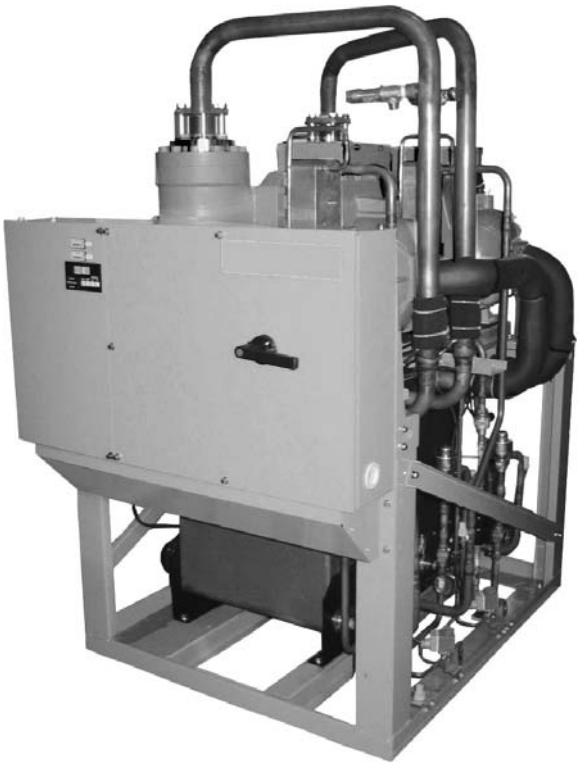
YCSE040-YCSE100 & YCRE040-YCRE100

INSTALLATION, COMMISSIONING, OPERATION & MAINTENANCE	Revision 1	Form 035-21786-100 (0909)

WATER AND REMOTE AIR COOLED LIQUID CHILLERS WITH SCREW COMPRESSORS STYLE B (YCSE 134-320KW) (YCRE 127-307KW)

Aspak



R407C

EUROVENT CERTIFIED PERFORMANCE

CE

YORK BY JOHNSON CONTROLS

Johnson Controls

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1 SUPPLIER INFORMATION

1.1 Introduction

York YCSE/YCRE 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 units are intended for cooling water or glycol solutions and are not suitable for purposes other than those specified in this manual.

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

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

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

1.2 Warranty

Johnson Controls warrants all equipment and materials against defects in workmanship and materials for one year from initial start-up, or eighteen months from delivery (whichever occurs first) unless extended warranty has been agreed as part of the contract.

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

All warranty claims must specify the unit model, serial number and order number. These details are printed on the unit identification plate, fitted on the outer edge of the options panel.

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 Authorised York Service Centre.

Only genuine York approved spare parts, oils and refrigerants must be used.

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

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

1.3 Safety

Standards for Safety

YCSE/YCRE chillers are designed and built within an EN ISO 9001 accredited design and manufacturing organisation and, within the limits specified in this manual, are in conformity with the essential health and safety requirements of the following European Union Directives:

Machinery Directive (98/37/EC)

Low Voltage Directive (2006/95/EC)

EMC Directive (2004/108/EC)

They conform to the applicable and essential safety requirements of Pressure Equipment Directive 97/23/EC and bear CE marking.

Fluorinated Greenhouse Gases

- This equipment contains fluorinated greenhouse gases covered by the Kyoto Protocol.
- The global warming potential of the refrigerant (R407C) used in this unit is **1520**.
- The refrigerant quantity is stated in the Physical Data table in Section 9 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.

1.4 Responsibility for Safety

Every care has been taken in the design and manufacture of the units to ensure that they meet the safety requirements listed in the previous paragraph. However, the individual operating or working on any machinery is primarily responsible for:

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

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

1.5 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, 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 authorisation from an Authorised Johnson Controls representative.

1.6 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 limits 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.

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 with the unit unless suitable safety precautions are taken. It is important to ensure access to the unit is restricted to suitably qualified persons who are familiar with the potential hazards and precautions necessary for safe operation and maintenance of equipment containing high temperatures, pressures and voltages.

Pressure Systems

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

Electrical

The unit must be earthed. No installation or maintenance work should be attempted on electrical equipment without first switching off, isolating and locking-off the power supplies. Work on live equipment must only be carried-out by suitably trained and qualified personnel. No attempt should be made to gain access to inside of the control panel, wiring or other electrical enclosures during normal operation of the unit.

Refrigerants and Oils

Refrigerants and oils used in the unit are generally non-toxic, non-flammable and non-corrosive, and pose no special safety hazards. Use of gloves and safety glasses are, however, recommended when working on the unit. Build up of refrigerant vapour, from a leak for example, does pose a risk of asphyxiation in confined or enclosed spaces and attention should be given to good ventilation. For more comprehensive information on safety precautions for use of refrigerants and oils, refer to the Materials Safety Data tables provided.

High Temperature and Pressure Cleaning

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

1.7 Emergency Shutdown

In case of emergency the unit can be shut down by operating the main power switch on the control panel.

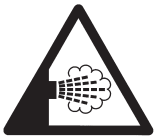
1.8 Safety Labels

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

White symbol on blue background
For safe operation, read the Instructions first

Black symbol on yellow background
Warning: 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

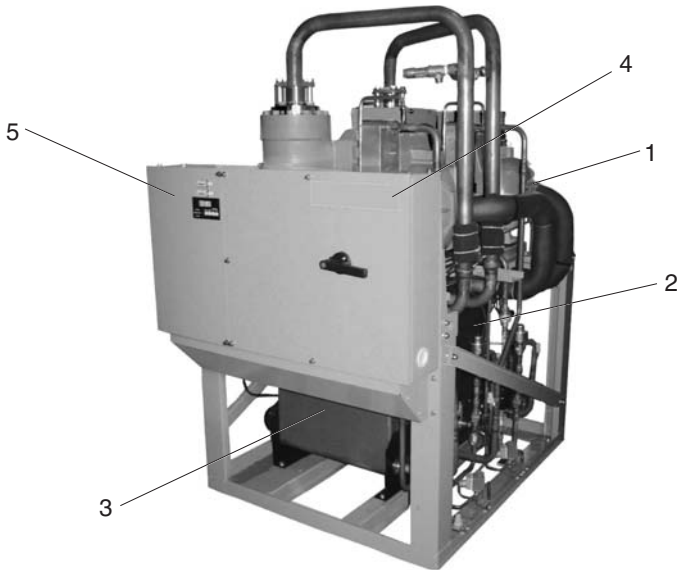
1.9 Material Safety Data

Refrigerant Data:	
Safety Data	**R407C**
Toxicity	Low.
In contact with skin	Liquid splashes or spray may cause freeze burns. Unlikely to be hazardous by skin absorption. Thaw affected areas with water. Remove contaminated clothing carefully — may adhere to skin in case of freeze burns. Wash affected areas with plenty of warm water. If symptoms occur (irritation or blistering) obtain medical attention.
In contact with eyes	Vapour has no effect. Liquid splashes or spray may cause freeze burns. Immediately irrigate with eyewash solution or clean water for at least 10 minutes. Obtain immediate medical attention.
Ingested	Highly unlikely to occur — but should this occur freeze burn will occur. Do not induce vomiting. Provided patient is conscious, wash mouth with water and give about 250 ml (0.5 pint) to drink. Obtain immediate medical attention.
Inhalation	High atmospheric concentrations may have an anaesthetic effect, including loss of consciousness. Very high exposures may cause an abnormal heart rhythm and prove suddenly fatal.
	At higher concentration there is a danger from asphyxiation due to reduced oxygen content of atmosphere. Remove patient to fresh air, keep warm and at rest. Administer oxygen if necessary. Apply artificial respiration if breathing has ceased or shows signs of failing. In event of cardiac arrest apply external cardiac massage. Obtain immediate medical attention.
Further medical advice	Symptomatic and supportive therapy is indicated. Cardiac sensitisation has been described which may, in the presence of circulating catecholamines such as adrenalin, give rise to cardiac arrhythmia's and subsequent arrest following exposure to high concentrations.
Long term exposure	A lifetime inhalation study in rats has shown that exposure to 50,000 ppm resulted in benign tumours of the testis. This is not considered to be of relevance to humans exposed to concentrations at or below the occupational exposure limit.
Occupational exposure limits	Recommended limit: 1000 ppm v/v - 8 hr TWA.
Stability	Not specified.
Conditions to avoid	Use in presence of naked flames, red hot surfaces and high moisture levels.
Hazardous reactions	May react violently with sodium, potassium, barium and other alkali and alkaline earth metals. Incompatible materials: Magnesium and alloys containing more then 2% magnesium.
Hazardous decomposition products	Halogen acids by thermal decomposition and hydrolysis.
General precautions	Avoid inhalation of high concentrations of vapours. Atmospheric concentrations should be minimised and kept as low as reasonably practicable below the occupational exposure limit. The vapour is heavier than air and collects at low level and in confined areas. Ventilate by extraction at lowest levels.
Respiratory protection	Where doubt exists on atmospheric concentration, HSE approved breathing apparatus should be worn. This should be self contained or of the long breather type.
Storage	Keep containers dry and in a cool place away from fire risk, direct sunlight, and all sources of heat such as radiators. Keep at temperatures not exceeding 45 °C.
Protective clothing	Wear overalls, impervious gloves and goggles/face protection.
Spill/leak procedure	Ensure suitable personal protective clothing and respiratory protection is worn. Provided it is safe to do so, isolate the source of the leak. Allow small spillage's to evaporate provided there is suitable ventilation. Large spillage's: Ventilate area. Contain spillage's with sand, earth or any suitable absorbent material. Prevent liquid from entering drains, sewers, basements and work pits since vapour may create a suffocating atmosphere.
Disposal	Best to recover and recycle. If this is not possible, destruction is to be in an approved facility which is equipped to absorb and neutralise acids and other toxic processing products.
Fire extinguishing data	Non-flammable at atmospheric conditions.
Containers	Fire exposed containers should be kept cool with water sprays. Containers may burst if overheated.
Fire fighting protective equipment	Self contained breathing apparatus and protective clothing must be worn in fire conditions.

Thermal and 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.

Refrigerant Oil Data:	
Safety Data	**York "Y" Oil**
Hazardous Ingredients / Identity Information	
Hazardous Components (Specific Chemical Identity, Common Name)	No hazardous materials present. CHEMICAL NAME: Polyole ester and Lubricating oil additive COMPONENT : Polyole ester >99mass% Lubricating oil additive <1mass% OSHA PEL ACGIH TLV
Physical Characteristics	
Boiling Point	Not applicable
Vapor Pressure (mmHg)	Not applicable
Vapor Density (AIR=1)	Not applicable
Appearance and Odor	Light yellow, clear mobile liquid
Specific Gravity (H.0=1)	1.0230g/cm³(15)
Melting Point (Pour point)	-27.5
Evaporation Rate	Not applicable
Fire and Explosion Hazard Data	
Flash Point (Method Used)	250 (COC)
Flammable limits	No information LEL UEL
Extinguishing Media	Foam, dry chemical, carbon dioxide
Special Fire Fighting Procedures	No
Unusual Fire and Explosion Hazards	Not in particular. Normal protective measures for organic chemical products with flash points of above 100
Reactivity Data	
Stability	Stable
Incompatibility (Materials to Avoid)	No
Hazardous Decomposition or By-products	No
Hazardous Polymerization	Will not occur

Health Hazard Data	
Route(s) of Entry	No significant health hazards are identified. Prolonged repeated skin contact may cause irritation and dermatitis
Health Hazards (Acute and Chronic)	No significant health hazards are identified. Prolonged repeated skin contact may cause irritation and dermatitis
Carcinogenicity	NTP: No IARC Monographs: No OSHA Regulated: No
Signs and Symptoms of Exposure	No information is available
Medical Conditions Generally Aggravated by Exposure	No information is available
Skin Contact	Wash material off the skin with copious amounts of water and soap
Eyes Contact	Immediately flush with plenty of water for at least 15 minutes
Inhalation	Remove exposed person to fresh air
Ingestion	Do not induce vomiting. Call a physician immediately
Precautions for Safe Handling and Use	
Steps to be Taken In Case Material is Released or Spilled	Prevent spillage from spreading by using sand and absorb the liquid substance using a suitable inert material. Transfer to a suitably labelled sealable container. Do not allow liquid to enter open waters or ground water.
Waste Disposal Method	Waste material may be incinerated under conditions which meet all Federal, state and local environmental control regulations.
Precautions to be Taken in Handling and Storing	Store in cool, dark and low humidity place.
Other Precautions	Avoid repeated skin contact and breathing of mist or vapour.
Control Measures	
Respiratory Protection	Under normal conditions, respirator is not usually required.
Ventilation	Local Exhaust: Not required Mechanical (General): Not required Special: Adequate ventilation should be maintained when handling heated products
Protective Gloves	Rubber gloves
Eye Protection	Glasses or goggles
Other Protective Clothing or Equipment	Not required
Work/Hygienic Practices	Not required
Additional Information	
The information contained herein has been compiled from data published in the literature. This data is believed to be reliable, but certain values may vary from source to source. This data is not to be construed as absolutely complete. It is the responsibility of the user to determine the best precautions necessary for his/her application. This data only refers to the specific material designated and not to any combinations.	



1 Compressor
2 Evaporator
3 Condenser (YCSE only)
4 Power Section
5 Control Panel

2 PRODUCT DESCRIPTION

2.1 Introduction

YORK YCSE/YCRE R407C chillers are designed for water or water-glycol cooling. It is designed for indoor installation in a plant room. Units are available with one or two independent refrigerant circuits with a single evaporator and, on YCSE models, a single condenser. Units are completely factory assembled with all interconnecting refrigerant piping and wiring ready for field installation. The units are pressure tested, evacuated, and fully factory charged with refrigerant R407C and oil in each of the independent refrigerant circuits. After assembly, an operational test is performed with water flowing through the evaporator and condenser (YCSE) to ensure that each refrigerant circuit operates correctly.

2.2 Compressor

The unit has suction cooled, semi-hermetic screw compressors. The compressors incorporate twin-screw rotors and solenoid valves for continuous capacity control. The compressors are equipped with a built-in oil separator, an oil sight glass, a crankcase oil heater and a suction filter. The compressors have a 2-pole motor with over current and thermostat protection. Start / Delta starting is provided as standard. All compressors are mounted on isolator pads to reduce transmission of vibration to the rest of the unit.

Capacity Control

For YCSE/YCRE units, the compressors will start at the minimum load position and provide a capacity control range from 15% to 100 % per compressor using a continuous function slide valve.

2.3 Refrigerant Circuits

Depending on model size, one or 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, a high absorption filter dryer, a sight glass with moisture indicator and an electronic expansion valve.

Suction line components include an optional service and isolation valve.

Discharge line components include a check valve, an optional service and isolation valve and a pressure relief valve.

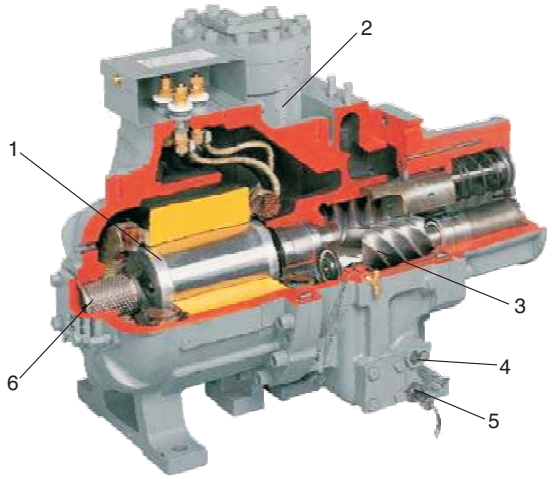
2.4 Evaporator

The evaporator is a stainless steel brazed type plate heat exchanger. The waterside design working pressure is 10 barg. The refrigerant side design working pressure is 18 bar g. The cooler is thermally insulated with flexible closed cell foam. Water connection to the evaporator is via victaulic-grooved connections. Flange connections are available as an option.

2.5 Condenser (YCSE Only)

The condenser is a stainless steel brazed type plate heat exchanger. The waterside design working pressure is 10 barg. The refrigerant side design working pressure is 30 bar g. Water connection to the condenser is via victaulic-grooved connections. Flange connections are available as an option.

1 2-Pole Motor
2 Built-in Oil Separator
3 Twin Screw Rotors
4 Oil Sight Glass
5 Oil Heater
6 Suction Filter



2.6 Power and Control Panels

All power and controls are contained in an IP2X cabinet with hinged and gasket sealed outer doors.

The power section includes

A factory mounted non-fused disconnect switch with external 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, fuses and over current relays to provide overload and short circuit protection.

The control section includes

Four 7-segment LED display

Four push button switches

LED indicators for power, operation and alarm status

Customer terminal block for control inputs and liquid flow switch connection

Microprocessor boards to provide automatic operation and accurate temperature control.

2.7 Accessories and Options

Modbus

To integrate the unit into the building management system. The interface permits the connection of up to 8 units using the Modbus communications protocol. Refer to HARC Modbus data sheet (035-22384-000).

Lonworks

To integrate the unit into the building management system. The interface permits the connection of up to 8 units using the Lon communications protocol. Refer to HARC Lonworks data sheet (035-22383-000).

Multi Unit Sequencer - CSC-5S

Provides individual control and monitoring for up to 8 units within the air conditioning system. This allows the units to be managed remotely from the plant room.

Compressor Circuit Breakers

Circuit breakers to replace the standard fuses for protection against over current. The breakers provide more precise monitoring than fuses and easy reset after fault.

Differential Water Pressure Switch (es)

Differential pressure switches between the water inlet and outlets to ensure liquid flow during operation.

Flow Switch (es)

Field installed flow switches to ensure liquid flow during operation.

Glycol Cooling

Factory set-up for applications requiring water outlet temperatures below 5°C: Category 1: Outlet temperature 0 to 4°C; Category 2: Outlet temperature -1 to - 5°C and Category 3: Outlet temperature - 6 to - 10°C. The system must have the correct percentage of glycol added. (Refer to glycol application factors)

Discharge and/or Suction Stop Valves

Factory fitted valve(s) to allow refrigerant isolation during servicing.

Compressor Safety Valve(s)

Factory fitted single or dual compressor safety valve(s).

Dual Pressure Relief Valves

Two safety valves in parallel of which one is operational to assist in valve replacement during maintenance.

Suction Pressure Relief Valves

Additional pressure relief valve on suction side of compressor when required.

PN16 Flanges

Welded PN16 flanges and companion flanges on the water connections with gasket seals.

AVM (Resilient Pads)

Rubber anti-vibration pads underneath the unit to avoid transmission of vibration to the plant room structure.

AVM (Spring Isolators)

Spring and cage type isolators for mounting under the unit base rails to avoid transmission of vibration to the plant room structure (supplied loose with unit for field assembly)

Water Filter

Field installed water filter at the cooler inlet to protect the exchanger from excessive fouling.Wooden Crate

Special packing in a wooden crate to protect the chiller from damages during transportation

Heat Pump Kit (YCSE only)

Capability to control the chiller based on the condenser leaving water temperature.

2.8 Nomenclature

YCSE100SB50B

1	2	3	4	5	6	7	7	8	9	10	11
BASE PRODUCT TYPE				NOMINAL CAPACITY			UNIT DESIGNATOR / REFRIGERANT		VOLTAGE		DESIGN SERIES
Y	C	S	E	#	#	# kW	S		5	0	
: York	: Chiller	: S = Screw : R = Remote Air Cooled Screw	: European	Standard Units :040 :050 :060 :080 :100			: Standard Unit	B : R407C Refrigerant			B : Design Level
											: 380-415 / 3 / 50 + N

Refigerant Flow Diagram

YCSE

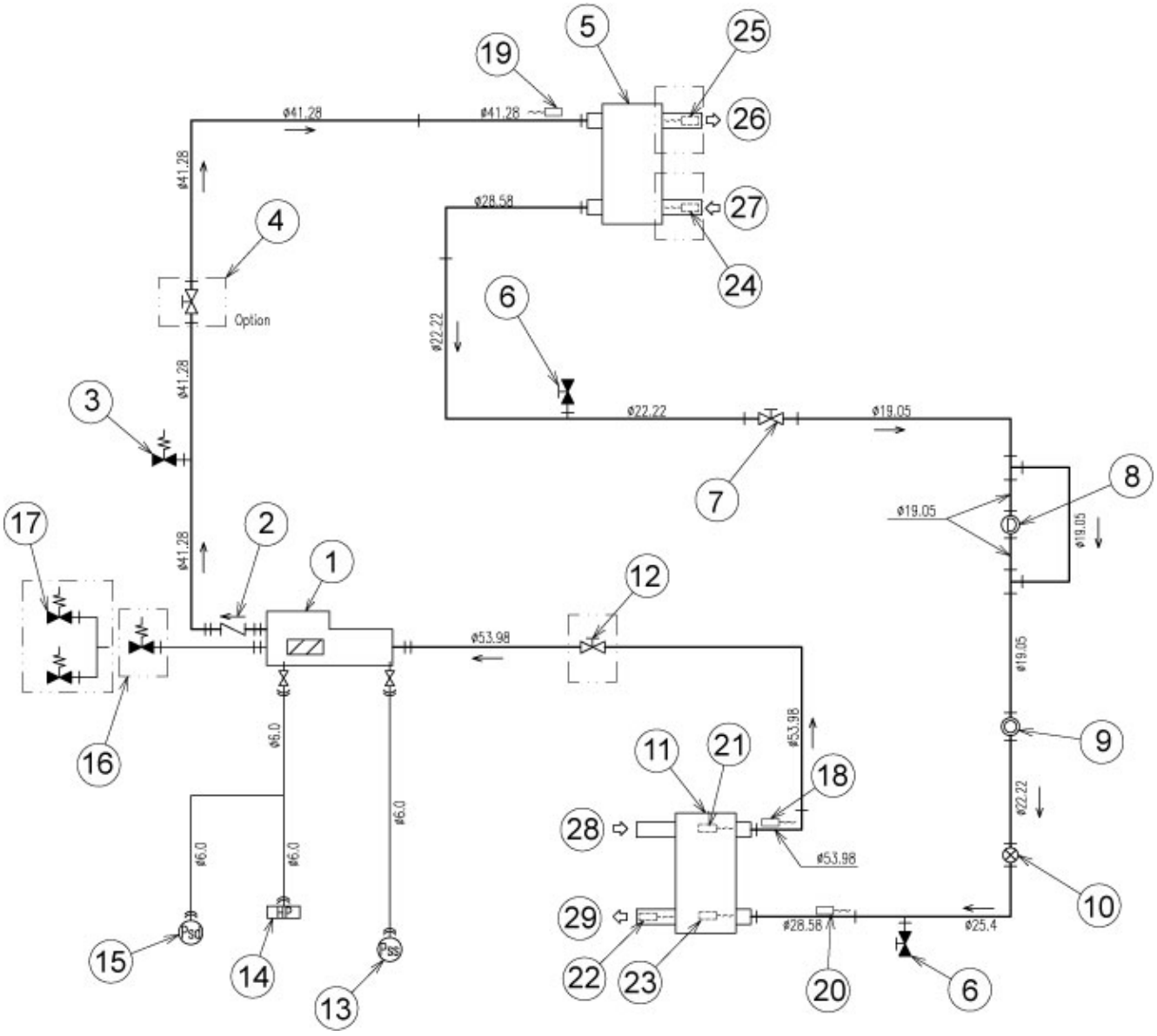
Low-pressure liquid refrigerant enters the cooler and is evaporated and superheated by the heat energy absorbed from the chilled liquid passing through the cooler plates. Low-pressure vapour enters the compressors where pressure and superheat are increased. High pressure superheated refrigerant enters the condenser where heat is rejected to the condenser water passing through the plates. The fully condensed and subcooled liquid leaves the condenser and enters the expansion valve, where pressure reduction and further cooling takes place. The low-pressure liquid refrigerant then returns to the cooler.

YCRE

Low pressure liquid refrigerant enters the cooler and is evaporated and superheated by the heat energy absorbed from the chilled water passing through the cooler plates. Low pressure vapour enters the compressor where pressure and superheat are increased. Heat is rejected by the remote condenser. The fully condensed and subcooled liquid refrigerant then enters the expansion valve where pressure reduction and further cooling takes place before returning to the cooler.

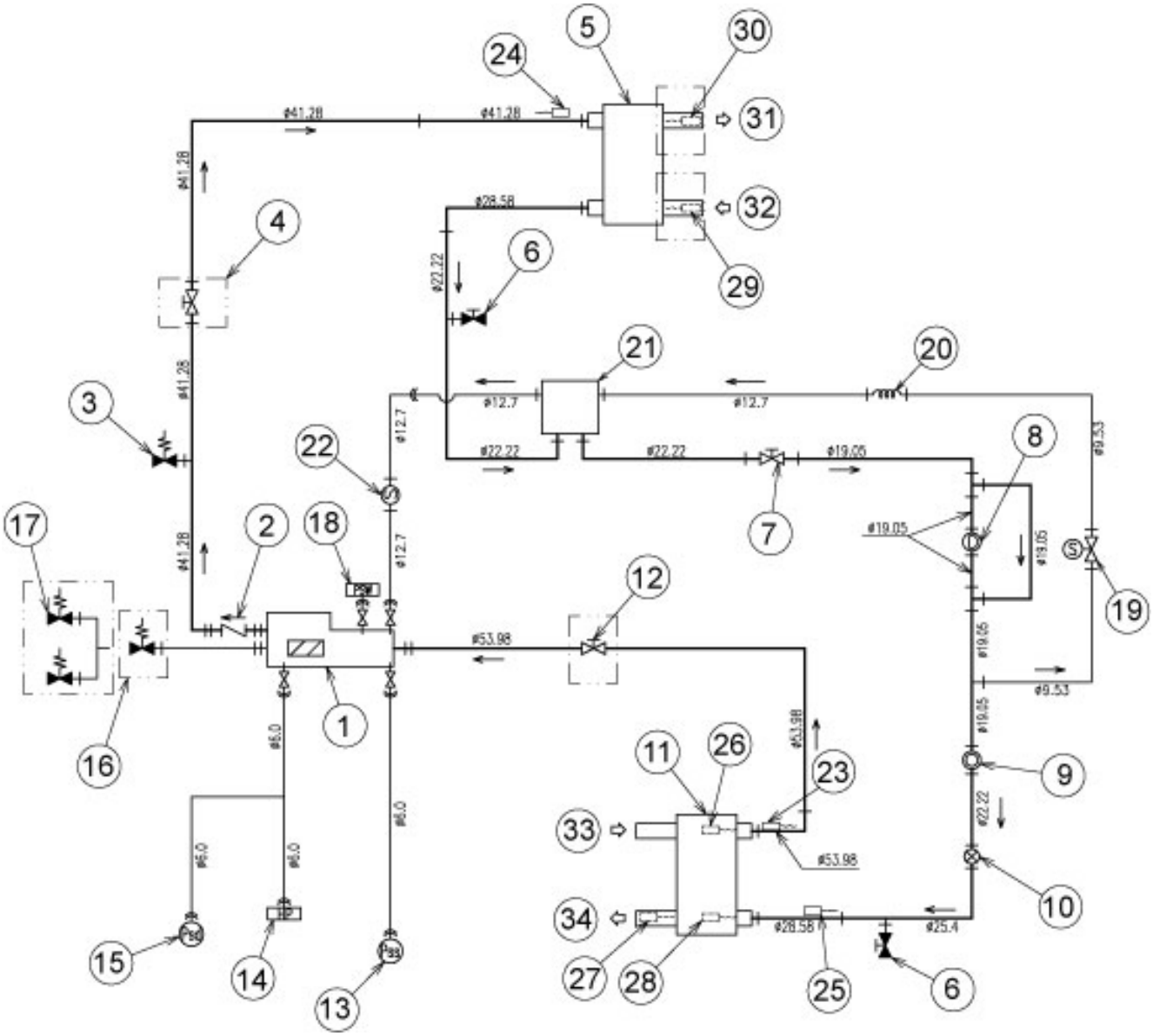
2.9 Refrigerant Flow Diagram

YCSE 040, 050, 060, 100 Models



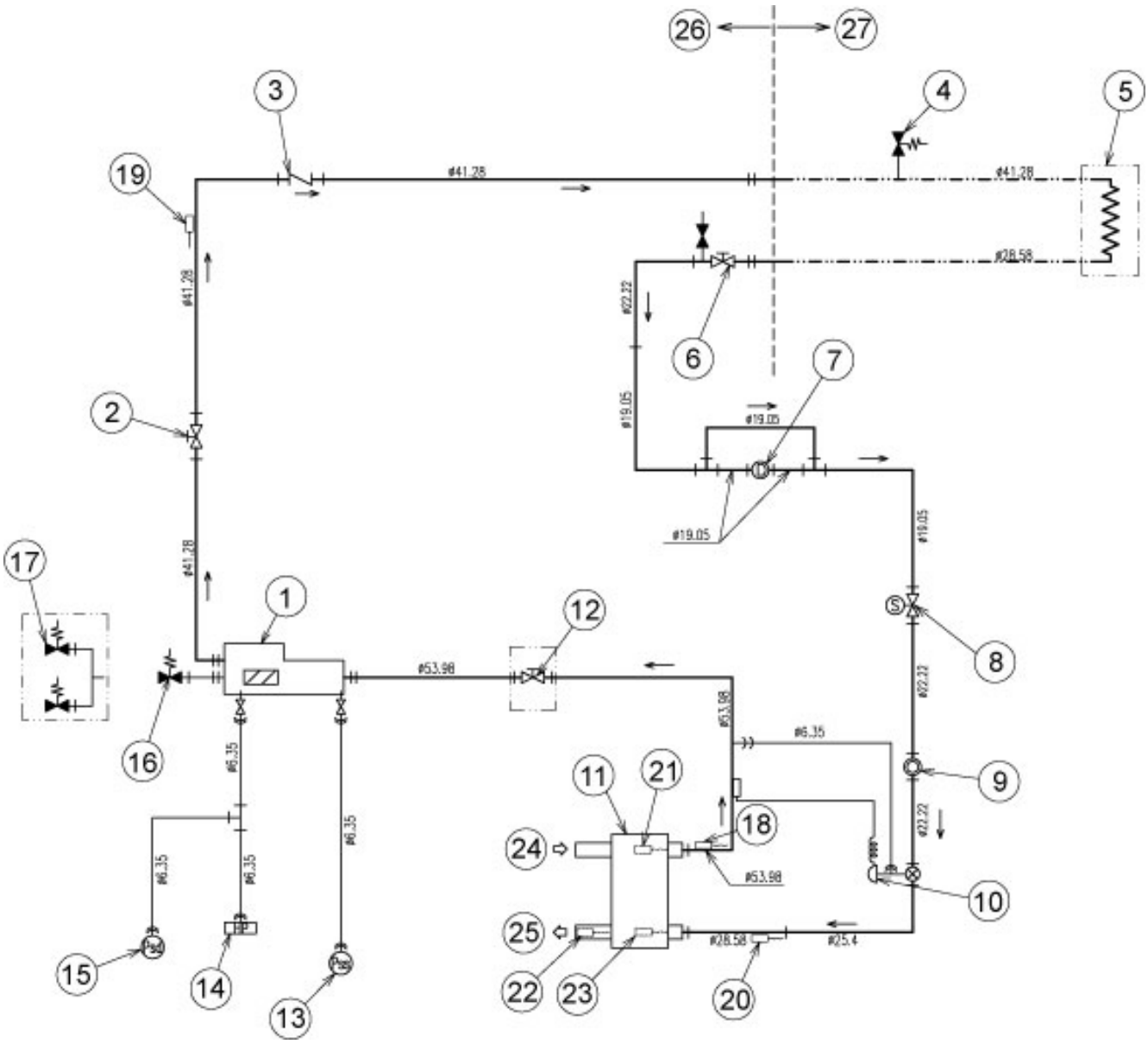
1	Compressor	16	Compressor Safety Valve (Option)
2	Check Valve	17	Compressor Dual Safety Valve (Option)
3	Pressure Relief Valve	18	Thermistor - Suction
4	Stop Valve (Option)	19	Thermistor - Discharge
5	Condenser	20	Thermistor - Evaporator
6	Stop Valve - Refrigerant Charge Point	21	Thermistor - Evaporator Water Inlet
7	Stop Valve	22	Thermistor - Evaporator Water Oulet
8	Drier	23	Thermistor - Evaporator Water Oulet
9	Sight Glass	24	Thermistor - Condenser Water Inlet (Option)
10	Electronic Expansion Valve	25	Thermistor - Condenser Water Outlet (Option)
11	Evaporator	26	Condenser Water Outlet
12	Stop Valve (Option)	27	Condenser Water Inlet
13	Low Pressure Sensor	28	Evaporator Water Inlet
14	High Pressure Switch	29	Evaporator Water Outlet
15	High Pressure Sensor		

YCSE 080 Models



1	Compressor	18	Pressure Switch
2	Check Valve	19	Solenoid Valve
3	Pressure Relief Valve	20	Capillary Tube
4	Stop Valve (Option)	21	Economiser
5	Condenser	22	Strainer
6	Stop Valve - Refrigerant Charge Point	23	Thermistor - Suction
7	Stop Valve	24	Thermistor - Discharge
8	Drier	25	Thermistor - Evaporator
9	Sight Glass	26	Thermistor - Evaporator Water Inlet
10	Electronic Expansion Valve	27	Thermistor - Evaporator Water Oulet
11	Evaporator	28	Thermistor - Evaporator Water Oulet
12	Stop Valve (Option)	29	Thermistor - Condenser Water Inlet (Option)
13	Low Pressure Sensor	30	Thermistor - Condenser Water Outlet (Option)
14	High Pressure Switch	31	Condenser Water Outlet
15	High Pressure Sensor	32	Condenser Water Inlet
16	Compressor Safety Valve (Option)	33	Evaporator Water Inlet
17	Compressor Dual Safety Valve (Option)	34	Evaporator Water Outlet

YCRE 040, 050, 060, 080, 100 Models



1	Compressor	15	High Pressure Sensor
2	Stop Valve	16	Compressor Safety Valve (Option)
3	Check Valve	17	Compressor Dual Safety Valve (Option)
4	Pressure Relief Valve (Field Supplied)	18	Thermistor - Suction
5	Remote Condenser (Field Supplied)	19	Thermistor - Discharge
6	Stop Valve	20	Thermistor - Evaporator
7	Drier	21	Thermistor - Evaporator Water Inlet
8	Solenoid Valve	22	Thermistor - Evaporator Water Oulet
9	Sight Glass	23	Thermistor - Evaporator Water Oulet
10	Expansion Valve	24	Evaporator Water Inlet
11	Evaporator	25	Evaporator Water Outlet
12	Stop Valve (Option)	26	YCRE
13	Low Pressure Sensor	27	Field Supplied
14	High Pressure Switch		

3 TRANSPORTATION, HANDLING AND STORAGE

3.1 Delivery and Storage

To ensure consistent quality and maximum reliability, all units are tested and inspected before leaving the factory. Units are shipped completely assembled and containing refrigerant under pressure. Units are shipped without export crating unless this has been specified on the Sales Order.

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

Ensure that all openings, such as water connections, are securely capped.

Do not store where exposed to ambient air temperatures exceeding 42°C.

The unit should be stored in a location where there is minimal activity to limit the risk of accidental physical damage.

To prevent inadvertent operation of the pressure relief devices the unit must not be steam cleaned.

It is recommended that the unit is periodically inspected during storage.

3.2 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 shipment documentation and a claim entered according to the instructions given.

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

3.3 Moving the Unit

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

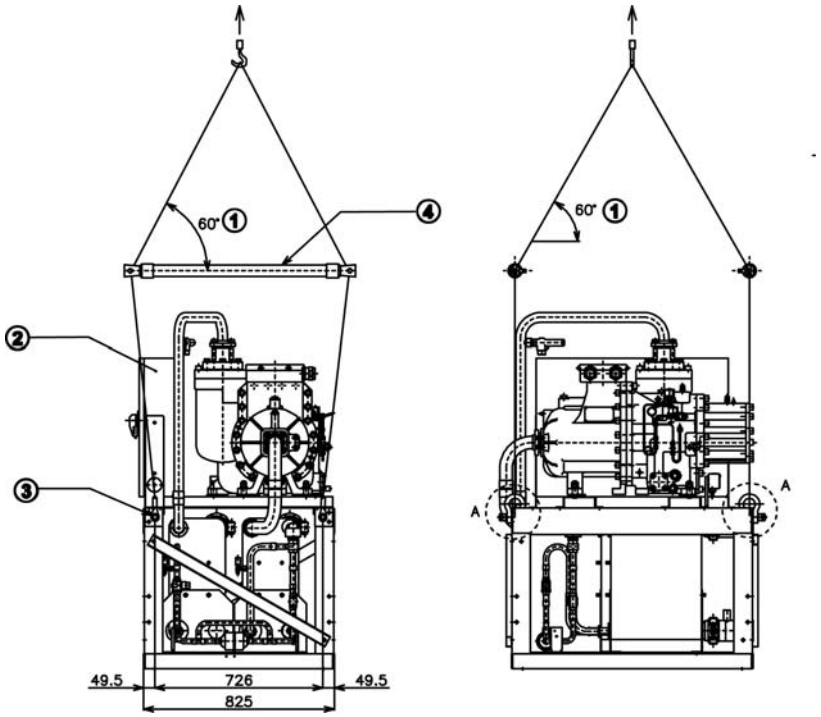
The units are designed to be moved using either lifting chains or rollers .

Lifting by Crane/Hoist

Attach the lifting chains to the lifting lugs on each corner of the unit framework. A spreader frame should be used to prevent damage to the unit from the lifting chains.

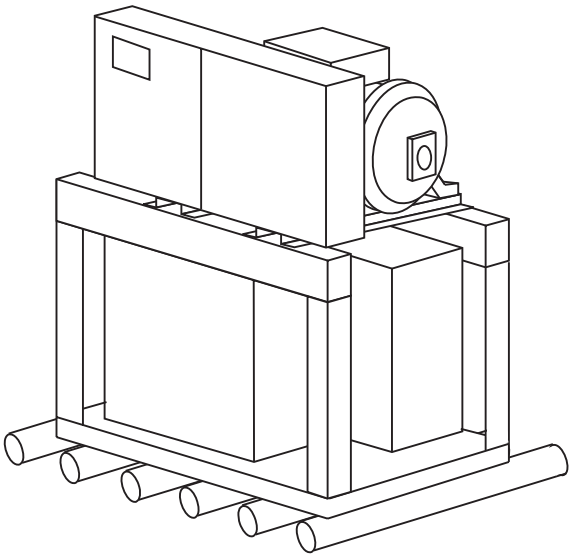
The unit must only be lifted at the points provided.

1 60° (or more)
2 Power Section
3 4 x Rigging Bolts
4 Spreader Bars

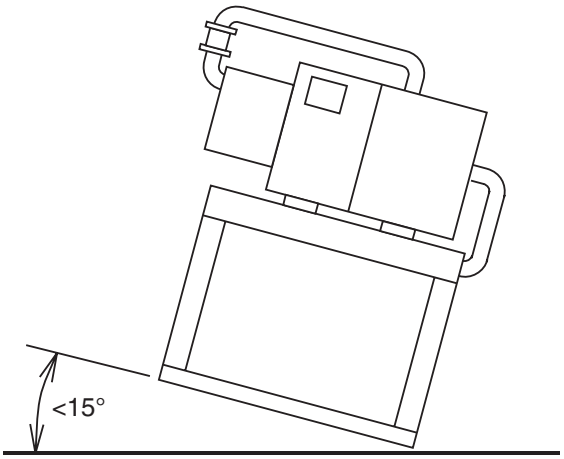


Moving the Unit with Rollers

Use at least 6 equal sized rollers under the base frame. Each roller must support both outer frames. Ensure the unit is balanced evenly on all the rollers.



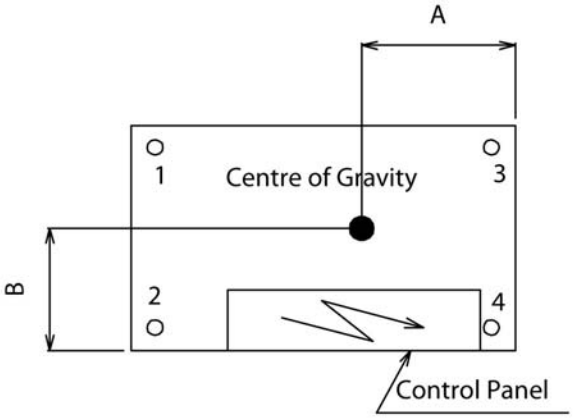
To prevent the unit tipping over do not tilt the unit more than 15°.



3.4 Lifting Weights

For details of weights and weight distribution refer to Section 9.

3.5 Weight Distribution & Centre of Gravity



Model	YCSE				
	40	50	60	80	100
Location	Weight Distribution (kg)				
1	225	230	245	275	410
2	175	175	190	215	415
3	215	225	250	285	415
4	165	170	190	225	415
Operating Weight					
(kg)	780	800	875	1000	1655
Location of Center of Gravity (mm)					
Dimension A	538	531	522	509	521
Dimension B	490	490	490	482	815

Model	YCRE				
	40	50	60	80	100
Location	Weight Distribution (kg)				
1	190	205	225	350	405
2	120	130	135	290	325
3	210	230	250	335	355
4	130	145	150	275	285
Operating Weight					
(kg)	650	710	760	1250	1370
Location of Center of Gravity (mm)					
Dimension A	420	415	415	535	555
Dimension B	565	570	575	895	905

4 INSTALLATION

4.1 Location Requirements

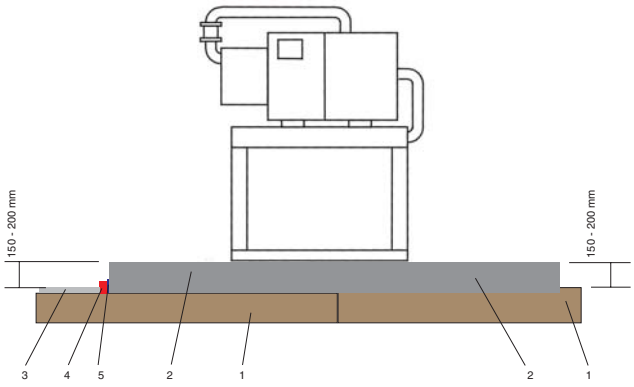
To achieve optimum performance and trouble-free service, it is essential that the proposed installation site meets with the location and space requirements for the model being installed. For dimensions, weight and space requirements, including service access details, refer to Section 9.

NOTE

The clearances recommended are nominal for the safe 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 Section 9.

Units are designed for indoor installation and not intended for wet, corrosive or explosive atmospheres. Installation should allow for water drain, ventilation and sufficient clearance for service.

For installation in equipment rooms near noise-critical areas, common walls should be of adequate sound attenuating construction, all doors should be tightly gasketed, and the unit should have vibration isolators fitted.



The unit must be installed on a suitable flat and level concrete base (2) that extends to fully support the unit base frame.

On basement foundations remove a portion of the basement floor (3) so that a concrete base can be poured resting on the ground (1) , with a corkboard (4) installed on both sides, and a waterproof sealing compound (5).

The concrete base must capable of supporting 150% of the operating weight. In case of upper floors, the unit and piping should be isolated from walls and ceiling. The unit may be bolted to the foundation using 13 mm Ø holes in the base of the framework. When lower transmitted vibration levels are required optional anti-vibration isolators can be supplied loose for site installation.

4.2 Installation of Vibration Isolators

An optional set of spring and cage or rubber mat type vibration isolators can be supplied loose with each unit. Installation drawings are attached inside the power and control panel.

CAUTION

Only spring and cage **or** rubber mat type vibration isolators can be installed. Do not install both types of vibration isolator together.

4.3 Pipework Connection

General Requirements

The following piping recommendations are intended to ensure satisfactory operation of the unit. Failure to follow these recommendations could cause damage to the unit, or loss of performance, and may invalidate the warranty.

CAUTION

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

- The water must enter the heat exchangers by the inlet connection. Refer to Section 9 for details.
- A flow switch must be installed in the customer pipework at the outlet of the exchangers as shown in the arrangement diagrams, and wired back to the control panel using screened cable. For details refer to “Electrical Connection”. This is to prevent damage to the exchanges caused inadequate liquid flow.
- The flow switch used must have gold plated contacts for low voltage/current operation. Paddle type flow switches suitable for 10 barg working pressure can be obtained from Johnson Controls as an option for the unit.
- The liquid pump(s) installed in the pipework system(s) should discharge directly into the unit heat exchanger section of the system. The pump(s) require an auto-starter (by others) to be wired to the control panel. For details refer to “Electrical Connection”.

- Pipework and fittings must be separately supported to prevent any loading on the heat exchanger(s). Flexible connections are recommended which will also minimise 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 exchangers should be readily de-mountable to enable cleaning prior to operation, and to facilitate visual inspection of the exchanger nozzles.

- Each heat exchanger must be protected by a 20 mesh strainer, available as an option, 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 is installed to allow flushing of the pipework system. The by-pass can be used during maintenance to isolate the heat exchanger without disrupting flow to other units. Do not exceed heat exchanger design pressures during water side pressure tests.

- 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 pump(s) 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 watts per metre under the insulation is recommended, supplied independently and controlled by an ambient temperature thermostat set to switch on at 3°C above the freezing temperature of the liquid.

Any debris left in the water pipework between the strainer and heat exchanger could cause serious damage to the plates in the heat exchanger and must be avoided. The installer/user must also ensure that the quality of the water in circulation is adequate, without any dissolved gasses which can cause oxidation of steel parts within the heat exchanger(s).

4.4 Water Treatment

The unit performance given in the Design Guide is based on a fouling factor of 0.044 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 heat exchanger pressure drop, reducing the flow rate and causing potential damage to the heat exchanger plates.

Aerated, brackish or salt water is not recommended for use in the water system(s). JCI recommend that a water treatment specialist is consulted to determine that the proposed water composition will not affect the evaporator materials of stainless steel. The pH value of the water flowing through the heat exchangers must be kept between 7 and 8.5. The total installed sytem including pumps, cooling coils, pipework, couplings and chiller should be assesed with regards to correct water treatment. Poor or incorrect water treatment can lead to warranty being avoided.

Glycol Solutions

For unit operation with chilled liquid temperatures leaving the cooler at below 5°C, glycol solutions should be used to help prevent freezing. Section 9, gives recommended solution strength with water, as a percentage by weight, for the most common types of glycol. It is important to check glycol concentration regularly to ensure adequate concentration and avoid possible freeze-up in the cooler.

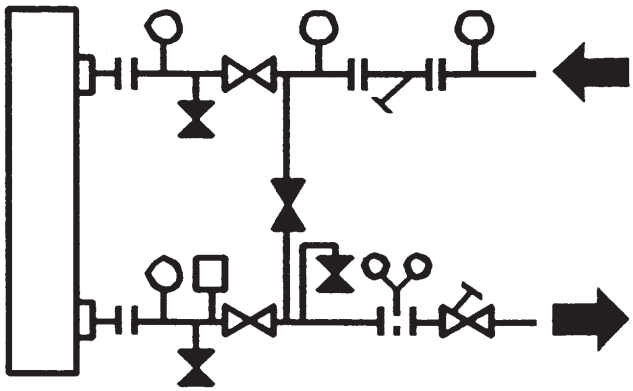
When using glycol solutions, pressure drops are higher than with water. Special care must be taken not to exceed the maximum pressure drop allowed.

4.5 Pipework Arrangement

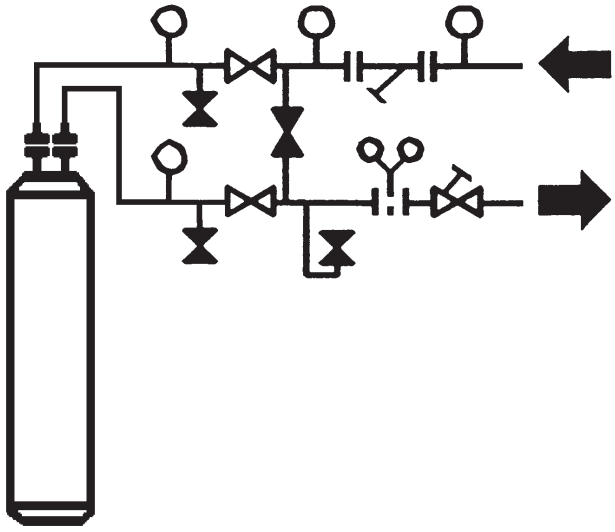
The following are suggested pipework arrangements for single unit installations. For multiple unit installations, each unit should be piped as shown.

Recommendations of the Building Services Research Association

Chilled Liquid System



Condenser Liquid System (YCSE Only)




Isolating Valve - Normally Open


Isolating Valve - Normally Closed


Flow Regulating Valve


Flow Measurement Device


Strainer


Pressure Tapping **/ Binder Point**


Flow Switch


Connection

4.6 Connection Types & Sizes

For connection sizes relevant to individual models refer to Section 9.

Refrigerant Relief Valve Piping

The compressor, cooler and condensers are each protected against internal refrigerant over-pressure and fire by refrigerant relief valves. The pressure relief valve is set at the design pressure of the system and has discharge capacity required by the relevant standard.

It is recommended that each valve should be piped to the exterior of the building so that when the valve is activated the release of high pressure gas and liquid cannot be a danger or cause injury.

The size of any pipework attached to a relief valve must be of sufficient diameter so as not to cause resistance to the operation of the valve. For critical or complex installations refer to EN13136.

The vent pipe must be installed and completed prior to commissioning/start-up work commencing.

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

$D5=1.447 \times L$

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.

4.7 Condenser Cooling Liquid Systems (YCSE Only)

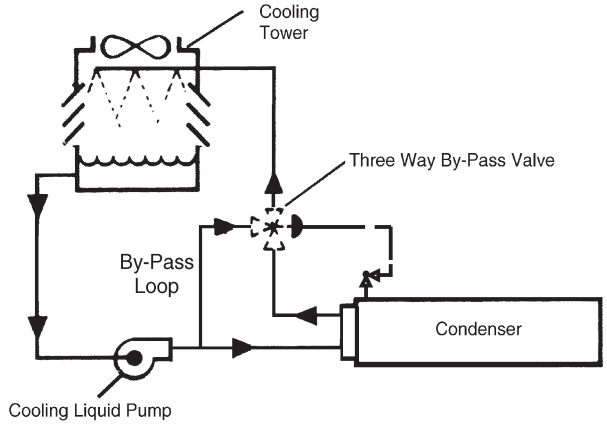
For primary cooling of units, condensers are usually piped in conjunction with a cooling tower, well water or dry coolers. Ensure the water is suitable for the stainless steel heat exchanger.

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

Direct Pressure Control (By others)

With YCSE units it is possible, if desired, to control the condenser cooling liquid inlet temperature / flow directly from the unit refrigerant pressure.

The refrigerant pressure can either be used to control cooling tower / dry cooler effectiveness by controlling fans or dampers on the tower, or to control condenser flow using a three way bypass valve.

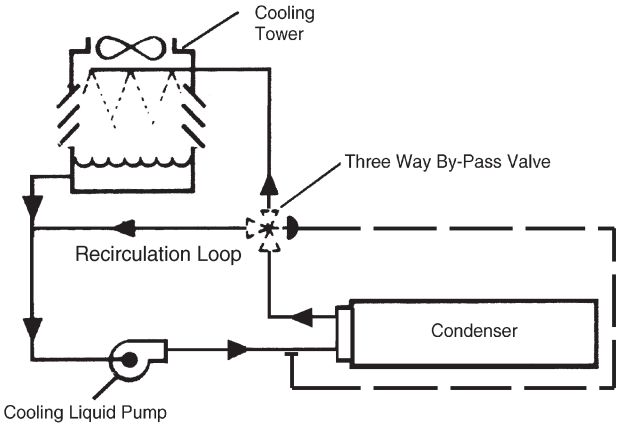


The aim is to maintain a stable discharge pressure as low as possible, but at least 5.0 bar above suction pressure. This can be done at a fixed value above the highest expected suction pressure, or by also measuring suction pressure and using differential control. In either case condenser cooling liquid flow and temperature limits must also be observed.

Inlet Temperature Control (By others)

For a cooling tower / dry cooler system, the simplest forms of control are to use fan cycling, fan speed control, or air damper control, with the tower having a thermostat in its sump. This will ensure stable condenser cooling liquid temperature sensing at design conditions and should be adjusted to ensure a condenser cooling liquid entering temperature of not lower than 22°C at lower ambient conditions.

If these methods are not available, or a cooling tower is not the source of cooling water, then a three way valve recirculation system can be used with control based on condenser inlet liquid temperature. In this case the objective is to maintain the inlet cooling liquid temperature as low as possible, although still observing the minimum limit of 22°C.



4.8 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.

Do not earth earth any portable electrical or welding equipment via the chiller.

After connection do not switch on mains power to the unit until it has been commissioned by JCI Authorised personnel. Some internal components are live when mains is switched on.

The unit ON/OFF switch on the front of the control panel has been set in the “OFF” position at the factory.

This switch MUST remain in the “OFF” position until the unit is commissioned by JCI Authorised personnel. If the switch is set to the “ON” position before commissioning then it must be reported to JCI, otherwise the warranty may be invalidated.

4.9 Remote Refrigerant Condenser Systems (YCRE models only)

General

For cooling of YCRE units, condensers are usually of the remote air-cooled type either roof or ground level mounted. Refrigerant systems should be designed and installed by suitably qualified persons in compliance with relevant national codes and standards. The complete pipework system and condenser **MUST** have a Design Working Pressure of at least 27.6 barg.

Suitable controls (e.g. fan cycling) should be included to keep discharge pressure within the unit operational limits and at least 4.0 bar above suction pressure.

The condenser should be designed to provide sufficient subcooling at its outlet to ensure that no 'flashing' will occur in the liquid line to the unit, or in the filter/drier and liquid valves on the unit itself. Liquid subcooling should be 4°C to 10°C on arrival at the unit.

It is important to ensure that for each system the remote condenser and liquid line volume is at least 1.65 times the liquid volume of the operating refrigerant charge.

When the unit has been located in its final position, the refrigerant system pipework can be connected. Pipework and fittings **MUST** be separately supported and not cause any loading on the unit. Flexible connections are recommended and will also minimise 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 operation.

Pipework Design

The following notes give guidance but should not be considered exhaustive:

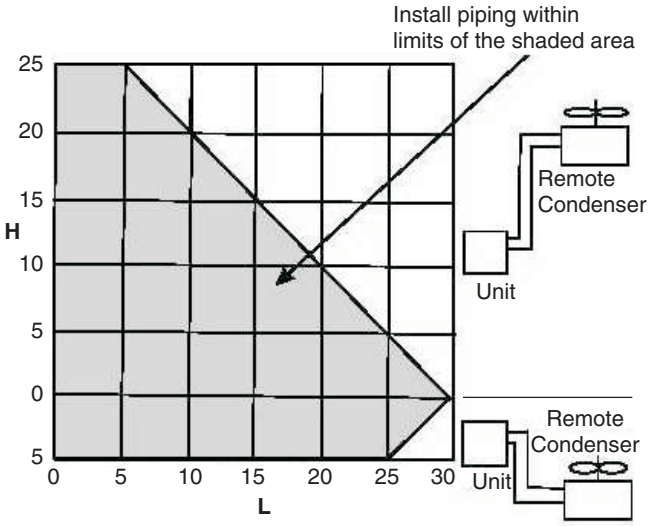
- Discharge lines MUST be sized for guaranteed oil transfer at minimum load step on the compressor. P-traps and double risers may be required when the condenser is sighted above the unit. Horizontal runs should be inclined slightly towards the condenser to aid oil transfer.
- Where the condenser is above or level with the unit, the discharge line should rise to at least the top edge of the condenser at some point. This will prevent liquid draining back to the compressor during the off cycle.
- Elbows, bends and valves should be minimised to reduce pressure drop and prevent loss of performance. The liquid line in particular should be designed for minimum pressure drop to avoid 'flashing' in the liquid line which will cause loss of performance and fault conditions to occur. Particular care should be taken where the condenser is below or level with the unit.
- To avoid the risk of discharge gas pulsation's causing undesired noise within the building, a suitably sized discharge gas muffler may be fitted in the discharge line near the unit. A slight loss of performance may, however, result at full load.

Incorrectly or badly designed and/or installed pipework systems may invalidate unit warranty.

Refrigerant Connections

Units are supplied with a nitrogen holding charge. Do not open the unit stop valves until all preparation for field leakage checks has been completed.

The refrigerant piping between the unit and the remote condenser should be designed in accordance with the following diagram.



H: Vertical Distance between the Chiller Unit and Remote Condenser
L: Horizontal Distance between the Chiller Unit and Remote Condenser

Connection pipe sizes are given in the following table. When selecting pipe sizes, pressure drop and velocity must be considered. If the pipe size is too small prctical friction loss is excessive or noise is emitted due to high velocity. The pipe size should permit sufficient gas speed to ensure oil return.YCRE units are equipped with an unloader system. The diameter of the discharge piping must allow sufficient oil to be carried even during minimum unloader operation. An excessively large diameter must not be selected.

	Outer Diameter (mm)	Thickness (mm)
Refrigerant Gas	41.3	2.0
Refrigerant Liquid	28.6	1.6

YCRE units are dehydrated and and charged with approximately 1kg of refrigerant at the factory.

It is possible that air and moisture may enter the system during installation. It is essential that that all moisture is removed from the piping system.

Install the connection piping and accessories with soldered, brazed or flare connections. Install oil traps and liquid loops in accordance with the piping arrangement digrams. Piping length and lift must not exceed the following values.

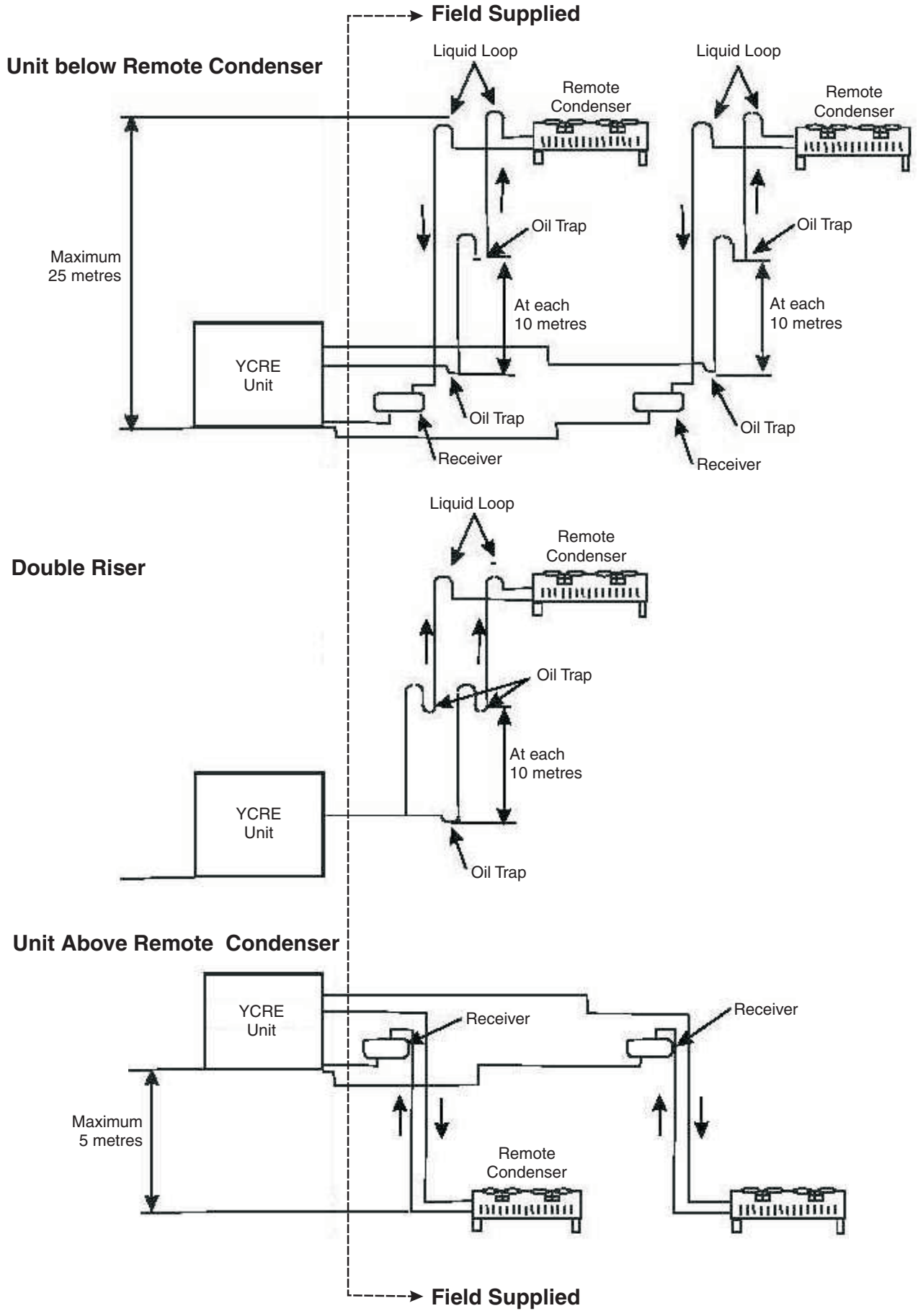
	Maximum Equivalent Piping Length (m)	Maximum Difference in Height (m)
Unit below Remote Condenser	30.0	25.0
Unit above Remote Condenser	30.0	5.0

All horizontal discharge piping should be pitched downwards in the direction of the refrigerant flow. The discharge line from the compressor should be looped to form a trap so that oil does not train from the discharge piping to the compresssor head during compressor stoppages.

System Testing

All newly installed pipework must be pressure/leak tested to national code requirements (normally 1.1 x Design Working Pressure) then fully evacuated before charging. Refer to the Section 5 for correct charging methods.

YCRE Refrigerant Piping Arrangements



4.10 Power Wiring

The units are suitable for 380 or 400 V, 3 phases + neutral + earth, 50 Hz nominal supplies only.
Minimum allowable 360 V.
Maximum allowable 440 V.

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

	Lug Size	Max. Cable Capacity (mm^2)
YCSE 040	M8	185
YCSE 050	M8	185
YCSE 060	M8	185
YCSE 080	M8	185
YCSE 100	M10	240
YCRE 040	M8	185
YCRE 050	M8	185
YCRE 060	M8	185
YCRE 080	M10	240
YCRE 100	M10	240

In accordance with EN 60204 it is the responsibility of the user to install overcurrent 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 metal gland plate the cables forming each 3 phase power supply must enter via the same hole in the gland plate.

If separate entries for each cable forming the 3 phase supplies are used, the metal gland plate must be replaced by a non-metallic gland plate, with due regard given to sealing the panel to IP2X.

All sources of supply to the unit must be taken via a common point of isolation (not supplied by York). Voltages from external sources may be present. Refer to operating limits for unit max/min voltages.

Single Point Power Supply Wiring

All models require one field provided 400 V, 3Ø, + N 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.

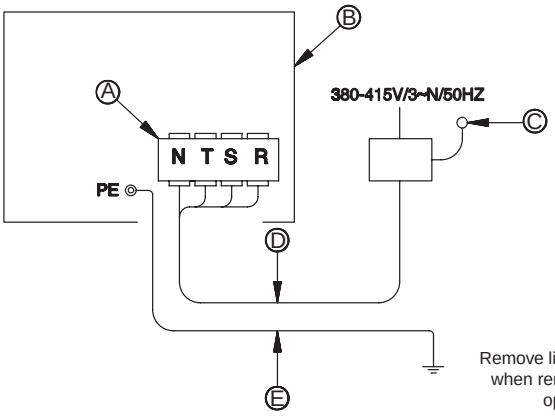
Connect the earth wire to the main protective earth terminal located in the power panel.

4.11 Control Wiring

Connect the interlock and control wiring as shown in the unit connection diagram below.

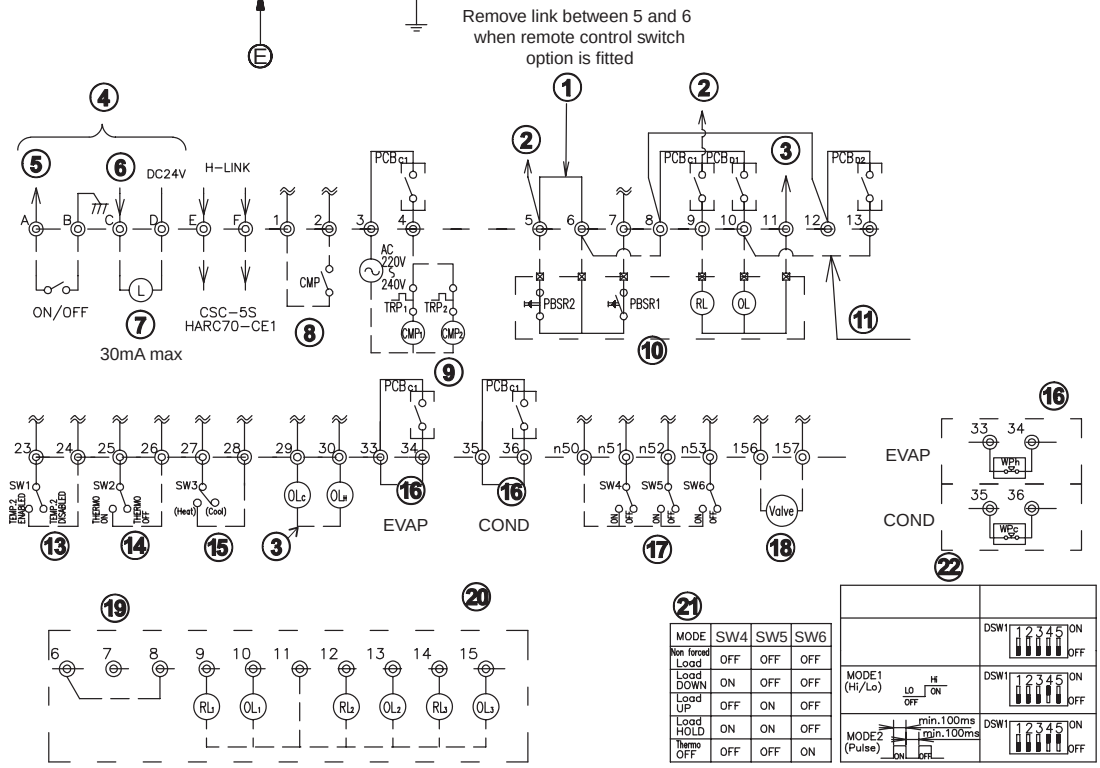
4.12 Connection Diagram

YCSE



N°	Name
A	Main Power/Terminal Board (R,S,T,N)
B	Electrical Box
C	Main Power Switch
D	Main Power Wiring
E	Earth Wiring

The main connection to terminal N is required.



NOTES:

N°	Name
1	In case of remote control operation this wire shall be removed (using item 10).
2	R Phase
3	Neutral
4	Low Voltage / Remote Control
5	Run/Stop Signal
6	Alarm Signal
7	Alarm Lamp (30mA max)
8	Pump Interlock
9	Pump operation
10	Remote Control Switch (RSW-A) (OPTION)
11	2 Circuit Units
12	Not Fitted

N°	Name
13	2 nd. Setting Temperature
14	External Thermostat Operation
15	Operation Mode (OPTION)
16	Only used for: -Diff. Water Pressure switch (OPTION) -Flow Switch (OPTION)
17	Force Compressor Load Operation
18	Free Cooling Output signal (Only cycle Nº 1)
19	In case of individual indication without Remote Control Switch
20	Customer wiring
21	Force compressor load
22	Setting of low voltage control

DSW1-4 must be set to ON when remote control switch option is fitted

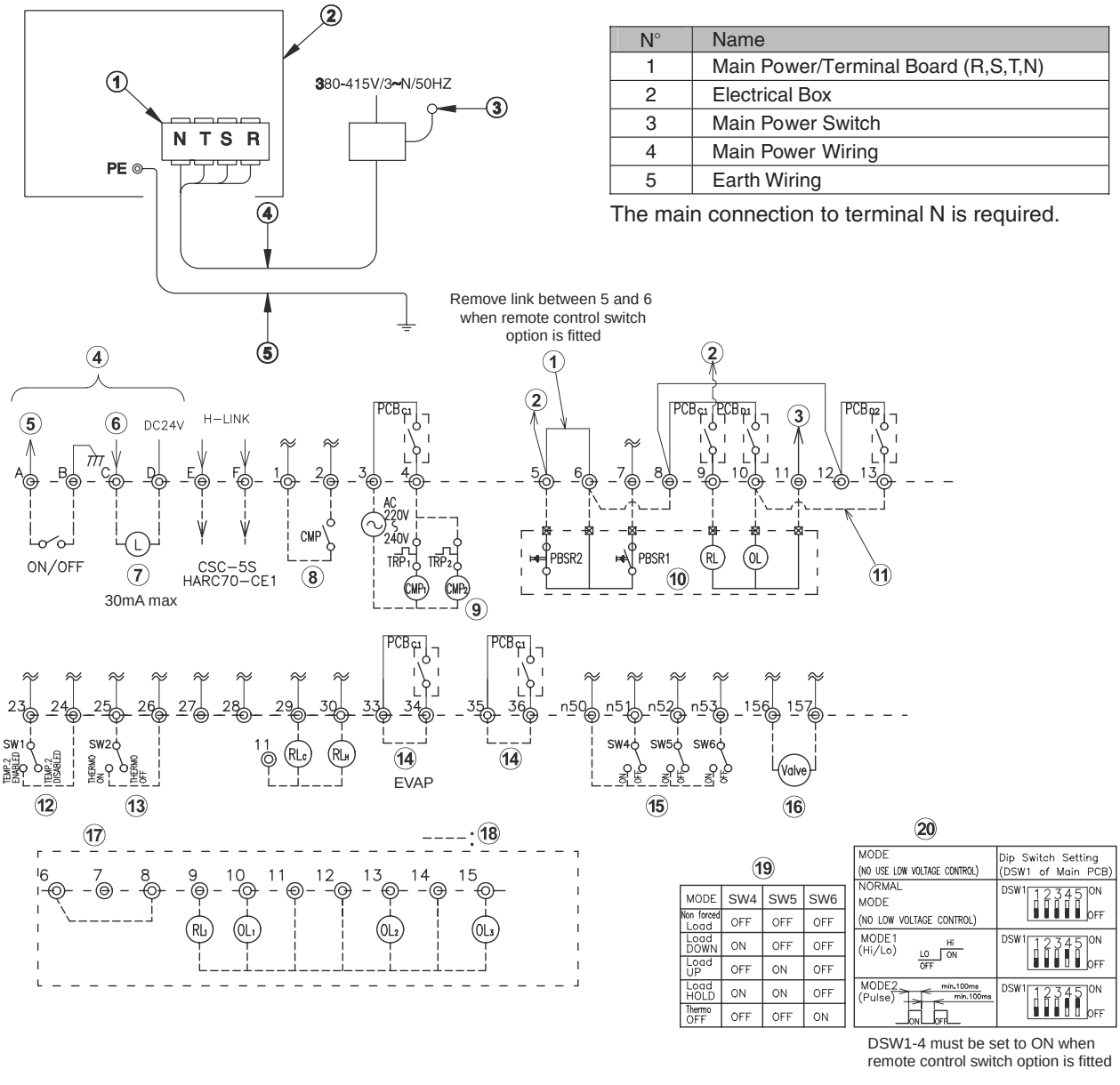
NOTE:

1.All the setting shall be performed before Power ON.

2.Remote / Local Change over Switch on Operation Switch shall be set, to Remote.

3.Terminals 1 ◎~/21◎ are for AC220-240V,Terminals A ◎~D ◎ are for DC24V. Terminals E ◎~F ◎ are H-link (Low signal)

YCRE



N°	Name
1	Main Power/Terminal Board (R,S,T,N)
2	Electrical Box
3	Main Power Switch
4	Main Power Wiring
5	Earth Wiring

The main connection to terminal N is required.

MODE	SW4	SW5	SW6
Non forced Load	OFF	OFF	OFF
Load DOWN	ON	OFF	OFF
Load UP	OFF	ON	OFF
Load HOLD	ON	ON	OFF
Thermo OFF	OFF	OFF	ON

MODE (NO USE LOW VOLTAGE CONTROL)	Dip Switch Setting (DSW1 of Main PCB)
NORMAL MODE (NO LOW VOLTAGE CONTROL)	DSW1 1 2 3 4 5 ON OFF
MODE1 (Hi/Lo) LO OFF Hi ON	DSW1 1 2 3 4 5 ON OFF
MODE2 (Pulse) min.100ms min.100ms ON OFF	DSW1 1 2 3 4 5 ON OFF

DSW1-4 must be set to ON when remote control switch option is fitted

NOTES:

N°	Name
1	In case of remote control operation this wire must be removed (using item 10).
2	S Phase
3	Neutral
4	Low Voltage / Remote Control
5	Run/Stop Signal
6	Alarm Signal
7	Alarm Lamp (30mA max)
8	Pump Interlock
9	Pump operation
10	Remote Control Switch (RSW-A) (OPTION)
11	2 cycles

N°	Name
12	2nd. Setting Temperature
13	External Thermostat Operation
14	Only used for: - Diff. Water Pressure switch (OPTION) - Flow Switch (OPTION) For Air Cooled: Link 35/36
15	Force Compressor Load Operation
16	Free Cooling Output signal (Only cycle Nº 1)
17	In case of individual indication without Remote Control Switch
18	Customer wiring
19	Force compressor load
20	Setting of low voltage control

NOTE

1. All the setting must be performed before Power ON.
2. Remote / Local Change over Switch on Operation Switch must be set, to: Remote
3. Terminals 1 ~ 57 are for AC220-240V,Te rminals A ~ D are for DC24V. Terminals E ~ F are H-link (Low signal)

5 COMMISSIONING

5.1 Preparation

Commissioning of this unit should only be carried out by JCI Authorised personnel who have attended a YCSE/YCRE training course.

The unit 'ON/OFF' switch on the front 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 JCI Authorised personnel. If the switch has been set to the 'ON' position before commissioning then it must be reported to JCI 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.

Charging from the liquid connection is necessary on R407C to ensure the correct refrigerant mix is maintained.

Do not charge liquid refrigerant with static water in the cooler. 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 into the condenser with the full operating charge as given in Section 9.

The stated operating charge is a guideline only and for both YCSE and YCRE units the charge should be rechecked at full load stable conditions (30mins runtime) for correct suction superheat (6°C), liquid sub-cooling 5.5°C - 9.5°C water cooled, 5.5°C - 9.5°C air cooled.

Valves: Open the compressor suction valve (option), discharge valve (option) and the liquid line service valves on all systems.

Compressor oil: Check the compressor oil for correct level at the oil level sight glass. Full at commission startup and no less than half full during normal operation.

Isolation/protection: Verify that all sources of electrical supply to the unit are taken from point(s) 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 panels to the circuit breakers, terminal blocks or switch disconnectors are tight.

Earthing: Verify that the units protective terminal(s) are 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 Section 9.

Switch Settings: Ensure that the unit 'ON/OFF' switch on the control panel is set to 'ON'.

The unit is now live!

Compressor heaters: Verify the compressor heaters are energised. The compressor heaters should be on for 12 hours before start-up to bring the compressor oil up to the correct operating temperature.

Chilled Liquid System: Verify that the chilled liquid system has been installed correctly, and has been commissioned with the correct direction of water flow through the cooler. Purge air from the top of the cooler using the plugged air vent mounted on the top of the cooler body. Ensure system flushing and water treatment have been carried out and verify that water make-up/pressurization units are operating correctly.

Cooling Liquid System: Verify that the cooling liquid system has been installed correctly, and has been commissioned with the correct direction of water flow through the condenser. Purge air from the top of the condenser using the plugged air vent mounted at the top of the condenser water head (YCSE only).

Cooler and Condenser flow rates and pressure drops must be within the limits given in Section 9. 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 evaporator outlet, and wired into the control panel correctly. On YCSE units verify a cooling liquid flow switch is fitted in the customer's pipework on the condenser outlet, and wired into the control panel correctly.

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 compressors are at the correct setting and are reset.

5.2 First Time Start-up

During the commissioning period there should be sufficient heat load to run the unit under stable full load operation to enable the unit controls, and system operation to be set up correctly and a commissioning log taken.

Interlocks: Verify that liquid is flowing through the cooler 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.

System configuration: Ensure all DIP switch settings are correct for system operationand that safety settings are within the design parameters for the site application.

Start-up: Press the system ON switch SW1 to start the unit. There will be a delay before the compressor starts. See the operating sequence chart in Section 6. Be ready when the compressor starts to switch off the unit immediately if any unusual noises or other adverse conditions develop. Use the main ON/OFF switch if necessary.

Discharge and suction pressures: Check the discharge and suction pressures on the control panel display. Refer to Section 6. Check the pressures are in accordance with the pressure curves given in Section 9.

Superheat temperature: Check the superheat temperature is in accordance with the temperature curve given in Section 9.

Sub-cooling temperature: Check the sub-cooling temperature is in accordance with the temperature curve given in Section 9.

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 moisture indicator (if fitted) for correct colour indication.

Control and protective devices: Check that all the control and protective devices operate in accordance with the operation sequence chart in Section 6.

Thermostat: Check the unit responds correctly to thermostatic demands, remote run demands and shutdown.

General operation: When the checks are complete, stop the unit by pressing the system OFF switch SW2. If the unit is not in remote control mode, restart the unit the unit by pressing the system ON switch SW1. Check that loading occurs and that general operation is correct.

6 UNIT OPERATION

6.1 General Description

The units are designed to work independently, or in conjunction with other equipment via a building management system or other automated control system. When operating, the unit controls monitor the chilled liquid system temperature at the unit and take the appropriate action to maintain this temperature within desired limits. This action will involve running one or both compressors at a suitable load 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 via the water cooled condenser. The following sections give an overview of the operation of the unit.

6.2 Operation

The operating sequence described below relate to operation on a cooling demand start after power has been applied, such as start-up commissioning.

The controller will perform a pre-check to ensure that 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 compressor will start.

6.3 Normal Running and Cycling

Once the unit has been started, all operations are fully automatic. The display will show one of the normal operation codes as detailed in the following table.

Display Code		Function
No. 1 Comp.	No.2 Comp.	
C1-88	C2-88	Power supply present, System off
C1-Co	C2-Co	Unit in Cooling mode
C1-HE	C2-HE	Heating mode (heat pump option only)
C1-oF	C2-oF	Unit off - no cooling demand
Pu	Pu	Pump only operation
C1-E0	C2-E0	Initialising Electronic Expansion Valve

When a compressor is running the controller monitors various system parameters. Should any problems occur, the control system will immediately take appropriate action and display the nature of the fault Refer to Alarm Codes tables for further details.

6.4 Shutdown

The unit can be stopped manually at any time by pressing the system OFF switch SW2.

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.

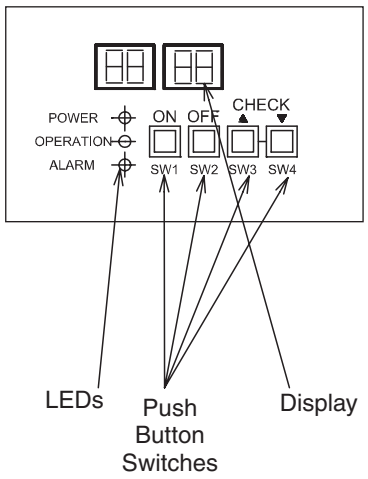
If mains power must be switched off, (for extended maintenance or a shutdown period), the compressor suction, discharge and liquid line service valves on both systems should be closed and if there is a possibility of liquid freezing due to low ambient temperatures, the cooler and condenser should be drained. Fit appropriate valve tags to indicate valve positions and that systems are drained and isolators. The valves should be opened, the cooler and condenser refilled and the power must be switched on for at least 12 hours before the unit is restarted.

6.5 Control System

The control system comprises the operator control panel and display on the front of the unit and a control printed circuit board located inside the unit on the rear of the control panel.

6.5.1 Control Panel

The control panel comprises four push-button switches, a four figure display and three LEDs.

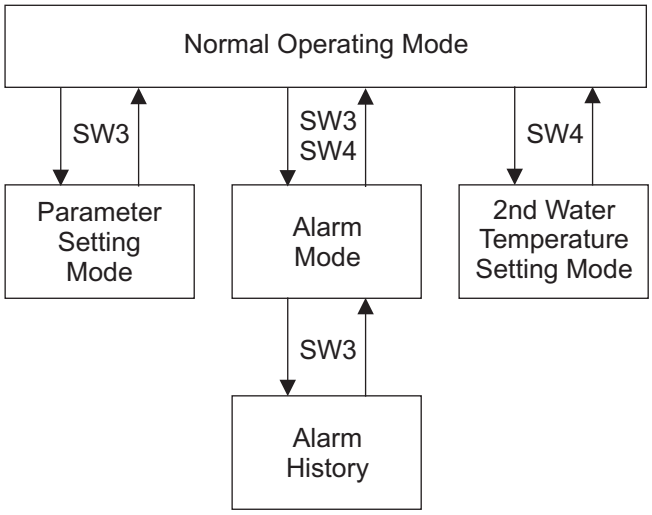


	Function
SW1	Sets system ON
SW2	Sets system OFF
SW3	Display control UP
SW4	Display control DOWN
Power LED	Displays red when power is present
Alarm LED	Display orange when alarm occurs
Display	Displays operating or alarm codes

The control panel has four modes of operation:

- Normal
- Alarm
- Parameter settings
- Second Water Temperature Setting

The modes are changed by using the display check switches SW3 and SW4.



Normal Mode

The display will show one of the normal operation codes as detailed in the following table.

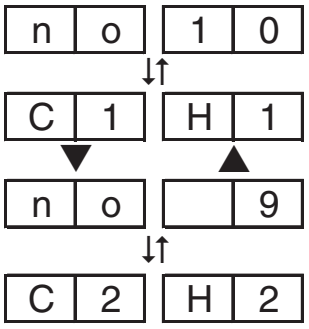
Display Code		Function
No. 1 Comp.	No.2 Comp.	
C1-88	C2-88	Power supply present, System off
C1-Co	C2-Co	Unit in Cooling mode
C1-HE	C2-HE	Heating mode (heat pump option only)
C1-oF	C2-oF	Unit off - no cooling demand
Pu	Pu	Pump only operation
C1-E0	C2-E0	Initialising Electronic Expansion Valve

Alarm Mode

When an alarm is activated the orange ALARM LED will be on. Select the Alarm Mode on the display by pressing and holding SW3 ▲ and SW4 ▼ simultaneously for 3 seconds.

Press SW3 ▲ for 3 seconds to enter the alarm history display. The unit can store up to 10 alarm occurences.

Press SW3 ▲ or SW4 ▼ to scroll through the alarms. The display will automatically toggle (↓↑) between the alarm number and one of the alarm codes as detailed in the alarm code table.

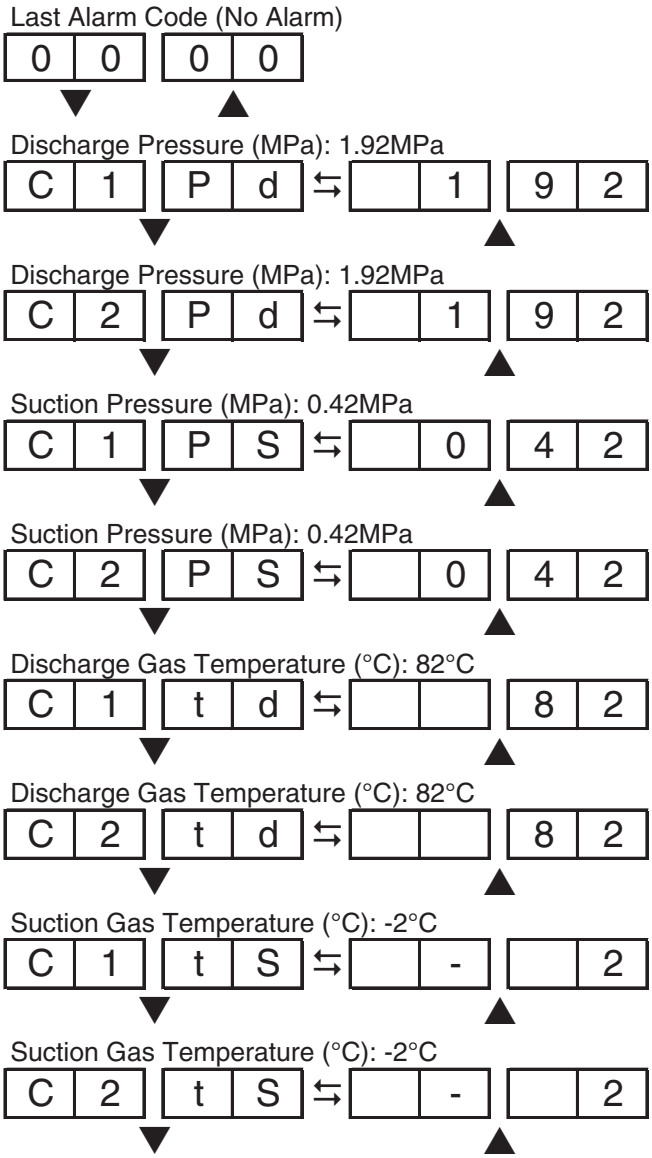


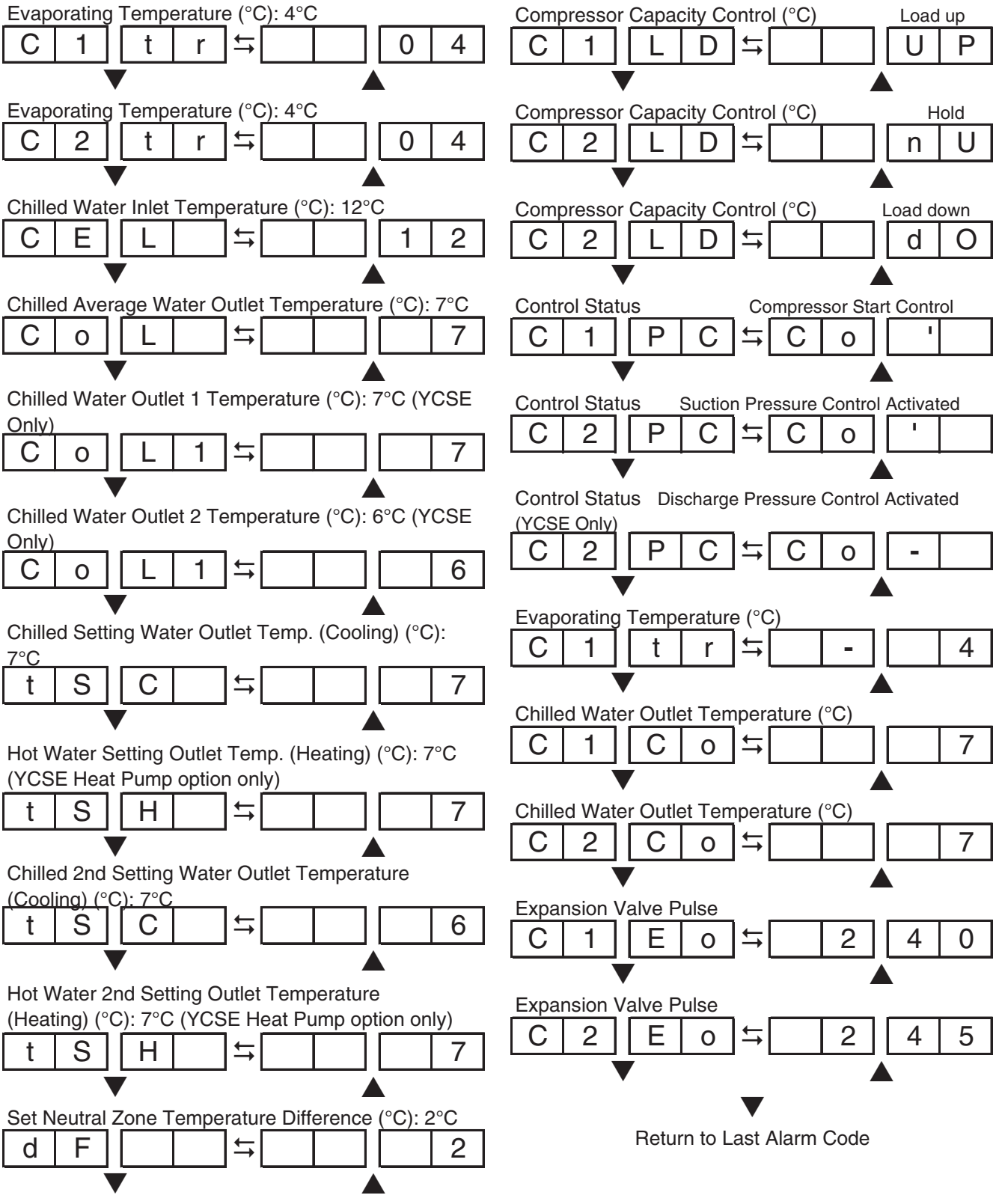
This example shows that alarm 10 was a system 1 high pressure alarm and alarm 9 was a system 2 high pressure alarm. See Alarm Codes, Pressure/ Temperature Settings and Safety and Control Device Settings.

Parameter Settings Mode

To change from Normal to Parameter Settings mode press and hold SW3 for 3 seconds. A small LED will light in the lower right hand section of the display when Parameter Settings mode is selected. To return to Normal mode press and hold SW3 again for 3 seconds.

Press SW3 ▲ or SW4 ▼ to scroll through the paramaeter settings. The display will show the automatically toggle (↓↑) between the parameter and the parameter value.

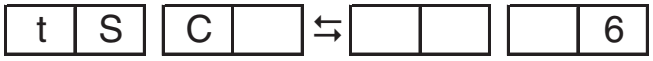



Evaporating Temperature (°C): 4°C
C 1 t r ⇆ 0 4
Evaporating Temperature (°C): 4°C
C 2 t r ⇆ 0 4
Chilled Water Inlet Temperature (°C): 12°C
C E L ⇆ 1 2
Chilled Average Water Outlet Temperature (°C): 7°C
C o L ⇆ 7
Chilled Water Outlet 1 Temperature (°C): 7°C (YCSE Only)
C o L 1 ⇆ 7
Chilled Water Outlet 2 Temperature (°C): 6°C (YCSE Only)
C o L 1 ⇆ 6
Chilled Setting Water Outlet Temp. (Cooling) (°C): 7°C
t S C ⇆ 7
Hot Water Setting Outlet Temp. (Heating) (°C): 7°C (YCSE Heat Pump option only)
t S H ⇆ 7
Chilled 2nd Setting Water Outlet Temperature (Cooling) (°C): 7°C
t S C ⇆ 6
Hot Water 2nd Setting Outlet Temperature (Heating) (°C): 7°C (YCSE Heat Pump option only)
t S H ⇆ 7
Set Neutral Zone Temperature Difference (°C): 2°C
d F ⇆ 2
Compressor Capacity Control (°C)
Load up
C 1 L D ⇆ U P
Compressor Capacity Control (°C)
Hold
C 2 L D ⇆ n U
Compressor Capacity Control (°C)
Load down
C 2 L D ⇆ d O
Control Status
Compressor Start Control
C 1 P C ⇆ C o '
Control Status
Suction Pressure Control Activated
C 2 P C ⇆ C o '
Control Status (YCSE Only)
Discharge Pressure Control Activated
C 2 P C ⇆ C o -
Evaporating Temperature (°C)
C 1 t r ⇆ - 4
Chilled Water Outlet Temperature (°C)
C 1 C o ⇆ 7
Chilled Water Outlet Temperature (°C)
C 2 C o ⇆ 7
Expansion Valve Pulse
C 1 E o ⇆ 2 4 0
Expansion Valve Pulse
C 2 E o ⇆ 2 4 5
Return to Last Alarm Code

Second Water Temperature Setting

This temperature setting provides another setting value for water temperature. It can be changed by a remote signal.

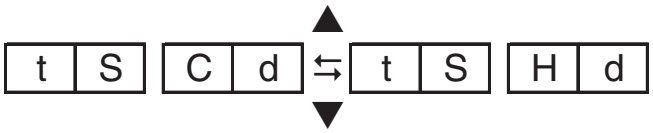
Select the Parameter Settings Mode by pressing and holding SW4 for 3 seconds. Press SW4 ▼ to scroll through the parameter settings until the second water temperature setting display is shown:



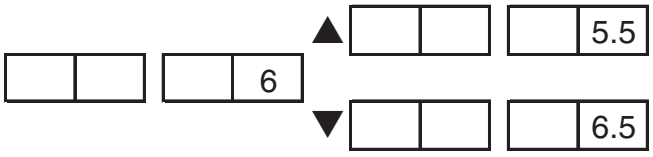
This shows the setting is 6°C.

The display automatically toggles (↓↑) between the parameter and the parameter value.

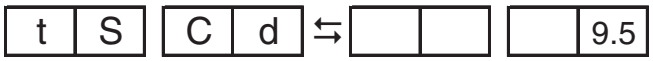
Press SW3 ▲ or SW4 ▼ to switch btween "Hot Water Temperature Setting" (YCSE heat pump option only) and "Chilled Water Temperature Setting".



Press and hold SW3 ▲ and SW4 ▼ for 3 seconds to enter the setting mode. Use SW3 ▲ and SW4 ▼ to change the value.



Press and hold SW3 ▲ and SW4 ▼ for 3 seconds to save the setting.



The Chilled Water Temperature is set to 9.5°C. Use the same procedure to set the Hot Water Temperature (YCSE heat pump option only).

Alarm Codes

Alarm Display Code		Function
No. 1 Comp.	No.2 Comp.	
C1-H1	C2-H2	High Pressure
C1-L1	C2-L2	Low Pressure
C1-t1	C2-t2	Low Suction Gas Temperature Sensor
C1-51	C2-52	Activation of Thermal Relay for Compressor Overload
C1-71	C2-72	Activation of Compressor Internal Thermistor
C1-61	C2-62	Activation of Discharge Gas Temperature Sensor
C1-91	C2-92	Cooler Inlet Refrigerant Temperature Low
C1-28	C2-28	Failure of Suction Gas Pressure Sensor (Open / Short)
C1-27	C2-27	Failure of Discharge Gas Pressure Sensor (Open / Short)
C1-26	C2-26	Failure of Suction Gas Thermistor (Open / Short)
C1-21	C2-21	Failure of Cooler Inlet Refrigerant Thermistor (Open/Short)
C1-23	C2-23	Failure of Discharge Gas Thermistor (Open / Short)
C1-24	C2-24	Failure of Thermistor set before Exapansion Valve
31-1		Failure of Hot Water Inlet Temperature Thermistor (Open/Short) (YCSE heat pump option only)
32-32		Failure of Hot Water Outlet Temperature Thermistor (Open/Short) (YCSE heat pump option only)

Alarm Display Code		Function
No. 1 Comp.	No.2 Comp.	
C3-P6	C3-P6	Water Failure for Condenser (Differential Pressure Switch or Flow switch option) (YCSE only)
6E-6E		Alarm of Water Failure (Differential Water Pressure Switch Option)
AP-AP		Activation of Additional Protection Device
13-13		Freezing Protection
05-05		Phase Abnormally
5P-5P		No Signal Feedback from Water Pump
EU-EU		Communication Error between Expansion Valve PCB and Control PCB
03-03		Communication Error between Chiller and Remote Control (if CSC-5S connected)
"Pu"-"Pu"		Excessive High Water Temperature
40-40		Malfunction
11-11		Failure of Water Inlet Temperature Thermistor (Open / Short)
12-12		Failure of Water Outlet Temperature Thermistor (Open / Short)
C1-25	C1-25	Failure of Water Outlet Temperature Thermistor in cooler site (Open / Short)
C1-P6	C1-P6	Retry Operation

"-" : Flashing Display

Pressure/Temperature Settings

	Cooling Liquid		Water (DSW4-4: OFF)	Brine/Glycol (DSW4-4: ON)	
	Leaving Liquid Temp (°C)		5 to 20	-5 to 5	-10 to -6
Pressure Control	Suction Gas (Ps)	Protection	If Ps < 3.7bar, starts loading down for 10 secs and then holds slide valve postion	If Ps < 0.9bar, starts loading down for 10 secs and then holds slide valve postion	If Ps < 0.2bar, starts loading down for 10 secs and then holds slide valve postion
		Alarm	If Ps < 3.7bar, stop compressor as thermo-off. Alarm Cn-Ln in this case 3 times	N/A	
		Alarm	Alarm Cn-Ln immediately when Ps<0.5bar		
	Discharge Gas (Pd)	Protection	Starts loading down at 26bar		
Freeze Protection	Water inlet/outlet temp.	Alarm	CEL/CoL < 2°C	CEL/CoL < -8.5°C	CEL/CoL < -13.5°C
		Protection	If CEL/CoL < 2.5°C starts loading down for 10 secs and then holds slide valve postion for 30 mins	If CEL/CoL < -8.0°C starts loading down for 10 secs and then holds slide valve postion for 30 mins	If CEL/CoL < -13.0°C starts loading down for 10 secs and then holds slide valve postion for 30 mins
	Suction Gas Temp (Ts)	Alarm	If Ts < 1°C for 10 secs. Alarm Cn-Tn.	If Ts < -10°C for 10 secs. Alarm Cn-Tn.	If Ts < -15°C for 10 secs. Alarm Cn-Tn.
	Evaporating Gas Temp. (Te)	Thermo-off	If Ts < 3°C for 10 secs stop compressor as thermo-off	If Ts < -15°C for 10 secs stop compressor as thermo-off	If Ts < -20°C for 10 secs stop compressor as thermo-off
Compressor Coil Protection	Discharge Gas Temp (Ts)	Alarm	If Td > 140°C for 3 secs alarm Cn-6n		

Safety and Control Device Settings

Standard Models	YCSE040	YCSE050	YCSE060	YCSE080	YCSE100
Compressor HP Switch	Manual Reset, Non-Adjustable (One switch for each compressor motor)				
Cut-out (Mpa)	2.74				
Compressor LP Switch (Pressure Sensor)	Electronic Control				
Cut-out (Mpa)	0.05				
Compressor Internal Thermostat	Manual Reset, Non-Adjustable (One switch for each compressor motor)				
Cut-out (°C)	115				
Cut-in (°C)	93				
Compressor Motor Fuse (A)	100	100	125	125	100
Compressor Motor Thermal Relay	Manual Reset, Non-Adjustable (One 3 phase set for each compressor motor)				
Rating (A)	48	55	70	75	55
Compressor Magnetic Circuit Protection (Option)	Manual Reset, Non-Adjustable (One 3 phase set for each compressor motor)				
Rating (A)	90	107	127	127	107
Oil Heater	One heater for each compressor motor)				
Rating (W)	150				
Discharge Gas (Electronic Control)	One for each system				
Cut-out (°C)	140				
CCP Timer	Non-Adjustable (One timer for each compressor motor)				
Setting Time (S)	180				
Star-Delta (S)	5				
Unloading During Starting (S)	30				
Refrigerant Circuit Pressure Relief Valve	One for each circuit				
Pressure Setting (Mpa)	3.0				
Freeze Protection Thermostat	One for each evaporator				
Cut-out (°C)	2.0				

Standard Operating Sequence - YCSE-040, 050, 060, 080, YCRE-040, 050, 060

Control Devices		Control Stage																			
		Starting Control									Capacity Control				Safety Devices			Shut Down		
Main Power Switch		OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF
Chilled Water Pump		-	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF
Condenser Water Pump		-	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF
Operation Switch (ON/OFF)		-	-	-	ON	-	-	-	-	-	-	-	-	-	-	-	OFF	-	OFF	-
Controller	Load Up	-	-	-	-	-	-	O	O	-	-	-	-	-	-	-	-	-	-	
	Neutral	-	-	-	-	-	-	-	-	O	-	O	-	-	O	O	-	O	-	
	Load Down	-	-	-	-	-	-	-	-		O	-	O	O	-	-	-	-	-	
Safety Devices	Nº 1	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	CLS	CLS	CLS	CLS
Power Supply Lamp		OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF
Operation Lamp		OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF
Alarm Lumpr		OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
Oil Heater	CH1	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON	OFF
Motor for Compressor	MC1	OFF	OFF	OFF	OFF	STA (ULD) 15%	DLT (ULD) 15%	DLT (ULD) 15%-99%	DLT (FLD) 100%	DLT (FLD) 100%	DLT (ULD) 15%-99%	DLT (ULD) 15%-99%	DLT (ULD) 15%	OFF	DLT (ULD) 15%-99%	OFF	OFF	DLT (FLD) 100%	OFF	OFF
Solenoid Valve	SV11	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
	SV12	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV13	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Timing Schedule					3min															
						5 sec														
							30 sec													
								Minimum 3 mins												

CLS=Close OPN=Open STA=Star DLT=Delta ULD=Unload FL=Full Load

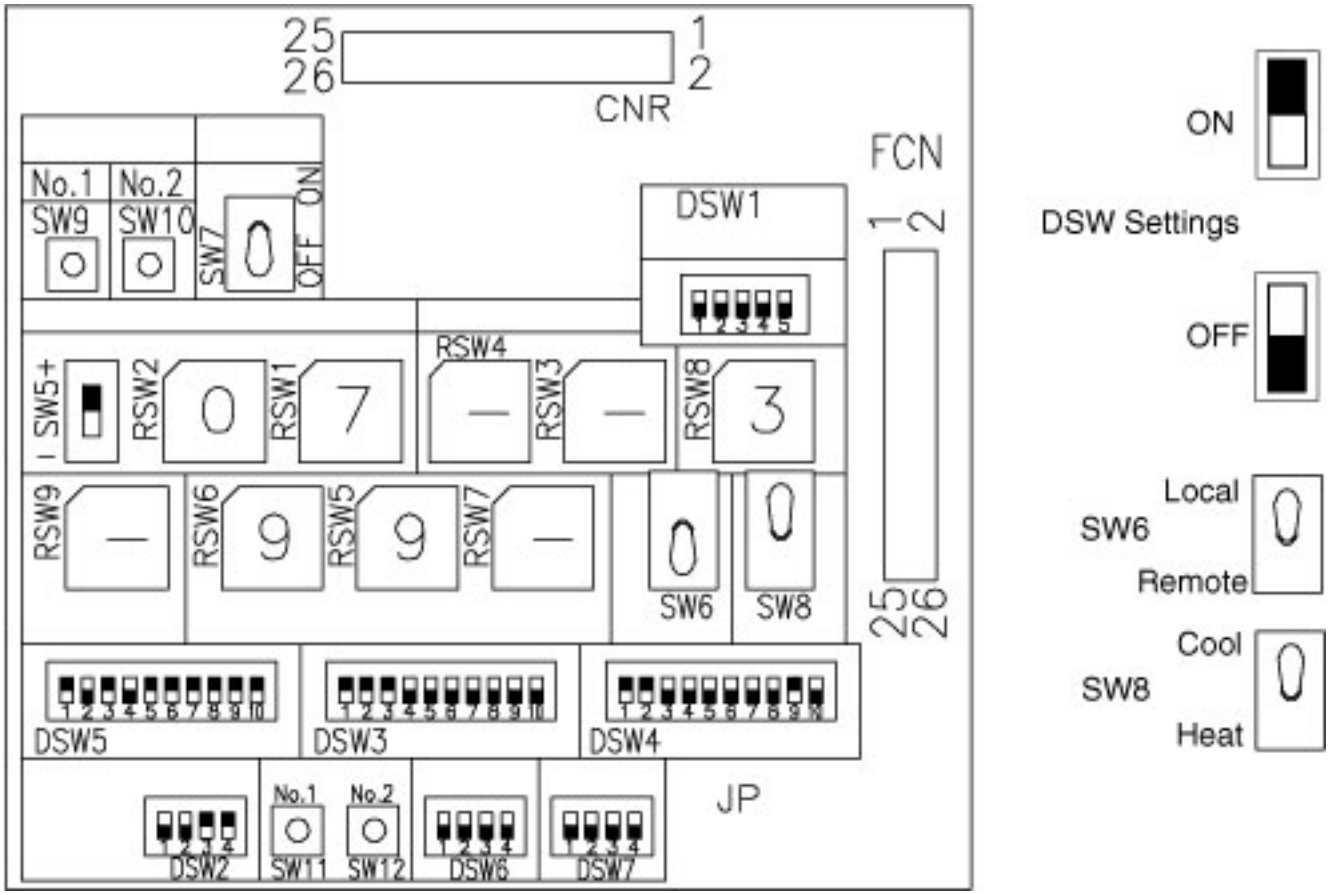
Standard Operating Sequence - YCSE-100, YCRE-080, 100

Control Devices		Control Stage																					
		Starting Control											Capacity Control				Safety Devices				Shut Down		
Main Power Switch		OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF
Chilled Water Pump		-	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF
Condenser Water Pump		-	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF
Operation Switch (ON/OFF)		-	-	-	ON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	OFF	-	OFF	-
Controller	Load Up	-	-	-	-	-	-	-	-	O	O	-	-	-	-	-	-	O	O	-	-	-	-
	Neutral	-	-	-	-	-	-	-	-	-	-	O	-	-	-	-	O	-	-	-	O	-	-
	Load Down	-	-	-	-	-	-	-	-	-	-	-	O	O	O	O	-	-	-	-	-	-	-
Safety Devices	Nº 1	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	OPN	CLS	CLS	CLS	CLS
	Nº 2	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	CLS	OPN	CLS	CLS	CLS	CLS
Power Supply Lamp		OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF
Operation Lamp		OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF
Alarm Lamp		OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON			OFF	ON	OFF	OFF
Oil Heater	CH1	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON	ON	OFF
	CH2	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	ON	OFF
Motor for Compressor YCSE YCRE	MC1	OFF	OFF	OFF	OFF	STA (ULD) 15%	DLT (ULD) 15%	STA (ULD) 15%	DLT (ULD) 15%	DLT (ULD) 15-99%	DLT (FLD) 100%	DLT (FLD) 100%	DLT (ULD) 15-99%	DLT (ULD) 15-99%	DLT (ULD) 15%	OFF	DLT (ULD) 15-99%	OFF	OFF	OFF	DLT (FLD) 100%	OFF	OFF
Motor for Compressor YCSE	MC2	OFF	OFF	OFF	OFF	OFF	OFF	STA (ULD) 15%	DLT (ULD) 15%	DLT (ULD) 15%-99%	DLT (FLD) 100%	DLT (FLD) 100%	DLT (ULD) 15%-99%	DLT (ULD) 15%-99%	DLT (ULD) 15%	OFF	DLT (ULD) 15%-99%	DLT (ULD) 15%-99%	OFF	OFF	DLT (FLD) 100%	OFF	OFF
Solenoid Valve	SV11	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV12	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV13	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV21	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV22	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	SV23	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
Timing Schedule					3min																		
						5 sec																	
						60 sec																	
							5 sec																
							30 sec																
								Minimum 3 mins															

CLS=Close OPN=Open STA=Star DLT=Delta ULD=Unload FL=Full Load

6.5.2 Control Printed Circuit Board

The Control Printed Circuit Board contains various switches for setting the unit control parameters.



Switch	Function	Factory Default
RSW 1	Chilled Water Outlet Temperature Setting Switch	7
RSW 2	Chilled Water Outlet Temperature Setting Switch	0
RSW 3	Hot Water Outlet Temperature Setting Switch (heat pump option only)	5
RSW 4	Hot Water Outlet Temperature Setting Switch (heat pump option only)	4
RSW 5	Not Used	N/A
RSW 6	Not Used	N/A
RSW 7	Not Used	N/A
RSW 8	Neutral Zone Setting Switch. 2 °C is standard.	3
RSW 9	Not Used	N/A
SW 6	Local/Remote Changeover Switch. (Up:Local, Down:Remote)	Local
SW 7	Local/Remote Pump Operation (Up:Local, Down:Remote)	Remote
SW 8	Cooling/ Heating Operation Switch (Up:Cool, Down:Heat)	Cool
SW 9	Not Used	N/A
SW 10	Not Used	N/A
SW 11	Not Used	N/A
SW 12	Not Used	N/A

cont…

Switch	Function	Factory Default
DSW1	Not Used	OFF
DSW2-1 DSW2-2	Compressor Starting Time Delay	3 Mins OFF/OFF
DSW3-1 DSW3-2	Compressor Isolation for Maintenance	ON/ON
DSW3-3 to DSW3-7	Not Used	OFF
DSW3-8 DSW3-9 DSW3-10	Sets chiller ID when using more than one chiller with a remote control system	OFF/OFF/OFF
DSW4-1	Cooling Only (OFF) or Heat Pump Enabled (ON)	OFF
DSW4-4	Water (OFF) or Brine/Glycol (ON)	OFF
DSW4-2 DSW4-6 DSW4-7	Not Used	ON
DSW4-3 DSW4-5 DSW4-8	Not Used	OFF
DSW5-1 DSW5-2	Temperature Band for Stop Setting Switch. 1 °C is standard.	ON/OFF
DSW5-3 DSW5-4	Temperature Band for Restart Setting Switch. 2 °C is standard.	ON/OFF
DSW5-5	Differential Temperature of Load-up 2 Mode Setting Switch. 1 °C is standard.	ON
DSW5-6	Output Signal Time for Load-up 1 Mode Setting Switch. 12 secs is standard.	ON
DSW5-7 DSW5-8	Output Signal Time for Load-up 2 and Load-down Mode Setting Switch. 2 secs is standard.	ON/ON
DSW5-9 DSW5-10	Interval of Output Signal Time for Load-up 2 and Load-down Mode Setting Switch. 60 secs is standard.	ON/ON
DSW6-1 to DSW6-4	Not Used	OFF
DSW7-1 DSW7-2	This switch defines the chilled liquid temperature range +5°C to -5°C is standard.	ON/OFF
DSW7-3	Enables extended minimum capacity control on 2 system chillers.	OFF
DSW7-4	Enables H-Link communications between unit and HARC.	OFF

To prevent possible damage to the chiller and/or the control circuit and the warranty becoming void, only the following settings and parameters should be applied.

DIP switches must be checked and set before applying control circuit power for the settings to be applicable. With the exception of the chilled water settings, changing the DIP switch settings with the control circuit power on will have no effect on the unit operation.

Chilled Water Outlet Temperature Setting Switch RSW1 and RSW2

7°C for chilled water outlet temperature is recommended. The RSW1 and RSW2 dials are factory set at 7 and 0. RSW2 should only be set at 0,1 or 2.

Hot Water Outlet Temperature Setting Switch RSW3 and RSW4 (Heat pump option only)

45°C for hot water outlet temperature is recommended.The RSW3 and RSW4 dials are factory set at 5 and 4.

Current Limitation: RSW5, RSW6 and RSW7

RSW5, RSW6 and RSW7 are not used.

Neutral Zone Setting Switch: RSW8

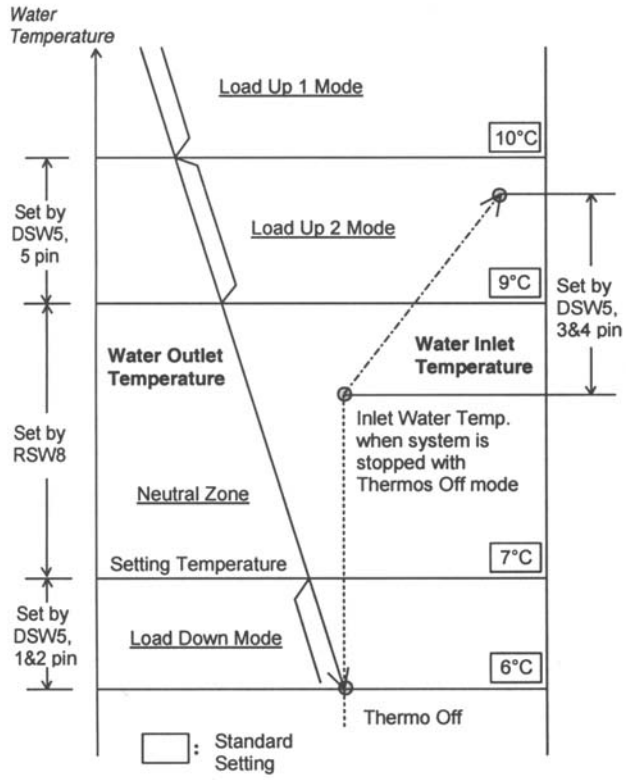
2 °C is standard. The RSW8 dial is factory set at 3 = 2 °C.

The settings for RSW8 dial are as follows:

RSW 8	0	1	2	3	4	5	6	7	8	9
°C	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5

Continuous Capacity Control Setting Switch: DSW5

The figure below the shows the various terms and definitions used for capacity control setting.



Temperature Band for Stop Setting Switch DSW5-1, DSW5-2

1°C degree is factory default: DSW5-1 ON; DSW5-2 OFF.

The settings for DSW5-1, DSW5-2 are as follows:

DSW5	1	2	1	2	1	2	1	2
Setting	On	On	On	Off	Off	On	Off	Off
°C	0.5		1		1.5		2	

Temperature Band for Restart Setting Switch DSW5-3, DSW5-4

2°C is factory default: DSW5-3 ON; DSW5-4 OFF.

The settings for DSW5-3, DSW5-4 are as follows:

DSW5	3	4	3	4	3	4	3	4
Setting	On	On	On	Off	Off	On	Off	Off
°C	1		2		3		4	

Differential Temperature of Load-up 2 Mode Setting Switch, DSW5-5

1°C degree is factory default: DSW5-5 ON.

The settings for DSW5-5 are as follows:

DSW5	5	5
Setting	On	Off
°C	1	3

Output Signal Time for Load-up 1 Mode Setting Switch, DSW5-6

12 seconds is factory default: DSW5-6 ON.

The settings for DSW5-6 are as follows:

DSW5	6	6
Setting	On	Off
Secs	12	24

Output Signal Time for Load-up 2 and Load-down Mode Setting Switch, DSW5-7, DSW5-8

2 seconds is factory default: DSW5-7 ON; DSW5-8 ON.

The settings for DSW5-7, DSW5-8 are as follows:

DSW5	7	8	7	8	7	8	7	8
Setting	On	On	On	Off	Off	On	Off	Off
Secs	2		4		6		8	

Interval of Output Signal Time for Load-up 2 and Load-down Mode Setting Switch: DSW5-9, DSW5-10

60 seconds is factory default: DSW5-9 ON; DSW5-10 ON.

The settings for DSW5-9, DSW5-10 are as follows:

DSW5	9	10	9	10	9	10	9	10
Setting	On	On	On	Off	Off	On	Off	Off
Secs	60		90		120		30	

Setting of Compressor Cycling Protection Start: DSW2-1, DSW2-2

This switch sets the compressor starting time delay. The compressor will start after this time.

3 minutes is factory default: DSW2-1 OFF; DSW2-2 OFF.

The settings for DSW2-1 and DSW2-2 are as follows:

	DSW2	
Minutes	1	2
0.5	ON	ON
3	OFF	OFF
6	ON	OFF
10	OFF	ON

Manual Set Switch A: DSW3-1, DSW3-2,

This switch allows the compressors to be electrically isolated for maintenance purpoes.

Switches DSW3-1 is for No.1 compressor, "DSW3-2" is for No.2 compressor. DSW3-3 to DSW3-10 are not used and should be set to OFF.

The settings for DSW3-1, DSW3-2 are as follows:

DSW3	1	2	1	2
Setting	On	Off	On	On
Model	1 Compressor		2 Compressors	

Manual Set Switch A: DSW3-8, DSW3-9, DSW3-10

This switch is used to set the chiller ID when using more than one chiller with a remote control system (HARC, ISN etc.)

DSW3	8	9	10	8	9	10	8	9	10
Setting	Off	Off	Off	On	Off	Off	Off	On	Off
Unit ID	1			2			3		
DSW3	8	9	10	8	9	10	8	9	10
Setting	On	On	Off	Off	Off	On	On	Off	On
Unit ID	4			5			6		
DSW3	8	9	10	8	9	10			
Setting	Off	On	On	On	On	On			
Unit ID	7			8					

Manual Set Switch B: DSW4-1

This switch defines if the unit operates in cooling mode only or if the optional heat pump mode is enabled.

The setting for DSW4-1 is as follows:

DSW4	1	1
Setting	On	Off
Mode	Heat pump enabled	Cooling Only

Manual Set Switch B: DSW4-4

This switch defines the unit chilled liquid as either water or brine/glycol .

The setting for DSW4-4 is as follows:

DSW4	4	4
Setting	On	On
Mode	Brine/Glycol	Water

Manual Set Switch B: DSW4-2, 4-6 and 4-7

These switches must be set to ON.

Manual Set Switch B: DSW4-3, 4-5 and 4-8

These switches must be set to OFF.

Manual Set Switch B: DSW4-9, DSW4-10

This switch identifies the compressor size.

The settings for DSW4-9, DSW4-10 are as follows:

DSW4	9	10	9	10	9	10	9	10
Setting	Off	On	On	Off	On	On	Off	Off
Size	40hp		50hp		60hp		80hp	

Manual Set Switch C: DSW7-1, DSW7-2,

This switch defines the chilled liquid temperature range.

The settings for DSW7-1, DSW7-2 are as follows:

DSW7	1	2	1	2	1	2
Setting	On	Off	Off	On	Off	Off
Temp	+5°C to -5°C		-5°C to -10°C		+5°C to +15°C	

Manual Set Switch C: DSW7-3,

Set to ON to enable extended minimum capacity control of 2 system units.

Manual Set Switch C: DSW7-4,

Set to ON to enable H-Link communications between unit and HARC remote control.

Selection Switch for Cooling/ Heating Operation: SW8

Factory default is COOL, SW8 in the up position.

If the optional heat pump is fitted, set SW8 to the down position for HEATING operation. Note DSW4-1 must be in the ON position for heat pump operation to be enabled.

Selection Switch for Local/ Remote Operation: SW6

Factory default is LOCAL, SW6 in the up position.

Set SW6 to the down position for REMOTE operation.

Selection Switch for Local/ Remote Pump Operation: SW7

Factory default is REMOTE, SW7 in the down position.

Set SW7 to the up position for LOCAL operation

Chilled Water/Brine Switch: SW5.

SW5 must be set to the up position for WATER and the down position for BRINE or GLYCOL.

7 MAINTENANCE

7.1 General Requirements

The units have been designed to operate continuously provided they are regularly maintained and operated within the limitations given in this manual. Each unit should be included in a routine schedule of daily maintenance checks by the operator/customer, backed up by regular service inspection and maintenance visits by a suitably qualified and trained 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 JCI service organisation to protect the operation of the unit. If damage or a system failure occurs due to improper maintenance during the warranty period, JCI 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.

7.2 Daily Maintenance

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

Unit status: If the Alarm LED is on select the Alarm Mode on the display by pressing and holding SW3 and SW4 for 3 seconds.

Press SW3 ▲ or SW4 ▼ to scroll through the alarms. The display will automatically toggle (↓↑) between the alarm number and one of the alarm codes as detailed in the alarm code table (refer to the Section 6 for explanation of messages and the Trouble Shooting section for courses of action).

Refrigerant leaks: Visually check the heat exchangers, compressors and pipework for damage and gas leaks.

Operating conditions: Read the operating pressures and temperatures at the control panel using SW3 and SW4 and check that these are within the operating limitations.

Compressor oil level: Check the compressor oil level after the compressor has been operating on 'FULL LOAD' for approximately half an hour.

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.

7.3 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 JCI Service Centre is contacted for recommendations for individual sites.

Standard Units

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 fusible plugs. Check for pipework damage. Check for leaks. (see note 1)	Check solenoid valves.
Compressors:	Check oil level. Check oil pressure. Check unloader operation. Check condition of oil.	Carry out full oil analysis.
Cooler:	Check water flow. Check water pressure drop.	Check water pH / glycol strength.
Condenser (YCSE Only):	Check water flow. Check water pressure drop.	Check water pH / glycol strength.
Power & Control system general: (Main power supply OFF).	Check panel condition. Check mains and control wiring. Check sensor locations. Check mechanical HP cut-outs. Check emergency stop. Check flow protection device operation.	Check all wiring connections for tightness. Check compressor contactors. Check sensor / transducer calibration. Check motor protectors. Check contactor contacts.

Note 1: If the plant room has a Leak Detection Monitoring System installed only an annual leak check is required. (EG -1005/2009 art. 23 applicable in EU countries).

7.4 Pressure Vessel 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 4.4, in-service inspection is not necessary. In the design of the vessels used in the unit a 1mm corrosion allowance has been used to consider slight corrosion on the water side. This allowance is sufficient to cover the lifetime of the unit.

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

8 Trouble Shooting

8.1 Competent Persons Trouble Shooting Guide

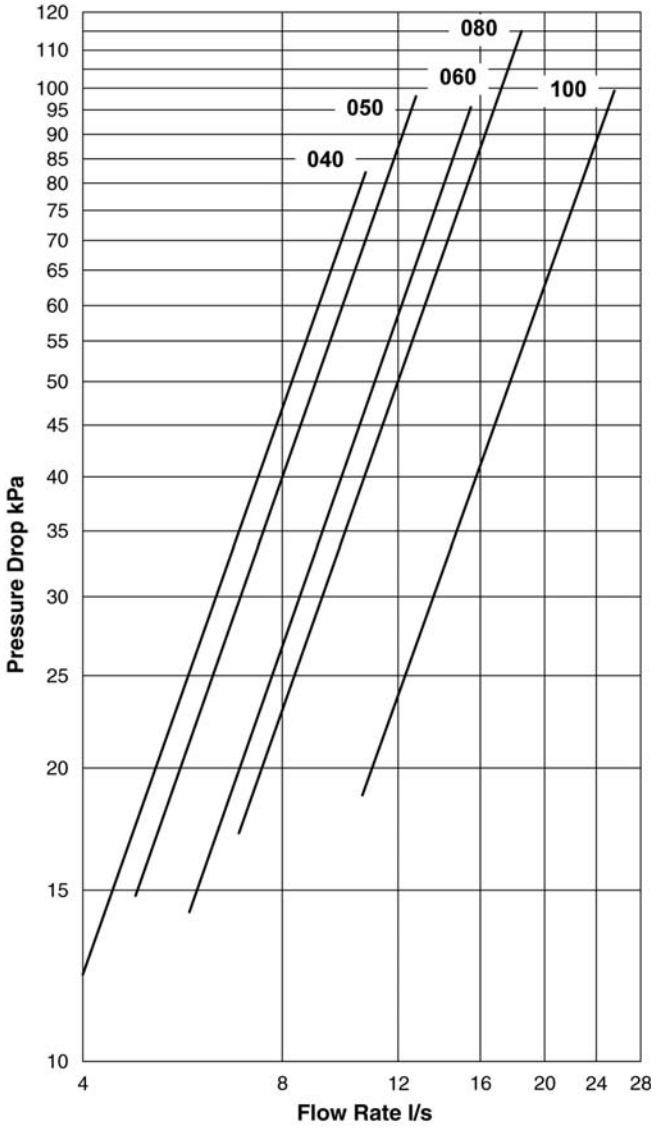
PROBLEM	POSSIBLE CAUSE	ACTION
Compressor does not operate	Interlock circuit for chilled water pump is open	Check the pump contactor. Repair or replace, if necessary. Check the pump.
	Electrical protective devices have tripped.	Locate and rectify the fault. Reset the "ON" switch.
	Incorrect wiring connection for compressor power source	Interchange two of three terminals R, S and T at the main power source terminals.
Compressor stopped by high pressure switch	Excessively high discharge pressure	See "High Discharge Pressure"
	Malfunction of high pressure switch	Readjust the setting or replace if defective.
Compressor stopped by overcurrent relay	Excessively high discharge pressure and suction pressure	See "High Discharge Pressure" and "High Suction Pressure".
	High or low voltage, single-phase or phase imbalance	Check the power supply line and contactors. Repair, if necessary.
	Loose electrical connections	Tighten the loose electrical connection or repair, if necessary.
	Faulty overcurrent relay	Replace overcurrent relay.
Compressor stopped by freeze protection thermistor	Excessively low chilled water outlet temperature	Check for excessively low setting of the chilled water tempearture switch..
	Defective thermistor	Check for malfunction of the thermistor. Replace, if necessary.
	Shortage of chilled water flow	Check chilled water pump.
	Air in water circuit	Purge air.
Compressor stopped by internal thermostat or discharge gas thermostat	High or low voltage, single-phase or phase imbalance	Check the power supply line and contactors. Repair, if necessary.
	Excessive superheat	Check for refrigerant leakage
	Defective element	Check the internal thermostat for correct operation.
	Excessive high discharge pressure and low suction pressure	See "High Discharge Pressure" and "High Suction Pressure".
Insufficient cooling	High discharge pressure or low suction pressure	See "High Discharge Pressure" and "Low Suction Pressure".
	Improper thermostat setting	Readjust the setting.
	Defective unload mechanism	Adjust unload mechanism. Repair or replaceany defective components.
Noisy compressor	Slugging due to liquid flooding back to compressor	Check the superheat of suction gas. Ensure the superheat is within range.
	Worn internal components	Replace the compressor.
Unloaded does not function	Faulty thermistor	Adjust the emperature setting t. Replace the thermistor.
	Faulty solenoid valve	Check the coil in the solenoid valve. Check oil passage for clogging.
	Faulty unloader mechanism	Check the unloaded system parts in the compressor.

PROBLEM	POSSIBLE CAUSE	ACTION
High Discharge Pressure	Warm inlet water or insufficient water flow through the condenser	Open the valve
	Gas outlet valve on the condenser not completely open	Check the valves, capillary tubes and strainer. Replace, if necessary.
	Overcharged refrigerant	Purge the refrigerant.
	Condenser plates coated with scale, slime, corrosion	Clean the condenser water plates with chemical cleaner
	Suction pressure is higher than standard	See "High Suction Pressure".
Low Discharge Pressure	Too much water flowing through the condenser or water is too cold	Adjust the water cock or the regulating valve. Check the operation of cooling tower.
	Insufficient refrigerant charge	Add refrigerant.
	Leakage from the condenser gas outlet valve	Check to determine how long it takes to balance high and low.
	Liquid refrigerant flooding back from the water cooler, causing oil to foam.	Check the operation and adjustment of the expansion valve. Check the feeler bulb is securely connected to the suction pipe and that it is completely insulated. Inlet water temperature is lower than the limited temperature.
	Suction pressure is lower than standard	See "Low Suction Pressure"
High Suction Pressure	High discharge pressure	See "High Discharge Pressure"
	Refrigerant overcharged	Purge the refrigerant
	Liquid refrigerant flooding back from the water cooler	Check the operation and adjustment of the expansion valve. Check the feeler bulb is securely connected to the suction pipe and completely insulated. Inlet chilled water temperature to the unit is considerably higher than the standard temperature.
	Leakage from the condenser gas outlet valve	Check the condenser gas outlet valve
	Insufficient insulation for the chilled water piping	Check the insulation of the piping
Low Suction Pressure	Condenser liquid outlet valve not completely open	Open the valve.
	Expansion valve not properly adjusted or faulty.	Adjust for correct superheat. Check for loss of refrigerant in the feeler bulb.
	Inlet chilled water temperature is considerably lower than standard temperature.	Check the insulation specifications
	Insufficient refrigerant charge	Add refrigerant
	Excessive oil circulating in the system	Check the oil charge
	Insufficient chilled water flow through the water cooler.	Check the chilled water piping lines for pressure loss.
	Low discharge pressure	Adjust the water shutoff valve
	Scales on water cooler plates	Clean the plates

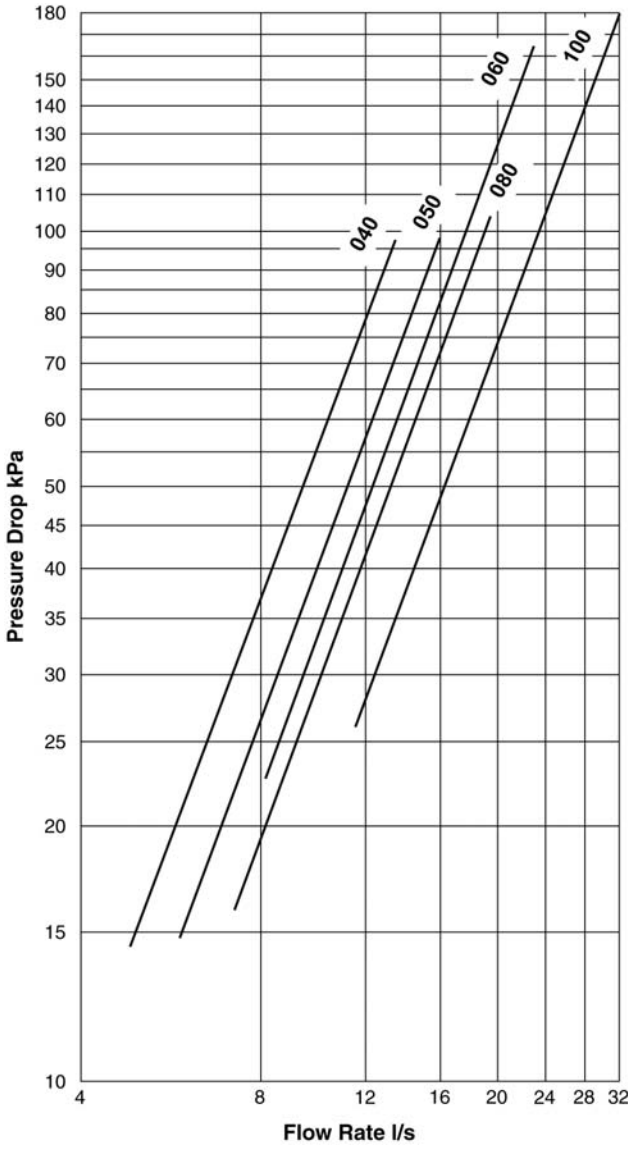
9 TECHNICAL DATA

9.1 Flow Rate and Pressure Drop Graphs

YCSE/YCRE Evaporator Water Pressure Drop

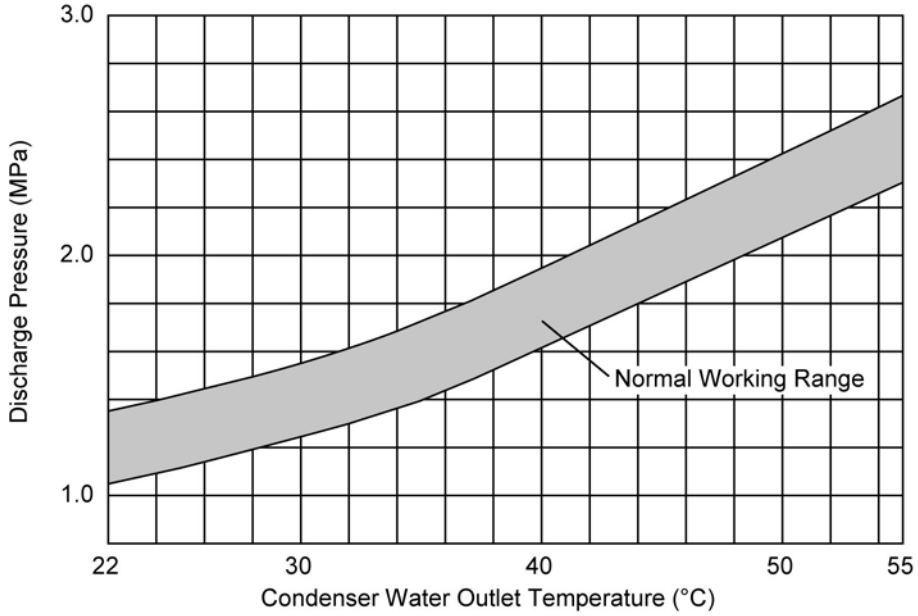


YCSE Condenser Water Pressure Drop

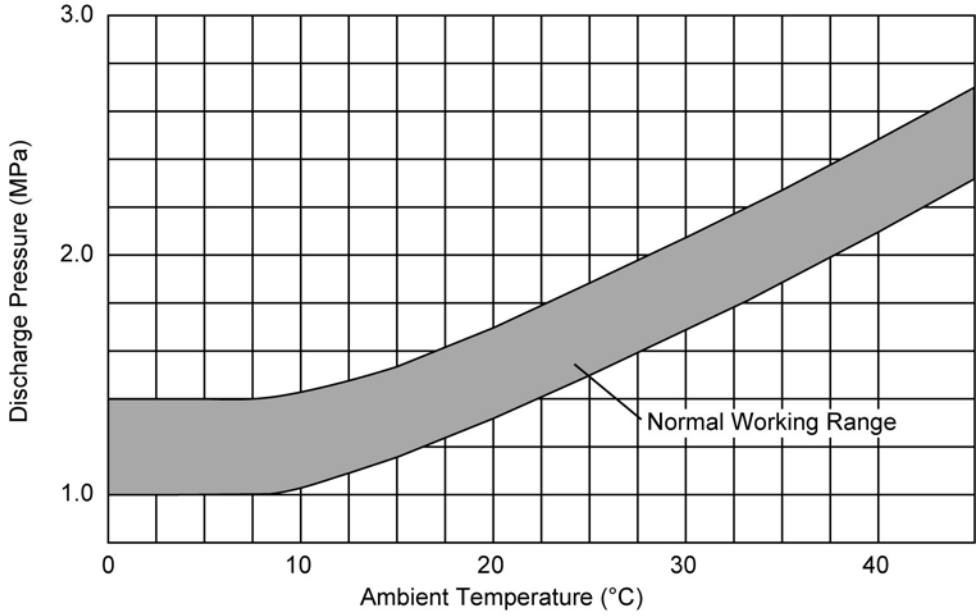


9.2 Performance Graphs

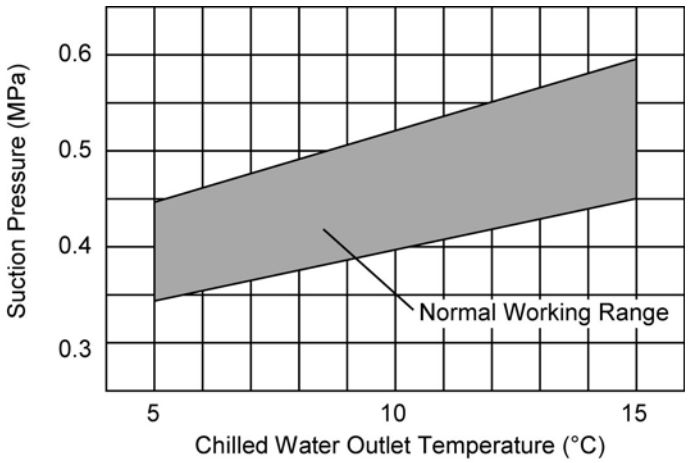
Discharge Pressure - Water Cooled Condenser



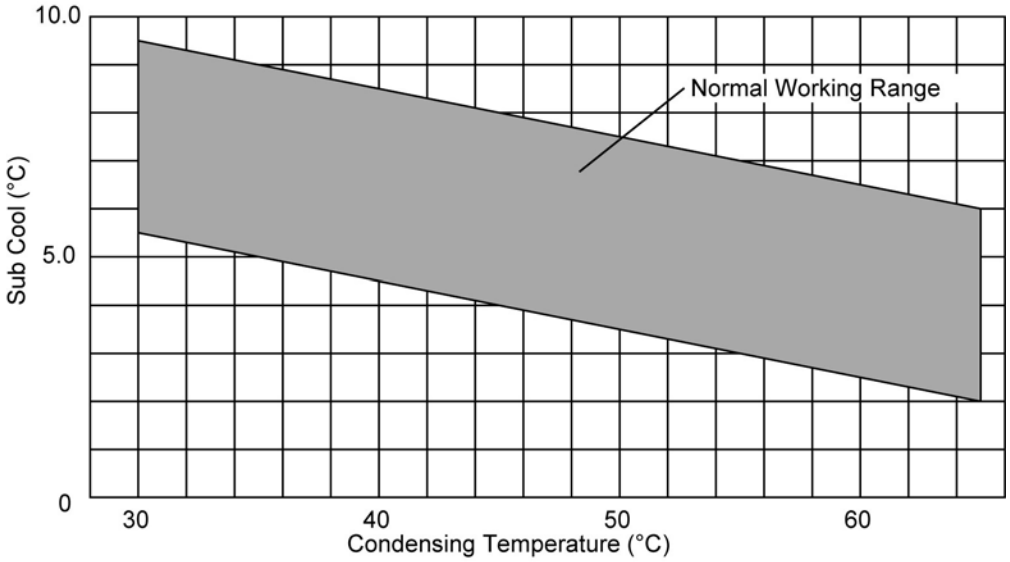
Discharge Pressure - Air Cooled Condenser



Suction Pressure - Evaporator



Sub-cooling Temperatures



9.3 Operating Limitations

Standard Models			YCSE040		YCSE050		YCSE060		YCSE080		YCSE100	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid Outlet Temperature (Water)	°C	5 to 15 (3)									
	Liquid Outlet Temperature (Glycol)	°C	-10 to 15 (1) (3)									
	Liquid Outlet Temperature Range	°C	4 to 8									
	Evaporator Flow Rate	l/s	4.0	10.7	4.8	12.8	5.8	15.5	6.9	18.5	10.6	25.5
	Evaporator Pressure Drop	kPa	12.3	82.2	14.8	98.2	14.3	95.5	17.2	114.6	18.8	99.4
	Maximum Water Side Pressure	bar	10									
Cooling Liquid	Liquid Outlet Temperature	°C	22 to 55*									
	Liquid Outlet Temperature Range	°C	2 to 10									
	Condenser Flow Rate	l/s	--	13.4	--	15.9	--	19.4	--	22.9	--	31.9
	Condenser Pressure Drop	kPa	--	97.0	--	97.7	--	103.2	--	164.5	--	178.8
	Maximum Water Side Pressure	bar	10									
Maximum Refrigerant Side Pressure		bar	30									
Power Supply Voltage 400V, 3 ~, 50 Hz (nominal)		V	360 to 440									
Recommended Minimum System Water Volume (2)		litres	420		510		610		730		1010	
Minimum Ambient Air Temperature		°C	5									
Maximum Ambient Air Temperature		°C	46									

(1): Refer to Accessories and Options for further details
(2): Based on 2ºC ON/OFF differential. System Volume should be increased if differential is lowered
The recommended volume ensures a minimum of 5 minutes cooling without interruption
(3): Minimum temperature is inclusive of control range.

Standard Models			YCRE040		YCRE050		YCRE060		YCRE080		YCRE100	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid Outlet Temperature (Water)	°C	5 to 15 (3)									
	Liquid Outlet Temperature (Glycol)	°C	-10 to 15 (1) (3)									
	Liquid Outlet Temperature Range	°C	4 to 8									
	Evaporator Flow Rate	l/s	4.3	9.6	5.2	11.6	6.4	14.3	8.6	19.1	10.4	23.1
	Evaporator Pressure Drop	kPa	14.4	66.9	17.6	81.5	17.6	82.0	12.7	57.5	18.2	82.5
	Maximum Water Side Pressure	bar	10									
Maximum Refrigerant Side Pressure		bar	30									
Power Supply Voltage 400V, 3 ~, 50 Hz (nominal)		V	360 to 440									
Recommended Minimum System Water Volume (2)		litres	420		510		610		730		1010	
Minimum Ambient Air Temperature		°C	5									
Maximum Ambient Air Temperature		°C	46									

(1): Refer to Accessories and Options for further details
(2): Based on 2ºC ON/OFF differential. System Volume should be increased if differential is lowered
The recommended volume ensures a minimum of 5 minutes cooling without interruption
(3): Minimum temperature is inclusive of control range.

9.4 Physical Data

Standard Models YCSE			040	050	060	080	100
Number of refrigerant circuits			1				2
Refrigerant Charge	Circuit 1 (/ Circuit 2)	kg	12	14	16	18	14 / 14
Oil Charge	Circuit 1 (/ Circuit 2)	litre	6	6	6	6	6/6
Compressor	Number of Compressors		1				2
	Type		Semi-hermetic Screw				
	Capacity Control	%	15-100				7.5,15-100
Evaporator	Number of Evaporator		1				
	Type		Brazed PHE				
	Water Volume	litre	13.7	15.2	19.5	19.5	40.8
	Water Connections	Inch	3	3	3	3	3
Condenser	Number of Condenser		1				
	Type		Brazed PHE				
	Water Volume	litre	13.5	16.9	21.7	25.0	34.1
	Water Connections	Inch	3	3	3	3	3
Dimensions	Length	mm	850	850	850	850	1465
	Width	mm	1105	1105	1105	1105	1105
	Height	mm	1520	1520	1520	1520	1700
Weight	Shipping Weight	kg	750	765	830	950	1570
	Operating Weight	kg	780	800	875	1000	1655

Standard Models YCRE			040	050	060	080	100
Number of refrigerant circuits			1			2	
Refrigerant Charge	Circuit 1 (/ Circuit 2) (1)	kg	12	14	16	18	14 / 14
Oil Charge	Circuit 1 (/ Circuit 2) (2)	litre	6	6	6	6	6/6
Compressor	Number of Compressors		1			2	
	Type		Semi-hermetic Screw				
	Capacity Control	%	15-100			7.5,15-100	
Evaporator	Number of Evaporator		1				
	Type		Brazed PHE				
	Water Volume	litre	13.7	15.2	19.5	32.4	40.8
	Water Connections	Inch	3	3	3	3	3
Connection Sizes	Discharge Line	Inch	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8
	Liquid Line	Inch	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
Dimensions	Length	mm	885	885	885	1471	1471
	Width	mm	1045	1045	1104	1104	1104
	Height	mm	1562	1562	1562	1720	1720
Weight	Shipping Weight	kg	630	680	730	1200	1310
	Operating Weight	kg	650	710	760	1250	1370

(1): Refrigerant charge should be adjusted according to the requirements of the interconnecting refrigerant pipe runs and condenser selection (specific to each appliaction).

(2): Additional oil may be required when commissioning dependant on the interconnecting refrigerant pipe runs and condenser selection (specific to each appliaction).

9.5 Electrical Data

YCSE	Nominal Running Conditions		Maximum Running Conditions	Start up Amps(3)
	kW	Amps(1) at 400 V	Amps(2) at 400V	
040	34	55	69	121
050	40	66	82	155
060	49	80	101	188
080	55	89	112	140
100	80	131	164	178

(1) Nominal Running Amps at 7ºC Leaving Evaporator Liquid Temperature and 35ºC Leaving Condenser Liquid Temperature
(2) Maximum Running Amps is the maximum unit running current under the following conditions:
Supply voltage: 90% of rated voltage; Unit capacity: 100% at maximum operating condtions.
(3) Unit maximum starting current , when last compressor starts.

YCRE	Nominal Running Conditions		Maximum Running Conditions	Start up Amps (3)
	kW	Amps(1) at 400 V	Amps(2) at 400V	
040	34	59	77	125
050	42	73	95	161
060	52	87	115	195
080	68	117	154	144
100	84	145	190	184

(1) Nominal Running Amps at 7ºC Leaving Evaporator Liquid Temperature and 45ºC Condenser Saturation Temperature
(2) Maximum Running Amps is the maximum unit running current under the following conditions:
Supply voltage: 90% of rated voltage; Unit capacity: 100% at maximum operating condtions.
(3) Unit maximum starting current , when last compressor starts.

9.6 Sound Data

YCSE		Mean	Sound Power Band Levels - Frequency Hz								SPL
		SWL	63	125	250	500	1000	2000	4000	8000	EN 292-1991
040	LWA	83	66	68	77	75	77	77	69	51	68
	LW	94	92	84	86	78	77	76	68	52	
050	LWA	85	63	75	77	76	80	80	67	49	69
	LW	94	89	91	86	79	80	79	66	50	
060	LWA	86	66	68	73	74	83	82	69	49	71
	LW	94	92	84	82	77	83	81	68	50	
080	LWA	86	66	69	76	83	77	80	66	53	71
	LW	94	92	85	85	86	77	79	65	54	
100	LWA	88	69	71	77	80	84	84	71	53	72
	LW	97	95	87	86	83	84	83	70	54	

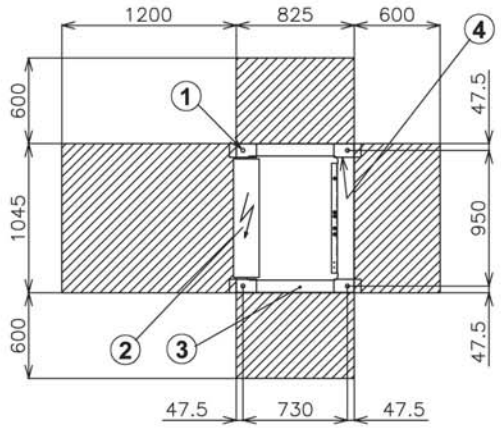
Notes:
1. Sound Power as per Eurovent Specification.
2. Sound Pressure values for EN 292-1991, 1 metre from Control Panel and 1.5 metres from Ground Level in dB(A)

YCRE		Mean	Sound Power Band Levels - Frequency Hz								SPL
		SWL	63	125	250	500	1000	2000	4000	8000	EN 292-1991
040	LWA	83	66	68	77	75	77	77	69	51	68
	LW	94	92	84	86	78	77	76	68	52	
050	LWA	84	63	75	77	76	80	80	67	49	69
	LW	94	89	91	86	79	80	79	66	50	
060	LWA	86	66	68	73	74	83	82	69	49	71
	LW	94	92	84	82	77	83	81	68	50	
080	LWA	86	66	69	76	83	77	80	66	53	71
	LW	94	92	85	85	86	77	79	65	54	
100	LWA	88	69	71	77	80	84	84	71	53	72
	LW	97	95	87	86	83	84	83	70	54	

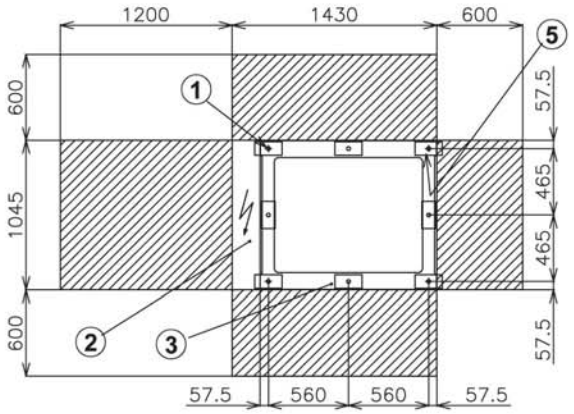
Notes:
1. Sound Power as per Eurovent Specification.
2. Sound Pressure values for EN 292-1991, 1 metre from Control Panel and 1.5 metres from Ground Level in dB(A)

9.7 Clearances and Foundations

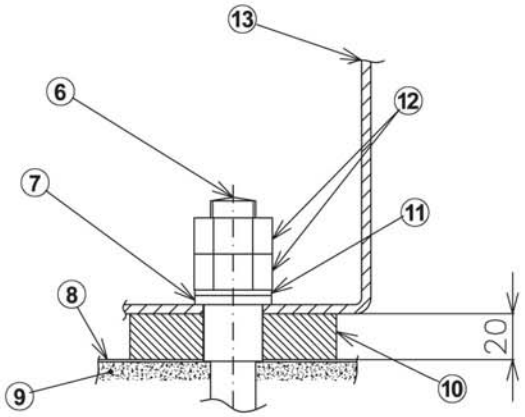
YCSE 040, 050, 060, 080 & YCRE 040, 050, 060



YCSE 100 & YCRE 080, 100



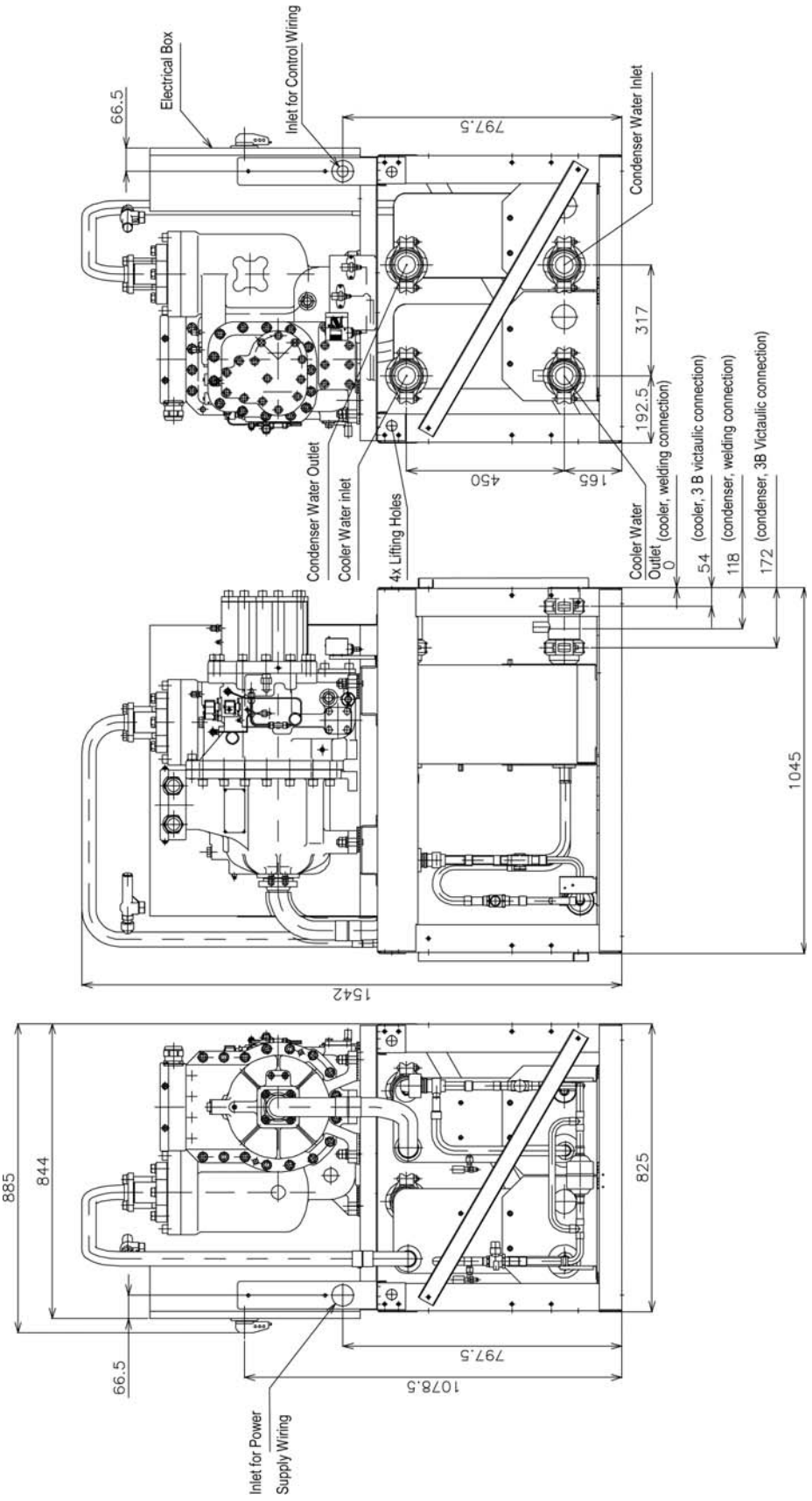
Detail of Foundation (example: YCSE/YCRE 060)



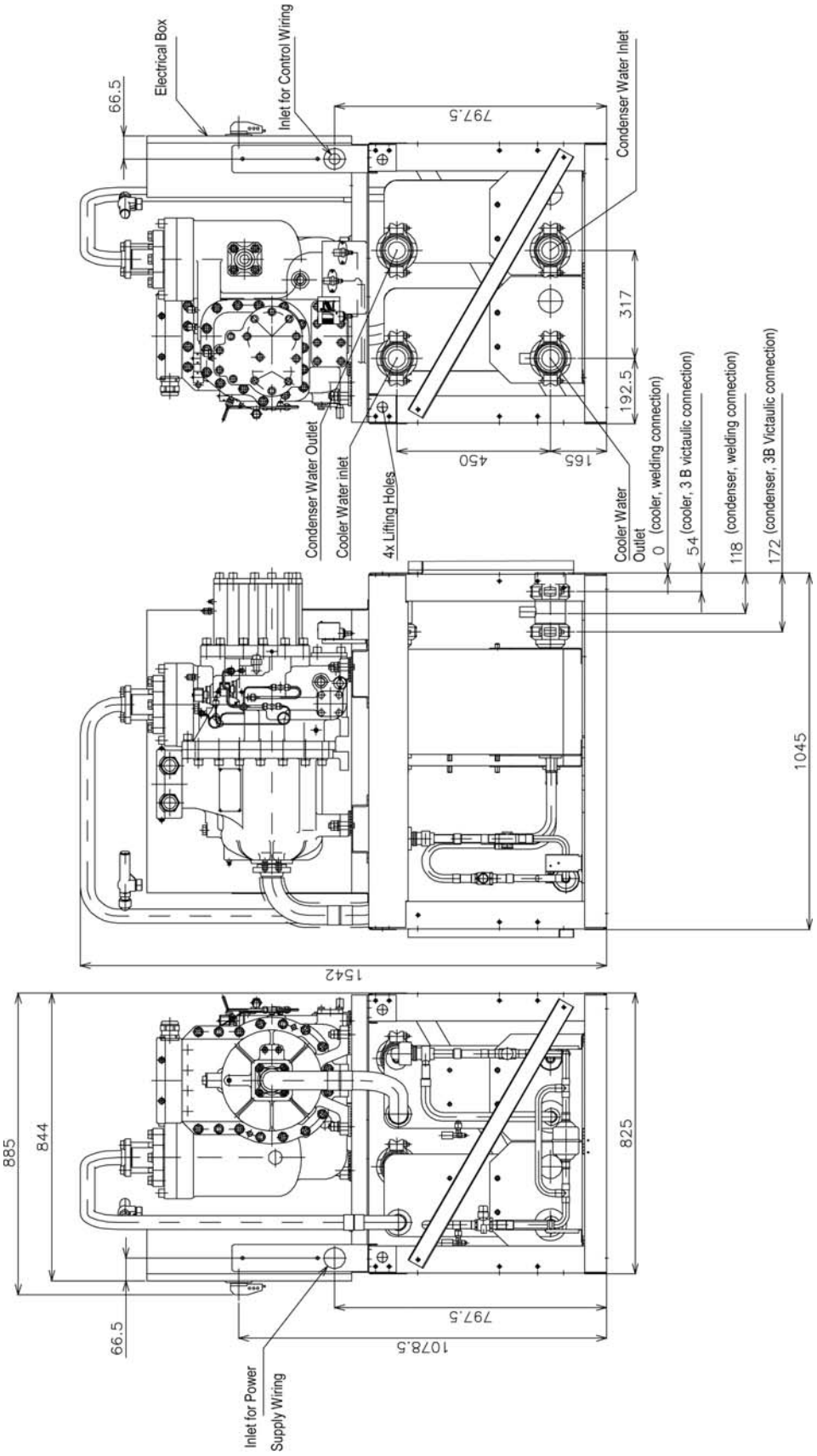
N°	Name	N°	Name
1	4-∅ 26 (Mounting Holes)	8	Steel Plate (1 mm)
2	Electrical Box	9	Concrete
3	Bottom Frame	10	Vibration proof Rubber Mat (1 mat per position) (option)
4	Vibration proof Rubber Mat (4 positions)	11	Washer
5	Vibration proof Rubber Mat (8 positions)	12	Nut
6	Foundation bolt (M20)	13	Bottom Frame
7	Rubber Bush (option)		

9.8 Dimensions

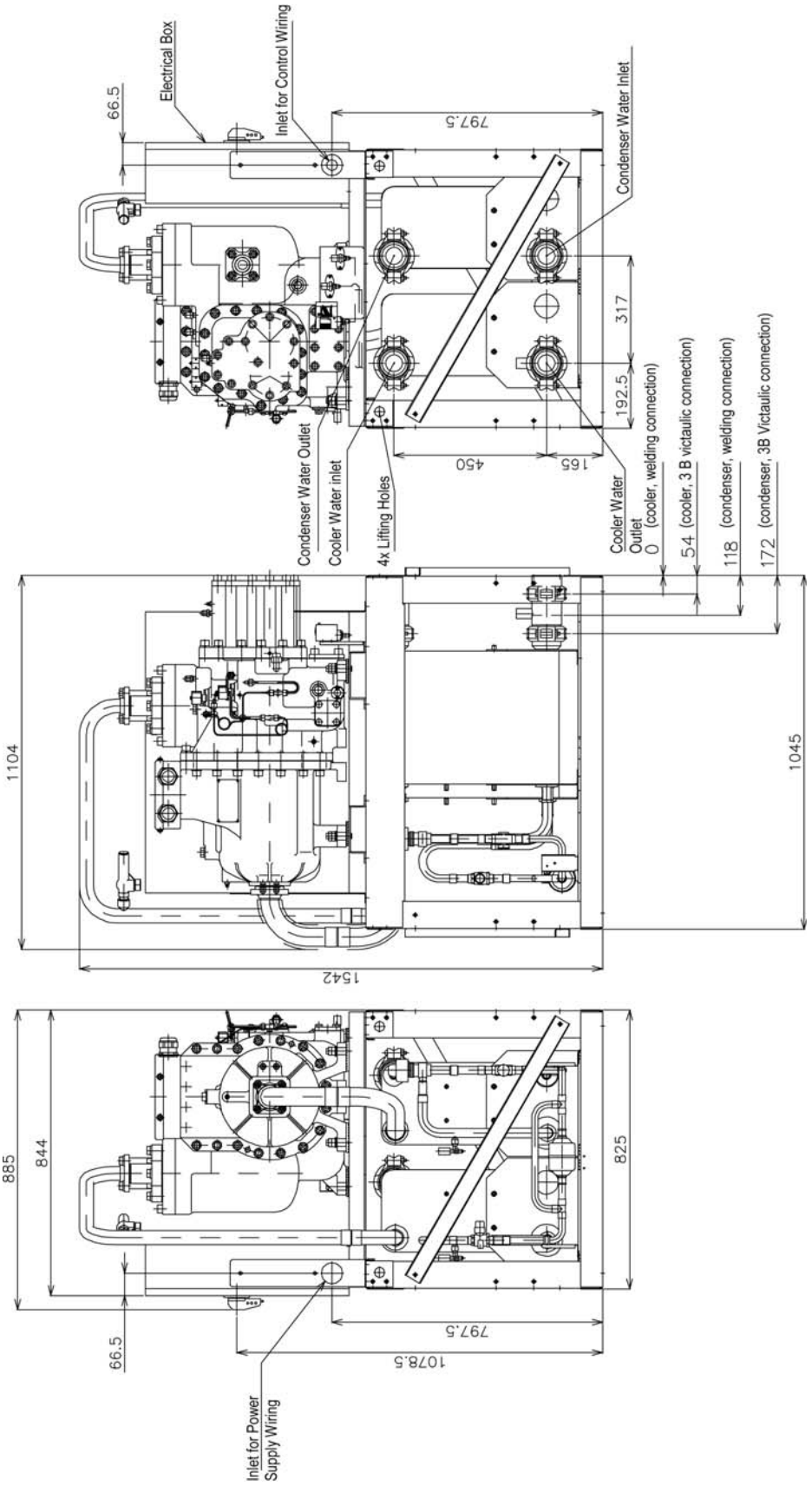
Model YCSE 040



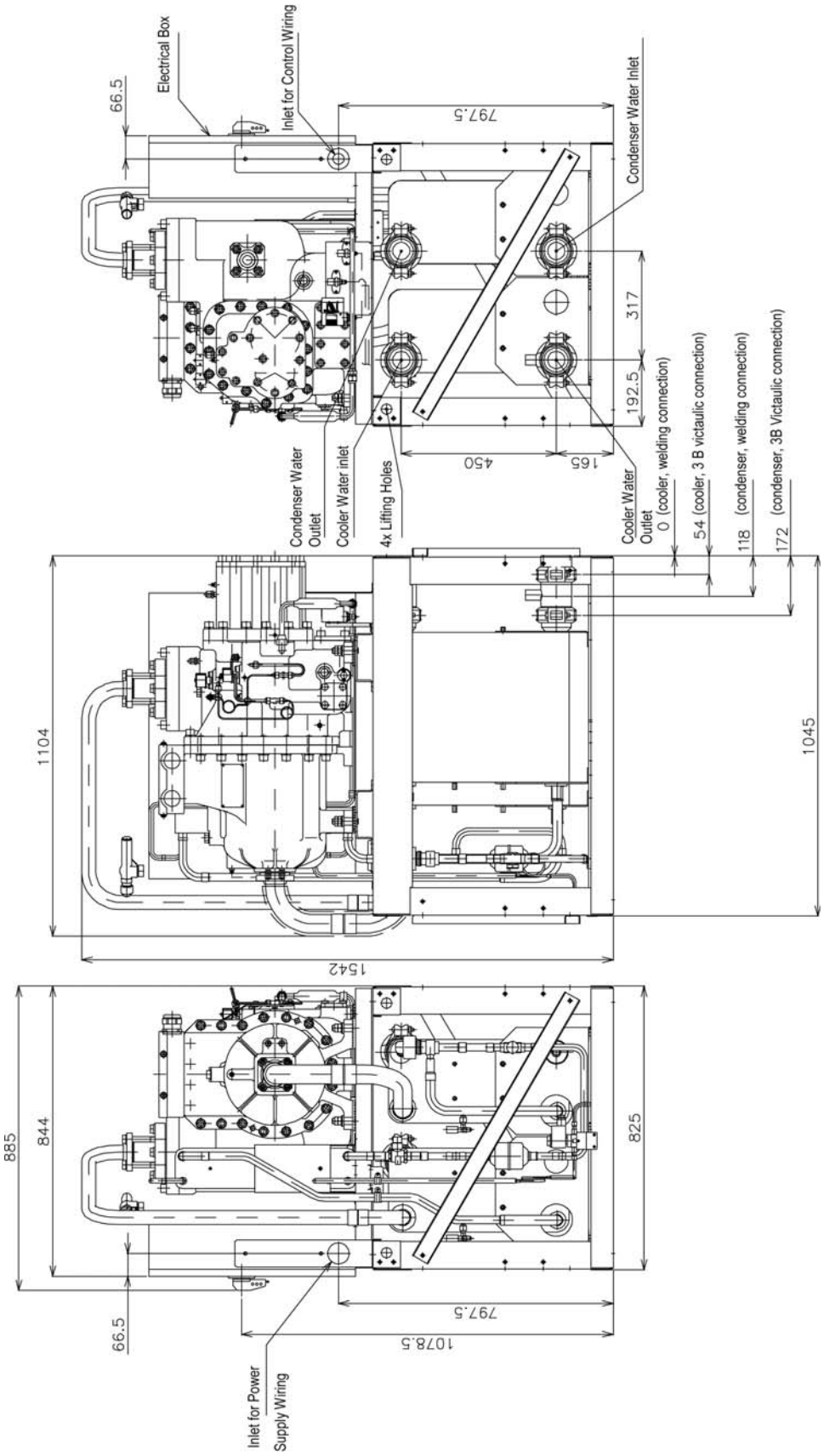
Model YCSE 050



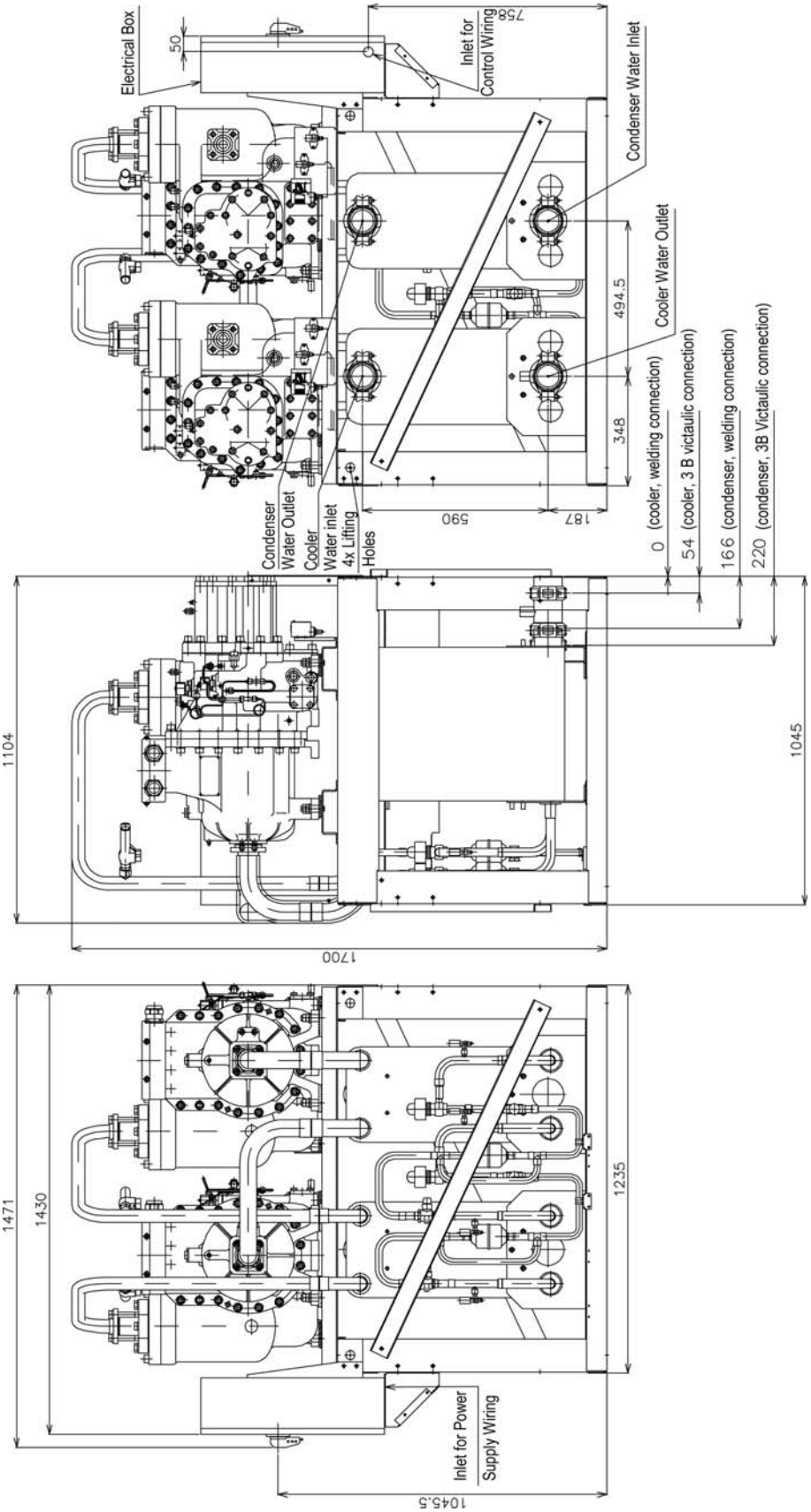
Model YCSE 060



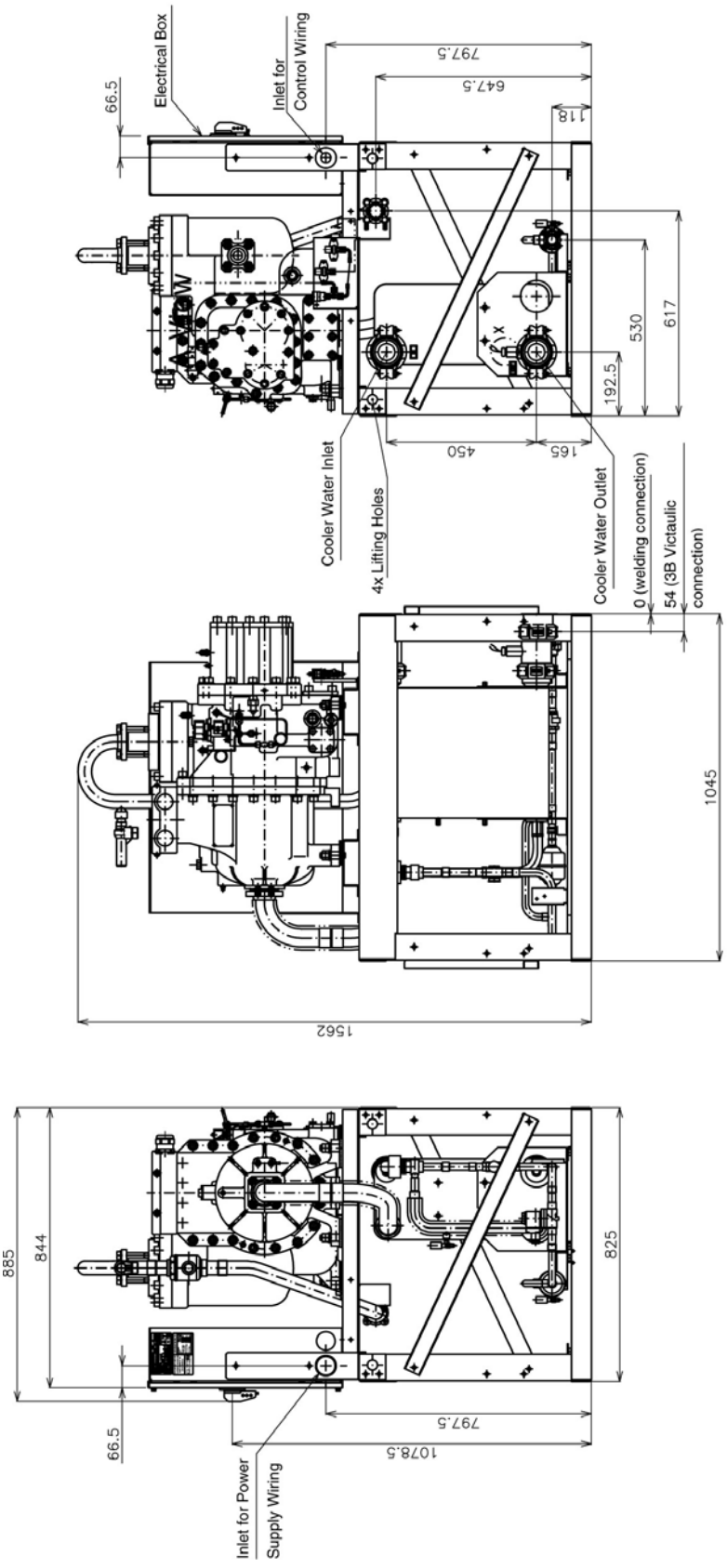
Model YCSE 080



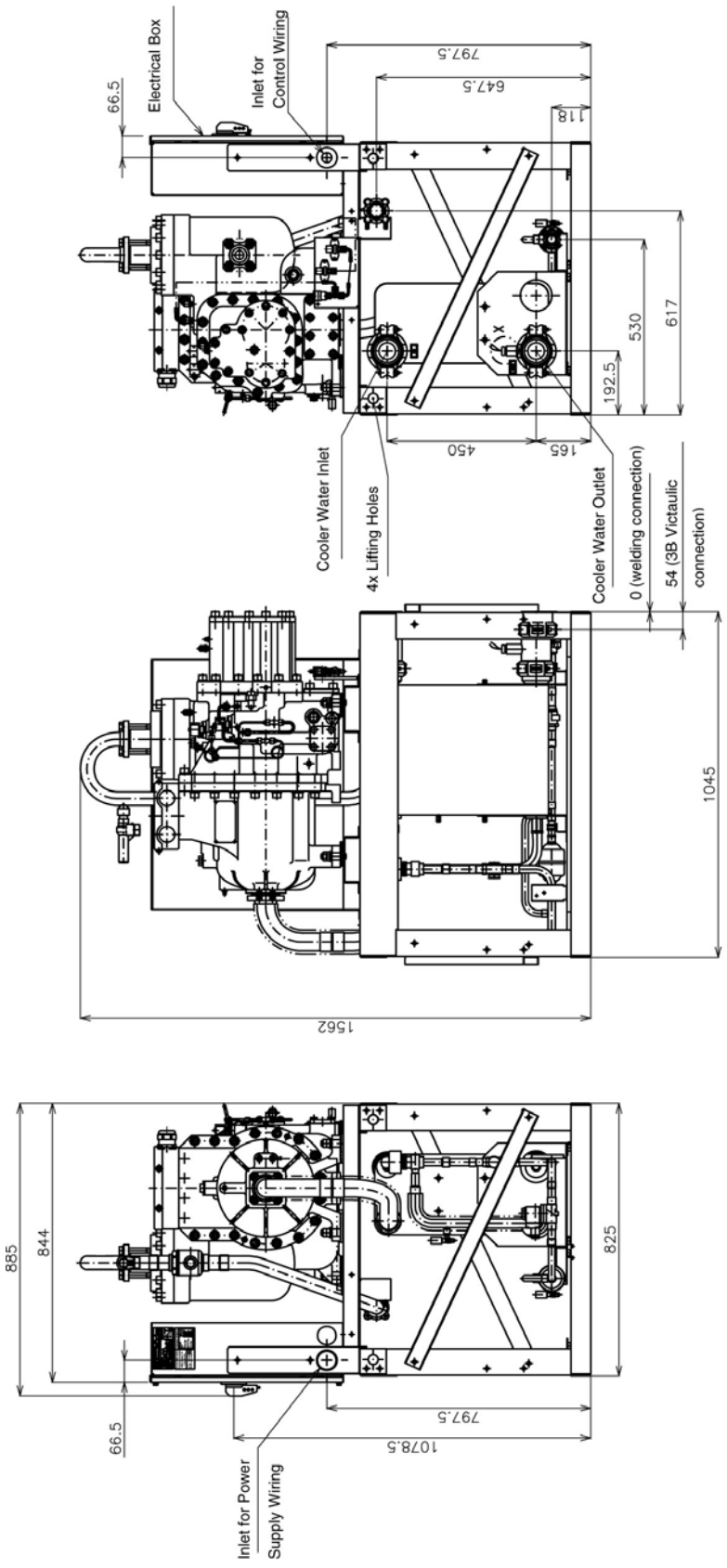
Model YCSE 100



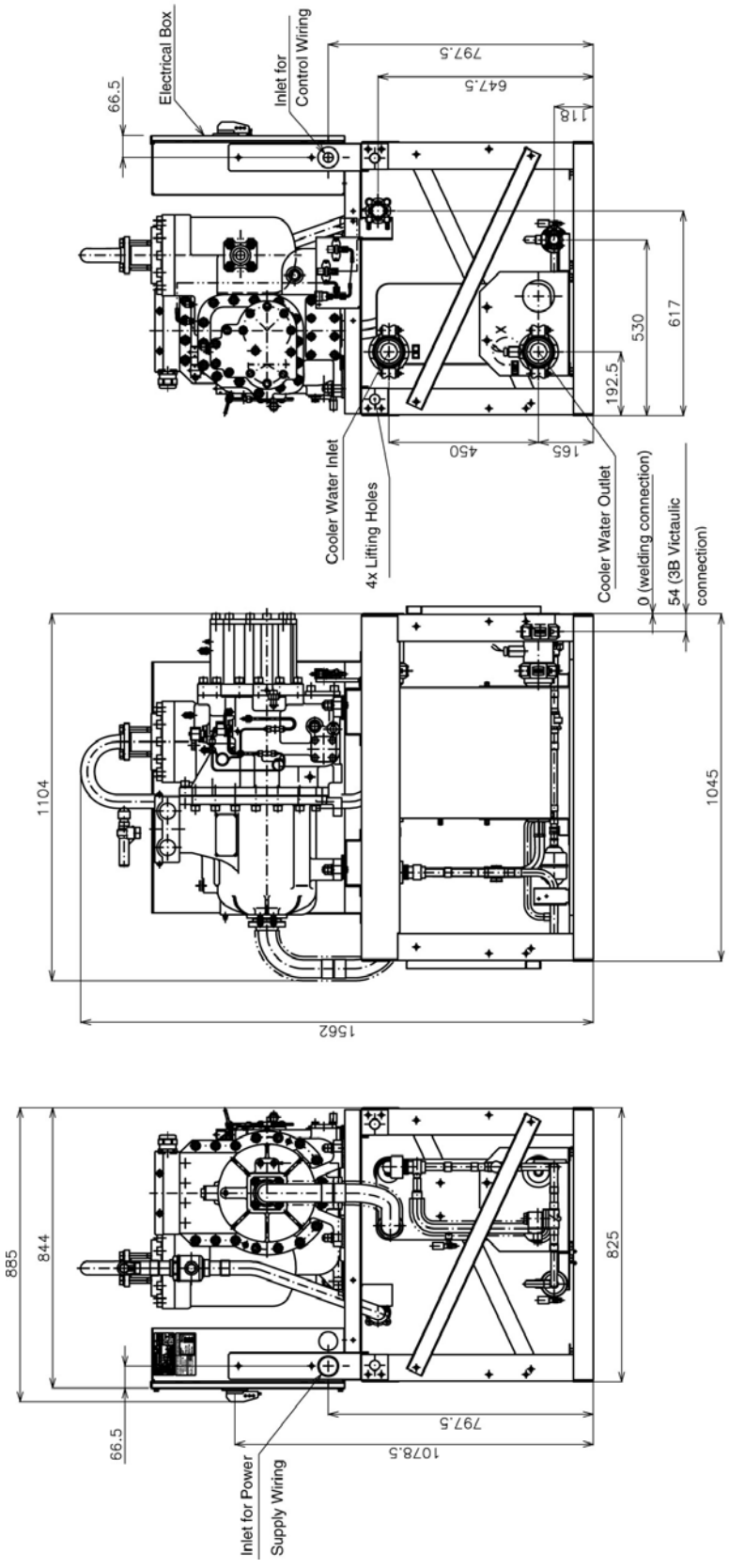
Model YCRE 040



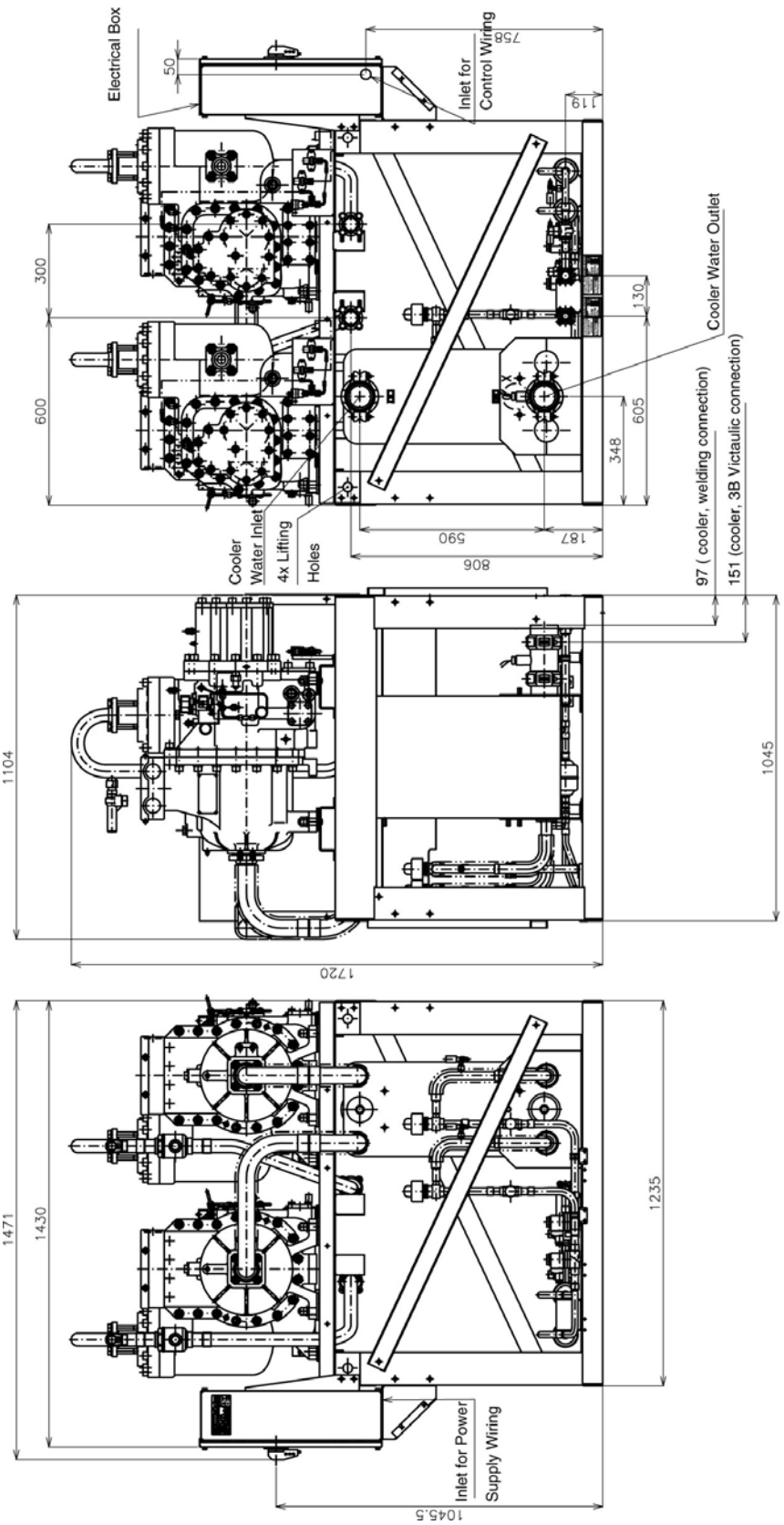
Model YCRE 050



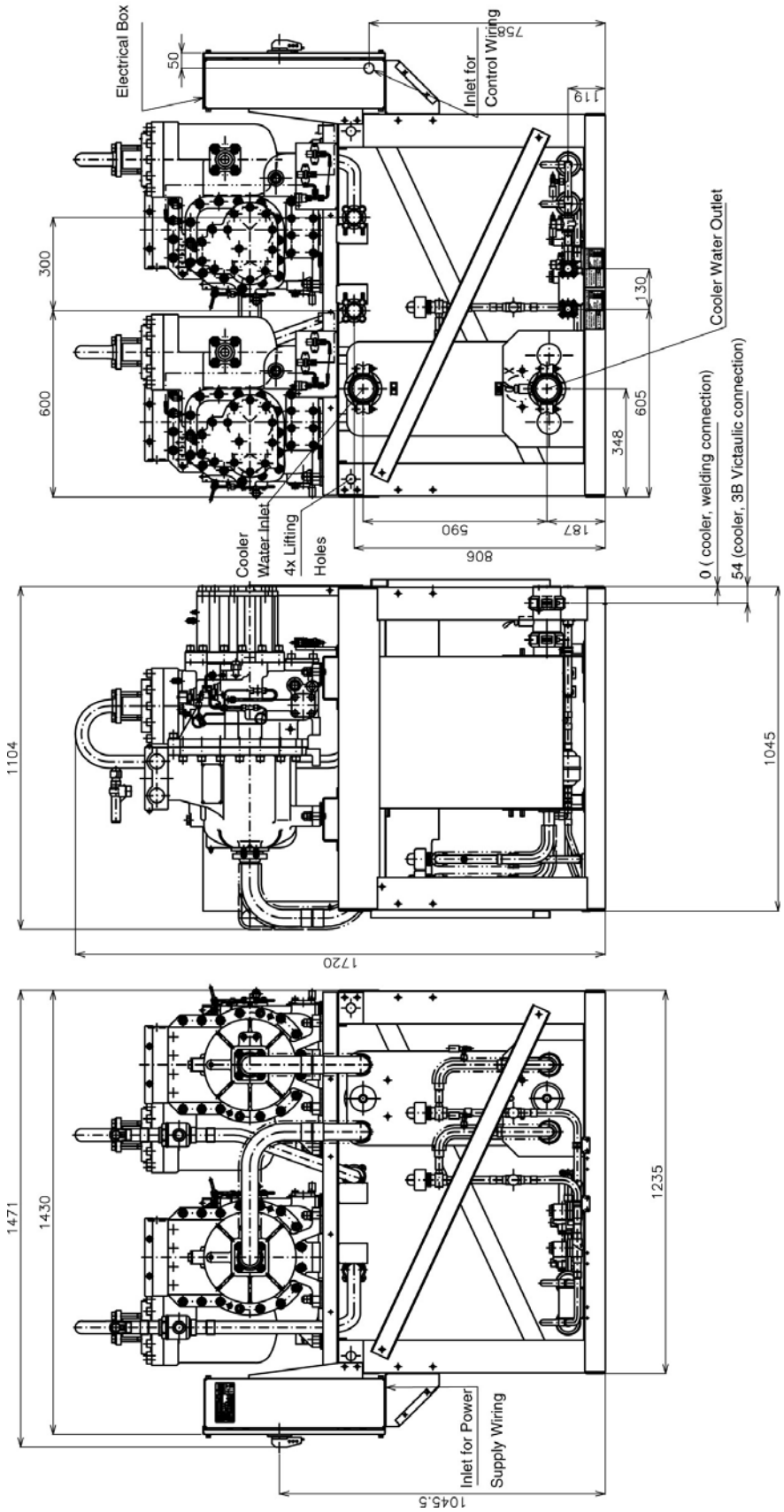
Model YCRE 060



Model YCRE 080



Model YCRE 100



10 SPARE PARTS

10.1 Renewal Parts List

Details of unit spare parts are given in 035-021787-000. Contact your local JCI Sales and Service Centre for information and please quote the unit model number and serial number.

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

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

All requests for parts should be made to your local JCI Sales and Service Centre.

10.2 Recommended Compressor Oils

The correct type of oil must be used in the unit as shown on the unit data plate and labels.

10.3 Associated Drawings

	Model				
	YCSE040SB50	**YCSE050SB50**	**YCSE060SB50**	**YCSE080SB50**	**YCSE100SB50**
Product Drawing	035-21895-000	035-21896-000	035-21896-000	035-21898-000	035-21899-000
Wiring Diagram (sheet 1)	035-21902-000				035-21908-000
Wiring Diagram (sheet 2)	035-21903-000				035-21909-000
Wiring Diagram (sheet 3)	035-21904-000				035-21904-000
Wiring Diagram (sheet 4)	035-21905-000				035-21905-000
Wiring Diagram (sheet 5)	035-21906-000				035-21906-000
Wiring Diagram (sheet 6)	035-21907-000				035-21907-000

	Model				
	YCRE040SB50	**YCRE050SB50**	**YCRE060SB50**	**YCRE080SB50**	**YCRE100SB50**
Product Drawing	TBA	TBA	TBA	TBA	TBA
Wiring Diagram (sheet 1)	TBA				TBA
Wiring Diagram (sheet 2)	TBA				TBA
Wiring Diagram (sheet 3)	TBA				TBA
Wiring Diagram (sheet 4)	TBA				TBA
Wiring Diagram (sheet 5)	TBA				TBA
Wiring Diagram (sheet 6)	TBA				TBA

YCSE/YCRE HARC-LONWORKS: 035-22383-000

YCSE/YCRE HARC-MODBUS: 035-22384-000

YCSE/YCRE HARC-SMS: 035-22385-000

YCSE/YCRE Wiring Amendments: Flow Switch Identification T33/34. 035-21904-000.

YCSE/YCRE Wiring Amendments: Force Compressor Loading Incorrect. 035-21906-000 Sheet 5.

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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.

11.1 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 Section 4.

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

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

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 can be disconnected and removed.

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

Reference should be made to Section 4 for unit installation instructions, Section 9 for unit weights and Section 3 for handling.

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

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

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

Only use lifting equipment of adequate capacity.

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

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Form 035-21786-100 Rev. 1 (0909)