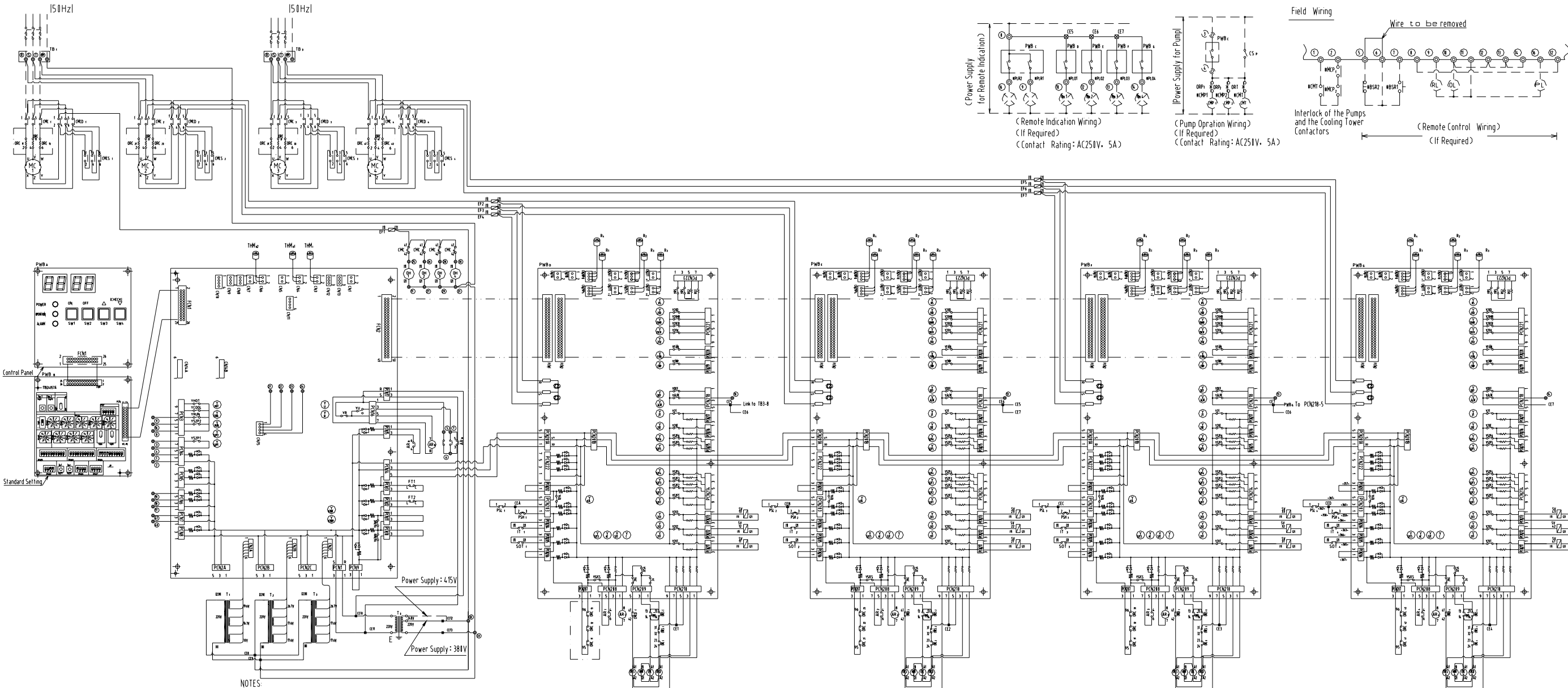
1.The terminal numbers in the figure indicate the number on the following terminal boards:
R,S,T,MPI TB1~3
1 to 18 TB 4, IRATED 254V 20A
19 to 36 TB 5, IRATED 254V 20A
Numbers 5 to 16 indicate the wiring numbers on the remote control switch

2.The dotted line shows field-wiring.
Contactors of pumps and cooling tower shall be wired to terminals ① and ② for interlock as shown above.
Contactors and coils of pumps and cooling tower shall be wired to terminals ③ and ④ for interlock as shown above.
If required.

ELECTRICAL WIRING DIAGRAM OF HITACHI WATER-COOLED WATER CHILLERS (MODELS : RCU200SYCZ,RCU240SYCZ)

Power Supply 3φ, MP:380V, 415V

Power Supply 3φ, MP:380V, 415V



NOTES

- 1 The terminal numbers in the figure indicate the number on the following terminal boards:
R, S, T, MP, TB1-2
1 to 25 TB3 (RATED: 250V, 21A)
26 to 58 TB4 (RATED: 250V, 21A)
Numbers 5 to 14, 16 indicate the wiring numbers on the remote control switch.
- 2 The dotted line shows field wiring.
Contactors of pumps and cooling tower shall be wired to terminals ① and ② for interlock as shown above.
Contactors and coils of pumps and cooling tower shall be wired to terminals ③ and ④ for interlock as shown above, if required.

Alarm Indication

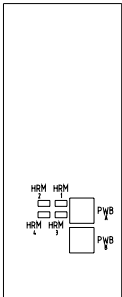
Code	Content
C1-H1	Activation of High Pressure Switch(PSH1)
C2-H2	Activation of High Pressure Switch(PSH2)
C3-H3	Activation of High Pressure Switch(PSH3)
C3-H4	Activation of High Pressure Switch(PSH4)
C1-L1	Activation of Low Pressure Switch(PSL1)
C2-L2	Activation of Low Pressure Switch(PSL2)
C3-L3	Activation of Low Pressure Switch(PSL3)
C3-L4	Activation of Low Pressure Switch(PSL4)
C1-T1	Activation of Internal Thermostat for Compressor Motor(T1)
C2-T2	Activation of Internal Thermostat for Compressor Motor(T2)
C3-T3	Activation of Internal Thermostat for Compressor Motor(T3)
C3-T4	Activation of Internal Thermostat for Compressor Motor(T4)
C1-61	Activation of Thermostat for Supplying Oil Protection(SO11)
C2-62	Activation of Thermostat for Supplying Oil Protection(SO12)
C3-63	Activation of Thermostat for Supplying Oil Protection(SO13)
C3-64	Activation of Thermostat for Supplying Oil Protection(SO14)
C1-51	Activation of Overcurrent Relay for Compressor Motor(OR1-1)
C2-52	Activation of Overcurrent Relay for Compressor Motor(OR2-1)
C3-53	Activation of Overcurrent Relay for Compressor Motor(OR3-1)
C3-54	Activation of Overcurrent Relay for Compressor Motor(OR4-1)
SP	Abnormal Condition of Feedback Signal from CMP and CMT
85	Alarm by Reverse Phase or Simple Phase
11	Alarm of Thermostat(T1)H1
13	Activation of Freeze Protection Thermostat(F11) indicate "1%" Activation
14	Activation of Freeze Protection Thermostat(F12) of Both "F11" And "F12"
48	Alarm for Operation Error
88	Power Supply
Co	Cooling Operation
oF	Stoppage by Thermostat
PU	Waiting of Pump Feed Back or Pump Operation

Table of Mark

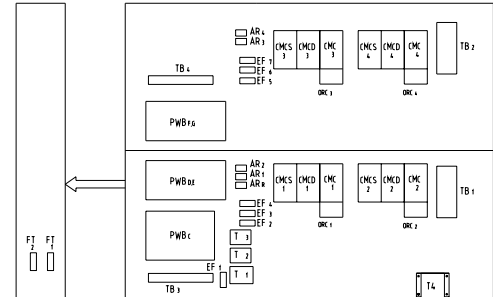
Mark	Name	Remarks
MC 1-4	Motor for Compressor	
CMC 1-4	Contact for Compressor Motor	
CMCS 1-4	Contact for Compressor Motor	
CMCD 1-4	Contact for Compressor Motor	
ORC 1-4	Overcurrent Relay for Compressor Motor	
IT 1-4	Internal Thermostat for Compressor	OFF/ON: T15/130
AR R-4	Auxiliary Relay	AC220V 24V
PSH 1-4	High Pressure Switch	ON: 250V, 21A OFF: 250V, 21A
PSL 1-4	Low Pressure Switch	ON: 250V, 21A OFF: 250V, 21A
SOT 1-4	Thermostat for Supplying Oil Protection	ON: 250V, 21A OFF: 250V, 21A
FT 1-2	Freeze Protection Thermostat	ON: 250V, 21A OFF: 250V, 21A
OH 1-4	Oil Heater	
PWB A	Printed Circuit Board	for Indication
PWB B	Printed Circuit Board	for setting
PWB C	Printed Circuit Board	for control
PWB D	Printed Circuit Board	for RelayNo1
PWB E	Printed Circuit Board	for RelayNo2
PWB F	Printed Circuit Board	for RelayNo3
PWB G	Printed Circuit Board	for RelayNo4
T 4123	Transformer	
THM1	Thermostat for Inlet Water Temperature	Chilling Water
THM1,2	Thermostat for Outlet Water Temperature	for control
HRM 1-4	Hour Meter	
RT	virtual resistance	10kΩ

Mark	Name	Remarks
R2	virtual resistance	25kΩ
R3	virtual resistance	2kΩ
R4	virtual resistance	5kΩ
SV 0-41	Solenoid Valve for Starting	
SV 0-42	Solenoid Valve for Load-down	
SV 0-43	Solenoid Valve for Load-up	
EF 1	Fuse	6A
EF 2-7	Fuse	3A
TB 1-2	Terminal Board for Power Supply	
TB 3, 4	Terminal Board for Control Circuit	
CE	Connector	
BSR 1	Push Button Switch for Starting(REMOTE)	
BSR 2	Push Button Switch for Stoppage(REMOTE)	
CMP 1,2	Contact for Pump Motor	
CMT	Contact for Cooling Tower	
PLR1	Push Button for Remote Indication	
PLR2	Push Button for Remote Indication	
PLD1-3	Push Button for Remote Indication	
ORP 1,2	Overcurrent Relay for Pump Motor	
ORT	Overcurrent Relay for Cooling Tower	
CSp	Changeover Switch for Pump Operation	
RL	Push Button for Remote Indication	AC220V
OL	Push Button for Remote Indication	AC220V
PL	Push Button for Remote Indication	AC220V

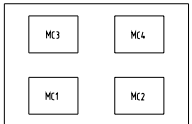
Operation Panel(The Display Panel Back)



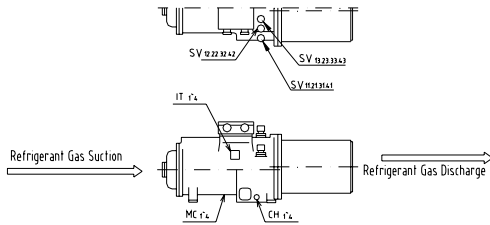
(The Left Panel Back)



Location of Electrical Parts in the Electrical Box



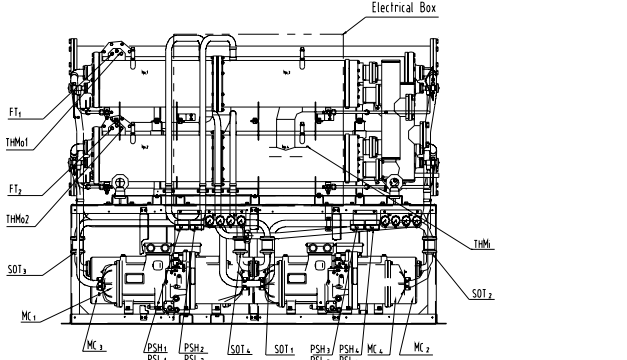
Location of the Compressor in the Unit



Location of Electrical Parts in the Compressor

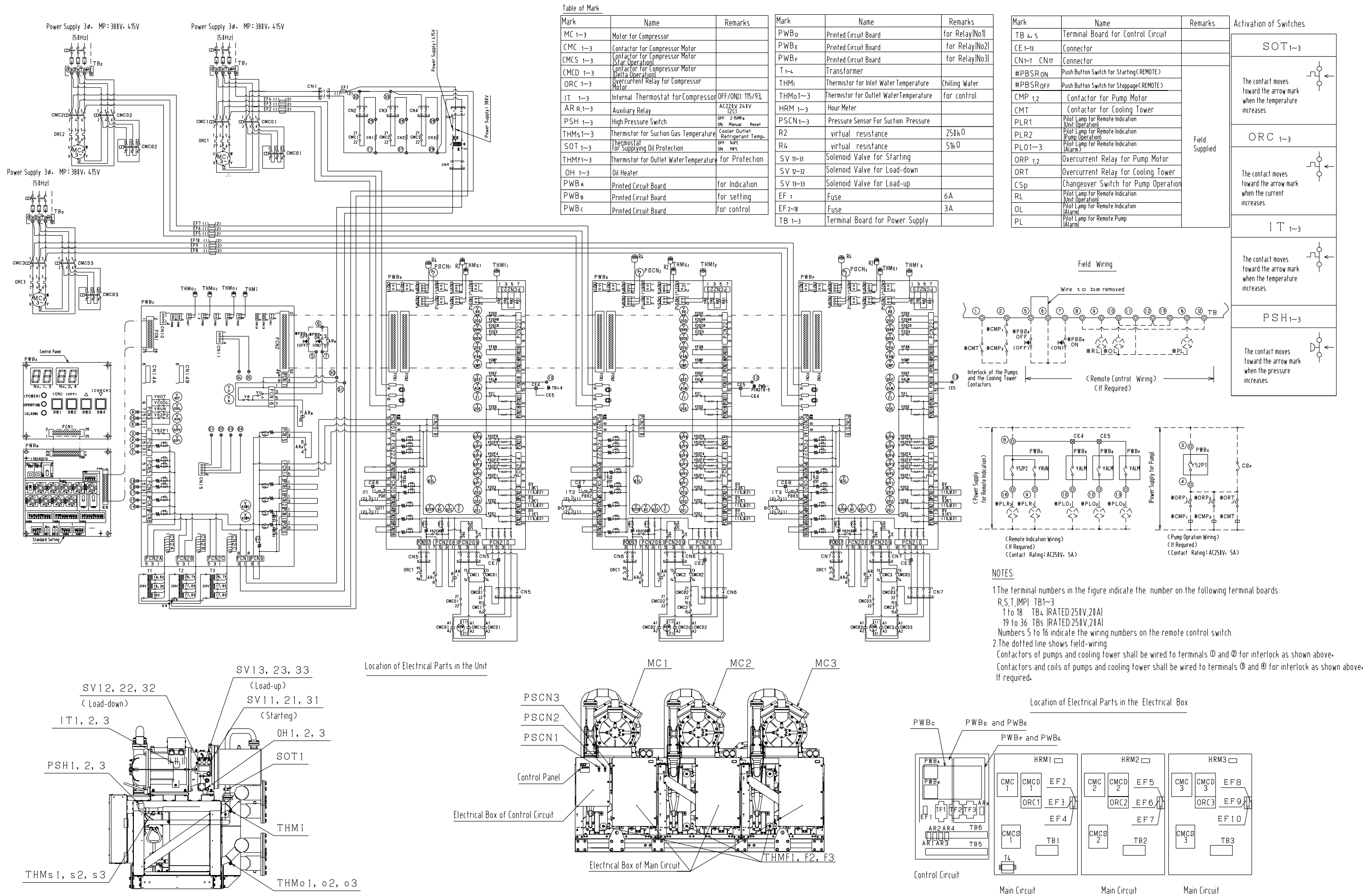
Activation of Switches

SOT 1-4	FT 1-2	IT 1-4
The contact moves toward the arrow mark when the temperature increases.	The contact moves toward the arrow mark when the temperature decreases.	The contact moves toward the arrow mark when the temperature increases.
PSL 1-4	PSH 1-4	ORC 1-4
The contact moves toward the arrow mark when the pressure decreases.	The contact moves toward the arrow mark when the pressure increases.	The contact moves toward the arrow mark when the current increases.



Location of Electrical Parts in the Unit

ELECTRICAL WIRING DIAGRAM OF HITACHI WATER-COOLED WATER CHILLERS< MODEL : RCU300SYCZ >



NOTES:

1.The terminal numbers in the figure indicate the number on the following terminal boards:

R,S,T,(MP) TB1~4
1 to 20 TBs (RATED-250V,20A)
21 to 40 TB (RATED-250V,20A)

Numbers 5 to 6 indicate the wiring numbers on the remote control switch.

2.The dotted line shows field-wiring.

Contactors of pumps and cooling tower shall be wired to terminals ① and ② for interlock as shown down.

Contactors and coils of pumps and cooling tower shall be wired to terminals ③ and ④ for interlock as shown down, If required.

ELECTRICAL WIRING DIAGRAM OF HITACHI WATER-COOLED WATER CHILLERS< MODEL : RCU400SYCZ>

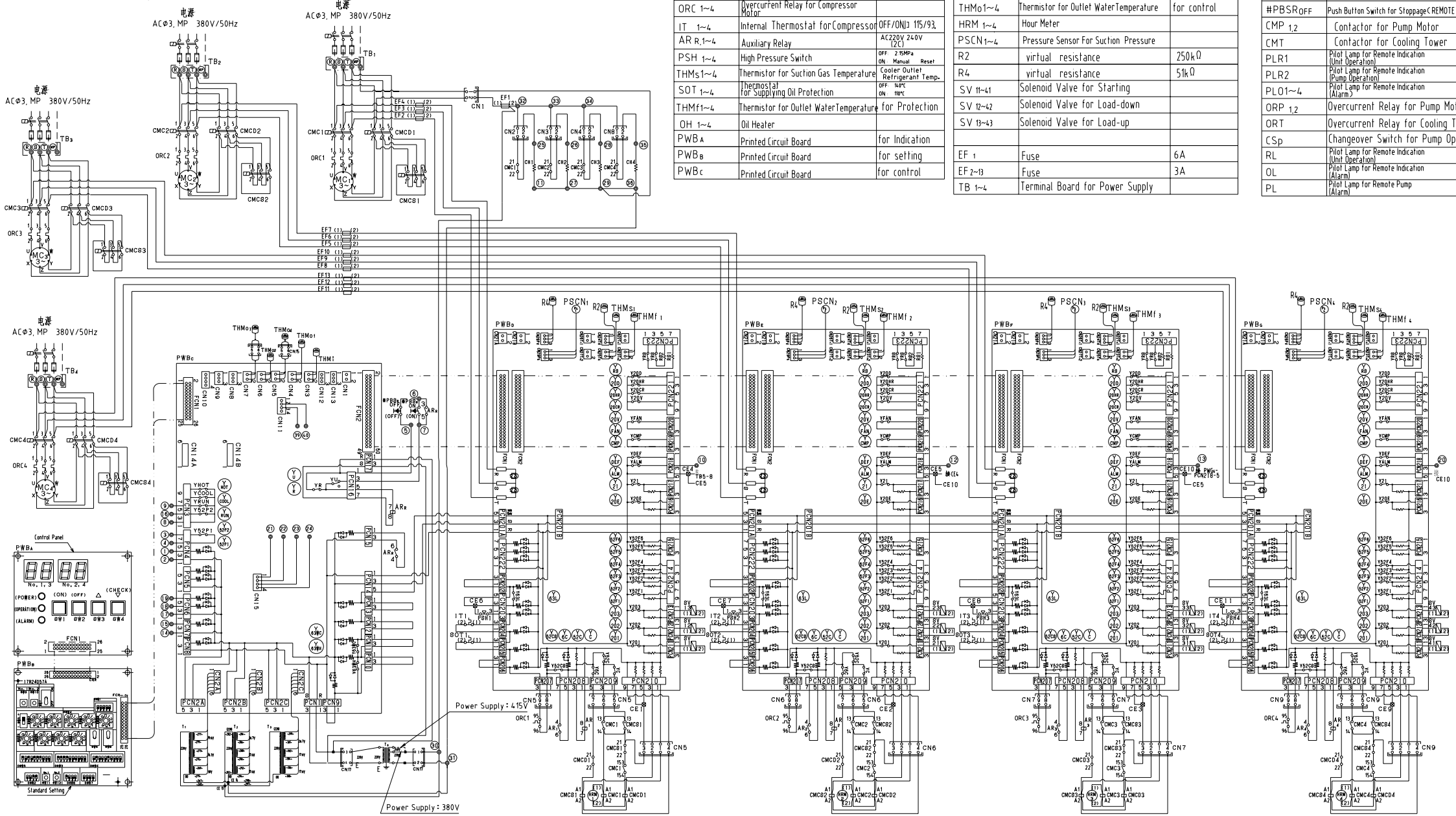
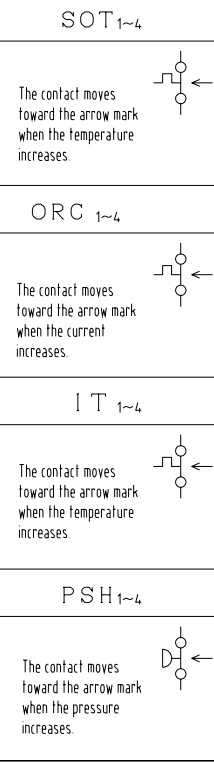
Table of Mark

Mark	Name	Remarks
MC 1~4	Motor for Compressor	
CMC 1~4	Contact for Compressor Motor	
CMCS 1~4	Contact for Compressor Motor (Star Operation)	
CMCD 1~4	Contact for Compressor Motor (Delta Operation)	
ORC 1~4	Overcurrent Relay for Compressor Motor	
IT 1~4	Internal Thermostat for Compressor	OFF/ON 115/93
AR 1~4	Auxiliary Relay	AC220V 240V (2C)
PSH 1~4	High Pressure Switch	OFF: 2.5MPa ON: Manual Reset
THMs1~4	Thermistor for Suction Gas Temperature	Cooler Outlet Refrigerant Temp.
SOT 1~4	Thermostat for Supplying Oil Protection	OFF: 90°C ON: 10°C
THMf1~4	Thermistor for Outlet Water Temperature for Protection	
OH 1~4	Oil Heater	
PWBa	Printed Circuit Board	for Indication
PWBb	Printed Circuit Board	for setting
PWBc	Printed Circuit Board	for control

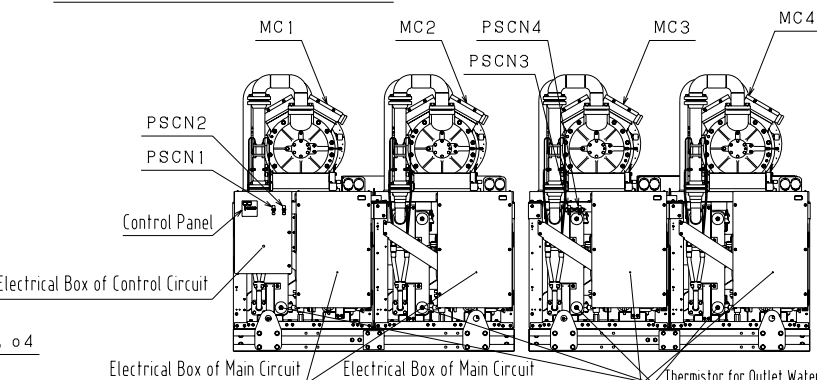
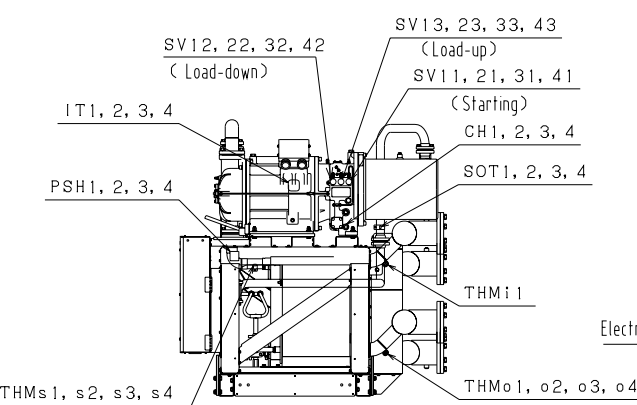
Mark	Name	Remarks
PWBa, b, c, d	Printed Circuit Board	for Relay
T _o	Transformer	
TF 1~3	Transformer	
THMi	Thermistor for Inlet Water Temperature	Chilling Water
THMo1~4	Thermistor for Outlet Water Temperature	for control
HRM 1~4	Hour Meter	
PSCN 1~4	Pressure Sensor for Suction Pressure	
R2	virtual resistance	250kΩ
R4	virtual resistance	51kΩ
SV 11~41	Solenoid Valve for Starting	
SV 12~42	Solenoid Valve for Load-down	
SV 13~43	Solenoid Valve for Load-up	
EF 1	Fuse	6A
EF 2~13	Fuse	3A
TB 1~4	Terminal Board for Power Supply	

Mark	Name	Remarks
TB 5, 6	Terminal Board for Control Circuit	
CE 1~4	Connector	
CN1~9	Connector	
HPBSRON	Push Button Switch for Starting(REMOTE)	
HPBSROFF	Push Button Switch for Stoppage(REMOTE)	
CMP 1,2	Contact for Pump Motor	
CMT	Contact for Cooling Tower	
PLR1	Pilot Lamp for Remote Indication (Unit Operation)	
PLR2	Pilot Lamp for Remote Indication (Unit Operation)	
PLO1~4	Pilot Lamp for Remote Indication (Alarm)	
ORP 1,2	Overcurrent Relay for Pump Motor	
ORT	Overcurrent Relay for Cooling Tower	
CSp	Changeover Switch for Pump Operation	
RL	Pilot Lamp for Remote Indication (Unit Operation)	
OL	Pilot Lamp for Remote Indication (Alarm)	
PL	Pilot Lamp for Remote Pump (Alarm)	

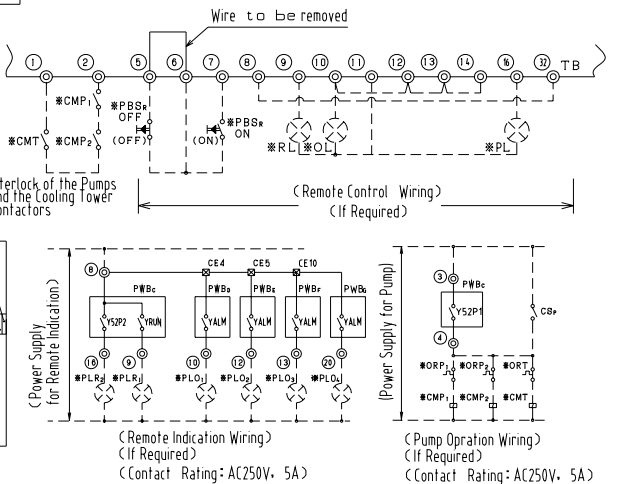
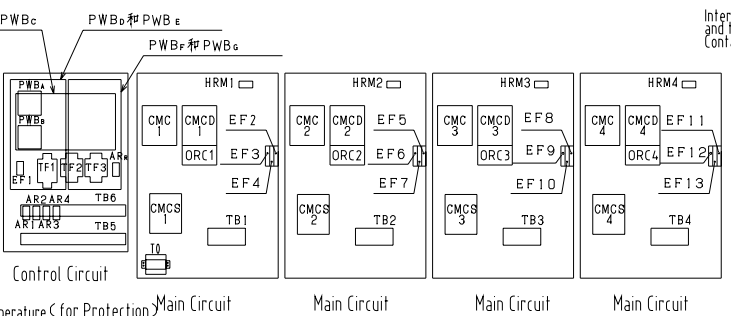
Activation of Switches



Location of Electrical Parts in the Unit



Location of Electrical Parts in the Electrical Box



CONTROL SYSTEM

In addition to the basic water chilled components such as compressors , a condenser , thermal expansion valves and a water cooler ,the following components are equipped.

Check Valve
This check valve stops the reverse flow of refrigerant from the condenser when the unit is stopped.

Refrigerant Control

Stop Valve
This stop valve is equipped at the condenser outlet. This stop valve and check valve are equipped in order to store refrigerant during long stoppage of the unit, or to perform servicing of the refrigerant circuit.

Capacity Control
A compressor unloading mechanism is equipped in order to decrease the starting torque and to perform capacity control. The unit capacity can be controlled at the range showed in following table, respectively.

Mode	Capacity Control	Mode	Capacity Control
RCU40SYCZ(1)	100%~33%	RCU150、180SYCZ(1)	100%~8.3%
RCU50、60SYCZ(1)	100%~25%	RCU200、240SYCZ(1)	100%~12.5%
RCU80SYCZ(1)	100%~13.5%	RCU300SYCZ(1)	100%~8.3%
RCU100、120SYCZ(1)	100%~12.5%	RCU400SYCZ(1)	100%~12.5%

Electrical Operation Control

Electrical operation control advanced the Hitachi's water-cooled water chillers are as follows.

Control Panel
ON switch, OFF switch, power supply lamp, operation lamp, alarm lamp, operation/alarm indicator for each refrigerant cycle and check switch are mounted in the control panel, the control panel is located at a position where easy access is available.

Operation/alarm indicator can display individual alarm codes such as high-cut, low-cut etc. this function is very useful for detecting what alarm has occurred.

Check switches is for checking chilled water temperature and alarm occurrence data. Chilled water temperature setting switch, ON/OFF differential setting switches、 remote-local switch and so on are located at the rear side of control panel, in order not to access during operation.

Operation Hour-Meter
This hour-meter is located at a position of the control panel where easy access is available. It indicates the sum of the compressor operation.

Printed Circuit Board
A micro-processor, relays and electronic components are mounted on the printed circuit board. Increased reliable is assured due to elimination the mechanical parts and wires. This board contains various functions as follows by applying micro-processor.

Screw Compressor Cycling Protection Circuit (CCP)
The electric timer of the screw compressor cycling

Protection (CCP) connected in the compressor control circuit delays the screw compressor restarting period for approximately three(3) minute for NO.1compressor,four(4)minutes for no.2 compressor five(5)minutes for no.3 compressor six(6)minutes for no.4 compressor for the mutli compressor units after the electronic thermostat calls for the cooling operation or automatic resetting of the protection devices. Thereby preventing harmful screw compressor cycling operation.

Electric Thermostat Circuit
The electronic thermostat mounted on the printed circuit board, senses chilled water temperatures at the water cooler outlet, and operates solenoid valves for HITACHI screw compressor capacity control.

Screw Compressor Reversing Protection Circuit
This circuit is composed of a reverse-phase protection devices, preventing reverse operation of the screw compressor. Because the screw compressor definitely cannot be operated in the wrong direction, due to the misconnection of the main power phases.

Rotation of Compressor Operation
Rotation of compressor operation order is available in order to balance the operation hours of the compressor. This function extends machine life.

Restart After Short Period Power-Failure.
In the case that a power failure shorter than 2 seconds occurred, compressors can be restarted automatically within 3minutes after power supply.

Protection and Safety Control

CONTROL SYSTEM

Compressor Protection System

All units are equipped with combination of safety devices, supplying a perfect guarding function for the screw compressor.

High Pressure Switch and Low Pressure Switch

Leading pressures from HITACHI screw compressor discharge and suction lines, these switches cut out HITACHI screw compressor operation when the discharge pressure exceeds the setting or the suction pressure decreases below the setting. (low-pressure protection function is achieved by micro-processor control for model RCU300SYCZ(1) and RCU400SYCZ(1))

Three Phase Quick Response Overcurrent Relay

Equipped in the electric box, this relay quickly cuts out HITACHI-SRW screw compressor operation when the current to the HITACHI-SRW screw compressor exceeds the setting.

Internal Thermostat

Embedded in the HITACHI-SRW screw compressor winding, this thermostat cuts out HITACHI-SRW screw compressor operation when the screw compressor temperature increase excessively.

Oil Heater

Equipped in the HITACHI screw compressor, this oil heater warms the oil and protects against oil foaming during cold starting, as it is energized while the compressor is stopped

Pressure reliable valve

This valve (placed in the condenser for model RCU40SYCZ (1) to RCU240SYCZ (1) and placed at the compressor outlet for model RCU300SYCZ (1) and RCU400SYCZ (1)) opens to discharge gas pressure exceeding the setting value, in order to protect the compressor from an abnormal high pressure.

HITACHI-SRW Screw Compressor Reverse Phase Protection Relay

This relay senses the misconnection of the power source phases and protects HITACHI-SRW screw compressor against operation in the wrong direction, which should be absolutely avoided.

Screw Compressor Cycling Protection Timer Relay.

This timer relay makes the combination of devices more effective by relaying the compressor restarting time (see "Operation Sequence Chart")

Refrigerant Circuit Protection.

Fusible Plug

Equipped in the condenser, this fusible plug melts when the refrigerant temperature exceeds the melting point.

Freezing Protection Thermostat

This is the sensor located near the water outlet on the water cooler shell, and cuts HITACHI-SRW screw compressor operation when the water temperature decrease below the setting, preventing the water cooler from freezing.

CONTROL SYSTEM

Safety and Control Device Setting

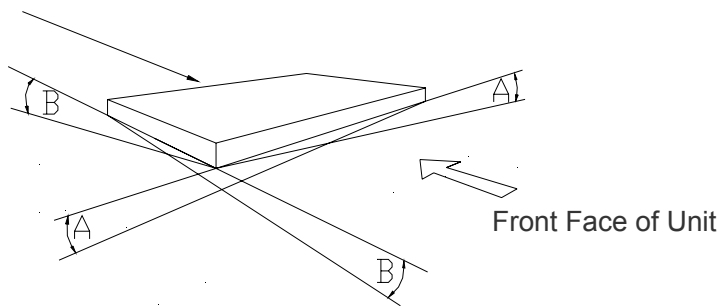
Model		RCU40SYCZ	RCU50SYCZ	RCU60SYCZ	RCU80SYCZ	RCU100SYCZ	RCU120SYCZ	RCU150SYCZ	RCU180SYCZ	RCU200YCZ	RCU240YCZ	RCU300SYCZ	RCU400SYCZ	
		RCU40SYCZ1	RCU50SYCZ1	RCU60SYCZ1	RCU80SYCZ1	RCU100SYCZ1	RCU120SYCZ1	RCU150SYCZ1	RCU180SYCZ1	RCU200YCZ1	RCU240YCZ1	RCU300SYCZ1	RCU400SYCZ1	
For Compressor		Manual Reset Non-Adjustable												
Pressure Switch														
High	Cut-Out	MPa	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	
Low		Automatic Reset Non-Adjustable 0.29(Control by Micro-processor)												
Cut-Out														
Overcurrent Relay		Manual Reset Adjustable (Three-Phase)												
380V	50Hz	A	40	50	60	40	50	60	50	60	50	60	100	100
415V	50Hz	A	40	50	60	40	50	60	50	60	50	60	100	100
Internal Thermostat		Automatic Reset Non-Adjustable												
	Cut-Out	℃	115	115	115	115	115	115	115	115	115	115	115	115
	Cut-In	℃	93	93	93	93	93	93	93	93	93	93	93	93
Oil Heater														
	Capacity	W	150	150	150	150	150	150	150	150	150	150	150	150
Electronic Timer														
	CCP(*1)	min..	3	3	3	3/4	3/4	3/4	3/4/5	3/4/5	3/4/5/6	3/4/5/6	3/4/5	3/4/5/6
	Star-Delta	sec.	5	5	5	5	5	5	5	5	5	5	5	5
	Unloading during starting	sec.	30	30	30	30	30	30	30	30	30	30	30	30
For Control Circuit														
	Fuse													
	Capacity	A	6	6	6	6	6	6	6	6	6	6	6	6
For Refrigerant Cycle														
	Fusible Plug													
	Melting Point	℃	72	72	72	72	72	72	72	72	72	72	72	72
Freezing Protection Thermostat		Automatic Reset Non-Adjustable												
	Cut-Out	℃	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	Cut-In	℃	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Discharge Gas Thermostat		Automatic Reset Non-Adjustable												
	Cut-Out	℃	140	140	140	140	140	140	140	140	140	140	140	140
	Cut-In	℃	110	110	110	110	110	110	110	110	110	110	110	110
Pressure Relief Valve														
	50Hz													
	Starting to Open	MPa	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.26	2.26

Note:
CCP: Compressor Cycle Protection.
CCP hour-meter has a range from 1minute to 10 minutes, but the adjustment should be less than 3minutes to avoid frequent unit starting, this function extends machine life.

INSTALLATION DATA

Foundation provisions

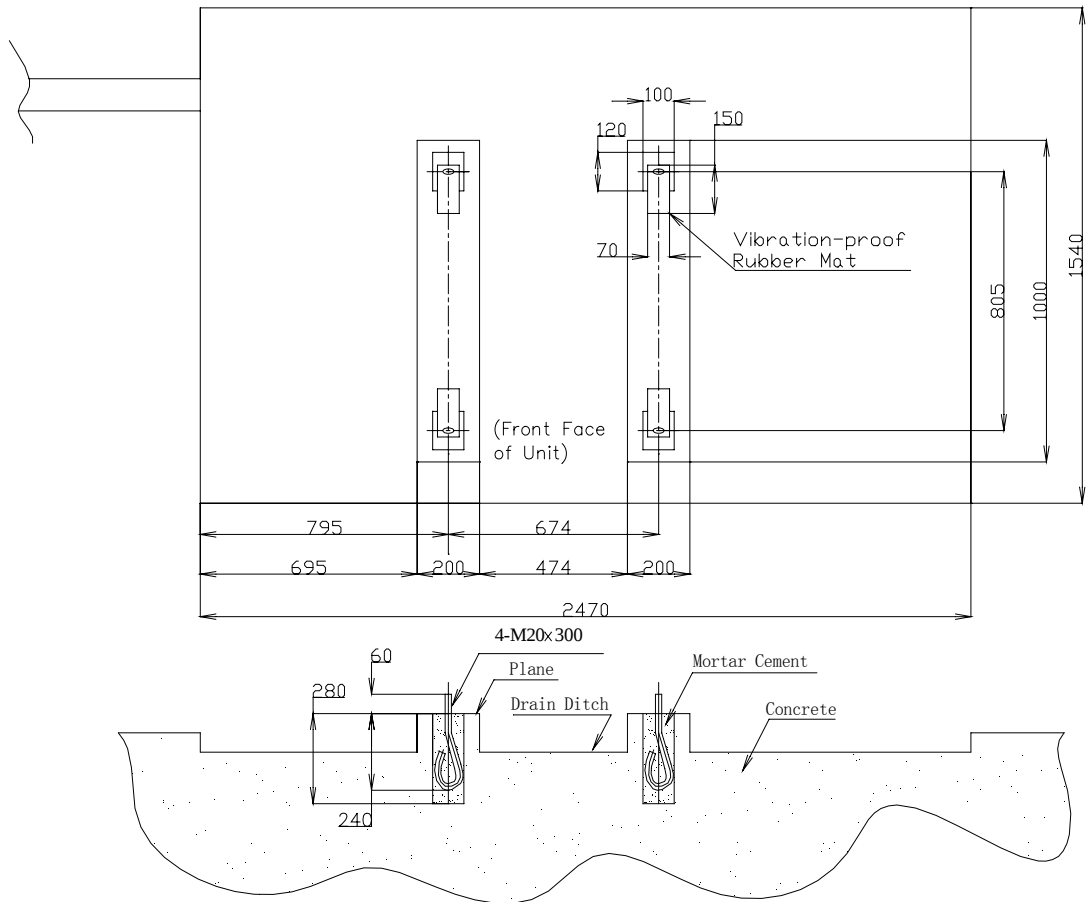
Maximum Foundation Gradient
The unit should be installed in an upright position within the gradient shown in the figure.



Models	Dimensions			
	A		B	
	deg.	mm	deg.	mm
RCU40SYCZ (1)	0.4	5	0.3	5
RCU50SYCZ (1)	0.4	5	0.3	5
RCU60SYCZ (1)	0.4	10	0.3	5
RCU80SYCZ (1)	0.3	10	0.3	5
RCU100SYCZ (1)	0.3	10	0.3	5
RCU120SYCZ (1)	0.3	10	0.3	5
RCU150SYCZ (1)	0.3	10	0.3	5
RCU180SYCZ (1)	0.3	10	0.3	5
RCU200SYCZ (1)	0.2	10	0.5	12
RCU240SYCZ (1)	0.2	10	0.5	12
RCU300SYCZ (1)	0.3	15	0.3	10
RCU400SYCZ (1)	0.4	15	0.3	10

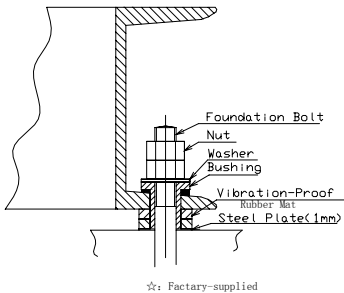
Recommended Concrete Curbs

For Models: RCU40SYCZ (1)、RCU50SYCZ (1)、RCU60SYCZ (1)



NOTE:
The number of the accessories shall be as follow

Vibration Proof Mat (t9×70×150)	Foundation Mat (m20×m300)	Bushing	Washer	Nut
4	4	4	4	8

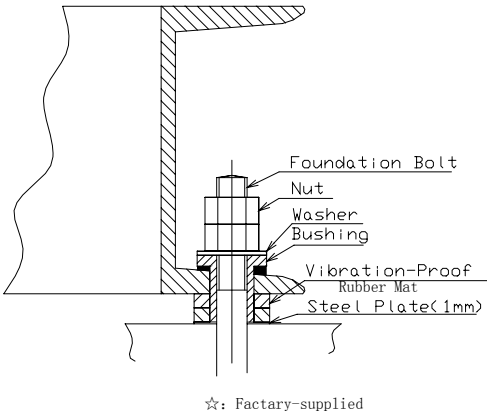
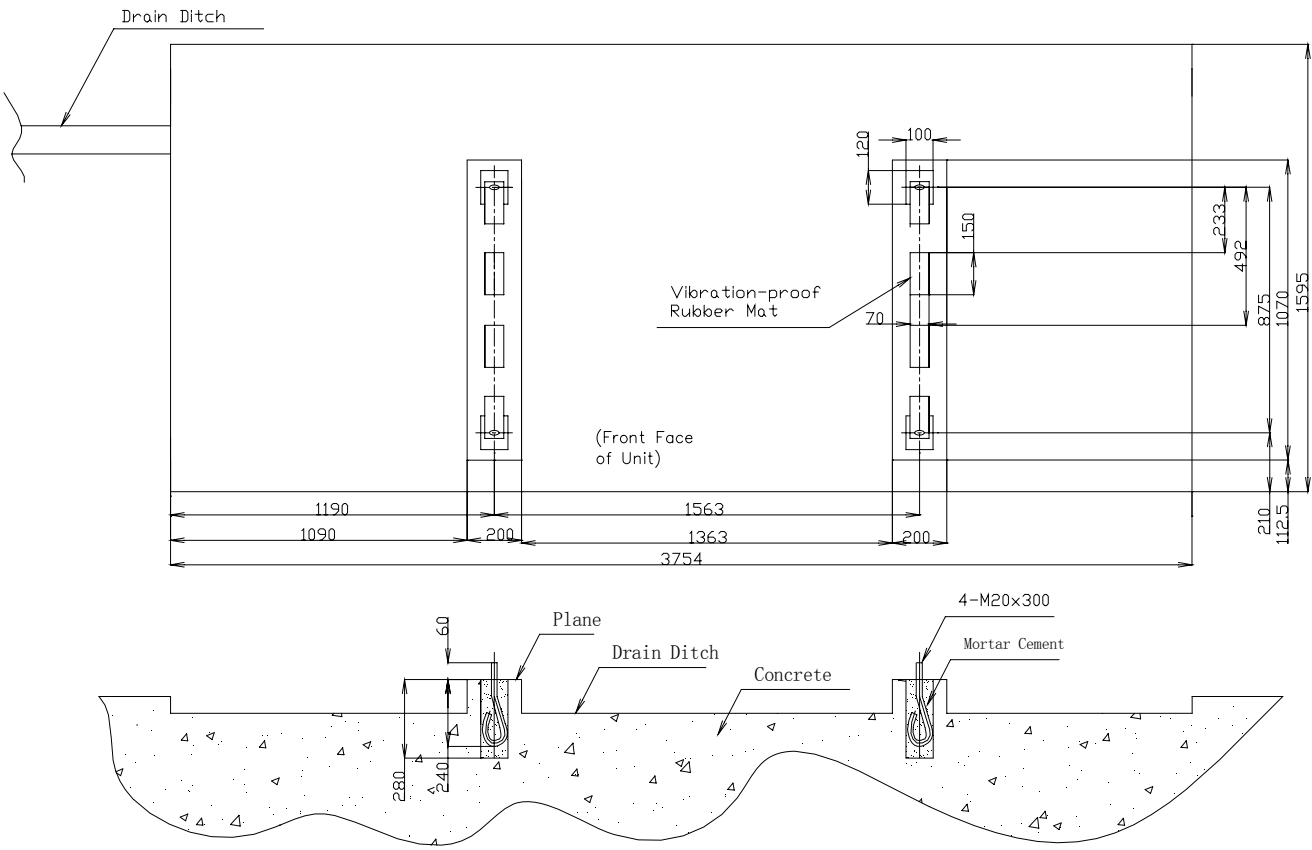


☆: Factory-supplied

INSTALLATION DATA

Foundation Provisions

For Models RCU80SYCZ (1)、 RCU100SYCZ (1)、 RCU120SYCZ (1)



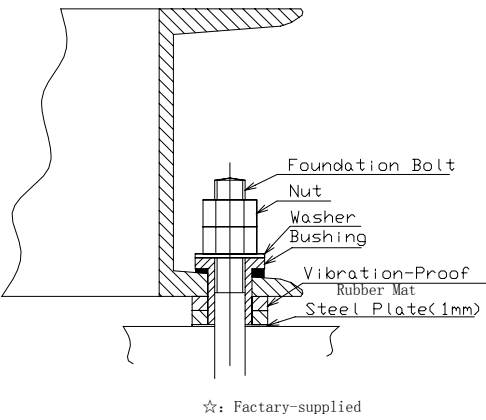
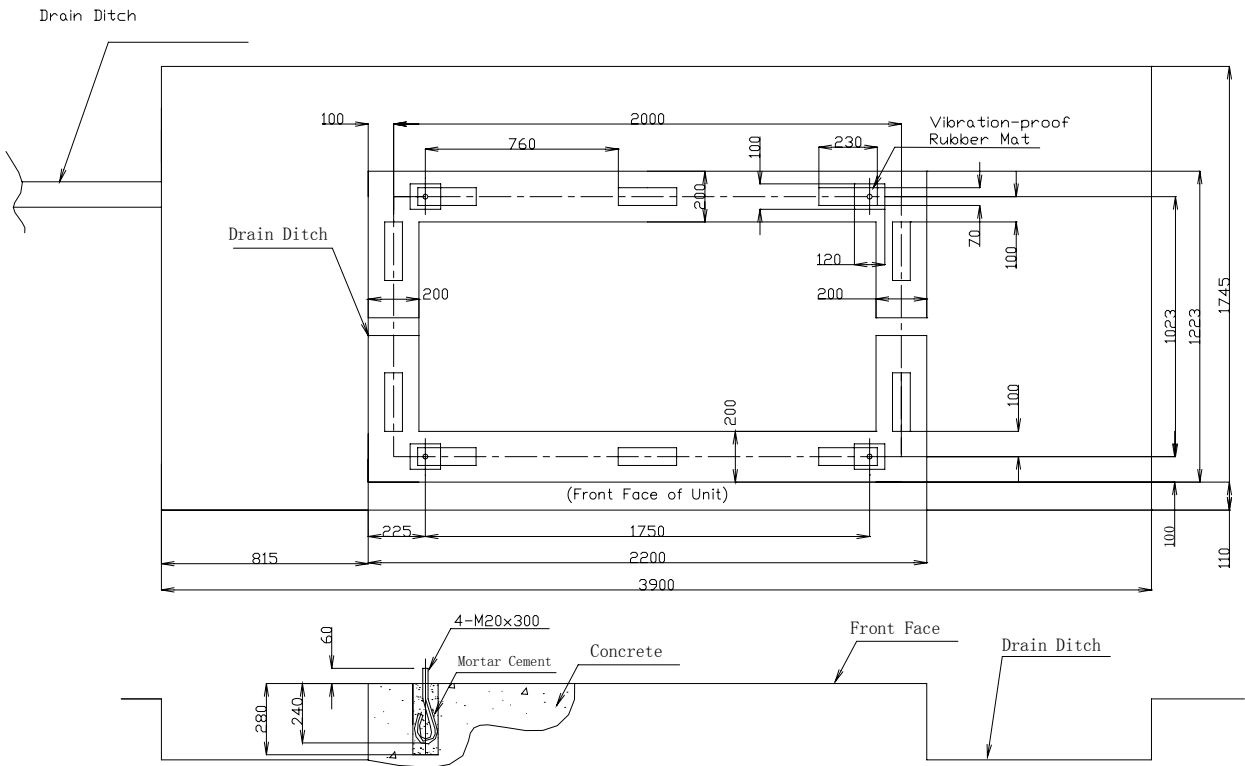
NOTE:
The number of the accessories shall be as follow.

Vibration Proof Mat (t9×50×150)	Foundation Mat (M20×300)	Bushing	Washer	Nut
8	4	4	4	8

INSTALLATION DATA

Foundation Provisions

For Models RCU150SYCZ(1)、RCU180SYCZ(1)



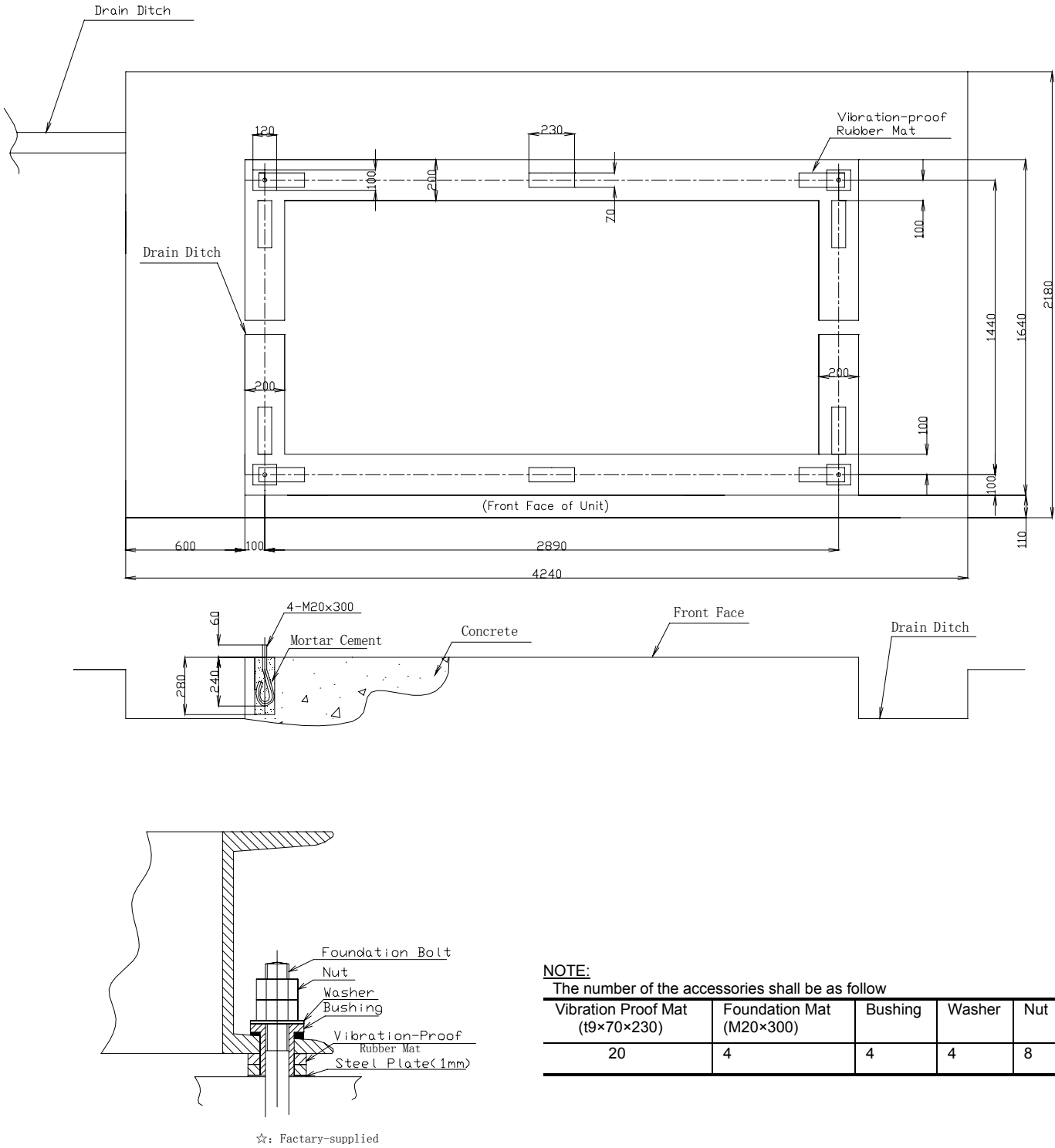
NOTE:
The number of the accessories shall be as follow

Vibration Proof Mat (t9×70×230)	Foundation Mat (M20×300)	Bushing	Washer	Nut
10	4	4	4	8

INSTALLATION DATA

Foundation Provisions

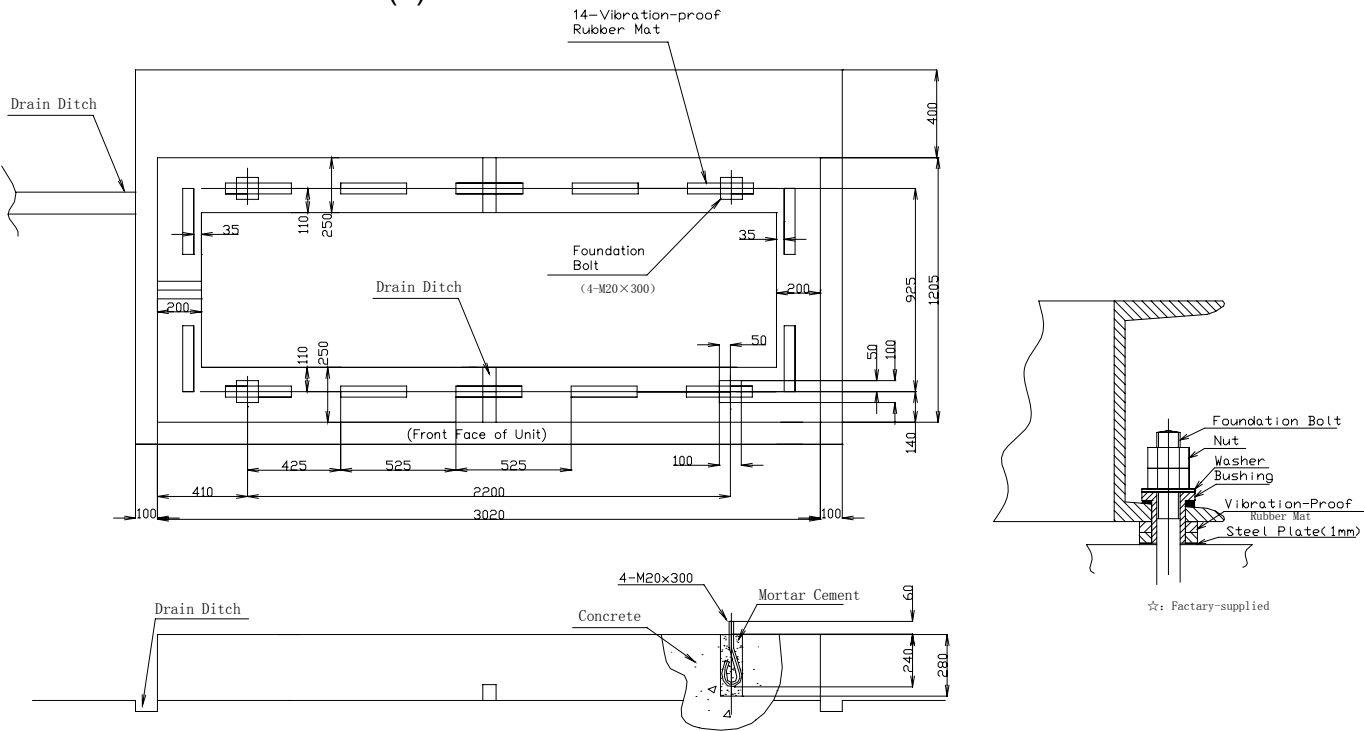
For Models RCU200SYCZ(1), RCU240SYCZ(1),



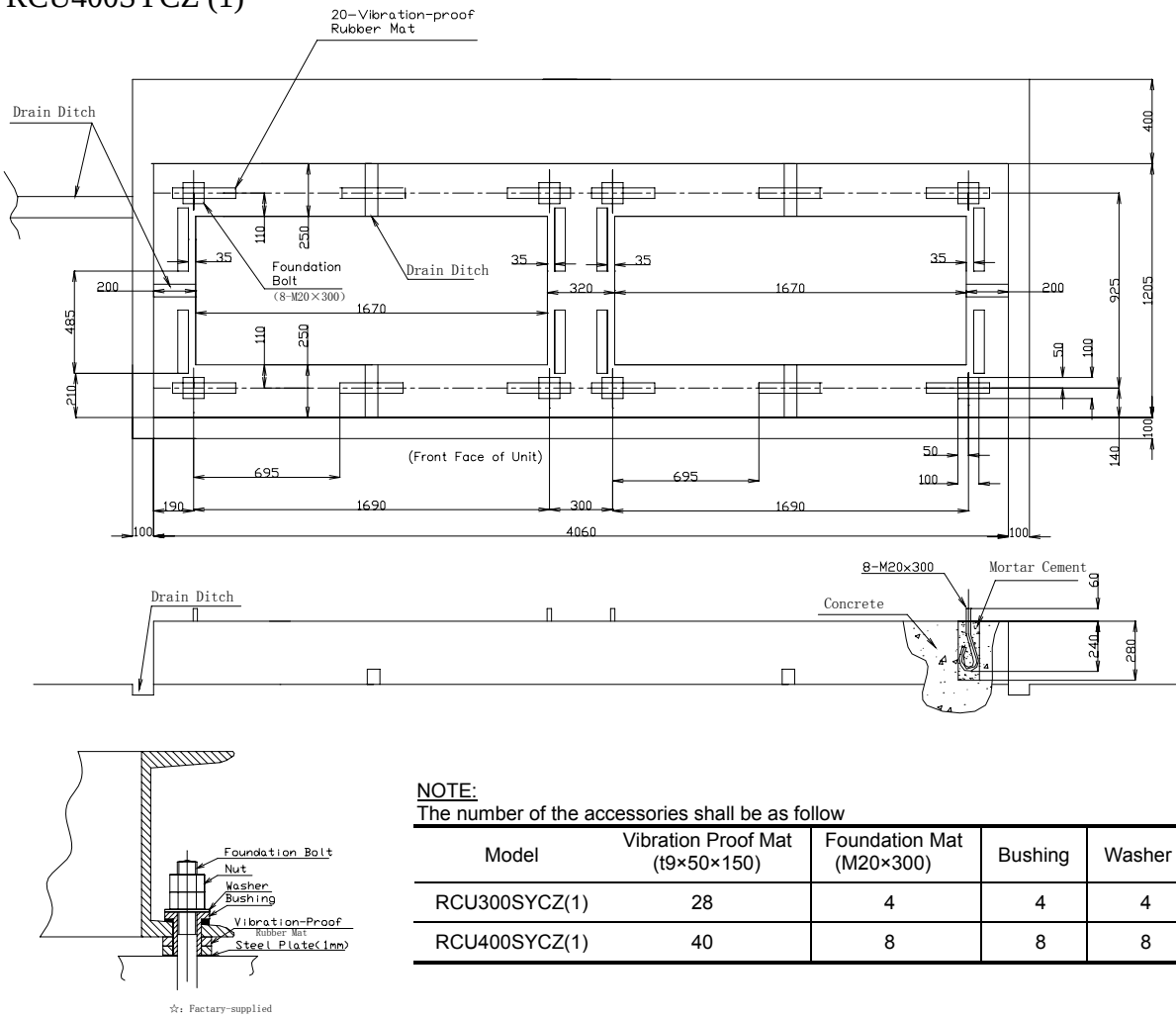
INSTALLATION DATA

Foundation Provisions

For Models RCU300SYCZ (1)



For Models RCU400SYCZ (1)



NOTE:
The number of the accessories shall be as follow

Model	Vibration Proof Mat (t9×50×150)	Foundation Mat (M20×300)	Bushing	Washer	Nut
RCU300SYCZ(1)	28	4	4	4	8
RCU400SYCZ(1)	40	8	8	8	16

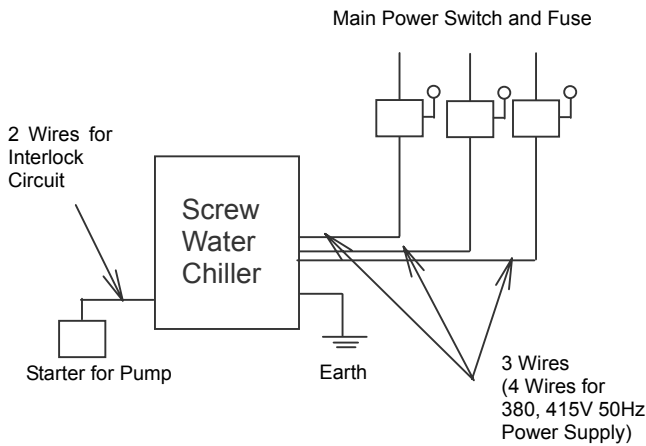
INSTALLATION DATA

Wring Provision

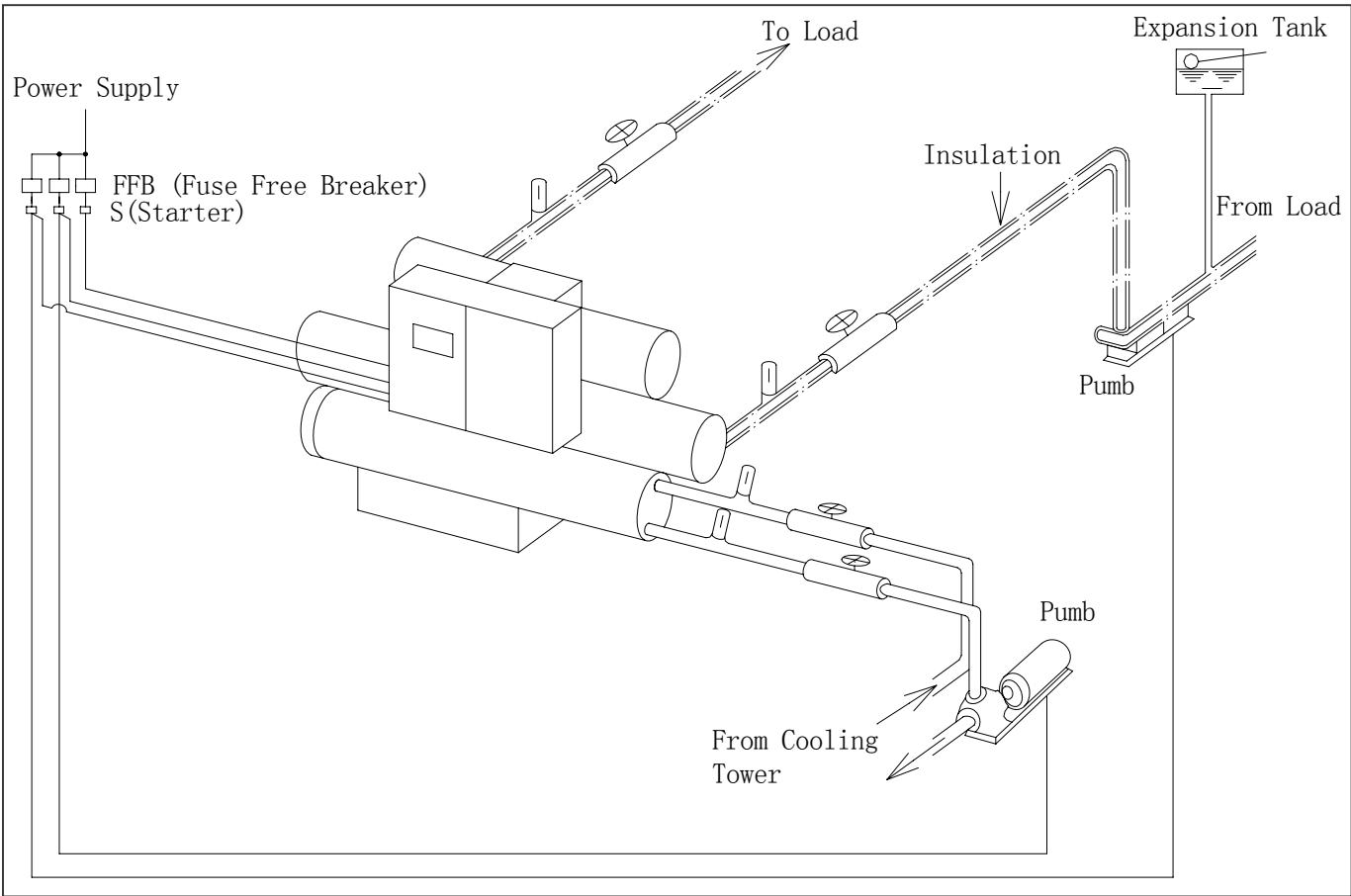
Field Wiring

Main power wiring, earth wiring and interlock wiring for pumps are required as field wiring.

Model	Quantity	
	Main Circuit	Main Power Switch
RCU40SYCZ (1)	1	1
RCU50SYCZ (1)	1	1
RCU60SYCZ (1)	1	1
RCU80SYCZ (1)	1	1
RCU100SYCZ (1)	1	1
RCU120SYCZ (1)	1	1
RCU150SYCZ (1)	3	3
RCU180SYCZ (1)	3	3
RCU200SYCZ (1)	2	2
RCU240SYCZ (1)	2	2
RCU300SYCZ (1)	3	3
RCU400SYCZ (1)	4	4



Typical Piping and Wiring



APPLICATION DATA

and

SPECIFICATIONS

Standard Specifications

Unit-The unit shall be a water-cooled screw water chiller for application with R-22 refrigerant, and shall be composed of a refrigerant cycle(s) and electrical components. Optional accessories shall also be provided upon customer request. The unit shall be for indoor installation. The unit shall be properly assembled, internally piped and wired, thoroughly tested and operation-charged with R-22 refrigerant at the factory. The unit shall comply with Japanese industrial standards and other Japanese industrial statues.

Capacity-The cooling capacity of the unit shall be
——kW(kcal/h) or greater under the following conditions:
——m³/h chilled water flow rate.
—— chilled water inlet temperature.
—— chilled water outlet temperature.
——m³/h condenser cooling water flow rate.
—— condenser water inlet temperature.
—— condenser water outlet temperature.

Water cooler and condenser fouling factors of
——m²h /kcal or greater.

Refrigerant Cycle-The refrigerant cycle shall be provided with HITACHI-SRW semi-hermetic screw compressor(s), a water-cooled condenser (s), a direct expansion type water cooler. Thermal expansion valve(s),liquid line strainer(s),fusible plug(s) and a check joint of low pressure.

Compressor-The compressor shall be a HITACHI-SRW sem-hermetic screw compressor of the same manufacture. The starting method shall be the star-delta type. The compressor shall be equipped with an oil separator in one piece and shall be the serviceable type.

Water-Cooler-the water cooler shall be the dry expansion type with a horizontal welded steel construction shell, containing inside tubes. The seamless copper tube shall be the thermofin cargated tube, in order to obtain the optimum heat transfer coefficient. The water side and the refrigerant side of the water cooler shall be tested for leakage. End plates shall be removable for maintenance.

{RCU300SYCZ(1) and RCU400SYCZ(1) shall be provided with plate type heat exchanger}

Condenser-The condenser shall be the shell-and –tube type, and water heads shall be removable. Seamless copper tubes shall be the high-flux heat transfer surfaces type. The refrigerant side of the condenser shall be cleaned, dehydrated and tested for leakage. {RCU300SYCZ (1) and RCU400SYCZ (1) shall be provided with plate type heat exchanger}

Compressor Protection-The compressor protection system of each compressor shall include a quick response overcurrent relay, a gas discharge thermostat, a high pressure switch, a low pressure switch, a timer relay and an internal thermostat embedded in the motor winding.

Control-All control devices should be enclosed in the unit. In addition to the compressor protection devices, the water cooler shall be equipped with a freeze protection thermostat to protect against freezing .The control devices shall include an electrical sequence of manual starting and stopping, and automatic, continuous operation whenever the thermostat(s) require, and the protection devices shall allow the operation. The capacity control shall be provided for all models.

Accessories-The factory-supplied standard accessories shall include vibration-proof rubber mats and foundation bolts. Therefore, Y style strainer is provided as factory-supplied standard accessories for model RCU300SYCZ (1) and RCU400SYCZ (2).

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