



United Technologies

turn to the experts 



# 30RB/RQ Modular

## Air-Cooled Liquid Chiller Reversible Air-To-Water Heat Pump

Nominal cooling capacity: 65kW (30RB/RQ)  
Nominal heating capacity: 70kW (30RQ)

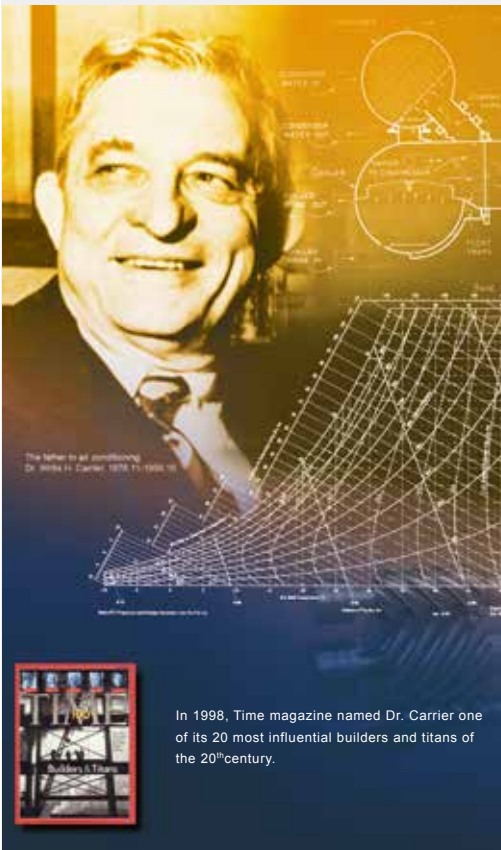


## Carrier

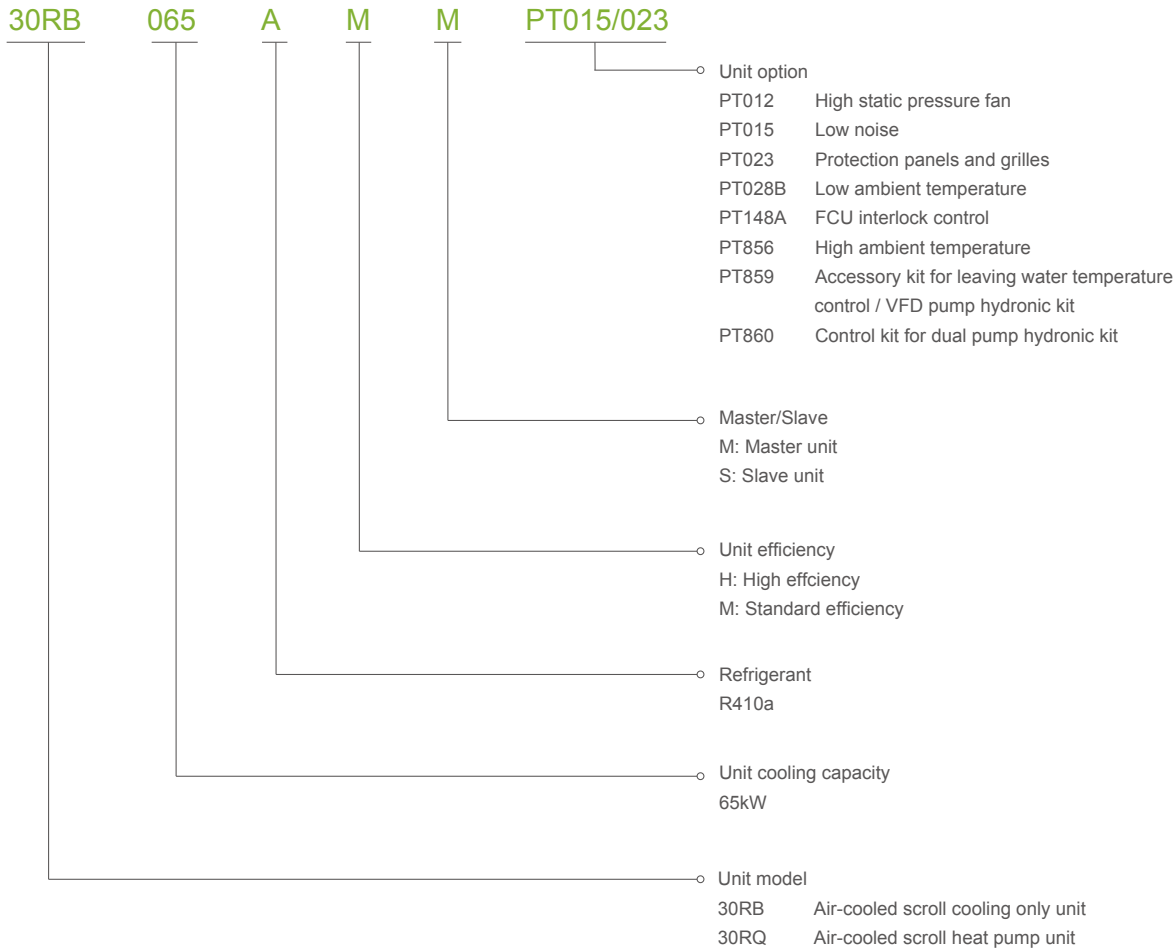
### Pioneer in sustainability

Carrier is the world leader in high technology heating, air-conditioning and refrigeration solutions. A part of United Technologies Corp., a leading provider of aerospace and building systems industries worldwide, Carrier offers sustainable solutions, integrating energy-efficient products, building controls and energy services for residential, commercial and retail customers. Founded by the inventor of modern air conditioning, Carrier provides the world around us through engineered innovation and environmental leadership.

With a broad portfolio of advanced technical patent awards, our global R&D center in Shanghai develops innovative heat, ventilation and air-conditioning (HVAC) solutions.

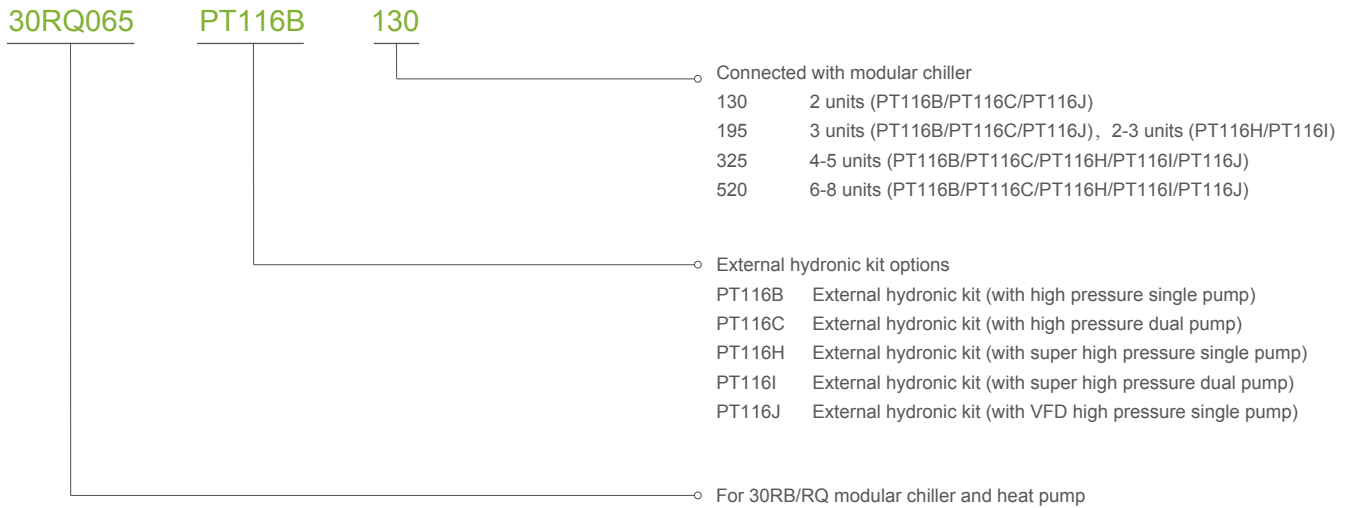


## Nomenclature



**Note:**

1. Master unit contains system controller, shipped inside of control box.
2. When selecting PT028B option, water system is mandatory equipped with brine to avoid freeze risk when unit shut down.
3. For multiple modular connection, system provides by default entering water temperature control. If leaving water temperature control is required, PT859 is mandatory.
4. PT859 is mandatory for modular chiller when external VFD pump hydronic kit is ordered.
5. PT860 is mandatory for modular chiller when external dual pump hydronic kit is ordered.



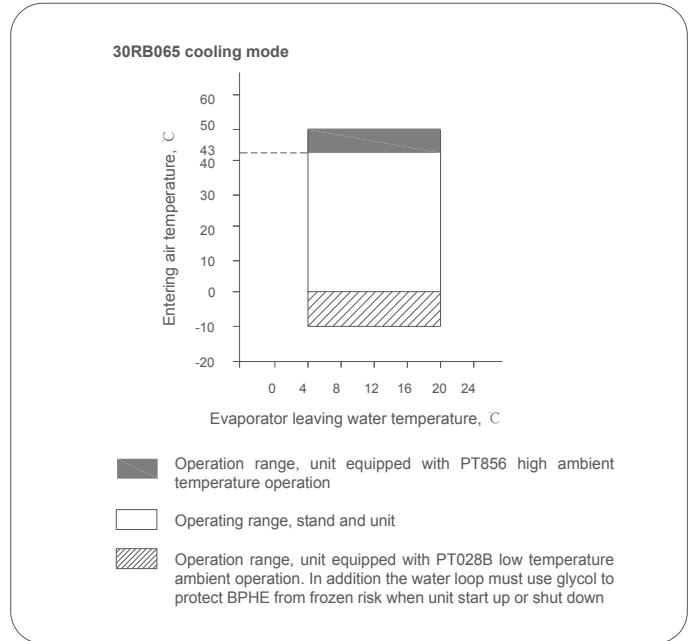
\* Unit shown on cover is with PT023 protection panels and grilles option

## Operating Range, 30RB

### Cooling mode

Evaporator	Minimum	Maximum
Entering water temperature at start-up	12 C	30 C
Leaving water temperature during operation	4 C	20 C
Entering/leaving water temperature difference	-	9K
Condenser	Minimum	Maximum
Outdoor air temperature*	0 C	43 C

\* Maximum outside temperature: For transport and storage of the 30RB/RQ units the minimum and maximum allowable temperatures are -20 C and +50 C. It is recommended that these temperatures are used for transport by container.



## Operating Range, 30RQ

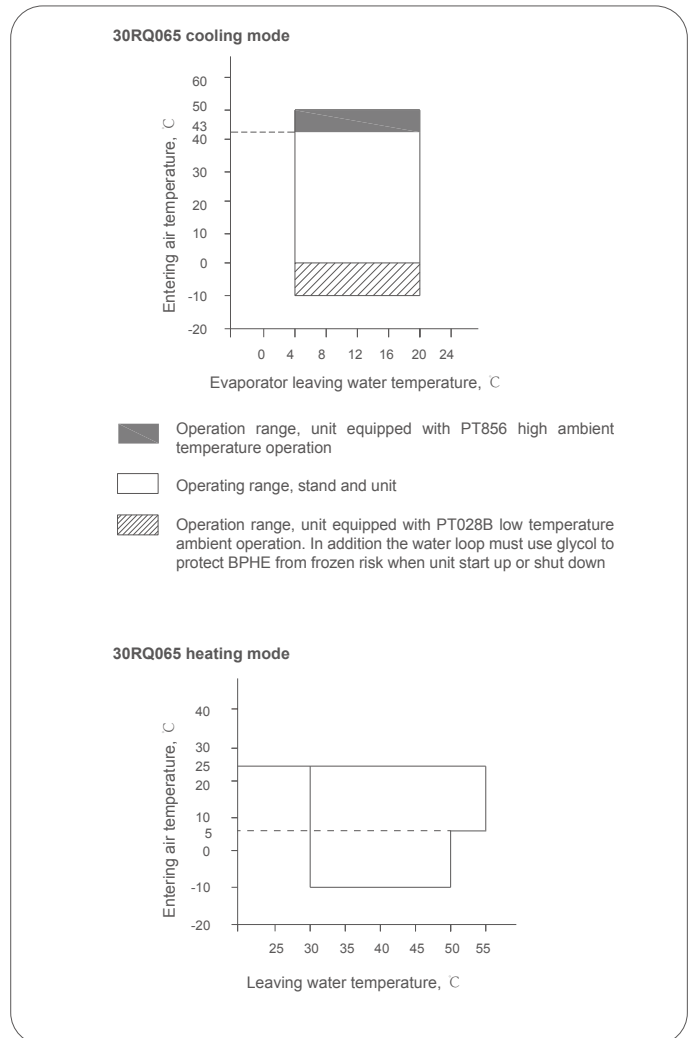
### Cooling mode

Water heat exchanger (Evaporator)	Minimum	Maximum
Entering water temperature at start-up	12 C	30 C
Leaving water temperature during operation	4 C	20 C
Entering/leaving water temperature difference	-	9K
Air heat exchanger (Condenser)	Minimum	Maximum
Outdoor air temperature*	0 C	43 C

\* Maximum outside temperature: For transport and storage of the 30RB/RQ units the minimum and maximum allowable temperatures are -20 C and +50 C. It is recommended that these temperatures are used for transport by container.

### Heating mode

Water heat exchanger (Condenser)	Minimum	Maximum
Entering water temperature at start-up	3.3 C	45 C
Leaving water temperature during operation	30 C	55 C
Entering/leaving water temperature difference	-	9K
Air heat exchanger (Evaporator)	Minimum	Maximum
Outdoor air temperature	-10 C	25 C



## Features

- ✔ The new generation of Aquasnap modular chillers/heat pumps is the new design type catering for flexible combination to suit different capacity needs and installation space. It is the premium solution for commercial and light commercial applications such as the air conditioning of office, hotel, complex building and industry, etc.

## Benefits

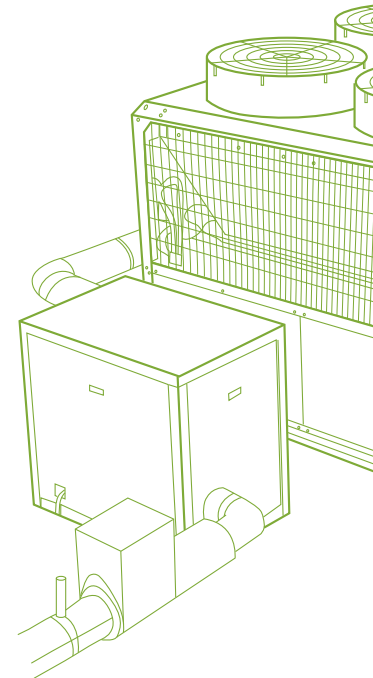
- ✔ Environment sound refrigerant HFC-410A of zero ozone depletion potential.
- ✔ Extremely high full load and system part load energy efficiency leads to low operation cost.
- ✔ Flexible combination of modular design type meets various capacity requirement and system capacity extension needs.
- ✔ Low operating sound with no intrusive low-frequency noise creates a better working/living environment.
- ✔ Multiple modules and robust control system ensure superior reliability to minimize chiller down-time.

## Environmental sound

- ✔ Ozone-friendly HFC-410A refrigerant
  - Chlorine-free refrigerant of the HFC group with zero ozone depletion potential.
  - High-density refrigerant, therefore less refrigerant required.
  - Very efficient - gives an increased energy efficiency ratio.
- ✔ Leak-tight refrigerant circuit
  - Brazed refrigerant connections for increased leaktightness.
  - Reduction of leaks due to reduced vibration levels and elimination of capillary tubes.
  - Verification of pressure transducers and temperature sensors without transferring refrigerant charge.

## Economical operation

- ✔ Extremely high full load efficiency and system part load efficiency
  - High tier offering boosts full load cooling efficiency above 3.2 and standard tier at 3.1.
  - The multiple module system offers flexible capacity control step to respond customer load change, its high system part load efficiency leads to more economical operating cost.
  - Counter flow brazed plate heat exchanger ensures high efficient heat transfer.
  - Electronic expansion device (EXV) allows operation at a lower condensing pressure. (EER and COP optimization) and improved utilization of the evaporator heat exchange surface(dynamic super heat control).
- ✔ Optimized defrost control algorithm reduced the defrost cycle (30RQ only)
- ✔ Reduced maintenance costs
  - Maintenance-free scroll compressors.
  - Fast diagnosis of possible incidents and their history via the Auto-adaptive Plus control.
  - HFC-410A refrigerant is easier to use than other refrigerant blends.



## Flexible combination

- Base module(65kW) could flexibly stack up in parallel to suit customer's various capacity needs, easy for system capacity extension (up to 520kW for one control system) and would be the primary choice for multi-phase investment.
- Multiple modulars in one system ensure superior redundancy avoiding system interruption in case single modular is in service.



## Quiet operation

- Compressors
  - Low-noise scroll compressors with low vibration level.
  - The compressor assembly is installed on an independent chassis and supported by anti-vibration mountings.
  - Dynamic suction and discharge piping support minimize vibration transmission (Carrier patent).
  - Acoustic compressor enclosure reduces radiated noise emission (option).
- Condenser section
  - Condenser coils in V-shape with an open angle allows quieter air flow across the coil.
  - Low-noise 4th generation Flying Bird fans (Carrier patent) enjoy quieter operation and never generate intrusive low-frequency noise.
  - Rigid fan mounting preventing start-up noise (Carrier patent).



## Easy and fast installation

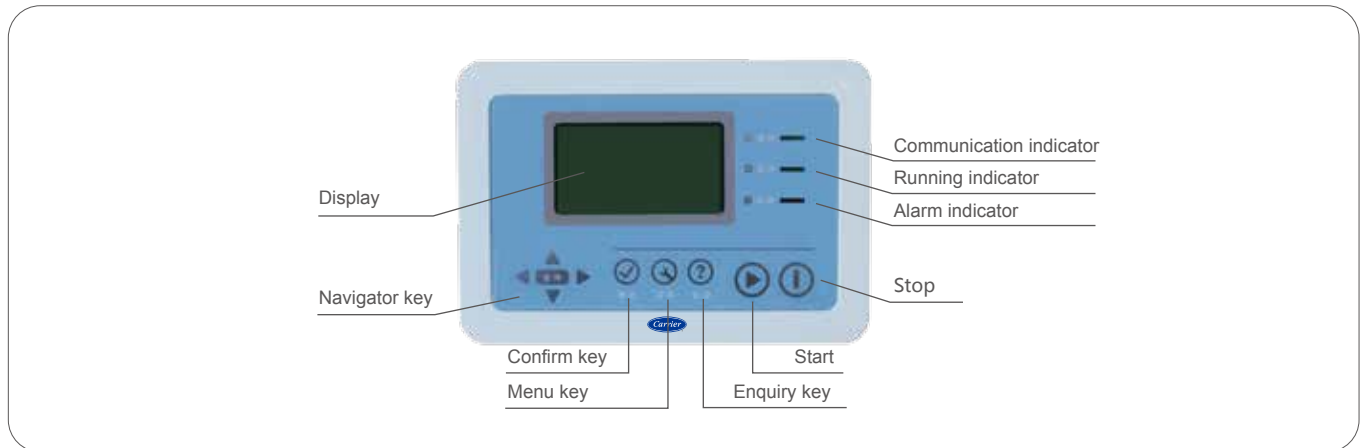
- Single module with compact footprint is easy for storage, shipping, lifting and installation.
- Multiple modulars connected in lateral with one side water piping ensure compact installation footprint, saving valuable space for customer.
- Extra screw/victaulic water connection adapts for various jobsite needs.
- Innovative external hydronic kit integrates all the necessary hydronic components, saving valuable installation time, effort and space.
  - Centrifugal high or super high pressure water pump provides diverse lifts for different applications.
  - Dual pumps apply operating time balancing and automatic changeover to the back-up pump if any fault occurs.
  - VFD pump kit reduces obviously the energy consumption based on load variation and the number of modular units operating.
  - High-capacity membrane expansion tank ensures pressurization of the water circuit.

## Auto-adaptive Control

Auto-adaptive Control combines intelligence with operating simplicity. The control constantly monitors all machine parameters and precisely manages the operation of compressors, expansion devices, fans for optimum energy efficiency.

### User-friendly interface

- ✔ The new backlit LCD ensures legibility, the information is in clear text and can be displayed in English.
- ✔ Unit uses intuitive tree-structure menus, similar to the Internet navigators. They are user-friendly and permit quick access to the principal operating parameters of master and each slave unit: operating mode, compressors operating status, suction pressure, compressor operating hours, set point, air temperature, entering and leaving water temperature.



### Advanced control function

- ✔ Unit control function including: Unit ON/OFF, user safety interlock, water pump control, operation indication, circuit alarm and alert etc.
- ✔ System can start/stop according to FCU status via FCU interlock controller (option).
- ✔ Intelligent defrost control algorithm reduced the defrost cycle duration and automatically balance the defrost sequence of more than one unit which have defrosting request at the same time (30RQ only).
- ✔ Password protection in case of mishandling.

### Powerful diagnostics

- ✔ Real-time monitor all the control and operation parameters, alarm when necessary.
- ✔ As many as 12 diagnostics to protect unit : water flow detective, water temperature out of range protection, compressor reverse, low chilled water temperature, high/low refrigerant pressure, motor overload, anti-freeze protection, etc. The diagnostics histories are recorded and could be easily visited via system controller.

### Group control

- ✔ Master/slave control of group modular operating in parallel with run time equalization and automatic changeover in case of fault.
- ✔ One system controller could support maximum 8 modules, which gives more flexibility for capacity extension.



# Modular Unit Technical Specifications

## Performance data

Model		30RB065AHM/S	30RB065AMM/S	30RQ065AHM/S	30RQ065AMM/S
Nominal cooling capacity*	kW	65	65	65	65
Compressor power input(cooling)	kW	18.1	19.5	18.7	19.5
EER	kW/kW	3.3	3.1	3.2	3.1
Nominal heating capacity*	kW			70	70
Compressor power input(heating)	kW	/	/	19.0	19.6
COP	kW/kW	/	/	3.4	3.3
Refrigerant		HFC-410A			
Circuit A	kg	9.0	6.5	9.0	7.5
Circuit B	kg	9.0	6.5	9.0	7.5
Compressor		Hermetic scroll compressors			
Circuit A		1	1	1	1
Circuit B		1	1	1	1
Number of capacity stages		2	2	2	2
Minimum capacity	%	50	50	50	50
Condensers		Grooved copper tubes and aluminium fins			
Fans		Axial Flying Bird IV with rotating shroud			
Quantity		2	2	2	2
Total air flow	l/s	6834	6834	6834	6834
Speed	rpm	700	700	700	700
Water heat exchanger		Braze plate heat exchanger			
Water volume	l	5.06	5.06	5.94	5.06
Nominal water flow rate, cooling mode	l/s	3.1	3.1	3.1	3.1
Nominal water flow rate, heating mode	l/s	/	/	3.3	3.4
Unit internal water pressure drop, cooling mode	kPa	62	62	55	62
Unit internal water pressure drop, heating mode	kPa	/	/	68	74
Max. water-side operating pressure	kPa	1000	1000	1000	1000
Water connections		Vactaulic			
Nominal diameter		DN50	DN50	DN50	DN50
Electrical data		400V-3Ph-50Hz (three-phase five line)			
Main power supply		230V (unit built in)			
Control power supply		230V (unit built in)			
Nominal unit operating current draw, circuit A/B	A	33.1	35.2	34.1	36.4
Maximum operating current draw, circuit A/B	A	45.0	43.0	45.0	43.0
Maximum start-up current, circuit A/B	A	176.0	176.0	176.0	176.0
Total fan power input	kW	1.6	1.6	1.6	1.6
Unit length	mm	2237	2237	2237	2237
Unit width	mm	1100	1100	1100	1100
Unit height	mm	1898	1898	1898	1898
Shipping weight**	kg	574	538	610	576
Operation weight	kg	580	543	616	581

\* Nominal cooling mode - evaporator entering/leaving water temperature 12/7 °C, outside air temperature 35 °C  
 Nominal heating mode - water heat exchange entering/leaving water temperature 40/45 °C, outside air temperature 7 °C;  
 Water heat exchanger fouling factor - 0.018m<sup>2</sup>/kW.

\*\*Unit only, not include additional shipping package weight 20kg.



## Options & accessories

Options	No.	Description	Advantages	Use
High static pressure fan	012	950RPM to provide 120kpa static pressure for indoor unit installation with discharge ducts	Ducted condenser air discharge, optimized condensing temperature control	30RB065AHM/S 30RB065AMM/S 30RQ065AHM/S 30RQ065AMM/S
Low noise	015	Acoustic compressor enclosure	Noise emission reduction by 2dBA	
Protection panels and grilles	023	Metallic panels and grilles on all four unit faces	Better chiller protection and aesthetics	
Low ambient temperature	028B	Fan running No. controlled by condensing pressure	Stable operation with air temperature down to -10C	
FCU interlock control	148A	Fan-coil interlock controller	Provide interlock function between FCU and master modular	
High ambient temperature	856	Optimized designed control box adaptive to high ambient temperature	Stable unit operation with air temperature up to 50C	
Accessory kit for leaving water temperature control */ variable speed pump hydronic kit	859	Accessory kit for controlling leaving water temperature set point Accessory kit for variable speed pump hydronic kit	Control leaving water temperature	
Control kit for dual pump hydronic kit	860	Control kit matched with dual pump hydronic kit	Optimized and adaptive performance	

\* Only for 2--4 Modulares

## Multiple Module Performance Data

Cooling capacity (kW)	65	130	195	260	325	390	455	520
Heating capacity (kW)	70	140	210	280	350	420	490	560
Modular No.	1	2	3	4	5	6	7	8
Piping DN recommendation	≥DN50	≥DN65	≥DN80	≥DN100	≥DN100	≥DN125	≥DN125	≥DN125

## Hydronic Kit Technical Specification

Hydronic kit model	Modular Qty	Nominal water flow rate*	Pump water head*	Customer available water pressure** (with standard efficiency modular)		Customer available water pressure** (with standard efficiency modular)		Expansion tank volume	Maximum water side pressure	Connection diameter	Pump power input	Pump maximum operating current draw	Main power supply	Recommended wiring size		
				30RB	30RQ	30RB	30RQ									
	unit	m³/h	kPa	kPa		kPa		l	kPa	DN	kW	A		mm²		
External hydronic kit (high pressure single pump)		High pressure single pump, control box, Y strainer, safety valve, expansion tank, pressure gage, air vent valves, victaulic water connection, etc.														
30RQ065PT116B130	2	22.4	270	208	208	208	215	35	500	DN65	4.0	7.5	380V-3Ph-50Hz	1.0x2.5 (Min.) 1.0x10.0 (Max.)		
30RQ065PT116B195	3	33.6	282	220	220	220	227	50	500	DN80	5.5	10.3				
30RQ065PT116B325	4	44.8	260	198	198	198	205	80	500	DN100	7.5	14.1				
	5	56.0	245	183	183	183	190									
30RQ065PT116B520	6	67.2	288	226	226	226	233	80	500	DN100	11.0	20.6				
	7	78.4	276	214	214	214	221									
	8	89.6	255	193	193	193	200									
External hydronic kit (high pressure dual pump)		High pressure dual pump, control box, Y strainer, safety valve, expansion tank, pressure gage, air vent valves, victaulic water connection, etc..														
30RQ065PT116C130	2	22.4	250	188	188	188	195	35	500	DN65	4.0	7.5			380V-3Ph-50Hz	1.0x2.5 (Min.) 1.0x10.0 (Max.)
30RQ065PT116C195	3	33.6	270	208	208	208	215	50	500	DN80	5.5	10.3				
30RQ065PT116C325	4	44.8	250	188	188	188	195	80	500	DN100	7.5	14.1				
	5	56.0	235	173	173	173	180									
30RQ065PT116C520	6	67.2	273	211	211	211	218	80	500	DN100	11.0	20.6				
	7	78.4	258	196	196	196	203									
	8	89.6	230	168	168	168	175									

\* at nominal cooling condition

\*\* at nominal cooling condition, customer available pressure = pump water pressure - modular chiller water pressure loss,

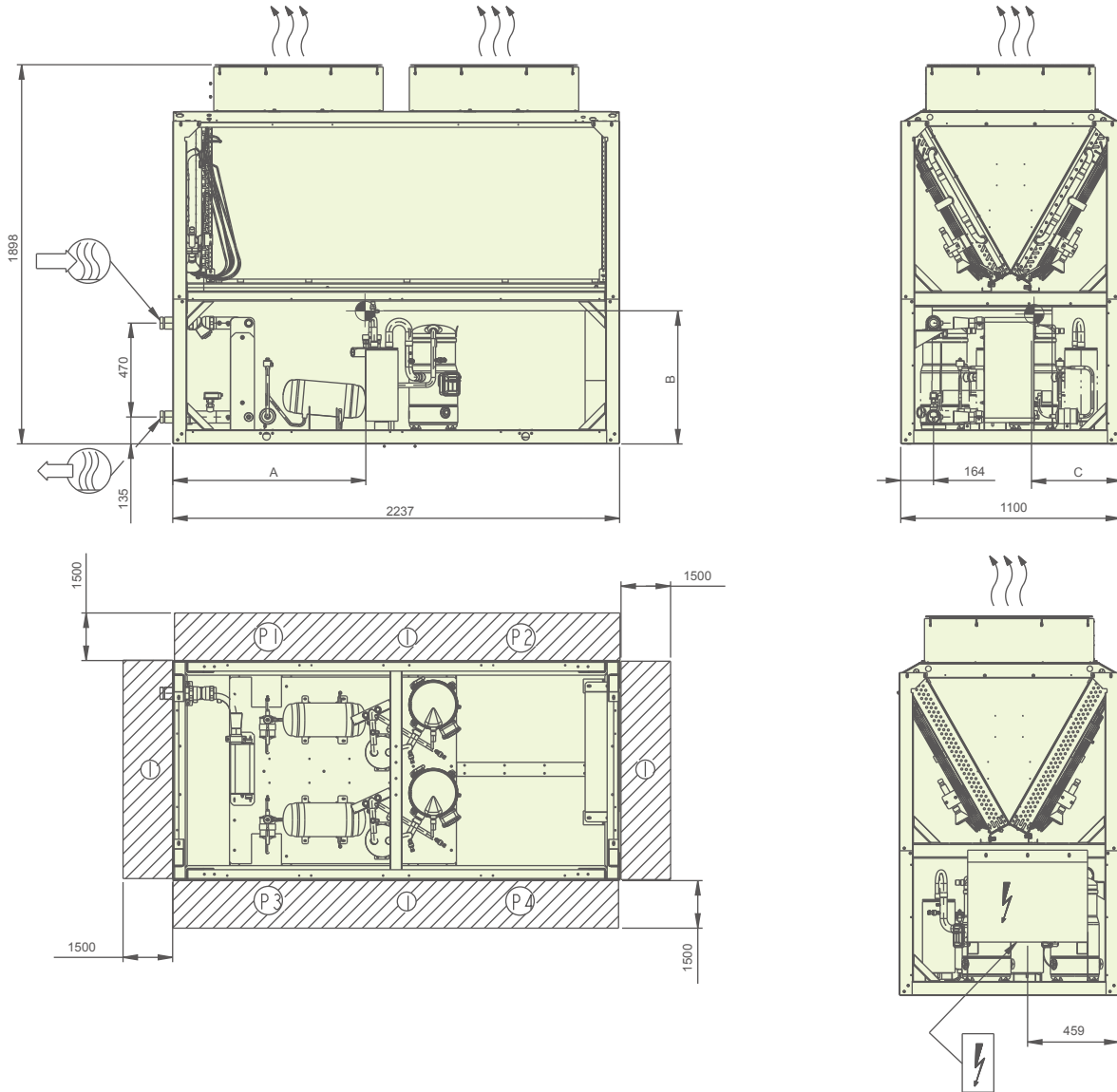
Need to consider the water head loss of the piping between external hydronic kit and modular chiller

\*\*\* at 50Hz

Hydronic kit model	Modular Qty	Nominal water flow rate*	Pump water head*	Customer available water pressure** (with standard efficiency modular)		Customer available water pressure** (with standard efficiency modular)		Expansion tank volume	Maximum water side pressure	Connection diameter	Pump power input	Pump maximum operating current draw	Main power supply	Recommended wiring size
				30RB	30RQ	30RB	30RQ							
	unit	m³/h	kPa	kPa		kPa		l	kPa	DN	kW	A		mm²
External hydronic kit (super high pressure single pump)		Super high pressure single pump, control box, Y strainer, safety valve, expansion tank, pressure gage, air vent valves, victaulic water connection, etc.												
30RQ065PT116H195	2	22.4	335	273	273	273	280	50	500	DN65	5.5	10.3	380V-3Ph-50hZ	1.0x2.5 (Min.) 1.0x10.0 (Max.)
	3	33.6	305	243	243	243	250							
30RQ065PT116H325	4	44.8	320	258	258	258	265	80	500	DN100	7.5	14.1		
	5	56.0	300	238	238	238	245							
30RQ065PT116H520	6	67.2	328	266	266	266	273	80	500	DN100	15.0	20.6		
	7	78.4	318	256	256	256	263							
	8	89.6	306	244	244	244	251							
External hydronic kit*** (super high pressure dual pump)		Super high pressure dual pump, control box, Y strainer, safety valve, expansion tank, pressure gage, air vent valves, victaulic water connection, etc.												
30RQ065PT116I195	2	22.4	335	253	253	253	260	50	500	DN65	5.5	10.3	380V-3Ph-50hZ	1.0x2.5 (Min.) 1.0x10.0 (Max.)
	3	33.6	305	231	231	231	238							
30RQ065PT116I325	4	44.8	320	248	248	248	255	80	500	DN100	7.5	14.1		
	5	56.0	300	228	228	228	235							
30RQ065PT116I520	6	67.2	328	251	251	251	258	80	500	DN100	15.0	20.6		
	7	78.4	318	238	238	238	245							
	8	89.6	306	219	219	219	226							
External hydronic kit*** (VFD high pressure single pump)		VFD high pressure single pump, control box, Y strainer, safety valve, expansion tank, pressure gage, air vent valves, frequency converter, electronic bypass valve, pressure sensor, victaulic water connection, etc.												
30RQ065PT116J130	2	22.4	284	222	222	222	229	35	500	DN65	4.0	7.5	380V-3Ph-50hZ	1.0x2.5 (Min.) 1.0x10.0 (Max.)
30RQ065PT116J195	3	33.6	290	228	228	228	235	50	500	DN80	5.5	10.3		
30RQ065PT116J325	4	44.8	272	210	210	210	217	80	500	DN100	7.5	14.1		
	5	56.0	250	188	188	188	195							
30RQ065PT116J520	6	67.2	294	232	232	232	239	80	500	DN100	11.0	20.6		
	7	78.4	275	213	213	213	220							
	8	89.6	245	183	183	183	190							

# Dimensions/Clearances

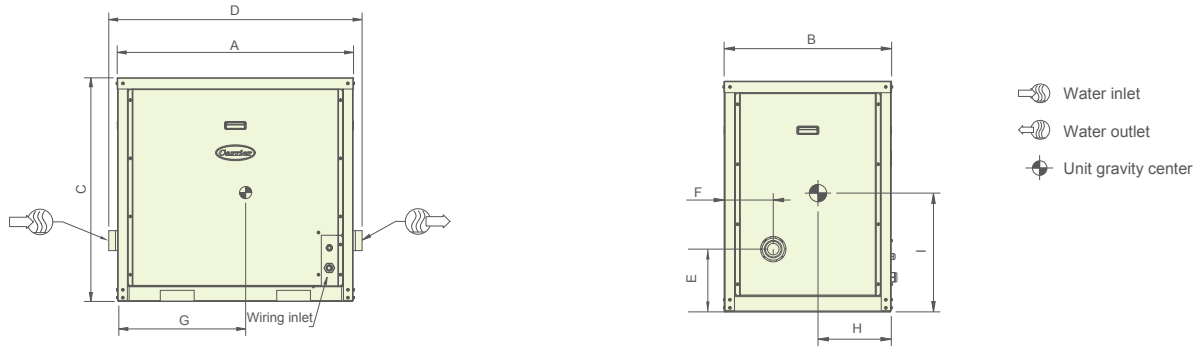
30RB/RQ



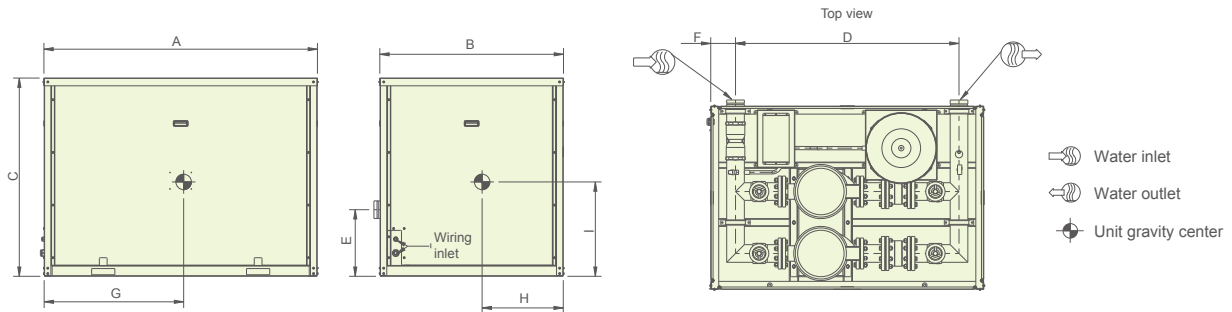
- ① Required clearances for air entry
- Water inlet
- Water outlet
- Air outlet - do not obstruct
- Power supply inlet
- Unit gravity center

Model	A	B	C
30RB065AHM/S	1044	737	594
30RB065AMM/S			
30RQ065AHM/S	1056	682	566
30RQ065AMM/S			

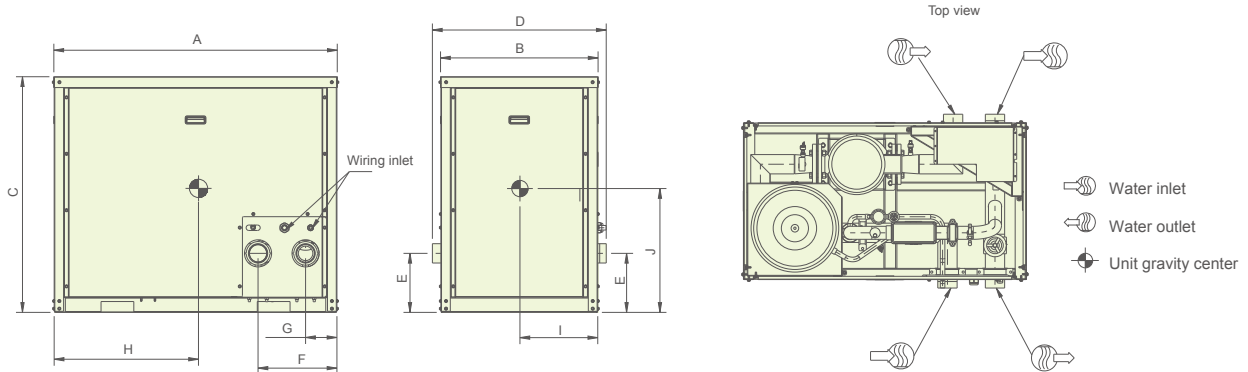
# Hydronic Kit Dimension



Model	A	B	C	D	E	F	G	H	I
30RQ065PT116B130	1056	726	1000	1132	272	212	572	438	487
30RQ065PT116B195							572	438	487
30RQ065PT116H195							574	435	491
30RQ065PT116B325	1641	916	1280	1746	430	252	901	552	620
30RQ065PT116H325						896	547	616	
30RQ065PT116B520						901	552	620	
30RQ065PT116H520						458	901	552	620

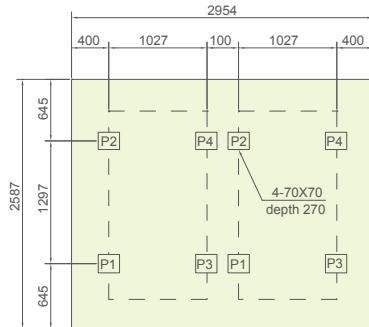
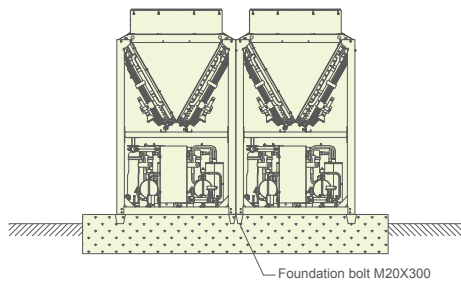


Model	A	B	C	D	E	F	G	H	I
30RQ065PT116C130	1366	986	1000	1100	272	133	623	420	438
30RQ065PT116C195							619	411	460
30RQ065PT116I195							619	411	460
30RQ065PT116C325	1766	1186	1280	1443	430	160	818	521	596
30RQ065PT116I325							818	521	596
30RQ065PT116C520							798	502	668
30RQ065PT116I520							798	502	668



Model	A	B	C	D	E	F	G	H	I	J
30RQ065PT116J130	1306	728	1086	801	272	363	144	649	386	454
30RQ065PT116J195	1306	728	1086	801	272	363	144	649	409	479
30RQ065PT116J325	1468	913	1187	986	272	393	144	765	556	584
30RQ065PT116J520	1468	913	1187	986	272	393	144	765	556	584

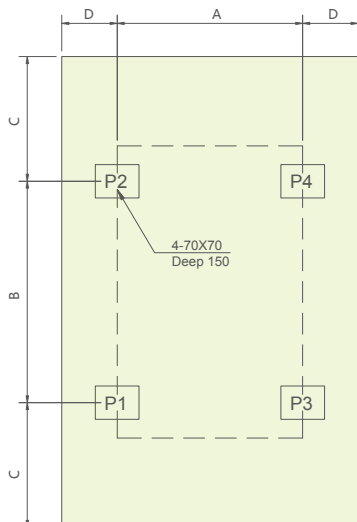
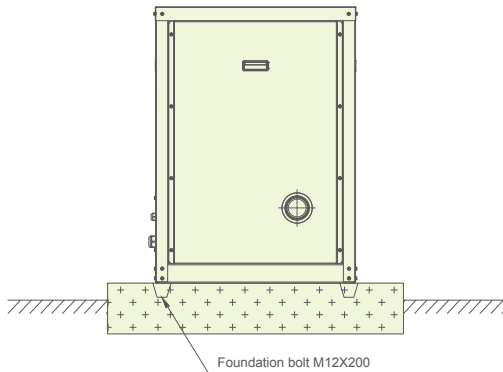
## Installation Basement and Weight Distribution



Model	Operating Weight (kg)	P1 (kg)	P2 (kg)	P3 (kg)	P4 (kg)
30RB065AHM/S	580	174	140	148	118
30RB065AMM/S	543	165	131	138	109
30RQ065AHM/S	616	167	150	158	141
30RQ065AMM/S	581	158	141	149	133

1. The installation basement shall be concrete structure or channel steel frame that is strong enough to support unit operation weight.
2. Each unit shall be fixed by four bolts(M20)
3. Anti-vibration pads (20mm) shall be installed between the unit chassis and basement.

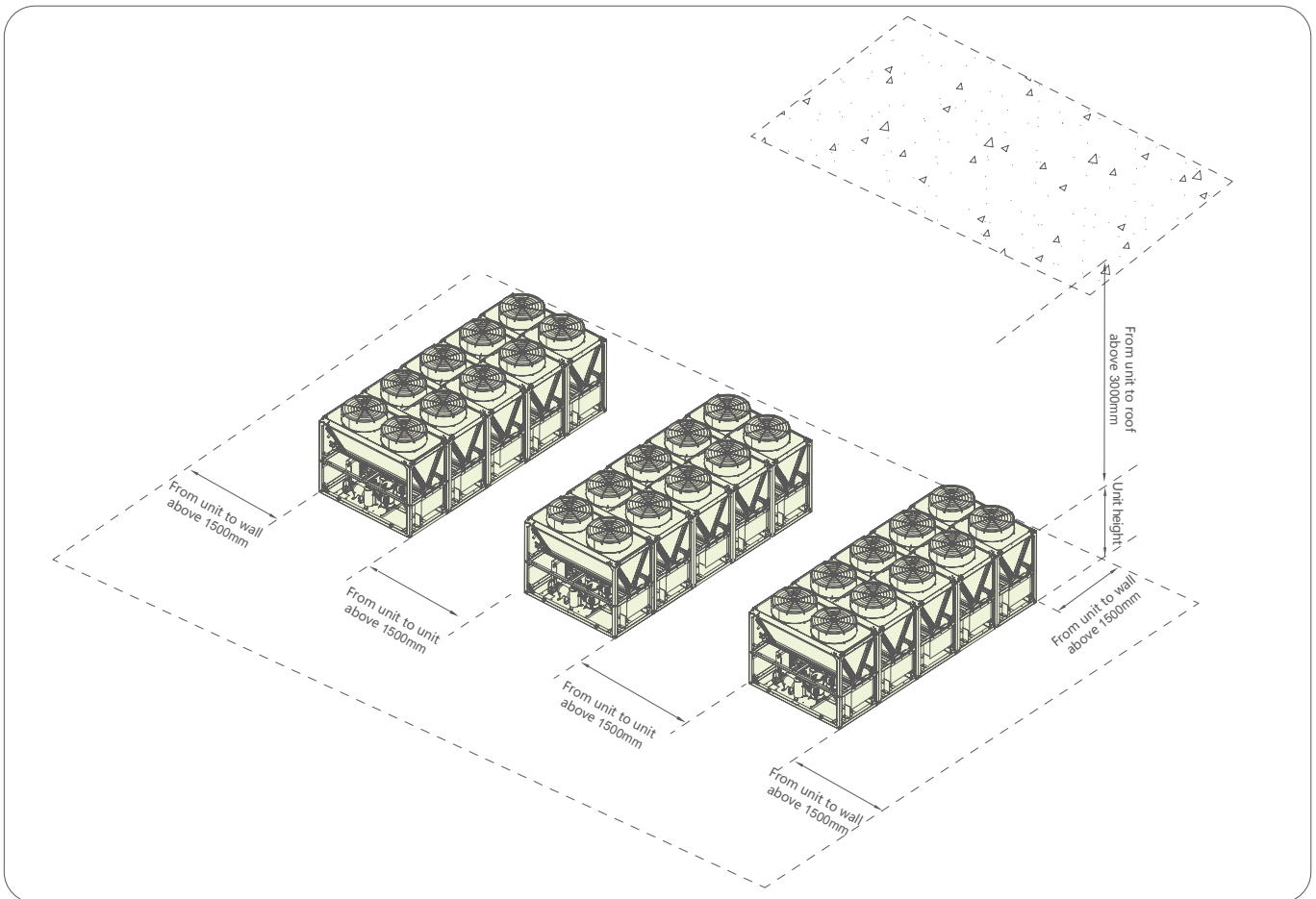
### External hydronic kit



Model	Operation Weight (kg)	P1 (kg)	P2 (kg)	P3 (kg)	P4 (kg)	A (mm)	B (mm)	C (mm)	D (mm)
30RQ065PT116B130	215	75	36	57	47	670	640	350	150
30RQ065PT116B195	258	90	43	68	57	670	640	350	150
30RQ065PT116B325	368	128	62	97	82	860	1162	400	200
30RQ065PT116B520	546	190	92	143	121	860	1162	400	200
30RQ065PT116C130	386	97	127	92	71	930	900	400	200
30RQ065PT116C195	462	117	155	109	82	930	900	400	200
30RQ065PT116C325	641	158	204	158	121	1130	1000	500	200
30RQ065PT116C520	793	191	269	195	138	1130	1000	500	200
30RQ065PT116H195	248	86	42	64	56	670	640	350	150
30RQ065PT116H325	358	122	62	94	80	860	1162	400	200
30RQ065PT116H520	546	189	92	143	122	860	1162	400	200
30RQ065PT116I195	462	117	155	109	82	930	900	400	200
30RQ065PT116I325	641	158	204	158	121	1130	1000	500	200
30RQ065PT116I520	793	191	269	195	138	1130	1000	500	200
30RQ065PT116J130	215	75	36	57	47	1130	640	500	200
30RQ065PT116J195	258	90	43	68	57	1130	640	500	200
30RQ065PT116J325	368	128	62	97	82	1130	640	500	200
30RQ065PT116J520	546	190	92	143	121	1130	640	500	200

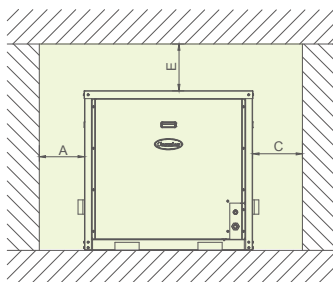
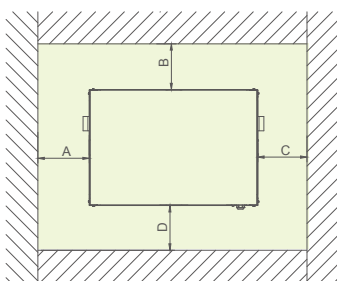
1. The installation basement shall be concrete structure or channel steel frame that is strong enough to support unit operation weight.
2. Each unit shall be fixed by four bolts(M12)
3. Anti-vibration pads (10mm) shall be installed between the unit chassis and basement.

## Multiple Module Installation

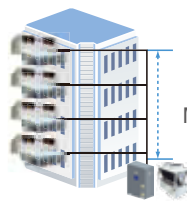


## Service Space

External hydronic kit



Recommended height difference



Max. 20m



Max. 100m

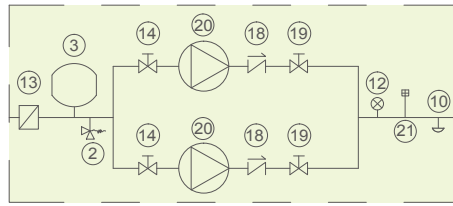
Placed on ground

Placed on roof

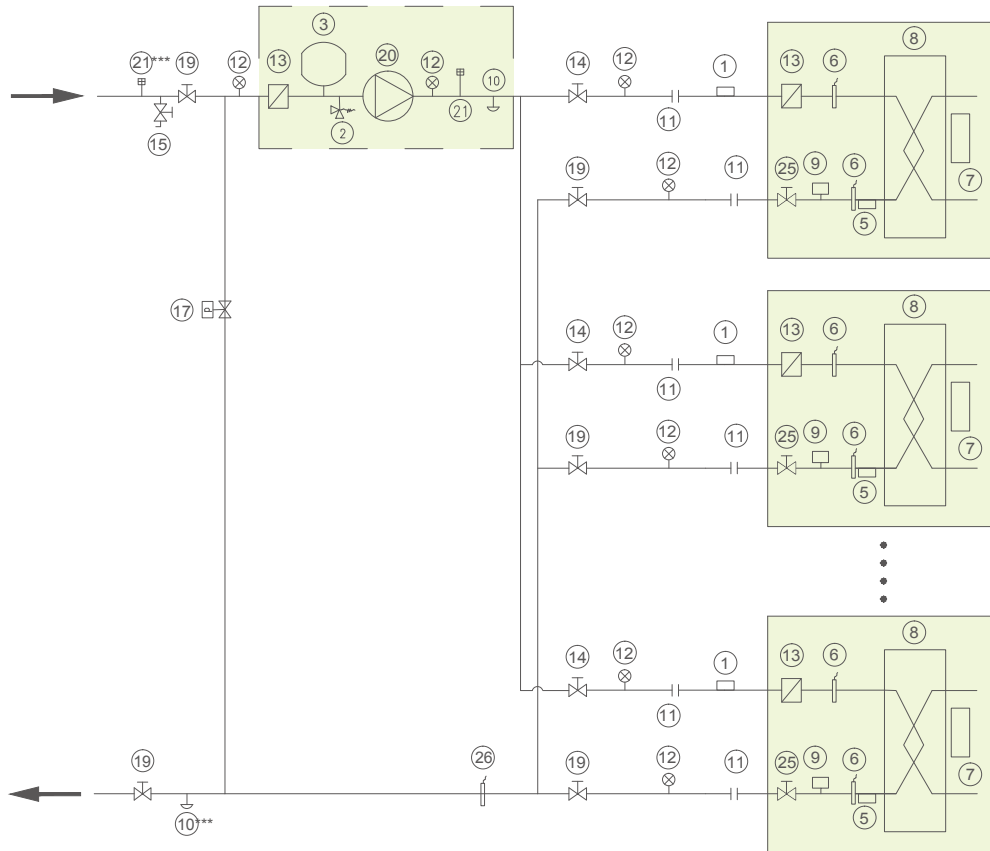
Model	30RQ065PT116B 130/195/325/520 30RQ065PT116H 195/325/520	30RQ065PT116C 130/195/325/520 30RQ065PT116I 195/325/520	30RQ065PT116J 130/195/325/520
A (mm)	600	500	500
B (mm)	500	600	600
C (mm)	600	500	500
D (mm)	500	500	600
E (mm)	100	100	100

## Typical Water Connection

External hydronic kit ( fixed speed dual pump)



External hydronic kit ( fixed speed single pump)



Unit components	Installation components	
	Included in kit	Not included in kit
5 Drain screw plug	2 Safety valve	1 Manual air vent
6 Temperature sensor	3 Expansion tank	11 Flexible connection
7 BPHE heater	10 Drain valve	14 Flow control valve**
8 Brazed plate exchanger	12 Pressur gauge	15 Charge valve
9 Flow switch*	13 Filter	17 Bypass valve
13 Filter	18 Check valve	19 Stop valve
25 Electrical ball valve(PT859)****	19 Stop valve	21 Auto air vent
26 Temperature sensor(PT859)****	20 Pump	
	21 Auto air vent	

Note: \* 30RB/RQ065 Unit flow switch is installed at BPHE outlet;

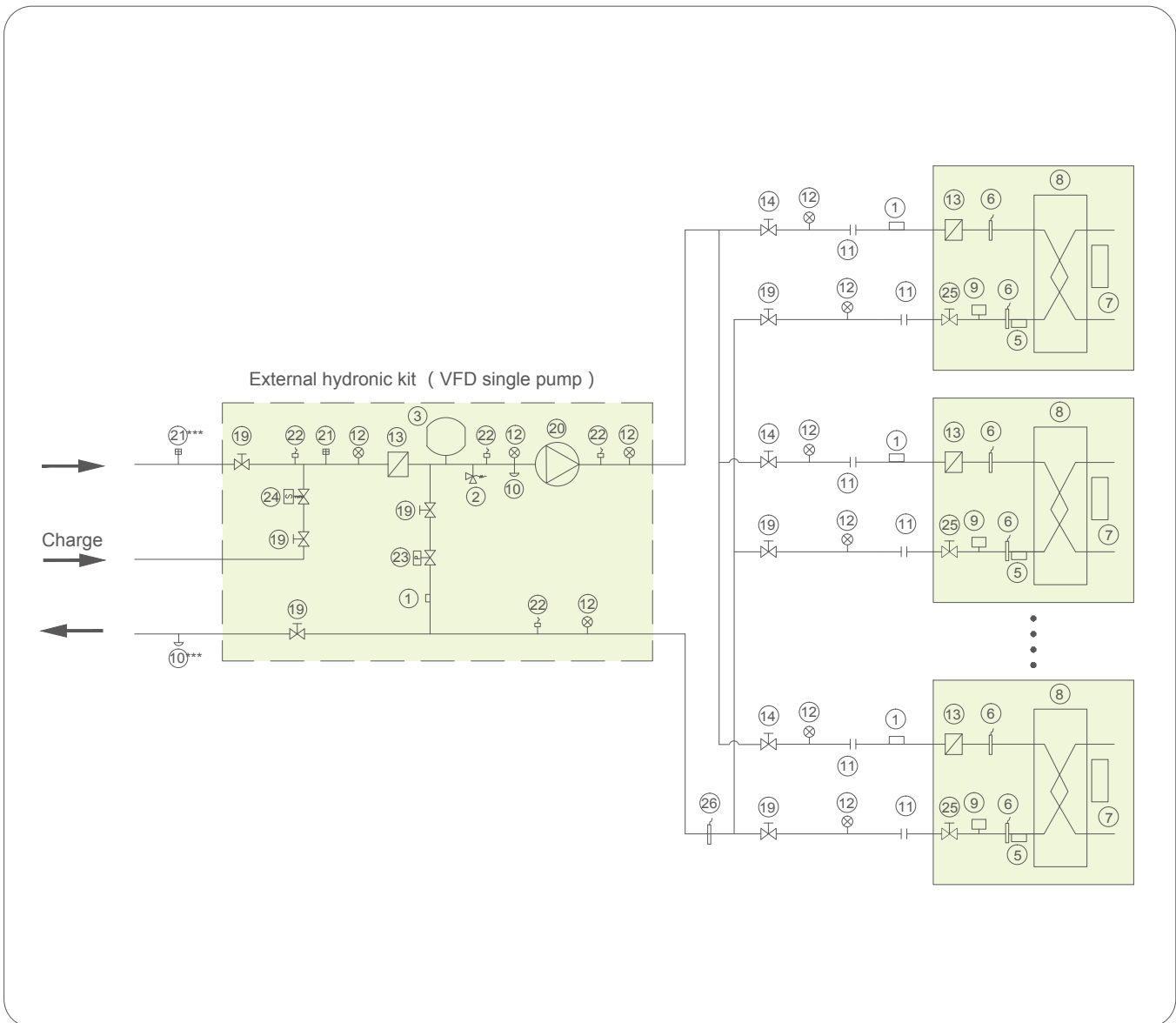
\*\* Recommend flow regulating valve as butterfly valve or sluice valve etc. instead of stop valves like ball valve;

\*\*\*Air vent valves should be installed at the highest point of water loop. Drain valve must be installed at the lowest point of water loop;

\*\*\*\*Temperature sensor mounted on main pipe is only for LWT control (PT859 option)



## Typical Water Connection



Unit components	Installation components	
	Included in kit	Not included in kit
5 Drain screw plug	2 Safety valve	1 Manual air vent
6 Temperature sensor	3 Expansion tank	11 Flexible connection
7 BPHE heater	10 Drain valve	14 Flow control valve**
8 Brazed plate exchanger	12 Pressur gauge	19 Stop valve
9 Flow switch*	13 Filter	21 Auto air vent
13 Filter	18 Check valve	
25 Electrical ball valve	20 Pump	
26 Temperature sensor****	21 Auto air vent	
	22 Pressure sensor	
	23 Digital bypass valve	
	24 Auto charge valve	

\* 30RB/RQ065 Unit flow switch is installed at BPHE outlet;

\*\* Recommend flow regulating valve as butterfly valve or sluice valve etc. instead of stop valves like ball valve;

\*\*\*Air vent valves should be installed at the highest point of water loop. Drain valve must be installed at the lowest point of water loop;

\*\*\*\*Temperature sensor mounted on main pipe is only for LWT control

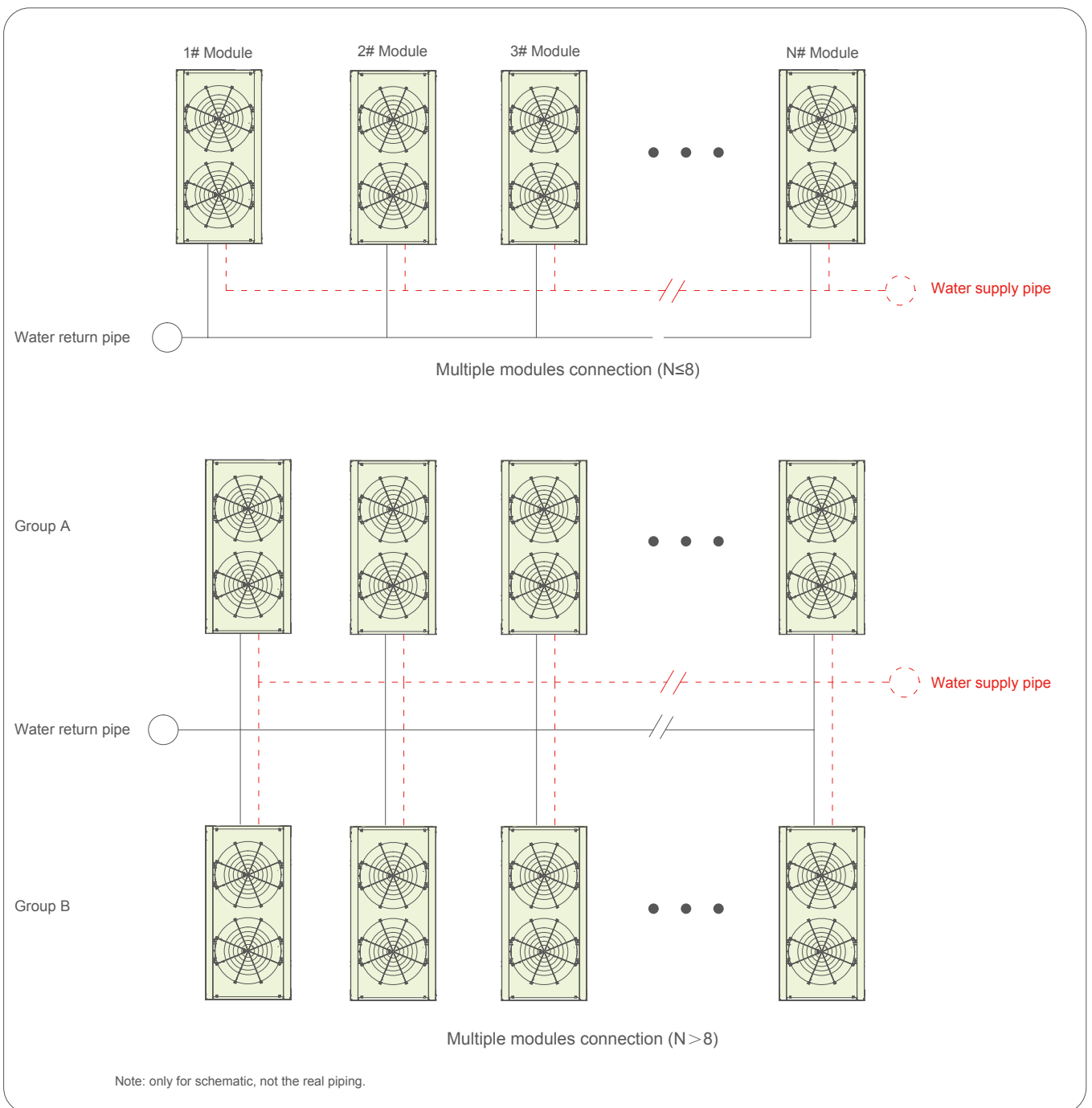
## Water Connection Layout Recommendation

Classified by the arrangement of water supply and return pipes, water system for air conditioning could be direct return or reversed return.

Direct return system: water flow is first-in first-out, so each module will have different pipe length and pressure drop. The direct return system advantages in its simple layout, easy installation and low cost. Due to the different water loop length of each module, the flow regulation valve for each is required to balance the pressure, which ensures the appropriate flow allocation.

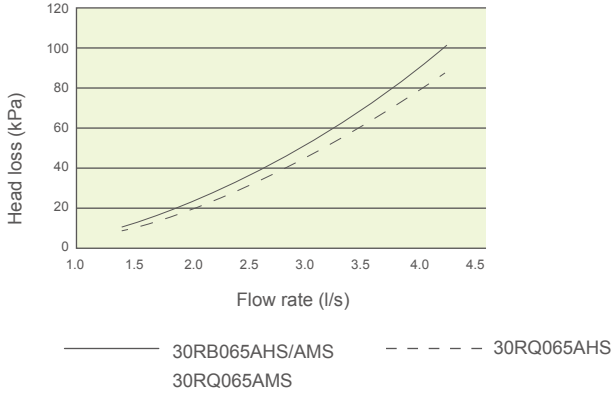
Reversed return system: water travels almost the same distance for each module connected in parallel. Each module will have uniform flow rate thanks to the similar water pressure drop. It is always recommended to apply reversed return water system (see below schematics for 30RB/RQ065 multiple module operation).

If not more than 8 modules are connected, Carrier recommends reversed return water system for balancing water allocation. For those jobsites with limited space, direct return water system sometimes is considered and the flow regulation valve must be installed in each module water loop to uniform flow rate. Moreover, when defining the pump size, customer needs to take full account of the extra pressure drop generated by adjusting valve. If more than 8 modules are stacked up, reversed return water system layout is mandatory.

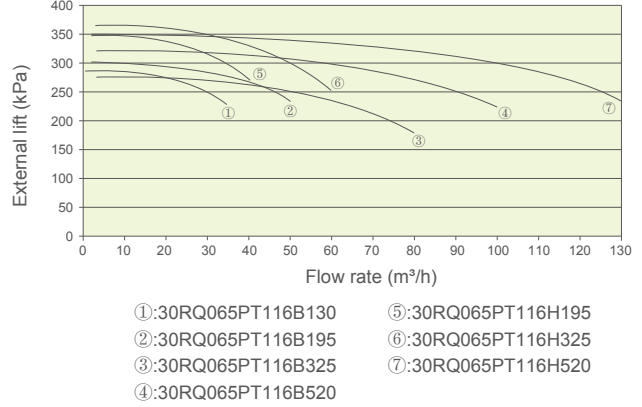


# Water Side Performance Diagram

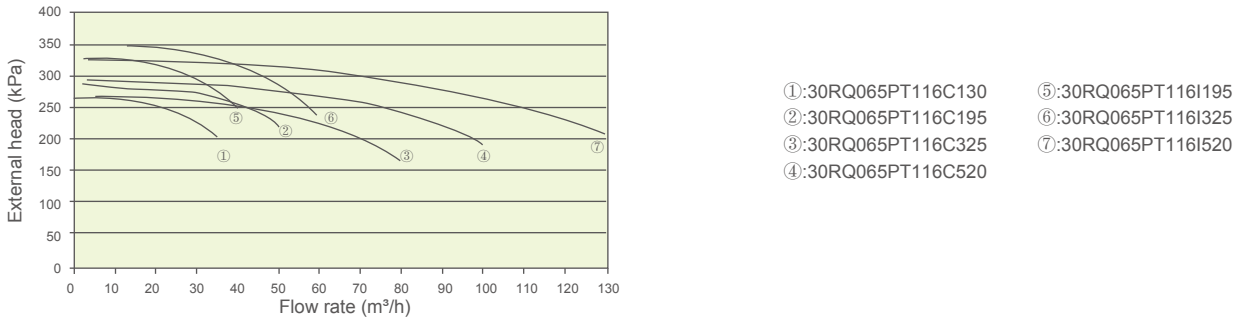
Water side heat exchanger pressure drop



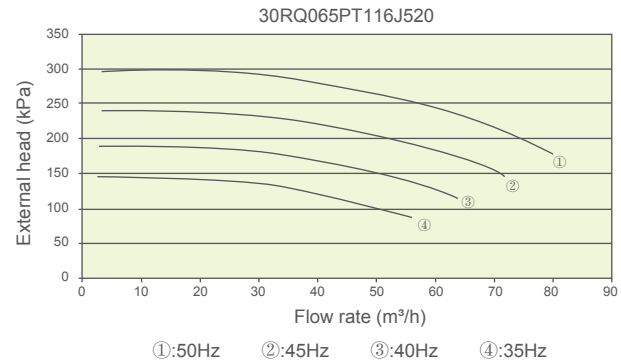
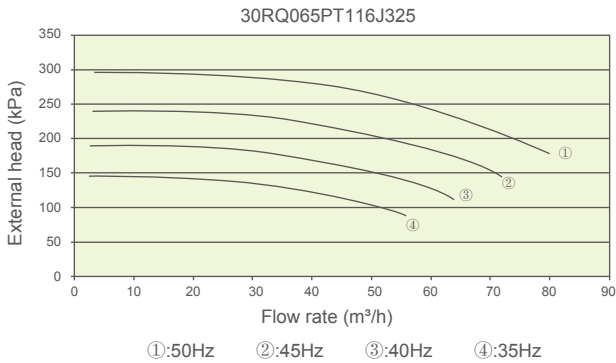
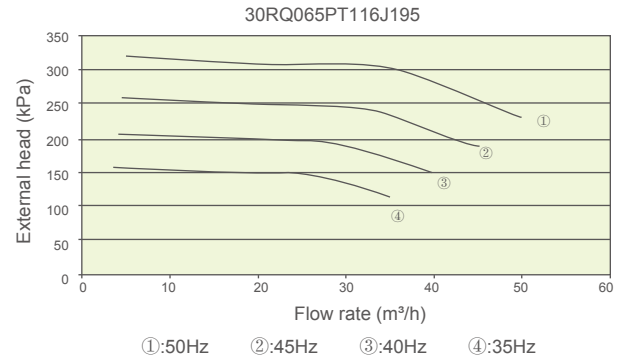
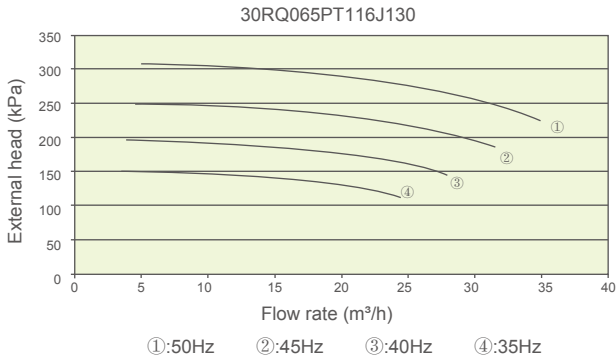
Hydronic kit external pressure(super high/high pressure single pump)



Hydronic kit external pressure(super high/high pressure dual pump)



Hydronic kit external pressure(high pressure VFD single pump)



# Minimum Water Loop Volume

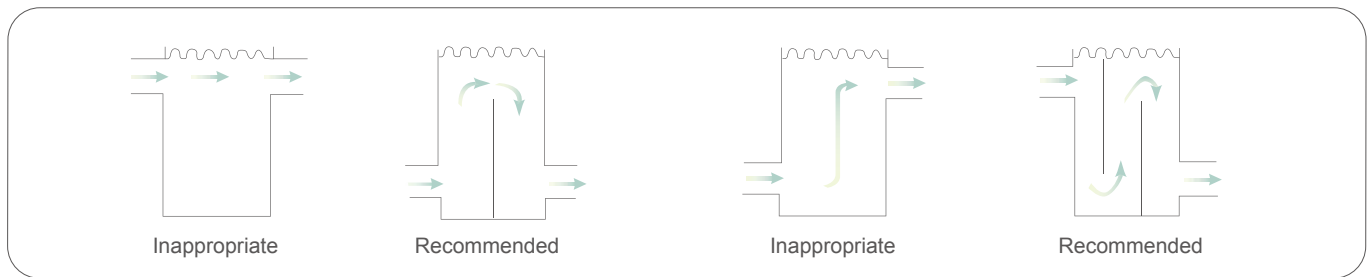
For better control of leaving water temperature, the water loop minimum capacity is given by the formula:

$$\text{Capacity} = \text{CAP (kW)} \times \text{N Liters}$$

CAP: Unit's nominal cooling capacity

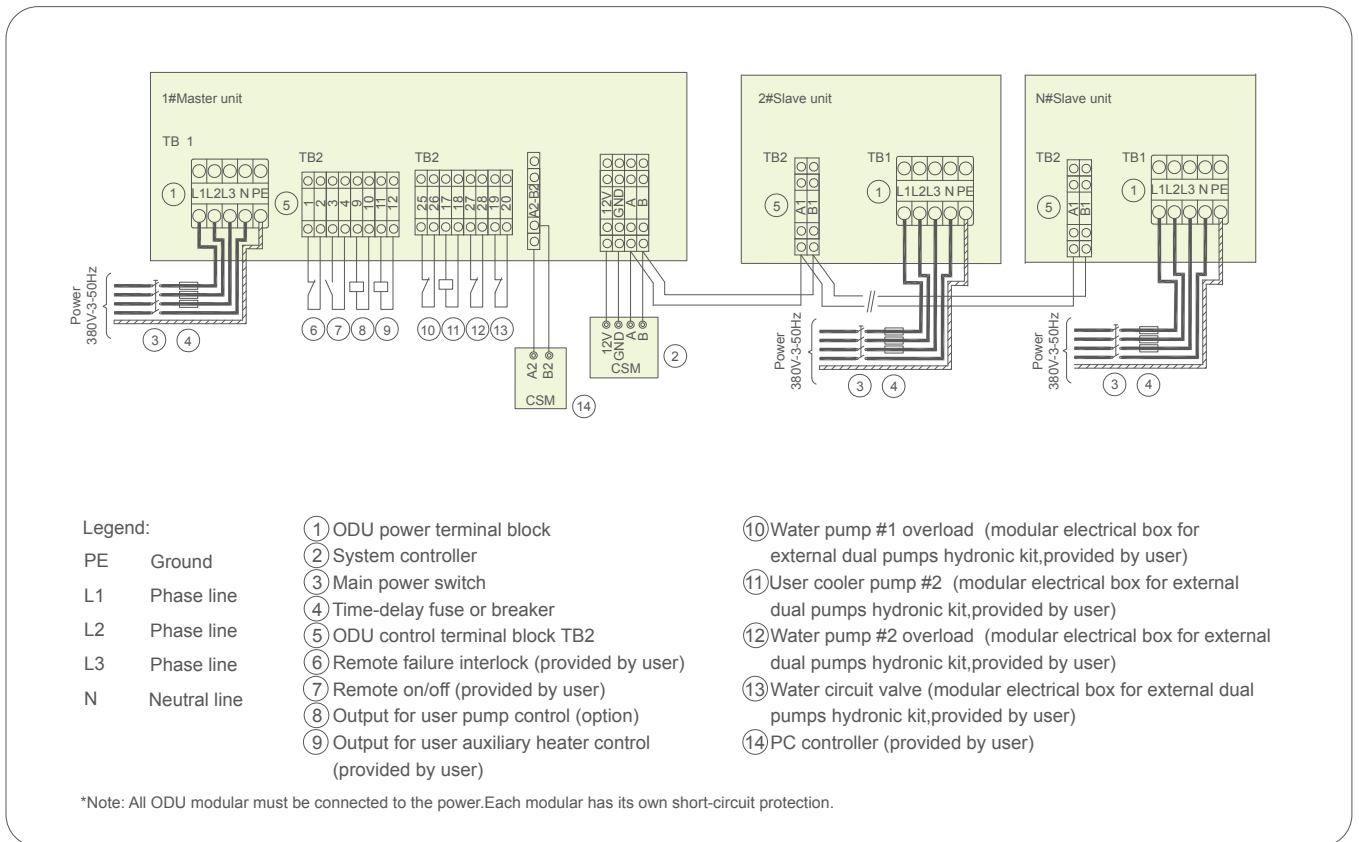
Application		N
Comfort air conditioning	30RB/RQ	3.5
Process cooling	30RB/RQ	Should be greater than 3.5 for better water temperature control

It is often necessary to add a buffer water tank to the circuit in order to achieve the required volume. The tank must itself be internally baffled in order to ensure proper mixing of the liquid (water or brine). Refer to the examples below.



## Field wiring diagram (modular unit)

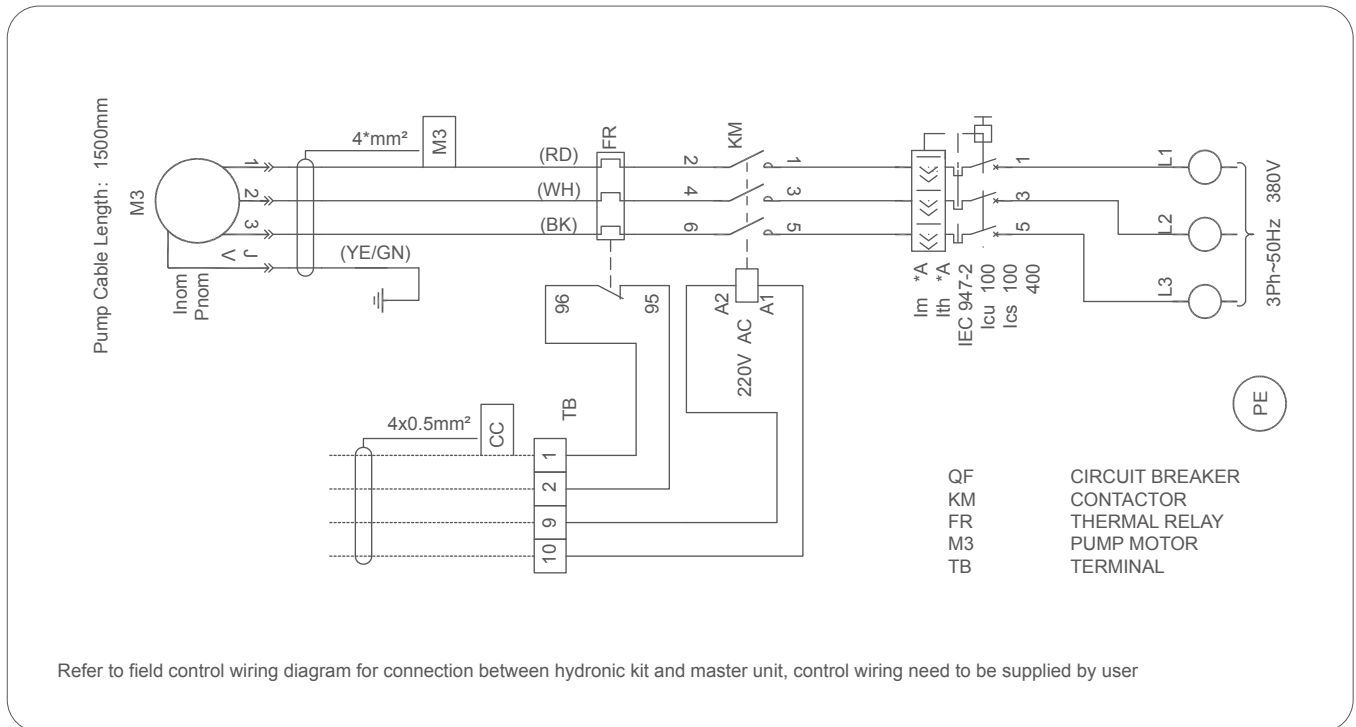
30RB/RQ



## Field wiring diagram (modular unit)



## Field wiring diagram (external hydronic kit)





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Supersede:	-
Effective Date:	Mar, 2014