

WATER-COOLED SCREW CHILLER

YGWS



Cooling Capacity: 100-200TR

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In order to meet continuously changing and increasing HVAC market requirement, Johnson Controls introduces the brand new HFC-134a water-cooled screw chiller YGWS. YGWS offers optimized efficiency at a more competitive price range, with benefit of flexibility, reliability and sustainability. The chiller is suitable for the light commercial market, i.e. hotel, retail store, small and medium-sized factory, hospital and etc.



Chiller Features

Efficiency

- High efficiency semi-hermetic screw compressor
- Patent hybrid falling film evaporator offers excellent efficiency of heat transfer with optimized heat exchanger design and compact structure
- Step-less capacity control keeps the compressor operating efficiently at every load point

Flexibility

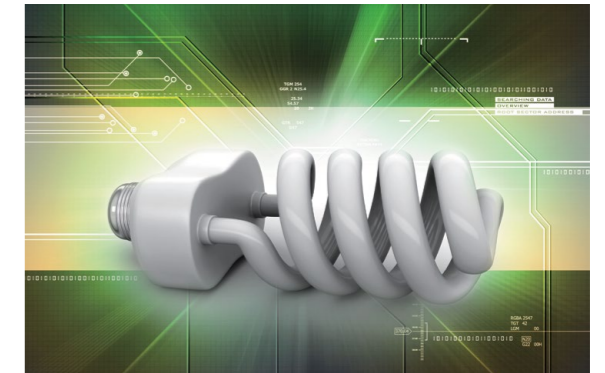
- Button start, easy to install and operate
- Supports remote monitoring and control via Modbus protocol
- Compact design yields a small footprint saving customer installation cost

Reliability

- Core component compressor has been sold more than 10,000 units since 2006, with zero failure record of motor and rotor
- Every chiller undergoes functional tests to ensure key parameters meet specific requirement
- Internal oil system provides adequate protection to the unit's compressor

Sustainability

- YGWS chiller uses environment-friendly refrigerant R134a which has no phase-out schedule under Montreal Protocol
- Patent hybrid falling film evaporator operates with less refrigerant charge



Mechanical Specifications

The YGWS model is completely assembled with all interconnecting refrigerant piping and internal wiring, ready for field installation. The unit is pressure tested, evacuated, and fully factory-charged with oil in the refrigerant circuit. After assembly, a run test is performed with water flowing through the cooler to ensure that each refrigerant circuit operates correctly. The chiller conforms to GB25131 Safety requirements for water chillers and heat pumps.

Compressor

Highly efficient and precisely manufactured direct drive, semi-hermetic oil-injected compressor for highest efficiency. 25%-100% step-less capacity control for highest part-load efficiency. Compressor design working pressure of 2.1MPa. The compressor housing is made of cast iron and provides optimal space for two ground-finishing screw rotors. The rotors are manufactured from forged steel with very small clearance but no direct contact. The design ensures that the rotors keep in the right positioned, reduces wear, prevents leak and prolongs life span. The unique oil separation system design ensures a constant supply of oil to the bearings at all times. An automatic control valve ensures the compressor starts at the minimum motor load and an internal discharge check valve prevents a rotor backspin upon shutdown.

Compressor Motor Protection – The microprocessor motor protection provides over current protection to ensure that the motor is not damaged due to voltage imbalance, excess refrigerant or other problems that could cause excessive motor current.

The microprocessor also provides low motor current protection when it senses a motor current of less than 10% FLA. A motor protector module provides over-heating protection.

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.

Refrigerant System

Liquid line components include a manual shut-off valve, refrigerant recovery valve, moisture sight glass and orifice plate. Suction lines are covered with closed-cell insulation. The orifice of the refrigerant system automatically adjusts to the continuously changing pressure condition and modulates refrigerant flow to the evaporator accordingly.

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

The unit is furthermore equipped with a suction strainer to prevent any particles from entering the compressor along with the suction gas.

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.

Heat Exchanger

Condenser – The refrigerant circuit water-cooled condenser is a cleanable shell and tube type heat exchanger with seamless external finned 19mm OD 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.

Codes & Standards

YGWS meets the following codes & standards:

- China Refrigeration and Air Conditioning Association
- GB25131-Safety requirements for water chillers (heat pumps) using the vapor compression cycle
- GB150 Pressure vessel
- GB151 Tubular heat exchangers
- 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



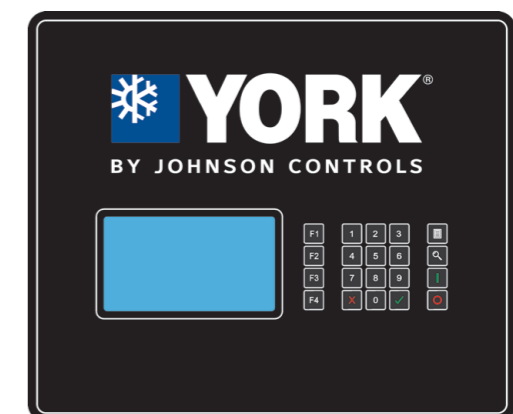
Electronics

Starter and Control Panel – The unit comes equipped with unit mounted wye-delta starter and control panel. All wiring is completely tested in the factory but field installation is excluded.

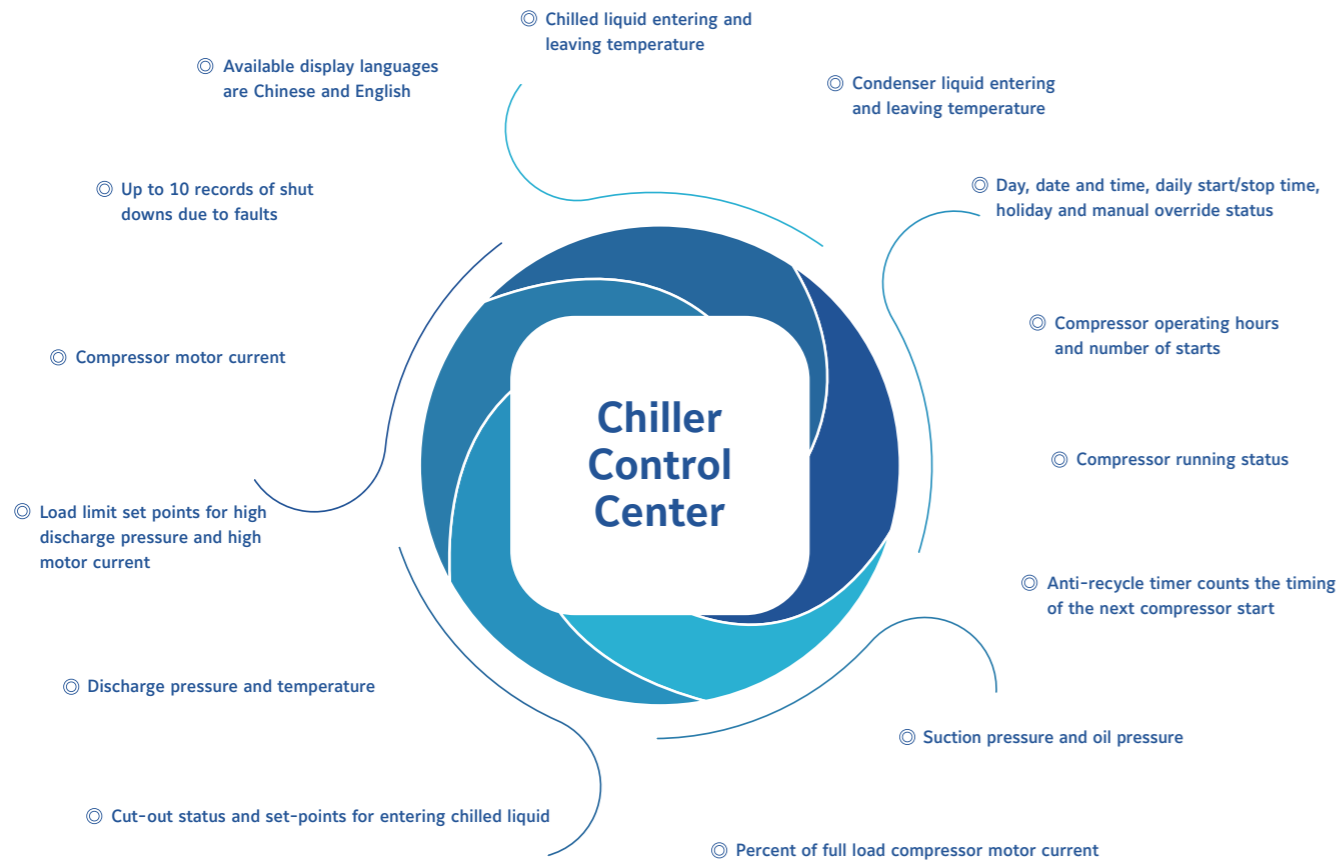
The painted galvanized steel panel enclosure meets the requirement of IP22 protection. The control panel is divided into a power section and a control section. Power and control sections have separate hinged, latched and gasket sealed doors. The power panel has a single power connection. Each power compartment contains compressor starting contractors, control circuit serving compressor capacity control, compressor contractor coils and compressor motor overloads. The compressor motor overloads contain current transformers as an input to the microprocessor. Compressor power supply protection modular protects high input voltage, low input voltage, phase reversal and lack of phase. The control section contains key pad, HMI and microprocessor board.

Microprocessor and display – The user can program and modify set points as well as general using the keypad. Additional changes such as cut-outs for low suction pressure, high discharge pressure, high oil temperature or high discharge pressure unloading set points and compressor motor current percent limit are password protected.

Through standard RS485 interface, the microprocessor can be connected to any Building Management System via MODBUS Protocol.



The microprocessor system is designed to monitor and control many key variables and can display the following items at its 120 character and 8-line big LCD display in metric unit (°C and kPa):



Chiller Standard configuration

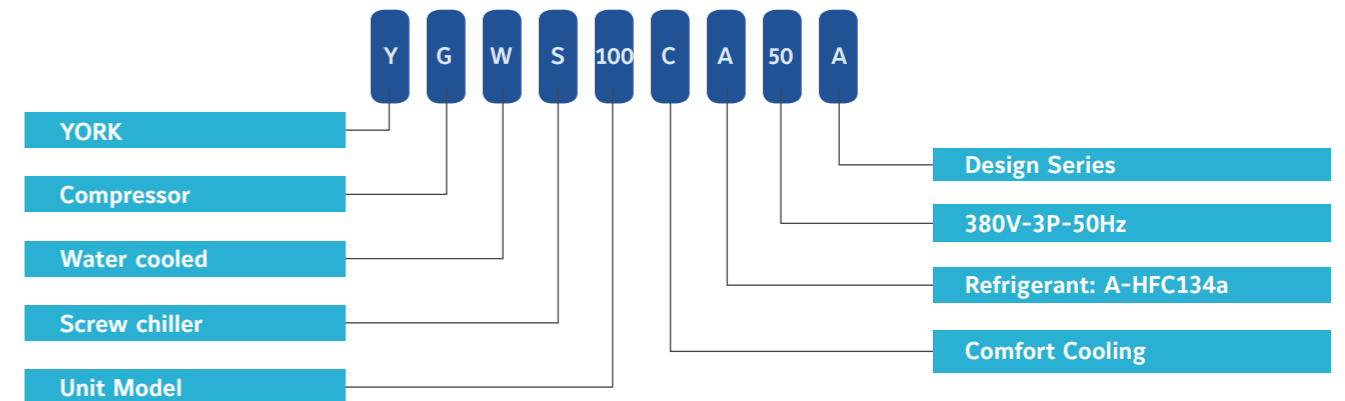
Chiller Insulation – The unit comes factory fitted with a 19mm thick flexible closed-cell plastic anti-sweat insulation attached to the evaporator shell, tube sheets, suction connection, and (if necessary) to the auxiliary tubing. The 19m thick insulation can prevent sweating in environments with relative humidity up to 75% and dry bulb temperatures ranging from 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. The power supply of flow switch is 125 V.A.C., 1 Phase, 50 Hz.

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

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

Nomenclature - YGWS100CA50A



Options

25mm 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.

Water Flanges

Four 150 lb. Flanges, for condenser and evaporator water connections, are factory welded to water nozzles. Companion flanges, bolts, nuts and gaskets are not included.

Left/Right Pipe connection

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

Thicker Evaporator Insulation (38mm)

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

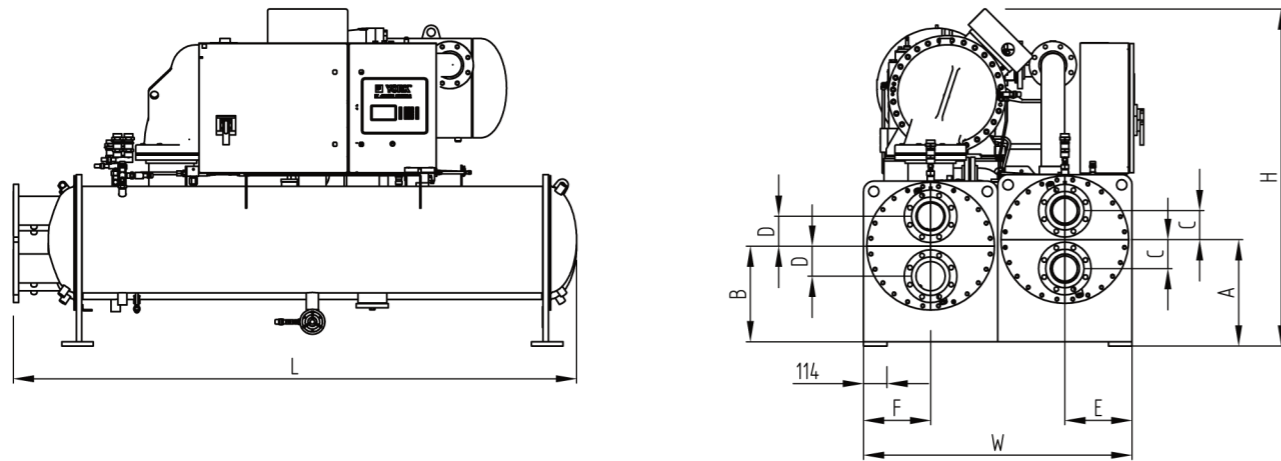
Model	Cooling capacity		Input Power kW	COP	FLA	Full load Consultation Index kW/TR	Evaporator				Condenser			
	TR	kW					Pass	Flow Rate l/s	Piping Dimension mm	Water Pressure Drop kPa	Pass	Flow Rate l/s	Piping Dimension mm	Water Pressure Drop kPa
YGWS100	97.2	341.8	69.4	4.92	118	0.71	2	14.7	125	22	2	18.4	125	41
YGWS130	121.3	426.5	85.9	4.96	144	0.71	2	18.4	125	49	2	23.0	125	57
YGWS160	159.0	559.0	110.4	5.06	187	0.69	2	24.1	125	33	2	30.1	125	48
YGWS175	176.1	619.2	122.3	5.06	207	0.69	2	26.7	150	34	2	33.3	150	56
YGWS200	191.1	671.9	132.7	5.06	226	0.70	2	28.9	150	36	2	36.2	150	54

Remark: 1. Chilled liquid leaving temperature 44F, Flow rate 2.4GPM/ton fouling factor 0.0001hr ft² °F / Btu.
 2. Condenser liquid entering leaving temperature 85F, Flow rate 3GPM/ton, fouling factor 0.00025hr ft² °F / Btu.
 3. The above data are based on Johnson Control's selection software: AECworks 4.7. Please refer to the latest version of the computer selection for specific projects.

Physical Data

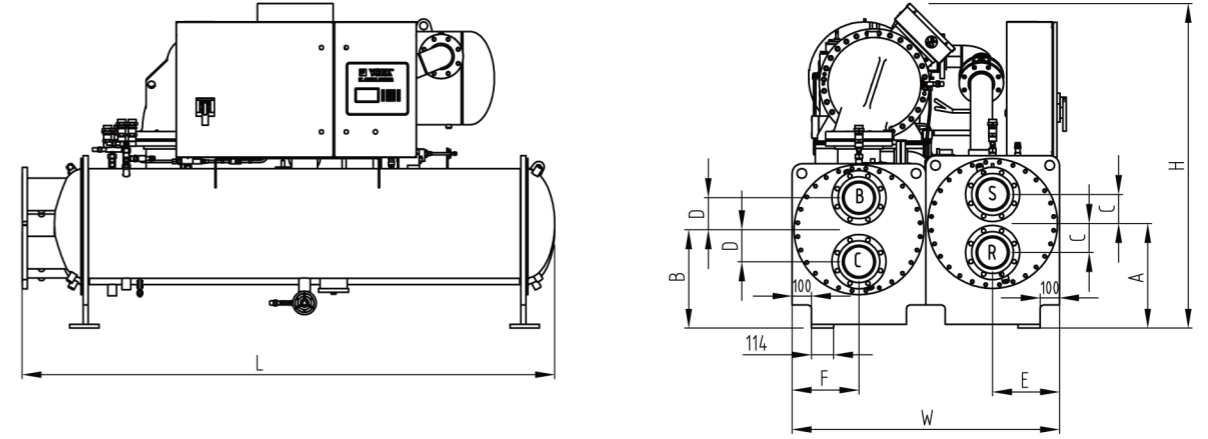
Model	Refrigerant circuit No	Refrigerant Charge (Kg)	Compressors Qty	Unit Capacity Control %	Weight	
					Shipping Weight kg	Operating Weight kg
YGWS100	1	75	1	25-100%	2470	2600
YGWS130	1	90	1	25-100%	2710	2850
YGWS160	1	95	1	25-100%	3010	3190
YGWS175	1	110	1	25-100%	3210	3410
YGWS200	1	110	1	25-100%	3300	3520

YGWS 100/130/160



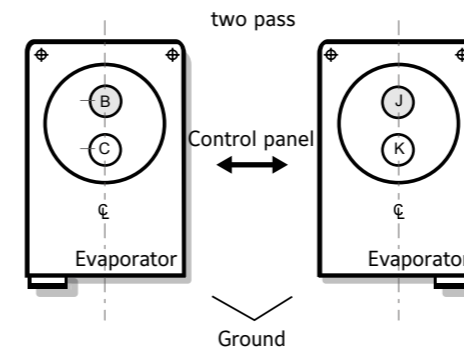
Model	L(mm)	W(mm)	H(mm)	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	F(mm)
YGWS100	2430	1280	1590	515	483	140	145	320	320
YGWS130	2730	1280	1595	515	483	140	145	320	320
YGWS160	2730	1300	1630	515	483	140	145	325	325

YGWS 175/200



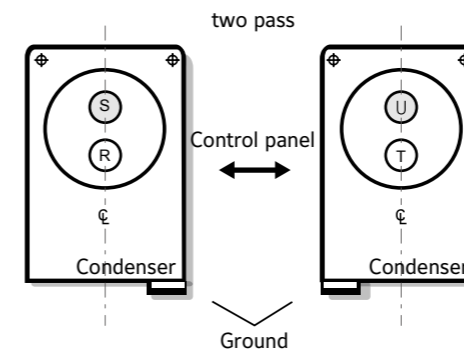
Model	L(mm)	W(mm)	H(mm)	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	F(mm)
YGWS175	2750	1380	1675	540	508	150	165	345	345
YGWS200	2750	1380	1675	540	508	150	165	345	345

Evaporator Water Pipe Connection



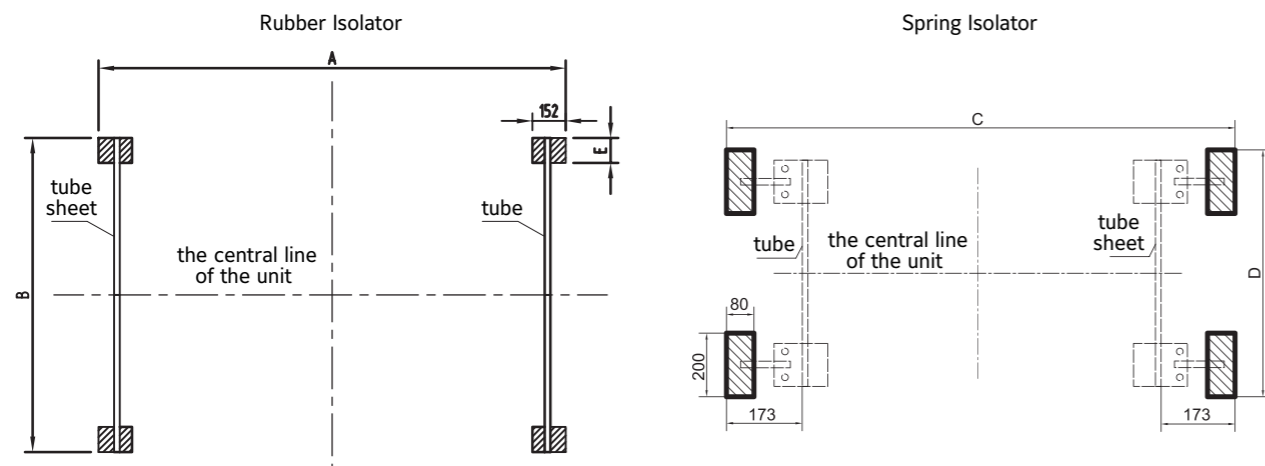
Pipe configuration		
pass	Evaporator	
	Entering water	Leaving water
2	C	B
	K	J

Condenser Water Pipe Connection

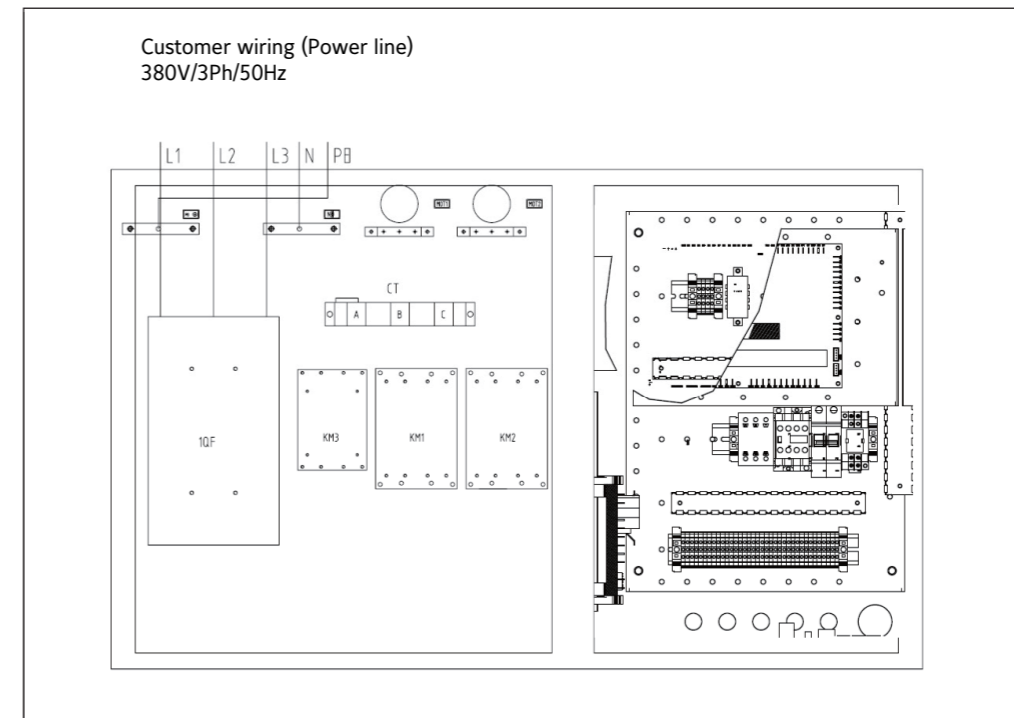


Pipe configuration		
pass	Evaporator	
	Entering water	Leaving water
2	R	S
	T	U

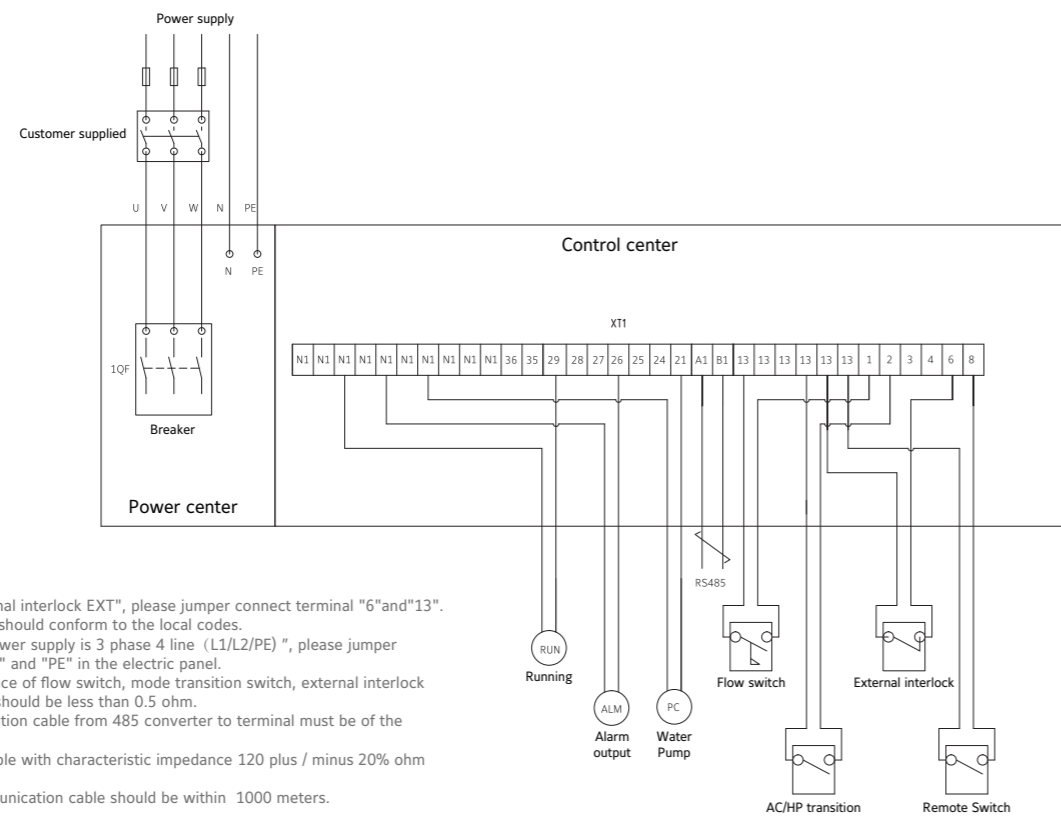
Isolator Floor Layout



Model	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
YGWS100	2126	1280	2332	1366	114
YGWS130	2426	1280	2632	1366	114
YGWS160	2426	1300	2632	1386	114
YGWS175	2426	1180	2632	1266	114
YGWS200	2426	1180	2632	1266	114



Wiring Diagram (Wye- Delta Starter)



- Remark:
1. If there is no "external interlock EXT", please jumper connect terminal "6" and "13".
 2. The cable selection should conform to the local codes.
 3. 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.
 4. The contact resistance of flow switch, mode transition switch, external interlock and remote switch should be less than 0.5 ohm.
 5. The 485 communication cable from 485 converter to terminal must be of the same type of cable.
 6. Use twisted-pair cable with characteristic impedance 120 plus / minus 20% ohm as the bus cable.
 7. The length of communication cable should be within 1000 meters.

The picture is only for: YGWS100, 130, 160, 175, 200

Johnson Controls is a global diversified technology and industrial leader serving customers in more than 150 countries. Our 130,000 employees create quality products, services and solutions to optimize energy and operational efficiencies of buildings; lead-acid automotive batteries and advanced batteries for hybrid and electric vehicles; and seating components and systems for automobiles. Our commitment to sustainability dates back to our roots in 1885, with the invention of the first electric room thermostat. Through our growth strategies and by increasing market share we are committed to delivering value to shareholders and making our customers successful. In 2015, Corporate Responsibility Magazine recognized Johnson Controls as the #14 company in its annual "100 Best Corporate Citizens" list. For additional information, please visit <http://www.johnsoncontrols.com> or follow us @johnsoncontrols on Twitter.

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