

MTW Series

Modular Oil Free Centrifugal Chillers

Cooling Capacity: 300-2890kW

Modular Chiller

Magnetic Levitating Centrifugal Compressor

Stainless Steel PHE

Refrigerant R134A

Max. COP: 12w/w



MULTISTACK 捷丰
MULTISTACK INTERNATIONAL LIMITED

The *Leader And Creator* Of Modular Chillers



MTW Series Modular Oil Free Centrifugal Chillers

MTW series modular oil free centrifugal chiller explores its way and lifts the whole industrial refrigeration technology up to a new level. MTW series chiller uses MULTISTACK modular patent technology, combined with 21st century revolutionary magnetic levitating compressor and high efficiency flooded brazed plate heat exchanger, which enables the chiller to achieve highest efficiency and maximum COP is above 12w/w.

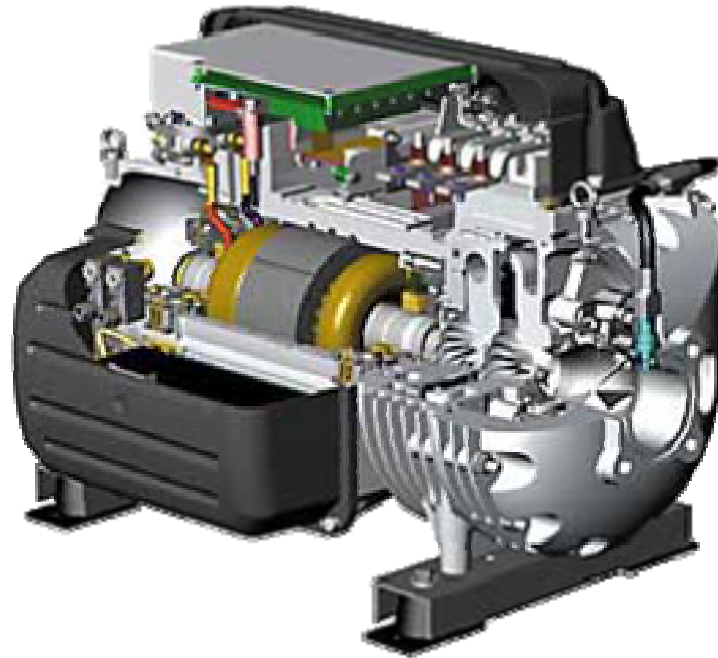
MTW series chiller consists of a number of individual modules, as many as 6 modules can be connected together as a complete chiller, producing a total cooling capacity of 2892kw for normal type and 3036kW for super type. With each module approximately 860mm wide and 1490kg weight, the chiller can access via standard lifts and doorways, this will greatly minimize the costs of construction and installation.

Each module contains an independent refrigeration circuit, in the event of malfunction with one refrigeration circuit, the computer selects the next available standby circuit to provide back up, thus to sustain system load demand. Same when testing or maintenance work required for individual circuit, the chiller's operation won't be affected and capacity output maintained as well.

MTW series chiller uses environmental friendly refrigerant R134a which is widely recognized by most areas worldwide.



Magnetic Levitating Oil Free Centrifugal Chiller



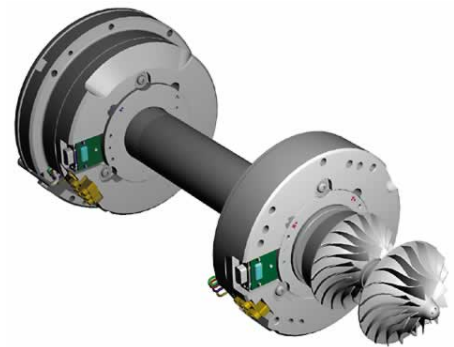
MTW series chiller uses oil free magnetic levitating centrifugal compressor which represents the leading compressor technology of 21 century.

It's the world's first totally Oil-Free compressor specially designed for the HVACR industry. Conventional mechanical bearings are replaced by top aerospace technology magnetic bearings, the one and only moving part (rotor shaft and impellers) is levitated during rotation by a digitally controlled magnetic bearing system. High friction losses and the maintenance-intensive oil management hardware and controls associated with conventional oil-lubricated bearings are now totally eliminated by the utilization of modern magnetic bearing technology, enabling outstanding

energy efficiency and reliable, long-life frictionless operation. The digital controlled system will monitor the deviation of rotor shaft 6 million times per minute and ensure it is within 0.007mm range.

A totally digital technology product with an onboard digital control system monitors all variables that may effect the compressor safe operation, and its self compensation software will adjust compressor's running status automatically in the event of abnormal situation. All enable an unprecedented reliability.

The digital control system also regulates the compressor's rotating speed, it changes smoothly between 15000-48000RPM according to load variation and other conditions. With variable frequency technology the compressor can run at a minimum load of 15%. The soft start enables the compressor achieving a startup current as low as 6A.



Brazed Plate Heat Exchanger & Flooded Evaporator

MTW Both condenser and evaporator of MTW series are manufactured from stainless steel and be of brazed plate heat exchanger. Its compact size and high heat transferring efficiency enables the MTW series having minimum size and installation area compared to conventional chillers with same capacity, thus to save user's cost.

The MTW series evaporator uses Multistack patent technology flooded evaporating system, which provides the evaporator with excessive liquid keeping the evaporator in best heat transferring status. A special designed gas liquid separator

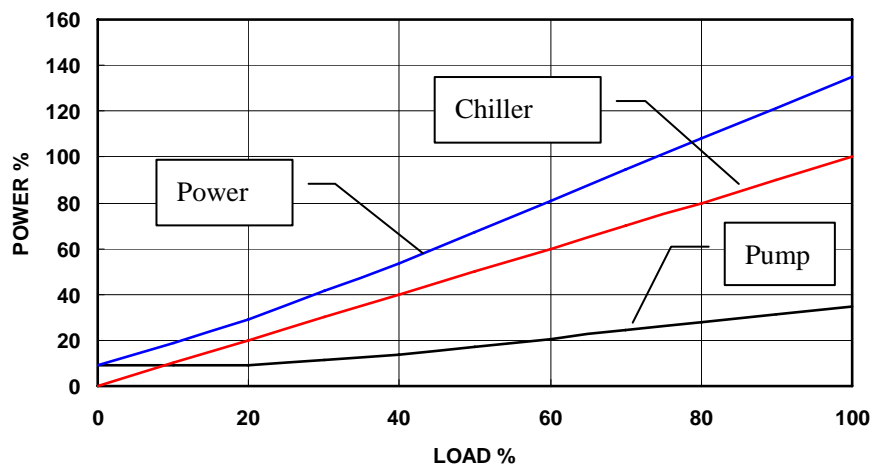
separates the gas refrigerant efficiently ahead of evaporator, the separated gas refrigerant is then bypassed back into the compressor directly, thus make good use of the evaporator's face area and improve heat transferring efficiency. At the same time, the gas liquid separator is also used to separate liquid refrigerant in the outlet of evaporator, the separated liquid refrigerant flows back to the evaporator under the force of gravity.

Variable Water Flow (VWF) Feature (Optional)

MTWMTW series is designed to control the water flow into the evaporator synchronously as per the compressor load output. For the optional MTW-V chiller, a proportional regulating valve is installed in the water inlet of evaporator, which will provide in phase control of water flow entering into the evaporator and chiller's load output. A special variable water flow controller is

MTW series uses electronic expansion valve to precisely control the refrigerant supply to evaporator, thus to ensure refrigerant supply matching running load.

used to analyze the system cooling demand and water flow demand of the air conditioning system, it sends out frequency regulation signal to water pump when the system is running at part load, keeping system water flow consistent with its working load, as a result save nearly 50% of running power of the water pump. MTW-V chiller is the choice for the user to pursue the maximum energy saving.



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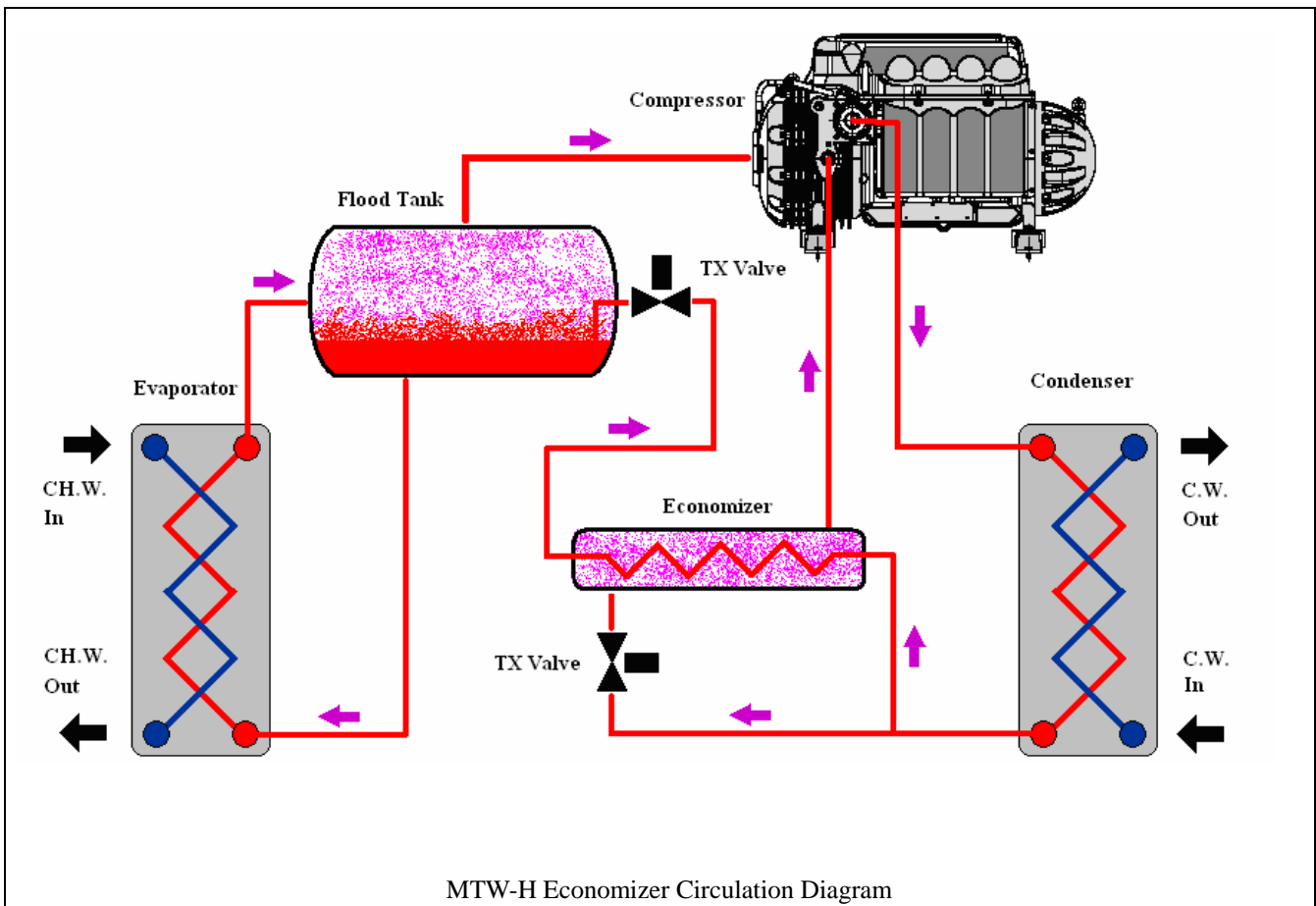
Super-high Efficiency Chiller with Economizer Circulation

MTW-H- the Super-high Efficiency model. The magnetic levitating oil free centrifugal compressor used on MTW series is a two-stage compressing compressor. The center suction jaw between the two stages compressing cavity is used to draw into the middle-pressure refrigerant for economizer circulation. MTW-H

model is designed base on it, an economizer is installed between evaporator and condenser, the liquid refrigerant from condenser is divided into two circuits, refrigerant in one circuit enters into the economizer after being throttled by an expansion valve and cools down the refrigerant in the other circuit to achieve a higher sub-cool before entering

into evaporator. The refrigerant from TX valve will be sucked back into the compressor via the center suction jaw after fully evaporated within the economizer.

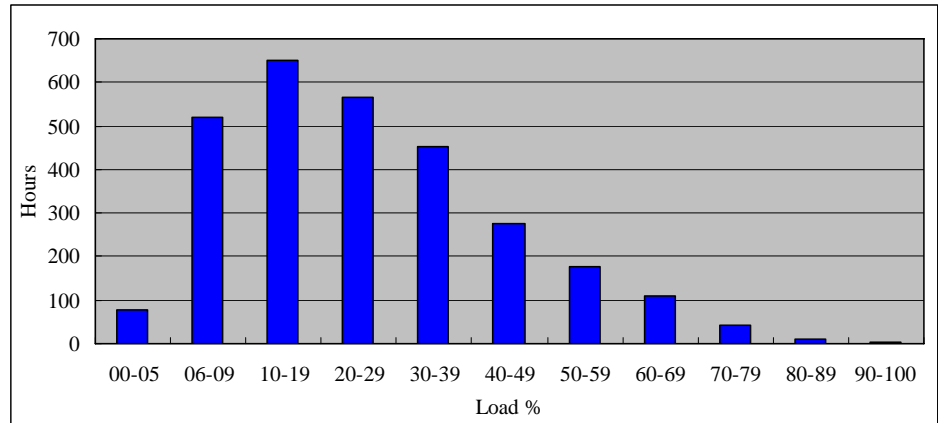
The economizer circulation may improve the chiller's cooling capacity without increasing compressor power input to achieve an even higher efficiency.



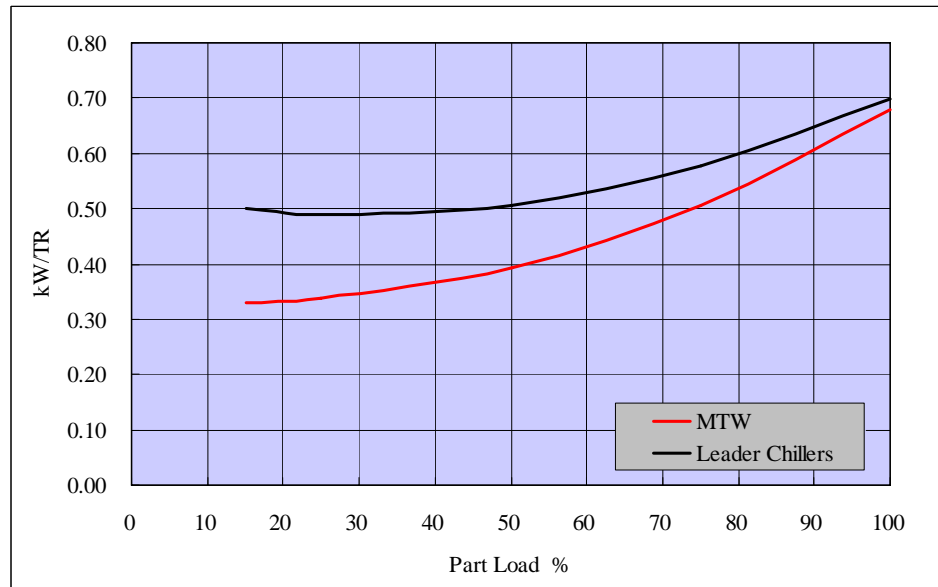
Unparalleled Peak Efficiency

M^{TW} **M**^{TW} series using oil free centrifugal compressor and flooded evaporator to enable the chiller's COP achieves 12w/w even running at part load.

A lot of statistics shows that capacity load often changes due to various reasons such as environmental effect of sunlight and seasonal shift, the change of building occupancies, thus the running hours at full load is very few in the whole year (see right figure). The actual running load profile makes the chiller's efficiency at part load is more important than efficiency at full load if we consider about its influence to the whole system energy consumption. MTW series chiller adjusts capacity output through compressor variable frequency drive, together with high efficiency flooded evaporating system, it not only achieves superior performance at full load, but also has a greater performance at part load than other chillers. MTW series chiller can save up to 35% power consumption per year for a general air conditioning system.



Air Conditioning System Running Load Profile



MTW Chiller VS Conventional Chiller Efficiency Performance under ARI550/590-2003

Typical Water-cooled Chiller Energy Saving Calculation

	MTW-H	Screw Chillers	Savings
IPLV kW/TR	0.41	0.63	0.22
Tons capacity	145	145	-
kW	59.45	91.35	31.90
Operating hours per year	2,880	2,880	-
Total annual kW.h	171,216	263,088	91,872

MTW chiller can save up to 35% power than conventional screw chiller of same capacity.

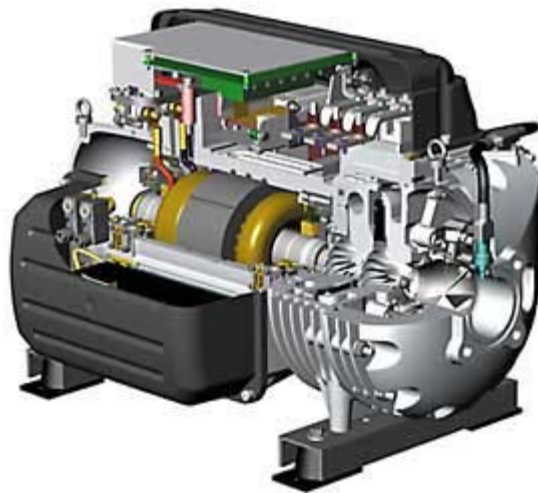
Computer Controller

Multistack MV6 computer controls the chiller's operation and regulates cooling capacity output automatically based on the system load demand, in the event of fault occur, it will shut off the relevant fault module.

With abundance design and auto & manual control modes, the MV6 control system enables the chiller satisfy various running demand at any time.

MV6 touch panel displays all running information of the chiller via text and table, including water temperature, compressor data, system load demand etc, load profile and fault review as well.

MV6 control system is fitted with RS485 communication port and opened to ASCII, ModBus and BecNet agreement etc which may satisfy most of internet control requirement nowadays.



Technical Data

Model		MTW350		MTW500		
		H-efficiency	Standard	H-efficiency	Standard	
Nominal capacity	kW	358	338	511	482	
Nominal power input	kW	66	64	95	93	
Compressor	Type	Oil free centrifugal compressor				
	Quantity	1	1	1	1	
	Power supply	AC380V/50Hz/3Phase				
	Max. working current	A	134	134	200	200
	Startup current/each	A	6	6	6	6
Modular cooling capacity control range		15%~100%				
Refrigerant		R134a				
Refrigerant charge	kg	86	83	96	93	
Chilled water	Evaporator type	AISI316 flooded stainless steel brazed PHE				
	Flow rate	l/s	17.1	16.2	24.4	23.0
	Pressure drop	kPa	42	39	42	40
	Fouling factor	m ² k/kW	0.043			
	Connections	8"				
Cooling water	Condenser type	AISI316 stainless steel brazed PHE				
	Flow rate	l/s	20.3	19.2	29.0	27.4
	Pressure drop	kPa	44	42	46	45
	Fouling factor	m ² k/kW	0.043			
	Connections	8"				
Dimensions	W	mm	864	864	864	864
	L	mm	2651	2651	2651	2651
	H	mm	2021	2021	2021	2021
Weight	Shipping	kg	1320	1280	1530	1490
	Operating	kg	1360	1320	1490	1450
Number of modules per chiller		1~6				

Nominal values based on:

Cooling water entering/leaving temperature 30°C/35°C

Chilled water entering/leaving temperature 12°C/7°C

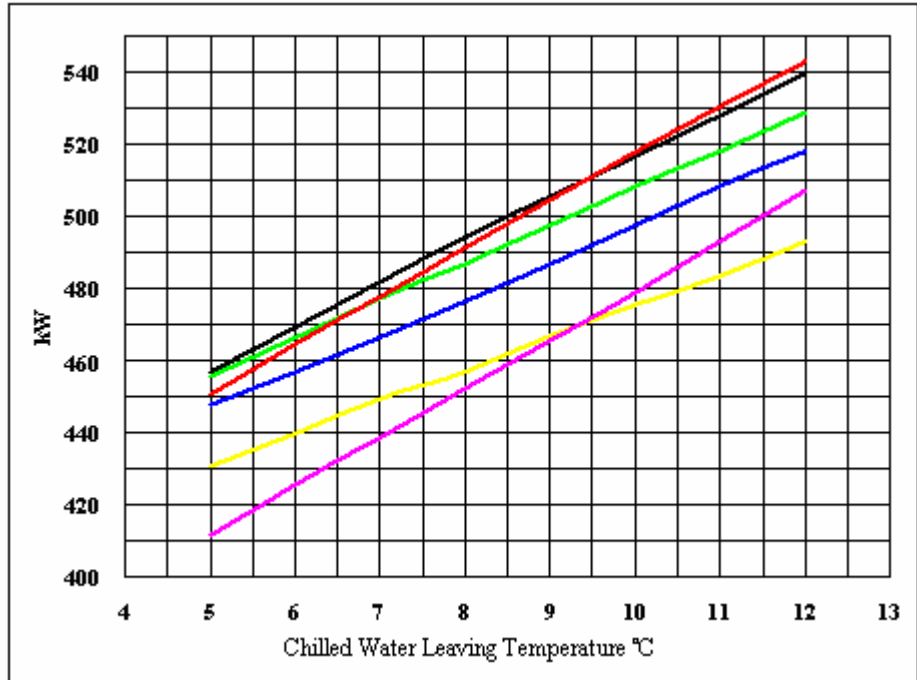
Performance Correction for Various Working Conditions

The following performance correction is based on the rated cooling water and chilled water flow under nominal working conditions.

1. Cooling Capacity Correction Curve

C.W. Entering Temp.

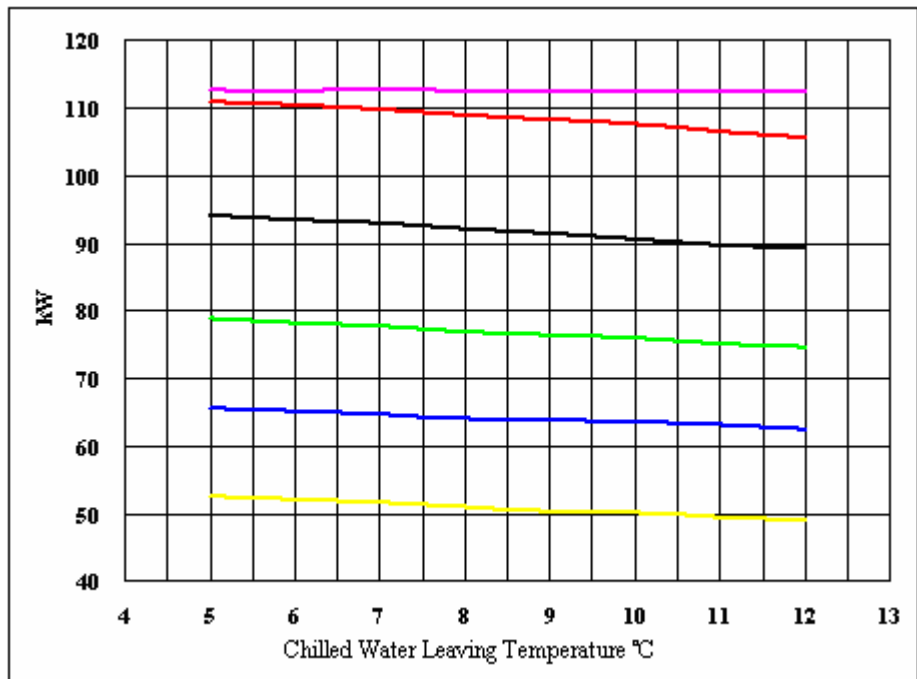
- 15°C ———
- 20°C ———
- 25°C ———
- 30°C ———
- 35°C ———
- 40°C ———



2. Power Input Correction Curve

C.W. Entering Temp.

- 15°C ———
- 20°C ———
- 25°C ———
- 30°C ———
- 35°C ———
- 40°C ———



Performance Correction for Various Working Conditions (Continued)

3. kW/TR Performance Correction Curve

C.W. Entering Temp.

15°C —

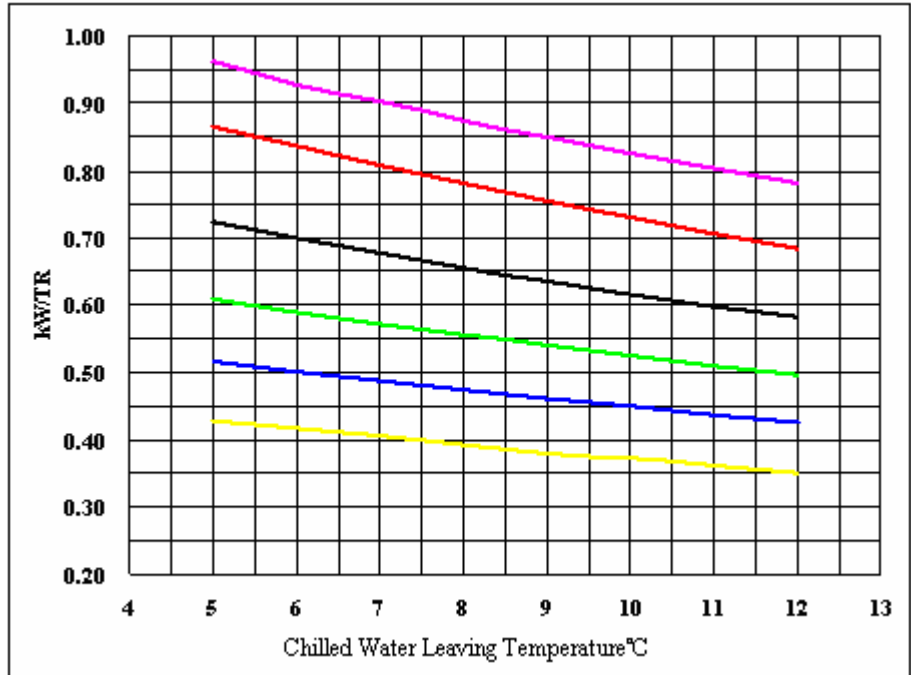
20°C —

25°C —

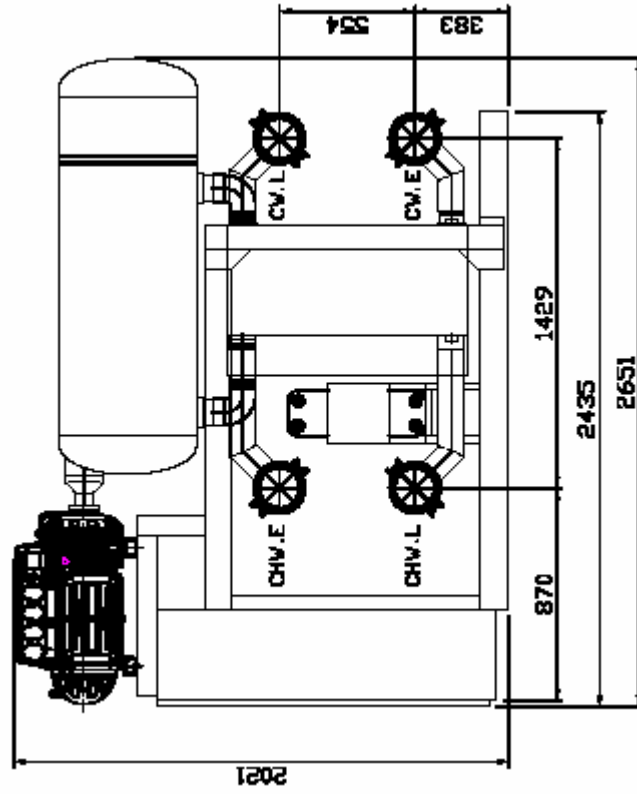
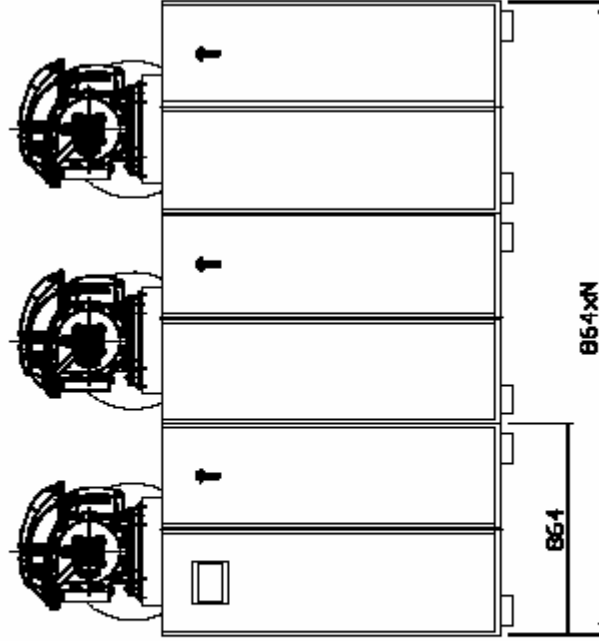
30°C —

35°C —

40°C —



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捷 丰 集 团
the Creator and Leader of Modular Chillers

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