YLAA0180SE-YLAA0485SE & YLAA0195HE-YLAA0515HE

Installation, Comissioning, Operation And Maintenance	Revision 2	Form 150.72-NM5 (0809)

(035-22130-100)

AIR COOLED LIQUID CHILLERS
WITH SCROLL COMPRESSORS
STYLE A

(Cooling Capacities: 180 kW to 520 kW)

Tempo

EUROVENT CERTIFIED PERFORMANCE

CE

R410A

YORK
BY JOHNSON CONTROLS

Johnson Controls

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1. General Chiller Information and Safety

Introduction

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

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

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

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

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

Warranty

Johnson Controls warrants all equipment and materials against defects in workmanship and materials for a period of eighteen months from date of shipment, unless labor 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, order number and run hours/starts. Model and serial number information is printed on the unit identification plate.

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

For warranty purposes, the following conditions must be satisfied:

The initial start of the unit must be carried out by trained personnel from an Authorized Johnson Controls Service Centre.

Only genuine Johnson Controls approved spare parts, oils, coolants, and refrigerants must be used.

All the scheduled maintenance operations detailed in this manual must be performed at the specified times by suitably trained and qualified personnel.

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

Standards for Safety

YLAA chillers are designed and manufactured within an EN ISO 9001 accredited organisation and in conformity with the following European Directives:

- Machinery Directive (98/37/EC)
- Low Voltage Directive (2006/95/EC)
- EMC Directive (2004/108/EC)
- Pressure Equipment Directive (97/23/EC)

Fluorinated Greenhouse Gases

- This equipment contains fluorinated greenhouse gases covered by the Kyoto Protocol.
- The global warming potential of the refrigerant (R410A) used in this unit is 1720.
- The refrigerant quantity is stated in the Physical Data table of this document.
- The fluorinated greenhouse gases in this equipment may not be vented to the atmosphere.
- This equipment should only be serviced by qualified technicians.

Responsibility for Safety

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

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

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

About this manual

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

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.

Misuse of Equipment

Suitability for Application

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

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

Structural Support

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

Mechanical Strength

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

General Access

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

Pressure Systems

The unit contains refrigerant vapor 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 lockingoff 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.

Rotating Parts

Fan guards must be fitted at all times and not removed unless the main power supply has been isolated. If ductwork is to be fitted, requiring the wire fan guards to be removed, alternative safety mesaures must be taken to protect against the risk of injury from rotating fans.

Refrigerants and Oils

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

High Temperature and Pressure Cleaning

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

Emergency Shutdown

In case of emergency, the control panel is fitted with a incoming supply non-fused disconnect switch which can be used as the emergency stop device. When operated it removes the electrical supply to the control circuit thus shutting down the unit.

Safety Labels

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

White symbol on blue background

For safe operation, read the instructions first

Black symbol on yellow background

Warning: This machine may start automatically without prior warning

Black symbol on yellow background

Warning: Hot surface

Black symbol on yellow background

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

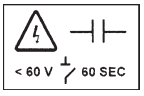
Black symbol on yellow background

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

Black symbol on yellow background

General attention symbol

Black symbol on yellow background



Power Factor Correction fitted Warning: On isolating the supply it may take up to 60 seconds for the capacitor voltage to fall below 60 volts

Material Safety Data

Refrigerant Safety Data R410A:		
COMPOSITION/INFORMATION ON INGREDIENTS		
Components Material	PENTAFLUOROETHANE (HFC-125)	DIFLUOROMETHANE (HFC-32)
CAS Number	354-33-6	75-10-5
%	50	50
HAZARDS IDENTIFICATION		
Potential Health Effects	Inhalation of high concentrations of vapour is harmful and may cause heart irregularities, unconsciousness, or death. Intentional misuse or deliberate inhalation may cause death without warning. Vapour reduces oxygen available for breathing and is heavier than air. Liquid contact can cause frostbite. At flame temperatures, this material can decompose to hydrogen fluoride which can be lethal at much lower concentrations.	
Human Health Effects	Overexposure to the vapours by inhalation may include temporary nervous system depression with anaesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness. Higher exposures to the vapours may cause temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation. Gross overexposure may be fatal. Skin contact with the liquid may cause frostbite. Individuals with preexisting diseases of the central nervous or cardiovascular system may have increased susceptibility to the toxicity of increased exposures.	
Carcinogenicity Information	None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.	
FIRST AID MEASURES		
Inhalation	If inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.	
Skin Contact	Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.	
Eye Contact	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.	
Ingestion	Do not induce vomiting. Give plenty of water in sips	
Notes to Physicians	THIS MATERIAL MAY MAKE THE HEART MORE SUSCEPTIBLE TO ARRHYTHMIAS. Catecholamines such as adrenaline, and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.	
FIRE FIGHTING MEASURES		
Flammable Properties	Flash Point : No flash point Flammable Limits in Air, % by Volume: LEL : None per ASTM E681 UEL : None per ASTM E681 Autoignition: Not determined	
Fire and Explosion Hazards	Cylinders may rupture under fire conditions. Decomposition may occur. Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and colour of torch flames. This flame effect will only occur in concentrations of product well above the recommended exposure limit, therefore stop all work and ventilate to disperse refrigerant vapours from the work area before using any open flames. R-410A is not flammable in air at temperatures up to 100 deg C (212 deg F) at atmospheric pressure. However, mixtures of R-410A with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. R-410A can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing R-410A and air, or R-410A in an oxygen enriched atmosphere becomes combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, R-410A should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example: R-410A should NOT be mixed with air under pressure for leak testing or other purposes.	

Refrigerant Safety Data R410A:	
Extinguishing Media	As appropriate for combustibles in area.
Fire Fighting Instructions	Cool cylinder with water spray or fog. Self-contained breathing apparatus (SCBA) is required if cylinders rupture and contents are released under fire conditions. Water runoff should be contained and neutralized prior to release.
ACCIDENTAL RELEASE MEASURES	
Safeguards (Personnel)	NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.
Accidental Release Measures	Ventilate area, especially low or enclosed places where heavy vapours might collect. Extinguish open flames. Use self-contained breathing apparatus (SCBA) for large spills or releases. Eliminate electrical sources.
HANDLING AND STORAGE	
Handling (Personnel)	Avoid breathing vapour. Avoid liquid contact with eyes and skin. Use with sufficient ventilation to keep employee exposure below recommended limits. See Fire and Explosion Data section.
Storage	Clean, dry area. Do not heat above 52 deg C (125 deg F).
EXPOSURE CONTROLS/PERSONAL PROTECTION	
Engineering Controls	Avoid breathing vapours. Avoid contact with skin or eyes. Use with sufficient ventilation to keep employee exposure below the recommended exposure limit. Local exhaust should be used if large amounts are released. Mechanical ventilation should be used in low or enclosed places.
Personal Protective Equipment	Impervious gloves should be used to avoid prolonged or repeated exposure. Chemical splash goggles should be available for use as needed to prevent eye contact. Under normal manufacturing conditions, no respiratory protection is required when using this product provided exposure is maintained at or below occupational limits. Self-contained breathing apparatus (SCBA) is required if a large release occurs.
Exposure Guidelines	Applicable Exposure Limits PENTAFLUOROETHANE (HFC-125) PEL (OSHA) : None Established TLV (ACGIH) : None Established AEL * (DuPont) : 1000 ppm, 8 & 12 Hr. TWA WEEL (AIHA) : 1000 ppm, 4900 mg/m^3, 8 Hr. TWA DIFLUOROMETHANE (HFC-32) AEL * (DuPont) : 1000 ppm, 8 & 12 Hr. TWA WEEL (AIHA) : 1000 ppm, 8 Hr. TWA * AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.
PHYSICAL AND CHEMICAL PROPERTIES	
Physical Data	Boiling Point : - 60.8 F (-51.6 C) @ 1 atm Vapour Pressure : 239.7 psia 25 C (77 F) % Volatiles : 100 WT% Evaporation Rate : (Cl4 = 1) Greater than 1 Solubility in Water : Not determined Odour : Slight ethereal Form : Liquefied gas Colour : Clear, colourless Specific Gravity : 1.066 @ 25 C (77 F)
STABILITY AND REACTIVITY	
Chemical Stability	Material is stable. However, avoid open flames and high temperatures.
Incompatibility with Other Materials	Incompatible with active metals, alkali or alkaline earth metals--powdered Al, Zn, Be, etc.
Decomposition	Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride. These materials are toxic and irritating. Contact should be avoided.

Refrigerant Safety Data R410A:	
Polymerization	Polymerization will not occur.
Other Hazards	Decomposition : Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid, and possibly carbonyl halides.
TOXICOLOGICAL INFORMATION	
Animal Data	The blend is untested. HFC-125 Inhalation 4-hour ALC: >709,000 ppm in rats Single exposure to high doses caused: Lethargy. Laboured breathing. Weak cardiac sensitization, a potentially fatal disturbance of heart rhythm caused by a heightened sensitivity to the action of epinephrine. Lowest-Observed-Adverse-Effect-Level for cardiac sensitization: 100,000 ppm. Repeated exposure caused: No significant toxicological effects. No-Observed-Adverse-Effect-Level(NOAEL): 50,000 ppm ADDITIONAL TOXICOLOGICAL EFFECTS: No animal data are available to define the following effects of this material: carcinogenicity, reproductive toxicity. In animal testing this material has not caused developmental toxicity. Tests have shown that this material does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. This material has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals (not tested for heritable genetic damage). HFC-32 Inhalation 4 hour-ALC: > 520,000 ppm in rats Single exposure caused: Lethargy. Spasms. Loss of mobility in the hind limbs. Other effects include weak cardiac sensitization, a potentially fatal disturbance of heart rhythm caused by a heightened sensitivity to the action of epinephrine. 250,000 ppm. Repeated exposure caused pathological changes of the lungs, liver, spleen, kidneys. In more recent studies repeated exposure caused: No significant toxicological effects. No-Observed-Effect-Level (NOEL): 49,100 ppm. No animal data are available to define the following effects of this material: carcinogenicity, reproductive toxicity. Animal data show slight fetotoxicity but only at exposure levels producing other toxic effects in the adult animal. Tests have shown that this material does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. This material has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals (not tested for heritable genetic damage).
DISPOSAL CONSIDERATIONS	
Waste Disposal	Comply with Federal, State, and local regulations. Reclaim by distillation or remove to a permitted waste disposal facility.
TRANSPORTATION INFORMATION	
Shipping Information	DOT/IMO/IATA Proper Shipping Name : Liquefied Gas, N.O.S. (Pentafluoroethane and Difluoromethane) Hazard Class : 2.2 UN No. : 3163 Label(s) : Nonflammable Gas Shipping Containers : Tank Cars. Cylinders. Ton Tanks

Oil Safety Data YORK 'V' Oil:
Section 1 Substance Product Information
Product Trade Name: YORK "V" Oil. Chemical Name: Carboxylic Ester.
Section 2 Components and Hazard Statement
This product is non-hazardous. This material has no known hazards under applicable laws.
Section 3 Safe Handling and Storage
Handling: Keep containers closed when not in use. Wash thoroughly after handling. Empty container contains product residue which may exhibit Storage: No special storage precautions required.
Section 4 Physical Data
Appearance: Clear liquid. Boiling Point: Not Determined. Vapour Pressure: Not Determined. Specific Gravity (water=1): 0.97 @ 15.6°C. Volatiles, Percent by Volume: Unknown. Odour: Mild. Solubility in Water: Insoluble. Evaporation Rate: Not Determined.
Section 5 Fire and Explosion Hazards
Flash Point: > 232°C, 450°F COC (Minimum). Flammable Limits: not established. Autoignition Temperature: no data. Extinguishing Media: CO2, dry chemical or foam. Water can be used to cool and protect exposed material. Unusual Fire and Explosion Hazards: Toxic fumes, gases or vapours may evolve on burning. Special Fire Fighting Techniques: Firefighters should use approved self-contained breathing apparatus. Water may cause splattering. Material will
Section 6 Reactivity Data
Stability: Material is normally stable at moderately elevated temperatures and pressures. Hazardous Polymerization: Will not occur. Incompatible Materials: Strong acids. Strong bases. Strong oxidizing agents. Decomposition Temperature: Not Determined. Thermal Decomposition: Smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion.
Section 7 Health Hazard Data
First Aid Procedures
Ingestion: DO NOT INDUCE VOMITING. If conscious, give 2 glasses of water. Get immediate medical attention. Eyes: Flush with water at least 15 minutes. Get medical attention if eye irritation develops or persists. Skin: Wash with soap and water. Get medical attention if irritation develops. Launder contaminated clothing before reuse. Inhalation: Remove exposed person to fresh air if adverse effects are observed. Additional Information: Note to physician: Treat symptomatically.
Section 8 Personal Protection Information
Respiratory Protection: Use respirator with an organic vapour cartridge if exposure limit is exceeded. Ventilation: Use with adequate ventilation. Protective Gloves: Neoprene. Eye/Face Protection: Safety glasses. Clothing: Long sleeve shirt is recommended.
Section 9 Spill or Leak Procedures
Spill Procedures: Personal Protective Equipment must be worn, see Personal Protection Information (Section 8). Ventilate area if spilled in
Section 10 Waste Disposal Methods
This material, if discarded, should be disposed of in a licensed facility in accordance with local regulations.

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

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2. Specification

YLAA air-cooled chillers are completely factory assembled with all interconnecting refrigerant piping and wiring ready for field installation. The unit is pressure tested, evacuated, and fully factory charged with refrigerant R410A and oil in each of the independent refrigerant circuits. After assembly, an operational test is performed with water flowing through the evaporator to ensure that each refrigerant circuit operates correctly.

The unit structure is manufactured from heavy-gauge, galvanised steel coated with baked-on powder paint (Champagne (RAL 7006, Munsell No. 9.8YR4.36/1.2))

YLAA chillers are designed and manufactured within an EN ISO 9001 accredited organisation and in conformity with the following European Directives:

- Machinery Directive (98/37/EC)
- Low Voltage Directive (2006/95/EC)
- EMC Directive (2004/108/EC)
- Pressure Equipment Directive (97/23/EC)

Compressors

The unit has suction-cooled, hermetic scroll compressors. High efficiency is achieved through a controlled orbit and the use of advanced scroll geometry. The compressors incorporate a compliant scroll design in both the axial and radial directions. All rotating parts are statically and dynamically balanced. The compressor motors have integral protection against overloads that will automatically reset. Starting is direct on line, and soft start is available as an option.

The compressors are switched On and Off by the unit microprocessor to provide capacity control. Each compressor is fitted with a crankcase strap heater. All compressors are mounted on isolator pads to reduce transmission of vibration to the rest of the unit.

The motor terminal boxes have IP 54 weather protection.

Refrigerant Circuits

Two independent refrigerant circuits are provided on each unit. Each circuit uses copper refrigerant pipe formed on computer controlled bending machines to reduce the number of brazed joints resulting in a reliable and leak resistant system.

Liquid line components include: a service valve with charging port, a high absorption removable core filter-drier, a solenoid valve, a sight glass with moisture indicator and a thermal expansion valve. Liquid lines between the expansion valve and the cooler are insulated with flexible, closed-cell foam.

Suction line components include: a pressure relief valve, a pressure transducer and a service valve. Suction lines are insulated with flexible, closed-cell foam.

Discharge lines include service and isolation ball valves, a high-pressure cutout switch, a pressure transducer and a pressure relief valve.

Evaporator

The evaporator on models YLAA0180SE, YLAA0210SE and YLAA0240SE is a stainless steel plate type heat exchanger with a design working pressure of 10 barg on the water side. All other models have a shell and tubes type evaporator.

The 2-pass dual circuit shell and tube type direct expansion (DX) evaporator has refrigerant in the tubes and chilled liquid flowing through the baffled shell. The waterside (shell) design working pressure of the cooler is 10.3 bar g. The refrigerant side (tubes) design working pressure is 27.6 bar g. The refrigerant side is protected by pressure relief valve(s).

Water Connection to the evaporator is via victaulic grooved connections. Victaulic flange connections are available as an option.

Air Cooled Condensers

Each condenser coil is a single piece all aluminium construction including headers, tubes and fins to avoid galvanic corrosion due to dissimilar metals. Coils and headers are brazed as one piece. Integral subcooling is included. The design working pressure is 43 bar.

The condenser fans have metal ‘sickle’ blades integrated into the rotor of an external rotor motor. They are designed for maximum efficiency and statically and dynamically balanced for vibration free operation. They are directly driven by independent motors, and positioned for vertical air discharge. The fan guards are constructed from heavy-gauge, corrosion resistant, coated steel.

The IP 54 fan motors are the totally enclosed air-over type with permanently lubricated double-sealed ball bearings.

Power and Controls Panels

All power and controls are contained in an IP 55 cabinet with hinged, latched and gasket sealed outer doors.

The power panel includes:

- A factory mounted non-fused disconnect switch with external, lockable handle to enable connection of the unit power supply. The disconnect switch can be used to isolate the power for servicing.
- Factory mounted compressor contactors and compressor fuses provide short circuit protection. Overload protection for each compressor is provided by inherent motor winding temperature sensing and a trip module.

- Factory mounted fan contactors and fuses provide short circuit protection. Overload protection for each fan is provided by a inherent motor winding temperature device.
- Factory mounted control transformer to convert the unit supply voltage to 110 V - 1 Ø - 50 Hz for the control system.
- Control supply fuses and connections for a remote emergency stop device.

The control panel includes:

- A Liquid Crystal Display (two display lines of twenty characters per line) with Light Emitting Diode backlighting for easy viewing
- A Colour coded 12-button keypad
- Customer terminal blocks for control inputs and liquid flow switch.

Microprocessor Controls

The microprocessor control includes:

- Automatic control of compressor start/stop, anticoincidence and anti-recycle timers, automatic pumpdown on shutdown, evaporator pump and unit alarm contacts. Automatic reset to normal chiller operation after power failure.
- Remote water temperature setpoint reset via a pulse width modulated (PWM) input signal or up to two steps of demand (load) limiting
- Software is loaded into the microprocessor controller via a SD card, with programmed setpoints retained in a lithium battery backed real time clock (RTC) memory.
- Forty character liquid crystal display, with description available in five languages (English, French, German, Spanish or Italian)

Programmable setpoints:

- Chilled liquid temperature setpoint and range
- Remote reset temperature range
- Set daily schedule/holiday for start/stop
- Manual override for servicing
- Low and High ambients cutouts
- Low liquid temperature cutout
- Low suction pressure cutout
- High discharge pressure cutout
- Anti-recycle timer (compressor start cycle time)
- Anti-coincident timer (delay compressor starts)

Displayed Data:

- Return and leaving liquid temperature
- Low leaving liquid temperature cutout setting
- Low ambient temperature cutout setting
- Ambient air temperature
- Metric or Imperial data
- Discharge and suction pressure cutout settings
- System discharge and suction pressures
- Anti-recycle timer status for each compressor
- Anti-coincident system start timer condition
- Compressor run status
- No cooling load condition
- Day, date and time
- Daily start/stop times
- Holiday status
- Automatic or manual system lead/lag control
- Lead system definition
- Compressor starts & operating hours (each compressor)
- Status of evaporator heater and fan operation
- Run permissive status
- Number of compressors running
- Liquid solenoid valve status
- Load & unload timer status
- Water pump status

System Safeties:

Cause individual compressors to perform auto shut down and require manual reset in the event of 3 trips in a 90-minute time period

- High discharge pressure
- Low suction pressure
- High-pressure switches
- Motor protector

Unit Safeties:

They are automatic reset and cause compressor to shut down

- Low leaving chilled liquid temperature
- Under voltage
- Loss of liquid flow (through flow switch)

Alarm Contacts:

- Low leaving chilled liquid temperature
- Low voltage
- Low battery
- High discharge pressure (per system)
- Low suction pressure (per system)

Accessories and Options

Power Factor Correction

Factory mounted passive (static) power factor correction capacitors to correct unit compressor power factors to a target of 0.9 (depending on operating conditions). Option not available on compressors fitted with soft start option.

Soft Starters

Factory mounted soft starters reduce the inrush current to the last compressor on each refrigerant circuit. They are preset so that no field adjustment is required. This option is not available for units operating in ambients greater than 35ºC.

Language LCD and Keypad

English, French, German, Italian and Spanish unit LCD read out and keypad available. Standard Language is English.

Multi-Chiller Sequencer

The multi-chiller sequencer has been designed to manage up to four chillers, piped in parallel, from a common chilled water sensor. The sequencer is factory mounted in an IP55 panel with viewing window, lockable door and an electrical isolator. To be field fitted and wired to power supply and chillers.

Heat Recovery

Stainless steel, dual refrigerant circuit, plate heat exchanger with victaulic water connections.

Hydrokit

Factory fitted Hydrokit suitable for water glycol systems with up to 35% glycol at leaving liquid temperatures down to -7ºC. The kit is available in single or dual motor configuration (dual as standby duty only), with totally enclosed permanently lubricated pump motors.

The Hydrokit option is provided with a balancing valve, flow switch, pressure ports (gauges to be supplied by others), suction guide, strainer, bleed and drain valves and frost protection.

The pumps and flow switch are factory wired to the chiller control system to provide auto pump starting and running.

Victaulic Flange Kit

Victaulic PN10 flange joint kit supplied loose for field installation. Includes flanges and companion flanges and all necessary nuts, bolts and gaskets.

38 mm Evaporator Insulation

Double thickness insulation provided for enhanced efficiency, and low temperature applications.

Flow Switch

Vapour Proof, paddle-type with 1"NPT connection for upright mounting in horizontal pipe. This flow switch or its equivalent must be supplied with each unit to protect the evaporator from loss of liquid flow (Field Mounted)

Dual Pressure Relief Valves

Two pressure relief valves mounted on a 3-way valve in parallel of which one is operational and the other one assists during maintenance.

Low Sound (LS) Unit

Includes low speed fans and compressor acoustic enclosures (factory fit).

Compressor Acoustic Enclosure

Factory fit acoustically lined, painted galvanised steel, enclosure with removable panels.

Dual speed fans

Fans operate either in high mode (920 RPM) or in low mode (670 RPM). Fan speed reduces automatically from high to low mode as head pressure falls, or at programmed times within the control software.

High Pressure Fans

Fans and motors suitable for high external static conditions up to 120 Pa.

High Ambient Kit

Double skinned control panel, to offset solar heat, should be selected for all units operating in ambients greater than 46ºC.

Low Ambient Kit

This accessory includes fan speed control, on one fan per refrigerant circuit, to permit chiller operation below -1ºC and down to -18°C ambient temperature.

Condenser Coil Louvred Panels

Louvred panels mounted over the condenser coils.

Condenser Coil Louvred Panels and Unit Wire Guards

Louvred panels mounted over the condenser coils, and welded wire mesh guards mounted around the bottom of the unit.

Unit Wire Enclosure

Welded wire mesh guards over condenser coils and around the bottom of the unit.

Aesthetic Vee Panels

Panels covering the pipework on the side of each condenser module.

Coil End Hail Guard

Louvred panel attached to exposed coil end.

Neoprene Pads Isolators

Recommended for normal installations (Field mounted)

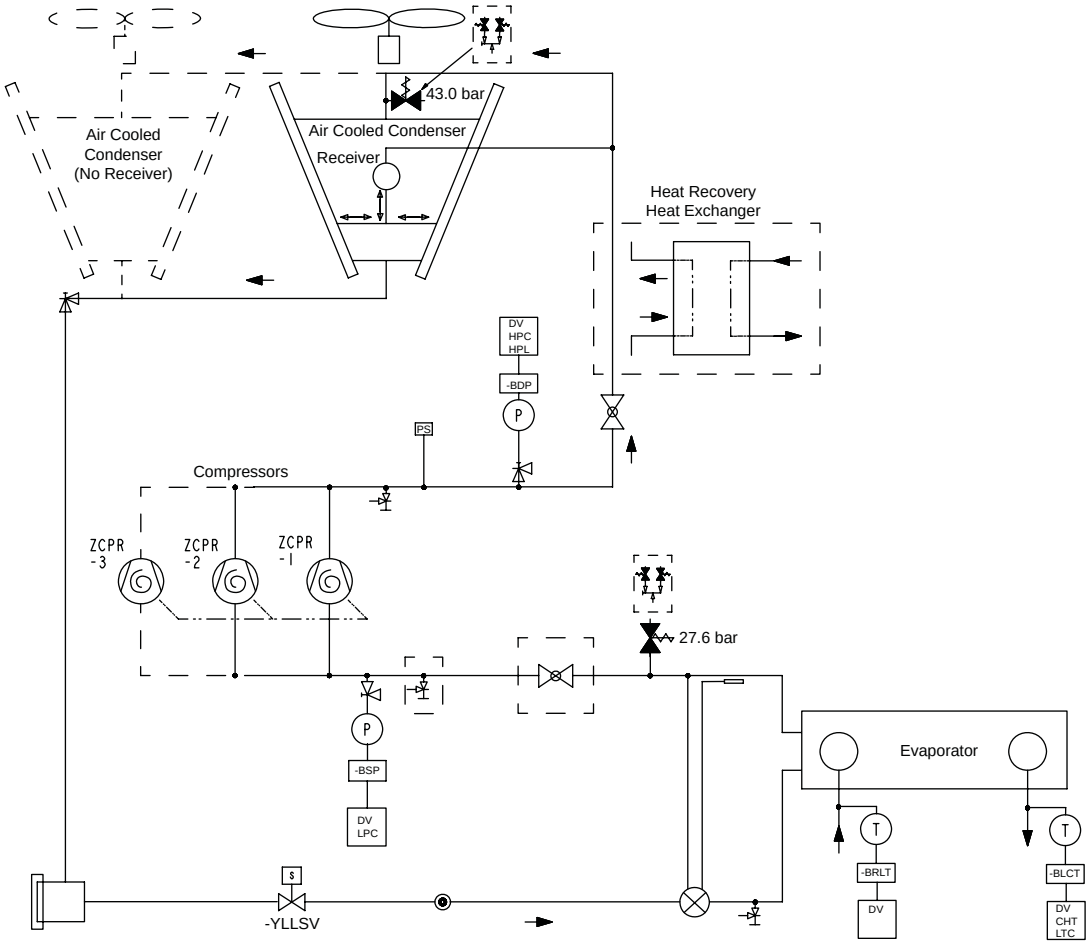
25 mm Spring Isolators

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

Lifting Lug Kit

One set of ISO MK5 camlocs to enable safe and easy unit handling.

Refrigerant Flow Diagram



Components:

- Pressure Relief Valve
- Service (Ball) Valve
- Expansion Valve
- Solenoid Valve
- Sight Glass
- Sensor Pressure or Temperature
- Service (Stop) Access Valve
- Pressure Switch
- Filter Drier (Removable Core)

Control Functions:
CHT - Chilled Liquid Temperature
HPC - High Pressure Cutout
LPC - Low Pressure Cutout
HPL - High Pressure Load Limiting
HTC - High Temperature Cutout
LTC - Low Temperature Cutout
DV - Display Value

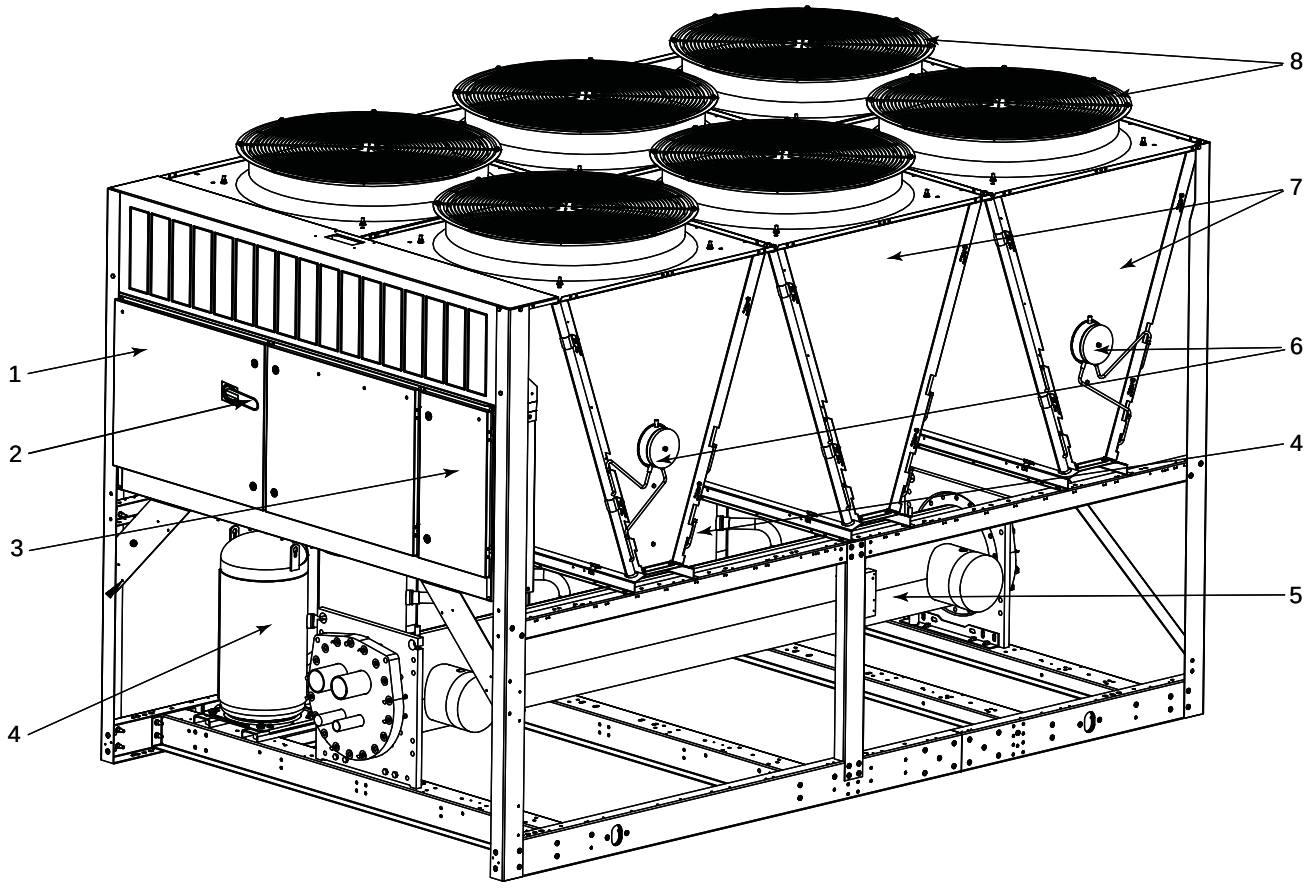
Pressure Transducers:
-BDP Discharge Pressure
-BSP Suction Pressure

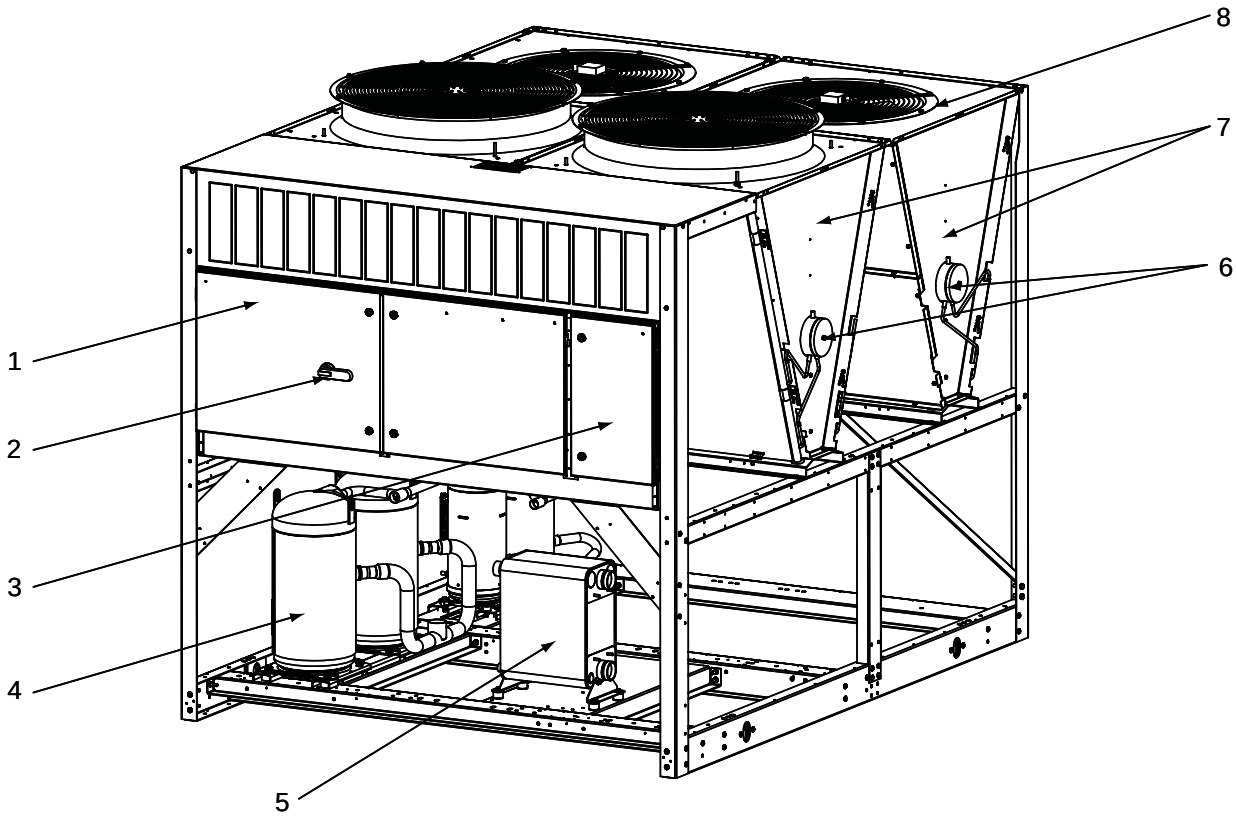
Temperature Sensors:
-BLCT Leaving Chilled Temperature
-BRLT Return Liquid Temperature

Solenoid Valves:
-YLLSV Liquid Line Solenoid Valve

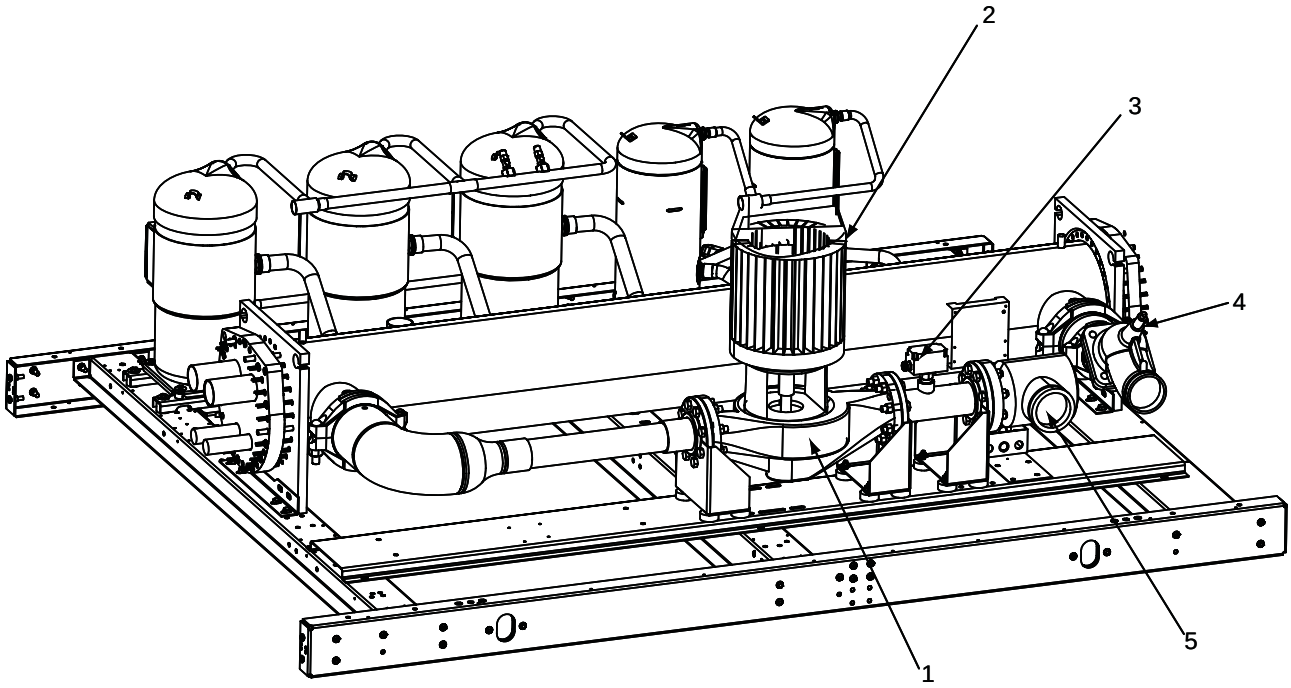
Low pressure liquid refrigerant enters the evaporator and is evaporated and superheated by the heat energy absorbed from the chilled liquid. Low pressure vapour enters the compressor where pressure and superheat are increased. The high pressure vapour is fed to the air cooled condenser coil and fans where heat is removed. The fully condensed and subcooled liquid passes through the expansion valve where pressure is reduced and further cooling takes place before returning to the evaporator.

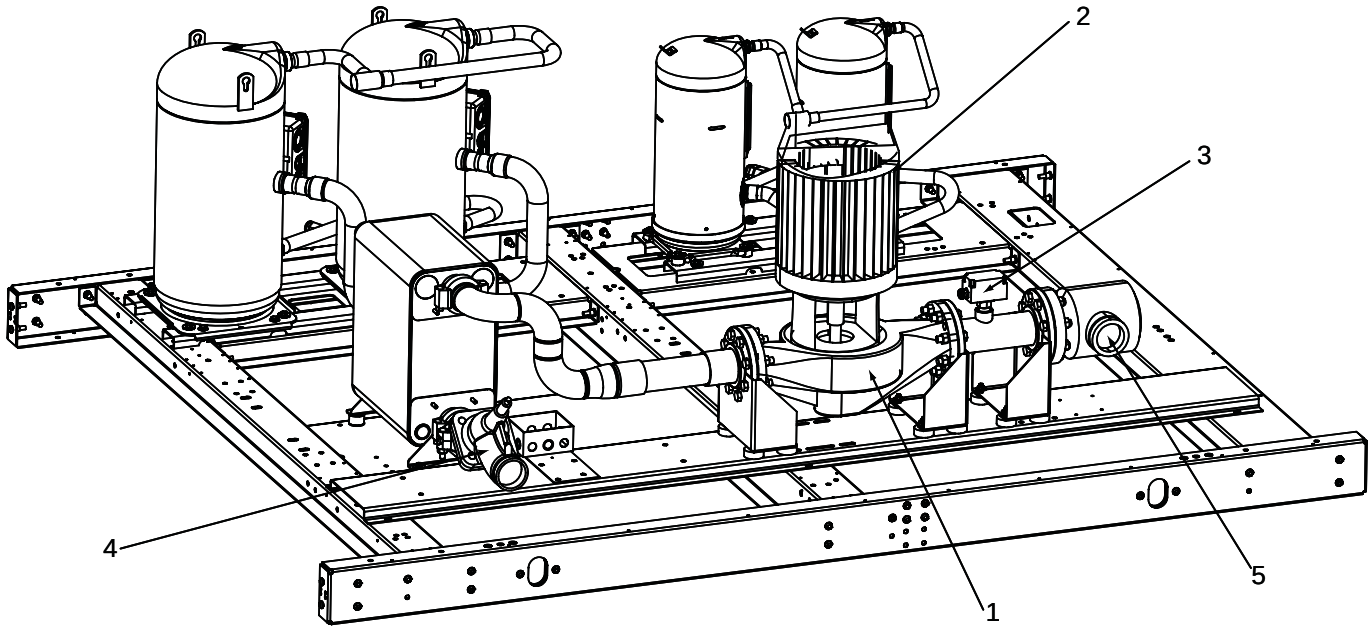
Component Location Diagram





1 Power Panel
2 Non-Fused Disconnect Switch
3 Control Panel
4 Compressor
5 Evaporator
6 Receiver
7 Condenser
8 Fans





1 Pump Body (Single or Dual)
2 Pump Motor (Single or Dual)
3 Flow Switch
4 Balancing valve with flow check and shut-off functions
5 Suction Guide with integrated strainer

Nomenclature

YLAA0390HE50XAA

1 2 3 4 BASE PRODUCT TYPE

Y	: York
L	: Scroll
A	: Air Cooled
A	: European

5 6 7 8 NOMINAL CAPACITY

#	#	#	#	kW
:0180	:0195	:0210	:0240	:0260
:0285	:0300	:0320	:0350	:0360
:0390	:0400	:0435	:0440	:0455
:0485	:0515			

9 UNIT DESIGNATION

S	: Standard Unit
H	: High Efficiency

10 REFRIGERANT

E	: R-410A

11 12 13 VOLTAGE / STARTER

5 0	: 380-415 / 3 / 50
X	: Direct on Line
T	: Soft Start

14 15 DESIGN / DEVELOPMENT LEVEL

A	: Design Series
A	: Development Level

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3. Transportation, Handling and Storage

Delivery and Storage

To ensure consistent quality and maximum reliability, all units are tested and inspected before leaving the factory. Units are shipped completely assembled and containing refrigerant under pressure. Units are 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 all openings, such as water connections, are securely capped.

The unit should be stored in a location where there is minimal activity in order 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 is periodically inspected during storage.

Inspection

Remove any transit packing and inspect the unit to ensure that all components have been delivered and that no damage has occurred during transit. If any damage is evident, it should be noted on the carrier's freight bill and a claim entered in accordance with the instructions given on the advice note.

Major damage must be reported immediately to your local Johnson Controls representative.

Moving the unit

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 using lifting lugs and a spreader bar or frame of sufficient width to prevent damage to the unit from the lifting chains.

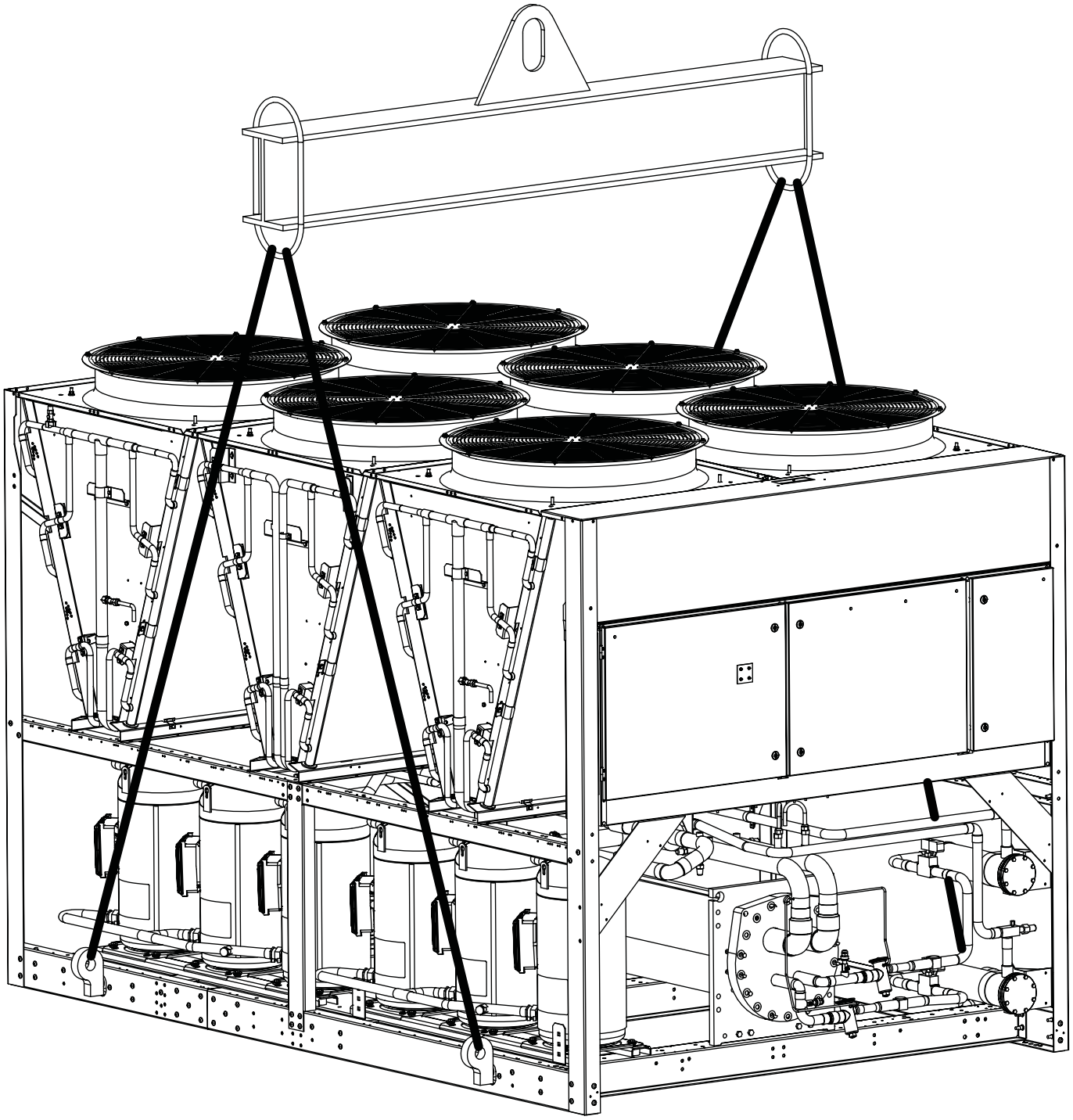
The unit must only be lifted by the base frame at the points provided. Never move the unit on rollers, or lift the unit using a fork-lift truck.

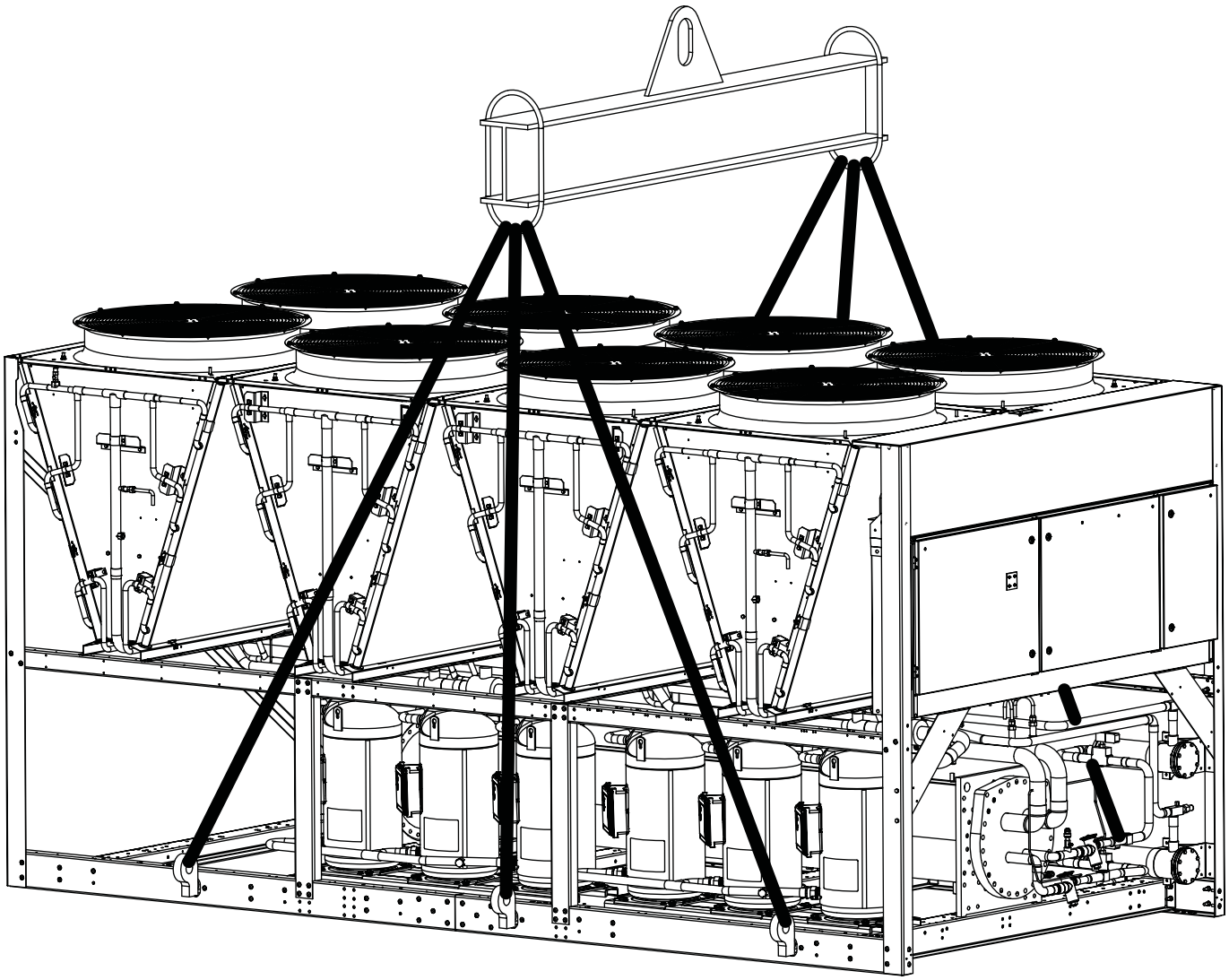
Care should be taken to avoid damaging the condenser coil fins when moving the unit.

Units are provided with lifting holes in the base frame which accept the accessory lifting lug set (part number 026L00261-000 - 4 lug set, 026-45594-000 - 6 lug set).

The lugs should be inserted into the respective holes in the base frame and turned so that the spring loaded pin engages into the hole and the flanges on the lug lock behind the hole. The lugs should be attached to the cables/chains using shackles or safety hooks.

Typical Lifting Arrangement





Lifting Weights

For details of weights and weight distribution, refer to the technical data section of this manual.

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4. Installation

Location Requirements

To achieve optimum performance and trouble-free service, it is essential that the proposed installation site meet with the location and space requirements for the model being installed.

The clearances recommended are nominal for the safe and efficient operation and maintenance of the unit and power and control panels. Local Health and safety regulations, or practical considerations for service replacement of large components, may require larger clearances than those given in this manual.

Outdoor installations

The units can be installed at ground level on a suitable at level foundation easily capable of supporting the weight of the unit, or on a suitable rooftop location. In both cases an adequate supply of air is required. Avoid locations where the sound output and air discharge from the unit may be objectionable.

The location should be selected for minimum sun exposure and away from boiler flues and other sources of airborne chemicals that could attack the condenser coils and steel parts of the unit.

If located in an area accessible to unauthorized persons, steps must be taken to prevent access to the unit by means of a protective fence. This will help to prevent the possibility of vandalism, accidental damage, or possible harm caused by unauthorized removal of protective guards or opening panels to expose rotating or high voltage components.

For ground level locations, the unit must be installed on a suitable flat and level concrete base that extends to fully support the two side channels of the unit base frame. A one-piece concrete slab, with footings extending below the frost line is recommended. To avoid noise and vibration transmission, the unit should not be secured to the building foundation.

On rooftop locations, choose a place with adequate structural strength to safely support the entire operating weight of the unit and service personnel. The unit can be mounted on a concrete slab, similar to ground floor locations, or on steel channels of suitable strength. The channels should be spaced with the same centres as the unit side and front base rails. This will allow vibration isolators to be fitted if required. Isolators are recommended for rooftop locations. Any ductwork or attenuators fitted to the unit must not have a total static pressure resistance, at full unit air-flow, exceeding the capability of the fans installed in the unit.

Indoor installations

The unit can be installed in an enclosed plant room, provided the floor is level and of suitable strength to support the full operating weight of the unit. It is essential that there is adequate clearance for air flow to the unit. The discharge air from the top of the unit must be ducted away to prevent re-circulation of air within the plant room. If common ducts are used for fans, non-return dampers must be fitted to the outlet from each fan.

The discharge ducting must be properly sized with a total static pressure loss, together with any intake static pressure loss, less than the available static pressure capability for the type of fan fitted.

The discharge air duct usually rejects outside the building through a louvre. The outlet must be positioned to prevent the air being drawn directly back into the air intake for the condenser coils, as such re-circulation will affect unit performance.

Operating in low ambient conditions

If low cooling capacities are required, at lower ambient conditions (below -1°C), the refrigerant pressure will fall. To prevent operational problems the low ambient kit option should be used.

For efficient head pressure control in ambients below -1°C, where unusually high wind gusts are expected, it is recommended that, if the customer has not provided a wind break, the optional condenser louvred enclosure panels are included.

High static fan ductwork connection

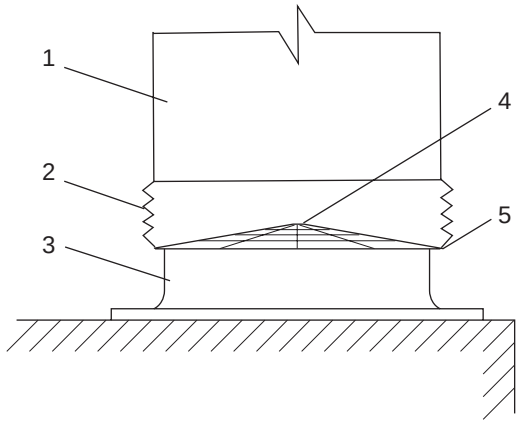
The following ductwork recommendations are intended to ensure satisfactory operation of the unit, when optional high static fans are used. Failure to follow these recommendations could cause damage to the unit, or loss of performance, and may invalidate the warranty. When ducting is to be fitted to the fan discharge it is recommended that the duct should be the same cross sectional area as the fan outlet and straight for at least 1 meter to obtain static regain from the fan.

Ductwork should be suspended with flexible hangers to prevent noise and vibration being transmitted to the structure. A flexible joint is also recommended between the duct attached to the fan and the next section for the same reason. Flexible connectors should not be allowed to concertina.

The unit is not designed to take structural loading. No significant amount of weight should be allowed to rest on the fan outlet flange, deck assemblies or condenser coil module. No more than 1 meter of light construction ductwork should be supported by the unit.

Where cross-winds may occur, any ductwork must be supported to prevent side loading on the unit. If the ducts from two or more fans are to be combined into a common duct, back-flow dampers should be fitted in the individual fan ducts. This will prevent re-circulation of air when only one of the fans is running.

Units are supplied with outlet guards for safety and to prevent damage to the fan blades. If these guards are removed to fit ductwork, adequate alternative precautions must be taken to ensure persons cannot be harmed or put at risk from rotating fan blades.



1 Solid Duct
2 Flexible Duct
3 Fan
4 Fan Guard
5 Backing Ring

Location Clearances

Adequate clearances around the unit(s) are required for the unrestricted air-flow for the air-cooled condenser coils and to prevent re-circulation of warm discharge air back onto the coils. If clearances given are not maintained, air-flow restriction or re-circulation will cause a loss of unit performance, an increase in power consumption, and may cause the unit to malfunction. Consideration should also be given to the possibility of down drafts, caused by adjacent buildings, which may cause re-circulation or uneven unit air-flow.

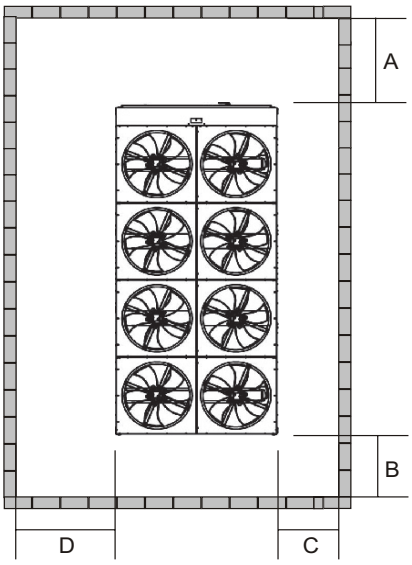
For locations where significant cross winds are expected, such as exposed roof tops, an enclosure of solid or louvre type is recommended to prevent wind turbulence interfering with the unit air-flow.

When units are installed in an enclosure, the enclosure height should not exceed the height of the unit on more than one side. If the enclosure is of louvred construction, the same requirement of static pressure loss applies as for ducts and attenuators stated above. Where accumulation of snow is likely, additional height must be provided under the unit to ensure normal air-flow to the unit.

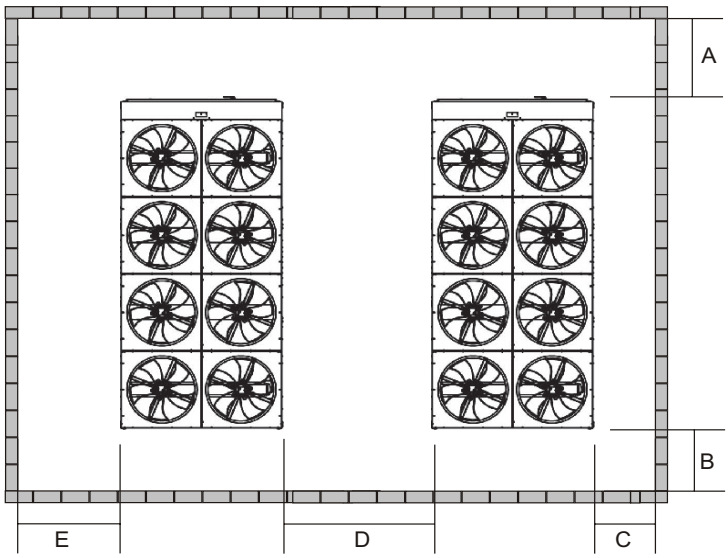
Installation of Vibration Isolators

An optional set of vibration isolators can be supplied loose with each unit.

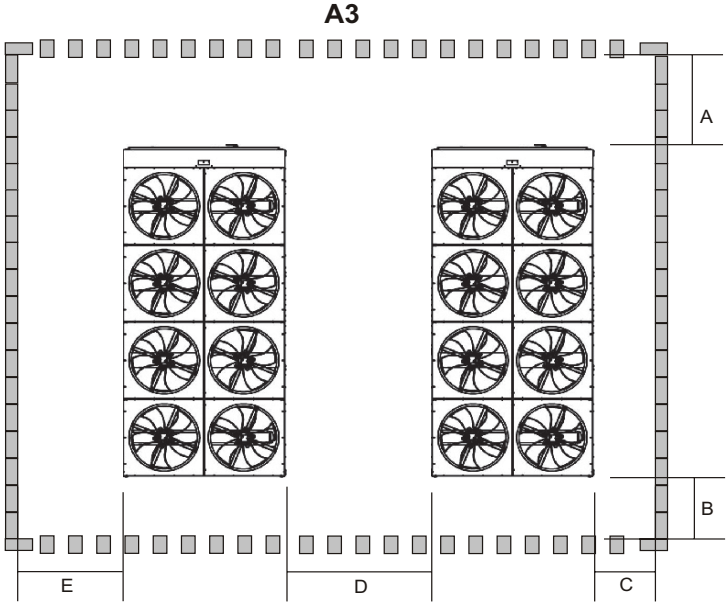
A1



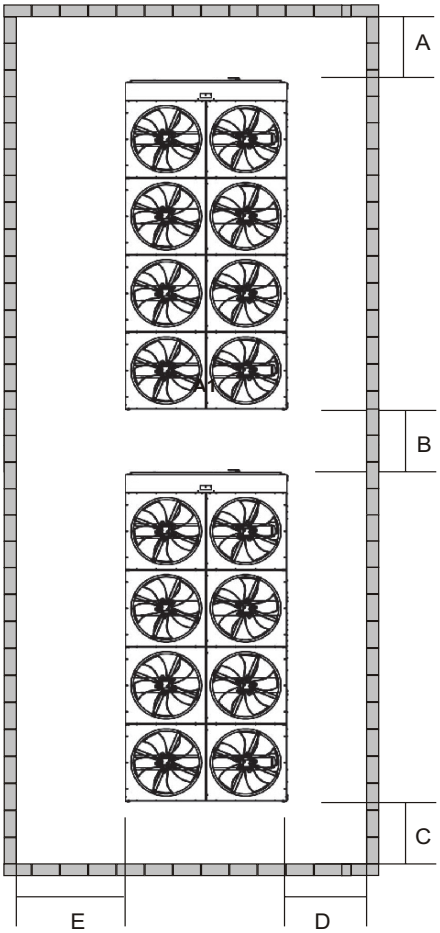
A2



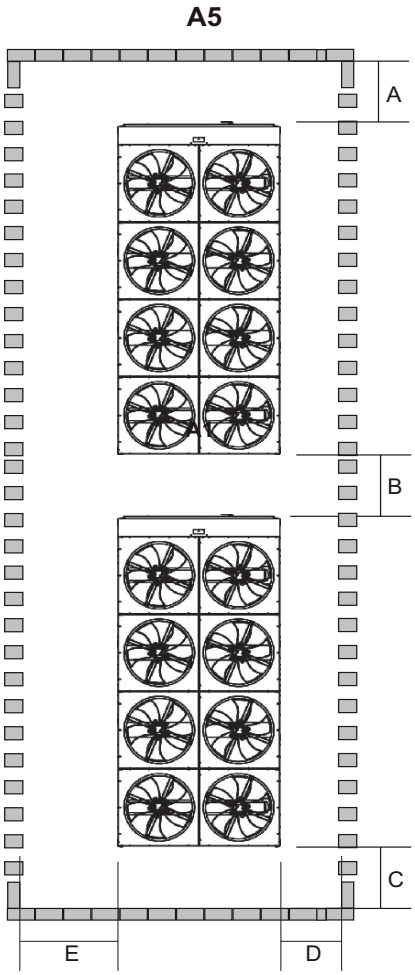
A3



A4



A5



YLAA	Dim. (m)	YLAA-SE			YLAA-SE-LS		
		0180 0210 0240 0285 0320	0360 0400	0435 0485	0180 0210 0240 0285 0320	0360 0400	0435 0485
Arrangement A1 Solid Walls	A	1.2	1.2	1.2	1.2	1.2	1.2
	B	0.8	0.8	0.8	0.8	0.8	0.8
	C	0.8	0.8	0.8	0.8	0.8	0.8
	D	1.4	1.4	1.4	1.4	1.4	1.4
Arrangement A2 Solid Walls	A	1.2	1.2	1.2	1.2	1.2	1.2
	B	0.8	0.8	0.8	0.8	0.8	0.8
	C	0.8	0.8	0.8	0.8	0.8	0.8
	D	1.9	2.2	2.7	1.6	1.9	2.2
	E	1.4	1.4	1.4	1.4	1.4	1.4
Arrangement A3 Louvres on 2 walls	A	1.2	1.2	1.2	1.2	1.2	1.2
	B	0.8	0.8	0.8	0.8	0.8	0.8
	C	0.8	0.8	0.8	0.8	0.8	0.8
	D	1.7	1.8	2.3	1.4	1.7	2
	E	1.4	1.4	1.4	1.4	1.4	1.4
Arrangement A4 Solid Walls	A	1.2	1.2	1.2	1.2	1.2	1.2
	B	1.2	1.2	1.2	1.2	1.2	1.2
	C	0.8	0.8	0.8	0.8	0.8	0.8
	D	1.0	1.3	1.5	1.0	1.0	1.4
	E	1.4	1.4	1.5	1.4	1.4	1.4
Arrangement A5 Louvres on 2 walls	A	1.2	1.2	1.2	1.2	1.2	1.2
	B	1.2	1.2	1.2	1.2	1.2	1.2
	C	0.8	0.8	0.8	0.8	0.8	0.8
	D	0.8	0.8	0.8	0.8	0.8	0.8
	E	1.4	1.4	1.4	1.4	1.4	1.4

YLAA	Dim. (m)	YLAA-HE					YLAA-HE-LS				
		0195 0260	0300	0350 0390	0440	0455 0515	0195 0260	0300	0350 0390	0440	0455 0515
Arrangement A1 Solid Walls	A	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	B	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	C	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	D	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Arrangement A2 Solid Walls	A	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	B	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	C	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	D	1.9	2.2	2.7	2.7	3.0	1.6	1.9	2.2	2.2	2.6
	E	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Arrangement A3 Louvres on 2 walls	A	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	B	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	C	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	D	1.7	1.8	2.3	2.3	2.8	1.4	1.7	2	2	2.2
	E	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Arrangement A4 Solid Walls	A	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	B	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	C	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	D	1.0	1.3	1.5	1.5	1.7	1.0	1.0	1.4	1.4	1.4
	E	1.4	1.4	1.5	1.5	1.7	1.4	1.4	1.4	1.4	1.4
Arrangement A5 Louvres on 2 walls	A	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	B	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	C	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	D	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	E	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4

Pipework Connection

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.

If an optional Hydrokit has not been selected, a flow switch must be installed in the customer pipework at the outlet of the evaporator as shown in the arrangement diagrams, and wired back to the control panel using screened cable. This is to prevent damage to the evaporator caused by inadequate liquid flow. To prevent turbulent flow, there must be straight pipework either side of the flow switch equal in length to at least 5 times the diameter of the pipe.

The flow switches used must have gold plated contacts for low voltage/current operation

Alternatively, a differential pressure switch fitted across an orifice plate may be used, preferably of the high/low limit type.

The liquid pumps installed in the pipework systems should discharge directly into the unit heat exchanger sections of the system. The pumps require an auto-starter (by others) to be wired to the control panel.

Pipework and fittings must be separately supported to prevent any loading on the heat exchanger(s). 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 heat exchanger(s) should be readily demountable to enable cleaning prior to operation, and to facilitate visual inspection of the exchanger nozzles.

Each heat exchanger must be protected by a strainer, preferably of 20 mesh, fitted as close as possible to the liquid inlet connection, and provided with a means of local isolation.

The heat exchanger(s) must not be exposed to flushing velocities or debris released 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 heat exchanger(s) without disrupting flow to other units.

Thermometer and pressure gauge connections should be provided on the inlet and outlet connections of each heat exchanger.

Drain and air vent connections should be provided at all low and high points in the pipework to permit drainage of the system, and to vent any air in the pipes.

Liquid systems at risk of freezing, due to low ambient temperatures, should be protected using insulation and heater tape and/or a suitable glycol solution. The liquid pumps must also be used to ensure liquid is circulated when the ambient temperature approaches freezing point. Insulation should also be installed around the heat exchanger nozzles.

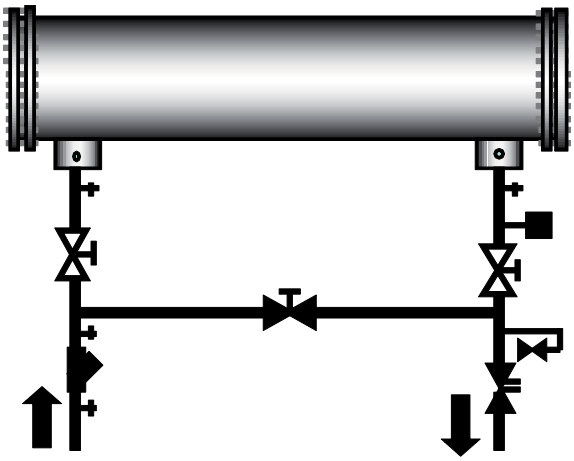
Heater tape of 21 W/m under the insulation is recommended, supplied independantly and controlled by an ambient temperature thermostat set to switch on at approximately 2.2ºC above the freezing temperature of the chilled liquid.

The evaporator is protected by two heater mats placed under the insulation, which are powered from the unit control system power supply. During cold weather when there is a risk of freezing, chiller power should be left switched on to provide the freeze protection function unless the liquid systems have been drained.

Pipework Arrangement

The following are suggested pipework arrangements for single unit installations. For multiple unit installations, each unit should be piped as shown. These are recommendations of the Building Services Research Association.

Chilled Liquid System



Pressure Tapping

Air vent

Flow Switch

Isolating Valve – Normally Open

Isolating Valve – Normally Closed

Flow Regulating Valve

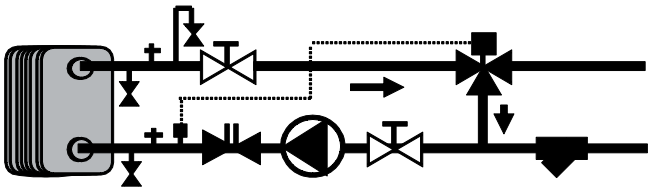
Strainer

Connection Types and Sizes

Standard pipework connections are of the Victaulic groove type.

For connection sizes relevant to individual models refer to the physical data tables in this manual.

Heat Recovery System



- Pressure Tapping
- Air vent
- Drain
- Isolating Valve – Normally Open
- 3 Way Control Valve
- Flow Regulating Valve
- Strainer

Water Treatment

The unit performance given in the Design Guide is based on a fouling factor of 0.018 m² °C/kW . Dirt, scale, grease and certain types of water treatment will adversely affect the heat exchanger surfaces and therefore unit performance. Foreign matter in the water system(s) can increase the pressure drop, reducing the flow rate and causing potential damage.

Aerated, brackish or salt water is not recommended for use in the water systems. JCI recommends that a water treatment specialist be consulted to determine whether the proposed water composition will not affect the heat exchanger materials of carbon steel and copper. The pH value of the water flowing through the unit must be kept between 7 and 8.5.

Refrigerant Relief Valve Piping

The evaporator is protected against internal refrigerant overpressure by refrigerant relief valves. A pressure relief valve is mounted on each of the main refrigerant lines connecting the evaporator to the compressors.

For indoor installations, pressure relief valves should be piped to the exterior of the building.

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. For critical or complex installations refer to EN13136.

Unless otherwise specified by local regulations, the internal diameter depends on the length of pipe required and can be estimated with the following formula:

D5=1.447 x L

Where:

D = minimum pipe internal diameter (cm)

L = length of pipe (m).

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

Electrical Connection

The following 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 control panel should not be run through the control panel. If these precautions are not followed it could lead to a risk of electrocution. In addition, electrical noise could cause malfunctions or damage the unit and its controls.

Power Wiring

These units are suitable for 400 V, 3-phase, 50Hz nominal supplies only.

All electrical wiring should be carried out in accordance with local regulations. Route properly sized cables to the cable entries in the bottom of the power panel.

In accordance with EN 60204 it is the responsibility of the user to install over current protection devices between the supply conductors and the power supply terminals on the unit.

To ensure that no eddy currents are set up in the power panel, the cables forming each 3 phase power supply must enter via the same cable entry.

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

Single Point Power Supply Wiring

All models require one field provided 400 V, 3Ø, 50 Hz + PE (Protected Earth) supply to the unit with circuit protection.

Connect the 3-phase supply to the non-fused disconnect switch located in the power panel using M10 lugs.

Connect the earth wire to the main protective earth terminal located in the power panel.

Control Circuit Transformer

The control circuit transformer (400 V, 2Ø, 50 Hz) providing the 115 V, 1Ø, 50 Hz supply to the unit control system is fitted in a separate enclosure mounted on top of the control panel.

Remote Emergency Stop Device

If required, a remote emergency stop device may be wired into the unit. This device should be rated at 20 A amps, 110 V, AC-15. The device should be wired into terminals L and 5 in the power panel after removing the factory fitted link.

Control Wiring - Voltage Free Contact

All wiring to the voltage free contact terminal block requires a supply provided by the customer maximum voltage 254 Vac, 28 Vdc.

The customer must take particular care deriving the supplies for the voltage free terminals with regard to a common point of isolation. Thus, these circuits when used must be fed via the common point of isolation so the voltage to these circuits is removed when the common point of isolation to the unit is opened. This common point of isolation is not supplied by JCI.

In accordance with EN 60204 it is recommended that the customer wiring to these terminals uses orange wires. This will ensure that circuits not switched off by the units supply disconnecting device are distinguished by colour, so that they can easily be identified as live even when the unit disconnecting devices are off. The YORK voltage free contacts are rated at 125 VA.

All inductive devices (relays) switched by the YORK voltage free contacts must have their coil suppressed using standard RC suppressors. If these precautions are not followed, electrical noise could cause malfunctions or damage to the unit and its controls.

Chilled Liquid Pump Starter

Terminals 23 and 24 close to start the liquid pump. This contact is closed if there is a 'Leaving Liquid Temperature Cutout' or any of the compressors are running or the daily schedule is not calling for a shutdown with the unit switch on.

The contact must be used to ensure that the pump is running in the event of a 'Leaving Liquid Temperature Cutout'.

The pump contact will not close to run the pump if the unit has been powered up for less than 30 seconds, or if the pump has run in the last 30 seconds, to prevent pump motor overheating.

Run Contacts

Terminals 25 and 26 close to indicate that refrigerant system 1 is running and terminals 27 and 28 close to indicate that refrigerant system 2 is running.

Alarm Contacts

Each refrigerant system has a voltage-free normally open contact that will close when control power is applied to the panel, if no fault conditions are present. When a fault occurs which locks a system out, or there is a power failure the contact opens. To obtain a system alarm signal, connect the alarm circuit to terminals 29 and 30 for No. 1 system and terminals 31 and 32 for No. 2 system.

Control Wiring - System Inputs

All wiring to the control terminal block (nominal 30 Vdc) must be run in screened cable, with the screen earthed at the panel end only. Run screened cable separately from mains cable to avoid electrical noise pick-up.

The voltage free contacts must be suitable for 30 Vdc (gold contacts recommended). If the voltage free contacts form part of a relay or contactor, the coil of the device must be suppressed using a standard RC suppressor. The above precautions must be taken to avoid electrical noise that could cause a malfunction or damage to the unit and its controls.

Flow Switch

A chilled liquid flow switch of suitable type must be connected to terminals 13 and 18 to provide adequate protection against loss of liquid flow.

Remote Start/Stop

Connect a remote switch to terminals 13 and 14 to provide remote start/stop control if required.

Remote Reset of Chilled Liquid Setpoint

The PWM input (terminals 13 and 20) allows reset of the chilled liquid setpoint by supplying a 'timed' contact closure.

Remote Load Limiting

Load limiting prevents the unit from loading beyond a desired value. The unit % load limit depends on the number of compressors on the unit. The load limit inputs to terminals 13 and 21 work in conjunction with the PWM input to terminals 13 and 20.

Fan Full Speed Inhibit

The fan full speed inhibit input is 30 Vdc and the customer voltage free contact and wiring must be suitable for 30 Vdc.

To reduce unit noise the fans can be limited to run at a maximum step of all fans in star (reduced speed) i.e. fan full speed is inhibited. Connect a customer voltage free contact to terminals 13 & 16 in the fan panel. The contact must be rated for 30 Vdc, connecting wiring need to be run in screened cable. When the contact is closed fan full speed inhibit is in effect.

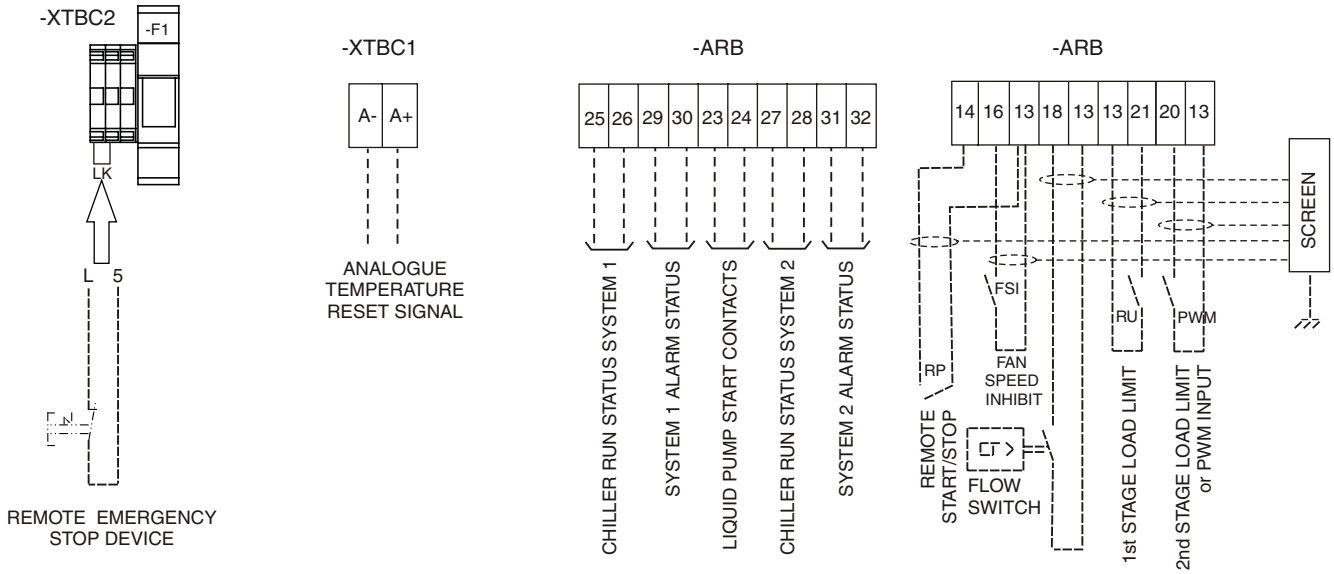
EMS Analogue Input

Provides a means of resetting the leaving chilled liquid temperature from the BAS/EMS. Accepts 4 to 20 mA, 0 to 20 mA, 0 to 10 Vdc or 2-10 Vdc. Connect to terminal A+ and A-. Disabled when using Modbus or BACnet MS/TP communications.

Modbus and BACnet MS/TP

Enable communications with building protocol systems using Modbus or BACnet protocol. Connect through standard RS485 port. Disabled when using EMS Analogue Input.

Connection Diagram



YLAA Customer Controls

5. Commissioning

Preparation

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

The unit On/Off switch beneath the key pad in the electronic section of the control panel has been set to the Off position at the factory. This switch must remain in the Off position, preventing running of the unit until commissioned by Authorised personnel. If the switch has been set to the On position before commissioning then it must be reported to Johnson Controls otherwise the warranty may be invalidated.

Preparation - Power Off

The following checks should be made with the customer supply/supplies to the unit switched OFF.

Inspection: Inspect unit for installation damage. If found take action and/or repair as appropriate.

Refrigerant charge: Units are normally shipped as standard with a full refrigerant operating charge. Check that refrigerant pressure is present in both systems and that no leaks are apparent. If no pressure is present a leak test must be undertaken, the leak(s) located and repaired. Repaired systems must be evacuated with a suitable vacuum pump/recovery unit as appropriate to below 100 microns before charging.

Do not charge liquid refrigerant with static water in the evaporator. Care must also be taken to charge liquid refrigerant slowly to avoid excessive thermal stress at the charging point.

Once the vacuum is broken, charge with the full operating charge as given in Technical Data section.

Liquid sub-cooling measured at the liquid line should be between 8.5 ºC and 11 ºC at circuit full load. Subcooling is determined by the level of refrigerant charge in each system.

Valves: Ensure that the compressor discharge and suction service valves are set correctly (OPEN).

Compressor oil: The oil level in multiple scroll compressors (piped in parallel) must be checked directly after all compressors are shut down and have been allowed time to stabilise.

The oil level must be between the bottom and middle of the oil sight glass mounted in the oil equalising line between the compressors.

Fans: Check that all fans are free to rotate and are not damaged. Ensure blades are at the same height when rotated. Ensure fan guard is securely fixed.

Isolation/protection: Verify that all sources of electrical supply to the unit are taken from a point of isolation.

Control panel: Check the panel to see that it is free of foreign materials (wire, metal chips, etc.) and clean out if required.

Power connections: Check the customer power cables are connected correctly. Ensure that connections of power cables within the power panel to the non-fused switch disconnects are tight.

Earthing: Verify that the unit earth terminal is properly connected to a suitable earthing point. Ensure that all unit internal earth connections are tight.

Supply voltage: Verify that the site voltage supply corresponds to the unit requirement and is within the limits given in the Technical Data Section. The phase imbalance should less than 2% of the average voltage.

Soft Start (Option)

Due to vibration during transport the soft starter internal bypass contactor may be in a undefined state. If the following procedure is not followed this may result in the compressor momentarily starting when the unit power is first turned on.

During commissioning or if the soft start is replaced the following procedure MUST BE PERFORMED.

- With the unit switch and unit switch disconnect set to OFF to isolate the unit, remove the fuses from the compressors fitted with a soft starter.
- Turn ON the unit switch disconnect to turn on the unit supply and thus apply control circuit voltage to soft starter terminals A1 and A2.
- Turn OFF the unit disconnect switch and refit the compressor fuses.

Switch Settings: Ensure that the unit On/Off toggle switch beneath the key pad in the electronic section of the control panel is set to OFF. Set the non-fused disconnect switch to ON. The customers disconnection devices can now be set to ON.

The machine is now live!

Crankcase Heaters: Verify the heaters are energised.

Depending upon the ambient temperature the crankcase heaters must be on for 12 to 24 hours before start-up.

Water System: Verify that the chilled liquid system has been installed correctly, and has been commissioned with the correct direction of water flow through the evaporator. Inlet should be at the refrigerant pipework connection end of the evaporator. Purge air from the evaporator using the air vent mounted in the pipework.

Flow rates and pressure drops must be within the limits given in the Technical Data Section. Operation outside of these limits is undesirable and could cause damage.

Flow switch: Verify a chilled liquid flow switch is correctly fitted in the customer's pipework on the cooler outlet, and wired into the control panel correctly.

Temperature sensor(s): Ensure the leaving (-BLCT) and entering (-BECT) liquid temperature sensors are coated with heat conductive compound (Part No. 013-00989-000) and are inserted in the water inlet and outlet sensor pockets of the cooler.

Control supply: Verify the control panel display is illuminated.

HP cut-out reset: Check that the hand reset mechanical high pressure cut-outs mounted on the discharge lines are at the correct setting and are reset.

Programmed options: Verify that the options factory programmed into the Microprocessor Control Centre are in accordance with the customers order requirements by pressing the 'OPTIONS' key on the keypad and reading the settings from the display. Refer also to the Operating Instructions Manual for notes and explanation of messages.

Programmed settings: Ensure the system cut-out and operational settings are in accordance with operational requirements by pressing the 'PROGRAM' key (refer to Operating Instructions Manual).

Date & time: Press the 'CLOCK' key and set the date and time (refer to Operating Instructions Manual).

Start/Stop schedule: Programme the daily and holiday start/stop by pressing the 'SCHEDULE/ADVANCE DAY' key (refer to Operating Instructions Manual).

Setpoints: Set the required leaving chilled liquid temperature set-point and control range using the 'COOLING SETPOINTS' key (refer to Operating Instructions Manual).

Compressor Operation: Use the 'OPTIONS' key to switch off each refrigerant system in turn (refer to Operating Instructions Manual) and then check the compressors on the active system:

Connect a manifold gauge to each refrigerant circuit suction and discharge service valves and temporarily start each compressor and check that the discharge pressure rises and the suction pressure decreases to ensure that the compressors are operating in the correct direction. Any faults found must be corrected before starting the unit.

After completing the checks on both circuits, set both systems to on using the 'OPTIONS' key.

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.

Read the following section in conjunction with the Operating Instructions Manual, then proceed step by step as follows:

Interlocks: Verify that liquid is flowing through the evaporator and that heat load is present. Ensure that any remote run interlocks are in the run position and that the run schedule requires the unit to run or is overridden.

Start-up: Set the unit switch to the ON position to start the unit (there may be a few seconds delay before the first compressor starts because of the anti-recycle timer). Be ready when each compressor starts, to switch the unit off immediately if any unusual noises or other adverse conditions develop. Refer to the Technical Data Section for the normal operating sequence from start-up.

Refrigerant flow: When a compressor starts a flow of liquid refrigerant will be seen in the liquid line sight glass. After several minutes operation and providing a full charge of refrigerant is in the system, the bubbles will disappear and be replaced by a solid column of liquid. Check that the moisture indicator is satisfactory (Green).

System Operation: Use the 'OPER DATA' key to check the system pressures and temperatures.

Suction Superheat: Check suction superheat at steady full system load only. It is important that no bubbles show in the liquid line sight glass. Measure suction temperature on the copper line about 150 mm before the compressor suction service valve. Measure suction pressure at the compressor service valve. Superheat should be 7ºC to 10ºC relative to the 'dew' temperature.

Thermal Expansion valve adjustment: The expansion valves are factory set and should not need adjustment. If any superheat values are out of range, however, the expansion valve adjusting screw should be adjusted no more than 1 turn at a time ('in' to increase superheat, 'out' to decrease superheat), allowing at least 10 minutes for the valve to stabilise before rechecking the value of superheat.

Subcooling: Check liquid subcooling at steady full compressor load only. Measure liquid line temperature on the copper line beside the main liquid line service valve. Measure liquid pressure at the liquid line service valve. Subcooling should be 8.5 ºC to 11 ºC relative to the 'bubble' temperature. If subcooling is out of range add or remove refrigerant as required. Do not overcharge the unit.

General operation: After completion of the above checks for System 1 repeat the process for system 2. In addition, check that loading occurs as specified in the Technical Data Section and that general operation is correct.

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6. Unit Operation

General Description

The units are designed to work independently, or in conjunction with other equipment via a Johnson Controls building management system or other automated control system. When operating, the unit controls monitor the chilled liquid system temperatures at the unit and take the appropriate action to maintain the temperatures within desired limits. This action will involve running one or more compressors to match the cooling effect of the refrigerating systems to the heat load on the liquid system. The heat removed from the chilled liquid is then rejected from the air cooled condenser coils.

The following sections give an overview of the operation of the unit. For detailed information, reference should be made to the Operating Instructions for the unit.

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 chilled liquid flow has been established (unless the unit chilled liquid pump start control is being used, in which case just ensure the pump supply is on). Ensure that the system switches under the 'OPTIONS' key are in the 'ON' position.

Press the 'STATUS' key on the keypad and then switch the unit 'ON/OFF' switch below the keypad to the 'ON' position.

The controller will perform a pre-check to ensure that the daily/holiday schedule and any remote interlocks will allow the unit to run, all safety cut-outs are satisfied and that cooling 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 present. If no problems are present and cooling duty is required the lead compressor will start. The display will show the anti-coincidence timer status for the lag compressor.

Normal running and cycling

Once the unit has been started, all operations are fully automatic. After an initial period of operation with the lead compressor, the control system will adjust the unit load depending on the chilled liquid temperature and rate of temperature change. If high heat load is present, the controller will increase the capacity of the unit and start-up the next compressor.

If very little heat load is present, the lead compressor may continue to operate or may simply stop again to avoid overcooling the liquid. If the latter is the case, one compressor will restart automatically should the liquid temperature rise again.

When a compressor is running the controller monitors suction pressure, motor current, and various other system parameters such as discharge pressure, chilled liquid temperature, etc. Should any problems occur, the control system will immediately take appropriate action and display the nature of the fault (see Operating Instructions Manual).

Shutdown

The unit can be stopped at any time by switching the unit 'ON/OFF' switch just below the keypad to the 'OFF' position. Under normal conditions use the 'OPTIONS' key to switch off each refrigerant system in turn (refer to Operating Instructions Manual), to ensure a pumpdown is completed before each system stops. The compressor heaters will energise to prevent refrigerant condensing in the compressor rotors and to prevent the compressor oil becoming saturated with refrigerant.

To prevent damage to the unit the control supply to the compressor heaters should not be switched off, even when the unit is not required to run.

If mains power must be switched off, (for extended maintenance or a shutdown period), the compressor suction, discharge and liquid line service valves on both systems should be closed (clockwise) and if there is a possibility of liquid freezing due to low ambient temperatures, the cooler and condenser should be drained. The valves should be opened, the cooler and condenser refilled and the power must be switched on for at least 8 hours before the unit is restarted.

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7. Maintenance

General Requirements

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

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

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. This section should be read in conjunction with the Unit Operation Section.

Daily Maintenance

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

Unit status: Press the 'STATUS' key on the keypad and ensure no fault messages are displayed (refer to the Operating Instruction Manual for explanation of messages and the Trouble Shooting section for courses of action).

Operating conditions: Read the operating pressures and temperatures at the control panel using the 'OPER DATA' key and check that these are within the operating limitations given in the Operating Instructions Manual.

Refrigerant leaks: Visually check the cooler, air cooled condensers, compressors and pipework for damage and gas leaks.

Condenser Fan Motors: The fan motors are permanently lubricated and require no maintenance.

Airflow obstructions: Check the air cooled condenser coil intakes and adjacent areas are clear of foreign materials or obstructions e.g. paper, leaves, etc.

Compressor oil level: Check the compressor oil level when the compressor is operating normally. The oil level should be between the ½ and ¾ in the oil sight glass.

At shutdown the oil level can fall to the lower limit of the oil sight glass.

Compressor Oil Quality: The oil used in the compressors is pale in colour. If the oil colour darkens or exhibits a change in colour, this may be an indication of contaminants in the refrigerant system. If this occurs, an oil sample should be taken and analysed. If contaminants are present, the system must be cleaned to prevent compressor failure.

Refrigerant Charge: When a system starts up, or sometimes after a change of capacity, a flow of bubbles will be seen in the liquid line sight glass. After a few minutes of stable operation, the bubbles should clear leaving just liquid refrigerant showing in the sight glass.

In addition to the checks listed above, periodic inspections of the unit should be carried out to ensure proper equipment operation. Items such as loose equipment, component operation, unusual noises, etc. should be investigated and corrected immediately.

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 Johnson Controls Service Centre is contacted for recommendations for individual sites.

SERVICE SCHEDULE	MINOR SERVICE	MAJOR SERVICE All items under Minor Service plus:
Unit general:	Check thermal insulation. Check vibration isolators.	Check main structure. Check paint-work.
Refrigerant systems general:	Check relief valves. Check for pipework damage. Check for leaks. Check moisture indicator. Check suction superheat. Check liquid subcooling.	Check solenoid valves.
Compressors:	Check oil level. Check condition of oil.	
Evaporator:	Check water flow. Check water pressure drop. Check heater mats.	Check water pH / glycol strength.
Air cooled condensers:	Check for airflow obstructions. Check fins. Check fans and fan guards.	Brush fins. Check fan motor bearings.
Power & Control system general:	Check panel condition. Check mains and control wiring. Check sensor locations. Check mechanical HP cut-outs.	Check all connections. Check compressor contactors. Check fan contactors / overloads. Check sensor / transducer calibration. Check motor protectors. Check contactor contacts.
Microprocessor controls:	Check fault history. Check program settings. Check HP / LP cut-out function's. Check pump-down function. Check load / unload function.	Check fan control function. Check ambient cut-out function.

Evaporator In-Service Inspection

There is no corrosion on the refrigerant side therefore in-service inspection on the refrigerant side is not necessary.

For the water side, if the water used is treated in accordance with Section 4, in-service inspection is not necessary. In the design of the vessels used in the unit, a 1 mm corrosion allowance has been used to consider slight corrosion on the water side. This allowance is sufficient to cover the lifetime of the unit.

Johnson Controls believes that periodic in service proof testing (e.g.; hydro tests) is not required. However, Johnson Controls recognises that national regulations may require such testing to be conducted.

8. Trouble Shooting

Competent Persons Trouble Shooting Guide

PROBLEM	POSSIBLE CAUSE	ACTION
No display on panel — Unit will not operate	Mains supply to unit off.	Switch on mains supply if safe to do so.
	Emergency stop device off.	Check if remote emergency stop device is in the 'OFF' position. Turn to 'ON' position if safe to do so.
	No supply to -T1.	Check wiring to -T1 and fuse -F1.
	No 24 Vac supply to microprocessor board.	Check wiring from -T1 to J14 microprocessor board.
	No 24 Vac output from Transformer -T1.	Change transformer -T1
	Short circuit in wiring to temperature sensors or pressure transducers.	Unplug connections at microprocessor board to isolate.
	Defective microprocessor board or display board.	Replace board after contacting Johnson Controls Service.
FLOW SWITCH OPEN displayed	No liquid flow through the cooler.	Ensure that liquid pumps are running. Valves are correctly set and flow is established.
	Flow switch contacts are not made.	Check the flow switch is functional and is installed according to the manufacturers instructions. Note: On some systems the pump starter may be wired to the unit and controlled to start by the unit.
	Defective flow switch.	Replace flow switch.
UNIT FAULT: LOW AMBIENT TEMP displayed	Ambient air temperature is lower than the programmed operating limit.	Use the 'OPER DATA' key to display the temperature and confirm that the displayed value is approximately correct. The warning message should clear when the ambient air temperature reaches the programmed operating limit.
		Check the programmed settings are correct for the options fitted to the unit.
	Measured temperature is incorrect.	Check sensor calibration, location and wiring.
UNIT FAULT: LOW LIQUID TEMP displayed	Improperly adjusted leaving chilled liquid temperature cut-out (glycol only).	Re-program the leaving chilled liquid temperature cut-out.
	Control panel setpoint/range values improperly programmed.	Re-adjust setpoint/range.
	Chilled liquid flow too low.	Increase chilled liquid flow.
	Defective -BLCT or -BECT sensor. (Check the sensor is properly installed in the bottom of the well with a generous amount of heat conductive compound).	Compare sensor against a known good temperature sensing device. Refer to sensor calibration tables.
UNIT FAULT: 115 VAC UNDERVOLTAGE displayed	Poor mains supply voltage.	Check mains supply is stable and within allowable limits. Check for voltage dip on compressor

PROBLEM	POSSIBLE CAUSE	ACTION
SYS X HIGH DSCH PRES displayed	Discharge pressure cut-out incorrectly set.	Adjust in accordance with recommended setting.
	Poor Airflow through the condenser coils	Check for airflow restrictions caused by blockages on intake faces of air coils. Check fir damaged fins.
	Condenser fans not operating or operating backwards	Check fan motor, fuses and contactors. Check fan airflow is upward.
	Air in refrigerant system.	Check for non-condensables (air) in system. Evacuate and recharge system.
	Excessive refrigerant charge.	Remove refrigerant.
	Measured pressure is incorrect.	Check discharge transducer calibration and wiring.
SYS X LOW SUCT PRESS displayed	Suction pressure cut-out incorrectly set.	Adjust in accordance with recommended setting.
	Faulty expansion valve.	Replace valve
	Reduced cooler performance.	Check for restricted chilled liquid flow. Check for fouled tube surfaces.
	Low refrigerant charge.	Check for leaks.
	Restricted refrigerant flow.	Check for blocked filter/drier. Check -YLLSV is operating correctly Check for moisture in the system.
	Measured pressure incorrect.	Check suction pressure transducer calibration/pressure switch and wiring.
SYS X MP/HPCO FAULT displayed	Compressor internal motor protector (MP) open.	Verify refrigerant charge is not low. Verify superheat setting of 5.6° - 8.3°C. Verify correct compressor rotation. Verify compressor is not over loaded.
	External overload tripped.	Determine cause and reset.
	-FHP switch open.	See 'High Discharge Pressure Fault'.
	Defective -FHP switch.	Replace -FHP switch.
Compressor(s) do not start	Demand not sufficient.	No problem.
	Defective water temperature sensor.	Compare the display with a thermometer. Should be within +/- 2 degrees. Refer to BECT/ BLCT calibration charts.
	Contactor/Overload failure.	Replace defective part.
	Compressor failure.	Diagnose cause of failure and replace.
Lack of cooling effect	Fouled cooler surface. (Low suction pressure will be observed).	Contact the local Johnson Controls service representative.
	Improper flow through the cooler	Reduce flow to within unit design specification.
	Low refrigerant charge. (Low suction pressure will be observed).	Check subcooling and add charge as needed. Check for leaks.
!! LOW BATTERY !! CHECK PROG / SETP / OPTN displayed	RTC battery (U5) flat.	Replace U5 and reprogram setpoints, values, options, time and schedule.

Sensor Calibration Charts

Chilled Liquid Temperature Sensors (-BLCT & -BECT)

Temperature °C	Resistance ohms	Microboard Voltage Vdc	Sensor Voltage Vdc
-8	14896	1.57	3.43
-6	13388	1.69	3.31
-4	12047	1.81	3.19
-2	10856	1.93	3.07
0	9795	2.05	2.95
2	8849	2.17	2.83
4	8005	2.30	2.70
6	7251	2.42	2.58
8	6575	2.54	2.46
10	5970	2.66	2.34
12	5427	2.78	2.22
14	4937	2.90	2.10

Red wire = 5 V, Black wire = Signal

Test points :

Leaving Liquid Temperature (-BLCT)

Sensor Voltage Input 5V -AMB J6-4/1
Microboard Voltage Input 0V -AMB J6-7/1

Entering Liquid Temperature (-BECT)

Sensor Voltage Input 5V -AMB J6-5/2
Microboard Voltage Input 0V -AMB J6-8/2

Ambient Air Temperature Sensor (-BAMB)

Temperature °C	Resistance ohms	Microboard Voltage Vdc	Sensor Voltage Vdc
-18	85398	0.67	4.33
-15	72950	0.77	4.23
-10	55330	0.97	4.03
-5	42227	1.20	3.80
0	32650	1.45	3.55
5	25390	1.72	3.28
10	19900	2.00	3.00
15	15710	2.29	2.71
20	12490	2.58	2.42
25	10000	2.85	2.15
30	8057	3.11	1.89
35	6530	3.35	1.65
40	5327	3.57	1.43

Red wire = Signal, Black wire = 5 V

Test points :

Ambient Air (-BAMB)

Sensor Voltage Input 5V -AMB J6-6/3
Microboard Voltage Input 0V -AMB J6-9/3

Discharge and Suction Pressure Transducers (-BDP & -BSP)

-BSP 0 - 27.58 Barg		-BDP 0 - 44.83Barg	
Pressure Barg	Volts Vdc	Pressure Barg	Volts Vdc
0.00	0.50	0.00	0.50
3.00	0.94	4.00	0.86
6.00	1.37	8.00	1.21
9.00	1.81	12.00	1.57
12.00	2.24	16.00	1.93
15.00	2.68	20.00	2.28
18.00	3.11	28.00	3.00
21.00	3.55	32.00	3.36
24.00	3.98	36.00	3.71
27.58	4.50	42.00	4.25
		44.83	4.50
		3.35	1.65
		3.57	1.43

Red wire = Signal, Black wire = 5 V

Test points :

Discharge Pressure (-BDP) 44.83 barg Transducer:

Refrigerant Circuit 1 -AMB J7-11/7
Refrigerant Circuit 2 -AMB J9-11/7

Voltage = (Pressure (barg) X 0.0892) + 0.5

Suction Pressure (-BSP) 27.58 barg Transducer:

Refrigerant Circuit 1 -AMB J7-10/9
Refrigerant Circuit 2 -AMB J9-10/9

Voltage = (Pressure (barg) X 0.145) + 0.5

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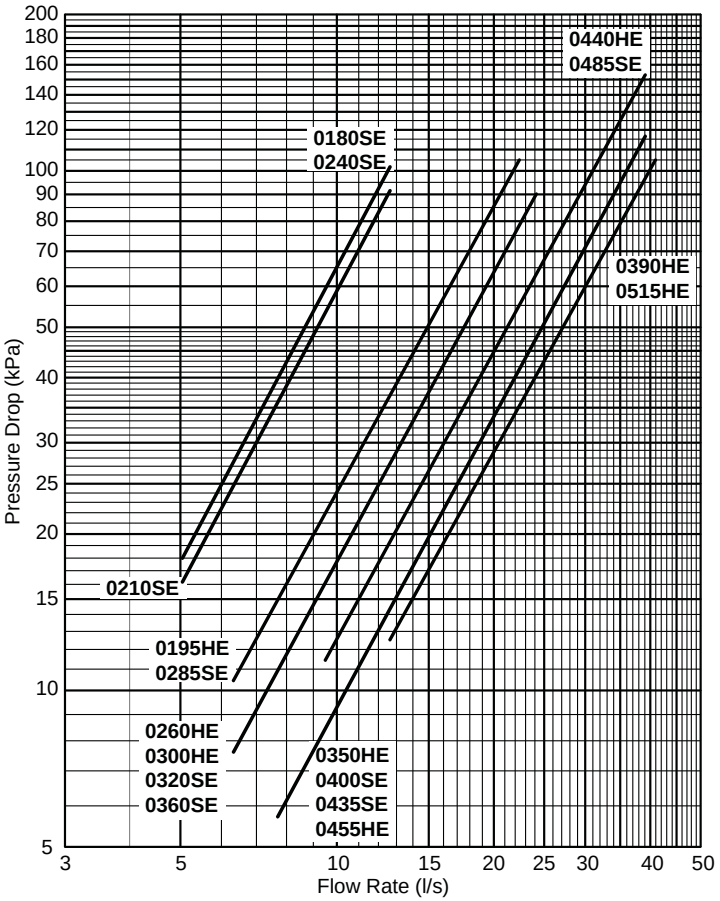
9. Technical Data

Evaporator pressure drop graph



Operating Limitations - SE Models

YLAA SE			0180		0210		0240		0285		0320	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid Outlet Temperature (Water)	°C	5 to 15									
	Liquid Outlet Temperature (Glycol)	°C	-1 to 15									
	Liquid Outlet Temperature Range	°C	3 to 8									
	Evaporator Flow Rate	l/s	5.0	12.6	5.0	12.6	5.0	12.6	6.3	22.4	6.3	24.3
	Evaporator Pressure Drop	kPa	18	103	16	92	18	103	10	105	8	91
	Maximum Water Side Pressure	bar	10									
Ambient Air	Air Temperature - Standard Unit	°C	-1 to 46 *									
	Air Temperature - Unit with Low Ambient Kit	°C	-18 to 46 *									
Maximum Refrigerant Side Pressure		bar	38.6									
Power Supply Voltage 400V, 3~, 50Hz (nominal)		V	360 to 440									

YLAA SE			0360		0400		0435		0485	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid Outlet Temperature (Water)	°C	5 to 15							
	Liquid Outlet Temperature (Glycol)	°C	-1 to 15							
	Liquid Outlet Temperature Range	°C	3 to 8							
	Evaporator Flow Rate	l/s	6.3	24.3	7.6	39.4	7.6	39.4	9.5	39.4
	Evaporator Pressure Drop	kPa	8	91	6	118	6	118	11	154
	Maximum Water Side Pressure	bar	10							
Ambient Air	Air Temperature - Standard Unit	°C	-1 to 46 *							
	Air Temperature - Unit with Low Ambient Kit	°C	-18 to 46 *							
Maximum Refrigerant Side Pressure		bar	38.6							
Power Supply Voltage 400V, 3~, 50Hz (nominal)		V	360 to 440							

*: Unit may operate unloaded up to 52ºC depending on model size and site conditions.

Operating Limitations - HE Models

YLAA HE			0195		0260		0300		0350	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid Outlet Temperature (Water)	°C	5 to 15							
	Liquid Outlet Temperature (Glycol)	°C	-1 to 15							
	Liquid Outlet Temperature Range	°C	3 to 8							
	Evaporator Flow Rate	L/s	6.3	22.4	6.3	24.3	6.3	24.3	7.6	39.4
	Evaporator Pressure Drop	kPa	10	105	8	91	8	91	6	118
	Maximum Water Side Pressure	bar	10							
Ambient Air	Air Temperature - Standard Unit	°C	-1 to 46 *							
	Air Temperature - Unit with Low Ambient Kit	°C	-18 to 46 *							
Maximum Refrigerant Side Pressure		bar	38.6							
Power Supply Voltage 400V, 3~, 50Hz (nominal)		V	360 to 440							

YLAA HE			0390		0440		0455		0515	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid Outlet Temperature (Water)	°C	5 to 15							
	Liquid Outlet Temperature (Glycol)	°C	-1 to 15							
	Liquid Outlet Temperature Range	°C	3 to 8							
	Evaporator Flow Rate	L/s	12.6	41.0	9.5	39.4	7.6	39.4	12.6	41.0
	Evaporator Pressure Drop	kPa	13	105	11	154	6	118	13	105
	Maximum Water Side Pressure	bar	10							
Ambient Air	Air Temperature - Standard Unit	°C	-1 to 46 *							
	Air Temperature - Unit with Low Ambient Kit	°C	-18 to 46 *							
Maximum Refrigerant Side Pressure		bar	38.6							
Power Supply Voltage 400V, 3~, 50Hz (nominal)		V	360 to 440							

*: Unit may operate unloaded up to 52ºC depending on model size and site conditions.

Fan Power Data

Values for fans used on system 2 on YLAA0180SE, YLAA0210SE and YLAA0195HE

Standard			Low Noise			Two Speed						High Head		
kW	FLA @400V	LRA @400V	kW	FLA @400V	LRA @400V	Slow			Fast			kW	FLA @400V	LRA @400V
						kW	FLA @400V	LRA @400V	kW	FLA @400V	LRA @400V			
0.9	2.8	9.6	0.6	1.3	4.6	0.6	1.3	4.6	0.9	2.8	9.6	1.9	3.4	11.9

Values are for each fan. (**FLA**: Full Load Amps; **LRA**: Lock Rotor Amps)

Values for fans used on all other models and on system 1 on YLAA0180SE, YLAA0210SE and YLAA0195HE

Standard			Low Noise			Two Speed						High Head		
kW	FLA @400V	LRA @400V	kW	FLA @400V	LRA @400V	Slow			Fast			kW	FLA @400V	LRA @400V
						kW	FLA @400V	LRA @400V	kW	FLA @400V	LRA @400V			
1.7	3.8	18.5	1.2	2.2	6.0	1.2	2.2	6.0	1.7	3.8	18.5	2.6	4.0	20.0

Values are for each fan. (**FLA**: Full Load Amps; **LRA**: Lock Rotor Amps)

Physical Data - SE Models

YLAA - SE			0180SE	0210SE	0240SE	0285SE	0320SE
Number of refrigerant circuits			2				
Refrigerant Charge (1)	Circuit 1 / Circuit 2	kg	21 / 15	25 / 15	24 / 23	26 / 24	26 / 26
Oil Charge	Circuit 1 / Circuit 2	L	12 / 6	12 / 6	10 / 10	11 / 10	11 / 11
Compressor	Number of compressors		3 / 2	2 / 2	2 / 2	2 / 2	2 / 2
	Type		Scroll				
Evaporator	Number		1				
	Type		Plate Heat Exchanger			Shell and Tubes	
	Water Volume	L	10	10	10	185	193
	Water Connections	Inch	2.5	2.5	2.5	6	6
Air Cooled Condenser	Total Coil Face Area	m^2	7.4	7.4	10.0	10.0	10.0
Condenser Fans	Number of Fans (circuit 1 / circuit 2)		2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
	Total Air Flow - Standard Models	m^3/s	19.5	19.5	26	26	26
	Total Air Flow - LS Models	m^3/s	16.5	16.5	22	22	22
	Dual Speed Fans - High Speed Air Flow	m^3/s	19.5	19.5	26	26	26
	Dual Speed Fans - Low Speed Air Flow	m^3/s	16.5	16.5	22	22	22
Dimensions	Length	mm	2911	2911	2911	2911	2911
	Width	mm	2242	2242	2242	2242	2242
	Height	mm	2508	2508	2508	2508	2508
Basic Unit Weight	Shipping Weight	kg	1705	1739	1838	2183	2274
	Operating Weight	kg	1715	1749	1848	2367	2469
Additional Weight	Heat Recovery Models	kg	136	136	136	136	136
	Hydrokit - Single Pump / Motor - Maximum	kg	267	267	267	267	267
	Hydrokit - Dual Pump / Motor - Maximum	kg	439	439	439	439	439
	Unit Louvred Panels	kg	227	227	227	227	227
	Low Sound Units	kg	156	156	156	156	156

YLAA - SE			0360SE	0400SE	0435SE	0485SE
Number of refrigerant circuits			2			
Refrigerant Charge (1)	Circuit 1 / Circuit 2	kg	30 / 24	31 / 27	31 / 29	32 / 30
Oil Charge	Circuit 1 / Circuit 2	L	17 / 12	17 / 11	17 / 20	17 / 17
Compressor	Number of compressors		3 / 3	3 / 2	3 / 3	3 / 3
	Type		Scroll			
Evaporator	Number		1			
	Type		Shell and Tubes			
	Water Volume	L	193	208	208	250
	Water Connections	Inch	6	8	8	8
Air Cooled Condenser	Total Coil Face Area	m^2	12.6	12.6	15.0	15.0
Condenser Fans	Number of Fans (circuit 1 / circuit 2)		3 / 2	3 / 2	3 / 3	3 / 3
	Total Air Flow - Standard Models	m^3/s	32.5	32.5	39	39
	Total Air Flow - LS Models	m^3/s	27.5	27.5	33	33
	Dual Speed Fans - High Speed Air Flow	m^3/s	32.5	32.5	39	39
	Dual Speed Fans - Low Speed Air Flow	m^3/s	27.5	27.5	33	33
Dimensions	Length	mm	3690	3690	3690	3690
	Width	mm	2242	2242	2242	2242
	Height	mm	2508	2508	2508	2508
Basic Unit Weight	Shipping Weight	kg	3060	3131	2901	3039
	Operating Weight	kg	3254	3339	3108	3290
Additional Weight	Heat Recovery Models	kg	136	136	136	136
	Hydrokit - Single Pump / Motor - Maximum	kg	267	267	267	267
	Hydrokit - Dual Pump / Motor - Maximum	kg	439	439	439	439
	Unit Louvred Panels	kg	266	266	266	266
	Low Sound Units	kg	195	195	195	195

(1) Liquid sub-cooling measured at the liquid line should be between 8.5 and 11.0ºC at circuit full load.
Sub-cooling is determined by the level of refrigerant charge in each system

Physical Data - HE Models

YLAA - HE			0195HE	260HE	0300HE	0350HE
Number of refrigerant circuits			2			
Refrigerant Charge (1)	Circuit 1 / Circuit 2	kg	22 / 15	24 / 24	28 / 24	29 / 27
Oil Charge	Circuit 1 / Circuit 2	L	12 / 6	10 / 10	11 / 10	11 / 11
Compressor	Number of compressors		3 / 2	2 / 2	2 / 2	2 / 2
	Type		Scroll			
Evaporator	Number		1			
	Type		Shell and Tubes			
	Water Volume	L	185	193	193	208
	Water Connections	Inch	6	6	6	8
Air Cooled Condenser	Total Coil Face Area	m^2	10.0	10.0	12.6	15.1
Condenser Fans	Number of Fans (circuit 1 / circuit 2)		2 / 2	2 / 2	3 / 2	3 / 3
	Total Air Flow - Standard Models	m^3/s	26	26	32.5	39
	Total Air Flow - LS Models	m^3/s	22	22	27.5	33
	Dual Speed Fans - High Speed Air Flow	m^3/s	26	26	32.5	39
	Dual Speed Fans - Low Speed Air Flow	m^3/s	22	22	27.5	33
Dimensions	Length	mm	2911	2911	3690	3690
	Width	mm	2242	2242	2242	2242
	Height	mm	2508	2508	2508	2508
Basic Unit Weight	Shipping Weight	kg	1980	2134	2847	2597
	Operating Weight	kg	2165	2328	3041	2805
Additional Weight	Heat Recovery Models	kg	136	136	136	136
	Hydrokit - Single Pump / Motor - Maximum	kg	253	253	253	253
	Hydrokit - Dual Pump / Motor - Maximum	kg	439	439	439	439
	Unit Louvred Panels	kg	227	227	266	266
	Low Sound Units	kg	156	156	195	195

YLAA - HE			0390HE	0440HE	0455HE	0515HE
Number of refrigerant circuits			2			
Refrigerant Charge (1)	Circuit 1 / Circuit 2	kg	33 / 28	38 / 28	37 / 35	39 / 39
Oil Charge	Circuit 1 / Circuit 2	L	17 / 10	17 / 11	17 / 20	17 / 17
Compressor	Number of compressors		3 / 2	3 / 2	3 / 3	3 / 3
	Type		Scroll			
Evaporator	Number		1			
	Type		Shell and Tubes			
	Water Volume	L	293	250	208	293
	Water Connections	Inch	8	8	8	8
Air Cooled Condenser	Total Coil Face Area	m^2	15.1	17.6	20.1	20.1
Condenser Fans	Number of Fans (circuit 1 / circuit 2)		3 / 3	4 / 3	4 / 4	4 / 4
	Total Air Flow - Standard Models	m^3/s	39	45.5	52	52
	Total Air Flow - LS Models	m^3/s	33	39	44	44
	Dual Speed Fans - High Speed Air Flow	m^3/s	39	45.5	52	52
	Dual Speed Fans - Low Speed Air Flow	m^3/s	33	39	44	44
Dimensions	Length	mm	3690	4807	4807	4807
	Width	mm	2242	2242	2242	2242
	Height	mm	2508	2508	2508	2508
Basic Unit Weight	Shipping Weight	kg	2859	3583	3695	3900
	Operating Weight	kg	3151	3833	3902	4192
Additional Weight	Heat Recovery Models	kg	136	136	136	136
	Hydrokit - Single Pump / Motor - Maximum	kg	253	253	253	253
	Hydrokit - Dual Pump / Motor - Maximum	kg	439	439	439	439
	Unit Louvred Panels	kg	266	317	317	317
	Low Sound Units	kg	195	195	195	195

(1) Liquid sub-cooling measured at the liquid line should be between 8.5 and 11.0ºC at circuit full load. Sub-cooling is determined by the level of refrigerant charge in each system

Electrical Data SE Models

YLAA	Nominal Running Conditions		Maximum Running Conditions			Start up Amps	
	kW	Amps(1) @ 400 V	kW	Amps(2) @360V	Amps(2) @ 400V	Direct on Line (3)	Optional Soft Start (3&4)
	without Power Factor Correction						
	with Optional Power Factor Correction Fitted						
0180SE	62	113	78	142	135	290	233
	62	104	78	136	127	283	227
0210SE	80	138	98	176	164	414	289
	80	130	98	170	157	409	286
0240SE	79	139	104	185	175	418	259
	79	131	104	180	168	412	255
0285SE	105	178	122	216	202	450	325
	105	171	122	211	195	444	321
0320SE	125	208	140	247	230	480	355
	125	201	140	241	223	474	351
0360SE	134	229	155	274	258	501	376
	134	218	155	267	248	492	369
0400SE	156	260	175	309	287	532	407
	156	250	175	301	278	524	401
0435SE	180	301	186	330	311	573	448
	180	286	186	319	296	560	438
0485SE	186	311	210	371	345	583	458
	186	299	210	362	334	573	450

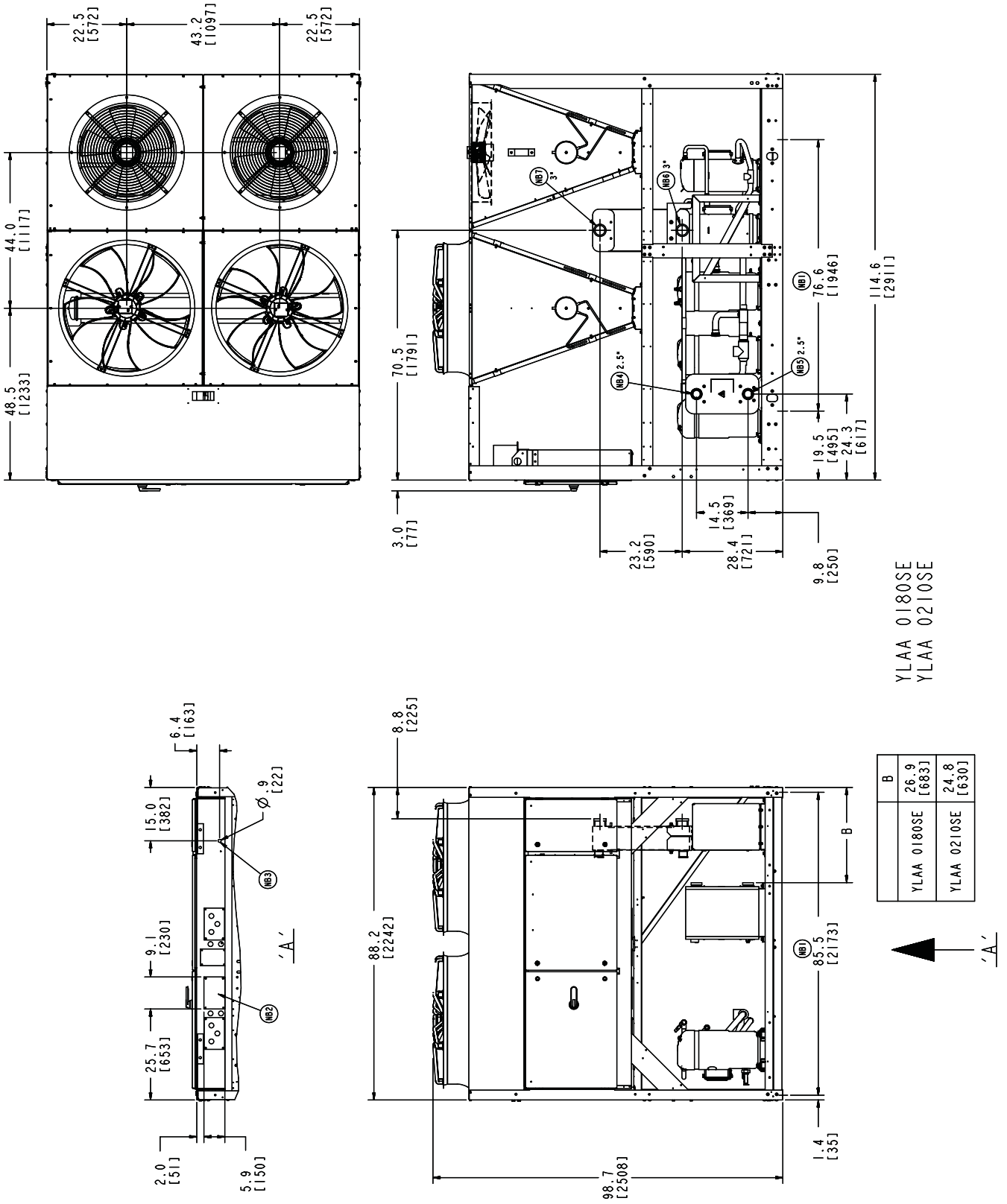
(1) Nominal running amps at 35ºC ambient air temperature and 7ºC leaving chilled liquid temperature
(2) Maximum running amps at maximum operating conditions before compressor unloading
(3) Start up amps is the largest compressor starting with all other compressors/fans operating at nominal conditions at 400V.
(4) Soft Start is only fitted on the largest compressor in each system

Electrical Data HE Models

YLAA	Nominal Running Conditions		Maximum Running Conditions			Start up Amps	
	kW	Amps(1) @ 400 V	kW	Amps(2) @360V	Amps(2) @ 400V	Direct on Line (3)	Optional Soft Start (3&4)
	without Power Factor Correction						
	with Optional Power Factor Correction Fitted						
0195HE	66	119	78	142	135	294	237
	66	110	78	136	127	287	232
0260HE	86	149	104	185	175	424	268
	86	141	104	180	168	419	264
0300HE	76	173	124	220	206	449	324
	76	165	124	214	199	443	320
0350HE	115	197	143	255	237	473	348
	115	189	143	249	230	467	344
0390HE	133	227	159	282	264	502	377
	133	217	159	275	255	495	371
0440HE	145	246	178	316	295	522	397
	145	236	178	309	286	514	391
0455HE	169	289	189	337	318	565	440
	169	274	189	326	303	551	429
0515HE	175	296	213	378	352	572	447
	175	284	213	369	341	562	439

(1) Nominal running amps at 35ºC ambient air temperature and 7ºC leaving chilled liquid temperature
(2) Maximum running amps at maximum operating conditions before compressor unloading
(3) Start up amps is the largest compressor starting with all other compressors/fans operating at nominal conditions at 400V.
(4) Soft Start is only fitted on the largest compressor in each system

Dimensions - YLAA0180SE & YLAA0210SE



	B
YLAA 0180SE	26.9 [683]
YLAA 0210SE	24.8 [630]

NB1 Distance between anti vibration mounts

NB2 Power cable entry via gland plate

NB3 Control cable entry

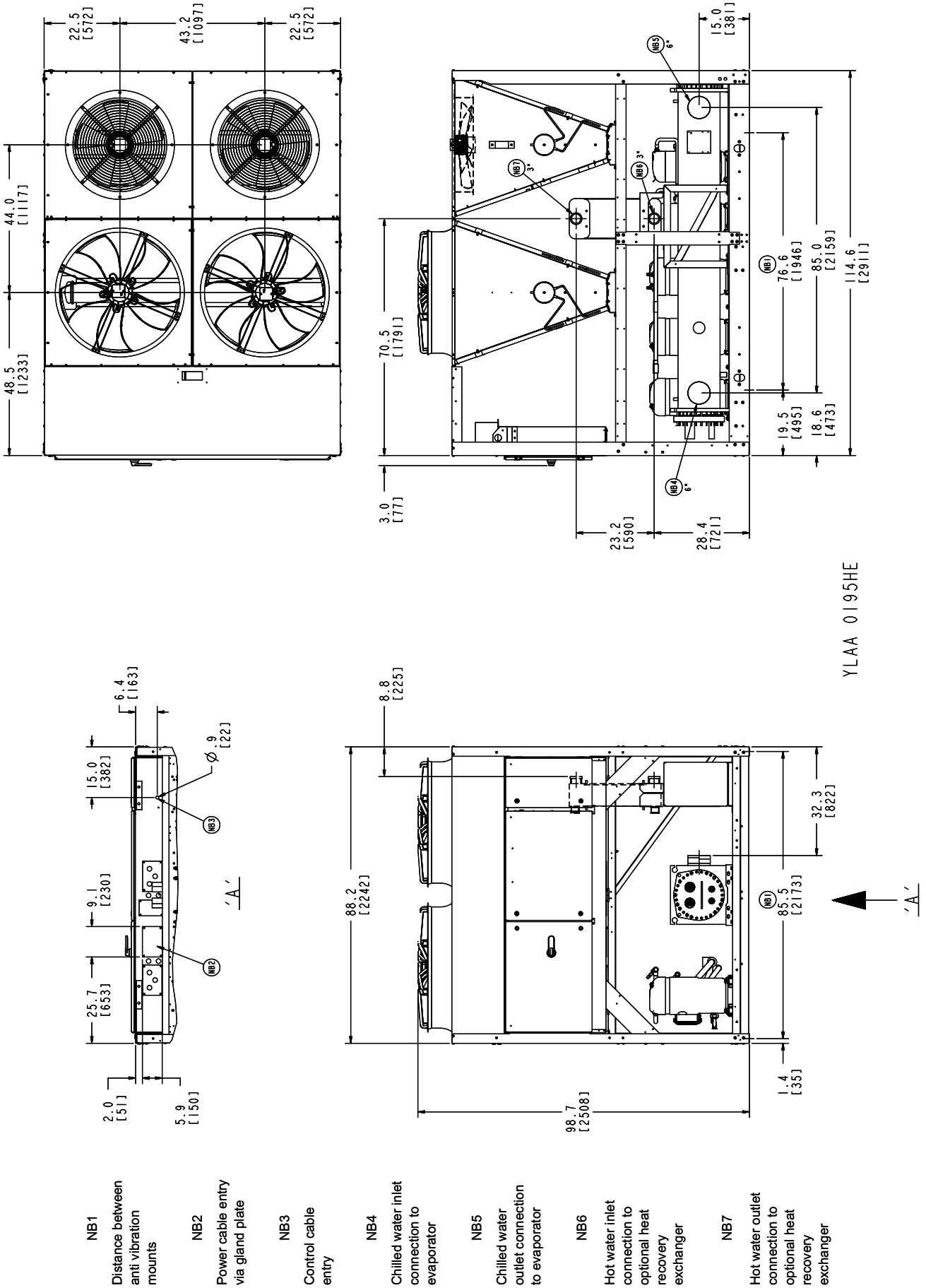
NB4 Chilled water inlet connection to evaporator

NB5 Chilled water outlet connection to evaporator

NB6 Hot water inlet connection to optional heat recovery exchanger

NB7 Hot water outlet connection to optional heat recovery exchanger

Dimensions - YLAA0195HE



NB1 Distance between anti vibration mounts

NB2 Power cable entry via gland plate

NB3 Control cable entry

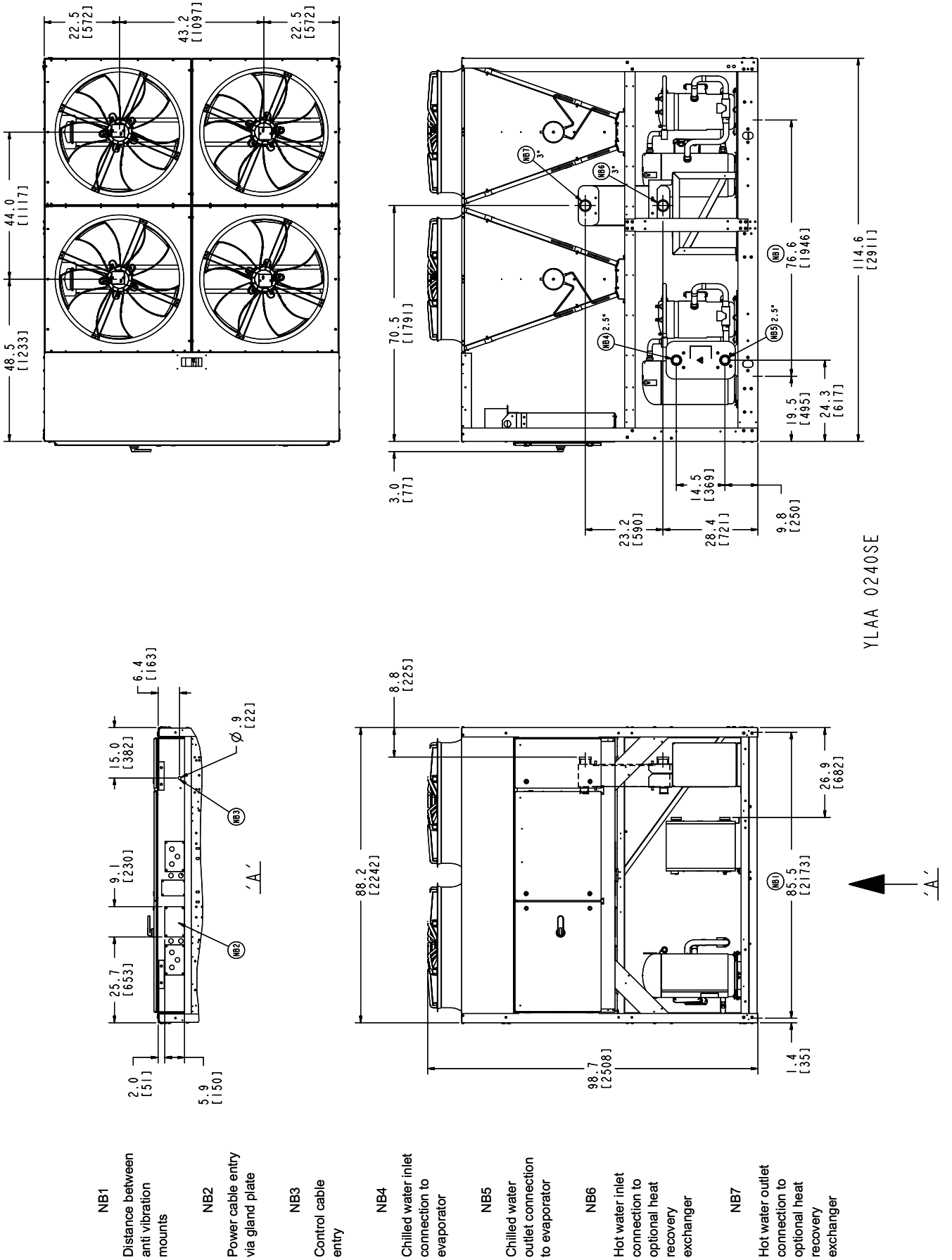
NB4 Chilled water inlet connection to evaporator

NB5 Chilled water outlet connection to evaporator

NB6 Hot water inlet connection to optional heat recovery exchanger

NB7 Hot water outlet connection to optional heat recovery exchanger

Dimensions - YLAA0240SE



NB1 Distance between anti vibration mounts

NB2 Power cable entry via gland plate

NB3 Control cable entry

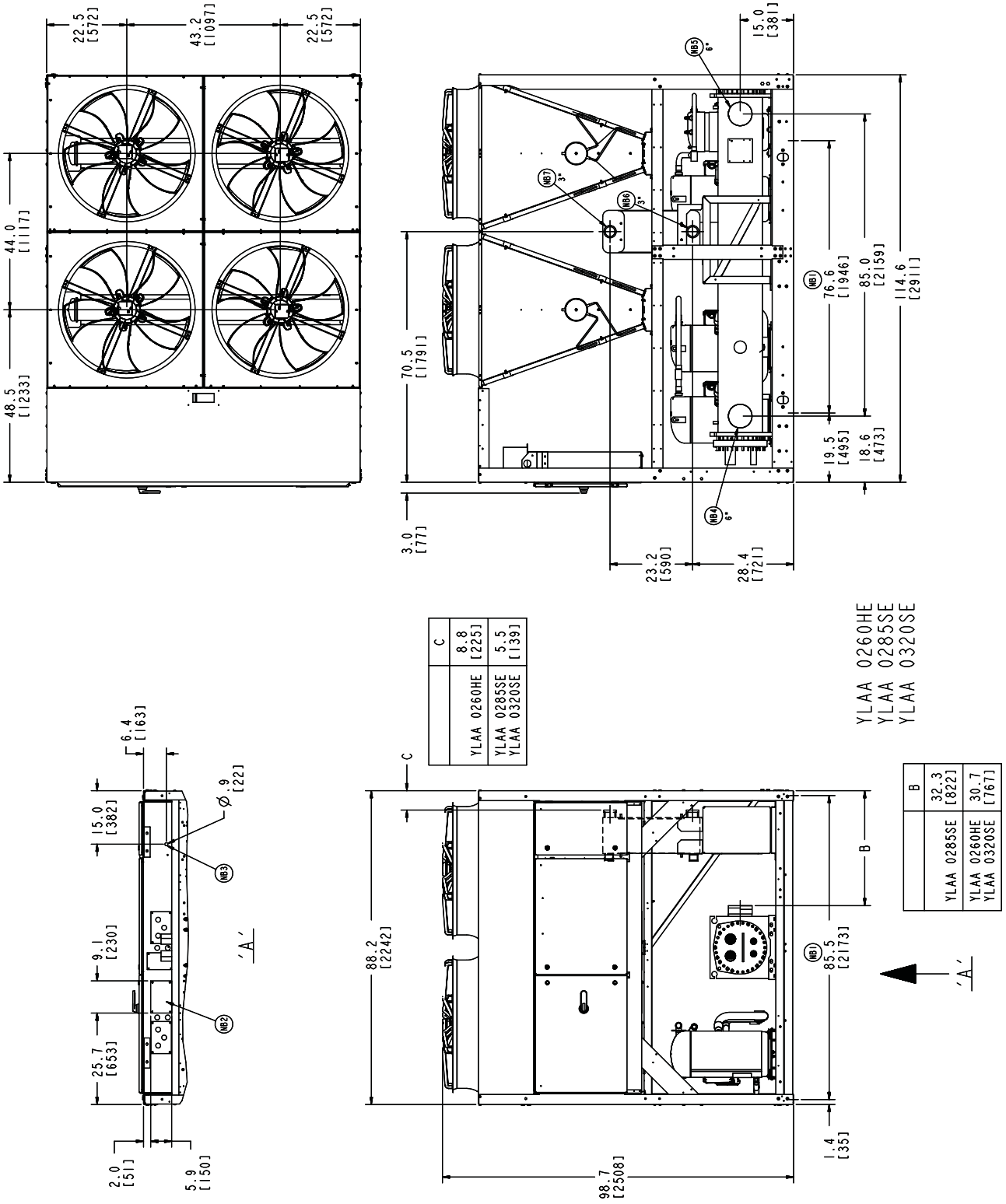
NB4 Chilled water inlet connection to evaporator

NB5 Chilled water outlet connection to evaporator

NB6 Hot water inlet connection to optional heat recovery exchanger

NB7 Hot water outlet connection to optional heat recovery exchanger

Dimensions - YLAA0260HE, YLAA0285SE & YLAA0320SE



NB1 Distance between anti vibration mounts

NB2 Power cable entry via gland plate

NB3 Control cable entry

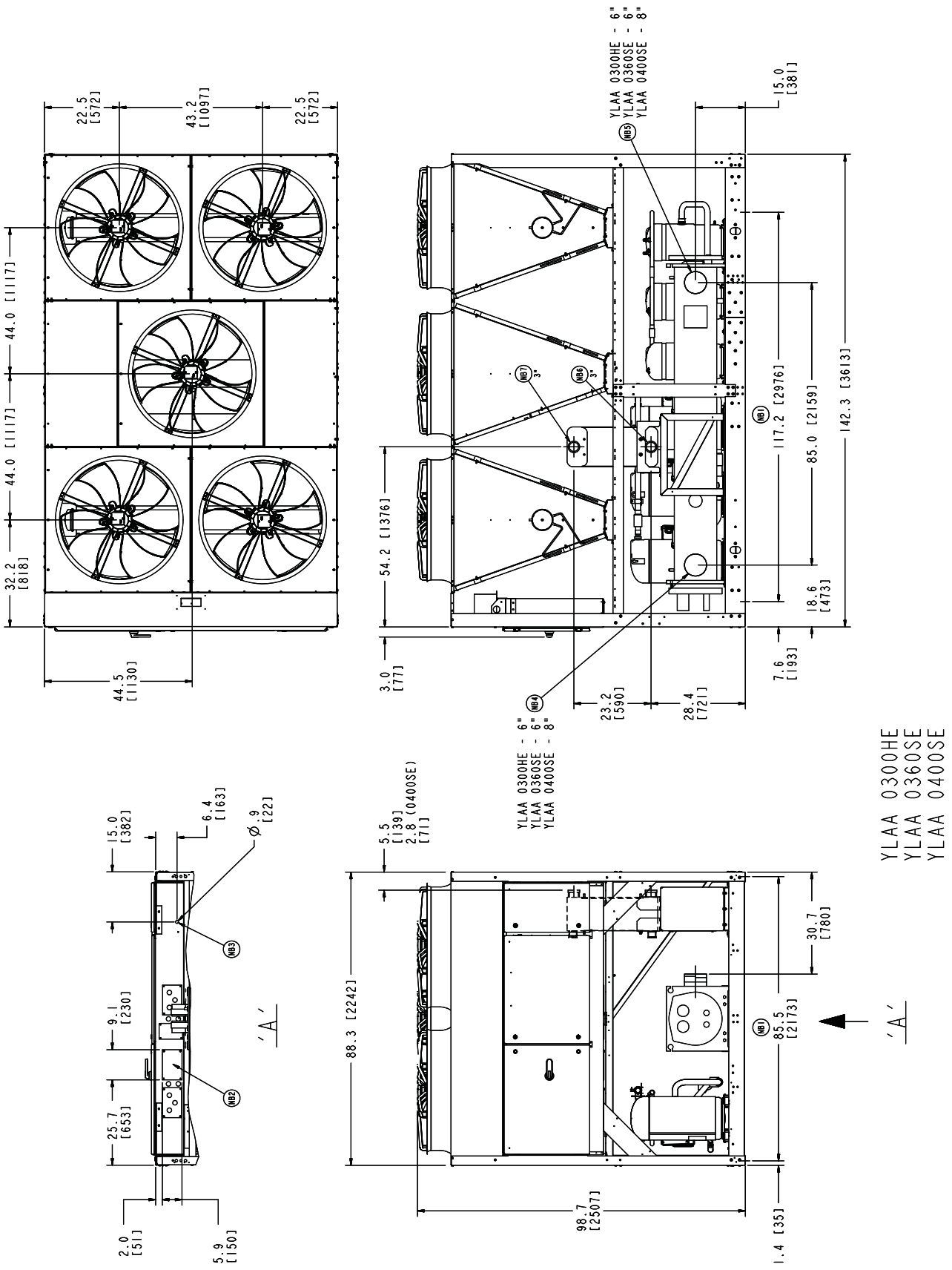
NB4 Chilled water inlet connection to evaporator

NB5 Chilled water outlet connection to evaporator

NB6 Hot water inlet connection to optional heat recovery exchanger

NB7 Hot water outlet connection to optional heat recovery exchanger

Dimensions - YLAA0300HE, YLAA0360SE & YLAA0400SE



NB1 Distance between anti vibration mounts

NB2 Power cable entry via gland plate

NB3 Control cable entry

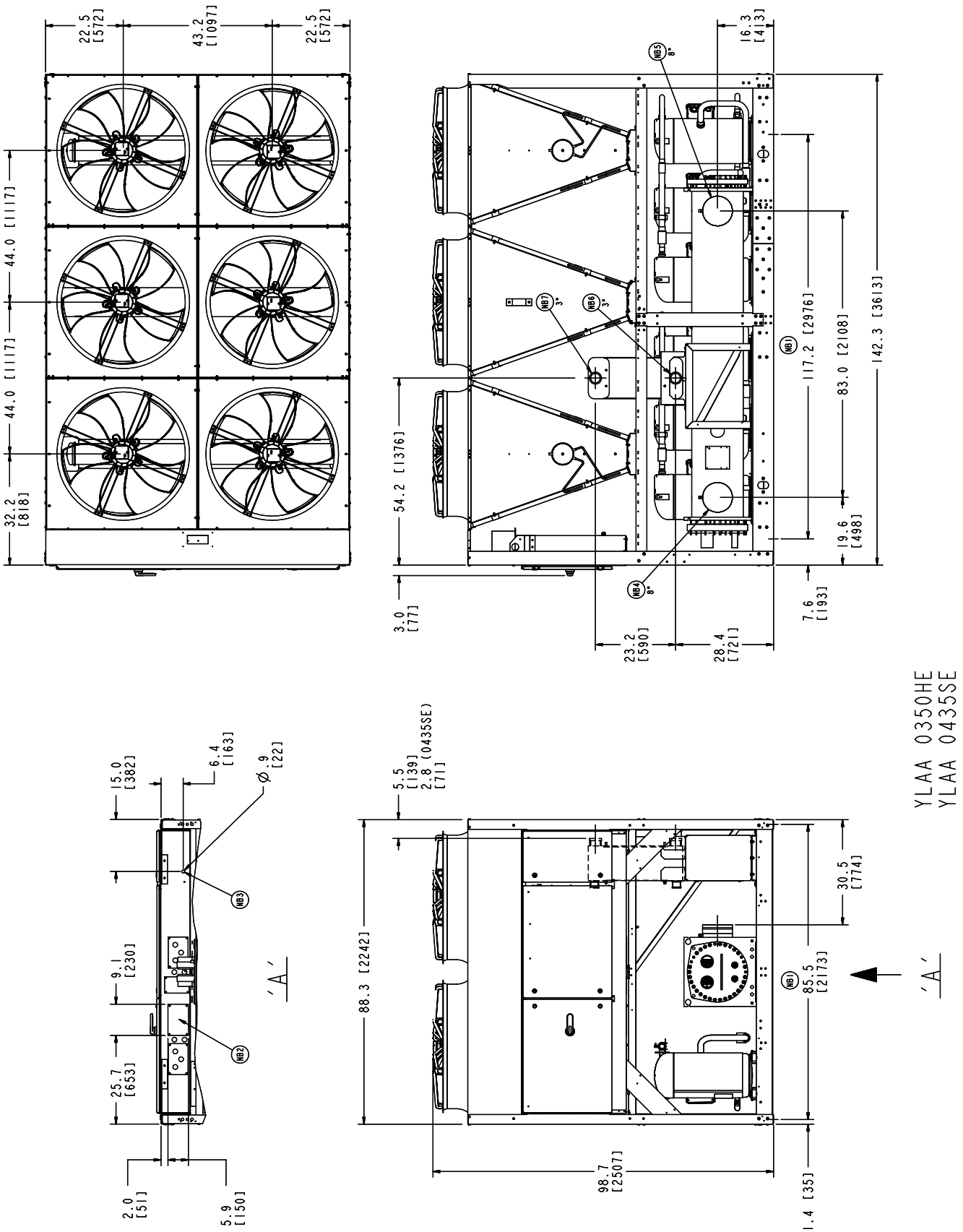
NB4 Chilled water inlet connection to evaporator

NB5 Chilled water outlet connection to evaporator

NB6 Hot water inlet connection to optional heat recovery exchanger

NB7 Hot water outlet connection to optional heat recovery exchanger

Dimensions - YLAA0350HE & YLAA0435SE



NB1 Distance between anti vibration mounts

NB2 Power cable entry via gland plate

NB3 Control cable entry

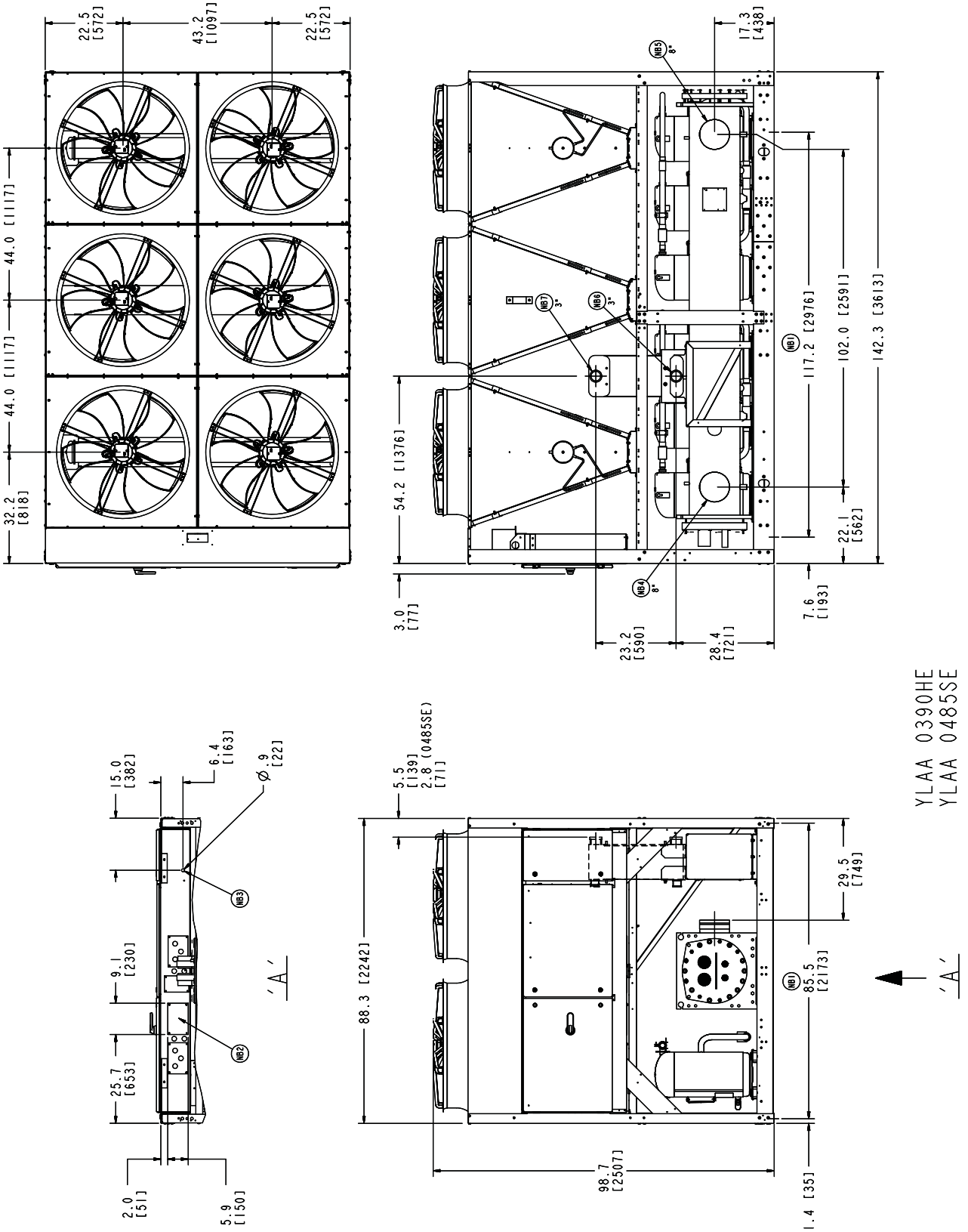
NB4 Chilled water inlet connection to evaporator

NB5 Chilled water outlet connection to evaporator

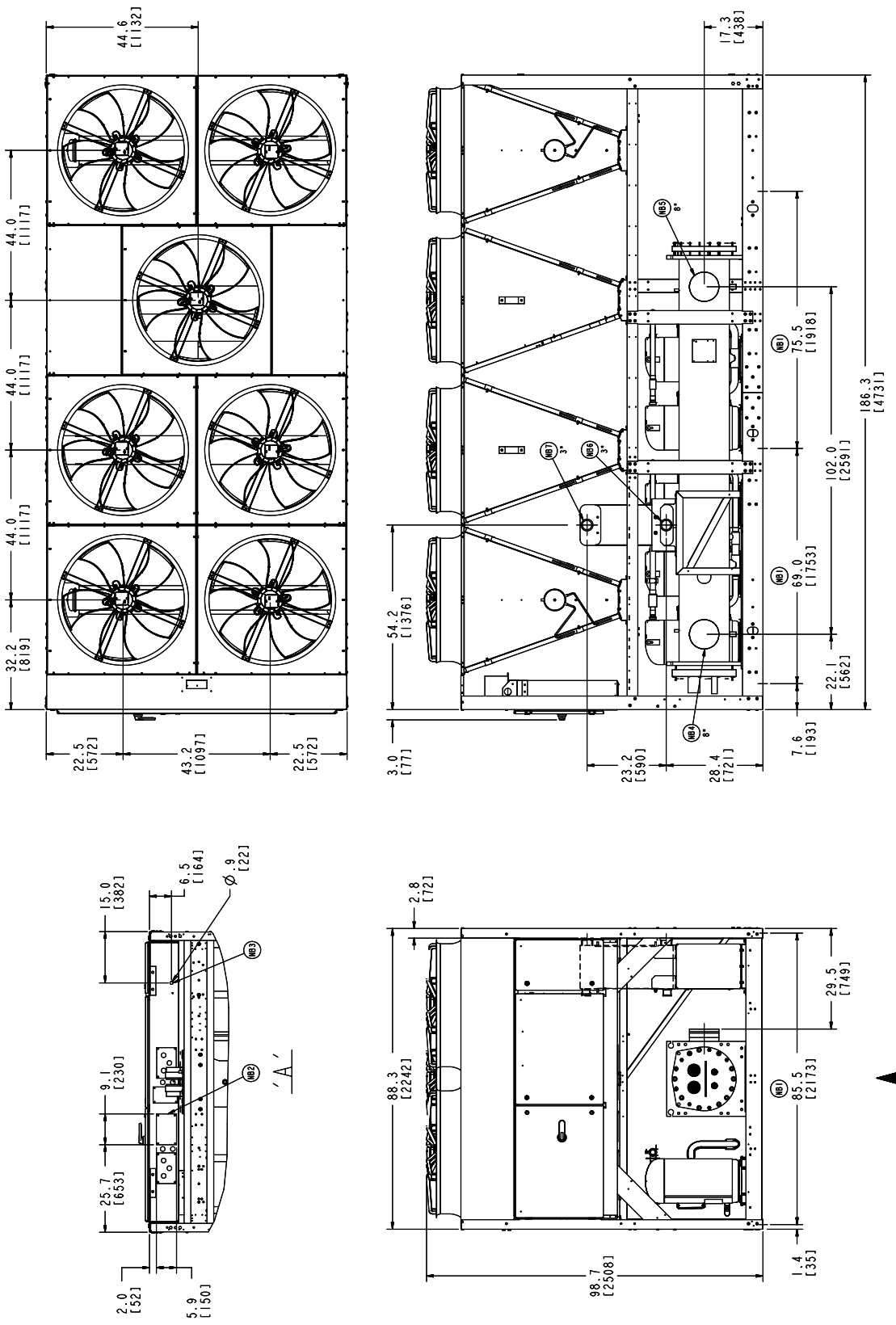
NB6 Hot water inlet connection to optional heat recovery exchanger

NB7 Hot water outlet connection to optional heat recovery exchanger

Dimensions - YLAA0390HE & YLAA0485SE



Dimensions - YLAA0440HE



NB1
Distance between anti vibration mounts

NB2
Power cable entry via gland plate

NB3
Control cable entry

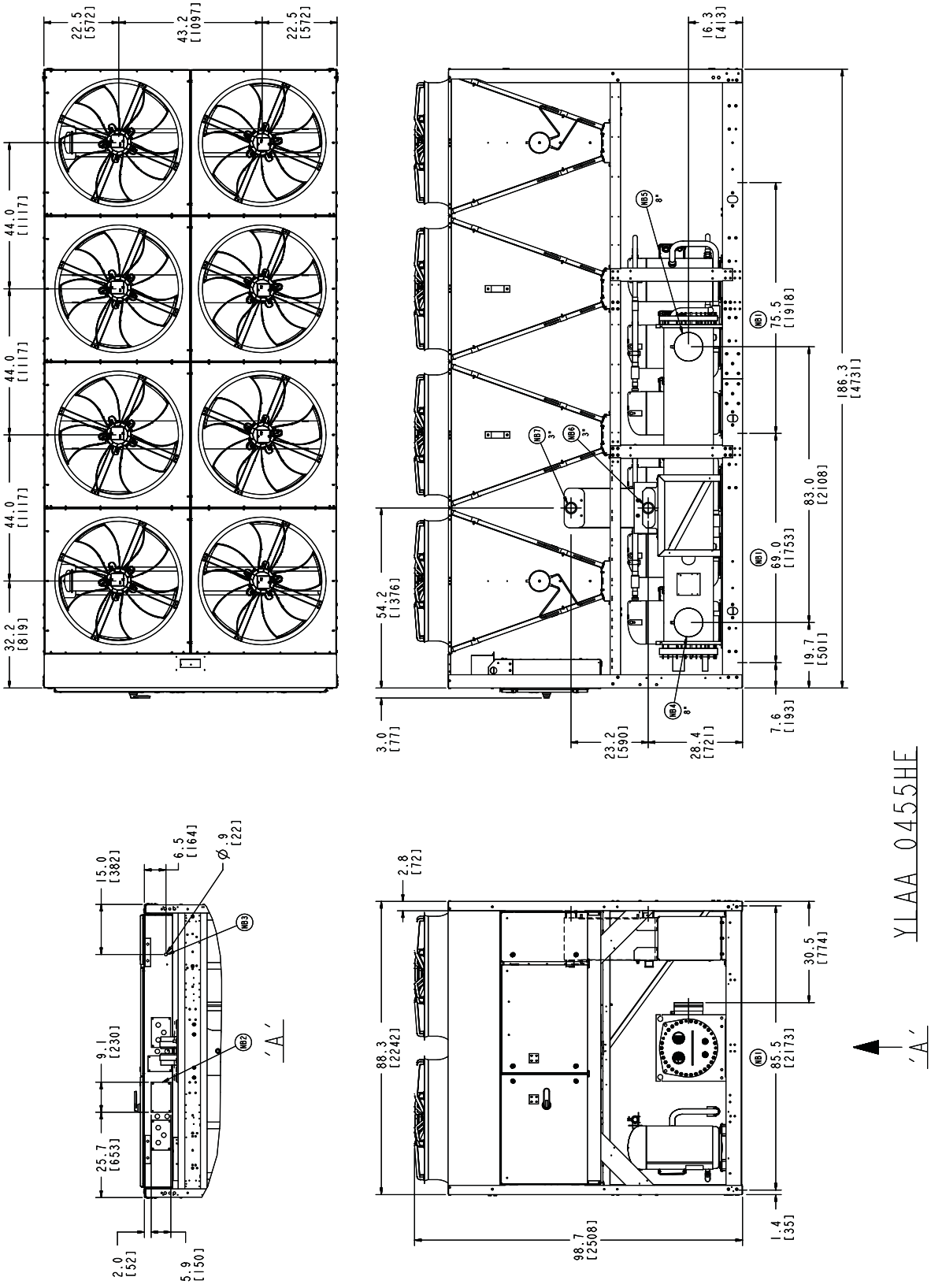
NB4
Chilled water inlet connection to evaporator

NB5
Chilled water outlet connection to evaporator

NB6
Hot water inlet connection to optional heat recovery exchanger

NB7
Hot water outlet connection to optional heat recovery exchanger

Dimensions - YLAA0455HE



NB1 Distance between anti vibration mounts

NB2 Power cable entry via gland plate

NB3 Control cable entry

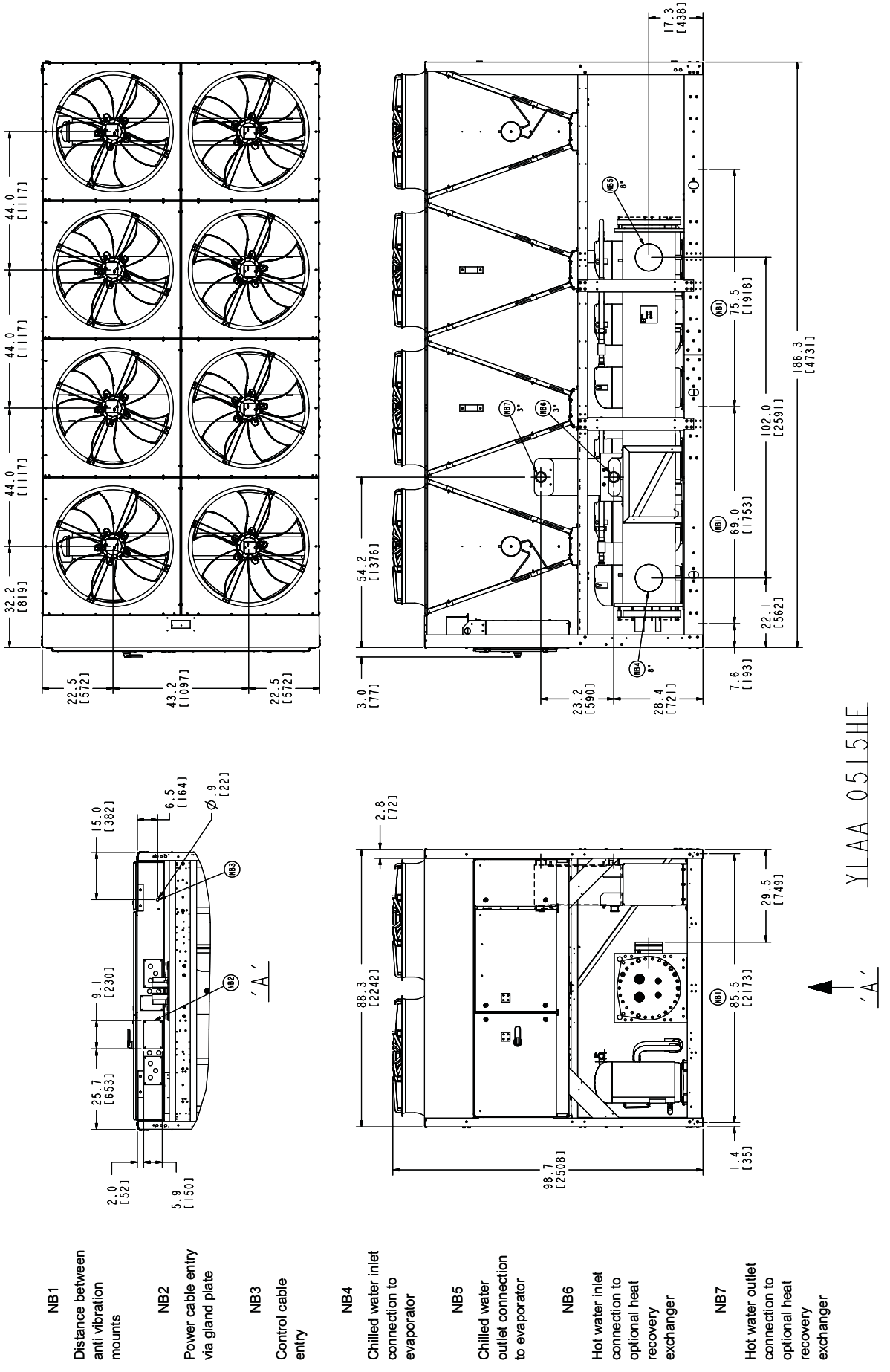
NB4 Chilled water inlet connection to evaporator

NB5 Chilled water outlet connection to evaporator

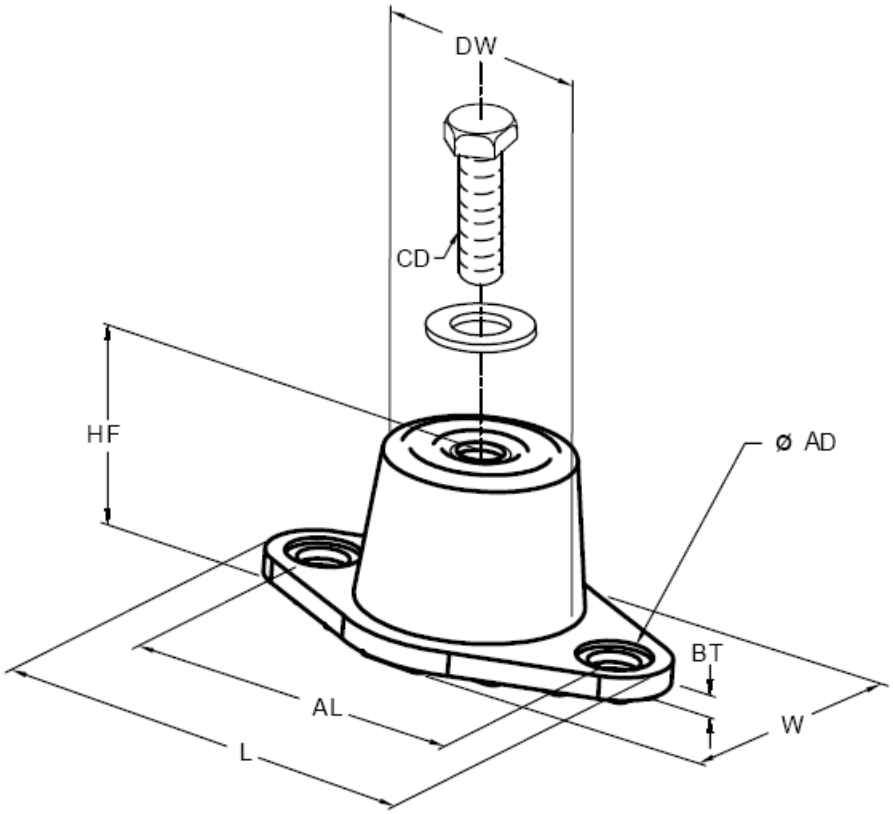
NB6 Hot water inlet connection to optional heat recovery exchanger

NB7 Hot water outlet connection to optional heat recovery exchanger

Dimensions - YLAA0515HE



Anti Vibration Isolators Data - Neoprene Isolators



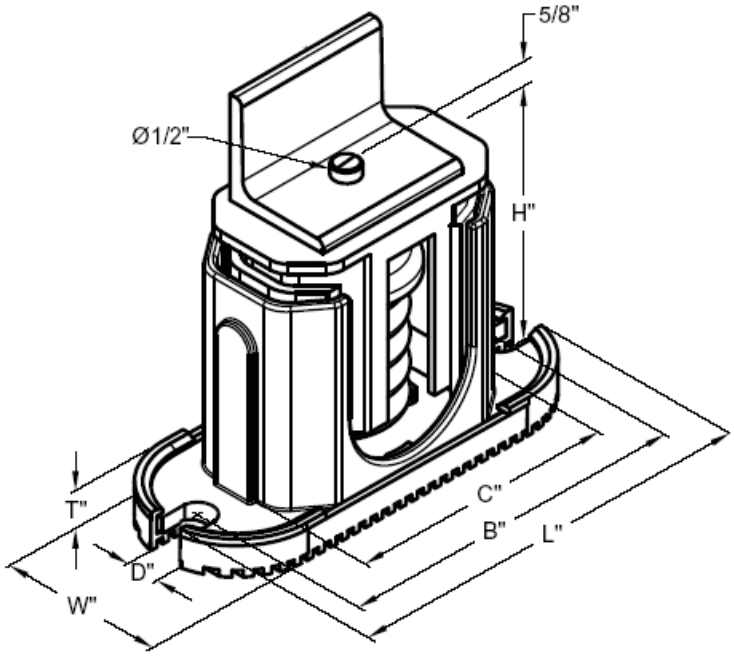
Mount Type	Dimensions (mm)							
	L	W	HF	AL	AD	BT	CD (inch)	DW
RD1-WR	80	44	32	60	9	5	5/16-18 UNC X 3/4	32
RD2-WR	99	60	44	76	9	6	3/8-16 UNC X 1	44
RD3-WR	140	86	73	105	14	6	1/2-13 UNC X 1	64
RD4-WR	159	118	70	127	14	10	1/2-13 UNC X 1	76

Weight Range (kg)	Mount Type	Colour	JCI Part Number
Up to 375	RD3-WR	Charcoal	029-25335-001
375 to 766	RD4-WR	Brick Red	029-25335-002
766 to 1814	RD4-WR	Charcoal	029-25335-004

- Read instructions in their entirety before beginning installation.
- Isolators are shipped fully assembled and are to be positioned in accordance with the product drawings or as otherwise recommended.
- Set isolators on floor, hosuekeeping pad or subbase, ensuring that all isolators centerlines match the equipement mounting holes. It is recommended that the isolator base be installed on a level surface. Shim or grout as required, levelling all isolator bases to the same elevation (0.25 inch maximum difference can be tolerated).
- Bolt or anchor all isolators to supporting structure utilizing base through holes.
- Remove top bolt and top washer. Please equipment on top of isolators so that mounting holes in equipment or base line up with threaded hole.
- Reinstall top bolt and washer and tighten down.
- Installation is complete.

Anti Vibration Isolators Data - 25 mm Deflection Spring Isolators

CP



Mount Type	Dimensions (mm)						
	W	D	L	B	C	T	H
CP1	76	16	197	165	121	13	143
CP2	76	16	267	235	197	14	152

Weight Range (kg)	Mount Type	Colour	JCI Part Number
Up to 197	CP	Black	029-25334-002
197 to 347	CP	Dark Green	029-25334-003
347 to 463	CP	Gray	029-25334-004
463 to 525	CP	White	029-25334-005
525 to 810	CP	Gray / Red	029-25334-006
Up to 521	C2P	Dark Purple	029-25334-008
521 to 694	C2P	Dark Green	029-25334-009
694 to 926	C2P	Gray	029-25334-010
926 to 1049	C2P	White	029-25334-012
1049 to 1619	C2P	Gray / Red	029-25334-013

- Read instructions in their entirety before beginning installation.
- Isolators are shipped fully assembled and are to be positioned in accordance with the product drawings or as otherwise recommended.
- Set isolators on floor, hosuekeeping pad or subbase, ensuring that all isolators centerlines match the equipement mounting holes. It is recommended that the isolator base be installed on a level surface. Shim or grout as required, levelling all isolator bases to the same elevation (0.25 inch maximum difference can be tolerated).
- Bolt or anchor all isolators to supporting structure utilizing base slotted holes.
- Place equipment on top of isolators making sure that mounting holes of the equipment line up with isolator positioning pin.
- The adjustement process can only begin after the equipment is at its full operating weight.
- Adjust each isolator in sequence by turning the spring adjusting bolt one full counterclockwise turn at a time. Repeat this procedure on all isolators, one at a time.
- Continue adjusting each isolator until a minimum of 0.25 inch clearance is achieved between the lower housing and upper housing.
- Fine adjust isolators to level equipment.
- Installation is complete.

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10. Spare Parts

Recommended Spares

Details of unit spare parts are given in the Renewal Parts List 035-22290-000. Contact your local Johnson Controls Sales and Service Centre for information and please quote the unit model number and serial number.

Recommended Compressor Oil

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:

Refrigerant	Compressor Oil
R410A	York grade V

Associated Drawings

Wiring Diagrams	
Models	**All**
Schematic	035-21583-202 to -209
Connection	035-21589-201 to -207
Legend/Notes	035-21966-201

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11. Decommissioning, Dismantling and Disposal

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. Return used oil to the oil manufacturer.

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

General

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

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

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

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

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

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

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

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.

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