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.

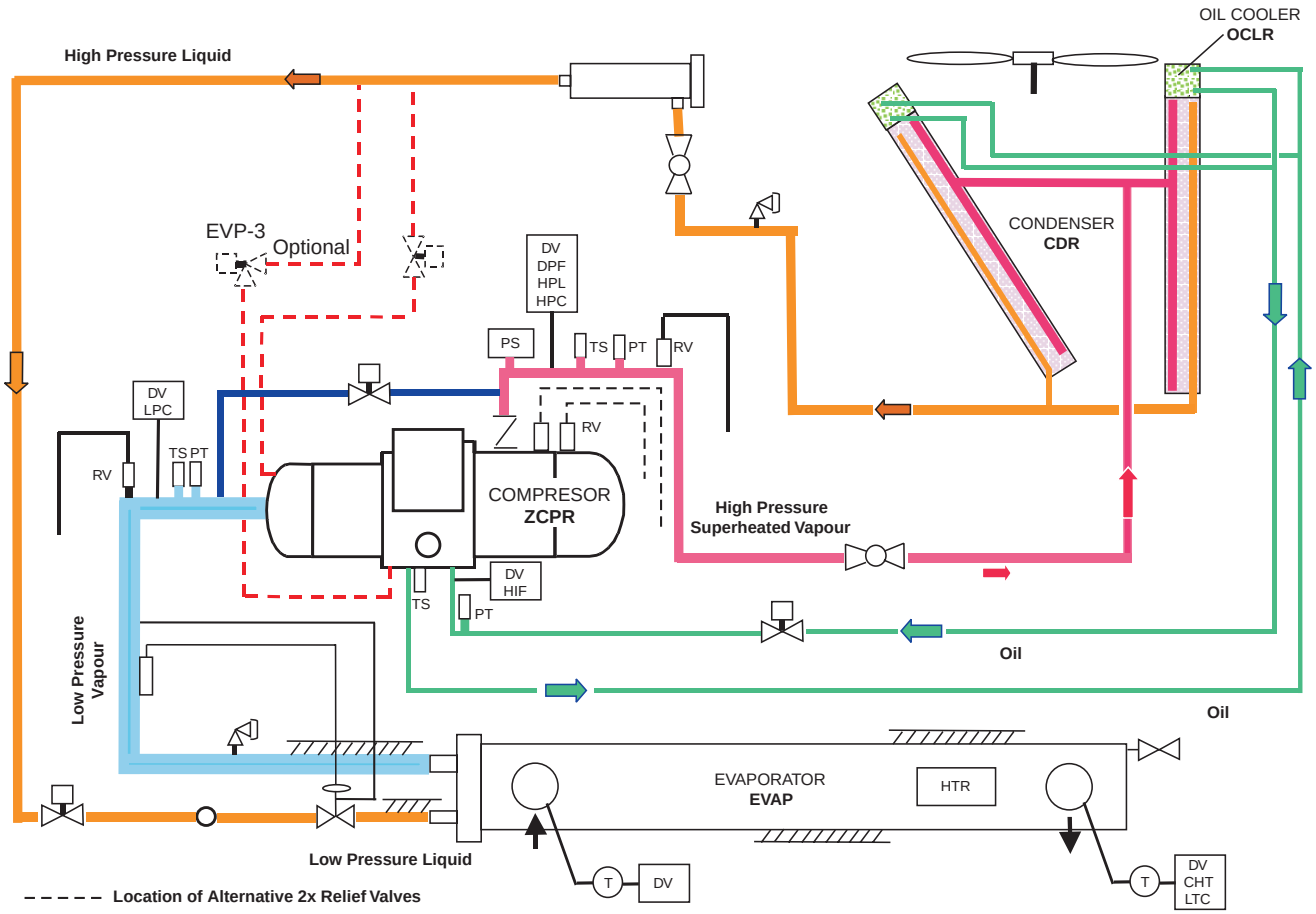
High Ambient/Sun Shield Kit
Kit to provide shade / air gap around the power and control panels at ambients above 45°C.

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:

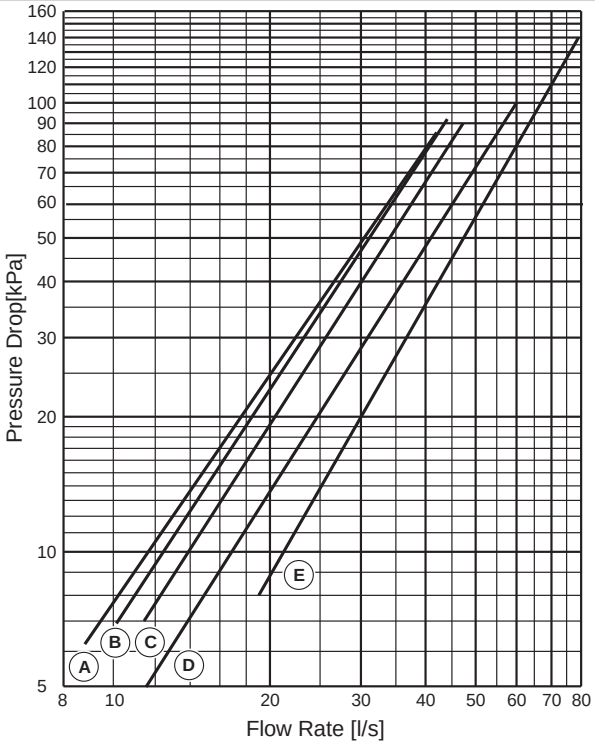
Capacity = 723.1 kW
Compressor power = 219.5 kW

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

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

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.

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.

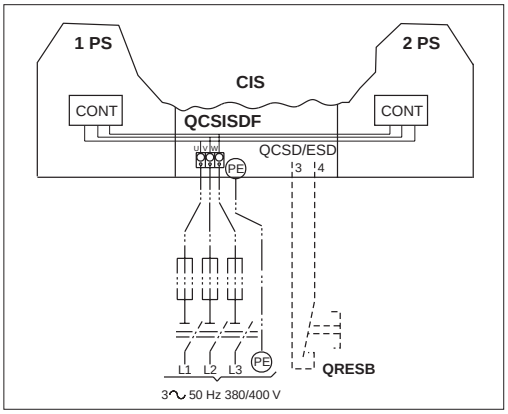
(2) Maximum running amps at 45°C ambient air temperature and 10°C leaving liquid temperature.

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

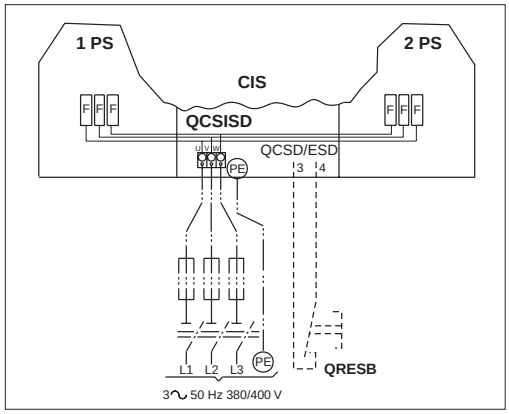
POWER SUPPLY CONNECTION DIAGRAMS
MAIN PANEL - ALL MODELS AND AUXILIARY PANEL - YAES-DSA MODELS ONLY

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.

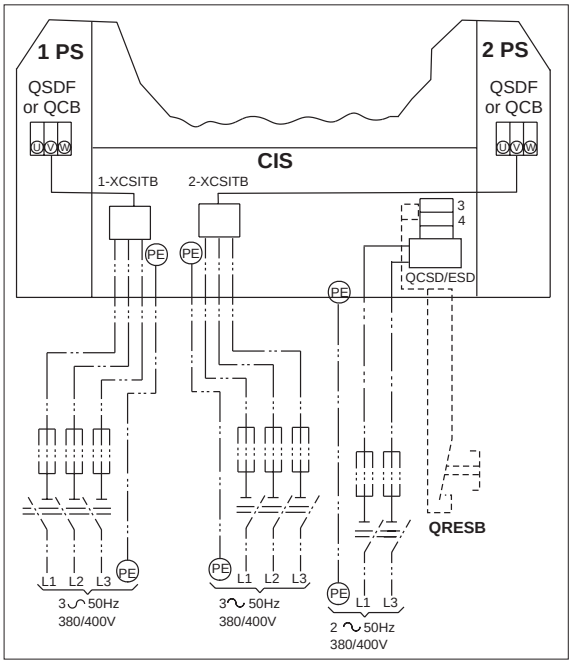
Models YAES0475SA to YAES0715SA



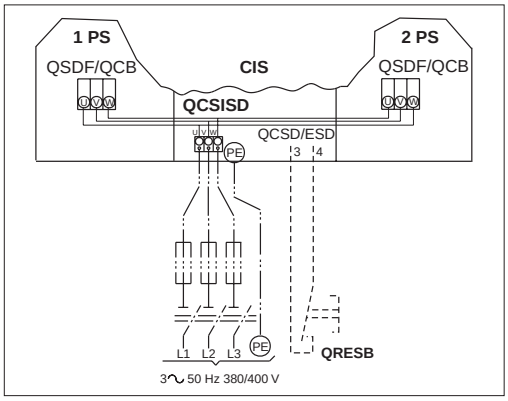
Models YAES0785SA to YAES1925DSA



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).



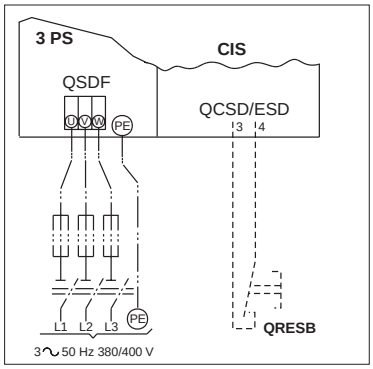
Single Point Power Supply (Option)
One supply to master non-fused disconnect switch (QCSISD) with internal power distribution to fused disconnect switches (QSDF) or circuit breakers (QCB), control supply to non-fused disconnect switch (QCSD/ESD) derived internally.



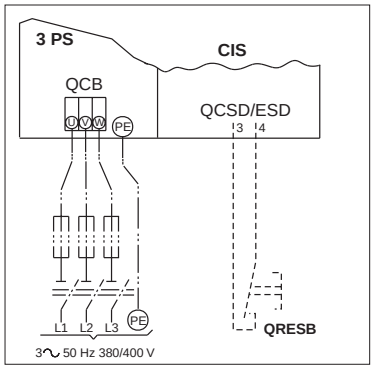
ITEM	DESCRIPTION
CS	CONTROL SECTION
CIS	COMMON INPUT SECTION
F	FUSE
PE	PROTECTIVE EARTH
PS	POWER SECTION
QCSD/ESD	CONTROL CIRCUIT SWITCH DISCONNECT/ EMERGENCY STOP DEVICE
QCB	CIRCUIT BREAKER
QCSISD	COMMON SUPPLY INPUT SWITCH DISCONNECT
QCSISDF	COMMON SUPPLY INPUT SWITCH DISCONNECT FUSED
XCSITB	COMMON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

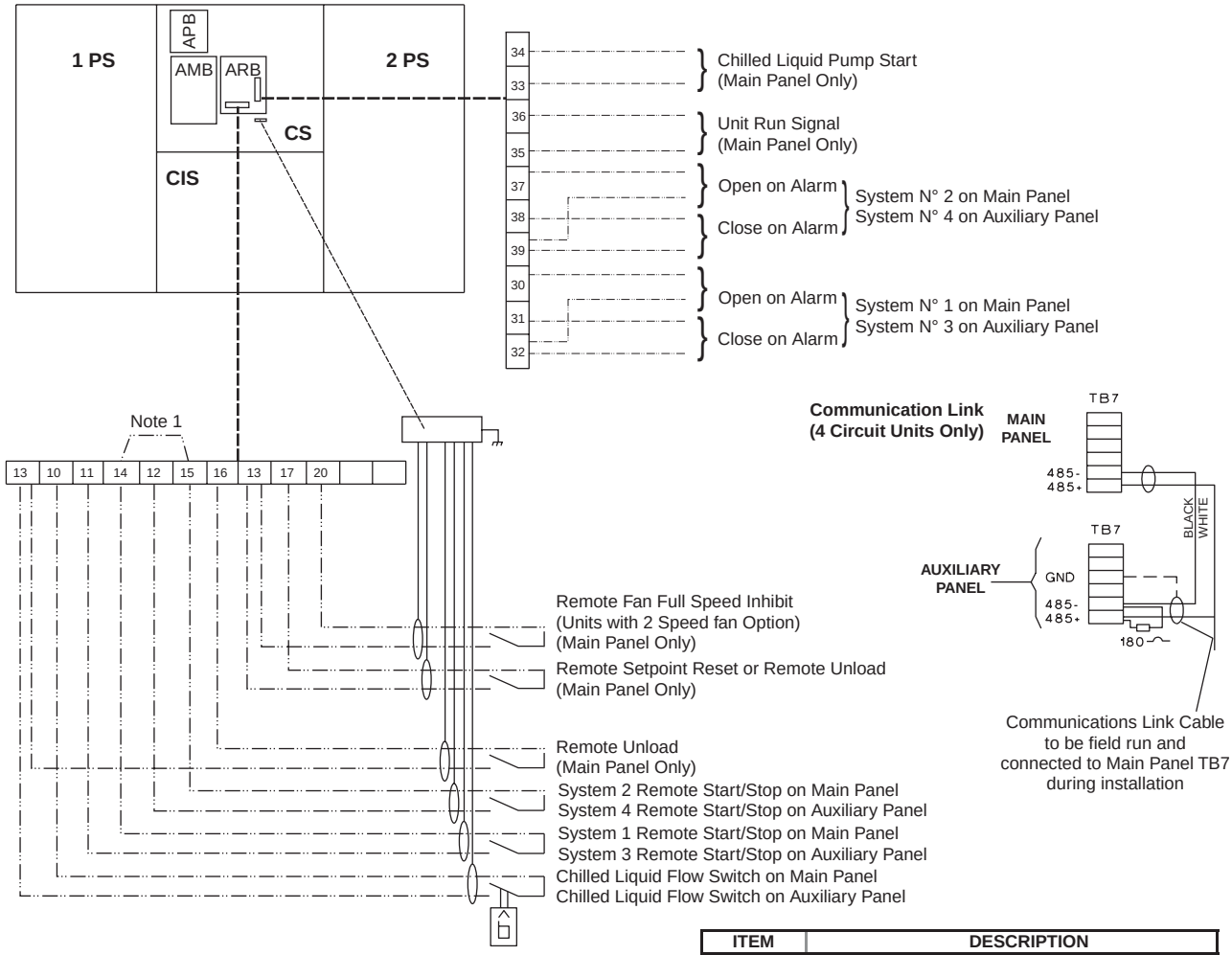


Single Point Power Supply (Option)
One supply to master circuit breaker (QCB) in power section, control supply to non-fused disconnect switch (QCSD/ESD) derived internally.



CUSTOMER CONNECTION DIAGRAM (All Models)

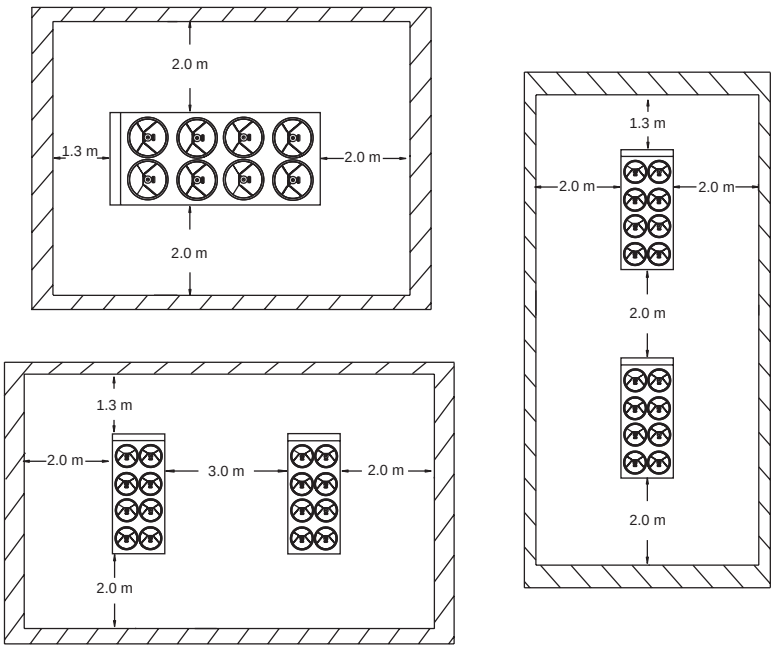
Note: The Auxiliary Panel is fitted to Models YAES-SA1075, YAES-SA1245, YAES-SA1405 and all YAES-DSA only.



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.

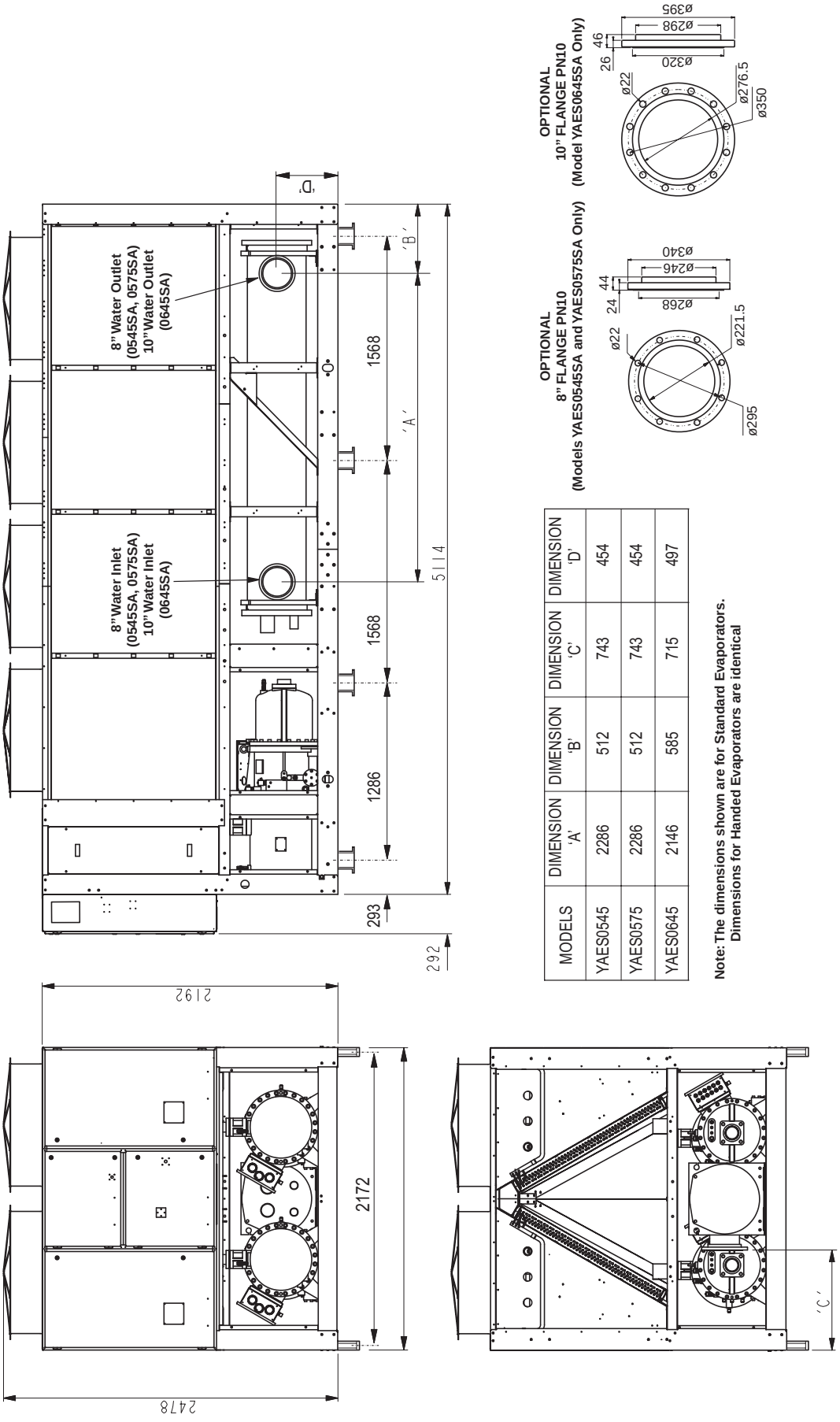
ITEM	DESCRIPTION
AIOB	INPUT/OUTPUT EXPANSION BOARD
AMB	MICROPROCESSOR BOARD
APB	POWER SUPPLY BOARD
ARB	RELAY BOARD
CS	CONTROL SECTION
CIS	COMMON INPUT SECTION
PS	POWER SECTION

CLEARANCES (All Models)



DIMENSIONS (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