Johnson Controls	YGWS Water Cooled Screw Chillers	
Installation, Operation and Maintenance	Supersedes: Nothing	FORM NO.:6S3X-B02C-NA-EN(0616)

YGWS Series 330-1160 kW

STYLE B

Warning

The System is charged with refrigerant with a certain pressure

Improper operation during maintenance may cause serious damage to the system. All maintenance shall be done by York authorized technician, following the guide in York installation, operation and maintenance manual.

IMPORTANT!
READ BEFORE PROCEEDING!
GENERAL SAFETY GUIDELINES

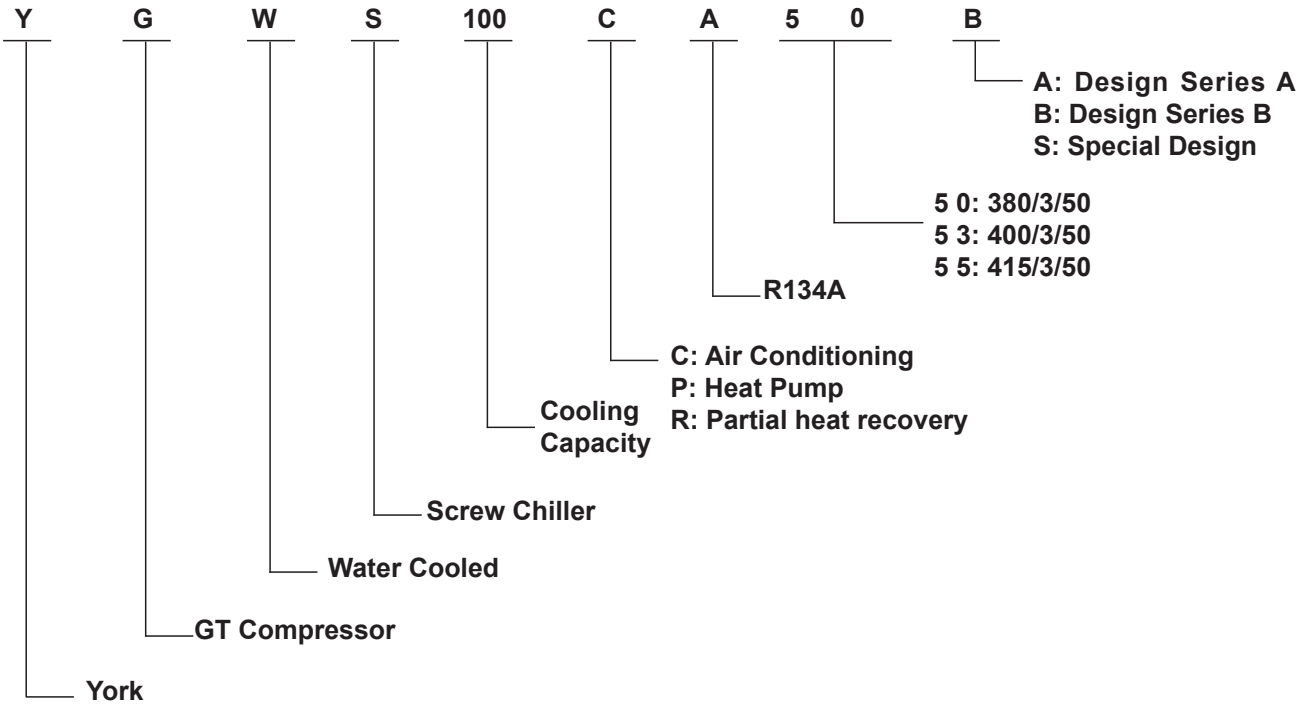
This equipment is a relatively complicated apparatus. During installation, operation, maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to: refrigerants, oils, materials under pressure, rotating components , and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibilities of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/service personnel. It is expected that this individual possesses independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

In complying with YORK's policy for continuous product improvement, the information contained in this document is subject to change without notice. While YORK makes no commitment to update or provide current information automatically to the manual owner, that information, if applicable, can be obtained by contacting the nearest YORK Applied Systems Service office.

It is the responsibility of operating/service personnel to verify the applicability of these documents to the equipment in question. If there is any question in the mind of operating/service personnel as to the applicability of these documents, then prior to working on the equipment, they should verify with the owner whether the equipment has been modified and if current literature is available.

NOMENCLATURE



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General Chiller Information and Safety

1.1 Introduction

York YGWS chillers (Heat Pumps) are manufactured to the highest design and construction standards to ensure high performance, reliability and adaptability for all types of air conditioning installations. The unit should be used to supply chilled water solution (hot water - Heat Pumps) 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.

1.2 Warranty

YORK warrants all equipment and materials against defects in workmanship and materials for a period of eighteen (18) months from date of shipment, or twelve (12) months from commissioning, whichever occurs first, unless labour or 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 and order number. 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 YORK.

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 YORK Service Centre.
- Only genuine YORK approved spare parts, oils 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. See Warranty Policy.

1.3 Safety

YGWS chillers (Heat Pumps) are designed and manufactured by the factory within ISO 9000. Units satisfy all the limitations within this manual and conform to the following Directive GB25131 (Safety requirements of Positive displacement and Centrifugal Water chilling Packages).

1.4 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 manual.

1.5 About This Manual

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

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.

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.

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.

This manual and any other document supplied with the unit are the property of Johnson Controls which reserves all rights. They may not be reproduced, in whole or in part, without prior written authorization from an authorized Johnson Controls representative.

1.6 Misuse of Equipment

Suitability for Application

The unit is intended for cooling water 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 non-toxic, 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.

Use only the refrigerant specifically designated for the unit. Any other type of refrigerant may cause damage to the equipment and will void the warranty.

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.

1.7 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.

1.8 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: Hot surface.

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.

Product Description

2.1 Introduction

YORK YGWS chillers (Heat Pumps) are for cooling (chilled liquid) and heating (hot liquid) and are designed for indoor installation (Equipment room).

2.2 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 2975 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;
- an internal 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.

When the microprocessor initiates a start signal to run a compressor, the applicable relays are energized. The transition of the relay contacts enables the 'Star' connection of the motor start.

The 'Star' connection of the motor start is enabled for 4~10 seconds, then motor switches to the 'Delta' connection.

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.

2.3 Oil Separator

The YGWS 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.

2.4 Refrigerant Circuit

Each unit has an independent refrigeration circuit, the liquid line components include: a manual shut-off valve and throttling device.

2.5 Condenser

The water-cooled condenser is a cleanable shell and tube type, with 19mm 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 China National Standard GB151.

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 19mm-thick flexible closed-cell foam.

2.6 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 China National Standard GB151.

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

2.7 Power and Control 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.

The power panel contains: compressor starting contactor, control wiring, compressor contacting solenoid and compressor overload protection module.

Compressor overload protection is achieved as following: Motor protector sense the current of each phase of motor current and the temperature of motor, and send corresponding signals to the I/O Board. Then compare the values with MLA setpoints and active to protect the motor once the values is higher than MLA setpoints. It protects the compressor motors from damage due to: Current overload, current imbalance (the error of the current of each phase), miswire, motor over temperature, uncalibrated, supply power phase loss.

The control panel includes: Microcomputer keyboard, XS09 and microprocessor board YORK-003.

2.8 Microprocessor Control

The HMI consists of a liquid crystal display, with light emitting diode back-lighting for outdoor viewing of operating parameters and program points. It can display 8 rows and 120 characters in 2 languages (English or Chinese). The keyboard has 20 keys, which is divided into two kinds: Funtion keys and Programme keys.

The standard control function of microprocessor board includes: chiller alarm contactor controlling, chilled water pump controlling, chiller auto resetting when it is re-power on after a period of power off, optimizing the system axiomatically according to the running conditions

Unit operating firmware is stored in non-volatile memory (Flash Memory) to protect chiller from failure for power off. All field programmed setpoints are retained in the EPROM register. A lithium battery backed real time clock (RTC) supply the clock for the system control, and the battery has 3 years memory.

2.9 Motor Protection

The microprocessor provides the overcurrent protection to ensure that the motor is free from the damages due to excessive voltage and other overcurrent problems.

After the Star/Delta starter started for more than 10 seconds, the microprocessor will shut down and lock the chiller for fault if the current exceeds the current setpoints. It is required to reset the system switch manually to eliminate the fault before restart the system. And prior to start the chiller which stopped due to overcurrent, checking should be done on the motor, wiring and refrigerant system.

When it is found that the current is lower than 10% of MLA (Max Loading Amps), the low current protection will be initiated and the unit should be stopped. In that case, prior to restart the system, unit resetting should be done manually.

Motor Protector

Motor protector is used to protect motor from overheat, There are three PTC (Positive Temperature Coefficient) thermistor installed in each phase of motor winding. The resistance of thermistor will be below 1K when the temperature is lower than 125°C, however, the resistance of thermistor will increase as its temperature rise. When the resistance value of sensor increases up-to 13K, the motor protector will be active and cut off the power supply of motor. The chiller is not allowed to restart until the motor is cooled down and the resistance value of sensor drops down to 3.25K.

2.10 Keyboard Control

Display

The parameters of each refrigerant circuit can be displayed in 2 languages (English or Chinese),

All the displayed parameters are listed as follows:

- Entering/Leaving chilled water temperature
- Entering/Leaving cooling water temperature.
- Time and date, start and stop time at ordinary days, arrangement on holidays and status of manual setting.
- Compressor running hours and starting times. Compressor running status.
- System Suction/Discharge pressure, oil pressure, discharge temperature.
- Percentage of compressor current to Full Load Amps.
- Cut-out value and setpoints: Leaving Chilled (Hot) Water Temperature, Low Evaporator Pressure , High Discharge Temperature/Pressure , High/Low Amps , Low Chilled Water Temperature , High Discharge Pressure Unload, High Compressor Amps unload.
- Outside operating limits data, Up to 50 fault records.

Input

Setting the chilled water temperature.

Clock

Setting time, daily and holiday start/stop schedule.

Programming

Cut-out setpoints: Low Evaporator pressure, High Discharge Pressure, Low Evaporator temperature, High Discharge Temperature, High Discharge pressure unloading, Compressor Current Percentage Limits.

2.11 Options

YORK ISN building automation system can directly send the communication signal to the standard control panel through the standard RS485 connection.

Flow Switch

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

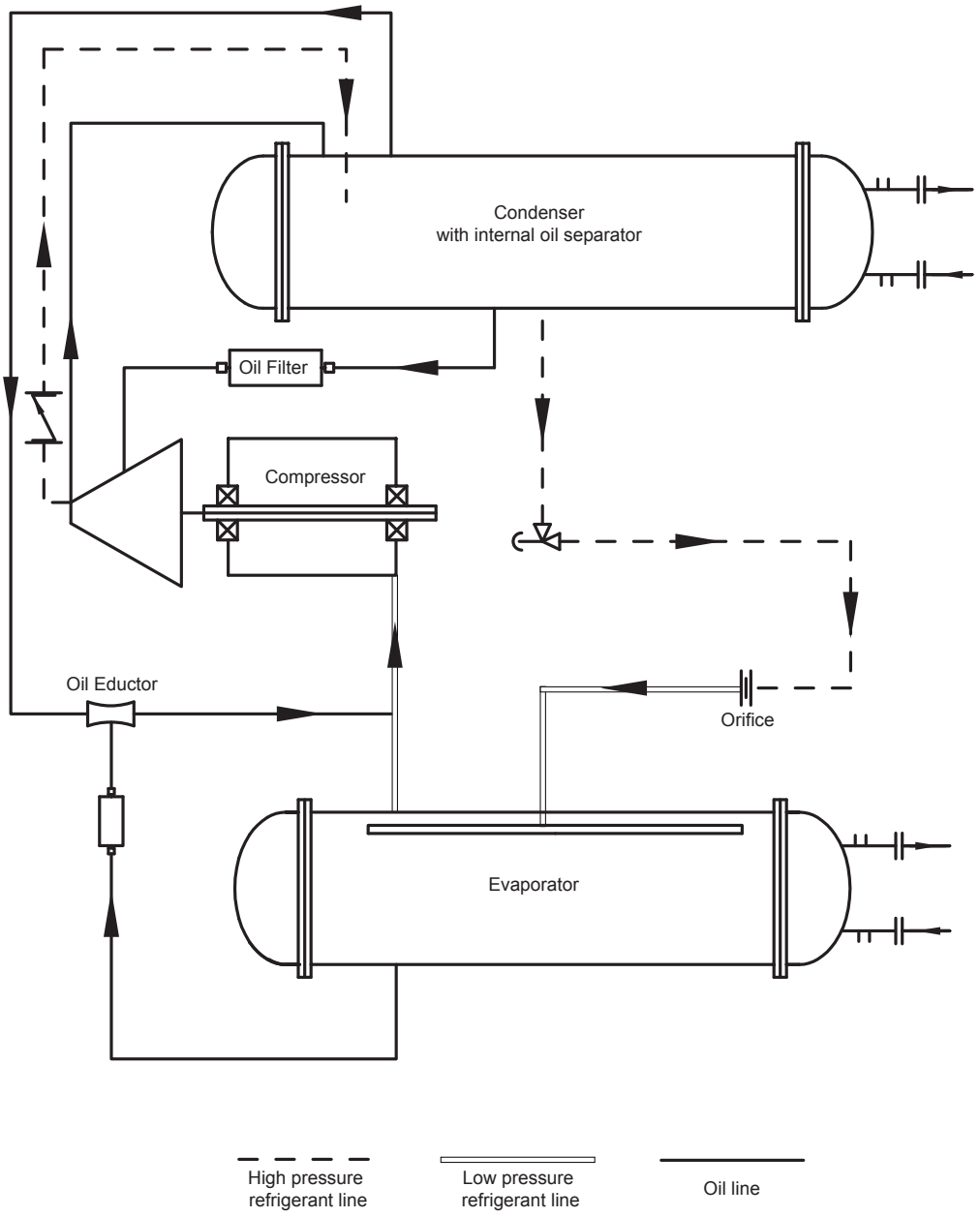
25mm Spring Isolators (Option)

Level adjustable, spring and cage type isolators for mounting under the unit base rails (Field mounted).

2.12 Functional Description

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.

YGWS Functional Diagram



Transportation, Handling and Storage

3.1 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 (YORK W oil for Heat Pump and Heat Recovery Units) 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).

3.2 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.

3.3 Rigging

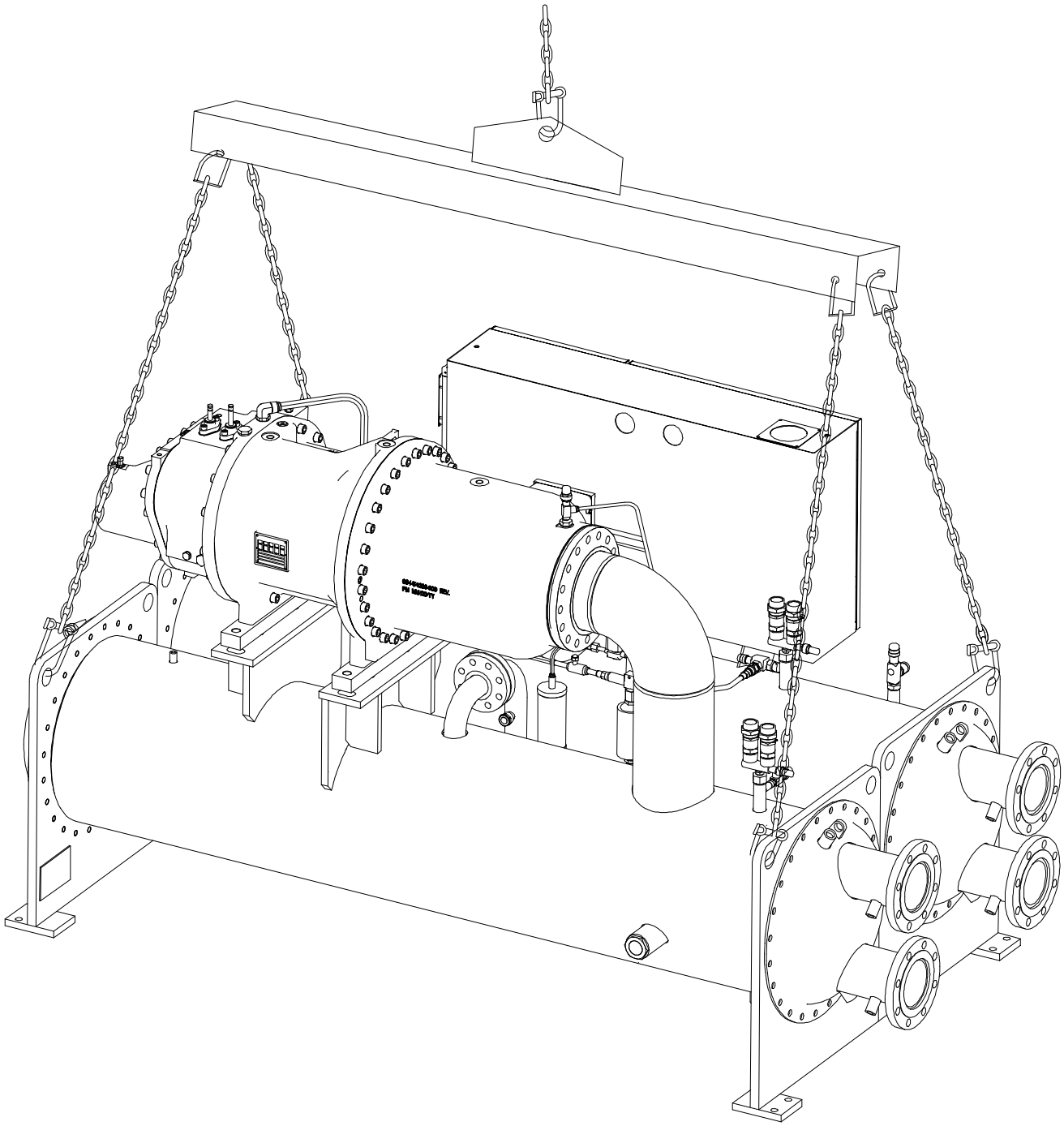
Prior to moving the unit, ensure that the installation site is suitable for installing the unit and is easily capable of supporting the weight of the unit and all associated services.

The unit should be lifted as shown in figure 3.1, using chains and shackles. The shackles should be inserted into the respective holes in the tube end sheets.
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.
Rig the unit to its final location on the floor or mounting pad by lifting the unit (or shell assembly) with an overhead lift and lower the unit to its mounting position.

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

Rigging Instruction

Use a spreader bar as shown, with 4 separate slings, the length of lifting elements must be adequate to clear all projections, the strength of lifting elements must be suitable for lifting weight of the unit (lifting holes in the tube end sheet are for a 6.8 shackle).



Installation

4.1 Introduction

The YGWS 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.

4.2 Location Requirements

YGWS 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.

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 table

Model	Tube removal space
YGWS095/100	2100 mm
YGWS130/160/175/200	2650 mm
YGWS230/260/300/330	3050 mm

4.3 Installation of Vibration Isolators

The optional vibration isolators are shipped loose with the chiller.

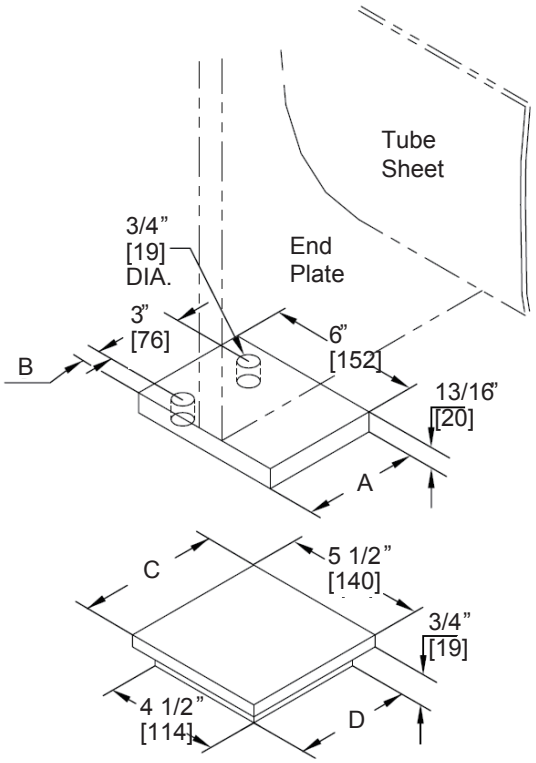
Please refer to the foundation figures in Section 10 to decide proper installation position for the units.

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 of the dimensional product 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.



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 6.4mm 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.

SYSTEM OPERATING WEIGHT		
kg	**lbs**	**Part No.**
UP TO 7423	UP TO 16365	028W14462-000
7424 TO 13079	16366 TO 28835	028W14459-000

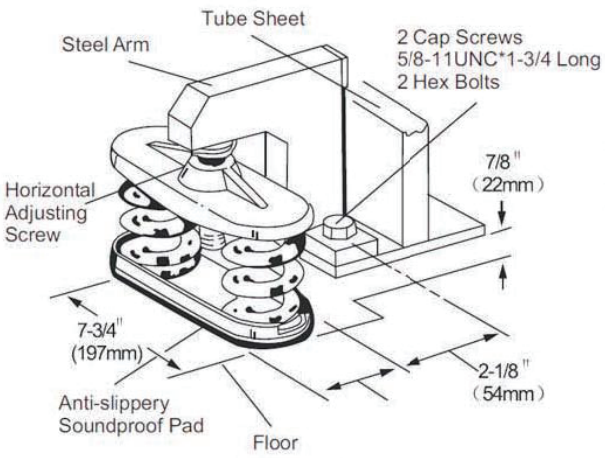
	YGWS Model	
Dim.	**095-200**	**230-330**
A	4"[114]	6"[152]
B	3/4"[19]	1 1/2"[38]
C	5 1/2"[140]	7"[178]
D	4"[114]	6"[152]

Installing Option Spring Isolators

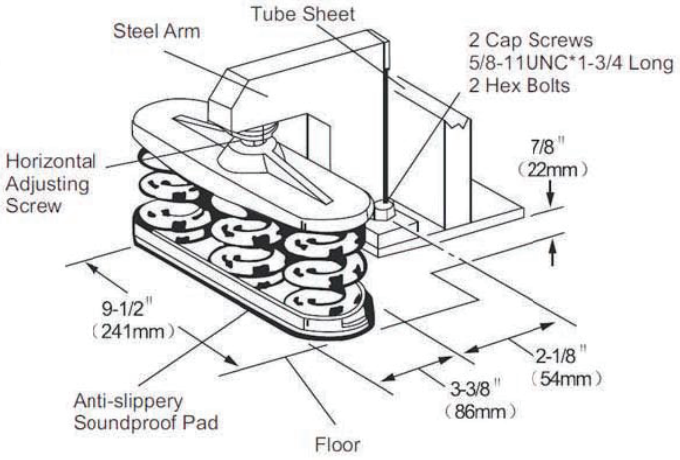
In order to mount spring isolators, first remove the nuts and screws on the spring isolator supports. Before the unit is positioned, the isolator supports should be bolted to the unit support. Position the 4 spring isolators, screw out the adjusting screws on each isolator until they reach out to match 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 N0: 029-18479



Part N0: 029-18480

SPRING ISOLATORS		
SYSTEM OPERATING WEIGHT		
kg	**Lbs**	PART NUMBER
UP TO 3114	UP TO 6865	029W26599-001
3115 TO 4453	6866 TO 9818	029W18479-002
4454 TO 5526	9819 TO 12182	029W26599-003
5527 TO 6927	12183 TO 15272	029W18479-004
6928 TO 8288	15273 TO 18272	029W18480-001

4.4 Piping Connections

General Requirements

The following piping recommendations are intended to ensure satisfactory operation of the unit. Failure to follow these recommendations could cause damage to the unit, or loss of performance, 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 10 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 Electrical Connection. 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.

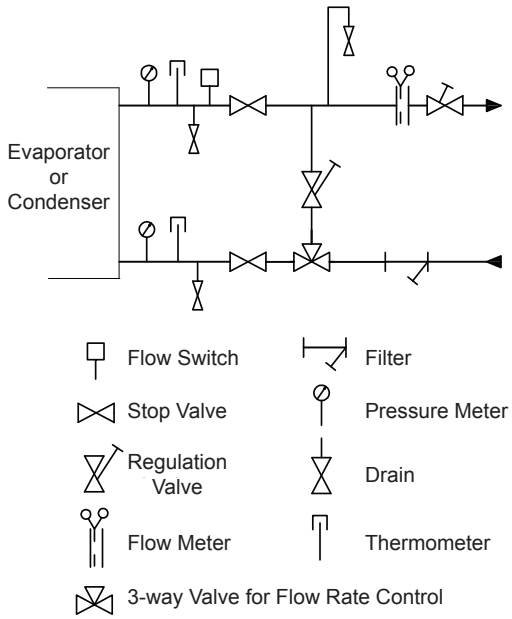
The evaporator must not be exposed to too high flushing velocities or debris deposited during flushing. It is recommended that a suitably sized by-pass and valve arrangement be installed to allow flushing of the pipework system. The by-pass can be used during maintenance to isolate the evaporator without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



4.5 Water Treatment

The unit performance provided in the design guide is based on a fouling factor of (0.044m²/KW for condenser and 0.0018m²/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

Target		Allowable value	Corrosion	Fouling
Name	Unit			
PH value(25℃)	-	6.5～8.0	X	
Conductivity(25℃)	μs/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
SiO_2	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.

4.6 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.

4.7 Connection Types and Sizes

Please refer to Section 10 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.

4.8 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:

$D^5 = 1.447 \times L$

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.

4.9 Electrical Connection

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.

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.

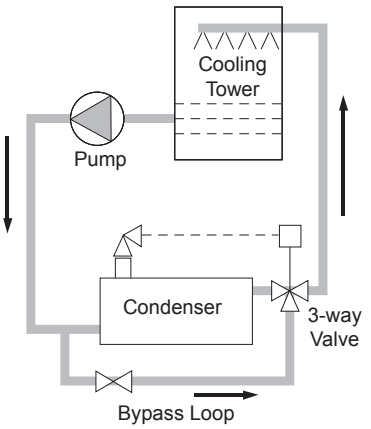
4.10 Condenser Cooling Water System

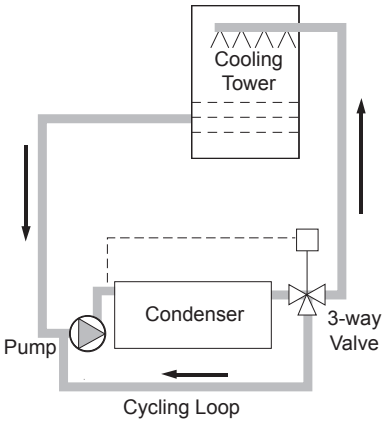
For YGWS units, condensers are usually piped in conjunction with a cooling tower.

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 YGWS 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 R134 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.

4.11 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 YGWS chillers.

4.12 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 / 3P / 50Hz power supply to the unit with circuit protection. Connecting power supply to the circuit breaker located in the power panel on site.

4.13 Control Panel Wiring

The power connect to the I/O switch input terminals is 12 Vdc while the power connect to the I/O switch 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.

4.14 220 Vac Outputs

Water pump starter

Terminal 21 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 26 provides a 220 Vac output to indicate an alarm condition.

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

4.15 12 Vdc Inputs

Flow switch

A suitable water flow switch must be connected to terminals 1 and 13 to provide adequate protection against loss of liquid flow.

Note: Contact resistance should be less than 5Ω. .

Remote Run/Stop

Connect a remote switch between 8 and 13 to provide remote start/stop if required.

Note: Contact resistance should be less than 5Ω.

Control System

5.1 Introduction

Use the information on the unit nameplate information, when setting up the control system to ensure the correct unit type is programmed.

5.1.1 Controller Hardware Description

(1) Installation

This technical manual should be kept with the unit for reference at all times and made available to users operating the machine.

Only the approved YORK accessories can be used, and please ask the manufacturer or authorized dealer to provide the corresponding technical installation and technical service.

Malfunction of controller or electric shock may be caused from improper installation of the control accessories. The user is prohibited from maintaining the unit, because electric shock or controller damage may be caused due to improper repair. Please consult the manufacturer for any repair requirements.

(2) YORK-003 Control Board

YORK-003 control board must be installed within an enclosure where rain or snow, leaf or other wastes will not accumulate. High voltage passes through the installation; and 220 Vac is present in the control panel. Power and signal cables should be kept separate and the control panel should be at least 100 mm from the contactor.

(3) XS09 Central Controller

XS09 central controller should be installed correctly, to avoid injury or damage to the controller. The power supply should not be shared with other electrical devices to avoid the danger of overloading. Use a fuse or circuit breaker correctly rated for the controller. Over-rated wire or protection devices should not be used.

(5)Earthing

The YORK-003 control board and transformer frame must be earthed. The earth wire must be correctly grounded or electric shock may occur. Regularly inspect the earth connection between the controller / transformer and the earthing electrode for tightness.

(6)Operating

Do not use sharp objects to press the keys on the keypad to avoid damage to the controller. Do not pull the wiring of the controller to avoid damage to the controller to further malfunction. Do not wipe the controller with the benzene, thinner or chemical cloth, otherwise, the controller may malfunction. A damp cloth with detergent should be used to clean the controller.

5.2 Initialisation

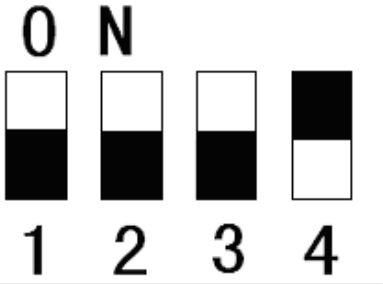
When the control system installation wiring is complete, initialisation must be carried out.

(1) When is initialisation required

- When the control system installation wiring is complete.
- After the YORK-003 control board or XS09 central controller have been replaced, because of defects.
- If the controller or main board in the control system is exchanged to another network.

(2) Process

- Power off the control system.
- On the YORK-003 control board set the DIP switches:



DIP Switch

The DIP switch settings should only be changed, by YORK approved personnel.

Apply power to the Control System.

At the main interface, Press the **F2** key to enter the parameter setting interface, input the password and navigate to settings interface S14.

- Move the cursor to CLEAR RECORD, set all the parameters by pressing 8, and press ✓ to confirm.
- Move the cursor to CLEAR FAULT, set all the parameters by pressing 8, and press ✓ to confirm.
- Move the cursor to DEFAULT DATA, set all the parameters by pressing 8, and press ✓ to confirm.

Navigate to settings interface S13.

- Move the cursor to SYS1 FLA, set the correct FLA using the 0 to 9 keys, and press ✓ to confirm.
- In addition check the correct unit type is set.

Navigate to settings interface S3.

- Move the cursor to SYS1 CUR.OFFSET, check that the correct value of 100 is set.

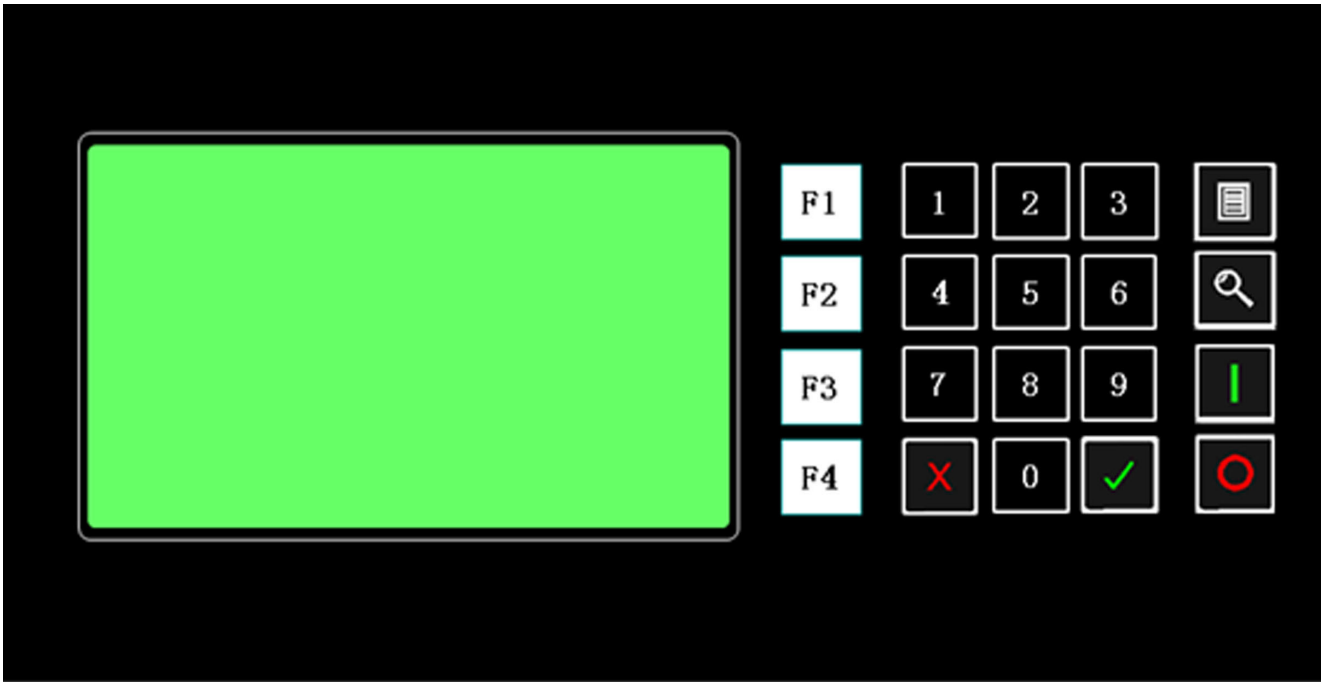
Remove power to the Control System, to de-energise the YORK-003 control board and XS09 central controller.

Power on again to re-energise the XS09 central controller and YORK-003 control board.

- Return to the main interface by pressing F1, then press F1 to enter into Status display interface to view the communication of XS09 central controller and the YORK-003 control board. The communication status of centralized controller and control board will be displayed in Status display interface. If it is displayed in normal, please check the input status of AI and DI for each module via the display interface.
- Ensure the unit type displayed matches the data given on the unit nameplate (air conditioning unit, heat recovery unit or heat pump unit) the start-up can be done after confirmation.

5.3 Instructions on the operation

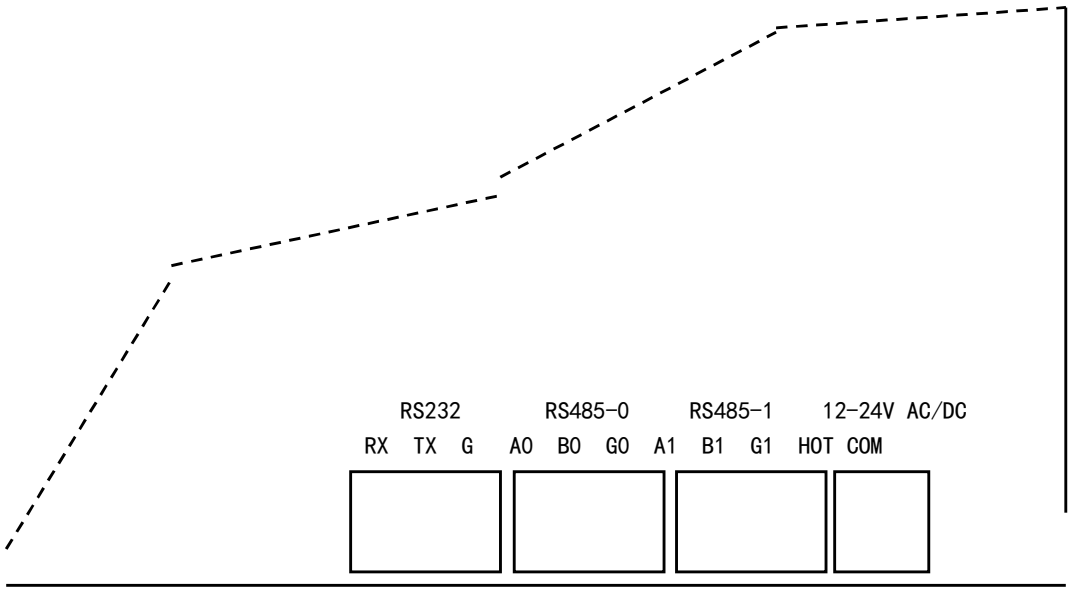
5.3.1 XS09 Central Controller Panel Keys



I + O	Unit start and stop keys.
	Return to the main interface screen ‘Home’.
	View detailed fault information.
F1	View detailed unit status (information), inputs, outputs etc. Key is also used return to the home screen from sub screens.
F2	View and modify system settings (parameters). Key is also used return to first status screen from sub screens.
F3	Setup the system date and time. Key is also used to return to previous screen when navigating sub screens.
F4	View detailed unit fault history (status information at time of fault), inputs, outputs etc. Key is also used to move to next screen when navigating sub screens.
1 2 3 4 5 6 7 8 9 X 0 ✓	Numeric keys for modifying settings, time date etc. ✓ Confirm changes and move to next parameter. X Cancel changes and move to previous parameter. 8 0 Keys are also used for stepping ↑ and ↓ through parameters.

5.3.2 X09 Central Controller Interface Specification

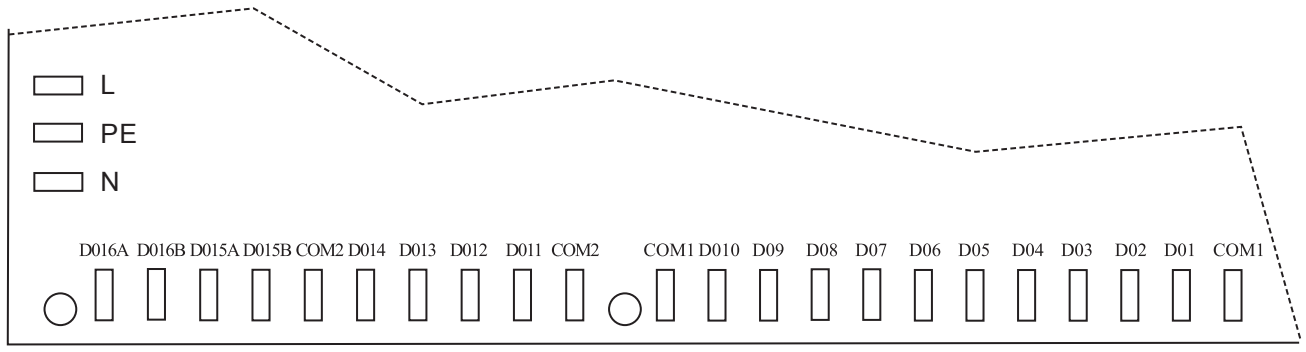
Interface No.	Description	Remarks
J4	Keyboard Interface	
J5	ISP Program download interface	
RS232		
RS485-0	485 Communication port	A0, B0: communication interface and control board
RS485-1	485 Communication port	A1, B1: with BAS communication interface
12-24V AC / DC	Input Power	Input 12-24 Vac / Vdc power supply



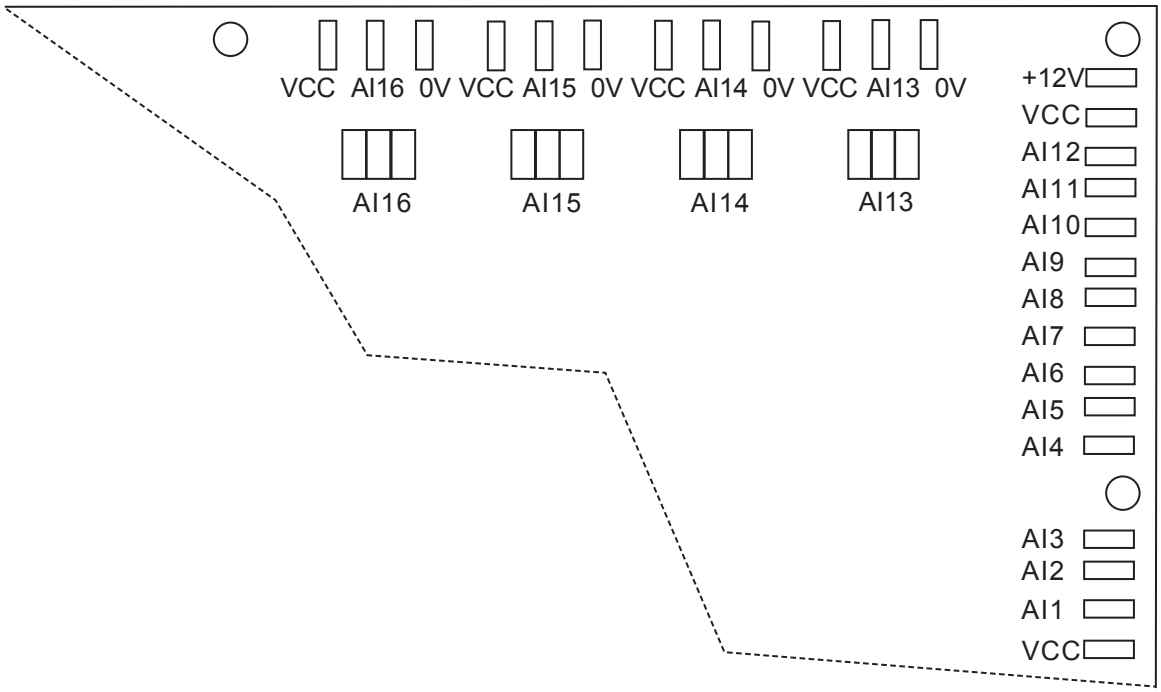
5.3.3 YORK-003 Control Board Interface Specification

Interface No.	Description	Remarks
CON2 (COMU)	485 communication port	Press the panel marked A, B, and positive and negative power supply terminal wiring
COM	Comm Port DI digital input	Two Comms Ports are connected
DI1 -DI12	DI digital input	A total of 12 DI digital input
CON3	Fan Speed Interface	PG motor speed
VCC	Analog input + 5V power supply	VCC for 6 circuits
0V	Analog input ground terminal	AI13 -AI16 ground terminal, 4-way connection for 0V
AI13 -AI16	Analog Input	4-20 ma, 1-5V or NTC input signal
+ 12V	+ 12V power output	
AI1 -AI12	Analog Input	Common NTC input signal
CN5, CN6	Extended output	2 * 4 TTL-level output
COM1	Relay output common	DO1 - DO10 common terminal
COM2	Relay output common	The common terminal DO11 - DO14
DO15A, DO15B	SCR Output	
DO16A, DO16B	SCR Output	
L, N	AC power input	220VAC / 50Hz
PE	Safety ground	
JP1	485 comms - load resistor	Connect or disconnect the load resistance, as detailed in figure
AI13 -AI16 (pin)	Dividing resistor selection	AI13 -AI16 analog dividing resistor selection method, as detailed in figure
TEST	test	The down loading programs
SW1	DIP switch	For setting the address of the board
POWER (LED)	Power Indicator	Illuminated Red, if the motherboard power supply is normal
COM (LED)	Communication indicator	Flassing Green, communication is successful
RUN (LED)	Running lights	Yellow, flashing at a frequency of 0.5 Hz

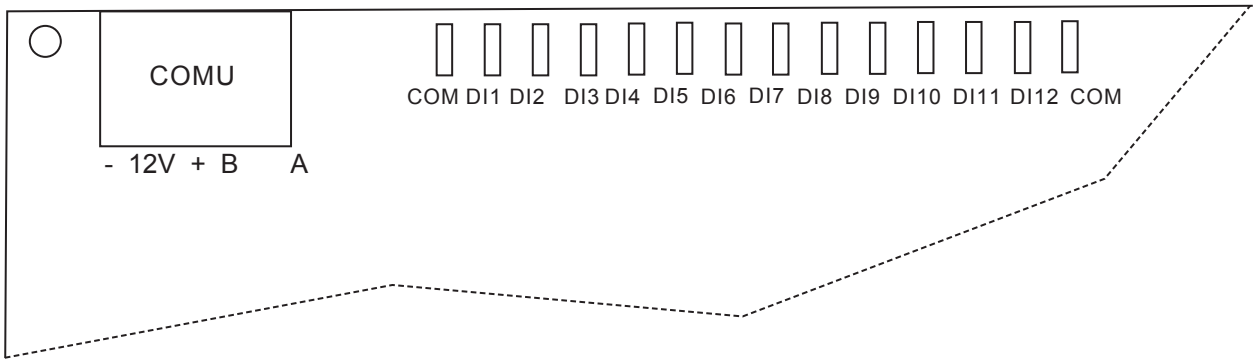
5.3.3.1 Power and DO interface connections



5.3.3.2 AI interface connections



5.3.3.3 Comms, Power Supply and DI interface connections



Analogue Input definition

No.	Analog input	Measuring range and status description
AI1	Cooling water outlet temperature	-29°C to 99°C, outside of this range is fault
	Hot water outlet temperature (heat recovery mode / heat pump mode)	
AI2	Cooling water return temperature	-29°C to 99°C, outside of this range is fault
	Hot water return temperature(heat recovery mode / heat pump mode)	
AI3	Chilled water outlet temperature	-29°C to 99°C, outside of this range is fault
AI4	Chilled water returntemperature	-29°C to 99°C, outside of this range is fault
AI5	Discharge temperature	-29°C to 99°C, outside of this range is fault
AI13	Evaporation pressure	0.41 to 5.1 kg /cm² (air conditioning units), outside of this range is fault
		0 to 20.69 kg /cm² (heat recovery units / heat pump units), outside of this range is fault
AI14	Discharge pressure	0 to 28 kg /cm², outside of this range is fault
AI15	Oil pressure	0 to 28 kg /cm², outside of this range is fault
AI16	Compressor current	Rated current, open or short circuit is fault

Pressure conversion: 1 kg /cm² = 98.07 Kpa (unless otherwise stated all pressures are gauge)

Digital Input definition

No.	Switch input	status description	Participation and Protection Logic
DI1	Flow switch	Closed normal / disconnect fault	Startup, shutdown logic, liquid circuit protection
DI2	Air conditioning / heat recovery switch	Disconnect - air conditioning, closed - heat recovery	Heat recovery unit
	Air conditioning / heat pump switch	Disconnect - air conditioning, closed - heat pump	Heat Pump
DI3	High Pressure Switch	Closed normal, disconnect fault	Discharge pressure protection
DI4	Oil level switch	Closed normal, disconnect fault	Low oil level protection
DI5	Motor protection	Closed normal, disconnect fault	Compressor motor protection
DI6	External linkage	Closed normal, disconnect fault	External chain protection
DI7	Failed to start	Closed normal, disconnect fault	Boot failure protection
DI8	Remote Switch	Disconnect - power off, power on - closed	

Digital Output definition

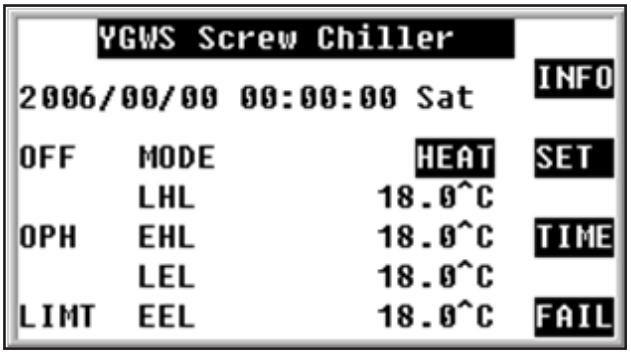
No.	Output	Status description	Control logic
DO1	Pump	Normally open, the output is closed	Switch logic
DO2	Compressor contactor 1	Normally open, the output is closed	Switch logic
DO3	Compressor contactor 2	Normally open, the output is closed	Compressor delta contactor closed three seconds after operation
DO4	Oil heater	Normally open, the output is closed	Oil heater logic
DO5	Liquid solenoid valve 1	Normally closed output opens	Switch logic, liquid supply shortage
DO6	Alarm output	Normally open, the output is closed	There is no alarm, the output is closed
DO7	Demand Cooling	Normally closed output opens	Suitable for heat recovery units and heat pumps
D08	Liquid solenoid valve 2	Normally closed output opens	Switch logic, liquid supply shortage
DO9	Operating status	Normally closed output opens	Indicates the compressor running
DO10	Hot gas bypass valve	Normally closed output opens	Indicating the status of the hot gas bypass valve
DO15	CR4 load solenoid valve	Normally closed output opens	Switch logic, the logic load, unload logic
DO16	CR3 unloading solenoid valve	Normally open, output open	Switch logic, the logic load, unload logic

5.4 Instructions of Display Interface

5.4.1 Initialisation Interface

Screen shows during initialisation, before the Home screen is shown.

5.4.2 Home Interface



Keys **F1** to **F4** used to enter 4 sub-interfaces of "INFO" " SET" " TIME" and " FAIL" separately.

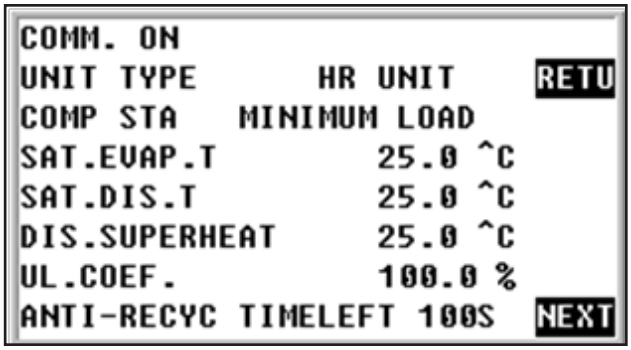
Screen displays:

Current date and time.
ON/OFF status of unit.
MODE - AC for airconditioning.
LCL/ECL - Leaving and entering condenser cooling liquid temperature.
LEL/EEL: Leaving and entering evaporator liquid temperature.
OPH - oil preheat (when shown).
LIMIT - limit reached (when shown).
FAIL - flashing when a fault exists.

5.4.3 Status Interfaces

These screens display the current status of the unit operating parameters

5.4.3.1 Status Interface 1



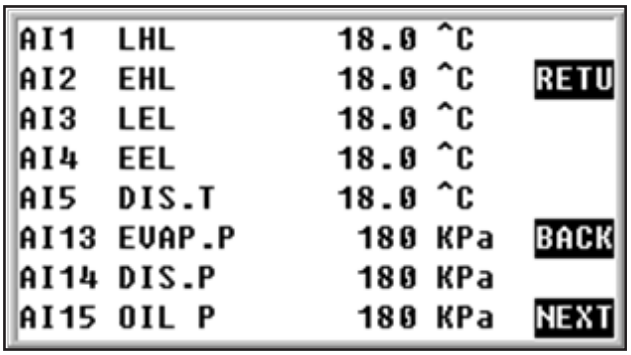
F1 key used to enter/exit status interface, **F3** and **F4** to navigate between screens.

Screen displays:

COMM - communication status.
UNIT TYPE - AC Unit.
COMP STA:
COMP OFF- The compressor is off.
STOPPING- The compressor is stopping.
STARTING- The compressor is starting.
HIGH DIST UNLOAD- Discharge temperature is too high and the compressor executes to unload.
LOW EVAP UNLOAD- Evaporating pressure is too low and the compressor executes to unload.
HIGH CUR UNLOAD- Compressor motor current is too high and the compressor executes to unload.
HIGH DP UNLOAD- Discharge pressure is too high and the compressor executes to unload.
LOW DISH UNLOAD- Discharge Superheat is too low and the compressor executes to unload.
HIGH DIST HOLD Discharge temperature is too high and the compressor executes to hold.
LOW DISH HOLD- Discharge Superheat is too low and the compressor executes to hold.
HIGH CUR HOLD - Current of compressor motor is too high and compressor executes to hold.
HIGH DP HOLD- Discharge pressure is too high and the compressor executes to hold.
MANUAL LOAD- The compressor executes to load by manual control.
MANUAL UNLOAD- The compressor executes to unload by manual control.
CAP HOLD- The compressor is holding.
CAP LOAD- The compressor is loading.
CAP UNLOAD- The compressor is unloading.
DIST LOAD - Compresss protection logic, load.
MINIMUM LOAD- Compressor motor current is below minimum load setting, load.

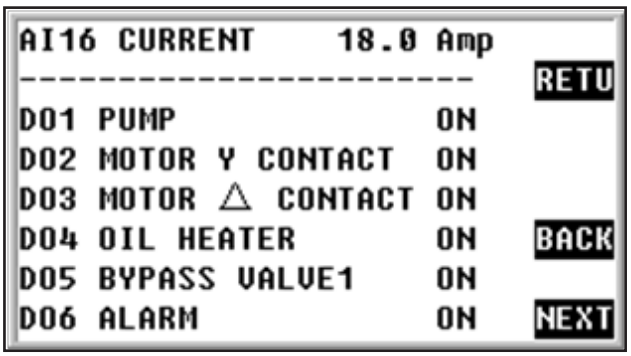
SAT.EVAP.T: Saturation temperature of the refrigerant in Evaporator.
SAT.DIS.T: Saturation temperature of the discharge refrigerant.
DIS.SUPERHEAT: Discharge superheat equals to the diacharge temperature minus the saturation temperature of the discharge refrigerant.
ULCOEF.: The value of compressor running current to the unit FLA.
ANTI-RECYC TIMELEFT: time remaining on anti-recyle timer, when applicable.

5.4.3.2 Status Interface 2



Displays AI analog input values of the main board, AI1 thru AI5 and AI13 thru AI15.

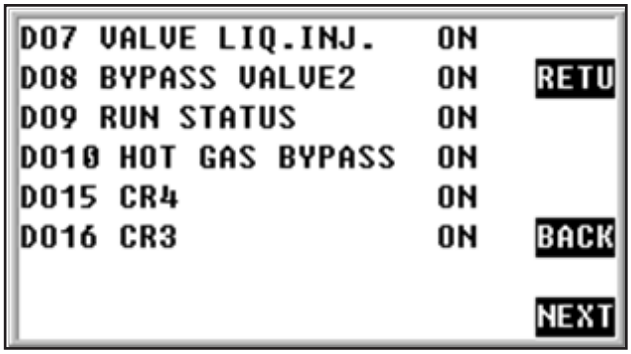
5.4.3.3 Status Interface 3



Displays AI analog input value of the main board, AI16 and status of DO relay of the main board DO1 thru DO6.

ON indicates the digital output is closed.

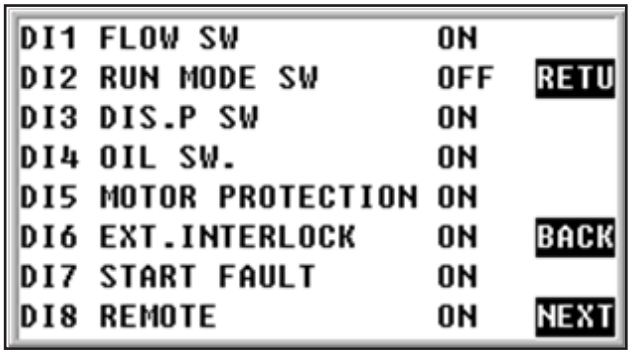
5.4.3.4 Status Interface 4



Displays status of DO relay of the main board DO7 thru DO10 and DO15 and DO16.

ON indicates the digital output is closed.

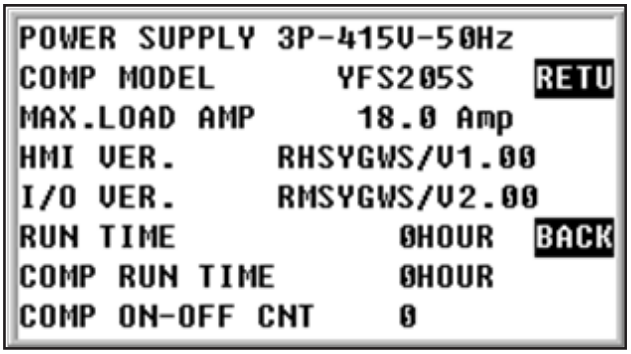
5.4.3.5 Status Interface 5



Displays the input status of DI switch of the main board, DI1 thru DI8.

ON indicates the digital input is closed.

5.4.3.6 Status Interface 6



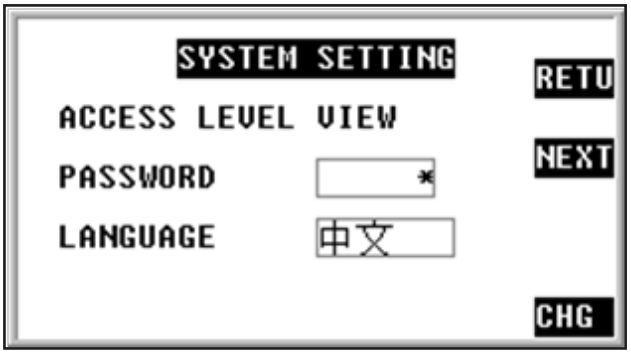
POWER SUPPLY: Power supply of unit.
COMP MODEL: Model of compressor in this unit.
MAX.LOAD AMP: Maximum load amp of motor.
HMI VER.: Firmware version of XS09.
I/O VER.: Firmware version of YORK003.
RUN TIME: Unit accumulated running time.
COMP RUN TIME: Compressor accumulated running time.
COMP ON-OFF CNT: Number of compressor start/stops.

5.4.4 Parameter Settings

These screens allow the unit control parameters to be viewed and programmed.

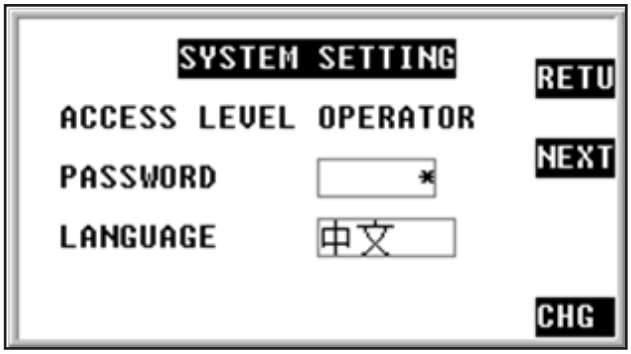
5.4.4.1 Parameter Settings 1a

F2 is used to navigate between the screens, after entering the relevant password press ☑ to confirm.



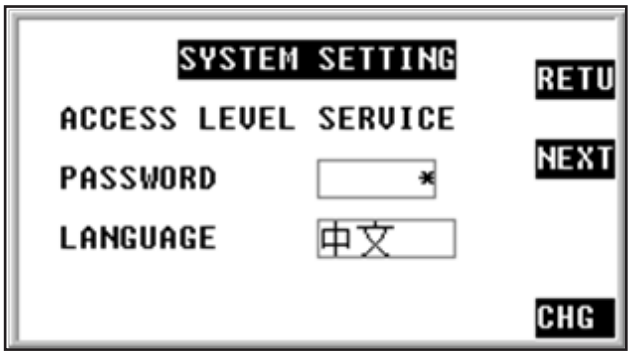
Parameter Setting Interface 1a allows the parameters to be viewed only, no password is required.

5.4.4.1 Parameter Settings 1b



Parameter Setting Interface 1b allows the operator parameters to be set, a password is required.

5.4.4.1 Parameter Settings 1c



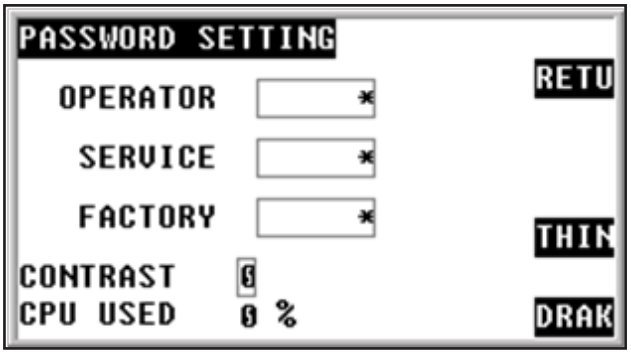
Parameter Setting Interface 1c allows the service parameters to be set, a password is required.

5.4.4.1 Parameter Settings 1d

Parameter Setting Interface 1d allows the factory parameters to be set, a password is required.

5.4.4.1 Parameter Settings 1e

F4 is used to enter **Parameter Setting Interface 1e.**



The Parameter Setting Interface 1e allows the access level passwords to be set.

The contrast of screen can be changed with the **F3** and **F4** keys.

The CPU usage is also displayed to assist in development.

5.4.4.2 Parameter Settings 2

Parameter setting

For numeric programmable items, the data is entered by pressing the number keys 0 to 9.

For non-numeric programmable items, data is selected by pressing the 8 ▲ or 0 ▼ (ARROW) keys.

To store the programmed value and move to the next value, the (ENTER) key must be pressed.

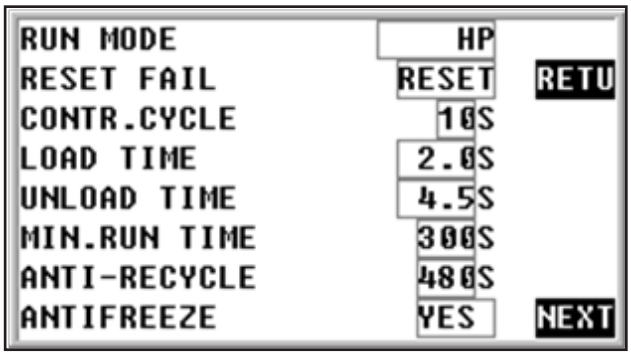
To cancel the programmed value and move to the previous value, the (CANCEL) key must be pressed.

Function keys F3 and F4 enable navigation forwards and backwards through the different settings (program) pages.

In the main interface, press **F2** to enter into the parameter setting interface.

Keys **F1** to **F4** allow navigation and different functions within the different interfaces

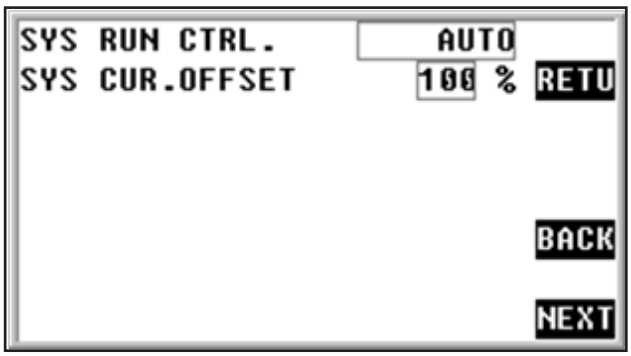
Note; The input parameters will be invalid if they are exceeds the setting ranges.



Screen allows setting of:

RUN MODE: - Unit working mode,
RESET FAIL: - Reset system failures.
CONTR.CYCLE: - The time period of capacity regulation
LOAD TIME: Time of CR4 solenoid of compressor is energized.
UNLOAD TIME: - Time of CR3 solenoid of compressor is de-energized.
MIN.RUN TIME: - The minimum operation time once the compressor is started.
ANTI-RECYCLE: - The minimum stand-by time of the unit after the compressor is stopped.
ANTIFREEZE: - Activate anti-freeze operation protection in standby state.

5.4.4.3 Parameter Settings 3

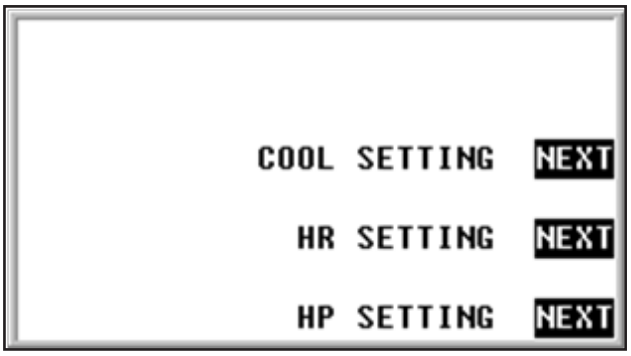


Screen allows setting of:

SYS1 RUN CTRL.:
AUTO, the unit will automatically carry out load/ unload control according to water temperature conditions.t
LOAD, the unit will carry out compulsive load (CR3 and CR4 solenoid of compressor is energized).
UNLOAD (CR3 and CR4 solenoid of compressor is deenergized), the unit will carry out compulsive unload.

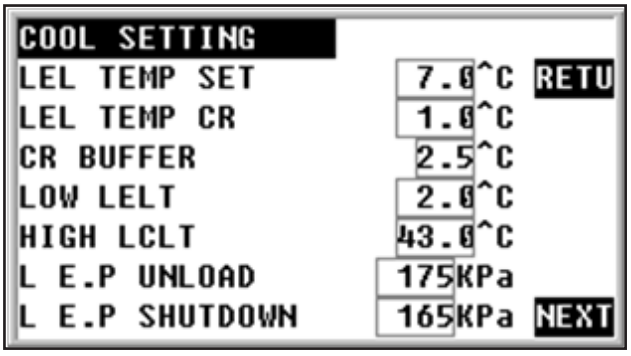
SYS1 CUR.OFFSET: allows correction of minor error between current value displayed on centralized controller and actual measured current value.

5.4.4.4 Parameter Settings 4



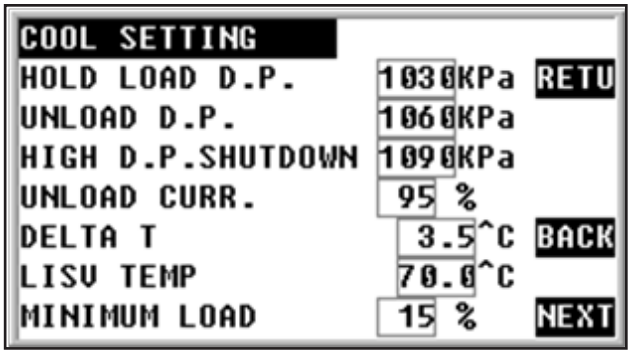
Allows access into the **COOL SETTING** (air conditioning settings), use **F2** to enter.

5.4.4.5 Parameter Settings 5



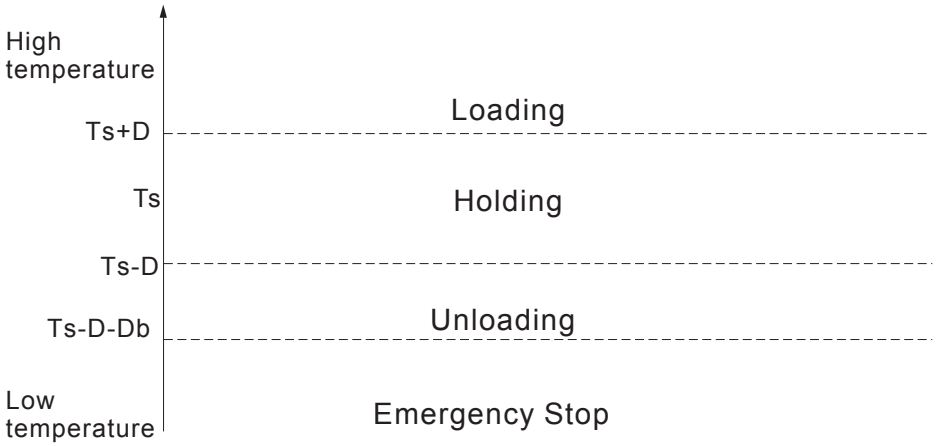
LEL TEMP SET: Set the leaving evaporator temperature.
LEL TEMP CR: Set the desired LEL control range.
LOW LELT: setpoint, for fault alarm and compressor shut off, with water pump still running.
HIGH LCLT: setpoint, for fault alarm and compressor shut off, with water pump still running.
L E.P UNLOAD: setpoint, the compressor will unload compulsively,the unit will come back to normal capacity control when the evaporator pressure.
L E.P SHUTDOWN: setpoint, the unit will stop immediately.

5.4.4.6 Parameter Settings 6



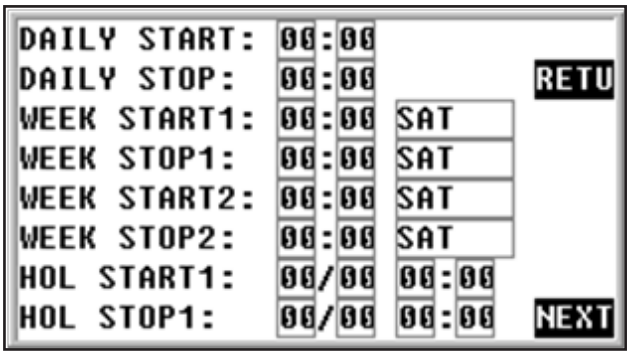
HOLD LOAD D.P: setpoint, the compressor will stop loading.
UNLOAD D.P: setpont, the compressor will unload rapidly.
HIGH D.P.SHUTDOWN: setpont, the compressor will shutdown.
UNLOAD CURR: Percentage of the compressor running amps to MLA(maximum load amps) to cause unload.
DELTA T: The difference between LEL temperature and evaporator refrigerant temperature.
LISV TEMP: Liquid discharge valve opening temperature.

Instructions for capacity control (AC mode for example)

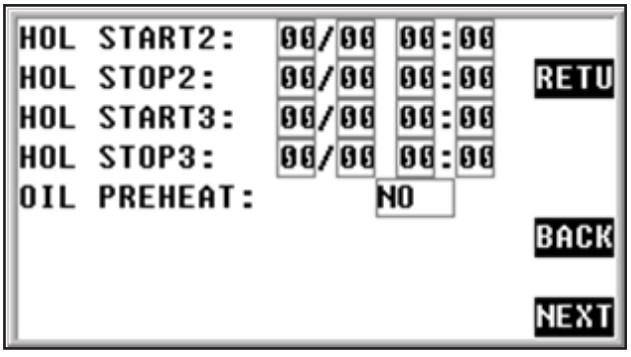


- Ts: Leaving chilled water temperature setpoint (LEL TEMP SET)
- D: Differential of Leaving chilled water temperature (LEL TEMP CR)
- Db: Differential buffering value
- When leaving chilled water temperature≥ (Ts + D), the compressor will load. when leaving chilled water temperature ≥(Ts - D) and≤ (Ts + D) , the comrepssor will operate fuzzy control logic. when leaving chilled water temperature ≥(Ts - D- Db) and≤ (Ts - D) , the comrepssor will unload. When leaving chilled water temperature ≤(Ts - D- Db) , the compressor will be cycling shut down.
- By setting the value of Ts, D and Db, the temperature range of different running mode(Hold/Unload/Load/Stop) of compressor can be adjusted.

5.4.4.7 Parameter Settings 11



5.4.4.8 Parameter Settings 12



Parameter settings screens 11 and 12 allow the starting and stopping time on daily, weekends and holidays to be set:

A maximum of 3 holidays can be set.

The incorrect input of date is not effective, for example, 00 means that the holiday is invalid.

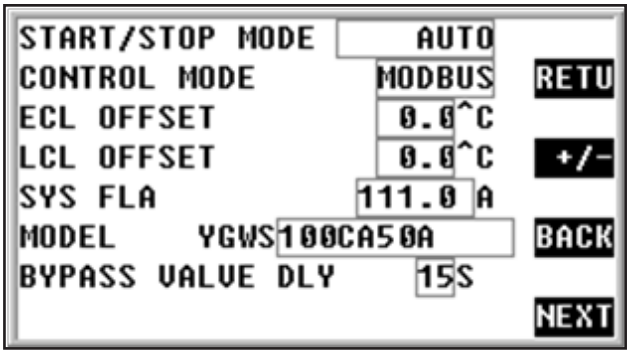
If the START/STOP MODE is set as AUTO, the unit can automatically perform the startup and stop actions according to the set DAILY START/DAILY STOP, HOL START/HOL STOP/START or WEEK START/WEEK STOP.

If the START/STOP MODE is set as MANUAL, the automatic switch is invalid; it is required to perform the startup and stop action by the operations on X09 manually.

The Priority level of the automatic start/stop action is: holidays >weekend >ordinary days.

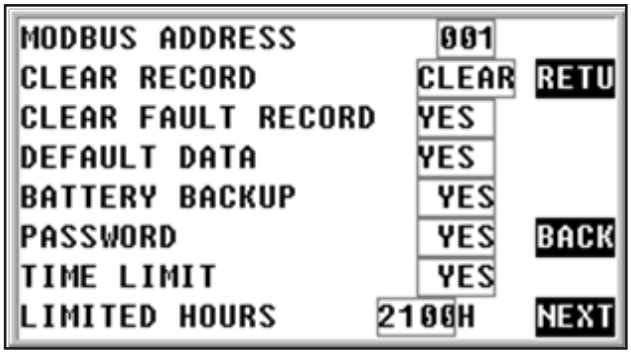
In addition the **OIL PREHEAT** function can be activated.

5.4.4.9 Parameter Settings 13



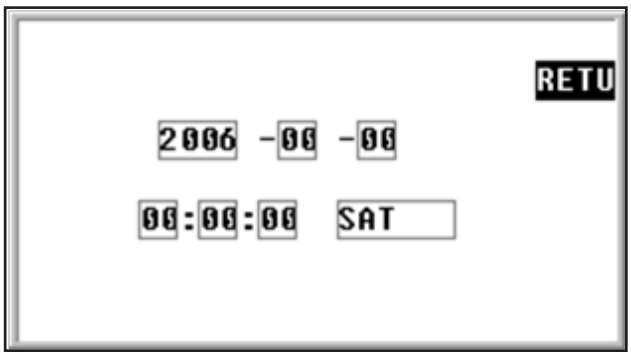
START/STOP MODE - MANUAL, the unit will operate according to the keys on the control panel or remote switch, or perform the switch control in Modbus protocol. - AUTO switch, the set time for startup and stop of the unit will control the startup and stop operations.
CONTROL MODE - LOCAL, the startup and stop will be completed by the operation panel, - REMOTE, the startup and stop will be realized by DI switch on the control panel, - MODBUS, its startup and stop will be controlled by BMS.
ECL OFFSET / LCL OFFSET For compensating the loss of signal, to ensure that the unit can run normally
SYS FLA - FLA,Factory settings.
MODEL- Sets the real mode.
BYPASS VALVE DLY - That is time period from open to close or from close to open.

5.4.4.10 Parameter Settings 14



MODBUS ADDRESS Setting the ModBus address.
CLEAR RECORD - clear unit accumulated operation hours and compressor accumulated operation hours.
CLEAR FAULT RECORD - clear historical fault information.
DEFAULT DATA - restoring default data.
BATTERY BACKUP - back up of all running status data when the unit is power off.
PASSWORD - Enabling password protection of parameters.
TIME LIMIT - Enabling time limit function.
LIMITED HOURS - Hours to control the time limit function.

5.4.5 Clock Set



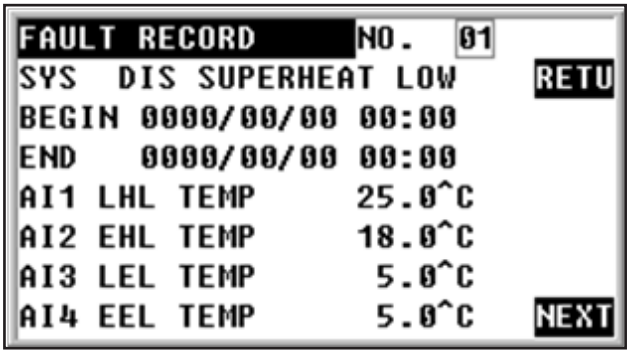
The system clock is set using the clock screen, using the same procedure as the other parameters.

5.4.6 Troubleshooting

The fault record screens display unit operating parameters at the time of a fault on the unit. These should be used to assist faul diagnosis.

50 Fault records can be stored:
Fault record [01] is most recent.
Fault record [50] is the oldest fault.
[**F1** & **F2**] keys are used to step between records.
[F3 & F4 keys are used to step between screens.

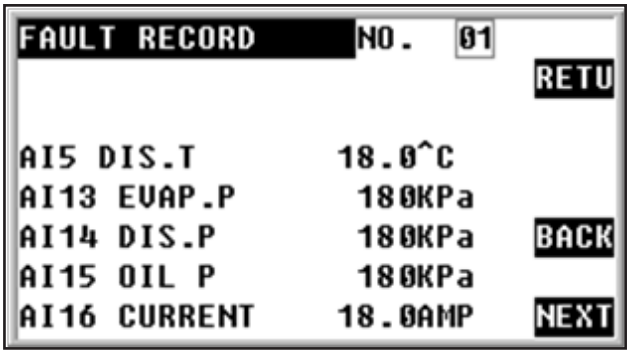
5.4.6.1 Fault Record 1



Screen 1 Lists:

[01] - Fault No.
Reason for the Fault.
Start and End times and dates of the Fault
System entering (return) & leaving liquid temps.

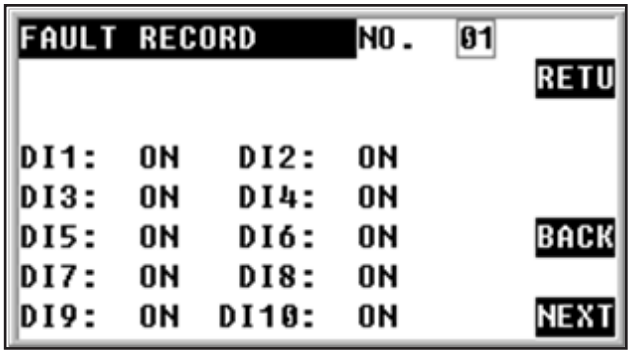
5.4.6.2 Fault Record 2



Screen 2 Lists:

System temperatures and pressures at the time of the fault.

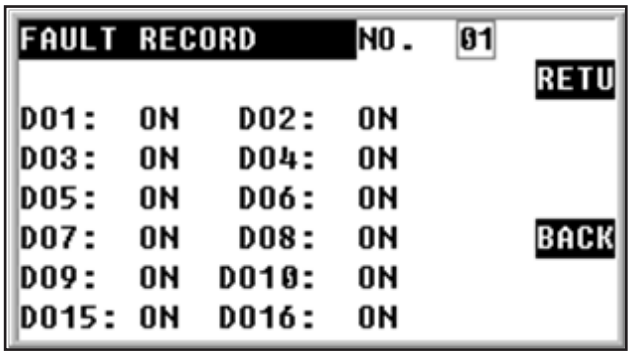
5.4.6.3 Troubleshooting 3



Screen 3 Lists:

System digital input status at the time of the fault.

5.4.6.4 Troubleshooting 4



Screen 4 Lists:

System digital output status at the time of the fault.

5.5.1 Parameters setting and default values

ECL OFFSET	0℃	-5.0 - +5.0℃	Service password
LCL OFFSET	0℃	-5.0 - +5.0℃	Service password
MODBUS ADDRESS	1	1 - 255	Userpassword
BATTERY BACKUP	NO	YES/NO	User password
PASSWORD	YES	YES/NO	Ex-factory password
TIME LIMIT	NO	YES/NO	Service password
LIMITED HOURS	2100 H	0 - 9998H	Service password
START/STOP MODE	MANUAL	MANUAL/AUTO	User password
RUN MODE	AC	AC/HR/HP/REMOTE	User password
CONTROL MODE	LOCAL	LOCAL/REMOTE/MODBUS	User password
LOAD TIME	2.0s	0.5-20.0s	Service password
UNLOAD TIME	4.5s	0.5-20.0s	Service password
CONTR.CYCLE	10s	5-60s	Service password
MIN.RUN TIME	300s	120-600s	Service password
ANTI-RECYCLE	480s	120-600s	Service password
SYS FLA	111.0	60.0 ~ 400.0 A	Service password
OIL PREHEAT	YES	YES/NO	Service password
SYS RUN CTRL.	AUTO	AUTO/LOAD/UNLOAD	Service password
SYS CUR.OFFSET	100%	50 - 150 %	Service password
CLEAR FAULT RECORD	----	----/YES	Ex-factory password
RESET FAIL.	----	----/RESET	User password
ANTIFREEZE	YES	YES/NO	Service password
CLEAR RECORD	----	----/YES	Service password
DEFAULT DATA	----	----/YES	Service password

5.5.2 Assignable parameters setting and defult values (AC mode)

Items	Defult values	Setting range	Access level
LEL TEMP SET	7.0°C	4.0~18.0°C	User password
LT CONTROL RANGE	2.5°C	1.0~2.5°C	User password
LT HYSTERESIS	1.0°C	0.5~2.0°C	User password
LOW LELT	2.0°C	1.0~7.0°C	Service password
HIGH LCLT	43.0°C	30.0~60.0°C	Service password
LEP UNLOAD	175 KPa	150.0~300.0 KPa	Service password
LEP SHUT DOWN	165 KPa	150.0~300.0 KPa	Service password
HOLD LOAD D.P	1070 KPa	100.0~1300.0 KPa	Service password
UNLOAD D.P	1100 KPa	100.0~1300.0 KPa	Service password
HIGH D.P.SHUTDOWN	1130 KPa	100.0~1350.0 KPa	Service password
UNLOAD CURR.	95%	10~98%	Service password
DELTA T	3.5°C	2.0~6.0°C	Service password
LISV TEMP	70.0°C	50.0~80.0°C	Service password

5.5.3 Fault imformation

No.	Fault information	Fault reason	Reset method
1	COMM.FAULT	Communication disconnection between the centralized controller and 1# main board	Auto
2	FLS OPEN	Flow switch open	Auto
3	DIS.PRESSURE SW.OPEN	Discharge pressure switch open	Manual
4	OIL SW.OPEN	Oil level switch open	Manual
5	MOTOR PROTECTION	Motor protection switch open	Manual
6	EXT.INTERLOCK OPEN	Interlock switch open	Manual
7	Y- △TRANSITION FAULT	Star-Delta transformation failed	Manual
8	AI1 SENSOR FAULT	The leaving cooling water temperature sensor is short circuit or break	Manual
9	AI2 SENSOR FAULT	The entering cooling water temperature is short circuit or break	Manual
10	AI3 SENSOR FAULT	The leaving chilled water temperature sensor is short circuit or break	Manual
11	AI4 SENSOR FAULT	The entering chilled water temperature sensor is short circuit or break	Manual
12	AI5 SENSOR FAULT	The discharge temperature sensor is short circuit or break	Manual
13	AI13 SENSOR FAULT	The evaporating pressure sensor is short circuit or break	Manual
14	AI14 SENSOR FAULT	The discharge pressure sensor is short circuit or break	Manual
15	AI15 SENSOR FAULT	The oil pressure sensor is short circuit or break	Manual
16	HIGH DIS.PRESSURE	The discharge pressure exceeds the set value of alarming	Manual
17	LOW EVAP.PRESSURE	The evaporator pressure is lower than the alarming value	Manual
18	HIGH DIS.T	The discharge temperature is higher than the alarming value	Auto
19	HIGH CURRENT	Compressor current is higher than MLA	Manual
20	LOW CURRENT	Compressor current is lower than MLA *5%	Manual
21	HIGH LCLT	The leaving cooling liquid temperature is higher than the setting value	Auto
22	LOW LELT	The leaving chilled water temperature is lower than the setting value	Auto
23	LOW DIFF OIL P	(Oil pressure - evaporating pressure) < 100 kPa	Manual
24	CLOGGED FILTER	(Discharge pressure - oil pressure) > 200 kPa	Manual
25	CMPS HF START-STOP	Compressor High-Frequency start-stop	Auto
27	LOW DIS.SUPERHEAT	Discharge superheat is less than 3 for 3 minutes	Manual

5.5.4 Modbus Protocol

(1) Modbus protocol instructions

Baud rate	9600
Word length	8
Parity	None
Stop bits	1
Data mode	RTU
verify	CRC 16

(2) ModBus node list

Address	Functions	Description	Word length	note
201	3,6	Start/stop	word	Command 1:start, 2:stop Status 0:stop,1:start
202	3,6	Mode select	word	0:AC 1:ITS 2:HP 3:REMOTE
203	3,6	AC: LEL setting	word	Range： 4.0 −15.0 ℃
206	3	Alarm	word	1: yes 0: no
207	3	Runtime limit	word	1: yes 0: no
208	3	Oil Pre-heating	word	1: yes 0: no
101	3	Digital output	word	For details, see the definition of digital inpu t and output
102	3	Digital input	word	
121	3	Leaving condenser Liquid	word	Signed binary ，the value is multiplied per 10
103	3	Enter condenser Liquid	word	Signed binary ，the value is multiplied per 10
122	3	Leaving evaporator Liquid	word	Signed binary ，the value is multiplied per 10
104	3	Enter evaporator Liquid	word	Signed binary ，the value is multiplied per 10
105	3	Discharge Temperature	word	unsigned binary ，the value is multiplied per 10
106	3	Evaporator pressure	word	unsigned binary
107	3	Discharge pressure	word	unsigned binary
108	3	Oil pressure	word	unsigned binary
109	3	Motor current	word	unsigned binary ，the value is multiplied per 10
113	3	DI fault	word	See the d efinition of failure information, f ault corresponding bit is 1, 0 otherwise.
114	3	AI fault	word	
115	3	RUN fault	word	
112	3	Unit operation time	word	accumulative total
111	3	Compressor operation time	word	accumulative total

(3) Definition of fault information in ModBus protocol
AI Sensor input fault

Bit	Fault
bit0	Leaving Cooling Liquid Temperature Sensor Failure
bit1	Entering Cooling Liquid Temperature Sensor Failure
bit2	Leaving Chilled Liquid Temperature Sensor Failure
bit3	Entering Chilled Liquid Temperature Sensor Failure
bit4	Discharge Temperature Sensor Failure
bit5	
bit6	
bit7	
bit8	
bit9	
bit10	
bit11	
bit12	Evaporating Pressure Transducer Failure
bit13	Discharge Pressure Transducer Failure
bit14	Oil Pressure Transducer Failure
bit15	

DI switch input fault

Bit	Fault
bit0	Flow Switch Open
bit1	-
bit2	High pressure Switch Open
bit3	Oil level switch open
bit4	Motor Protection Switch Open
bit5	External Interlock Switch Open
bit6	Start-up Failure
bit7	-
bit8	-
bit9	-
bit10	-
bit11	-
bit12	-
bit13	-
bit14	-
bit15	-

Run fault

Bit	Fault
bit0	High discharge pressure cut out
bit1	Low Evaporating Pressure Cutout
bit2	High Discharge Temperature Cutout
bit3	High Compressor Motor Current Cutout
bit4	Low Compressor Motor Current Cutout
bit5	High leaving cooling water cutout
bit6	Low leaving chilled water cutout
bit7	Low Differential Oil Pressure Cutout
bit8	Oil filter blockage
bit9	Compressor start and stop cycling
bit10	
bit11	Low Discharge superheat
bit12	-
bit13	-
bit14	-
bit15	-

(4) Definition of digital input in ModBus protocol

Bit	Switch Input	Status
bit0	FLOW SWITCH	0=open 1=close
bit1	AIR CONDITIONING SWITCH	0=open 1=close
bit2	HIGH PRESSURE SWITCH	0=open 1=close
bit3	OIL LEVEL SWITCH	0=open 1=close
bit4	MOTOR PROTECTION	0=open 1=close
bit5	EXT.INTERLOCK	0=open 1=close
bit6	START FAILURE	0=open 1=close
bit7	REMOTE SWITCH	0=open 1=close
Bit8-15	RESERVED	0=open 1=close

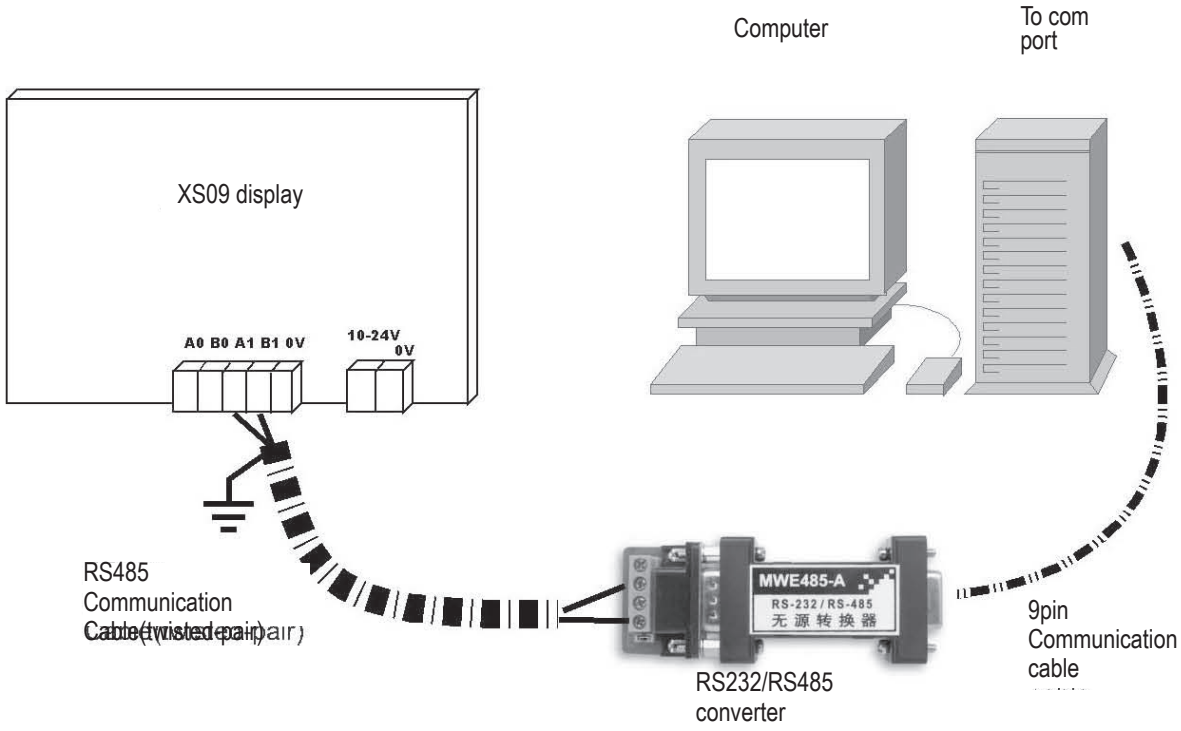
(5) Definition of digital output in ModBus protocol

Bit	Digital output	Status
bit0	CHILLED LIQUID PUMP	0=open 1=close
bit1	COMPRESSOR WYE CONTACTOR	0=open 1=close
bit2	COMPRESSOR DELTA CONTACTOR	0=open 1=close
bit3	COMPRESSOR OIL HEATER	0=open 1=close
bit4	LIQUID LINE BYPASS SOLENOID1	0=open 1=close
bit5	ALARM	0=open 1=close
bit6	LIQUID INJECTION	0=open 1=close
bit7	LIQUID LINE BYPASS SOLENOID2	0=open 1=close
bit8	RUNNING STATUS	0=open 1=close
Bit14	CR4 LOAD SOLENOID	0=open 1=close
bit15	CR3 UNLOAD SOLENOID	0=open 1=close

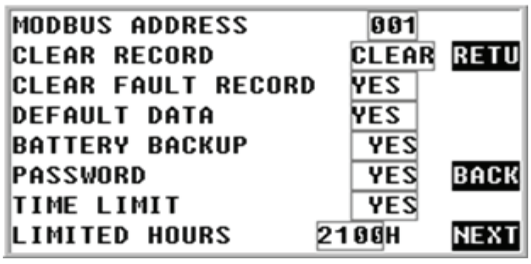
(6) How to monitor it remotely

Y GWS centralized controller XS09 supply a RS485 communicaiton port for users, hence, users are able to monitor the operation of chillers conveniently with it, and connect easily it to external integration system when connecting cable according to the MODBUS protocol.

Wiring sketch



MODBUS address of centralized controller has to be set and PC can read the data of chillers or operate the chillers conveniently affer connnecting cables according to the figure above. These paratmeters must be input in parameter setting interface-10, as follows.



Notes:

1. The cable connecting RS232/RS485 converter to XS09 must be the same one.
2. Communication Cable must be a shield Twisted-pair with character resistance 120 ±10%Ω 0.5mm2 cross-section.
3. Communication Cable must be shorter than 1000m.
4. Port A1 and B1 of XS09 should be connected to the communication port of PC, and RS232/RS485 converter must be used to connect them. Makė certain to connect communication cable properly, which is polar, avoiding to communicaiton fault.

5.6 Unit Configuration table

Model	Compressor	MLA(Amp)	Voltage	Notes
YGWS100CA	YFS175S	147.0	380V/3PH/50HZ	
YGWS130CA	YFS188S	208.0	380V/3PH/50HZ	
YGWS160CA	YFS205S	228.0	380V/3PH/50HZ	
YGWS175CA	YFS205L	328.0	380V/3PH/50HZ	
YGWS200CA	YFS205L	328.0	380V/3PH/50HZ	
YGWS100RA50A	YFS175S	208.0	380V/3PH/50HZ	
YGWS130RA50A	YFS188S	263.0	380V/3PH/50HZ	
YGWS160RA50A	YFS205S	328.0	380V/3PH/50HZ	
YGWS175RA50A	YFS205S	328.0	380V/3PH/50HZ	
YGWS200RA50A	YFS205L	399.0	380V/3PH/50HZ	
YGWS100CA-B	GT175S	147.0	380V/3PH/50HZ	
YGWS130CA-B	GT188S	208.0	380V/3PH/50HZ	
YGWS160CA-B	GT205S	228.0	380V/3PH/50HZ	
YGWS175CA-B	GT205L	328.0	380V/3PH/50HZ	
YGWS200CA-B	GT205L	328.0	380V/3PH/50HZ	
YGWS230CA-B	GT233S	409.0	380V/3PH/50HZ	
YGWS260CA-B	GT233S	409.0	380V/3PH/50HZ	
YGWS300CA-B	GT233L	540.0	380V/3PH/50HZ	
YGWS330CA-B	GT233L	540.0	380V/3PH/50HZ	

Commissioning

6.1 Preparation

Commissioning of this unit should only be carried out by YORK Authorised personnel.

This section must be read in conjunction with the control system operation, in section 5.

Power Off

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

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 educator 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.

R134a Pressure at different saturated temperatures

Sat. Temp.°C	Press. kPa	Sat. Temp.°C	Press. kPa	Sat. Temp.°C	Press. kPa
-15	164	-8	217	-1	282
-14	171	-7	225	0	293
-13	178	-6	234	1	304
-12	185	-5	243	2	315
-11	193	-4	253	3	326
-10	201	-3	262	4	338
-9	209	-2	272	5	350

Flow rates and pressure drops must be within the limits given in the Section 10. Out of these limits is undesirable and could cause damage.

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 display 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 by pressing relevant function keys.

Start-up/Stop Programming

Set the Start/Stop timers, ordinary days and holidays via the function keys.

Setpoints

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

The chiller is now ready to work.

6.2 First Time Start-Up

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 5 have been fully understand and the System Start-up Checklist is completed.

Start-up

Press the start key on the keypad, 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 Display Panel, and verify that oil differential pressure (oil pressure-suction 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 t develop oil pressure immediately.

Operation

7.1 General Description

The units are designed to work independently, or in conjunction with other equipment via a 485 communication devices. During operation, the unit controller monitors the chilled system temperature leaving the unit and takes the appropriate action to maintain this temperature within desired limits. The compressor will automatically regulate the slide valve position to match the cooling load of the system. The heat removed from the chilled liquid is then rejected via the water cooled condenser.

The following sections give an overview of the operation of the unit.

7.2 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 'START' key on the keypad.

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.

7.3 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 chiller stop, 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 chiller.

Oil and Refrigerant

The lubricant should be replaced periodically according to the advice of York to ensure that the unit can be in continues running normally.

The moisture indicating sight glass located in the liquid line under the condenser should be inspected periodically, please contact York if any moisture is found in the system. It must be investigated by the YORK service personnel otherwise compressor damage will occur.

The oil sump is located at the bottom of the oil separator inside of the condenser. It is easy to connect with hose and add lubricating oil quickly. The oil filter is on the oil supply line.

If the unit is running with a load lower than 20% rated load, it may caused the depressing of the oil level due to the low condensing temperature. In that case, the oil does not leak out, it is carried out to the condenser by the refrigerant flow and finally the oil will enter the evaporator and accumulated. However, if the oil in the evaporator accumulates to a certain amount , it may cause operation problems.

If the discharge superheat is lower than 5°C, it may cause some trouble to the oil system. Discharge superheat temperature is equal to discharge temperature minus the condensing temperature. The most suitable refrigerant charge is decided by the discharge superheat and the evaporator approach temperature.

If the unit cannot be loaded normally, it is possible that the lubricant in the evaporator is excessive. Where there is too much oil in the refrigerant, the liquid level will blister and the mixture of oil and liquid refrigerant will be carried to the compressor, which decreases the discharge superheat. If the discharge superheat decreases to a value lower than 5°C, the compressor will compulsively unload and decrease the cooling capacity unless the discharge superheat rises up to 5°C and keeps higher than 5°C for more than 60 seconds.

The excessive charge amount of refrigerant will also decrease the discharge superheat temperature, and cause the unit fail to load normally.

So refrigerant should be adjusted to a suitable amount (ensure the discharge superheat temperature is in the range of 6-10°C at rating conditions)

Fault treatment

If the unit stops on a fault, the operator should handle the fault in time, if it cannot be solved, please contact the YORK service personnel immediately. No attempt should be made to start the chiller continuously when it is stopped due to fault otherwise it would cause damage to the chiller.

Running log

The running situation should be permanently recorded according to the regulated time interval in each 24 hour running cycle.

The following table is the duty record table of WORK for unit examination.

Please record all data correctly, because it is reference for engineer to judge the running conditions. The record values by testing a new unit can be set as the normal situation, which can be compared with the later record value.

For example, if the difference between the leaving cooling water temperature and condensing temperature is higher than the normal value, it shows that the water side of condenser may be too dirty.

7.4 Other notes

At any times, the unit will stop once the OFF key in the keyboard is pressed, then the oil heater will be powered on and keep a high oil temperature to prevent refrigerant dissolving into the oil.

In order to prevent the damage to chiller, the chiller should be power on when it is not running for a long period of time (The compressor oil heat is also powered on).

If the main power has to be cut-out in a long period of service, the discharge service valve must be turned off, and the oil heater has to run for more than 5 hours (24 hours suggested) before the chiller starting.

If the chiller is required to close for a long time (such as a whole winter), the following sections introduce the steps need to be carried out:

1. It is required to inspect the sealing situation of the system periodically in the period of long-term stop.

2. If the temperature in standby period is lower than the water freezing temperature, it is required to drain out all the water in the cooling tower, condenser, condenser pump, chilled water system and chilled water pump.

Open the drain pipe in the evaporator and condenser to ensure the complete drain.

Performing the periodical inspection and maintenance according to the value displayed in the display panel, the operator can avoid the serious operating default. The following is the instructions of inspection content and operation process.

7.5 Running detection

Performing the periodical detection and maintenance according to the value displayed in the microcomputer control centre, the operator can avoid the serious running default. The following detection content and method is a good guide for user.

Daily

1. Inspect the displayed content of the display screen.
2. If the compressor is in running status, the bearing oil pressure is required to be inspected.
3. Inspect the inlet and outlet water pressure and temperature of the condenser so as to compare with those in the design situation.
4. Inspect the leaving and entering temperature of the chilled water and evaporator pressure as to compare with those in the design situation.
5. Inspect the condenser saturation temperature (confirmed according to the condenser pressure detected by the condenser sensor).
6. Inspect the discharge temperature of the compressor. The discharge temperature should be lower than 75°C when normal.
7. Check that whether the condenser pipe is fouling or blocking (the difference between the current condenser approach temperature and the one measured in the new chiller cannot exceed 3°C)
8. Confirm whether the water has acceptable quality level.
9. Press Status key for displaying the alarming information once there is a display requirement.

Weekly

Inspect the refrigerant charged record.

Quarterly

Performing the chemical analysis of the lubricant each 6 months (or perform the frequent inspection according to the requirement)

Biannually

1. Inspect and replace the cartridge of compressor oil filter.
2. Oil return system

a. Clean the oil filter

b. Inspect the operational situation of ejector for finding the impurity granule

3. Inspect the controller and safety protection device.

Yearly (or perform a more frequent inspection according to the requirement)

1. Clearly drain out and replace the oil in oil separator tank.
2. Evaporator and condenser

a. Inspect and clean the water drainage valve

b. Inspect and clean the pipes according to the requirements.

3. Inspect and maintain the electrical parts according to the requirements.
4. Perform the chemical analysis to the system.

Screw Chiller/Heat-pump Unit Record Table

330-1160 kW

Unit Configuration:

Model:

Date									
Time									
Runing hours									
Ambient Temperature	Dry-bulb/ Wet -bulb								
Compressor	Oil pressure kPa								
	Evaporator pressure kPa								
	Discharge pressure kPa								
Motor	Current(A)								
Evaporator	Entering Liquid temperature °C								
	Leaving Liquid temperature °C								
	Flow rate L/S								
	Liquid level insight glass	○	○	○	○	○	○	○	○
Condenser	Entering Liquid temperature °C								
	Leaving Liquid temperature °C								
	Flow rate L/S								

Maintenance

8.1 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 YORK service organization to protect the operation of the unit. If damage or a system failure occurs due to improper maintenance during the warranty period, YORK shall not be liable for costs incurred to return the unit to satisfactory condition.

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.

The Safety Section of this manual should be read carefully before attempting any maintenance operations on the unit.

8.2 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 YORK Service Agent.

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 Table 8-1.

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 YGWS units shipped From1 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= (S.E.T)-(L.E.L.T)
Discharge superheat= (C.D.G.T)-(S.C.T)

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

TABLE 8-1 REFRIGERANT CHARGE LEVEL

Condition	R134a
AC	
EVAPORATOR APPROACH	2.5°C-3.5°C
DISCHARGE SUPERHEAT	5°C-1.5°C

Refrigerant Charge

Should it become necessary to add refrigerant charge to a YORK YGWS Chiller; add charge until the evaporator approach and refrigerant gas discharge superheat are at within the values listed in Table 8-1.

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).

8.3 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 Table 8.2.

TABLE 8.2 COMPRESSOR OIL LIMITS

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

The YORK YGWS Chiller 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 oil types approved for YGWS Units and the quality of oil required is listed in the tables below.

YGWS AC (air conditioning) Models		
MODEL	OIL TYPE	QTY.(l)
YGWS100CA	L	17
YGWS130CA	L	25
YGWS160CA	L	27
YGWS175CA	L	30
YGWS200CA	L	30
YGWS230CA	L	33
YGWS260CA	L	33
YGWS300CA	L	34
YGWS330CA	L	34

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.

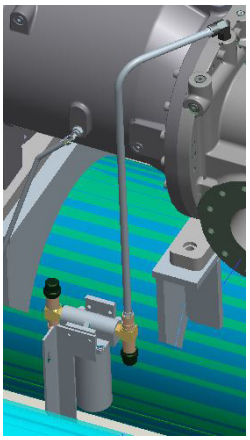
2. Immerse the suction connection of the oil charging pump in a clean container of new oil and connect the discharge connection to the compressor oil charging valve. Do not tighten the connection at the charging valve unless the air is forced out by pumping a few strokes of the oil pump. Filling the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

8.4 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.



8.5 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 YGWS Chiller are internally enhanced copper tubes.

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 5.0°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 YGWS 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 YORK YGWS Chillers are internally enhanced copper tubes.

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.

8.6 Working conditions

Read the working pressure and temperature from the display status screens. Confirm that these values are within the working limits.

8.7 Scheduled Maintenance

The maintenance operations detailed in the following table 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.

9.1 Troubleshooting Guide

Problem	Possible Cause	Remedy
Control Centre No Display - Unit Cannot Run	No Control Centre Power	Turn Power On - if safe to do so.
	Emergency Stop Devices Off	Check Control Centre and Remote Emergency Stop Devices - Reset - if safe.
	No Power	Check the control board fuses.
	Control Centre Faulty	Replace the system board.
	QF1 Circuit Breaker Open	Investigate cause and reset (close).
No run enable signal (Unit not allowed to run)	Evaporator Flow Switch contacts open	Check pump is running, valves are set correctly and flow is present.
		Check that the flow switch is correctly installed, and working properly.
		Note: The pump may be controlled by the chiller, and start and stop schedule.
Chiller Failure, display shows: Chilled Water Temperature Low	Chilled Water Temperature below setpoint and falling	Check water system pipework.
		Check the water system flow rate is correct.
	Slide Valve failed to unload	Check the compressor unloading is correct.
		Check the sensor, and the sensor wiring is correct.
Chiller Failure, display shows: AC Voltage Low	Power Supply Voltage is too low	Check the power source is stable, and within the operating range.
		Check the voltage drop on the compressor start.
Chiller Failure, display shows: Discharge Pressure High	Condenser not operating correctly	Check the water system flow switch.
	Air in Condenser	Check the system non-condensable gases.
	Excessive refrigerant charge	Check whether the condenser subcooling normal.
	Pressure measurement incorrect	Check the discharge pressure sensor, and the sensor wiring is correct.
Chiller Failure, display shows: Discharge Temperature High	Discharge Temperature measurement is incorrect	Check the Evaporator refrigerant level
		Check the sensor, and the sensor wiring is correct.
Discharge Pressure Limiting (discharge pressure is too high	Discharge Pressure is higher than set Limit and unloading	Check the chilled water temperature is within the set range.
		Check the cooling water temperature is within a set range.
Chiller Failure, display shows: Oil Pressure High	Oil filter fouling	Check and replace the oil filter cartridge.
Chiller Failure, display shows: Suction Pressure Low	Evaporator performance degradation	Check the water system regulation.
		Check Evaporator for tube fouling.
	Refrigerant charge low	Check subcooler is normal
		Check for refrigerant leaks
	Pressure measurement incorrect	Check the suction pressure sensor, and the sensor wiring is correct.
Chiller Failure, display shows: Low System Current	Compressor current incorrect	Check the compressor current, fuses, contactors and wiring.
		Check the power supply voltage is within limits.
	Current measurement incorrect	Check the motor protection setting.
		Check the control centre programmed value.
	Compressor motor protection signal failure	Check the motor protection and wiring.
		Check the compressor motor
	Mechanical high pressure switch open	Check the compressor discharge valve is open
		Check switch, installation and wiring.
System Current Limit (Compressor current high)	Unit operation over load limit, due to Low flow / motor protection / high voltage relay fault	Check the liquid temperature is within the operating range

9.2 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	34.71	31.32	28.29	25.59	23.17	21.01	19.07	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	122.81	105.83	91.443	79.219	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	31.076	27.44	24.283	21.535	19.137	17.042	15.206	13.595	12.178	10.929

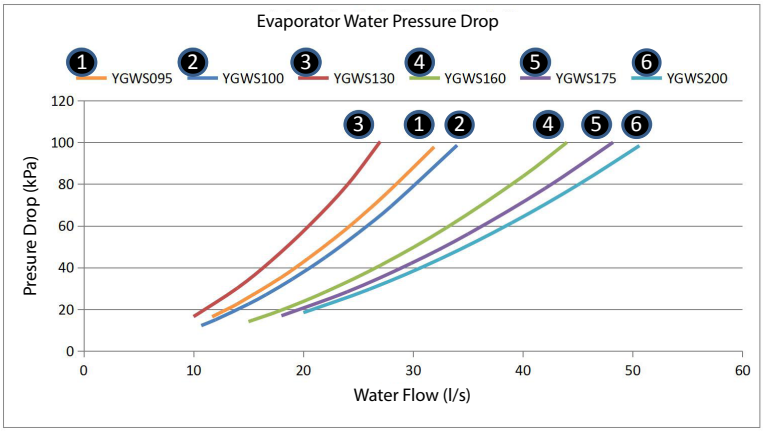
Technical Data

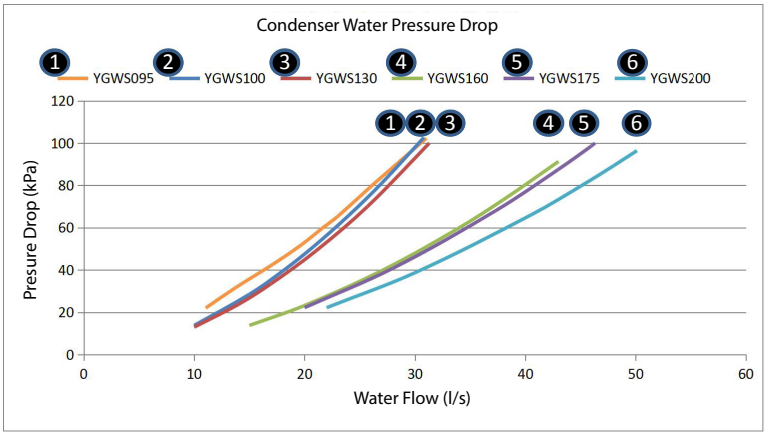
10.1 Unit Dimensions

YGWS AC (air conditioning) Models					
Model	Connection Size mm		Unit Size mm		
	Evap.	Cond.	Length	Width	Height
YGWS095CA	125	125	2427	1280	1483
YGWS100CA	125	125	2427	1280	1483
YGWS130CA	125	125	2726	1280	1492
YGWS160CA	125	125	2726	1300	1554
YGWS175CA	150	150	2749	1380	1604
YGWS200CA	150	150	2749	1380	1604
YGWS230CA	150	150	3114	1630	1897
YGWS260CA	150	150	3114	1630	1897
YGWS300CA	150	200	3595	1680	2003
YGWS330CA	150	200	3595	1680	2003

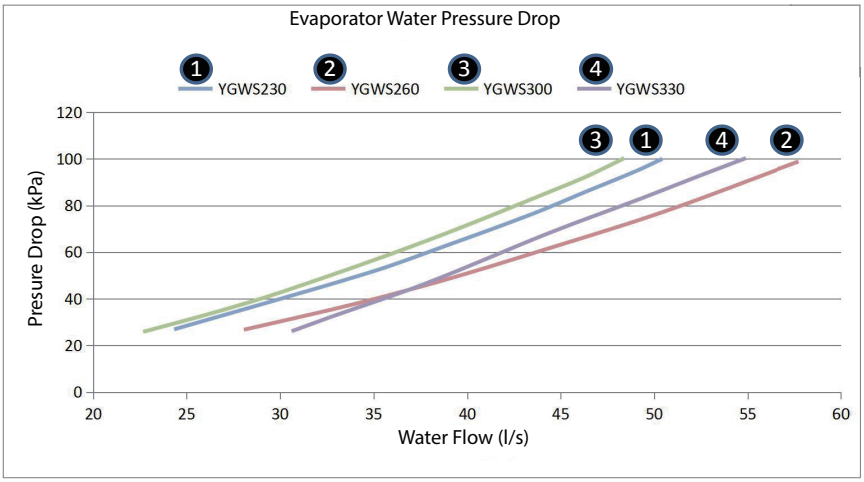
10.2 Pressure Drop Graphs

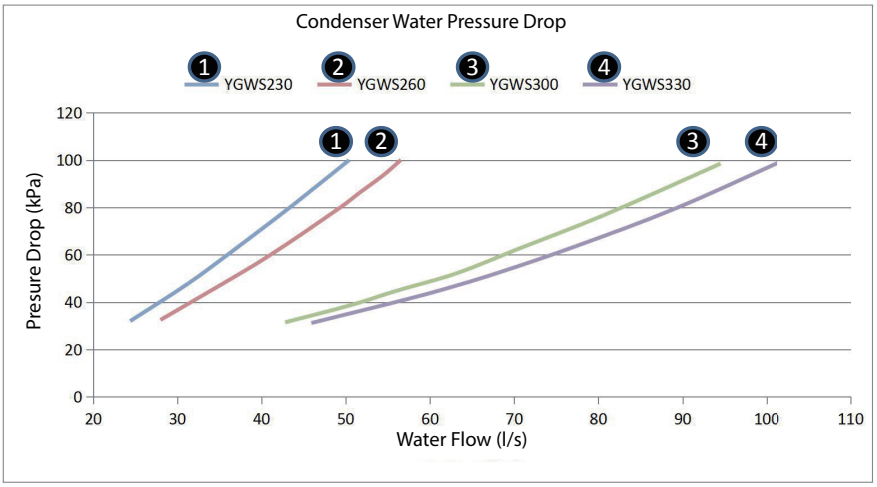
YGWS095CA to YGWS200CA





YGWS230CA to YGWS330CA





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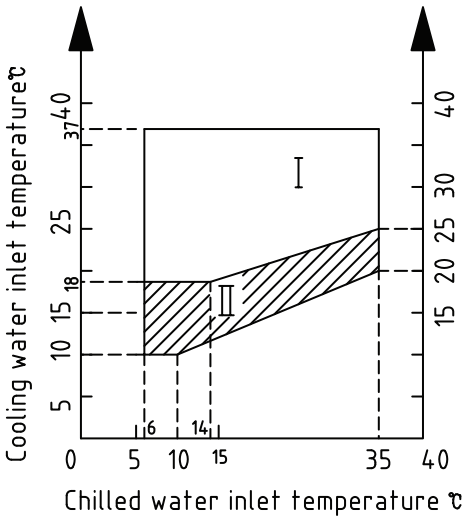
10.3 Physical Data

Model	Circuits	Refrig. Charge (kg)	Oil Charge (l)	Compressor	Unit Capacity Control %100	Evap. Water Volume (l)	Cond. Water Volume (l)	Shipping Weight (kg)	Operating Weight (kg)
YGWS095CA	1	75	17	1	25-100%	59	51	2450	2580
YGWS100CA	1	75	17	1	25-100%	71	59	2470	2600
YGWS130CA	1	90	25	1	25-100%	68.3	71.7	2710	2850
YGWS160CA	1	95	27	1	25-100%	92.8	87.2	3010	3190
YGWS175CA	1	110	30	1	25-100%	103.4	96.6	3210	3410
YGWS200CA	1	110	30	1	25-100%	114.5	105.5	3300	3520
YGWS230CA	1	150	33	1	25-100%	187.3	172.7	4540	4900
YGWS260CA	1	150	33	1	25-100%	203.4	186.6	4600	4990
YGWS300CA	1	200	34	1	25-100%	226.8	243.2	5410	5910
YGWS330CA	1	210	34	1	25-100%	244.4	255.6	5440	5940

10.4 Starting/Operation limits of unit

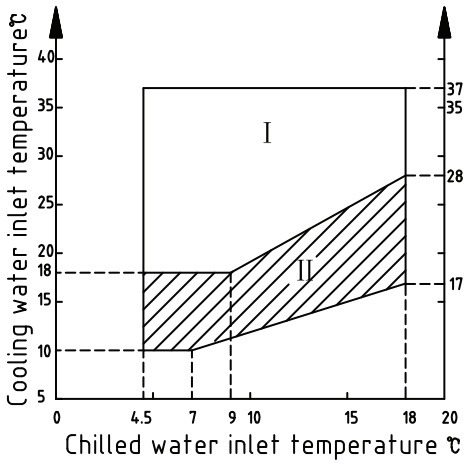
AC Chiller Starting Range



I ----AC unit strating range
II ----Extra starting range for AC unit after equiped with three-way valve to maintain the required condenser pressure

**:The unit should be used within the allowed scope of atmoshpere temperater: 4.3~43.3° C

AC Chiller Operation Range

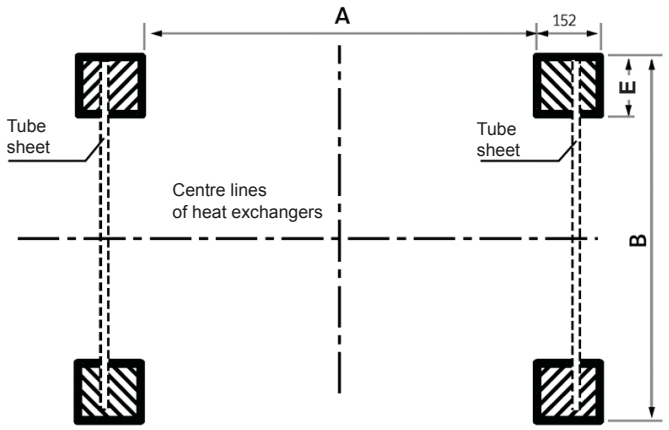


Operation Range I based on 5℃ water temperature approach for both chilled and cooling water.
I ----AC unit standard full load operation
II ----Extra full load operation range after equiped with three-way valve to maintain the required condenser pressure

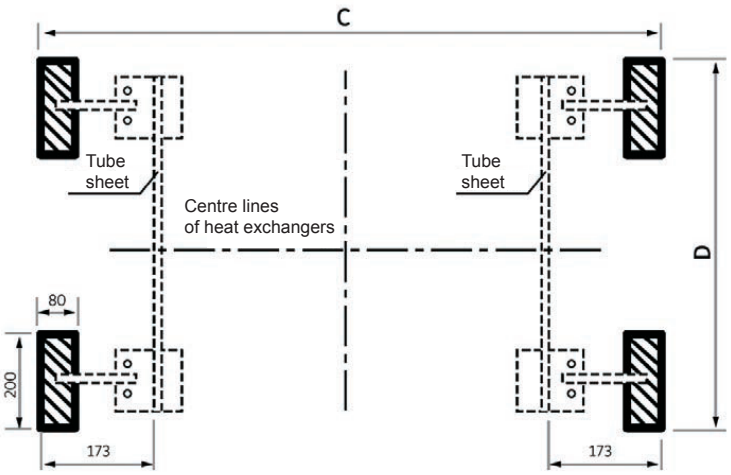
10.5 Foundation Diagram

YGWS095CA-YGWS200CA

Rubber Isolator Pad Layout



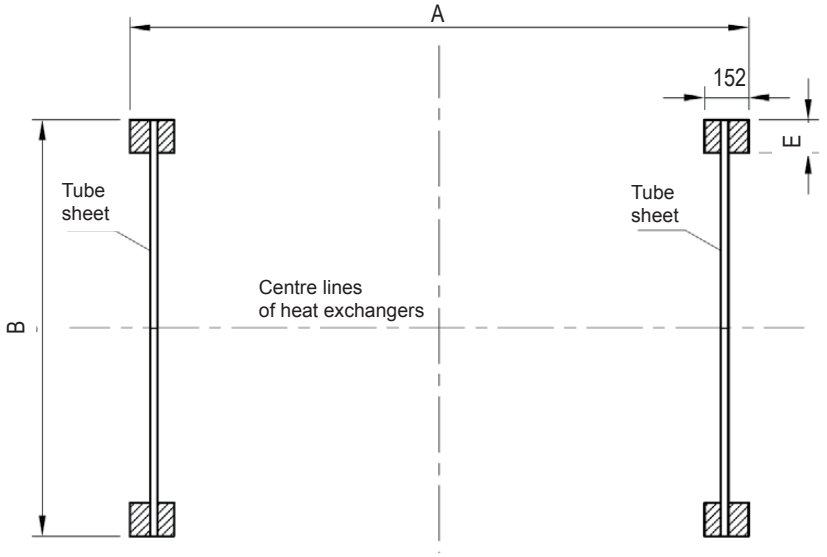
Spring Isolator Layout



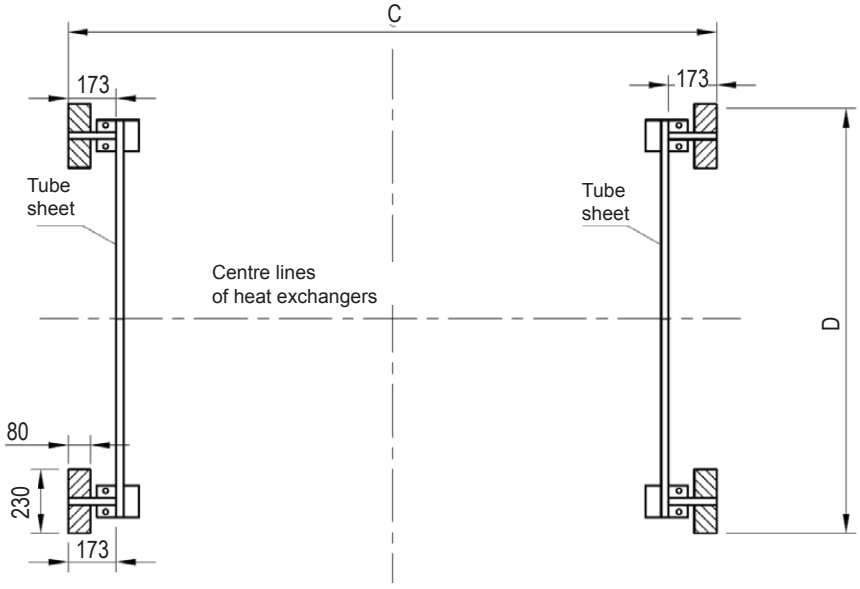
Model	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
YGWS095CA	2126	1280	2332	1366	114
YGWS100CA	2126	1280	2332	1366	114
YGWS130CA	2426	1280	2632	1366	114
YGWS160CA	2426	1300	2632	1386	114
YGWS175CA	2426	1180	2632	1266	114
YGWS200CA	2426	1180	2632	1266	114

YGWS230CA-YGWS330CA

Rubber Isolator Pad Layout



Spring Isolator Layout



Model	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
YGWS230CA	2734	1330	2940	1408	152
YGWS260CA	2734	1330	2940	1408	152
YGWS300CA	3188	1680	3394	1758	152
YGWS330CA	3188	1680	3394	1758	152

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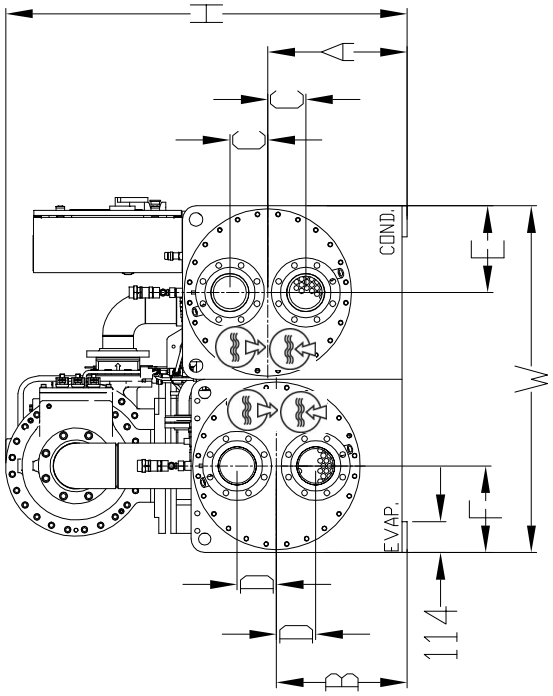
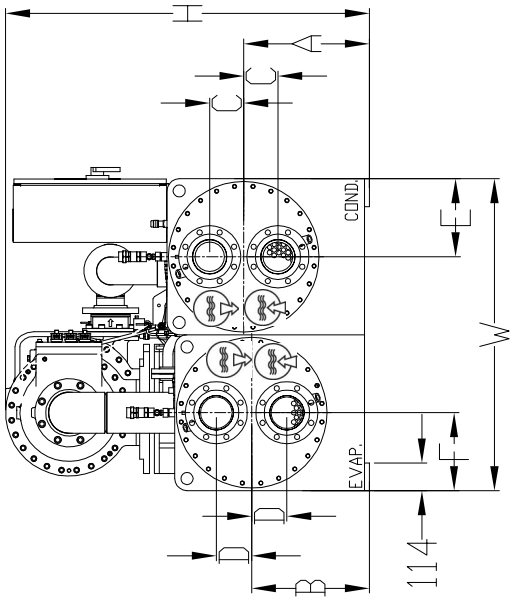
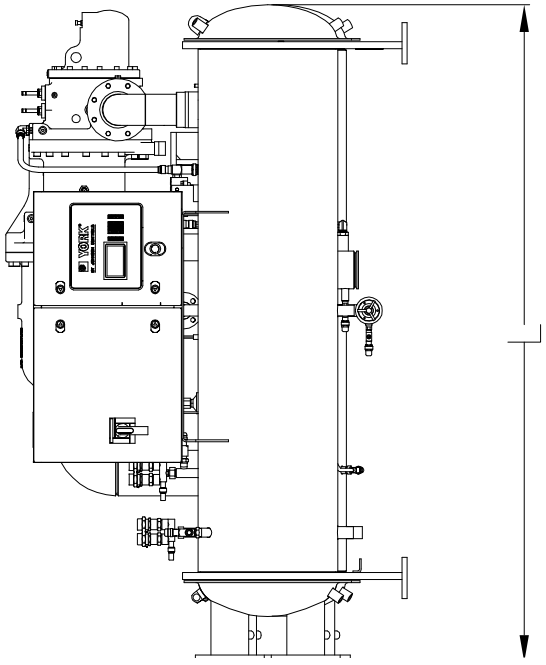
10.6 Dimensions

YGWS095CA/100CA/130CA

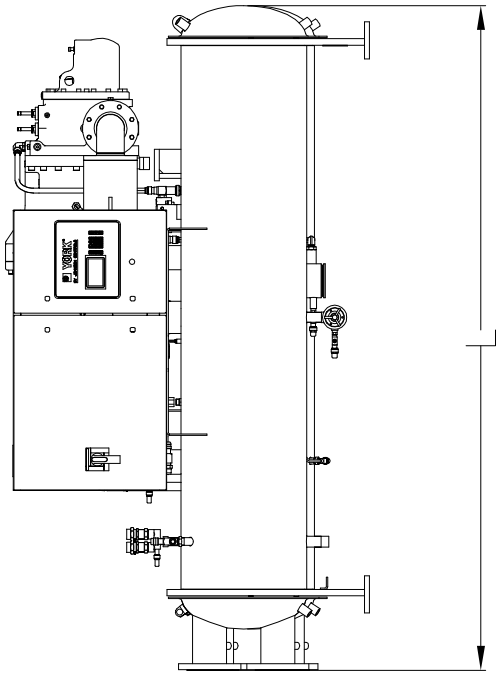




YGWS095CA/100CA

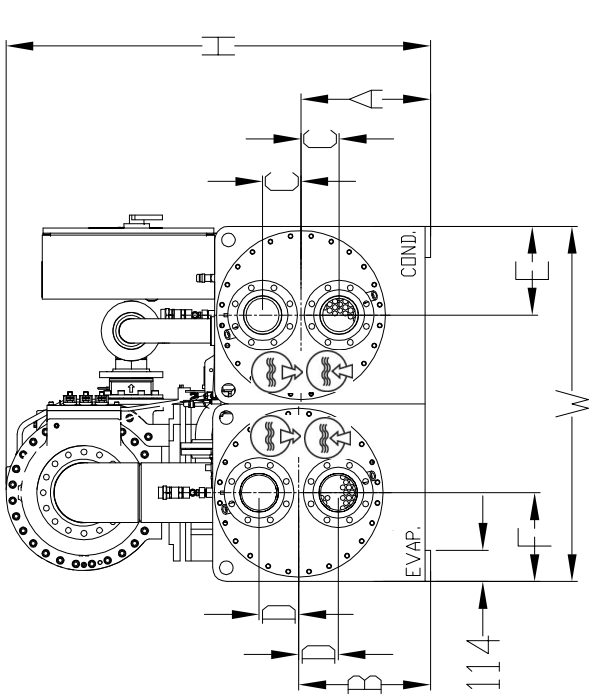


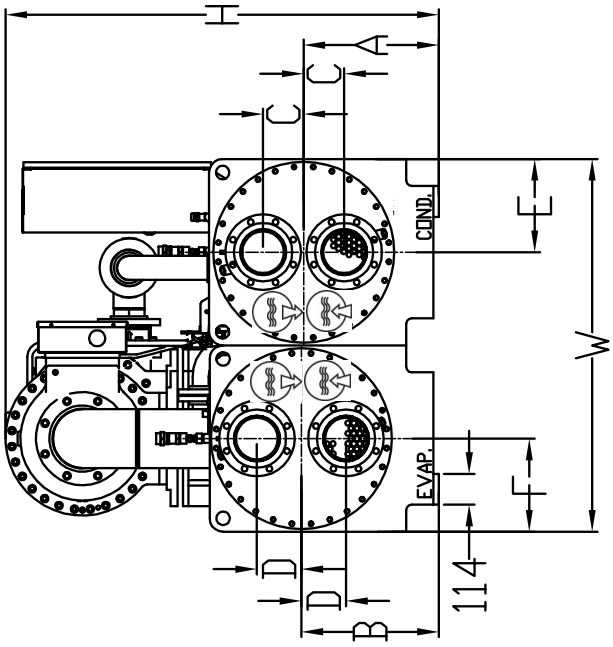
YGWS130CA



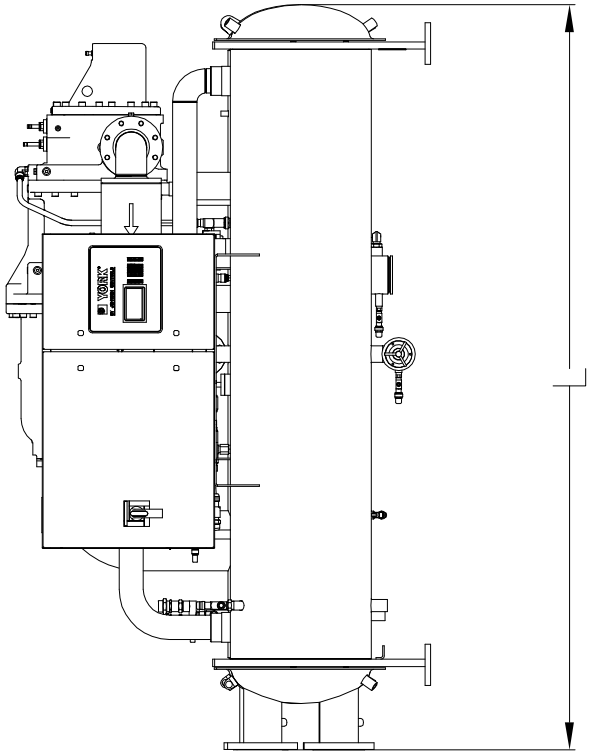
Model	L (mm)	W (mm)	H (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
YGWS095CA	2427	1280	1483	515	483	140	145	320	320
YGWS100CA	2427	1280	1483	515	483	140	145	320	320
YGWS130CA	2726	1280	1492	515	483	140	145	320	320

YGWS160CA/175CA/200CA

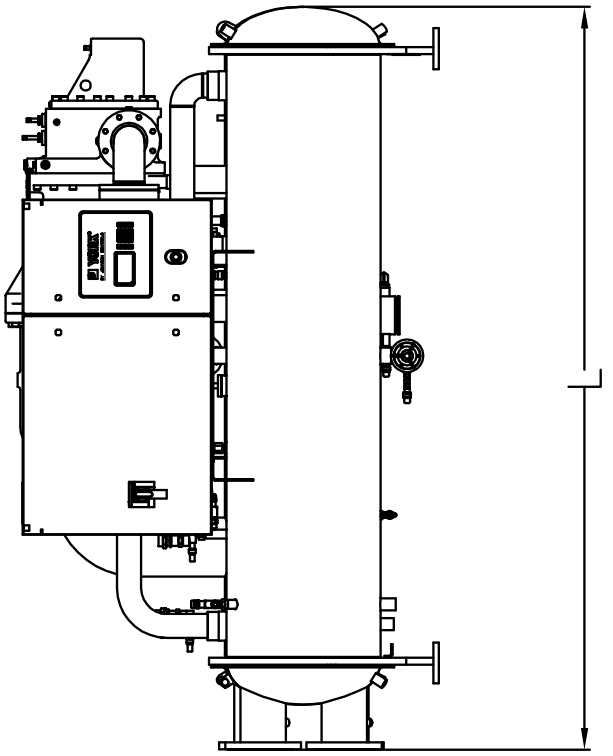




YGWS160CA

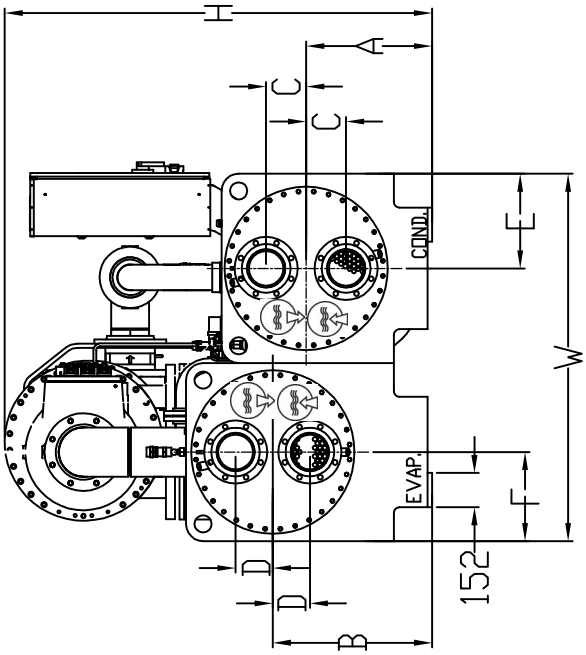


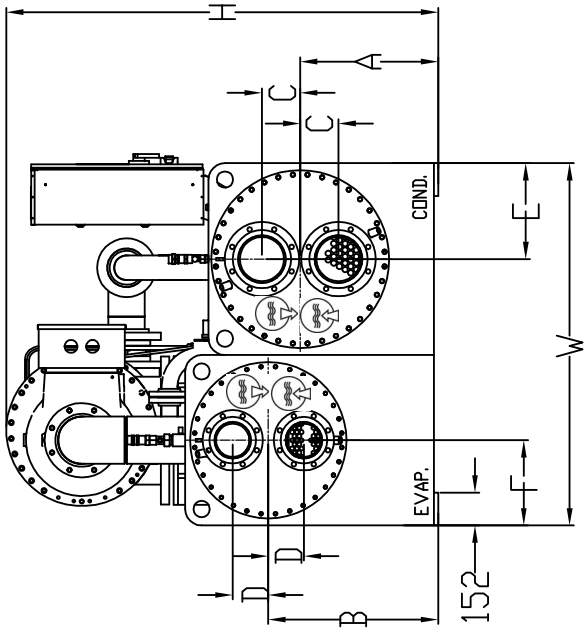
YGWS175CA/200CA



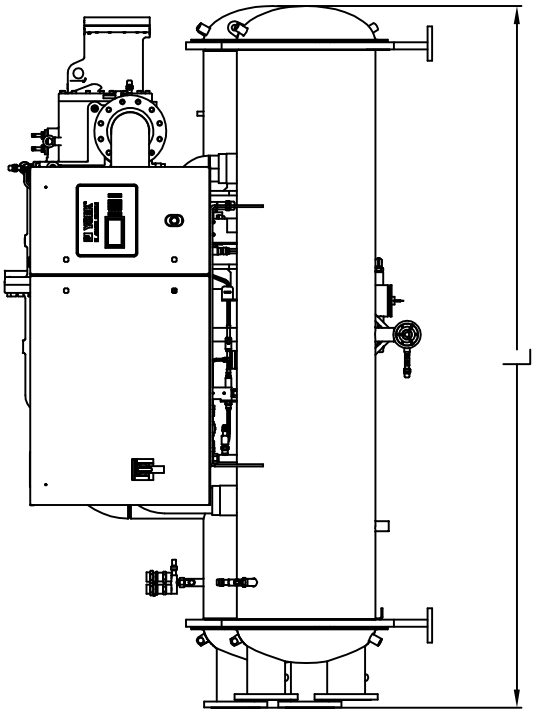
Model	L (mm)	W (mm)	H (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
YGWS160CA	2726	1300	1554	475	483	140	145	325	324
YGWS175CA	2749	1380	1604	500	508	150	165	345	345
YGWS200CA	2749	1380	1604	500	508	150	165	345	345

YGWS230CA/260CA/300CA/330CA

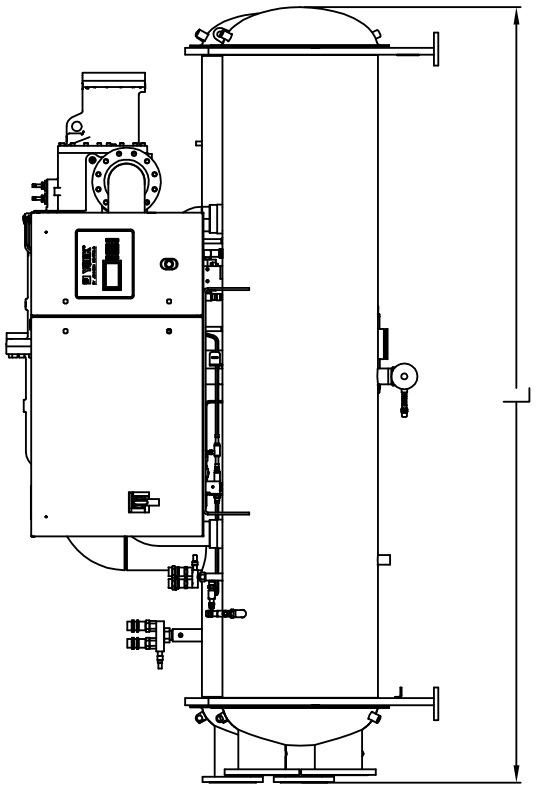




YGWS230CA/260CA



YGWS300CA/330CA



Model	L (mm)	W (mm)	H (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
YGWS230CA	3114	1630	1897	559	707	178	165	420	395
YGWS260CA	3114	1630	1897	559	707	178	165	420	395
YGWS300CA	3595	1680	2003	640	788	178	165	445	395
YGWS330CA	3595	1680	2003	640	788	178	165	445	395

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Spare Parts

11.1 Recommended Spares

It is recommended that the following common spare parts are held for preventative of corrective maintenance operations.

Other spare parts vary depending on the unit model. Contact your local York Sales and Service Centre for information and please quote the unit model number and serial number.

When ordering spare parts, we will require the following information to ensure the correct parts are supplied:

Full unit model number, serial number, application and details of the parts required.

All requests for parts should he made to your local York Sales and Service Centre.

11.2 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 is used in the AC units
YORK W lubricating oil is used in the HR/HP units
.
Refrigerant: R134a refrigerant is used in all units.

Decommissioning,Dismantling And Disposal

12.1 General Description

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.

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

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

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 oil from each system into a suitable container and dispose of according to local laws and regulations governing the disposal of oily wastes. Any spill oil should be mopped up and similarly disposed of.

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

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

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

Reference should be made to the Installation Section for unit installation instructions, Technical Data for unit weights and Handling for handling.

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.

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.

Only use lifting equipment of adequate capacity.

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

INSTALLATION INSTRUCTIONS FOR THE HF68 FLOW SWITCHES

13.1 Application

This switch, a SPDI type flow switch, is a kind of relay used for inspecting and observing liquid flow. Normally, it is applied to air flow adjustment and water supply equipments and induction flow channels where there is flow variation such as water, ethane, ethanediol and other non-hazardous liquids. Its typical application is where linkage or cut-out protection is needed.

13.2 Parameters

Maximum working pressure: 1.6MPA, connector size: 1” NPT, 3/4 ” NPT and 1/2 ” NPT With three-way pipe connector.

13.3 Flow adjustment range and media temperature range

18L/min-2000L/min (standard)
5L/min-3000L/min (non-standard)
-45℃-120℃

This switch shall not be used in pipes where freezing is possible. The flow switch is designed to be used as a controller. Failure of its controlling function may result in personal injury and/or property damages. The managerial personnel shall be responsible for installing protection devices (safety device and restriction controller), or adding alarm and monitor systems to guard against its failure.

The controller shall not be used for load in excess of the ratings as shown in the controller label.

13.4 Installation

In order to sense the flow variation, its flap shall not be in contact with the pipe wall, neither with any throttle devices in the pipe.

Danger of incorrect operation.

The switch has been set to the minimum flow at the plant, which shall not be exceeded during adjustment as it may result in the switch's failure to reset to no flow position. The HF68 flow switch MUST be installed in a linear pipe at both sides of which there MUST be a linear length with at least five times of the pipe diameter. When a switch is installed, its wiring terminals must be accessible.

The switch should be installed in a position easy for wiring, normally within the outlet stop valve for the convenience of maintenance.

It is suggested to install the flow switch in the following steps:
1. Drill the water pipe with the hole size 3-4mm larger than the outer diameter of the steel connector.

2. Weld the steel connector to the hole of the water pipe.

3. Tighten the switch on the steel connector with a flat wrench. Note: DO NOT tighten it with the switch housing.

4. Ensure that no part is in contact with the pipe wall or its activity is not obstructed.

5. Adjust the water flow to the minimum design flow with an adjusting screw. The on/of f action and the arrow on the housing MUST point at the flow direction.

The steel connector MUST be welded directly on the water pipe. The steel pipe shall not be welded to the water pipe to connect the steel connector. The steel connector MUST be the one provided by YORK which is included in the water flow switch packaging box. No use of this connector may result in flow switch explosion.

The flow switch shall not be subject to water hammer. If a snap cut-off valve is installed on the downstream of the flow switch, appropriate water hammer proofing devices MUST be used.

13.5 Wiring

All wiring can adopt only copper conductors and NEC or local regulations MUST be observed. HF68 has color

leads with the red one as the center line. When the flow increases, the red line contacts the yellow line; when the flow decreases, the red line contacts the blue line. Use supplied terminal screws for wiring. Use of other screws may result in improper wiring.

No power shall be supplied during wiring to guard against electric shocks or damages to the equipment.

13.6 Steps to adjust the flow switch settings

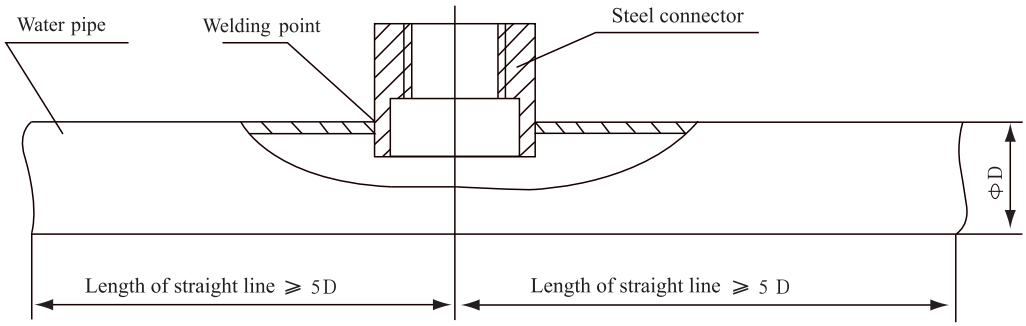
1. Remove the HF68 housing.

2. Turn the adjusting screw clockwise to increase the flow . If the flow needs to be decreased, turn the adjusting screw anticlockwise.

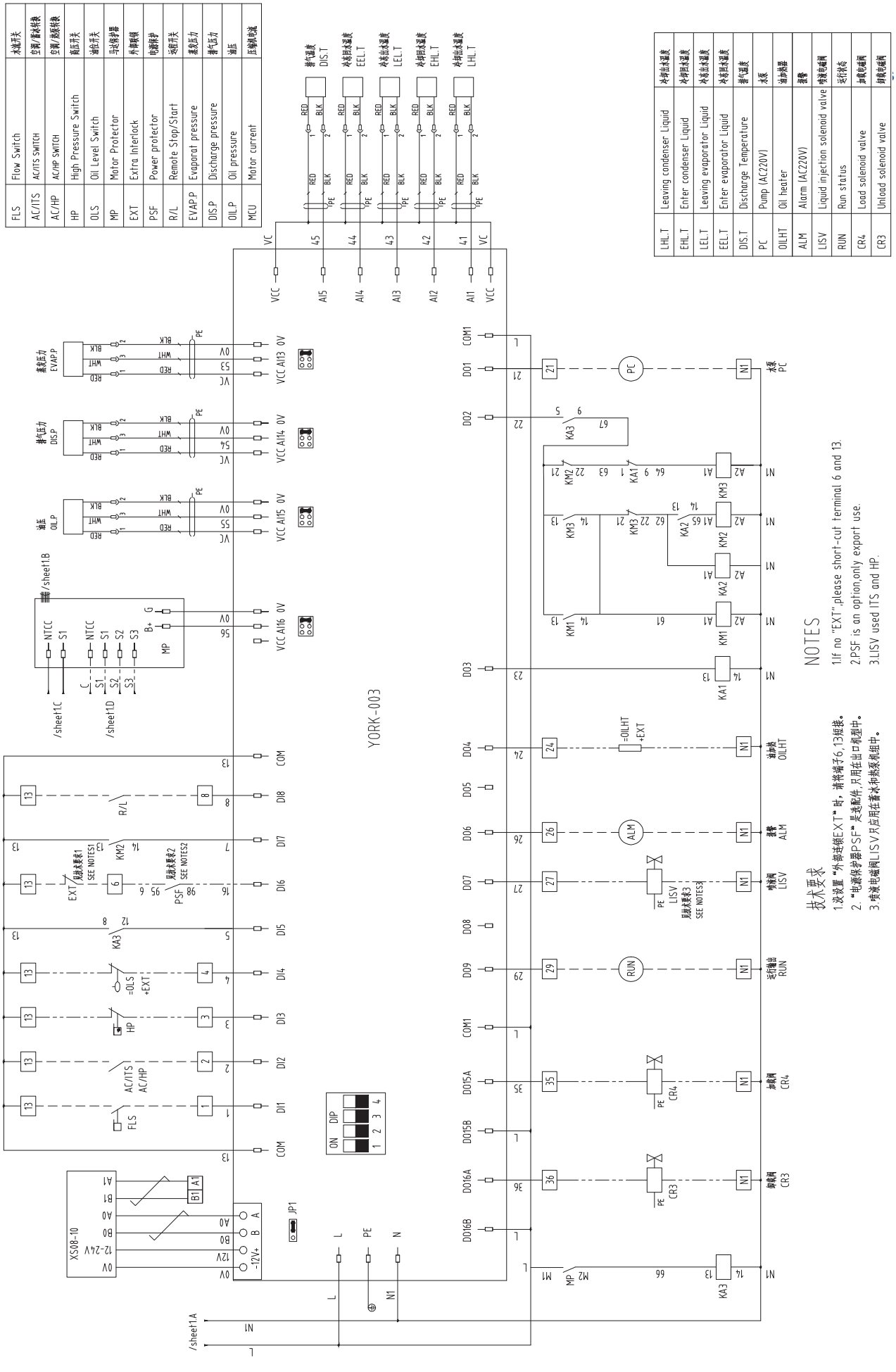
3. Press the main lever for a few times to ensure the flow switch setting is no less than the EXW setting. If there is no click sound when the lever is Enteringed, turn the adjusting screw clockwise until click sound appears.

If the water flow switch is used in chilled water pipes, ensure its insulation as described in Water Flow Switch Manual.

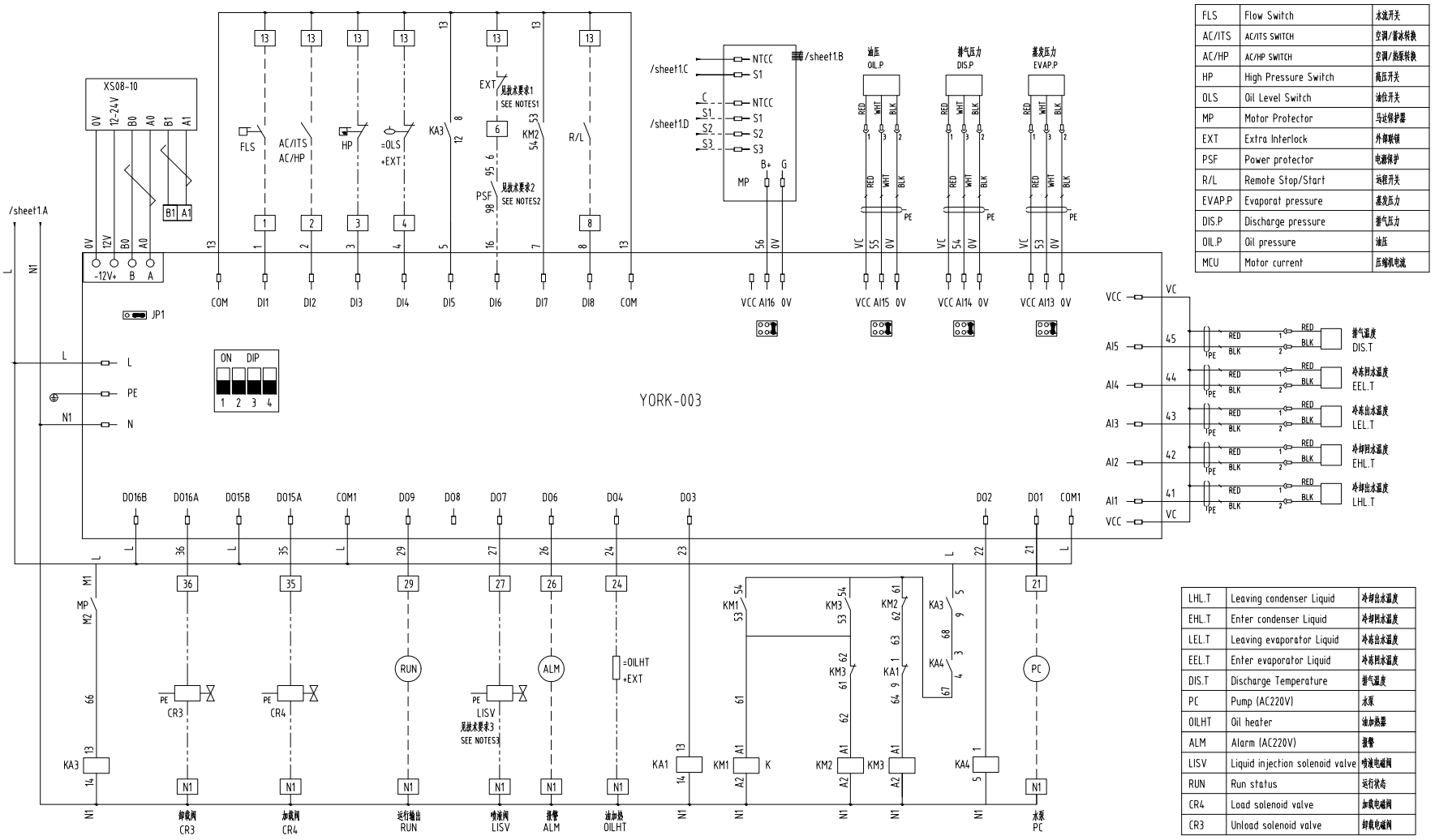
The water flow switch is set to the minimum at the plant. It is forbidden to set it below the EXW setting. Otherwise, it may cause that the flow switch cannot reset during water cut-out.



You MUST carefully read HF68 Flow Switch Manual before installing the flow switch and follow the instruction strictly. If you have any question, please contact the nearest YORK Maintenance Center.



YGWS095CA- 200CA Sensor and Control Wiring Diagram



FLS	Flow Switch	水流开关
AC/ITS	AC/ITS SWITCH	空调/蓄冰转换
AC/HP	AC/HP SWITCH	空调/热泵转换
HP	High Pressure Switch	高压开关
OLS	Oil Level Switch	油位开关
MP	Motor Protector	马达保护器
EXT	Extra Interlock	外部联锁
PSF	Power protector	电源保护
R/L	Remote Stop/Start	远程开关
EVAP.P	Evaporat pressure	蒸发压力
DIS.P	Discharge pressure	排气压力
OIL.P	Oil pressure	油压
MCU	Motor current	压缩机电流

LHL.T	Leaving condenser Liquid	冷却出水温度
EHL.T	Enter condenser Liquid	冷却回水温度
LEL.T	Leaving evaporator Liquid	冷冻出水温度
EEL.T	Enter evaporator Liquid	冷冻回水温度
DIS.T	Discharge Temperature	排气温度
PC	Pump (AC220V)	水泵
OILHT	Oil heater	油加热器
ALM	Alarm (AC220V)	报警
LISV	Liquid injection solenoid valve	喷液电磁阀
RUN	Run status	运行状态
CR4	Load solenoid valve	加载电磁阀
CR3	Unload solenoid valve	卸载电磁阀

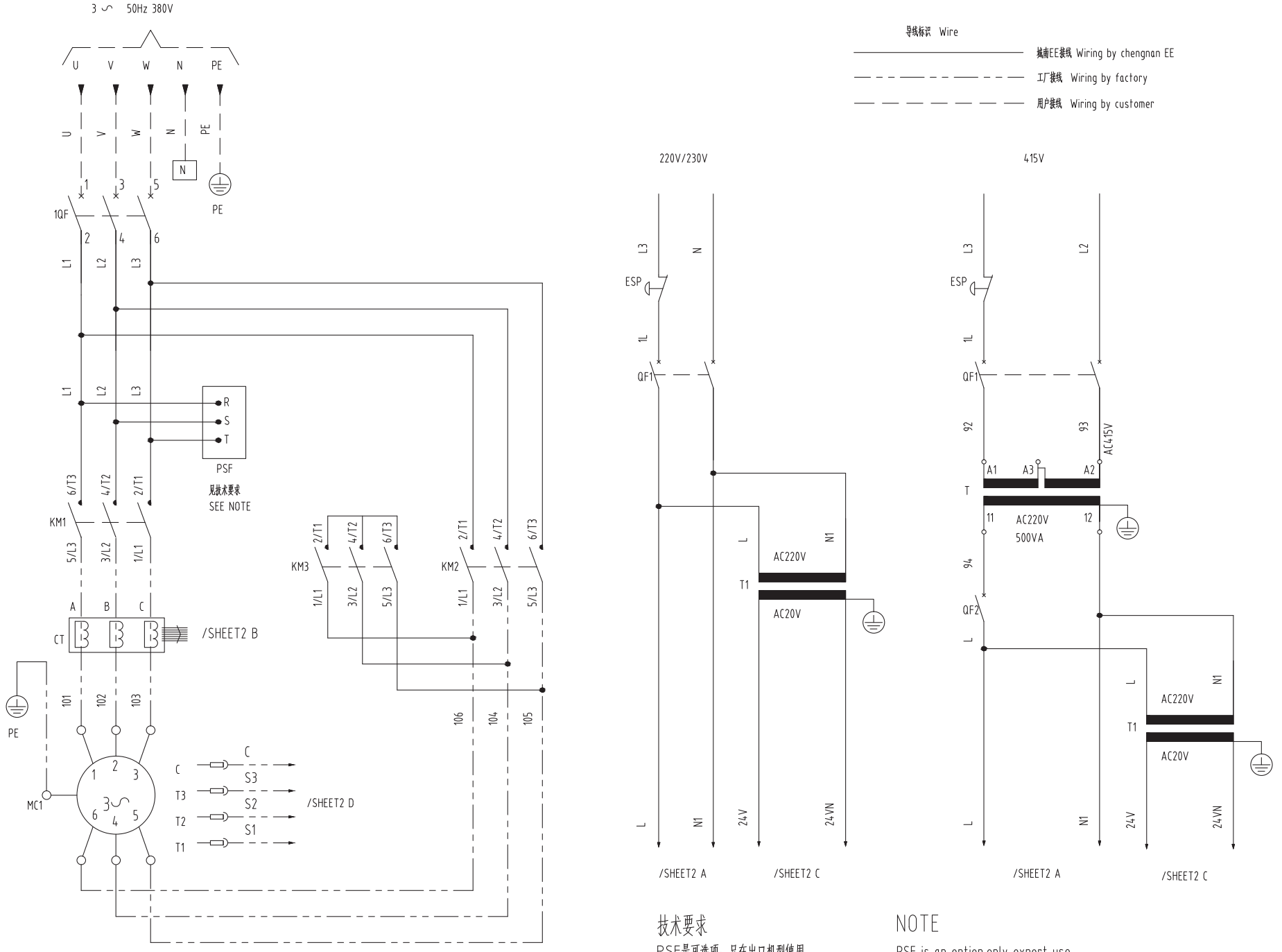
技术要求

1.没设置“外部连锁EXT”时，请将端子6,13短接。
2.“电源保护器PSF”是选配件,只用在出口机型中。
3.喷液电磁阀LISV只应用在蓄冰和热泵机组中。

NOTES

1.If no “EXT”,please short-cut terminal 6 and 13.
2.PSF is an option,only export use.
3.LISV used ITS and HP.

YGWS230CA- 330CA Sensor and Control Wiring Diagram



技术要求

PSF是可选项，只在出口机型使用。

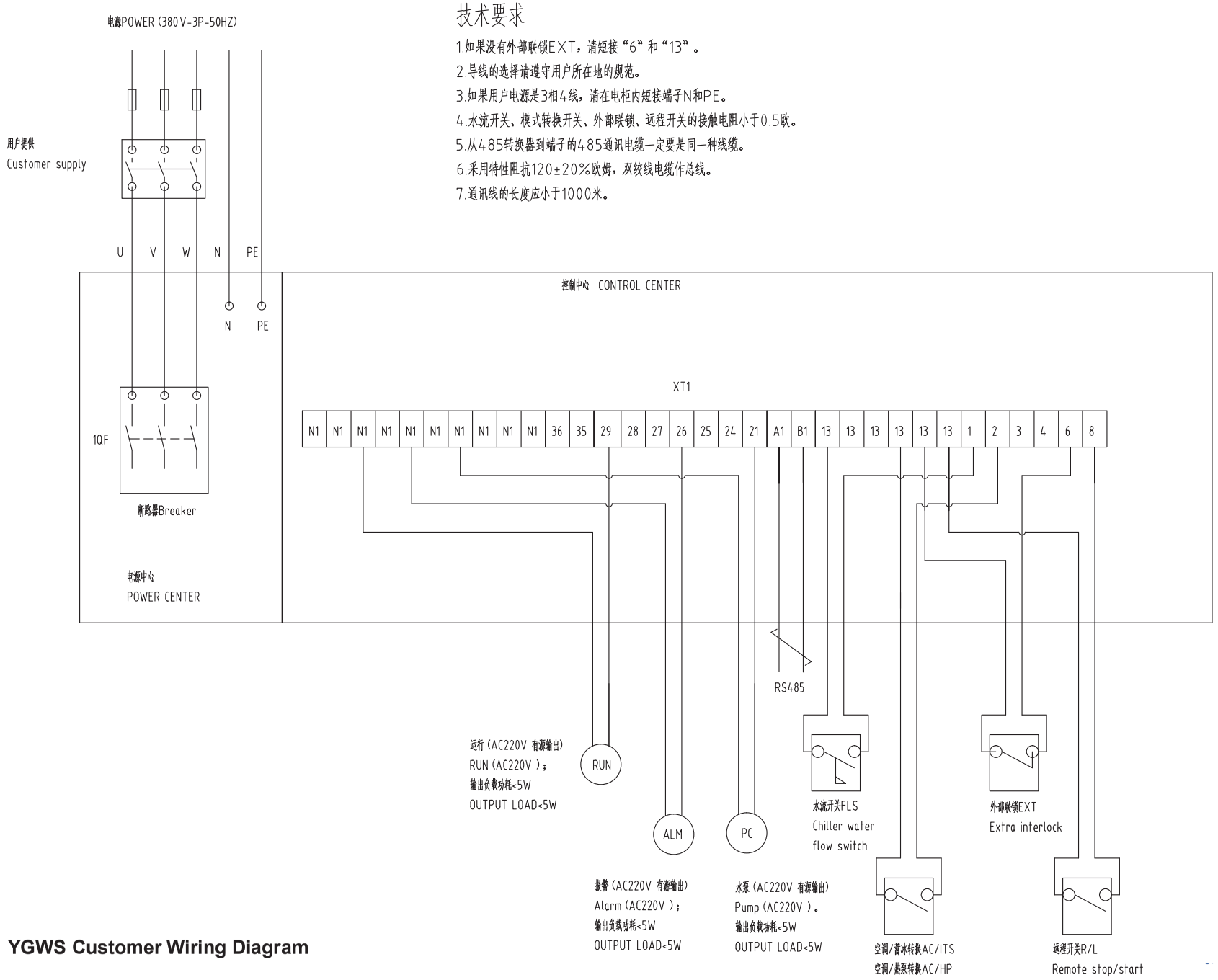
NOTE

PSF is an option,only export use.

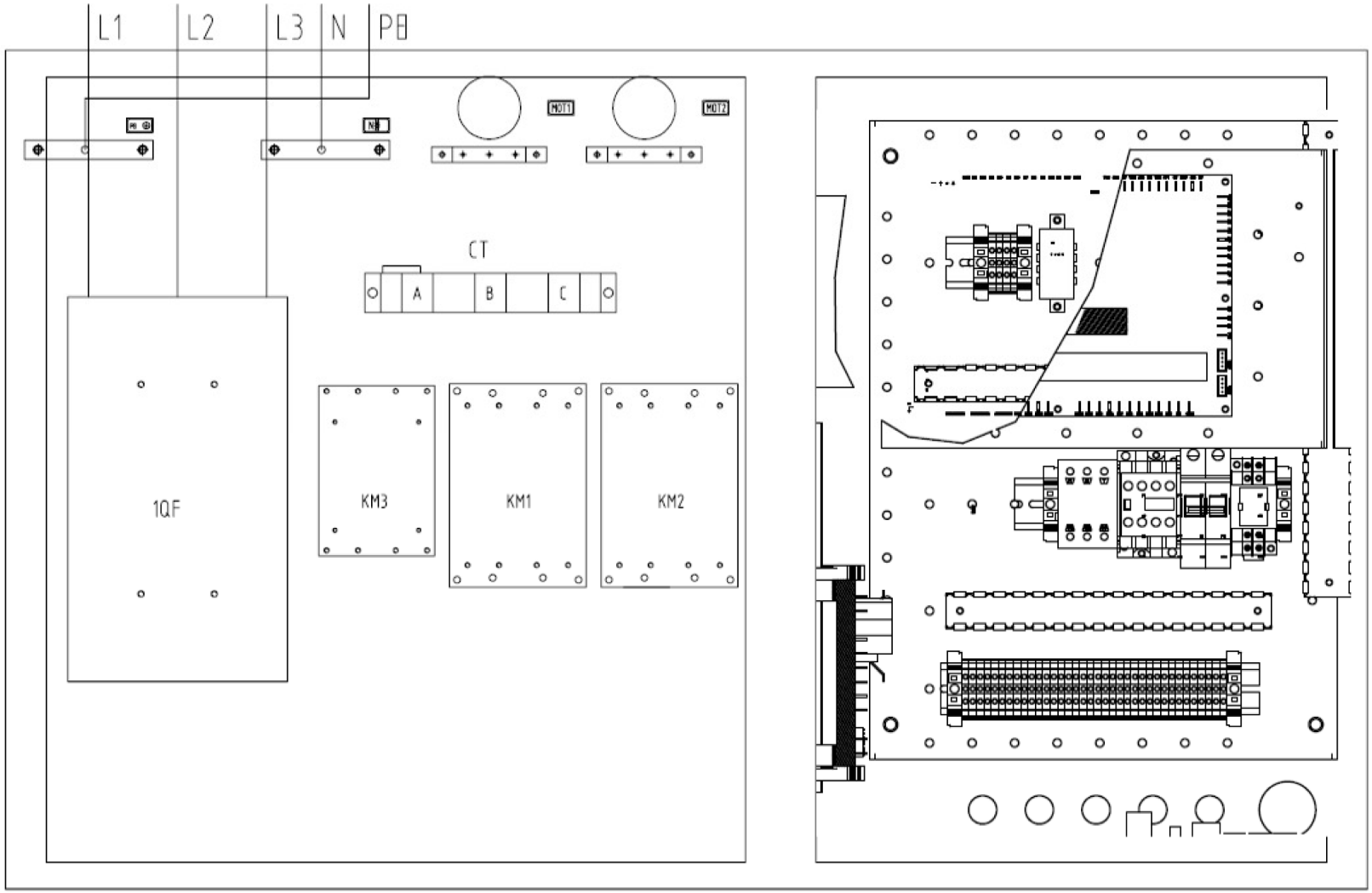
YGWS Compressor and Power Wiring Diagram

技术要求

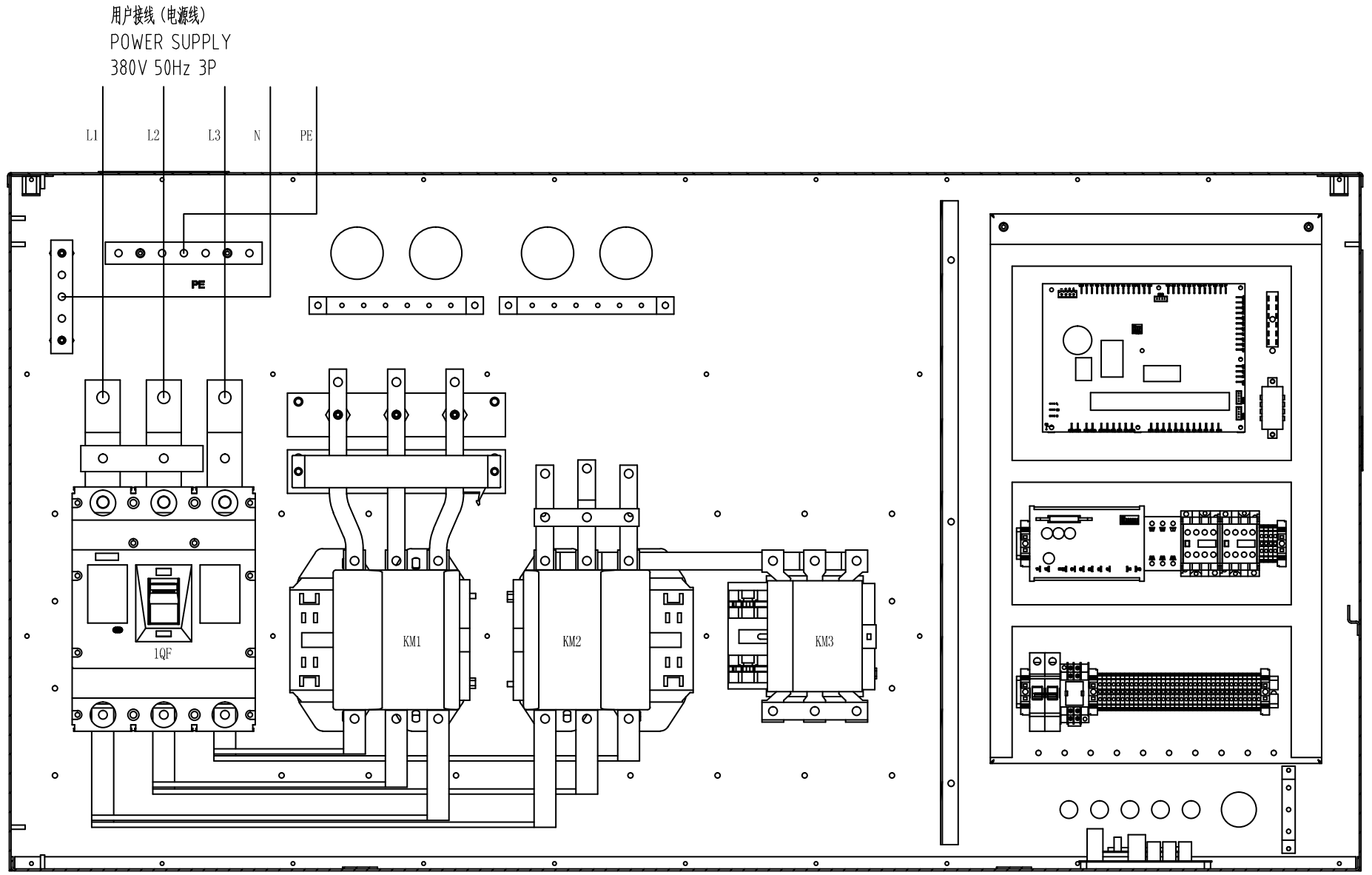
1.如果没有外部联锁EXT，请短接“6”和“13”。
2.导线的选择请遵守用户所在地的规范。
3.如果用户电源是3相4线，请在电柜内短接端子N和PE。
4.水流开关、模式转换开关、外部联锁、远程开关的接触电阻小于0.5欧。
5.从485转换器到端子的485通讯电缆一定要是同一种线缆。
6.采用特性阻抗120±20%欧姆，双绞线电缆作总线。
7.通讯线的长度应小于1000米。



YGWS Customer Wiring Diagram



YGWS095CA-0200CA Power Connection Diagram



YGWS230CA-0330CA Power Connection Diagram

Form No.: 6S3X-B02C-NA-EN(0616)
Supersedes: Nothing