BROAD CENTRAL AIR CONDITIONING & MAGNETIC BEARING OIL FREE CHILLER

BROAD PACKAGED POWER-EFFICIENT CHILLER(HEATPUMP)

MODEL SELECTION & DESIGN MANUAL

Application

- Provide cooling/heating for central air conditioning system
- Produce chilled water over 2°C
- Produce heating water below 60°C

Cooling capacity

420~4,200kW

Heating capacity

670~4,020kW

2025.06 EN

UNIQUE VALUE

ENERGY SAVING

- The Integrated Part Load Value (IPLV) of the chiller can reach 10, which can reduce energy consumption by 40% compared to traditional electric chillers.
- BROAD Packaged Water Distribution System can reduce electricity consumption up to 76% compared to conventional field-built systems.

ADDITIONAL COST SAVING

- The magnetic oil free and zero friction technology can save up to 40% energy cost and 90% of maintenance cost compared with traditional electric chillers.
- BROAD PLC "Smart anti-surge control" module ensures the chiller always operate in a safe range.
- The integrated design of the BROAD chiller, water distribution system and stainless steel metal enclosure reduce design cost and field installation costs for customers.

SPACE SAVING

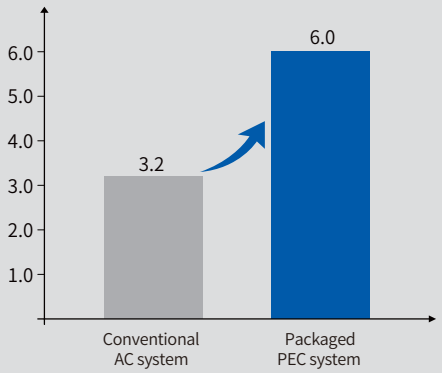
- Compared with the traditional electric chillers, BROAD packaged chiller reduces footprint by 30~50% and weight by 30%.
- BROAD Packaged Water Distribution System and stainless steel metal enclosures can be installed outside or rooftop which reduces mechanical room footprint requirements.

WORRY-FREE

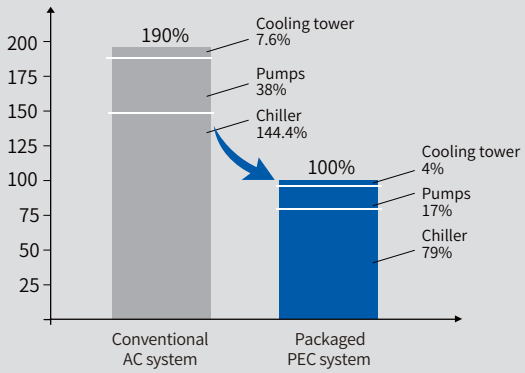
- BROAD Packaged Water Distribution System and stainless steel metal enclosure eliminate risk and minimize system design, procurement and installation errors.
- BROAD Intelligent Control System (ICS)can be automated for free operation of the chiller and water distribution system.
- BROAD Global Internet Monitoring System provides customers with 24/7 fault prediction, analysis and energy-saving management .

Comparison of BROAD Packaged Power Efficient chiller(PEC) and Conventional chiller

Comparison of Integrated energy efficiency ratio(IEER)



Comparison of energy consumption



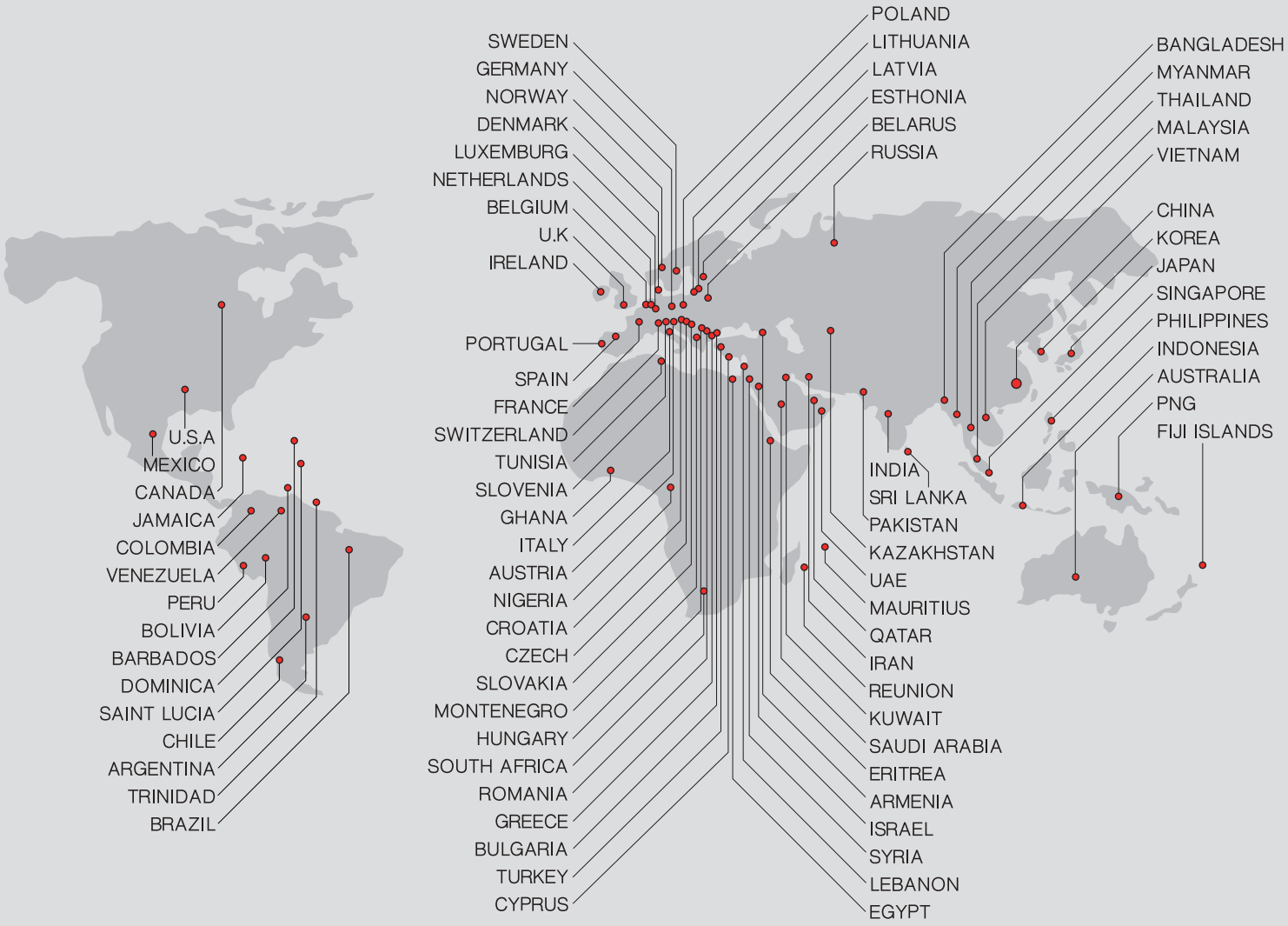
According to the data of authoritative organizations, in China, only 15% of AC systems have an IEER higher than 3.5, and most of them are in inefficient operation.While in some countries such as the United States and Singapore, their IEER can be higher than 5.0, indicating that there is significant room for improvement in China's AC systems.

BROAD has raises AC systems' IEER to 6 through the following four measures: selecting energy-saving products, applying energy-saving technology, system optimization design, and energy-saving operation and maintenance, which is much higher than the conventional AC systems in China and abroad.

CONTENTS

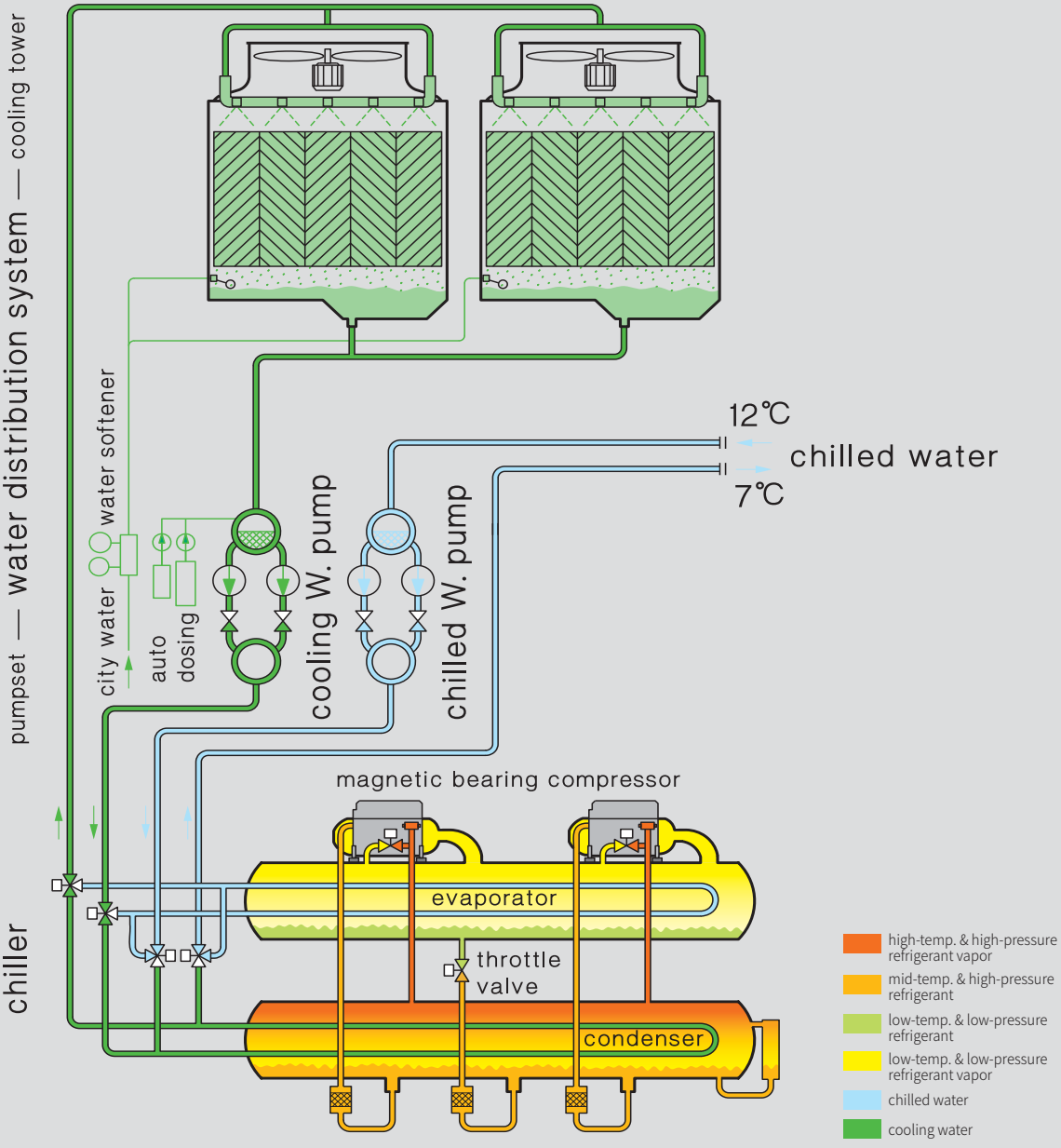
Packaged Power-efficient Chiller/Heatpump

Design & Construction Tips



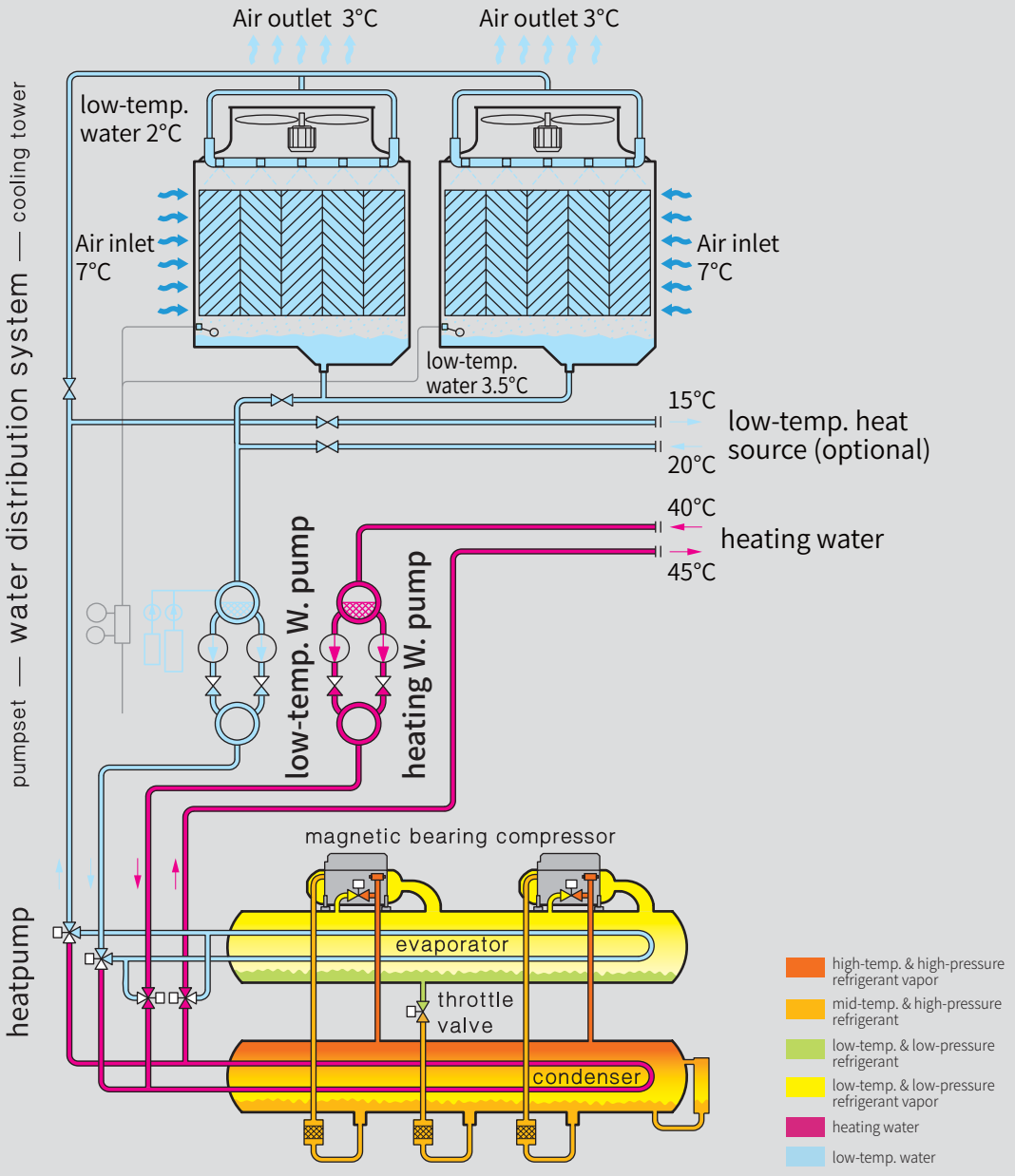
BROAD Global Market

Working Principle



Cooling principle

The compressor compresses 7 °C low-temp. & low-pressure refrigerant vapor to 45 °C high temp. & high pressure vapor then flows into condenser. In condenser cooling water absorbs the heat from refrigerant vapor condensation process and its temperature raises from 30°C to 35°C . Then the heat will be discharged to air through cooling tower. After condensation, 33°C refrigerant becomes into 6°C low-temp. & low-pressure liquid after throttle valve. The refrigerant enters evaporator and evaporates immediately. It absorbs heat from the chilled water and makes chilled water drop from 12°C to 7°C . After evaporation, the refrigerant gasifies into 7°C vapor and sucked into compressor. Then next cycle begins.



Heating Principle

Compressor operation, 14 °C low-temp. low-pressure refrigerant vapor is compressed into 55 °C high-temp. high-pressure vapor then flows into condenser. In condenser, heating water is heated from 40 °C to 45 °C , then provided to users..... After condensation, 43 °C refrigerant becomes into 13 °C low-temp. low-pressure liquid after throttle valve. The refrigerant enters evaporator and evaporates immediately. It absorbs heat from the low temp. water and makes low-temp. water drop from 20 °C to 15 °C ....., After evaporation, the refrigerant becomes into low temp. & low-pressure vapor and sucked to compressor. Then next cycle begins.

Packaged Power-efficient Chiller Rated Parameters

Chiller Rated Parameters

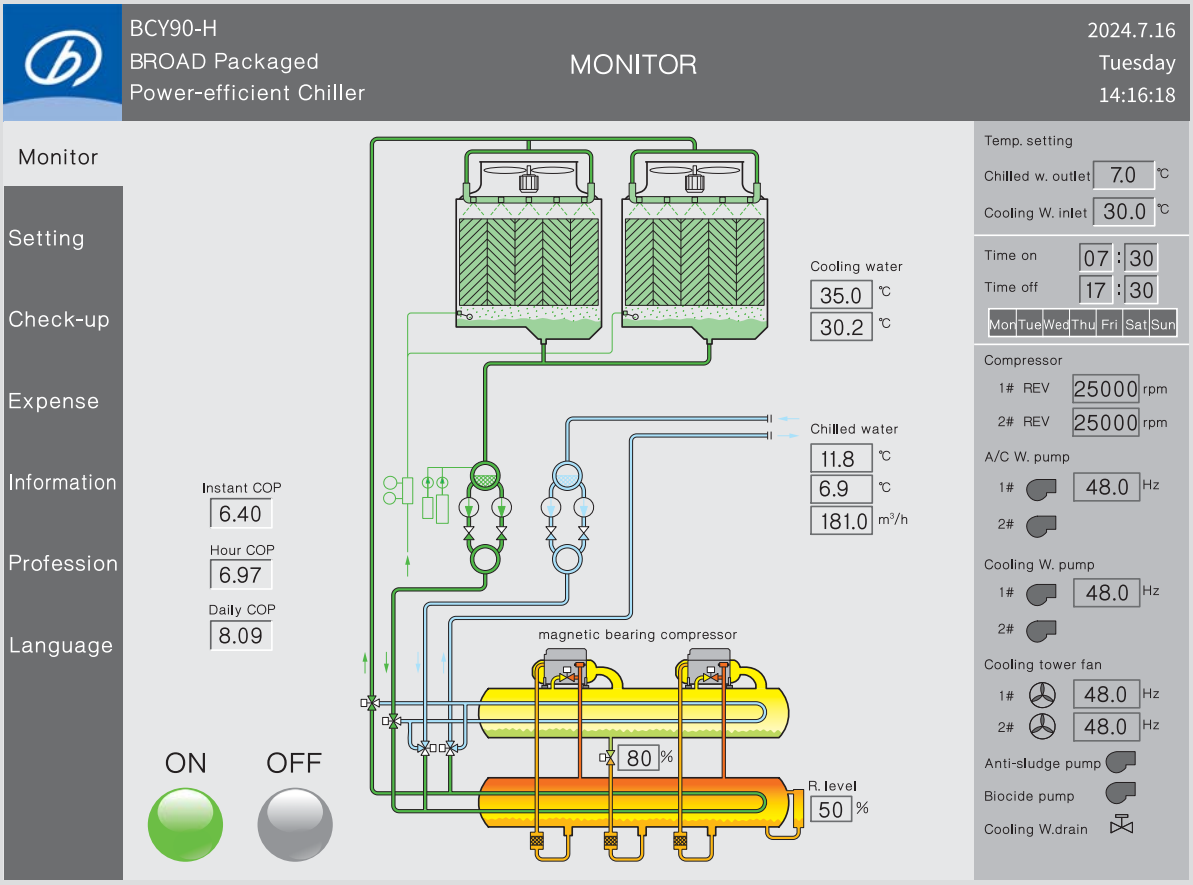
Model	BC	45-H	60-H	90-H	120-H	180-H	240-H	360-H
Cooling capacity	kW	520	700	1045	1400	2090	2800	4200
	10^4kcal/h	45	60	90	120	180	240	360
	RT	150	200	300	400	600	800	1200
Input power	kW	87.0	112.0	166.2	218.0	326.1	414.8	624.1
Rated COP		5.98	6.25	6.29	6.42	6.41	6.75	6.73
IPLV (AHRI)		9.52	9.45	9.85	9.81	9.77	9.94	10.01
Starting current	A	2	2	2	2	2	2	2
Maximum operation current	A	180	230	360	460	690	920	1380
Power demand	kW	105	130	200	260	380	520	750
Evaporator								
Flow rate	m^3/h	90	120	180	240	360	480	720
Pressure drop	kPa	35	40	70	70	70	70	80
Connection nozzle	DN	150	150	200	200	250	300	350
Condenser								
Flow rate	m^3/h	112	150	225	300	450	600	900
Pressure drop	kPa	35	45	75	75	60	75	75
Connection nozzle	DN	150	150	200	200	250	300	350
Refrigerant wt.	kg	190	280	380	480	775	960	1550
Shipment wt.	kg	2500	3200	4100	5600	8500	11400	17200
Operation wt.	kg	2900	3800	4900	6600	9700	13400	19600
Compressor Config. (RT×Qty)		45×1	60×1	45×2	60×2	60×3	60×4	60×6

General Conditions

1. Rated chilled W. outlet/inlet temp: 7/12°C
2. Rated cooling W. outlet/inlet temp: 35/30°C
3. Lowest permitted outlet temp. for chilled water: 3°C
4. Lowest permitted inlet temp. for cooling water: 10°C
5. Adjustable chilled water flowrate: 50~120%
6. Adjustable cooling water flowrate: 20~130%
7. Pressure limit for chilled W. and cooling W.: ⩽ 1.0MPa (high pressure model available)
8. Adjustable load: 10~100%(BC45/60-H ⩾ 30%)
9. Fouling factor for chilled W: 0.018$m^2 \cdot K/kW$
   Fouling factor for cooling W: 0.044$m^2 \cdot K/kW$
10. Refrigerant: R134a (option for other Refri)
11. Machine room ambient temperature: 5~43°C , humidity ⩽ 85%
12. Life design: 30 years
13. Operation noise: ⩽ 75dB (A)
14. Operation vibration: ⩽ 0.30mm

Packaged Distribution System Rated Parameters

Model		BCY	45	60	90	120	180	240	360
Pumpset	Chilled water pump								
	External head	mH_2O	23	22	27	28	28	28	27
	Power demand	kW	11	15	22	37	44	60	90
	Cooling water pump								
	External head	mH_2O	15	17	19	22	16	19	19
	Power demand	kW	8	11	22	30	37	44	74
	Total power demand		19	26	44	67	81	104	164
	Shipment wt.	kg	1300	1600	2100	2250	3300	3300	5200
	Operation wt.	kg	2500	3100	3800	4000	6300	6800	8700
Cooling tower	Cooling tower								
	Power demand	kW	5.5	5.5	11	11	15	22	30
	Operation wt .	kg	3170	3600	6335	7195	10495	14895	19120



Packaged Power-efficient Heatpump Rated Parameters

Heatpump Rated Parameters

Model	BC	35-R-H	70-R-H	105-R-H	140-R-H	210-R-H
Cooling/Heating capacity (C/H)	kW	420/670	840/1340	1260/2010	1680/2680	2520/4020
	10^4kcal/h	36/57	72/115	108/173	144/230	216/345
	RT	120/190	240/381	360/571	480/762	720/1143
Input power (C/H)	kW	69.4/107.2	134.2/208.7	200.6/311.6	246.3/377.5	367.9/563.8
Rated COP (C/H)		6.05/6.25	6.26/6.42	6.28/6.45	6.82/7.10	6.85/7.13
IPLV (AHRI)		9.49	9.85	9.75	10.13	10.10
Starting current	A	2	2	2	2	2
Maximum operation current	A	210	420	630	840	1260
Power demand	kW	135	270	405	520	780
Evaporator (C/H)						
Flow rate	m^3/h	72/90	144/180	216/270	288/360	432/540
Pressure drop	kPa	35/45	75/99	75/105	75/99	75/105
Connection nozzle	DN	125	150	200	250	300
Condenser (C/H)						
Flow rate	m^3/h	90/72	180/144	270/216	360/288	540/432
Pressure drop	kPa	35/25	75/45	75/45	75/45	75/45
Connection nozzle	DN	125	200	200	250	300
Refrigerant wt.	kg	170	350	500	700	1000
Shipment wt.	kg	2500	4100	5500	8400	11200
Operation wt.	kg	2900	4800	6300	9800	12800
Compressor Config. (RT×Qty)		35×1	35×2	35×3	35×4	35×6

General Conditions

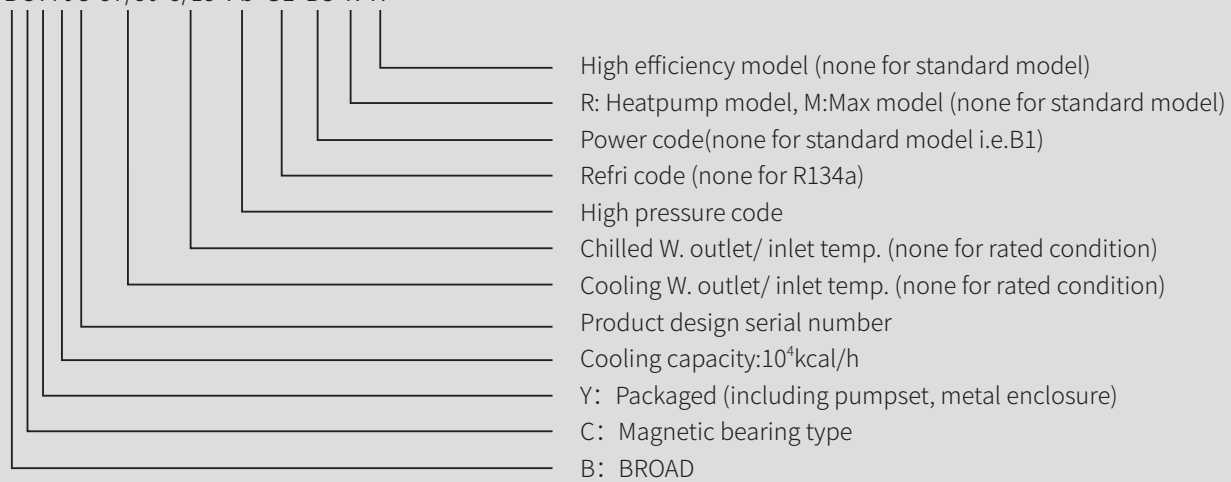
1. Rated chilled W. outlet/inlet temp: 7/12°C
2. Rated cooling W. outlet/inlet temp: 35/30°C
3. Low temp. W.outlet/inlet temp: 15 /20°C
4. Heating. W.outlet/inlet temp: 45/40°C (Max:60°C)
5. Lowest permitted outlet temp. for chilled water: 2°C
6. Lowest permitted inlet temp. for cooling water: 10°C
7. Adjustable chilled water flowrate: 50~120%
8. Adjustable cooling water flowrate: 20~130%
9. Pressure limit for chilled W. and cooling W.: ⩽ 1.0MPa(high pressure model available)
10. Adjustable load: 10~100%(BC35-R-H ⩾ 30%)
11. Fouling factor for chilled W: 0.018$m^2 \cdot K/kW$
    Fouling factor for cooling W: 0.044$m^2 \cdot K/kW$
12. Refrigerant: R134a (option for other Refri)
13. Machine room ambient temperature: 5~43°C ,humidity ⩽ 85%
14. Life design: 30 years
15. Operation noise: ⩽ 75dB (A)
16. Operation vibration: ⩽ 0.30mm

Packaged Distribution System Rated Parameters

Model		BCY	35-R	70-R	105-R	140-R	210-R
Pumpset	AC water pump						
	External head	mH_2O	23	24	27	27	28
	Power demand	kW	11	15	30	37	60
	Cooling water pump						
	External head	mH_2O	13	15	19	22	24
	Power demand	kW	6	15	22	37	60
	Total power demand		17	30	52	74	120
	Shipment wt.	kg	1200	1650	2050	2250	3350
	Operation wt.	kg	2400	3150	3750	3950	6850
Cooling tower	Cooling tower						
	Power demand	kW	4	8	11	15	22
	Operation wt .	kg	2430	4860	6620	9525	12605

Nomenclature

BCY70C-37/30-8/13-Fb-G1-B3-R-H



Power Codes:

Power supply	Voltage	Frequency
B1	380V	50Hz
B2	400~415V	
B3	460V	60Hz
B5	380V	
B6	400~415V	
B7	575V	

Refrigerant Codes:

Category Code	Refrigerant
None	R134a
G1	R1234ze
G2	R513A

High Pressure Codes:

Pressure limit (MPa)	Chilled W.	Cooling W.
1.01~1.60	Fb	Mb
1.61~2.00	Fc	Mc
2.01~2.40	Fd	Md

Packaged Power-efficient Chiller(M) Rated Parameters

Chiller(M) Rated Parameters

Model	BC	75-M	120-M	150-M	180-M	240-M	360-M
Cooling capacity	kW	875(1000)	1400(1540)	1750(2000)	2100	2800(3080)	4200
	10^4kcal/h	75(86)	120(133)	150(172)	180	240(265)	360
	RT	250(285)	400(440)	500(570)	600	800(880)	1200
Input power	kW	135.7(162.3)	216.4(248.8)	268.4(321.5)	332.8	427.5(492.0)	661.4
Rated COP		6.45(6.16)	6.47(6.19)	6.52(6.22)	6.31	6.55(6.26)	6.35
IPLV (AHRI)		10.15(9.95)	10.20(10.00)	10.60(10.39)	9.88	10.66(10.45)	10.75
Starting current	A	2	2	2	2	2	2
Maximum operation current	A	300	500	600	678	1000	1356
Power demand	kW	175	310	350	400	620	800
Evaporator							
Flow rate	m^3/h	151(172)	241(265)	301(344)	361	482(530)	722
Pressure drop	kPa	40(50)	40(50)	70(90)	40	70(85)	95
Connection nozzle	DN	200	200	250	250	300	350
Condenser							
Flow rate	m^3/h	188(215)	301(331)	376(430)	452	602(662)	903
Pressure drop	kPa	45(55)	45(55)	65(85)	45	65(80)	90
Connection nozzle	DN	200	200	250	250	300	350
Refrigerant wt.	kg	400	500	800	800	1000	1400
Shipment wt.	kg	4200	6400	8500	9000	11500	13350
Operation wt.	kg	4900	7200	9500	10200	13500	15650
Compressor Config. (RT×Qty)		75×1	120×1	75×2	180×1	120×2	180×2

General Conditions (The max parameters in parenthesis)

1. Rated chilled W. outlet/inlet temp: 7/12°C
2. Rated cooling W. outlet/inlet temp: 35/30°C
3. Lowest permitted outlet temp. for chilled water: 3°C
4. Lowest permitted inlet temp. for cooling water: 10°C
5. Adjustable chilled water flowrate: 50~120%
6. Adjustable cooling water flowrate: 20~130%
7. Pressure limit for chilled W. and cooling W.: ⩽ 1.0MPa (high pressure model available)
8. Adjustable load: 10~100%(BC75/120/180 ⩾ 30%)
9. Fouling factor for chilled W: 0.018$m^2 \cdot K/kW$
   Fouling factor for cooling W: 0.044$m^2 \cdot K/kW$
10. Refrigerant: R134a
11. Machine room ambient temperature: 5~43°C, humidity ⩽ 85%
12. Life design: 30 years
13. Operation noise: ⩽ 75dB (A)
14. Operation vibration: ⩽ 0.30mm

Packaged Distribution System Rated Parameters

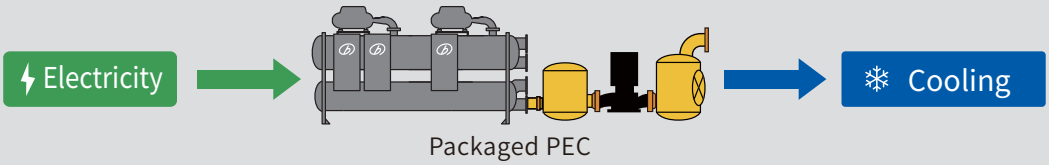
Model		BCY	75-M	120-M	150-M	180-M	240-M	360-M
Pumpset	Chilled water pump							
	External head	mH_2O	27	28	28	28	28	32
	Power demand	kW	22	37	37	44	60	110
	Cooling water pump							
	External head	mH_2O	15	15	15	16	16	19
	Power demand	kW	15	22	37	37	44	74
	Rated power consuption		37	59	74	81	104	184
	Shipment wt.	kg	2000	2250	2850	3300	4300	5200
	Operation wt.	kg	3600	4000	5600	6300	7800	8700
Cooling tower	Cooling tower							
	Power demand	kW	8	11	15	15	22	30
	Operation wt .	kg	4860	7195	9525	10495	14895	19120

(BCY240-M Packaged Chiller)

Application Modes & Performance Curves

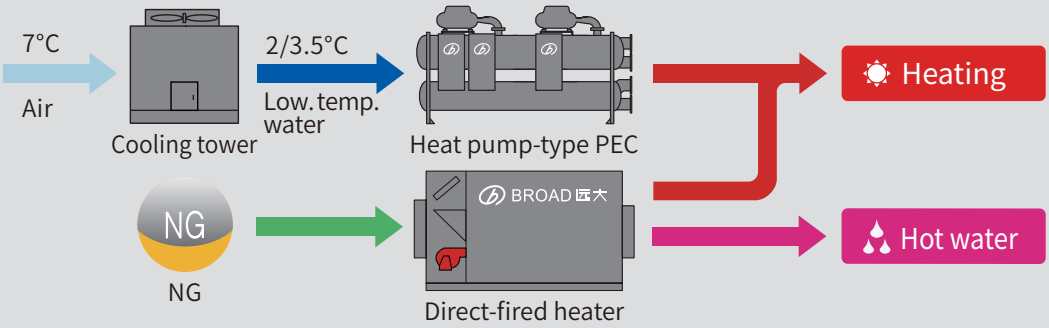
BROAD Packaged PEC(SEES--Supper-Energy Efficient System)

Packaged PEC reduces cooling costs by 40% in summer, with an IEER of 6.0, which is 10% higher than the standard.



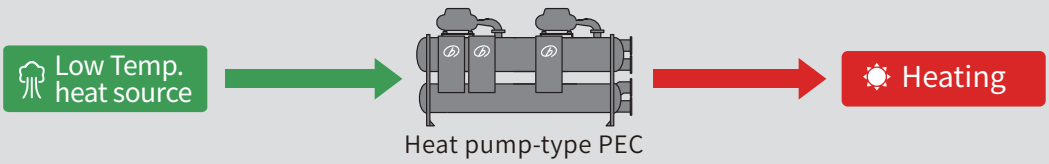
Heat Pump-Type Three Function Dual Energy Chiller／Heater

In summer, PEC saves 40% of the cooling cost (cooling process is same as Packaged PEC); in winter, it switches to heat pump mode to recover the air heat through the cooling tower, with direct-fired heater as a supplement when heating is insufficient, saving 30~40% of heating cost.



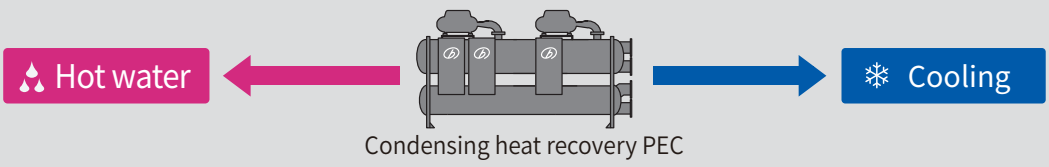
Water/Geothermal Heat Pump

In winter, low-temperature heat sources such as groundwater, soil, and reclaimed water are recovered for heating. In summer, during cooling, these low-temperature heat sources serve as cooling water, eliminating the need for cooling towers.

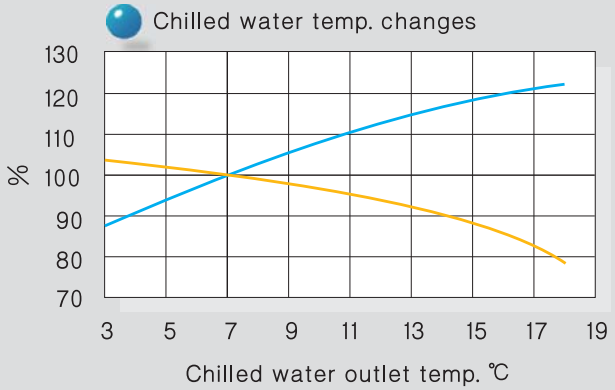


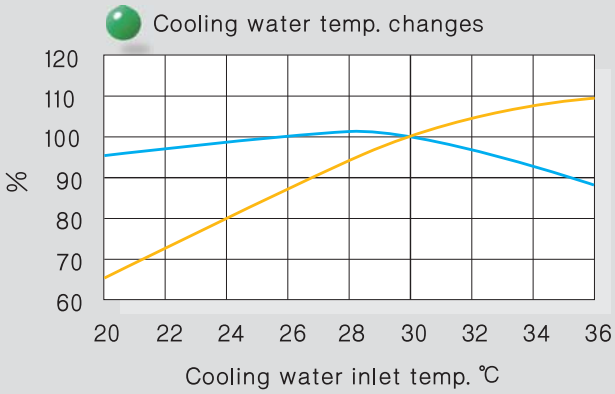
Condensing Heat Recovery PEC

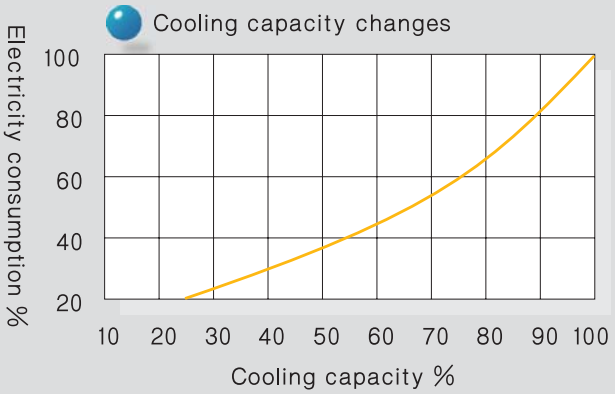
PEC recovers waste heat from refrigerant condensing heat to produce free sanitary hot water while providing cooling. Cooling capacity is determined by heating demand, and PEC is used to supplement cooling when it is insufficient.



Performance Curves

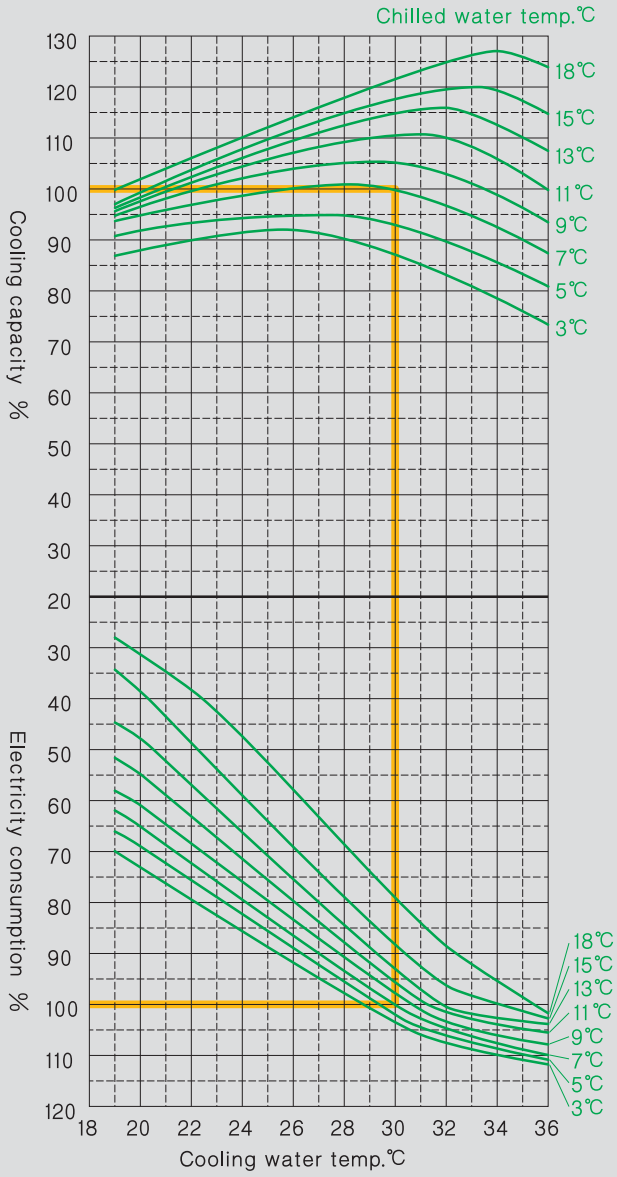






Cooling capacity ——— Electricity consumption ———

Model Selection Curves



Notes: Calculation method of COP
COP= cooling capacity%/electricity consumption%×rated COP
e.g. C90-H rated COP is 6.29, chilled water temp. is 7°C , cooling water temp. is 26°C , then cooling capacity is 100%, electricity consumption is 87%,
COP=100%/87%×6.29=7.23

Model Selection & Ordering

Function selection

- Cooling only type
- Combination of CHP and power-efficient chiller, Combination of waste heat chiller and power-efficient chiller, combination of direct-fired chiller and power-efficient chiller, combination of vacuum boiler and power-efficient chiller

Load selection

- Any building cooling load cannot be estimated according to the building area, as it is more closely related to building insulation and room function
- 30~50W/m^2 is recommended for energy-efficiency building, 60~90W/m^2 for normal building, 100~150W/m^2 for high occupancy and high space building

Flowrate selection

- BROAD designs the distribution system head according to its profound experiences
- BROAD is open for special head design

Pressure selection

- The standard pressure limit for chilled/heating/cooling water is 1.0MPa. Information about high pressure type please see Code for high pressure type
- >2.0MPa system: secondary heat exchange recommended

Control

- BROAD power-efficient chillers are equipped with complete control function including internet monitoring
- If customers have a building management system (BMS), the BMS control interface can be selected as an optional supply. If the BMS interface is not ordered along with the chiller, it can be purchased later
- BROAD BMS is recommended to customers (for the whole building)

Machine room location

- On the floor or on building rooftop
- Chiller can also be installed in the basement
- Cooling tower should be installed on the floor, on stilt or on building rooftop

Packaged selection

· Packaged power-efficient chiller includes chiller, water distribution system, metal enclosure as machine room, etc.
· If the packaged system is installed in the building, metal enclosure can be selected as an option
· Cooling tower is an option for international

Lead time

· ⩽ CY90: 5~8 months
· ⩾ CY180: 8~10 months

Warranty

Free warranty is to cover 12 months from commissioning or 18 months from shipment,whichever comes earlier

Warranty conditions:
· The Chiller should be installed as per BROAD Power-efficient Chiller Model Selection & Design Manual catalogue, and commissioned by BROAD service engineer
· The chiller should be well connected with Internet
· The Buyers must operate and conduct regular maintenance as per Service Form of maintenance
· The Chiller service & maintenance record should be uploaded to BROAD Service Management APP within 24 hours after the procedure is done
· Any service abnormal should be reported to BROAD International Service Center within 4 hours when it occurs

Technical specification is based upon

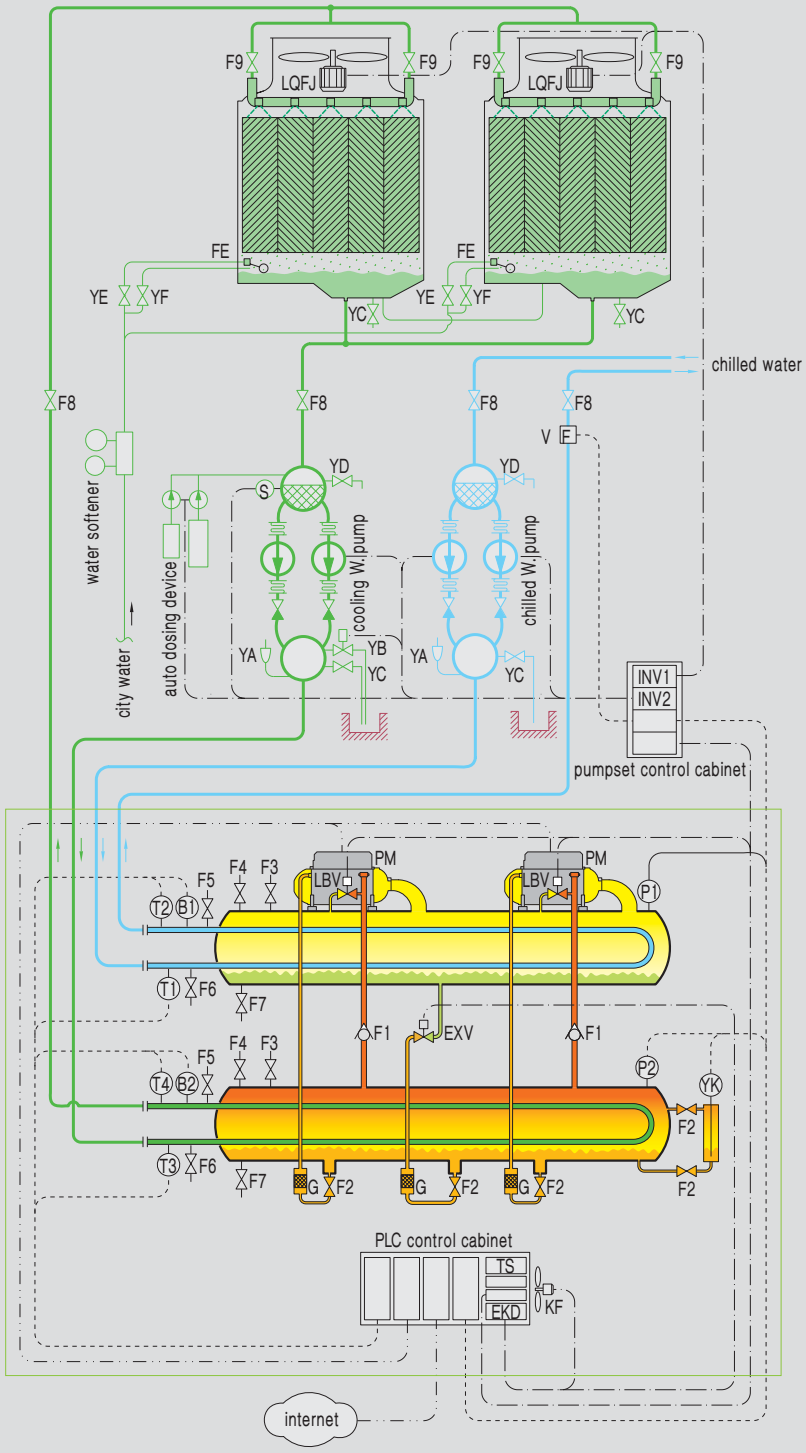
· GB/T18430 Water Chilling (Heat Pump) Packages Using The Vapor Compression Cycle. Part 1: Water Chilling (Heat Pump) Packages For Industrial & Commercial And Similar Application
· GB 25131 Safety Requirements For Water Chillers (Heat Pump) Using The Vapor Compression Cycle
· GB 19577 Minimum Allowable Values Of Energy Efficiency And Energy Efficiency Grades For Water Chillers
· ANSI/AHRI 551-591 (SI) with Addendum Performance Rating of Water-Chilling and Heat Pump Water-Heating Packages Using the Vapor Compression Cycle

Supply Scope and P&I Diagram

Supply Scope

Products	Category	Item	Remarks
Chiller	Chiller	Heat exchanger	Include condenser, evaporator (cold insulation included)
		Compressor	Magnetic bearing, VFD centrifugal type ,oil free operation
		Throttling valve set	Include electronic expansion valve, drying filter, shut-off valve, regulating valve
		Check valve	Prevent refrigerant vapor flow-back to protect compressor
		Motor cooling device	Include drying filter, control valve set etc
	Control system	Low voltage control cabinet	Include low voltage electric parts, control board, PLC, etc
		Power control cabinet	Includes switch gear, instant, reactor etc
		Touch screen	For operation
		External control elements	Include temperature & pressure sensors, flow switches, solution level probes and actuators
		BMS interface (optional)	Connect to BMS system through dry contact or serial communication
	Refrigerant	R134a	Used for cooling
Pumpset system	Pumpset	A/C water pump	Two units
		Cooling water pump	Two units
		Accessories	Include zero resistance filter, check valve, soft connectors, valves and vibration isolator etc
		Piping*	Include all piping between pumpset and chiller
		Piping accessories	Include flow switches, auto air vent & its socket, soft connectors
		Motor drain valve	When water quality becomes poor, this valve automatically drains the cooling water. It also drains cooling water automatically in winter to avoid freeze
		A/C W. flowmeter	For precise management of chiller load and efficiency
		Water softener	Improve A/C water and cooling water quality
		Auto dosing device	Automatically charge biocide corrosion inhibitor and anti-sludge to the cooling water
		Pumpset control cabinet	Include inverters for A/C W. pump, cooling W. pump, cooling fan soft starter, low voltage electric parts, etc
		Electric wiring*	Include wires, cables, cable conduit, cable supporters, etc.
Option	Enclosure	Enclosure	Include stainless steel panel, roof cover, structural frame, baseframe, as well as accessories

Notes: 1. *only for standard size. Special offer is available
2. If the customer does not order cooling tower, a control signal linkage to cooling fan will be provided



Control devices:
EKD electronic throttle valve controller
INV1 cooling tower fan inverter
INV2 cooling water pump inverter
PLC Programmable Logic Controller
TS touch screen

Controlled objects:
EXV electronic throttle valve
KF control cabinet fan
LBV load balancing valve
LQFJ cooling tower fan
PM compressor
YB motor drain valve

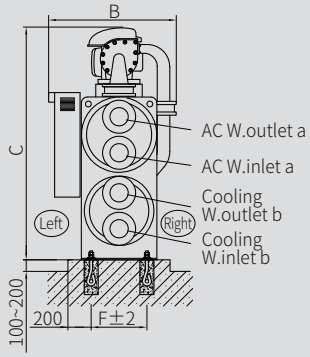
Sensors:
T1 chilled W. inlet temp. sensor
T2 chilled W. outlet temp. sensor
T3 cooling W. inlet temp. sensor
T4 cooling W. outlet temp. sensor
B1 chilled W. flow switch
B2 cooling W. flow switch
P1 evaporation pressure sensor
P2 condensation pressure sensor
S conductivity sensor
V A/C W. flowmeter

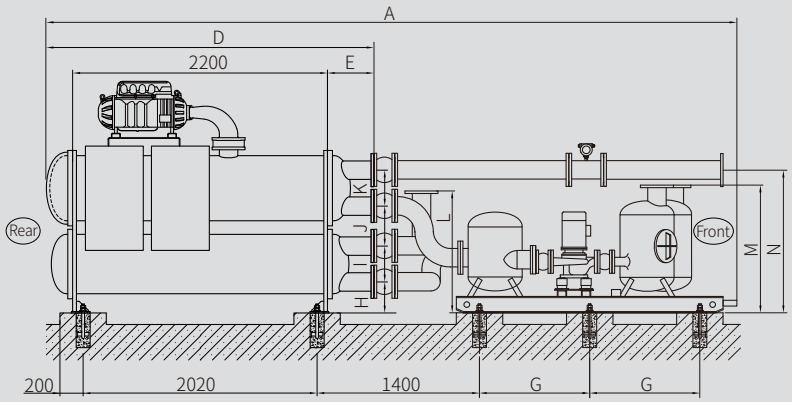
Others:
F1 check valve
F2 shutoff valve
F3 safety valve
F4 purge valve
F5 vent valve
F6 drain valve
F7 refrigerant discharge valve
F8 shutoff valve
F9 balance valve
FE auto water makeup valve
YA auto vent valve
YC manual drain valve
YD pollution discharge valve
YE water makeup valve
YF manual water makeup valve
YK level probe
G dry filter

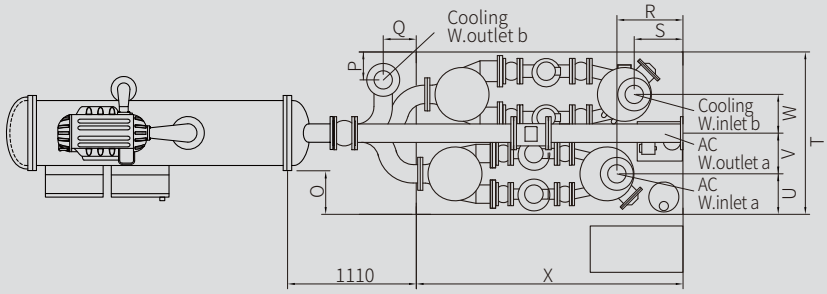
Notes:
1. Chiller scope
2. Line type:
actuator signal output
sensor signal input
communication

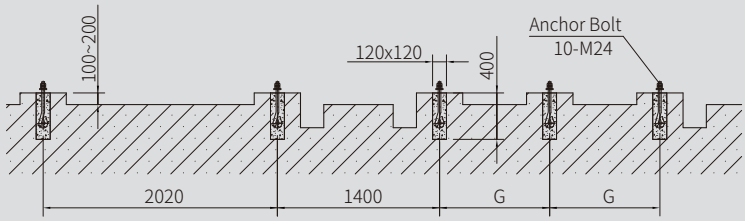
Dimensions

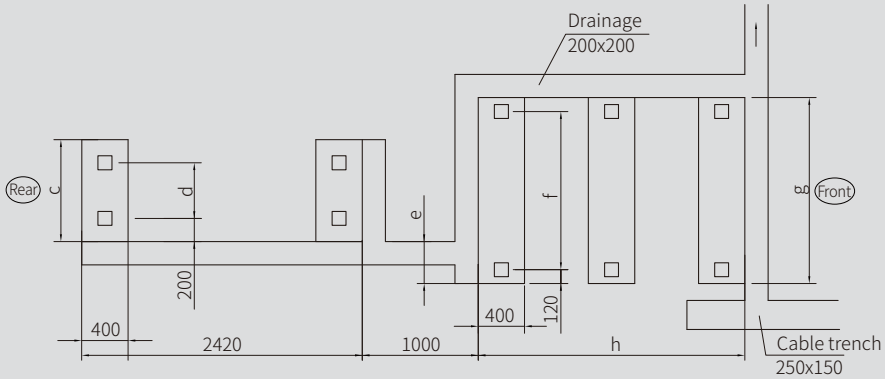
BCY45-H、BCY60-H、BC35-R-H(Line layout)





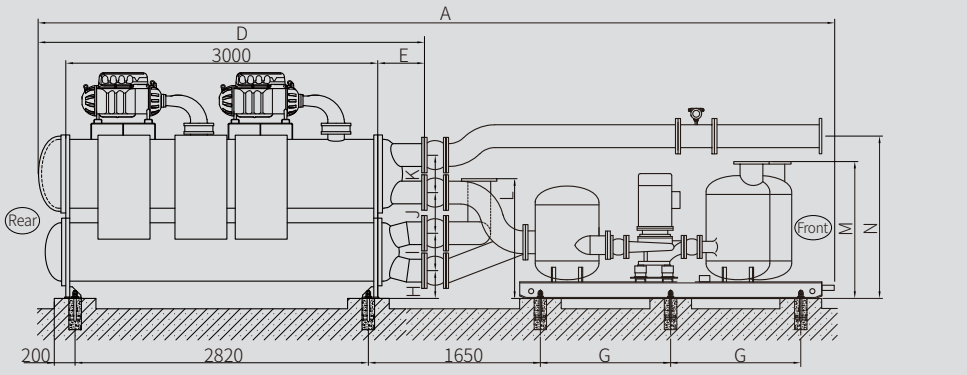


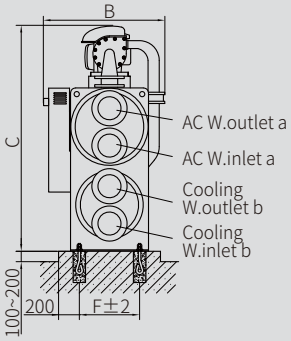


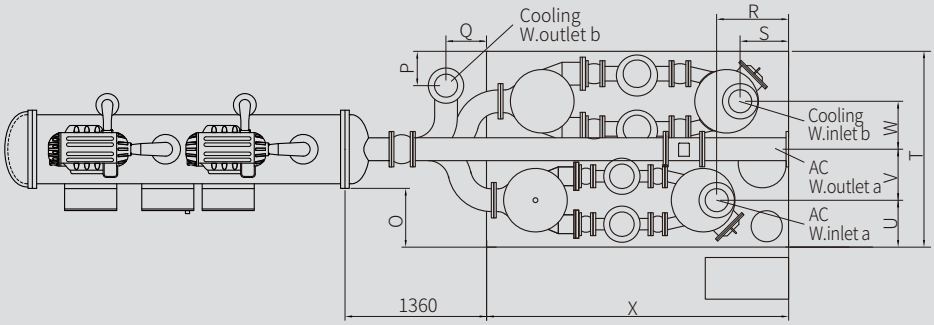


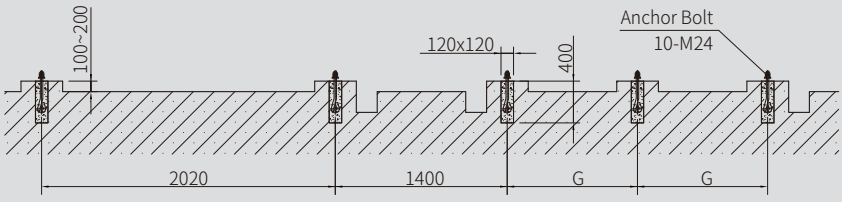
BCY	45-H	60-H	35-R-H
A	5960	5990	/
B	1080	1200	1080
C	2005	2175	1860
D	2830	2860	2755
E	400	400	350
F	480	580	430
G	950	950	/
H	267	292	262
I	310	310	270
J	345	440	320
K	310	310	300
L	1050	1100	/
M	1100	1120	/
N	1230	1350	/
O	375	376	/
P	240	290	/
Q	285	285	/
R	570	540	/
S	420	365	/
T	1400	1500	/
U	350	400	/
V	350	350	/
W	335	390	/
X	2300	2300	/
a	DN150	DN150	DN125
b	DN150	DN150	DN125
c	880	980	830
d	480	580	430
e	362	362	/
f	1365	1465	/
g	1605	1704	/
h	2300	2300	/

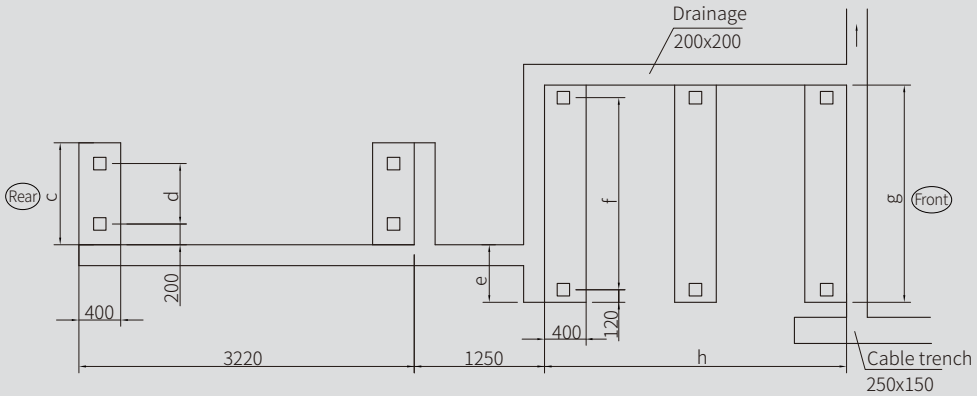
BCY90-H、BCY120-H、BC70-R-H(Line layout)







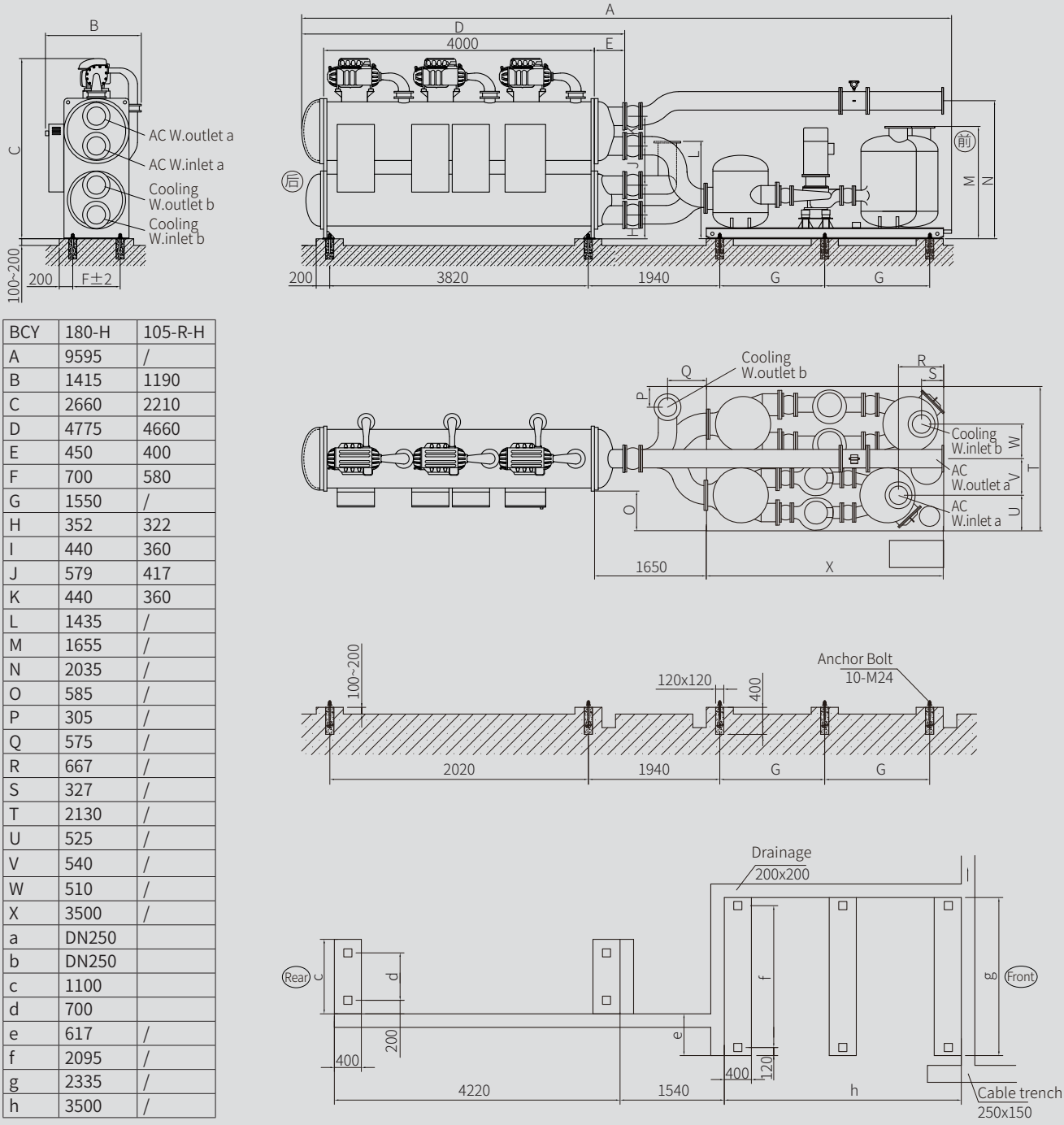




BCY	90-H	120-H	70-R-H
A	7650	7775	/
B	1150	1209	1170
C	2175	2405	2075
D	3715	3745	3700
E	450	450	450
F	580	670	530
G	1250	1300	/
H	267	347	267
I	360	360	360
J	390	493	365
K	360	360	360
L	1150	1265	/
M	1315	1380	/
N	1560	1740	/
O	565	595	/
P	330	415	/
Q	390	390	/
R	690	590	/
S	465	390	/
T	1880	2050	/
U	450	530	/
V	490	495	/
W	460	505	/
X	2900	3000	/
a	DN200	DN200	DN150
b	DN200	DN200	DN200
c	980	1070	930
d	580	670	530
e	552	592	/
f	1845	2015	/
g	2085	2255	/
h	2900	3000	/

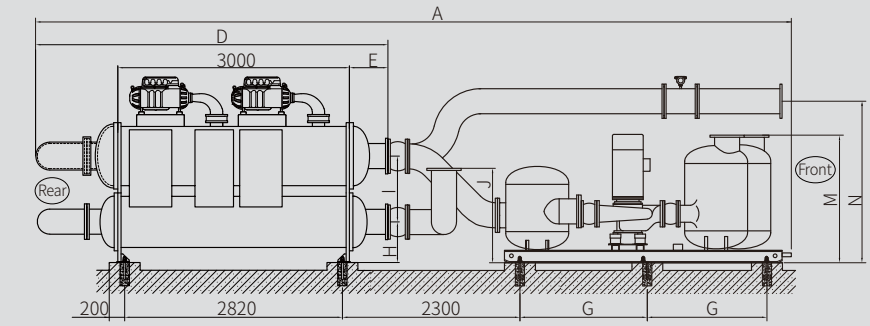
Dimensions

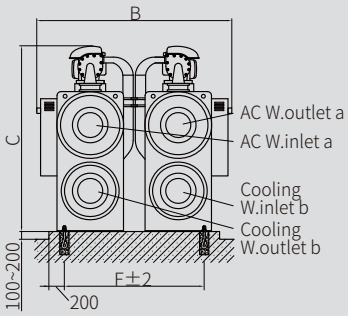
BCY180-H、BC105-R-H(Line layout)

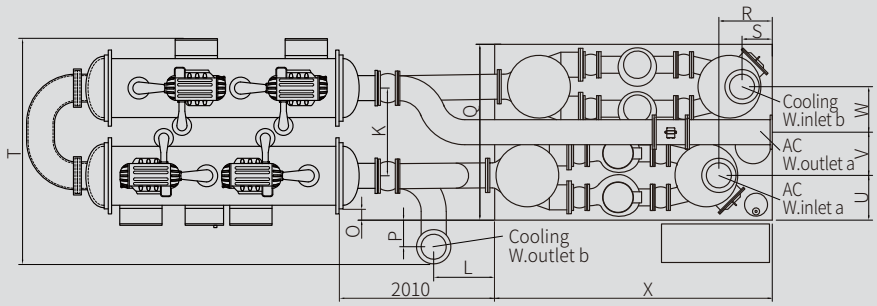


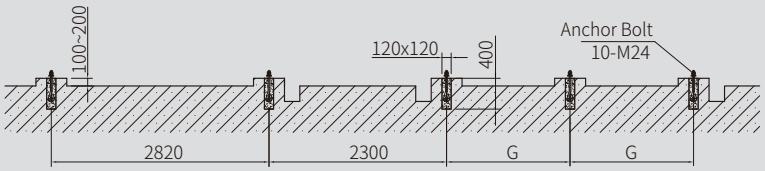
BCY	180-H	105-R-H
A	9595	/
B	1415	1190
C	2660	2210
D	4775	4660
E	450	400
F	700	580
G	1550	/
H	352	322
I	440	360
J	579	417
K	440	360
L	1435	/
M	1655	/
N	2035	/
O	585	/
P	305	/
Q	575	/
R	667	/
S	327	/
T	2130	/
U	525	/
V	540	/
W	510	/
X	3500	/
a	DN250	
b	DN250	
c	1100	
d	700	
e	617	/
f	2095	/
g	2335	/
h	3500	/

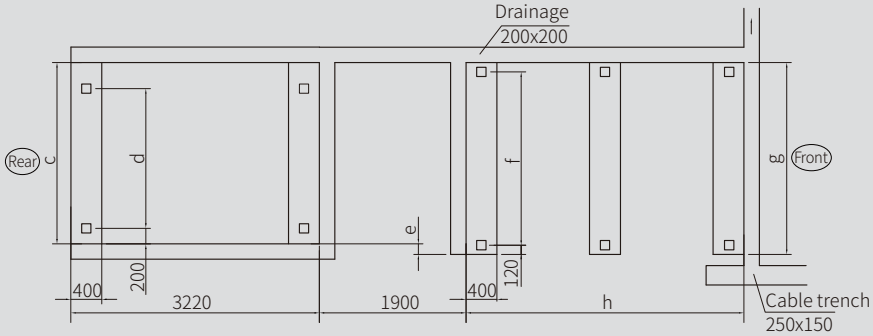
BCY240-H、BC140-R-H(Line layout)







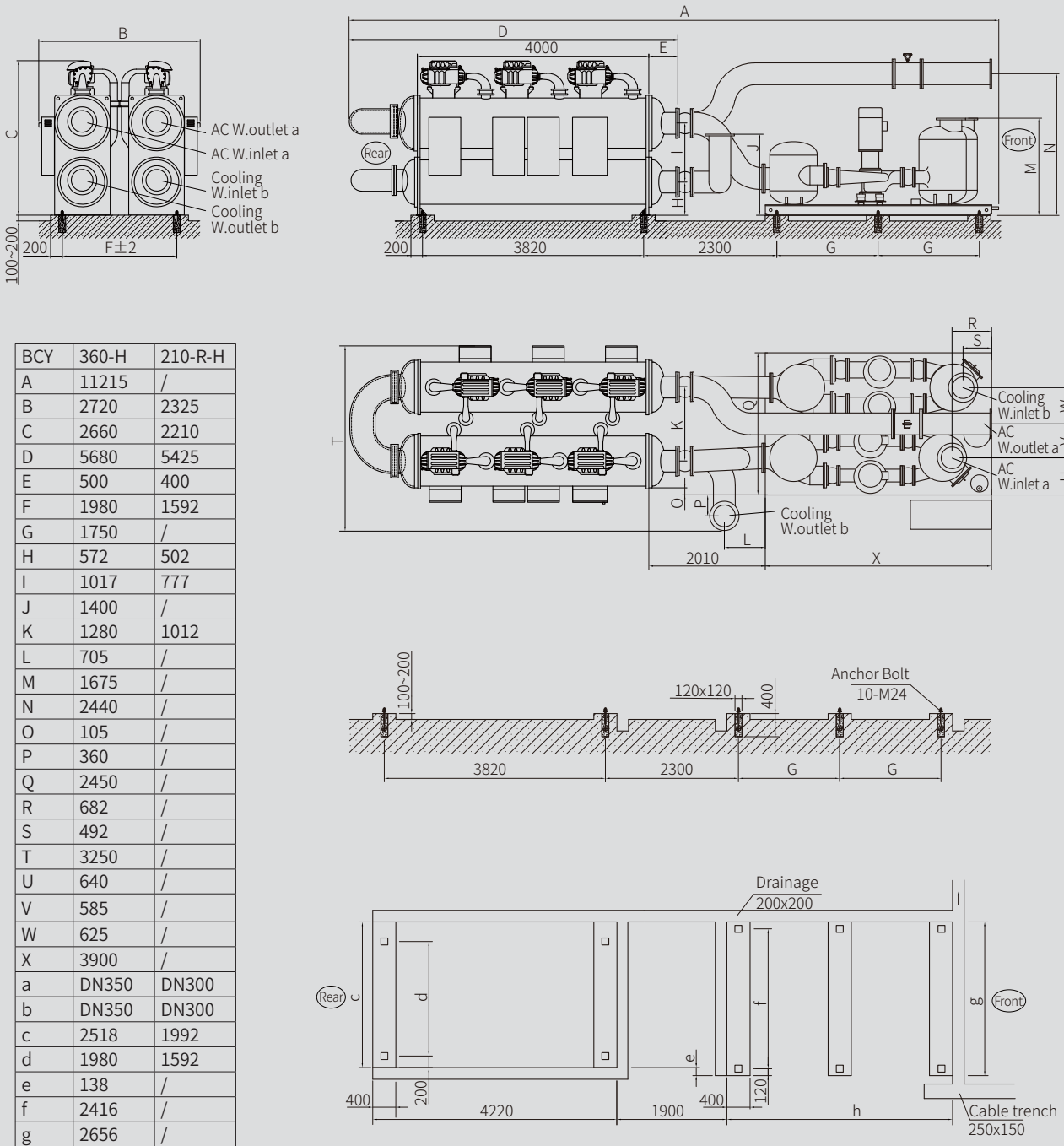




BCY	240-H	140-R-H
A	9795	/
B	2460	2260
C	2405	2075
D	4565	4295
E	500	400
F	1810	1492
G	1600	/
H	527	447
I	853	725
J	1225	/
K	1140	962
L	790	/
M	1655	/
N	2095	/
O	140	/
P	345	/
Q	2280	/
R	692	/
S	392	/
T	2950	/
U	580	/
V	560	/
W	590	/
X	3600	/
a	DN300	DN300
b	DN300	DN300
c	2348	1892
d	1810	1492
e	138	/
f	2246	/
g	2486	/
h	3600	/

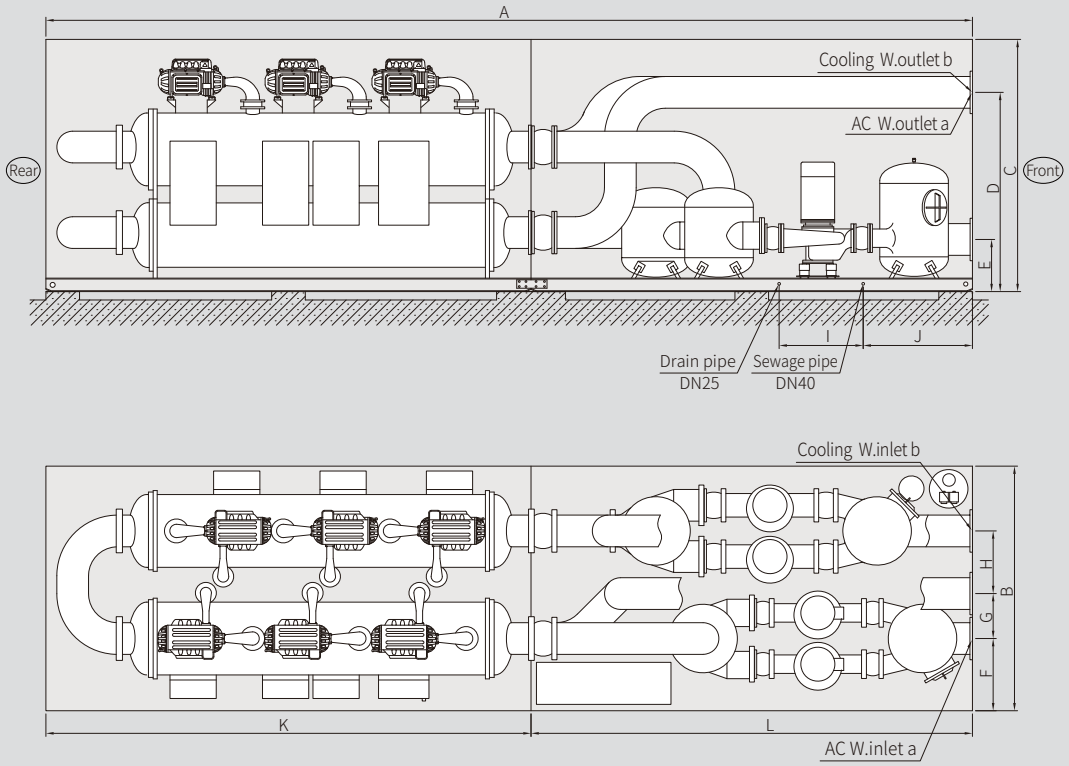
Dimensions

BCY360-H、BC210-R-H(Line layout)



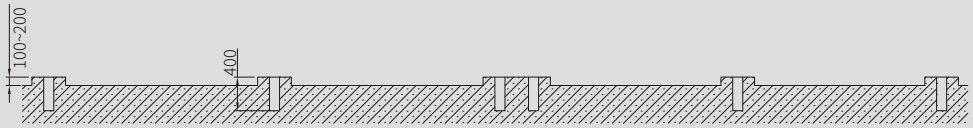
BCY	360-H	210-R-H
A	11215	/
B	2720	2325
C	2660	2210
D	5680	5425
E	500	400
F	1980	1592
G	1750	/
H	572	502
I	1017	777
J	1400	/
K	1280	1012
L	705	/
M	1675	/
N	2440	/
O	105	/
P	360	/
Q	2450	/
R	682	/
S	492	/
T	3250	/
U	640	/
V	585	/
W	625	/
X	3900	/
a	DN350	DN300
b	DN350	DN300
c	2518	1992
d	1980	1592
e	138	/
f	2416	/
g	2656	/
h	3900	/

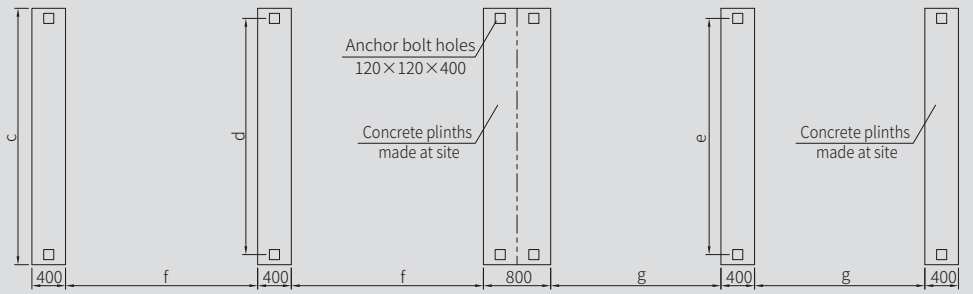
BCY240-H、BCY360-H(Line layout with enclosure)



BCY	240-H	360-H
A	9850	11020
B	2650	2910
C	2660	3040
D	2070	2370
E	590	620
F	795	860
G	560	535
H	580	745
I	1000	1000
J	1300	1300
K	4730	5770
L	5120	5250
a	DN300	DN350
b	DN300	DN350
c	2850	3050
d	2610	2810
e	2610	2875
f	1765	2285
g	1960	2050

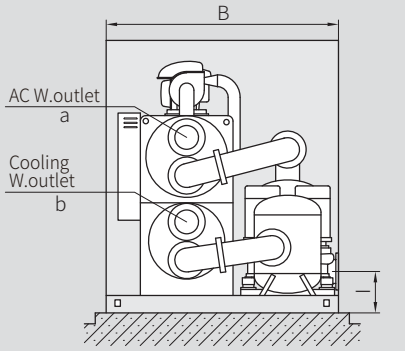
Note:
BCY240 with 4 compressors
BCY360 with 6 compressors

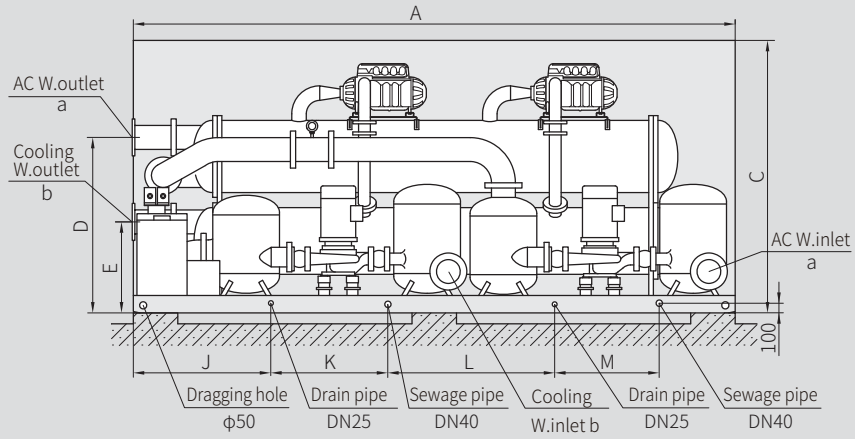


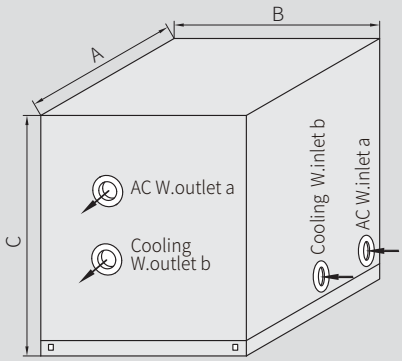


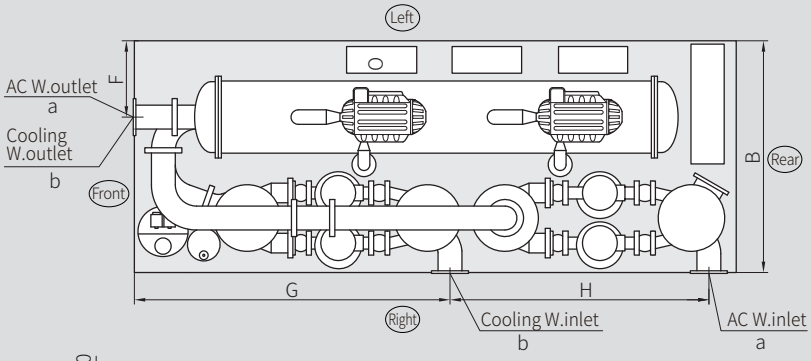
Dimensions

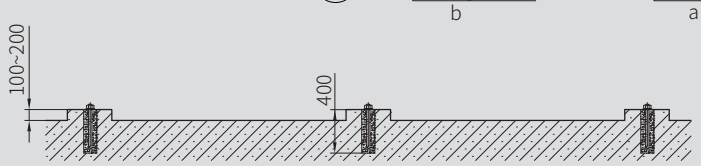
BCY45-H、BCY60-H、BCY90-H、BCY120-H、BCY180-H(parallel layout with enclosure)

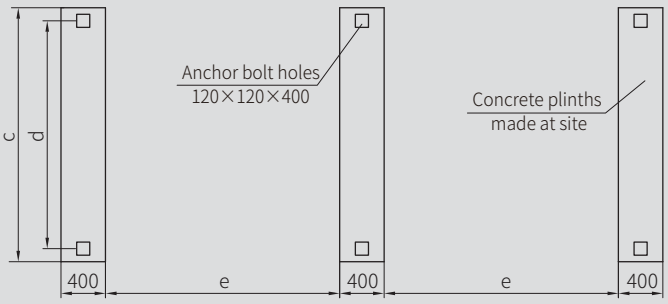












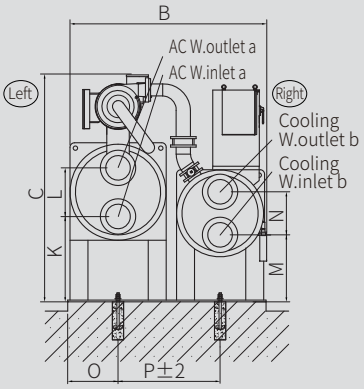
Model	A	B	C	D	E	F	G	H	I
BCY45-H	3960	1880	260	1395	740	640	1825	1920	380
BCY60-H	4220	2130	2660	1510	760	710	1885	2050	420
BCY90-H	5260	2130	2660	1540	790	700	2860	2160	380
BCY120-H	5520	2390	2660	1610	760	745	2620	2600	380
BCY180-H	6820	2520	3000	1930	910	800	3415	3125	450
Model	J	K	L	M	a	b	c	d	e
BCY45-H	765	645	1090	800	DN150	DN150	2080	1840	1380
BCY60-H	800	645	1340	800	DN150	DN150	2330	2090	1510
BCY90-H	1200	800	1780	800	DN200	DN200	2334	2094	2030
BCY120-H	1050	1000	1550	1000	DN200	DN200	2594	2354	2160
BCY180-H	1400	1000	2250	1000	DN250	DN250	2724	2484	2810

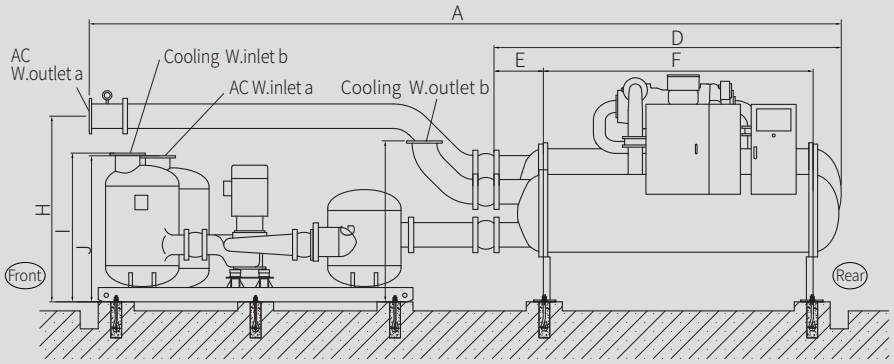
注：1.BCY45-H、BCY60-H with 1 compressor; BCY90-H、BCY120-H with 2 compressors; BCY180-H with 3 compressors.
2.Line layout for BCY35~105-R-H is optional.

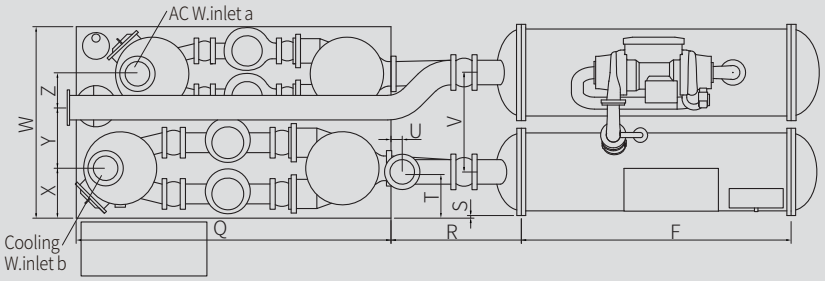
Global Internet Monitoring Center for BROAD central air conditioning.
It has been operating since 1996, known as the pioneer of "internet +".

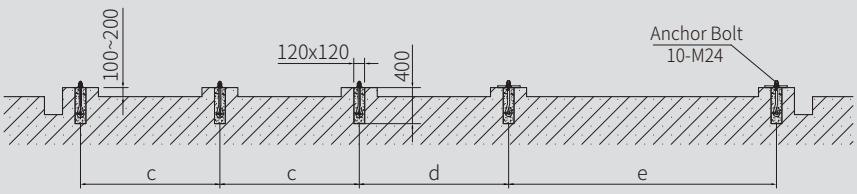
Dimensions

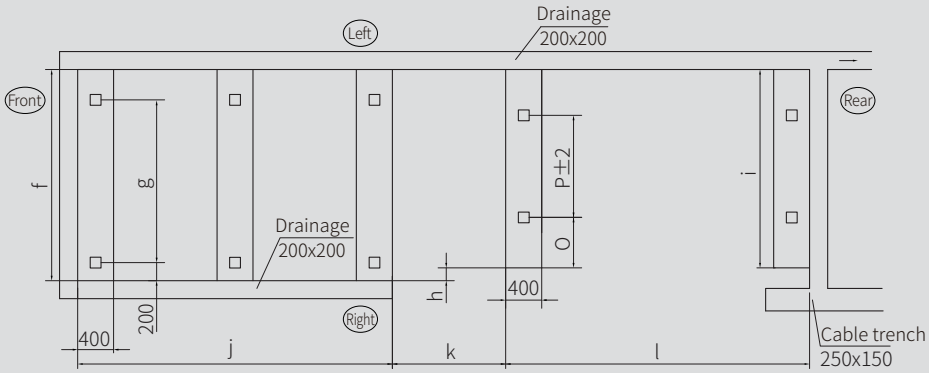
BCY75-M、BCY120-M、BCY180-M(Line layout)





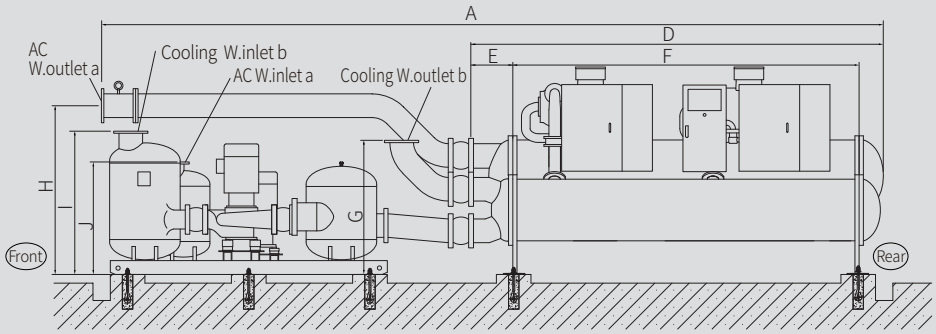


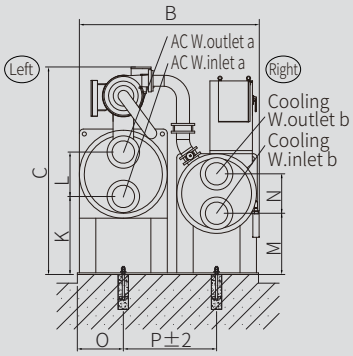


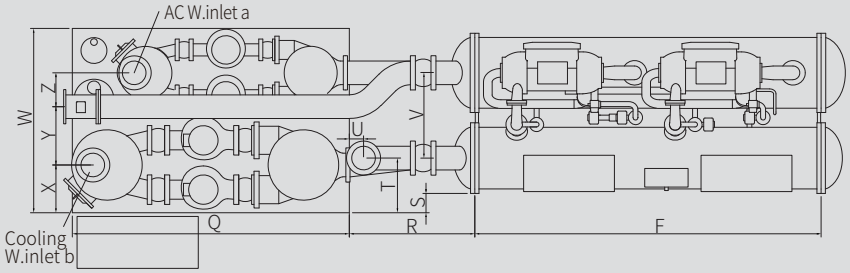


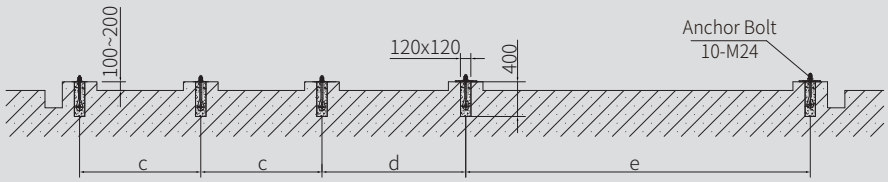
BCY	75-M	120-M	180-M
A	7265	7600	8380
B	1600	1780	2190
C	1980	2000	2534
D	3690	3720	3835
E	450	400	518
F	3000	3000	3000
G	1230	1290	1790
H	1500	1500	2065
I	1330	1345	1655
J	1330	1345	1655
K	460	680	949
L	360	360	540
M	400	460	744
N	360	360	480
O	400	455	560
P	800	890	1135
Q	2700	3000	3500
R	1200	1200	1450
S	208	244	0
T	540	630	485
U	60	112	125
V	800	890	1135
W	1790	2050	2130
X	490	505	555
Y	450	615	675
Z	400	400	375
a	DN200	DN200	DN250
b	DN200	DN200	DN250
c	1150	1300	1550
d	990	990	1450
e	2980	2980	2980
f	1790	2050	2130
g	1550	1810	1890
h	240	60	0
i	1550	1750	2205
j	2700	3000	3500
k	1010	1010	1260
l	3380	3380	3380

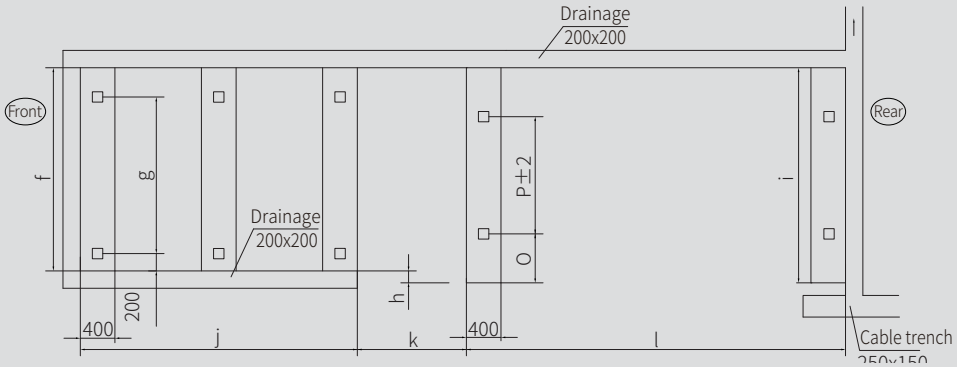
BCY150-M、BCY240-M、BCY360-M(Line layout)











BCY	150-M	240-M	360-M
A	9045	9585	10500
B	1960	2220	2490
C	2400	2520	2675
D	4760	4840	5390
E	400	518	550
F	4000	4000	4500
G	1550	1980	2190
H	1950	2150	2300
I	1655	1675	1675
J	1335	1675	1675
K	915	949	1030
L	460	540	580
M	505	744	795
N	480	480	580
O	482	560	610
P	985	1135	1335
Q	3200	3600	3900
R	1450	1550	1650
S	224	80	0
T	630	565	545
U	165	0	0
V	985	1135	1335
W	2130	2280	2450
X	550	550	600
Y	675	650	580
Z	390	500	630
a	DN250	DN300	DN350
b	DN250	DN300	DN350
c	1400	1600	1750
d	1660	1760	1860
e	3980	3980	4480
f	2130	2280	2450
g	1890	2040	2210
h	230	75	0
i	1900	2205	2505
j	3200	3600	3900
k	1260	1360	1460
l	4380	4380	4880

Delivery & Machine Room Civil Works Requirements

Scope of Supply / Work

Category	Item	BROAD	Customer	Remarks
Transportation & Positioning	Factory to port		√	BROAD can arrange transportation upon request
	Jobsite settlement (eg. positioning)		√	BROAD provides guidance
Electrical engineering	Power supply to enclosure		√	3 phase, 4 wires
	Internet connection	√		Network cable to the enclosure is to be provided by customer
	Grounding		√	
Construction & Installation	Foundation		√	
	Pipe connection between chiller and pumpset for order with pumpset	√		A crane must be provided by customer
	External piping installation		√	Include chilled water pipes, water make-up and drain pipes
	Chiller cold insulation and chilled water pumps cold insulation	√		Factory-mounted
	Piping cold insulation in enclosure	√		For order with pumpset
	Pipeline cold insulation		√	
	Anti-freezing		√	Water anti-freeze treatment is recommended when the ambient temp. is below 0°C
Commissioning	Jobsite chiller commissioning	√		Customer provides energy and air conditioning load
Operation & Maintenance	Operator training on site	√	√	BROAD provides free professional site training; the customer pays the accommodations and transportation for BROAD engineer
	Regular maintenance	√		Service contract can be signed after the warranty period

Machine Room

BROAD Packaged Power-efficient Chiller can be placed outdoor directly, no additional construction of machine room. Make the foundation in accordance with the drawings

Foundation

- Please refer to dimension drawings for plinth dimensions
- Load capacity:

① The machine room foundation load is recommended as 1.5 times of the operation weight
② Make sure that the foundation is level without sinking or overload (for rooftop installation)
③ Chiller load should be evenly distributed on the contact surface between the frame base rolling steel and the plinth

- Anchor bolts:

① Anchor bolts must be pre-installed in foundation per dimension drawings
② Place the chiller on the foundation directly and fix it with anchor bolts

Machine room built by customer

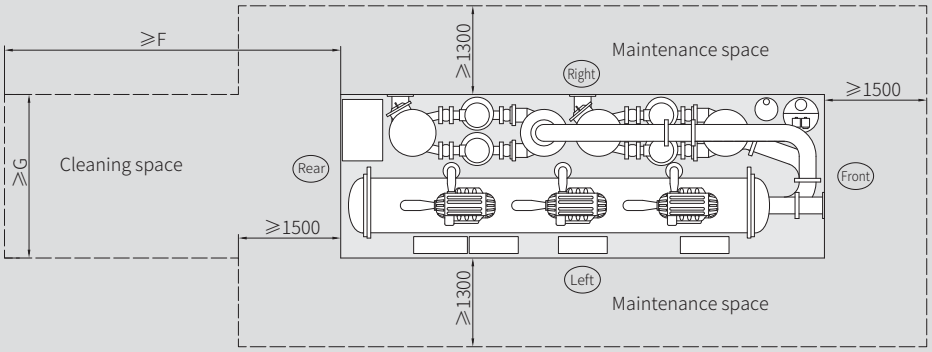
- Ventilation: poor ventilation leads to high humidity in the machine room, which may erode the unit. Please ventilate 3 times machine rooms every hour
- Drainage:

① Chiller foundation must be on a high level in the machine room
② All discharge pipes and drainpipes must be visible above the drainage
③ Machine room in basement must be built above a water ditch, which is equipped with an auto level-controlled submerged pump

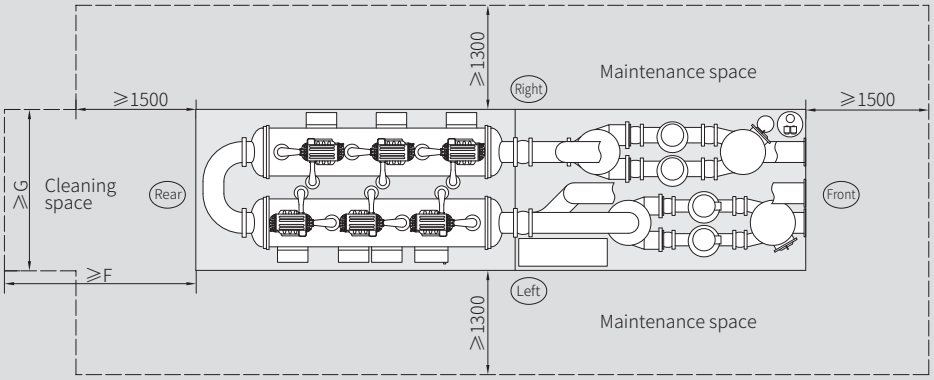
- Temperature:
  Machine room temperature must be controlled within 5~43°C. Lower temperature may crack heat exchange tubes and water box when the chiller is shut off. Higher temperature may damage electrical components. Thermometer and over temperature alarm must be installed in machine room
- Humidity:
  Machine room humidity must be lower than 85%.Higher humidity may impair insulation of electrical components

Maintenance space for the unit

Parallel layout type



Line layout type



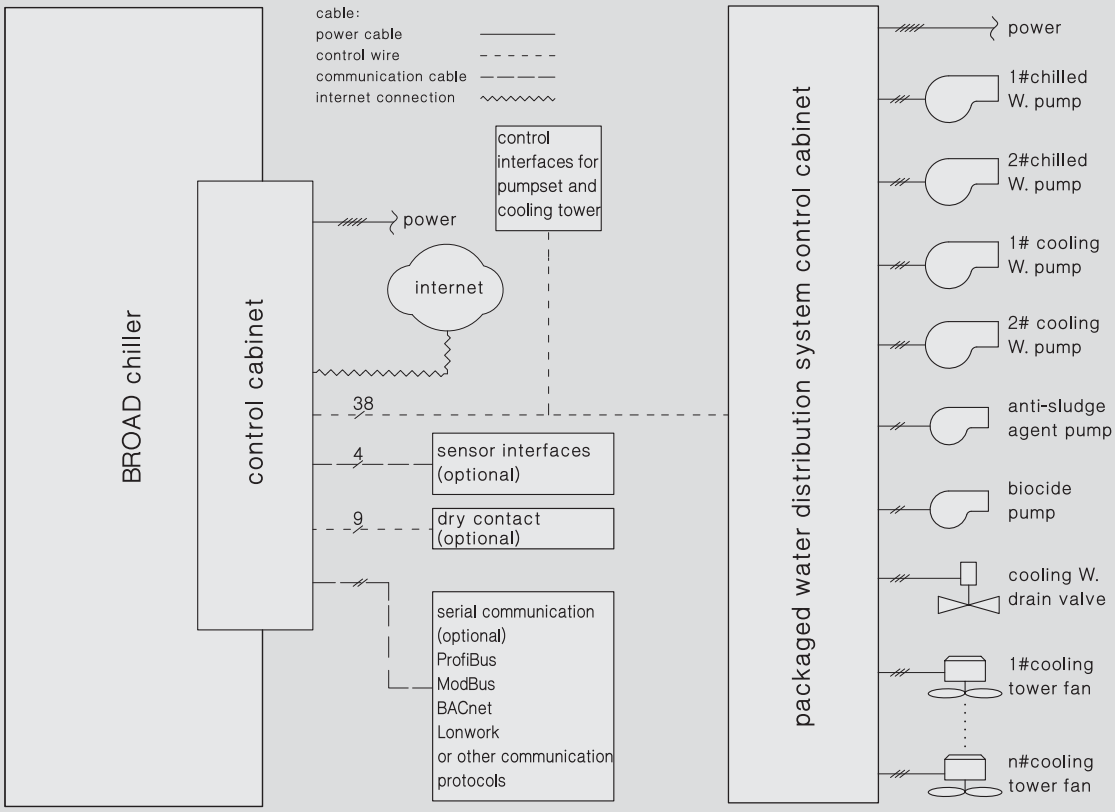
Model	BCY45-H、BC35-R-H	BCY60-H	BCY90-H、BC70-R-H	BCY120-H	BCY180-H、BC105-R-H	BCY240-H、BC140-R-H	BCY360-H、BC210-R-H
F	2200	2200	3000	3000	4000	3000	4000
G	1097	1219	1170	1305	1415	2526	2728

Notes:
1. F, G is the space for tube service clearance. It could be the space of water pumps, doors or windows and also can be shared by two chillers.
2. The checking and washing work can be done by removing flexible joint and water cover in the front of chiller without dismantling pipeline system.
3. If the machine room is smaller than the above size, please contact with BROAD for a solution.
4. It is recommended that the height of the machine room be 500mm higher than that of chillers.

Electrical diagram

Control System

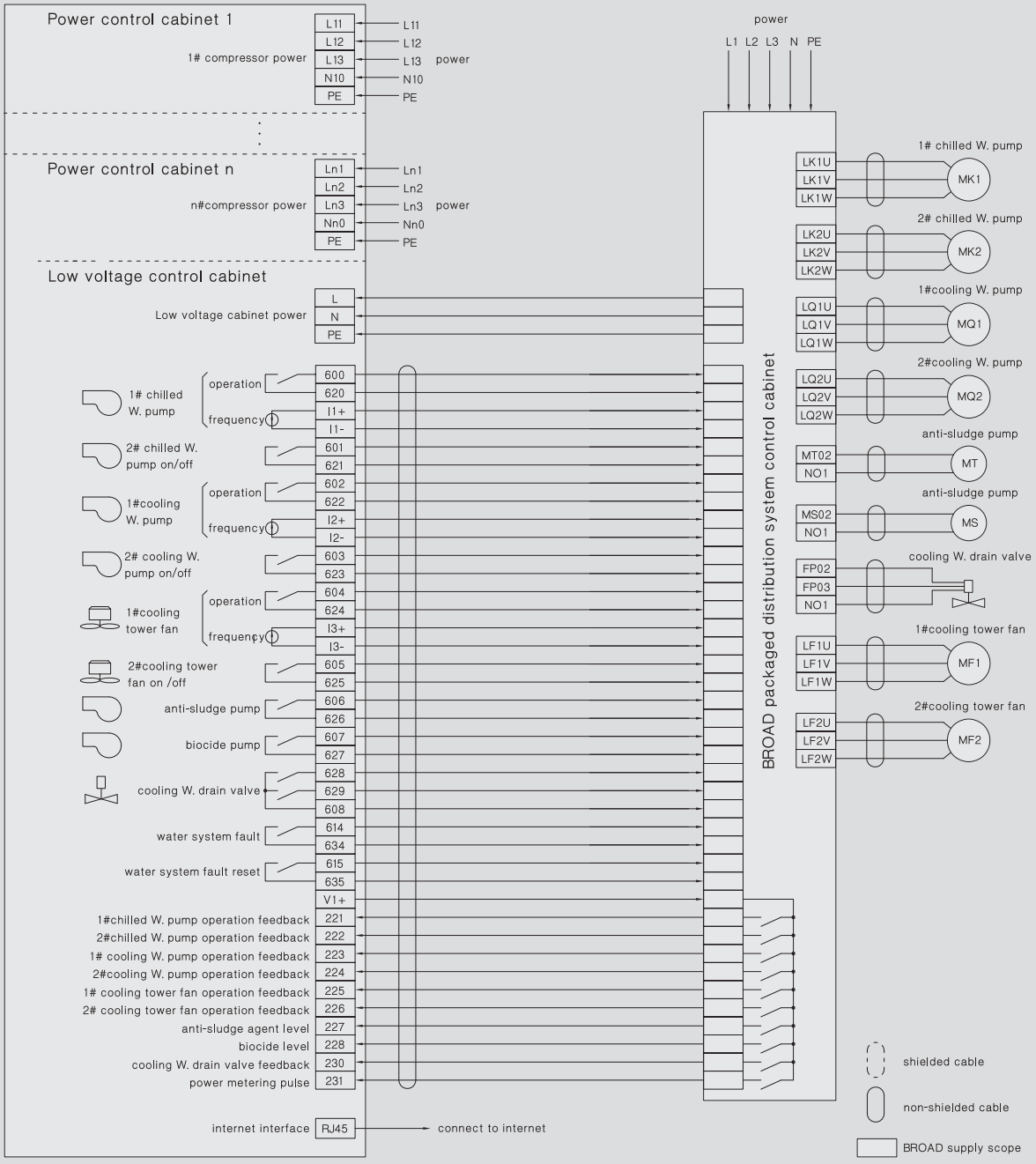
Notes:
1. BROAD packaged chiller control system includes interfaces for chiller / pumpset / cooling tower fan / internet / BMS etc
2. Pumpset and cooling tower control interface and water distribution system control cabinet are supplied with pumpset
3. BMS control interface includes Serial Communication and Dry Contact options. Serial Communication interface can be ModBus / ProfiBus / BACnet or Lonwork
4. Only control interfaces will be provided to customers who only order chiller without pumpset and cooling tower



List of Control System Installation

Item	Object	Installation position and requirement	Material	Source	BROAD scope	Customer scope
Chiller	Chiller power	Chiller control cabinet and water system	5-core cable	Customer	/	Cable installation and wiring inside chiller control cabinet
	Touch screen	Built-in	/	BROAD	/	/
	Ambient temperature sensor	Ventilation and avoid direct sunlight	3-core shielded cable (10m standard supple)	BROAD	Wiring inside chiller control cabinet	Temperature sensor installation and cable installation
	Network monitor	Built-in	Network cable	Customer	Wiring inside chiller control cabinet	Cable installation Wiring at building side
	BMS interface (optional)	Chiller control cabinet	Communication cable (for serial communication), 11-core cable (for dry contact)	Customer	Wiring inside chiller control cabinet	Cable installation wiring at building side
	Chiller and umpset grounding	Grounding resistance ⩽4Ω	Grounding / wire	Customer	/	Grounding setup and wiring
Pumpset	Main power supply connection	Water distribution system control cabinet	5-core cable	Customer	Wiring inside chiller control cabinet	Cable installation
	Wire between chiller and water distribution system cabinet	Between chiller and water distribution system cabinet	Cable supply as per package chiller	BROAD	installation and wiring inside chiller control cabinet	/

Exterior Wiring Diagram



Notes:

1. Instead of a control cabinet, only control interfaces will be provided to customers who only order chiller without pumpset and cooling tower
2. DC4-20mA signal is provided for frequency control and sensors

Handling & Lifting

Lifting & Leveling Tips

1. Before the chiller is positioned, concrete foundation plinths must be molded and leveled. The level degree is <1.5‰ , height of foundation is 100~200mm. Then fix the chiller with anchor bolts on the foundation.

2. Lifting must be done by qualified lifting companies that are properly insured.

3. The crane must be supported by crossties and firm foundation to avoid sinking. Check the crane steel ropes and hooks before lifting to prevent any accident. The lifting intersection angle must be less than 90° . It is strictly prohibited to lift the chiller with a single steel rope. When the chiller is lifted 20mm above the carriage or the ground, it should be kept for a while. Lift the chiller slowly if everything is fine.

4. If limited by loading height, loading angle or machine room access, the professional lifting company must make special plan with BROAD team together to avoid any risk.

5. The landing of the chiller must be with care. Crash landing is strictly forbidden.

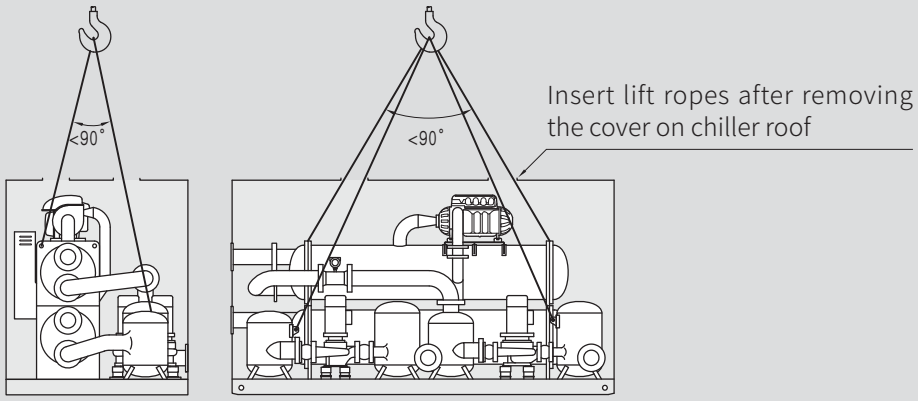
6. When moving the chiller, only round steels or thick steel tubes can be used as rollers instead of wooden sticks. Only drag the dragging hole on the rolling steel. Do not place forces on other part of the chiller. Lift the unit first with jacks under the rolling steel before rigging

7. After chiller positioning, please adjust leveling and lay thin steel plate where it is uneven to guarantee compact contact between the chiller and base. Take tube sheet as the leveling point and make front/rear and left/right leveling (check level height of every part by acrylic tube). It should be leveled within 1‰ both lengthwise and sidewise. Leveling must be done within 2 hours after locating the chiller; otherwise the chiller base will be damaged.

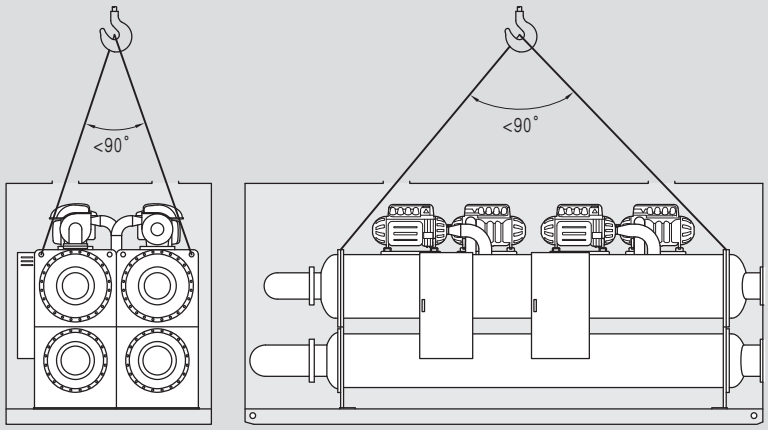
8. The chiller must be located levelly and its steel frame bases must match the plinth, the weight of the chiller must be evenly balanced on the plinth.

9. The chiller should be protected by full time personnel during transportation & installation. No access allowed for unauthorized persons. Valves of the chiller are forbidden to be screwed. If the machine room is still under construction, precautions are essential to avoid chiller get damaged or dirty. No scraping the paint or insulation layer.

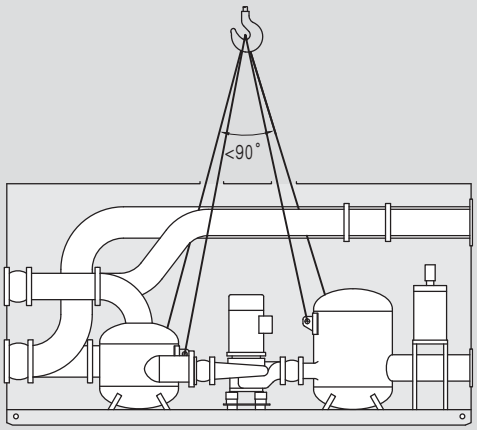
Sketch of lifting



BCY45/60/90/120/180 lifting sketch



BCY240/360 chiller lifting sketch



BCY240/360 pumpset lifting sketch

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2025.06.22 The first edition
Quantity: 2,000