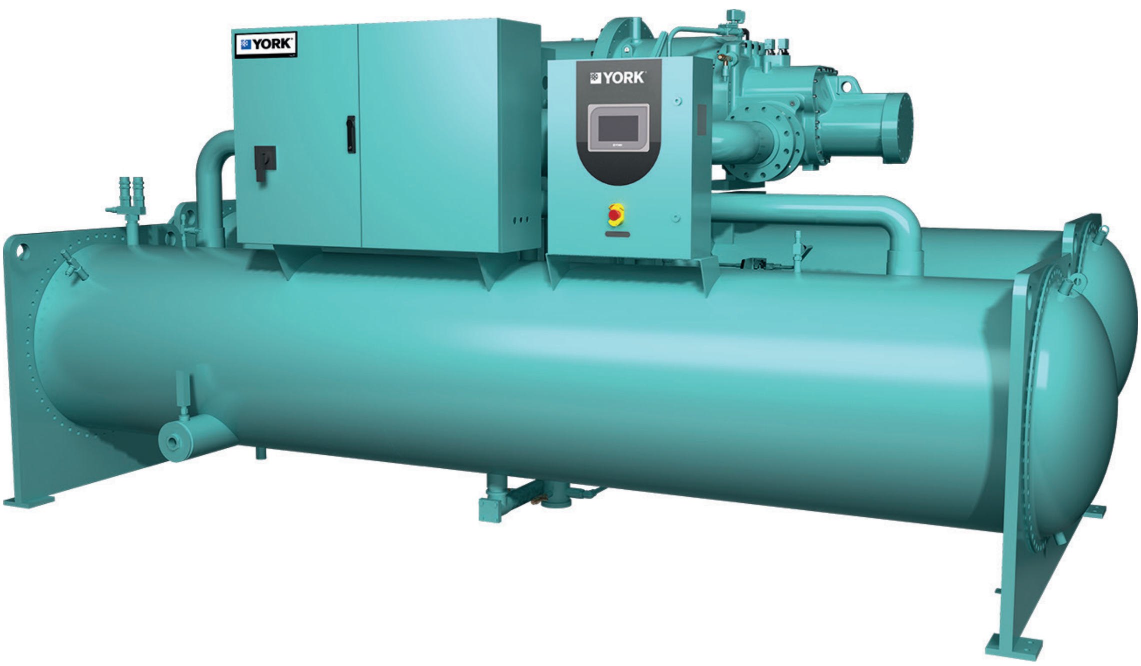
| YORK® INSTALL CONFIDENCE | YGWH WATER COOLED SCREW CHILLERS |
| --- | --- |
| Installation, Commissioning, Operation & Maintenance | FORM NO.: 6S6I-B01C-EOMA-EN(0318) |

# YGWH WATER COOLED SCREW CHILLERS
# STYLE A

Cooling Capacities: 416 kW to 1328 kW (118 to 378 TR)



## Table of Contents

## 1. General Chiller Information and Safety

### Introduction

YORK YGWH units are manufactured to the highest design and construction standards to ensure high performance, reliability and adaptability to all types of air conditioning installations.

The unit is intended for cooling water or glycol solutions and is not suitable for purposes other than those specified in this manual.

This manual contains all the information required for correct installation and commissioning of the unit, together with operating and maintenance instructions. The manuals should be read thoroughly before attempting to operate or service the unit.

All procedures detailed in the manuals, including installation, commissioning and maintenance tasks must only be performed by suitably trained and qualified personnel.

The manufacturer will not be liable for any injury or damage caused by incorrect installation, commissioning, operation or maintenance resulting from a failure to follow the procedures and instructions detailed in the manuals.

### Warranty

Johnson Controls warrants all equipment and materials against defects in workmanship and materials for a period of eighteen months from date of shipment, or twelve months from commissioning, whichever comes first, unless extended warranty has been purchased as part of the contract.

The warranty is limited to parts only replacement and shipping of any faulty part, or sub-assembly, which has failed due to poor quality or manufacturing errors. All claims must be supported by evidence that the failure has occurred within the warranty period, and that the unit has been operated within the designed parameters specified.

All warranty claims must specify the unit model, serial number, order number and run hours/starts. Model and serial number information is printed on the unit identification plate.

The unit warranty will be void if any modification to the unit is carried out without prior written approval from Johnson Controls.

For warranty purposes, the following conditions must be satisfied:

- The initial start of the unit must be carried out by trained personnel from an Authorized Johnson Controls Service Centre.
- Only genuine Johnson Controls approved spare parts, oils, coolants, and refrigerants must be used.
- All the scheduled maintenance operations detailed in this manual must be performed at the specified times by suitably trained and qualified personnel.

Failure to satisfy any of these conditions will automatically void the warranty.

### Standards for Safety

YGWH units are designed and manufactured within an ISO 9001 accredited organisation and in conformity with the following safety standards:

- China Refrigeration and Air Conditioning Association
- NB/T 47012
- GB/T18430.1
- GB25131

### Fluorinated Greenhouse Gases

- This equipment contains fluorinated greenhouse gases covered by the Kyoto Protocol.
- The global warming potential of the refrigerant (R134A) used in this unit is 1430.
- The refrigerant quantity is stated in the Physical Data table of this document.
- The fluorinated greenhouse gases in this equipment may not be vented to the atmosphere.
- This equipment should only be serviced by qualified technicians.

### Responsibility for Safety

Every care has been taken in the design and manufacture of the unit to ensure compliance with the safety requirements listed above. However, the individual operating or working on any machinery is primarily responsible for:

Personal safety, safety of other personnel, and the machinery.

Correct utilization of the machinery in accordance with the procedures detailed in the manuals.

## About this manual

The following symbols are used in this document to alert the reader to areas of potential hazard.

WARNING

A WARNING is given in this document to identify a hazard, which could lead to personal injury. Usually an instruction will be given, together with a brief explanation and the possible result of ignoring the instruction.

CAUTION

A CAUTION identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution. Usually an instruction will be given, together with a brief explanation and the possible result of ignoring the instruction.

NOTE

A NOTE is used to highlight additional information, which may be helpful to you but where there are no special safety implications.

The contents of this manual include suggested best working practices and procedures. These are issued for guidance only, and they do not take precedence over the above stated individual responsibility and/or local safety regulations.



## Misuse of Equipment

### Suitability for Application

The unit is intended for cooling and heating water or glycol solutions and is not suitable for purposes other than those specified in these instructions. Any use of the equipment other than its intended use, or operation of the equipment contrary to the relevant procedures may result in injury to the operator, or damage to the equipment.

The unit must not be operated outside the design parameters specified in this manual.

### Structural Support

Structural support of the unit must be provided as indicated in these instructions. Failure to provide proper support may result in injury to the operator, or damage to the equipment and/or building.

### Mechanical Strength

The unit is not designed to withstand loads or stresses from adjacent equipment, pipework or structures. Additional components must not be mounted on the unit. Any such extraneous loads may cause structural failure and may result in injury to the operator, or damage to the equipment.

### General Access

There are a number of areas and features, which may be a hazard and potentially cause injury when working on the unit unless suitable safety precautions are taken. It is important to ensure access to the unit is restricted to suitably qualified persons who are familiar with the potential hazards and precautions necessary for safe operation and maintenance of equipment containing high temperatures, pressures and voltages.

### Pressure Systems

The unit contains refrigerant vapour and liquid under pressure, release of which can be a danger and cause injury. The user should ensure that care is taken during installation, operation and maintenance to avoid damage to the pressure system. No attempt should be made to gain access to the component parts of the pressure system other than by suitably trained and qualified personnel.

### Electrical

The unit must be earthed. No installation or maintenance work should be attempted on the electrical equipment without first switching power OFF, isolating and locking off the power supply. Servicing and maintenance on live equipment must only be performed by suitably trained and qualified personnel. No attempt should be made to gain access to the control panel or electrical enclosures during normal operation of the unit.

### Refrigerants and Oils

Refrigerants and oils used in the unit are generally nontoxic, non-flammable and non-corrosive, and pose no special safety hazards. Use of gloves and safety glasses is, however, recommended when working on the unit. The build up of refrigerant vapour, from a leak for example, does pose a risk of asphyxiation in confined or enclosed spaces and attention should be given to good ventilation.

### High Temperature and Pressure Cleaning

High temperature and pressure cleaning methods (e.g. steam cleaning) should not be used on any part of the pressure system as this may cause operation of the pressure relief device(s). Detergents and solvents, which may cause corrosion, should also be avoided.

### Emergency Shutdown

In case of emergency, the control panel is fitted with an emergency stop button (RED) when pressed it removes the electrical supply to the control circuit thus shutting down the unit. The button is locked in the closed (OFF) position and has to be rotated to reset it.


### Safety Labels

The following labels are fixed to each unit to give instruction, or to indicate potential hazards which may exist.

White symbol on blue background

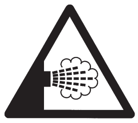
For safe operation, read the instructions first

Black symbol on yellow background

Warning: This machine may start automatically without prior warning

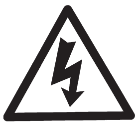
Black symbol on yellow background

Warning: Hot surface



Black symbol on yellow background

Warning: Safety relief valve may discharge gas or liquid without prior warning



Black symbol on yellow background

Warning: Isolate all electrical sources of supply before opening or removing the cover, as lethal voltages may exist

Black symbol on yellow background

General attention symbol

**Material Safety Data**

| **Refrigerant Data:** | |
|---|---|
| **Safety Data** | **R134a** |
| Toxicity | Low |
| In contact with skin | Liquid splashes or spray may cause freeze burns. Unlikely to be hazardous by skin absorption. R134a may be slightly irritant and liquid has a degreasing effect. Thaw affected areas with water. Remove contaminated clothing carefully — may adhere to skin in case of freeze burns. Wash affected areas with plenty of warm water. If symptoms occur (irritation or blistering) obtain medical attention. |
| In contact with eyes | Vapour has no effect. Liquid splashes or spray may cause freeze burns. Immediately irrigate with eyewash solution or clean water for at least 10 minutes. Obtain immediate medical attention. |
| Ingested | Highly unlikely to occur — but should this occur freeze burn will occur. Do not induce vomiting. Provided patient is conscious, wash mouth with water and give about 250 ml (0.5 pint) to drink. Obtain immediate medical attention. |
| Inhalation | High atmospheric concentrations may have an anaesthetic effect, including loss of consciousness. Very high exposures may cause an abnormal heart rhythm and prove suddenly fatal. |
| | At higher concentration there is a danger from asphyxiation due to reduced oxygen content of atmosphere. Remove patient to fresh air, keep warm and at rest. Administer oxygen if necessary. Apply artificial respiration if breathing has ceased or shows signs of failing. In event of cardiac arrest apply external cardiac massage. Obtain immediate medical attention. |
| Further medical advice | Symptomatic and supportive therapy is indicated. Cardiac sensitisation has been described which may, in the presence of circulating catecholamines such as adrenalin, give rise to cardiac arrhythmia’s and subsequent arrest following exposure to high concentrations |
| Long term exposure | A lifetime inhalation study in rats has shown that exposure to 50,000 ppm resulted in benign tumours of the testis. This is not considered to be of relevance to humans exposed to concentrations at or below the occupational exposure limit. |
| Occupational exposure limits | Recommended limit: 1000 ppm v/v - 8 hr TWA. |
| Stability | Not specified. |
| Conditions to avoid | Use in presence of naked flames, red hot surfaces and high moisture levels. |
| Hazardous reactions | May react violently with sodium, potassium, barium and other alkali and alkaline earth metals. Incompatible materials: Magnesium and alloys containing more then 2% magnesium. |
| Hazardous decomposition products | Halogen acids by thermal decomposition and hydrolysis. |
| General precautions | Avoid inhalation of high concentrations of vapours. Atmospheric concentrations should be minimised and kept as low as reasonably practicable below the occupational exposure limit. The vapour is heavier than air and collects at low level and in confined areas. Ventilate by extraction at lowest levels. |
| Respiratory protection | Where doubt exists on atmospheric concentration, HSE approved breathing apparatus should be worn. This should be self contained or of the long breather type. |
| Storage | Keep containers dry and in a cool place away from fire risk, direct sunlight, and all sources of heat such as radiators. Keep at temperatures not exceeding 45 °C. |
| Protective clothing | Wear overalls, impervious gloves and goggles/face protection. |
| Spill/leak procedure | Ensure suitable personal protective clothing and respiratory protection is worn. Provided it is safe to do so, isolate the source of the leak. Allow small spillage’s to evaporate provided there is suitable ventilation.<br>Large spillage’s: Ventilate area. Contain spillage’s with sand, earth or any suitable absorbent material. Prevent liquid from entering drains, sewers, basements and work pits since vapour may create a suffocating atmosphere. |

| Refrigerant Data: | |
|---|---|
| **Safety Data** | **R134a** |
| Disposal | Best to recover and recycle. If this is not possible, destruction is to be in an approved facility which is equipped to absorb and neutralise acids and other toxic processing products. |
| Fire extinguishing data | Non-flammable at atmospheric conditions. |
| Containers | Fire exposed containers should be kept cool with water sprays. Containers may burst if overheated. |
| Fire fighting protective equipment | Self contained breathing apparatus and protective clothing must be worn in fire conditions. |

| Refrigerant Oil Data | |
|---|---|
| **Safety Data** | **YORK 'L' Oil** |
| Classification | Non-hazardous |
| In contact with skin | Minimally irritating. No first aid necessary. Exercise reasonable personal cleanliness including cleansing exposed skin areas several times daily with soap and water. Launder soiled work clothes at least weekly. |
| In contact with eyes | Flush eyes with eyewash solution or clean water for 15 minutes and consult a physician. |
| Ingested | May cause nausea and diahorrhea. Obtain immediate medical attention. |
| Inhalation | If oil mist is inhaled, remove to fresh air and consult a physician. |
| Occupational exposure limits | Not determined. |
| Stability | Stable but hygroscopic - store in sealed containers. |
| Conditions to avoid | Strong oxidisers, caustic or acid solutions, excessive heat. May degrade some paints and rubber materials. |
| Hazardous decomposition | Not fully, Analogous compounds evolve carbon monoxide, carbon dioxide and other unidentified fragments when burned. Burning may evolve irritating/noxious fumes. |
| Respiratory protection | Use in well ventilated areas - ventilate locally. |
| Protective clothing | Goggles or face shield should be worn. Gloves not necessary, but recommended, especially for prolonged exposure. |
| Spill / Leak procedure | Wear suitable protective equipment. Especially goggles. Stop source of spill. Use absorbent materials to soak up fluid (i.e. sand, sawdust and commercially available materials). |
| Disposal | Incinerate the oil and all associated wastes in an approved facility in accordance with local laws and regulations governing oily wastes. |
| Fire extinguishing data | Flash point over 300°C. Use dry chemical, carbon dioxide or foam. Spraying water on hot or burning liquid may cause frothing or splashing. |
| | If a leak or spill has not ignited use water spray to disperse the vapours and to provided protection for persons attempting to stop the leak. |
| Containers | Fire exposed containers should be kept cool with water sprays. |
| Fire fighting protective equipment | Self contained breathing apparatus should be worn in fire conditions. |

| Thermal & Acoustic Materials Data | |
|---|---|
| Health Hazard & First Aid | Toxicity Index <10 to NES713 Issue 3 (1991): Non-hazardous, non-toxic. No first aid necessary. |
| Stability / Reactivity | Stable. |
| Handling / Use / Disposal | No special handling precautions required. Dispose of according to local laws and regulations governing non-biodegradable non-hazardous solid wastes. |
| Fire & Explosion | Flammability rating Class 1 to BS 476 pt 7: Non-flammable. If forced to burn, combustion products are typically over 95% carbon dioxide and carbon monoxide. |

Page Left Intentionally Blank

## 2. Specification

YGWH water cooled chillers are completely factory assembled with all interconnecting refrigerant piping and wiring ready for field installation.

The unit is pressure tested, evacuated, and fully factory charged with refrigerant R134a and oil in the independent refrigerant circuit. After assembly, an operational test is performed with water flowing through the heat exchanger to ensure that the refrigerant circuit operate correctly.

YGWH units are designed and manufactured within an EN ISO 9001 accredited organisation and in conformity with the following safety standards:

- NB/T 47012
- GB/T18430.1
- GB25131

YGWH units are designed to work independently, or in conjunction with other equipment via Modbus building management systems or other automated control systems.

### Sound Standards

The sound data for YGWH water cooled chillers conforms to, and is rated in accordance with ARI Standard 575.

### Compressor

A semi-hermetic screw compressor is provided to ensure high operational efficiency and reliable performance. Capacity control is achieved through slide valve. The compressor is a positive displacement type characterized by two helically grooved rotors, which are manufactured from forged steel. The 50 Hz motor operates at 2950 rpm to directly drive the male rotor, which in turn drives the female rotor on a light film of oil.

Each compressor is direct drive, semi-hermetic, rotary twin screw type and includes the following items:

- two screw rotors, manufactured from forged steel;
- a cast iron compressor housing precisely machined;
- a discharge check valve can prevent rotor backspin during shutdown;
- a suction vapour cooled, high efficient and reliable semi- hermetic motor has overload protection: thermistor and current overload protection.

Refrigerant vapour is sucked into the void created by the unmeshing of the male and female rotors. Further meshing of the rotors closes the rotor threads to the suction port and progressively compresses the vapour in an axial direction to the discharge port. The vapour is compressed in volume and increased in pressure before exiting at a designed volume at the discharge end of the rotor casing. Since the intake and discharge cycles overlap, a resulting smooth flow of vapour is maintained.

The rotors are housed in a cast iron compressor housing precision machined to minimize the void between the housing and the rotors. Contact between the male and female rotor is primarily rolling on a contact band on each of the rotor's pitch circle. It result in virtually no rotor wear and increased reliability.

The compressor incorporates a complete anti- friction bearing design for reduced power input and increased reliability. Four separated, cylindrical, roller bearings handle radial loads. Angular-contact ball bearings handle axial loads. Together they maintain accurate rotor positioning at all pressure ratios, thereby minimizing leakage and maintaining efficiency.

Motor cooling is provided by refrigerant vapour from the evaporator flowing across the motor. Over load protection includes overheat and current overload protections.

### Motor Starting

Star/Delta (S/D) open transition starter is used for compressor motor starting. The S/D starter utilizes 3 motor contactors and a starting relay. The starter allows inrush current to be limited to approximately 33%LRA for the first 4~10 seconds, with current changing to normal running current when the Delta connection is established

### Capacity Control

The compressors should start at the minimum load position and provide a capacity control within 25%~100% by using one continuous function slide valve.

The capacity control valve regulating spring returns the valve to the minimum load position to ensure compressor starting at the minimum motor load.

**Oil Separator**

The YGWH condenser has a built-in internal oil separator, to remove oil from the refrigerant and return it back to the compressor for lubrication. An oil sump is located in the oil separator, along with an oil level switch to assure the continuous oil supply.

All lubricant must flow through a renewable filter before it is supplied to compressor to lubricate the bearings and the rotors.

After lubricating the bearings, the oil is injected through an orifice located in the closed thread near the suction end of the rotors. The oil is automatically injected because of the pressure difference between the discharge pressure and the pressure at the suction end of the rotors. This lubricates the rotors as well as provides an oil seal against leakage around the rotors to assure refrigerant compression (volumetric efficiency).

An oil heater is located in the oil sump inside the condenser. The heater is thermostatically controlled to prevent refrigerant condensation into lubricant during shutdown.

**Refrigerant Circuit**

Each unit has an independent refrigeration circuit, the liquid line components include: a filter, a manual shut-off valve and throttling device (EEV or fixed orifice).

**Condenser**

The water-cooled condenser is a cleanable shell and tube type, with 19 mm thermally enhanced seamless copper tubes.

The condenser shell is equipped with a pressure relief valve set to 20.7 Bar. The condenser is manufactured and tested according to NB/T 47012.

The design working pressure is 10 bar on the waterside. The water connections are victaulic grooves as standard, HG20615 welded flanges are available as an option.

The external surface of the condenser shell on Heat Pump and Heat Recovery Units, is covered with 19 mm thick flexible closed-cell foam.

**Evaporator**

The evaporator is a shell and tube, falling film type heat exchanger equipped with a pressure relief valve set to 20.7 Bar.

The evaporator is manufactured and tested according to NB/T 47012.

The external surface of the evaporator shell is covered with 19 mm thick flexible closed-cell foam. The water connections are victaulic grooves as standard, HG20615 welded flanges are available as an option.

**Power Panel**

All controls are factory-wired and function tested. The panel enclosures are designed according to IP22 and are manufactured from powder-painted steel.

The panel is divided into power supply section, control section and starter section. The power supply section and control section have separated hinged, latched, and gasket sealed doors.

**Control Panel**

The control panel contains the main PCB (unit monitoring and control (external inputs / outputs)) and the OptiView™ LT Panel (HMI). The PCBs within the control and power panel function as a single microprocessor. Data exchange between the PCBs is via a RS485 communication bus.

**Control System**

The microprocessor control system is capable of single circuit control to maintain liquid temperature within programmed limits, as well as system safeties, displaying status, and daily schedules.

Remote starting and flow and equipment interlock can be accomplished by field supplied contacts.

Remote indications of alarms, run status and pump control are available as outputs.

Compressor starting/stopping and loading/unloading decisions are performed by the microprocessor to maintain leaving liquid temperature.

**Accessories and Options**

**Flow Switch**

A paddle type water flow switch with 10.3 bar DWP, which is applicable to chilled water and cooling water lines.

**Rubber Isolator Pads**

Rubber isolators for mounting under the tube sheets (field mounted).

**Spring Isolators**

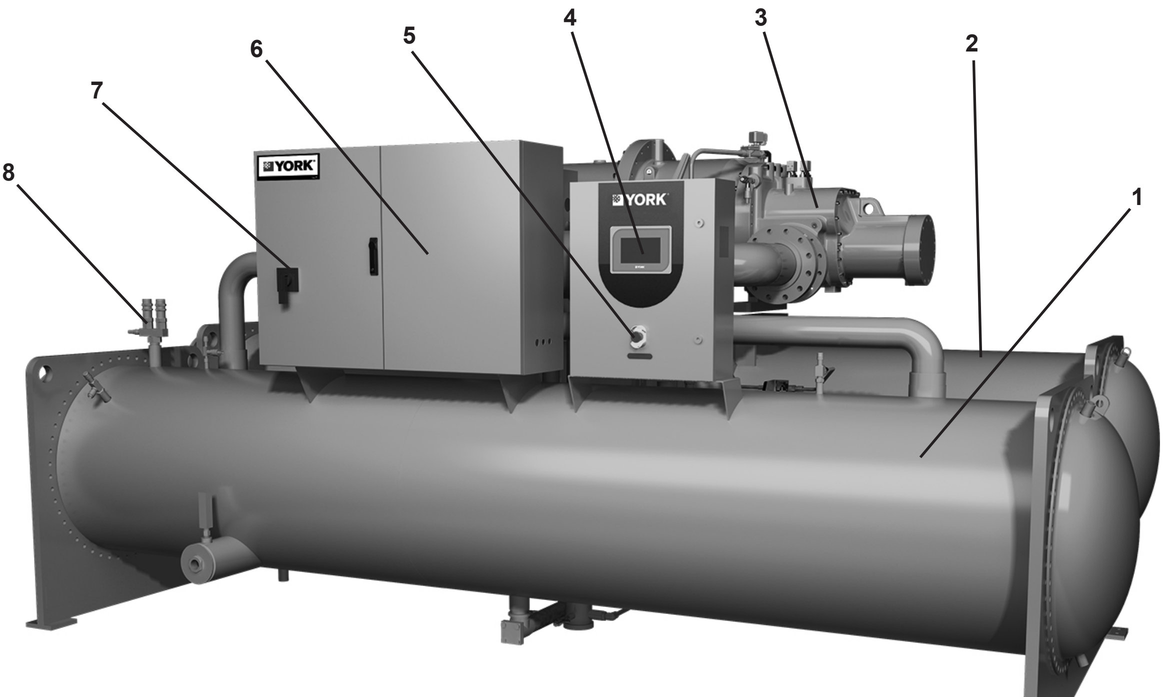
Level adjustable, spring and cage type isolators for mounting under the tube sheets (field mounted).

## Nomenclature

# YGWH180CA50A

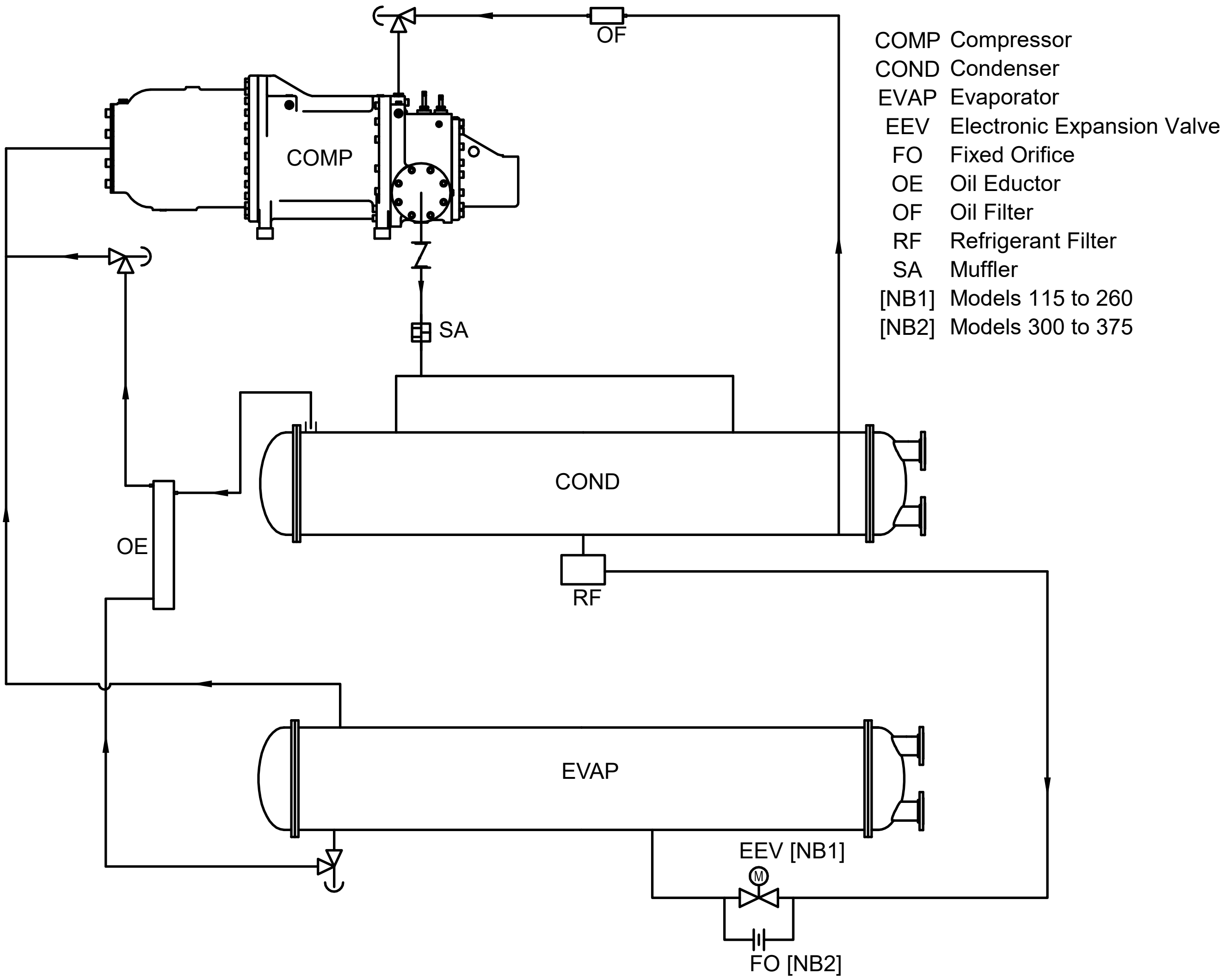
| 1 2 3 4 BASE PRODUCT TYPE | 5 6 7 NOMINAL CAPACITY | 8 APPLICATION TYPE | 9 REFRIGERANT | 10 11 VOLTAGE | 12 DESIGN / DEVELOPMENT LEVEL |
|---|---|---|---|---|---|
| Y : York | # # # TR | C : Comfort Cooling | A : HFC-134a | 5 0 : 380 / 3 / 50 | A : Design Series |
| G : GT Compressor | :115, 145, 180, 225, | D : Ice storage dual conditions | | 5 3 : 400 / 3 / 50 | |
| W : Water cooled | 260, 300, 330, 375 | | | 5 5 : 415 / 3 / 50 | |
| H : High Efficiency | | | | | |

## Component Location Diagram



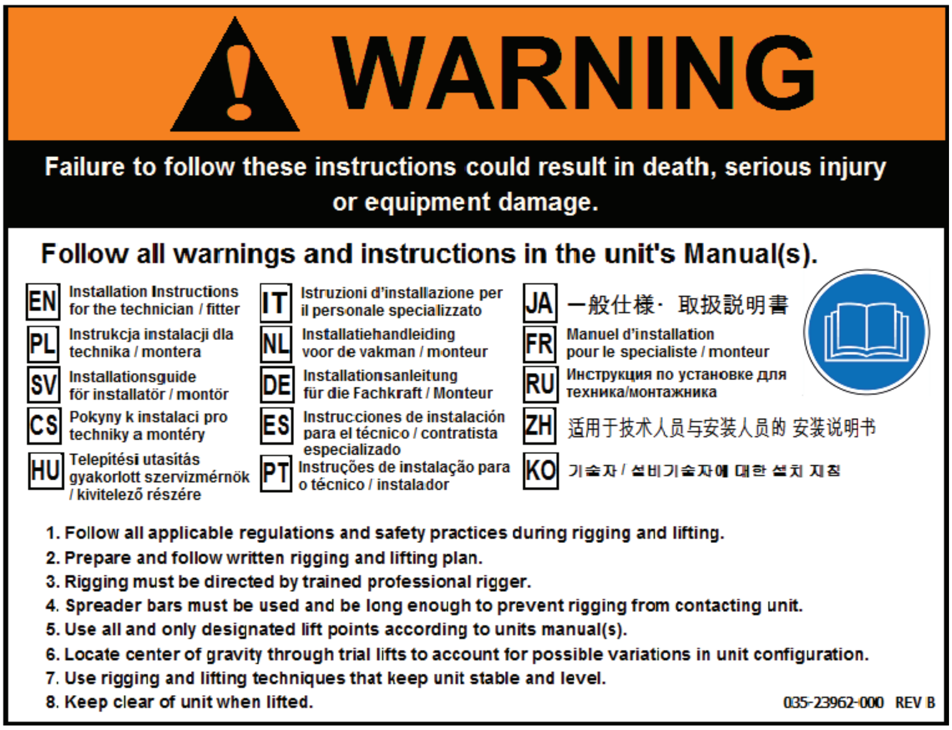

1 Condenser
2 Evaporator
3 Compressor
4 Control Panel
5 Emergency Stop Button
6 Power Panel
7 Circuit Breaker
8 Pressure Relief Valve

**Refrigerant Flow Diagram**




Low pressure liquid refrigerant enters the cooler and is evaporated and superheated by the heat energy absorbed from the chilled water passing through the cooler tubes. The low pressure vapour is returned to the compressor where the pressure and temperature are increased. The high pressure and temperature refrigerant vapour enters the condenser and is condensed. The fully condensed and subcooled liquid refrigerant then enters the throttling device where pressure reduction and further cooling takes place before returning to the cooler.

## 3. Rigging, Lifting, Handling and Storage

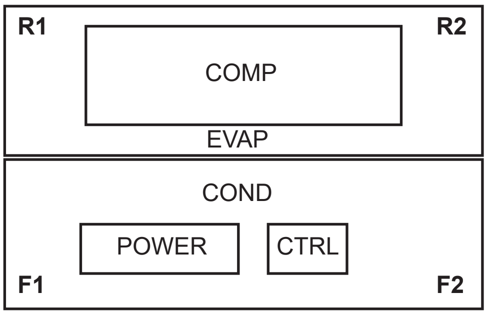



WARNING

**RIGGING AND LIFTING SHOULD ONLY BE DONE BY A PROFESSIONAL RIGGER IN ACCORDANCE WITH A WRITTEN RIGGING AND LIFTING PLAN. THE MOST APPROPRIATE RIGGING AND LIFTING METHOD WILL DEPEND ON JOB SPECIFIC FACTORS, SUCH AS THE RIGGING EQUIPMENT AVAILABLE AND SITE NEEDS. THEREFORE, A PROFESSIONAL RIGGER MUST DETERMINE THE RIGGING AND LIFTING METHOD TO BE USED, AND IT IS BEYOND THE SCOPE OF THIS MANUAL TO SPECIFY RIGGING AND LIFTING DETAILS. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN DEATH, SERIOUS INJURY OR EQUIPMENT DAMAGE.**

### Weights and Weight Distribution

Refer to the unit nameplate for unit shipping weight. Note that weight may vary depending on unit configuration at the time of lifting. Standard weights and weight distribution are given below:




| YGWH Model | Weight (kg) | | Point Weight (kg) | | | |
|---|---|---|---|---|---|---|
| | Shipping | Operating | F1 | F2 | R1 | R2 |
| **115** | 3906 | 4307 | 1124 | 1160 | 996 | 1027 |
| **145** | 4588 | 5089 | 1317 | 1356 | 1190 | 1226 |
| **180** | 5632 | 6270 | 1451 | 1479 | 1654 | 1686 |
| **225** | 6040 | 6839 | 1579 | 1620 | 1796 | 1843 |
| **260** | 7102 | 7802 | 2118 | 2148 | 1856 | 1883 |
| **300** | 8053 | 8882 | 2051 | 2077 | 2362 | 2392 |
| **330** | 8242 | 9271 | 2490 | 2527 | 2111 | 2143 |
| **375** | 8837 | 9948 | 2278 | 2310 | 2662 | 2699 |

## Delivery and Storage

To ensure consistent quality and maximum reliability, all units are tested and inspected before leaving the factory. The chiller may be ordered and shipped in any of the following forms:

- Form 1 (shipped complete)
- Form 2 (shipped without refrigerant charge)

Units are filled with YORK L oil and shipped without export crating, unless crating has been specified on the Sales Order.

If the unit is to be put into storage, prior to installation, the following precautions should be observed:

- Ensure that the unit is not exposed to wind and rain.
- Ensure that all openings, such as water connections, are securely capped.
- The unit should be stored in a location where there is minimal activity to limit the risk of accidental physical damage.
- To prevent inadvertent operation of the pressure relief devices the unit must NOT be steam cleaned.
- It is recommended that the unit be periodically inspected during storage.
- If the unit is stored for longer than six months, you must comply with screw chiller requires long-term storage requirements detailed in documents (Form 50.20-NM9 / Form 50.20-CL9 / Form 50.20-NM1).

## Inspection

The unit shipment should be checked on arrival to see that all major pieces, boxes and crates are received. Each unit should be checked on the trailer or rail car when received, before unloading, for any visible signs of damage. Any damage of signs of possible damage must be reported to the transportation company immediately for their inspection.

When received at the job site,all containers should be opened and the contents checked against the packing list. Any material shortage should be reported to YORK immediately.

## Rigging

Prior to moving the unit, ensure that the installation site is suitable for installing the unit and is easily capable of supporting the weight of the unit and all associated services.

The unit should be lifted in accordance with the written rigging and lifting plan, using chains and shackles. The shackles should be inserted into the respective holes in the tube end sheets (lifting holes in the tube end sheet are for a 6.8 shackle).

Use spreader bars to avoid lifting chains hitting the chiller. Various methods of spreader bar arrangements may be used, keeping in mind the intent is to keep the unit stable and to keep the chains from hitting the chiller and causing damage.


Do not move the unit on rollers, or lift it using a forklift.

## 4. Installation

The YGWH unit is shipped as a single factory assembled, piped, wired and refrigerant charged package (or nitrogen holding charge), requiring a minimum of field labour to make chilled water connections, condenser water connections, refrigerant atmospheric relief connections, and electrical power connections.

York representatives will provide unit installation inspection, initial start-up and other services as detailed in the supply contract.

The YORK Warranty will be voided if the following restrictions are not adhered to:

- No valves or connections should be opened under any circumstances because such action will result in loss of the factory charged refrigerant or nitrogen.
- Do not dismantle or open the Unit for any reason except under the supervision of a YORK representative.
- Do not make final power supply connections to the compressor motor or control panel.
- Do not charge the compressor with oil.
- Do not attempt to start the system.
- Do not supply the evaporator with hot water (temperature limit is 38°C (100°F) or steam

### Location Requirements

YGWH units are low noise, and low vibration and can be located in any building or structure that is level (within 6 mm) and can withstand the weight of the entire unit.

The unit should be located in an indoor location where temperature ranges from 4°C to 43°C and the altitude is less than 2000 metres.

The units are furnished with neoprene vibration isolator mounts for basement or ground level installations. Unit may by located on upper floor levels providing the floor is capable of supporting the total unit operating weight (in this application, the spring isolator option is recommended).

A level floor, mounting pad or foundation must be provided by others, capable of supporting the operating weight of the unit.

There should be sufficient clearances at the sides and top of the unit to carry out routine maintenance work. In addition, tube removal space should be allowed at one end of the unit for cleaning the evaporator and condenser tubes, a doorway or other suitable hole maybe used.

Maintenance space requirements are as follows: Rear, Ends and Above Unit - 610 mm

Front of Unit - 914 mm

Tube Removal - See following tables

| YGWH Models | Tube removal space |
|---|---|
| 115, 145, 180, 225 | 2591 mm |

| YGWH Models | Tube removal space |
|---|---|
| 260, 300, 330, 375 | 4267 mm |

### Installation of Vibration Isolators

The optional vibration isolators are shipped loose with the chiller.

Please refer to the floor layout drawing, for installation positions for the units.

### Isolator Installation

There are two types of isolator available: rubber pads or spring isolators.

### Locating and installing isolator pads

The isolator pads should be located in accordance with the floor layout drawing. After the isolator pads have been placed into position on the floor, lower the unit onto the pads. Make sure the pads are even with the edges of the mounting feet. When the unit is in place, remove the rigging equipment and check that the chiller is level, both longitudinally and transversely.

| YGWH115, YGWH145, YGWH180, YGWH225 | | |
|---|---|---|
| Unit Weight (kg) | Unit Weight (lbs) | Part No. |
| UP TO 7423 | UP TO 16365 | 028W14462-000 |

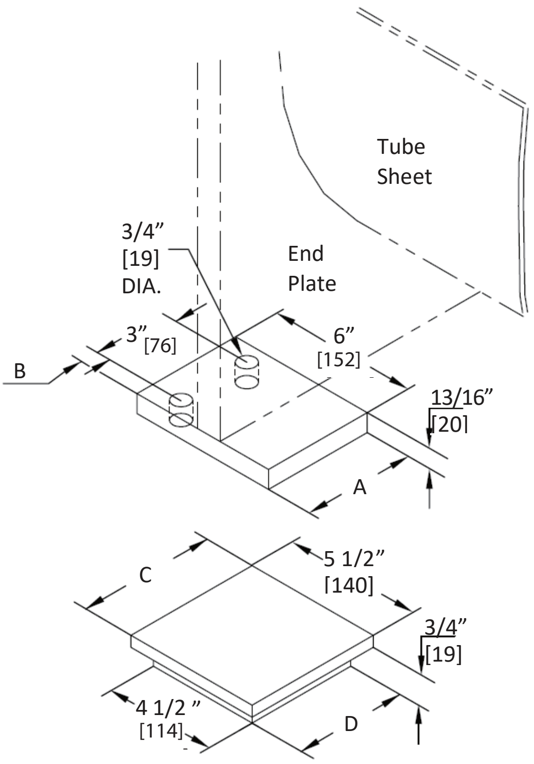
| YGWH260, YGWH300, YGWH330, YGWH375 | | |
|---|---|---|
| Unit Weight (kg) | Unit Weight (lbs) | Part No. |
| 7424 TO 13079 | 16366 TO 28835 | 028W14459-000 |

The longitudinal alignment of the unit should be checked by placing a level on the top centre of the evaporator shell under the compressor. Transverse alignment should be checked by placing a level on top of the shell end sheets at each end of the unit.

The unit should be level within 6.4 mm from one end to the other end and from front to rear. If the chiller is not level within the amount specified, lift it and place shims between the isolation pad and the tube sheets.

### Checking the Isolator Pads Deflection

All isolator pads should be checked for the proper deflection while checking the level of the unit. Each pad should be deflected approximately 4 mm (0.15"). If an isolator pad is under deflected, shim should be placed between the unit tube sheet and the top of the pad to equally deflect all pads.



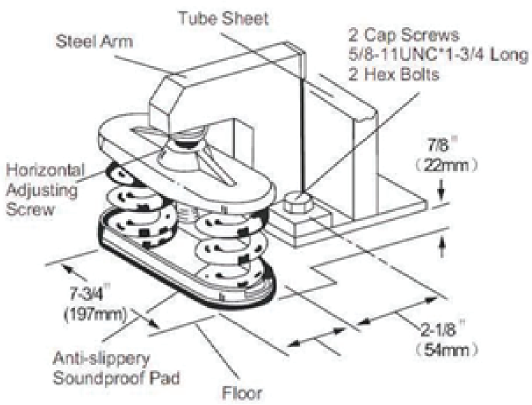

| Dim. mm (") | YGWH Models | |
|---|---|---|
| | 115, 145, 180, 225 | 260, 300, 330, 375 |
| A | 152 (6") | 152 (6") |
| B | 38 (1-1/2") | 38 (1-1/2") |
| C | 140 (5-1/2“) | 178 (7") |
| D | 114 (4-1/2“) | 152 (6") |

### Installing Option Spring Isolators

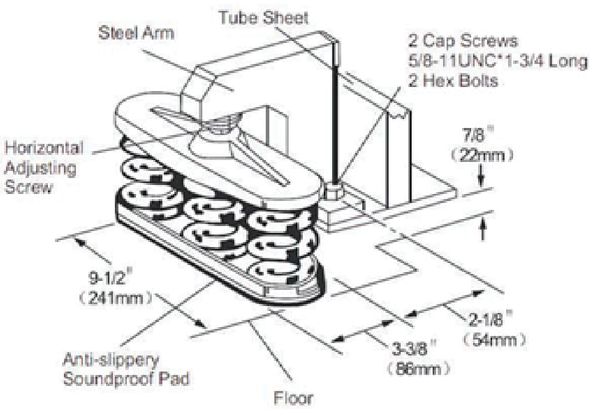
In order to mount spring isolators, first remove the nuts and screws on the spring isolator supports. Before the unit is positioned, the isolator supports should be bolted to the unit support. Position the 4 spring isolators, screw out the adjusting screws on each isolator until they reach out to match the isolator support holes. Then lower down the unit on the adjusting screws.

The levelling bolts should now be rotated one (1) turn at a time, in sequence, until the unit end sheets are clear of the floor or foundation by 22 mm (7/8") and the unit is level. Check that the unit is level, both longitudinally and transversely. If the levelling bolts are not long enough to level unit due to an uneven or sloping floor or foundation, steel shims (ground, if necessary) must be added beneath the isolator assemblies as necessary.

After the unit is levelled, wedge and shim under each corner to solidly support the unit in this position while piping connections are being made, pipe hangers adjusted and connections checked for alignment. Then the unit is filled with water and checked for leaks. The levelling bolts should now be finally adjusted until the wedges and shims can be removed the unit should now be in correct level position, clear of the floor or foundation and without any effect from the weight of the piping.




Part No.: 029W27514-###




Part No.: 029W27515-###

| YGWH115 | | |
|---|---|---|
| Unit Weight (kg) | Unit Weight (lbs) | Part No. |
| 3115 TO 4453 | 6866 TO 9818 | 029W27514-002 |

| YGWH145 | | |
|---|---|---|
| Unit Weight (kg) | Unit Weight (lbs) | Part No. |
| 4454 TO 5526 | 9819 TO 12182 | 029W27514-003 |

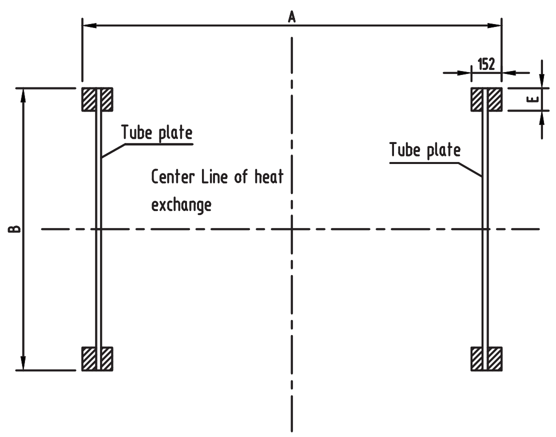
| YGWH180, YGWH225 | | |
|---|---|---|
| Unit Weight (kg) | Unit Weight (lbs) | Part No. |
| 5527 TO 6927 | 12183 TO 15272 | 029W27514-004 |

| YGWH260 | | |
|---|---|---|
| Unit Weight (kg) | Unit Weight (lbs) | Part No. |
| 6928 TO 8288 | 15273 TO 18272 | 029W27515-001 |

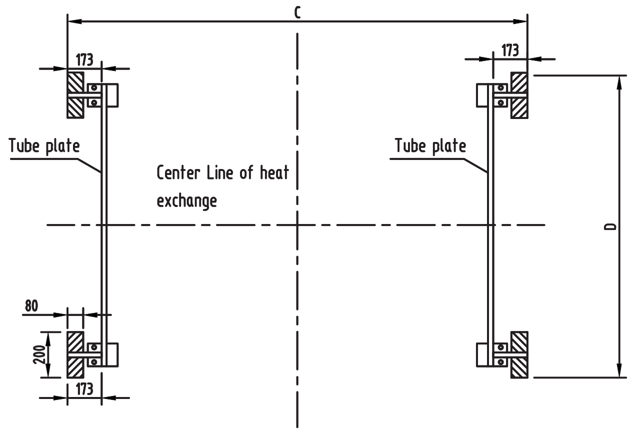
| YGWH300, YGWH330, YGWH375 | | |
|---|---|---|
| Unit Weight (kg) | Unit Weight (lbs) | Part No. |
| 8289 TO 10391 | 18273 TO 22909 | 029W27515-002 |

## YGWH Floor Layout Diagram

Rubber Isolator Pad Layout




Spring Isolator Layout




| Model | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 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 | 4407 | 2060 | 4613 | 2138 | 152 | 230 |
| YGWH375 | 4407 | 2060 | 4613 | 2138 | 152 | 230 |

**Piping Connections**

The following connection recommendations are intended to ensure safe and satisfactory operation of the unit. Failure to follow these recommendations could cause harm to persons, or damage to the unit, and may invalidate the warranty.

CAUTION

The maximum flow rate and pressure drop for the evaporator and condenser must not be exceeded at any time. Refer to Section 9 for details.

A flow switch must be directly in series with the evaporator/ condenser and wired back to the control panel using screened cable. For details, refer to customer connection diagram. This is to prevent damage to the evaporator/ condenser caused by inadequate liquid flow. A paddle type flow switches are suitable for 10 bar working pressure.

The chilled water pump should be installed in the entering water pipe. Pipework and fittings must be separately supported to prevent any loading on the unit. Flexible connections are recommended which will also minimize transmission of vibrations to the building. Flexible connections must be used if the unit is mounted on anti-vibration mounts as some movement of the unit can be expected in normal operation.

Pipework and fittings immediately next to the evaporator should be readily dismantled to enable cleaning prior to operation, and to facilitate visual inspection of the heat exchanger nozzles.

A strainer must be mounted on the waterside of the evaporator and condenser respectively, preferably of 40 mesh, fitted as close as possible to the liquid inlet connection, and provided with a local water cut-off switch.

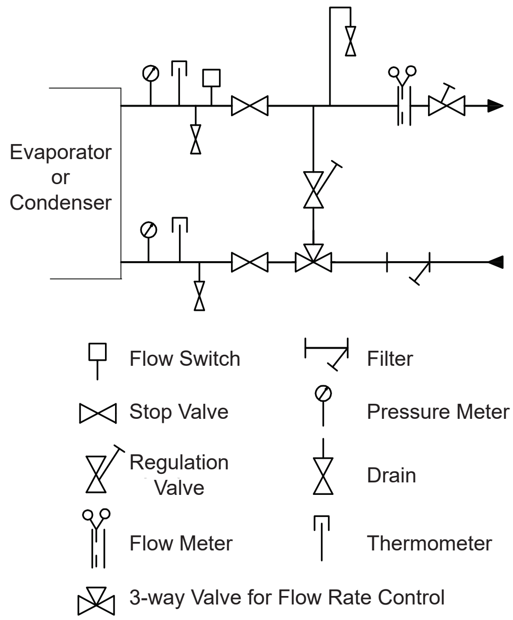
The evaporator must not be exposed to too high flushing velocities or debris deposited during flushing. It is recommended that a suitably sized by-pass and valve arrangement be installed to allow flushing of the pipework system. The by-pass can be used during maintenance to isolate the evaporator without disrupting flow to other units.

Thermometer and pressure gauge connections should be provided on the inlet and outlet connections of the evaporator and condenser.

Drain and vent valves (by others) should be installed in the connections provided in the cooler and condenser liquid heads. These connections may be piped to drain if desired.

CAUTION

Any debris left in the water piping between the strainer and cooler could cause serious damage to the tubes in the cooler and must be avoided. The installer/user must also ensure that the quality of the water in circulation is adequate, without any dissolved gases, which can cause oxidation of steel parts within the cooler.




**Water Treatment**

The unit performance provided in the design guide is based on a fouling factor of (0.044 m²/KW for condenser and 0.0018 m²/KW for evaporator). Dirt, scale, grease and certain types of water treatment will adversely affect the heat exchanger surfaces and therefore the unit performance. Foreign matter in the water system(s) can increase the heat exchanger pressure drop, reducing the flow rate and causing potential damage to the heat exchanger tubes. YORK recommends that a water treatment specialist should be consulted to determine whether the proposed water composition will adversely affect the evaporator materials of carbon steel and copper. The pH value of the water flowing through the evaporator must be kept in a range between 6.5 and 8.0. The water quality of chiller should be in accordance with local code.

Quality requirement of water used in chiller

| Name | Unit | Allowable value | Corrosion | Fouling |
|---|---|---|---|---|
| PH value(25°C) | - | 6.5 to 8.0 | X | |
| Conductivity(25°C) | s/cm | <800 | X | |
| Chloridion | mg/L | <200 | X | |
| Sulphate ion | mg/L | <200 | X | |
| Acid wastage | mg/L | <100 | | X |
| Total Hardness | mg/L | <200 | | X |
| Calcium Hardness | mg/L | <150 | | X |
| SiO2 | mg/L | <50 | | X |

Notes:

1. The user should make regular inspections on the water quality before installation and during use. If the water quality does not meet the requirements, the heat exchange tubes will be in the danger of fouling, corruption and even leakage when using the 'Defective' water long term.

2. Testing about the influence of using 'Defective' water whose quality exceeds the limits for long term shows that, the chiller will fail to run normally due to the heat exchanger tubes corrupting and leakage.

3. Fouling testing about the influence of using 'Defective' water whose quality exceeds the limits for long term shows that, the chiller capacity will be decreasing due to the heat exchanger tube fouling.

4. The water should be drained out of the heat exchangers, if the unit is stopped for a long time, it is suggested that the heat exchanger tubes should be cleaned after each long term stop.

5. User will be responsibility for any losses caused by poor water quality.

### Pipework Arrangement

The following are suggested pipework arrangements for single unit installations. For multiple unit installations, each unit should be piped as per the relative drawings.

### Connection Types and Sizes

Please refer to the physical data table for connection sizes of each model.

The piping connections of evaporator and condenser are victaulic grooves as standard, HG20615 welded flanges are available as an option.

### Refrigerant Relief Valve Piping

The evaporator and condenser are each protected against internal refrigerant overpressure by refrigerant relief valves. It is recommended that each valve should be piped to the exterior of the building so that when the valve is activated the release of high pressure gas and liquid cannot be a danger or cause injury.

The size of any pipework attached to a relief valve must be of sufficient diameter so as not to cause resistance to the operation of the valve. Unless otherwise specified by local regulations, the internal diameter depends on the length of pipe required and is given by the following formula:

D5 =1.447 x L

Where:

D = minimum pipe internal diameter in centimetres (cm) L =length of pipe in meters (m)

If relief pipework is common to more than one valve, its cross sectional area must be at least the total required by each valve. Valve types should not be mixed on a common pipe. Precautions should be taken to ensure that the exit of relief valves/vent pipe remain clear of obstructions at all times.

### Electrical Connection

The following electrical connection recommendations are intended to ensure safe and satisfactory operation of the unit. Failure to follow these recommendations could cause harm to persons, or damage to the unit, and may invalidate the warranty.

No additional controls (relays, etc.) should be mounted in the control panel. Power and control wiring not connected to the York control panel should not be run through the control panel. If these precautions are not followed it could lead to a risk of electric shock. In addition, electrical noise could cause malfunctions or damage the unit and its controls.

Since some internal components are live when main power is switched on, the unit should not be switched on, until it has been commissioned by York authorized personnel after connection.

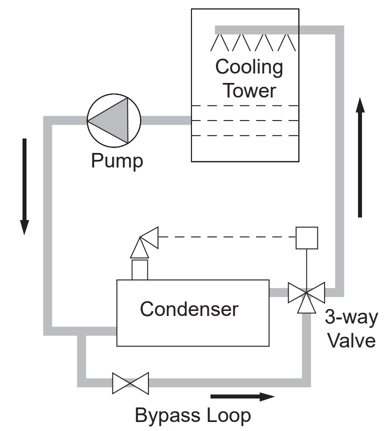
### Condenser Cooling Water System

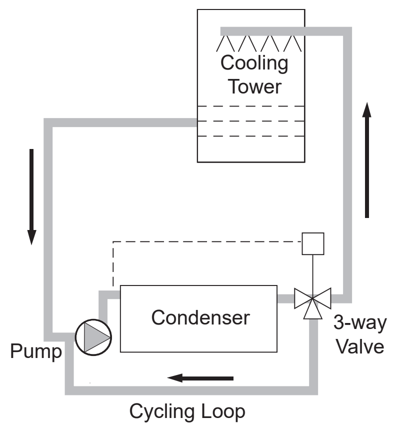
For YGWH units, condensers are usually piped in conjunction with a cooling tower.

With water cooled units it is necessary to control the condenser water flow and/or temperature into the condenser to maintain refrigerant pressure as constant as possible to ensure satisfactory operation of the unit.

**Direct Pressure Control**

With YGWH units it is possible, if desired, to control the condenser cooling liquid inlet temperature/flow directly from the unit refrigerant pressure. The refrigerant pressure can either be used to control cooling tower effectiveness by controlling fans or dampers on the tower, or to control condenser water flow using a three way bypass valve. The purpose of this method is to keep a low and steady discharge pressure .But with the units using R134a refrigerant, it is essential that the discharge pressure should be higher than suction pressure for more than 3 bar. In that case, units should be controlled by a certain setpoint higher than suction pressure or be controlled by the suction pressure and a pressure difference. However, the temperature and flow rate of cooling water should not exceeds the allowable range.




**Inlet Temperature Control**

For a cooling tower system the simplest forms of control is to use fan cycling, fan speed control, or air damper control, with the tower having a thermostat in its sump. This will ensure stable condenser cooling liquid temperature and should be adjusted to ensure a condenser cooling liquid entering temperature of not lower than 21°C to 24°C at lower ambient conditions.

If these methods are not available, or a cooling tower is not the source of cooling water, then a three way valve recirculation system can be used with control based on condenser inlet liquid temperature as shown in the diagram above. In this case the objective is to maintain the inlet cooling liquid temperature as low as possible, although still observing the minimum limit of 21°C to 24°C.

**Variable Primary Flow**

Johnson Controls recommends a maximum 10% per minute flow rate change, based on design flow, for variable primary applications. Provide 8 to 10 gallons per chiller ton (8.6 to 10.8 litres per cooling kW) system water volume. Insufficient system volume and rapid flow changes can cause control problems or chiller shutdowns. There are many other design issues to evaluate with variable primary flow systems. Consult your Johnson Controls Sales Office for more information for YGWH chillers.

**Power Wiring**

The allowable variation range of power supply voltage is ±10%.

All electrical wiring should be carried out in accordance with local regulations.

In accordance with China National Standard it is the responsibility of the user to install overload protection (current) for input power supply to the unit.

All sources of supply to the unit must be taken via a common point of isolation (not supplied by York).

**Single Point Power Supply Wiring**

Models require field provided 380V / 400 V / 415 V, 3P / 50Hz power supply to the unit with circuit protection. Connect the power supply to the circuit breaker located in the power panel on site. Refer to customer connection diagram.

**Control Panel Wiring**

The power connected to the I/O board input terminals is 24 Vdc while the power connected to the I/O board output terminals is 220 Vac.

The wiring for 220 Vac power must use dry-contacts (It is suggested to use the golden contact).If the dry-contact is part of a relay or a contactor, a capacitance-resistance suppressor winding must be used to minimise Electromagnetic Interference. Make sure that the above precautions are followed to avoid the Electromagnetic Interference, which may result in the fault or damages on the unit or the controller.

The length of cable connected to these terminals should not exceed 7.5 metres.

**220 Vac Outputs**

**Water pump starter**

Terminal 60 provides a 220 Vac output for water pump control. Starting and stopping of pump can be achieved by a contactor and the programmed start /stop.

Note: The power load should not exceed 5W.

**Alarm**

Terminal 68 provides a 220 Vac output to indicate an alarm condition.

Note: The power load should be less than 5W.

**24 Vdc Inputs**

**Flow switch**

A suitable water flow switch must be connected to terminals 11 and 0 to provide adequate protection against loss of condenser liquid flow.

A suitable water flow switch must be connected to terminals 12 and 0 to provide adequate protection against loss of evaporator liquid flow.

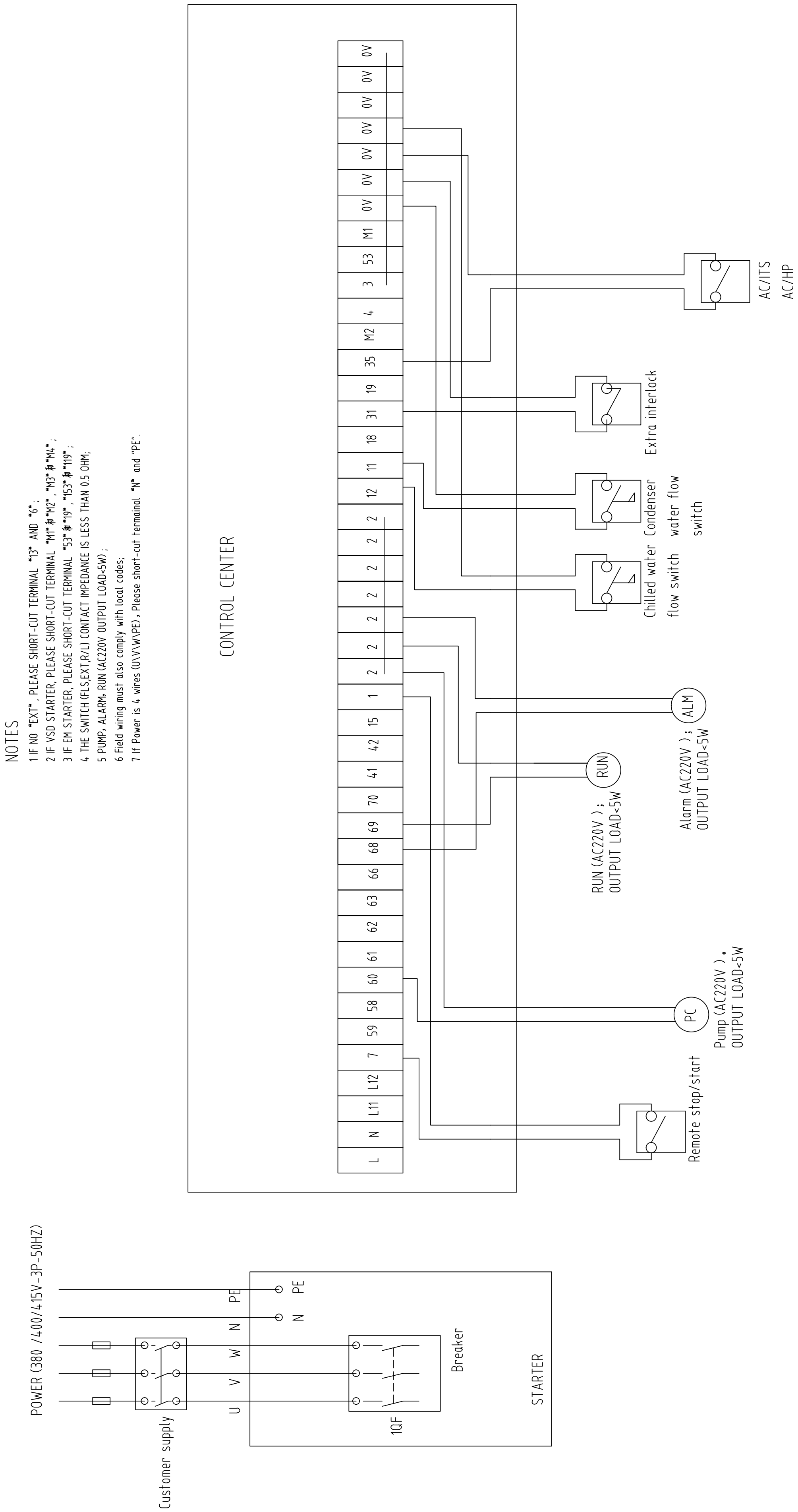
Note: Contact resistance should be less than 0.5Ω.

**220 Vac Remote Run/Stop**

Connect a remote switch between 7 and 1 to provide remote start/stop if required.

Note: Contact resistance should be less than 0.5Ω.

**Customer Connections**



# 5. Commissioning

## Preparation

CAUTION

**Commissioning of this unit should only be carried out by Johnson Controls Authorised personnel.**

This section must be read in conjunction with the control system operation, in Section 6.

Power Off

The following basic checks should be made with the customer power supply to the unit switched off.

WARNING

Ensure all sources of supply to the unit are locked off, in the OFF position.

### Inspection

Inspect unit for installation damage. If found, take action or repair as appropriate.

### Refrigerant Charge

Packaged units are normally shipped as standard with a full refrigerant operating charge. Check that refrigerant pressure is present in the system and that no leaks are apparent. If no pressure is present, a leak test must be undertaken, located and repaired the leak(s). These systems must be evacuated with a suitable vacuum pump/recovery unit as appropriate to below 500 mHg.

### Valves

Open discharge valve on compressor and liquid line angle valve under condenser fully (counter-clockwise) then close one turn of the stem to ensure operating pressure is fed to pressure transducers. Open all angle valves on the oil return line and eductor line.

### Isolation / Protection

Verify all sources of electrical supply to the unit are taken from a single point of isolation.

### Control Panel

Make sure the control panel is free of foreign materials (wire, metal chips, etc.) and clean out foreign materials if found.

### Power Connections

Check that the customer power cables are connected correctly to the circuit breaker. Ensure that connections of power cables within the panels to the circuit breaker are tight.

### Earthing

Make sure all the protective conductor is properly and tightly connected to the ground.

### Oil heater

Verify that the oil heater is powered on. If the chiller has not had power applied for more than 15 days, the compressor are not allowed to run unless the oil heater has been on for more than 5 hours.

### Water System

Verify the chilled liquid system has been installed correctly, and has been commissioned with the correct direction of water flow through the cooler. The inlet should be connected to the bottom nozzle of water box of the cooler and the outlet to the top one. Purge air using the plugged air vent mounted on the top of water box.

Flow rates and pressure drops must be within the limits given in the Section 9. Out of these limits is undesirable and could cause damage.

### Low Temperature Brine Chiller

Confirm the freezing point of the evaporator brine fluid, using a hydrometer or an optical refractometer to test the concentration of the birne and calculate the freezing point. Concentrations and freezing points of glycol solution:

| E.G wt% | Freezing point °C | E.G wt% | Freezing point °C |
|---|---|---|---|
| 5 | -1.4 | 20 | -7.8 |
| 10 | -3.28 | 26 | -11.38 |
| 15 | -5.31 | 30 | -14.04 |

When working on the ITS mode, the LOW LELT / LEP UNLOAD / LEP SHUT DOWN should be reset. Confirm that the temperature corresponding to the LOW LELT / LEP UNLOAD / LEP SHUT DOWN are higher than the freezing point of brine, and that any of these two values should be at least 3°C higher than the brine freezing point.

Saturated temperature of R134a in difference pressure:

| Sat. Temp.°C | Press. kPa | Sat. Temp.°C | Press. kPa | Sat. Temp.°C | Press. kPa |
|---|---|---|---|---|---|
| -15 | 16 4 | -8 | 21 7 | -1 | 282 |
| -14 | 17 1 | -7 | 22 5 | 0 | 293 |
| -13 | 17 8 | -6 | 23 4 | 1 | 304 |
| -12 | 18 5 | -5 | 24 3 | 2 | 315 |
| -11 | 19 3 | -4 | 25 3 | 3 | 326 |
| -10 | 20 1 | -3 | 26 2 | 4 | 338 |
| -9 | 20 9 | -2 | 27 2 | 5 | 350 |

### Flow Switch

Verify a chilled water flow switch is correctly fitted in the customer's piping on the cooler outlet, and wired into the control panel correctly using shielded cable.

### Control Panel Power Supply

Confirm the control panel is powered on and the LCD screen can display normally.

### Programmed Options

Make sure all the options programmed into the panel are in accordance with the customers order requirements.

### Programmed Settings

Make sure all the setpoints are in accordance with the operating requirements. Water temperature should be set according to the unit type and operating conditions.

### Time and Date

Set the time/date using the Setting page.

### Start-up/Stop Programming

Set the Start/Stop timers, schedule days, special days, alternate day and holidays via the Schedule page.

### Setpoints

Set the setpoints and control range of the chilled/hot liquid.

The chiller is now ready to work.

### First Time Start-Up

NOTE

During the commissioning period there should be sufficient heat load to run the unit under stable full load operation to enable the unit controls, and system operation to be set up correctly, and a commissioning log taken. Be sure that the operating instructions in section 6 have been fully understood and the System Start-up Checklist is completed.

### Start-up

Press the ON/OFF key on the OptiView™ LT panel, and there may be a few seconds delay before the compressor starts because of the anti-recycle timer. Be ready to push the Emergency Switch immediately if any unusual noises or other adverse conditions appear during the compressor starting.

### Oil Pressure

When a compressor starts, inspect the running information from the OptiView™ LT panel, and verify that oil pressure develops immediately. If oil pressure does not develop, the automatic controls will shut down the compressor. Under no circumstances should a restart attempt be made on a compressor, which can not develop oil pressure immediately.

## 6. Unit Operation

### General

Units are designed to work independently, or in conjunction with other equipment via Modbus building management systems or other automated control systems.

### Control System

The microprocessor control system is capable refrigerant circuit control to maintain liquid temperature within programmed limits, as well as system safeties, displaying status, and daily schedules.

Remote starting and flow and equipment interlock can be accomplished by field supplied contacts.

Remote indications of alarms, run status and pump control are available as outputs.

Compressor starting/stopping and loading/unloading decisions are performed by the microprocessor to maintain leaving liquid temperature.

### OptiView™ LT Panel

The OptiView™ LT panel enables the user to control the unit operation either manually or automatically or via remote communications. In addition, it provides access to view, change and program parameters and system commands and view faults through an LCD touch screen.

All the data is displayed in metric values, in English or Chinese.

The following sections give an overview of the operation of the unit and the use of the OptiView™ LT panel.

Start-up

Check the main power supplies to the unit are ‘ON’, all refrigerant service valves are open (anti-clockwise one turn short of fully open) and both chilled and cooling liquid have a regular flow rate, then press the ‘ON/OFF’ key on the OptiView™ LT panel.

The controller will perform a pre-check to ensure that if there is any the daily/holiday schedule or remote interlocks to prohibit the unit to run, and all safety cut-outs are satisfied and the cooling or heating load is required (i.e. that the chilled liquid temperature is outside the set limits). Any problems found by the pre-check will be displayed. If no problems are found and cooling/heating load is required, the compressor will start.

Normal Running and Cycling

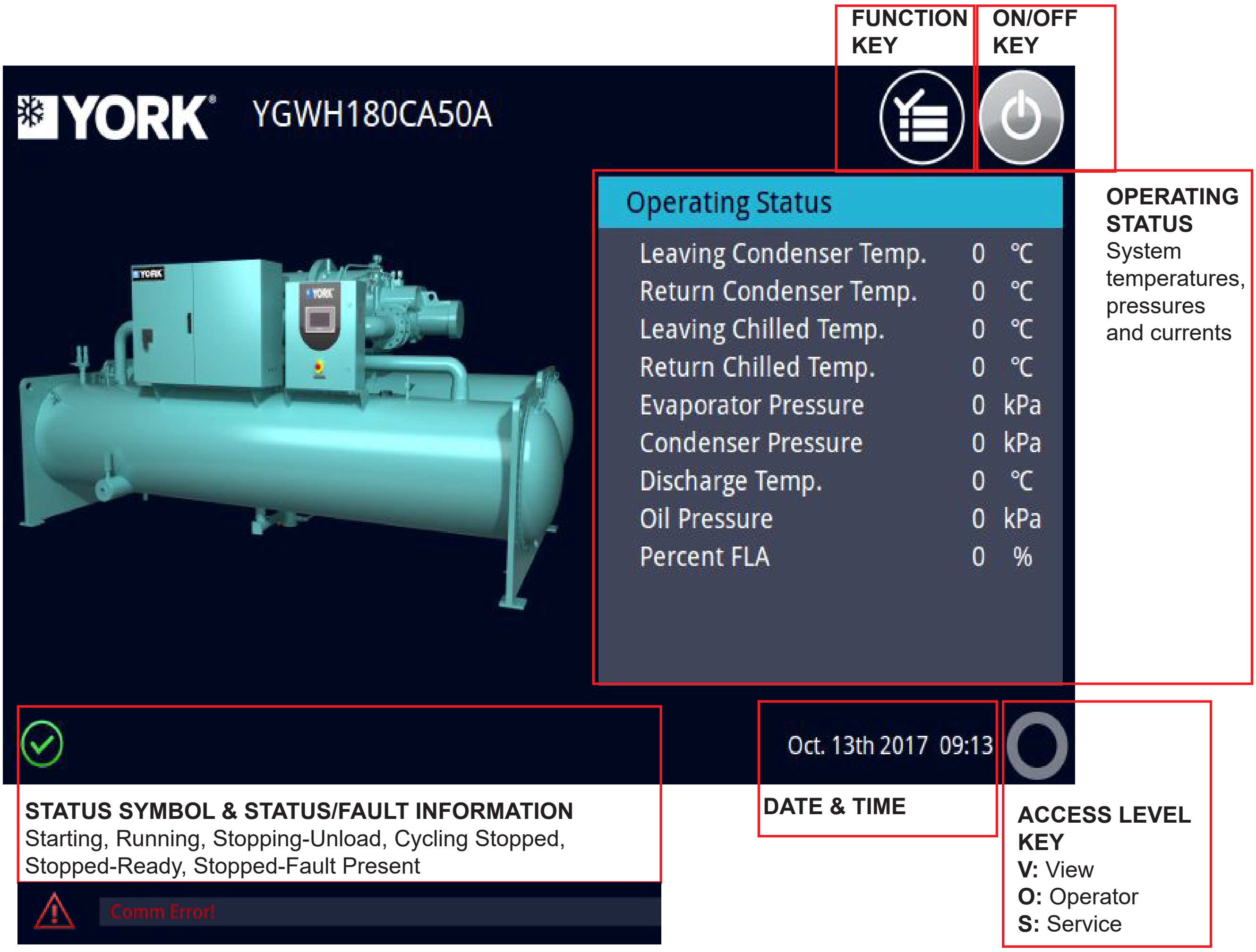
Once the unit has been started, all operations are fully automatic. After an initial period at minimum capacity on the compressor, the control system will adjust the unit load depending on the chilled liquid temperature and rate of temperature change. If very little heat load is present, the compressor will continue at minimum capacity or perform a cycling shutdown to avoid overcooling the liquid. In that case, the compressor will restart automatically when the liquid temperature rise again.

Once the compressor is running, the evaporated refrigerant vapour is pumped into the water cooled condenser, which results in the rise of discharge pressure.

Once the compressor is running the controller monitors oil pressure, motor current, and various other system parameters such as discharge pressure, chilled liquid temperature, etc. Should any problems occurs, the control system will immediately take appropriate action and display the nature of the fault.

After the unit stops, the check valve of compressor may send out some noises, which is caused by the internal refrigerant equalizing due to the pressure differential. It is a normal phenomenon and has no influence on the performance and reliability of unit.

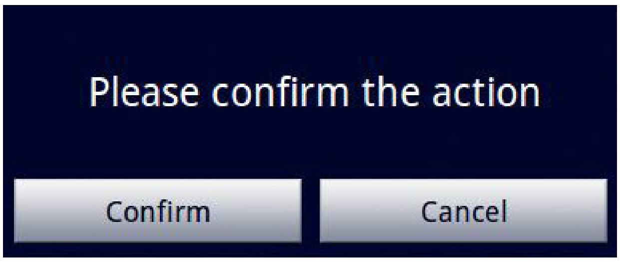
**Main (Home) Page**




This page displays unit current operating status and / or fault information and current time and date.

The ON/OFF key, is used to start or stop the unit. The ON/OFF key is active on all pages.

After actuation, confirmation is required to complete mode change.



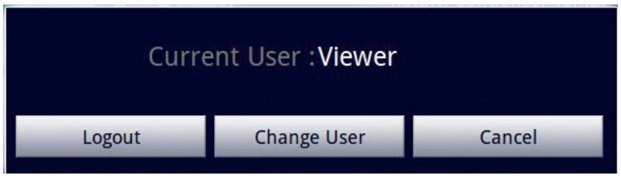

The ON/OFF key also indicates unit status (grey when unit is OFF or green when unit is operating). The key will also remain grey when the unit is prevented from starting by safety faults etc.

The ACCESS LEVEL key, is used to change the access level pages to the different pages. At power on, the access level is view.

NOTE

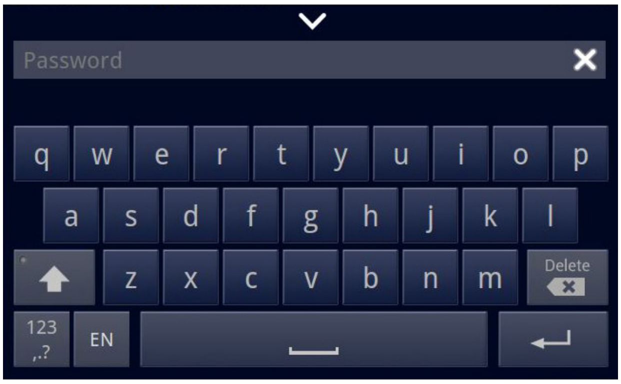
The ACCESS LEVEL key is only active on the Main (Home) page.

After actuation, confirmation is required using the Change User button to carry out the access level change.



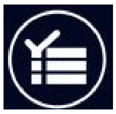

The Logout button is used to return to view access level.

After confirmation, the correct password must be entered for the required level (operator or service) and the entry confirmed by the enter key to complete the access level change.



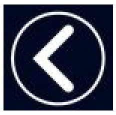


The alternate keypad is selected using the [123,.?] key on the qwerty keypad and vice/versa when entering the password.



The FUNCTION key is used to select the Function Page.

.

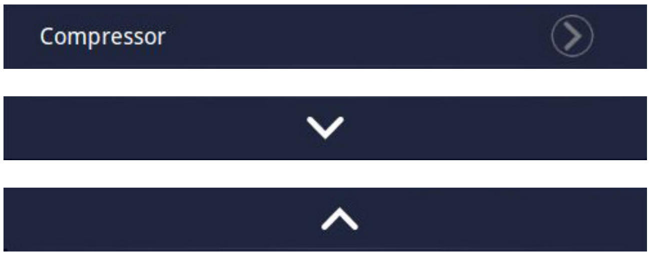


After the FUNCTION key has been activated, it is replaced with the RETURN key.

.

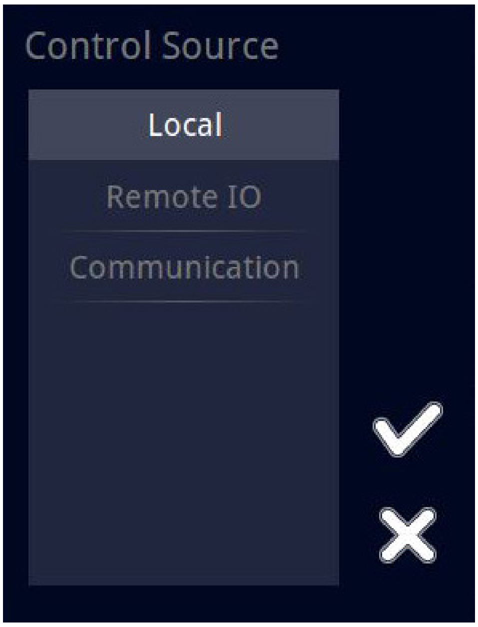
The HOME key enables instant return to the Main Page.

Navigation through the pages accessed via the FUNCTION key and Function page is completed through clicking related graphics or buttons:



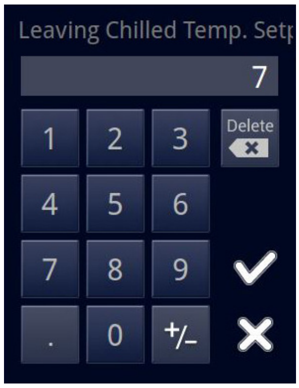
Programmable keys within the pages, allow parameters to be modified when permitted (by access level).

Option parameters are selected from the options in pop-up dialogue, only one option per parameter is selectable, and confirmed with the [TICK] or cancelled with the [CROSS].




Binary parameters (e.g. true or false) are changed by clicking the parameter item and pressing [Confirm].


Digital parameters are changed with the digital keyboard, which appears when the parameter is selected, and confirmed with the [TICK] or cancelled with the [CROSS].




The modification of parameters will be accepted if the value is within the parameter range.

**Function Page**

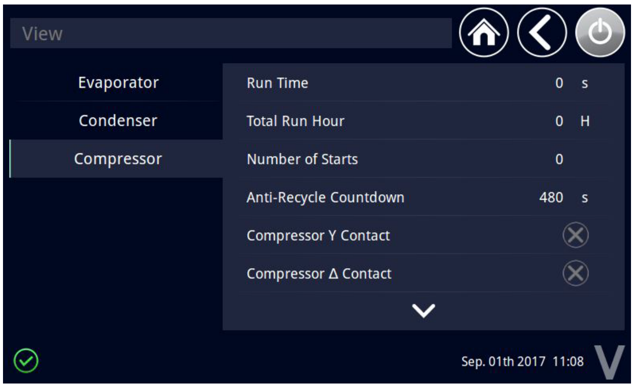
This page is used to navigate to pages within the panel.

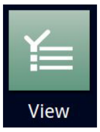

| | | Access Level | | |
|---|---|---|---|---|
| | | V | O | S |
| View | Evaporator | 👁 | 👁 | 👁 |
| | Condenser | 👁 | 👁 | 👁 |
| | Compressor | 👁 | 👁 | 👁 |
| Configure | System | | 🔧 | 🔧 |
| | Evaporator | 👁 | 🔧 | 🔧 |
| | Condenser | 👁 | 🔧 | 🔧 |
| | Condenser Level Control | | | 🔧 |
| | Compressor | 👁 | 🔧 | 🔧 |
| | Diagnostic | | | 🔧 |
| | Save History | | | 🔧 |
| History | Clear Safeties | | 🔧 | 🔧 |
| | Clear History | | | 🔧 |
| | Trend | 👁 | 🔧 | 🔧 |
| Schedule | Schedule Setting | 👁 | 🔧 | 🔧 |
| | Special Day | 👁 | 🔧 | 🔧 |
| Setting | Display | 👁 | 🔧 | 🔧 |
| | Date & Time | 👁 | 🔧 | 🔧 |
| | Security | | 🔧 | 🔧 |
| | Default | | | 🔧 |
| | Upgrade | | | 🔧 |
| | LoadConfigFile | | | 🔧 |
| | ExportConfigFile | | | 🔧 |
| | LoadUserConfigFile | | | 🔧 |
| | ExportUserConfigFile | | | 🔧 |
| | Calibration | | | 🔧 |
| | About | 👁 | 👁 | 👁 |
| | FCT | | | 🔧 |

👁 Values can be viewed 🔧 Values can be adjusted

**View Pages**

The view pages display the unit component operating temperatures, pressures, switch and pump status, runtime, starts timers and electrical data.

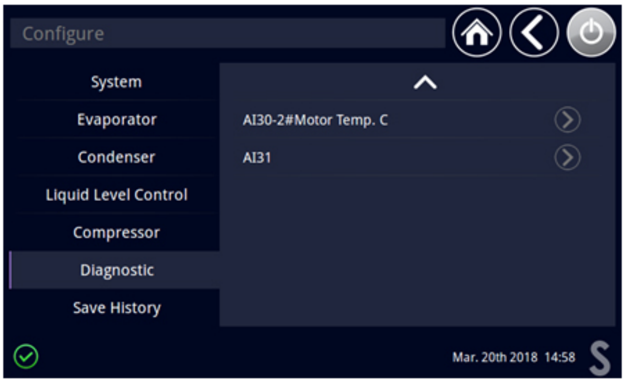



| | Pages | Item | Access (V / O / S) |
|---|---|---|---|
|  | Evaporator | Leaving Chilled Temp. |  |
| | | Return Chilled Temp. | |
| | | Evaporator Pressure | |
| | | Saturation Temp. | |
| | | Small Temp. Diff. | |
| | | Chilled Liquid Flow Switch | |
| | | Liquid Pump | |
| | | Pump Total Run Hour | |
| | Condenser | Leaving Condenser Temp. |  |
| | | Return Condenser Temp. | |
| | | Condenser Pressure | |
| | | Saturation Temp. | |
| | | Small Temp. Diff. | |
| | | Liquid Level | |
| | | Condenser Liquid Flow Switch | |
| | | Liquid Pump | |
| | | Pump Total Run Hour | |
| | Compressor | Run Time |  |
| | | Total Run Hour | |
| | | Number of Starts | |
| | | Anti-Recycle Countdown | |
| | | Compressor Y Contact | |
| | | Compressor Δ Contact | |
| | | Slide Valve Status | |
| | | Run Current | |
| | | Percent FLA | |
| | | Motor Temperature A | |
| | | Motor Temperature B | |
| | | Motor Temperature C | |
| | | Discharge Temp. | |
| | | Disch. Superheat | |
| | | Oil Pressure | |
| | | Liquid Injection Oil Cooling | |
| | | Oil Supply Circuit | |
| | | Oil Heater | |
| | | Low Oil Level Switch | |
| | | Hot Gas Bypass | |

 Values can be viewed

## Configure Pages

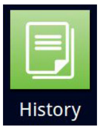

The configure pages are used to set the unit operating mode and parameters. Details of the settings and values are given in the following table. For detailed information on service parameters, contact your local Johnson Controls Service Centre.



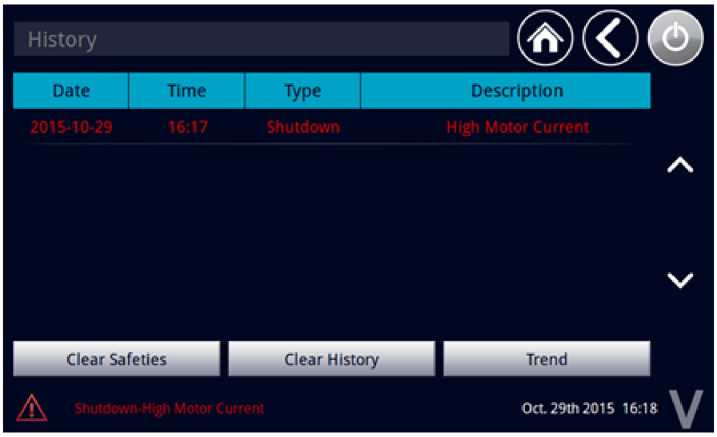

| Pages | Class | Item | Access Level | Values / Range |
|---|---|---|---|---|
| System | | Unit Type | O | Factory Set |
| | | Voltage Type | O | Factory Set |
| | | Running Mode<br>**(Unit must be stopped)** | O | Cooling, Ice Storage, Heat Pump, Remote.<br>Default: Cooling |
| | | Control Source | O | Local, Remote I/O, Communication.<br>Default: Local |
| | | Communication Address | O | Range: 1 to 247. Default: 1 |
| | | Schedule Start/Stop | O | Enable / Disable. Default: Disable |
| Evaporator | | Leaving Chilled Temp. Setpoint | O | Range: 4.0 to 21.0°C. Default: 7.0°C |
| | | D | O | After the unit cycling stops, if the leaving chilled temperature goes above the ‘Leaving Chilled Temp. Setpoint + D’, then the unit will cycle start.<br>Range: 0.5 to 2.0°C, default: 1.0°C |
| | | Db | O | When the unit is running, if the leaving chilled temperature falls below the ‘Leaving Chilled Temp. Setpoint - D - Db’, then the unit will cycle stop.<br>Range: 1.0 to 2.5°C, default: 2.5°C |
| | | Leaving Chilled Temp. | O | Actual Leaving Chilled Temp.<br>Display range: -20.0 to 80.0°C |
| | | Return Chilled Temp. | O | Actual Return Chilled Temp.<br>Display range: -20.0 to 80.0°C |
| | | Evaporator Pressure | O | Actual Evaporator Pressure.<br>Display range: 0.0 to 2069.0 kPa |
| | | Saturation Temp. | O | Actual Evaporator Saturation Temp.<br>Display range: -50.0 to 50.0°C |
| | | Small Temp. Diff. | O | Actual Evaporator Small Temp. Diff.<br>Display range: -20.0 to 20.0°C |
| Condenser | | Leaving Condenser Temp. | O | Actual Leaving Condenser Temp.<br>Display range: -20.0 to 80.0°C |
| | | Return Condenser Temp. | O | Actual Return Condenser Temp.<br>Display range: -20.0 to 80.0°C |
| | | Condenser Pressure | O | Actual Condenser Pressure.<br>Display range: 0.0 to 2758.0 kPa |
| | | Saturation Temp. | O | Actual Condenser Saturation Temp.<br>Display range: -50.0 to 50.0°C |
| | | Small Temp. Diff. | O | Actual Condenser Small Temp. Diff.<br>Display range: -20.0 to 20.0°C |

| Pages | Class | Item | Access Level | Values / Range |
|---|---|---|---|---|
| Compressor | Compressor | Discharge Temp. | O | Actual Discharge Temp.<br>Display range: -20.0 to 130.0°C |
| | | Disch. Saturation Temp. | O | Actual Disch. Saturation Temp.<br>Display range: -100.0 to 100.0°C |
| | | Disch. Superheat | O | Actual Disch. Superheat.<br>Display range: -100.0 to 100.0°C |
| | | Oil Pressure | O | Actual Oil Pressure.<br>Display range: 0.0 to 2758.0 kPa |
| | | Run Current | O | Actual Run Current.<br>Display range: 0.0 to 1000.0 A |
| | | Percent FLA | O | Percentage of actual Run Current divided by the FLA.<br>Display range: 0.0 to 100.0 %. |
| | | Motor Temperature A | O | Actual Phase A Motor Temperature.<br>Display range: 0.0 to 130.0°C |
| | | Motor Temperature B | O | Actual Phase B Motor Temperature.<br>Display range: 0.0 to 130.0°C |
| | | Motor Temperature C | O | Actual Phase C Motor Temperature.<br>Display range: 0.0 to 130.0°C |
| | | Anti-Recycle Countdown | O | Actual time of Anti-Recycle Countdown |

## History Page




This page is used to access the historical data on faults, safeties etc. that are stored during unit operation. The faults are listed sequentially on the page, with details of date, time, type and description of fault. For detailed information on Safety Faults, Cycling Stops and Warnings, refer to the Trouble Shooting Section.

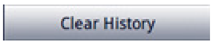



When a fault is selected, the history details are displayed listing the system parameters at the time of fault.

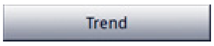
The following parameters can be checked on the details pages:

| ID | Parameter | UOM | ID | Parameter | UOM |
|---|---|---|---|---|---|
| 962 | Leaving Condenser Temp. | °C | 963 | Return Condenser Temp. | °C |
| 964 | Leaving Chilled Temp. | °C | 965 | Return Chilled Temp. | °C |
| 1165 | Evaporator Pressure | kPa | 943 | Condenser Pressure | kPa |
| 1206 | Discharge Temp. | °C | 1207 | Oil Pressure | kPa |
| 1221 | Run Current | A | 1223 | Percent FLA | % |
| 949 | Liquid Level | % | 1121 | Level Control AO | % |
| 1403 | Motor Temperature A | °C | 1404 | Motor Temperature B | °C |
| 1405 | Motor Temperature C | °C | 1069 | HMI Start/Stop | |
| 901 | Chilled Liquid Flow Switch | | 902 | Mode Switch | |
| 1375 | High Pressure Switch | | 904 | Low Oil Level Switch | |
| 1376 | Motor Internal Protect/Power Protect | | 906 | External Interlock | |
| 1377 | Starter Running Feedback | | 908 | Remote Switch | |
| 909 | EM Stop | | 1378 | Starter Fault Feedback | |
| 911 | Condenser Liquid Flow Switch | | 927 | Liquid Pump | |
| 1383 | Slide Valve Load | | 1384 | Slide Valve Unload | |
| 1391 | Compressor Star Contact | | 1392 | Compressor Delta Contact | |
| 930 | Oil Heater | | 931 | Hot Gas Bypass | |
| 932 | Alarm | | 935 | Unit Running | |
| 1393 | Liquid Injection Oil Cooling | | 1394 | Oil Supply Circuit | |
| 1074 | Total Run Hour | H | 1072 | Number of Starts | |
| 1080 | Unit Type | | 1082 | Control Source | |
| 1084 | Running Mode | | 1227 | FLA | A |
| 1417 | Over Current Percent | % | 1232 | Minimum Load Percent | % |
| 1418 | Leaving Chiller Temp. Setpoint | °C | 1419 | Evap. Low Press. Stop Setpoint | kPa |
| 1420 | Cond. High Temp. Stop Setpoint | °C | 1421 | High Press. Stop Setpoint | kPa |
| 1166 | Standby Anti-Freezing | | 1167 | Smart Freeze | |
| 1323 | Frequency Command | Hz | 1324 | Frequency Running | Hz |
| 1325 | BUS Voltage | V | 1326 | Output Voltage | V |
| 1327 | Output Current | A | 1328 | Output Power | kW |
| 1329 | Heatsink Temperature | °C | 1367 | VSD Run Status | |

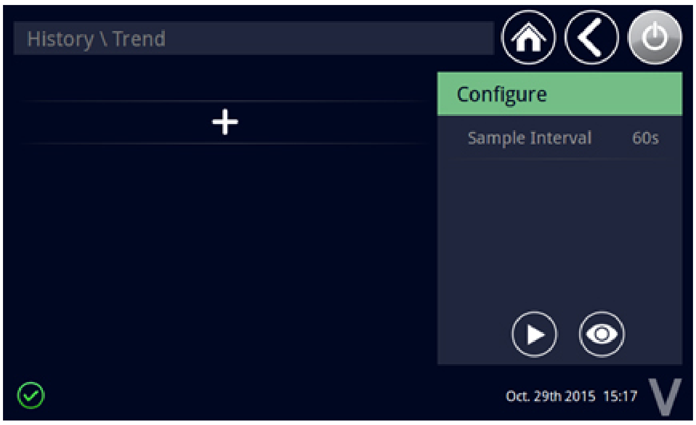
is used to clear faults,



is used to clear saved historical fault data.



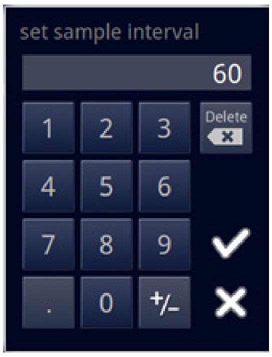
is used to create trends of the parameters above using the ID to select. Up to five trends of different parameters can be created. This feature is useful for monitoring parameters during fault diagnosis, and when unit performance is below standard.



The **+** button is used to add parameter trends.

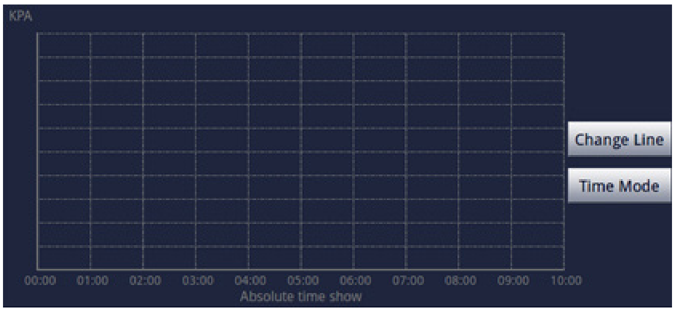

Parameter ID's are entered with the digital keyboard, which appears, and confirmed with the [TICK] or cancelled with the [CROSS].

By default the sample interval, is set to 60 seconds. This can be modified, by clicking on the interval and inputting the new value into pup-up dialogue (range is 1~3000 seconds).

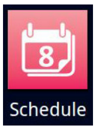



 will start recording the selected parameter trend. Note: A U-disk is required to record parameter trends, pop up dialogues will confirm whether a U-disk is available. When no U-disk is available, only the graph can be displayed.

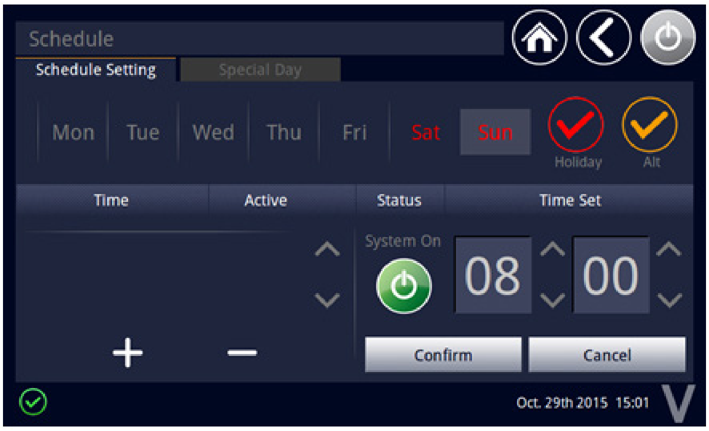
 will enable the selected parameter graph to be viewed.



### Schedule Page



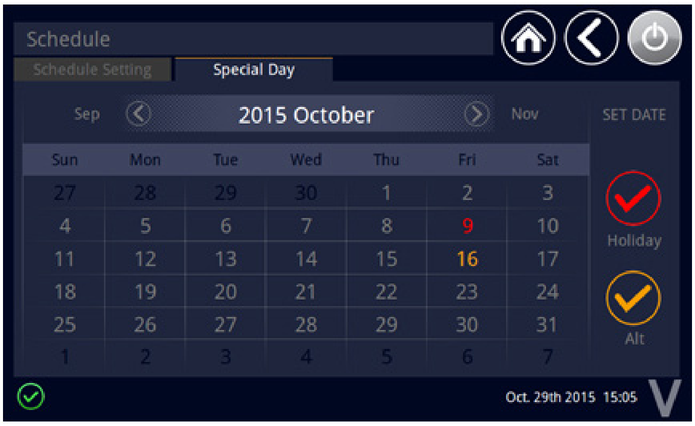

This page is used to set the schedules, holidays and alternate days that are used to control the unit operation when the Schedule Start/Stop on the System Page (Configure Pages) is enabled.




In Schedule Setting, the schedule for startup or shutdown of the unit can be set based on week, holiday or alternate day. Each day can have four settings (maximum).

To set a new time setting,: click button  to create a default item, then click this item and change the time using the up or down buttons, use the  button to enable startup or shutdown timing, and [Confirm] the modification.

Special Day refers to holiday or alternate days. Actual calendar dates can be set as holiday or alternate days.




 or  are used to change month and year of the dates required.

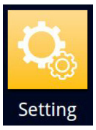
 is used to set holidays.

 is used to set alternate days.

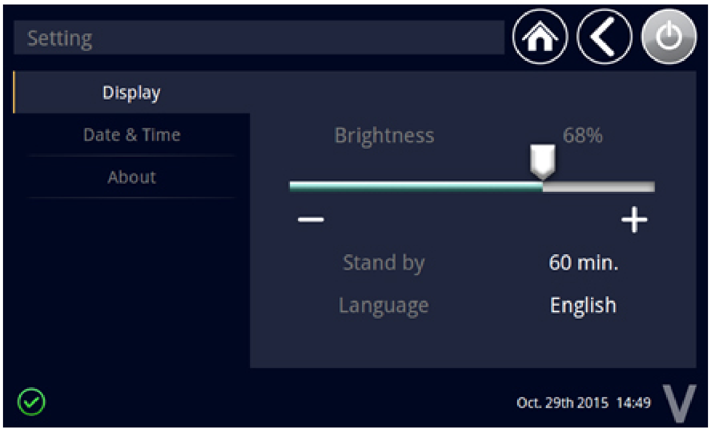
These days then used the settings programmed in the Schedule Setting to control unit operation.

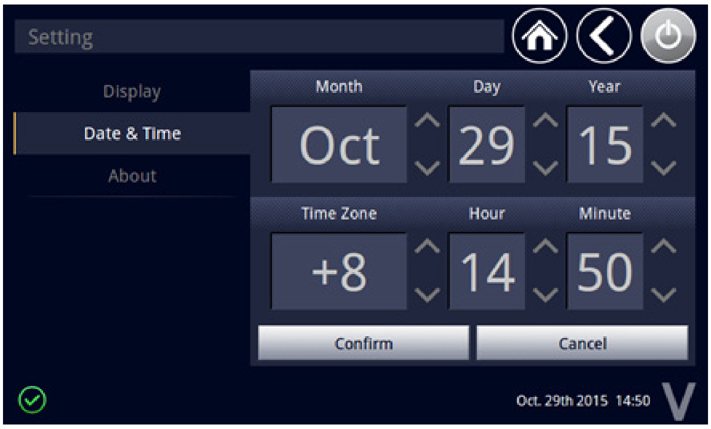
Note that: each group of special days has 30 days (maximum).

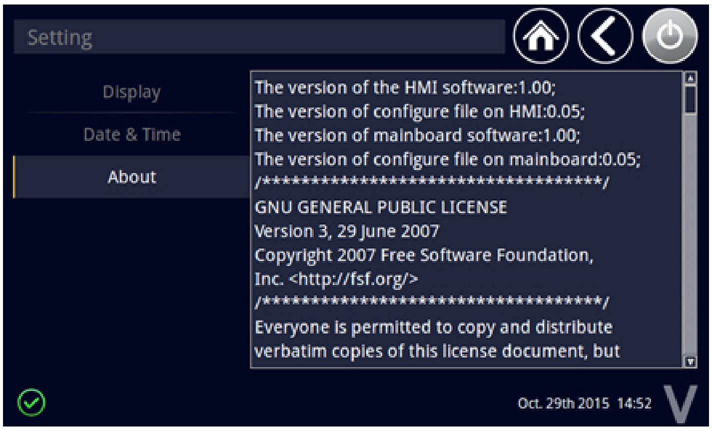
## Setting Pages




These pages are mainly for service use, contact your local Johnson Controls Service Centre for details. The operator can only adjust the display, set the system date and time and view version information about the control system.



Page Left Intentionally Blank

# 7. Maintenance

## General Requirements

The units have been designed to operate continuously provided they are regularly maintained and operated within the limitations given in this manual. Each unit should be included in a routine schedule of daily maintenance checks by the operator/customer, backed up by regular service inspection and maintenance visits by a suitably qualified Service Engineer.

It is entirely the responsibility of the owner to provide for these regular maintenance requirements and/or enter into a maintenance agreement with a Johnson Controls service organisation to protect the operation of the unit. If damage or a system failure occurs due to improper maintenance during the warranty period, Johnson Controls shall not be liable for costs incurred to return the unit to satisfactory condition.

NOTE

This maintenance section applies to the basic unit only and may, on individual contracts, be supplemented by additional requirements to cover any modifications or ancillary equipment as applicable.

WARNING

**The Safety Section of this manual should be read carefully before attempting any maintenance operations on the unit. This section should be read in conjunction with the Unit Operation Section.**

## Daily Maintenance

The following maintenance checks should be carried out on a daily basis by the operator/customer. Please note that the units are not generally user serviceable and no attempt should be made to rectify faults or problems found during daily checks unless competent and equipped to do so. If in any doubt, contact your local Johnson Controls Service Centre.

**Operating conditions:** Read the operating pressures and temperatures at the control panel check that these are within the operating limitations given in the Operating Instructions Manual.

## Unit Status

Using the keypad check the fault screens to ensure no fault are displayed.

## Refrigerant charging and leak checking

### Refrigerant leaks checking

Periodic refrigerant leak checking must be part of a comprehensive maintenance program. Leak check the entire chiller using a calibrated electronic leak detector. Confirm leaks with soap bubbles that are found using the electronic leak detector. Check refrigerant relief valve piping and tube rolled joints as part of the comprehensive refrigerant leak checking program.

Repair leaks before adding refrigerant. Visually check the heat exchangers, compressors and pipework for damage and gas leaks.

### Determining correct refrigerant charge level

The refrigerant charge level is correct when the measured evaporator approach and discharge superheat are within the values listed in the table below.

Liquid refrigerant will be visible in the evaporator sight glass. The refrigerant level cannot be properly determined by viewing the liquid refrigerant level in the evaporator sight glass.

All YGWH units Form 1 shipped are charged with the correct amount of refrigerant. Under some operating conditions the chiller may appear to be overcharged or undercharged with refrigerant. Consult with YORK Factory prior to removing or adding refrigerant.

Definitions
Evaporator approach= (L.E.L.T) - (S.E.T)
Discharge superheat= (C.D.G.T) - (S.C.T)

When:
L.E.L.T = Leaving Evaporator Liquid Temperature
S.E.T = Saturated Evaporator Temperature
C.D.G.T = Compressor Discharge Gas Temperature
S.C.T = Saturated Condensing Temperature

### Refrigerant Charge

Should it become necessary to add refrigerant charge to a YORK YGWH Chiller; add charge until the evaporator approach and refrigerant gas discharge superheat are within the values listed in the following table:

| Condition | R134a |
|---|---|
| Evaporator Approach | 1.1°C ~ 2.5°C |
| Discharge Superheat | 7.0°C ~ 10.0°C |

A charging valve is located in the liquid line below the evaporator. The size of the charging connection is 1/4 inch male flare. Purge air and non-condensables from the charging hose. Only add new refrigerant, or refrigerant that has been tested and certified to meet American Refrigeration Institute Standard (ARI-700).

### Compressor Oil

Yearly oil analysis is recommended to verify the continued use of the compressor oil.

It is very important to take the oil sample after the oil filter. The oil sample should not be left open to the atmosphere for more than 15 minutes since it will absorb moisture from the atmosphere and may yield erroneous results.

Compressor oil should be changed when the oil analysis indicates the oil has moisture and acid numbers are in excess of the limits set in the following table:

| YORK OIL TYPE | MOISTURE CONTENT ppm | Total Acid NO.# mgKOH/ml |
|---|---|---|
| L(W) | < 300ppm | < 0.5 |

The YGWH compressors use rolling element bearings (ball and roller bearings); no sleeve bearings are used. Oil analysis that includes metals may cause confusion when the results are compared to other equipment that utilize different bearing types. Iron and copper are examples of metals, which will appear in oil analysis that include metals. Other metals that may appear are Titanium, Zinc, Lead, Tin and Silicon. These metals should be ignored and are acceptable in quantities of less than 100 ppm. If an oil analysis should indicate high levels of Iron (more than 300 ppm) combined with Chromium and Nickel (more than 50 ppm), consult your local YORK Service Office this could indicate bearing damage and wear.

### Changing Compressor Oil

Compressor oil is changed by draining oil from the oil sump into a refrigerant recovery container. The oil sump is under positive pressure at ambient temperatures. Connect one end of a refrigeration charging hose to the service valve located at the bottom of the oil sump; connect the other end to an approved refrigerant recovery cylinder. Open the valve and drain the oil from the oil sump.

### Charging units with Oil

### Oil Charge

YORK 'L' oil is approved for YGWH Units, and the quality of oil required is listed in the Physical Data tables.

### Oil Charging Procedure

The oil should be charged into the oil separator using the YORK Oil Charging Pump. To charge oil, proceed as follows:

1. The unit should be shut down.

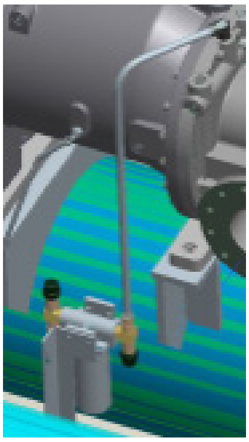
2. Immerse the suction connection of the oil charging pump in a clean container of new oil and connect the discharge connection to the compressor oil charging valve. Do not tighten the connection at the charging valve unless the air is forced out by pumping a few strokes of the oil pump. Filling the lines with oil to prevent air from being pumped into the system.

3. Open the oil charging valve and pump appropriate oil (according the data in oil charge table) into the system. Then close the charging valve and disconnect the hand oil pump.

4. As soon as oil charging is completed, closed the power supply to the starter to energize the oil heater. This will keep the concentration of refrigerant in the oil to a minimum.

### Oil filter

A replaceable oil filter is equipped in the external oil supply line (as below picture) . Please make sure all the valves are in open status after the replacement of oil filter.



### Condenser and Evaporator

### General

Maintenance of condenser and evaporator shells is important to provide trouble free operation of the unit. The water side of the tubes in the shell must be kept clean and free from scale. Proper maintenance such as tube cleaning, and testing for leaks, is covered on the following pages.

### Chemical water treatment

Since the mineral content of the water circulated through evaporators and condensers varies with almost every source of supply, it is possible that the water being used may corrode the tubes or deposit heat resistant scale in them.

Reliable water treatment companies are available in most large cities to supply a water treating process which will greatly reduce the corrosive and scale forming properties of almost any type of water. As a preventive measure against scale and corrosion and prolong the life of evaporator and condenser tubes, a chemical analysis of water should be made, preferably before the system is installed. A reliable water treatment company can be consulted to determine whether water treatment is necessary, and if so, to finish the proper treatment for particular water condition.

**Condenser and evaporator water side tube cleaning procedure**

The standard condenser tubes used in YORK YGWH Chiller are internally enhanced copper tubes.

CAUTION

**If the equipment is located in an unheated area that is susceptible to freezing, the water must be drained from the condenser to prevent tube failure from freezing.**

Proper condenser water treatment can eliminate or significantly reduce the formation of scale on the waterside of the condenser tubes.

Maintain a minimum condenser water flow rate through the tubes of at least 3.33 ft/sec. (1 meter/sec.). Through tube water velocity should not exceed 12 ft/sec. (3.6 meter/sec.).

Condenser tubes must be maintained to provide proper chiller operation. Condenser Approach Temperature is a useful tool to monitor the performance of the condenser. By recording and logging the Condenser Approach Temperature as part of the chiller maintenance program, this will provide a warning that the waterside condenser tubes are fouled and require cleaning. Condenser Approach Temperature is the difference between the Condenser Leaving Water Temperature and the Saturated Condensing Temperature.

If the approach increases above 3.5°C, or during the annual condenser inspection and the tubes are observed to be fouled, the tubes will require cleaning. For condenser fluids other than water consult with the local YORK Field Service Office for the correct condenser approach temperature.

**Condenser water side tube cleaning procedure**

Two methods are used for waterside tube cleaning to remove the scale; chemical and mechanical cleaning procedures. The composition of the scale will determine which method will be most effective to remove the scale and dirt.

Consult with the local YORK Field Service Office for a recommendation of the method(s) used in the local area.

**Chemical Cleaning Procedure**

Chemical cleaning is an effective method to remove scale from internally enhanced copper tubes. However, a company knowledgeable with the chemical cleaning procedure should be contracted or consulted. Follow the chemical cleaning company recommendations concerning solution cleaning strength and time duration of the cleaning process.

Serious damage to the condenser tubes will result if the chemical cleaning procedure is improperly applied.

Mechanical tube cleaning must always follow a chemical cleaning procedure.

When chemical cleaning of the condenser tubes is required, it may be necessary to calculate the internal volume of the waterside condenser tubes. This information is necessary to properly mix the correct concentration of cleaning solution.

Standard materials of construction for YORK YGWH Chiller condensers is copper tubes and mild carbon steel water boxes.

**Mechanical Cleaning Procedure**

1. Drain the water from the condenser.

2. Remove the water boxes from both ends of the condenser. Use proper lifting equipment when removing the water boxes. Use caution not to damage the threads on the mounting studs that are welded to the tube sheet.

3. Select a tube cleaning brush for 3/4 inch I.D copper condenser tubes. If tubes other than 3/4 inch copper are used, select a tube cleaning brush that is made for the tube size. Generally, brushes made of hard plastic or brass bristled wires are preferred for cleaning copper tubes.

4. Attach the tube cleaning brush to the end of a cleaning machine or cleaning rod.

5. Flush the condenser with clean water to remove the debris.

6. Replace the water box gasket with a new gasket and reassemble the water boxes onto the condenser.

### Evaporator tubes

The standard evaporator tubes used in YGWH Chillers are internally enhanced copper tubes.

CAUTION

**If the equipment is located in an unheated area that is susceptible to freezing, the water must be drained from the evaporator to prevent tube damage from freezing.**

Maintain evaporator water or brine flow rates through the evaporator tubes that the chiller was designed for. Refer to the engineering data on the sales order form for the correct flow rates. Generally, the water or brine that is circulated through the evaporator is part of closed loop circuit that is treated with chemicals to prevent the formation of scale and debris.

### Evaporator

It is difficult to determine by a particular test whether possible lack of performance of water evaporator is due to fouled tubes alone or due to a combination of troubles. Trouble which may be due to fouled tubes is indicated when, over a period time, the cooling capacity decreases and the split (temperature difference between the water leaving the evaporator and the refrigerant temperature in the evaporator) increases. A gradual drop off in cooling capacity can also be caused by a gradual leak of refrigerant from the system or by a combination of fouled tubes and shortage of refrigerant charge. An excessive quantity of oil in the evaporator can also contribute to erratic performance.

If cleaning of the evaporator tubes is required, follow the condenser cleaning procedure.

### Working conditions

Read the working pressures and temperatures from the OptiView™ LT panel pages. Confirm that these values are within the working limits.

### Scheduled Maintenance

All maintenance operations should be carried out on a regular basis by a suitably qualified Service Engineer, It should be noted that the interval necessary between each ‘minor’ and ‘major’ service can vary depending on, for instance, application, site conditions and expected operating schedule. Normally a minor ‘service’ should be carried out every three to six months and a ‘major’ service once a year. It is recommended that your local York Service Centre is contacted for recommendations for individual sites.

## 8. Trouble Shooting

### Competent Persons Trouble Shooting Guide

| PROBLEM | POSSIBLE CAUSES | ACTION |
|---|---|---|
| Low Evaporator Pressure | Transducer reads incorrectly. | Check transducer against a gauge. |
| | Chilled water temperature sensor defective. | Check temperature sensor. |
| | Insufficient refrigerant charge. | Check for leaks and charge refrigerant into system. |
| | Low evaporator water flow. | Check flow. |
| | Liquid line filter clog. | Check liquid line filter. |
| | Feed or flow valve defective. | Repair or replace valve or control. |
| | Evaporator tubes dirty or restricted. | Clean evaporator tubes. |
| | EEV failure or fail to open. | Check EEV or EEV drive. |
| | Insufficient load for system capacity. | Check low water temperature cutout setting and low evaporator pressure cutout setting. |
| Low Oil Level | Oil heater failure. | Check oil heater. |
| | Oil level switch failure. | Check oil level switch. |
| | Condenser water temperature low. | Adjust condenser water flow, increase condenser leaving water temperature. |
| | Oil filter clog. | Check oil filter. |
| | Refrigerant over charged. | Recover refrigerant and keep discharge superheat in 7 to 10°C, evaporator small temperature in 0.5 to 2.5°C. |
| | Eductor failure or oil filter clog, | Repair or replace Eductor or filter. |
| | insufficient oil charge. | Increasing oil charge. |
| High Discharge Pressure | High condenser water temperature. | Check sensor. |
| | Discharge transducer is defective. | Check and clean tubes. Check water conditioning. |
| | High pressure switch is defective. | Check site pumps, valves, and strainers. Increase quantity of water through the condenser to the proper value. |
| | Condenser water dirty. | Check tower fan motor/blade, valve, and water circulation. |
| | Non condensable gas in the chiller. | Vent air from the condenser gas. |
| | Condenser water flow low. | Check the condenser water flow and distribution. |
| | Refrigerant over charged. | Recover refrigerant and keep discharge superheat in 7 to 10°C, evaporator small temperature in 0.5 to 2.5°C. |
| No Display on Control Panel. Unit Will NOT Run | Electric supply to the panel is missing. | High voltage to the chiller is missing. |
| | Line fuse is blown. | Check fuses. |
| | Control board is defective. | Replace control board. |
| | Display board is defective. | Replace display board. |
| Low Leaving Chilled Liquid Temperature | Leaving chilled liquid temperature drops faster than the unit can unload. | Check for restricted flow. |
| | | Check for rapid flow changes. |
| | | Water loop is too small. |
| | | Flow is below minimum for chiller. |
| | Chilled water sensor is defective. | Check sensor against temperature gauge in water line. |
| | | Check sensor for intermittent operation. |
| | | Check wiring for short or open circuits. |
| High Discharge Temperature | Discharge temperature sensor is defective. | Check sensor. |
| | Condenser tubes are dirty or scaled. | Check and clean tubes. Check water conditioning. |
| | Condenser water flow low. | Check site pumps, valves, and strainers. Increase quantity of water through the condenser to the proper value. |
| | Condenser water too warm. | Check tower fan motor/blade, valve, and water circulation. |

| PROBLEM | POSSIBLE CAUSES | ACTION |
|---|---|---|
| High Motor Temperature | High motor temperature input from one of the sensors. | Refrigerant charge low. Check evaporator approach temperature. |
| | | Excess charge in system. High discharge pressure. Check superheat. |
| | | High superheat. Feed valves NOT controlling. Isolate cause. |
| | | Motor sensor reading incorrectly. Program panel to ignore a single sensor. |
| Motor Current Limiting | High motor current has activated current limiting. | Condenser water temperature is high. Normal response from controller. |
| | | Remote or panel limiting is in effect. Normal response. |
| | | Excess charge in system. Adjust charge. |
| Oil Pressure Gradually Decreases | Oil filter is dirty. | Change oil filter. |
| | Extreme bearing wear. | Check compressor. |
| Excessive Noise and Vibration | Bearing damage or excessive wear. | Check compressor. |
| | Refrigerant flood back. | Correct system problem. |
| | Chiller vibration isolators installed improperly. | Install isolators properly according to instructions in this manual. |
| | Room acoustics are poor. | Evaluate sound attenuation. |
| | Piping supports not supporting load. | Adjust piping supports. |

**Safety Faults, Cycling Stops and Warnings**

| |
|---|
| ***Code 0: No Fault*** |
| There is nothing in the fault status bar if the unit has not any fault or warning. |
| **Safety Faults** |
| ***Code 103: Safety Fault-SYS1 High Pressure Contact Open*** |
| If the 1#High Pressure Switch (DI3) is opened for over 0.5 second, the 1# unit will be shut down and the message will be displayed in the status bar. This fault has to be manually reset after the 1#High Pressure Switch is closed. |
| ***Code 104: Safety Fault-Low Level Switch Open*** |
| If the Low Oil Level Switch (DI4) is opened for over 5 seconds, the unit will be shut down and the message will be displayed in the status bar. This fault has to be manually reset after Low Oil Level Switch is closed. |
| ***Code 105: Safety Fault-SYS1 Compressor Motor Protection*** |
| If the 1#Motor Internal Protect (DI5) is opened for over 0.5 second, the 1# unit will be shut down and the message will be displayed in the status bar. This fault has to be manually reset after 1#Motor Internal Protect is closed. |
| ***Code 106: Safety Fault-External Interlock Protection*** |
| If the External Interlock/Power Protect (DI6) is opened for over 0.5 second, the unit will be shut down and the message will be displayed in the status bar. This fault has to be manually reset after External Interlock/Power Protect is closed. |
| ***Code 107: Safety Fault-SYS1 Compressor Start Fail*** |
| If the 1# compressor has entered the running state, but the 1#Starter Running Feedback (DI7) is still open for over 3 seconds, the 1# unit will be shut down and the message will be displayed in the status bar. This fault has to be manually reset after the unit is stopped. |
| ***Code 108: Safety Fault-Leaving Condenser Temp. Sensor Fault*** |
| When there is a fault or disconnection in the Leaving Condenser Temperature Sensor or connection plug is pulled out, the unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. (Only available when running mode is Air-conditioner or Ice-Storage) |
| ***Code 109: Safety Fault-Return Condenser Temp. Sensor Fault*** |
| When there is a fault or disconnection in the Return Condenser Temperature Sensor or connection plug is pulled out, the unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. (Only available when running mode is Air-conditioner or Ice-Storage) |
| ***Code 110: Safety Fault-Leaving Chilled Sensor Fault*** |
| When there is a fault or disconnection in the Leaving Chilled Temperature Sensor or connection plug is pulled out, the unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. |

| |
|---|
| ***Code 111: Safety Fault-Return Chilled Temp. Sensor Fault*** |
| When there is a fault or disconnection in the Return Chilled Temperature Sensor or connection plug is pulled out, the unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. |
| ***Code 112: Safety Fault-SYS1 Discharge Temp. Sensor Fault*** |
| When there is a fault or disconnection in the SYS1 Discharge Temperature Sensor or connection plug is pulled out, the 1# unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. |
| ***Code 113: Safety Fault-Leaving Hot Liquid Temp. Sensor Fault*** |
| When there is a fault or disconnection in the Leaving Hot Liquid Temperature Sensor or connection plug is pulled out, the unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. (Only available when running mode is Heat Pump) |
| ***Code 114: Safety Fault-Return Hot Liquid Temp. Sensor Fault*** |
| When there is a fault or disconnection in the Return Hot Liquid Temperature Sensor or connection plug is pulled out, the unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. (Only available when running mode is Heat Pump) |
| ***Code 115: Safety Fault-Evaporator Pressure Out Of Range Fault*** |
| This safety fault is set when the unit is running, the Evaporator Pressure is over 510 kPa while condenser pressure is less than 300 kPa, or the leaving Chilled Temperature is less than 18 °C, or the leaving Chilled Temperature is not less than 18 °C and lasts for over 30 minutes, the unit will be shut down and the message will be displayed in the status bar. This fault has to be manually reset after the unit is stopped. (Only available when running mode is Air-conditioner or Ice-Storage) |
| ***Code 116: Safety Fault-Condenser Pressure Sensor Fault*** |
| When there is a fault or disconnection in the Condenser Pressure Sensor or connection plug is pulled out, the unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. |
| ***Code 117: Safety Fault-SYS1 Oil Pressure Sensor Fault*** |
| When there is a fault or disconnection in the SYS1 Oil Pressure Sensor or connection plug is pulled out, the 1# unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. |
| ***Code 118: Safety Fault-Condenser High Pressure*** |
| This safety fault is set when the Condenser Pressure goes above the ‘High Press. Stop Setpoint’ for 1 second, the unit will shut down and the message will be displayed. This fault has to be manually reset after the Condenser Pressure is less than the ‘High Press. Stop Setpoint’. |
| The ‘High Press. Stop Setpoint’ is configurable on the HMI, and its default value is as below:<br>Air-conditioner/Ice-Storage: 1090kpa;<br>Heat Pump: 1356kpa; High Temperature Heat Pump: 1745kpa. |
| ***Code 119: Safety Fault-Evaporator Low Pressure*** |
| This safety fault is set whenever the Evaporator Pressure is less than the ‘Low Press. Stop Setpoint’ and lasts for 10 seconds, the unit will shut down and the message will be displayed. This fault has to be manually reset after the Evaporator Pressure is larger than the ‘Low Press. Stop Setpoint’. |
| The default value of ‘Low Press. Stop Setpoint’ is as below:<br>Air-conditioner/ Heat Pump: 165kPa;<br>Ice-Storage: 91kpa. |
| ***Code 120: Safety Fault-SYS1 Discharge High Temp.*** |
| The ‘cycling stop-SYS1 Discharge High Temp.’ is set when the 1#Discharge Temperature goes above the Protection Point for over 0.5 second, and this cycling stop has happened no more than three times during the last 90 minutes. And the cycling stop will be released automatically and the 1# unit will cycle start after the 1#Discharge Temperature falls below the Protection Point. This safety fault is set when the Discharge Temperature goes above the Protection Point for over 0.5 second, and the cycling stop of ‘Discharge High Temp.’ has happened more than three times during the last 90 minutes. This safety fault has to be manually reset after the 1#Discharge Temperature falls below the Protection Point. |
| Protection Point: Air condition/Ice Storage: 95°C, Heat Pump: 100°C. |

| |
|---|
| ***Code 121: Safety Fault-SYS1 Compressor Over Current*** |
| This safety fault is set when the 1#Percent MLA rises above 100% for 5 seconds, the 1# unit will shut down and the message will be displayed. This fault has to be manually reset after the 1#Percent MLA falls below 100%. |
| ***Code 122: Safety Fault-SYS1 Compressor Low Current*** |
| This safety fault is set when the 1#Percent FLA falls below 10% for 10 seconds, the 1# unit will shut down and the message will be displayed. This fault has to be manually reset after the 1#Percent MLA goes above 10%. |
| ***Code 123: Safety Fault-SYS1 Oil Low Diff. Pressure*** |
| This safety fault is set if, after 180 seconds of unit run time, the difference of Oil Pressure minus Evaporator Pressure goes below 100 kPa and lasts for over 15 seconds, the 1# unit will shut down and the message will be displayed. This fault has to be manually reset after the 1# unit is stopped. |
| ***Code 124: Safety Fault-SYS1 Oil Clogged Filter*** |
| This safety fault is set if, after 180 seconds of unit run time and the difference of Condenser Pressure minus Oil Pressure is above the 'Fault Pressure' and lasts for over 15 seconds, the 1# unit will shut down and the message will be displayed. This fault has to be manually reset after the 1# unit is stopped. |
| The default value of the 'Fault Pressure' is:<br>Air-conditioner/Ice-Storage: 245kPa;<br>Heat Pump: 245kPa, the 'Fault Pressure' becomes 370 kPa when the leaving or return condenser temperature is above 42 °C, and it does not return to 245 kPa until leaving and return condenser temperature are both below 40 °C. |
| ***Code 127: Safety Fault-SYS1 Discharge Low Superheat*** |
| This safety fault is set after the unit is running for over 180 seconds, when the Discharge Superheat Temperature falls below 3°C for over 15 minutes, the 1# unit will shut down and the message will be displayed. This fault has to be manually reset after the 1#unit is stopped. |
| ***Code 128: Safety Fault-SYS1 Motor High Temperature*** |
| This safety fault is set when one of the Motor Temperature A, B, C goes above 115°C(121°C for heat pump) for 5 seconds, the 1# unit will shut down and the message will be displayed. This fault has to be manually reset after all the three phase 1# motor temperatures are less than fault point. If one of the motor temperature is set as unprotected in the option of Motor Temp Protect Option, it will be ignored by protection logic. |
| ***Code 151: Safety Fault-SYS1 Motor Phase A Temp. Sensor Fault*** |
| When there is a fault or disconnection in the *Motor Phase A Temp.* Sensor or connection plug is pulled out, the unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. If one of the motor temperature is set as unprotected in the option of Motor Temp Protect Option, it will be ignored by protection logic. |
| ***Code 152: Safety Fault-SYS1 Motor Phase B Temp. Sensor Fault*** |
| When there is a fault or disconnection in the *Motor Phase B Temp.* Sensor or connection plug is pulled out, the unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. If one of the motor temperature is set as unprotected in the option of Motor Temp Protect Option, it will be ignored by protection logic. |
| ***Code 153: Safety Fault-SYS1 Motor Phase C Temp. Sensor Fault*** |
| When there is a fault or disconnection in the *Motor Phase C Temp.* Sensor or connection plug is pulled out, the unit will shut down and the message will be displayed. This fault has to be manually reset after the sensor recovers. If one of the motor temperature is set as unprotected in the option of Motor Temp Protect Option, it will be ignored by protection logic. |

| |
|---|
| ***Code 161: Safety Fault-Emergency Stop Pressed*** |
| When the emergency stop button on the panel is pressed, the power of IO board will be cut off, but the power of HMI and maiboard will continue and the message will be displayed in the status bar. This fault has to be manually reset after the unit is stopped. |
| ***Code 162: Start Inhibit-Oil Heat Over 5 Hour Before Start*** |
| This start inhibit is set if the oil heater works no more than 5 hours after the unit has been stopped for over 15 days, the message will be displayed in the status bar and prevent the unit to start. After continuously oil heating for over 5 hours, this message will be released automatically. This safety fault is not applicable if the Oil Heater is disabled. |
| ***Code 163: Safety Fault-Evaporator Smart Freeze Protection*** |
| This safety fault is set whenever the evaporator saturation temperature is presently below the freeze threshold, and the total number of seconds that the evaporator saturation temperature was below the freeze threshold is greater than the number of seconds to freezing. It is released when either the present evaporator saturation temperature rises above or equal to the freeze threshold, or the total number of seconds that the evaporator saturation temperature was below the freeze threshold is less than or equal to the number of seconds to freezing, and the ‘Clear Fault’ button is pressed on the History Screen. This fault is only applicable if Smart Freeze Point Protection is active. |
| ***Code 299: Communication Error*** |
| This is a warning display on HMI, but not for mainboard. When HMI lose communication with mainboard, the warning will display on the status bar, and it clears automatically when communication is OK. |
| **Cycling Stops** |
| ***Code 601: Cycling Stop-Chilled Liquid Flow Switch Open*** |
| This cycling stop is checked 20 seconds after the Liquid Pump is running. It is set whenever the Chilled Liquid Flow Switch (DI1) is open for 5 seconds or more, the unit will stop and the message will be displayed. The cycling stop is released whenever the Chilled Liquid Flow Switch closes and the unit will cycling start automatically. |
| ***Code 602: Cycling Stop-Condenser Liquid Flow Switch Open*** |
| This cycling stop is checked 20 seconds after the Liquid Pump is running. It is set whenever the Condenser Liquid Flow Switch (DI11) is open for 5 seconds or more, the unit will stop and the message will be displayed. The cycling stop is released whenever the Condenser Liquid Flow Switch closes and the unit will cycling start automatically. |
| ***Code 618: Cycling Stop-SYS1 Discharge High Temp.*** |
| Refer to the description of ‘***Code 120: Safety Fault-SYS1 Discharge High Temp.***’. |
| ***Code 621: Cycling Stop-Leaving Condenser High Temperature*** |
| If the running mode is set as Air-conditioner, this cycling stop is set when Leaving Condenser Temperature is equal or higher than the ‘High Temp. Stop Setpoint’, the unit will stop and the message will be displayed. It is released when the Leaving Condenser Temperature goes below the ‘High Temp. Stop Setpoint’-10°C and the unit will cycling start automatically. |
| ***Code 622: Cycling Stop-Leaving Chilled Liquid Low Temperature*** |
| This cycling stop is set when Leaving Chilled Temperature is equal or lower than the ‘Low Temp. Stop Setpoint’, the unit will stop and the message will be displayed. It is released when the Leaving Chilled Temperature goes above the ‘Low Temp. Stop Setpoint’+10°C and the unit will cycling start automatically. |
| ***Code 625: Cycling Stop-SYS1 Anti-Recycle*** |
| This cycling stop is set when the stopped time of the compressor is less than the ‘Anti-Recycle Time’ (default: 480s), or if the compressor has started to run for over 4 times during last one hour. This cycling stop is cleared automatically when the stopped time of the compressor is more than the ‘Anti-Recycle Time’ (default: 480s) and the compressor has started to run for less than 4 times during last one hour. The compressor is not allowed to start again until this cycling stop is released. |
| ***Code 628: Cycling Stop-Leaving Hot Liquid High Temperature*** |
| If the running mode is set as Heat-Pump, this cycling stop is set when Leaving Hot Liquid Temperature is equal or higher than the ‘High Temp. Stop Setpoint’, the unit will stop and the message will be displayed. It is released when the Leaving Hot Liquid Temperature goes below the ‘High Temp. Stop Setpoint’-10°C and the unit will cycling start automatically. |

| **Warnings** |
|---|
| ***Code 501: Warning-Evaporator Low Pressure Force Unload*** |
| This warning is set after the compressor is running, whenever the Evaporator Pressure is less than the 'Low Press. Force Unload Setpoint', the unit will force unload and the message will be displayed. This warning releases and capacity is recovered to automatic control after the Evaporator Pressure is larger than the 'Low Press. Force Unload Setpoint'. |
| The default value of 'Low Press. Force Unload Setpoint' is as below:<br>Air-conditioner/Heat Pump: 175kPa;<br>Ice-Storage: 101kpa. |
| ***Code 502: Warning-Condenser High Pressure Stop Load*** |
| This warning is set after the compressor is running, whenever the Condenser Pressure is more than the 'High Press. Stop Load Setpoint', the unit will stop load and the message will be displayed. This warning releases and capacity is recovered to automatic control after the Condenser Pressure is less than the 'High Press. Stop Load Setpoint - 100kPa' and lasts for 5 minutes. |
| The default value of 'High Press. Stop Load Setpoint' is as below:<br>Air-conditioner/Ice-Storage: 1030kPa;<br>Heat Pump: 1286kPa; High Temperature Heat Pump: 1660kPa. |
| ***Code 503: Warning-Condenser High Pressure Force Unload*** |
| This warning is set after the compressor is running, whenever the Condenser Pressure is more than the 'High Press. Unload Setpoint', the unit will stop load and the message will be displayed. This warning releases and capacity is recovered to automatic control after the Condenser Pressure is less than the 'High Press. Stop Load Setpoint - 100kPa' and lasts for 5 minutes. |
| The default value of 'High Press. Unload Setpoint' is as below:<br>Air-conditioner/Ice-Storage: 1060kPa;<br>Heat Pump: 1303kPa; High Temperature Heat Pump: 1685kPa. |
| ***Code 504: Warning-Standby Freeze Protection Pump On*** |
| This warning is set when the system is stopped, and for Air Conditioner, Heat Pump or High Temperature Heat Pump mode: Leaving Condenser Temperature, Return Condenser Temperature, Leaving Chilled Temperature, or Return Chilled Temperature is lower than 2.0 °C; and for Ice Storage: Leaving Condenser Temperature or Return Condenser Temperature is lower than 2.0 °C, or Leaving Chilled Temperature or Return Chilled Temperature is lower than 'Low Temp. Stop Setpoint', and the liquid pump is turned on. This warning is released if Leaving Condenser Temperature and Return Condenser Temperature are higher than 8.0 °C and Leaving Chilled Temperature and Return Chilled Temperature are higher than 'Low Temp. Stop Setpoint' + 6.0 °C, and the liquid pump is turned off. This fault is not applied if 'Standby Anti-Freezing' is disabled. |
| ***Code 505: Info-System No Load*** |
| When the unit is stopped and ready to start, only the leaving temperature is not in the Load section, this message will be displayed and the unit can not start. This message is released if the leaving temperature is in the Load section. |
| ***Code 506: Warning-Evaporator Low Pressure Stop Load*** |
| This warning is set after the compressor is running, whenever the Evaporator Pressure is less than the 'Low Press. Force Unload Setpoint + 25kPa', the unit will stop load and the message will be displayed. This warning releases and capacity is recovered to automatic control after the Evaporator Pressure is larger than the 'Low Press. Force Unload Setpoint + 25kPa'. |
| ***Code 511: Warning-SYS1 Discharge High Temperature Force Unload*** |
| This warning is set after the 1# compressor is running, whenever the 1# compressor discharge temperature is larger than the 'LICO Open Dischar. Temp. Setpoint + 5°C', and the motor current is higher than the MLA multiplied by 80%, the unit will force unload and the message will be displayed. This warning releases and capacity is recovered to automatic control after the 1# compressor discharge temperature is lower than the 'LICO Open Dischar. Temp. Setpoint'. |
| The default value of 'LICO Open Dischar. Temp. Setpoint' is : 80°C. |
| ***Code 512: Warning-SYS1 Discharge High Temperature Force Load*** |
| This warning is set after the 1# compressor is running, whenever the 1# compressor discharge temperature is larger than the 'LICO Open Dischar. Temp. Setpoint + 5°C', and the motor current is lower than the MLA multiplied by 65%, the unit will force load and the message will be displayed. This warning releases and capacity is recovered to automatic control after the 1# compressor discharge temperature is lower than the 'LICO Open Dischar. Temp. Setpoint'. |

| |
|---|
| ***Code 513: Warning-SYS1 Discharge Low Superheat Stop Load*** |
| This warning is set after the 1# compressor is running over 180 seconds, whenever the 1# discharge superheat is less than Setpoint (default: 3°C), the unit will stop load, level control EEV will be force close and the message will be displayed. This warning releases, capacity and EEV is recovered to automatic control after the 1# discharge superheat is larger than Setpoint + 1°C. |
| ***Code 514: Warning-SYS1 Discharge Low Superheat Force Unload*** |
| This warning is set after the 1# compressor is running over 180 seconds, whenever the 1# discharge superheat is less than Setpoint (default: 3°C) and lasts for 120 seconds, the unit will force unload, level control EEV will be force close and the message will be displayed. This warning releases, capacity and EEV is recovered to automatic control after the 1# discharge superheat is larger than Setpoint + 1°C. |
| ***Code 515: Warning-SYS1 Oil Low Diff. Pressure Close EEV*** |
| This warning is set after the 1# compressor is running over 60 seconds, whenever the 1#Oil Pressure minus the Evaporator Pressure is less than 100kPa, and the Evaporator Pressure is above 300kPa, the level control EEV will be force close and the message will be displayed. This warning releases and EEV is recovered to automatic control after the 1#Oil Pressure minus the Evaporator Pressure is larger than 150 kPa or the Evaporator Pressure is less than 280 kPa. |
| ***Code 516: Warning-SYS1 Compressor Over Current Stop Load Force Unload*** |
| This warning is set after the 1# compressor is running, whenever the 1#Motor current is larger than the MLA multiplied by ‘Over Current Percent-5%’, the unit will stop load; whenever the 1#Motor current is larger than the MLA multiplied by ‘Over Current Percent-4%’, the unit will force unload by the middle level pulse; whenever the 1#Motor current is larger than the MLA multiplied by ‘Over Current Percent-3%’, the unit will force unload continuously. This message will be displayed if any of the unit stop load or force unload happens. This warning releases and capacity is recovered to automatic control after the 1#Motor current is less than the MLA multiplied by ‘Over Current Percent-5%’. |
| ***Code 517: Warning-SYS1 Compressor Minimum Force Load*** |
| This warning is set after the 1# compressor is running over 180 seconds, whenever the 1# motor current is less than the MLA multiplied by the ‘Minimum Load Percent’, the unit will force load and the message will be displayed. This warning releases and capacity is recovered to automatic control after the 1# motor current is larger than the MLA multiplied by the ‘Minimum Load Percent’. (Only applicable to constant driver unit) |
| ***Code 518: Info-SYS1 Compressor Minimum Run Time Protect*** |
| The compressor can’t response to the temperature cycling stop request if it has been running less than the ‘Minimum Run Time’, and this information will be displayed on the status bar. This message will be released automatically after the unit has been running over the ‘Minimum Run Time’, or if the leaving temperature has not reached the stop point. |
| ***Code 519: Warning-SYS1 Motor High Temperature Force Unload*** |
| This warning is set after the 1# compressor is running, whenever one of the 1#Motor Temperature A, B, C is larger than the ‘LICO Open Dischar. Temp. Setpoint + 5°C’, and the motor current is higher than the MLA multiplied by 80%, the unit will force unload and the message will be displayed. This warning releases and capacity is recovered to automatic control after all the three phase 1# motor temperatures are lower than the ‘LICO Open Dischar. Temp. Setpoint’. |
| The default value of ‘LICO Open Dischar. Temp. Setpoint’ is as below: |
| Air-conditioner/Ice-Storage: 95°C; |
| Heat Pump: 100°C. |
| ***Code 520: Warning-SYS1 Motor High Temperature Force Load*** |
| This warning is set after the 1# compressor is running, whenever one of the 1#Motor Temperature A, B, C is larger than the ‘LICO Open Dischar. Temp. Setpoint + 5°C’, and the motor current is lower than the MLA multiplied by 65%, the unit will force load and the message will be displayed. This warning releases and capacity is recovered to automatic control after all the three phase 1# motor temperatures are lower than the ‘LICO Open Dischar. Temp. Setpoint’. |

## Sensor Calibration Charts

### Chilled Leaving/Return Liquid and Cooling Leaving/Return Liquid Temperature Sensors

| Temperature °C | -5 | -3 | -1 | 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Resistance kΩ | 42.82 | 38.53 | 3 4.71 | 31.32 | 28.29 | 2 5.59 | 23.17 | 21. 01 | 1 9.07 | 17.33 | 15. 77 |
| Temperature °C | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 | 37 |
| Resistance kΩ | 14.37 | 13.1 | 11.96 | 10.93 | 10 | 9.16 | 8.4 | 7.71 | 7 .085 | 6.517 | 6 |

### Discharge Temperature Sensor

| Temperature °C | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Resistance kΩ | 166.75 | 142 .9 | 1 22.81 | 105.83 | 91.4 43 | 7 9.219 | 68.804 | 59.908 | 52.291 | 45.752 | 40.125 |
| Temperature °C | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 | 57 | 60 | 63 |
| Resistance kΩ | 35.272 | 31.0 76 | 2 7.44 | 24.283 | 21.5 35 | 1 9.137 | 17.042 | 15.206 | 13.595 | 12.178 | 10.929 |

## 9. Technical Data

### Operational Limits

| YGWH Models | | | 115 | | 145 | | 180 | | 225 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| Chilled liquid | Liquid outlet temperature (water) | °C | 2.2 to 21 | | | | | | | |
| | Flow rate | l/s | 9 | 27 | 11 | 32 | 14 | 39 | 18 | 48 |
| | Maximum working pressure | barg | 10 | | | | | | | |
| Cooling liquid | Liquid outlet temperature | °C | 18 to 43 | | | | | | | |
| | Flow rate | l/s | 11 | 33 | 13 | 38 | 16 | 48 | 20 | 58 |
| | Maximum working pressure | barg | 10 | | | | | | | |
| Refrigerant System High pressure side | | barg | 18 | | | | | | | |
| Power supply voltage | | V | 380V, 400V, 415V 3Ø, 50Hz (nominal) | | | | | | | |
| System water volume - Air Conditioning | | l | 401 | | 501 | | 638 | | 799 | |
| Air temperature surrounding unit | | °C | 4.4 to 43.3 | | | | | | | |

| YGWH Models | | | 260 | | 300 | | 330 | | 375 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| Chilled liquid | Liquid outlet temperature (water) | °C | 2.2 to 21 | | | | | | | |
| | Flow rate | l/s | 25 | 75 | 27 | 79 | 40 | 122 | 40 | 120 |
| | Maximum working pressure | barg | 10 | | | | | | | |
| Cooling liquid | Liquid outlet temperature | °C | 18 to 43 | | | | | | | |
| | Flow rate | l/s | 30 | 88 | 33 | 98 | 45 | 133 | 50 | 144 |
| | Maximum working pressure | barg | 10 | | | | | | | |
| Refrigerant System High pressure side | | barg | 18 | | | | | | | |
| Power supply voltage | | V | 380V, 400V, 415V 3Ø, 50Hz (nominal) | | | | | | | |
| System water volume - Air Conditioning | | l | 700 | | 829 | | 1029 | | 1111 | |
| Air temperature surrounding unit | | °C | 4.4 to 43.3 | | | | | | | |

### Pressure Drop

The expected waterside pressure drop at design flow is provided on the particular sales order form header. When rated in accordance with AHRI-550, the actual pressure drop for clean tubes is permitted to be lower than or 15% greater than the stated value.

To determine flow or waterside pressure drop at conditions other than sales order design, use the following relationship to calculate the unknown parameter. Ensure consistent units of measure are used during calculation:

$$\frac{\textit{Design}\ \text{flow}}{\sqrt{\textit{Design pressure}\ \text{drop}}} = \frac{\textit{Actual}\ \text{flow}}{\sqrt{\textit{Actual pressure}\ \text{drop}}}$$

Physical Data

| YGWH Models | | | 115 | 145 | 180 | 225 |
|---|---|---|---|---|---|---|
| Refrigerant circuits | | | 1 | | | |
| Refrigerant charge | | kg | 200 | 200 | 240 | 250 |
| Oil Charge | | l | 25 | 25 | 33 | 33 |
| Compressor | Type | | Semi-hermetic Screw | | | |
| | Capacity Control | % | 25%-100% | | | |
| Evaporator | Type | | Hybrid FF | | | |
| | Number of Passes | | 4 | | | |
| | Connection sizes | inch | 5 | 5 | 6 | 6 |
| Condenser | Type | | Shell-tube | | | |
| | Number of Passes | | 4 | | | |
| | Connection sizes | inch | 5 | 5 | 6 | 6 |
| Dimensions | Length | mm | 3118 | 3131 | 3156 | 3153 |
| | Width | mm | 1710 | 1797 | 1975 | 1995 |
| | Height | mm | 1739 | 1796 | 1932 | 1934 |
| Weight | Shipping | kg | 3906 | 4588 | 5632 | 6040 |
| | Operating | kg | 4307 | 5089 | 6270 | 6839 |

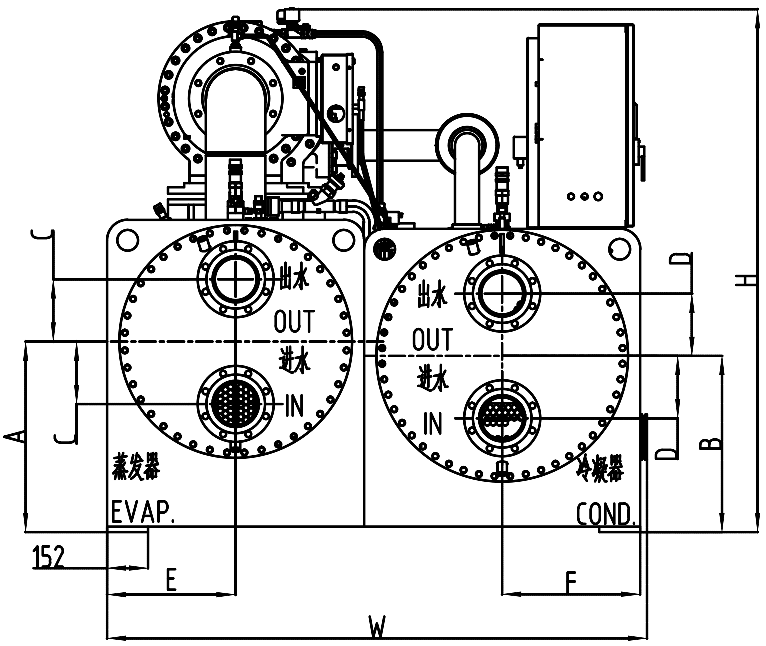
| YGWH Models | | | 260 | 300 | 330 | 375 |
|---|---|---|---|---|---|---|
| Refrigerant circuits | | | 1 | | | |
| Refrigerant charge | | kg | 360 | 370 | 400 | 410 |
| Oil Charge | | l | 40 | 40 | 40 | 40 |
| Compressor | Type | | Semi-hermetic Screw | | | |
| | Capacity Control | % | 25%-100% | | | |
| Evaporator | Type | | Hybrid FF | | | |
| | Number of Passes | | 2 | | | |
| | Connection sizes | inch | 8 | 8 | 8 | 8 |
| Condenser | Type | | Shell-tube | | | |
| | Number of Passes | | 2 | | | |
| | Connection sizes | inch | 8 | 8 | 8 | 8 |
| Dimensions | Length | mm | 4807 | 4835 | 4872 | 4872 |
| | Width | mm | 1925 | 1988 | 2086 | 2086 |
| | Height | mm | 2156 | 2174 | 2156 | 2156 |
| Weight | Shipping | kg | 7102 | 8053 | 8242 | 8837 |
| | Operating | kg | 7802 | 8882 | 9271 | 9948 |

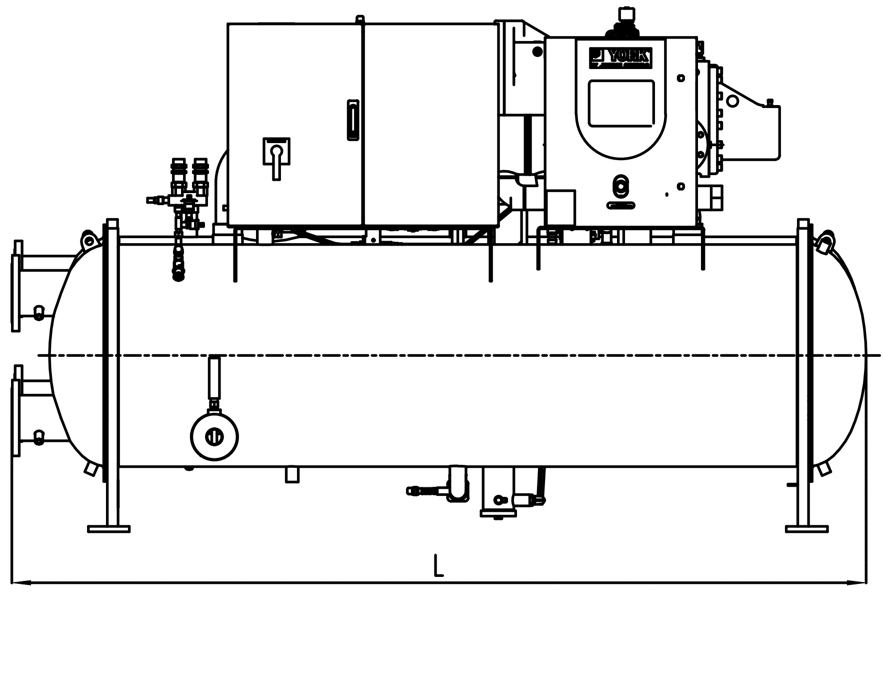
**Electrical Connections**

| Model | YGWH115 | YGWH145 | YGWH180 | YGWH225 |
|---|---|---|---|---|
| INPUT CABLE (RECOMMENDED) | 3 × 120 mm² + 1 x 50 mm² | 3 × 150 mm² + 1 x 70 mm² | 3 × 185 mm² + 1 x 95 mm² | 2 x (3 × 185 mm² + 1 x 95 mm²) |

| Model | YGWH260 | YGWH300 | YGWH330 | YGWH375 |
|---|---|---|---|---|
| INPUT CABLE (RECOMMENDED) | 2 x (3 × 185 mm² + 1 x 95 mm²) | 2 x (3 × 185 mm² + 1 x 95 mm²) | 2 x (3 × 240 mm² + 1 x 95 mm²) | 2 x (3 × 240 mm² + 1 x 95 mm²) |

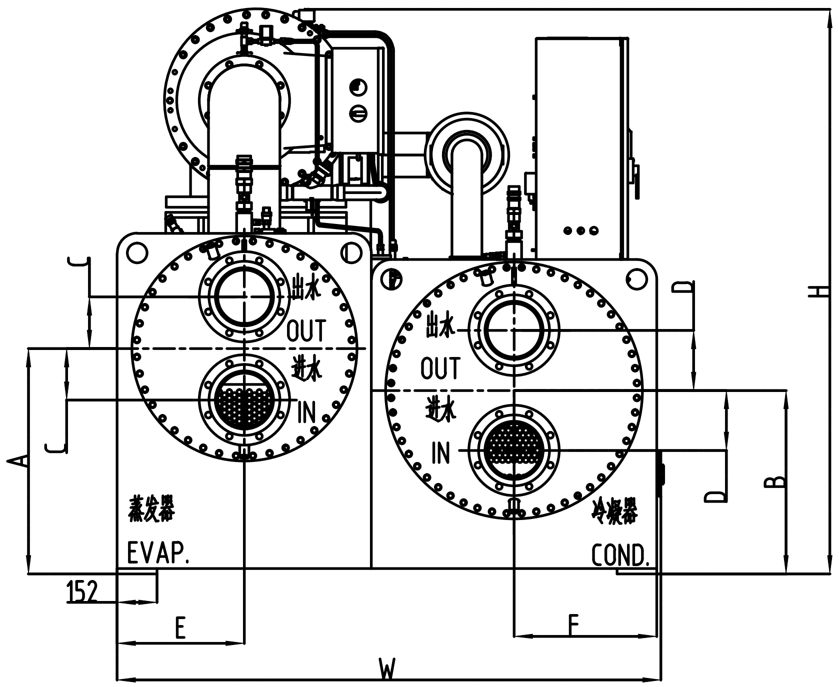
**Dimensions YGWH115, YGWH145, YGWH180, YGWH225**

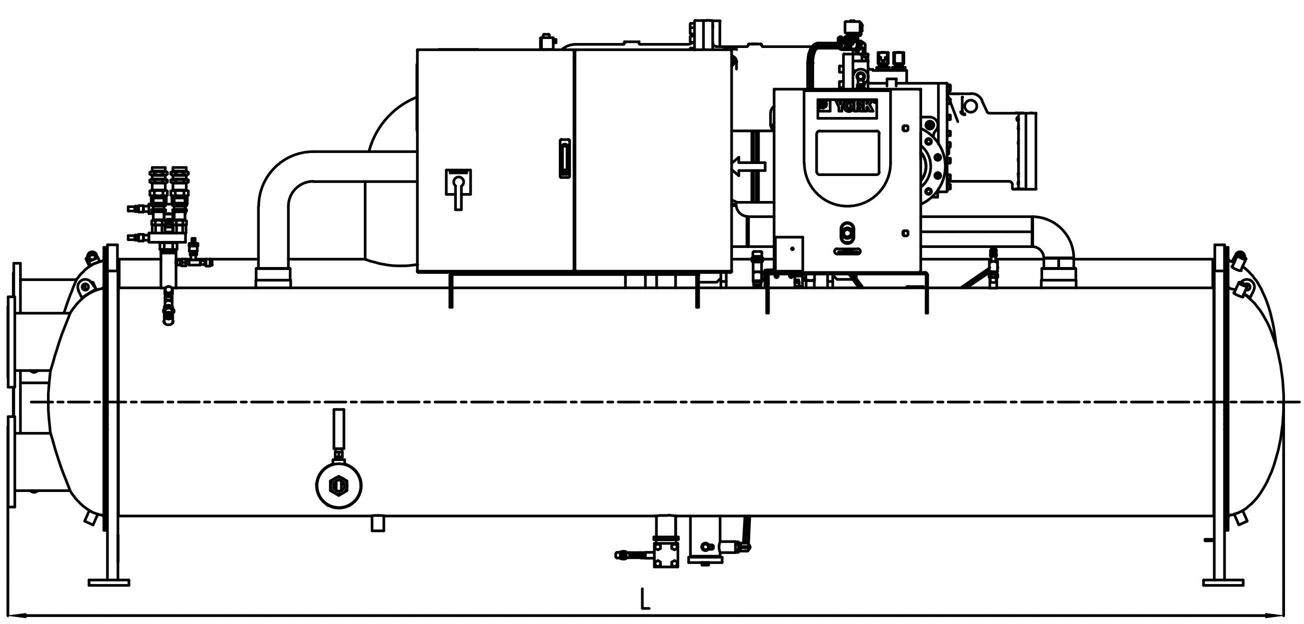



| MODEL | A | B | C | D | E | F | L | W | H |
|---|---|---|---|---|---|---|---|---|---|
| **YGWH115** | 648 | 570 | 190 | 180 | 400 | 435 | 3118 | 1710 | 1739 |
| **YGWH145** | 698 | 590 | 195 | 180 | 425 | 450 | 3131 | 1797 | 1796 |
| **YGWH180** | 713 | 650 | 230 | 230 | 460 | 520 | 3156 | 1975 | 1932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

**Dimensions YGWH260, YGWH300, YGWH330, YGWH375**




| MODEL | A | B | C | D | E | F | L | W | H |
|---|---|---|---|---|---|---|---|---|---|
| **YGWH260** | 860 | 700 | 195 | 195 | 460 | 485 | 4807 | 1925 | 2156 |
| **YGWH300** | 860 | 700 | 195 | 230 | 460 | 520 | 4835 | 1988 | 2174 |
| **YGWH330** | 860 | 700 | 197 | 229 | 485 | 545 | 4872 | 2086 | 2156 |
| **YGWH375** | 860 | 700 | 197 | 229 | 485 | 545 | 4872 | 2086 | 2156 |

# 10. Spare Parts

## Recommended Spares

Details of unit spare parts are given in the Renewal Parts List. Contact your local Johnson Controls Sales and Service Centre for information and please quote the unit model number and serial number.

Recommended Compressor Oils

The correct type of oil must be used in the unit as shown on the unit data plate and labels. Standard units use the following oil and refrigerant:

Oil: YORK 'L' lubricating oil.

Page Left Intentionally Blank

## 11. Decommissioning, Dismantling and Disposal

WARNING

**Never release refrigerant to the atmosphere when emptying the refrigerating circuits. Suitable retrieval equipment must be used. If reclaimed refrigerant cannot be reused, it must be returned to the manufacturer.**

WARNING

**Never discard used compressor oil, as it contains refrigerant in solution. Return used oil to the oil manufacturer.**

Unless otherwise indicated, the operations described below can be performed by any properly trained maintenance technician.

### General

Isolate all sources of electrical supply to the unit including any control system supplies switched by the unit. Ensure that all points of isolation are secured in the 'OFF' position. The supply cables may then be disconnected and removed. For connection points refer to Installation Section.

Remove all refrigerant from each system of the unit into a suitable container using a refrigerant reclaim or recovery unit. This refrigerant may then be re-used, if appropriate, or returned to the manufacturer for disposal. Under NO circumstances should refrigerant be vented to atmosphere. Drain the refrigerant oil from each system into a suitable container and dispose of according to local laws and regulations governing the disposal of oily wastes. Any spilt oil should be mopped up and similarly disposed of.

Isolate the unit heat exchanger from the external water systems and drain the heat exchanger section of the system. If no isolation valves are installed it may be necessary to drain the complete system.

WARNING

**If glycol or similar solutions have been used in the water system, or chemical additives are contained, the solution MUST be disposed of in a suitable and safe manner. Under NO circumstances should any system containing glycol or similar solutions be drained directly into domestic waste or natural water systems.**

After draining, the water pipework may be disconnected and removed.

Packaged units can generally be removed in one piece after disconnection as above. Any fixing down bolts should be removed and then the unit should be lifted from position using the points provided and equipment of adequate lifting capacity.

Units which cannot be removed in one piece after disconnection as above must be dismantled in position. Special care should be taken regarding the weight and handling of each component. Where possible units should be dismantled in the reverse order of installation.

WARNING

**Residual refrigerant oil and glycol or similar solutions may remain in some parts of the system. These should be mopped up and disposed of as described above.**

It is important to ensure that whilst components are being removed the remaining parts are supported in a safe manner.

WARNING

**Only use lifting equipment of adequate capacity**

After removal from position the unit parts may be disposed of according to local laws and regulations.

Johnson Controls



www.johnsoncontrols.com

FORM NO.: 6S6I-B01C-EOMA-EN(0318)
SUPERSEDES: 6S6I-B01C-EOMA-EN(1217)

Printed on recycled paper



SAP NO.: