



## MSRA-E SERIES Modular Air Cooled Scroll (Heat Pump) Chiller



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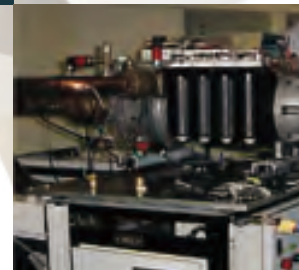
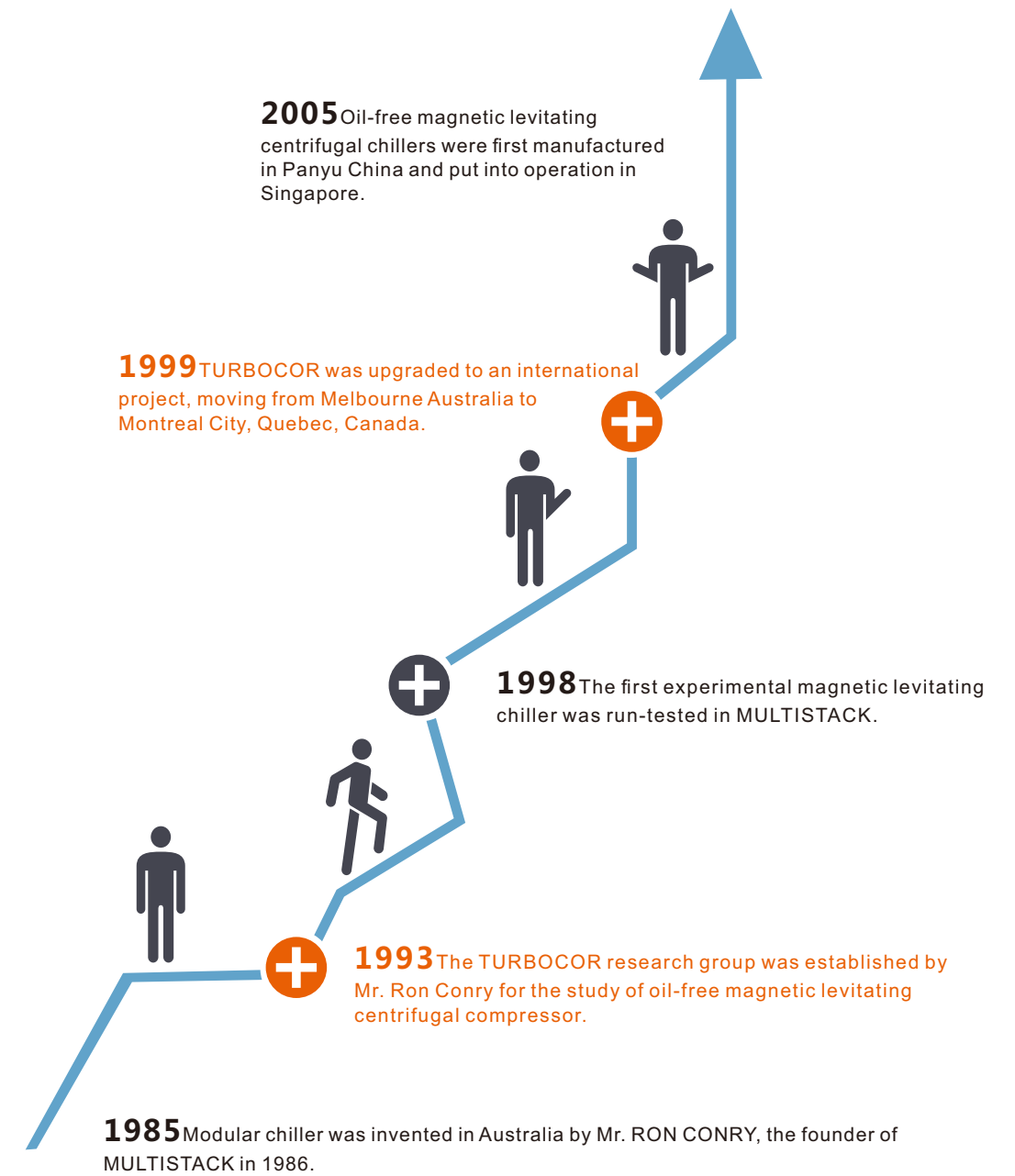
We are the creator and advocator of energy efficient chillers and the pioneer of magnetic levitating technology in refrigeration industry.

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## World's First Oil-free Magnetic Levitating Centrifugal Compressor



INTRODUCTION

MULTISTACK created the first modular chiller in Melbourne, Australia in 1985. This is a great invention riding the wave of industrial design of the 20<sup>th</sup> century, featuring energy saving, reliability and flexibility. Users all over the world benefit greatly from MULTISTACK’s modular air conditioning technology. For decades, MULTISTACK continues to provide reliable products and professional services. We are undoubtedly the inventor and leader of modular magnetic levitating technology.

Features of MULTISTACK modular chillers:

**ENERGY SAVING** Automatic scheduling of the compressors allows the chiller to match the fluctuating cooling loads and conserve energy with each individual unit running at its peak efficiency. This is much more economical when compared to a traditional large single unit running at part load.

**RELIABLE** Every module works as an independent refrigeration circuit, with adjacent modules operating independently. In the event of a malfunction in the system, the computer controller selects the next available standby module to provide back up. One failed module will not disrupt the other modules or system, giving you total piece of mind.

**EASY INSTALLATION AND ADD-ON FLEXIBILITY** Chillers could be field-assembled without the aid of a large lifting machine and dedicated doorways. Chilled/cooling water headers can be easily dismantled if necessary for easy transportation to the rooftop or basement through elevators. When larger cooling capacity is needed, just add on new modules to increase unit capacity without any complicated change to the equipment room, piping system and control system.

**INTELLIGENT CONTROL SYSTEM** MULTISTACK’s original modular control system is based on micro-process control technology, combining modules to form a complete and integrated unit. Each module runs smoothly with peak efficiency based on system load demand. The control system features optimized compressor running, pro-long service life and automatic capacity control.

MODEL NUMBER DESIGNATION

MSRA-E	065	H	F	S	A	--	6
1	2	3	4	5	6		7

- 1 — Modular Scroll Air Cooled Economy-type
- 2 — Model Number
- 3 — Chiller Type H:Heat Pump
- 4 — Refrigerant Type F:R22 R: R407C G:R410A
- 5 — Shell & Tube Heat Exchanger
- 6 — Electrical Specifications A:AC380/415V-3Ph-60Hz  
B:AC440/460V-3Ph-60Hz
- 7 — Number of modules per chiller (Max. 16)



CHILLER FEATURES

Stable and Reliable

- ⦿ Modular Design  
Original modular technology is used for composing a MULTISTACK chiller with maximum 16 parallel modules involving in the chiller bank.
- ⦿ Stable Compressor Operation  
Running status and run time of every compressor are monitored and controlled in real time to pro-long chiller service life.
- ⦿ Compressor Anti-slug  
Compressors are equipped with oil heaters to better lubricate the compressors with refrigeration oil when the chiller is idle in winter, ensuring that liquid refrigerant is separate from refrigeration oil and preventing the compressors from being damaged by liquid slugging when chiller starts.
- ⦿ Intelligent Defrosting  
High-precision temperature sensor is able to accurately detect system pressure and temperature changes under frosting condition, and determine the best defrosting time, avoiding annoying problems such as incomplete incomplete or frequent defrosting. This exclusive defrosting technology ensures complete defrosting and drainage promising with safer and more reliable operation.
- ⦿ Forced Defrosting  
In addition to intelligent defrosting, the chiller is designed to have forced defrosting when it runs in heating mode in harsh environment. Forced defrosting is actuated to thoroughly remove frost or ice formed in high-humidity or low-temperature environment.

Intelligent Control

- ⦿ Auto Alarm  
Chiller controller has the function of auto malfunction monitoring. Error codes are displayed to help trouble shooting faster.
- ⦿ Auto Reset  
Auto reset is useful for some non-damaging fault. When the system data recover, faults will be automatically cleared.
- ⦿ BACnet Supported  
Chiller can be connected to BACnet via RS485 series port through legal protocols.
- ⦿ Power Failure Recovery (PFR)  
In the event of power failure, the chiller will automatically resume the last session when power is restored if PFR is enabled.
- ⦿ A Variety of Timings  
Chiller has various timings including weekly timing, cycle timing and single timing to satisfy different demands of customers.

A Single Chiller Serves Several Purposes

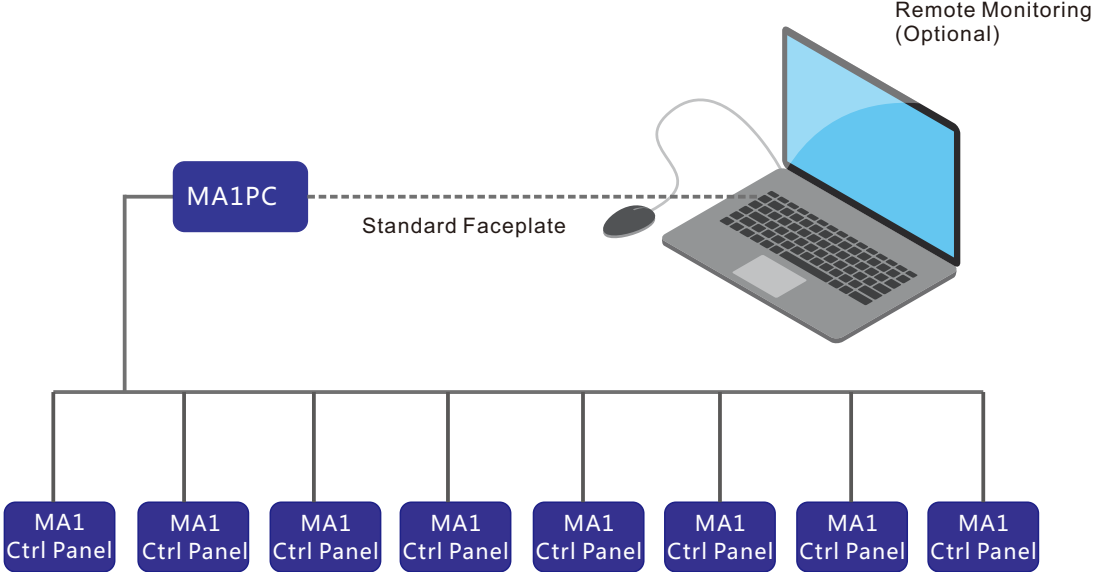
- ⦿ Cooling Only  
Supplying cooling in summer particularly applicable for hot climate regions
- ⦿ Heat Pump  
Supplying cooling in summer and heating in winter
- ⦿ Year-round Cooling (Optional)  
Supplying year-round cooling to meet cooling load demands for specific environments with great heat dissipation, maintaining stable operation even in winter
- ⦿ Sensible Heat Recovery (for MSRA065H only)  
Supplying domestic hot water by recovering waste heat which would have been emitted into the atmosphere in the process of cooling



DESIGN FEATURES



SYSTEM STRUCTURE



Multi-color LCD backlight display features:

Cooling and heating mode	Multi-color backlight display
Chilled water temperature display	Fault alarm, fault code display
Real time display	Buzzer warning in keyboard input
Timing start/stop	Battery-support & real-time clock in power down
System running status display	Different settings of control data

Controller features:

Compressor wear leveling	Remote monitoring interface
Multi-stage timing start/stop control	Remote control (dry contact control)
Self-diagnosis of fault and protection	Remote run/alarm (dry contact output)
Fuzzy control of capacity regulation	Group control, plug and play
Leaving water antifreeze protection	Temp/press sensor short/open circuit fault protection
Leaving water superheat protection	PFR in power failure
Restart time delay	Preset the number of compressors in control
Multiple start/stop operation mode	Timeout restriction of comp. running and alarming

Safety alarm features:

High pressure protection	Low water flow protection
Low pressure protection	External interlock protection
Compressor overload/coil superheat protection	Communication failure alarm
Phase missing/high voltage/low voltage protection	Sensor failure alarm
High discharge temperature protection	Leaving condenser/chilled water sub-cooling/superheating alarm

TECHNICAL PERFORMANCE DATA

Model			MSRA065H			MSRA130H		
Refrigerant			R22	R407C	R410A	R22	R407C	R410A
Nominal Cooling Capacity*		kW	65	63.1	64.2	130	126.2	128.4
Nominal Heating Capacity*		kW	67	65.6	66	134	131.2	132
Electrical Specification	Power Supply		380V/3ph/50Hz					
	Power Input	kW	20	20	20.06	40	40	40.13
	Working Current	A	39.2	39.2	41	72.8	75.8	79
Compressor	Type		Hermetic Scroll Compressor					
	Number	Set	2	2	2	4	4	4
	Power Input	kW	2x9.1	2x9.1	2x9.1	4x9.1	4x9.1	4x9.1
Refrigerant Charge		kg	2x6.5	2x6.8	2x6	4x6.5	4x5.7	4x6
Water Side Heat Exchanger	Type		Shell & Tube HX					
	Rated Water Flow	m³/h	11.2	10.9	11.1	22.5	21.8	22.2
	Rated Water Pressure Drop	kPa	54	54	54	68	68	68
	Working Pressure Water Side	Mpa	1					
	Connection Size		DN50	DN50	DN50	DN65	DN65	DN65
Air Side Heat Exchanger			Hydrophilic Fin Tube HX					
Axial Fan	Type		Low-noise, High-efficiency and Water-proof Axial Fan					
	Number	PCS	2	2	2	2	2	2
	Power Input	kW	2×0.75	2×0.75	2×0.75	2×1.8	2×1.8	2×1.8
Physical Dimensions	Length	m	1800	1800	1800	2240	2240	2240
	Width	m	900	900	900	1200	1200	1200
	Height	m	2000	2000	2000	2200	2200	2200
Operating Weight		kW	800	800	800	1600	1600	1600

- Notes:** 1. Nominal cooling condition: chilled water entering/leaving temperature 12/7°C; ambient temperature 35°C;  
2. Nominal heating condition: hot water entering/leaving temperature 40/45°C; ambient temperature 7°C ( DB )  
6°C ( WB ) ;  
3. Sensible heat recovery is optional for MSRA065H: sensible heat recovery 15kW; water leaving temperature 45°C; pipe connection DN25;  
4. Year-round Cooling is optional for both MSRA065H and MSRA130H.

CORRECTION FACTORS

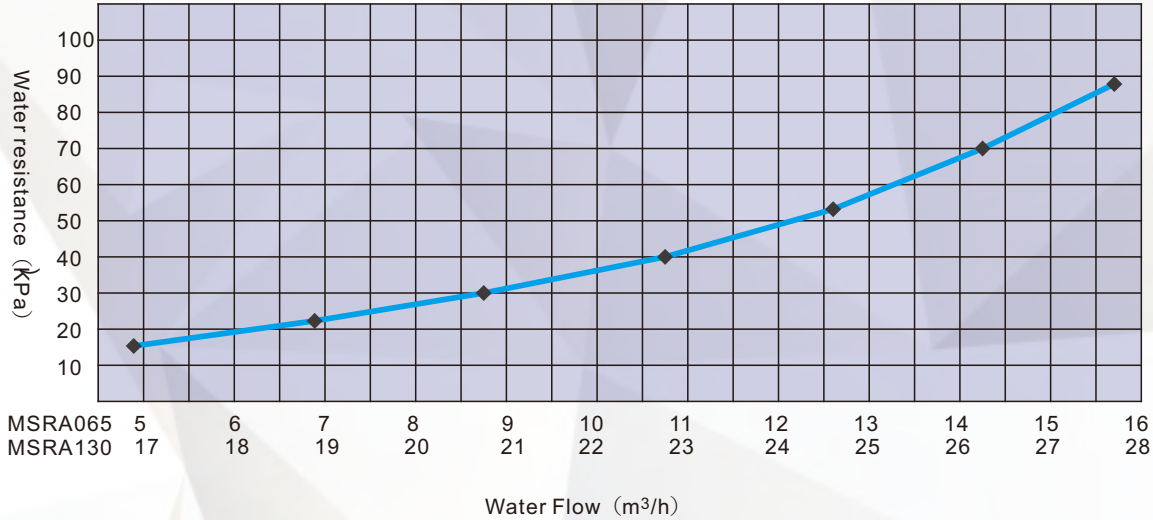
COOLING CAPACITY CORRECTION FACTOR

Ambient ( °C )	Cooling Capacity				Power Input			
	Leaving Water Temperature (°C )				Leaving Water Temperature (°C )			
	5	7	9	11	5	7	9	11
28	1.03	1.08	1.13	1.18	0.88	0.89	0.91	0.94
32	0.99	1.04	1.09	1.14	0.94	0.95	0.97	1.00
35	0.95	1.00	1.06	1.10	0.97	1.00	1.03	1.05
38	0.92	0.97	1.02	1.06	1.03	1.05	1.08	1.08
40	0.90	0.94	0.99	1.04	1.06	1.08	1.11	1.1

HEATING CAPACITY CORRECTION FACTOR

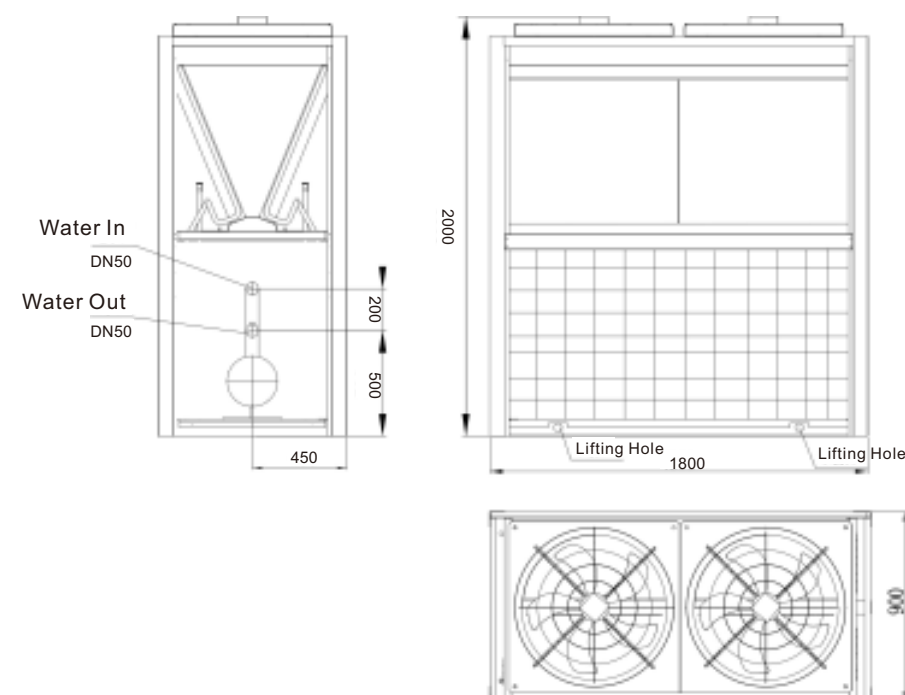
Ambient ( °C )	Heating Capacity					Power Input				
	Leaving Water Temperature (°C )					Leaving Water Temperature (°C )				
	39	42	45	48	50	39	42	45	48	50
13	1.23	1.21	1.19	1.15	1.13	0.96	1.00	1.05	1.10	1.14
10	1.15	1.13	1.11	1.08	1.05	0.94	0.98	1.02	1.07	1.11
7	1.06	1.03	1.00	0.98	0.95	0.92	0.96	1.00	1.05	1.09
2	0.92	0.89	0.86	0.83	0.80	0.90	0.94	0.98	1.02	1.05
-2	0.80	0.77	0.74	0.71	0.69	0.87	0.91	0.96	1.00	1.04
-6	0.68	0.65	0.61	—	—	0.82	0.86	0.91	—	—
-10	0.57	0.55	—	—	—	0.78	0.81	—	—	—

WATER PRESSURE DROP CORRECTION

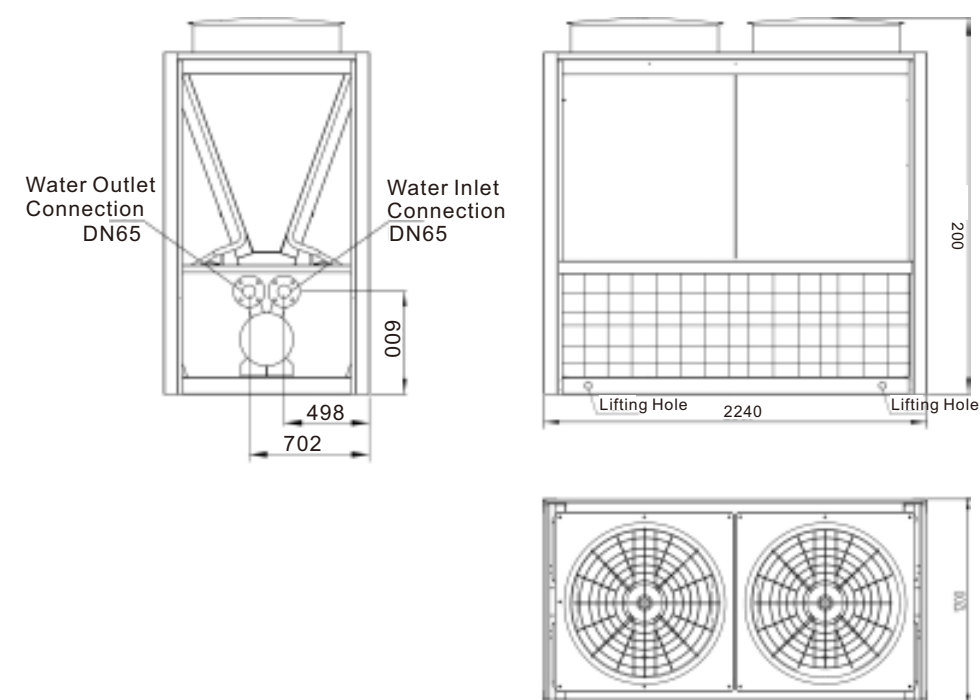


# PHYSICAL DIMENSIONS

## MSRA065H

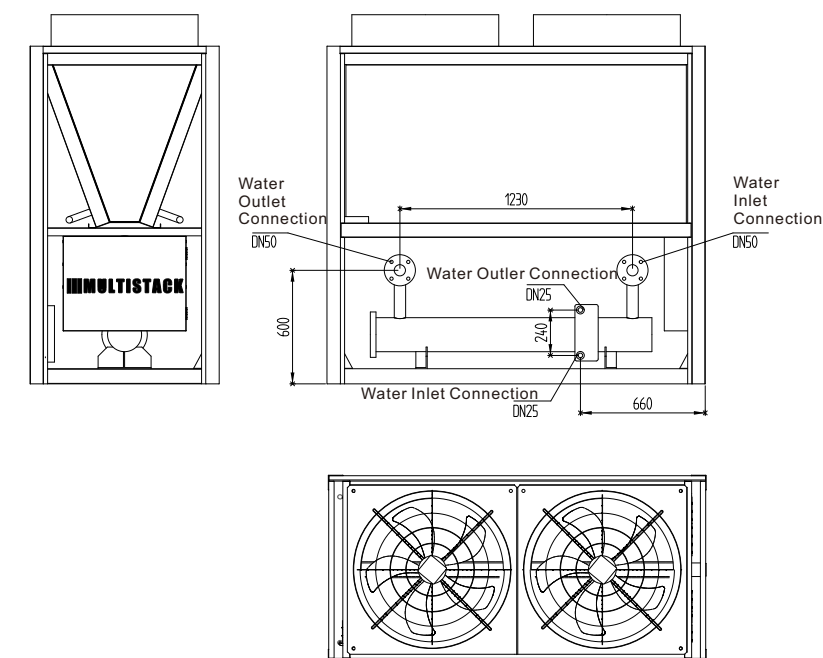


## MSRA130H



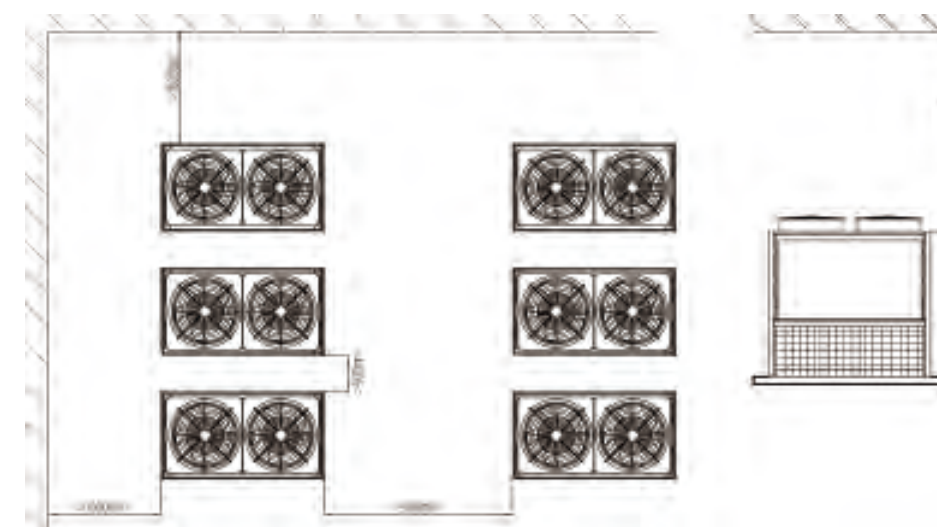
# HEAT RECOVERY WATER CONNECTION DIMENSIONS

## MSRA065H - HEAT RECOVERY WATER CONNECTION DIMENSIONS



## CHILLER LAYOUT

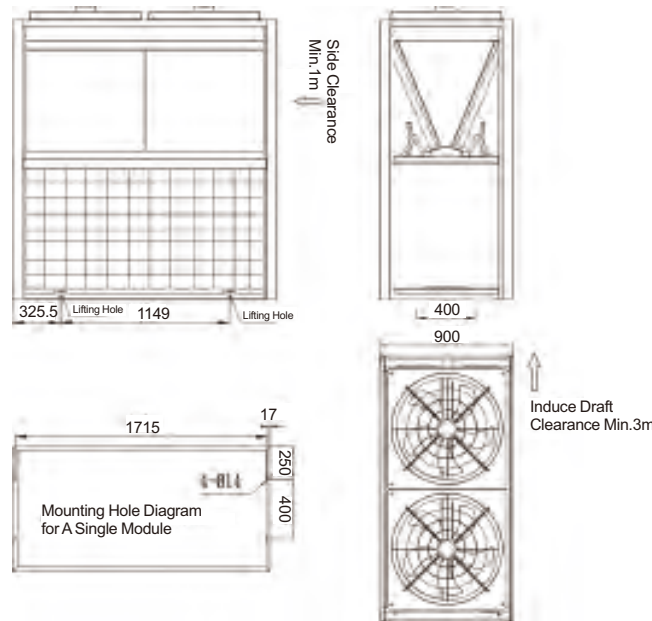
1. The chillers could be installed in clean, well-lighted places with good ventilation such as the rooftop, balcony or courtyard. Installation location should be easy for drainage and piping, keeping away from oil fume, steam or other heat sources. The surroundings would not be adversely affected by the noise and cooling/heating air of the chiller.
2. Users should provide the room size as below, making sure sufficient clearances for maintenance and ventilation. No obstacles are allowed in the clearances shown below. The wall height around the clearances should be lower than the bottom of the coil. Ventilation clearance on the top of the chiller should maintain minimum 3 meters to avoid short air circuit.
3. Direction of air intake of the chiller should, as possible, avoid paralleling with the direction of monsoon (mainly winter monsoon).





BASE SKETCH MAP

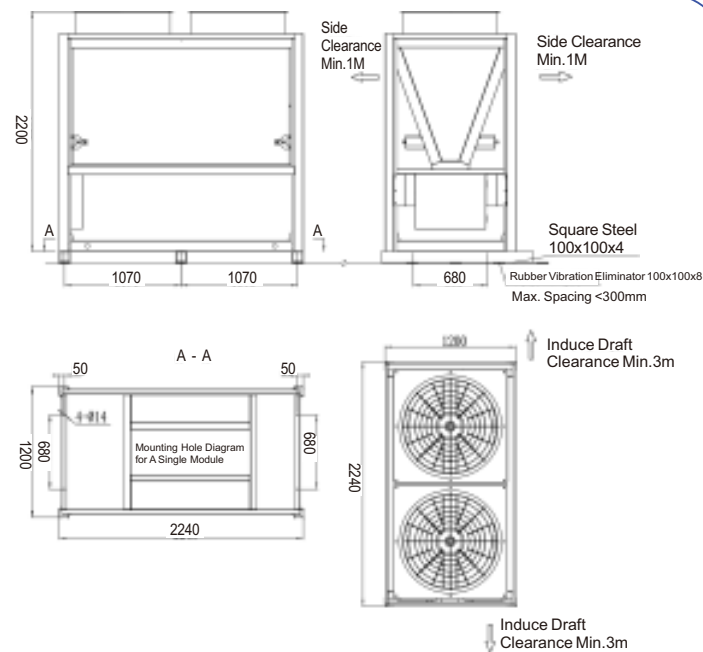
MSRA065H



MSRA130H

Technical Requirements:

1. Construction shall be carried out as required;
2. Concrete base should be casted on cement floor of rooftop or ground;
3. Chiller and square steel should be connected with bolts (M12,  $\geq 4.8$ ). Tightening torque should be 10 N•M.

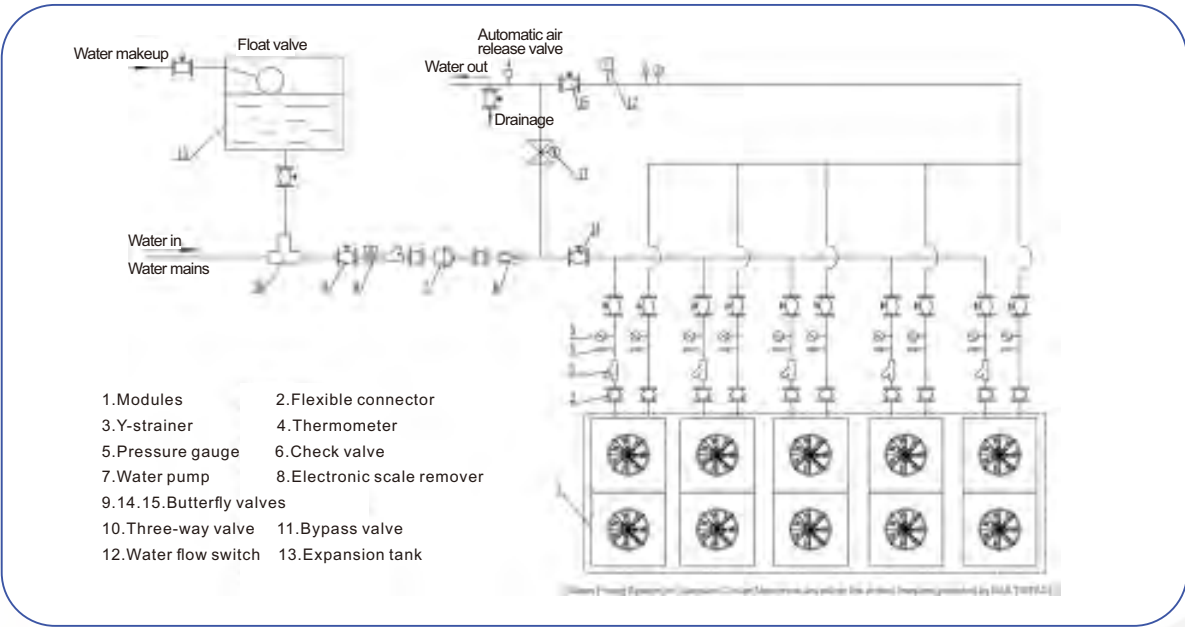


TRANSPORT AND HANDLING

1. Hand pallet truck or fork lift can be used to lift up the chiller.
2. Be careful to handle the chiller when using a crane. Wide lift slings or wire ropes are used to bind the chiller and corner protector should be applied between the wire ropes and the chiller for protection. The wire ropes should wind around the hook and balance the chiller during handling in case of turnover.

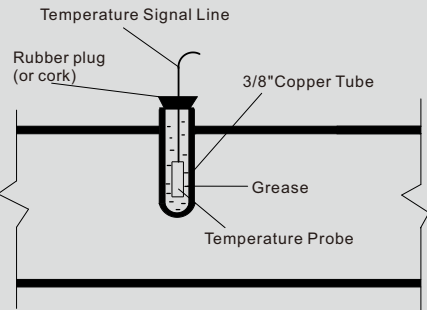
WATER PIPING SYSTEM

1. Water inlet/outlet pipes and valves should have proper insulation. Outdoor parts should be protected with enclosures to avoid harmful effects on the structure of the building caused by cooling/heating energy loss and condensation. Furthermore, the protection would prevent the air-conditioning water from freezing in winter.
2. Flow switch should be installed on the outlet side to ensure sufficient water flows in the heat exchanger and piping system. The flow switch should also be in the same interlock control circuit with the compressor to prevent the evaporator from freezing due to water shortage.
3. Expansion tank for water return should be installed for the closed-loop water system to absorb impacts on the piping system caused by water expansion/contraction or make-up water pressure. Water level of the expansion tank must be min. 1 meter higher than the highest point of the pipelines. Do not install check valve on the outlet of the expansion tank in case of pipe leakage or burst.
4. If the water pump discharge pressure is beyond the pressure limit the chiller can bear, water pump should be installed on the outlet side of the chiller; if the chiller and the auxiliary heater are in serial connection, water pump should be installed on the inlet side of the auxiliary electric heater.
5. Automatic air release valve should be installed on the local high points of the piping system to eliminate entrapped air in water lines. Transverse piping should be arranged with 1/250 gradient. Use 20~50 meshes strainer on the return water side. The water lines should be cleaned of impurities such as rust and welding slag prior to installation. And the chiller should also maintain clean before operation.
6. The weight of water pipes should not bear on the chiller. When water pumps are connected to the water inlet/outlet pipes of the chiller, be sure to isolate them with flexible connectors or rubber joints in case of vibration, noise transmission and interference.
7. Thermometer and pressure gauge should be installed on the water inlet/outlet pipes for regular operation check.
8. Underground water, hard water or other waste water should not be used in the circulating water system of the chiller. PH-level of circulating water should be within 6.8~8.0 and GH number should not exceed 70. Regular water quality tests are required to ensure water quality.
9. Piping for two or more modules must be arranged in equal distance.
10. Figure below is for reference only. Construction must be carried out by professionals as per relevant standards and design requirements.



Notes:

1. Temperature sensor well is required on the water mains.
2. This sensor well must be made by the installing company using a 3/8" copper tube. Punch a hole on the water mains and insert the tube to the hole (recommended insert depth: 2/3 of the water mains) and weld it to the water mains. The tube end inside the water mains must be sealed and watertight. Location of the sensor well should be as close to the master module as possible.
3. Grease should be applied into the sensor well to protect the temperature probe. See figure on the right.

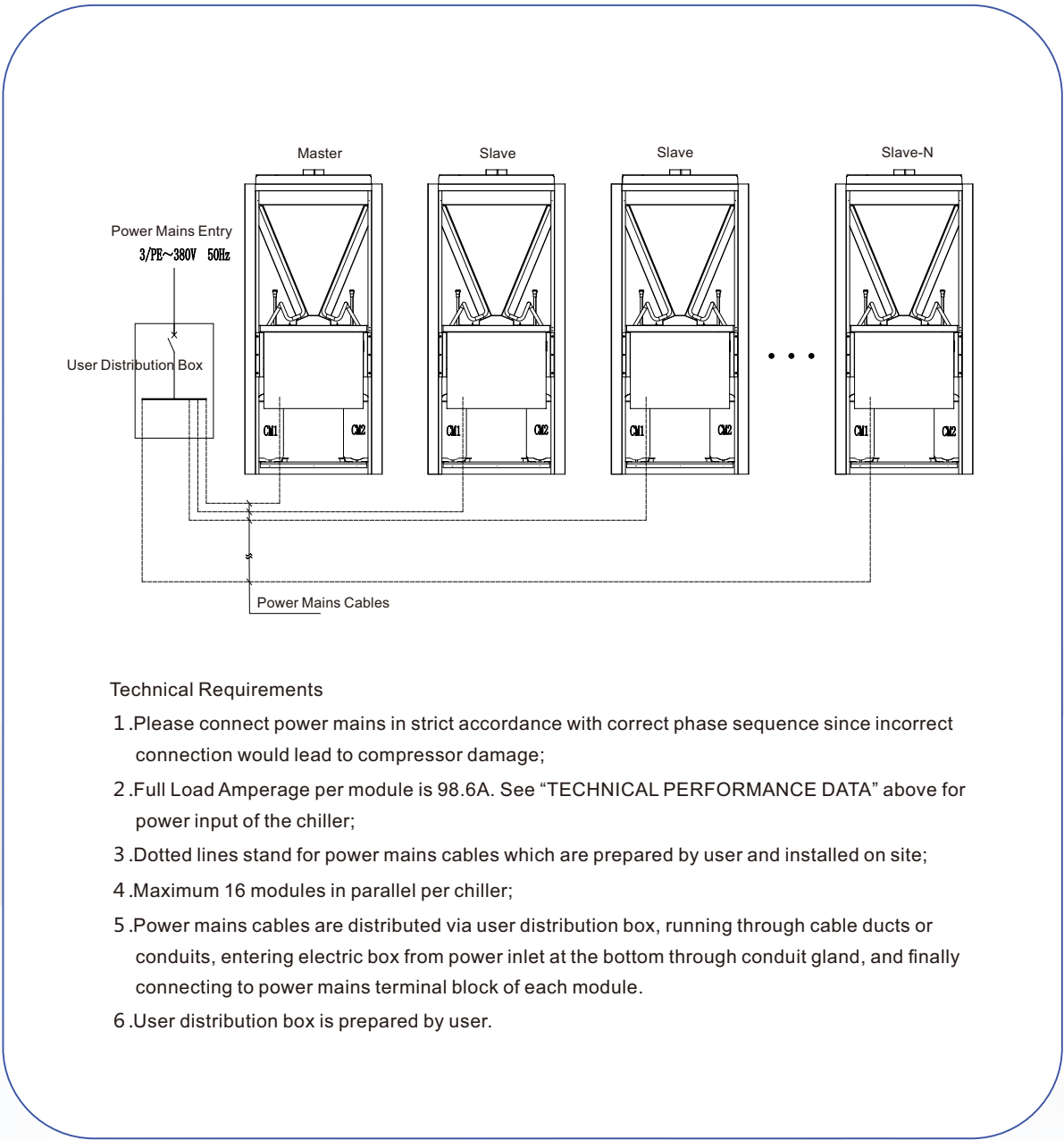


ELECTRIC WIRING

1.Electric Connection Table

Model	Full Load Amperage	Mains Wire (mm <sup>2</sup> )	Wires for Each Module
	A	BCR (PVF flexible conduit)	
MSRA065H	49.5	16	Phase Conductors: · 3 wires (16mm <sup>2</sup> ) for MSRA065H · 3 wires (35mm <sup>2</sup> ) for MSRA130H · Ground: 1 wire (10mm <sup>2</sup> )
MSRA130H	98.6	35	

2.Power Cable Connection for Each Module



ELECTRIC WIRING

3.Field Wiring for Electric Controls

