YORK
A JOHNSON CONTROLS COMPANY

YAES-SA
YAES-DSA

QPak-sa

QPak-sa Sonata

QPak-dsa

QPak-dsa Sonata

AIR COOLED SCREW CHILLER

R134a REFRIGERANT

COOLING CAPACITIES 385 kW to 1845 kW

The YAES-SA (QPak-sa) range are single packaged air cooled chillers. The larger cooling capacity YAES-DSA (QPak-dsa) are manufactured in two sections, with integrated controls, to facilitate transport and lifting.

There are two product families, standard units and low sound units, which are equipped with semi-hermetic twin helical screw compressors and microprocessor controls to provide high full and part load efficiencies and reliable performance.

CONTENTS

AVAILABLE MODELS, NOMINAL CAPACITIES and SOUND PRESSURE LEVELS — TABLE 1

YAES-SA			0405	0475	0545	0575	0645	0685
Cooling Capacity Standard Units		kW	385	448	494	540	614	661
Energy Efficiency Ratio Standard Units		EER	2.8	2.8	2.9	2.9	2.7	2.8
Cooling Capacity *Sonata* Units		kW	369	430	474	518	589	635
Energy Efficiency Ratio *Sonata* Units		EER	2.6	2.6	2.7	2.7	2.6	2.7
Sound Pressure SPL at 10 metres	Standard Units	dB(A)	63	65	65	66	68	67
	Sonata Units (Fans at High Speed)	dB(A)	56	58	58	59	60	59
	Sonata Units (Fans at low Speed)	dB(A)	53	54	54	54	56	56

YAES-SA			0715	0785	0905	0985	1075	1245	1405
Cooling Capacity Standard Units		kW	723	787	853	922	1030	1180	1314
Energy Efficiency Ratio Standard Units		EER	3.0	2.9	2.9	2.9	2.9	2.8	2.8
Cooling Capacity *Sonata* Units		kW	694	756	819	886	989	1133	1261
Energy Efficiency Ratio *Sonata* Units		EER	2.9	2.7	2.8	2.8	2.7	2.7	2.7
Sound Pressure SPL at 10 metres	Standard Units	dB(A)	68	68	69	69	69	70	70
	Sonata Units (Fans at High Speed)	dB(A)	62	62	62	62	63	63	63
	Sonata Units (Fans at low Speed)	dB(A)	59	59	58	60	60	60	60

YAES-DSA			1505	1575	1645	1715	1785	1855	1925
Cooling Capacity Standard Units		kW	1446	1510	1574	1640	1710	1775	1845
Energy Efficiency Ratio Standard Units		EER	3.0	2.9	2.9	2.9	2.9	2.9	2.9
Cooling Capacity *Sonata* Units		kW	1388	1450	1511	1574	1641	1704	1771
Energy Efficiency Ratio *Sonata* Units		EER	2.9	2.8	2.7	2.7	2.7	2.8	2.8
Sound Pressure SPL at 10 metres	Standard Units	dB(A)	69	69	69	70	71	71	71
	Sonata Units (Fans at High Speed)	dB(A)	63	63	63	64	64	64	64
	Sonata Units (Fans at low Speed)	dB(A)	60	60	60	60	61	61	61

Cooling capacities at 7°C leaving chilled liquid temperature and 35°C ambient.
Sound Pressure level at 10 metres in free field conditions.

The optional low sound version (Sonata) has an acoustically treated enclosure that contains compressors, valves and piping systems and has specially designed low sound two speed fans.

YAES-DSA units have a communications link, that must be plugged together, between the two panels and a mixed liquid sensor that must be installed in the common leaving liquid pipework from the two evaporators. All units are designed for roof or ground level locations.

EUROVENT CERTIFIED PERFORMANCE

CE

SPECIFICATION

FEATURES	BENEFITS
Optional acoustic component enclosure and two speed fans	Low sound operation.
High efficiency semi hermetic screw compressors.	Energy efficient, long life reliability.
Multiple independent refrigerant circuits.	System standby security.
Optional heat recovery desuperheaters.	Cost effective heat supply for domestic hot water applications.
Low temperature leaving liquid option.	Process cooling applications.
Microprocessor control with visual display of temperatures, Pressures, motor currents, operating hours, number of starts and start/stop schedules.	System data logging and temperature setpoint reset capability. Energy management and improved operating efficiency.
Optional Modbus and Bacnet building management system interfaces.	For central data logging and single point full system monitoring and control.
Open transition star delta starters.	Low starting current.
Optional closed transition star delta starters.	Reduced changeover spike reduces the risk of electrical interference. Additionally smoothed low starting current.
Optional power factor correction	Reduced operating costs.
Separate power and control compartments with lockable doors and emergency stop device.	Operator safety considerations.
Full factory run test.	Verifies quality control and ensures that the unit operates satisfactorily prior to delivery.
Manufactured to ISO 9001 EN 29001.	High standard of quality control.
Eurovent certified.	Independent certification of published performance data.

The YAES air-cooled chiller shall be completely assembled with all interconnecting refrigerant piping and internal wiring, ready for field installation. The unit shall be pressure tested, evacuated, and fully factory charged with refrigerant and oil in each of the independent refrigerant circuits.

After assembly, an operational test shall be performed with water flowing through the evaporator to ensure that each refrigerant circuit operates correctly.

The unit structure shall be manufactured from heavy gauge, galvanised steel and coated with baked-on powder paint (Desert Sand (RAL 1019).

Compressors

Twin helical semi-hermetic screw compressors shall be provided to ensure high operational efficiencies and reliable performance. Capacity shall be through a single slide valve. Each compressor shall be of positive displacement type characterised by two helically grooved rotors manufactured from forged steel. The 50Hz motor shall operate at 2950rpm to direct drive the male rotor which drives the female rotor on a light film of oil.

Each compressor shall be direct drive, semi-hermetic, rotary twin screw type with integral oil separator and include the following items:

- Two screw rotors, with asymmetric profiles, manufactured from forged steel.
- A cast iron compressor housing precision machined to provide optimal clearance for the rotors. Contact between the male and female rotor is primarily rolling on a contact band on each of the rotor's pitch circle. This results in virtually no rotor wear and increased reliability.
- The entire compressor, from suction to discharge shall have a design working pressure of 28kg/cm².
- Capacity Control: The compressors shall start at the minimum load position and each shall have four steps of capacity control via a slide valve. A microprocessor controlled output pressure regulating capacity control valve shall be supplied to command compressor capacity independent of control valve input pressure and to balance the compressor capacity with the cooling load.
- An automatic spring return of capacity control valve to the minimum load position to ensure compressor starting at minimum motor load.
- An integral discharge check valve to prevent rotor backspin upon shutdown.
- Discharge shut-off service valves.
- A reliable suction gas cooled high efficiency, accessible hermetic motor with overload protection using both thermistor and over current protection.
- A suction gas screen and serviceable, 17 micron full flow oil filter within the compressor housing. Refrigerant gas is injected into the void created by the unmeshing of the five lobed male and seven lobed female rotor. Further meshing of the rotors closes the rotor threads to the suction port and progressively compresses the gas in an axial direction to the discharge port.
- The gas is compressed in volume and increased in pressure before exiting at a designed volume at the discharge end of the rotor casing. Since the intake and discharge cycles overlap, a resulting smooth flow of gas is maintained.
- The compressor incorporates a complete anti-friction bearing design for reduced power input and increased reliability. Separated, cylindrical, roller bearings handle radial loads. Angular-contact ball bearings handle axial loads. Together they maintain accurate rotor positioning at all pressure ratios, thereby minimising leakage and maintaining efficiency. A spring loaded check valve is installed on the compressor discharge housing to prevent compressor rotor backspin due to system refrigerant pressure gradients during shutdown.
- Motor cooling is provided by suction gas from the evaporator flowing across the motor.
- The compressor is lubricated by removing oil from the discharged refrigerant gas within the integral oil separator. The pressurised oil is then cooled in the condenser coils and piped back to the compressor for lubrication.
- A 300 watt (230 V 1 Ø 50 Hz) immersion heater is located in the compressor. The heater is temperature activated to prevent refrigerant condensation.

Motor Starting

Two types of compressor motor starting are available: star/delta open transition starter and optional star/delta closed transition starter.

The standard star/delta starter utilises 3 motor contactors and a transition delay relay. The optional closed Star/Delta starter utilises 4 motor contactors, a set of transition resistors and a transition delay relay. The star/delta start allows inrush current to be limited to approximately 33% LRA with the closed transition option reducing the transient star to delta current.

When the microprocessor initiates a start signal to run a compressor, it runs in Star for 4 seconds and then transitions to Delta.

Oil Cooler

Oil cooling shall be provided by a dedicated air-cooled finned tube type heat exchanger located in the condenser section of the unit. Oil leaving the integral oil separator passes through the oil cooler section for cooling before return to the compressor.

Refrigerant Circuits
An independent refrigerant circuit shall be provided per compressor. Each circuit will use 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 shall include: manual shut-off valve with charging port, high absorption removable core filter-drier, sight glass with moisture indicator, and thermostatic expansion valve. Suction lines shall be covered with closed-cell insulation.

Evaporator
The unit uses a Shell and Tube type Direct Expansion Evaporator. Each of the refrigerant circuits consists of 2 passes with the chilled liquid circulating back and forth across the tubes from one end to the other.

The design working pressure of the cooler on the shell side is 10 bar, and 16.2 bar for the tube (refrigerant side). The water baffles are fabricated from galvanised steel to resist corrosion. Removable heads are provided for access to internally enhanced, seamless, copper tubes. Water vent and drain connections are included.

The cooler is equipped with a thermostatically controlled heater for protection to -29°C ambient and are insulated with 19 mm flexible closed-cell foam.

The water nozzles have victaulic grooves as standard and are available with optional flanges.

Condenser
Standard units have condensers fitted with single speed fans. Low sound units have two speed fans fitted.

Fans - The fans shall be dynamically and statically balanced, direct drive with corrosion resistant glass fibre reinforced composite blades moulded into low sound, full airfoil cross section, providing vertical air discharge from extended orifices for efficiency and low sound. Each fan shall be located in a separate compartment to prevent cross flow during fan cycling. Guards of heavy gauge, PVC (polyvinyl chloride) coated galvanised steel shall be provided.

Motors - The fan motors shall be the high efficiency, direct drive, 8 pole, 3 phase, Class-"F", current overload protected, totally enclosed (TEAC) type with double sealed, permanently lubricated, ball bearings.

Coils - Fin and tube condenser coils shall be manufactured from seamless, internally enhanced, high condensing coefficient, corrosion resistant copper tubes arranged in staggered rows and mechanically expanded into corrosion resistant aluminium alloy with full height fin collars. The design working pressure shall be 31 bar and each coil shall be pressure tested to 34 bar.

Power and Control Panel
All controls and motor starting equipment necessary for unit operation shall be factory wired and function tested.

The panel enclosure shall be designed to IP55 (rain/dust tight) and be manufactured from powder painted galvanised steel. Component mounting panels are of non-painted galvanised steel to ensure optimum protective circuit (earthing).

2 circuit models have a single power and control panel (Main - Circuits 1 and 2). 3 and 4 circuit models have two power and control panels (Main - Circuits 1 and 2) and (Auxiliary - Circuits 3 and 4).

The Power and Control Panel shall be divided into a power section for each electrical system, a control section and a common input section. All sections shall have a separate hinged, latched, and gasket sealed door equipped with wind struts for safer servicing.

Each power compartment shall contain:

Compressor fuses, compressor and fan contactors, fan manual motor starters to give overload and short circuit protection phase rotation relay and a control circuit fuse.

The control section shall contain:

On/Off switch, microcomputer keypad and display, microprocessor board, I/O expansion board, relay boards and power supply board.

Standard Single Point Power Supply Connection - Main Panel All Models
The common input section contains:

Models YAES0405SA to 0715SA, 1075SA, 1505DSA, 1575DSA
An incoming fused disconnect switch for connection of the customer provided power supply. Internally factory wiring to compressor contactors of each circuit. The control supply is derived internally from the incoming power supply.

Models YAES0785SA to 0985SA, 1245SA, 1405SA, 1645DSA to 1925DSA
An incoming non-fused disconnect switch for connection of the customer provided power supply. Internally factory wiring to fuses for each circuit. The control supply is derived internally from the incoming power supply.

Standard Single Point Power Supply Connection - Auxiliary Panel 3 Circuit Models
The power section contains:

Models YAES1075SA, 1245SA, 1405SA
The customer provided power supply is connected to a fused disconnect switch. The control supply is derived internally from the incoming power supply.

Standard Single Point Power Supply Connection - Auxiliary Panel YAES-DSA Models
The common input section contains:

Models YAES1505DSA to 1925DSA
An incoming non-fused disconnect switch for connection of the customer provided power supply. Internally factory wiring to fuses for each circuit. The control supply is derived internally from the incoming power supply.

The common input section also contains the control circuit switch disconnect/emergency stop device, a transformer (to provide the necessary 24Vac supply for the power supply board), control fuses, residual current circuit breaker, and terminals for a remote emergency stop device.

Microprocessor Controls
The microprocessor shall have the following functions and displays:

- A liquid crystal 40 character display with text provided on two lines and light emitting diode backlighting for outdoor viewing.
- A colour coded, 35 button, sealed keypad with sections for Display, Entry, Setpoints, Clock, Print, Program and Unit On/Off switch.
- The standard controls shall include: glycol chilling or thermal storage, automatic pump down, run signal contacts, demand load limit from external building automation system input, remote reset liquid temperature reset input, unit alarm contacts, chilled liquid pump control, automatic or manual reset after power failure, automatic system optimisation to match operating conditions, software stored in non-volatile memory (EPROM) to eliminate chiller failure due to AC power failure.
- Programmed Setpoint shall be retained in a lithium battery backed RTC memory for a minimum of 5 years.

DISPLAY – In Metric (°C and Bar) or English (°F and psi) units. For each circuit, the following items shall be displayed:

- Leaving chilled liquid, and ambient temperature.
- Day, date and time. Daily start/stop times. Holiday and Manual Override status.
- Compressor operating hours and starts. Automatic lead/lag. Lead compressor identification.
- Run permissive status. No cooling load condition. Compressor run status.
- Anti-recycle timer and anti-coincident start timer status per compressor.
- System suction discharge, and oil pressures and oil and discharge temperatures.
- Full load compressor motor current. Compressor capacity control valve steps.
- Cut-out status and set-points for: low oil level, low suction pressure, high discharge pressure and temperature, high oil temperature, low and high ambient, high and low current, and low leaving liquid temperature.
- Unloading limit setpoints for high discharge pressure and compressor motor current.
- Liquid pull-down rate sensitivity.
- Status of: evaporator heater, condenser fans, chilled liquid pump.
- "Out of range" message.
- Up to 3 fault shut down conditions.
- Standard Display Language is English, with other language options.

ENTRY – Enter set point changes, cancel inputs, advance day, and change AM/PM.

SET POINTS – Chilled liquid temperature, chilled liquid range, remote reset temperature range.

CLOCK – Time, daily or holiday start/stop schedule, manual override for servicing.

PRINT – Operating data or system fault shutdown history for last three faults, and software version. Printouts through an RS-232 port via a separate printer (by others).

PROGRAM – For setting language, high discharge pressure cut-out, high discharge pressure unload, suction pressure cut-out, high ambient cut-out, low ambient cut-out, leaving liquid temperature cut-out, high motor current unload, local remote control and power failure reset. Settings for liquid temperature set-point reset signal from YORK ISN or building automation system.

Temperature Offset

Pulse width modulating (PWM) control is provided to remotely adjust the leaving chilled water temperature setpoint to a higher value.

Motor Protection

The microprocessor motor protection provides high current protection to ensure that the motor is not damaged due to voltage, excess refrigerant or other problems that could cause excessive motor current. If the motor current exceeds the 115% FLA trip point after 9 seconds of operation, the microprocessor will shut the system down and lock it out after three faults in 90 minutes.

The microprocessor also provides low motor current protection when it senses a motor current of less than 10% FLA.

A motor protector module provides thermal overload protection.

ACCESSORIES AND OPTIONS

POWER OPTIONS

Power Supply Connection Options:

Single Point - System Fused Disconnect Switches
Main Panel - All Models, Auxiliary Panel - 4 Circuit Models.
A non-fused disconnect switch in the common input section of the panel for connection of the customer provided single power supply. Internally factory wiring to a door interlocked fused disconnect switch, for each circuit. The control supply is derived internally.

Single Point - System Circuit Breakers
Main Panel - All Models, Auxiliary Panel - 4 Circuit Models.
A non-fused disconnect switch in the common input section of the panel for connection of the customer provided single power supply. Internally factory wiring to a door interlocked circuit breaker, for each circuit. The control supply is derived internally.

Multi-Point - System Fused Disconnect Switches
Main Panel - All Models, Auxiliary Panel - 4 Circuit Models.
Two terminal blocks in the common input section of the panel for connection of the customer provided power supplies. Internally factory wiring to a door interlocked fused disconnect switch, for each circuit. A non-fused disconnect switch / emergency stop device (QCSD/ESD) in the common input section with termination for the customer (400 V, 2 Ø, 50 Hz) control supply.

Multi-Point - System Circuit Breakers
Main Panel - All Models, Auxiliary Panel - 4 Circuit Models.
Two terminal blocks in the common input section of the panel for connection of the customer provided power supplies. Internally factory wiring to a door interlocked circuit breaker, for each circuit. A non-fused disconnect switch / emergency stop device (QCSD/ESD) in the common input section with termination for the customer (400 V, 2 Ø, 50 Hz) control supply.

Single Point - System Circuit Breaker
Auxiliary Panel - 3 Circuit Models.
One supply to master fused disconnect switch (QCB) master circuit breaker in power section, control supply to non-fused disconnect switch (QCSD/ESD) derived internally

Power Factor Correction
Factory mounted passive (static) correction capacitors to correct unit compressor power factors to 0.95.

CONTROL OPTIONS

BAS/EMS Interface
Provides a means to reset the leaving chilled liquid temperature from the building automation system (BAS) / energy management system (EMS), factory mounted:

Printed circuit board to accept 4 to 20 mA or 0 to 10 Vdc from the BAS/EMS.
(Cannot be fitted when a Multi-unit Sequence Control is fitted).

Note: A YORK ISN Building Automation System can provide a reset signal direct to the standard control panel via the standard on-board RS485 port.

Micro Gateway
Interface to enable communications with building control systems using BACnet or MODBUS protocols. See separate York documentation.

Control Panel Display Language
English (standard), German, Spanish, French, Italian, Hungarian and Portuguese panels and EPROMs available.

REFRIGERANT CIRCUIT OPTIONS

Desuperheaters
Factory fitted desuperheaters on compressor discharge lines to provide hot water during cooling operation.

Electronic Expansion Valve
Electronic expansion valves and controls instead of thermally operated valves for improved efficiency.

38mm Insulation
Double thickness insulation provided for enhanced efficiency and low temperature applications.

Handed Evaporator Liquid Connections
Evaporator connections on standard units are on the right-hand side (when viewed from the control panel). The connections are available on left-hand side as an option, to assist in pipework design etc.

Cooler Flange Kit
Factory fitted flanges on cooler water connections to I.S.O. R2084-NP10. Adaptor flanges to match cooler flange kit ISO 7005-1 PN10 supplied loose for field installation by contractor. Includes all necessary nuts, bolts, gaskets, etc.

Flow Switch Accessory
Vapour-proof SPDT, NEMA 4X switch, 10.3 bar DWP, -29°C to 121°C, with 1" BSP connection for upright mounting in horizontal pipe. A flow switch must be field installed with each unit.

Additional PED safety devices
Relief valves with bursting disks and 3 way change - over valve.

CONDENSER/EXTERIOR OPTIONS

Un-coated Aluminium Fin Stock
Standard condenser coils are constructed using un-coated aluminium fin stock.

Gold Coloured Epoxy Coated Fin Condenser Coils
Available as an option.

Copper Fin Condenser Coils
Condenser coils are constructed with corrosion resistant copper fins and provide added protection.

Condenser Wired Guards
Heavy gauge welded wire mesh guards mounted over the exterior condenser coil faces (Field mounted).

Unit Aesthetic Panels
Infill panels manufactured from powder painted galvanised steel for below the power and control panel and the sides of the unit near the power and control panel and at the rear of the unit.

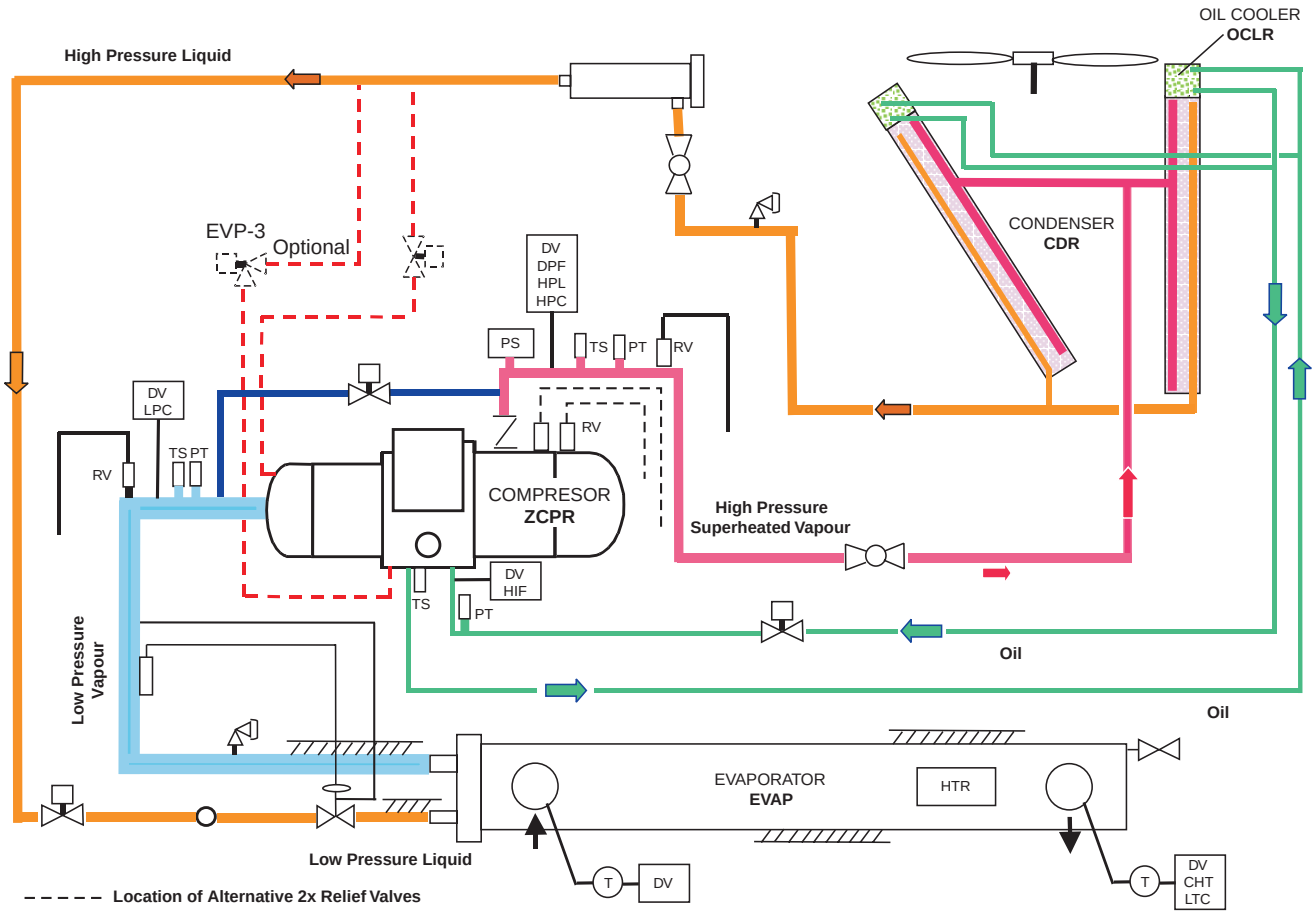
High Ambient/Sun Shield Kit
Kit to provide shade / air gap around the power and control panels at ambients above 45°C.

High Pressure Fans
Fans and motors suitable for high external static conditions.

VIBRATION ISOLATION

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

REFRIGERANT FLOW DIAGRAM — FIGURE 1



Cooling
Low pressure liquid refrigerant enters the evaporator and is evaporated and superheated by the heat energy absorbed from the chilled water passing through the evaporator shell. Low pressure vapour enters the compressor where pressure and superheat are increased. High pressure vapour is passed through the oil separator where compressor oil is removed and recirculated to the compressor via the oil cooler. The high pressure oil-free vapour is fed to the air cooled condenser coil where the heat is removed. The subcooled refrigerant then passes through the expansion valve where pressure is reduced and further cooling takes place before returning to the evaporator.

TABLE 2 OPERATING LIMITATIONS

Model YAES-SA				0405		0475		0545		0575		0645	
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid outlet temperature	Water outlet	°C	4.5 to 15									
		Glycol outlet	°C	-12 to 15									
		Temp. spread	°C	3 to 10									
	Evaporator Flow rate		l/s	8.8	42.6	8.8	42.6	8.8	42.6	8.8	42.6	10.1	44.1
	Evaporator Pressure drop		kPa	6.2	87.0	6.2	87.0	6.2	87.0	6.2	87.0	7.0	93.3
	Maximum working pressure		bar	10									
Ambient Air	Air entering temp. Standard units (1)(2)			-18 to 50									
	Air entering temp. Low sound units (1)		°C	-18 to 50									
	Fan Pressure	Std/Dual Speed fans	Pa	10									
		High pressure fans	Pa	120									
Refrigerant System High Pressure Side			bar	27.6									
Power Supply Voltage 400 V, 3 Ø, 50 Hz (nominal)			V	360 to 440									
Recommended Minimum System Water Volume			l	1210		1250		1560		1700		1940	

Model YAES-SA				0685		0715		0785		0905		0985	
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid outlet temperature	Water outlet	°C	4.5 to 15									
		Glycol outlet	°C	-12 to 15									
		Temp. spread	°C	3 to 10									
	Evaporator Flow rate		l/s	10.1	44.1	10.1	44.1	10.1	44.1	11.4	47.3	11.4	59.9
	Evaporator Pressure drop		kPa	7.0	93.3	7.0	93.3	7.0	93.3	7.0	90.0	4.9	100.0
	Maximum working pressure		bar	10									
Ambient Air	Air entering temp. Standard units (1)(2)			-18 to 50									
	Air entering temp. Low sound units (1)		°C	-18 to 50									
	Fan Pressure	Std/Dual Speed fans	Pa	10									
		High pressure fans	Pa	120									
Refrigerant System High Pressure Side			bar	27.6									
Power Supply Voltage 400 V, 3 Ø, 50 Hz (nominal)			V	360 to 440									
Recommended Minimum System Water Volume			l	2090		2110		2326		2674		2925	

Model YAES-SA				1075		1245		1405	
				Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid outlet temperature	Water outlet	°C	4.5 to 15					
		Glycol outlet	°C	-12 to 15					
		Temp. spread	°C	3 to 10					
	Evaporator Flow rate		l/s	19.0	79.0	19.0	79.0	19.0	79.0
	Evaporator Pressure drop		kPa	8.0	140.0	8.0	140.0	8.0	140.0
	Maximum working pressure		bar	10					
Ambient Air	Air entering temp. Standard units (1)(2)			-18 to 50					
	Air entering temp. Low sound units (1)		°C	-18 to 50					
	Fan Pressure	Std/Dual Speed fans	Pa	10					
		High pressure fans	Pa	120					
Refrigerant System High Pressure Side			bar	27.6					
Power Supply Voltage 400 V, 3 Ø, 50 Hz (nominal)			V	360 to 440					
Recommended Minimum System Water Volume			l	3378		3846		4228	

Model YAES-DSA				1505		1575		1645		1715	
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid outlet temperature	Water outlet	°C	4.5 to 15							
		Glycol outlet	°C	-12 to 15							
		Temp. spread	°C	3 to 10							
	Flow rate	Evaporator 1	l/s	10.1	44.1	10.1	44.1	10.1	44.1	10.1	44.1
		Evaporator 2	l/s	10.1	44.1	10.1	44.1	10.1	44.1	11.4	47.3
	Pressure drop	Evaporator 1	kPa	7.0	93.3	7.0	93.3	7.0	93.3	7.0	93.3
		Evaporator 2	kPa	7.0	93.3	7.0	93.3	7.0	93.3	7.0	90.0
	Maximum working pressure		bar	10							
Ambient Air	Air entering temp. Standard units (1)(2)			-18 to 50							
	Air entering temp. Low sound units (1)		°C	-18 to 50							
	Fan Pressure	Std/Dual Speed fans	Pa	10							
		High pressure fans	Pa	120							
Refrigerant System High Pressure Side			bar	27.6							
Power Supply Voltage 400 V, 3 Ø, 50 Hz (nominal)			V	360 to 440							
Recommended Minimum System Water Volume			l	2110		2326		2326		2674	

Model YAES-DSA				1785		1855		1925	
				Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid outlet temperature	Water outlet	°C	4.5 to 15					
		Glycol outlet	°C	-12 to 15					
		Temp. spread	°C	3 to 10					
	Flow rate	Evaporator 1	l/s	11.4	59.9	11.4	59.9	11.4	59.9
		Evaporator 2	l/s	10.1	44.1	11.4	47.3	11.4	47.3
	Pressure drop	Evaporator 1	kPa	4.9	100.0	4.9	100.0	4.9	100.0
		Evaporator 2	kPa	7.0	93.3	7.0	90.0	4.9	100.0
	Maximum working pressure		bar	10					
Ambient Air	Air entering temp. Standard units (1)(2)			-18 to 50					
	Air entering temp. Low sound units (1)		°C	-18 to 50					
	Fan Pressure	Std/Dual Speed fans	Pa	10					
		High pressure fans	Pa	120					
Refrigerant System High Pressure Side			bar	27.6					
Power Supply Voltage 400 V, 3 Ø, 50 Hz (nominal)			V	360 to 440					
Recommended Minimum System Water Volume			l	2925		2925		2925	

(1) Compressor liquid injection kit required on all units operating in ambients exceeding 45°C.
(2) For ambient temperatures below -4°C it is preferable to use dual speed fans.

SELECTION GUIDE

DATA REQUIRED

To select a YORK YAES chiller the following information is required:

1. Required cooling capacity.
2. Design chilled water entering and leaving temperatures.
3. Design water flow rate if one of the temperatures in item 3 are unknown.
4. Design condenser entering air temperature. This will normally be the design summer ambient air temperature unless location or other factors have an influence.
5. Altitude above sea level.
6. Design evaporator fouling factor.
7. Static pressure resistance against condenser entering and leaving air flow (where ducts, louvres, attenuators, etc., are used) at full unit air volume.

Note: Items 1, 2 and 3 must be linked by the following formulae:

Cooling Capacity (kW) = Range (°C) x Flow (litres/sec) x 4.18

Where:
Range = Entering liquid temperature - Leaving liquid temperature.

CHILLER SELECTION METHOD

1. Determine the correct size of chiller by selecting the model which most closely matches the required capacity at the design conditions of leaving water temperature and entering air temperature (Table 6).
2. Apply correction factors for fouling factor and altitude (Table 3) to the capacity and power values from the capacity tables (Table 6). Ensure the corrected capacity is still sufficient for requirements.
3. Using the corrected capacity of the selected chiller adjust the design temperature range, or flow rate, to balance the formulae shown in “Data Required”.
4. Physical and electrical data can now be determined from Tables 13 and 15.
5. Always re-check that selections fall within the design limitations specified in Table 2.

FOULING AND ALTITUDE FACTORS — TABLE 3

COOLER		
Fouling Factor m² °C/kW	**Capacity Factor**	**Comp. Input Factor**
0.044	1.000	1.000
0.088	0.987	0.995
0.176	0.964	0.985
0.352	0.915	0.962

Altitude (m)	**Capacity Factor**	**Comp. Input Factor**
0	1.000	1.000
600	0.987	1.010
1200	0.973	1.020
1800	0.958	1.029
2400	0.943	1.038

YAES-SA SAMPLE SELECTION - COOLING

A chiller is required to cool water from 12°C to 7°C having a cooling capacity of 690 kW at a design flow rate of 33 l/s. Other design conditions applying are:

Ambient air entering condenser: 35°C
Fouling factor: 0.044 m² °C./kW
Altitude: Sea level

From a cursory examination of Capacity Table 6, a model YAES0715SA gives approximately the required capacity:

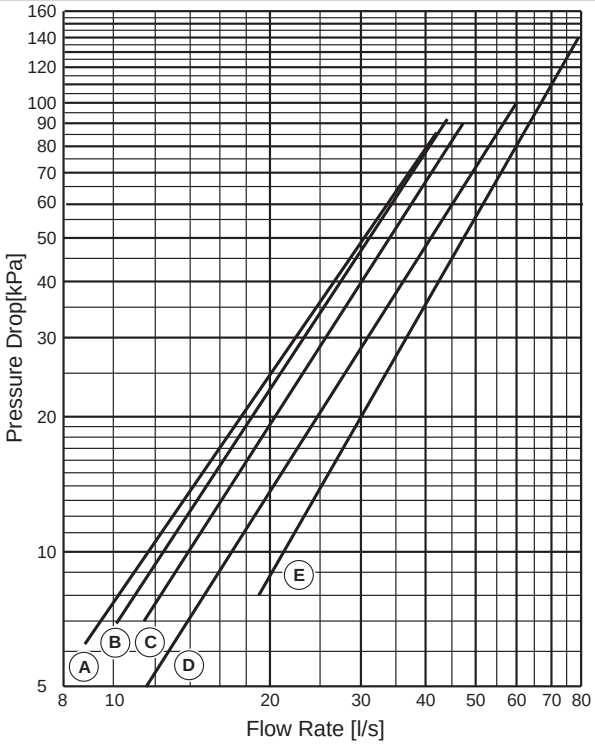
Capacity = 723.1 kW
Compressor power = 219.5 kW

No correction factors apply therefore, after calculating the flow rate, the conditions will be as follows:

Cooling capacity: 723.1 kW
Water temperature: 12°C to 7°C (Range = 5°C)
Water flow rate: 34.6 l/s
Compressor power: 219.5 kW

All values are within the operating limits in Table 2. From Pressure Drop Graph (Figure 2), YAES0715SA evaporator water pressure drop = 60.0 kPa at the calculated flow of 34.6 l/s.

EVAPORATOR PRESSURE DROPS — FIGURE 2



YAES-SA Model	
0405	A
0475	
0545	
0575	
0645	B
0685	
0715	
0785	
0905	C
0985	D
1075	E
1245	
1405	

YAES-DSA Model	Evaporator	
	Main	**Auxiliary**
1505	B	B
1575	B	B
1645	B	B
1715	B	C
1785	D	B
1855	D	C
1925	D	D

Model	Pressure Drop Calculation
A	Pressure Drop[kPa] = 0.1624 x(Flow Rate[l/s] ^ 1.6784
B	Pressure Drop[kPa] = 0.1203 x(Flow Rate[l/s] ^ 1.7572
C	Pressure Drop[kPa] = 0.0887 x(Flow Rate[l/s] ^ 1.8179
D	Pressure Drop[kPa] = 0.0587 x(Flow Rate[l/s] ^ 1.8179
E	Pressure Drop[kPa] = 0.0216 x(Flow Rate[l/s] ^ 2.0085

WATER TEMPERATURE RANGE CORRECTION FACTORS

Temperature Range °C	Correction Factors	
	Cooling Capacity	**Compressor kW Input**
3	0.98	0.99
4	0.99	1.00
5	1.00	1.00
6	1.01	1.00
7	1.02	1.00
8	1.02	1.01
9	1.03	1.01
10	1.04	1.01

TABLE 4 COOLING CAPACITY FACTORS AND COMPRESSOR POWER FACTORS - PART LOAD OPERATION

Models YAES 0405SA, 0475SA, 0545SA, 0575SA, 0645SA, 0685SA, 0715SA, 0785SA, 0905SA & 0985SA	Compressor Capacity Step		Unit Cooling Capacity Factor	Unit Compressor kW Factor
	Compressor No			
Unit Capacity Step	1	2		
8	step 4	step 4	1.00	1.00
7	step 4	step 3	0.92	0.89
6	step 3	step 3	0.84	0.77
5	step 3	step 2	0.71	0.65
4	step 3	step 1	0.55	0.49
3	step 3	off	0.42	0.39
2	step 2	off	0.29	0.27
1	step1	off	0.25	0.21

Models YAES 1075SA, 1245SA & 1405SA	Compressor Capacity Step			Unit Cooling Capacity Factor	Unit Compressor kW Factor
	Compressor No				
Unit Capacity Step	1	2	3		
12	step 4	step 4	step 4	1.00	1.00
11	step 4	step 4	step 3	0.97	0.95
10	step 4	step 3	step 3	0.87	0.85
9	step 4	step 3	step 2	0.79	0.80
8	step 4	step 3	step 1	0.75	0.76
7	step 4	step 3	off	0.59	0.60
6	step 3	step 3	off	0.54	0.51
5	step 3	step 2	off	0.48	0.45
4	step 3	step 1	off	0.41	0.41
3	step 3	off	off	0.30	0.28
2	step 2	off	off	0.20	0.20
1	step 1	off	off	0.16	0.16

Models YAES1505DSA, 1575DSA, 1645DSA, 1715DSA, 1785DSA, 1855DSA & 1925DSA	Compressor Capacity Step Number				Unit Cooling Capacity Factor	Unit Compressor kW Factor
	Compressor No					
Unit Capacity Step	1	2	3	4		
16	step 4	step 4	step 4	step 4	1.00	1.00
15	step 4	step 4	step 4	step 3	0.98	0.97
14	step 4	step 3	step 4	step 3	0.92	0.89
13	step 4	step 3	step 3	step 3	0.88	0.83
12	step 3	step 3	step 3	step 3	0.84	0.77
11	step 3	step 3	step 3	step 2	0.78	0.71
10	step 3	step 2	step 3	step 2	0.71	0.65
9	step 3	step 2	step 3	step 1	0.63	0.57
8	step 3	step 1	step 3	step 1	0.55	0.49
7	step 3	step 1	step 3	off	0.49	0.44
6	step 3	off	step 3	off	0.42	0.39
5	step 3	off	step 2	off	0.36	0.33
4	step 2	off	step 2	off	0.29	0.27
3	step 2	off	step 1	off	0.27	0.24
2	step 1	off	step 1	off	0.25	0.21
1	step 1	off	off	off	0.13	0.10

Part load performance tests performed 7°C leaving chilled water and 35°C ambient

TABLE 5 NOMINAL FAN POWER CONSUMPTION AT 400 V

	Fan Power kW												
YAES-SA	0405	0475	0545	0575	0645	0685	0715	0785	0905	0985	1075	1245	1405
Standard Units	10	12	14	16	16	18	20	20	24	24	28	36	36
Sonata Units - Fans at Low Speed	5.5	6.6	7.7	8.8	8.8	9.9	11	11	13.2	13.2	15.4	19.8	19.8
Sonata Units - Fans at High Speed	10	12	14	16	16	18	20	20	24	24	28	36	36
Units with High Pressure Fans	11	13.2	15.4	17.6	17.6	19.8	33	33	39.6	39.6	45.2	59.4	59.4

	FAN POWER kW						
YAES-DSA	1505	1575	1645	1715	1785	1855	1925
Standard Units	40	40	40	44	44	48	48
Sonata Units - Fans at Low Speed	22	22	22	24.2	24.2	26.4	26.4
Sonata Units - Fans at High Speed	40	40	40	44	44	48	48
Units with High Pressure Fans	66	66	66	72.6	72.6	79.2	79.2

Model	LWT °C	Condenser Coil Entering Air Temperature °C																	
		20		25		30		35		38		40		42		44		45	
		Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW
	5	405.1	103.5	393.3	110.6	372.4	113.2	360.9	125.2	343.1	131.7	331.2	136.1	319.3	140.5	307.4	144.9	301.5	147.0
	6	***422.1***	***105.0***	***408.7***	***112.2***	***385.9***	***118.2***	***372.8***	***126.8***	***354.9***	***133.4***	***342.9***	***137.9***	***331.0***	***142.3***	***319.1***	***146.7***	***313.1***	***148.9***
YAES	7	439.1	104.9	424.1	113.7	399.3	119.8	384.7	128.4	366.7	135.1	354.7	139.6	342.7	144.1	330.7	148.5	324.7	150.8
0405SA	***8***	***451.6***	***109.8***	***436.6***	***116.8***	***411.6***	***122.8***	***397.0***	***131.3***	***378.1***	***138.0***	***365.6***	***142.5***	***353.0***	***147.0***	***340.4***	***151.5***	***334.2***	***153.8***
	10	476.6	113.1	461.7	119.9	436.1	125.8	421.5	134.2	401.0	140.9	387.3	145.5	373.6	150.0	359.9	154.5	353.0	156.8
	12	***496.7***	***117.4***	***484.0***	***124.4***	***460.1***	***130.7***	***447.7***	***139.2***	***425.1***	***145.9***	***410.0***	***150.4***	***394.9***	***154.8***	***379.8***	***159.3***	***372.3***	***161.5***
	15	526.9	121.7	517.5	128.9	496.0	135.5	486.9	144.3	461.2	150.9	444.0	155.3	426.9	159.7	409.8	164.1	401.2	166.3
	5	471.5	120.5	457.8	128.8	433.5	135.7	420.1	145.7	399.3	153.4	385.5	158.5	371.7	163.5	357.9	168.6	350.9	171.2
	6	***491.4***	***122.2***	***475.8***	***130.6***	***449.2***	***137.6***	***433.9***	***147.6***	***413.1***	***155.3***	***399.2***	***160.5***	***385.3***	***165.6***	***371.4***	***170.8***	***364.5***	***173.3***
YAES	7	511.2	122.1	493.7	132.4	464.9	140.9	447.8	149.5	426.8	157.3	412.9	162.5	398.9	167.7	385.0	172.9	378.0	175.5
0475SA	***8***	***525.7***	***127.8***	***508.3***	***136.0***	***479.1***	***143.0***	***462.1***	***152.8***	***440.2***	***160.7***	***425.5***	***165.9***	***410.9***	***171.1***	***396.3***	***176.4***	***389.0***	***179.0***
	10	554.8	131.6	537.4	139.6	507.7	146.5	490.7	156.2	466.8	164.1	450.8	169.3	434.9	174.6	418.9	179.8	411.0	182.5
	12	***578.2***	***136.6***	***563.4***	***144.8***	***535.6***	***152.1***	***521.1***	***162.1***	***494.8***	***169.9***	***477.3***	***175.1***	***459.7***	***180.3***	***442.2***	***185.4***	***433.4***	***188.0***
	15	613.3	141.6	602.4	150.0	577.4	157.7	566.8	168.0	536.9	175.7	516.9	180.8	497.0	185.9	477.0	191.0	467.1	193.6
	5	519.8	131.5	504.7	140.6	477.9	143.9	463.1	153.0	440.2	161.0	425.0	166.4	409.8	171.7	394.5	177.0	386.9	179.7
	6	***541.7***	***133.4***	***524.5***	***142.5***	***495.2***	***145.9***	***478.4***	***155.0***	***455.4***	***163.1***	***440.1***	***168.5***	***424.8***	***173.9***	***409.5***	***179.3***	***401.8***	***182.0***
YAES	7	563.6	133.3	544.3	144.5	512.5	147.8	493.6	157.0	470.6	165.2	455.2	170.6	439.8	176.1	424.4	181.5	416.7	184.2
0545SA	***8***	***579.6***	***139.5***	***560.3***	***148.4***	***528.2***	***151.5***	***509.4***	***160.5***	***485.2***	***168.7***	***469.1***	***174.2***	***453.0***	***179.7***	***436.9***	***185.2***	***428.8***	***187.9***
	10	611.6	143.7	592.5	152.4	559.7	155.3	541.0	164.0	514.6	172.2	497.0	177.8	479.4	183.3	461.8	188.8	453.1	191.6
	12	***637.4***	***149.1***	***621.1***	***158.1***	***590.4***	***161.2***	***574.5***	***170.2***	***545.5***	***178.3***	***526.1***	***183.8***	***506.8***	***189.3***	***487.5***	***194.7***	***477.8***	***197.4***
	15	676.1	154.6	664.1	163.8	636.6	167.2	624.8	176.4	591.8	184.4	569.9	189.8	547.9	195.2	525.9	200.6	514.9	203.3
	5	568.1	143.7	551.6	153.6	522.3	157.3	506.1	167.2	481.1	176.0	464.5	181.8	447.8	187.7	431.2	193.5	422.8	196.4
	6	***592.0***	***145.8***	***573.2***	***155.8***	***541.2***	***159.4***	***522.8***	***169.4***	***497.7***	***178.2***	***481.0***	***184.1***	***464.2***	***190.0***	***447.5***	***195.9***	***439.1***	***198.9***
YAES	7	615.9	145.6	594.8	157.9	560.1	161.6	539.5	171.6	514.3	180.5	497.5	186.5	480.7	192.4	463.9	198.4	455.5	201.4
0575SA	*8*	***633.4***	***152.5***	***612.4***	***162.2***	***577.3***	***165.6***	***556.7***	***175.4***	***530.3***	***184.4***	***512.7***	***190.4***	***495.1***	***196.4***	***477.5***	***202.4***	***468.7***	***205.4***
	10	668.4	157.0	647.5	166.5	611.6	169.7	591.2	179.2	562.4	188.2	543.2	194.3	524.0	200.3	504.8	206.4	495.1	209.4
	12	***696.6***	***163.0***	***678.8***	***172.8***	***645.3***	***176.2***	***627.9***	***186.0***	***596.2***	***194.9***	***575.0***	***200.9***	***553.9***	***206.8***	***532.7***	***212.8***	***522.2***	***215.8***
	15	738.9	168.9	725.8	179.0	695.7	182.7	682.9	192.8	646.8	201.6	622.8	207.5	598.8	213.3	574.7	219.2	562.7	222.2
	5	646.5	181.5	627.7	194.1	594.4	198.6	576.0	207.4	547.5	218.3	528.6	225.5	509.6	232.8	490.7	240.0	481.2	243.6
	6	***673.7***	***184.2***	***652.3***	***196.8***	***615.9***	***201.4***	***595.0***	***210.1***	***566.4***	***221.1***	***547.3***	***228.4***	***528.3***	***235.7***	***509.3***	***243.0***	***499.7***	***246.7***
YAES	7	700.9	184.0	676.9	199.5	637.4	204.1	613.9	212.8	585.2	223.9	566.1	231.3	547.0	238.7	527.9	246.1	518.3	249.8
0645SA	*8*	***720.8***	***192.6***	***696.9***	***204.9***	***656.9***	***209.2***	***633.6***	***217.5***	***603.5***	***228.7***	***583.5***	***236.1***	***563.4***	***243.6***	***543.4***	***251.0***	***533.4***	***254.8***
	10	760.7	198.3	736.8	210.3	696.1	214.3	672.8	222.3	640.0	233.5	618.1	241.0	596.3	248.5	574.4	256.0	563.5	259.7
	12	***792.8***	***205.9***	***772.5***	***218.2***	***734.3***	***222.6***	***714.5***	***230.7***	***678.4***	***241.8***	***654.4***	***249.2***	***630.3***	***256.6***	***606.3***	***263.9***	***594.2***	***267.6***
	15	840.9	213.4	826.0	226.1	791.7	230.8	777.1	239.1	736.1	250.0	708.7	257.3	681.4	264.6	654.0	271.9	640.4	275.6
	5	696.5	183.7	676.2	196.4	640.3	201.0	620.5	209.9	589.9	220.9	569.4	228.2	549.0	235.6	528.6	242.9	518.4	246.6
	6	***725.8***	***186.4***	***702.7***	***199.1***	***663.5***	***203.8***	***641.0***	***212.6***	***610.2***	***223.8***	***589.7***	***231.2***	***569.2***	***238.6***	***548.6***	***246.0***	***538.4***	***249.7***
YAES	7	755.1	186.2	729.3	201.9	686.7	206.5	661.4	215.4	630.5	226.6	609.9	234.1	589.3	241.6	568.7	249.0	558.4	252.8
0685SA	***8***	***776.6***	***194.9***	***750.8***	***207.4***	***707.7***	***211.7***	***682.6***	***220.2***	***650.2***	***231.5***	***628.6***	***239.0***	***607.0***	***246.5***	***585.4***	***254.1***	***574.6***	***257.8***
	10	819.5	200.7	793.8	212.9	749.9	216.9	724.8	224.9	689.5	236.3	665.9	243.9	642.4	251.5	618.8	259.1	607.0	262.9
	12	***854.1***	***208.3***	***832.2***	***220.8***	***791.1***	***225.2***	***769.8***	***233.5***	***730.9***	***244.7***	***705.0***	***252.2***	***679.1***	***259.6***	***653.1***	***267.1***	***640.2***	***270.9***
	15	905.9	216.0	889.8	228.8	852.9	233.6	837.2	242.0	793.0	253.0	763.5	260.4	734.1	267.8	704.6	275.2	689.9	278.9

Power (kW) is for compressors only.

Correction factors for Low Sound *(Sonata)* Units

Compressor Power: All models multiply the tabulated Power kW by 1.01

Cooling Capacities:

Models YAES 0405, 0475 and 0545 multiply the tabulated Cool kW by:

At ambients 29°C and less multiply the tabulated Cool kW by 0.93

At ambients 30°C and greater multiply the tabulated Cool kW by 0.95

Models YAES 0575, 0645 and 0685 multiply the tabulated Cool kW by:

At ambients 29°C and less multiply the tabulated Cool kW by 0.94

At ambients 30°C and greater multiply the tabulated Cool kW by 0.96

Model	LWT °C	Condenser Coil Entering Air Temperature °C																	
		20		25		30		35		38		40		42		44		45	
		Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW
YAES 0715SA	5	772.2	181.0	741.2	198.0	698.6	204.8	673.7	211.6	644.6	219.7	625.2	232.0	605.8	240.1	586.4	248.3	576.8	252.4
	6	***800.7***	***185.5***	***768.6***	***203.0***	***724.3***	***209.2***	***698.4***	***215.5***	***668.3***	***223.4***	***648.2***	***235.2***	***628.2***	***243.1***	***608.1***	***251.0***	***598.1***	***254.9***
	7	829.3	190.1	796.0	207.9	750.1	213.7	723.1	219.5	692.0	227.1	671.2	238.5	650.5	246.1	629.8	253.7	619.4	257.5
	8	***866.7***	***194.6***	***831.9***	***212.9***	***785.7***	***218.1***	***759.2***	***223.4***	***728.5***	***231.2***	***708.0***	***242.8***	***687.6***	***250.6***	***667.1***	***258.4***	***656.8***	***262.3***
	10	904.1	199.2	867.8	217.8	821.3	222.6	795.4	227.4	765.1	235.3	744.8	247.2	724.6	255.1	704.4	263.0	694.3	267.0
	12	***965.8***	***207.4***	***927.0***	***226.7***	***877.3***	***231.9***	***849.7***	***237.0***	***818.9***	***244.8***	***798.3***	***256.6***	***777.8***	***264.4***	***757.3***	***272.2***	***747.0***	***276.1***
	15	1027.5	215.6	986.2	235.6	933.3	241.1	903.9	246.6	872.7	254.3	851.8	265.9	831.0	273.6	810.2	281.4	799.7	285.2
YAES 0785SA	5	829.6	209.0	792.6	226.2	753.6	238.2	733.4	250.2	700.8	258.3	679.1	270.5	657.4	278.6	635.7	286.7	624.8	290.8
	6	***858.8***	***214.0***	***820.5***	***231.6***	***780.6***	***242.1***	***760.2***	***252.6***	***726.6***	***261.3***	***704.2***	***274.2***	***681.8***	***282.8***	***659.4***	***291.4***	***648.2***	***295.7***
	7	887.9	219.0	848.3	237.0	807.6	246.1	787.1	255.1	752.4	264.2	729.4	277.9	706.3	287.0	683.2	296.1	671.7	300.7
	8	***928.4***	***228.8***	***887.0***	***247.6***	***843.9***	***255.3***	***821.8***	***263.0***	***785.9***	***272.2***	***761.9***	***285.8***	***737.9***	***294.9***	***713.9***	***304.0***	***701.9***	***308.6***
	10	*969.0*	234.6	925.8	258.2	880.2	264.6	856.6	271.0	819.3	280.1	794.3	293.7	769.4	302.8	744.5	311.9	732.1	316.5
	12	***1030.5***	***243.6***	***984.5***	***263.6***	***934.4***	***270.7***	***907.8***	***277.9***	***873.3***	***286.7***	***850.4***	***299.9***	***827.4***	***308.7***	***804.5***	***317.5***	***793.0***	***321.9***
	15	*1092.0*	248.7	1043.3	269.0	988.7	276.9	*958.9*	284.8	927.4	293.3	906.4	306.1	885.4	314.6	864.4	323.0	853.9	327.3
YAES 0905SA	5	914.5	227.4	870.2	244.3	821.7	252.5	794.0	260.6	762.3	270.0	741.1	284.0	719.9	293.1	698.7	302.7	688.1	307.3
	6	***945.2***	***232.7***	***899.4***	***250.0***	***850.7***	***257.8***	***823.4***	***265.7***	***791.3***	***275.0***	***769.9***	***288.9***	***748.4***	***298.0***	***727.0***	***307.5***	***716.3***	***312.2***
	7	975.8	238.0	928.6	255.6	879.6	263.2	852.7	270.7	820.3	280.0	798.6	293.9	777.0	302.9	755.3	312.4	744.5	317.0
	8	***1020.8***	***243.8***	***971.3***	***261.9***	***921.4***	***269.7***	***894.5***	***277.5***	***860.6***	***287.0***	***838.0***	***301.2***	***815.4***	***310.5***	***792.9***	***320.2***	***781.6***	***325.0***
	10	1065.7	252.9	1014.1	268.1	963.1	276.2	936.2	284.4	901.0	294.1	877.4	308.6	853.9	318.1	830.4	328.0	818.6	332.9
	12	***1129.0***	***260.3***	***1074.3***	***279.5***	***1019.8***	***286.4***	***990.8***	***293.4***	***956.8***	***303.4***	***934.1***	***318.4***	***911.4***	***328.2***	***888.7***	***338.5***	***877.3***	***343.5***
	15	1192.2	270.9	1134.5	290.9	1076.4	296.6	1045.4	302.4	1012.6	312.7	990.7	328.2	968.8	338.3	947.0	348.9	936.0	354.1
YAES 0985SA	5	1003.1	253.7	954.5	263.6	892.1	273.5	852.4	287.3	813.5	289.0	787.6	306.3	761.7	320.7	735.8	322.5	722.9	327.2
	6	***1037.2***	***257.4***	***987.0***	***268.1***	***925.4***	***278.7***	***887.4***	***291.7***	***846.1***	***296.5***	***818.5***	***311.9***	***791.0***	***326.2***	***763.5***	***327.6***	***749.7***	***332.0***
	7	1071.4	260.5	1019.5	277.6	958.8	285.8	922.4	293.9	878.6	304.1	849.5	316.4	820.3	331.1	791.1	332.7	776.5	336.8
	8	***1109.6***	***263.5***	***1055.9***	***281.2***	***993.1***	***289.5***	***955.4***	***296.4***	***914.0***	***305.8***	***886.4***	***319.9***	***858.8***	***335.9***	***831.2***	***338.6***	***817.4***	***341.4***
	10	1147.9	268.6	1092.3	284.6	1027.3	293.1	988.3	301.9	949.3	307.5	923.3	327.3	897.4	342.7	871.4	344.5	858.4	349.8
	12	***1216.5***	***275.6***	***1157.7***	***294.0***	***1088.7***	***301.4***	***1047.4***	***306.2***	***1009.8***	***317.0***	***984.8***	***333.3***	***959.8***	***351.0***	***934.8***	***354.9***	***922.3***	***360.3***
	15	1285.2	282.6	1223.0	303.4	1150.2	309.5	1106.5	315.4	1070.4	326.5	1046.3	343.1	1022.2	361.4	998.1	365.3	986.1	370.9
YAES 1075SA	5	1099.6	271.5	1055.4	297.0	994.8	307.2	959.3	317.3	917.9	329.6	890.3	347.9	862.7	360.2	835.1	372.4	821.3	378.5
	6	***1140.2***	***278.3***	***1094.4***	***304.4***	***1031.4***	***313.9***	***994.5***	***323.3***	***951.6***	***335.1***	***923.1***	***352.8***	***894.5***	***364.7***	***866.0***	***376.5***	***851.7***	***382.4***
	7	1180.9	285.1	1133.5	311.9	1068.1	320.5	1029.7	329.2	985.4	340.6	955.9	357.7	926.3	369.1	896.8	380.5	882.0	386.2
	8	***1234.2***	***291.9***	***1184.6***	***319.3***	***1118.8***	***327.2***	***1081.2***	***335.2***	***1037.4***	***346.8***	***1008.2***	***364.3***	***979.1***	***375.9***	***949.9***	***387.6***	***935.3***	***393.4***
	10	1287.5	298.8	1235.7	326.7	1169.5	333.9	1132.7	341.1	1089.4	353.0	1060.6	370.8	1031.8	382.7	1003.0	394.6	988.6	400.5
	12	***1375.3***	***311.0***	***1320.1***	***340.1***	***1249.3***	***347.8***	***1209.9***	***355.5***	***1166.1***	***367.2***	***1136.8***	***384.8***	***1107.6***	***396.6***	***1078.3***	***408.3***	***1063.7***	***414.2***
	15	1463.1	323.3	1404.4	353.4	1329.1	361.7	1287.2	369.9	1242.7	381.5	1213.0	398.9	1183.3	410.5	1153.7	422.0	1138.8	427.8
YAES 1245SA	5	1264.0	317.9	1205.9	343.3	1138.2	354.9	1099.1	366.4	1054.1	379.8	1024	400.0	994.0	413.1	964.0	426.8	949.0	433.5
	6	***1307.7***	***325.5***	***1247.7***	***351.5***	***1178.8***	***362.4***	***1139.6***	***373.4***	***1093.8***	***386.7***	***1063***	***406.5***	***1032.6***	***419.5***	***1002.0***	***433.0***	***986.7***	***439.6***
	7	1351.5	333.0	1289.4	359.6	1219.4	370.0	**1180.2**	**380.4**	1133.4	393.5	1102	413.1	1071.2	425.9	1040.0	439.3	1024.4	445.8
	8	***1413.3***	***341.1***	***1348.4***	***368.3***	***1277.3***	***378.8***	***1238.3***	***389.3***	***1190.4***	***402.6***	***1159***	***422.7***	***1126.6***	***435.8***	***1094.7***	***449.4***	***1078.7***	***456.1***
	10	1475.2	352.5	1407.5	377.0	1335.2	387.5	*1296.5*	*398.1*	1247.4	411.7	1215	432.2	1182.1	445.6	1149.4	459.5	1133.0	466.4
	12	***1566.7***	***364.0***	***1494.8***	***392.8***	***1417.6***	***402.4***	***1376.0***	***411.9***	***1327.9***	***425.8***	***1296***	***446.7***	***1263.8***	***460.4***	***1231.8***	***474.6***	***1215.7***	***481.5***
	15	1658.3	378.7	1582.2	408.7	1500.1	417.2	*1455.6*	*425.7*	1408.4	439.9	1377	461.2	1345.6	475.1	1314.2	489.6	1298.5	496.7
YAES 1405SA	5	1428.4	332.1	1359.2	384.9	1270.3	399.4	1213.8	419.5	1158.5	421.9	1121.6	447.2	1084.7	468.3	1047.8	470.8	1029.4	477.8
	6	***1477.0***	***339.8***	***1405.5***	***391.4***	***1317.8***	***406.9***	***1263.6***	***425.8***	***1204.8***	***433.0***	***1165.6***	***455.3***	***1126.4***	***476.2***	***1087.2***	***478.3***	***1067.6***	***484.8***
	7	1525.7	347.5	1451.8	405.3	1365.4	417.3	**1313.5**	**429.1**	1251.2	444.0	1209.6	461.9	1168.1	483.4	1126.5	485.8	1105.7	491.7
	8	***1580.1***	***356.0***	***1503.7***	***410.5***	***1414.1***	***422.6***	***1360.4***	***432.8***	***1301.5***	***446.5***	***1262.2***	***467.0***	***1223.0***	***490.4***	***1183.7***	***494.4***	***1164.0***	***498.4***
	10	1634.6	369.3	1555.5	415.6	1462.9	428.0	1407.3	440.7	1351.8	449.0	1314.8	477.8	1277.8	500.3	1240.8	503.0	1222.4	510.7
	12	***1732.3***	***380.0***	***1648.5***	***429.3***	***1550.4***	***440.0***	***1491.5***	***447.0***	***1438.0***	***462.8***	***1402.4***	***486.5***	***1366.7***	***512.5***	***1331.1***	***518.2***	***1313.3***	***526.1***
	15	1830.1	395.6	1741.5	443.0	1637.8	451.8	1575.6	460.5	1524.2	476.7	1489.9	501.0	1455.6	527.6	1421.4	533.4	1404.2	541.5

Power (kW) is for compressors only.

Correction factors for Low Sound *(Sonata)* Units

Compressor Power: All models multiply the tabulated Power kW by 1.01

Cooling Capacities: **ALL models multiply the tabulated Cool kW by:**

At ambients 29°C and less multiply the tabulated Cool kW by 0.94

At ambients 30°C and greater multiply the tabulated Cool kW by 0.96

Model	LWT °C	Condenser Coil Entering Air Temperature °C																	
		20		25		30		35		38		40		42		44		45	
		Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW
YEAS 1505 DSA	5	1544.3	362.0	1482.3	396.0	1397.2	409.6	1347.3	423.1	1289.2	439.4	1250.4	463.9	1211.7	480.2	1172.9	496.5	1153.5	504.7
	6	***1601.5***	***371.1***	***1537.1***	***405.9***	***1448.6***	***418.5***	***1396.8***	***431.0***	***1336.6***	***446.8***	***1296.5***	***470.4***	***1256.3***	***486.2***	***1216.2***	***502.0***	***1196.2***	***509.9***
	7	1658.6	380.2	1592.0	415.8	1500.1	427.4	1446.2	439.0	1384.0	454.2	1342.5	477.0	1301.0	492.2	1259.6	507.4	1238.8	515.0
	8	***1733.4***	***389.3***	***1663.8***	***425.7***	***1571.3***	***436.3***	***1518.5***	***446.9***	***1457.0***	***462.4***	***1416.1***	***485.7***	***1375.1***	***501.2***	***1334.2***	***516.7***	***1313.7***	***524.5***
	10	1808.2	398.4	1735.6	435.6	1642.5	445.2	1590.8	454.8	1530.1	470.6	1489.7	494.4	1449.2	510.2	1408.8	526.1	1388.5	534.0
	12	***1931.6***	***414.7***	***1854.0***	***453.4***	***1754.6***	***463.7***	***1699.3***	***474.0***	***1637.7***	***489.7***	***1596.7***	***513.1***	***1555.6***	***528.8***	***1514.5***	***544.4***	***1494.0***	***552.2***
	15	2055.0	431.1	1972.4	471.2	1866.7	482.2	1807.9	493.2	1745.3	508.7	1703.7	531.8	1662.0	547.3	1620.3	562.7	1599.5	570.4
YEAS 1575 DSA	5	1601.8	390.0	1533.8	424.2	1452.2	443.0	1407.1	461.7	1345.4	478.0	1304.3	502.4	1263.2	518.7	1222.1	535.0	1201.5	543.1
	6	***1659.5***	***399.5***	***1589.0***	***434.6***	***1504.9***	***451.4***	***1458.6***	***468.2***	***1394.9***	***484.7***	***1352.5***	***509.4***	***1310.0***	***525.9***	***1267.5***	***542.4***	***1246.3***	***550.6***
	7	1717.2	409.1	1644.3	444.9	1557.7	459.8	1510.1	474.6	1444.4	491.3	1400.6	516.4	1356.8	533.1	1313.0	549.8	1291.1	558.2
	8	***1795.1***	***423.4***	***1718.9***	***460.4***	***1629.6***	***473.5***	***1581.1***	***486.5***	***1514.4***	***503.4***	***1469.9***	***528.7***	***1425.4***	***545.5***	***1380.9***	***562.4***	***1358.7***	***570.8***
	10	*1873.1*	433.8	1793.6	476.0	1701.4	487.2	1652.0	498.4	1584.3	515.4	1539.2	540.9	1494.0	558.0	1448.9	575.0	1426.3	583.5
	12	***1996.3***	***451.0***	***1911.6***	***490.3***	***1811.7***	***502.6***	***1757.5***	***514.9***	***1692.2***	***531.5***	***1648.7***	***556.5***	***1605.2***	***573.1***	***1561.7***	***589.7***	***1540.0***	***598.0***
	15	*2119.5*	464.2	2029.5	504.6	1922.0	518.0	*1862.9*	531.4	1800.1	547.6	1758.2	572.0	1716.4	588.2	1674.5	604.4	1653.6	612.5
YEAS 1645 DSA	5	1659.2	418.0	1585.3	452.4	1507.2	476.4	1466.9	500.3	1401.7	516.6	1358.2	540.9	1314.8	557.2	1271.3	573.4	1249.6	581.5
	6	***1717.5***	***428.0***	***1641.0***	***463.2***	***1561.2***	***484.3***	***1520.5***	***505.3***	***1453.3***	***522.5***	***1408.5***	***548.4***	***1363.7***	***565.6***	***1318.9***	***582.8***	***1296.5***	***591.4***
	7	1775.8	438.0	1696.7	474.0	1615.2	492.1	1574.1	510.2	1504.9	528.5	1458.7	555.8	1412.6	574.0	1366.4	592.2	1343.3	601.3
	8	***1856.9***	***457.6***	***1774.1***	***495.2***	***1687.8***	***510.6***	***1643.7***	***526.1***	***1571.7***	***544.3***	***1523.7***	***571.6***	***1475.7***	***589.8***	***1427.7***	***608.1***	***1403.7***	***617.2***
	10	*1937.9*	469.3	1851.5	516.4	1760.4	529.2	1713.3	541.9	1638.5	560.1	1588.7	587.5	1538.9	605.7	1489.0	623.9	1464.1	633.0
	12	***2061.0***	***487.3***	***1969.1***	***527.2***	***1868.9***	***541.5***	***1815.6***	***555.8***	***1746.7***	***573.4***	***1700.8***	***599.8***	***1654.8***	***617.4***	***1608.9***	***635.0***	***1585.9***	***643.8***
	15	*2184.0*	497.3	2086.6	538.0	1977.4	553.8	*1917.9*	569.6	1854.8	586.6	1812.8	612.1	1770.8	629.1	1728.8	646.1	1707.8	654.6
YEAS 1715 DSA	5	1744.1	436.4	1662.8	470.5	1575.3	490.7	1527.5	510.8	1463.1	528.2	1420.2	554.4	1377.3	571.7	1334.4	589.4	1312.9	598.1
	6	***1803.9***	***446.7***	***1719.9***	***481.6***	***1631.3***	***499.9***	***1583.6***	***518.3***	***1517.9***	***536.2***	***1474.1***	***563.1***	***1430.3***	***580.8***	***1386.5***	***598.9***	***1364.6***	***607.9***
	7	1863.7	457.0	1776.9	492.6	1687.2	509.2	1639.8	525.8	1572.7	544.2	1528.0	571.8	1483.3	589.9	1438.5	608.5	1416.2	617.7
	8	***1949.2***	***472.6***	***1858.4***	***509.5***	***1765.2***	***525.0***	***1716.3***	***540.6***	***1646.5***	***559.2***	***1599.9***	***587.1***	***1553.3***	***605.4***	***1506.7***	***624.2***	***1483.4***	***633.5***
	10	2034.7	487.6	1939.9	526.3	1843.3	540.8	1792.9	555.3	1720.2	574.1	1671.8	602.4	1623.3	620.9	1574.9	640.0	1550.7	649.4
	12	***2159.5***	***503.9***	***2058.9***	***543.1***	***1954.2***	***557.2***	***1898.6***	***571.3***	***1830.1***	***590.1***	***1784.5***	***618.3***	***1738.8***	***636.9***	***1693.1***	***656.0***	***1670.3***	***665.4***
	15	2284.2	519.6	2177.8	559.8	2065.2	573.5	2004.3	587.2	1940.0	606.0	1897.1	634.3	1854.2	652.9	1811.4	671.9	1789.9	681.4
YEAS 1785 DSA	5	1832.7	462.7	1747.1	489.9	1645.7	511.7	1585.8	537.5	1514.4	547.3	1466.7	576.8	1419.1	599.3	1371.5	609.2	1347.7	618.0
	6	***1896.0***	***471.4***	***1807.5***	***499.7***	***1706.0***	***520.8***	***1647.6***	***544.3***	***1572.7***	***557.8***	***1522.8***	***586.0***	***1472.8***	***609.0***	***1422.9***	***619.0***	***1397.9***	***627.7***
	7	1959.3	479.5	1867.9	514.6	1766.4	531.9	1709.5	549.1	1631.1	568.4	1578.8	594.3	1526.6	618.1	1474.3	628.8	1448.2	637.5
	8	***2038.1***	***492.4***	***1943.0***	***528.8***	***1837.0***	***544.8***	***1777.2***	***559.5***	***1699.8***	***578.0***	***1648.3***	***605.7***	***1596.7***	***630.8***	***1545.1***	***642.6***	***1519.3***	***649.9***
	10	2116.9	503.2	2018.1	542.8	1907.5	557.7	1844.9	572.8	1768.6	587.6	1717.7	621.0	1666.8	645.5	1615.9	656.4	1590.5	666.3
	12	***2247.0***	***519.3***	***2142.2***	***557.6***	***2023.2***	***572.1***	***1955.2***	***584.1***	***1883.2***	***603.7***	***1835.2***	***633.1***	***1787.2***	***659.7***	***1739.2***	***672.4***	***1715.2***	***682.2***
	15	2377.2	531.3	2266.3	572.4	2138.9	586.4	2065.4	600.2	1997.8	619.8	1952.7	649.2	1907.6	676.0	1862.5	688.4	1840.0	698.2
YEAS 1855 DSA	5	1917.5	481.2	1824.7	508.0	1713.8	526.0	1646.4	547.9	1575.8	558.9	1529	590.3	1481.6	613.8	1434.6	625.1	1411.0	634.6
	6	***1982.4***	***490.1***	***1886.4***	***518.1***	***1776.1***	***536.5***	***1710.8***	***557.3***	***1637.3***	***571.5***	***1588***	***600.8***	***1539.4***	***624.2***	***1490.5***	***635.1***	***1466.0***	***644.2***
	7	2047.2	498.5	1948.1	533.2	1838.4	549.0	**1775.1**	**564.6**	1698.9	584.1	1648	610.3	1597.3	634.0	1546.4	645.1	1521.0	653.9
	8	***2130.4***	***507.4***	***2027.3***	***543.0***	***1914.4***	***559.2***	***1849.8***	***574.0***	***1774.6***	***592.8***	***1724***	***621.1***	***1674.3***	***646.4***	***1624.1***	***658.8***	***1599.0***	***666.3***
	10	2213.6	521.5	2106.5	552.7	1990.4	569.4	*1924.5*	*586.2*	1850.3	601.6	1801	635.9	1751.3	660.8	1701.8	672.5	1677.0	682.6
	12	***2345.5***	***535.9***	***2232.0***	***573.5***	***2108.5***	***587.8***	***2038.2***	***599.5***	***1966.6***	***620.4***	***1919***	***651.7***	***1871.2***	***679.2***	***1823.4***	***693.4***	***1799.6***	***703.8***
	15	2477.4	553.6	2357.5	594.3	2226.6	606.1	*2151.9*	*617.8*	2082.9	639.2	2037	671.4	1991.1	699.7	1945.1	714.2	1922.1	725.0
YEAS 1925 DSA	5	2006.1	507.5	1909.0	527.3	1784.1	547.1	1704.7	574.6	1627.0	577.9	1575.2	612.6	1523.5	641.5	1471.7	644.9	1445.8	654.5
	6	***2074.4***	***514.8***	***1974.0***	***536.2***	***1850.9***	***557.4***	***1774.8***	***583.3***	***1692.2***	***593.1***	***1637.1***	***623.7***	***1582.0***	***652.4***	***1526.9***	***655.2***	***1499.4***	***664.1***
	7	2142.8	520.9	2039.1	555.2	1917.7	571.6	**1844.8**	**587.9**	1757.3	608.2	1698.9	632.8	1640.5	662.2	1582.2	665.5	1553.0	673.6
	8	***2219.3***	***527.1***	***2111.9***	***562.3***	***1986.2***	***579.0***	***1910.7***	***592.9***	***1828.0***	***611.6***	***1772.8***	***639.7***	***1717.6***	***671.8***	***1662.5***	***677.2***	***1634.9***	***682.7***
	10	2295.8	537.2	2184.7	569.3	2054.6	586.3	1976.6	603.7	1898.6	615.0	1846.7	654.6	1794.7	685.4	1742.8	689.0	1716.8	699.5
	12	***2433.1***	***551.2***	***2315.3***	***588.1***	***2177.5***	***602.7***	***2094.7***	***612.3***	***2019.7***	***634.0***	***1969.6***	***666.5***	***1919.6***	***702.1***	***1869.5***	***709.8***	***1844.5***	***720.7***
	15	2570.3	565.3	2445.9	606.9	2300.3	618.9	2212.9	630.8	2140.7	653.0	2092.6	686.3	2044.4	722.8	1996.3	730.7	1972.2	741.8

Power (kW) is for compressors only.

Correction factors for Low Sound *(Sonata)* Units

Compressor Power: All models multiply the tabulated Power kW by 1.01

Cooling Capacities: **ALL models multiply the tabulated Cool kW by:**

At ambients 29°C and less multiply the tabulated Cool kW by 0.94

At ambients 30°C and greater multiply the tabulated Cool kW by 0.96

SELECTION GUIDE - GLYCOL COOLING

DATA REQUIRED

To select a YORK YAES glycol chiller, the following information is required:

1. Required cooling capacity.
2. Design chilled liquid entering and leaving temperatures.
3. Design glycol flow rate, if only one of the temperatures in item 2 is unknown.
4. Design condenser entering air temperature. This will normally be the design summer ambient air temperature unless location or other factors have an influence.
5. Altitude above sea level.
6. Design cooler fouling factor.
7. Static pressure resistance (against condenser entering and leaving airflow where ducts, louvres, attenuators, etc., are used) at full unit air flow.

Note: Items 1, 2 and 3 must be linked by the following formulae:

$$\text{Cooling capacity kW} = \frac{\text{l/s chilled liquid x °C range}}{\text{Glycol Factor}}$$

Where:
Range = Entering liquid temperature - leaving liquid temperature.

The glycol factor is obtained from table 6 using the design leaving liquid temperature and the percentage by weight glycol concentration. **Recommended glycol concentration for the unit is given in table 8.**

SELECTION METHOD

1. Determine the correct size of chiller by selecting the model which most closely matches the required capacity at the design conditions of leaving glycol temperature and entering air temperature.
2. Apply the relevant correction factors for fouling and altitude (Tables 3 and 4) and glycol concentration (Table 9), to the capacity and power values from the capacity table (Table 11). Ensure the corrected capacity is sufficient for requirements.
3. Using the customer requested duty or corrected capacity of the selected chiller, adjust the design temperature range, or flow rate, to balance the formulae shown in “Data Required”.
4. Physical and electrical data can now be determined from Tables 13 and 15.
5. Always re-check that selections fall within the design limitations specified (Table 2).

TABLE 7 GLYCOL FACTORS

LCLT °C	% by Weight				
	10	20	30	40	50
	Ethylene Glycol Factor				
10	0.246	0.255	0.260	0.288	0.305
5	0.245	0.256	0.265	0.290	0.310
0	0.240	0.257	0.269	0.293	0.315
-5		0.258	0.271	0.296	0.318
-10			0.272	0.298	0.320

LCLT °C	% by Weight				
	10	20	30	40	50
	Propylene Glycol Factor				
10	0.243	0.250	0.258	0.268	0.279
5	0.242	0.249	0.257	0.269	0.281
0	0.241	0.248	0.256	0.270	0.283
-5		0.247	0.255	0.271	0.285
-10			0.254	0.272	0.286

YAES SAMPLE SELECTION - GLYCOL COOLING

A YAES chiller is required to cool ethylene glycol from 3°C to -2°C having a cooling capacity of 330 kW.

Other design conditions applying are:

Ambient air entering condenser:	30°C
Fouling factor:	0.088m °C/kW
Altitude:	1200m
Glycol Type:	Ethylene

For a - 2°C ethylene glycol leaving temperature the recommended concentration from table 8 is 23%.

From the capacity table 11, an "Ethylene Glycol" temperature of “-2°C” leaving chilled liquid temperature at 30°C condenser entering air temperature a YAES0785SA gives approximately the required capacity of 573.5 kW.

From the design fouling factor, corrections of capacity x 0.987 and power x 0.995 apply (Table 3).

From the design altitude, corrections of capacity x 0.973 and power x 1.020 apply (Table 4).

From the design ethylene glycol strength, corrections of capacity x 1.0175 and power x 1.0070 apply (Interpolation from Table 8).

Applying these factors to the selection: YAES0785SA

Cooling Capacity= 573.5 x 0.987 x 0.973 x 1.0175 = 560.3 kW

Compressor Power= 213.6 x 0.995 x 1.020 x 1.0070 = 218.3 kW

For the glycol concentration specified and a leaving liquid temperature of - 2°C, the Glycol Factor is 0.2613 from table 7. The flow rate can be determined, therefore, from the formula shown in "Data Required".

$$560.3 \text{ kW} = \frac{(3 - (-2)) \times \text{Flow (l/s)}}{0.2613}$$

$$\text{Flow rate} = \frac{560.3 \times 0.2613}{5} = 29.2 \text{ (l/s)}$$

This satisfies the Operating Limits.

Cooler pressure drop = 45.2 kPa (Figure 2) x 1.19 (correction factor, Table 9 for 23% strength).

Cooler pressure drop = 53.8 kPa.

TABLE 8 RECOMMENDED CONCENTRATIONS

Leaving Liquid Temperature °C	Ethylene Gylcol Concentration % Weight	Propylene Gylcol Concentration % Weight
4	12	14
2	16	18
0	20	22
-2	23	25
-4	27	30
-6	30	33
-8	32	35
-10	35	38
-12	38	41

TABLE 9 GLYCOL CONCENTRATION FACTORS

	Ethylene Glycol		Propylene Glycol	
% by Weight	Capacity Factor	Power Factor	Capacity Factor	Power Factor
10	1.050	1.020	1.075	1.025
20	1.025	1.010	1.045	1.015
30	1.000	1.000	1.000	1.000
40	0.975	0.990	0.955	0.985
50	0.950	0.980	0.910	0.970

TABLE 10 PRESSURE DROP CORRECTIONS

% by Weight	Pressure Drop Correction Factor							
	Ethylene Glycol				Propylene Glycol			
	6°C	0°C	-6°C	-12°C	6°C	0°C	-6°C	-12°C
10	1.07	1.10			1.08	1.11		
20	1.13	1.16	1.19		1.17	1.20	1.24	
30	1.17	1.21	1.25	1.28	1.28	1.32	1.36	1.40
40	1.24	1.29	1.34	1.39	1.39	1.45	1.51	1.57
50	1.31	1.36	1.41	1.47	1.52	1.58	1.64	1.71

30% ETHYLENE GLYCOL CAPACITIES - YAES-SA

TABLE 11

Model	LWT °C	Condenser Coil Entering Air Temperature °C																	
		20		25		30		35		38		40		42		44		45	
		Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW
YEAS 0405 SA	4	360.8	114.4	348.5	116.6	328.1	118.7	316.0	120.9	308.8	122.2	304.0	123.0	299.1	123.9	294.3	124.8	291.9	125.2
	2	***338.0***	***107.6***	***326.6***	***110.8***	***307.6***	***114.0***	***296.4***	***117.2***	***289.7***	***119.1***	***285.2***	***120.4***	***280.7***	***121.7***	***276.2***	***123.0***	***274.0***	***123.6***
	0	315.3	100.7	304.7	105.0	287.1	109.2	276.7	113.5	270.5	116.1	266.4	117.8	262.2	119.5	258.1	121.2	256.0	122.0
	-2	***299.1***	***97.0***	***287.0***	***101.3***	***268.4***	***105.5***	***256.6***	***109.8***	***249.5***	***112.4***	***244.8***	***114.1***	***240.1***	***116.7***	***235.4***	***119.3***	***233.0***	***120.6***
	-4	282.9	93.3	269.3	97.6	249.7	101.8	236.5	106.1	228.6	108.7	223.3	110.4	218.0	113.9	212.7	117.4	210.1	119.2
	-6	***266.7***	***89.6***	***251.7***	***93.9***	***231.0***	***98.1***	***216.4***	***102.4***	***207.6***	***105.0***	***201.7***	***106.7***	***195.9***	***111.1***	***190.0***	***115.6***	***187.1***	***117.8***
	-8	250.2	84.3	237.6	89.9	219.5	95.4	207.2	101.0	199.8	104.3	194.8	106.5	189.9	110.5	184.9	114.5	182.5	116.5
	-10	***233.7***	***79.1***	***223.4***	***85.9***	***208.0***	***92.7***	***198.0***	***99.6***	***192.0***	***103.7***	***187.9***	***106.4***	***183.9***	***109.9***	***179.9***	***113.5***	***177.9***	***115.2***
	-12	217.2	73.8	209.3	81.9	196.6	90.0	188.8	98.1	184.1	103.0	181.0	106.3	177.9	109.3	174.8	112.4	173.3	113.9
YEAS 0475 SA	4	418.6	132.7	404.2	135.2	380.6	137.7	366.6	140.2	358.2	141.7	352.6	142.7	347.0	143.7	341.4	144.7	338.6	145.2
	2	***392.1***	***124.8***	***378.8***	***128.5***	***356.8***	***132.2***	***343.8***	***135.9***	***336.0***	***138.2***	***330.8***	***139.7***	***325.6***	***141.2***	***320.4***	***142.6***	***317.8***	***143.4***
	0	365.7	116.8	353.4	121.8	333.0	126.7	321.0	131.7	313.8	134.6	309.0	136.6	304.2	138.6	299.4	140.6	297.0	141.6
	-2	***346.9***	***112.5***	***332.9***	***117.5***	***311.3***	***122.4***	***297.7***	***127.4***	***289.5***	***130.4***	***284.0***	***132.3***	***278.5***	***135.4***	***273.1***	***138.4***	***270.3***	***139.9***
	-4	328.1	108.2	312.4	113.2	289.7	118.1	274.3	123.1	265.1	126.1	259.0	128.0	252.9	132.1	246.7	136.2	243.7	138.3
	-6	***309.4***	***104.0***	***292.0***	***108.9***	***268.0***	***113.9***	***251.0***	***118.8***	***240.8***	***121.8***	***234.0***	***123.8***	***227.2***	***128.9***	***220.4***	***134.0***	***217.0***	***136.6***
	-8	290.2	97.8	275.6	104.3	254.7	110.7	240.3	117.2	231.7	121.0	226.0	123.6	220.3	128.2	214.5	132.8	211.7	135.1
	-10	***271.1***	***91.7***	***259.2***	***99.7***	***241.3***	***107.6***	***229.7***	***115.5***	***222.7***	***120.3***	***218.0***	***123.4***	***213.3***	***127.5***	***208.7***	***131.6***	***206.3***	***133.7***
	-12	252.0	85.6	242.8	95.0	228.0	104.4	219.0	113.9	213.6	119.5	210.0	123.3	206.4	126.8	202.8	130.4	201.0	132.2
YEAS 0545 SA	4	460.4	146.0	444.6	148.8	418.7	151.5	403.3	154.2	394.0	155.9	387.9	157.0	381.7	158.1	375.5	159.2	372.5	159.7
	2	***431.4***	***137.3***	***416.7***	***141.4***	***392.5***	***145.4***	***378.2***	***149.5***	***369.6***	***152.0***	***363.9***	***153.6***	***358.2***	***155.3***	***352.4***	***156.9***	***349.6***	***157.7***
	0	402.3	128.5	388.8	133.9	366.3	139.4	353.1	144.8	345.2	148.1	339.9	150.3	334.6	152.5	329.3	154.6	326.7	155.7
	-2	***381.6***	***123.8***	***366.2***	***129.2***	***342.5***	***134.7***	***327.4***	***140.1***	***318.4***	***143.4***	***312.4***	***145.6***	***306.4***	***148.9***	***300.4***	***152.2***	***297.4***	***153.9***
	-4	361.0	119.1	343.7	124.5	318.6	130.0	301.8	135.4	291.6	138.7	284.9	140.8	278.2	145.3	271.4	149.8	268.0	152.1
	-6	***340.3***	***114.3***	***321.1***	***119.8***	***294.8***	***125.2***	***276.1***	***130.7***	***264.9***	***133.9***	***257.4***	***136.1***	***249.9***	***141.8***	***242.4***	***147.5***	***238.7***	***150.3***
	-8	319.3	107.6	303.1	114.7	280.1	121.8	264.4	128.9	254.9	133.1	248.6	135.9	242.3	141.0	236.0	146.1	232.8	148.6
	-10	***298.2***	***100.9***	***285.1***	***109.6***	***265.5***	***118.3***	***252.6***	***127.1***	***244.9***	***132.3***	***239.8***	***135.8***	***234.7***	***140.3***	***229.5***	***144.8***	***227.0***	***147.0***
	-12	277.2	94.2	267.1	104.5	250.8	114.9	240.9	125.2	235.0	131.4	231.0	135.6	227.0	139.5	223.1	143.4	221.1	145.4
YEAS 0575 SA	4	502.3	159.3	485.1	162.3	456.7	165.3	439.9	168.3	429.8	170.1	423.1	171.3	416.4	172.5	409.7	173.7	406.3	174.3
	2	***470.6***	***149.7***	***454.6***	***154.2***	***428.2***	***158.7***	***412.6***	***163.1***	***403.2***	***165.8***	***397.0***	***167.6***	***390.7***	***169.4***	***384.5***	***171.2***	***381.4***	***172.1***
	0	438.8	140.2	424.1	146.1	399.6	152.1	385.2	158.0	376.6	161.6	370.8	163.9	365.0	166.3	359.3	168.7	356.4	169.9
	-2	***416.3***	***135.0***	***399.5***	***141.0***	***373.6***	***146.9***	***357.2***	***152.9***	***347.4***	***156.4***	***340.8***	***158.8***	***334.2***	***162.4***	***327.7***	***166.1***	***324.4***	***167.9***
	-4	393.8	129.9	374.9	135.8	347.6	141.8	329.2	147.7	318.2	151.3	310.8	153.6	303.4	158.6	296.1	163.5	292.4	165.9
	-6	***371.2***	***124.7***	***350.3***	***130.7***	***321.6***	***136.6***	***301.2***	***142.6***	***289.0***	***146.1***	***280.8***	***148.5***	***272.6***	***154.7***	***264.5***	***160.9***	***260.4***	***163.9***
	-8	348.3	117.4	330.7	125.1	305.6	132.9	288.4	140.6	278.1	145.2	271.2	148.3	264.3	153.8	257.4	159.4	254.0	162.2
	-10	***325.3***	***110.1***	***311.0***	***119.6***	***289.6***	***129.1***	***275.6***	***138.6***	***267.2***	***144.3***	***261.6***	***148.1***	***256.0***	***153.0***	***250.4***	***157.9***	***247.6***	***160.4***
	-12	302.4	102.8	291.3	114.0	273.6	125.3	262.8	136.6	256.3	143.4	252.0	147.9	247.7	152.2	243.4	156.5	241.2	158.6
YEAS 0645 SA	4	573.4	181.9	553.8	185.3	521.4	188.7	502.2	192.1	490.7	194.2	483.1	195.5	475.4	196.9	467.7	198.3	463.9	198.9
	2	***537.2***	***170.9***	***519.0***	***176.0***	***488.8***	***181.1***	***471.0***	***186.2***	***460.3***	***189.3***	***453.2***	***191.3***	***446.1***	***193.4***	***438.9***	***195.4***	***435.4***	***196.4***
	0	501.0	160.0	484.2	166.8	456.2	173.6	439.8	180.4	429.9	184.5	423.3	187.2	416.8	189.9	410.2	192.6	406.9	194.0
	-2	***475.3***	***154.2***	***456.1***	***160.9***	***426.5***	***167.7***	***407.8***	***174.5***	***396.6***	***178.6***	***389.1***	***181.3***	***381.6***	***185.5***	***374.1***	***189.6***	***370.4***	***191.7***
	-4	449.6	148.3	428.0	155.1	396.8	161.9	375.8	168.6	363.2	172.7	354.8	175.4	346.4	181.0	338.0	186.6	333.8	189.4
	-6	***423.8***	***142.4***	***400.0***	***149.2***	***367.2***	***156.0***	***343.9***	***162.8***	***329.9***	***166.8***	***320.6***	***169.5***	***311.3***	***176.6***	***301.9***	***183.6***	***297.3***	***187.2***
	-8	397.6	134.0	377.5	142.9	348.9	151.7	329.3	160.5	317.5	165.8	309.6	169.3	301.8	175.6	293.9	182.0	290.0	185.1
	-10	***371.4***	***125.7***	***355.1***	***136.5***	***330.6***	***147.4***	***314.6***	***158.2***	***305.1***	***164.7***	***298.7***	***169.1***	***292.3***	***174.7***	***285.9***	***180.3***	***282.7***	***183.1***
	-12	345.2	117.3	332.6	130.2	312.4	143.1	300.0	156.0	292.6	163.7	287.7	168.9	282.8	173.7	277.8	178.6	275.4	181.1

Power (kW) is for compressors only.

Correction factors for Low Sound *(Sonata)* Units

Compressor Power: All models multiply the tabulated Power kW by 1.01

Cooling Capacities:

Models YAES 0405, 0475 and 0545 multiply the tabulated Cool kW by:

At ambients 29°C and less multiply the tabulated Cool kW by 0.93

At ambients 30°C and greater multiply the tabulated Cool kW by 0.95

Models YAES 0575 and 0645 multiply the tabulated Cool kW by:

At ambients 29°C and less multiply the tabulated Cool kW by 0.94

At ambients 30°C and greater multiply the tabulated Cool kW by 0.96

Model	LWT °C	Condenser Coil Entering Air Temperature °C																	
		20		25		30		35		38		40		42		44		45	
		Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW
YEAS 0685 SA	4	615.3	195.1	594.2	198.8	559.5	202.5	538.9	206.1	526.6	208.3	518.3	209.8	510.1	211.3	501.9	212.7	497.7	213.5
	2	***576.4***	***183.4***	***556.9***	***188.9***	***524.5***	***194.4***	***505.4***	***199.8***	***493.9***	***203.1***	***486.3***	***205.3***	***478.6***	***207.5***	***471.0***	***209.7***	***467.2***	***210.8***
	0	537.6	171.7	519.5	179.0	489.5	186.3	471.9	193.6	461.3	197.9	454.2	200.8	447.2	203.7	440.1	206.7	436.6	208.1
	-2	***510.0***	***165.4***	***489.4***	***172.7***	***457.7***	***180.0***	***437.6***	***187.2***	***425.5***	***191.6***	***417.5***	***194.5***	***409.4***	***199.0***	***401.4***	***203.5***	***397.4***	***205.7***
	-4	482.4	159.1	459.3	166.4	425.8	173.7	403.3	180.9	389.7	185.3	380.7	188.2	371.7	194.2	362.7	200.2	358.2	203.3
	-6	***454.8***	***152.8***	***429.2***	***160.1***	***394.0***	***167.4***	***369.0***	***174.6***	***354.0***	***179.0***	***344.0***	***181.9***	***334.0***	***189.5***	***324.0***	***197.0***	***319.0***	***200.8***
	-8	426.7	143.8	405.1	153.3	374.4	162.8	353.3	172.2	340.6	177.9	332.2	181.7	323.8	188.5	315.4	195.3	311.2	198.6
	-10	***398.5***	***134.9***	***381.0***	***146.5***	***354.8***	***158.1***	***337.6***	***169.8***	***327.3***	***176.8***	***320.5***	***181.4***	***313.6***	***187.4***	***306.7***	***193.5***	***303.3***	***196.5***
	-12	370.4	125.9	356.9	139.7	335.2	153.5	321.9	167.4	314.0	175.7	308.7	181.2	303.4	186.4	298.1	191.7	295.5	194.3
YAES 0715SA	4	758.8	159.2	718.9	189.6	654.0	200.8	606.5	204.8	582.5	214.4	566.2	221.7	550.2	228.4	534.2	239.6	526.2	238.5
	2	***719.3***	***152.6***	***678.9***	***183.5***	***614.8***	***195.0***	***567.2***	***199.4***	***542.9***	***209.1***	***526.5***	***216.5***	***510.2***	***223.2***	***494.0***	***234.4***	***485.9***	***233.5***
	0	679.9	146.2	638.8	177.5	575.6	189.3	528.0	194.0	503.3	203.7	486.7	211.2	470.2	218.0	453.8	229.2	445.6	228.3
	-2	***626.0***	***141.5***	***589.1***	***172.3***	***531.7***	***184.0***	***488.7***	***188.4***	***466.5***	***198.1***	***451.6***	***205.4***	***436.8***	***212.1***	***422.0***	***223.1***	***414.6***	***222.3***
	-4	572.0	136.8	539.3	167.0	487.8	178.6	449.5	183.0	429.8	192.5	416.5	199.7	403.4	206.3	390.3	217.0	383.7	216.3
	-6	***517.9***	***132.0***	***489.4***	***161.9***	***443.8***	***173.3***	***410.2***	***184.8***	***393.0***	***186.9***	***381.5***	***194.0***	***370.0***	***200.5***	***358.6***	***211.1***	***352.8***	***210.4***
	-8	478.7	128.0	452.4	157.1	410.3	168.2	379.2	179.4	363.4	181.2	352.7	188.1	342.1	194.5	331.6	204.7	326.2	204.0
	-10	***439.6***	***124.0***	***415.4***	***152.3***	***376.7***	***163.1***	***348.2***	***173.9***	***333.6***	***175.5***	***323.8***	***182.2***						
	-12	400.4	120.0	378.5	147.5	343.2	158.0	317.1	168.5	303.8	169.8	294.8	176.4						
YAES 0785SA	4	815.2	184.0	768.9	216.7	705.5	233.0	660.3	242.2	633.2	252.0	615.2	258.5	597.1	265.0	579.0	271.6	570.0	274.8
	2	***772.8***	***176.5***	***726.1***	***209.8***	***663.2***	***226.4***	***617.6***	***235.8***	***590.2***	***245.8***	***572.0***	***252.5***	***553.7***	***259.1***	***535.5***	***265.8***	***526.3***	***269.1***
	0	730.5	169.2	*683.2*	203.0	620.9	219.8	574.8	229.5	547.2	239.6	528.7	246.4	510.3	253.1	491.9	259.9	482.7	263.2
	-2	***672.5***	***163.7***	***630.0***	***197.0***	***573.5***	***213.6***	***532.1***	***223.0***	***507.2***	***233.0***	***490.6***	***239.7***	***474.0***	***246.3***	***457.4***	***253.0***	***449.2***	***256.3***
	-4	614.6	158.4	576.8	191.1	526.2	207.5	*489.3*	216.7	467.2	226.5	452.5	233.1	437.7	239.6	423.0	246.2	415.6	249.5
	-6	***556.4***	***152.9***	***523.4***	***185.2***	***478.8***	***201.4***	***446.6***	***217.6***	***427.3***	***220.1***	***414.4***	***226.6***	***401.5***	***233.0***	***388.7***	***239.5***	***382.2***	***242.7***
	-8	514.3	148.3	483.8	179.8	442.6	195.5	412.9	211.3	395.0	213.5	383.1	219.8	371.3	226.1	359.4	232.4	353.4	235.5
	-10	***472.3***	***143.7***	***444.3***	***174.3***	***406.4***	***189.6***	***379.0***	***204.9***	***362.7***	***206.9***	***351.7***	***213.0***						
	-12	430.2	139.2	404.8	168.9	370.2	183.7	*345.2*	198.6	330.2	200.3	320.3	206.2						
YAES 0905SA	4	898.6	200.1	844.1	234.0	769.3	247.5	714.9	256.1	688.7	267.6	671.3	275.2	653.9	282.8	636.4	290.5	627.8	294.3
	2	***851.9***	***191.9***	***797.1***	***226.5***	***723.2***	***240.4***	***668.6***	***249.5***	***641.9***	***261.1***	***624.1***	***268.8***	***606.3***	***276.6***	***588.6***	***284.3***	***579.7***	***288.2***
	0	805.2	183.9	750.1	219.1	677.1	233.3	622.3	242.8	595.1	254.5	577.0	262.4	558.8	270.2	540.7	278.0	531.6	281.9
	-2	***741.3***	***177.9***	***691.6***	***212.6***	***625.4***	***226.7***	***576.0***	***236.0***	***551.7***	***247.6***	***535.4***	***255.3***	***519.1***	***263.0***	***502.8***	***270.7***	***494.7***	***274.6***
	-4	677.5	172.1	633.2	206.2	573.8	220.2	529.8	229.3	508.2	240.7	493.8	248.3	479.4	255.9	464.9	263.5	457.8	267.3
	-6	***613.3***	***166.0***	***574.6***	***199.8***	***522.1***	***213.7***	***483.5***	***222.6***	***464.7***	***233.9***	***452.2***	***241.4***	***439.7***	***248.9***	***427.2***	***256.3***	***421.0***	***260.1***
	-8	566.9	161.0	531.2	193.9	482.6	207.4	447.0	216.0	429.7	226.9	418.1	234.2	406.6	241.5	395.0	248.7	389.3	252.4
	-10	***520.6***	***156.0***	***487.7***	***188.0***	***443.1***	***201.1***	***410.4***	***209.3***	***394.4***	***219.9***	***383.8***	***227.0***						
	-12	474.2	151.0	444.4	182.1	403.7	194.8	373.7	202.6	359.2	212.9	349.5	219.8						
YAES 0985SA	4	985.7	221.4	926.0	257.3	835.1	267.7	767.4	283.3	749.1	293.2	732.5	300.5	716.0	306.4	699.5	313.0	659.5	316.3
	2	***934.4***	***214.3***	***874.4***	***249.1***	***785.1***	***259.9***	***717.7***	***274.7***	***698.2***	***284.8***	***681.1***	***291.6***	***664.0***	***298.4***	***646.9***	***305.1***	***609.0***	***308.5***
	0	883.2	205.4	822.8	240.9	735.0	252.2	668.1	267.4	647.3	277.7	629.6	284.6	612.0	291.5	594.3	298.4	558.4	301.9
	-2	***813.1***	***198.8***	***758.7***	***233.9***	***679.0***	***245.0***	***618.4***	***259.9***	***600.0***	***270.2***	***584.2***	***277.0***	***568.4***	***283.8***	***552.7***	***290.6***	***519.7***	***294.0***
	-4	743.1	192.4	694.6	226.8	622.9	237.8	568.7	252.6	552.7	262.7	538.8	269.4	524.9	276.2	511.0	282.9	480.9	286.2
	-6	***672.7***	***185.6***	***630.3***	***219.9***	***566.8***	***230.7***	***519.0***	***245.3***	***505.5***	***255.3***	***493.5***	***262.0***	***481.5***	***268.6***	***469.6***	***275.3***	***442.2***	***278.6***
	-8	621.8	180.1	582.7	213.4	523.9	223.8	479.8	238.0	467.3	247.7	456.3	254.2	445.2	260.7	434.2	267.1	408.9	270.4
	-10	***571.0***	***174.6***	***535.0***	***207.0***	***481.1***	***221.7***	***440.5***	***230.7***	***429.0***	***240.2***	***418.8***	***246.4***						
	-12	520.1	169.1	487.5	200.5	438.2	214.8	401.2	223.4	390.7	232.6	381.4	238.7						

Power (kW) is for compressors only.

Correction factors for Low Sound *(Sonata)* Units

Compressor Power: All models multiply the tabulated Power kW by 1.01

Cooling Capacities: **ALL models multiply the tabulated Cool kW by:**

At ambients 29°C and less multiply the tabulated Cool kW by 0.94

At ambients 30°C and greater multiply the tabulated Cool kW by 0.96

Model	LWT °C	Condenser Coil Entering Air Temperature °C																	
		20		25		30		35		38		40		42		44		45	
		Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW
YAES 1075SA	4	1076.1	239.3	1015.0	281.7	931.2	303.0	871.6	314.8	835.8	327.5	784.3	336.0	788.2	344.5	764.3	353.0	752.4	357.3
	2	***1020.1***	***229.5***	***958.4***	***272.7***	***875.4***	***294.3***	***815.2***	***306.6***	***779.1***	***319.5***	***729.2***	***328.2***	***730.9***	***336.8***	***706.8***	***345.5***	***694.8***	***349.8***
	0	964.2	219.9	*901.9*	263.8	819.6	285.8	758.8	298.3	722.3	311.5	674.1	320.3	673.6	329.0	649.3	337.8	637.1	342.2
	-2	***887.7***	***212.9***	***831.6***	***256.1***	***757.1***	***277.7***	***702.3***	***290.0***	***669.5***	***302.9***	***625.5***	***311.6***	***625.7***	***320.2***	***603.8***	***328.9***	***592.9***	***333.2***
	-4	811.2	205.9	761.3	248.4	694.6	269.8	*645.9*	281.7	616.7	294.5	576.9	303.0	577.8	311.5	558.4	320.1	548.6	324.3
	-6	***734.4***	***198.7***	***690.9***	***240.8***	***632.0***	***261.8***	***589.5***	***282.9***	***564.0***	***286.1***	***528.3***	***294.5***	***530.0***	***302.9***	***513.0***	***311.4***	***504.5***	***315.6***
	-8	678.9	192.8	638.7	233.7	584.2	254.2	545.0	274.6	521.4	277.5	488.5	285.7	490.1	293.9	474.4	302.1	466.5	306.2
	-10	***623.4***	***186.9***	***586.4***	***226.6***	***536.4***	***246.5***	***500.3***	***266.4***	***478.7***	***268.9***	***448.4***	***276.9***	***449.9***	***284.9***	***435.4***	***292.8***	***428.2***	***296.8***
	-12	567.8	181.0	534.3	219.6	488.6	238.9	*455.7*	258.2	435.9	260.4	408.3	268.1	409.6	275.8	396.4	283.5	389.8	287.4
YAES 1245SA	4	1222.8	277.9	1153.4	327.2	1058.2	351.9	990.5	365.7	949.8	380.5	891.2	390.3	895.6	400.2	868.5	410.1	855.0	415.0
	2	***1159.2***	***266.5***	***1089.1***	***316.8***	***994.8***	***341.9***	***926.3***	***356.1***	***885.3***	***371.2***	***828.6***	***381.2***	***830.6***	***391.2***	***803.2***	***401.3***	***789.5***	***406.3***
	0	1095.7	255.5	1024.9	306.5	931.3	331.9	862.2	346.5	820.8	361.8	766.0	372.0	765.5	382.2	737.8	392.4	724.0	397.5
	-2	***1008.8***	***247.3***	***945.0***	***297.5***	***860.3***	***322.6***	***798.1***	***336.8***	***760.8***	***351.9***	***710.8***	***361.9***	***711.0***	***372.0***	***686.2***	***382.0***	***673.7***	***387.0***
	-4	921.8	239.2	865.1	288.5	789.3	313.3	734.0	327.2	700.8	342.1	655.6	352.0	656.6	361.9	634.5	371.8	623.5	376.7
	-6	***834.6***	***230.8***	***785.1***	***279.7***	***718.2***	***304.1***	***669.9***	***328.6***	***640.9***	***332.3***	***600.4***	***342.1***	***602.3***	***351.9***	***583.0***	***361.7***	***573.3***	***366.5***
	-8	771.4	223.9	725.8	271.5	663.9	295.2	619.3	319.0	592.6	322.4	555.1	331.9	556.9	341.4	539.0	350.9	530.1	355.6
	-10	***708.4***	***217.1***	***666.4***	***263.3***	***609.5***	***286.3***	***568.6***	***309.4***	***544.0***	***312.4***	***509.6***	***321.6***	***511.2***	***330.9***	***494.8***	***340.1***	***486.6***	***344.7***
	-12	645.3	210.2	607.2	255.0	555.3	277.5	517.8	299.9	495.4	302.4	464.0	311.4	465.4	320.4	450.4	329.3	443.0	333.8
YAES 1405SA	4	1361.4	309.2	1284.1	364.1	1178.1	391.5	1102.7	406.8	1057.5	423.3	992.2	434.3	997.1	445.2	967.0	456.2	951.9	461.7
	2	***1290.6***	***296.5***	***1212.5***	***352.4***	***1107.5***	***380.4***	***1031.3***	***396.2***	***985.6***	***412.9***	***922.5***	***424.1***	***924.7***	***435.3***	***894.2***	***446.5***	***879.0***	***452.1***
	0	1219.9	284.2	1141.0	341.0	1036.9	369.3	959.9	385.5	913.8	402.5	852.9	413.9	852.2	425.2	821.5	436.6	806.1	442.2
	-2	***1123.1***	***275.1***	***1052.1***	***331.0***	***957.8***	***358.9***	***888.6***	***374.7***	***847.0***	***391.5***	***791.4***	***402.7***	***791.6***	***413.8***	***763.9***	***425.0***	***750.1***	***430.6***
	-4	1026.3	266.1	963.2	321.0	878.7	348.6	817.2	364.1	780.3	380.6	729.8	391.6	731.0	402.6	706.4	413.6	694.1	419.1
	-6	***929.2***	***256.8***	***874.1***	***311.2***	***799.6***	***338.4***	***745.8***	***365.6***	***713.6***	***369.7***	***668.4***	***380.6***	***670.6***	***391.5***	***649.1***	***402.4***	***638.3***	***407.8***
	-8	858.9	249.1	808.0	302.0	739.1	328.5	689.5	354.9	659.7	358.7	618.0	369.2	620.0	379.8	600.1	390.4	590.2	395.7
	-10	***788.7***	***241.5***	***741.9***	***292.9***	***678.6***	***318.6***	***633.0***	***344.3***	***605.6***	***347.6***	***567.3***	***357.8***	***569.1***	***368.1***	***550.9***	***378.4***	***541.8***	***383.5***
	-12	718.4	233.8	676.0	283.7	618.2	308.7	576.5	333.6	551.5	336.5	516.6	346.4	518.2	356.4	501.5	366.4	493.2	371.4
YEAS 1505 DSA	4	1517.6	318.4	1437.9	379.2	1307.9	401.6	1213.0	409.6	1164.9	428.7	1132.5	443.4	1100.4	456.8	1068.4	479.2	1052.3	477.0
	2	***1438.6***	***305.2***	***1357.8***	***367.0***	***1229.5***	***390.1***	***1134.5***	***398.8***	***1085.8***	***418.1***	***1053.0***	***432.9***	***1020.4***	***446.5***	***988.0***	***468.8***	***971.7***	***466.9***
	0	1359.8	292.4	1277.6	355.0	1151.1	378.7	1056.0	387.9	1006.6	407.5	973.4	422.4	940.5	436.0	907.6	458.4	891.1	456.7
	-2	***1251.9***	***282.9***	***1178.1***	***344.5***	***1063.3***	***367.9***	***977.5***	***376.9***	***933.1***	***396.1***	***903.2***	***410.8***	***873.6***	***424.2***	***844.1***	***446.1***	***829.2***	***444.5***
	-4	1144.0	273.6	1078.6	334.0	975.5	357.3	898.9	366.0	859.6	384.9	833.0	399.3	806.7	412.6	780.5	434.0	767.3	432.6
	-6	***1035.8***	***263.9***	***978.8***	***323.7***	***887.7***	***346.7***	***820.4***	***369.6***	***786.1***	***373.8***	***762.9***	***388.0***	***740.0***	***401.1***	***717.2***	***422.1***	***705.7***	***420.8***
	-8	957.4	256.0	904.8	314.1	820.6	336.5	758.5	358.8	726.7	362.4	705.4	376.2	684.2	388.9	663.1	409.4	652.5	408.1
	-10	***879.2***	***248.0***	***830.8***	***304.5***	***753.4***	***326.2***	***696.3***	***347.9***	***667.2***	***351.1***	***647.5***	***364.5***						
	-12	800.8	240.1	756.9	294.9	686.3	316.0	634.2	337.0	607.6	339.7	589.6	352.7						
YEAS 1575 DSA	4	1574.0	343.2	1487.9	406.3	1359.4	433.9	1266.8	447.0	1215.7	466.3	1181.4	480.2	1147.3	493.4	1113.2	511.1	1096.2	513.3
	2	***1492.1***	***329.1***	***1405.0***	***393.3***	***1277.9***	***421.5***	***1184.8***	***435.2***	***1133.1***	***454.9***	***1098.4***	***468.9***	***1063.9***	***482.3***	***1029.5***	***500.2***	***1012.2***	***502.5***
	0	1410.4	315.4	1322.1	380.4	1196.5	409.2	1102.8	423.4	1050.5	443.3	1015.5	457.5	980.6	471.1	945.7	489.0	928.2	491.6
	-2	***1298.5***	***305.2***	***1219.1***	***369.3***	***1105.2***	***397.6***	***1020.8***	***411.5***	***973.7***	***431.1***	***942.2***	***445.1***	***910.8***	***458.4***	***879.5***	***476.0***	***863.8***	***478.6***
	-4	1186.6	295.2	1116.0	358.1	1014.0	386.1	938.8	399.7	897.0	419.0	869.0	432.8	841.1	445.9	813.3	463.2	799.3	465.8
	-6	***1074.3***	***284.8***	***1012.8***	***347.1***	***922.6***	***374.8***	***856.8***	***402.4***	***820.3***	***407.0***	***795.9***	***420.6***	***771.5***	***433.6***	***747.2***	***450.6***	***735.1***	***453.1***
	-8	993.0	276.3	936.2	336.9	852.9	363.8	792.1	390.6	758.4	394.7	735.8	407.9	713.4	420.5	690.9	437.1	679.7	439.6
	-10	***911.9***	***267.8***	***859.6***	***326.6***	***783.1***	***352.7***	***727.2***	***378.9***	***696.2***	***382.4***	***675.5***	***395.2***						
	-12	830.6	259.2	783.2	316.4	713.3	341.7	662.3	367.1	634.0	370.1	615.1	382.6						

Power (kW) is for compressors only.

Correction factors for Low Sound *(Sonata)* Units

Compressor Power: All models multiply the tabulated Power kW by 1.01

Cooling Capacities: **ALL models multiply the tabulated Cool kW by:**

At ambients 29°C and less multiply the tabulated Cool kW by 0.94

At ambients 30°C and greater multiply the tabulated Cool kW by 0.96

Model	LWT °C	Condenser Coil Entering Air Temperature °C																	
		20		25		30		35		38		40		42		44		45	
		Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW	Cool kW	Power kW
YEAS 1645 DSA	4	1630.4	368.1	1537.8	433.4	1410.9	466.1	1320.6	484.3	1266.4	503.9	1230.3	517.0	1194.2	530.0	1158.1	543.1	1140.0	549.6
	2	***1545.6***	***353.0***	***1452.2***	***419.6***	***1326.4***	***452.8***	***1235.1***	***471.6***	***1180.4***	***491.6***	***1143.9***	***504.9***	***1107.4***	***518.2***	***1070.9***	***531.5***	***1052.7***	***538.2***
	0	1461.0	338.4	*1366.5*	405.9	1241.8	439.7	1149.6	459.0	1094.4	479.2	1057.5	492.7	1020.6	506.2	983.8	519.7	965.3	526.5
	-2	***1345.1***	***327.5***	***1260.0***	***394.0***	***1147.1***	***427.3***	***1064.2***	***446.1***	***1014.4***	***466.1***	***981.2***	***479.4***	***948.1***	***492.7***	***914.9***	***506.0***	***898.3***	***512.6***
	-4	1229.1	316.8	1153.5	382.1	1052.4	415.0	*978.7*	433.4	934.5	453.1	905.0	466.2	875.5	479.3	846.0	492.4	831.3	499.0
	-6	***1112.8***	***305.7***	***1046.9***	***370.5***	***957.6***	***402.8***	***893.2***	***435.2***	***854.6***	***440.2***	***828.8***	***453.1***	***803.1***	***466.1***	***777.3***	***479.0***	***764.4***	***485.5***
	-8	1028.6	296.6	967.7	359.6	885.2	391.1	825.7	422.5	790.1	427.0	766.3	439.6	742.5	452.2	718.7	464.7	706.8	471.0
	-10	***944.6***	***287.5***	***888.5***	***348.7***	***812.7***	***379.3***	***758.1***	***409.9***	***725.3***	***413.8***	***703.5***	***426.0***						
	-12	860.4	278.4	809.6	337.8	740.4	367.5	*690.4*	397.2	660.5	400.6	640.5	412.4						
YEAS 1715 DSA	4	1713.9	384.1	1613.0	450.7	1474.8	480.5	1375.2	498.3	1321.9	519.5	1286.4	533.7	1251.0	547.9	1215.5	562.0	1197.8	569.1
	2	***1624.7***	***368.4***	***1523.2***	***436.3***	***1386.4***	***466.8***	***1286.1***	***485.3***	***1232.1***	***506.9***	***1196.1***	***521.3***	***1160.1***	***535.7***	***1124.0***	***550.1***	***1106.0***	***557.3***
	0	1535.7	353.1	1433.3	422.0	1298.0	453.2	1197.1	472.3	1142.3	494.1	1105.7	508.7	1069.1	523.3	1032.5	537.9	1014.3	545.2
	-2	***1413.9***	***341.6***	***1321.6***	***409.6***	***1199.0***	***440.4***	***1108.1***	***459.0***	***1058.9***	***480.6***	***1026.0***	***495.0***	***993.1***	***509.3***	***960.3***	***523.7***	***943.8***	***530.9***
	-4	1292.0	330.5	1209.9	397.2	1100.0	427.7	1019.1	446.0	975.4	467.2	946.3	481.4	917.1	495.5	888.0	509.7	873.4	516.8
	-6	***1169.7***	***318.8***	***1098.0***	***385.0***	***1000.9***	***415.1***	***930.1***	***440.2***	***892.0***	***454.0***	***866.6***	***467.9***	***841.2***	***481.9***	***815.9***	***495.9***	***803.2***	***502.8***
	-8	1081.2	309.3	1015.0	373.7	925.2	402.9	859.9	427.2	824.7	440.4	801.3	454.0	777.8	467.5	754.4	481.1	742.7	487.9
	-10	***992.9***	***299.8***	***932.0***	***362.3***	***849.5***	***390.7***	***789.4***	***414.2***	***757.1***	***426.8***	***735.6***	***440.0***						
	-12	904.4	290.2	849.1	351.0	773.9	378.5	719.0	401.2	689.4	413.2	669.7	426.0						
YEAS 1785 DSA	4	1800.9	405.4	1694.9	474.0	1540.6	500.7	1427.7	525.5	1382.3	545.2	1347.7	559.0	1313.1	571.4	1278.6	584.6	1229.5	591.1
	2	***1707.2***	***390.9***	***1600.5***	***458.8***	***1448.2***	***486.3***	***1335.3***	***510.5***	***1288.4***	***530.6***	***1253.0***	***544.0***	***1217.7***	***557.5***	***1182.4***	***570.9***	***1135.3***	***577.6***
	0	1613.7	374.6	1506.0	443.9	1355.9	472.0	1242.9	496.8	1194.5	517.3	1158.4	531.0	1122.3	544.6	1086.2	558.3	1041.1	565.1
	-2	***1485.7***	***362.6***	***1388.7***	***430.9***	***1252.5***	***458.6***	***1150.5***	***483.0***	***1107.2***	***503.2***	***1074.9***	***516.7***	***1042.5***	***530.1***	***1010.1***	***543.6***	***968.8***	***550.3***
	-4	1357.6	350.8	1271.3	417.9	1149.1	445.3	1058.1	469.4	1020.0	489.3	991.3	502.5	962.7	515.8	934.1	529.1	896.5	535.7
	-6	***1229.1***	***338.5***	***1153.8***	***405.1***	***1045.6***	***432.1***	***965.6***	***462.9***	***932.8***	***475.4***	***907.9***	***488.5***	***883.0***	***501.7***	***858.2***	***514.8***	***824.4***	***521.3***
	-8	1136.1	328.4	1066.5	393.2	966.5	419.3	892.7	449.3	862.4	461.2	839.4	474.0	816.5	486.7	793.5	499.5	762.3	505.9
	-10	***1043.3***	***318.3***	***979.3***	***381.3***	***887.4***	***411.3***	***819.6***	***435.7***	***791.7***	***447.0***	***770.6***	***459.4***						
	-12	950.3	308.2	892.2	369.4	808.4	398.6	746.4	422.0	720.9	432.9	701.6	444.9						
YEAS 1855 DSA	4	1884.3	421.5	1770.1	491.3	1604.4	515.1	1482.3	539.5	1437.8	560.8	1403.8	575.7	1369.9	589.3	1336.0	603.5	1287.3	610.6
	2	***1786.3***	***406.2***	***1671.5***	***475.5***	***1508.3***	***500.3***	***1386.3***	***524.1***	***1340.2***	***545.9***	***1305.2***	***560.4***	***1270.3***	***574.9***	***1235.5***	***589.4***	***1188.7***	***596.7***
	0	1688.5	389.3	1572.8	460.0	1412.1	485.5	1290.4	510.1	1242.5	532.2	1206.6	547.0	1170.8	561.7	1134.9	576.5	1090.1	583.8
	-2	***1554.5***	***376.7***	***1450.3***	***446.5***	***1304.4***	***471.7***	***1194.4***	***495.9***	***1151.7***	***517.7***	***1119.6***	***532.3***	***1087.5***	***546.8***	***1055.5***	***561.3***	***1014.4***	***568.6***
	-4	1420.5	364.4	1327.7	433.0	1196.7	457.9	1098.5	482.0	1060.9	503.4	1032.6	517.7	1004.3	532.0	976.0	546.4	938.7	553.5
	-6	***1286.1***	***351.6***	***1205.0***	***419.7***	***1088.9***	***444.3***	***1002.5***	***468.0***	***970.2***	***489.2***	***945.7***	***503.3***	***921.2***	***517.5***	***896.7***	***531.6***	***863.2***	***538.7***
	-8	1188.7	341.1	1113.8	407.3	1006.6	431.1	926.8	454.0	897.0	474.6	874.4	488.4	851.8	502.1	829.2	515.9	798.2	522.8
	-10	***1091.7***	***330.6***	***1022.7***	***395.0***	***924.2***	***422.8***	***850.9***	***440.0***	***823.5***	***460.1***	***802.7***	***473.4***						
	-12	994.3	320.1	931.8	382.6	841.9	409.6	775.0	426.1	749.9	445.5	730.9	458.5						
YEAS 1925 DSA	4	1971.3	442.7	1851.9	514.6	1670.2	535.4	1534.9	566.7	1498.2	586.5	1465.1	600.9	1432.0	612.8	1399.1	626.0	1319.0	632.6
	2	***1868.8***	***428.7***	***1748.8***	***498.1***	***1570.1***	***519.8***	***1435.5***	***549.3***	***1396.4***	***569.6***	***1362.2***	***583.2***	***1328.0***	***596.7***	***1293.8***	***610.3***	***1217.9***	***617.1***
	0	1766.4	410.9	1645.6	481.9	1470.0	504.4	1336.1	534.7	1294.6	555.4	1259.3	569.2	1223.9	583.1	1188.5	596.9	1116.9	603.8
	-2	***1626.3***	***397.7***	***1517.4***	***467.8***	***1357.9***	***489.9***	***1236.8***	***519.9***	***1200.1***	***540.3***	***1168.5***	***554.0***	***1136.9***	***567.6***	***1105.3***	***581.2***	***1039.3***	***588.0***
	-4	1486.1	384.7	1389.2	453.7	1245.8	475.6	1137.4	505.3	1105.5	525.4	1077.7	538.9	1049.9	552.3	1022.1	565.8	961.8	572.5
	-6	***1345.5***	***371.3***	***1260.7***	***439.8***	***1133.6***	***461.3***	***1038.1***	***490.7***	***1011.0***	***510.6***	***987.0***	***523.9***	***963.0***	***537.2***	***939.1***	***550.5***	***884.4***	***557.2***
	-8	1243.6	360.2	1165.3	426.9	1047.9	447.5	959.7	476.1	934.7	495.5	912.5	508.4	890.4	521.3	868.3	534.3	817.8	540.7
	-10	***1142.1***	***349.2***	***1070.0***	***413.9***	***962.1***	***443.4***	***881.1***	***461.5***	***858.1***	***480.3***	***837.7***	***492.9***						
	-12	1040.3	338.1	974.9	401.0	876.4	429.6	802.5	446.9	781.4	465.2	762.8	477.4						

Power (kW) is for compressors only.

Correction factors for Low Sound *(Sonata)* Units

Compressor Power: All models multiply the tabulated Power kW by 1.01

Cooling Capacities: **ALL models multiply the tabulated Cool kW by:**

At ambients 29°C and less multiply the tabulated Cool kW by 0.94

At ambients 30°C and greater multiply the tabulated Cool kW by 0.96

Capacity Data

LCLT °C	RHLT / LHLT °C	Model																																	
		0715SA		0785SA		0905SA		0985SA		1075SA			1245SA			1405SA			1505DSA				1575DSA				1645DSA				1715DSA				1785DSA			
		System																																			
		1	2	1	2	1	2	1	2	1	2	3	1	2	3	1	2	3	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		DeSuperheater Heat Recovery Capacity (kW)																																			
5	40 / 50	140	154	169	181	140		169		181			140	140	154	140	154	154	154	169	181	154	181	169	181	181	154	169	181	154	181	169	181	181	154	169	181	181
6		***144***	***159***	***174***	***187***	***144***		***174***		***187***			***144***	***144***	***159***	***144***	***159***	***159***	***159***	***174***	***187***	***159***	***187***	***174***	***187***	***187***	***159***	***174***	***187***	***159***	***187***	***174***	***187***	***187***	***159***	***174***	***187***	***187***
7		149	164	179	193	149		179		193			149	149	164	149	164	164	164	179	193	164	193	179	193	193	164	179	193	164	193	179	193	193	164	179	193	193
8		***155***	***171***	***187***	***199***	***155***		***187***		***199***			***155***	***155***	***171***	***155***	***171***	***171***	***171***	***187***	***199***	***171***	***199***	***187***	***199***	***199***	***171***	***187***	***199***	***171***	***199***	***187***	***199***	***199***	***171***	***187***	***199***	***199***
9		158	175	191	202	158		191		202			158	158	175	158	175	175	175	191	202	175	202	191	202	202	175	191	202	175	202	191	202	202	175	191	202	202
10		***161***	***178***	***195***	***205***	***161***		***195***		***205***			***161***	***161***	***178***	***161***	***178***	***178***	***178***	***195***	***205***	***178***	***205***	***195***	***205***	***205***	***178***	***195***	***205***	***178***	***205***	***195***	***205***	***205***	***178***	***195***	***205***	***205***
11		166	183	200	210	166		200		210			166	166	183	166	183	183	183	200	210	183	210	200	210	210	183	200	210	183	210	200	210	210	183	200	210	210
12		***171***	***188***	***205***	***215***	***171***		***205***		***215***			***171***	***171***	***188***	***171***	***188***	***188***	***188***	***205***	***215***	***188***	***215***	***205***	***215***	***215***	***188***	***205***	***215***	***188***	***215***	***205***	***215***	***215***	***188***	***205***	***215***	***215***
13		175	191	208	218	175		208		218			175	175	191	175	191	191	191	208	218	191	218	208	218	218	191	208	218	191	218	208	218	218	191	208	218	218
14		***178***	***195***	***212***	***222***	***178***		***212***		***222***			***178***	***178***	***195***	***178***	***195***	***195***	***195***	***212***	***222***	***195***	***222***	***212***	***222***	***222***	***195***	***212***	***222***	***195***	***222***	***212***	***222***	***222***	***195***	***212***	***222***	***222***
15		181	198	215	225	181		215		225			181	181	198	181	198	198	198	215	225	198	225	215	225	225	198	215	225	198	225	215	225	225	198	215	225	225
5	45 / 55	111	123	136	149	111		136		149			111	111	123	111	123	123	123	136	149	123	149	136	149	149	123	136	149	123	149	136	149	149	123	136	149	149
6		***114***	***127***	***140***	***154***	***114***		***140***		***154***			***114***	***114***	***127***	***114***	***127***	***127***	***127***	***140***	***154***	***127***	***154***	***140***	***154***	***154***	***127***	***140***	***154***	***127***	***154***	***140***	***154***	***154***	***127***	***140***	***154***	***154***
7		118	131	145	159	118		145		159			118	118	131	118	131	131	131	145	159	131	159	145	159	159	131	145	159	131	159	145	159	159	131	145	159	159
8		***123***	***137***	***151***	***164***	***123***		***151***		***164***			***123***	***123***	***137***	***123***	***137***	***137***	***137***	***151***	***164***	***137***	***164***	***151***	***164***	***164***	***137***	***151***	***164***	***137***	***164***	***151***	***164***	***164***	***137***	***151***	***164***	***164***
9		125	140	154	166	125		154		166			125	125	140	125	140	140	140	154	166	140	166	154	166	166	140	154	166	140	166	154	166	166	140	154	166	166
10		***128***	***143***	***157***	***169***	***128***		***157***		***169***			***128***	***128***	***143***	***128***	***143***	***143***	***143***	***157***	***169***	***143***	***169***	***157***	***169***	***169***	***143***	***157***	***169***	***143***	***169***	***157***	***169***	***169***	***143***	***157***	***169***	***169***
11		132	147	161	173	132		161		173			132	132	147	132	147	147	147	161	173	147	173	161	173	173	147	161	173	147	173	161	173	173	147	161	173	173
12		***136***	***151***	***165***	***177***	***136***		***165***		***177***			***136***	***136***	***151***	***136***	***151***	***151***	***151***	***165***	***177***	***151***	***177***	***165***	***177***	***177***	***151***	***165***	***177***	***151***	***177***	***165***	***177***	***177***	***151***	***165***	***177***	***177***
13		138	153	168	180	138		168		180			138	138	153	138	153	153	153	168	180	153	180	168	180	180	153	168	180	153	180	168	180	180	153	168	180	180
14		***141***	***156***	***171***	***183***	***141***		***171***		***183***			***141***	***141***	***156***	***141***	***156***	***156***	***156***	***171***	***183***	***156***	***183***	***171***	***183***	***183***	***156***	***171***	***183***	***156***	***183***	***171***	***183***	***183***	***156***	***171***	***183***	***183***
15		144	159	174	186	144		174		186			144	144	159	144	159	159	159	174	186	159	186	174	186	186	159	174	186	159	186	174	186	186	159	174	186	186
5	50 / 60	85	95	105	110	85		105		110			85	85	95	85	95	95	95	105	110	95	110	105	110	110	95	105	110	95	110	105	110	110	95	105	110	110
6		***88***	***98***	***108***	***114***	***88***		***108***		***114***			***88***	***88***	***98***	***88***	***98***	***98***	***98***	***108***	***114***	***98***	***114***	***108***	***114***	***114***	***98***	***108***	***114***	***98***	***114***	***108***	***114***	***114***	***98***	***108***	***114***	***114***
7		91	101	111	117	91		111		117			91	91	101	91	101	101	101	111	117	101	117	111	117	117	101	111	117	101	117	111	117	117	101	111	117	117
8		***94***	***105***	***116***	***120***	***94***		***116***		***120***			***94***	***94***	***105***	***94***	***105***	***105***	***105***	***116***	***120***	***105***	***120***	***116***	***120***	***120***	***105***	***116***	***120***	***105***	***120***	***116***	***120***	***120***	***105***	***116***	***120***	***120***
9		96	107	119	122	96		119		122			96	96	107	96	107	107	107	119	122	107	122	119	122	122	107	119	122	107	122	119	122	122	107	119	122	122
10		***98***	***110***	***121***	***124***	***98***		***121***		***124***			***98***	***98***	***110***	***98***	***110***	***110***	***110***	***121***	***124***	***110***	***124***	***121***	***124***	***124***	***110***	***121***	***124***	***110***	***124***	***121***	***124***	***124***	***110***	***121***	***124***	***124***
11		101	113	124	127	101		124		127			101	101	113	101	113	113	113	124	127	113	127	124	127	127	113	124	127	113	127	124	127	127	113	124	127	127
12		***104***	***116***	***127***	***130***	***104***		***127***		***130***			***104***	***104***	***116***	***104***	***116***	***116***	***116***	***127***	***130***	***116***	***130***	***127***	***130***	***130***	***116***	***127***	***130***	***116***	***130***	***127***	***130***	***130***	***116***	***127***	***130***	***130***
13		106	118	129	132	106		129		132			106	106	118	106	118	118	118	129	132	118	132	129	132	132	118	129	132	118	132	129	132	132	118	129	132	132
14		***108***	***120***	***131***	***134***	***108***		***131***		***134***			***108***	***108***	***120***	***108***	***120***	***120***	***120***	***131***	***134***	***120***	***134***	***131***	***134***	***134***	***120***	***131***	***134***	***120***	***134***	***131***	***134***	***134***	***120***	***131***	***134***	***134***
15		111	122	133	137	111		133		137			111	111	122	111	122	122	122	133	137	122	137	133	137	137	122	133	137	122	137	133	137	137	122	133	137	137

Pressure Drop Data

	Ex Type	34/34	34/42	42/42	42/42	34/34		42/42		42/42		34/34	34/34	34/42	34/34	34/42	34/42	34/42	42/42	42/42	42/42	42/42	42/42	42/42	42/42
Min.	Flow l/s	1.9	2.1	2.4	2.4	1.9		2.4		2.4		1.9	1.9	2.1	1.9	2.1	2.1	2.1	2.4	2.4	2.1	2.4	2.4	2.4	2.4
	P.D. kPa	30	33.9	37.7	37.7	30		37.7		37.7		30	30	33.9	30	33.9	33.9	33.9	37.7	37.7	33.9	37.7	37.7	37.7	37.7
Max.	Flow l/s	3.8	4.3	5.1	5.1	3.8		5.1		5.1		3.8	3.8	4.3	3.8	4.3	4.3	4.3	5.1	5.1	4.3	5.1	5.1	5.1	5.1
	P.D. kPa	112	123	154	154	112		154		154		112	112	123	112	123	123	123	154	154	123	154	154	154	154

34/34 Pressure Drop = 8.9602 X Flow (l/s) ^ 1.9049 34/42 Pressure Drop = 8.2209 X Flow (l/s) ^ 1.8657

42/42 Pressure Drop = 7.6755 X Flow (l/s) ^ 1.8315

Notes:

All data relates to 2 circuits with a DeSuperheater fitted to both refrigerant circuits.

The liquid side of both exchangers are connected in series and the pressure drop values quoted reflect this.

Performance values are based on unit operating at 100% capacity at 35 °C ambient, with a standard 10 deg c water temperature range - apply correction factors for different requirements.

TABLE 13 PHYSICAL DATA - YAES-SA

Model YAES-SA				0405	0475	0545	0575	0645
Refrigerant Circuits		Quantity		2	2	2	2	2
Refrigerant Charge		Circuit 1	kg	40	40	50	50	52
		Circuit 2	kg	31	40	40	50	52
Compressors		Number		2	2	2	2	2
		Type (circuit 1)		YTS H-A-E	YTS H-A-E	YTS I-A-F	YTS I-A-F	YTS J-A-G
		Type (circuit 2)		YTS F-A-D	YTS H-A-E	YTS F-A-D	YTS I-A-F	YTS J-A-G
		Capacity Control per Compressor	%	30 - 100	30 - 100	30 - 100	30 - 100	30 - 100
Oil Charge		Per Circuit	l	19.1/18.1	20.1/20.1	23.1/19.1	23.1/23.1	28.1/28.1
Evaporator		Quantity		1	1	1	1	1
		Type		DXC1786	DXC1786	DXC1786	DXC1786	DXC21086
		Water Volume per Evaporator	l	304	304	304	304	445
Air-Cooled Condenser		Total Coil Face Area	m^2	13	15.6	18.2	20.8	20.8
		Number of Tube Rows		3	3	3	3	3
		Number of Fans (circuits 1)		3	3	4	4	4
		Number of Fans (circuits 2)		2	3	3	4	4
Fans	Standard	Nominal Speed	rpm	715	715	715	715	715
		Total Air Flow	m^3/s	31.25	37.5	43.75	50	50
	2 Speed	Nominal Speed	rpm	551	551	551	551	551
	at low speed	Total Air Flow	m^3/s	20	24	28	32	32
	2 Speed	Nominal Speed	rpm	687	687	687	687	687
	at high speed	Total Air Flow	m^3/s	30	36	42.00	48	48
	High	Nominal Speed	rpm	950	950	950	950	950
	Pressure	Total Air Flow	m^3/s	31.25	37.5	43.75	50	50
Dimensions [1]		Length	mm	4340	4340	5407	5407	5407
		Width	mm	2242	2242	2242	2242	2242
		Height	mm	2478	2478	2478	2478	2478
Weight: Units with coated aluminium fin coils		Shipping	kg	4010	4420	4760	5100	5545
		Operating	kg	4314	4724	5064	5404	5990
Extra Weight:		Units with copper coils	kg	315	378	442	504	504
		Low Sound Sonata Units	kg	160	160	160	160	160
		Units with Aesthetic Panels [2]	kg	150	150	150	150	150

Model YAES-SA				0685	0715	0785	0905	0985
Refrigerant Circuits		Quantity		2	2	2	2	2
Refrigerant Charge		Circuit 1	kg	60	60	65	70	72
		Circuit 2	kg	52	60	65	70	72
Compressors		Number		2	2	2	2	2
		Type (circuit 1)		YTS L-A-H	YTS L-A-H	YTS M-A-I	YTS M-A-I	YTS N-A-J
		Type (circuit 2)		YTS J-A-G	YTS L-A-H	YTS L-A-H	YTS M-A-I	YTS N-A-J
		Capacity Control/Compressor	%	30 - 100	30 - 100	30 - 100	30 - 100	30 - 100
Oil Charge		Per Circuit	l	29.1/28.1	23/23	28/23	28/28	28/28
Evaporator		Quantity		1	1	1	1	1
		Type		DXC21086	DXC21086	DXC21086	DXC22086	DXC25080
		Water Volume	l	445	445	445	515	652
Air-Cooled Condenser		Total Coil Face Area	m^2	23.4	26	26	31.2	31.2
		Number of Tube Rows		3	3	3	3	3
		Number of Fans (circuit 1)		5	5	5	6	6
		Number of Fans (circuit 2)		4	5	5	6	6
Fans	Standard	Nominal Speed	rpm	715	715	715	715	715
		Total Air Flow	m^3/s	56.2	62.5	62.5	75.0	75.0
	2 Speed	Nominal Speed	rpm	551	551	551	551	551
	at low speed	Total Air Flow	m^3/s	36	40	40	48	48
	2 Speed	Nominal Speed	rpm	687	687	687	687	687
	at high speed	Total Air Flow	m^3/s	54	60	60	72	72
	High	Nominal Speed	rpm	950	950	950	950	950
	Pressure	Total Air Flow	m^3/s	56.2	62.5	62.5	75.0	75.0
Dimensions [1]		Length	mm	6473	6473	6473	7540	7540
		Width	mm	2242	2242	2242	2242	2242
		Height	mm	2478	2478	2478	2478	2478
Weight: Units with coated aluminium fin coils		Shipping	kg	6240	6664	7006	7527	7893
		Operating	kg	6685	7109	7451	8042	8545
Extra Weight:		Units with copper coils	kg	568	630	630	756	756
		Low Sound Sonata Units	kg	160	165	165	165	165
		Units with Aesthetic Panels [2]	kg	150	150	150	150	150

(1) Length excludes disconnect switch or circuit breaker handles.

(2) Aesthetic panels are an option on Standard Units.

PHYSICAL DATA - YAES-SA

Model YAES-SA				1075	1245	1405
Refrigerant Circuits		Quantity		3	3	3
Refrigerant Charge		Circuit 1	kg	66	78	81
		Circuit 2	kg	66	78	81
		Circuit 3	kg	66	78	81
Compressors		Number		3	3	3
		Type (circuit 1)		YTS L-A-H	YTS L-A-H	YTS N-A-J
		Type (circuit 2)		YTS L-A-H	YTS L-A-H	YTS N-A-J
		Type (circuit 3)		YTS L-A-H	YTS L-A-H	YTS N-A-J
		Capacity Control/Compressor	%	30 - 100	30 - 100	30 - 100
Oil Charge		Per Circuit	l	23/23/23	28/28/28	28/28/28
Evaporator		Quantity		1	1	1
		Type		DXJ350	DXJ350	DXJ350
		Water Volume	l	580	580	580
Air-Cooled Condenser		Total Coil Face Area	m^2	37.9	46.8	46.8
		Number of Tube Rows		3	3	3
		Number of Fans (circuit 1)		5	6	6
		Number of Fans (circuit 2)		5	6	6
		Number of Fans (circuit 3)		4	6	6
Fans	Standard	Nominal Speed	rpm	715	715	715
		Total Air Flow	m^3/s	87.5	112.5	112.5
	2 Speed at low speed	Nominal Speed	rpm	551	551	551
		Total Air Flow	m^3/s	56	72	72
	2 Speed at high speed	Nominal Speed	rpm	687	687	687
		Total Air Flow	m^3/s	84	108	108
	High Pressure	Nominal Speed	rpm	950	950	950
		Total Air Flow	m^3/s	87.5	112.5	112.5
Dimensions [1]		Length	mm	9759	11588	11588
		Width	mm	2242	2242	2242
		Height	mm	2478	2478	2478
Weight: Units with coated aluminium fin coils		Shipping	kg	9200	10576	10585
		Operating	kg	9758	11096	11105
Extra Weight:		Units with copper coils	kg	918	1134	1134
		Low Sound Sonata Units	kg	280	280	280
		Units with Aesthetic Panels [2]	kg	255	255	255

(1) Length excludes disconnect switch or circuit breaker handles.

(2) Aesthetic panels are an option on Standard Units.

PHYSICAL DATA - YAES-DSA

Model YAES-DSA				1505	1575	1645	1715
Refrigerant Circuits		Quantity		4	4	4	4
Refrigerant Charge		Circuits 1 & 2	kg	60	65	70	60
		Circuits 3 & 4	kg	60	60	70	70
Compressors		Number		4	4	4	4
		Type (circuit 1)		YTS L-A-H	YTS M-A-I	YTS M-A-I	YTS M-A-I
		Type (circuit 2)		YTS L-A-H	YTS L-A-H	YTS L-A-H	YTS L-A-H
		Type (circuit 3)		YTS L-A-H	YTS L-A-H	YTS M-A-I	YTS M-A-I
		Type (circuit 4)		YTS L-A-H	YTS L-A-H	YTS L-A-H	YTS M-A-I
		Capacity Control per Compressor	%	30 - 100	30 - 100	30 - 100	30 - 100
Oil Charge		Circuits 1 & 2	l	23/23	28/23	28/28	23/23
		Circuits 3 & 4	l	23/23	23/23	28/28	28/28
Evaporator		Quantity		2	2	2	2
		Type (circuits 1 & 2)		DXC21086	DXC21086	DXC21086	DXC21080
		Type (circuits 3 & 4)		DXC21086	DXC21086	DXC21086	DXC22080
		Water Volume per Evaporator	l	445/445	445/445	515/515	445/515
Air-Cooled Condenser		Total Coil Face Area	m^2	52	52	52	57.2
		Number of Tube Rows		3	3	3	3
		Number of Fans (circuits 1 & 2)		5	5	5	5
		Number of Fans (circuits 3 & 4)		5	5	5	6
Fans	Standard	Nominal Speed	rpm	715	715	715	715
		Total Air Flow	m^3/s	125	125	125	138
	2 Speed	Nominal Speed	rpm	551	551	551	551
	at low speed	Total Air Flow	m^3/s	80	80	80	88
	2 Speed	Nominal Speed	rpm	687	687	687	687
	at high speed	Total Air Flow	m^3/s	120	120	120	132
	High	Nominal Speed	rpm	950	950	950	950
	Pressure	Total Air Flow	m^3/s	125	125	150	138
Dimensions [1]		Length	mm	13246	13246	13246	14313
		Width	mm	2242	2242	2242	2242
		Height	mm	2478	2478	2478	2478
Weight: Units with coated aluminium fin coils		Shipping	kg	2 x 6664	7006+6664	7006+7006	7006+7527
		Operating	kg	2 x 7109	7451+7109	7451+7451	7451+8042
Extra Weight:		Units with copper coils	kg	2 X 630	2 X 630	2 x756	2 x 756
		Low Sound Sonata Units	kg	2 x 165	2 x 165	2 x 165	2 x 165
		Units with Aesthetic Panels [2]	kg	2 x 150	2 x 150	2 x 150	2 x 150

(1) Length excludes disconnect switch or circuit breaker handles.
(2) Aesthetic panels are an option on Standard Units.

Model YAES-DSA				1785	1855	1925
Refrigerant Circuits		Quantity		4	4	4
Refrigerant Charge		Circuits 1 & 2	kg	72	72	72
		Circuits 3 & 4	kg	65	70	72
Compressors		Number		4	4	4
		Type (circuit 1)		YTS N-A-J	YTS N-A-J	YTS N-A-J
		Type (circuit 2)		YTS N-A-J	YTS N-A-J	YTS N-A-J
		Type (circuit 3)		YTS M-A-I	YTS M-A-I	YTS N-A-J
		Type (circuit 4)		YTS L-A-H	YTS M-A-I	YTS N-A-J
		Capacity Control/Compressor	%	30 - 100	30 - 100	30 - 100
Oil Charge		Circuits 1 & 2	l	28/28	28/28	28/28
		Circuits 3 & 4	l	23/28	28/28	28/28
Evaporator		Quantity		2	2	2
		Type (circuits 1 & 2)		DXC25080	DXC25080	DXC25080
		Type (circuits 3 & 4)		DXC21086	DXC22080	DXC25080
		Water Volume per Evaporator	l	652/445	652/515	652/652
Air-Cooled Condenser		Total Coil Face Area	m^2	57.2	62.4	62.4
		Number of Tube Rows		3	3	3
		Number of Fans (circuits 1 & 2)		6	6	6
		Number of Fans (circuits 3 & 4)		5	6	6
Fans	Standard	Nominal Speed	rpm	715	715	715
		Total Air Flow	m^3/s	138	150	150.0
	2 Speed	Nominal Speed	rpm	551	551	551
	at low speed	Total Air Flow	m^3/s	88	96	96
	2 Speed	Nominal Speed	rpm	687	687	687
	at high speed	Total Air Flow	m^3/s	132	144	144
	High	Nominal Speed	rpm	950	950	950
	Pressure	Total Air Flow	m^3/s	138	150	150.0
Dimensions [1]		Length	mm	14313	15380	15380
		Width	mm	2242	2242	2242
		Height	mm	2478	2478	2478
Weight: Units with coated aluminium fin coils		Shipping	kg	7893+7006	7893+7527	7893 + 7893
		Operating	kg	8545+7451	8545+8042	8545 + 8545
Extra Weight:		Units with copper coils	kg	756 + 630	2 x 756	2 x 756
		Low Sound Sonata Units	kg	2 x 165	2 x 165	2 x 165
		Units with Aesthetic Panels [2]	kg	2 x 150	2 x 150	2 x 150

(1) Length excludes disconnect switch or circuit breaker handles.
(2) Aesthetic panels are an option on Standard Units.

SOUND POWER LEVEL DB

TABLE 14

Sound Power Level dB			Standard Models									SPL[(1)] at at 10m distance
			Mean	Octave Band Levels - Frequency Hz								
UNIT TYPE			SWL	63	125	250	500	1000	2000	4000	8000	
Standard models without acoustic treatment	0405	LWA	99	72	80	88	94	94	92	85	80	67
		LW	104	98	96	97	98	94	91	84	81	
	0475	LWA	100	73	81	90	95	95	93	86	81	68
		LW	105	99	97	98	99	95	92	85	82	
	0545	LWA	100	73	81	90	96	95	93	87	81	68
		LW	105	99	97	98	99	95	92	86	82	
	0575	LWA	100	73	81	90	96	95	93	87	81	68
		LW	105	99	97	98	99	95	92	86	82	
	0645	LWA	101	74	82	91	97	96	94	88	82	69
		LW	106	100	98	99	100	96	93	87	83	
	0685	LWA	101	75	83	92	98	97	95	89	83	68
		LW	107	101	99	100	101	97	94	88	84	
	0715	LWA	99	74	78	87	92	97	92	82	71	67
		LW	104	100	94	96	95	97	91	81	72	
	0785	LWA	99	74	78	87	92	97	92	82	71	67
		LW	104	100	94	96	95	97	91	81	72	
	0905	LWA	100	75	79	88	93	98	93	83	72	68
		LW	105	101	95	97	96	98	92	82	73	
	0985	LWA	100	75	79	88	93	98	93	83	72	68
		LW	105	101	95	97	96	98	92	82	73	
	1075	LWA	101	75	79	89	94	98	94	83	73	68
		LW	105	101	95	97	96	98	92	82	73	
	1245	LWA	102	76	80	90	95	99	95	84	74	69
		LW	107	103	96	98	98	99	94	84	75	
	1405	LWA	102	76	80	90	95	99	95	84	74	69
		LW	107	103	96	98	98	99	94	84	75	
	1505	LWA	102	77	81	90	95	100	95	85	74	70
		LW	107	103	97	99	98	100	94	84	75	
	1575	LWA	102	77	81	90	95	100	95	85	74	72
		LW	107	103	97	99	98	100	94	84	75	
	1645	LWA	102	77	81	90	95	100	95	85	74	72
		LW	107	103	97	99	98	100	94	84	75	
	1715	LWA	103	78	82	91	96	101	96	86	75	72
		LW	108	104	98	100	99	101	95	85	76	
	1785	LWA	103	78	82	91	96	101	96	86	75	73
		LW	108	104	98	100	99	101	95	85	76	
	1855	LWA	103	78	82	91	96	101	96	86	75	73
		LW	108	104	98	100	99	101	95	85	76	
	1925	LWA	103	78	82	91	96	101	96	86	75	73
		LW	108	104	98	100	99	101	95	85	76	

Note: Data in accordance with ISO 3744.

1. Sound Pressure level at 10 metres in free field conditions.

SOUND POWER LEVEL DB

Sound Power Level			Low Sound Sonata Models									SPL[1] at at 10m distance
			Mean	Octave Band Levels - Frequency Hz								
UNIT TYPE			SWL	63	125	250	500	1000	2000	4000	8000	
Low Sound Models	0405	LWA	88	60	67	80	81	84	80	72	61	56
Fans at High speed		LW	93	86	83	89	84	84	79	71	62	
Low Sound Models		LWA	85	57	64	81	78	80	76	66	56	53
Fans at low speed		LW	92	83	80	90	81	80	75	65	57	
Low Sound Models	0475	LWA	90	62	69	82	83	86	82	74	63	58
Fans at High speed		LW	95	88	85	91	86	86	81	73	64	
Low Sound Models		LWA	86	58	65	82	79	81	77	67	57	54
Fans at low speed		LW	93	84	81	91	82	81	76	66	58	
Low Sound Models	0545	LWA	90	62	69	82	83	86	82	74	63	58
Fans at High speed		LW	95	88	85	91	86	86	81	73	64	
Low Sound Models		LWA	86	58	65	82	79	81	77	67	57	54
Fans at low speed		LW	93	84	81	91	82	81	76	66	58	
Low Sound Models	0575	LWA	91	63	70	83	84	87	83	75	64	59
Fans at High speed		LW	96	89	86	92	87	87	82	74	65	
Low Sound Models		LWA	86	58	65	82	79	81	77	67	57	54
Fans at low speed		LW	93	84	81	91	82	81	76	66	58	
Low Sound Models	0645	LWA	92	72	73	80	87	89	84	77	67	60
Fans at High speed		LW	100	98	89	89	90	89	83	76	68	
Low Sound Models		LWA	88	65	71	81	82	84	78	69	60	56
Fans at low speed		LW	95	91	87	90	85	84	77	68	61	
Low Sound Models	0685	LWA	92	71	73	79	86	88	84	76	66	59
Fans at High speed		LW	99	97	89	88	89	88	83	75	67	
Low Sound Models		LWA	88	65	72	80	82	84	78	69	60	56
Fans at low speed		LW	95	91	88	89	85	84	77	68	61	
Low Sound Models	0715	LWA	94	69	72	82	87	91	87	77	66	62
Fans at High speed		LW	99	95	89	91	90	92	86	76	67	
Low Sound Models		LWA	90	64	69	78	82	88	83	69	61	59
Fans at low speed		LW	95	91	86	87	86	88	82	69	62	
Low Sound Models	0785	LWA	94	69	72	82	87	91	87	77	66	62
Fans at High speed		LW	99	95	89	91	90	92	86	76	67	
Low Sound Models		LWA	91	65	70	79	83	89	84	70	62	59
Fans at low speed		LW	96	92	87	88	87	89	83	70	63	
Low Sound Models	0905	LWA	95	68	72	85	89	92	88	78	65	62
Fans at High speed		LW	99	94	88	93	92	91	86	76	65	
Low Sound Models		LWA	91	64	69	81	84	88	84	70	59	58
Fans at low speed		LW	95	90	85	89	87	88	82	69	60	
Low Sound Models	0985	LWA	95	68	72	85	89	92	88	78	65	62
Fans at High speed		LW	100	95	89	94	92	92	87	77	66	
Low Sound Models		LWA	92	65	70	82	85	89	85	71	60	60
Fans at low speed		LW	97	91	87	91	89	89	84	70	62	
Low Sound Models	1075	LWA	96	71	74	84	89	93	89	79	68	63
Fans at High speed		LW	101	97	90	92	92	93	87	77	69	
Low Sound Models		LWA	93	67	72	81	85	91	86	72	64	60
Fans at low speed		LW	98	93	88	89	89	91	84	71	65	
Low Sound Models	1245	LWA	96	69	73	86	90	93	89	79	66	63
Fans at High speed		LW	101	96	90	95	93	93	88	78	67	
Low Sound Models		LWA	93	66	71	83	86	90	86	72	61	60
Fans at low speed		LW	98	92	88	92	90	90	85	71	63	
Low Sound Models	1405	LWA	96	69	73	86	89	92	88	78	65	63
Fans at High speed		LW	101	96	90	95	94	93	88	78	67	
Low Sound Models		LWA	93	66	71	83	86	90	86	72	61	60
Fans at low speed		LW	97	92	87	91	89	90	84	71	62	
Low Sound Models	1505	LWA	96	71	75	84	89	94	89	79	68	63
Fans at High speed		LW	101	97	91	93	92	94	88	78	69	
Low Sound Models		LWA	93	66	71	80	85	90	85	72	64	60
Fans at low speed		LW	97	92	87	89	88	90	84	71	65	
Low Sound Models	1575	LWA	96	71	75	84	89	94	89	79	68	63
Fans at High speed		LW	101	97	91	93	92	94	88	78	69	
Low Sound Models		LWA	93	66	71	80	85	90	85	72	64	60
Fans at low speed		LW	97	92	87	89	88	90	84	71	65	
Low Sound Models	1645	LWA	96	71	75	84	89	94	89	79	68	63
Fans at High speed		LW	101	97	91	93	92	94	88	78	69	
Low Sound Models		LWA	93	66	71	80	85	90	85	72	64	60
Fans at low speed		LW	97	92	87	89	88	90	84	71	65	
Low Sound Models	1715	LWA	97	70	74	87	90	93	89	79	66	64
Fans at High speed		LW	101	96	90	96	93	93	88	78	67	
Low Sound Models		LWA	93	65	71	83	86	90	85	72	61	60
Fans at low speed		LW	97	91	87	92	89	90	84	71	62	
Low Sound Models	1785	LWA	97	70	75	87	91	94	90	80	67	64
Fans at High speed		LW	102	96	91	96	94	94	89	79	68	
Low Sound Models		LWA	94	67	72	84	88	91	87	73	62	61
Fans at low speed		LW	99	93	88	93	91	91	86	72	63	
Low Sound Models	1855	LWA	97	70	75	87	91	94	90	80	67	64
Fans at High speed		LW	102	96	91	96	94	94	89	79	68	
Low Sound Models		LWA	94	67	72	84	88	91	87	73	62	61
Fans at low speed		LW	99	93	88	93	91	91	86	72	63	
Low Sound Models	1925	LWA	97	70	75	87	91	94	90	80	67	64
Fans at High speed		LW	102	96	91	96	94	94	89	79	68	
Low Sound Models		LWA	94	67	72	84	88	91	87	73	62	61
Fans at low speed		LW	99	93	88	93	91	91	86	72	63	

Note: Data in accordance with ISO 3744. 1. Sound Pressure level at 10 metres in free field conditions.

ELECTRICAL DATA

TABLE 15

Models	Nominal Running [1] AMPS @ 380 V	Nominal Running [1] AMPS @ 400 V	Maximum Running [2] AMPS @360V	Maximum Running [2] AMPS @ 380 V	Maximum Running [2] AMPS @ 400 V	Start-up [3] Amps	Largest Compressor Star for Star/Delta Current Amps @ 380V	Largest Compressor Star for Star/Delta Current Amps @ 400V
	Without Power Factor Correction							
	With Optional Power Factor Correction fitted							
0405	247	235	328	308	291	306	175	187
	238	226	318	297	280	302		
0475	289	275	387	363	343	359	175	187
	279	265	375	349	329	352		
0545	313	298	415	390	369	400	215	228
	303	289	404	378	357	393		
0575	336	320	442	416	394	425	215	228
	326	312	432	406	384	420		
0645	390	372	512	484	462	479	233	248
	378	360	500	470	450	473		
0685	403	386	543	513	489	596	340	365
	387	369	527	495	472	590		
0715	415	399	573	541	515	623	340	365
	395	377	553	519	493	612		
0785	468	450	649	613	585	745	457	487
	446	426	626	590	561	734		
0905	544	522	734	694	664	819	457	487
	520	496	708	670	638	806		
0985	576	554	780	738	706	860	475	507
	552	528	754	712	678	846		
Main Panel (System 1 and 2)								
1075	415	399	573	541	515	880	340	365
	395	377	553	519	493	858		
1245	530	510	734	694	664	1077	457	487
	506	484	708	670	638	1053		
1405	576	554	780	738	706	1213	475	507
	552	528	754	712	678	1185		
Auxiliary Panel (System 3)								
1075	203	195	282	266	253	Start-up Amps included with System 1 and 2	340	365
	193	184	272	255	242			
1245	212	204	291	275	262		340	365
	202	193	281	264	251			
1405	288	277	390	369	353		475	507
	276	264	377	356	339			
Main Panel (Systems 1 and 2)								
1505	415	399	573	541	515	1138	340	365
	395	377	553	519	493	1105		
1575	468	450	649	613	585	1260	457	487
	446	426	626	590	561	1227		
1645	468	450	649	613	585	1330	457	487
	446	426	626	590	561	1295		
1715	468	450	649	613	585	1404	457	487
	446	426	626	590	561	1367		
1785	576	554	780	738	706	1445	475	507
	552	528	754	712	678	1407		
1855	576	554	780	738	706	1524	475	507
	552	528	754	712	678	1484		
1925	576	554	780	738	706	1566	475	507
	552	528	754	712	678	1525		
Auxiliary Panel (Systems 3 and 4)								
1505	415	399	573	541	515	Start Up Amps included with Main Panel Data	340	365
	395	377	553	519	493			
1575	415	399	573	541	515		340	365
	395	377	553	519	493			
1645	468	450	649	613	585		457	487
	446	426	626	590	561			
1715	544	522	734	694	664		457	487
	520	496	708	670	638			
1785	468	450	649	613	585		457	487
	446	426	626	590	561			
1855	544	522	734	694	664		457	487
	520	496	708	670	638			
1925	576	554	780	738	706		475	507
	552	528	754	712	678			

(1) Nominal running amps at 35°C ambient air temperature and 7°C leaving liquid temperature.

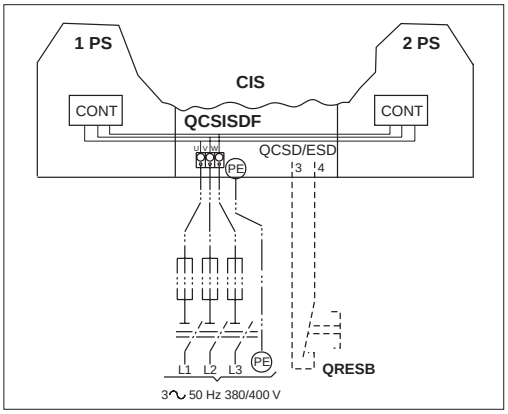
(2) Maximum running amps at 45°C ambient air temperature and 10°C leaving liquid temperature.

(3) Start-Up amps is the largest compressor starting with the other systems operating at maximum amps at 400 V.

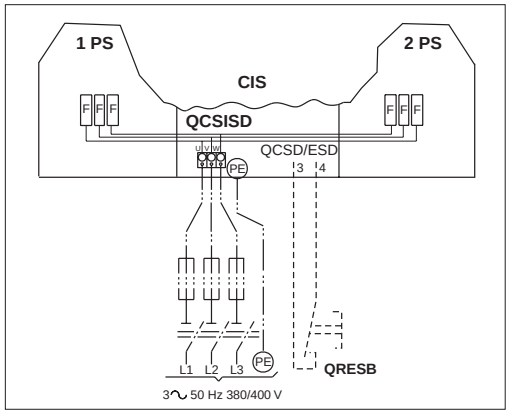
POWER SUPPLY CONNECTION DIAGRAMS
MAIN PANEL - ALL MODELS AND AUXILIARY PANEL - YAES-DSA MODELS ONLY

Standard Single Point Power Supply
One supply to master fused disconnect switch (QCSISDF) or non-fused disconnect switch (QCSISD) with internal power distribution to compressor contactors or fuses, control supply to non-fused disconnect switch (QCSD/ESD) derived internally.

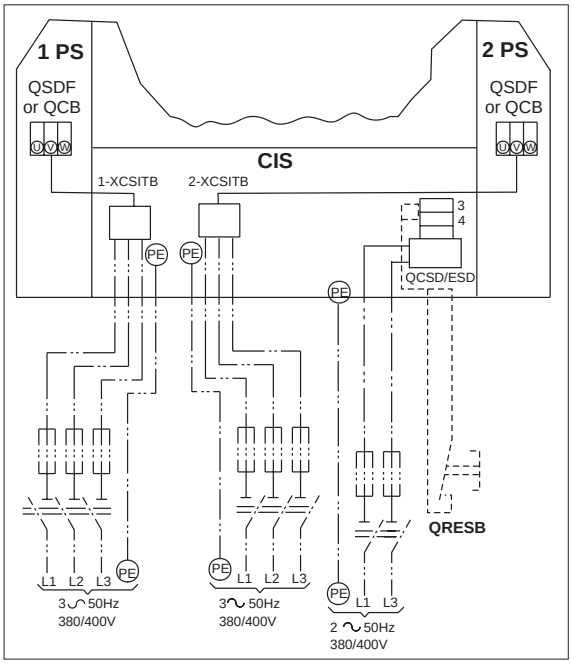
Models YAES0475SA to YAES0715SA



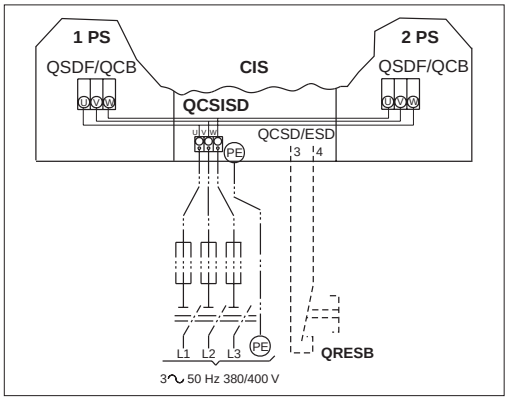
Models YAES0785SA to YAES1925DSA



Multi Point Power Supply (Option)
Two supplies to terminal blocks 1, 2 - XCSITB with internal power distribution to fused disconnect switches (QSDF) or circuit breakers (QCB) with separate control supply to non-fused disconnect switch (QCSD/ESD).



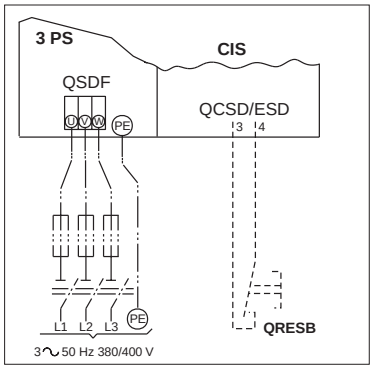
Single Point Power Supply (Option)
One supply to master non-fused disconnect switch (QCSISD) with internal power distribution to fused disconnect switches (QSDF) or circuit breakers (QCB), control supply to non-fused disconnect switch (QCSD/ESD) derived internally.



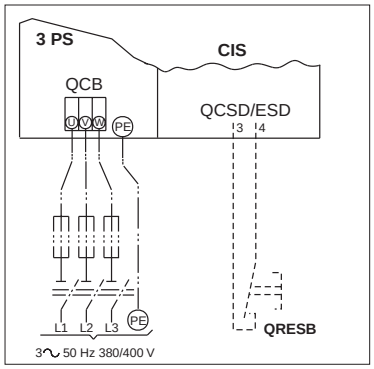
ITEM	DESCRIPTION
CS	CONTROL SECTION
CIS	COMMON INPUT SECTION
F	FUSE
PE	PROTECTIVE EARTH
PS	POWER SECTION
QCSD/ESD	CONTROL CIRCUIT SWITCH DISCONNECT/ EMERGENCY STOP DEVICE
QCB	CIRCUIT BREAKER
QCSISD	COMMON SUPPLY INPUT SWITCH DISCONNECT
QCSISDF	COMMON SUPPLY INPUT SWITCH DISCONNECT FUSED
XCSITB	COMMON SUPPLY INPUT TERMINAL BLOCK
QRESB	REMOTE EMERGENCY STOP BUTTON
QSDF	SWITCH DISCONNECT FUSED

POWER SUPPLY CONNECTION DIAGRAMS (ALL MODELS)
AUXILIARY PANEL - 3 CIRCUIT YAES-SA MODELS ONLY

Standard Single Point Power Supply
One supply to master fused disconnect switch(QSDF) in power section, control supply to non-fused disconnect switch (QCSD/ESD) derived internally.

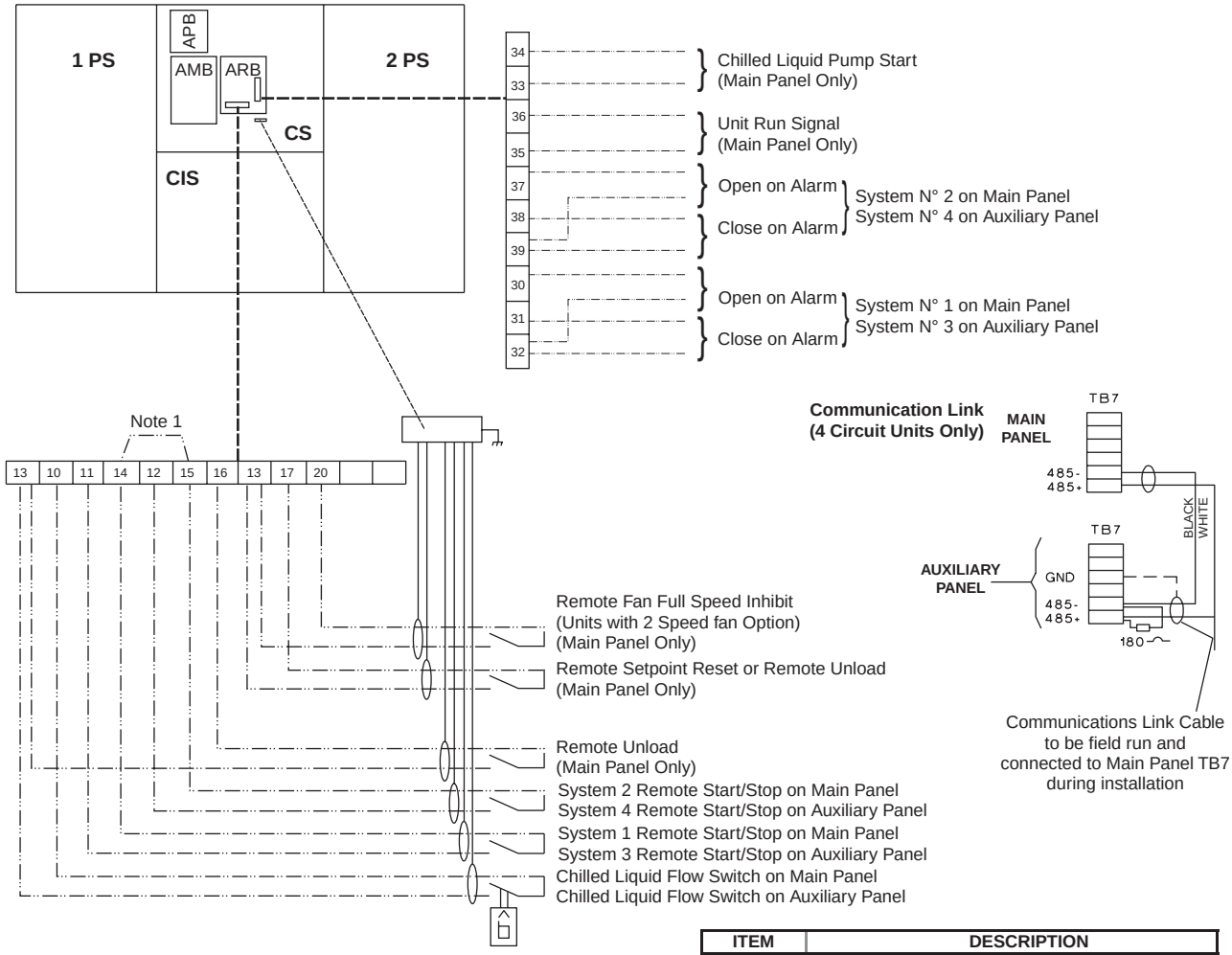


Single Point Power Supply (Option)
One supply to master circuit breaker (QCB) in power section, control supply to non-fused disconnect switch (QCSD/ESD) derived internally.



CUSTOMER CONNECTION DIAGRAM (All Models)

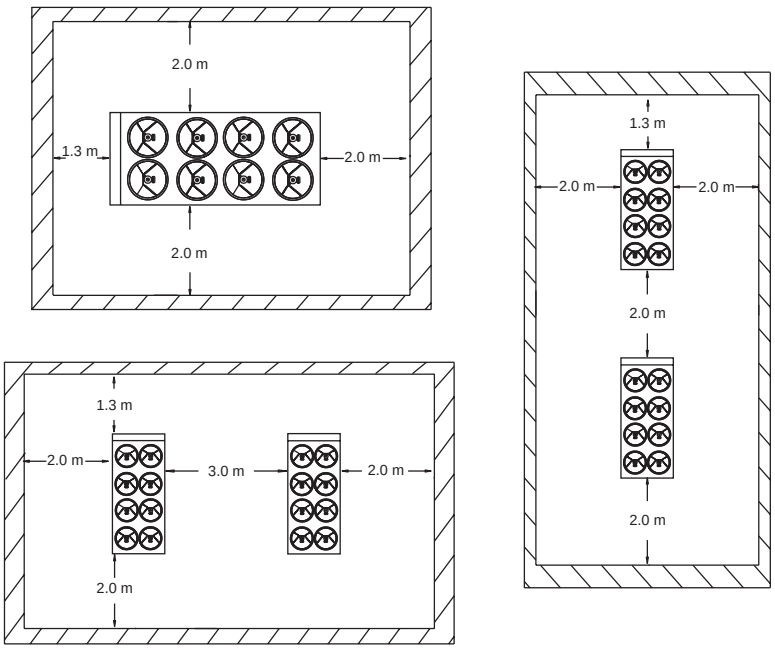
Note: The Auxiliary Panel is fitted to Models YAES-SA1075, YAES-SA1245, YAES-SA1405 and all YAES-DSA only.



Note 1: Fit link between terminals 14 and 15 and connect a voltage free contact to terminals 11 and 14 for Remote Unit Start/Stop.

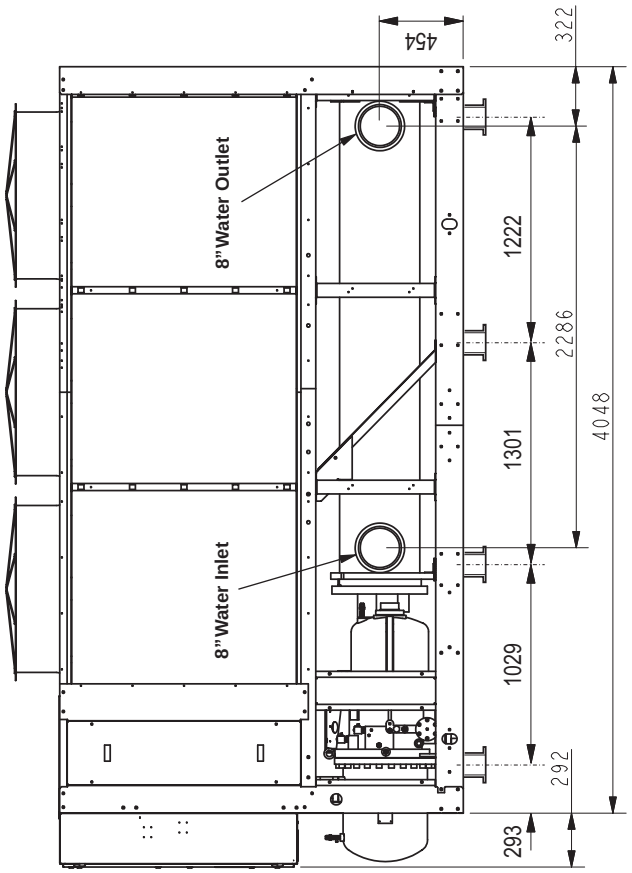
ITEM	DESCRIPTION
AIOB	INPUT/OUTPUT EXPANSION BOARD
AMB	MICROPROCESSOR BOARD
APB	POWER SUPPLY BOARD
ARB	RELAY BOARD
CS	CONTROL SECTION
CIS	COMMON INPUT SECTION
PS	POWER SECTION

CLEARANCES (All Models)

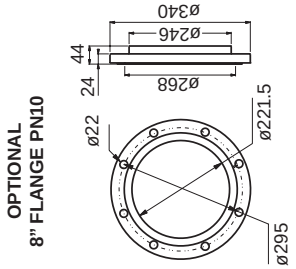


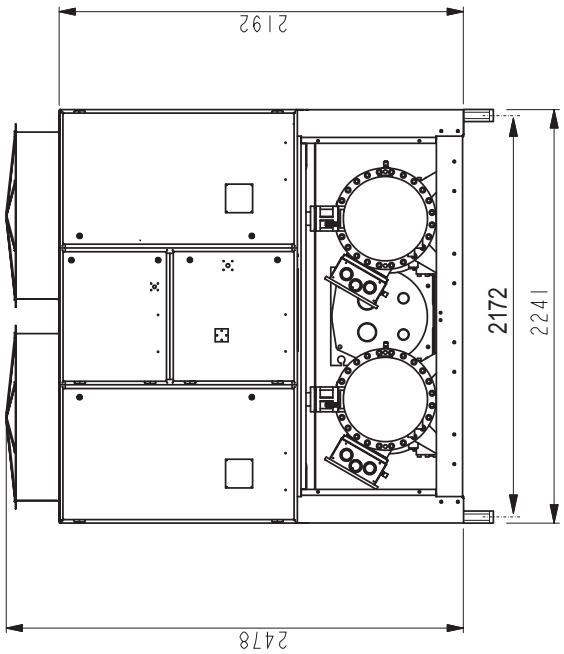
DIMENSIONS

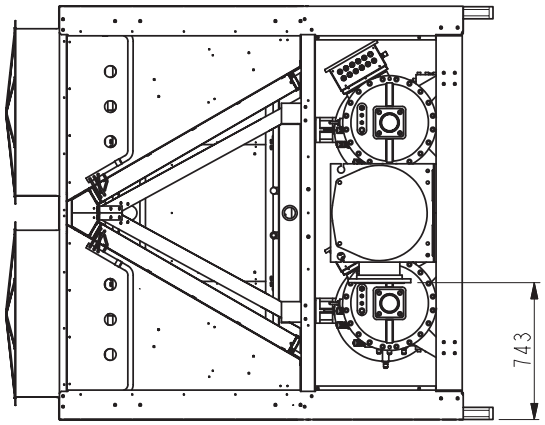
Models YAES0405SA and YAES0475SA



Note: The dimensions shown are for Standard Evaporators. Dimensions for Handed Evaporators are identical

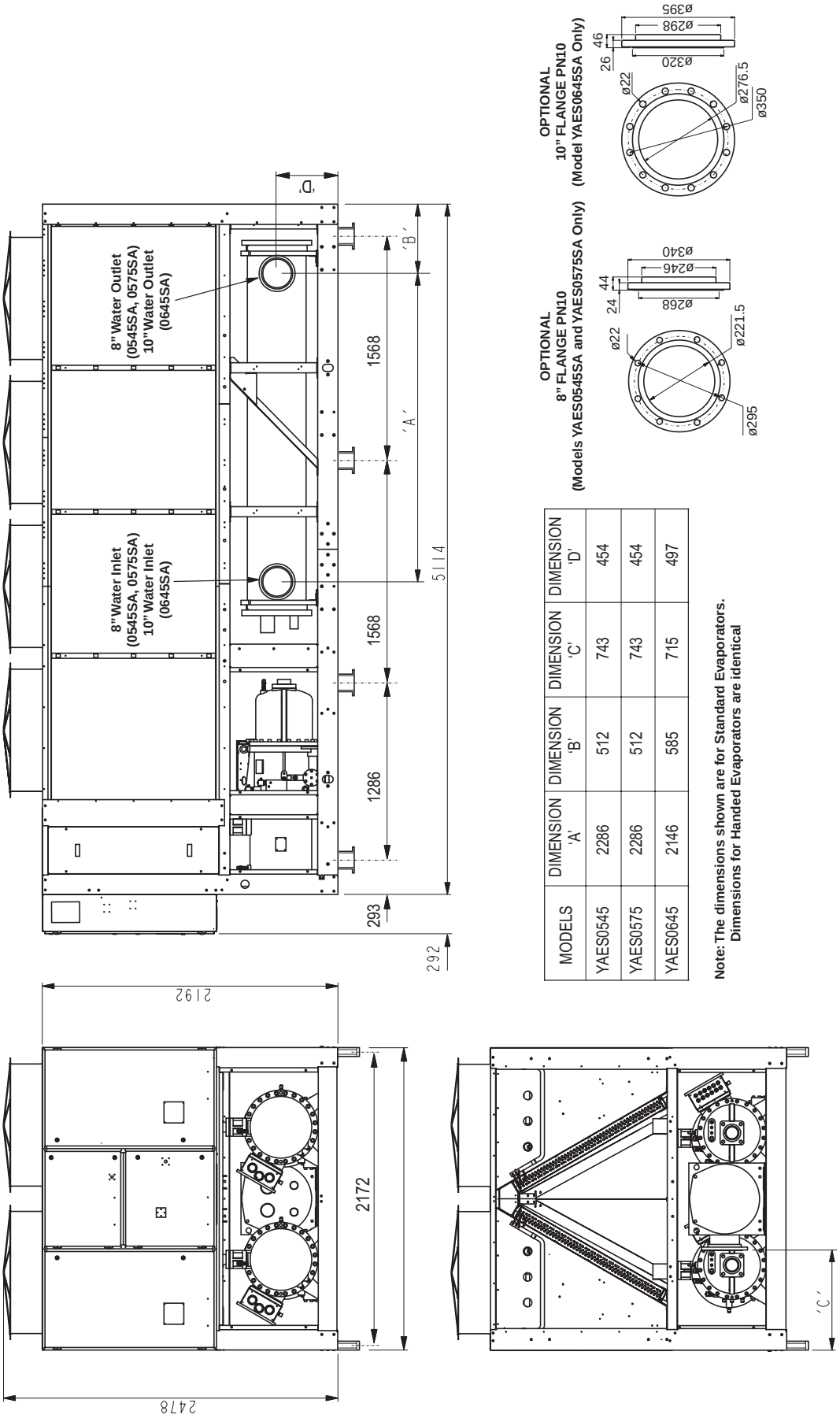






DIMENSIONS (continued)

Models , YAES0545SA, YAES0575SA and YAES0645SA

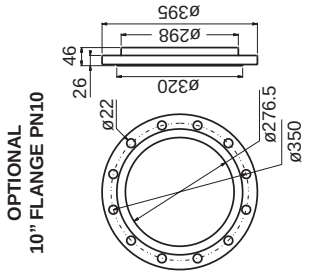


MODELS	DIMENSION 'A'	DIMENSION 'B'	DIMENSION 'C'	DIMENSION 'D'
YAES0545	2286	512	743	454
YAES0575	2286	512	743	454
YAES0645	2146	585	715	497

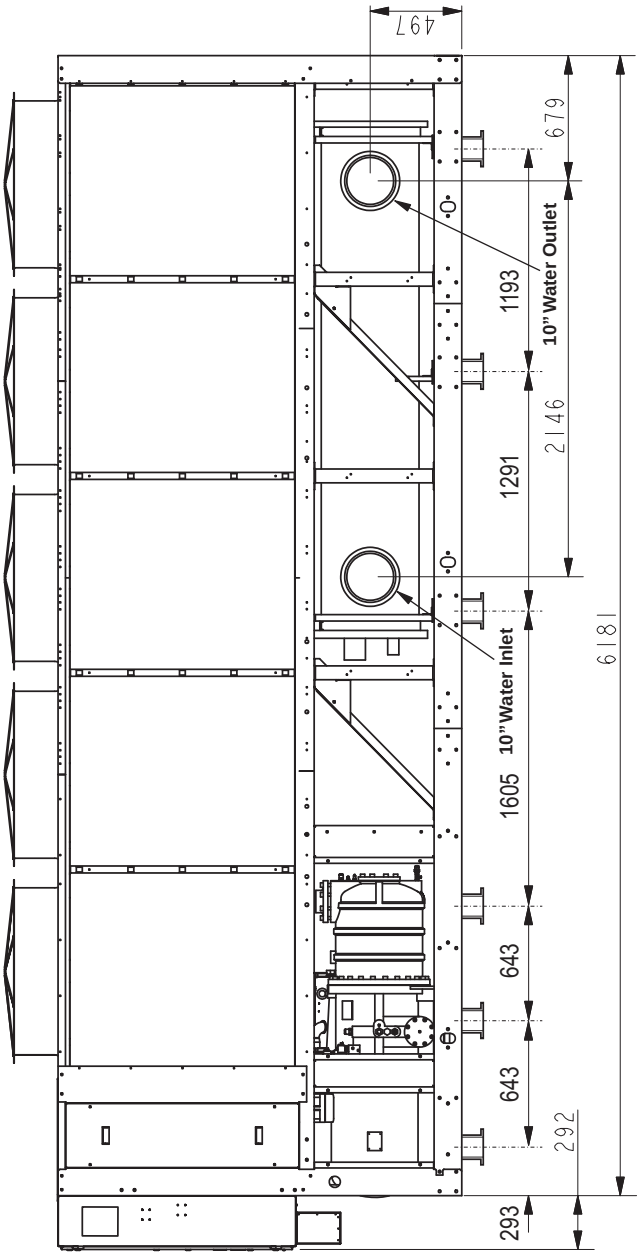
Note: The dimensions shown are for Standard Evaporators.
Dimensions for Handed Evaporators are identical

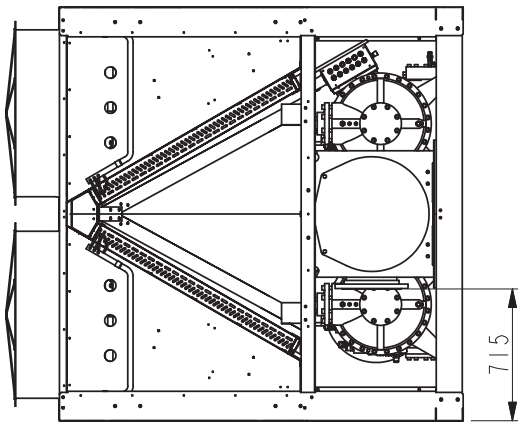
DIMENSIONS (continued)

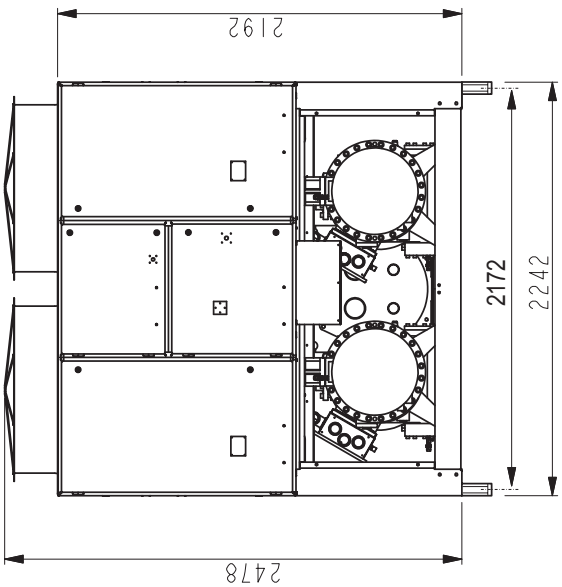
Models YAES0685SA, YAES0715SA and YAES0785SA



Note: The dimensions shown are for Standard Evaporators. Dimensions for Handed Evaporators are identical

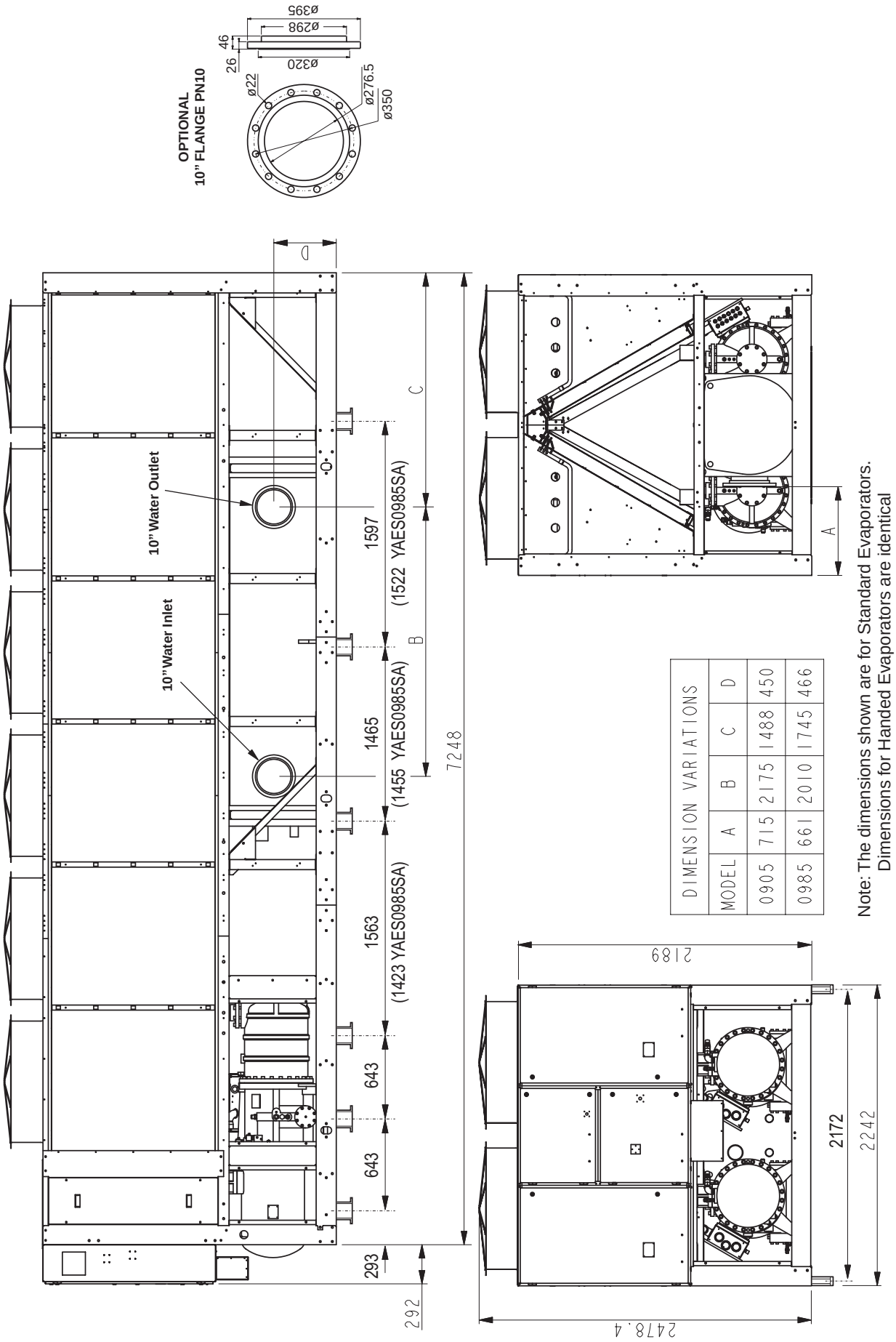






DIMENSIONS (continued)

Models YAES0905SA and YAES0985SA

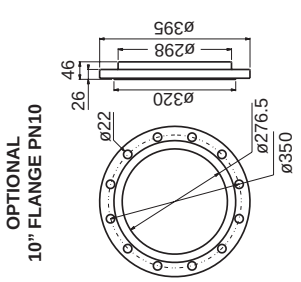


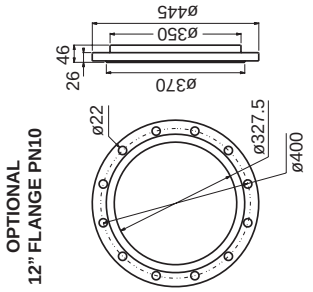
DIMENSION VARIATIONS				
MODEL	A	B	C	D
0905	715	2175	1488	450
0985	661	2010	1745	466

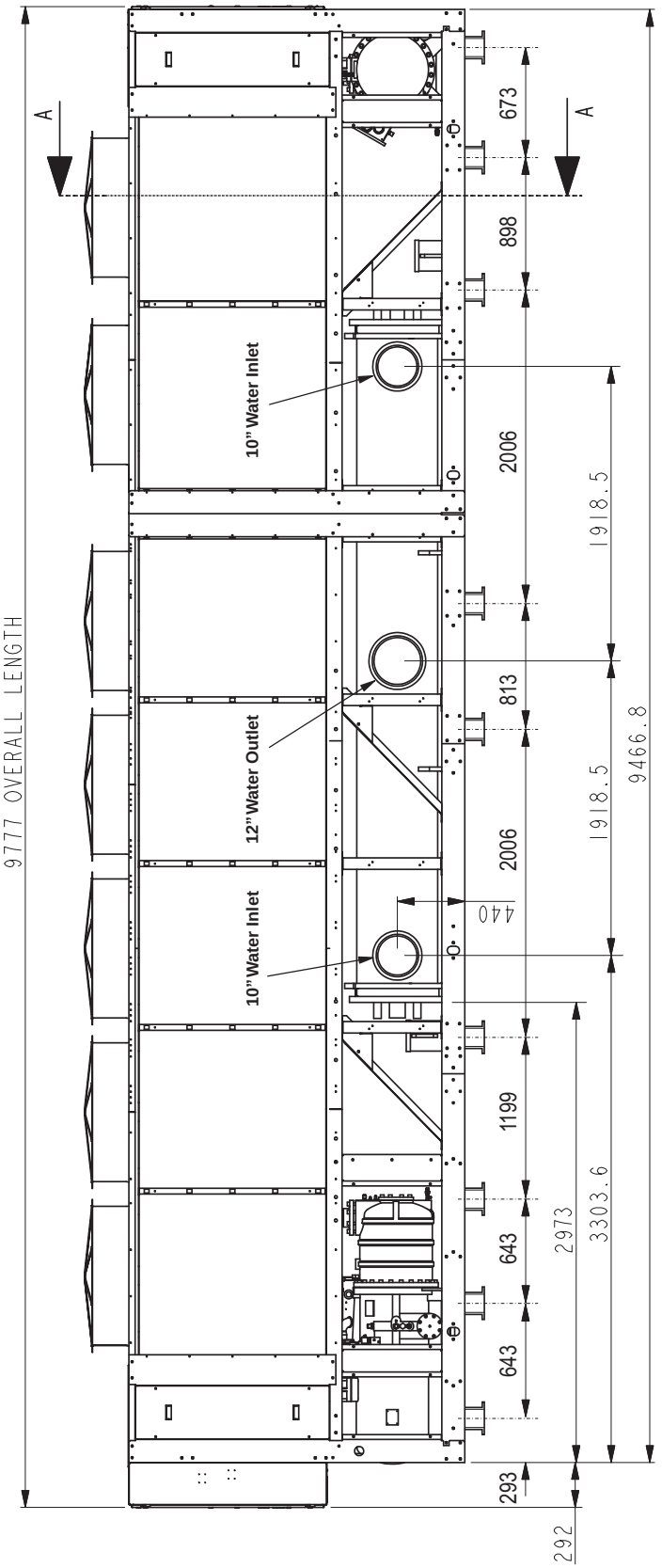
Note: The dimensions shown are for Standard Evaporators.
Dimensions for Handed Evaporators are identical

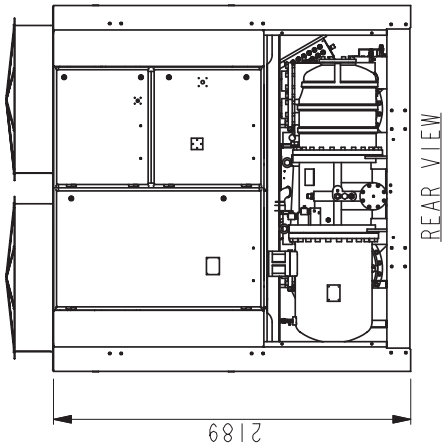
DIMENSIONS (continued)

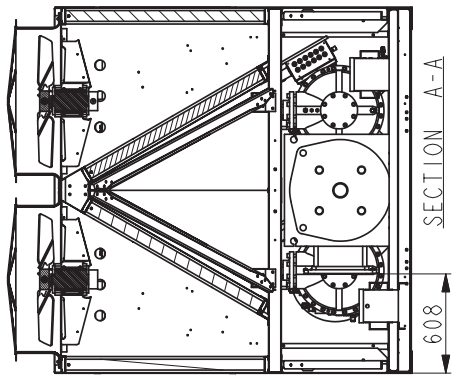
Model YAES1075SA

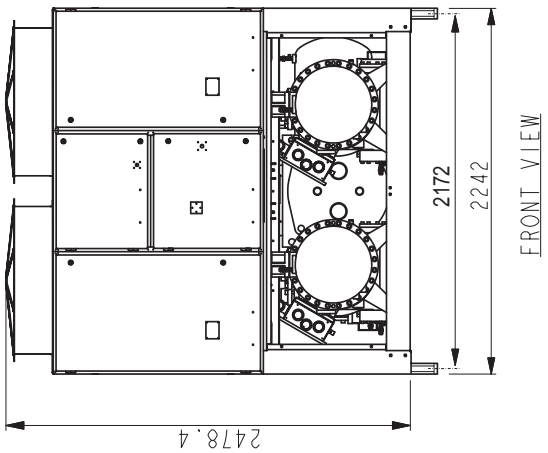








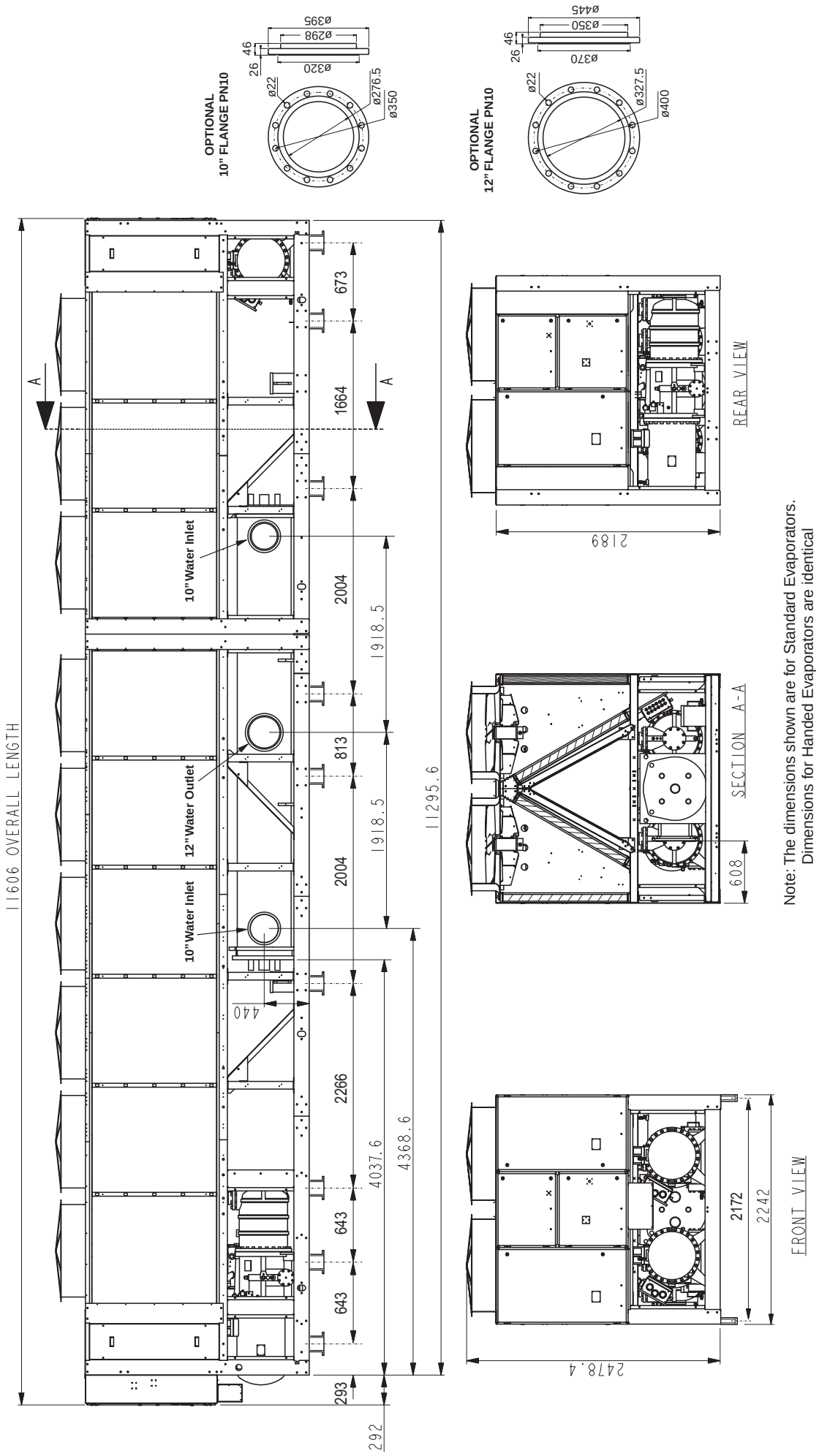




Note: The dimensions shown are for Standard Evaporators.
Dimensions for Handed Evaporators are identical

DIMENSIONS (continued)

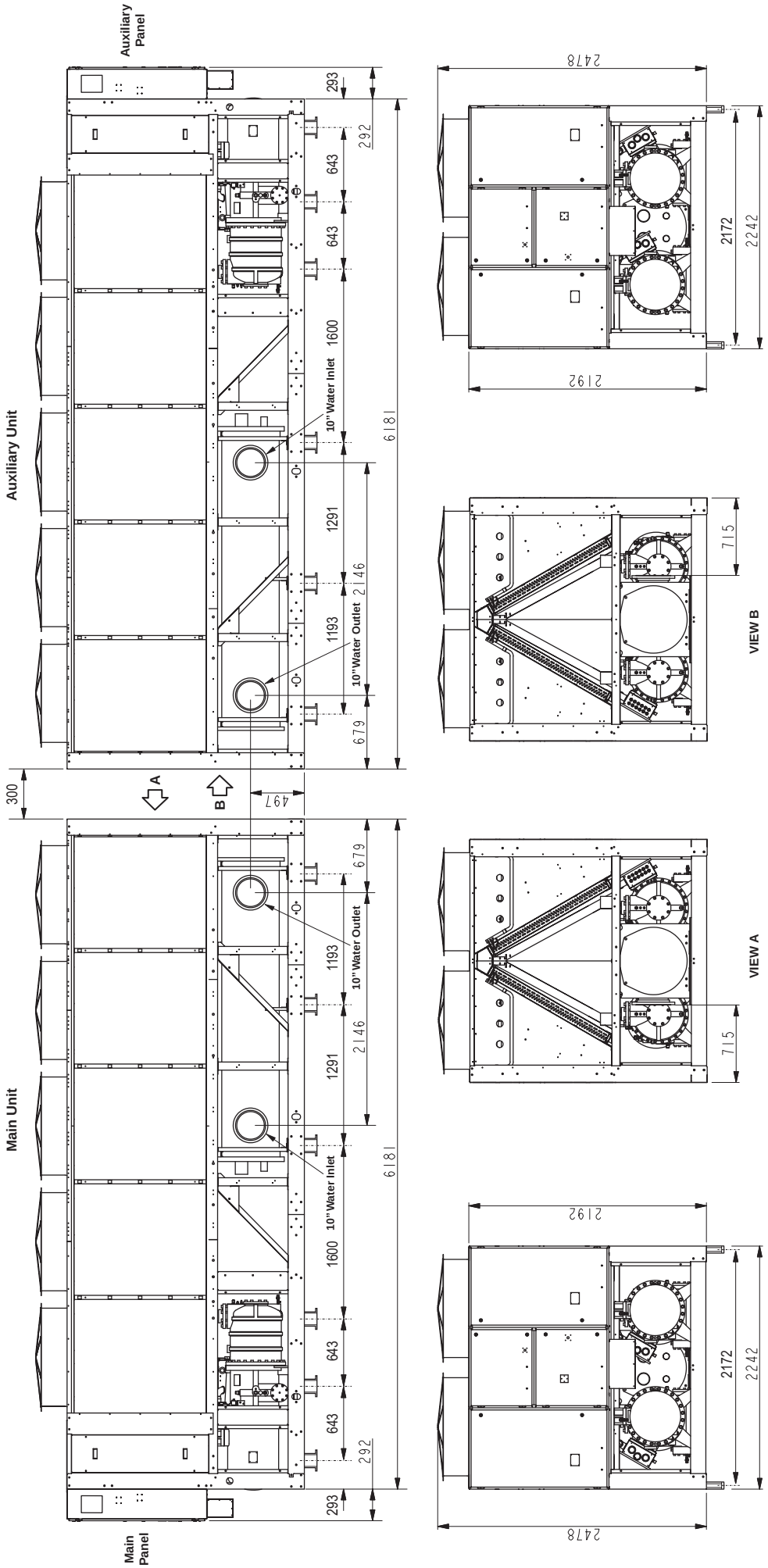
Models YAES1245SA and YAES1405SA



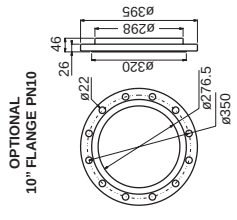
Note: The dimensions shown are for Standard Evaporators.
Dimensions for Handed Evaporators are identical

DIMENSIONS (continued)

Models YAES1505DSA,YAES1575DSA and YAES1645DSA

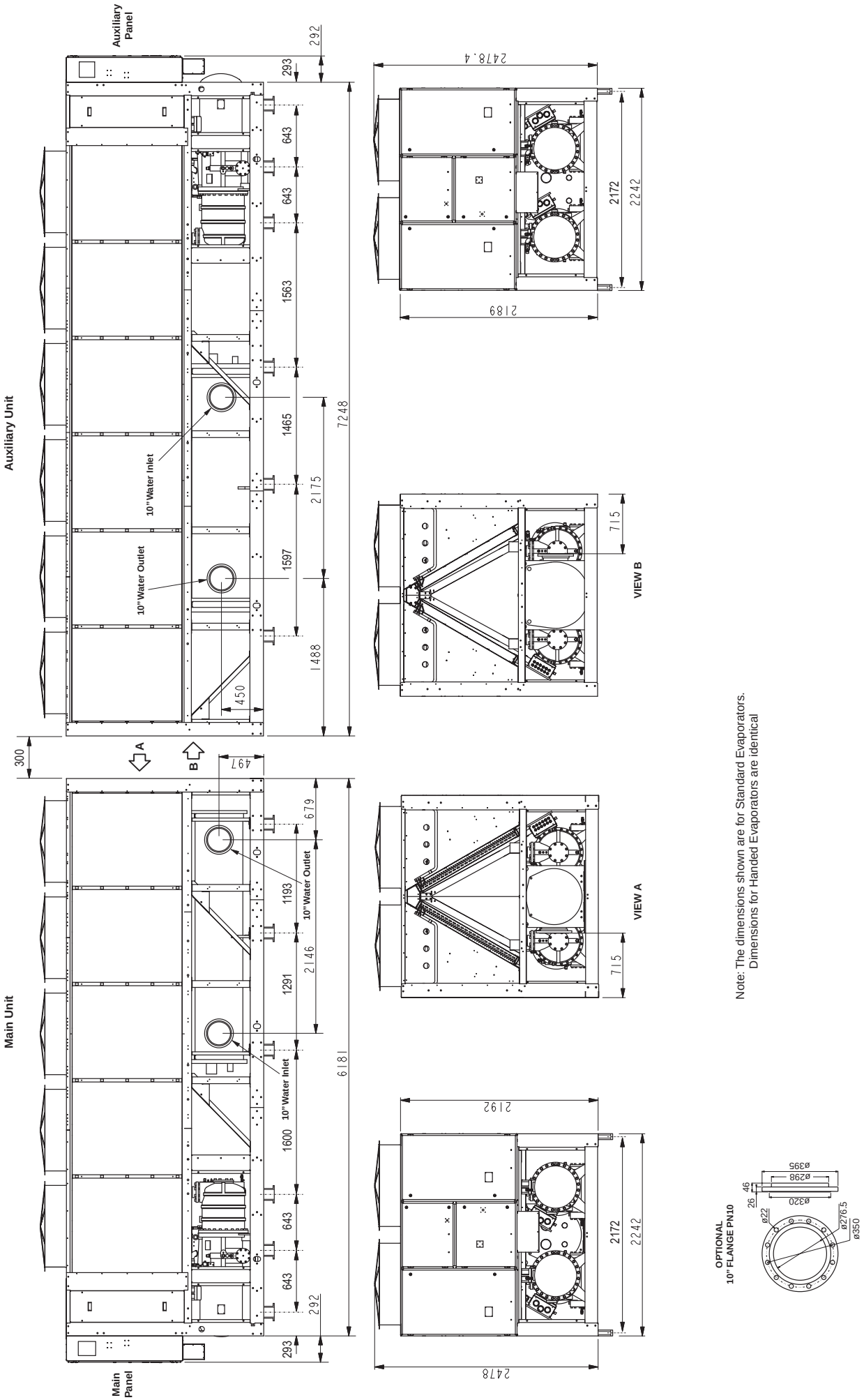


Note: The dimensions shown are for Standard Evaporators.
Dimensions for Handed Evaporators are identical



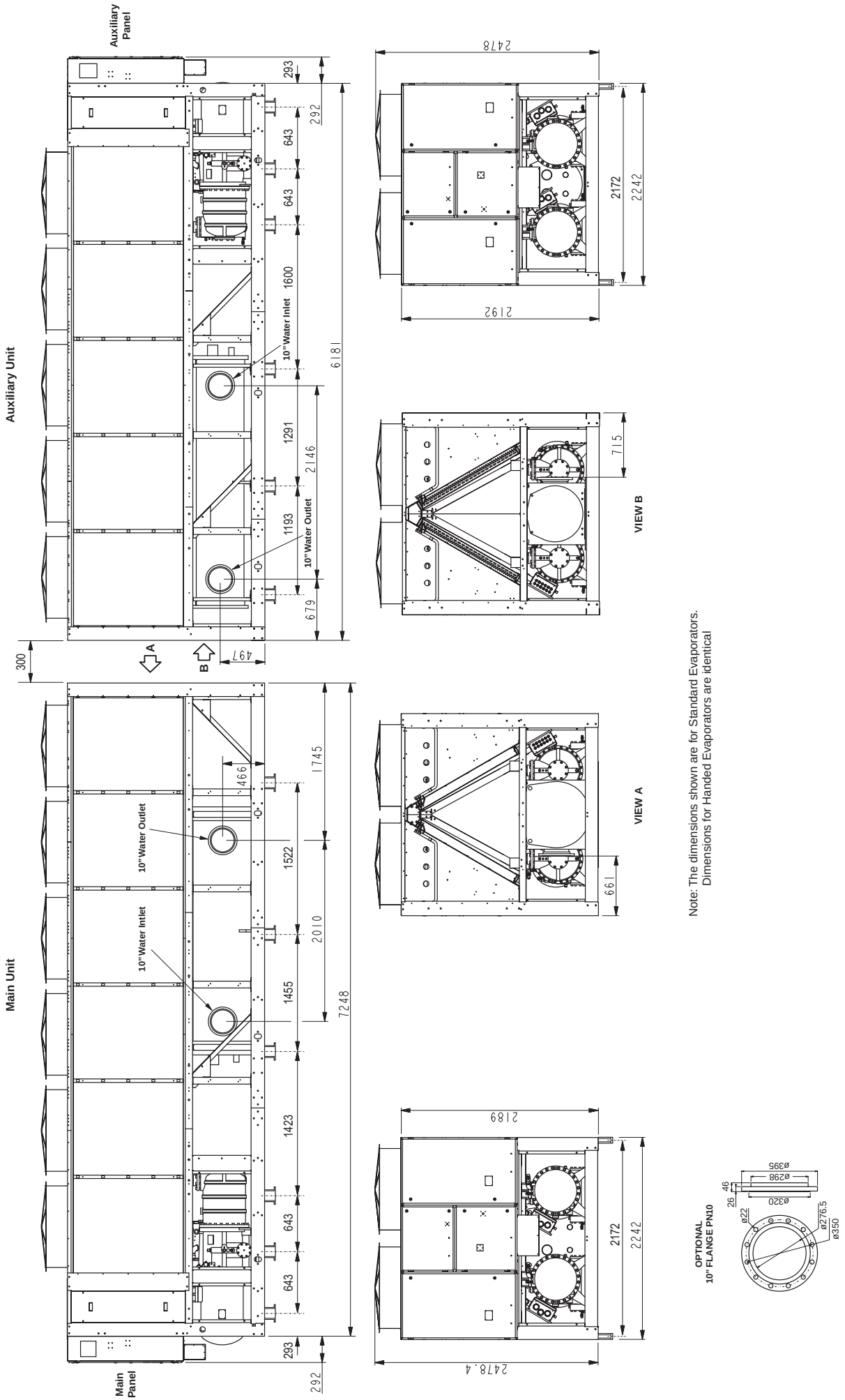
DIMENSIONS (continued)

Model YAES1715DSA



DIMENSIONS (continued)

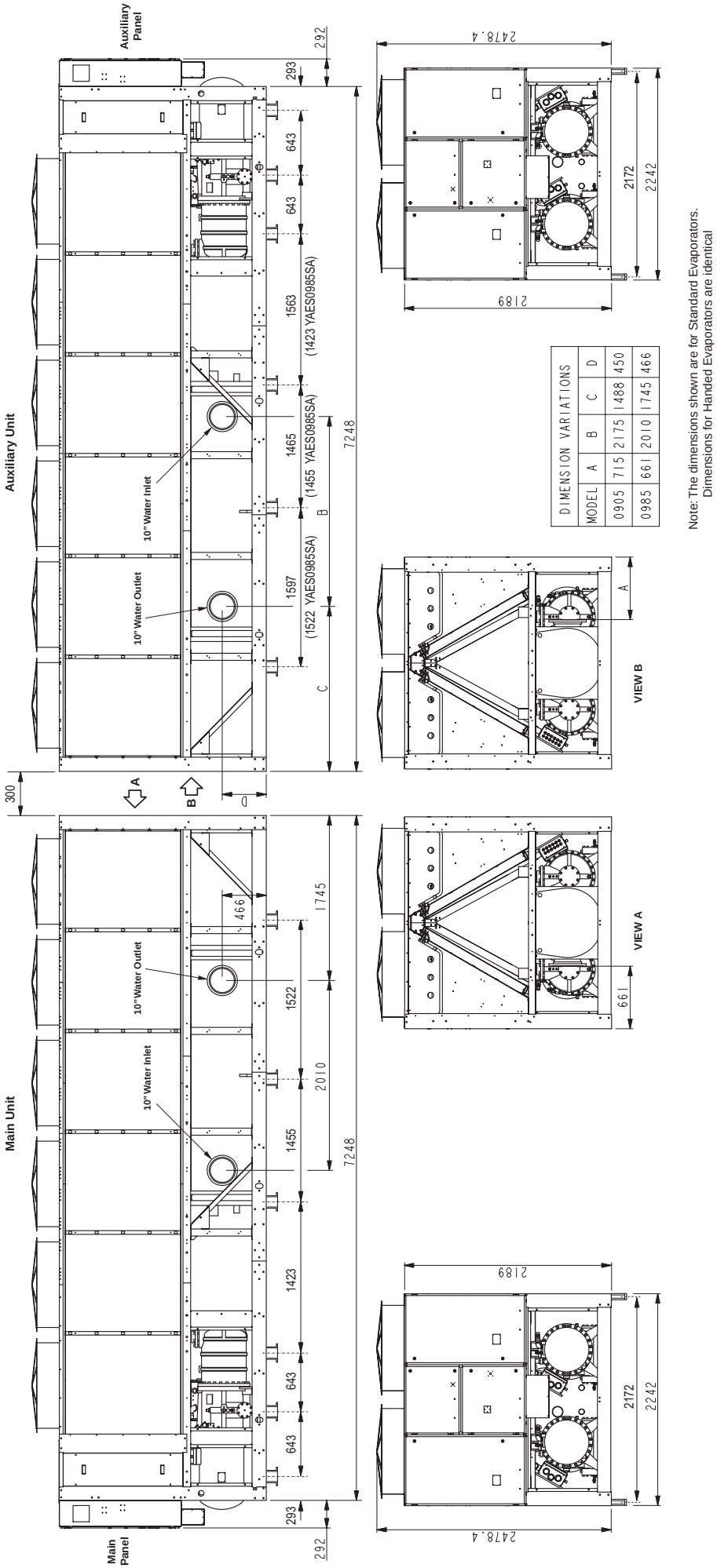
Model YAES1785DSA



Note: The dimensions shown are for Standard Evaporators.
Dimensions for Handed Evaporators are identical

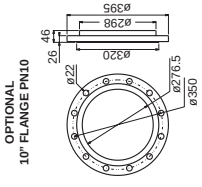
DIMENSIONS (continued)

Models YAES1855DSA and YAES1925DSA



DIMENSION VARIATIONS				
MODEL	A	B	C	D
0905	715	2175	1488	450
0985	661	2010	1745	466

Note: The dimensions shown are for Standard Evaporators.
Dimensions for Handed Evaporators are identical



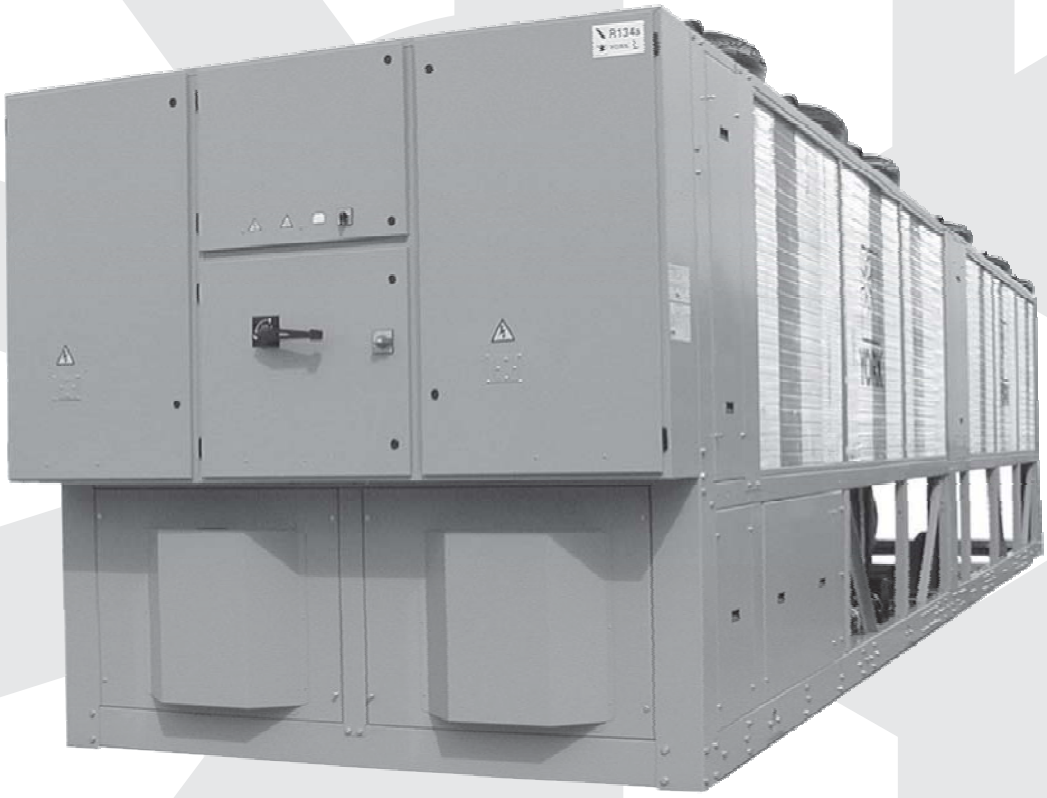
YAES-SA/DSA

QPak-sa QPak-sa Sonata

& QPak-dsa QPak-dsa Sonata

AIR COOLED LIQUID CHILLER

INSTALLATION, COMMISSIONING, OPERATION AND MAINTENANCE



STYLE: **B**

REFRIGERANT TYPE: **R134a**

STANDARD and HIGH EFFICIENCY MODELS

UNITS WITH THERMOSTATIC EXPANSION VALVES

EUROVENT CERTIFIED PERFORMANCE

YORK® INTERNATIONAL

035L02672-100 Rev. 2

(08/05) GB

TABLE OF CONTENTS

1 SUPPLIER INFORMATION

1.1 Introduction

YORK YAES 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 and the Microprocessor Based Control System Operating Instructions contain all the information required for correct installation and commissioning of the unit, together with operating and maintenance instructions. The manuals should be read thoroughly before attempting to operate or service the unit.

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

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

1.2 Warranty

YORK International 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 YORK International.

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

YAES 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 (89/392/EEC)

Low Voltage Directive (73/23/EEC, EN 60204)

EMC Directive (89/336/EEC)

Refrigeration equipment built at YORK Basildon confirms to the applicable and essential safety requirements of Pressure Equipment Directive 97/23/EC and bear CE marking.

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 YORK which reserves all rights. They may not be reproduced, in whole or in part, without prior written authorisation from an Authorised YORK 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.

Rotating Parts

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

Sharp Edges

The finning on the air cooled condenser coils has sharp metal edges. Reasonable care should be taken when working in contact with the coils to avoid the risk of minor abrasions and lacerations. The use of gloves is recommended.

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 electrical options panel is fitted with an emergency stop device (-QCSD/ESD), this can be identified as red in colour and sited on a yellow back plate. When operated, it removes the electrical supply from the control system. The device can be looked in the Off position.

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

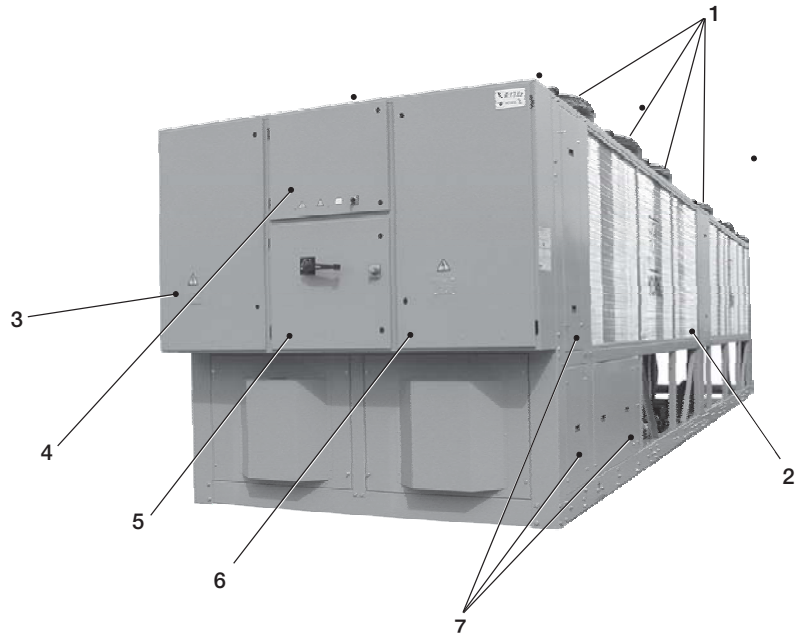
1.9 Material Safety Data

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

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

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

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



1 Fans
2 Condenser
3 Power Section - System 1
4 Control Section
5 Common Input Section
6 Power Section - System 2
7 Aesthetic Panels (option)

2 PRODUCT DESCRIPTION

2.1 Introduction

The YAES-SA (QPak-sa) range are single packaged air cooled chillers. The larger cooling capacity YAES-DSA (QPak-dsa) are manufactured in two sections, with integrated controls, to facilitate transport and lifting. There are two product families, standard and high efficiency, an optional low sound version is available for both the standard and high efficiency models. All units are designed to be located outside on the roof of a building or at ground level.

The unit consists of two screw compressors, one in each of two separate refrigerant circuits, a single shell and tube DX evaporator, air cooled condensers and thermostatic expansion valves.

The units are completely assembled with all interconnecting refrigerant piping and internal wiring, ready for field installation.

Before delivery, the unit is pressure tested, evacuated, and fully charged with refrigerant and oil in each of the independent refrigerant circuits. After assembly, an operational test is performed with water flowing through the evaporator to ensure that each refrigerant circuit operates correctly.

The unit structure is manufactured from heavy gauge, galvanised steel and coated with “Desert Sand” (RAL 1019) baked-on enamel powder paint.

2.2 Compressor

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

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

Two screw rotors, with asymmetric profiles, manufactured from forged steel.

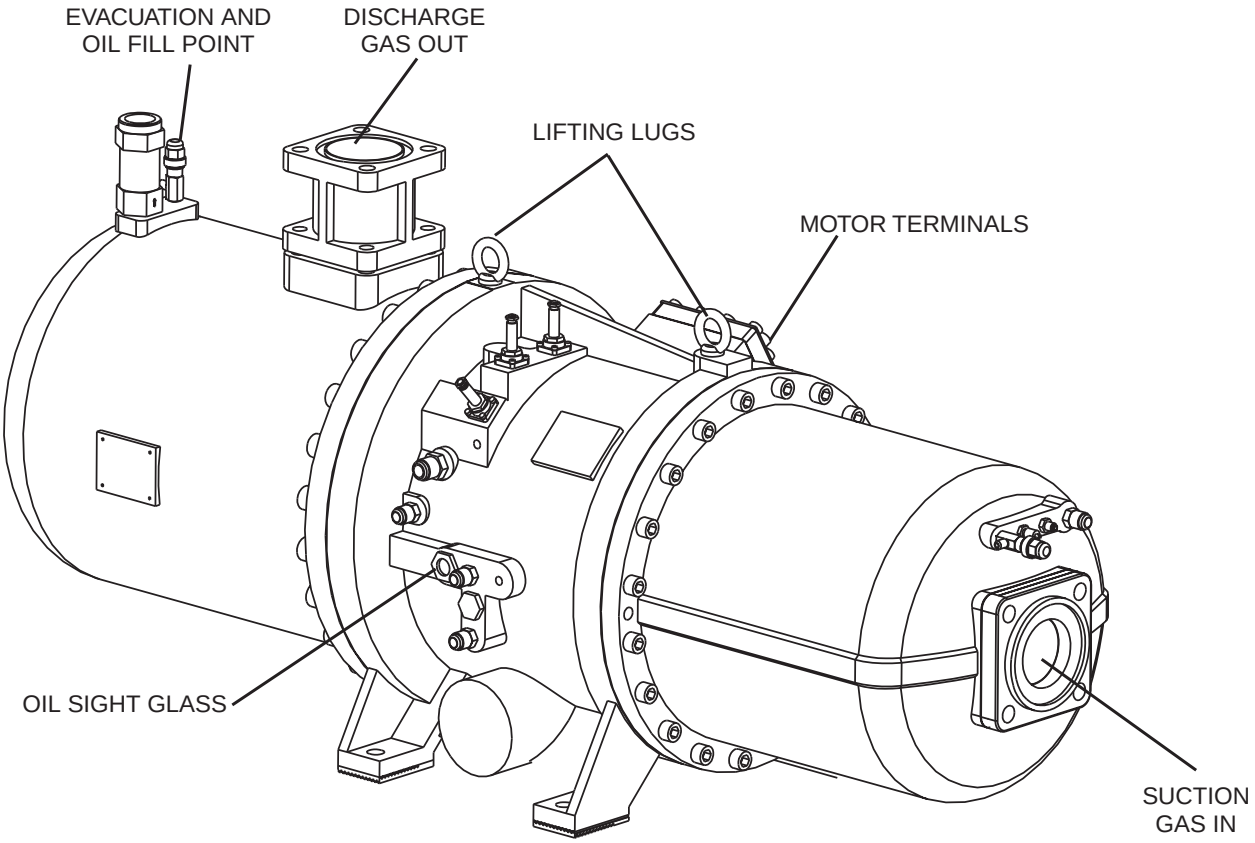
A cast iron compressor housing precision machined to provide optimal clearance for the rotors.

An integral discharge check valve to prevent rotor backspin during shutdown.

Discharge shut-off service valves.

A reliable suction gas cooled high efficiency, accessible hermetic motor with overload protection using both thermistor and over current protection.

A suction gas screen and serviceable, 17 micron full flow oil filter within the compressor housing.



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

The rotors are housed in a cast iron compressor housing precision machined to provide optimal clearances for the rotors. Contact between the male and female rotor is primarily rolling on a contact band on each of the rotor's pitch circle. This results in virtually no rotor wear and increased reliability.

The compressor incorporates a complete anti-friction bearing design for reduced power input and increased reliability. Separated, cylindrical, roller bearings handle radial loads. Angular-contact ball bearings handle axial loads. Together they maintain accurate rotor positioning at all pressure ratios, thereby minimising leakage and maintaining efficiency. A spring loaded check valve is installed on the compressor discharge housing to prevent compressor rotor backspin due to system refrigerant pressure gradients during shutdown.

Motor cooling is provided by suction gas from the evaporator flowing across the motor.

The compressor is lubricated by removing oil from the discharged refrigerant gas within the integral oil separator. The pressurised oil is then cooled in the condenser coils and piped back to the compressor for lubrication. The compressor design working pressure is 28kg/cm².

A 300 watt (230 V 1 Ø 50 Hz) immersion heater is located in the compressor. The heater is temperature activated to prevent refrigerant condensation.

Motor Starting

Two types of compressor motor starting are available: star/delta open transition starter and optional star/delta closed transition starter.

The standard star/delta starter utilises 3 motor contactors and a transition delay relay. The optional closed Star/Delta starter utilises 4 motor contactors, a set of transition resistors and a transition delay relay. The star/delta start allows inrush current to be limited to approximately 33% LRA with the closed transition option reducing the transient star to delta current.

When the microprocessor initiates a start signal to run a compressor, it runs in Star for 4 seconds and then transitions to Delta.

Capacity Control

The compressors will start at the minimum load position and provide a capacity control range from approximately 30% to 100% per compressor via a valve. The microprocessor controlled output pressure regulating capacity control valve will command compressor capacity independent of control valve input pressure and balance the compressor capacity with the cooling load.

The automatic spring return of the capacity control valve to the minimum load position will ensure compressor starting at minimum motor load.

2.3 Oil Cooler

Oil cooling is provided by a dedicated air-cooled finned tube type heat exchanger located in the condenser section of the unit. Oil leaving the compressor integral oil separator passes through this oil cooler section where it is cooled before returning back to the compressor.

2.4 Refrigerant Circuits

Each refrigerant 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 manual shut-off valve with charging port, a high absorption removable core filter-drier, a sight glass with moisture indicator, and a thermostatic expansion valve.

Suction lines are covered with closed-cell insulation.

2.5 Condenser

The condenser coils are manufactured from seamless, internally enhanced, high condensing coefficient, corrosion resistant copper tubes arranged in staggered rows and mechanically expanded into corrosion resistant aluminium alloy fins with full height fin collars. They have a design working pressure of 31 bar (450 PSIG).

Standard units have condensers fitted with single speed fans. As an option low sound two speed fans can be fitted. All fans are dynamically and statically balanced, direct drive with corrosion resistant glass fibre reinforced composite blades moulded into low noise, full aerofoil cross section, providing vertical air discharge from extended orifices for efficiency and low sound. Each fan is located in a separate compartment to prevent cross flow during fan cycling. Guards of heavy gauge, PVC coated galvanised steel are provided.

The fan motors are high efficiency, direct drive, 8 pole, 3 phase, Class- “F”, current overload protected, totally enclosed (TEAC) type with double sealed, permanently lubricated, ball bearings.

2.6 Cooler

The unit uses a Shell and Tube type Direct Expansion Evaporator. Each of the refrigerant circuits consists of 2 passes with the chilled liquid circulating back and forth across the tubes from one end to the other.

The design working pressure of the cooler on the shell side is 10.0 bar, and 16.2 bar for the tube (refrigerant side). The water baffles are fabricated from galvanised steel to resist corrosion. Removable heads are provided for access to internally enhanced, seamless, copper tubes. Water vent and drain connections are included.

The cooler is equipped with a thermostatically controlled heater for protection to -29°C ambient and are insulated with 19 mm flexible closed-cell foam.

The water nozzles have victaulic grooves as standard and are available with optional PN16 flanges per ISO 7005 part 1a. Companion weld flanges to match evaporator flanges are supplied loose for field installation by contractor. All necessary nuts, bolts and gaskets are included.

2.7 Power and Control Panels

All controls and motor starting equipment are factory wired and function tested. The panel enclosures are designed to IP55 and are manufactured from powder painted galvanised steel. Component mounting panels are of non-painted galvanised steel to ensure optimum protective circuit (earthing).

2 circuit models have a single power and control panel (Main - Circuits 1 and 2). 3 and 4 circuit models have two power and control panels (Main - Circuits 1 and 2) and (Auxiliary - Circuits 3 and 4).

The Power and Control Panel shall be divided into a power section for each electrical system, a control section and a common input section. All sections shall have a separate hinged, latched, and gasket sealed door equipped with wind struts for safer servicing.

Each power section contains:

Compressor fuses, compressor and fan contactors, fan manual motor starters to give overload and short circuit protection phase rotation relay, compressor motor current transformer and a control circuit fuse.

The control section contains:

On/Off switch, microcomputer keypad and display, microprocessor board (AMB), relay boards (ARB) and power supply board (APB).

Standard Single Point Power Supply Connection - Main Panel All Models
The common input section contains:

Models YAES0405SA to YAES0715SA
An incoming fused disconnect switch for connection of the customer provided power supply. Internally factory wiring to compressor contactors of each circuit. The control supply is derived internally from the incoming power supply.

Models YAES0785SA to YAES1925DSA
An incoming non-fused disconnect switch for connection of the customer provided power supply. Internally factory wiring to fuses for each circuit. The control supply is derived internally from the incoming power supply.

Standard Single Point Power Supply Connection - Auxiliary Panel 3 Circuit Models
The power section contains:

The customer provided power supply is connected to a fused disconnect switch. The control supply is derived internally from the incoming power supply.

Standard Single Point Power Supply Connection - Auxiliary Panel YAES-DSA Models
The common input section contains:

An incoming non-fused disconnect switch for connection of the customer provided power supply. Internally factory wiring to fuses for each circuit. The control supply is derived internally from the incoming power supply.

The common input section also contains the control circuit switch disconnect/emergency stop device, a transformer (to provide the necessary 24Vac supply for the power supply board), control fuses, residual current circuit breaker, and terminals for a remote emergency stop device.

2.8 Microprocessor Controls

The microprocessor has the following functions and displays:

A liquid crystal 40 character display with text provided on two lines and light emitting diode backlighting for outdoor viewing.

A colour coded, 35 button, sealed keypad with sections for Display, Entry, Setpoints, Clock, Print, Program and the unit Auto/Off switch.

The standard controls include: glycol chilling or thermal storage, automatic pump down, run signal contacts, demand load limit from external building automation system input, remote reset liquid temperature reset input, unit alarm contacts, chilled liquid pump control, automatic or manual reset after power failure, automatic system optimisation to match operating conditions.

The software is stored in non-volatile memory (EPROM) to eliminate unit failure due to AC power failure. The Programmed Setpoint is stored in a lithium battery backed memory.

2.9 Motor Current Protection

The microprocessor motor protection provides high current protection to assure that the motor is not damaged due to voltage, excess refrigerant, or other problems that could cause excessive motor current.

If the motor current exceeds the 115% FLA trip point after 9 seconds of operation, or is above 105% for 30 seconds, the microprocessor will shut the system down and lock it out after three faults occur in 90 minutes. A manual reset of the respective system switch is required to clear the fault and restart the system after a lockout. A thorough check of the motor, wiring, and refrigerant system should be carried out before restarting a system that has faulted on high motor current.

The microprocessor also provides low motor current protection when it senses a motor current less than 15% FLA. Low motor current protection is activated 9 seconds after start. The microprocessor will shut the system down whenever low motor current is sensed and will lock out a system if three faults occur in 90 minutes. Once a system is locked out on Low Motor Current, it must be manually reset with the system switch.

The microprocessor also senses low motor current whenever a High Pressure Cut-out (HPCO) or Motor Protector (MP) or Phase Rotation Relay (KPR) contact opens. The MP, HPCO and KPR contacts are connected in series with the motor contactor. Whenever any of these devices are open, the contactor de-energises and the motor shuts down. Since the microprocessor is sending a run signal to the contactor, it senses the low motor current below 15% FLA and shuts the system down.

Motor Protector Module

The motor protector module provides thermal overload protection.

Three thermistors in the motor windings of each phase provide thermal protection. If the motor temperature rise above 110°C the motor protector module contact will open. The contact will reclose at 75°C.

Phase Rotation relay (KPR)

Each power section is fitted with a phase rotating relay to monitors the 3 phase voltage. Provided the phase rotation is correct the relay will close its contact in the compressor contactor circuit.

Temperature Offset

Pulse width modulating (PWM) input is provided to remotely adjust the leaving chilled water temperature setpoint to a higher value.

2.10 Accessories and Options

Power Options:

Single Point - System Fused Disconnect Switches
Main Panel - All Models, Auxiliary Panel - 4 Circuit Models.
A non-fused disconnect switch in the common input section of the panel for connection of the customer provided single power supply. Internally factory wiring to a door interlocked fused disconnect switch, for each circuit. The control supply is derived internally.

Single Point - System Circuit Breakers
Main Panel - All Models, Auxiliary Panel - 4 Circuit Models.
A non-fused disconnect switch in the common input section of the panel for connection of the customer provided single power supply. Internally factory wiring to a door interlocked circuit breaker, for each circuit. The control supply is derived internally.

Multi-Point - System Fused Disconnect Switches
Main Panel - All Models, Auxiliary Panel - 4 Circuit Models.
Two terminal blocks in the common input section of the panel for connection of the customer provided power supplies. Internally factory wiring to a door interlocked fused disconnect switch, for each circuit. A non-fused disconnect switch / emergency stop device (QCSD/ESD) in the common input section with termination for the customer (400 V, 2 Ø, 50 Hz) control supply.

Multi-Point - System Circuit Breakers
Main Panel - All Models, Auxiliary Panel - 4 Circuit Models.
Two terminal blocks in the common input section of the panel for connection of the customer provided power supplies. Internally factory wiring to a door interlocked circuit breaker, for each circuit. A non-fused disconnect switch / emergency stop device (QCSD/ESD) in the common input section with termination for the customer (400 V, 2 Ø, 50 Hz) control supply.

Single Point - System Circuit Breaker
Auxiliary Panel - 3 Circuit Models.
One supply to master fused disconnect switch (QCB) master circuit breaker in power section, control supply to non-fused disconnect switch (QCSD/ESD) derived internally.

Power Factor Correction

Factory mounted passive (static) correction capacitors to correct unit compressor power factors.

Control Options:

BAS/EMS Interface
Provides a means to reset the leaving chilled liquid temperature from the building automation system (BAS) / energy management system (EMS), factory mounted:

Printed circuit board to accept 4 to 20 mA or 0 to 10 Vdc voltage free contact closure input from the BAS/EMS.

A YORK ISN Building Automation System can provide a reset signal direct to the standard control panel via the standard on-board RS485 port.

Micro Gateway
Interface to enable communications with building control systems using BACnet or MODBUS protocols. See separate YORK documentation.

Control Panel Display Language
English (standard), German, Spanish, French, Portuguese or Italian panels and EPROMs available.

Refrigerant Circuit Options:

Desuperheaters
Factory fitted desuperheaters on compressor discharge lines to provide hot water during cooling operation.

38mm Insulation
Double thickness insulation provided for enhanced efficiency and low temperature applications.

Handed Evaporator Liquid Connections
Evaporator connections on standard units are on the right-hand side (when viewed from the control panel). The connections are available on left-hand side as an option, to assist in pipework design etc.

Flow Switch Accessory
Vapour-proof SPDT, NEMA 4X switch, 10.3 bar DWP, -29°C to 121°C, with 1" NPT (IPS) connection for upright mounting in horizontal pipe. A flow switch must be field installed with each unit.

Additional PED safety devices:
Relief valves with bursting disks and 3 way change - over valve.

Printer

Hand held printer for obtaining printout of unit operating data and history data.

Condenser/Exterior Options:

Un-coated Aluminium Fin Stock
Standard condenser coils are constructed using un-coated aluminium fin stock.

Gold Coloured Epoxy Coated Fin Condenser Coils
Available as an option.

Copper Fin Condenser Coils
Condenser coils are constructed with corrosion resistant copper fins and provide added protection.

Condenser Wired Guards
Heavy gauge welded wire mesh guards mounted over the exterior condenser coil faces and around the bottom of the unit (factory mounted).

Unit Aesthetic Panels
Infill panels manufactured from powder painted galvanised steel for below the power and control panel and the sides of the unit near the power and control panel.

High Ambient/Sun Shield Kit
Kit to provide shade / air gap around the power and control panels at ambients above 45°C.

High Pressure Fans
Fans and motors suitable for high external static conditions.

Vibration Isolation:

25 mm Spring Isolators
Non-restrained level adjustable, spring and cage type isolators for mounting under the unit base rails (Field mounted).

2.11 Nomenclature

YAES0905SA50Y--

1 2 3 4 BASE PRODUCT TYPE
- Y A : York
- Y E : Chiller
- Y S : Air Cooled
- Y A S : Screw

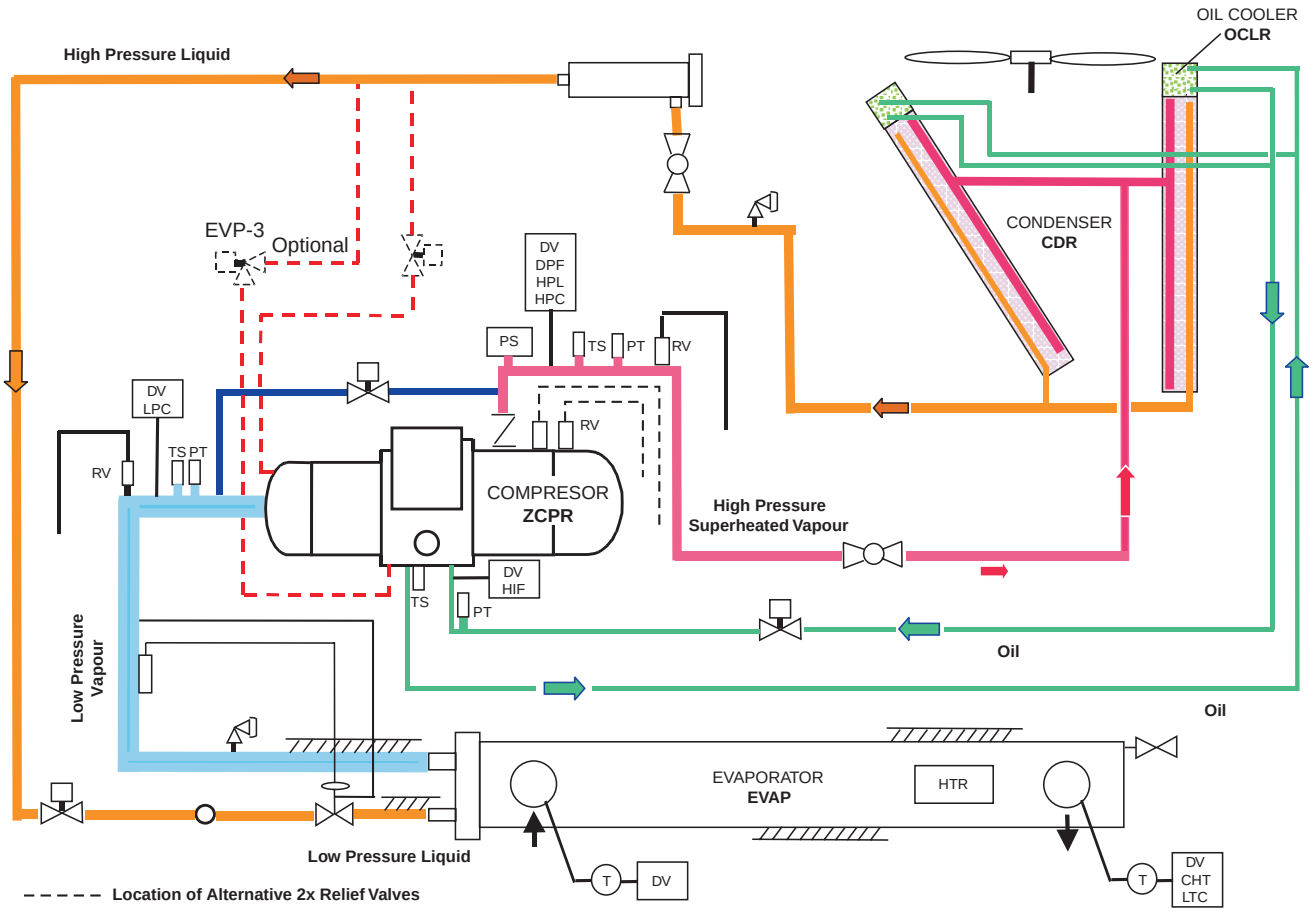
5 6 7 8 MODEL NUMBER
- # # # # Standard Units
  - :0405 :0475 :0645 :0645
  - :0575 :0685 :0715 :0785
  - :0905 :0985 :1075 :1245
  - :1405
- Dual Units
  - :1504 :1575 :1645 :1715
  - :1785 :1855 :1925

9 10 REFRIGERANT
- S A : Standard Unit : R134a
- DS A : Dual Standard Unit : R134a

11 12 13 VOLTAGE / STARTER
- 5 0 Y : 342-440 / 3 / 50 Star Delta Starter

14 15 OPTIONS

2.12 Functional Description



Low pressure liquid refrigerant enters the evaporator and is evaporated and superheated by the heat energy absorbed from the chilled water passing through the evaporator shell. Low pressure vapour enters the compressor where pressure and superheat are increased. High pressure vapour is passed through the oil separator where compressor oil is removed and recirculated to the compressor via the oil cooler.

The high pressure oil-free vapour is fed to the air cooled condenser coil where the heat is removed. The subcooled refrigerant then passes through the expansion valve where pressure is reduced and further cooling takes place before returning to the evaporator.

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3 TRANSPORTATION, HANDLING AND STORAGE

3.1 Delivery and Storage

YAES-SA units should be transported on a Standard Tilt Type Trailer (**NOT** a Tautliner/Euroliner) this enables trailer frame bars to be removed if necessary to facilitate safe loading and unloading by crane. Units up to 7.3 m long must be secured on the trailer by a minimum of 2 span-sets (straps) and units over 8m long by a minimum of 3 span-sets.

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.

The condensers should be covered to protect the fins from potential damage and corrosion, particularly where building work is in progress.

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.

On Sonata Units 0715 to 0985 the aesthetic panel mounting brackets have been removed and are attached within the frame work. These need to be refitted when installed.

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 YORK 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.

To avoid injury and damage to the unit. The unit must only lifted in accordance with the rigging instructions label, which is attached to the unit.

The unit should be lifted using lifting shackles and a spreader bar or frame of sufficient width to prevent damage to the unit from the lifting chains.

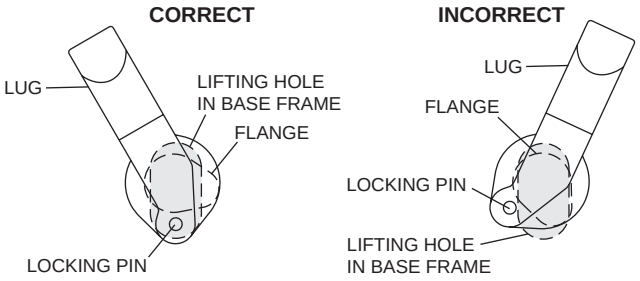
The unit must only be lifted by the base frame at the points provided. Never move the unit on rollers, or lift the unit using a fork-lift truck.

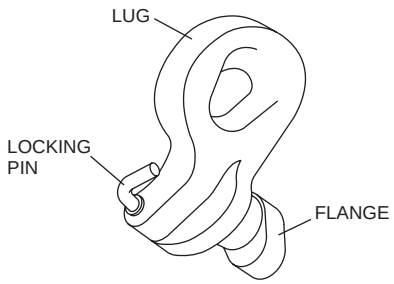
Care should be taken to avoid damaging the condenser coil fins when moving the unit.

Lifting using Lugs

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

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





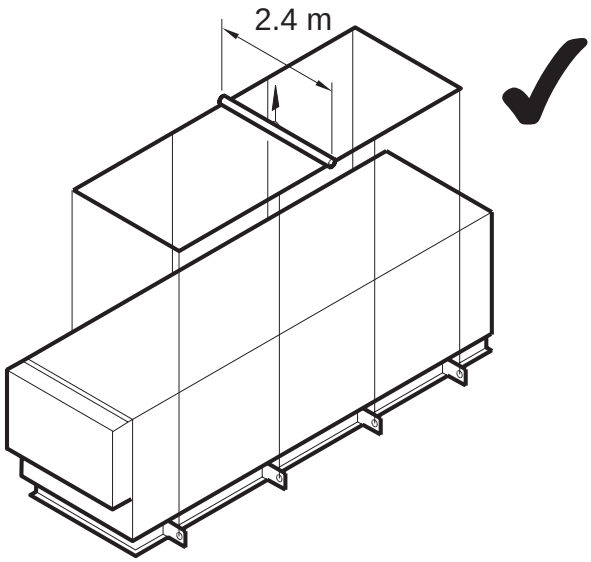
Lifting using shackles

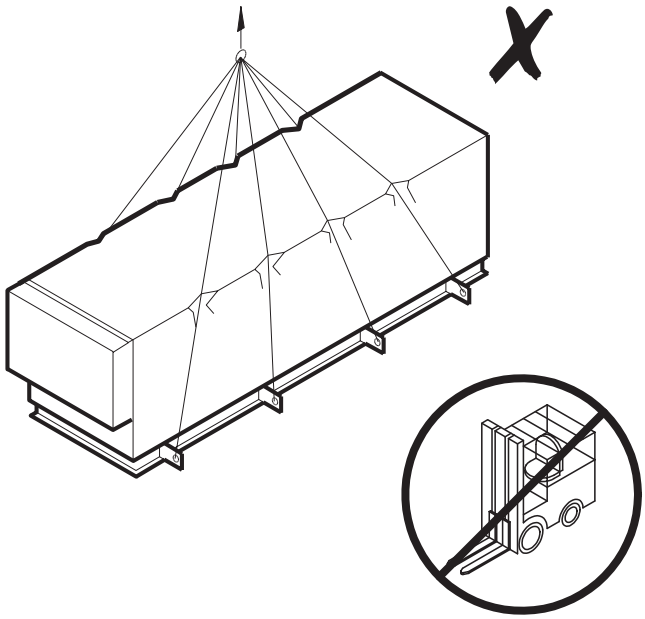
The shackles should be inserted into the respective holes in the base frame and secured from the inside.

Lifting Weights

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

Typical Lifting Arrangement





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.

It is important to ensure that the minimum service access space is maintained for cleaning and maintenance purposes.

The unit should not be installed directly on flammable materials such as wooden structures or roofs..

Outdoor Installations

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

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

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

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

On rooftop locations, choose a place with adequate structural strength to safely support the entire operating weight of the unit and service personnel. The unit can be mounted on a concrete slab, similar to ground floor locations, or on steel channels of suitable strength. The channels should be spaced at the same centres as the vibration mounting holes in the unit base frame and must be at least 120 mm wide at the contact points. This will allow vibration isolators to be fitted if required.

Any ductwork or attenuators fitted to the unit must not have a total static pressure resistance, at full unit airflow, exceeding the capability of the fans installed in the unit.

Indoor Installations

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

The discharge ducting must be properly sized with a total static pressure loss, together with any intake static pressure loss, less than the available static pressure capability for the type of fan fitted. The discharge air duct usually rejects outside the building through a louvre. The outlet must be positioned to prevent the air being drawn directly back into the air intake for the condenser coils as such recirculation will affect unit performance.

4.2 Location Clearances

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

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

When units are installed in an enclosure, the enclosure height should not exceed the height of the unit on more than one side. If the enclosure is of louvered construction the same requirement of static pressure loss applies as for ducts and attenuators stated above.

Where accumulation of snow is likely, additional height must be provided under the unit to ensure normal airflow to the unit.

The clearance dimensions given are necessary to maintain good airflow and ensure correct unit operation. It is also necessary to consider access requirements for 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.

4.3 Installation of Vibration Isolators

Optional sets of vibration isolators can be supplied loose with each unit.

- Using the Isolator tables (refer to Section 9), identify each mount and its correct location on the unit.

Mounts - Installation

- Place each mount in its correct position and lower the unit carefully onto the mounts.
- Transfer the unit weight evenly to the springs by turning the mount adjusting nuts. This should be done until the unit base is level.

4.4 Pipework Connection

General Requirements

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

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

- The liquid must enter the evaporator by the inlet connection (refer to Section 9).
- A flow switch must be installed in the customer pipework at the outlet of the evaporator and wired back to the control panel using screened cable. For details refer to “Electrical Connection.” This is to prevent damage to the evaporator caused by the unit operating without adequate liquid flow. To prevent turbulent flow there must be straight pipework either side of the flow switch equal in length to at least 5 times the diameter of the pipe.
- The flow switch used must have gold plated contacts for low voltage/current operation. Paddle type flow switches suitable for 10 barg working pressure and having a 1" N.P.T. connection can be obtained from YORK as an accessory for the unit. Alternatively a differential pressure switch sited across an orifice plate may be used, preferably of the high/low limit type.
- The chilled liquid pump installed in the pipework system should discharge directly into the unit evaporator section of the system. The pump may be controlled external to the unit — but an override must be wired to the control panel so that the unit can start the pump in the event that the liquid temperature falls below the minimum setting. For details refer to “Electrical Connection.”
- Pipework and fittings must be separately supported to prevent any loading on the evaporator. 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 evaporator should be readily de-mountable to enable cleaning before operation, and to facilitate visual inspection of the exchanger nozzles.
- The evaporator must be protected by a strainer, preferably of 30 mesh, fitted as close as possible to the liquid inlet connection, and provided with a means of local isolation.
- The evaporator 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.

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

- 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 must also be used to ensure liquid is circulated when the ambient temperature approaches freezing point. Insulation should also be installed around the evaporator 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.

- The liquid circulation pump must be controlled by the unit. This will ensure that when the liquid temperature falls within 2 or 3°C of freezing the pump will start.

- The evaporator is protected by heater mats under the insulation which are supplied from the unit control system power supply. During risk of freezing the control system should be left switched on to provide the freeze protection function unless the liquid systems have been drained.

Any debris left in the water pipework between the strainer and evaporator could cause serious damage to the tubes in the evaporator 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 evaporator.

4.5 Water Treatment

The unit performance given in the Design Guide is based on a fouling factor of 0.044 m² °C/kW (0.00025 ft²hr°F/Btu). 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 can increase the heat exchanger pressure drop, reducing the flow rate and causing potential damage to the heat exchanger tubes.

Aerated, brackish or salt water is not recommended for use in the water system. YORK recommend that a water treatment specialist is consulted to determine that the proposed water composition will not affect the evaporator materials of carbon steel and copper. The pH value of the water flowing through the evaporator must be kept between 7 and 8.5.

4.6 Pipework Arrangement

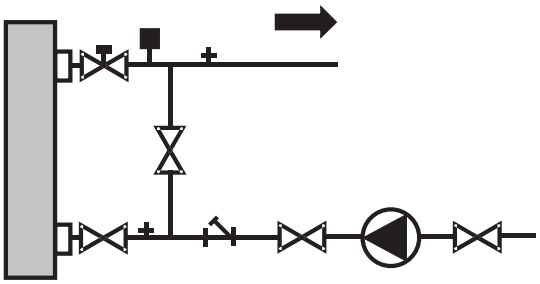
The following are suggested pipework arrangements for single and multiple unit installations, each unit should be piped as shown.

4.7 Connection Types & Sizes

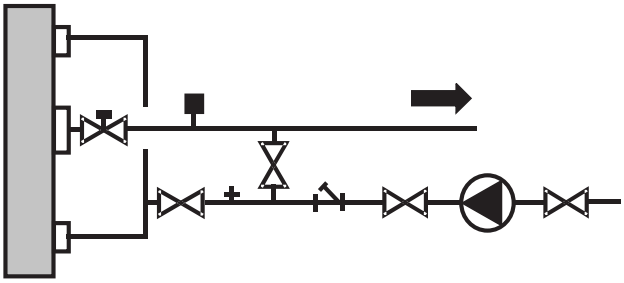
Standard chilled liquid connections on all evaporators are PN10 flanges per ISO 7005 part 1a. For sizes relevant to individual models refer to Section 9.

Recommendations of the Building Services Research Association

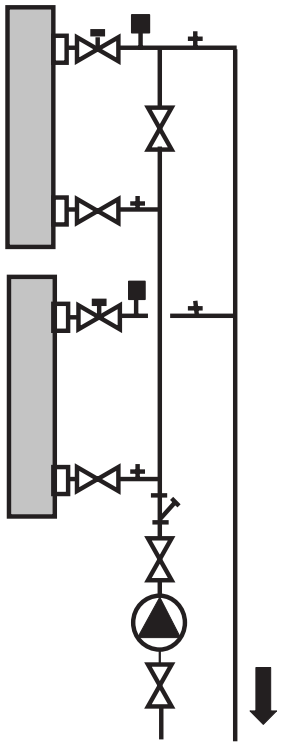
1xYAES-SA, 2 Connections per Evaporator



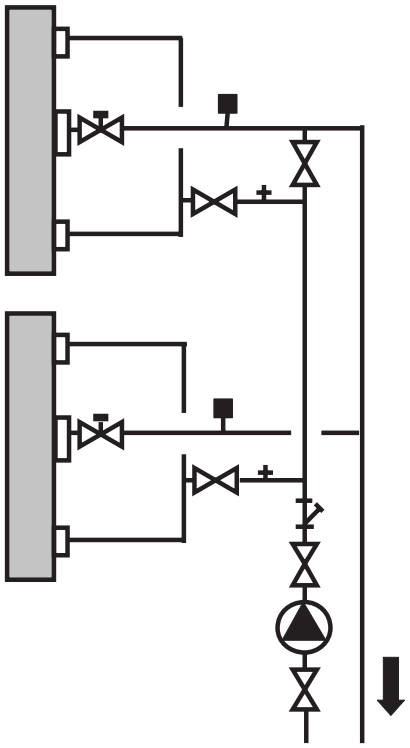
1xYAES-SA, 3 Connections per Evaporator



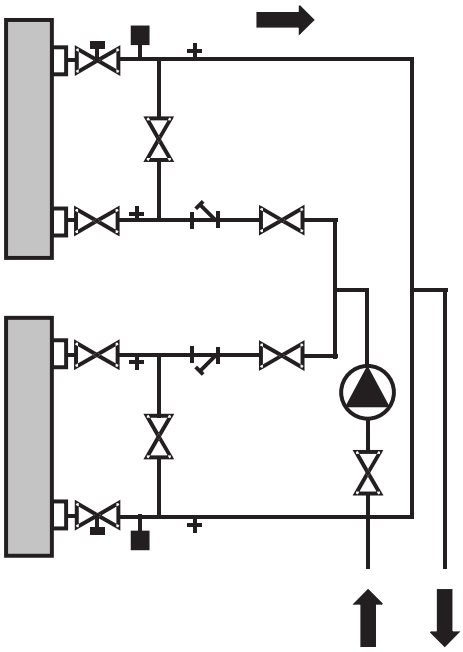
2xYAES-SA, 2 Connections per Evaporator

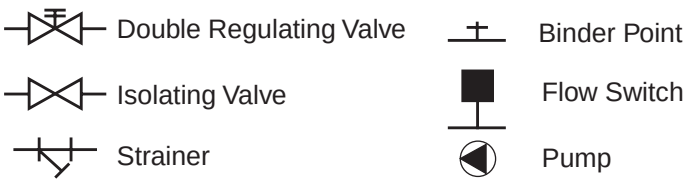


2xYAES-SA, 3 Connections per Evaporator



YAES-DSA, 2 Connections per Evaporator





4.8 Refrigerant Relief Valve Piping

Evaporators and oil separators 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. For evaporators, a pressure relief valve is mounted on each of the main refrigerant lines connecting the evaporator to the compressors. On oil separators the pressure relief valve is mounted on the side near the top of the vessel body.

It is recommended that a piece of pipe is fitted to each valve and directed so that when the valve is activated the release of high pressure gas and liquid cannot be a danger or cause injury. For indoor installations pressure relief valves should be piped to the exterior of the building.

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

$D^5 = 1.447 \times L$
D = minimum pipe internal diameter in centimetres
L = length of pipe in metres

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

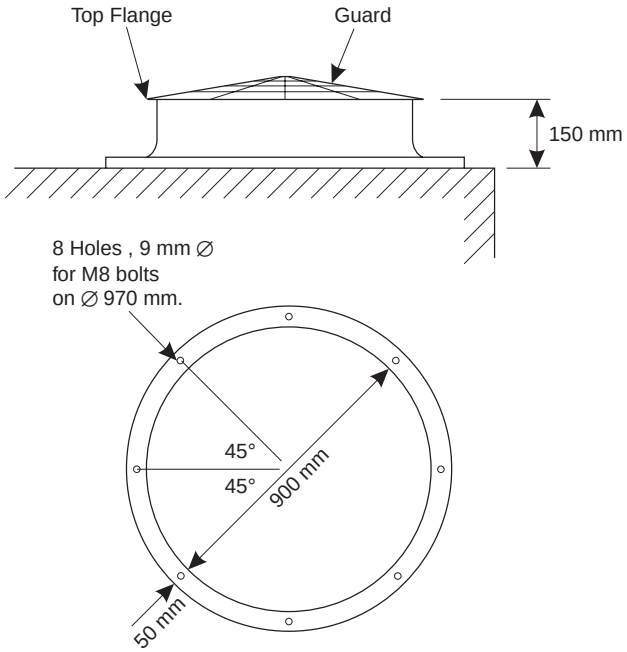
4.9 Ductwork Connection

General Requirements

The following ductwork 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.

- When ducting is to be fitted to the fan discharge it is recommended that the duct should be the same cross sectional area as the fan outlet and straight for at least one metre to obtain static regain from the fan.
- Ductwork should be suspended with flexible hangers to prevent noise and vibration being transmitted to the structure. A flexible joint is also recommended between the duct attached to the fan and the next section for the same reason. Flexible connectors should not be allowed to concertina.
- The unit is not designed to take structural loading. No significant amount of weight should be allowed to rest on the fan outlet flange, deck assemblies or condenser coil module. No more than one metre of light construction ductwork should be supported by the unit. Where cross winds may occur, any ductwork must be supported to prevent side loading on the unit.
- If the ducts from two or more fans are to be combined into a common duct, back-flow dampers should be fitted in the individual fan ducts. This will prevent recirculation of air when only one of the fans is running.
- Units are supplied with outlet guards for safety and to prevent damage to the fan blades. If these guards are removed to fit ductwork, adequate alternative precautions must be taken to ensure persons cannot be harmed or put at risk from rotating fan blades.

Connection Details and Dimensions



4.10 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.

After connection do not switch on mains power to the unit. Some internal components are live when mains is switched on and this must only be done by Authorised persons.

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 YORK Authorised personnel. If the switch is set to the “ON” position before commissioning then it must be reported to YORK, otherwise the warranty may be invalidated.

4.11 Power Wiring

The units are suitable for 380 or 400 V, 3 phase, 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 bottom of the power and control panel.

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

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

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

Units with Standard Single Point Power Supply Wiring - Non-fused Disconnect Switch (internal power distribution to fuses)

Models require one field provided 400 V, 3Ø, 50 Hz + PE supply to the unit with circuit protection.

The cables should enter the common input section through the gland plate on the bottom of the section.

Connect the 3 phase supply to the non-fused disconnect switch located in the common input section, refer to section 9 for connection sizes/details.

Connect the earth wire (PE) to the main protective earth terminal located in the common input section using an M10 lug.

Units with Single Point Power Supply Wiring - Non Fused Disconnect switch (internal power distribution to fused disconnect switches or circuit breakers) (Option)

Models require one field provided 400 V, 3Ø, 50 Hz supply to the unit with circuit protection.

The cables should enter the common input section through the gland plate on the bottom of the section.

Connect the 3 phase supply to the non fused disconnect switch located in the common input section, refer to section 9 for connection sizes/details.

Connect the earth wire to the main protective earth terminal located in the common input section using an M10 lug.

Units with Multi Point Power Supply Wiring Fused Disconnect Switch or Circuit Breaker Option

Models require two field provided 400 V, 3Ø, 50 Hz supplies with circuit protection and a 400 V, 2Ø, 50 Hz control supply with circuit protection.

Connect each of the 3 phase supplies to the two input terminal blocks located in the centre power section, refer to section 9 for connection sizes/details. The two sets of three supply cables should enter via the gland plates in the centre power section.

Connect each of the earth wires to the main protective earth terminals in the centre power section using an M10 lug.

Connect the 2 phase control supply to the non-fused disconnect switch/emergency stop device (QCSD/ESD) located in the common input section, refer to section 9 for connection sizes/details.

Connect the control supply earth wire to the main protective earth terminal located in the common input section an M4 lug.

Control Circuit Transformer (Primary Voltage Tappings)

The control circuit transformer (400 V, 2 Ø, 50 Hz) providing the 230 V, 1 Ø, 50 Hz power supply to the unit control system is fitted in a separate IP55 enclosure mounted on the unit framework. It is important to check that the correct primary tapping has been used:

- With the supply to the unit isolated remove the lid to the transformer enclosure.
- Check that the tapping is 360-440 V.

Remote Emergency Stop Device

If required, a remote emergency stop device can be wired into the unit. This device should be rated at 10 amps, 230 V, AC-15. The device should be wired into terminals 3 and 4 in the common input section. The existing link must first be removed. Terminals 3 and 4 are in a circuit protected by a 10 amp class gG fuse. When operated it removes the 230 Vac control supply to the electronics. All devices are de-energised including compressor and fan contactors. The loss of supply to the power supply board results in the display going off.

To conform with the requirement of EN 418 and EN 60204-1 that re-setting the emergency stop device will not initiate a restart , 'POWER FAIL RESTART' should be programmed under the 'PROGRAM' key to 'MANUAL'. 'MANUAL' restart requires a reset using the unit **ON/OFF** switch on the control section door.

4.12 Output Signals

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

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

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

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

Chilled Liquid Pump Starter

Terminals 33 and 34 close to start chilled liquid pump. This contact can be used as a master start/stop for the pump in conjunction with the daily start/stop schedule. If no schedule is set and the customer has master control of the pump, the contact must be used so that the contact can start the pump in the event of a low temperate liquid condition.

Run Contact

Terminals 35 and 36 close to indicate that a system is running.

Alarm Contacts

Each refrigerant system has a voltage-free change over contact which will operate to signal an alarm condition whenever a system locks out, or there is a power failure. To obtain system alarm signal, connect the alarm circuit to volt free terminals 30 and 32 (open on alarm) or 31 and 32 (close on alarm) for No. 1 system and volt free terminals 37 and 39 (open on alarm) or 38 and 39 (close on alarm) for No. 2 system.

4.13 System Inputs

All wiring to the relay board input signal terminal block (nominal 30 Vdc) must be run in screened cable, with the screen earthed at the panel end only. Run screened cable separately from mains cable to avoid electrical noise pick-up. The cables should be routed via the gland plate in the bottom of the common input section.

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

Flow Switch

A chilled liquid flow switch of suitable type must be connected to terminals 13 and 10 to provide adequate protection against loss of liquid flow.

Remote Start/Stop

Remote start/stop can be accomplished using a time clock, manual contact or other 'voltage free' contact, terminals 11 and 14 with terminals 14 and 15 linked in the control section of the control panel. The contact must be closed to allow the unit to run. Any time the contact opens, the unit will shutdown and the 'NO RUN PERM' message will be displayed.

For individual system start/stop contacts connect No. 1 system to terminals 11 and 14 and No. 2 system to terminals 12 and 15. With the associated contact open the 'NO RUN PERM' message will be displayed and the associated systems will not run.

Remote Set Point Offset - Temperature

Timed closure of suitable contacts connected to terminals 13 and 17 (PWM contacts) will give remote offset function of the chilled liquid set point if required.

Remote Unloading (not available when Remote Setpoint Setpoint Reset is used)

The microprocessor is capable of remote unloading or Pull-down demand limiting in two steps:

The first contact imposes a maximum load step of two on the lag system. The second step imposes a maximum load of two steps on the lead system. For the first step of unloading a voltage free contact can be fitted to terminals 16 & 13 for the second step to 13 & 17.

The following two cautions should be observed when using these functions to assure that undesirable operation does not result.

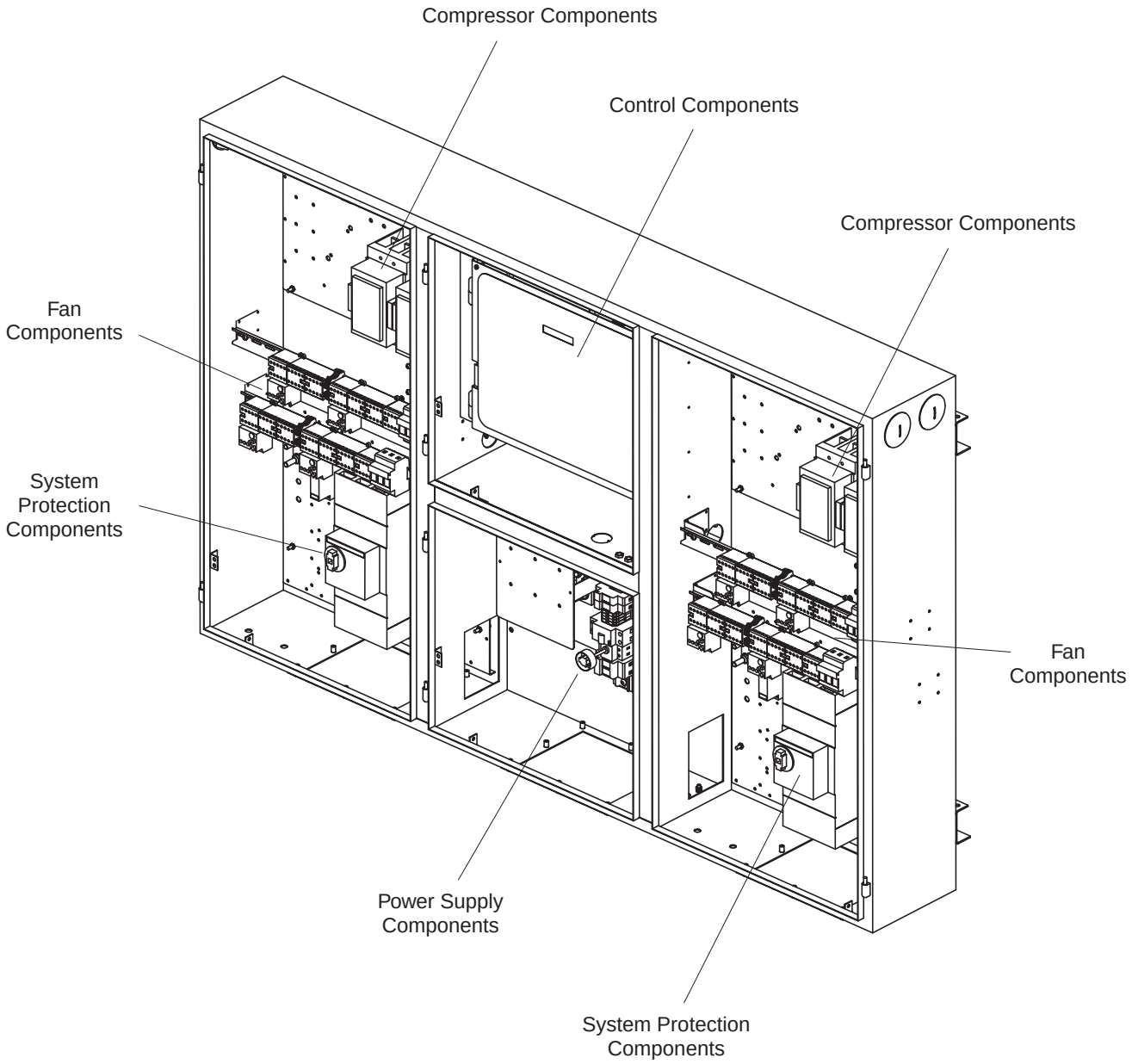
Terminal 13 & 17 contact should always be closed after or simultaneous with those on 13 & 16, when two steps of unloading are required. Otherwise, the microprocessor may mistake the closed contacts on 13 & 17 as a signal for a setpoint reset.

Terminals 13 & 17 contact should always be opened before or simultaneous with those on 13 & 16 when loading is desired. Otherwise, the microprocessor may mistake the closed contacts on 13 & 17 as a signal for a setpoint reset.

Fan Full Speed Inhibit (Low Sound Units only)

Connect a contact to terminals 13 and 20 to prevent the fans from running at full speed. The contact should be closed for fan full speed inhibit.

4.14 Typical Panel Layout

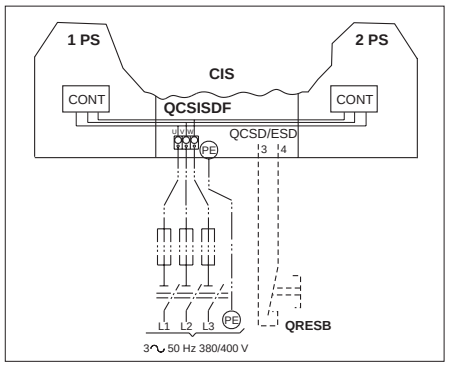


4.15 Power Supply Connection Diagrams

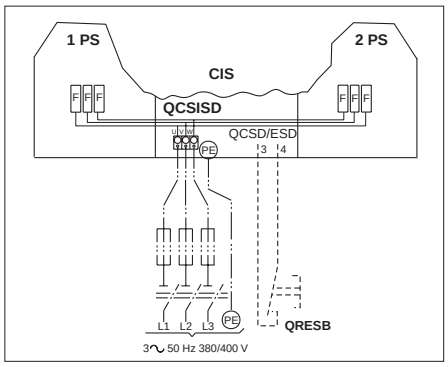
Main Panel - All Models and AUXILIARY Panel - YAES-DSA Models Only

Standard Single Point Power Supply
One supply to master fused disconnect switch (QCSISDF) or non-fused disconnect switch (QCSISD) with internal power distribution to compressor contactors or fuses, control supply to non-fused disconnect switch (QCSD/ESD) derived internally.

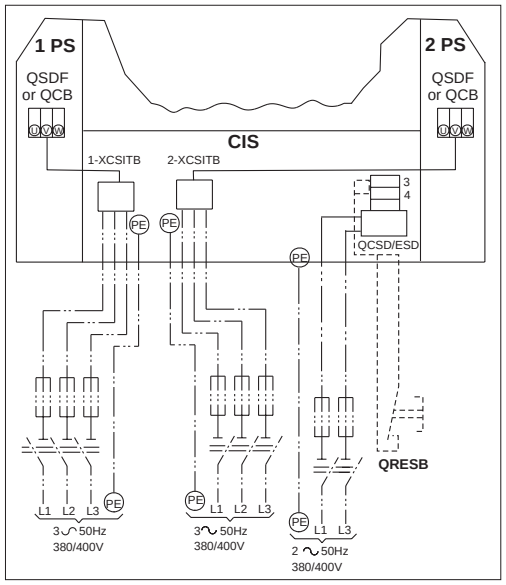
Models YAES0475SA to YAES0715SA



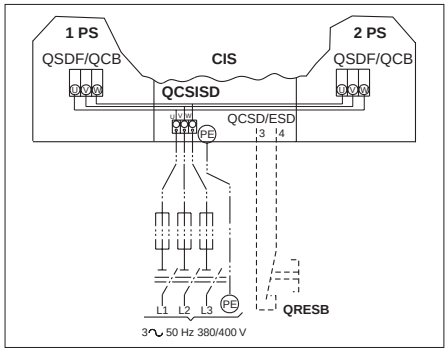
Models YAES0785SA to YAES1925DSA



Multi Point Power Supply (Option)
Two supplies to terminal blocks 1, 2 - XCSITB with internal power distribution to fused disconnect switches (QSDF) or circuit breakers (QCB) with separate control supply to non-fused disconnect switch (QCSD/ESD).



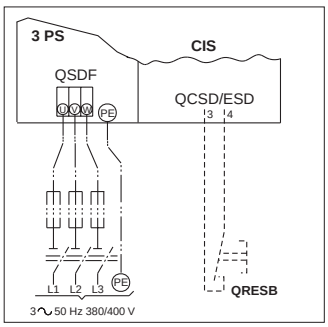
Single Point Power Supply (Option)
One supply to master non-fused disconnect switch (QCSISD) with internal power distribution to fused disconnect switches (QSDF) or circuit breakers (QCB), control supply to non-fused disconnect switch (QCSD/ESD) derived internally.



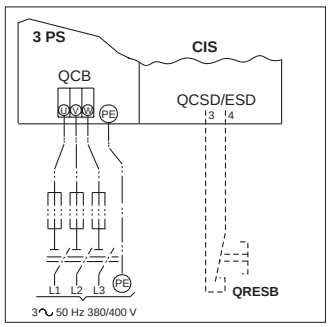
ITEM	DESCRIPTION
CS	CONTROL SECTION
CIS	COMMON INPUT SECTION
F	FUSE
PE	PROTECTIVE EARTH
PS	POWER SECTION
QCSD/ESD	CONTROL CIRCUIT SWITCH DISCONNECT/ EMERGENCY STOP DEVICE
QCB	CIRCUIT BREAKER
QCSISD	COMMON SUPPLY INPUT SWITCH DISCONNECT
QCSISDF	COMMON SUPPLY INPUT SWITCH DISCONNECT FUSED
XCSITB	COMMON SUPPLY INPUT TERMINAL BLOCK
QRESB	REMOTE EMERGENCY STOP BUTTON
QSDF	SWITCH DISCONNECT FUSED

Auxiliary Panel - 3 Circuit YAES-SA Models Only

Standard Single Point Power Supply
One supply to master fused disconnect switch(QSDF) in power section, control supply to non-fused disconnect switch (QCSD/ESD) derived internally.

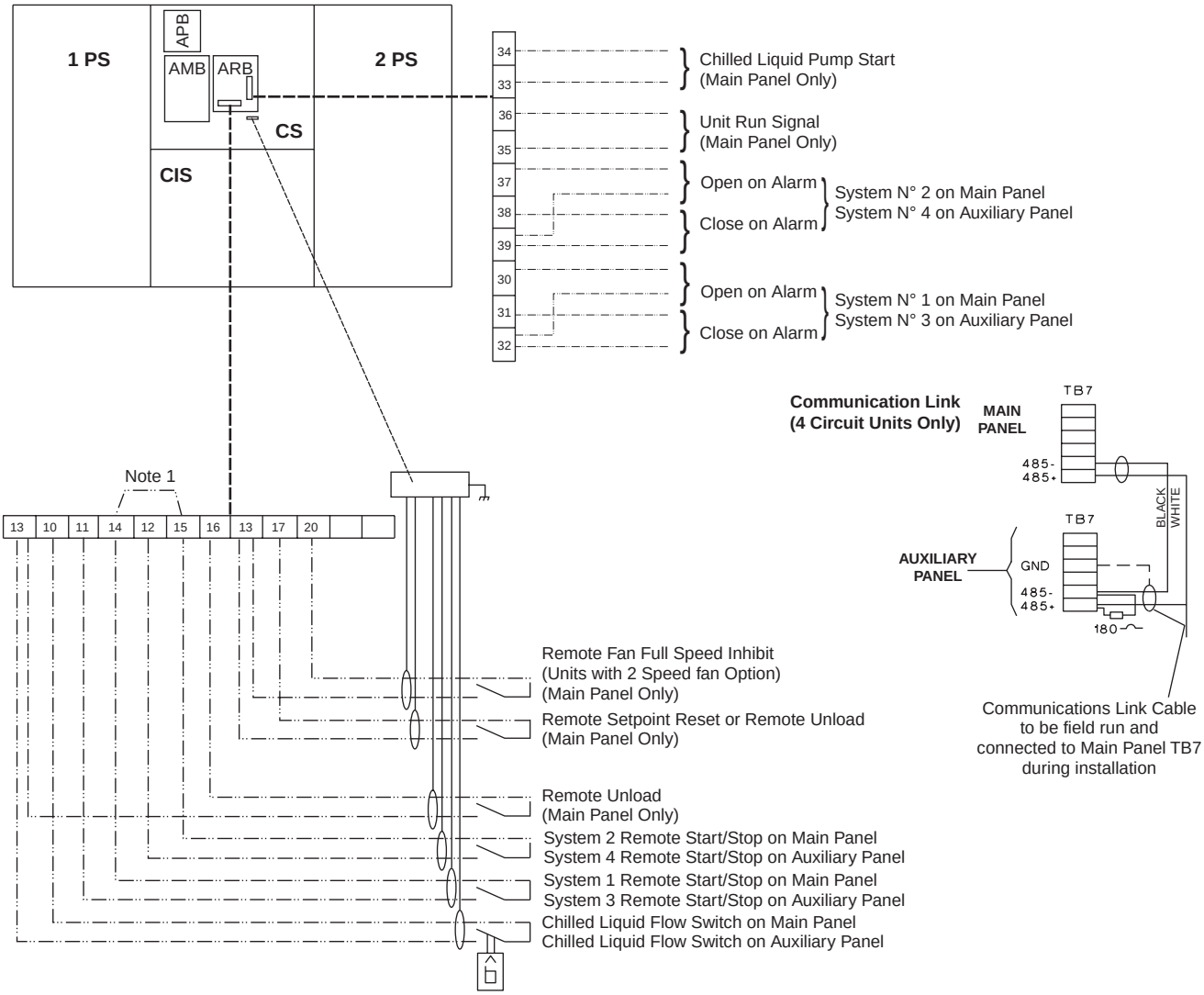


Single Point Power Supply (Option)
One supply to master circuit breaker (QCB) in power section, control supply to non-fused disconnect switch (QCSD/ESD) derived internally.



4.16 Customer Connection Diagram (All Models)

Note: The Auxiliary Panel is fitted to Models YAES-SA1075, YAES-SA1245, YAES-SA1405 and all YAES-DSA only.



Note 1: Fit link between terminals 14 and 15 and connect a voltage free contact to terminals 11 and 14 for Remote Unit Start/Stop.

ITEM	DESCRIPTION
AIOB	INPUT/OUTPUT EXPANSION BOARD
AMB	MICROPROCESSOR BOARD
APB	POWER SUPPLY BOARD
ARB	RELAY BOARD
CS	CONTROL SECTION
CIS	COMMON INPUT SECTION
PS	POWER SECTION

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5 COMMISSIONING

5.1 Preparation

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

The Microprocessor Based Control System (MBCS) Operating Instructions must be read in conjunction with this section.

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 Authorised personnel. If the switch has been set to the On position before commissioning then it must be reported to YORK International otherwise the warranty may be invalidated.

Preparation - Power Off

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

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

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

Refrigerant	Break vacuum from bottle connection for:	Raise system pressure to approximately:
R134a	Vapour	4.0 barg (60 psig)

Valves: Open the compressor discharge ball valves fully. Open the compressor motor cooling valves and the liquid line service valves fully and ensure the oil return line ball valves are open.

Compressor oil: The compressor oil level must be in the upper sight glass on the oil separators.

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

Isolation/protection: Verify that all sources of electrical supply to the unit are taken from 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 connection points 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.

Fan Overloads: Ensure that the fan overload settings are correct for the type of fan fitted.

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 and the microprocessor board system switches S2 and S5 are set to “0" (OFF). Set the red handled emergency stop device on the options panel to ”1" (ON). For units fitted with door interlocked isolation devices the panel doors must be closed and the devices set to “1" (ON). The customers disconnection devices can now be set to ON.

The machine is now live!

Compressor heaters: Verify the compressor heaters are energised.

Water System: Verify that the chilled liquid system has been installed correctly, and has been commissioned with the correct direction of water flow through the evaporator. Inlet should be at the refrigerant pipework connection end of the evaporator. Purge air from the top of the evaporator using the plugged air vent mounted on the top of the evaporator body. 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 water flow switch is correctly fitted in the customer's pipework on the evaporator outlet, and wired into the control panel correctly.

Temperature sensor(s): Ensure the leaving liquid temperature sensor is coated with heat conductive compound (part no. 013-00890-000) and is inserted in the water outlet sensor pocket of the evaporator. This sensor also acts as the freeze protection thermostat sensor and must always be in the water OUTLET sensor pocket.

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.

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

Programmed settings: Ensure the system cut-out and operational settings are in accordance with the instructions given in the MBCS Manual and with operational requirements by pressing the 'Program' key. The chilled liquid temperature control settings need to be set according to the unit model and required operating conditions.

Date & time: Programme the date and time by first ensuring that the CLK jumper J18 on the microprocessor board is in the ON position (top two pins). Then press the 'SET TIME/DATE' key and set the date and time (see MBCS Manual).

Start/Stop schedule: Programme the daily and holiday start/stop by pressing the 'Set Schedule/Holiday' key (see MBCS Manual).

Set-points: Set the required leaving chilled liquid temperature set-point and control range using the 'LOCAL COOLING SETPOINTS' and 'REMOTE COOLING SETPOINTS' keys. (see MBCS Manual).

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

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

System switches: Set the system switches on the microprocessor board to the 'ON' position — see operating sequence in the MBCS Manual.

Start-up: Press the 'STATUS' key, and set the unit switch to the ON position to start the unit (there may be a few seconds delay before the first compressor starts because of the anti-recycle timer). Be ready when each compressor starts, to switch the unit off immediately if any unusual noises or other adverse conditions develop. Use the appropriate emergency stop device if necessary. Also refer to the MBCS Manual for the normal operating sequence from start-up.

Oil pressure: When a compressor starts, press the relevant 'SYSTEM DATA' key and verify that oil differential pressure develops immediately. If oil pressure does not develop, the automatic controls will shut down the compressor (see the MBCS Manual for the flow chart of the automatic oil pressure safety system). Under no circumstances should a restart attempt be made on a compressor which does not develop oil pressure immediately. Switch the unit switch to the Off position.

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.

Fan rotation: As discharge pressure rises, the condenser fans operate in stages to control the pressure. Verify that the fan operation is correct for the type of unit.

Suction Superheat: Check suction superheat at steady full compressor load only. It is important that no bubbles show in the liquid line sight glass. Measure suction temperature on the copper line about 150 mm before the compressor suction service valve. Measure suction pressure at the compressor service valve. Superheat should be 4°C to 5°C relative to the 'dew' temperature.

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

Subcooling: Check liquid subcooling at steady full compressor load only. It is important that all fans are running for the system. Measure liquid line temperature on the copper line beside the main liquid line service valve. Measure liquid pressure at the liquid line service valve. Subcooling should be 5°C to 7°C relative to the 'bubble' temperature. If subcooling is out of range add or remove refrigerant as required. Do not overcharge the unit.

General operation: After completion of the above checks for System 1 repeat the process for each subsequent system. When all run correctly, stop the unit, switch all applicable switches to the 'ON' position and restart the unit. Check that loading occurs as specified in the MBCS and that general operation is correct.

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6 UNIT OPERATION

6.1 General Description

The units are designed to work independently, or in conjunction with other equipment via a YORK ISN 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 more compressors at a suitable load step to match the cooling effect of the refrigerating systems to the heat load on the liquid system. The heat removed from the chilled liquid is then rejected from the air cooled condenser coils.

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

6.2 Start-up

Check the main power supplies to the unit are 'ON', all refrigerant service valves are open and chilled liquid flow has been established (unless the unit chilled liquid pump start control is being used, in which case just ensure the pump supply is on). Ensure only the correct system switches (SYS 1 or 2) on the microprocessor circuit board are in the 'ON' position.

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

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

The display will show the anti-coincidence timer status for the lag compressor, followed by `NO COOL LOAD' until it is called to operate by the control system.

6.3 Normal Running and Cycling

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

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

Once a compressor is running, discharge pressure rises as refrigerant is pumped into the air cooled condenser coils. This pressure is controlled by stages of fans to ensure maximum unit efficiency whilst maintaining sufficient pressure for correct operation of the condensers and expansion valves.

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

6.4 Shutdown

The unit can be stopped at any time by switching the unit 'ON/OFF' switch on the control section door to the 'OFF' position. The compressor heaters will energise to prevent refrigerant condensing in the compressor rotors and to prevent the compressor oil becoming saturated with refrigerant. If ambient temperatures are low, the evaporator heater mats will also energise to prevent the possibility of liquid freezing in the vessel.

To prevent damage the to the unit the control supply to the compressor heaters and evaporator heater mats 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 motor cooling service stop valves should be closed (clockwise) and if there is a possibility of liquid freezing due to low ambient temperatures, the evaporators should be drained. Valves should be opened and power must be switched on for at least 8 Hours (36 Hours if ambient temperature is over 30°C) before the unit is restarted.

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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 Service Engineer.

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

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

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

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 YORK Service Agent.

Unit status: Press the 'STATUS' key on the keypad and ensure no fault messages are displayed (refer to the MBCS Manual 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.

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

Operating conditions: Read the operating pressures and temperatures at the control panel using the display keys and check that these are within the operating limitations given in the MBCS manual.

Compressor oil level: Check the compressor oil level after the compressor has been operating on 'FULL LOAD' for approximately half an hour. The oil level should be between the upper and lower sight glasses on the oil separators.

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 YORK 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. Check moisture indicator. Check suction superheat. Check economiser superheat. Check liquid subcooling.	Check solenoid valves.
Compressors:	Check liquid subcooling. Check oil level. Check oil pressure. Check unloader operation. Check crankcase heater. Check condition of oil.	
Evaporator:	Check water flow. Check water pressure drop. Check heater mats.	Check water pH / glycol strength.
Air cooled condensers:	Check for airflow obstructions. Check fins. Check fans and fan guards.	Brush fins. Check fan motor bearings.
Power & Control system general:	Check panel condition. Check mains and control wiring. Check sensor locations. Check mechanical HP cut-outs. Check emergency stop.	Check all connections. Check compressor contactors. Check fan contactors / overloads. Check sensor / transducer calibration. Check motor protectors. Check contactor contacts.
Microprocessor controls:	Check fault history. Check program settings. Check HP / LP cut-out function's. Check pump-down function. Check load / unload function.	Check fan control function. Check ambient cut-out function. Check low oil pressure function.

7.4 In Service Inspection

YORK International believe that their vessel designs do not lend themselves to corrosion. A corrosion allowance of 1 mm has however been included within the design calculations for the thickness of the vessel shell of which is assessed as being appropriate for the design life of the vessel.

A check on the vessel shell thickness must be conducted by the user every five years by ultrasonic examination or other appropriate methods of examination.

YORK International believe that periodic in service proof testing (ie; hydro tests) is not required. However, YORK International recognise that national regulations may require such testing to be conducted.

8 TROUBLE SHOOTING

8.1 Competent Persons Trouble Shooting Guide

PROBLEM	POSSIBLE CAUSE	ACTION
No display on panel — unit will not operate	Mains supply to control system off.	Switch on mains supply if safe to do so.
	Emergency stop device off.	Check if control panel emergency stop switch and any remote emergency stop devices are in the 'OFF' position. Turn to 'ON' position (1) if safe to do so.
	No supply to -T2.	Check fuses. F1.
	No 24 Vac supply to power board.	Check QRCD is reset, fuse F4 and wiring from -T2 to power board and fuse -F5.
	No +12 V output from power board.	Replace power board or isolate excessive load on the board.
NO RUN PERM displayed (No run permissive)	No liquid flow through the evaporator.	Ensure that liquid pumps are running. Valves are correctly set and flow is established.
	Flow switch contacts are not made.	Check the flow switch is functional and is installed according to the manufacturers instructions. Note: On some systems the pump starter may be wired to the unit and controlled to start by the unit.
SYS # HIGH OIL TEMP displayed	Measured temperature incorrect.	Check for airflow restrictions caused by blockages on intake faces of air coils.
		Check sensor calibration, location and wiring.
Chiller FAULT: LOW AMBIENT TEMP displayed	Ambient air temperature is lower than the programmed operating limit.	Use the 'ambient temp.' key to display the temperature and confirm that the displayed value is approximately correct. The warning message should clear when the ambient air temperature reaches the programmed operating limit. Check the programmed settings are correct for the options fitted to the unit.
	Measured temperature is incorrect.	Check sensor calibration, location and wiring.
Chiller FAULT: HIGH AMBIENT TEMP displayed	Ambient air temperature is higher than the programmed operating limit.	Use the 'ambient temp.' key to display the temperature and confirm that the displayed value is approximately correct. The warning message should clear when the ambient air temperature falls below the programmed operating limit.
		Check the programmed settings are correct for the options fitted to the unit.
	Residual heat is not being dissipated.	Check fan is operating correctly and the rotation is correct. Check for airflow recirculation.
	Measured temperature is incorrect.	Check sensor calibration, location and wiring.
Chiller FAULT: LOW WATER TEMP displayed	Leaving liquid drops below the programmed low limit faster than the unit can unload.	Check for restrictions in the liquid flow line. Check the liquid flow is stable.
	Unit is not unloading.	Check the supply to the unloader valve solenoid. Check the compressor unloads correctly.
	Measured temperature is incorrect.	Check sensor calibration, location and wiring.
Chiller FAULT: VAC UNDER-VOLTAGE displayed	Poor mains supply voltage.	Check mains supply is stable and within allowable limits. Check for voltage dip on compressor start.

PROBLEM	POSSIBLE CAUSE	ACTION
SYS # HIGH DSCH displayed (High discharge pressure trip)	Poor airflow through the condenser coils.	Check for airflow restrictions caused by blockages on intake faces of air coils. Check for damaged fins/return bends. Check for correct fan operation and direction of rotation. Check for non-condensables (air) in system.
	Excessive refrigerant charge.	Check sub-cooling is correct.
	Measured pressure is incorrect.	Check discharge transducer calibration and wiring.
SYS # HIGH DSCH TEMP displayed (High discharge temperature)	Suction superheat too high.	Check suction superheat is within range.
	Measured temperature incorrect.	Check for airflow restrictions caused by blockages on intake faces of air coils.
		Check sensor calibration, location and wiring.
SYS # DSCH LIMITING displayed (Discharge pressure unloading)	Discharge pressure unloading due to unit operating above load limit. See also SYS # HIGH DSCH.	Check chilled liquid temperature is within range. Check if ambient air temperature is above design conditions.
SYS # LOW SUCTION displayed	Badly adjusted or faulty expansion valve.	Check superheat.
	Reduced evaporator performance.	Check for restricted chilled liquid flow. Check for fouled tube surfaces. Check superheat.
	Low refrigerant charge.	Check subcooling is correct. Check for leaks.
	Restricted refrigerant flow.	Check for blocked filter/drier. Check YLLSV operating correctly
	Measured pressure incorrect.	Check suction pressure transducer calibration and wiring.
SYS # LOW CURR/MP/HP displayed	Compressor current too low.	Check compressor mains supply, fuses, contactors and wiring. Check mains supply voltage is within tolerance.
	Measured current is incorrect.	Check for defective current transformer (resistance should be between 42 and 44 Ohms). Check calibration resistor is correctly fitted.
	Compressor motor protector signal failure.	Check motor protector and wiring. Check compressor motor.
	Mechanical high pressure cut-out trip.	Check compressor discharge valve is open. Check cut-out setting and wiring.
	No motor cooling.	Check motor cooling service valve is open Check operation of economiser and motor cooling TEVs and liquid solenoid valve.
SYS # CURR LIMITING displayed (Compressor current unloading).	High compressor motor current has activated unloading.	Check liquid temperature is within operating limits. Check if ambient air temperature is above operating limits.

8.2 Sensor Calibration Charts

Leaving Chilled Liquid (BLCT)

Temperature °C	Resistance ohms	Voltage Vdc
-10	16598	1.45
-8	14896	1.57
-6	13388	1.69
-4	12047	1.81
-2	10856	1.93
0	9795	2.05
2	8849	2.17
4	8005	2.30
6	7251	2.42
8	6575	2.54
10	5670	2.73
20	3748	3.23
30	2417	3.69
40	1598	4.05
42	1475	4.11
44	1363	4.17
46	1260	4.22
48	1167	4.27
50	1081	4.32

Test points :

Leaving Chilled Liquid (BLCT) AMB J11-7/4

Discharge (BDT) Temperature Sensors

Temperature °C	Resistance ohms	Voltage Vdc
0	163250	0,282
10	99500	0,447
20	62450	0,676
30	40285	0,976
40	26635	1,34
50	18015	1,76
60	12440	2,20
70	8760	2,63
80	6290	3,04
90	4588	3,40
100	3400	3,71
110	2556	3,96
120	1946	4,17
130	1504	4,33
140	1174	4,46
150	926	4,57

Test points :

Discharge Temperature (BDT):
Refrigerant Circuit 1 AMB J17-9/6
Refrigerant Circuit 2 AMB J17-10/7

Oil (BOT) Temperature Sensor
Ambient Air (BAMB) Temperature Sensor

Temperature °C	Resistance ohms
-10	55330
-5	42227
0	32650
5	25390
10	19900
15	15710
20	12490
25	10000
30	8057
35	6530
40	5324
50	3600
60	2490
70	1752
80	1255
90	916
100	680
110	510
120	390
130	300
140	235
150	185

Test point :

Ambient Air (BAMB) AMB J11-9/6

Oil Temperature (BOT):
Refrigerant Circuit 1 AMB J11-8/5
Refrigerant Circuit 2 AMB J16-6/5

Oil (BOP - 400PSIG), Discharge (BDP - 400PSIG), Suction (BSP - 400PSIG) Pressure Transducers

0 - 200 psig Transducer		0 - 400 psig Transducer	
Pressure psig	Voltage Vdc	Pressure psig	Voltage Vdc
0	0,5	0	0,5
25	1,0	50	1,0
50	1,5	100	1,5
75	2,0	150	2,0
100	2,5	200	2,5
125	3,0	250	3,0
150	3,5	300	3,5
175	4,0	350	4,0
200	4,5	400	4,5

Red wire = 5 V, Black wire = 0 V,
White/Green wire = signal

Test points :

Oil Pressure (BOP):

Refrigerant Circuit 1	AMB J13-8/3
Refrigerant Circuit 2	AMB J14-8/3

Discharge Pressure (BDP):

Refrigerant Circuit 1	AMB J15-8/3
Refrigerant Circuit 2	AMB J15-7/1

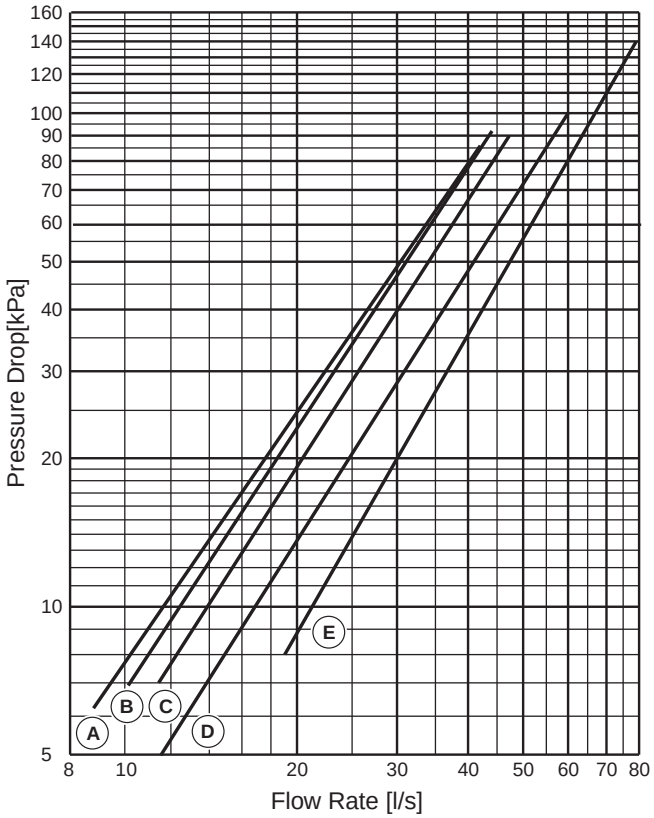
Suction Pressure (BSP):

Refrigerant Circuit 1	AMB J13-7/1
Refrigerant Circuit 2	AMB J14-7/1

9 TECHNICAL DATA

9.1 Pressure Drop Graphs

Evaporator



YAES-SA Model	
0405 0475 0545 0575	A
0645 0685 0715 0785	B
0905	C
0985	D
1075 1245 1405	E

YAES-DSA Model	Evaporator	
	Main	Auxiliary
1505	B	B
1575	B	B
1645	B	B
1715	B	C
1785	D	B
1855	D	C
1925	D	D

Model	Pressure Drop Calculation
A	Pressure Drop[kPa] = 0.1624 x(Flow Rate[l/s] ^ 1.6784
B	Pressure Drop[kPa] = 0.1203 x(Flow Rate[l/s] ^ 1.7572
C	Pressure Drop[kPa] = 0.0887 x(Flow Rate[l/s] ^ 1.8179
D	Pressure Drop[kPa] = 0.0587 x(Flow Rate[l/s] ^ 1.8179
E	Pressure Drop[kPa] = 0.0216 x(Flow Rate[l/s] ^ 2.0085

9.2 Operating Limitations

Model YAES-SA				0405		0475		0545		0575		0645	
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid outlet temperature	Water outlet	°C	4.5 to 15									
		Glycol outlet	°C	-12 to 15									
		Temp. spread	°C	3 to 10									
	Evaporator Flow rate		l/s	8.8	42.6	8.8	42.6	8.8	42.6	8.8	42.6	10.1	44.1
	Evaporator Pressure drop		kPa	6.2	87.0	6.2	87.0	6.2	87.0	6.2	87.0	7.0	93.3
	Maximum working pressure		bar	10									
Ambient Air	Air entering temperature (1)		°C	-18 to 46									
	Fan Available Static Pressure	Standard fans	Pa	10									
		2 speed fans	Pa	10									
		High pressure fans	Pa	120									
Refrigerant System High Pressure Side			bar	27.6									
Power Supply Voltage 400 V, 3 Ø, 50 Hz (nominal)			V	360 to 440									
Recommended Minimum System Water Volume			l	1210		1250		1560		1700		1940	

(1) 52°C when optional High Ambient / Sun Shield Kit is fitted.

Operating Limitations (Continued)

Model YAES-SA				0685		0715		0785		0905		0985	
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid outlet temperature	Water outlet	°C	4.5 to 15									
		Glycol outlet	°C	-12 to 15									
		Temp. spread	°C	3 to 10									
	Evaporator Flow rate		l/s	10.1	44.1	10.1	44.1	10.1	44.1	11.4	47.3	11.4	59.9
	Evaporator Pressure drop		kPa	7.0	93.3	7.0	93.3	7.0	93.3	7.0	90.0	4.9	100.0
	Maximum working pressure		bar	10									
Ambient Air	Air entering temperature (1)		°C	-18 to 46									
	Fan Available Static Pressure	Standard fans	Pa	10									
		2 speed fans	Pa	10									
		High pressure fans	Pa	120									
Refrigerant System High Pressure Side			bar	27.6									
Power Supply Voltage 400 V, 3 Ø, 50 Hz (nominal)			V	360 to 440									
Recommended Minimum System Water Volume			l	2090		2110		2326		2674		2925	

Model YAES-SA				1075		1245		1405	
				Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid outlet temperature	Water outlet	°C	4.5 to 15					
		Glycol outlet	°C	-12 to 15					
		Temp. spread	°C	3 to 10					
	Evaporator Flow rate		l/s	19.0	79.0	19.0	79.0	19.0	79.0
	Evaporator Pressure drop		kPa	8.0	140.0	8.0	140.0	8.0	140.0
	Maximum working pressure		bar	10					
Ambient Air	Air entering temperature (1)		°C	-18 to 46					
	Fan Available Static Pressure	Standard fans	Pa	10					
		2 speed fans	Pa	10					
		High pressure fans	Pa	120					
Refrigerant System High Pressure Side			bar	27.6					
Power Supply Voltage 400 V, 3 Ø, 50 Hz (nominal)			V	360 to 440					
Recommended Minimum System Water Volume			l	3378		3846		4228	

Model YAES-DSA				1505		1575		1645		1715	
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid outlet temperature	Water outlet	°C	4.5 to 15							
		Glycol outlet	°C	-12 to 15							
		Temp. spread	°C	3 to 10							
	Flow rate	Evaporator 1	l/s	10.1	44.1	10.1	44.1	10.1	44.1	10.1	44.1
		Evaporator 2	l/s	10.1	44.1	10.1	44.1	10.1	44.1	11.4	47.3
	Pressure drop	Evaporator 1	kPa	7.0	93.3	7.0	93.3	7.0	93.3	7.0	93.3
		Evaporator 2	kPa	7.0	93.3	7.0	93.3	7.0	93.3	7.0	90.0
	Maximum working pressure		bar	10							
Ambient Air	Air entering temperature (1)		°C	-18 to 46							
	Fan Available Static Pressure	Standard fans	Pa	10							
		2 speed fans	Pa	10							
		High pressure fans	Pa	120							
Refrigerant System High Pressure Side			bar	27.6							
Power Supply Voltage 400 V, 3 Ø, 50 Hz (nominal)			V	360 to 440							
Recommended Minimum System Water Volume			l	2110		2326		2326		2674	

Model YAES-DSA				1785		1855		1925	
				Min.	Max.	Min.	Max.	Min.	Max.
Chilled Liquid	Liquid outlet temperature	Water outlet	°C	4.5 to 15					
		Glycol outlet	°C	-12 to 15					
		Temp. spread	°C	3 to 10					
	Flow rate	Evaporator 1	l/s	11.4	59.9	11.4	59.9	11.4	59.9
		Evaporator 2	l/s	10.1	44.1	11.4	47.3	11.4	47.3
	Pressure drop	Evaporator 1	kPa	4.9	100.0	4.9	100.0	4.9	100.0
		Evaporator 2	kPa	7.0	93.3	7.0	90.0	4.9	100.0
	Maximum working pressure		bar	10					
Ambient Air	Air entering temperature (1)		°C	-18 to 46					
	Fan Available Static Pressure	Standard fans	Pa	10					
		2 speed fans	Pa	10					
		High pressure fans	Pa	120					
Refrigerant System High Pressure Side			bar	27.6					
Power Supply Voltage 400 V, 3 Ø, 50 Hz (nominal)			V	360 to 440					
Recommended Minimum System Water Volume			l	2925		2925		2925	

(1) 52°C when optional High Ambient / Sun Shield Kit is fitted.

9.3 Physical Data

Model YAES-SA				0405	0475	0545	0575	0645
Refrigerant Circuits		Quantity		2	2	2	2	2
Refrigerant Charge		Circuit 1	kg	40	40	50	50	52
		Circuit 2	kg	31	40	40	50	52
Compressors		Number		2	2	2	2	2
		Type (circuit 1)		YTS H-A-E	YTS F-A-D	YTS I-A-F	YTS I-A-F	YTS J-A-G
		Type (circuit 2)		YTS F-A-D	YTS F-A-D	YTS F-A-D	YTS I-A-F	YTS J-A-G
		Capacity Control per Compressor	%	30 - 100	30 - 100	30 - 100	30 - 100	30 - 100
Oil Charge		Per Circuit	l	19.1/18.1	20.1/20.1	23.1/19.1	23.1/23.1	28.1/28.1
Evaporator		Quantity		1	1	1	1	1
		Type		DXC1786	DXC1786	DXC1786	DXC1786	DXC21086
		Water Volume per Evaporator	l	304	304	304	304	445
Air-Cooled Condenser		Total Coil Face Area	m^2	13	15.6	18.2	20.8	20.8
		Number of Tube Rows		3	3	3	3	3
		Number of Fans (circuits 1)		3	3	4	4	4
		Number of Fans (circuits 2)		2	3	3	4	4
Fans	Standard	Nominal Speed	rpm	715	715	715	715	715
		Total Air Flow	m^3/s	31.25	37.5	43.75	50	50
	2 Speed at low speed	Nominal Speed	rpm	448	448	448	448	448
		Total Air Flow	m^3/s	21	25.2	29.4	34	33.6
	2 Speed at high speed	Nominal Speed	rpm	628	628	628	628	628
		Total Air Flow	m^3/s	31.25	37.5	43.75	50	50
	High Pressure	Nominal Speed	rpm	950	950	950	950	950
		Total Air Flow	m^3/s	31.25	37.5	43.75	50	50
Dimensions (1)		Length	mm	4340	4340	5407	5407	5407
		Width	mm	2242	2242	2242	2242	2242
		Height	mm	2478	2478	2478	2478	2478
Weight: Units with coated aluminium fin coils		Shipping	kg	4010	4420	4760	5100	5545
		Operating	kg	4314	4724	5064	5404	5990
Extra Weight:		Units with copper coils	kg	315	378	442	504	504
		Low Sound Sonata Units	kg	160	160	160	160	160
		Units with Aesthetic Panels (2)	kg	150	150	150	150	150

Model YAES-SA				0685	0715	0785	0905	0985
Refrigerant Circuits		Quantity		2	2	2	2	2
Refrigerant Charge		Circuit 1	kg	60	60	65	70	72
		Circuit 2	kg	52	60	65	70	72
Compressors		Number		2	2	2	2	2
		Type (circuit 1)		YTS L-A-H	YTS L-A-H	YTS M-A-I	YTS M-A-I	YTS N-A-J
		Type (circuit 2)		YTS J-A-G	YTS L-A-H	YTS L-A-H	YTS M-A-I	YTS N-A-J
		Capacity Control/Compressor	%	30 - 100	30 - 100	30 - 100	30 - 100	30 - 100
Oil Charge		Per Circuit	l	29.1/28.1	23/23	28/23	28/28	28/28
Evaporator		Quantity		1	1	1	1	1
		Type		DXC21086	DXC21086	DXC21086	DXC22086	DXC25080
		Water Volume	l	445	445	445	515	652
Air-Cooled Condenser		Total Coil Face Area	m^2	23.4	26	26	31.2	31.2
		Number of Tube Rows		3	3	3	3	3
		Number of Fans (circuit 1)		5	5	5	6	6
		Number of Fans (circuit 2)		4	5	5	6	6
Fans	Standard	Nominal Speed	rpm	715	715	715	715	715
		Total Air Flow	m^3/s	56.2	62.5	62.5	75.0	75.0
	2 Speed at low speed	Nominal Speed	rpm	448	448	448	448	448
		Total Air Flow	m^3/s	37.8	42.0	42.0	50.0	50.0
	2 Speed at high speed	Nominal Speed	rpm	628	628	628	628	628
		Total Air Flow	m^3/s	56.2	62.5	62.5	75.0	75.0
	High Pressure	Nominal Speed	rpm	950	950	950	950	950
		Total Air Flow	m^3/s	56.2	62.5	62.5	75.0	75.0
Dimensions (1)		Length	mm	6473	6473	6473	7540	7540
		Width	mm	2242	2242	2242	2242	2242
		Height	mm	2478	2478	2478	2478	2478
Weight: Units with coated aluminium fin coils		Shipping	kg	6240	6664	7006	7527	7893
		Operating	kg	6685	7109	7451	8042	8545
Extra Weight:		Units with copper coils	kg	568	630	630	756	756
		Low Sound Sonata Units	kg	160	165	165	165	165
		Units with Aesthetic Panels (2)	kg	150	150	150	150	150

(1) Length excludes disconnect switch or circuit breaker handles.
(2) Aesthetic panels are an option on Standard Units.

Physical Data (Continued)

Model YAES-SA				1075	1245	1405
Refrigerant Circuits		Quantity		3	3	3
Refrigerant Charge		Circuit 1	kg	66	78	81
		Circuit 2	kg	66	78	81
		Circuit 3	kg	66	78	81
Compressors		Number		3	3	3
		Type (circuit 1)		YTS L-A-H	YTS M-A-I	YTS N-A-J
		Type (circuit 2)		YTS L-A-H	YTS M-A-I	YTS N-A-J
		Type (circuit 3)		YTS L-A-H	YTS L-A-H	YTS N-A-J
		Capacity Control/Compressor	%	30 - 100	30 - 100	30 - 100
Oil Charge		Per Circuit	l	23/23/23	28/28/28	28/28/28
Evaporator		Quantity		1	1	1
		Type		DXJ350	DXJ350	DXJ350
		Water Volume	l	580	580	580
Air-Cooled Condenser		Total Coil Face Area	m^2	37.9	46.8	46.8
		Number of Tube Rows		3	3	3
		Number of Fans (circuit 1)		5	6	6
		Number of Fans (circuit 2)		5	6	6
		Number of Fans (circuit 3)		4	6	6
Fans	Standard	Nominal Speed	rpm	715	715	715
		Total Air Flow	m^3/s	87.5	112.5	112.5
	2 Speed at low speed	Nominal Speed	rpm	448	448	448
		Total Air Flow	m^3/s	58.8	75.6	75.6
	2 Speed at high speed	Nominal Speed	rpm	628	628	628
		Total Air Flow	m^3/s	87.5	112.5	112.5
	High Pressure	Nominal Speed	rpm	950	950	950
		Total Air Flow	m^3/s	87.5	112.5	112.5
Dimensions (1)		Length	mm	9759	11588	11588
		Width	mm	2242	2242	2242
		Height	mm	2478	2478	2478
Weight: Units with coated aluminium fin coils		Shipping	kg	9200	10576	10585
		Operating	kg	9758	11096	11105
Extra Weight:		Units with copper coils	kg	918	1134	1134
		Low Sound Sonata Units	kg	280	280	280
		Units with Aesthetic Panels (2)	kg	255	255	255

(1) Length excludes disconnect switch or circuit breaker handles.
(2) Aesthetic panels are an option on Standard Units.

Physical Data (Continued)

Model YAES-DSA				1505	1575	1645	1715
Refrigerant Circuits		Quantity		4	4	4	4
Refrigerant Charge		Circuits 1 & 2	kg	60	65	70	60
		Circuits 3 & 4	kg	60	60	70	70
Compressors		Number		4	4	4	4
		Type (circuit 1)		YTS L-A-H	YTS M-A-I	YTS M-A-I	YTS M-A-I
		Type (circuit 2)		YTS L-A-H	YTS L-A-H	YTS L-A-H	YTS L-A-H
		Type (circuit 3)		YTS L-A-H	YTS L-A-H	YTS M-A-I	YTS M-A-I
		Type (circuit 4)		YTS L-A-H	YTS L-A-H	YTS L-A-H	YTS M-A-I
		Capacity Control per Compressor	%	30 - 100	30 - 100	30 - 100	30 - 100
Oil Charge		Circuits 1 & 2	l	23/23	28/23	28/28	23/23
		Circuits 3 & 4	l	23/23	23/23	28/28	28/28
Evaporator		Quantity		2	2	2	2
		Type (circuits 1 & 2)		DXC21086	DXC21086	DXC21086	DXC21080
		Type (circuits 3 & 4)		DXC21086	DXC21086	DXC21086	DXC22080
		Water Volume per Evaporator	l	445/445	445/445	515/515	445/515
Air-Cooled Condenser		Total Coil Face Area	m^2	52	52	52	57.2
		Number of Tube Rows		3	3	3	3
		Number of Fans (circuits 1 & 2)		5	5	5	5
		Number of Fans (circuits 3 & 4)		5	5	5	6
Fans	Standard	Nominal Speed	rpm	715	715	715	715
		Total Air Flow	m^3/s	125	125	125	138
	2 Speed	Nominal Speed	rpm	448	448	448	448
	at low speed	Total Air Flow	m^3/s	84	84	84	92
	2 Speed	Nominal Speed	rpm	628	628	628	628
	at high speed	Total Air Flow	m^3/s	125	125	125	138
	High	Nominal Speed	rpm	950	950	950	950
	Pressure	Total Air Flow	m^3/s	125	125	150	138
Dimensions (1)		Length	mm	13246	13246	13246	14313
		Width	mm	2242	2242	2242	2242
		Height	mm	2478	2478	2478	2478
Weight: Units with coated aluminium fin coils		Shipping	kg	2 x 6664	7006+6664	7006+7006	7006+7527
		Operating	kg	2 x 7109	7451+7109	7451+7451	7451+8042
Extra Weight:		Units with copper coils	kg	2 X 630	2 X 630	2 x756	2 x 756
		Low Sound Sonata Units	kg	2 x 165	2 x 165	2 x 165	2 x 165
		Units with Aesthetic Panels (2)	kg	2 x 150	2 x 150	2 x 150	2 x 150

(1) Length excludes disconnect switch or circuit breaker handles.
(2) Aesthetic panels are an option on Standard Units.

Physical Data (Continued)

Model YAES-DSA				1785	1855	1925
Refrigerant Circuits		Quantity		4	4	4
Refrigerant Charge		Circuits 1 & 2	kg	72	72	72
		Circuits 3 & 4	kg	65	70	72
Compressors		Number		4	4	4
		Type (circuit 1)		YTS N-A-J	YTS N-A-J	YTS N-A-J
		Type (circuit 2)		YTS N-A-J	YTS N-A-J	YTS N-A-J
		Type (circuit 3)		YTS M-A-I	YTS M-A-I	YTS N-A-J
		Type (circuit 4)		YTS L-A-H	YTS M-A-I	YTS N-A-J
		Capacity Control/Compressor	%	30 - 100	30 - 100	30 - 100
Oil Charge		Circuits 1 & 2	l	28/28	28/28	28/28
		Circuits 3 & 4	l	23/28	28/28	28/28
Evaporator		Quantity		2	2	2
		Type (circuits 1 & 2)		DXC25080	DXC25080	DXC25080
		Type (circuits 3 & 4)		DXC21086	DXC22080	DXC25080
		Water Volume per Evaporator	l	652/445	652/515	652/652
Air-Cooled Condenser		Total Coil Face Area	m^2	57.2	62.4	62.4
		Number of Tube Rows		3	3	3
		Number of Fans (circuits 1 & 2)		6	6	6
		Number of Fans (circuits 3 & 4)		5	6	6
Fans	Standard	Nominal Speed	rpm	715	715	715
		Total Air Flow	m^3/s	138	150	150.0
	2 Speed at low speed	Nominal Speed	rpm	448	448	448
		Total Air Flow	m^3/s	92	100	100
	2 Speed at high speed	Nominal Speed	rpm	628	628	628
		Total Air Flow	m^3/s	138	150	150.0
	High Pressure	Nominal Speed	rpm	950	950	950
		Total Air Flow	m^3/s	138	150	150.0
Dimensions (1)		Length	mm	14313	15380	15380
		Width	mm	2242	2242	2242
		Height	mm	2478	2478	2478
Weight: Units with coated aluminium fin coils		Shipping	kg	7893+7006	7893+7527	7893 + 7893
		Operating	kg	8545+7451	8545+8042	8545 + 8545
Extra Weight:		Units with copper coils	kg	756 + 630	2 x 756	2 x 756
		Low Sound Sonata Units	kg	2 x 165	2 x 165	2 x 165
		Units with Aesthetic Panels (2)	kg	2 x 150	2 x 150	2 x 150

(1) Length excludes disconnect switch or circuit breaker handles.
(2) Aesthetic panels are an option on Standard Units.

9.4 Sound Data

Sound Power Level dB			Standard Models									SPL(1) at at 10m distance
			Mean	Octave Band Levels - Frequency Hz								
UNIT TYPE			SWL	63	125	250	500	1000	2000	4000	8000	
Standard models without acoustic treatment	0405	LWA	99	72	80	88	94	94	92	85	80	67
		LW	104	98	96	97	98	94	91	84	81	
	0475	LWA	100	73	81	90	95	95	93	86	81	68
		LW	105	99	97	98	99	95	92	85	82	
	0545	LWA	100	73	81	90	96	95	93	87	81	68
		LW	105	99	97	98	99	95	92	86	82	
	0575	LWA	100	73	81	90	96	95	93	87	81	68
		LW	105	99	97	98	99	95	92	86	82	
	0645	LWA	101	74	82	91	97	96	94	88	82	69
		LW	106	100	98	99	100	96	93	87	83	
	0685	LWA	101	75	83	92	98	97	95	89	83	68
		LW	107	101	99	100	101	97	94	88	84	
	0715	LWA	102	76	80	90	95	99	95	84	74	69
		LW	106	103	96	98	98	99	93	83	75	
	0785	LWA	102	76	80	90	95	99	95	84	74	69
		LW	106	103	96	98	98	99	93	83	75	
	0905	LWA	102	77	81	90	95	100	95	85	74	69
		LW	107	103	97	99	98	100	94	84	75	
	0985	LWA	103	77	81	91	96	100	96	85	75	70
		LW	108	104	97	99	99	100	94	84	76	
	1075	LWA	104	79	83	92	97	102	97	87	76	71
		LW	109	105	99	101	100	102	96	86	77	
	1245	LWA	105	80	84	93	98	103	98	88	78	72
		LW	110	106	100	102	101	103	97	87	79	
	1405	LWA	105	77	85	94	99	101	97	91	84	72
		LW	110	103	101	103	102	101	96	90	85	
	1505	LWA	105	79	83	93	98	102	98	87	77	72
		LW	109	106	99	101	101	102	96	86	78	
	1575	LWA	105	79	83	93	98	102	98	87	77	72
		LW	109	106	99	101	101	102	96	86	78	
	1645	LWA	105	79	83	93	98	102	98	87	77	72
		LW	109	106	99	101	101	102	96	86	78	
	1715	LWA	105	80	84	93	98	103	98	88	77	72
		LW	110	106	100	102	101	103	97	87	78	
	1785	LWA	106	80	84	94	99	103	99	88	78	73
		LW	111	107	100	102	102	103	97	87	79	
	1855	LWA	106	80	84	94	99	103	99	88	78	73
		LW	111	107	100	102	102	103	97	87	79	
	1925	LWA	106	80	84	94	99	103	99	88	78	73
		LW	111	107	100	102	102	103	97	87	79	

Note: Data in accordance with ISO 3744. 1. Sound Pressure level at 10 metres in free field conditions.

Sound Data (Continued)

Sound Power Level			Low Sound Sonata Models									SPL[(1)] at at 10m distance
			Mean	Octave Band Levels - Frequency Hz								
UNIT TYPE			SWL	63	125	250	500	1000	2000	4000	8000	
Low Sound Models	0405	LWA	92	64	71	84	85	88	84	76	65	60
Fans at High speed		LW	97	90	87	93	88	88	83	75	66	
Low Sound Models		LWA	85	57	64	81	78	80	76	66	56	53
Fans at low speed		LW	92	83	80	90	81	80	75	65	57	
Low Sound Models	0475	LWA	93	65	72	85	86	89	85	77	66	61
Fans at High speed		LW	98	91	88	94	89	89	84	76	67	
Low Sound Models		LWA	86	58	65	82	79	81	77	67	57	54
Fans at low speed		LW	93	84	81	91	82	81	76	66	58	
Low Sound Models	0545	LWA	94	66	73	86	87	90	86	78	67	62
Fans at High speed		LW	99	92	89	95	90	90	85	77	68	
Low Sound Models		LWA	87	59	66	83	80	82	78	68	58	55
Fans at low speed		LW	94	85	82	92	83	82	77	67	59	
Low Sound Models	0575	LWA	95	67	74	87	88	91	87	79	68	63
Fans at High speed		LW	100	93	90	96	91	91	86	78	69	
Low Sound Models		LWA	88	60	67	84	81	83	79	69	59	56
Fans at low speed		LW	95	86	83	93	84	83	78	68	60	
Low Sound Models	0645	LWA	95	75	76	83	90	92	87	80	70	63
Fans at High speed		LW	103	101	92	91	93	92	86	79	71	
Low Sound Models		LWA	88	65	71	81	82	84	78	69	60	56
Fans at low speed		LW	95	91	88	89	85	84	77	68	61	
Low Sound Models	0685	LWA	97	76	78	84	91	93	89	81	71	64
Fans at High speed		LW	104	103	94	93	95	93	88	80	72	
Low Sound Models		LWA	89	66	73	81	83	85	79	70	61	56
Fans at low speed		LW	97	92	89	91	86	85	78	69	62	
Low Sound Models	0715	LWA	96	70	75	86	91	93	88	79	67	63
Fans at High speed		LW	101	97	91	95	94	93	87	78	68	
Low Sound Models		LWA	91	60	68	87	83	86	81	70	61	58
Fans at low speed		LW	97	86	84	96	86	86	80	69	62	
Low Sound Models	0785	LWA	96	70	75	86	91	93	88	79	67	63
Fans at High speed		LW	101	97	91	95	94	93	87	78	68	
Low Sound Models		LWA	91	60	68	87	83	86	81	70	61	58
Fans at low speed		LW	97	86	84	96	86	86	80	69	62	
Low Sound Models	0905	LWA	96	72	76	86	90	93	89	80	69	63
Fans at High speed		LW	102	98	92	94	93	93	87	79	70	
Low Sound Models		LWA	91	62	69	86	84	87	83	73	64	58
Fans at low speed		LW	97	88	85	94	87	87	81	72	65	
Low Sound Models	0985	LWA	96	73	77	85	90	93	89	81	71	63
Fans at High speed		LW	103	100	93	94	93	93	88	80	72	
Low Sound Models		LWA	92	63	69	84	85	88	84	75	66	59
Fans at low speed		LW	97	89	85	93	88	88	83	74	67	
Low Sound Models	1075	LWA	98	75	79	87	92	95	91	83	73	65
Fans at High speed		LW	105	102	95	96	95	95	90	82	74	
Low Sound Models		LWA	94	65	71	86	87	90	87	77	68	61
Fans at low speed		LW	99	91	87	95	90	90	85	76	69	
Low Sound Models	1245	LWA	100	77	81	89	94	97	93	85	75	67
Fans at High speed		LW	107	105	97	98	97	97	92	84	76	
Low Sound Models		LWA	96	67	73	88	89	92	88	79	70	63
Fans at low speed		LW	101	93	89	97	92	92	87	78	71	
Low Sound Models	1405	LWA	102	79	83	91	96	99	95	87	77	69
Fans at High speed		LW	109	106	99	100	99	99	94	86	78	
Low Sound Models		LWA	98	69	75	90	91	94	90	81	72	65
Fans at low speed		LW	103	95	91	99	94	94	89	80	73	
Low Sound Models	1505	LWA	99	73	78	89	94	96	91	82	70	66
Fans at High speed		LW	104	100	94	98	97	96	90	81	71	
Low Sound Models		LWA	94	63	71	90	86	89	84	73	64	61
Fans at low speed		LW	100	89	87	99	89	89	83	72	65	
Low Sound Models	1575	LWA	99	73	78	89	94	96	91	82	70	66
Fans at High speed		LW	104	100	94	98	97	96	90	81	71	
Low Sound Models		LWA	94	63	71	90	86	89	84	73	64	61
Fans at low speed		LW	100	89	87	99	89	89	83	72	65	
Low Sound Models	1645	LWA	99	73	78	89	94	96	91	82	70	66
Fans at High speed		LW	104	100	94	98	97	96	90	81	71	
Low Sound Models		LWA	94	63	71	90	86	89	84	73	64	61
Fans at low speed		LW	100	89	87	99	89	89	83	72	65	
Low Sound Models	1715	LWA	99	75	79	89	93	96	92	83	72	66
Fans at High speed		LW	105	101	95	97	96	96	90	82	73	
Low Sound Models		LWA	94	65	72	89	87	90	86	76	67	61
Fans at low speed		LW	100	91	88	97	90	90	84	75	68	
Low Sound Models	1785	LWA	99	76	80	88	93	96	92	84	74	66
Fans at High speed		LW	106	103	96	97	96	96	91	83	75	
Low Sound Models		LWA	95	66	72	87	88	91	87	78	69	61
Fans at low speed		LW	100	92	88	96	91	91	86	77	70	
Low Sound Models	1855	LWA	99	76	80	88	93	96	92	84	74	65
Fans at High speed		LW	106	103	96	97	96	96	91	83	75	
Low Sound Models		LWA	95	66	72	87	88	91	87	78	69	61
Fans at low speed		LW	100	92	88	96	91	91	86	77	70	

9.5 Unit Electrical Data

Models	Nominal Running (1) AMPS @ 380 V	Nominal Running (1) AMPS @ 400 V	Maximum Running (2) AMPS @360V	Maximum Running (2) AMPS @ 380 V	Maximum Running (2) AMPS @ 400 V	Start-up (3) Amps	Largest Compressor Star for Star/Delta Current Amps @ 380V	Largest Compressor Star for Star/Delta Current Amps @ 400V
	Without Power Factor Correction							
	With Optional Power Factor Correction fitted							
0405	247	235	328	308	291	306	175	187
	238	226	318	297	280	302		
0475	289	275	387	363	343	359	175	187
	279	265	375	349	329	352		
0545	313	298	415	390	369	400	215	228
	303	289	404	378	357	393		
0575	336	320	442	416	394	425	215	228
	326	312	432	406	384	420		
0645	390	372	512	484	462	479	233	248
	378	360	500	470	450	473		
0685	403	386	543	513	489	596	340	365
	387	369	527	495	472	590		
0715	415	399	573	541	515	623	340	365
	395	377	553	519	493	612		
0785	468	450	649	613	585	745	457	487
	446	426	626	590	561	734		
0905	544	522	734	694	664	819	457	487
	520	496	708	670	638	806		
0985	576	554	780	738	706	860	475	507
	552	528	754	712	678	846		
Main Panel (System 1 and 2)								
1075	415	399	573	541	515	880	340	365
	395	377	553	519	493	858		
1245	530	510	734	694	664	1077	457	487
	506	484	708	670	638	1053		
1405	576	554	780	738	706	1213	475	507
	552	528	754	712	678	1185		
Auxiliary Panel (System 3)								
1075	203	195	282	266	253	Start-up Amps included with System 1 and 2	340	365
	193	184	272	255	242			
1245	212	204	291	275	262		340	365
	202	193	281	264	251			
1405	288	277	390	369	353		475	507
	276	264	377	356	339			

(1) Nominal running amps at 35°C ambient air temperature and 7°C leaving liquid temperature.
(2) Maximum running amps at 45°C ambient air temperature and 10°C leaving liquid temperature.
(3) Start-Up amps is the largest compressor starting with the other systems operating at maximum amps at 400 V.

Unit Electrical Data (Continued)

Models	Nominal Running (1) AMPS		Maximum Running (2) AMPS			Start-up (3) Amps	Largest Compressor Star for Star/Delta Current Amps	
	@ 380 V	@ 400 V	@360V	@ 380 V	@ 400 V			
	Without Power Factor Correction						@ 380V	@ 400V
	With Optional Power Factor Correction fitted							
Main Panel (Systems 1 and 2)								
1505	415	399	573	541	515	1138	340	365
	395	377	553	519	493	1105		
1575	468	450	649	613	585	1260	457	487
	446	426	626	590	561	1227		
1645	468	450	649	613	585	1330	457	487
	446	426	626	590	561	1295		
1715	468	450	649	613	585	1404	457	487
	446	426	626	590	561	1367		
1785	576	554	780	738	706	1445	475	507
	552	528	754	712	678	1407		
1855	576	554	780	738	706	1524	475	507
	552	528	754	712	678	1484		
1925	576	554	780	738	706	1566	475	507
	552	528	754	712	678	1525		
Auxiliary Panel (Systems 3 and 4)								
1505	415	399	573	541	515	Start Up Amps included with Main Panel Data	340	365
	395	377	553	519	493			
1575	415	399	573	541	515		340	365
	395	377	553	519	493			
1645	468	450	649	613	585		457	487
	446	426	626	590	561			
1715	544	522	734	694	664		457	487
	520	496	708	670	638			
1785	468	450	649	613	585		457	487
	446	426	626	590	561			
1855	544	522	734	694	664		457	487
	520	496	708	670	638			
1925	576	554	780	738	706		475	507
	552	528	754	712	678			

(1) Nominal running amps at 35°C ambient air temperature and 7°C leaving liquid temperature.
(2) Maximum running amps at 45°C ambient air temperature and 10°C leaving liquid temperature.
(3) Start-Up amps is the largest compressor starting with the other systems operating at maximum amps at 400 V.

9.6 System Electrical Data

Models	SYS No.	Nominal Running (1) AMPS @ 380 V	Nominal Running (1) AMPS @ 400 V	Maximum Running (2) AMPS @360	Maximum Running (2) AMPS @ 380 V	Maximum Running (2) AMPS @ 400 V	Compressor Star for Star/Delta Starting Current A @ 380V	Compressor Star for Star/Delta Starting Current A @ 400V
		Without Power Factor Correction						
		With Optional Power Factor Correction fitted						
0405	1	145	138	194	182	172	175	187
		140	133	188	175	165		
	2	102	97	134	126	119	157	167
		98	93	130	122	115		
0475	1 & 2	145	138	194	182	172	175	187
		140	133	188	175	165		
0545	1	168	160	221	208	197	215	228
		163	156	216	203	192		
	2	145	138	194	182	172	175	187
		140	133	188	175	165		
0575	1 & 2	168	160	221	208	197	215	228
		163	156	216	203	192		
0645	1 & 2	195	186	256	242	231	233	248
		189	180	250	235	225		
0685	1	208	200	287	271	258	340	365
		198	189	277	260	247		
	2	195	186	256	242	231	233	248
		189	180	250	235	225		
0715	1 & 2	208	200	287	271	258	340	365
		198	189	277	260	247		
0785	1	261	251	363	343	328	457	487
		249	238	350	331	315		
	2	208	200	287	271	258	340	365
		198	189	277	260	247		
0905	1 & 2	272	261	367	347	332	457	487
		260	248	354	335	319		
0985	1 & 2	288	277	390	369	353	475	507
		276	264	377	356	339		
1075	1 & 2	208	200	287	271	258	340	365
		198	189	277	260	247		
	3	203	195	282	266	253	340	365
		193	184	272	255	242		
1245	1 & 2	265	255	367	347	332	457	487
		253	242	354	335	319		
	3	212	204	291	275	262	340	365
		202	193	281	264	251		
1405	1, 2 & 3	288	277	390	369	353	475	507
		276	264	377	356	339		

(1) Nominal running amps at 35°C ambient air temperature and 7°C leaving liquid temperature.
(2) Maximum running amps at 45°C ambient air temperature and 10°C leaving liquid temperature.
When optional high pressure fans are fitted add 6.0 amps (models 0715, 0785), or 7.2 amps (models 0905, 0985), or 6.0 amps (model 1075, systems 1 & 2) and 4.8 amps (model 1075, systems 3), or 7.2 amps (models 1245, 1405).

System Electrical Data (Continued)

Models	SYS No.	Nominal Running (1) AMPS @ 380 V	Nominal Running (1) AMPS @ 400 V	Maximum Running (2) AMPS @360	Maximum Running (2) AMPS @ 380 V	Maximum Running (2) AMPS @ 400 V	Compressor Star for Star/Delta Starting Current A @ 380V	Compressor Star for Star/Delta Starting Current A @ 400V
		Without Power Factor Correction						
		With Optional Power Factor Correction fitted						
1505	**1, 2, 3 & 4**	208	200	287	271	258	340	365
		198	189	277	260	247		
1575	**1**	261	251	363	343	328	457	487
		249	238	350	331	315		
	2	208	200	287	271	258	340	365
		198	189	277	260	247		
	3 & 4	208	200	287	271	258	340	365
		198	189	277	260	247		
1645	**1 & 3**	261	251	363	343	328	457	487
		249	238	350	331	315		
	2 & 4	208	200	287	271	258	340	365
		198	189	277	260	247		
1715	**1**	261	251	363	343	328	457	487
		249	238	350	331	315		
	2	208	200	287	271	258	340	365
		198	189	277	260	247		
	3 & 4	272	261	367	347	332	457	487
		260	248	354	335	319		
1785	**1 & 2**	288	277	390	369	353	475	507
		276	264	377	356	339		
	3	261	251	363	343	328	457	487
		249	238	350	331	315		
	4	208	200	287	271	258	340	365
		198	189	277	260	247		
1855	**1 & 2**	288	277	390	369	353	475	507
		276	264	377	356	339		
	3 & 4	272	261	367	347	332	457	487
		260	248	354	335	319		
1925	**1, 2, 3 & 4**	288	277	390	369	353	475	507
		276	264	377	356	339		

(1) Nominal running amps at 35°C ambient air temperature and 7°C leaving liquid temperature.
(2) Maximum running amps at 45°C ambient air temperature and 10°C leaving liquid temperature.
When optional high pressure fans are fitted add 6.0 amps (models 0715, 0785), or 7.2 amps (models 0905, 0985), or 6.0 amps (model 1075, systems 1 & 2) and 4.8 amps (model 1075, systems 3), or 7.2 amps (models 1245, 1405).

Notes on Protective Devices

Fuses

The maximum fuse size given :

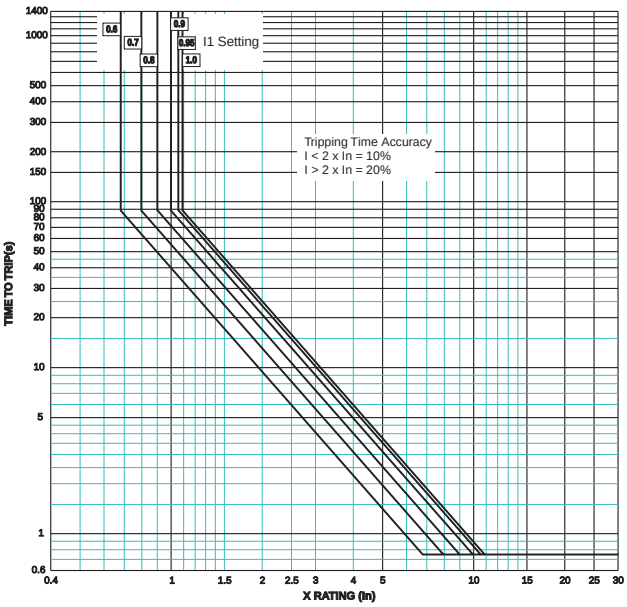
1. Means that the conditional short-circuit current of the (optional) fused disconnect switch is 50KA.
2. Ensures a minimum of TYPE 1 co-ordination for contactors to EN 60947-1:1992 with a conditional short circuit current of 50KA
3. Ensures that the ultimate allowable short-time conductor temperature under short-circuit conditions is not exceeded in accordance with EN 60204-1:1992

Fuses not exceeding the 5 second interruption current in the tables must be used.

Circuit Breakers

Short circuit protection - the circuit Breakers will trip at 4 times the rating of the Circuit Breaker (In) within 60ms.
Overload Protection - Refer to the Overload Protection Graph and the Settings (I1) given in the tables.

Overload Protection Tripping Times Graph



9.7 Compressor Electrical Data

			Compressor Running Conditions						Largest Compressor	
			Nominal (1)			Maximum (2)			Star for Star/Delta	
			Power	Current Amps		Power	Current Amps		Starting Current A	
			kW	@ 380V	@ 400V	kW	@360	@ 380V	@ 400V	
Models	**SYS No.**	Comp's Motor	Without Power Factor Correction						@ 380V	@ 400V
			With Optional Power Factor Correction fitted							
0405	**1**	YTS H-A-E	77	131	124	96.2	180	168	158	175	187
				126	119		174	161	151		
	2	YTS F-A-D	55.7	93	88	69.5	125	117	110	157	167
				89	84		121	113	106		
0475	**1 & 2**	YTS H-A-E	77	131	124	96.2	180	168	158	175	187
				126	119		174	161	151		
0545	**1**	YTS I-A-F	91.5	150	142	114.3	203	190	179	215	228
				145	138		198	185	174		
	2	YTS H-A-E	77	131	124	96.2	180	168	158	175	187
				126	119		174	161	151		
0575	**1 & 2**	YTS I-A-F	91.5	150	142	114.3	203	190	179	215	228
				145	138		198	185	174		
0645	**1 & 2**	YTS J-A-G	108	177	168	134.9	238	224	213	233	248
				171	162		232	217	207		
0685	**1**	YTS J-A-G	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
	2	YTS J-A-G	108	177	168	134.9	238	224	213	233	248
				171	162		232	217	207		
0715	**1 & 2**	YTS L-A-H	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
0785	**1**	YTS M-A-I	143	238	228	192	340	320	305	457	487
				226	215		327	308	292		
	2	YTS L-A-H	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
0905	**1 & 2**	YTS M-A-I	147	245	234	192	340	320	305	457	487
				233	221		327	308	292		
0985	**1 & 2**	YTS N-A-J	158	261	250	206	363	342	326	475	507
				249	237		350	329	312		
1075	**1, 2 & 3**	YTS L-A-H	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
1245	**1 & 2**	YTS M-A-I	143	238	228	192	340	320	305	457	487
				226	215		327	308	292		
	3	YTS L-A-H	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
1405	**1, 2 & 3**	YTS N-A-J	158	261	250	206	363	342	326	475	507
				249	237		350	329	312		

(1) Nominal conditions at 35°C ambient and 7°C leaving liquid temperature.
(2) Maximum conditions at 45°C ambient air temperature and 10°C leaving liquid temperature.

Compressor Electrical Data (Continued)

Models	SYS No.	Comp's Motor	Compressor Running Conditions							Largest Compressor Star for Star/Delta Starting Current A	
			Nominal (1)			Maximum (2)					
			Power kW	Current Amps @ 380V	Current Amps @ 400V	Power kW	Current Amps @360	Current Amps @ 380V	Current Amps @ 400V		
			Without Power Factor Correction							@ 380V	@ 400V
			With Optional Power Factor Correction fitted								
1505	**1, 2, 3 & 4**	YTS L-A-H	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
1575	**1**	YTS M-A-I	143	238	228	192	340	320	305	457	487
				226	215		327	308	292		
	2	YTS L-A-H	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
	3 & 4	YTS L-A-H	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
1645	**1 & 3**	YTS M-A-I	143	238	228	192	340	320	305	457	487
				226	215		327	308	292		
	2 & 4	YTS L-A-H	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
1715	**1**	YTS M-A-I	143	238	228	192	340	320	305	457	487
				226	215		327	308	292		
	2	YTS L-A-H	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
	3 & 4	YTS M-A-I	147	245	234	192	340	320	305	457	487
				233	221		327	308	292		
1785	**1 & 2**	YTS N-A-J	158	261	250	206	363	342	326	475	507
				249	237		350	329	312		
	3	YTS M-A-I	143	238	228	192	340	320	305	457	487
				226	215		327	308	292		
	4	YTS L-A-H	111	185	177	148	264	248	235	340	365
				175	166		254	237	224		
1855	**1 & 2**	YTS N-A-J	158	261	250	206	363	342	326	475	507
				249	237		350	329	312		
	3 & 4	YTS M-A-I	147	245	234	192	340	320	305	457	487
				233	221		327	308	292		
1925	**1, 2, 3 & 4**	YTS N-A-J	158	261	250	206	363	342	326	475	507
				249	237		350	329	312		

(1) Nominal conditions at 35°C ambient and 7°C leaving liquid temperature.
(2) Maximum conditions at 45°C ambient air temperature and 10°C leaving liquid temperature.

9.8 Control Circuit Electrical Data

	Multi-Point Power Supply
Control Supply Load at 400 V (A)	3
Internal Fuse Rating Class aM	10
Maximum Customer Fuse Rating	16
Maxinum Customer Wire Size	4 mm^2

9.9 Fan Electrical Data

Models	Standard Fans - data per fan						
	No. of Fans per System				Power kW	Running Conditions Amps	Locked Rotor Conditions Amps
	System						
	1	2	3	4	@ 400V	@ 400V	@ 400V
0405	3	2			2	4.5	18.6
0475	3	3			2	4.5	18.6
0545	4	3			2	4.5	18.6
0645, 00575	4	4			2	4.5	18.6
0685	5	4			2	4.5	18.6
0715, 0785	5	5			2	4.5	18.6
0905, 0985	6	6			2	4.5	18.6
1075	5	5	4		2	4.5	18.6
1245, 1405	6	6	6		2	4.5	18.6
1505, 1575, 1645	5	5	5	5	2	4.5	18.6
1715	5	5	6	6	2	4.5	18.6
1785	6	6	5	5	2	4.5	18.6
1855, 1925	6	6	6	6	2	4.5	18.6

Models	Low Sound Units (Sonata) - data per fan									
	No. of Fans per System				Power kW @ 400V		Running Conditions		Locked Rotor Conditions	
							Slow (Star)	Fast (Delta)	Slow (Star)	Fast (Delta)
	System									
	1	2	3	4	Slow (Star)	Fast(Delta)	Amps @ 400V		Amps @ 400V	
0405	3	2			1.1	2	2	3.4	3.9	11.5
0475	3	3			1.1	2	2	3.4	3.9	11.5
0545	4	3			1.1	2	2	3.4	3.9	11.5
0645, 00575	4	4			1.1	2	2	3.4	3.9	11.5
0685	5	4			1.1	2	2	3.4	3.9	11.5
0715, 0785	5	5			1.1	2	2	3.4	3.9	11.5
0905, 0985	6	6			1.1	2	2	3.4	3.9	11.5
1075	5	5	4		1.2	2	2	3.4	3.9	11.5
1245, 1405	6	6	6		1.2	2	2	3.4	3.9	11.5
1505, 1575, 1645	5	5	5	5	1.2	2	2	3.4	3.9	11.5
1715	5	5	6	6	1.2	2	2	3.4	3.9	11.5
1785	6	6	5	5	1.2	2	2	3.4	3.9	11.5
1855, 1925	6	6	6	6	1.2	2	2	3.4	3.9	11.5

Models	High Pressure Fans (data per fan)						
	No. of Fans per System				Power kW	Running Conditions Amps	Locked Rotor Conditions Amps
	System						
	1	2	3	4	@ 400V	@ 400V	@ 400V
0405	3	2			2.2	5.7	25.4
0475	3	3			2.2	5.7	25.4
0545	4	3			2.2	5.7	25.4
0645, 00575	4	4			2.2	5.7	25.4
0685	5	4			2.2	5.7	25.4
0715, 0785	5	5			2.2	5.7	25.4
0905, 0985	6	6			2.2	5.7	25.4
1075	5	5	4		3.3	5.7	25.4
1245, 1405	6	6	6		3.3	5.7	25.4
1505, 1575, 1645	5	5	5	5	3.3	5.7	25.4
1715	5	5	6	6	3.3	5.7	25.4
1785	6	6	5	5	3.3	5.7	25.4
1855, 1925	6	6	6	6	3.3	5.7	25.4

9.10 Connection and Protective Device Data

Standard Single Point Power Connection

Common Input Section Non-fused Switch Disconnect with Power section System Fuses

	Common Input Section			Power Section(s) System Fuses Max IEC 269-2-1 gG fuse Size			
Model	Switch	Rating Ie	Input Lug Size	**System**	Rating (A)	Din NH Size	Max. 5 S Interrupt (A)
0405	SDF	400	M10	**1**	250	2	1300
				2	160	2	810
0475	SDF	400	M10	**1 & 2**	250	2	1300
0545	SDF	400	M10	**1**	315	2	1700
				2	250	2	1300
0575	SDF	400	M10	**1 & 2**	315	2	1700
0645	SDF	400	M10	**1 & 2**	315	2	1700
0685	SDF	400	M10	**1**	355	2	2200
				2	315	2	1700
0715	SDF	400	M10	**1 & 2**	355	2	2200
0785	NSD	1000	2*M12	**1**	500	3	3300
				2	355	2	2200
0905	NSD	1000	2*M12	**1 & 2**	500	3	3300
0985	NSD	1000	2*M12	**1 & 2**	500	3	3300
Main Panel (System 1 and 2)							
1075	NSD	630	M12	**1 & 2**	355	2	2200
1245	NSD	1000	2*M12	**1 & 2**	500	3	3300
1405	NSD	1000	2*M12	**1 & 2**	500	3	3300
1505	SDF	630	M12	**1 & 2**	355	2	2200
1575	SDF	1000	2*M12	**1**	500	3	3300
				2	355	2	2200
1645	NSD	1000	2*M12	**1**	500	3	3300
				2	355	2	2200
1715	NSD	1000	2*M12	**1 & 2**	500	3	3300
1785	NSD	1000	2*M12	**1 & 2**	500	3	3300
1855	NSD	1000	2*M12	**1 & 2**	500	3	3300
1925	NSD	1000	2*M12	**1 & 2**	500	3	3300
Auxiliary Panel (System 3 and 4)							
1505	NSD	630	M12	**3 & 4**	355	2	2200
1575	NSD	630	M12	**3 & 4**	355	2	2200
1645	NSD	1000	2*M12	**3**	500	3	3300
				4	355	2	2200
1715	NSD	1000	2*M12	**3 & 4**	500	3	3300
1785	NSD	1000	2*M12	**3**	500	3	3300
				4	355	2	2200
1855	NSD	1000	2*M12	**3 & 4**	500	3	3300
1925	NSD	1000	2*M12	**3 & 4**	500	3	3300
Auxiliary Panel (System 3) - Fused Disconnect Switch							
1075	NSD	400	M10	**3**	355	2	2200
1245	NSD	400	M10	**3**	355	2	2200
1405	NSD	630	M12	**3**	500	3	3300

SDF = Switch Disconnect Fuse NSD = Non-fused Switch Disconnect

Optional Single Point Power Connection
Systems 1 and 2: Common Input Section Non-Fused Switch Disconnect with Power Section System Switch Disconnect Fuse or System Circuit Breakers
System 3 and 4: Power Section System Switch Disconnect Fuse or System Circuit Breakers

		Common Input Section		Power Section(s)						
				Fused Disconnect Switch Option				Circuit Breaker		
		Non-fused Switch Disconnect			Max IEC 269-2-1 gG fuse Size			Option		
Model	System No	Rating Ie	Input Lug Size	Rating Ie	Rating (A)	Din NH Size	Max. 5 S Interrupt (A)	Rating In	Setting (I1)	Effective Setting
0405	1	500	M10	400	250	2	1300	250	0.8	200
	2			250	160	1	810	160	0.9	144
0475	1 & 2	500	M10	400	250	2	1300	250	0.8	200
0545	1	630	M12	400	315	2	1700	250	0.9	225
	2			400	250	2	1300	250	0.8	200
0575	1 & 2	630	M12	400	315	2	1700	250	0.9	225
0645	1 & 2	630	M12	400	315	2	1700	400	0.7	280
0685	1	630	M12	400	355	2	2200	400	0.8	320
	2			400	315	2	1700	400	0.7	280
0715	1 & 2	630	M12	400	355	2	2200	400	0.8	320
0785	1	1000	2*M12	630	500	3	3300	400	0.95	380
	2			400	355	2	2200	400	0.8	320
0905	1 & 2	1000	2*M12	630	500	3	3300	630	0.6	378
0985	1 & 2	1000	2*M12	630	500	3	3300	630	0.7	441
Main Panel (System 1 and 2)										
1075	1 & 2	630	M12	400	355	2	2200	400	0.8	320
1245	1 & 2	1000	2*M12	630	500	3	3300	400	0.95	380
1405	1 & 2	1000	2*M12	630	500	3	3300	630	0.7	441
1505	1 & 2	630	M12	400	355	2	2200	400	0.8	320
1575	1	1000	2*M12	630	500	3	3300	400	0.95	380
	2			400	355	2	2200	400	0.8	320
1645	1	1000	2*M12	630	500	3	3300	400	0.95	380
	2			400	355	2	2200	400	0.8	320
1715	1	1000	2*M12	630	500	3	3300	400	0.95	380
	2			400	355	2	2200	400	0.8	320
1785	1 & 2	1000	2*M12	630	500	3	3300	630	0.7	441
1855	1 & 2	1000	2*M12	630	500	3	3300	630	0.7	441
1925	1 & 2	1000	2*M12	630	500	3	3300	630	0.7	441
Auxiliary Panel (System 3 and 4)										
1505	3 & 4	630	M12	400	355	2	2200	400	0.8	320
1575	3 & 4	630	M12	400	355	2	2200	400	0.8	320
1645	3	1000	2*M12	630	500	3	3300	400	0.95	380
	4			400	355	2	2200	400	0.8	320
1715	3 & 4	1000	2*M12	630	500	3	3300	630	0.6	378
1785	3	1000	2*M12	630	500	3	3300	400	0.95	380
	4			400	355	2	2200	400	0.8	320
1855	3 & 4	1000	2*M12	630	500	3	3300	630	0.6	378
1925	3 & 4	1000	2*M12	630	500	3	3300	630	0.7	441

Auxiliary Panel (System 3) - Circuit Breaker Option					
Model YAES-SA	System No	Input Lug Size	Rating In	Setting (I1)	Effective Setting
1075	3	M10	400	0.8	320
1245	3	M10	400	0.95	380
1405	3	M10	630	0.7	441

Optional Multi-Point Power Connection

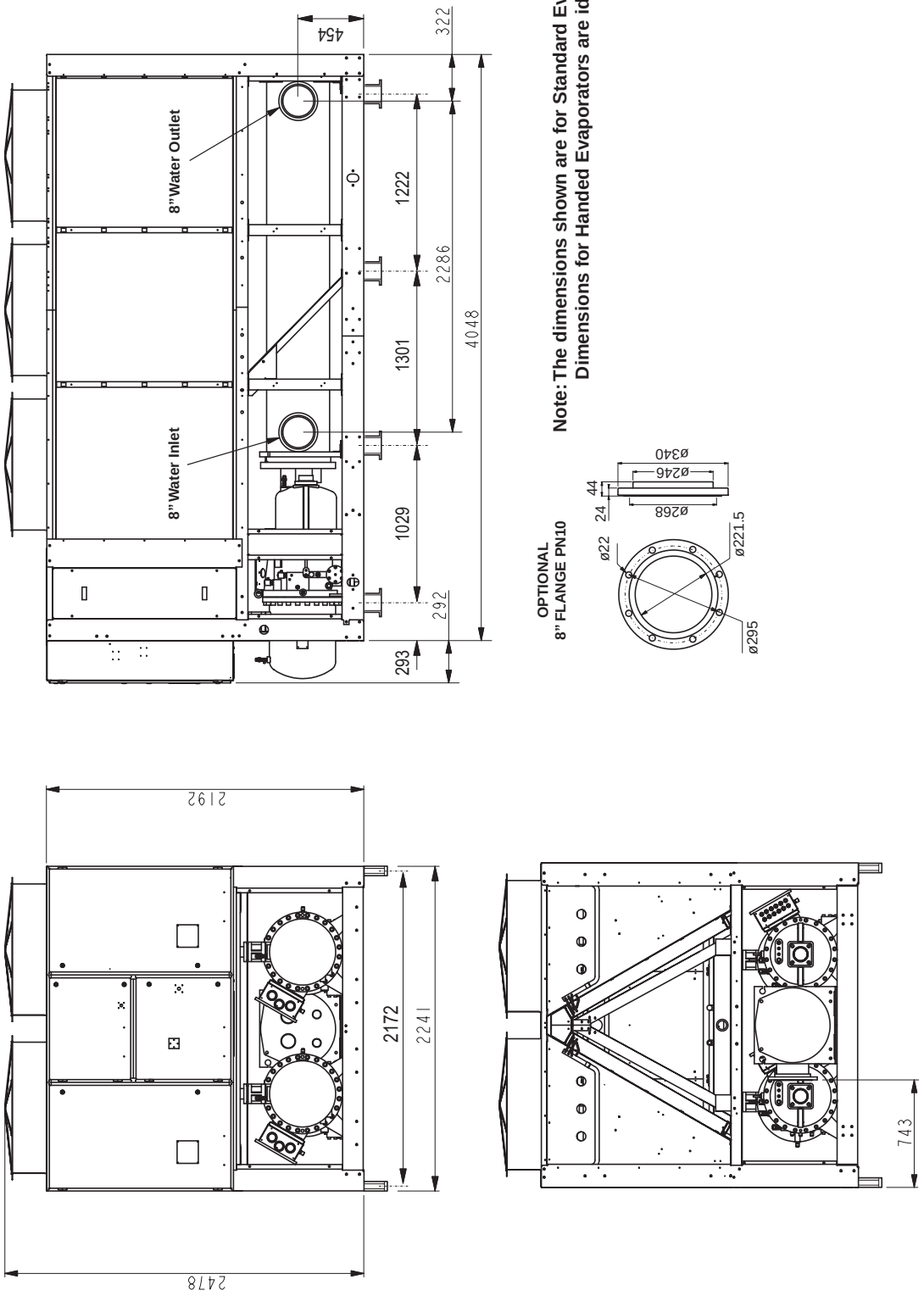
Systems 1 and 2: Common Input Section Terminal Block with Power Section System Switch Disconnect Fuse or System Circuit Breakers

System 3 and 4: Power Section System Switch Disconnect Fuse or System Circuit Breakers

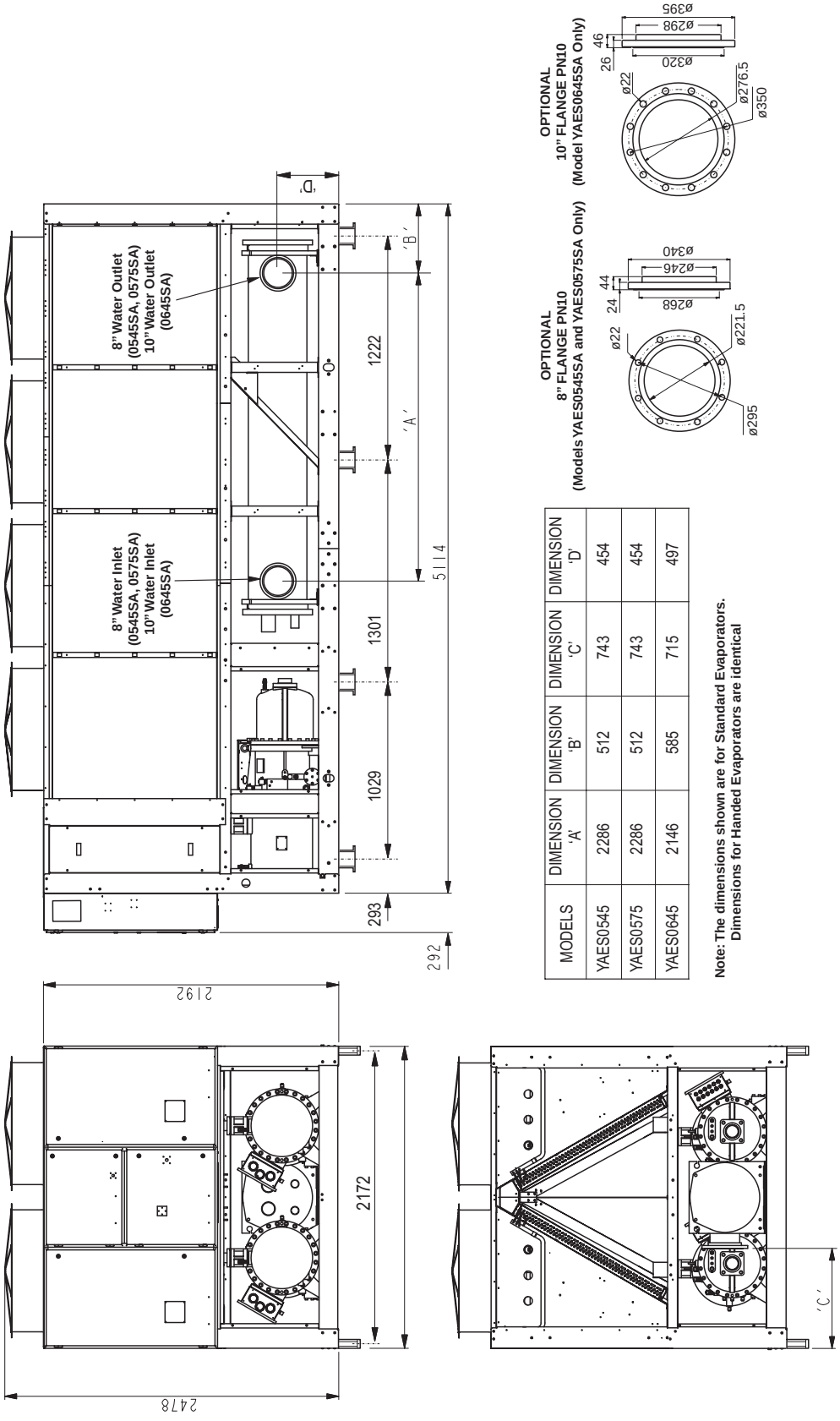
		Common Input Section		**Power Section(s)**						
		Terminal Block		Fused Disconnect Switch Option				Circuit Breaker Option		
					Max IEC 269-2-1 gG fuse Size					
Model	**System No**	Rating Ie	Lug Size	Rating Ie	Rating (A)	Din NH Size	Max. 5 S Interrupt (A)	Rating In	Setting (I1)	Effective Setting
0405	**1**	400	M10	400	250	2	1300	250	0.8	200
	2	400	M10	250	160	1	810	160	0.9	144
0475	**1 & 2**	400	M10	400	250	2	1300	250	0.8	200
0545	**1**	400	M10	400	315	2	1700	250	0.9	225
	2	400	M10	400	250	2	1300	250	0.8	200
0575	**1 & 2**	400	M10	400	315	2	1700	250	0.9	225
0645	**1 & 2**	400	M10	400	315	2	1700	400	0.7	280
0685	**1**	400	M10	400	355	2	2200	400	0.8	320
	2	400	M10	400	315	2	1700	400	0.7	280
0715	**1 & 2**	400	M10	400	355	2	2200	400	0.8	320
0785	**1**	400	M10	630	500	3	3300	400	0.95	380
	2	400	M10	400	355	2	2200	400	0.8	320
0905	**1 & 2**	630	M12	630	500	3	3300	630	0.6	378
0985	**1 & 2**	630	M12	630	500	3	3300	630	0.7	441
Main Panel (System 1 and 2)										
1075	**1 & 2**	400	M10	400	355	2	2200	400	0.8	320
1245	**1 & 2**	400	M10	630	500	3	3300	400	0.95	380
1405	**1 & 2**	630	M12	630	500	3	3300	630	0.7	441
1505	**1 & 2**	400	M10	400	355	2	2200	400	0.8	320
1575	**1**	400	M10	630	500	3	3300	400	0.95	380
	2	400	M10	400	355	2	2200	400	0.8	320
1645	**1**	400	M10	630	500	3	3300	400	0.95	380
	2	400	M10	400	355	2	2200	400	0.8	320
1715	**1**	400	M10	630	500	3	3300	400	0.95	380
	2	400	M10	400	355	2	2200	400	0.8	320
1785	**1 & 2**	630	M12	630	500	3	3300	630	0.7	441
1855	**1 & 2**	630	M12	630	500	3	3300	630	0.7	441
1925	**1 & 2**	630	M12	630	500	3	3300	630	0.7	441
Auxiliary Panel (System 3 and 4)										
1505	**3 & 4**	400	M10	400	355	2	2200	400	0.8	320
1575	**3 & 4**	400	M10	400	355	2	2200	400	0.8	320
1645	**3**	400	M10	630	500	3	3300	400	0.95	380
	4	400	M10	400	355	2	2200	400	0.8	320
1715	**3 & 4**	630	M12	630	500	3	3300	630	0.6	378
1785	**3**	400	M10	630	500	3	3300	400	0.95	380
	4	400	M10	400	355	2	2200	400	0.8	320
1855	**3 & 4**	630	M12	630	500	3	3300	630	0.6	378
1925	**3 & 4**	630	M12	630	500	3	3300	630	0.7	441
Auxiliary Panel (System 3)										
1075 to 1405	**Refer to Single Point Fused Disconnect Switch or Optional Circuit Breaker Data**									

9.11 Dimensions

Models YAES0405SA and YAES0475SA



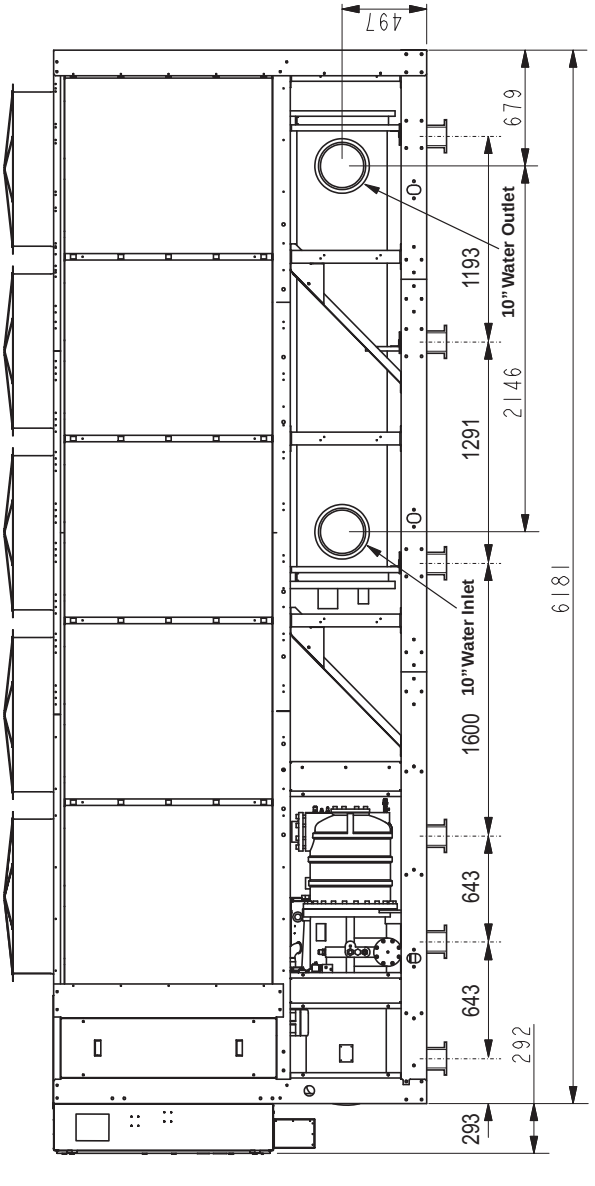
Models YAES0545SA, YAES0575SA and YAES0645SA

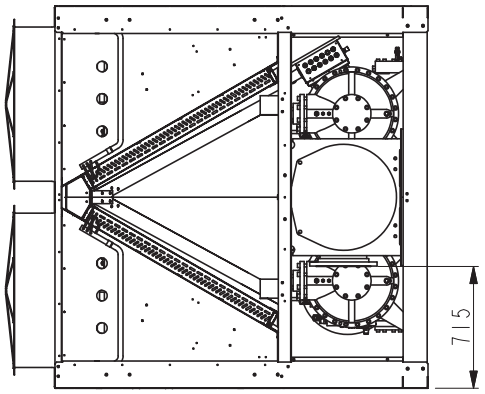


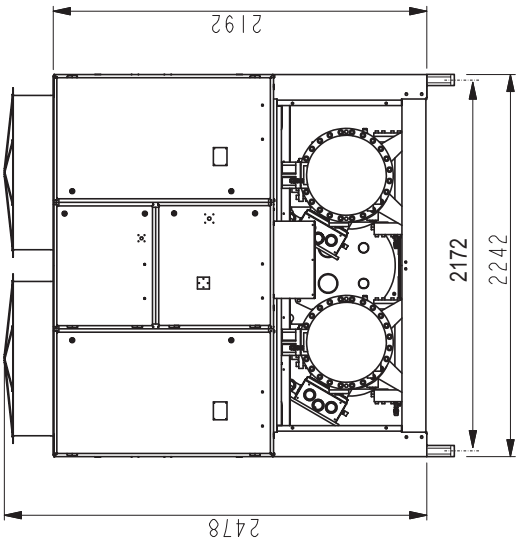
MODELS	DIMENSION 'A'	DIMENSION 'B'	DIMENSION 'C'	DIMENSION 'D'
YAES0545	2286	512	743	454
YAES0575	2286	512	743	454
YAES0645	2146	585	715	497

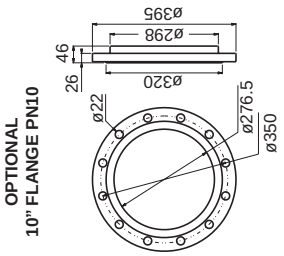
Note: The dimensions shown are for Standard Evaporators.
Dimensions for Handed Evaporators are identical

Models YAES0685SA, YAESSA0715 and YAESSA0785





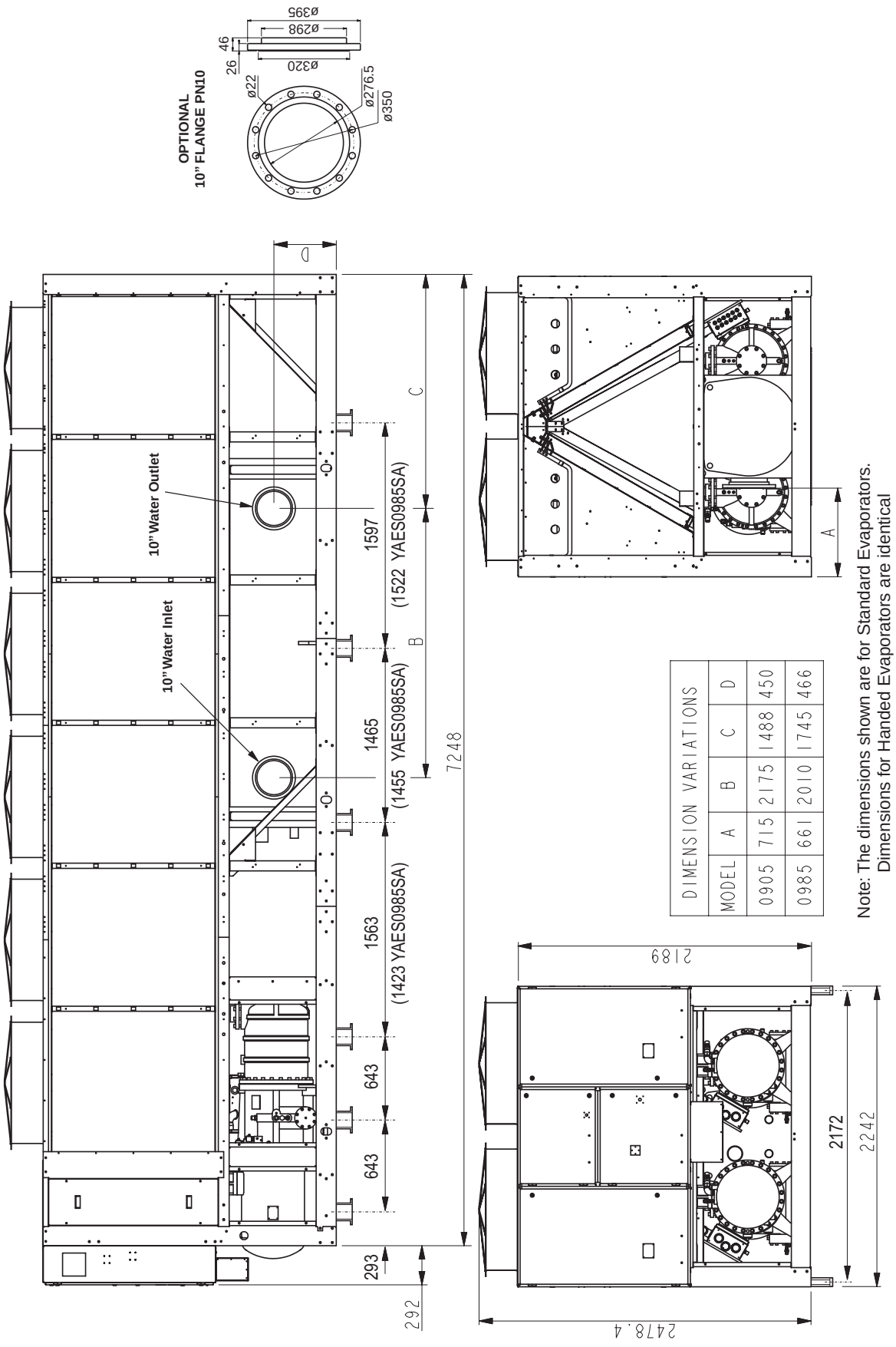




OPTIONAL
10" FLANGE PN10

Note: The dimensions shown are for Standard Evaporators. Dimensions for Handed Evaporators are identical

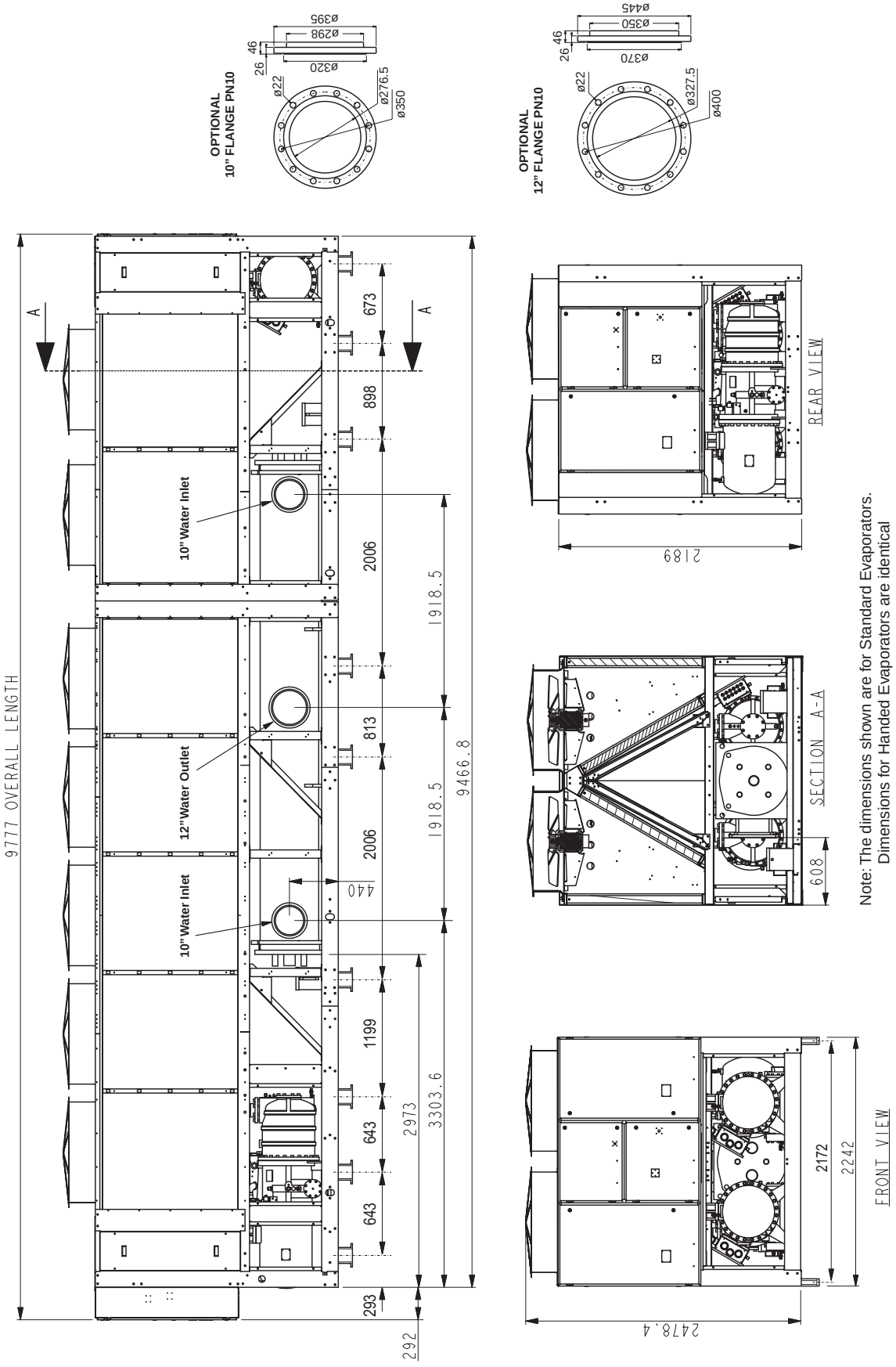
Models YAES0905SA and YAES0985SA



DIMENSION VARIATIONS				
MODEL	A	B	C	D
0905	715	2175	1488	450
0985	661	2010	1745	466

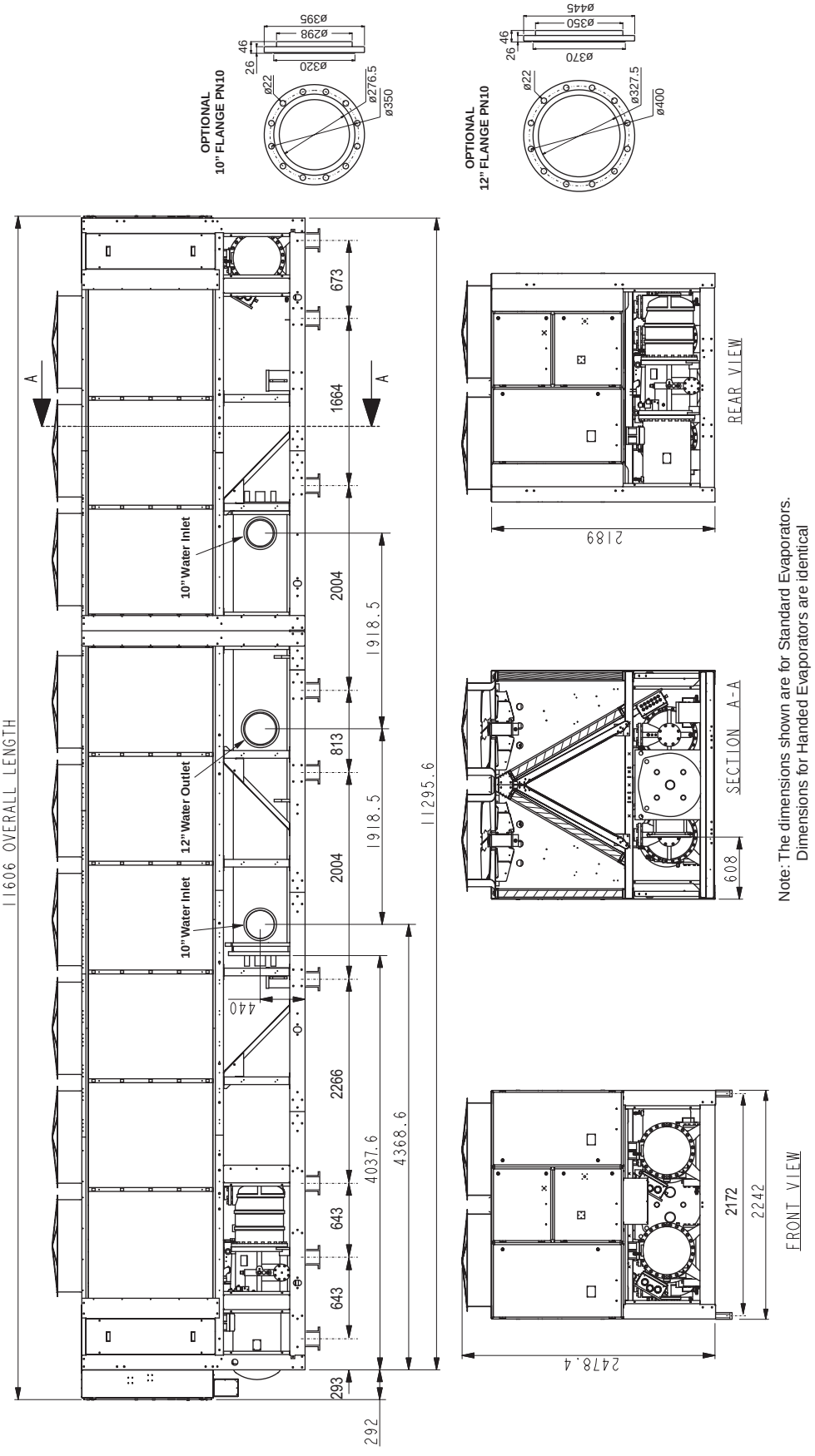
Note: The dimensions shown are for Standard Evaporators.
Dimensions for Handed Evaporators are identical

Model YAES1075SA

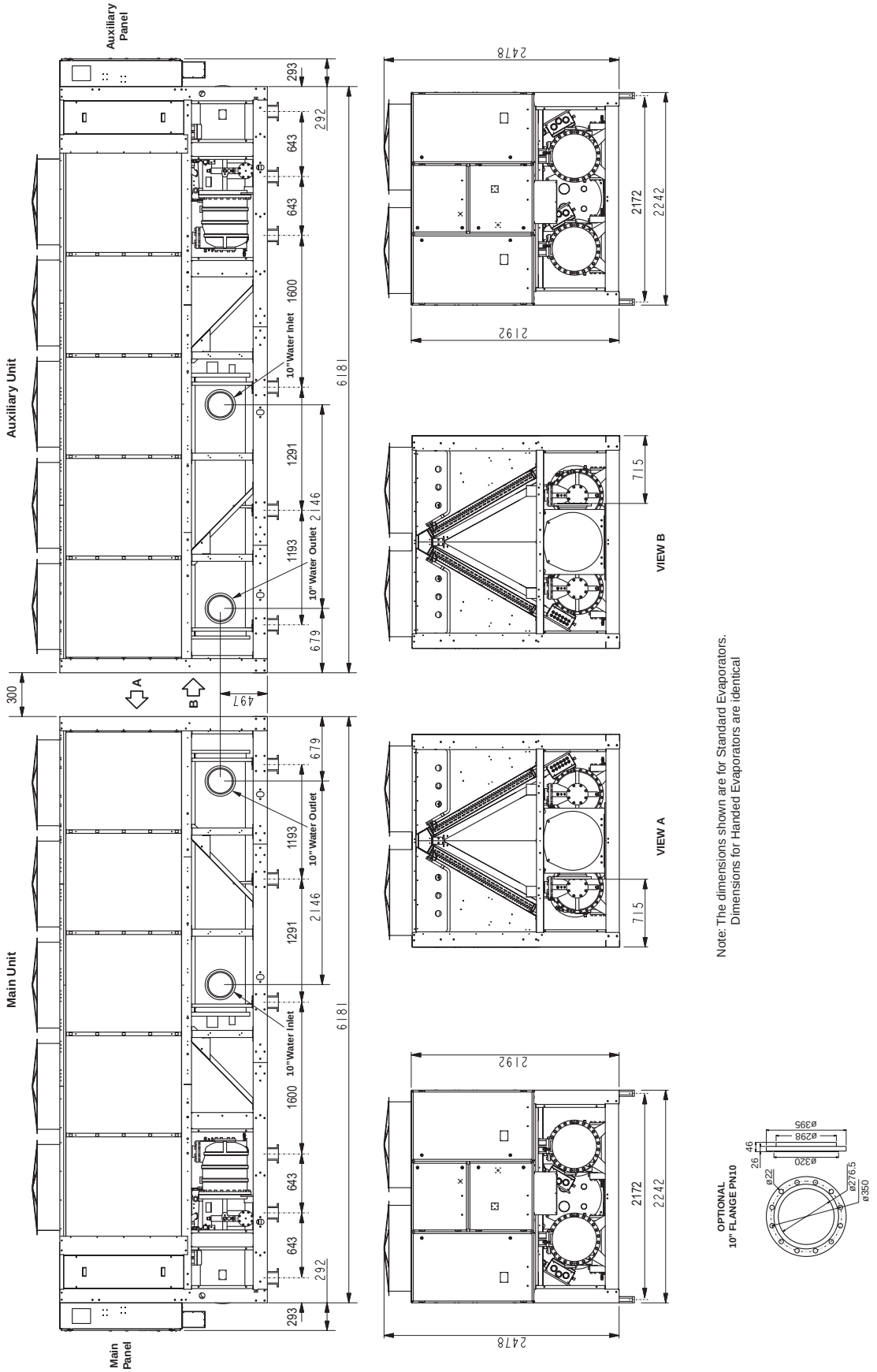


Note: The dimensions shown are for Standard Evaporators.
Dimensions for Handed Evaporators are identical

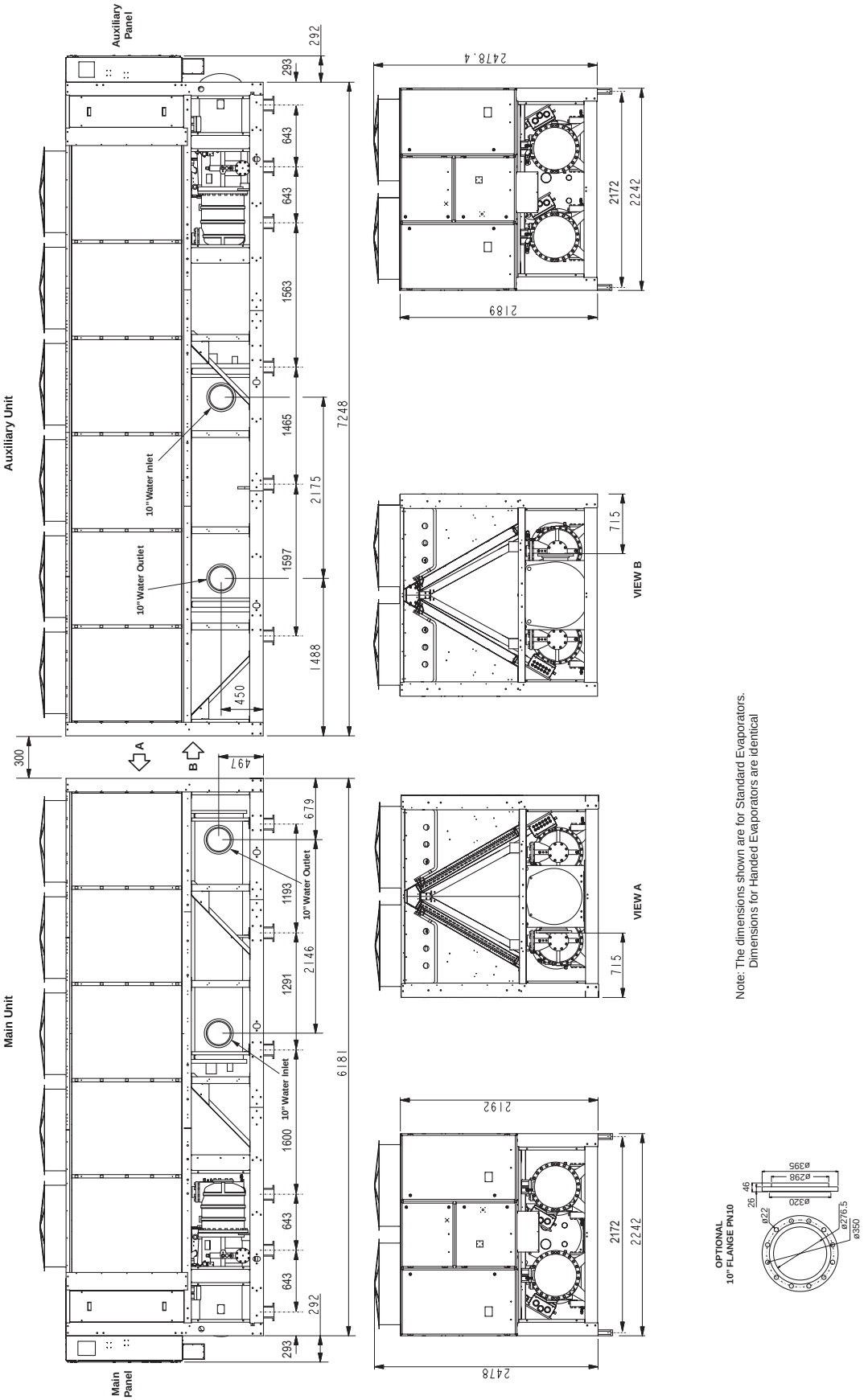
Models YAES1245SA and YAES1405SA



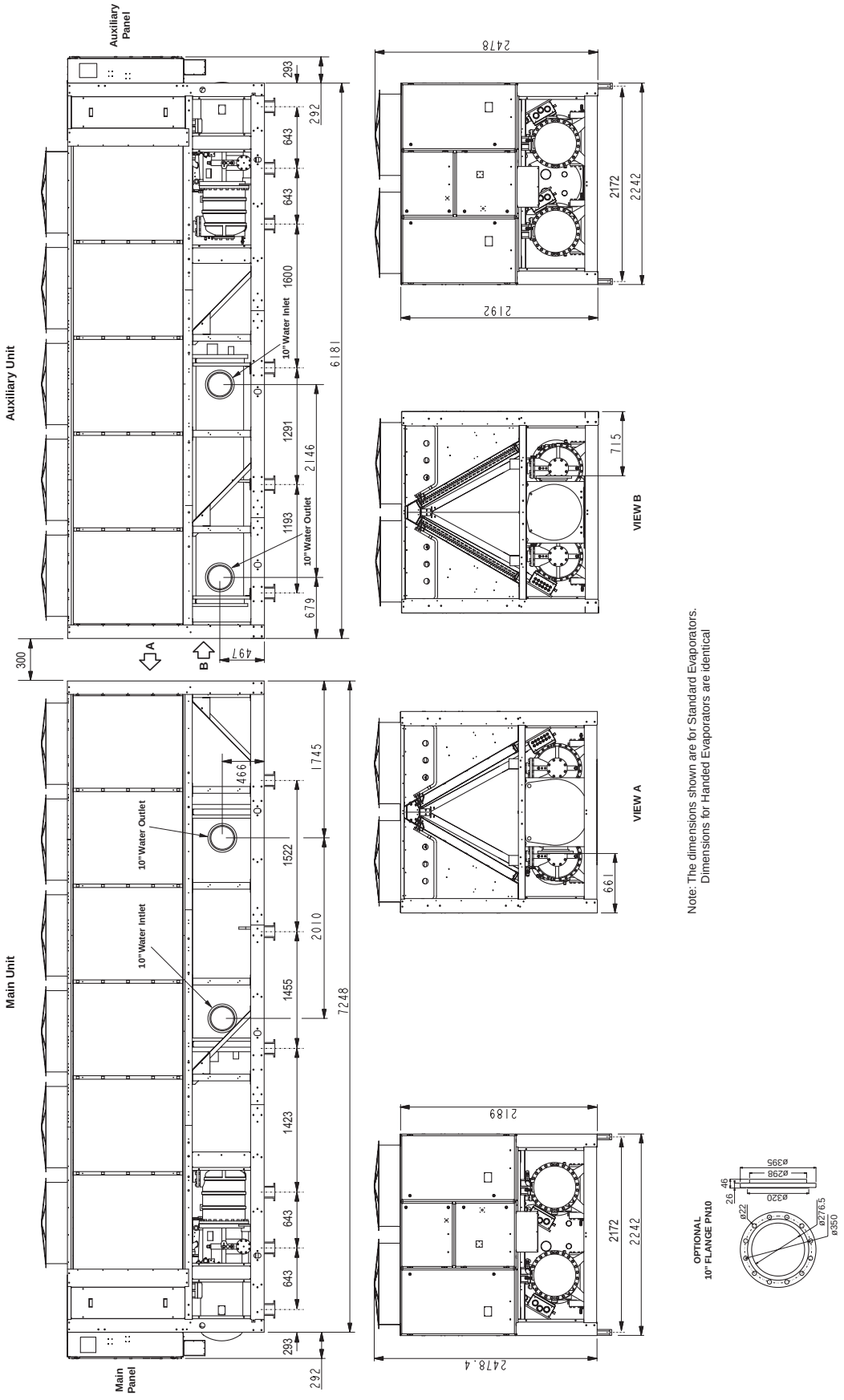
Models YAES1505DSA,YAES1575DSA and YAES1645DSA



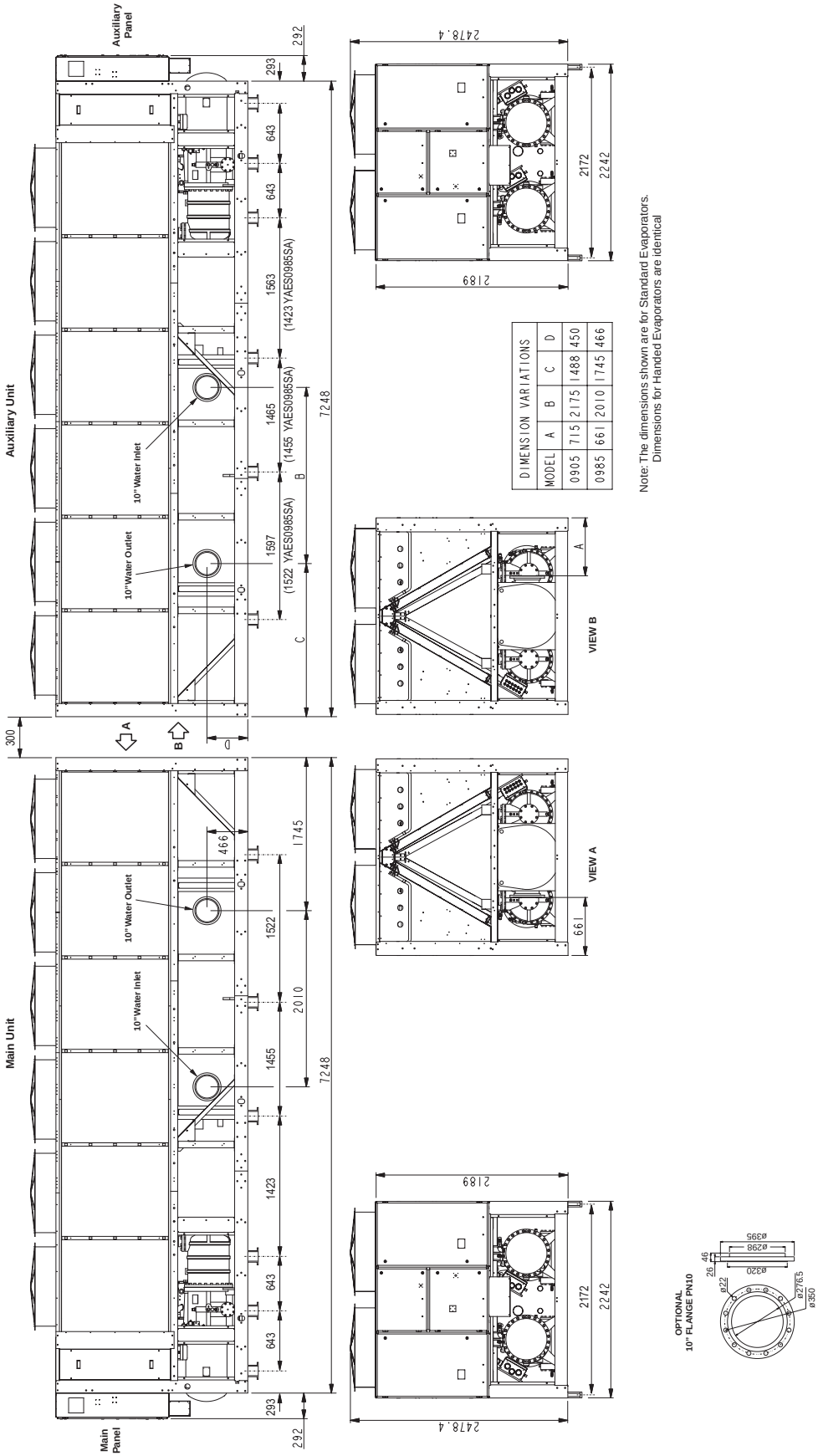
Model YAES1715DSA



Model YAES1785DSA

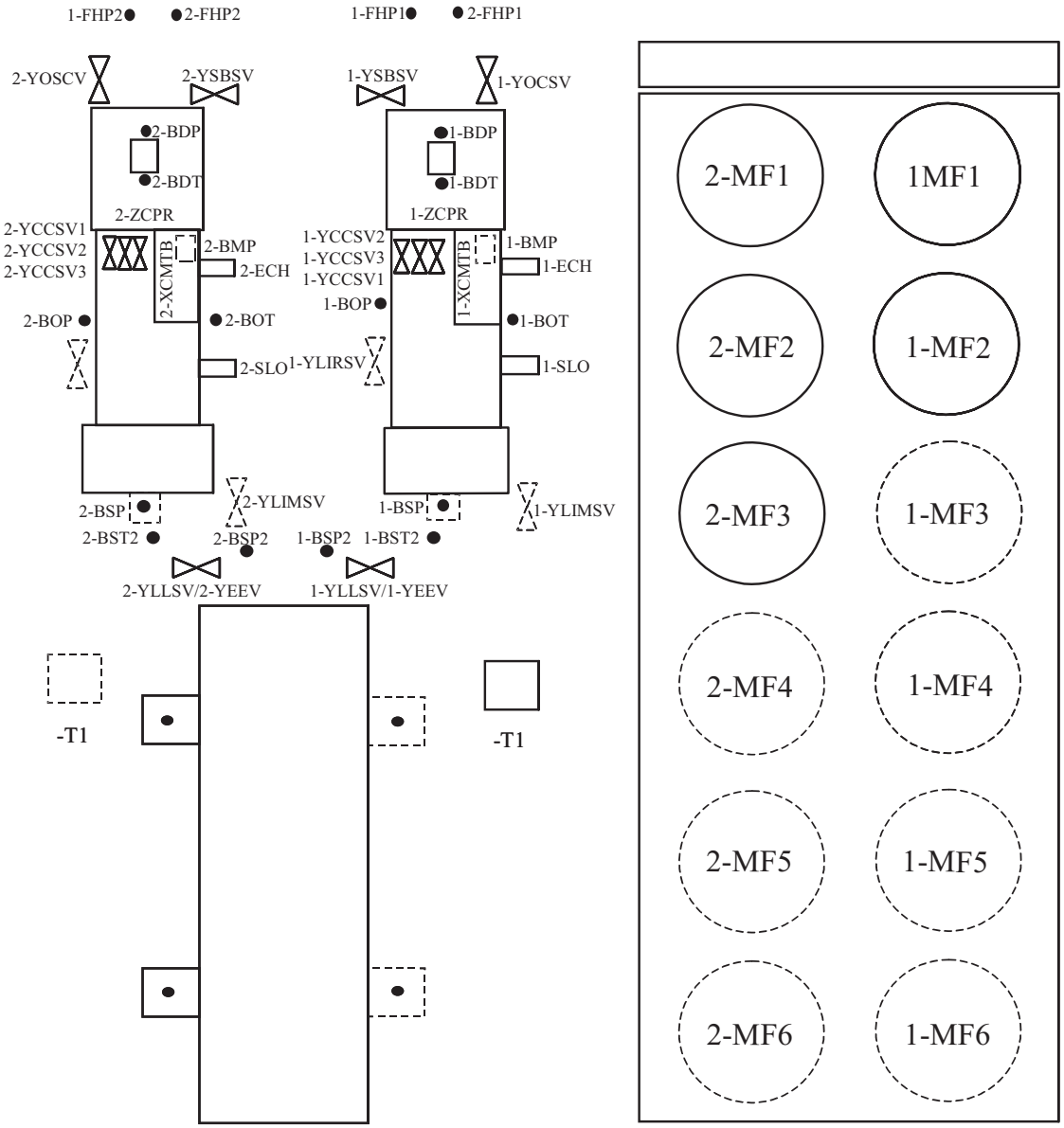


Models YAES1855DSA and YAES1925DSA



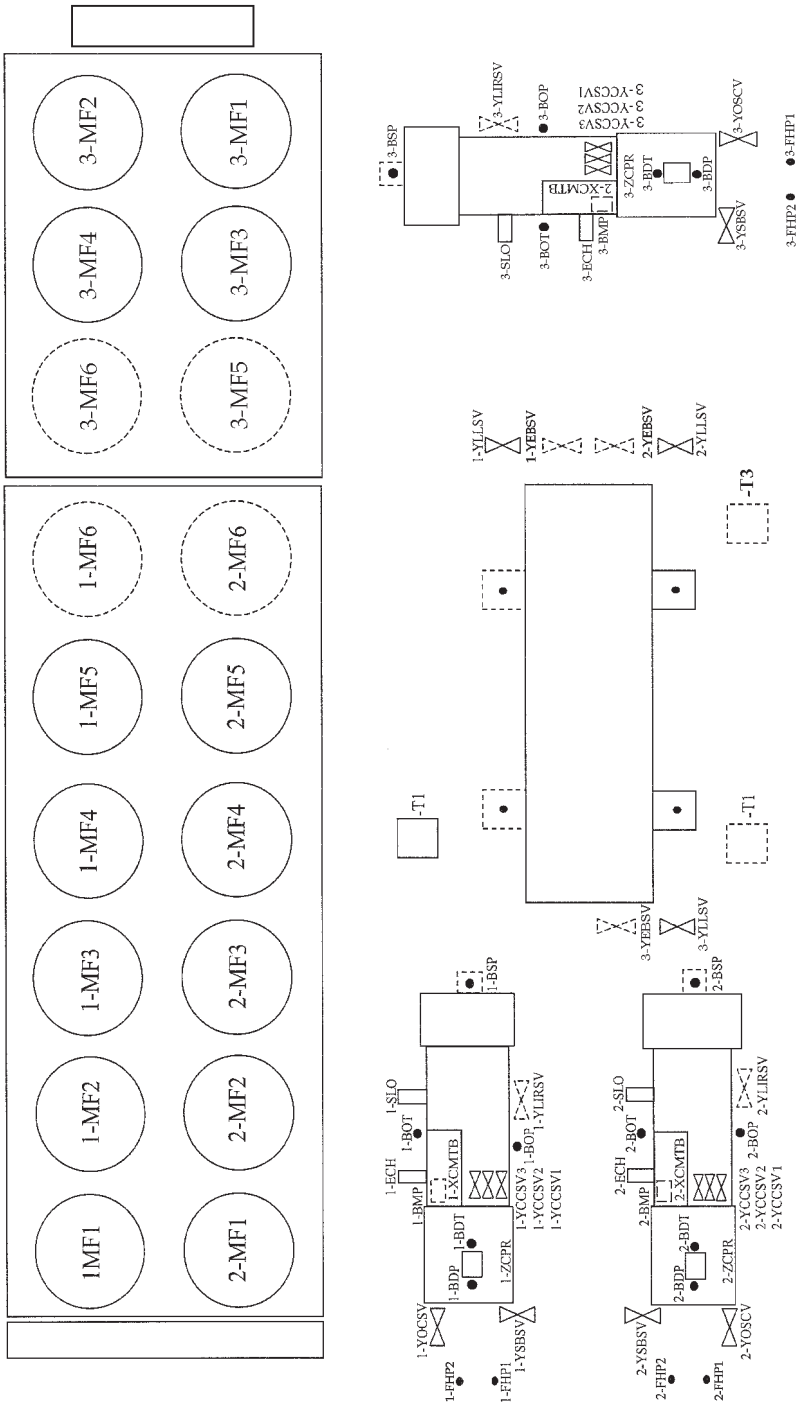
9.12 Component Locations

2 System Models



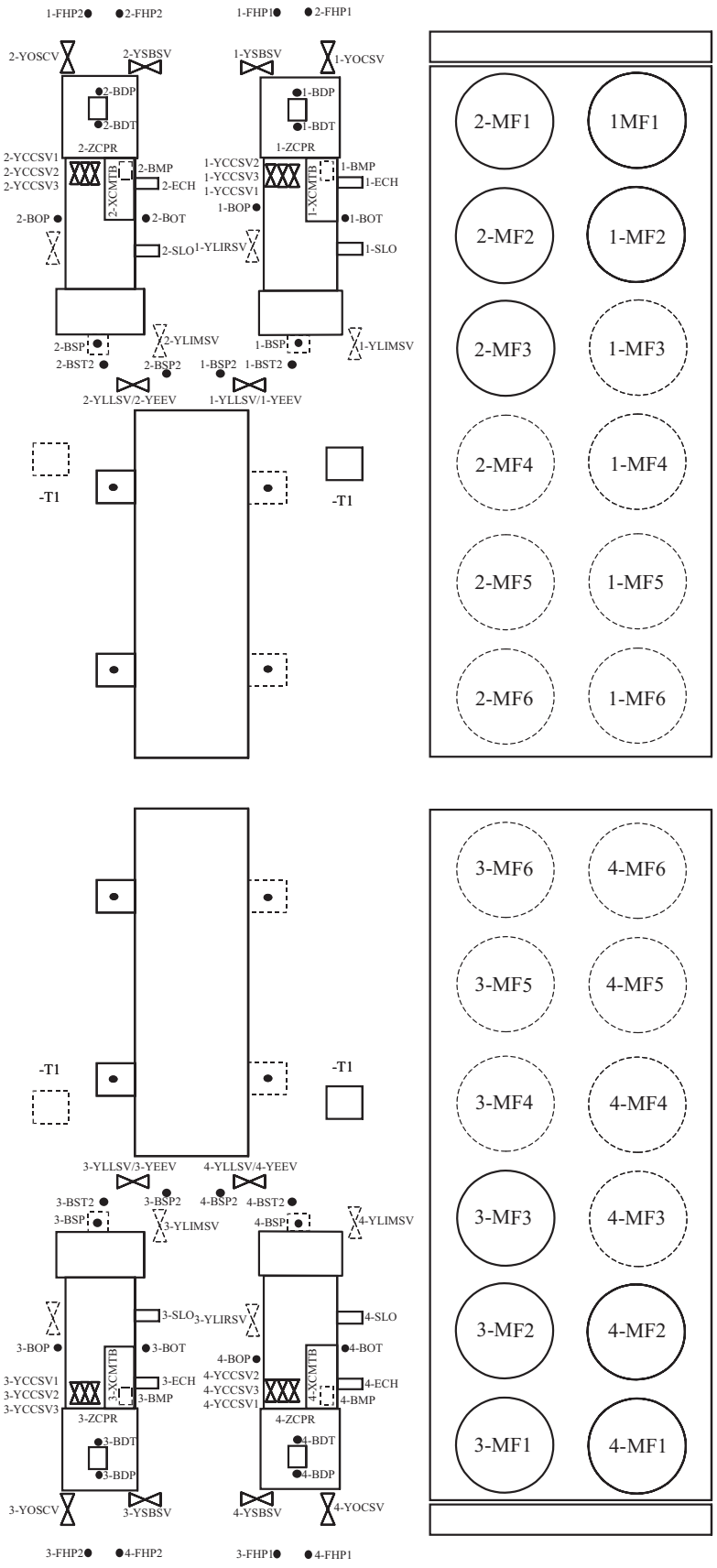
- BDP DISCHARGE PRESSURE
- BDT DISCHARGE TEMPERATURE
- BMP MOTOR PROTECTOR
- BOP OIL PRESSURE
- BOT OIL TEMPERATURE
- BSP SUCTION PRESSURE
- ECH CRANK CASE HEATER
- FHP HIGH PRESSURE CUT-OUT
- YEEV ELECTRONIC EXPANSION VALVE
- XCMTB COMPRESSOR MOTOR TERMINAL BOX
- ZCPR COMPRESSOR
- SLO SWITCH LOW OIL
- YOCSV OIL COOLING SOLENOID VALVE
- YLIRSV LIQUID INJECTION ROTOR SOLENOID VALVE
- YLLSV LIQUID LINE SOLENOID VALVE
- YEBSV EXPANSION VALVE BYPASS SOLENOID VALVE (WHEN FITTED)
- YSBSV STARTING BYPASS SOLENOID VALVE
- YLIMSV LIQUID INJECTION MOTOR SOLENOID VALVE

3 System Models



- BDP DISCHARGE PRESSURE
- BDT DISCHARGE TEMPERATURE
- BMP MOTOR PROTECTOR
- BOP OIL PRESSURE
- BOT OIL TEMPERATURE
- BSP SUCTION PRESSURE
- ECH CRANK CASE HEATER
- FHP HIGH PRESSURE CUT-OUT
- XCMTB COMPRESSOR MOTOR TERMINAL BOX
- ZCPR COMPRESSOR
- SLO SWITCH LOW OIL
- YOCSV OIL COOLING SOLENOID VALVE
- YLIRSV LIQUID INJECTION ROTOR SOLENOID VALVE
- YLLSV LIQUID LINE SOLENOID VALVE
- YEBSV EXPANSION VALVE BYPASS SOLENOID VALVE (WHEN FITTED)
- YSBSV STARTING BYPASS SOLENOID VALVE

4 System Models



- BDP DISCHARGE PRESSURE
- BDT DISCHARGE TEMPERATURE
- BMP MOTOR PROTECTOR
- BOP OIL PRESSURE
- BOT OIL TEMPERATURE
- BSP SUCTION PRESSURE
- ECH CRANK CASE HEATER
- FHP HIGH PRESSURE CUT-OUT
- XCMTB COMPRESSOR MOTOR TERMINAL BOX
- ZCPR COMPRESSOR
- SLO SWITCH LOW OIL
- YOCSV OIL COOLING SOLENOID VALVE
- YLIRSV LIQUID INJECTION ROTOR SOLENOID VALVE
- YLLSV LIQUID LINE SOLENOID VALVE
- YEBSV EXPANSION VALVE BYPASS SOLENOID VALVE (WHEN FITTED)
- YSBSV STARTING BYPASS SOLENOID VALVE
- YEEV ELECTRONIC EXPANSION VALVE
- YLIMSV LIQUID INJECTION MOTOR SOLENOID VALVE

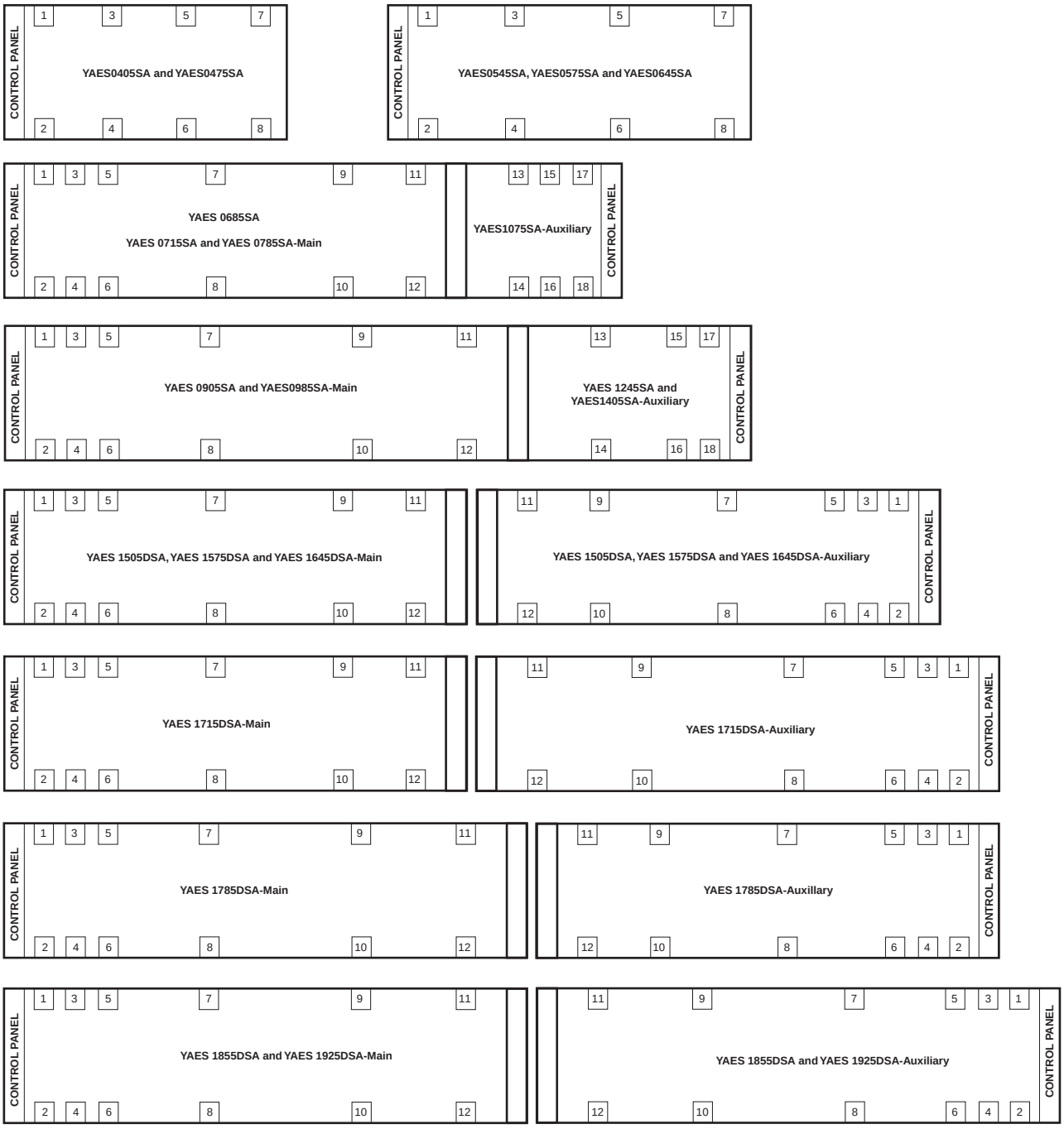
9.13 Point Load and AVM Data

		LOCATION											
MODEL		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
0405	AVM Colour	Grey	Grey	Green	Green	Green	Green	Green	Green				
	Point Load kg	884	884	582	582	431.4	431	259	259				
0475	AVM Colour	White	White	Green	Green	Green	Green	Green	Green				
	Point Load kg	968	968	638	638	472.4	472	283	283				
0545	AVM Colour	Grey	Grey	Green	Green	Green	Green	Green	Green				
	Point Load kg	810	810	658	658	658.32	658	405	405				
0575	AVM Colour	Grey	Grey	Green	Green	Green	Green	Green	Green				
	Point Load kg	865	865	703	703	702.52	703	432	432				
0645	AVM Colour	White	White	Grey	Grey	Grey	Grey	Green	Green				
	Point Load kg	958	958	779	779	778.7	779	479	479				
0685	AVM Colour	White	White	White	White	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
	Point Load kg	756.5	756.5	844.5	844.5	415.5	415.5	462	462	452	452	412	412
0715	AVM Colour	White	White	White	White	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
	Point Load kg	827	827	915	915	486	486	462	462	452	452	412	412
0785	AVM Colour	White	White	White	White	Green	Orange	Orange	Orange	Orange	Orange	Orange	Orange
	Point Load kg	914	856	1002	944	518	465	458	458	450	450	412	412
0905	AVM Colour	White	White	White	White	Green	Green	Green	Green	Green	Green	Orange	Orange
	Point Load kg	942	942	1030	1030	550	550	522	522	510	510	467	467
0985	AVM Colour	White	White	White	White	Green	Green	Green	Green	Green	Green	Green	Green
	Point Load kg	952	952	1040	1040	612	612	582	582	568	568	518	518

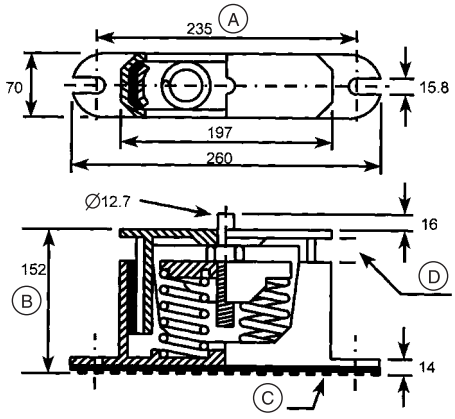
		LOCATION								
MODEL		**1&2**	**3&4**	**5&6**	**7&8**	**9&10**	**11&12**	**13&14**	**15&16**	**17&18**
1075	AVM Colour	Grey	Green	Orange	Green	Green	Green	Green	Orange	Orange
	Point Load kg	855	536	483	579	588	588	579	276	488
1245	AVM Colour	White	White	Green	Green	Green	Green	Green	Orange	Orange
	Point Load kg	952	1040	505	488	527	514	570	438	514
1405	AVM Colour	White	White	Green	Green	Green	Green	Green	Orange	Orange
	Point Load kg	952	1040	506	488	528	514	571	438	515

		LOCATION											
MODEL		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1505	AVM Colour	White	White	White	White	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Main & Auxillary	Point Load kg	827	827	915	915	486	486	462	462	452	452	412	412
1575	AVM Colour	White	White	White	White	Green	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Main	Point Load kg	914	856	1002	944	518	465	458	458	450	450	412	412
1575	AVM Colour	White	White	White	White	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Auxillary	Point Load kg	827	827	915	915	486	486	462	462	452	452	412	412
1645	AVM Colour	White	White	White	White	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Main & Auxillary	Point Load kg	827	827	915	915	486	486	462	462	452	452	412	412
1715	AVM Colour	White	White	White	White	Green	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Main	Point Load kg	914	856	1002	944	518	465	458	458	450	450	412	412
1715	AVM Colour	White	White	White	White	Green	Green	Green	Green	Green	Green	Orange	Orange
Auxillary	Point Load kg	942	942	1030	1030	550	550	522	522	510	510	467	467
1785	AVM Colour	White	White	White	White	Green	Green	Green	Green	Green	Green	Green	Green
Main	Point Load kg	952	952	1040	1040	612	612	582	582	568	568	518	518
1785	AVM Colour	White	White	White	White	Green	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Auxillary	Point Load kg	914	856	1002	944	518	465	458	458	450	450	412	412
1855	AVM Colour	White	White	White	White	Green	Green	Green	Green	Green	Green	Green	Green
Main	Point Load kg	952	952	1040	1040	612	612	582	582	568	568	518	518
1855	AVM Colour	White	White	White	White	Green	Green	Green	Green	Green	Green	Orange	Orange
Auxillary	Point Load kg	942	942	1030	1030	550	550	522	522	510	510	467	467
1925	AVM Colour	White	White	White	White	Green	Green	Green	Green	Green	Green	Green	Green
Main & Auxillary	Point Load kg	952	952	1040	1040	612	612	582	582	568	568	518	518

WHEN ACOUSTIC ENCLOSURE IS FITTED ADD 28kgs TO POINT LOADS AT LOCATIONS 1, 2, 3, 4, 5 & 6.



Isolator Details
CP-2-XX



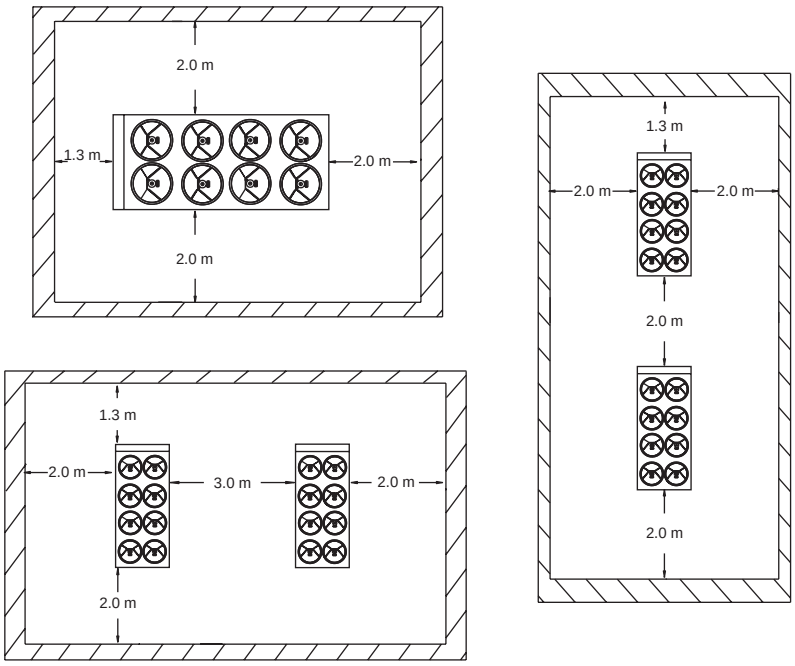
Key

A Foundation Bolts
B Free & Nominal Working Height
C 6 mmAcousticNon-Skid Neoprene Pad
D Adjust Height to Ensure Upper Housing ClearsLower by6 mmMin. 13 mmMax.

Type & Size	Max. Load Kg	Deflection mm	Spring Colour
CP-2-25	408.2	30.9	Red
CP-2-27	680.4	26.9	Orange
CP-2-28	816.4	25.9	Green
CP-2-31	997.9	21	Grey
CP-2-32	1179.3	18.7	White

9.14 Space Requirements

All Models



The recommended clearances and dimensions are the distances between the edge of the units and the architectural enclosure surrounding them. It is important that adequate space is available to ensure that air discharged via the fans is not recirculated into the condenser coil intake, which would reduce the unit capacity.

The dimensions at the front and rear of the units allow for access to the control panel and for component removal.

The enclosure height should not exceed the height of the units except that only one adjacent wall may be higher than the unit. Horizontal obstructions or overhangs should not be closer than 15 metres above the top of any unit and no obstructions are allowed directly above the unit.

10 SPARE PARTS

10.1 Renewal Parts List

Details of unit spare parts are given in 035L02778-000. Contact your local YORK Sales and Service Centre for information and please quote the unit model number and serial number.

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

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

All requests for parts should be made to your local YORK 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

Models YAES0405, 0475, 0545, 0575, 0645 and 0685SA		
Wiring Diagrams	Schematic	035L02815-000
	Connection	035L02816-000
	Unit Connection	035L02818-000
	Legend/Notes	035L02817-100

Models YAES0715, 0785, 0905 and 0985SA		
Wiring Diagrams	Schematic	035L02602-000
	Connection	035L02686-000
	Unit Connection	035L02767-000
	Legend/Notes	035L02603-100

Models YAES1075, 1245 and 1405SA		
Wiring Diagrams	Schematic Systems 1 & 2	035L02602-000
	Schematic System 3	035L02760-000
	Connection Systems 1 & 2	035L02686-000
	Connection System 3	035L02759-000
	Legend/Notes	035L02603-100

Models YAES1505, 1575, 1645, 1715, 1785, 1855 and 1925DSA		
Wiring Diagrams	Schematic Systems 1 & 2	035L02602-000
	Schematic System 3 & 4	035L02801-000
	Connection Systems 1 & 2	035L02686-000
	Connection System 3 & 4	035L02802-000
	Legend/Notes	035L02603-100

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

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

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

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

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

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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Italy
YORK International
20051 Limbiate (Milan)
Via Manara 2
Italia
Tel: ++39/0299450.1
Fax: ++39/0299450.860

Kazakhstan
YORK International
Representation Office
92 Maulenov Str. office 329,327
KZ-480012 Almaty
Kazakhstan
Tel: ++732 72/ 62 97 77
Fax: ++732 72/ 63 37 19

Latvia
YORK Latvia
YORK International S.I.A.
Krustpils iela 1
LV-1073 Riga
Latvia
Tel: ++371/7113068
Fax: ++371/7113067

Lithuania
YORK International GmbH
Representation Office
Fabijoniskiu 96
2029 Vilnius/Lithuania
Tel: ++3702 - 388337,
388339
Fax: ++3702 388112

Nederland
YORK International
Tinstraat 15
Postbus 3453
4800 DL Breda
Nederland
Tel: ++31 765486800
Fax: ++31 765421800

Poland
YORK Polska
YORK INT. Sp.z.o.o.
Al. Slowianska 10
PL-01-695 Warszawa
Poland
Tel: ++4822/83 22 220
Fax: ++4822/8330303

Portugal
Roca/YORK
Estrada Outeiro de Polima
Lote 9 3 A/D
Abübada Cascais
2785 518,
S. Domingos de Rana
Portugal
Tel: ++351 21 445 0601
Fax: ++351 21 445 0598

Romania
YORK Romania
YORK International S.R.L.
6 Londra St.
1 District
RO-712171 Bucharest
Romania
Tel: ++401/2304516/2315319
2315320/2315321
Fax: ++401/2304406

Russia
YORK International ZAO
Poklonnaya, 14a
CIS-121170 Moscow
Russia
Tel: ++7095/232-2075
Fax: ++7095/232-6661

YORK International ZAO
28 Zagorodny prospect
CIS-191002
St. Petersburg
Russia
Tel: ++7812/325 4700
Fax: ++7812/325 4701

YORK International ZAO
Alexeevskaya St. 26,
Office 208
N. Novgorod,
CIS
Tel/Fax: ++7 8312/35 19 03

Serbia
YORK International
YU Business Center
Bulevar Lenjina 10/D/I/127
YU-11070 Belgrade
Serbia
Tel: ++381 11 311 41 43
++381 11 311 91 19
Fax: ++381 11 137 694

Slovak Republic
YORK Slovensko
YORK International spol.sr.o.
Pekna cesta 6b
SK-83105 Bratislava
Slovak Republic
Tel/Fax: ++421/7/44880952,
0953, 0954, 0955

South Africa
YORK International
Johannesburg Head Office.
60 B Electron Ave.
Isando. 1600
Johannesburg
Tel: +27 11 921 7100
Fax: +27 11 921 7200

Supremeair (YORK Service)
'43 11th Rd.
Kew
Johannesburg
Tel: +27 11 786 0868
Fax: +27 11 786 0876

YORK International
35 Haulage Rd.
Carletonville 2500
Tel: +27 18 786 1062/3
Fax: +27 18 787 3213

YORK International
2 Cassiafield Grove
Springfield Park 4091
Durban
Tel: +27 31 579 4646
Fax: +27 31 579 1030

YORK International
5 Stepmar Building
27 Stells Rd.
Montague Gardens 7441
Cape Town
Tel: +27 21 551 3012
Fax: +27 21 551 4176

Supremair (YORK Service)
9 Henri van Rooijen St.
Eastend 9300
Bloemfontein
Tel: +27 51 432 7828
Fax: +27 51 432 2450

YORK International
118D Constantia St.
Welkom 9459
Tel: +27 57 352 3240
Fax: +27 57 352 8982

Spain
Roca/YORK
Industria 94-96
08908 Hospitalet de Llobregat
Barcelona
Spain
Tel: ++34 93 422 90 90
Fax: ++34 93 332 16 14

Roca/YORK
Hurtado de Amézaga 20, 4°
48008 Bilbao
Spain
Tel: ++34 944 162 833
Fax: ++34 94 415 49 69

Roca/YORK
Av. Valdelaparra 47
28100 Alcobendas
Madrid
Spain
Tel: ++34 916 624 101
Fax: ++34 91 662 41 57

Roca/YORK
Juventud 8
Parque Ind. PISA
41927 Mairena de Aljarafe
Seville
Spain
Tel: ++34 954 183 012
Fax: ++34 95 418 30 68

Roca/YORK
Senyera s/n
Pol. Ind. Mediterráneo Parc 28 Nave 3
46560 Massalfassar
Valencia
Spain
Tel: ++34 961 400 711
Fax: ++34 96 140 22 53

Switzerland
YORK International
Grindelstrasse 19
CH-8303 Bassersdorf
Switzerland
Tel: ++41/1/83844-11
Fax: ++41/1/8369780

YORK International
4, Chemin des l'Esparcette
CH-1023 Crissier
Switzerland
Tel: ++41/21/6328011
Fax: ++41/21/6328013

Ukraine
YORK Ukraine
YORK International GmbH
36, Degterevskaya street
floor 7, room 723-725
Kiev/Ukraine
Tel: ++38044/219 32 89,
461 91 77, 211 09 91
Fax: ++38044/213 36 95

United Kingdom
YORK International
72 Buckingham Avenue
Slough
Berkshire
SL1 4PN
England
Tel: ++44 (0) 1753 693919
Fax: ++44 (0) 1753 692405

YORK International
14-16 St Martins Avenue
Fieldhead Business Centre
Bradford
BD7 1LG
England
Tel: ++44 (0) 1274 765300
Fax: ++44 (0) 1274 765301

YORK International
Unit 17
Garanor Way
Royal Portbury
Bristol
BS920 7XE
England
Tel: ++44 (0) 1275 375713
Fax: ++44 (0) 1275 375714

YORK International
Unit 5
Swift Business Centre
Keen Road
Cardiff
CF1 5JR
Wales
Tel: ++44 292 0470619
Fax: ++44 292 0470624

YORK International
Unit 4
Zealley Estate
Greenhill Way
Kingsteignton
Newton Abbott
Devon
TQ12 3TD
England
Tel: ++44 (0) 1626 333734
Fax: ++44 (0) 1626 335220

YORK International
Gardiners Lane South
Basildon
Essex
SS14 3HE
England
Tel: ++44 (0) 1268 246000
Fax: ++44 (0) 1268 246001

YORK International
Unit 10
Hadrians Court
Seventh Avenue
Team Valley Trading Estate
Gateshead
Tyne & Wear NE11 0XW
England
Tel: ++44 (0) 191 491 0598
Fax: ++44 (0) 191 482 6167

YORK International
1 Donaldson Crescent,
Southbank Business Park
Kirkintillock
Glasgow
G66 1XF
Scotland
Tel: ++44 (0) 141 776 7576
Fax: ++44 (0) 141 777 7425

YORK International
Unit 1
Western Access
Guinness Road
Trafford Park
Manchester M17 1SY
England
Tel: ++44 (0) 161 848 0202
Fax: ++44 (0) 161 848 7196

YORK International
Unit 25
Portsmouth Enterprise Centre
Quartremaine Road
The Airport
Portsmouth
PO3 5QT
England
Tel: ++44 (0) 2392 650149
Fax: ++44 (0) 2392 650225

YORK International
Arden House
Marsh Lane
Hampton-In-Arden
Solihull
West Midlands
B92 0AJ
England
Tel: ++44 (0) 1675 443341
Fax: ++44 (0) 1675 442402

Uzbekistan
YORK International
Representation Office
C4, Place 35
UZ - 700017 Tashkent
Uzbekistan
Tel: ++998 71 137 5770
++998 71 137 5062
Fax: ++998 71 137 5055

European Parts Organisation
Gardiners Lane South
Basildon
Essex
SS14 3HE
England
Tel: ++44 (0) 1268 246400
Fax: ++44 (0) 1268 246426

YORK Service and Parts Contact Addresses

Austria
YORK Austria
Central & Eastern Europe Headquarters
Zetschegasse 3
A 1232 Wien
Austria
Tel: ++43 1 66 136 195
Fax: ++43 1 66 136 86

Azerbaijan
YORK International AO
90 M. Mansurov Str.
AZ-370004 Baku
Republic of Azerbaijan
Tel.: ++99 412/ 97 10 35
Fax: ++99 412/ 97 10 36

Belarus
YORK International AO
Leningradskaya str, 18
Minsk
Belarus
Tel/Fax: ++375/172/06 63 80
Tel/Fax: ++375/172/10 43 35

Belgium
YORK International
Prins Boudewijnlaan 1
2550 Kontich
Belgium
Tel: ++32 34510600
Fax:++32 34582444

Bulgaria
YORK Bulgaria
YORK International EOOD
10, Marko Balabanov Str.
BG-1303 Sofia
Bulgaria
Tel: ++3592/9803040,
9815780, 9817578
Fax: ++3592/9818386

Croatia
YORK International
Vrlicka 24
HR-10000 Zagreb
Croatia
Tel.: ++385/1/3843 444
++385/1/3843 851
++385/1/3840 352
Fax: ++385/1/3840 398

Czech Republic
YORK Ceska Republika
YORK International spol. sr.o.
Edisonova 27
CZ-10900 Praha 10 -Petrovice
Tel: ++420/2/721 21 111
Fax: ++420/2/721 21 100

Denmark
YORK Køleteknik
Sortevej 30
DK-8543 Hornslet
Tel: +45 86 99 44 33
Fax: +45 86 99 41 70

France
YORK International
Innolac n°7
Rue du Professeur G.Jeanneney
33300 Bordeaux
France
Tel: ++33 5.57.19.06.30
Fax: ++33 5.56.69.04.96

YORK International
14 rue de Bel Air
B.P.309
44473 Carquefou
France
Tel: ++33 2.40.30.62.93
Fax: ++33 2.40.30.22.66

YORK International
114-126 Avenue d'Alfortville
94607 Choisy-le-Roi
France
Tel: ++33 1.45.12.10.30
Fax: ++33 1.48.52.59.34

YORK International
31 rue Wilson
69150 Decines- Charpieu
France
Tel: ++33 4.72.02.62.50
Fax: ++33 4.72.05.30.01

YORK International
15 rue des Combattants d'Extrême Orient
13700 Marignane
France
Tel: ++33 4.42.77.04.60
Fax: ++33 4.42.15.08.99

YORK International
Rue A.Fruchard - Z.I. Jean Prouvé
54320 Maxeville
France
Tel: ++33 3.83.32.49.83
Fax: ++33 3.83.32.43.16

YORK International
14 rue de Constantine
62200 Boulogne Sur-Mer
France
Tel: ++33 3.21.83.17.70
Fax: ++33 3.21.83.11.02

YORK International
102 Bd de Strasbourg
49300 Cholet
France
Tel: ++33 2.41.29.13.73
Fax: ++33 2.41.29.13.80

YORK International
3 rue du Moros
29900 Concarneau
France
Tel: ++33 2.98.60.52.10
Fax: ++33 2.98.60.52.11

YORK International
Parc du Talou - 7 rue A.Legras
76200 Dieppe
France
Tel: ++33 2.32.14.41.50
Fax: ++33 2.32.14.41.51

YORK International
44 rue Gambetta
17260 Gemozac
France
Tel: ++33 5.46.95.87.80
Fax: ++33 5.46.94.56.41

YORK International
Z.I. du Vern
29230 Landivisiau
France
Tel: ++33 2.98.68.21.52
Fax: ++33 2.98.68.90.91

YORK International
4 rue du Grand Fief
85150 Vaire
France
Tel: ++33 2.51.33.70.83
Fax: ++33 2.51.33.70.85

YORK International
6 Bis rue Chalutier-La-Tanche
56100 Lorient
France
Tel: ++33 3.20.87.61.62
Fax: ++33 2.97.83.83.80

YORK International
Rue de la Longuerais
ZA des Landelles
35520 Melesse
France
Tel: ++33 2.99.66.01.87
Fax: ++33 2.99.66.92.73

YORK International
78 Avenue de Laon
02200 Soissons
France
Tel: ++33 3.23.59.65.55
Fax: ++33 3.23.59.65.56

YORK International
8 rue de l'Artisanat
67120 Dupigheim
France
Tel: ++33 3.88.48.22.50
Fax: ++33 3.88.48.22.51

YORK International
Z.A. du Prieuré
37530 Poce Sur Cisse
France
Tel: ++33 2.47.23.29.23
Fax: ++33 2.47.23.25.50

YORK International
Avenue Lavoisier
Z.I. de Villemilan
91320 Wissous
France
Tel: ++33 1.60.11.88.76
Fax: ++33 1.60.11.90.16

Germany
YORK International
Paradiesstraße 210
12526 Berlin
Germany
Tel: ++49/30/6797190
Fax: ++49/30/67971944

YORK International
Hafenstraße 100
45356 Essen
Germany
Tel: ++49/201/364000
Fax: ++49/201/3640041

YORK International
Wächtersbacher Straße 83
60386 Frankfurt
Germany
Tel: ++49/69/941402-0
Fax: ++49/69/94140244

YORK International
Merkurring 33-35
22143 Hamburg
Tel: ++49/40/727740
Fax: ++49/40/72774734

YORK International
Alter Flughafen 18a
30179 Hannover
Germany
Tel: ++49/511/678040
Fax: ++49/511/6780433

YORK International
Leipziger Straße 35-37
34125 Kassel
Germany
Tel: ++49/561/507210
Fax: ++49/561/5072122

YORK International
Widdersdorfer Straße 215
50825 Köln
Germany
Tel: ++49/221/498750
Fax: ++49/221/4987539

YORK International
Gottlieb-Daimler-Strasse 6
68165 Mannheim
Germany
Tel: ++49/621/468-532
Fax: ++49/621/468-680

YORK International
Geisenhausener Straße 6
81379 München
Germany
Tel: ++49/89/78048
Fax: ++49/89/7804844

YORK International
Edisonstraße 60
90431 Nürnberg
Germany
Tel: ++49/911/961750
Fax: ++49/911/9617544

YORK International
Mainzer Straße 29
66111 Saarbrücken
Germany
Tel: ++49/681/67494
Fax: ++49/681/66243

YORK International
Fabrikstraße 17
70794 Filderstadt
Germany
Tel: ++49/711/7709422
Fax: ++49/711/7709433

YORK Deutschland GmbH
Delitzcher Straße 74
06112 Halle
Tel: ++49/345/5686400
Fax: ++49/345/5686412

Greece
YORK International
YORK Hellas SA
68 A, Spaton Ave
GR - 153 44 Gerakas
Athens - Greece
Tel: ++30-210-6617000
Fax:++30-210-6616000

Hungary
YORK Magyaroszag
YORK International Kft.
Váci út 206
H-1138 Budapest
Hungary
Tel: ++361/4657060
Fax: ++361/4657069

Ireland
YORK ACR Ltd
Unit 2004/3
City West Business Campus
Naas Road
Dublin 22
Ireland
Tel: ++ 353 1466 0177
Fax: ++ 353 1466 0198

YORK International
Unit 19
Sarsfield Road
University Hale Industrial Estate
Wilton
Cork
Ireland
Tel: ++353 2 134 6580

YORK Europe

YORK INTERNATIONAL

YORK INTERNATIONAL
Gardiners Lane South, Basildon, Essex SS14 3HE, England

Part No. 035L02672-100 Rev. 2 (08/05) GB