



YGWH Premium-Efficiency Water-Cooled Screw Chiller

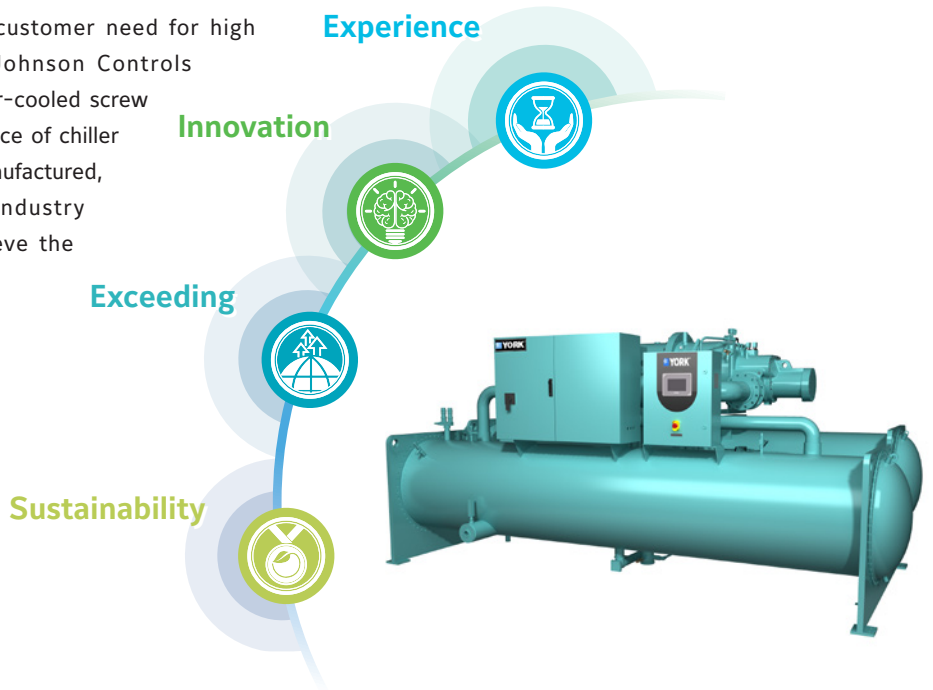
Cooling Capacity: 115 – 375TR



YGWH Premium-Efficiency Water-Cooled Screw Chiller



In order to better meet the increasing customer need for high efficiency and energy saving chiller, Johnson Controls introduces YGWH premium-efficiency water-cooled screw chiller. YGWH, built on YORK® rich experience of chiller products and innovatively designed and manufactured, surpasses the top efficiency level of industry standard and helps the customers achieve the greatest value.



Chiller Features



EXPERIENCE

- 1982 - Pioneered variable vi in twin screw compressor
- 1995 - Launched highly-efficient refrigerant-cooled DC reactance inverter
- 2004 - Pioneered the application of variable speed drives in air-cooled chillers
- 2011 - First to launch a variable speed water-cooled screw chiller
- 2017 - Launched the premium-efficiency and environmentally-friendly screw chiller



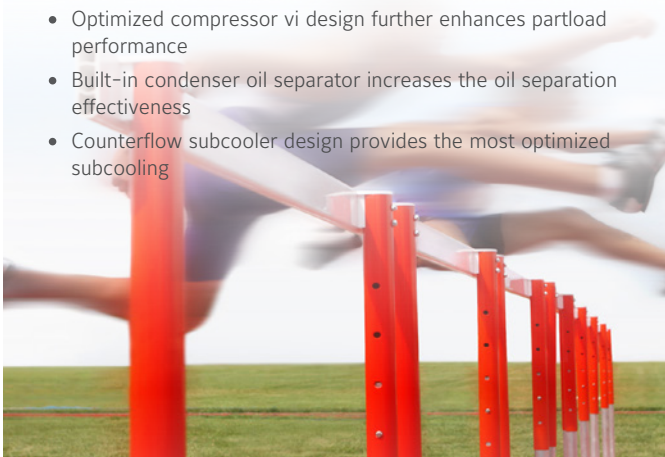
INNOVATION

- Advanced CFD simulation and state-of-the-art precision machining ensure the chiller's heart- the "compressor" operate efficiently
- Innovative design in the rotor profile enhances reliable operation
- Patented technology in compressor dampening structure design for quieter operation
- Patented technology in hybrid falling-film evaporator design delivers higher chiller efficiency
- Intelligent chiller control panel simplifies operation and interaction



EXCEEDING

- Chiller COP achieves as high as 6.68, surpasses top China GB and AHRI standards
- Optimized motor and flow structure design ensure high compressor efficiency
- Optimized compressor vi design further enhances partload performance
- Built-in condenser oil separator increases the oil separation effectiveness
- Counterflow subcooler design provides the most optimized subcooling



SUSTAINABILITY

- R134a refrigerant protects the ozone layer and has no phase out date
- Lower refrigerant charge and lower power consumption
- Premium chiller efficiency brings green building effectiveness to a remarkable level



Mechanical Specifications

General

Each YORK® YGWH water-cooled screw chiller will be completely factory-packaged including evaporator, condenser, compressor, motor, touch-screen control center and all interconnecting unit piping and wiring. The chiller will be painted prior to shipment and will be packaged to protect the unit during shipment. Performance will be certified in accordance with AHRI Standard 550/590. The initial charge of refrigerant and oil will be supplied for each unit.

Compressor

The new generation twin-screw, semi-hermetic compressor is highly efficient and reliable. The modular and compact design make the assembly and maintenance simple and easy.

Patented noise dampening structure design on slide valve improves compressor discharge pulsation transmission loss significantly and reduce chiller noise eventually.

The compressor housing is of grey iron which is optimized through Finite Element Analysis (FEA) and 100% qualified by pressure test. The rotors are manufactured from forged steel and use high efficiency profiles. The precise machining and flexible coating provide minimal clearance for the rotors and reduce the internal leakage significantly.

The compressor incorporates anti-friction bearings with SKF or FAG brand to reduce power and increase reliability. Cylindrical roller bearings to handle radial loads, point angular contact ball bearings to handle axial loads. An adequate supply of oil is available to the compressor at all times by advanced pressure-differential driven oil system.

The 3-phase asynchronous induction motor utilizes suction gas cooling. The motor design is optimized for better efficiency and adapted for wide application range. NTC sensors embedded in each phase winding can monitor motor temperature and provide effective protection for compressor operation.

Starter

The unit comes equipped with unit mounted wye-delta starter. All the wiring is completed and tested in the factory and does not require any field installation.

Heat Exchanger

Condenser – The refrigerant circuit water-cooled condenser is a cleanable shell and tube type heat exchanger with seamless external finned copper tubes rolled into tube plates. The design working pressure on the water side is 1MPa. The factory offers standard groove type water pipe connections. Meanwhile HG20615 flange type connections can be offered as an option. The refrigerant side

has a safety valve with trip pressure of 2.07MPa. The condenser is manufactured and tested according to China National Standard GB151.

Evaporator – The evaporator utilizes a hybrid falling film design which contains a balance of flooded and falling film technology to optimize efficiency, minimize refrigerant charge, and maintain reliable control. A specifically designed spray distributor provides uniform distribution of refrigerant over the entire length to yield optimum heat transfer. The hybrid falling film evaporator design has suction baffles around the sides and above the falling film section to prevent liquid refrigerant carryover into the compressor. A sight glass of 40mm diameter is also equipped on the shell side for refrigerant level observation. The design working pressure is 2.1MPa for shell and 1.0MPa for tube side. The refrigerant side has a safety valve with trip pressure of 2.07MPa. The refrigerant side is manufactured and tested according to China National Standard GB151. The evaporator shell is covered with 19mm closed-cell insulation. The factory offers groove type water pipe connections as standard. Meanwhile HG20615 flange type connections can be offered as an option. During the installation the contractor should furnish the insulation layer.

Compact Water Box – A removable Compact Water Box is fabricated from steel pipe with 1.0MPa design working pressure. Steel diaphragms are welded inside the water box as per the number of the flow pass. The factory offers groove type water pipe connections as standard. Meanwhile HG20615 flange type connections can be offered as an option. Vent and drain plugs are provided on each evaporator and condenser water box as standard.

Capacity Control

The compressor slide valve modulates the capacity from 100% to 25% of the full load. The slide valve will be adjusted according to the system's load requirement.

Oil System

The high efficient oil separation system provides adequate protection to the unit's compressor. It is equipped with an oil heater in oil sump to avoid refrigerant and oil mix when the chiller is not operating. During the chiller operation, the system operation pressure automatically transfers the oil in the oil sump back to the compressor. An oil filter is installed in the oil pipeline to prevent any particles from entering the compressor.

Refrigerant System

An electronic expansion valve controlled by the control center to accommodate varying head and load conditions will meter refrigerant flow to the evaporator.

The condenser shell is capable of storing the entire system refrigerant charge during servicing. The optional service valves need to be selected to facilitate removal of refrigerant charge from the system.

The unit is equipped with a suction strainer to prevent any foreign debris introduced to the system during maintenance or service to be allowed into the motor housing. Motors cooled by refrigerant is protected by means of filter or strainer to protect the motor and prolong motor life.

Isolation Mounting Pads

The four 3/4 inch (19.05 mm) thick neoprene pads are shipped loose, for field mounting under the heat exchanger foot supports. The pads are suitable for typical equipment rooms located on the ground floor.

Codes & Standards

YGWH meets the following codes & standards:

- AHRI550/590 and 551/591
- GB25131-Safety requirements for water chillers (heat pumps) using the vapor compression cycle
- GB/T18430.1-Water chilling (heat pump) packages using the vapor compression cycle – part 1: Water chilling (heat pump) packages for industrial & commercial and similar application



Factory Insulation of Evaporator

Factory-applied thermal insulation of the flexible, closed-cell plastic type, 3/4" (19mm) thick is attached with vapor-proof cement to the evaporator shell, flow chamber, evaporator tube sheets, suction connection, and (as necessary) to the auxiliary tubing. This insulation will normally prevent condensation in environments with relative humidity up to 75% and dry bulb temperatures ranging from 50° to 90°F (10° to 32°C). 1-1/2" (38mm) thick insulation is also available for relative humidity up to 90% and dry bulb temperatures ranging from 50° to 90°F (10° to 32°C).

Flow Switch

The design working pressure of paddle type flow switch is 1.03MPa (Gauge). It is suitable for chilled liquid and condenser liquid pipes.

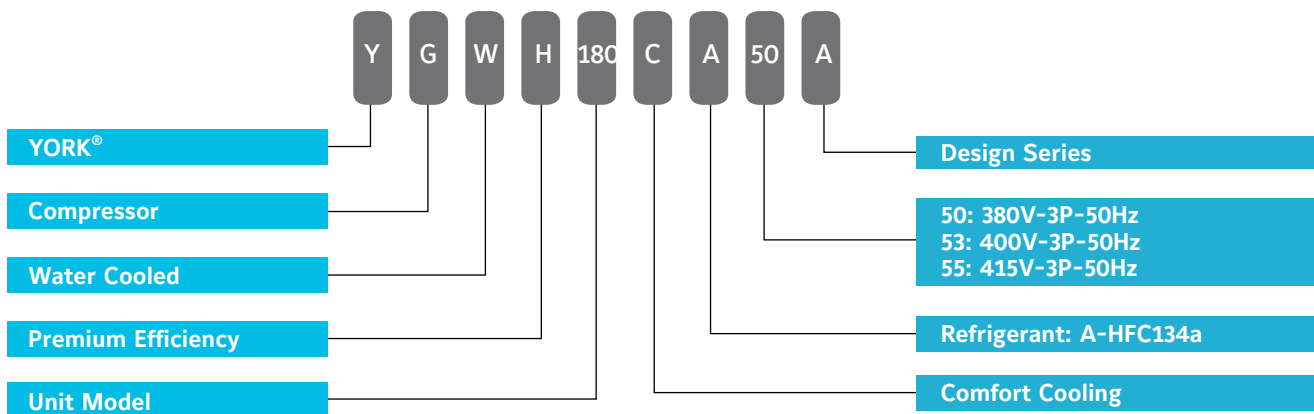
Paint

The chiller surface is painted with anticorrosion and durable Caribbean blue epoxy primer and propionic acid one-component top coat.

Shipment

Production covers are provided for the control center and controller on the unit. Plastic caps or fabrics cover plate are provided for all water pipe connectors.

Nomenclature—YGWH180CA50A



Control Center

Touch Screen Control Center

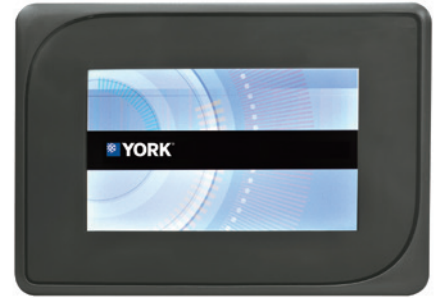
The YORK® Graphic Display Control Center, furnished as standard on each chiller, provides the ultimate in efficiency, monitoring, data recording, chiller protection and operating ease. The control center is a factory-mounted, wired and tested state-of-the-art microprocessor based control system for R-134a screw chillers. The panel is configured with a 7 inch diagonal color liquid Crystal Display(LCD) touch screen, which makes chiller operation quicker and easier than ever before. Instead of requiring keystroke after keystroke to hunt for information on a small monochrome LCD screen, touching the screen reveals a wide array of information on a large, full-color illustration of the appropriate component, which makes performance and operation easier to monitor.

The LCD display allows graphic display of the chiller, chiller sub-systems and system parameters; this allows the presentation of several operating parameters at once. In addition, the operator may view a graphical representation of the historical operation of the chiller as well as the present operation. A Status Bar is displayed at all times on all screens. It contains the System-Status Line and Details Line, Access Level, Date and Time.

The locations of various chiller parameters are clearly marked and instructions for specific operations are provided. The panel verbiage is available in English or Chinese. Data can be displayed in either English or Metric units.

Security access is provided to prevent unauthorized change of setpoints. This is accomplished with three different levels of access and passwords for each level. There are screens, displayed values and programmable setpoints only available with service level access to the chiller. They are only displayed when logged in at the service access level. The Advanced Diagnostics and troubleshooting record clearing for the chiller and the panel is also included at this access level.

The control panel has independent over-current protection and provides several terminals for wiring such as Remote Start/Stop, Flow Switch, Chilled Water Pump and Local or Remote Cycling Device are provided. The Panel also provides field interlocks that indicate the chiller



status. These contacts include a Warning Contact and a chiller Run Contact. Pressure transducers sense system pressures and thermistors sense system temperatures. The output of each transducer is a DC voltage that is analogous to the pressure input. The output of each thermistor is a DC voltage that is analogous to the temperature it is sensing.

The Control Center is standard with MODBUS protocol internally. Setpoints can be changed from a remote location via contact closures or through serial communications. The adjustable remote reset range [up to 20°F (11.1°C)] provides flexible, efficient use of remote signal depending on reset needs. Serial data interface to the Johnson Controls *Metasys*® System (BAS) is required through a micro gateway.



Options

Spring Isolators

The unit comes with four lose 19mm thick anti-vibration neoprene pads as standard for field installation. When the unit is installed on the floor, Spring Isolators are recommended to replace the standard neoprene pads. 4 level adjustable Spring Isolators with non-slip mat will be delivered lose and can be conveniently mounted under the tube sheet.

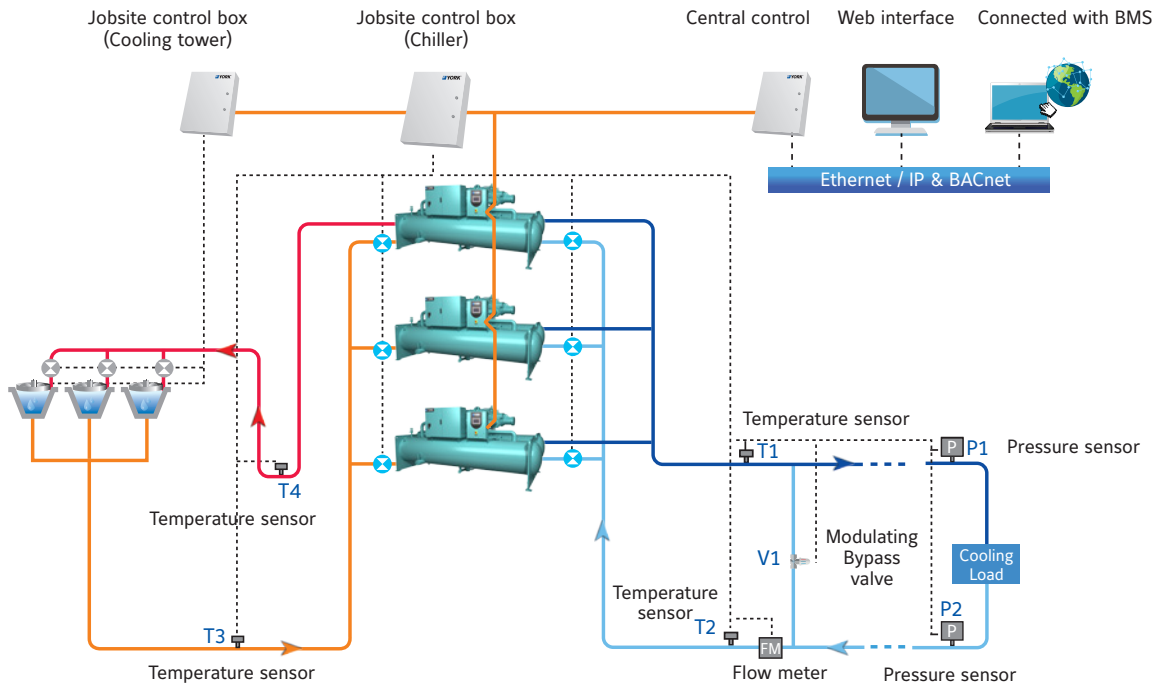
Left/Right Pipe Connection

Left or right piping connection can be chosen according to specific project requirement for easy installation.

Sound Attenuator

This option provides higher comfort to the user by lowering the sound emission of the chiller.

Central Control System



Thicker Evaporator Insulation

The 38mm thicker insulation is an option in case of relative humidity up to 90% and dry bulb temperatures ranging from 10 to 32°C. It is recommended for low temperature or high humidity areas and helps to avoid the sweat on the surface of the unit.

Refrigerant Isolation Valve

The condenser shell is capable of storing the entire system refrigerant charge during servicing if the unit is equipped with the optional isolation valve.

Refrigerant Storage / Recycling System

A refrigerant storage/recycling system is a self-contained package consisting of a refrigerant compressor with oil separator, storage receiver, water-cooled condenser, filter drier and necessary valves and hoses to remove, replace and distill refrigerant. All necessary controls and safety devices are a permanent part of the system. Typically not required if unit isolation valves are provided.

Technical Data

Chiller Performance Data

Model	Capacity		Power	COP	FLA	Full load Consulation Index	Evaporator				Condenser			
	TR	kW	kW	kW/kW	A	kW/TR	Pass	Flow rate l/s	Piping Dimension mm	Pressure Drop kPa	Pass	Flow rate l/s	Piping Dimension mm	Pressure Drop kPa
YGWH115	118.2	415.8	64.46	6.451	106	0.5452	4	17.88	125	60.7	4	22.45	125	69.8
YGWH145	147.5	518.6	78.97	6.559	129	0.5362	4	22.30	125	69.7	4	28.00	125	78.1
YGWH180	186.3	654.9	97.99	6.683	167	0.5262	4	28.16	150	73.1	4	35.36	150	81.5
YGWH225	227.3	799.2	120.3	6.641	204	0.5296	4	34.37	150	70.6	4	43.16	150	81.7
YGWH260	264.0	928.4	142.9	6.497	239	0.5413	2	39.92	200	42.9	2	50.13	200	45.8
YGWH300	304.6	1071	162.1	6.604	271	0.5325	2	46.05	200	48.5	2	57.83	200	48.7
YGWH330	325.3	1144	180.2	6.347	300	0.5541	2	49.19	200	25.7	2	61.78	200	32.0
YGWH375	377.7	1328	205.2	6.471	342	0.5435	2	57.10	200	34.9	2	71.71	200	36.0

Note:

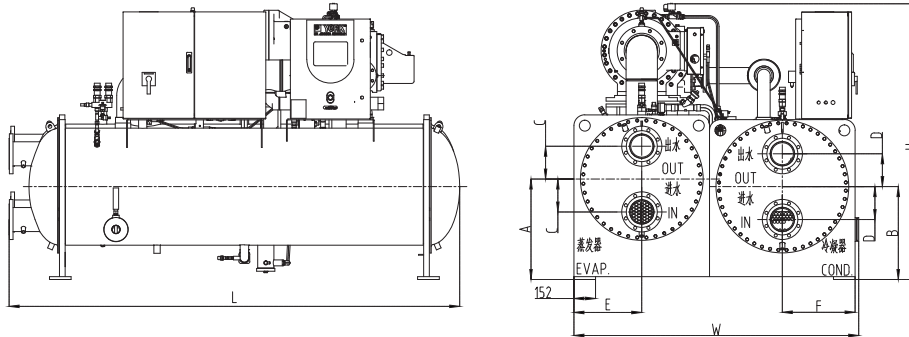
1. Chilled liquid leaving temperature 6.7°C, flow rate 0.043 l/(s·kW), fouling factor 0.018 m²·K/kW
2. Condenser liquid entering temperature 29.4°C, flow rate 0.054 l/(s·kW), fouling factor 0.044 m²·K/kW
3. The above data is based on Johnson Control's selection software: AECworks7.0. Please refer to the latest version of the software for specific projects.

Physical Data

Model	Refrigerant Circuit	Compressor Qty	Capacity Control%	Refrigerant Charge (kg)	Oil Charge (L)	Weight	
						Shipping Weight kg	Operating Weight kg
YGWH115	1	1	25-100%	200	25	3906	4307
YGWH145	1	1	25-100%	200	25	4588	5089
YGWH180	1	1	25-100%	240	33	5632	6270
YGWH225	1	1	25-100%	250	33	6040	6839
YGWH260	1	1	25-100%	360	40	7102	7802
YGWH300	1	1	25-100%	370	40	8053	8882
YGWH330	1	1	25-100%	400	40	8242	9271
YGWH375	1	1	25-100%	410	40	8837	9948

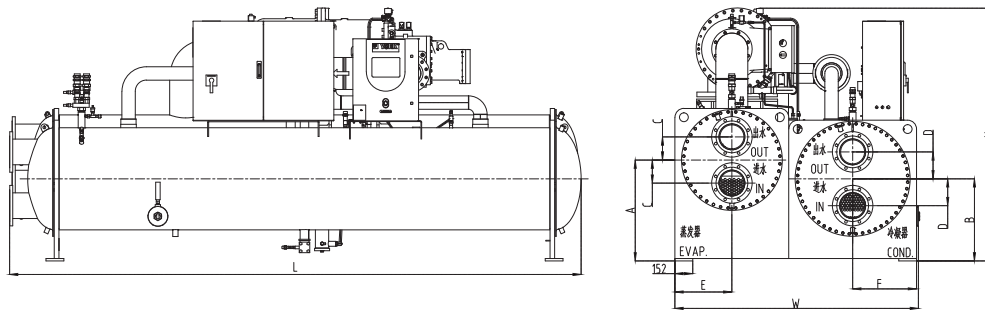
Dimensions

YGWH 115/145/180/225



Model	L (mm)	W (mm)	H (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
YGWH115	3118	1710	1739	648	570	190	180	400	435
YGWH145	3131	1797	1796	698	590	195	180	425	450
YGWH180	3156	1975	1932	713	650	230	230	460	520
YGWH225	3153	1995	1934	703	650	230	230	475	510

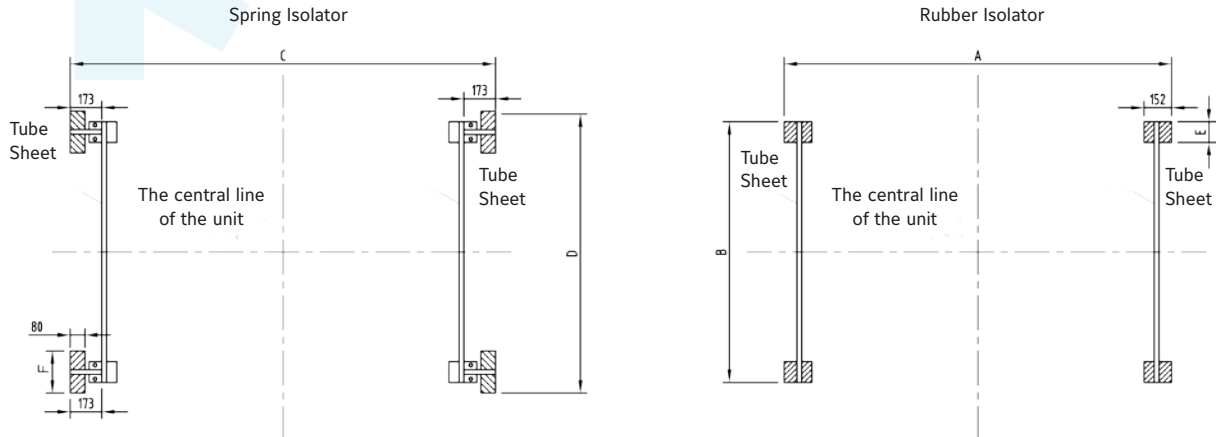
YGWH 260/300/330/375



Model	L (mm)	W (mm)	H (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
YGWH260	4807	1925	2156	860	700	195	195	460	485
YGWH300	4835	1988	2174	860	700	195	230	460	520
YGWH330/375	4872	2086	2156	860	700	197	229	485	545

Dimensions

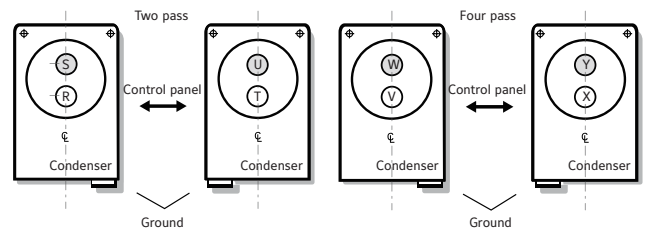
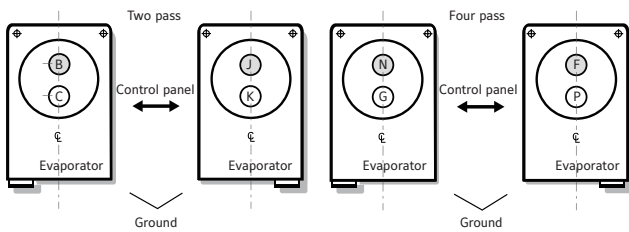
Isolator Floor Layout



Model	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
YGWH115	2731	1670	2937	1718	152	200
YGWH145	2731	1750	2937	1798	152	200
YGWH180	2731	1960	2937	2008	152	200
YGWH225	2731	1970	2937	2018	152	200
YGWH260	4407	1890	4613	1968	152	230
YGWH300	4407	1960	4613	2038	152	230
YGWH330/375	4407	2060	4613	2138	152	230

Evaporator Water Pipe Connection

Condenser Water Pipe Connection



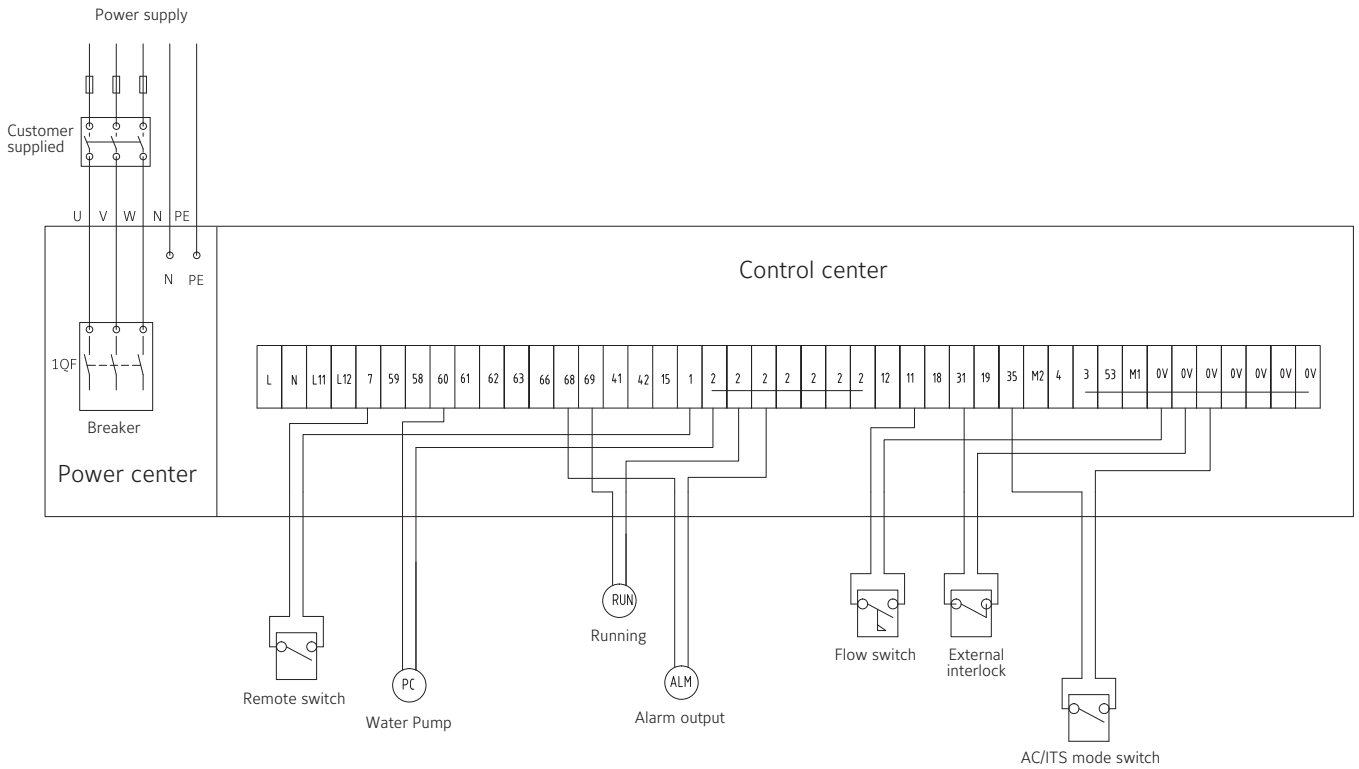
Pipe configuration		
pass	Evaporator	
	Entering water	Leaving water
2	C	B
	K	J

Pipe configuration		
pass	Evaporator	
	Entering water	Leaving water
4	G	N
	P	F

Pipe configuration		
pass	Condenser	
	Entering water	Leaving water
2	R	S
	T	U

Pipe configuration		
pass	Condenser	
	Entering water	Leaving water
4	V	W
	X	Y

Wiring Diagram (Wye-Delta Starter)



- Remarks:
1. If there is no "external interlock EXT", please jumper connect terminal "6" and "13".
 2. For the wye-delta starter, please jumper connect terminal "53" and "19", "153" and "119".
 3. The contact resistance of flow switch, mode transition switch, external interlock and remote switch should be less than 0.5 ohm.
 4. The output of pump, alarm and run is AC 220V and the load is allowed to be less than 5W.
 5. The cable selection should conform to the local codes.
 6. If the customer's power supply is 3 phase 4 line (L1/L2/PE)", please jumper connect terminal "N" and "PE" in the electric panel.



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