MULTISTACK
INTERNATIONAL LIMITED

The Leader in Modular

MTW – M SERIES

Modular Oil-free Centrifugal Water Cooled Chiller

Nominal Cooling Capacity 315 to 2104 kW (R)
Refrigerant: R134a

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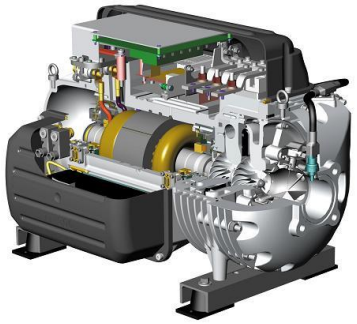
FEATURES

Modular Magnetic Levitation Centrifugal Chiller:



Cutting-edge Compressor Technology

Oil-free magnetic levitation centrifugal compressor is the perfect combination of top aerospace technology and advanced digital control technology. It is a 2-stage centrifugal compressor featuring light weight, oil free, ultra-low noise and vibration, excellent IPLV, integrated variable frequency drive (VFD), soft start and green refrigerant R134a, etc.

Ultra-low Noise and Vibration

The oil-free centrifugal compressor uses patented magnetic bearing system. Main shaft of the compressor revolves at high speed without any mechanical contact with the bearing, achieving extremely low noise and vibration.

100% Oil-free Design

The rotor and impellers of the compressor remain levitating in the magnetic field. The proximity sensors on the bearing constantly send feedback to the magnetic bearing system, reposition the rotor and ensure that the rotor is levitating in the center, staying in the best working condition. The system is simple without lubrication oil, which promises quiet and reliable operation, reduces faults and maintenance costs by eliminating complicated oil system and improves efficiency.

High Reliability

Redundancy design allows every module to work as an independent refrigeration circuit, with adjacent modules operating independently. In the event of a malfunction in the system, the computer selects the next available standby module to provide backup. One failed module will not disrupt the other modules or system.

Simple Installation & Add-on Flexibility

Chillers could be field-assembled without the aid of a large lifting machine and dedicated doorways. It is easy to move a large chiller to rooftop or basement. When necessary, and pipe size has a certain abundance, just add on new modules to increase unit capacity without any change to the system. Similarly, you can also purchase and install the chiller by stages to improve the capital usage.

Advanced 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 best efficiency based on system load. The control system features compressor wear leveling control, prolonged service life and automatic capacity control.

STRUCTURE

MULTISTACK oil-free centrifugal chillers are designed and constructed under the modular technology patent. A chiller is a bank of individual modules connected in parallel to operate as a complete machine. Cooling capacity is matched to load by varying the number of operating modules. The chiller can be a bank of the same series of modules or a bank of two different series of modules combined. It provides the users with more choices for various capacity and higher flexibility.

Each module operates as a complete independent refrigeration circuit, consisting of an oil-free centrifugal compressor, evaporator, condenser, and other controls and safeties. When total load varies, the controller can change the chiller's capacity accordingly by either adding/subtracting the number of on-line compressors based on wear leveling control or by adjusting the capacity of the last started compressor.

The chiller is enclosed within an attractive and sturdy frame with removable doors for easy access and convenience for maintenance and service. The doors can be lined with acoustic insulation (optional), which further silences the chiller.

COMPACT AND SPACE-SAVING

The compact size of each module means easy access via standard doorways and elevators. Users no longer need special access to install the chillers.
In comparison to conventional water cooled chillers users can gain up to 40% more space. Meaning larger capacity. Chillers can be easily installed in confined and small places.

ADD-ON FLEXIBILITY

As your needs for cooling increases, MULTISTACK has the solution. Being a modular chiller, it has never been easier to expand the system as larger cooling capacity is needed to meet increased building loads, with no complicated changes to the room, piping system or control system, and all work can be done quite easily.

SAFE AND 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 selects the next available standby module to provide back up. One failed module will not disrupt the other module or system, giving you total piece of mind.

CONDENSER AND EVAPORATOR

Condenser and evaporator are efficient, compact and anti-corrosive brazed plate heat exchangers, which are made from AIS1316L stainless steel.
The manufacture of condenser and evaporator meet the requirements of cleanliness, dryness and leakage-free for cooling system.
The plate heat exchangers are composed with corrugated heat transfer plates compressed together with certain intervals. Turbulence generated in the internal passages not only improves heat transfer efficiency but also slows down the formation of fouling.

EXCELLENT PART LOAD EFFICIENCY

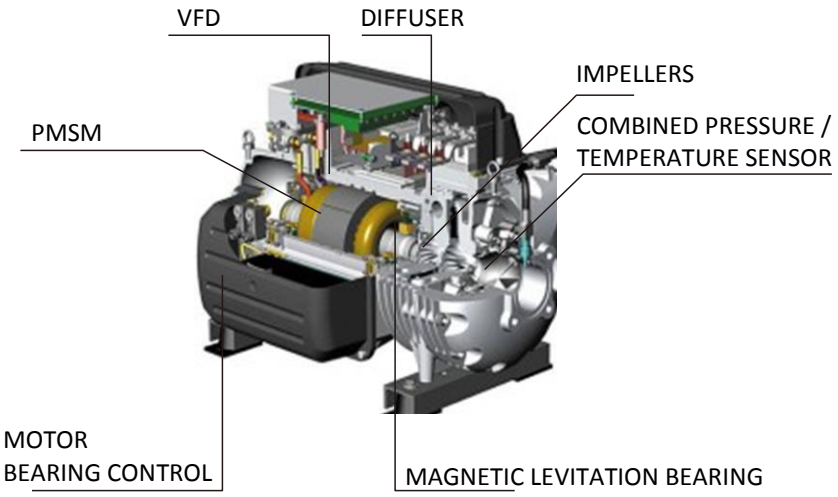
MTW-M compressors feature optimized part load efficiency. The special design and structure allow the compressors to run at part load condition as long as possible to achieve the best COP (w/w). When the cooling load decreases, MULTISTACK's unique MV7 Plus controller will shut down a certain number of compressors if necessary, leaving the rest to run at part load to meet the required capacity at high efficiency. With this self-adaptive control logic, a 450RT (1,600kW) MTW-M chiller can satisfy the required cooling capacity as low as 45RT (158kW) at high efficiency with Integrated Part Load Value (IPLV) of 9.5

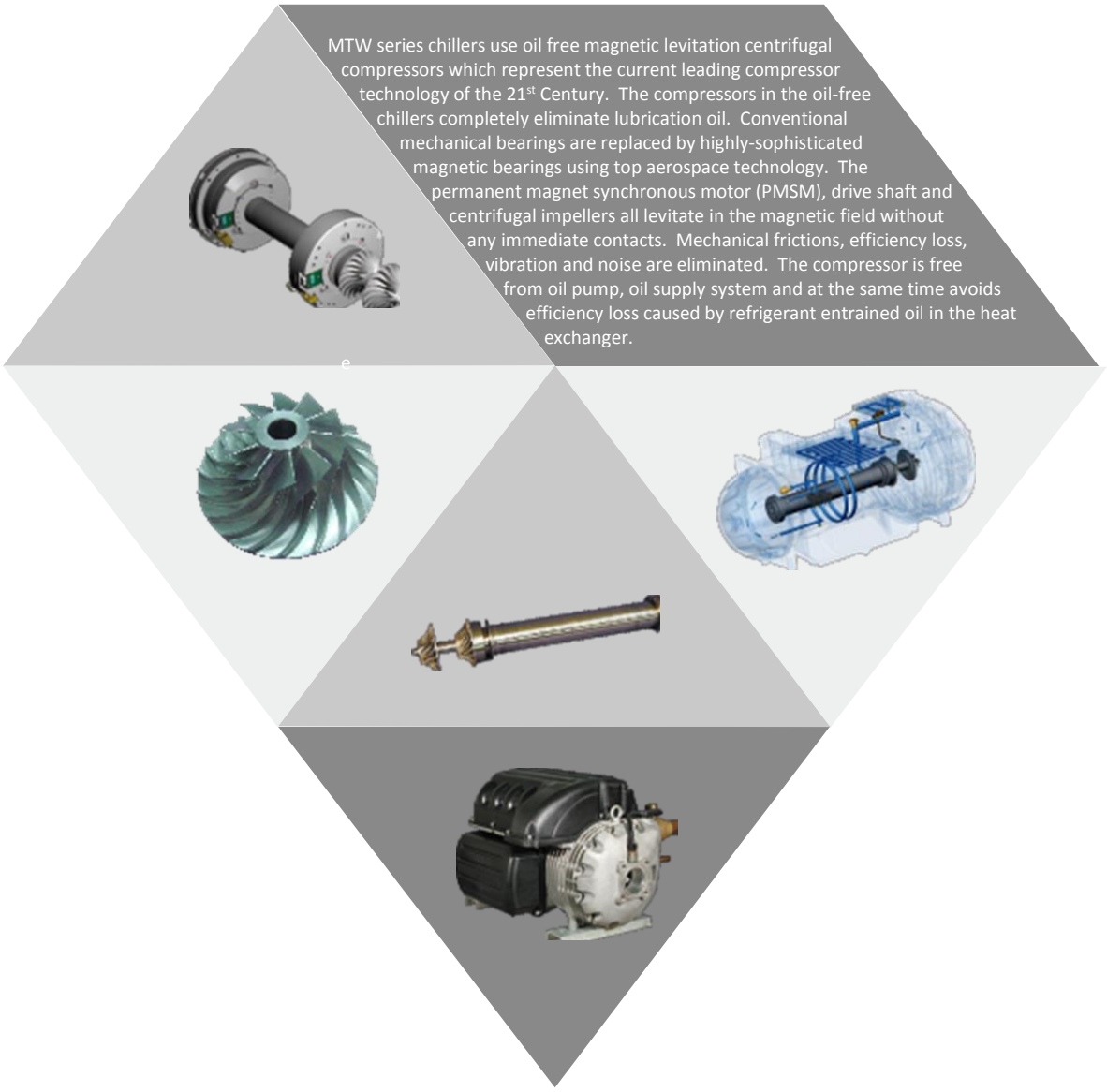
IN-LINE WATER STRAINERS

In-line water strainers are made under the MULTISTACK's patent technology, and made from stainless steel. In-line water strainers are supplied and fixed inside both chilled water header pipe and condenser water header pipe for each module. It can be easily dismantled and removed. The In-line water strainers can prevent particles contained in water from getting into the heat exchanger.

Together with another patent product is a header pipe stub which connects to the end of the condenser pipe, which enables the user to flush, clean and drain to the condenser water system very conveniently.

OIL-FREE MAGNETIC LEVITATION CENTRIFUGAL COMPRESSOR





The oil-free centrifugal compressor is a totally digital part with an onboard digital control system monitoring all variables that may affect the safe operation of compressors. The control system consists of several multi-functional modules, including AC-DC inverter module, magnetic bearing control module, soft-start module, inlet guide valve control module and communication module. All these modules are integrated in the compressor and make the compressor an electronic rather than a mechanical part. AC-DC inverter module converts AC voltage to adjustable DC voltage. The compressor speed is smoothly confined within 15,000-38,000 RPM based on load, suction/discharge pressure, running current and other conditions. The soft-start module of the compressor pulls only 2 amps.

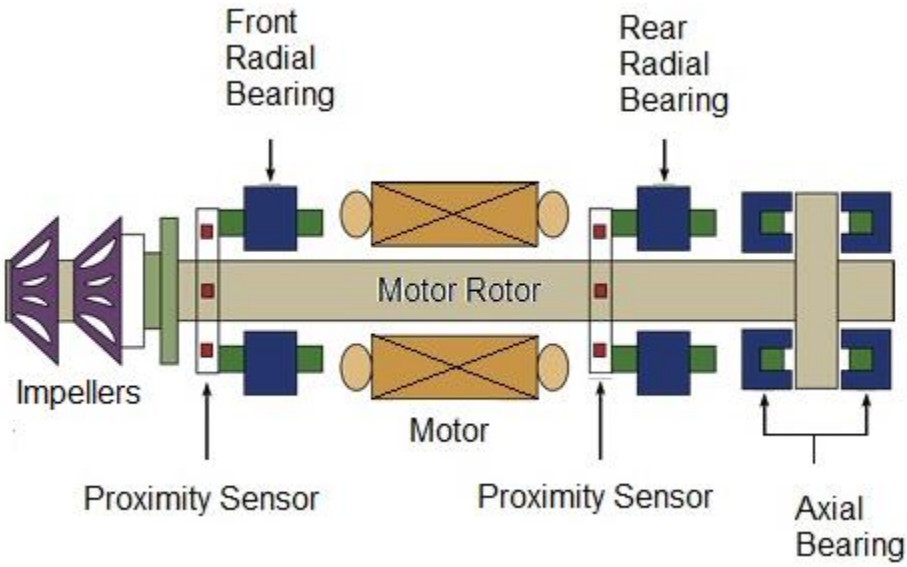
The compressor control system detects capacity required and compression ratio synchronously to match up with the revolving speed. Inlet guide valve control module continuously regulates the inlet guide vane open percentage and suction dynamic pressure in order to maximize operation at compressor sweet spots and avoid surge.. In this way, the compressor can remain smooth operation without surge even at 30% part load condition or at low cooling water temperature. The compressor can even run at part load condition closed to 0% if the chiller has load balancing valve.

Proximity sensors in the magnetic bearing control module sense and reposition the impellor shaft 6 million times a minute to ensure the bearing is within a 0.007mm range.

In the event of a shutdown or power outage, the controller will detect power loss and switch the compressor motor to generator mode. In this mode, the bearing and control system are powered by both the power accumulator and the motor power generated by the inertial kinetic energy of the impellers and shaft. The revolving assembly remains levitating until it is brought to a safe stop without any friction. This is an unprecedented reliability feature of the compressor.

The compressor runs very quietly since it seldom generates mechanical friction or mechanical vibration. Sound level of the compressor measured at 5 meters horizontally around the chiller is as low as 65 dB(A).

Advanced communication capability of the compressor enables it to connect to the Ethernet and makes it convenient for the users to access to the compressor running data via the browser.



CONTROL SYSTEM

System Overview

MS One Control System consists of a 10.1 inch (optional 15 inch) touch screen and a dedicated HVAC programmable logic control panel. It is designed to provide operator, technical personnel and servicemen with real-time running information such as pressure, temperature, system status, faults, load history, run log and historic data, etc.

MS One Control System has options for duty/ standby modules, duty/standby units and others to maximize reliable, stable and safe operation of the HVAC system.

MS One Control System is supported with cloud platform control to enable information exchange via the internet, remote control of the chillers and monitoring running data via VNC and Easy Access 2.0.

MS One Control System is fitted with Ethernet, RS485, RS232 and USB ports. Enable MS ONE Controller connecting to Building Automation System (BAS) or Distributed Control System (DCS) and various protocols.

Main Screen

The control system consists of programs, touch screen and system input/output. Features of MS ONE controller mainly includes:

- Chilled Water Temperature Monitor
- Cooling Water Flow Monitor (water-cooled only)
- Compressor Status Index
- Chiller Running Status Index
- Operation History Record Index
- Advanced Setting Index
- COMP Power Input and Current
- Percentage of Load Demand

Compressor Screen

This is where a detail status for one of the compressors can be found. Features of this page mainly includes:

* Compressor Real-time Status
* Chiller System Status (Refrigerant Side)
* Motor Status (Power, Voltage, Speed, etc.)
* Compressor's Temperature Monitor

VWF - VARIABLE WATER FLOW (Optional)

The applications below are for MTW-MV series only. For model selection, please consult your local MULTISTACK.

MTW-MV

The oil-free centrifugal chillers are designed for variable water flow, which not only change cooling capacity but also adjust chilled/cooling water working flow for maximum energy efficiency so that power consumption is greatly reduced. Besides, a simple primary flow system is adopted for both chilled and cooling water circulation instead of using secondary pump water system.
Generally at least two modules (maximum four) are involved in the chiller under the VWF mode.

Flow Regulation Valve

Flow regulation valves are installed between chilled/cooling water headers and evaporator/condenser to regulate water circulation of each module synchronously. The flow regulation valves are open when compressors are working and closed when compressors are off-work. The linear on-off design avoids water hammer as well as rapid change of system pressure. A differential pressure switch is used to prevent the compressors from operating when the flow regulation valves are closed.

Water Differential Pressure Transducer

Three differential pressure transducers are provided by MULTISTACK to detect the chiller leaving/ entering pressure difference of chilled and cooling water as well as pressure difference of chilled water on load side. Differential pressure transducers for the leaving/entering chilled water on load side could be installed at any proper location, including water loop with the greatest flow resistance. These three transducers are used to monitor water flow changes so that the computer controller can regulate water pump output frequency on demand.

Variable Frequency Pump Control System

MS ONE Controller not only dominates chiller operation but also regulates the flow change of chilled / cooling water through differential pressure transducers. By way of PID control, frequency signals are transmitted to the VFDs of chilled/ cooling water pumps so that the working flows are in accordance with system load demand and energy is saved ultimately.

MODEL NUMBER DESIGNATION

MT	W	090	M	-	4	A	E	V
1	2	3	4		5	6	7	8

1. Multistack Turbocor compressor
2. Cooling type:
   - A: Air cooled
   - W: Water cooled
3. Model Number
4. M: Modular Chiller with PHE
5. The number of modules per chiller bank:

	Constant	VWF
MTW090	1 ~ 5	2~5
MTW110 / 150	1 ~ 4	2~4

6. Electrical Specifications
   - A: AC400V ± 10% / 50Hz / 3Ph
   - B: AC380V / 60Hz / 3Ph
   - C: AC440-460V / 60Hz / 3Ph
7. Refrigerant
   - E: R134a
8. Water System:
   - Blank for standard - Constant Water Flow
   - V: Variable Water Flow*
     - *VWF price to be advised on request

PHYSICAL DATA

Per Module

Model		MTW090	MTW110	MTW150
Nominal Cooling Capacity (kW)		315	394	526
Power Input (kW)		57.7	73.0	97.0
COP (kW/kW)		5.46	5.40	5.42
Compressor	Type	Oil-Free Magnetic Levitation Centrifugal		
	Starting Mode	Soft Start		
	Number	1		
	Power Supply	415V/50Hz/3Ph		
	F.L.A. (A)	210		170
	R.L.A. (A)	103	127	161
	L.R.A. (A)	231		187
	Starting Current (A)	2		
Refrigerant	Type	R134a		
	Charge (KG)	52		68
	Throttling Device	Electronic Expansion Valve		
Evaporator	Type	Brazed Plate Type Stainless AISI 316		
	Max. Working Pressure (kPa) (Refrigerant Side)	2500		
	Rate Flow (L/s)	15.1	18.8	25.1
	Nominal Water Pressure Drop (kPa)	67	77	104
	Fouling Factor (m^2k/kW)	0.018		
	Pipe size	8"		10”
Condenser	Type	Brazed Plate Type Stainless AISI 316		
	Max. Working Pressure (kPa) (Refrigerant Side)	2500		
	Nominal Water Flow (L/s)	17.9	22.4	29.8
	Nominal Water Pressure Drop (kPa)	88	100	137
	Fouling Factor (m^2k/kW)	0.044		
	Pipe size	8"		10”
Dimensions	Panels	Include (Exclude)		Inc. (Exc.)
	L. (mm)	1600 (1680)		2000 (2080)
	W. (mm)	880 (950)		880 (950)
	H. (mm)	1730 (1750)		1780 (1800)
Shipping weight (kg)		1120	1220	1370
Operation weight (kg)		1240	1360	1530

F.L.A. = Full Load Amperage R.L.A. = Rated Load Amperage L.R.A. = Locked Rotor Amperage

Nominal Values based on:

- Chilled Water Leaving Temp. 7°C
- Chilled Water Entering Temp. 12°C
- Condenser Water Leaving Temp. 35°C
- Condenser Water Entering Temp. 30°C

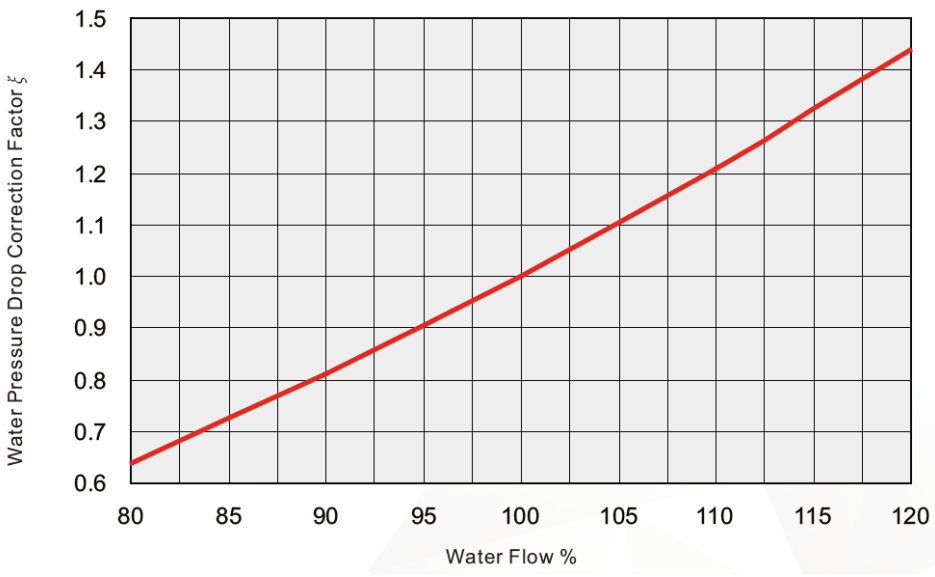
Notes:

- Minimum Chilled Water Flow Rate Per Module: Nominal Water Flow Rate Less 10%
- Minimum Condenser Water Flow Rate Per Module: Nominal Water Flow Rate Less 10%

MTW-M Series Chiller are rated and constructed in compliance with ARHR Standard 551/591 (SI) Performance rating of Water-chilling and Heat Pump Water-heating Packages using the Vapor Compression Cycle.

PRESSURE DROP CORRECTION FACOTOR

Pressure drop correction factor for Heat Exchanger water circuit (per module)



Water flow %= $\frac{Actualwaterflow}{Nominalwaterflow} \times 100$

Water Pressure drop correction factor (K) in regard to the number of modules (N) per chiller bank

N	1	2	3	4
MTW090M-1	1.00	1.01	1.01	1.02
MTW110M-1	1.00	1.01	1.01	1.02
MTW150M-1	1.00	1.01	1.01	1.02

N = Number of modules per chiller bank

Calculation of Actual Water pressure Drop (Heat Exchanger)
Actual Water Pressure Drop (Heat Exchanger) = K × ξ x Rated Water Pressure Drop

UNIT PERFORMANCE (per module)

MTW090

Condenser Water Leaving temp. °C	Leaving Chilled Water Temperature °C									
	5		7		9		11		12	
	CAP	**PI**	**CAP**	**PI**	**CAP**	**PI**	**CAP**	**PI**	**CAP**	**PI**
15	**274.1**	33.9	**277.2**	31.6	**277.2**	28.2	**270.9**	24.7	**264.6**	21.9
20	**293**	43.7	**302.4**	41.9	**308.7**	39.1	**315.0**	37.4	**311.9**	35.1
25	**302.4**	53.5	**315.0**	51.8	**330.8**	50.6	**337.1**	48.3	**343.4**	47.2
30	**289.8**	56.9	**315.0**	57.5	**330.8**	58.7	**349.7**	58.7	**359.1**	58.7
35	**261.5**	58.1	**280.4**	58.7	**299.3**	58.7	**318.2**	58.7	**327.6**	58.7

MTW110

Condenser Water Leaving temp. °C	Leaving Chilled Water Temperature °C									
	5		7		9		11		12	
	CAP	**PI**	**CAP**	**PI**	**CAP**	**PI**	**CAP**	**PI**	**CAP**	**PI**
15	**342.8**	43.1	**346.7**	40.2	**346.7**	35.8	**338.8**	31.4	**330.9**	27.7
20	**366.4**	55.5	**378.2**	53.3	**386.1**	49.6	**394.0**	47.5	**390.1**	44.5
25	**378.2**	67.9	**394.0**	65.7	**413.7**	64.2	**421.6**	61.3	**429.5**	59.9
30	**362.5**	72.3	**394.0**	73.0	**413.7**	74.5	**437.3**	74.5	**449.2**	74.5
35	**327.0**	73.7	**350.7**	74.5	**374.3**	74.5	**397.9**	74.5	**409.8**	74.5

MTW150

Condenser Water Leaving temp. °C	Leaving Chilled Water Temperature °C									
	5		7		9		11		12	
	CAP	**PI**	**CAP**	**PI**	**CAP**	**PI**	**CAP**	**PI**	**CAP**	**PI**
15	**457.6**	57.2	**462.9**	53.4	**462.9**	47.5	**452.4**	41.7	**441.8**	36.9
20	**489.2**	73.7	**505.0**	70.8	**515.5**	65.9	**526.0**	63.1	**520.7**	59.2
25	**505.0**	90.2	**526.0**	87.3	**552.3**	85.4	**562.8**	81.5	**573.3**	79.5
30	**483.9**	96.0	**526.0**	97.0	**552.3**	98.9	**583.9**	98.9	**599.6**	98.9
35	**436.6**	97.9	**468.1**	98.9	**499.7**	98.9	**531.3**	98.9	**547.0**	98.9

CAP Cooling Capacity (kW) **PI** Compressor Power input (kW)

Notes:

- This table is based on a 5°C difference in water temperature.
- Please contact your local Multistack Agent if you require performance data beyond the limits of the above table.
- Interpolation is permissible. Do not extrapolate.

CHILLER SELECTION

SELECT WATER-COOLED CHILLER ACCORDING TO FOLLOWING CONDITIONS:

1. Entering Chilled Water temperature (ECHW) ..... 12°C
2. Leaving Chilled Water temperature (LCHW) ..... 7°C
3. Entering Condenser Water temperature (ECW) ..... 30°C
4. Leaving Condenser Water temperature (LCW) ..... 35°C
5. Chilled Water Flow Rate ..... 97 L/s
6. Cooling Water Flow Rate ..... 114 L/s

Calculation

1. Calculation of cooling capacity:

   Cooling Capacity = W.F. x Cp x (ECHW – LCHW)
   = 97 L/s x 4.185 x (12-7)
   = 2030 kW

2. Selected Model: MTW150M
   CAP= 526 kW per module
   Required Number of Modules = $\frac{\text{Cooling Capacity Required}}{\text{CAP per Module}} = \frac{2030\ kW}{526\ kW} = 3.86$ $\therefore$ Select 4 modules

   The total cooling capacity of the chiller = Number of Modules x CAP
   = 4 × 526
   = 2104 kW

3. Chilled water pressure drop calculation:
   (i) Evaporator water pressure drop for nominal water flow per module is 104 kPa
   (ii) Nominal Water Flow Rate = Number for Modules x Evaporator Water Flow
   = 4 x 25.1 L/s
   = 100.4 L/s
   (iii) Chilled water flow % = Chilled Water Flow Rate ÷ Nominal Water Flow
   = 97 L/s ÷ 100.4 L/s
   = 96.6%
   (iv) Use the table Water Pressure drop correction curve (heat exchanger), the water pressure drop correction factor ξ 0.92 when water flow percentage is 96.6%
   (v) The table Water Pressure drop correction factor (K)" shows that when module number is 4, K = 1.02,

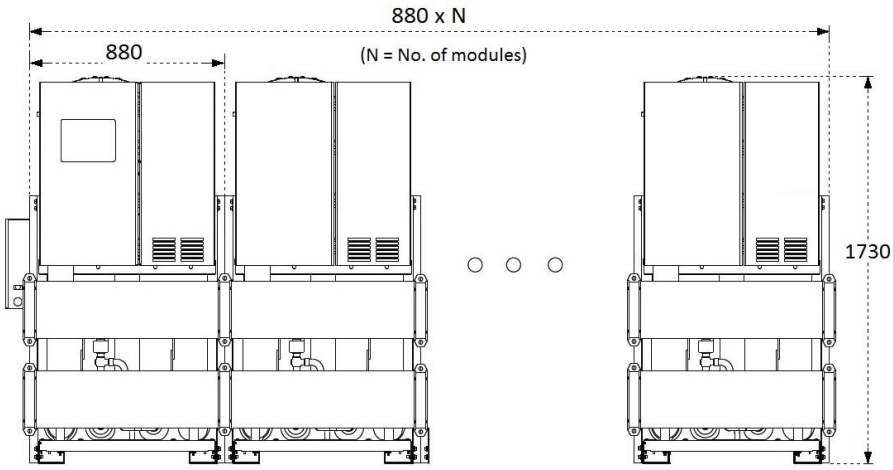
   Actual Evaporator water pressure drop is =0.92 x 104 kPa × 1.02 = **97.6kPa**

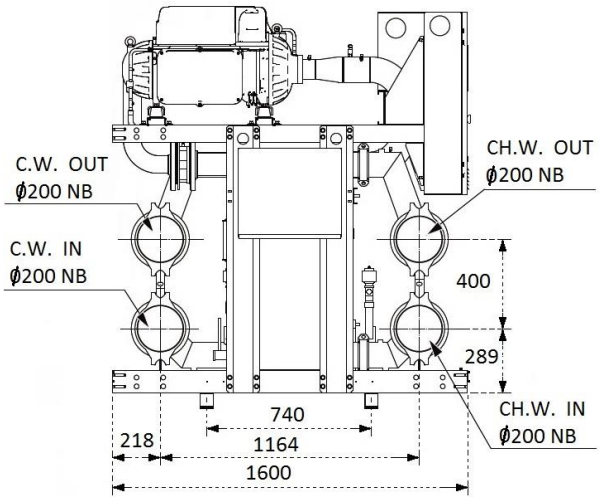
4. Cooling water flow and pressure drop calculation:
   (i) Condenser water pressure drip under rated cooling water flow is 137 kPa
   (ii) Condenser water flow rate = Number of Modules x Condenser Water Flow
   = 4 × 29.8 L/s
   = 119.2 L/
   (iii) Cooling water flow % = Cooling Water Flow Rate ÷ 119.2 L/s
   = 114.0 L/s ÷119.2 L/s
   = 95.6%
   (iv) Use the table Water Pressure drop correction curve (heat exchanger), the water pressure drop correction factor ξ = 0.91 when water flow percentage is 95.6%
   (v) The table Water Pressure drop correction factor (K)" shows that when module number is 4, K = 1.02

   Actual Condenser water pressure drop is 0.91 x 137 kPa × 1.02 = **127.2 kPa**

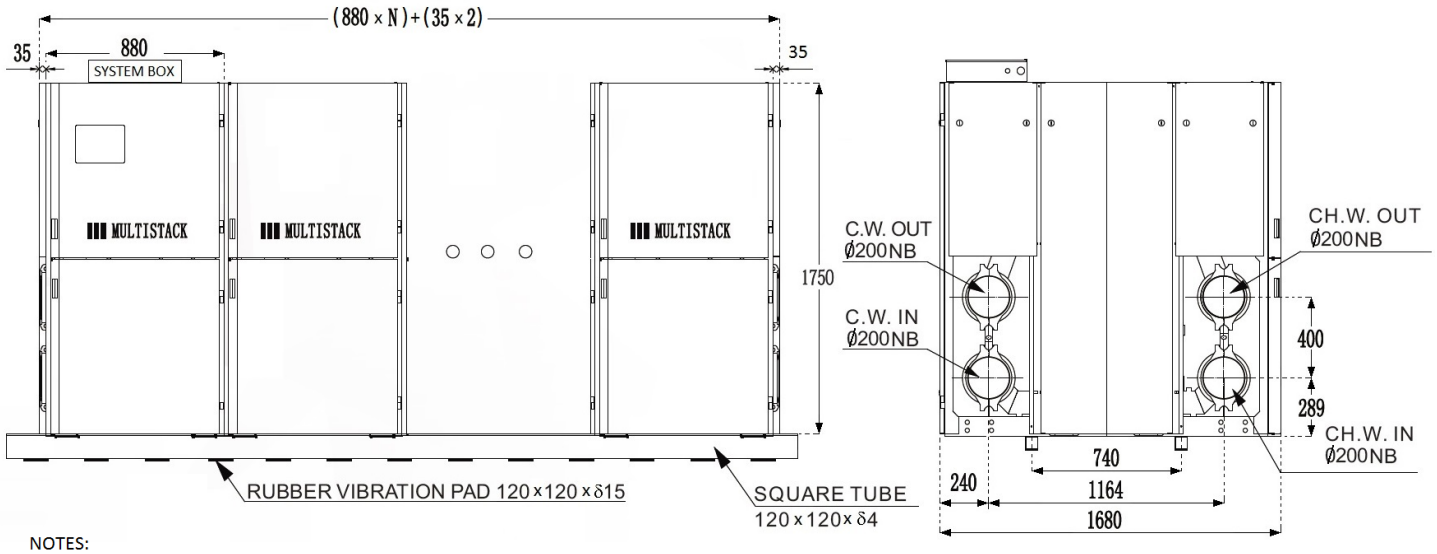
PHYSICAL DIMENSIONS

MTW090 / 110





MTW090 / 110 (with frame and panels)



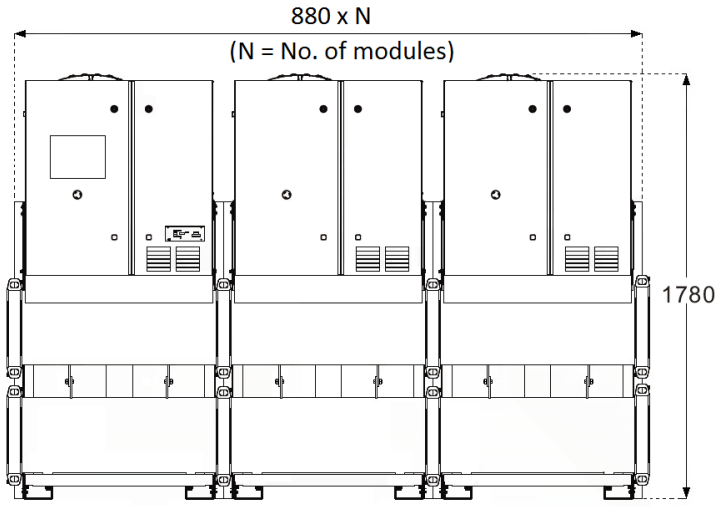
NOTES:
1. RUBBER VIBRATION PADS SHOULD BE APPLIED WITH 300mm INTERVALS (NOT SUPPLIED BY MULTISTACK).
2. THE HEIGHT OF SYSTEM IS 112mm, WHICH IS EXCLUDED FROM CHILLER OVERALL HEIGHT.

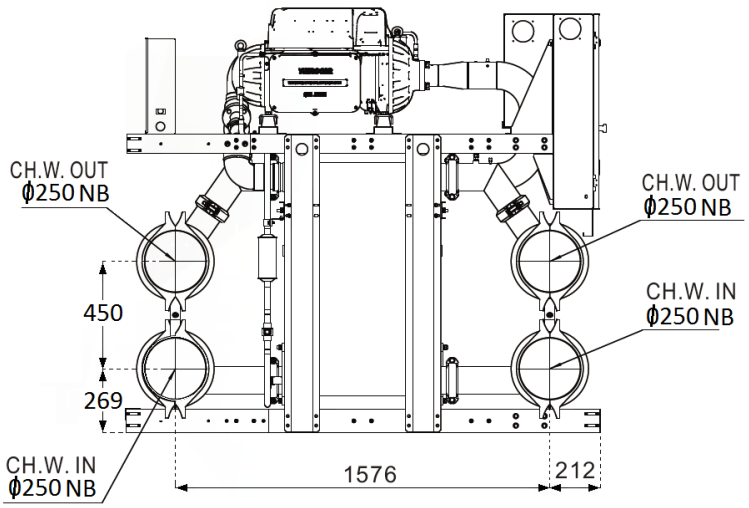
Notes:

1. Rubber vibration pads should be applied with 300mm intervals (not supplied by MULTISTACK)
2. Chiller can be supplied with frame and panels (optional)
3. Electrical mains entry may be made from either end of unit.

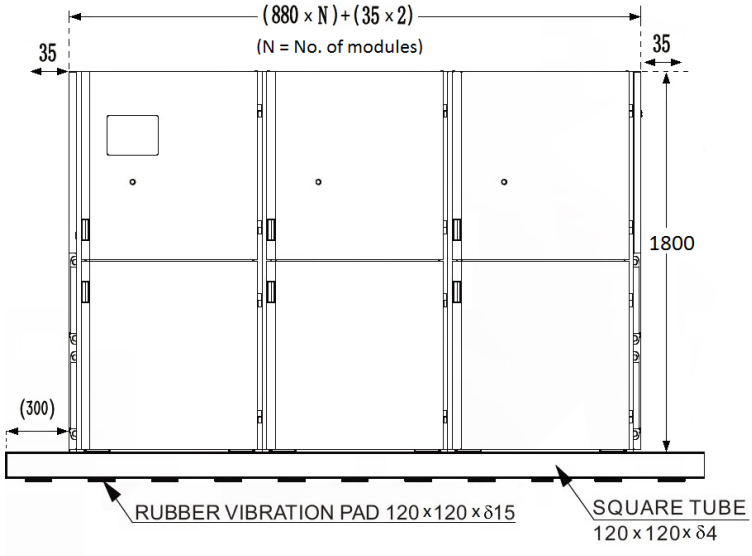
PHYSICAL DIMENSIONS

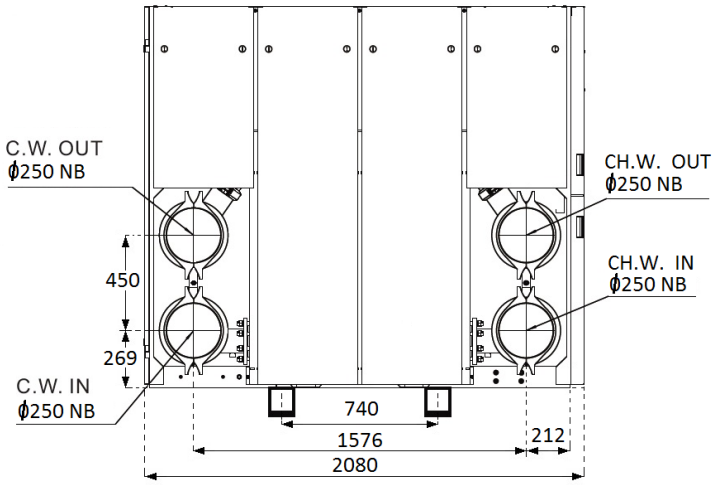
MTW150





MTW150 (with frame and panels)



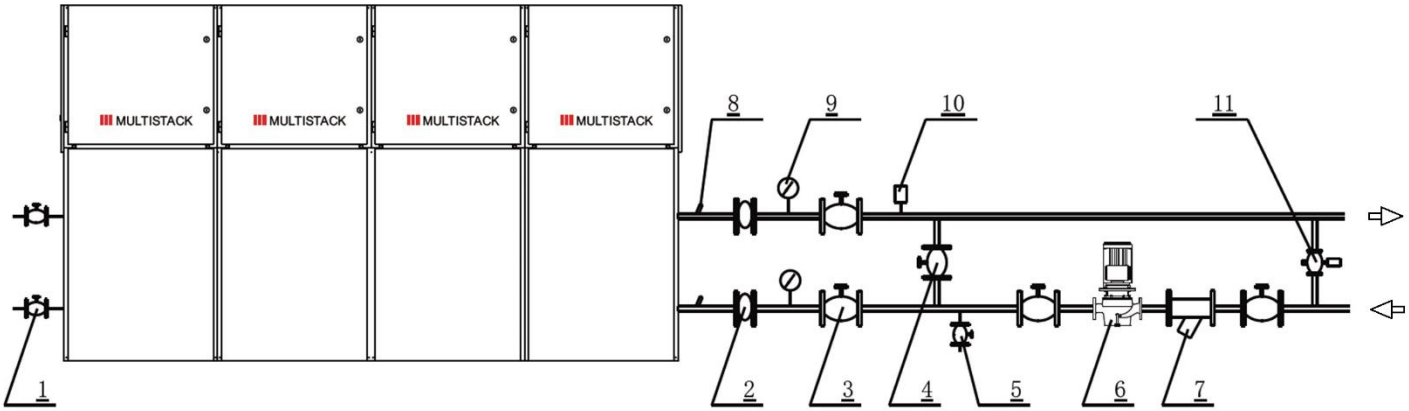


Notes:

1. Rubber vibration pads should be applied with 300mm intervals (not supplied by MULTISTACK)
2. Chiller can be supplied with frame and panels (optional)
3. Electrical mains entry may be made from either end of unit.

WATER PIPING

CHILLED WATER PIPING

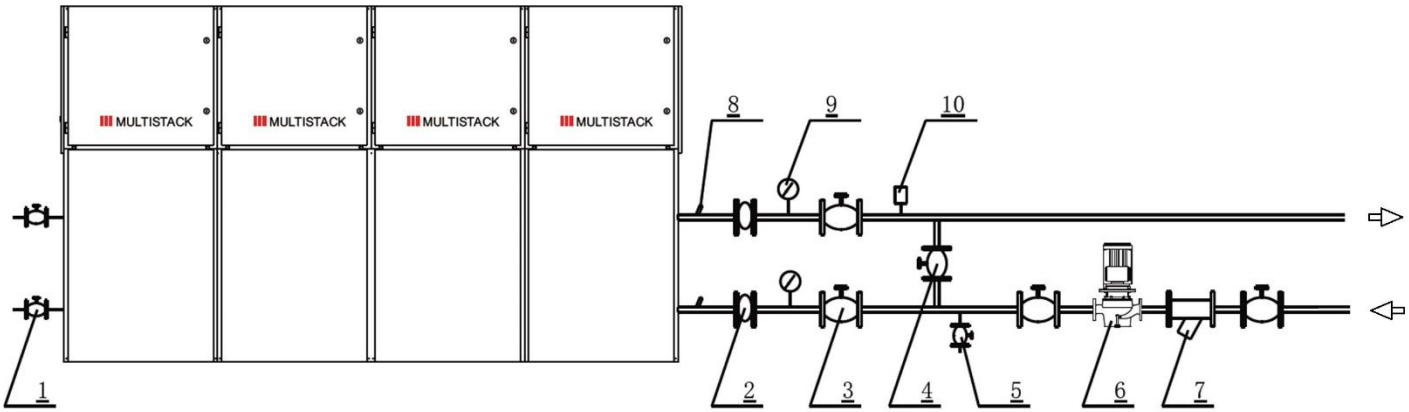


Item	Description	Qty	Remarks
1	Drain Valve	2	Not supplied by manufacturer
2	Vibration Eliminator	2	
3	Isolation Gate Valve	2	
4	Back Flush By-Pass Valve (*)	1	
5	Drain Valve	1	
6	Water Pump		
7	Water Strainer	1	
8	Chilled Water Temp Sensor	2	Supplied by manufacturer
9	Pressure Gauge	2	Not supplied by manufacturer
10	Water flow switch	1	
11	Chiller side differential pressure by-pass valve	1	

Notes:

1. It is customer's responsibility for all piping parts, except those included with the chiller.
2. During the whole installation process, the isolation gate valves on both entering/leaving line to the chiller should be closed. The valves will remain closed until the piping installation, leakage check and cleaning are all completed.
3. To prevent stress on the headers and Victaulic couplings all water pipe work must be properly supported.
4. To prevent water accumulation inside the sensor socket grease should be filled in the sensor socket before inserting the chilled water temperature sensor.
5. (*) The chiller’s piping system should be cleaned thoroughly to get rid of any mechanical debris prior to operation. During pipe cleaning, close chiller’s entering/leaving isolation gate valves and open the bypass valve to prevent the water circulation through the chiller.
6. (*) During chiller operation, the back flush by-pass valve must be closed.

CONDENSER WATER PIPING

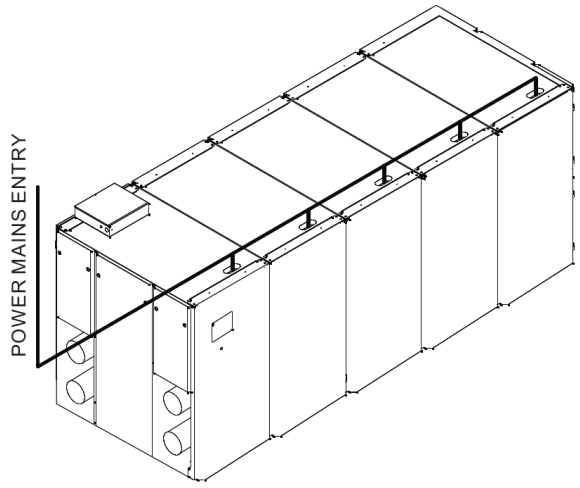


Item	Description	Qty	Remarks
1	Drain Valve	2	Not supplied by manufacturer
2	Vibration Eliminator	2	
3	Isolation Gate Valve	2	
4	Back Flush By-Pass Valve (*)	1	
5	Drain Valve	1	
6	Water Pump		
7	Water Strainer	1	
8	Chilled Water Temp Sensor	2	Supplied by manufacturer
9	Pressure Gauge	2	Not supplied by manufacturer
10	Water flow switch	1	

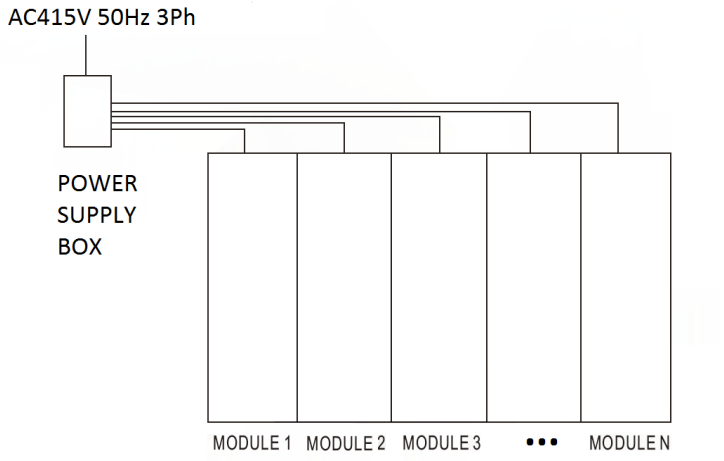
Notes:

1. It is the customer's responsibility to supply all piping parts, except for those supplied with the chiller.
2. The condenser water by-pass proportion regulating valve will not be necessary if the cooling tower fan is controlled by the condenser water leaving temperature.
3. The condenser water can be controlled by the cooling tower fan or condenser water by-pass, its leaving temperature shouldn't exceed 25% to prevent the compressor from operating at low suction pressure.
4. During the whole installation process, the isolation gate valves on both entering /leaving line to the chiller should be closed. The valves will remain closed until the piping installation, leakage check and cleaning are all completed.
5. To prevent stress on the headers and Victaulic couplings all water pipe work must be properly supported.
6. To prevent water accumulation inside the sensor socket grease should be filled in the sensor socket before inserting the chilled water temperature sensor.
7. (*) The chiller's piping system should be cleaned thoroughly to get rid of any mechanical debris prior to operation. During pipe cleaning, close chiller's entering/leaving isolation gate valves and open the bypass valve to prevent the water circulation through the chiller.
8. (*) During chiller operation back flush by-pass valve must be closed.

POWER CONNECTION



POWER MAINS ENTER FROM THE TOP OF THE CHILLER



POWER SUPPLY BOX SUPPLIED BY THE USER SHOLD DISTRIBUTE BRANCH LINES INTO EACH MODULE.

Notes:

1. When starting the chiller, the compressor will start stage by stage. Chiller starting current is equal to the total current of operating compressors plus the starting current of the compressor(s) being actuated.
2. Each module has its own power circuit. Power mains entry location is as shown in the figure above.
3. The selection of power mains should base on the voltage, MRC, allowable voltage drop and local electrical codes. Cables to the chiller should be of flexible copper cord.
4. Electrical Performance Data:

Model	Compressor (each)		
	AC400V ±10% /50Hz/3Ph		
	No. of Compressor	MOP (Kw)	FLA (A)
MTW090	1	81.8	150
MTW110	1	90.8	150
MTW150	1	102.9	170

MOP: Maximum Operating Power FLA: Full Load Ampere

5. In order to reduce harmonic interference, the chiller should be equipped with special input line reactor to restrict power grid fluctuation or current surge generated during system operation and to smooth out spike impulse in the supply voltage or to rectify phase missing during commutation. Input line reactor can also prevent interference from the grid and reduce impacts on the grid caused by harmonic current of the rectifier unit.
6. Harmonic filter (optional) improves power transmission and utilization, further reducing local parallel harmonic or series resonant and noise created by electrical system, improving system capacity of the transformer, breaker and cables, etc. and ensuring normal functions of safeties and automatic devices. All these configurations comply with GB/T 14549. Total harmonic distortion (THD) is ≤5% and automatic compensation power factor of the chiller can reach 0.95.

SHIPPING AND RIGGING

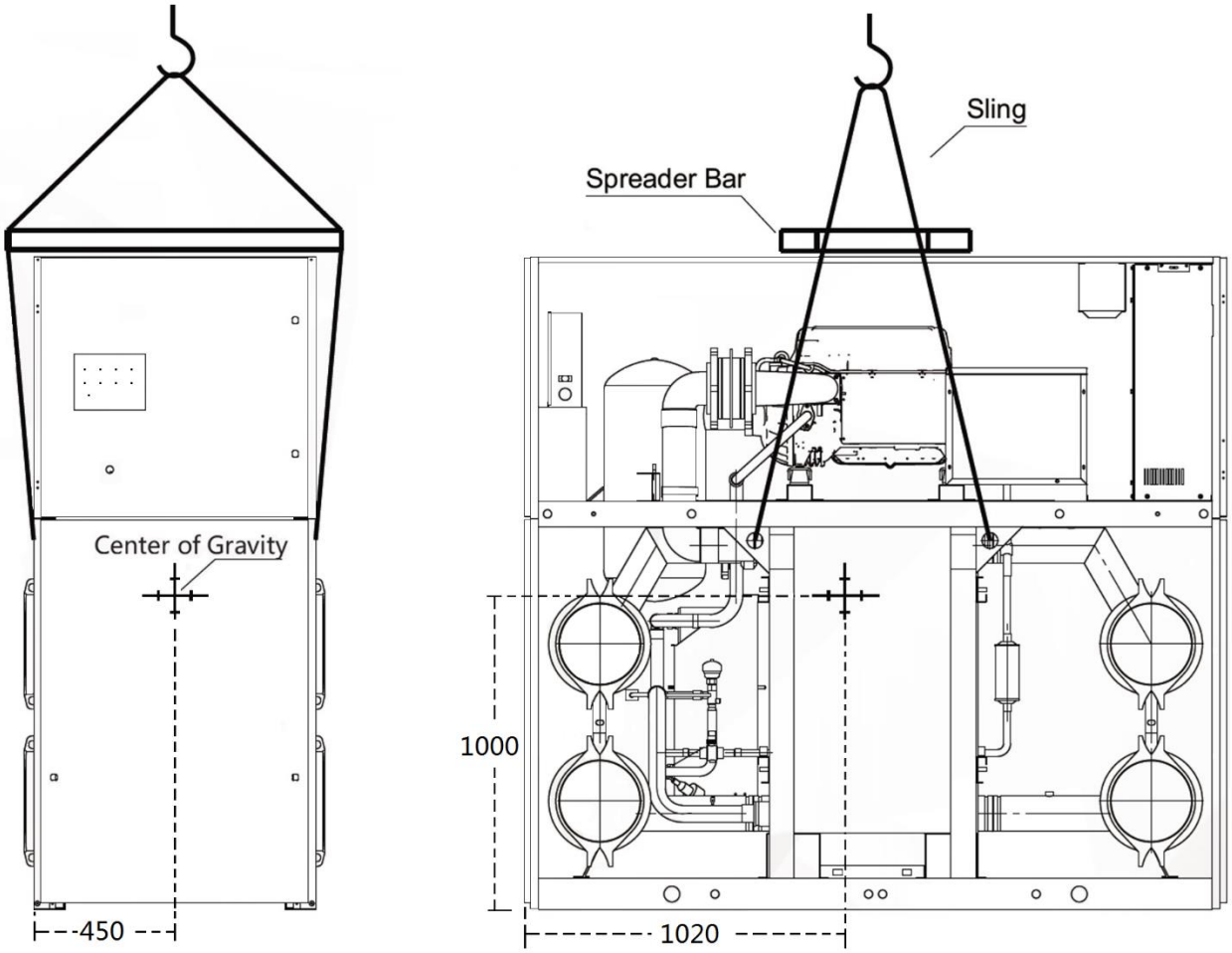
1.1 Rigging

MULTISTACK chillers are designed and constructed for the convenience for rigging and handling, which allow for the use of forklift or slings. Each module has lifting holes. Slings should be spread out by a “#” shape spreader bar on the top of the machine to prevent damage to the components and panels (see figure below).

1.2 Considerations

The gravity center of the module is located in the center the unit (see figure below). Please make sure to balance the unit during handling in case of turnover.

1.3 Hoisting Schematic (Example MTW150M)



1.4 Included Accessories

Accessory types and quantities vary with specific installation and purchase orders. Accessories will be separately packed. Do not unpack the accessories during handling unless they are needed for installation.

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