

# YVWE

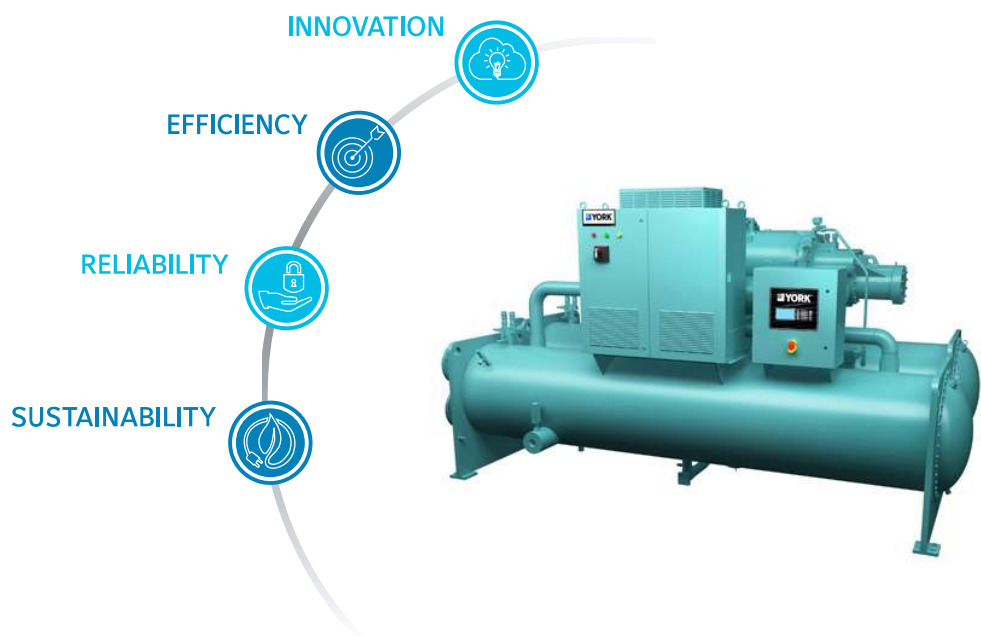
## Variable Speed Water-cooled Screw Chiller



CAPACITY: 103 – 428 TR



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





## INNOVATION

- 2016 – GT compressor platform, with higher efficiency
- 2017 – YGWH, COP up to 6.68
- 2017 – YVWH, variable speed, IPLV up to 10.77
- 2018 – YGWE, COP up to 6.0
- 2018 – YVWE, variable speed, IPLV up to 10.13



## EFFICIENCY

- AHRI Certified efficiency exceeds ASHRAE 90.1 and many country specific energy standards
- COP meets green building requirement
- Optimized motor and flow structure ensure high compressor efficiency
- Patented hybrid falling film evaporator delivers higher heat-exchange efficiency
- With VSD technology



## RELIABILITY

- Innovative design of rotor profile enhances reliable operation
- Wide operation fulfills various conditions and application needs
- Patented compressor dampening structure lowers the vibration and sound
- Rigorous qualification makes field operation more reliable



## SUSTAINABILITY

- Low R134a refrigerant charge protects the ozone layer
- Low power consumption achieves low carbon emission and contributes to green buildings



# Mechanical Specifications

Each YORK® YVWE water-cooled screw chiller will be completely factory-packaged including evaporator, condenser, compressor, motor, variable speed 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 is manufactured from forged steel and use high efficiency profiles. The precise machining 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.

## Variable Speed Drive

The unit-mounted Variable Speed Drive reduces the impact on the power grid by decreasing the inrush current at startup, and improves the part-load efficiency dramatically.

## 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

Capacity control is achieved by use of variable speed control and a slide valve to provide fully modulating control from 100% to 15% of full-load.

## 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.

## Codes & Standards

YVWE 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



## 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.

## 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° F to 90° F (10° C 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° F to 90° F (10° C 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.

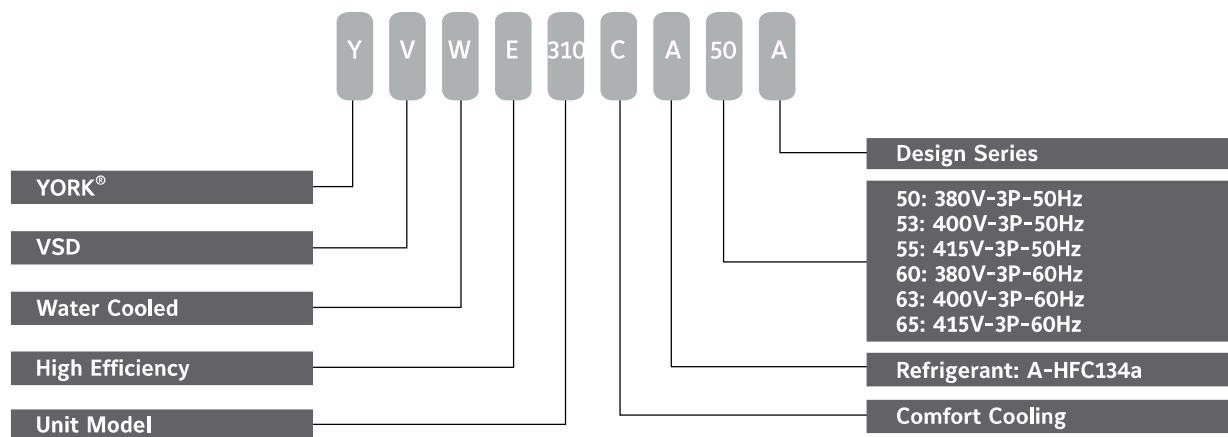
## Paint

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—YVWE310CA50A





## Control Center

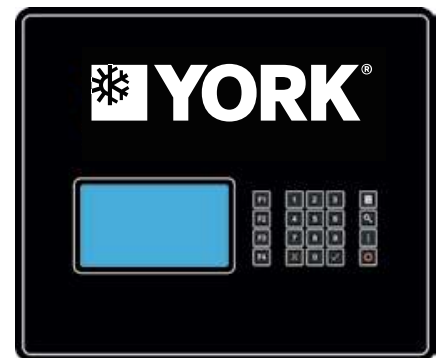
### Electronics

**Starter and Control Panel** – The unit comes equipped with unit mounted wye-delta starter and control panel. All wiring is completed and tested by the factory but does not include any field installation.

The painted galvanized steel panel enclosure is designed and meets the need of IP22 protection. The control panel is divided into a power section and a control section. Power and control sections have separated hinged, latched and gasket sealed doors. The power panel is 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, HML 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 require a password.

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



### Chiller Control Center

- Available display languages are Chinese and English
- Chilled liquid entering and leaving temperature
- Condenser liquid entering and leaving temperature
- Day, date and time, daily start/stop time, holiday and manual override status
- Compressor operating hours and starts
- Compressor run status
- System suction and oil pressure
- Up to 10 records for shut downs due to faults
- Compressor motor current
- Load limit set points for high discharge pressure and high motor current
- Anti-recycle timer counting the timing of the next compressor start
- Percent of full load compressor motor current
- Cut-out status and set-points for entering chilled liquid
- Discharge pressure and temperature

# 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.

## 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.

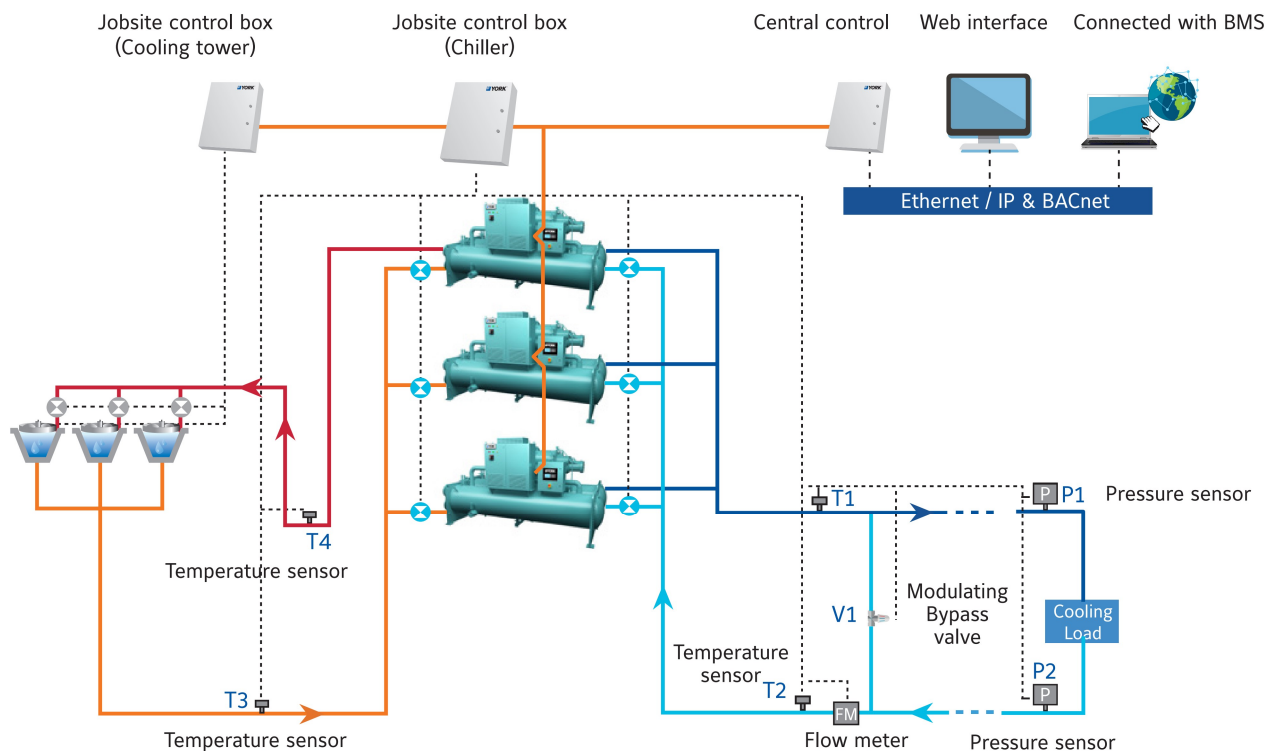
## Refrigerant Isolation Valve

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.

## Central Control System



---

## Johnson Controls:

At Johnson Controls, we transform the environments where people live, work, learn and play. From optimizing building performance to improving safety and enhancing comfort, we drive the outcomes that matter most. We deliver our promise in industries such as healthcare, education, data centers and manufacturing. With a global team of 105,000 experts in more than 150 countries and over 130 years of innovation, we are the power behind our customers' mission. Our leading portfolio of building technology and solutions includes some of the most trusted names in the industry, such as Tyco®, York®, Metasys®, Ruskin®, Titus®, Frick®, Penn®, Sabroe®, Simplex®, Ansul® and Grinnell®.

For more information, visit [www.johnsoncontrols.com](http://www.johnsoncontrols.com) or follow us [@johnsoncontrols](https://twitter.com/johnsoncontrols) on Twitter.

### Australia (Sydney)

Tel: +61 (2) 9805 8300  
Fax: +61 (2) 9247 7750

### India (Mumbai)

Tel: +91 (22) 6683 7000  
Fax: +91 (22) 6683 7002

### Malaysia (Kuala Lumpur)

Tel: +60 (3) 7628 4300  
Fax: +60 (3) 7874 1180

### China (Shanghai)

Tel: +86 (21) 2285 7000  
Fax: +86 (21) 2285 7599

### Indonesia (Jakarta)

Tel: +62 (21) 5366 8500  
Fax: +62 (21) 5366 8300

### New Zealand (Auckland)

Tel: +64 (9) 635 0880  
Fax: +64 (9) 633 1862

### China (Hong Kong)

Tel: +852 2885 4451  
Fax: +852 2885 7760

### Japan (Tokyo)

Tel: +81 (3) 5738 6100  
Fax: +81 (3) 5738 6298

### Singapore

Tel: +65 6748 0202  
Fax: +65 6743 4420

### China (Macau)

Tel: +853 2875 1820  
Fax: +853 2875 1825

### Korea (Seoul)

Tel: +822 1588 9117  
Fax: +822 6009 9014

### Thailand (Bangkok)

Tel: +66 (2) 794 0101  
Fax: +66 (2) 717 1327-8