

MODEL YHAU-C EXE AND EXW SERIES SINGLE EFFECT STEAM ABSORPTION CHILLER

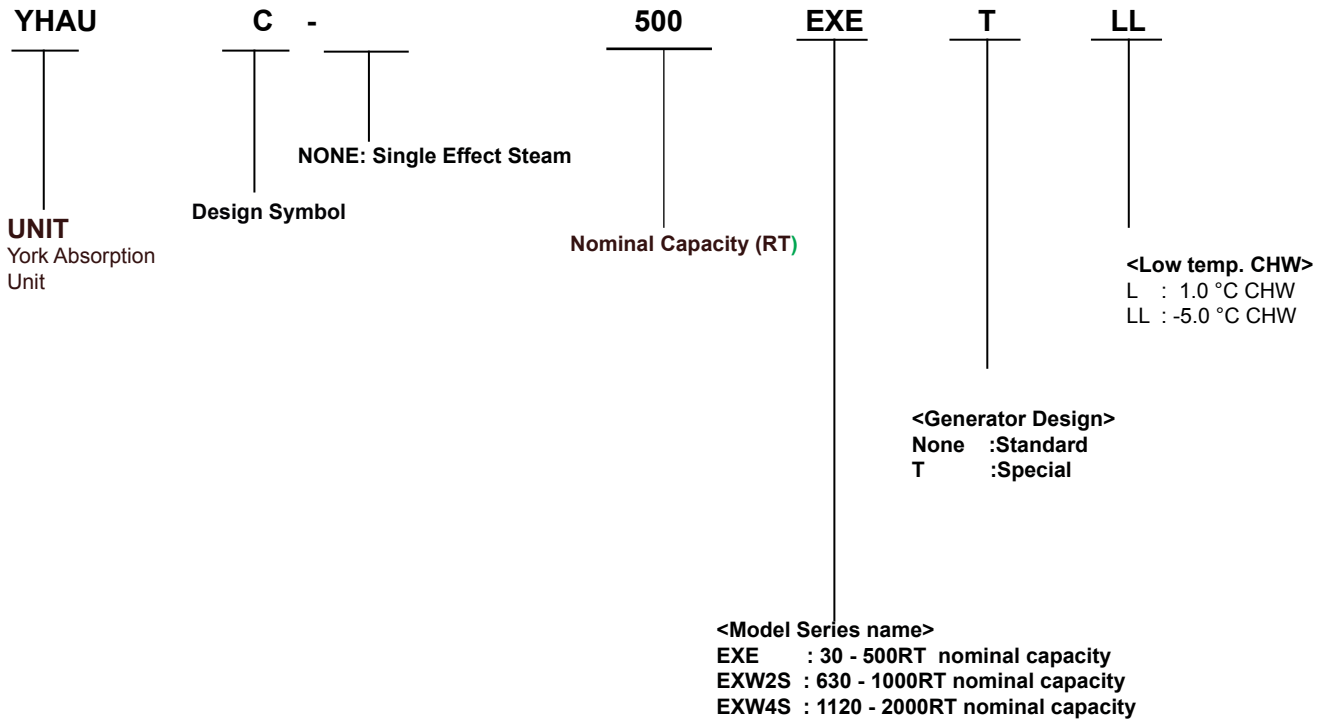
30-2000 Tons
105-7034 kW



 **YORK[®]**

INSTALL CONFIDENCE

Nomenclature



Approvals

- GB/T 18431-2014

For Europe:

- CE
- EN ISO 12100:2010
- EN 60204-1 : 2006+A1:2009
- EMC Directive 2014/30 EC
- EN 55011: 2009+A1:2010 (Group 1, Class A)
- EN61000-6-2:2005
- Pressure Equipment Directive 2014/68/EC

For Other Countries:

- Pressure Vessel Code GB 150-2011

Images contained in this document may represent the standard product with available options.

Table Of Contents

INTRODUCTION	5
HOW IT WORKS.....	6
EQUIPMENT OVERVIEW	10
OPTIONS AND ACCESSORIES.....	16
APPLICATION DATA	18
SOUND DATA	21
NOZZLE ARRANGEMENTS	22
WEIGHTS AND DIMENSIONS	24
PHYSICAL DATA	25
ELECTRICAL DATA	26
PROCESS AND INSTRUMENTATION	28
GUIDE SPECIFICATIONS	31

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Introduction

Today's environmental and energy considerations demand innovative chiller plant designs which save expensive peak load kW hours and eliminate CFC's. In a growing number of applications with waste heat or abundant low temperature hot water, single effect absorption chillers offer an ideal means of saving on cooling costs without a significant installation cost penalty.

That's why Johnson Controls is proud to present the YHAU-C Single Effect Absorption Chiller. The YHAU-C Absorption Chiller offers a rugged, industrial grade design, with PLC-based controls, designed to increase reliability and enhance performance.

Applications particularly well suited for the YHAU-C Absorption Chiller include the following:

Combined Heat & Power or Cogeneration – For CHP systems, high pressure steam has many valuable uses, while low pressure steam is considerably less useful, yet more plentiful. In these plants, the YHAU-C absorber can provide cooling with low pressure steam, freeing high pressure steam for power generation or other valuable uses.

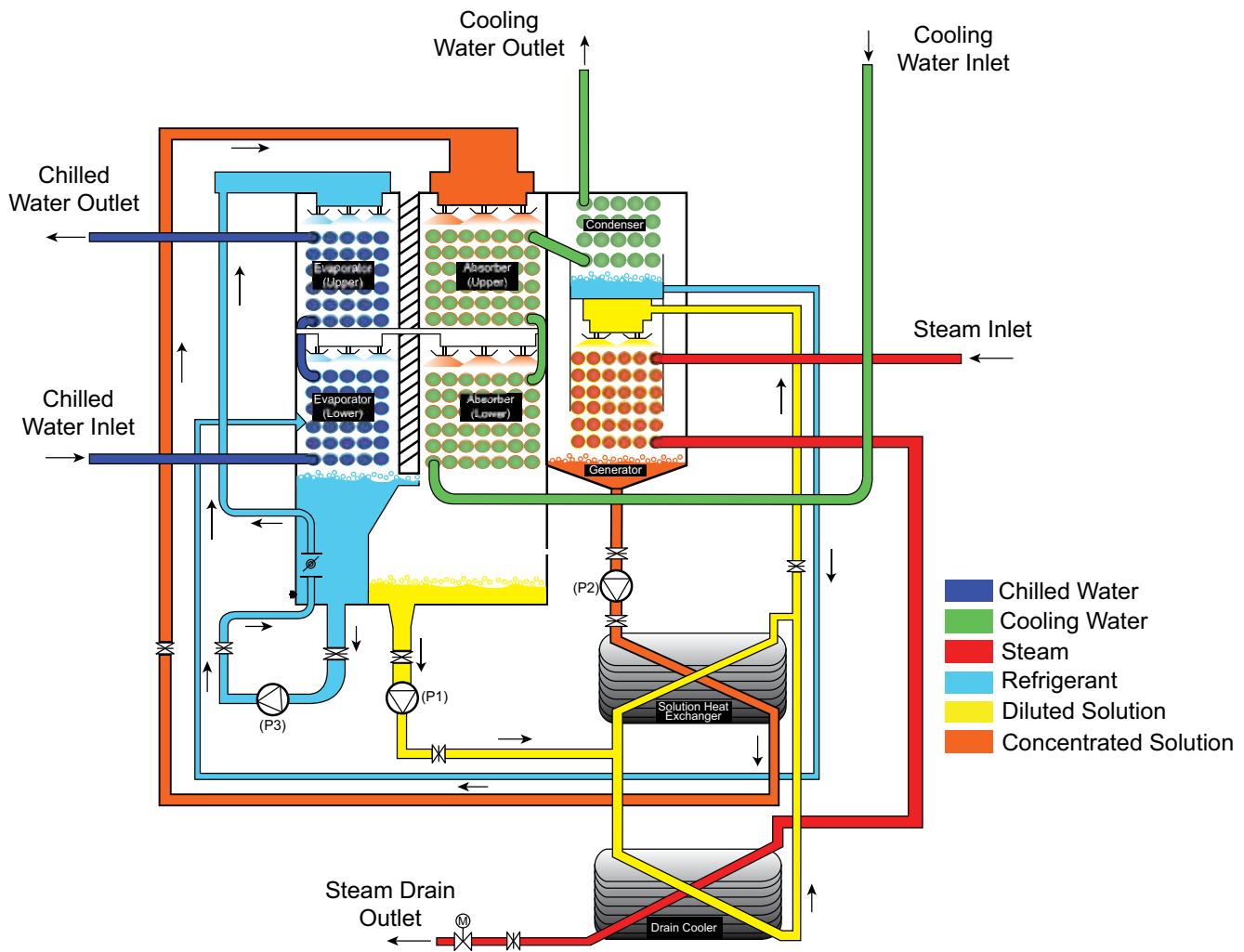
Waste Heat Recovery – Recover waste heat from industrial processes to provide required comfort or process cooling with minimal operational cost.

Commercial Cooling/Peak Shaving – For particularly pronounced peak loads with few operating hours, the YHAU-C absorber's lower first cost may provide an acceptable payback when more efficient, yet more expensive double effect chillers cannot.

For these and similar cost saving designs, consider the field proven YHAU-C design. In many years of operation, the single-effect design has proven itself in applications ranging from schools to refineries. Now, with state of the art controls and continual product improvement, the YHAU-C absorption chiller is truly without peer. When it comes to absorption technology, there's only one leader - Johnson Controls.

How It Works

The single effect (steam) absorption chiller uses water as the refrigerant and lithium bromide (LiBr) solution as the absorbent. It is the strong affinity that these two substances have for one another that makes the chiller cycle work. The vapor pressure of the lithium bromide solution is lower than the vapor pressure of the refrigerant. The vapor pressure of the LiBr solution is directly related to the amount of refrigerant (water) present in the solution with the LiBr and the solution temperature. The entire absorption process occurs in almost a complete vacuum.



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FIGURE 1 - SINGLE EFFECT STEAM ABSORPTION CYCLE

How It Works (Cont'd)

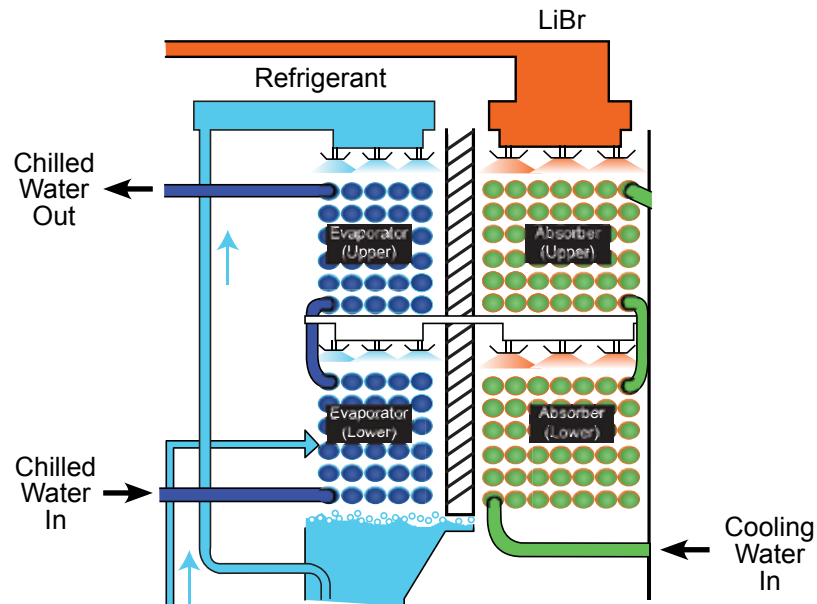
TWO STEP EVAPORATOR-ABSORBER

The evaporator as well as the absorber is split into two sections. This design, similar to a series counterflow chiller arrangement, provides an advantage in that it allows the overall cycle concentration to be lower than a similar chiller with a conventional absorber/evaporator. This innovative design provides higher reliability, increased efficiency, and the ability to use lower pressure steam in the Generator.

The two evaporators are in series with respect to the chilled water flow through the tubes. In other words, the chilled water flows through the lower evaporator tubes first and then the upper evaporator tubes. Each evaporator operates at a slightly different temperature and pressure. The refrigerant in the lower evaporator boils at a slightly higher temperature than in the upper evaporator, consequently cooling the chilled water in two steps. The two absorber sections are split as well, with the strong solution first entering the top of the uppermost absorber and flowing down through the top absorber bundle. It then flows into the top of the lower Absorber section. The strong solution entering the upper Absorber takes advantage of its lower vapor pressure allowing the upper Evaporator to operate at a lower pressure and temperature.

When the LiBr solution enters the lower Absorber section it is already somewhat diluted from the refrigerant vapor that boiled off in the upper evaporator. At this lower concentration the solution vapor pressure would normally not be sufficient to provide a low enough evaporator pressure to satisfy the leaving chilled water design. However, since the lower evaporator is the first step of the chilled water cooling, the dilute solution vapor pressure is adequate to maintain the lower evaporator at the required temperature and pressure.

The cooling water enters the lower absorber section first, keeping the vapor pressure of the weaker solution as low as possible.

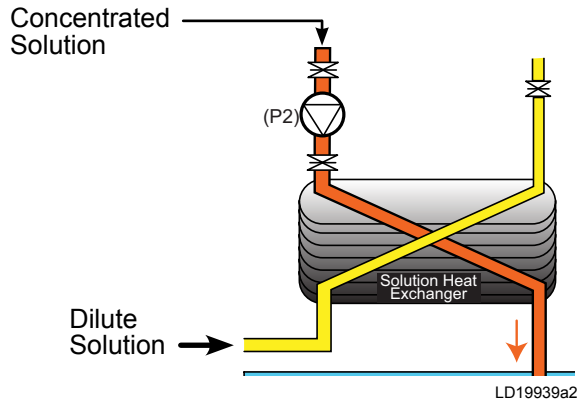


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How It Works (Cont'd)

SOLUTION HEAT EXCHANGER

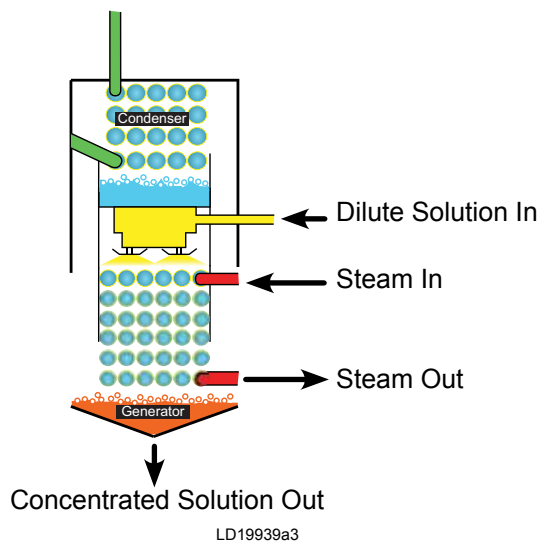
The dilute (weak) LiBr solution leaving the lower absorber section is pumped to the generator section through a solution to solution heat exchanger. It is pre-heated prior to entering the generator section. Such pre-heating of the dilute solution reduces the driving heat source requirement in the generator and also helps to cool down the concentrated (strong) solution before entering the upper absorber section.



GENERATOR

The generator section is of a falling film design. Such a design ensures substantially reduced wear and tear at the tube supports compared to the conventional flooded design. The falling film design ensures superior heat transfer and extended tube life. It also reduces the quantity of LiBr solution thereby ensuring reduced startup time from a cold start. The stainless steel tubes are arranged in a series counter flow arrangement .

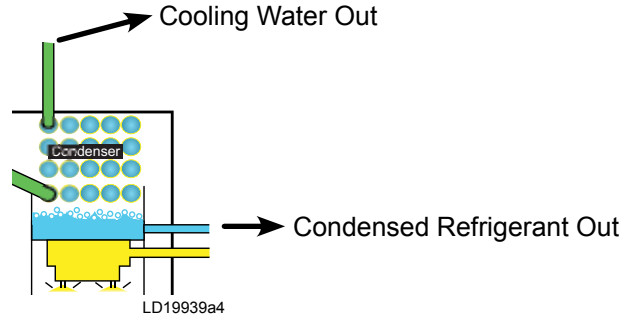
The pre-heated dilute solution enters on the top of the generator tubes where it is heated by the steam flowing through the stainless steel tubes. The refrigerant (water) vapors migrate to the condenser, leaving behind a concentrated (strong) LiBr solution, which is then cooled before being distributed in the upper absorber section using a solution pump.



How It Works (Cont'd)

CONDENSER

The refrigerant vapor from the generator enter the condenser section where it condenses into liquid refrigerant as a result of the cooling (condenser) water. The liquid refrigerant is then distributed to the lower evaporator section.



Equipment Overview

GENERAL

The YHAU-C Steam Single Effect Absorption Chillers are factory-packaged including the evaporator, condenser, generator, absorber, pumps, automatic purging system, control center, interconnecting unit piping and wiring.

The initial charge of refrigerant is supplied for each chiller. Actual shipping procedures will depend on a number of project-specific details.

Johnson Controls factory-trained, field service representatives will supervise or perform the initial start-up, and provide concurrent operator instructions.

CONSTRUCTION

The chiller shall consist of a generator, solution heat exchanger, absorber, condenser and an evaporator. To minimize the risk of corrosion, the evaporator dispersion tray and the absorber dispersion tray are stainless steel. Each dispersion tray has two stage construction and any foreign material is removed from the lithium bromide solution or the refrigerant at the first stage tray. This will avoid any degradation of dispersion performance due to clogging.

The evaporator, absorber, condenser and generator are a shell and tube construction. The steam generator is designed for 3 bar(g) and tested to 4.35bar(g) for Europe, 3.9bar(g) for other countries. A shell-side pressure releasing valve is furnished and set to blow at 0.8 bar(g). The evaporator cycle and the absorber cycle consists of two-steps (upper stage

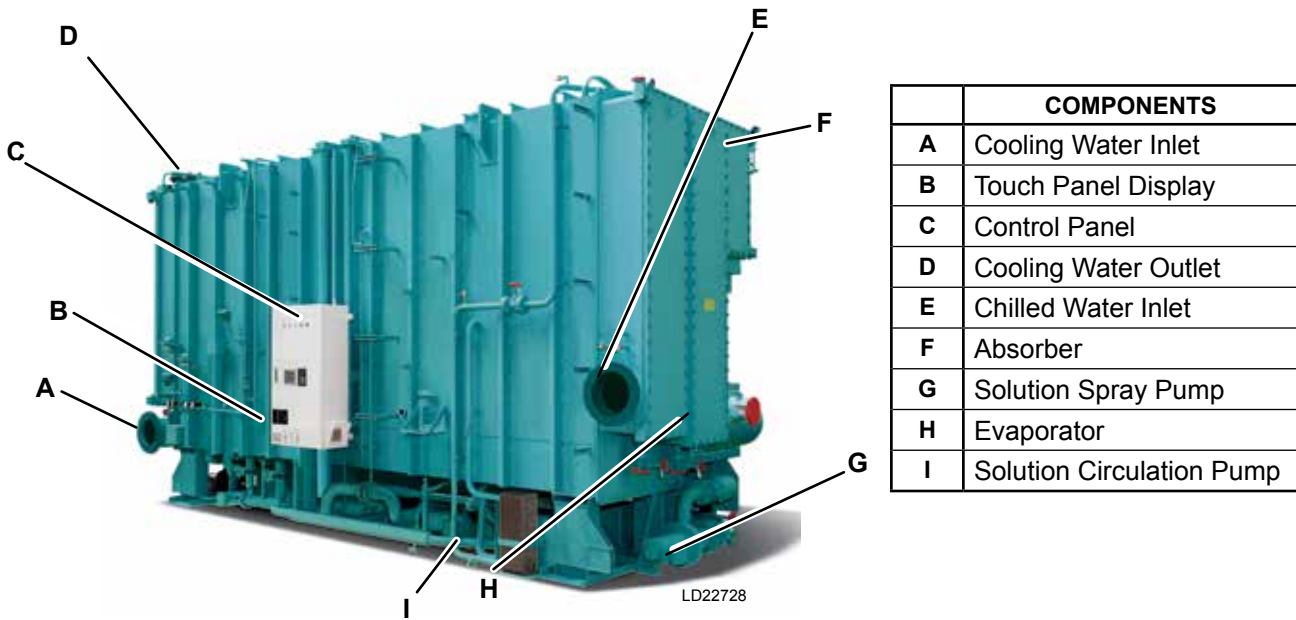


FIGURE 2 - YHAU-C COMPONENTS

Equipment Overview (Cont'd)

and lower stage). This technology makes the absorber solution concentration weak, extending the machine life. Furthermore, this technology makes the generator solution temperature lower than the ordinary chiller, which enables to utilize lowered pressure steam as driving heat source.

The steam generator is a falling liquid film type.

The plate-type solution heat exchanger preheats the diluted solution in order to achieve higher efficiency.

TUBE MATERIALS

Generator tubes are 0.8 mm wall stainless steel (S22053) and allow for the removal of the tubes from either end of the machine. Evaporator and Absorber tubes are made of low residual phosphorus deoxidized copper (C1201), finned type with a wall thickness before finning of 0.6 mm. Condenser tubes are made of 0.6 mm wall low residual phosphorus deoxidized copper (C1201).

WATERBOXES

Waterboxes are removable to permit tube cleaning and replacement, whereas Absorber and Condenser Waterboxes for 630EXW2ST model or larger are of marine type. Water circuit tubing are replaceable from either end of the absorption unit. All waterboxes and associated water circuit nozzles and tube bundles are designed for 8 bar(g) working pressure and water test to 11.6 bar(g) for Europe, 10 bar(g) working pressure and water tested to 12.5bar(g) for other counties. Vent and drain connections are provided on each waterbox. All the water connections are equipped with DIN flanges for Europe and GB flanges for other countries. Mating flanges are not included. Inside of waterboxes and waterbox covers are coated with epoxy resin paint, except the Generator.

FULLY AUTOMATIC DECRYSTALLIZATION SYSTEM

The YHAU-C chiller is built with an anti-crystallization system. The Absorber and the Evaporator are located side by side in the same shell and separated by the eliminator. When the concentration of lithium bromide in the chiller goes up, the water level at the Evaporator increases and automatically spills over to the Absorber. This causes the concentration of the solution at the absorber to go down.

PUMPS

Solution and refrigerant pumps are hermetically sealed, self-lubricating, totally enclosed, factory-mounted, wired, and tested. Motor windings are not exposed to lithium bromide or water. The suction and discharge connections for each pump are fully welded to the unit piping to minimize the opportunity for leaks. Suction and discharge connections are equipped with factory installed isolation valves to permit quick and easy servicing of pumps. Pumps are designed to operate for a total of 60,000 hours. The parts in the pumps such as bearings and sealing gaskets, are replaced every 20,000 hours.

Equipment Overview (Cont'd)

AUTOMATIC PURGING SYSTEM

The chiller is equipped with a purging system to remove non-condensable gases from the unit during operation. Non-condensables are collected by an eductor and accumulated in the purge tank. The chiller can dictate the pressure increase in the purge tank and automatically remove the non-condensable gas through the operation of an electric vacuum pump.

The purge pump is an oil rotary double stage design, and is furnished complete with a motor, and all required accessories. The purge pump is shipped mounted on the chiller and connecting hose is factory installed. The purge pump oil is charged at the job site.

LITHIUM BROMIDE AND REFRIGERANT CHARGE

Lithium bromide shall contain lithium molybdate corrosion inhibitor to minimize the rate of ferrous metal corrosion on both the solution and refrigerant sides of the unit. Deionized water is supplied for the refrigerant charge, except for model C2000EXW4ST, solution and refrigerant is charged to the chiller at the factory before the shipment. For model C2000EXW4ST, the solution and refrigerant is shipped separately, and be charged at the job site.

STEAM CONDENSATE CONTROL VALVE

Steam absorption chillers are furnished with a steam condensate control valve with the actuator motor. The valve features a cast iron or carbon steel body. The steam condensate control valve is capable of modulating steam flow continuously from approximately 20% to 100% of the maximum design chiller capacity into the chiller.

The actuator motor is powered by the chiller's control panel. Actuator motor position is controlled by the control panel through a 4-20 mA DC control signal.

CONTROL PANEL

Each unit is furnished complete with a factory mounted and pre-wired control system. The control panel enclosure is equipped with a hinged access door with lock and key. The protection rating of the control panel is equivalent to IP42. All temperature sensors and other control devices necessary to sense unit operating parameters are factory mounted and wired to panel. The control panel includes a touch panel showing all system parameters in various languages with numeric data in Metric units.

The operating program is stored in non-volatile memory (SRAM) to eliminate chiller failure due to AC power failure.

Capacity Control - The control panel automatically controls the input steam flow rate to maintain the programmed leaving chilled water setpoint for cooling loads ranging from approximately 20% to 100% of design. The input steam flow rate can also be manually adjusted from the control panel to any setting between minimum and maximum, when automatic operation is not desired and when steam input is not being inhibited by a specific operating condition.

Equipment Overview (Cont'd)

YHAU-C CONTROL CENTER

The YHAU-C Control Center, furnished as standard on each chiller, provides the ultimate in efficiency, monitoring, data recording, chiller protection and operating ease. The Control Center is a factory-mounted, wired and tested state-of-the-art microprocessor based control system for lithium bromide absorption chillers. The panel is configured with a color display with keys that are integrated into the display, which are redefined with one keystroke based on the screen displayed at that time. This revolutionary development makes chiller operation quicker and easier than ever before. Instead of requiring keystroke after keystroke to hunt for information on a small monochrome LCD screen, a single button reveals a wide array of information on a large, full-color illustration of the appropriate component, which makes information easier to interpret. This is all mounted in the middle of a keypad interface and installed in a locked enclosure.

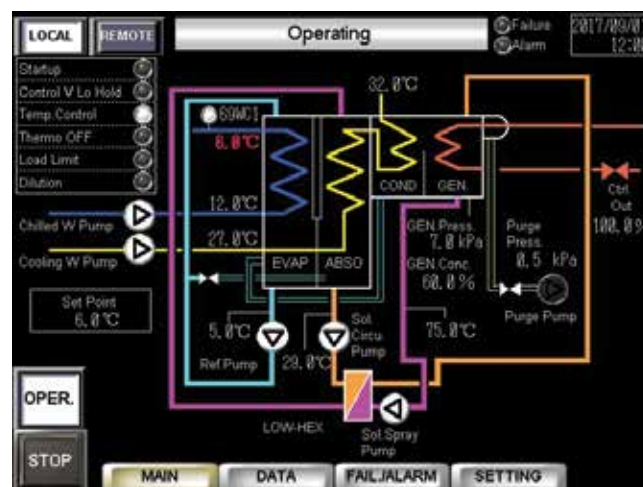
The LCD display allows graphic animated display of the chiller, chiller sub-systems and system parameters; this allows the presentation of several operating parameters at once. In addition, the operator may view a graphical representation of the historical operation of the chiller as well as the present operation. A Status Bar is displayed at all times on all screens.

Data can be displayed in Metric units plus keypad entry of setpoints to 0.1 increments.

Security access is provided to prevent unauthorized changes to setpoints. This is accomplished with three different levels of access and passwords for each level. There are certain screens, displayed values, programmable setpoints and manual controls not shown that are for servicing the chiller. The following listing describes the various system screens and subscreens, and what information they provide.

MAIN SCREEN

The Main Screen displays equipment status (chiller start/stop, operating conditions, pumps ON/OFF, purge pump ON/OFF, and chilled, cooling, and hot water pumps ON/OFF). Also displayed is the Operating Status of the various modes of chiller operation.

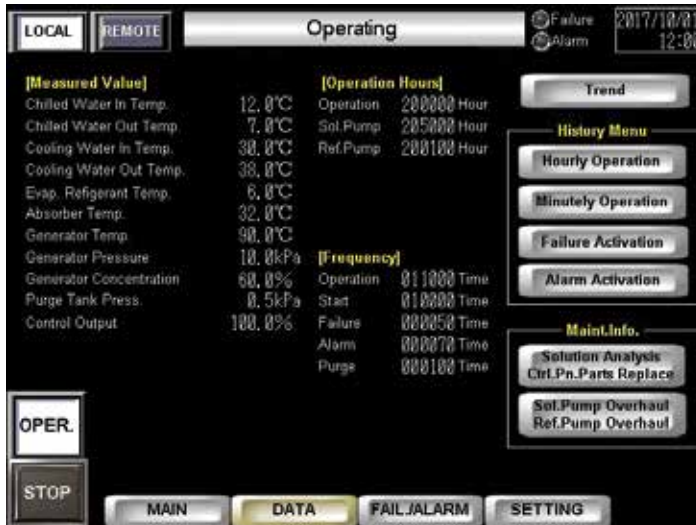


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Equipment Overview (Cont'd)

DATA SCREEN

The Data Screen displays values showing temperatures, operating hours, operating frequency, data trends and a history of failures, alarms, and time based temperature trends.



FAILURE/ALARM SCREEN

This screen displays failure indications (time outs, operation interlock, overcooled refrigerant, over and under temperatures, and problems with the unit's pumps) and system alarms.



Equipment Overview (Cont'd)

SETTING SCREEN

This screen displays control parameters (setting method, remote setting base temperature and differential temperature), valve operation (control valve mode auto/manual, pump operation, forced dilution, and purge mode (auto/manual), language (Japanese, German, English, or Chinese) and date and time parameters.



Options and Accessories

Optional Tubes – A CuNi (90/10), SUS436L, SUS316L, SUS304 and Titanium option for absorber, condenser and evaporator tubes is available, however the chiller rating may change with this option. Certified selection is issued by Johnson Controls engineering department. Price additions for non– standard tube materials and wall thickness is provided on a job specific basis.

Cold Surface Insulation – Elastomeric foam insulation on cold surfaces is applied at the Factory as option.

Isolation Pads – Four (4) pads of 10 mm thick NBR isolation are provided as an option.

Chilled Water Pressure 10 bar(g) for Europe – Option is available with compact or marine type water boxes.

Chilled Water Pressure 16 bar(g) – Option is available with compact or marine type waterboxes.

Chilled Water Pressure 20 bar(g) – Chilled Water Pressure 20 bar(g) – Option is available with marine type waterboxes only.

Cooling Water Pressure 10 bar(g) for Europe – Both compact and marine water boxes are available for models C30EXET through C500EXET. Only marine water boxes are available for models C630EXW2ST through C2000EXW4ST.

Cooling Water Pressure 16 bar(g) – Both compact and marine waterboxes are available for models C30EXET through C500EXET. Only marine waterboxes are available for models C630EXW2ST through C2000EXW4ST.

Cooling Water Pressure 20 bar(g) – Option is available with marine waterbox only.

Cooling Water Pressure Differential Switch – Chilled Water Pressure Differential Switch is included in the base unit. Pressure differential switches for the cooling water are provided as an option when it is required.

IP54 (Indoor Use) – Protection rating for control panel, electrical component and pumps is equivalent to IP54. Water– resistant flexible conduit are used for chiller wiring. If the plant room will ever get below 10°C, you must have the cold ambient option.

Outdoor Installation – Protection rating for control panel, electrical component and pumps is equivalent to IP54. Water–resistant flexible conduit are used for chiller wiring. Minimum allowable temperature for outdoor installation is 0°C, provided that the chiller includes the cold ambient option. Outdoor installations will be considered on a case-by-case basis.

Options and Accessories (Cont'd)

Dry Shipment - Solution and refrigerant are shipped separately. The solution and refrigerant will be charged at the factory and used for chiller testing. The solution and refrigerant will then be removed and shipped in barrels with the chiller.

Factory Performance Test Option Not 3rd Party Witnessed – Provides a full load performance test and a signed report of capacity and performance. (**NOTE:** Full load single point test. Additional part load points or special testing requirements will be addressed by marketing on a project specific basis.)

Customer Witness Factory Test – Permits a customer witnessed factory performance test of a given chiller at design full load conditions. The time of the test will be based on the manufacturing schedule and will be confirmed by the factory.

Remote Interface Option – Permit the use of 0 – 10 V or 4 - 20 mA remote signals to limit steam condensate control valve opening

Junction Box For Separate Installation Of Control Panel – A junction box is furnished when the control panel is installed at a remote location from the unit.

Split Shipment – For tight rigging jobs, it is possible to ship the unit in two pieces – the upper section (evaporator, absorber, condenser and generator) and the lower section (solution heat exchanger and base frame). Dry shipment option is mandatory and already included.

Application Data

The following discussion is a guide for the application and installation of YHAU-C Steam Single-Effect Absorption Chillers to ensure reliable, trouble free life for which this equipment was designed.

While this guide is directed towards normal water-chilling applications, your local Johnson Controls sales representative can provide complete recommendations on other types of applications.

LOCATION

YHAU-C units make very little noise or vibration and may generally be located at any level in a building where the construction will support the total system emergency weight.

The system location should provide sufficient space around the unit to permit tube removal, if required. If a door or other large opening is conveniently located opposite one end of the system, the tubes may be extracted and replaced through these openings. Allow sufficient clearance on the remaining sides of the unit for necessary access and maintenance.

Standard absorption chillers are not suitable for outdoor installation. The machine room must be enclosed, well lighted and properly ventilated to keep its temperature no higher than 40°C and no lower than 10°C.

WATER CIRCUITS

Flow Rate – For normal fluid chilling duty, the evaporator and absorber/condenser flow rates are permitted at water velocity levels in the heat exchangers tubes of up to 3.3 m/s.

Under variable chilled fluid and cooling fluid flow conditions, special attention needs to be paid to the rate of change of flow rate with time and the minimum/maximum velocities through the tubes. Applications involving chilled and cooling fluid flow rates which vary by more than +10% from design will require special considerations on a case by case basis.

Water Quality – The practical and economical application of liquid chillers requires that the quality of the water supply for the evaporator and the absorber/condenser be analyzed by a water treatment specialist. Water quality may affect the performance of any chiller through corrosion, deposits of heat resistant scale, sedimentation or organic growth. These will hurt chiller performance and increase operation and maintenance costs. Normally, performance may be maintained by corrective water treatment and periodic cleaning of tubes. If water conditions exist which cannot be corrected by proper water treatment, it may be necessary to provide a larger allowance for fouling, and/or specify special materials of construction.

Application Data (Cont'd)

General Water Piping – All chilled water and cooling water piping should be designed and installed in accordance with accepted piping practice. Chilled water and cooling water pumps should be located to discharge through the YHAU-C unit to assure positive pressure and flow through the unit. Piping should include offsets to provide flexibility and should be arranged to prevent drainage of water from the cooler and condenser when the pumps are shut down. Piping should be adequately supported and braced independent of the chiller to avoid imposition of strain on chiller nozzles and components. Hangers must allow for alignment of the pipe. Isolators in the piping and in the hangers are highly desirable in achieving sound and vibration control.

Convenience Considerations – With consideration given to facilitating the performance of routine maintenance work, some or all of the following steps may be taken by the purchaser.

- Evaporator, absorber and condenser waterboxes are equipped with plugged vent and drain connections.
- If desired, vent and drain valves may be installed with or without piping to an open drain.
- Pressure gauges with stop cocks, and stop valves, may be installed in the inlets and outlets of the cooling and chilled water lines as close as possible to the chiller.
- An overhead monorail or beam hoist may be used to facilitate servicing.

Connections – The standard unit is designed for 8bar(g) for Europe and 10 bar(g) for other countries working pressure in both the chilled and cooling water circuits. The connections (water nozzles) to these circuits are furnished in accordance with DIN flanges for Europe and GB flanges for other countries. Piping should be arranged for ease of disassembly at the unit for performance of routine maintenance such as tube cleaning. All water piping should be thoroughly cleaned of all dirt and debris before final connections are made to the YHAU-C unit.

Chilled Water – The chilled water circuit uses a differential pressure switch as standard, factory mounted in the water nozzle connection and wired to the chiller control panel. A water strainer with a 10 mm mesh, should be field installed in the chilled water inlet line as close as possible to the chiller. If located close enough to the chiller, the chilled water pump may be protected by the same strainer. The flow sensor and strainer assure chilled water flow during unit operation. The loss or severe reduction of water flow could seriously impair the YHAU-C unit performance or even result in tube freeze up.

Cooling Water – Like the chilled water circuit, the cooling water circuit requires a means of proving flow. Low flow protection is provided by an optional differential pressure switch mounted in the water nozzle connection and wired to the chiller control panel.

Application Data (Cont'd)

The YHAU-C chiller is engineered for maximum efficiency at both design and part load operation by taking advantage of the colder cooling water temperatures which naturally occur in the winter months. For standard air conditioning applications, YHAU-C absorbers can tolerate entering cooling water temperatures as low as 18°C without a cooling tower bypass.

For process or critical applications which have strict requirements for leaving chilled water temperatures, a three-way cooling tower bypass valve is recommended.

CONTROL VALVES

An automatic control valve is furnished with the unit. The valve will be electrically actuated and will automatically close on unit shutdown. The valve should be located at the absorption unit generator steam condensate drain pipe.

Automatic control valves are sized according to job specific full load parameters.

SOUND AND VIBRATION CONSIDERATIONS

Since the YHAU-C unit generates very little vibration, vibration eliminating mounts are not required. However, when the machine is installed where even mild noise is a problem, rubber pads can be used.

THERMAL INSULATION

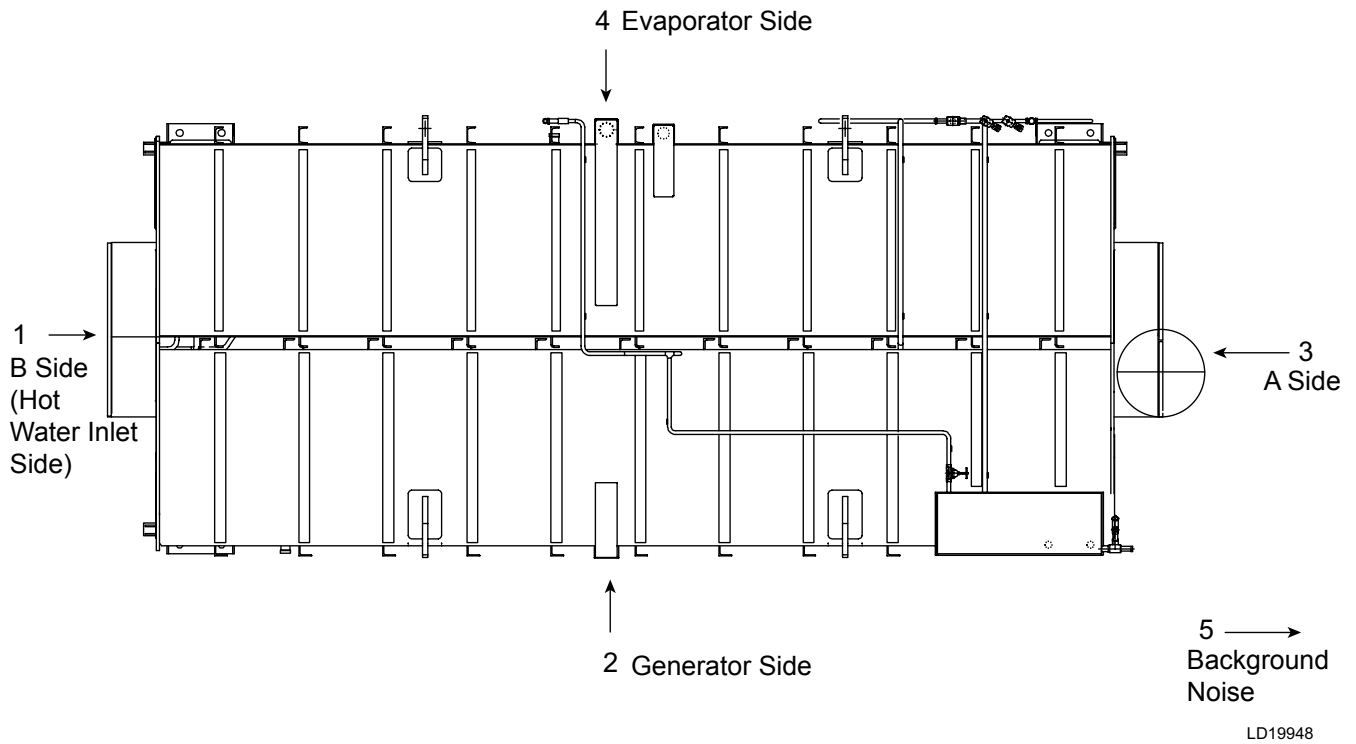
YHAU-C units require thermal insulation (by others) on both hot and cold surfaces in order to achieve maximum efficiency and prevent sweating.

TYPICAL OPERATIONAL RANGE

The numbers shown in below are the allowable ranges for each parameter. Not all combinations are possible. Please check with your Johnson Controls Service Center to see if your temperature differential is possible.

PARAMETER	ALLOWABLE RANGES
Chilled Water In	7 - 25°C
Chilled Water Out	4 - 16°C
Cooling Water In	20 - 37°C
Cooling Water Out	25 - 42°C
Steam	1 - 3bar(g)

Sound Data



	SOUND MEASURE LOCATIONS				
Optional Condition	1	2	3	4	5
Full Load Operation	77 dbs	79 dbs	79 dbs	78 dbs	72 dbs

* Position of Measuring Instrument
 Height: 1.5 m, Horizon: 1.0 m (from chiller surface)

Note: These are reference values, as the chiller unit was not insulated and water pipes were not permanently secured during the measurement.

FIGURE 3 - SAMPLE SOUND TESTING FOR YHAU-C CHILLER

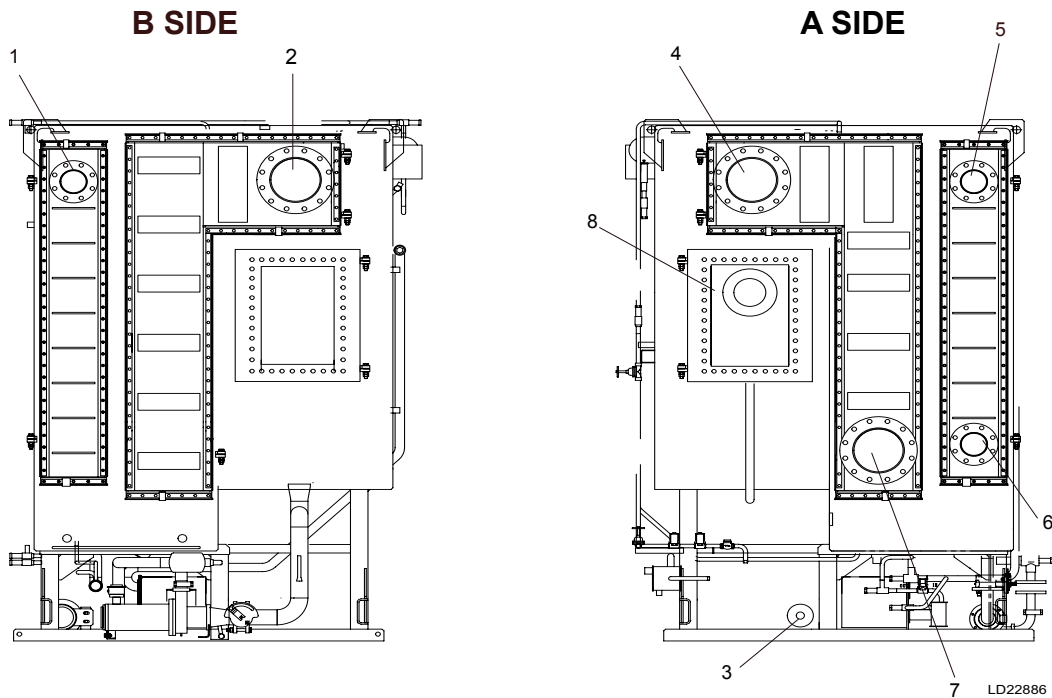
Nozzle Arrangements

30 - 500EXET

YHAU-C	NOZZLE LOCATION								
	CHILLED WATER (CHW)			COOLING WATER (COW)			STEAM		
	INLET	OUTLET		INLET	OUTLET		INLET	OUTLET	
30-500EXET	A	ODD PASS	B	A	ODD PASS	B	A	ODD PASS	B
		EVEN PASS	A		EVEN PASS	A		EVEN PASS	A

NOTE:

These images are representations of nozzle arrangements. Reference general arrangement drawings for detailed nozzle locations for each specific unit.



ITEM	DESCRIPTION
1	Chilled Outlet (Odd Pass)
2	Cooling Water Outlet (Odd Pass)
3	Steam Condensate Drain (always on the bottom)
4	Cooling Water Outlet (Even Pass)
5	Chilled Water Outlet (Even Pass)
6	Chilled Water Inlet
7	Cooling Water Inlet
8	Steam Inlet

FIGURE 4 - YHAU-C30-500EXET NOZZLE LOCATIONS

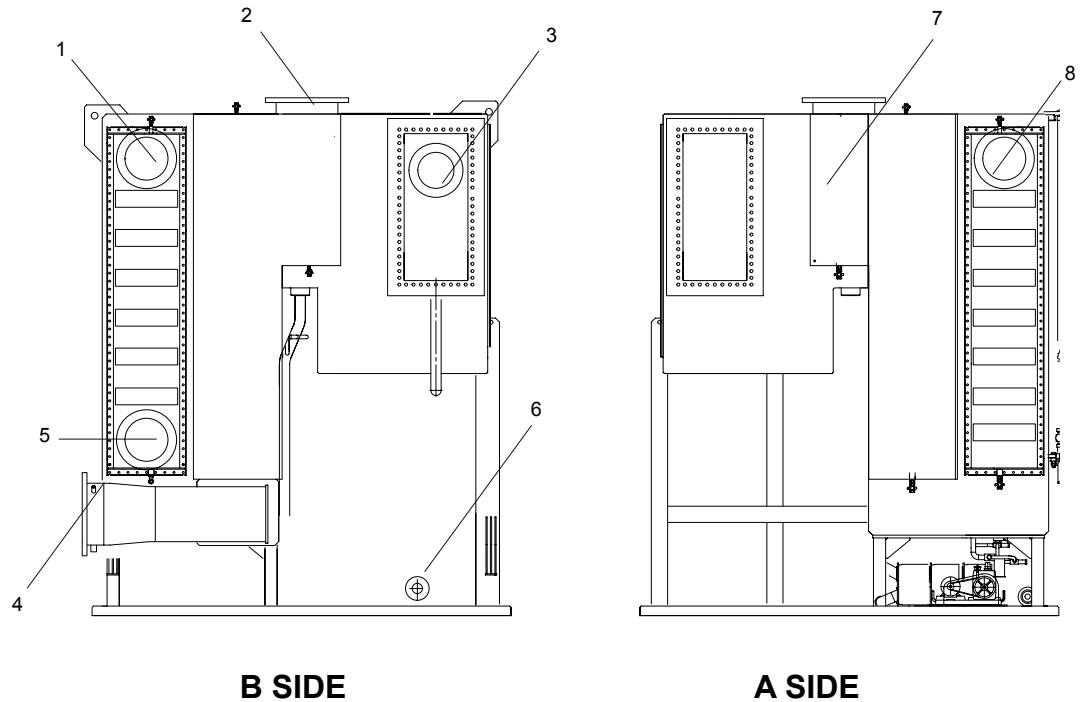
Nozzle Arrangements (Cont'd)

630EXW2ST-2000EXW4ST

YHAU-C	NOZZLE LOCATION								
	CHILLED WATER (CHW)			COOLING WATER (COW)			STEAM		
	INLET	OUTLET		INLET	OUTLET		INLET	OUTLET	
630EXW2ST-2000EXW4ST	B	ODD PASS	A	B	ODD PASS	A	A	ODD PASS	B
		EVEN PASS	B		EVEN PASS	B		EVEN PASS	A

NOTE:

These images are representations of nozzle arrangements. Reference general arrangement drawings for detailed nozzle locations for each specific unit.



ITEM	DESCRIPTION
1	Chilled Water Outlet (Even Pass)
2	Cooling Water Outlet (Even Pass)
3	Steam Inlet
4	Cooling Water Inlet
5	Chilled Water Inlet
6	Steam Condensate Drain
7	Cooling Water Outlet (Odd Pass)
8	Chilled Water Outlet (Odd Pass)

FIGURE 5 - YHAU-C630EXW2ST-2000EXW4ST NOZZLE LOCATIONS

Weights and Dimensions

YHAU-C	DIMENSION				WEIGHT		
	LENGTH (M)	WIDTH (M)	HEIGHT (M)	TUBE EXTRACTING SPACE (M)	MAXIMUM SHIPPING (TONS)	OPER. (TONS)	EMERGENCY (FILLED WITH WATER) (TONS)
30EXET	1.9	1.55	2.1	1.25	3.3	3.5	5.1
40EXET	2.25	1.55	2.1	1.6	3.6	3.9	6.0
50EXET	2.65	1.55	2.1	2.0	4.1	4.4	7.0
65EXET	3.2	1.55	2.1	2.55	4.6	5.0	8.3
80EXET	2.35	1.9	2.5	1.6	5.3	5.8	9.0
100EXET	2.75	1.9	2.5	2.0	6.0	6.6	10.7
130EXET	3.3	1.9	2.5	2.55	6.8	7.6	12.8
160EXET	3.95	1.9	2.5	3.2	7.9	8.9	15.4
200EXET	4.75	1.9	2.5	4.0	9.1	10.2	18.3
255EXET	3.4	2.35	3.2	2.55	11.9	13.7	21.2
320EXET	4.05	2.35	3.2	3.2	13.6	15.7	25.1
400EXET	4.85	2.35	3.2	4.0	15.3	17.9	29.7
500EXET	5.85	2.35	3.2	5.0	18.0	21.0	35.6
630EXW2ST	5.5	2.75	3.3	4.5	21.1	25.4	41.8
700EXW2ST	6.0	2.75	3.3	5.0	22.6	27.2	45.4
800EXW2ST	6.7	2.75	3.3	5.7	24.1	29.1	49.9
900EXW2ST	7.3	2.75	3.3	6.3	26.6	31.9	54.9
1000EXW2ST	8.0	2.75	3.3	7.0	28.6	34.3	59.9
1120EXW2ST	6.8	3.3	3.9	5.7	39.7	47.6	75.1
1250EXW2ST	7.6	3.3	3.9	6.3	41.6	50.0	80.4
1400EXW2ST	8.2	3.3	3.9	7.0	43.6	52.4	86.2
1500EXW4ST	8.7	3.3	3.9	7.5	45.4	54.6	90.8
1600EXW4ST	9.2	3.3	3.9	8.0	47.2	56.9	95.5
1680EXW4ST	9.7	3.3	3.9	8.5	49.2	59.1	100.1
1800EXW4ST	10.2	3.3	3.9	9.0	51.5	61.8	105.3
1900EXW4ST	10.7	3.3	3.9	9.5	53.8	64.6	110.4
2000EXW4ST	11.2	3.3	3.9	10.0	55.3	67.3	115.6

NOTE:

Refer to the general arrangement drawings for specific center of gravity locations and data.

Physical Data

YHAU-C	COLD INSULATION AREA (M2)	HOT INSULATION AREA (M2)	RADIATION HEAT LOSS (WITH INSULATION, AMBIENT TEMP. 10°C) (KW)	RADIATION HEAT LOSS (WITHOUT INSULATION, AMBIENT TEMP. 10°C) (KW)	WATER VOLUME		
					CHILLED WATER (EVAP) (M ³)	COOLING WATER (ABS AND COND) (M ³)	STEAM (GEN) (M ³)
30EXET	4	6	0.4	5.3	0.05	0.10	0.01
40EXET	5	7	0.6	7.0	0.06	0.11	0.02
50EXET	6	8	0.7	8.7	0.07	0.13	0.02
65EXET	6	9	0.9	11.3	0.09	0.16	0.02
80EXET	6	9	0.9	11.7	0.10	0.26	0.03
100EXET	7	10	1.1	14.6	0.12	0.30	0.04
130EXET	9	12	1.5	19.0	0.14	0.36	0.04
160EXET	10	14	1.8	23.3	0.16	0.43	0.05
200EXET	12	16	2.3	29.2	0.20	0.51	0.06
255EXET	12	17	2.5	31.1	0.34	0.88	0.07
320EXET	14	19	3.1	39.0	0.39	1.02	0.09
400EXET	17	22	3.9	48.8	0.47	1.19	0.10
500EXET	20	29	4.9	60.7	0.55	1.35	0.12
630EXW2ST	29	31	6.0	71.0	1.13	2.32	0.16
700EXW2ST	31	33	6.0	79.0	1.22	2.45	0.18
800EXW2ST	33	35	7.0	90.0	1.33	2.63	0.20
900EXW2ST	36	38	8.0	102.0	1.43	2.79	0.22
1000EXW2ST	39	41	9.0	113.0	1.55	2.97	0.24
1120EXW4ST	44	44	10.0	127.0	2.57	3.90	0.35
1250EXW4ST	47	47	11.0	142.0	2.71	4.13	0.38
1400EXW4ST	49	49	13.0	159.0	2.88	4.40	0.42
1500EXW4ST	52	52	14.0	170.0	2.99	4.59	0.45
1600EXW4ST	55	55	14.0	181.0	3.11	4.78	0.47
1680EXW4ST	57	57	15.0	189.0	3.23	4.97	0.50
1800EXW4ST	60	60	16.0	203.0	3.35	5.16	0.53
1900EXW4ST	63	63	17.0	214.0	3.46	5.35	0.55
2000EXW4ST	66	66	18.0	225.0	3.58	5.54	0.58

Electrical Data

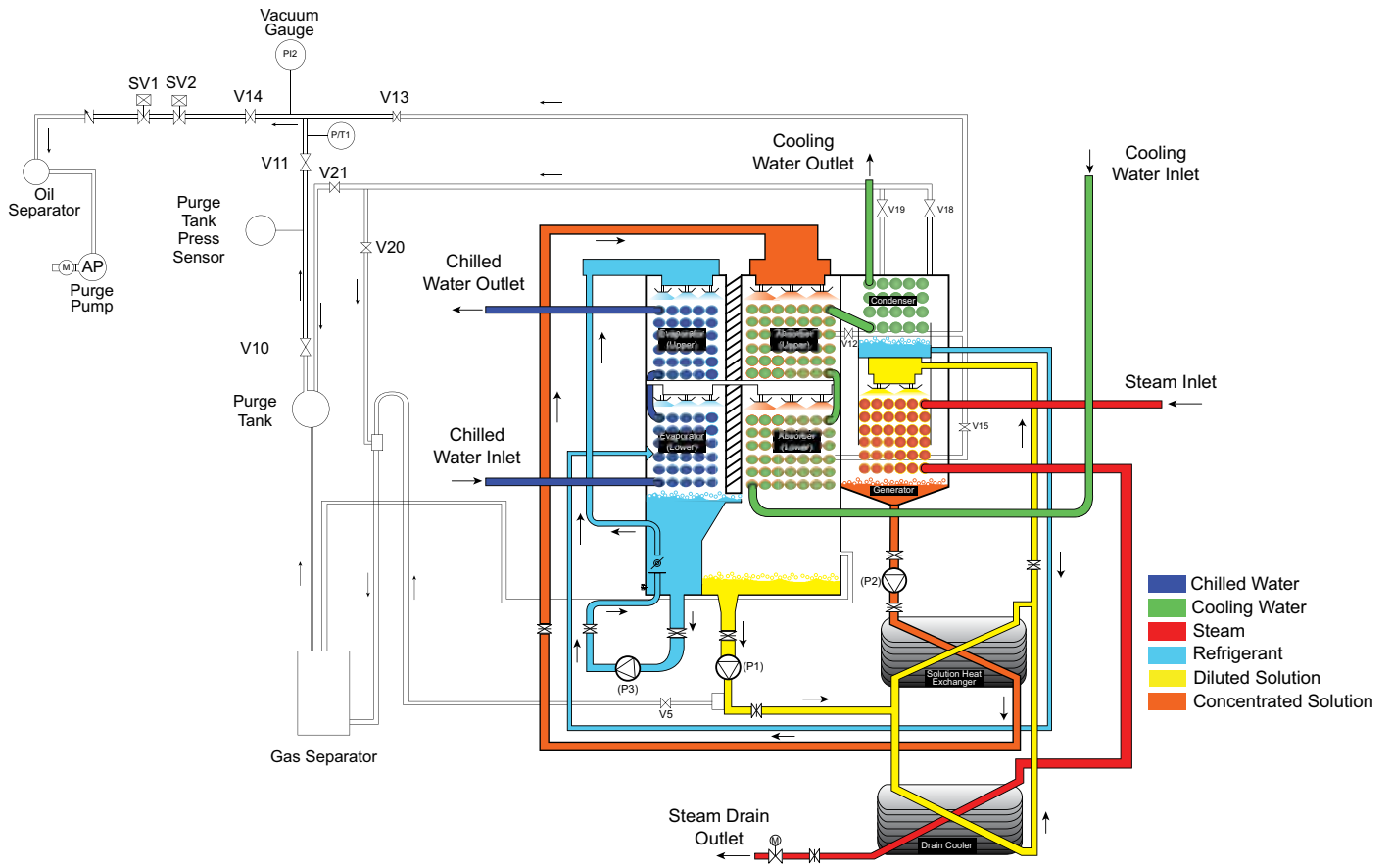
YHAU-C	VOLTAGE (V-PH-HZ)	MAIN BREAKER		SOLUTION CIRCULATION PUMP			SOLUTION SPRAY PUMP		
		RATED CURRENT	FRAME SIZE	KW	FLA	LRA	KW	FLA	LRA
30EXET	AC380V-3Ph-50Hz	20	30	1.1	3.4	12.1	1.1	3.4	12.1
	AC400V-3Ph-50Hz				3.45	12.6		3.45	12.6
40EXET	AC380V-3Ph-50Hz	20	30	1.1	3.4	12.1	1.1	3.4	12.1
	AC400V-3Ph-50Hz				3.45	12.6		3.45	12.6
50EXET	AC380V-3Ph-50Hz	20	30	1.1	3.4	12.1	1.1	3.4	12.1
	AC400V-3Ph-50Hz				3.45	12.6		3.45	12.6
65EXET	AC380V-3Ph-50Hz	20	30	1.1	3.4	12.1	1.1	3.4	12.1
	AC400V-3Ph-50Hz				3.45	12.6		3.45	12.6
80EXET	AC380V-3Ph-50Hz	20	30	1.1	3.4	12.1	1.1	3.4	12.1
	AC400V-3Ph-50Hz				3.45	12.6		3.45	12.6
100EXET	AC380V-3Ph-50Hz	20	30	1.1	3.4	12.1	1.1	3.4	12.1
	AC400V-3Ph-50Hz				3.45	12.6		3.45	12.6
130EXET	AC380V-3Ph-50Hz	30	50	2.2	6.1	23.0	1.1	3.4	12.1
	AC400V-3Ph-50Hz				5.8	24.0		3.45	12.6
160EXET	AC380V-3Ph-50Hz	30	50	2.2	6.1	23.0	1.1	3.4	12.1
	AC400V-3Ph-50Hz				5.8	24.0		3.45	12.6
200EXET	AC380V-3Ph-50Hz	30	50	2.2	6.1	23.0	2.2	6.1	23.0
	AC400V-3Ph-50Hz				5.8	24.0		5.8	24.0
255EXET	AC380V-3Ph-50Hz	30	50	2.2	6.1	23.0	2.2	6.1	23.0
	AC400V-3Ph-50Hz				5.8	24.0		5.8	24.0
320EXET	AC380V-3Ph-50Hz	30	50	3.0	8.1	29.0	2.2	6.1	23.0
	AC400V-3Ph-50Hz				7.8	30.0		5.8	24.0
400EXET	AC380V-3Ph-50Hz	30	50	3.0	8.1	29.0	2.2	6.1	23.0
	AC400V-3Ph-50Hz				7.8	30.0		5.8	24.0
500EXET	AC380V-3Ph-50Hz	30	50	3.0	8.1	29.0	2.2	6.1	23.0
	AC400V-3Ph-50Hz				7.8	30.0		5.8	24.0
630EXW2ST	AC380V-3Ph-50Hz	32	63	5.5	14.2	60.0	2.2	6.5	20.3
	AC400V-3Ph-50Hz				13.5	63.0		6.2	21.0
700EXW2ST	AC380V-3Ph-50Hz	32	63	5.5	14.2	60.0	2.2	6.5	20.3
	AC400V-3Ph-50Hz				13.5	63.0		6.2	21.0
800EXW2ST	AC380V-3Ph-50Hz	32	63	5.5	14.2	60.0	2.2	6.5	20.3
	AC400V-3Ph-50Hz				13.5	63.0		6.2	21.0
900EXW2ST	AC380V-3Ph-50Hz	32	63	5.5	14.2	60.0	2.2	6.5	20.3
	AC400V-3Ph-50Hz				13.5	63.0		6.2	21.0
1000EXW2ST	AC380V-3Ph-50Hz	32	63	5.5	14.2	60.0	2.2	6.5	20.3
	AC400V-3Ph-50Hz				13.5	63.0		6.2	21.0
1120EXW4ST	AC380V-3Ph-50Hz	50	63	7.5	19.8	68.6	3.7	10.6	34.0
	AC400V-3Ph-50Hz				19.2	72.0		10.1	36.0
1250EXW4ST	AC380V-3Ph-50Hz	50	63	7.5	19.8	68.6	3.7	10.6	34.0
	AC400V-3Ph-50Hz				19.2	72.0		10.1	36.0
1400EXW4ST	AC380V-3Ph-50Hz	50	63	7.5	19.8	68.6	3.7	10.6	34.0
	AC400V-3Ph-50Hz				19.2	72.0		10.1	36.0
1500EXW4ST	AC380V-3Ph-50Hz	50	63	7.5	19.8	68.6	3.7	10.6	34.0
	AC400V-3Ph-50Hz				19.2	72.0		10.1	36.0
1600EXW4ST	AC380V-3Ph-50Hz	50	63	7.5	19.8	68.6	3.7	10.6	34.0
	AC400V-3Ph-50Hz				19.2	72.0		10.1	36.0
1680EXW4ST	AC380V-3Ph-50Hz	50	63	7.5	19.8	68.6	3.7	10.6	34.0
	AC400V-3Ph-50Hz				19.2	72.0		10.1	36.0
1800EXW4ST	AC380V-3Ph-50Hz	80	125	11.0	27.5	99.1	7.5	19.8	68.6
	AC400V-3Ph-50Hz				26.3	104.0		19.2	72.0
1900EXW4ST	AC380V-3Ph-50Hz	80	125	11.0	27.5	99.1	7.5	19.8	68.6
	AC400V-3Ph-50Hz				26.3	104.0		19.2	72.0
2000EXW4ST	AC380V-3Ph-50Hz	80	125	11.0	27.5	99.1	7.5	19.8	68.6
	AC400V-3Ph-50Hz				26.3	104.0		19.2	72.0

Electrical Data (Cont'd)

YHAU-C	REFRIGERANT PUMP			VACUUM PUMP			CAPACITY KVA	CONSUMPTION KW	SCCR KA
	KW	FLA	LRA	KW	FLA	LRA			
30EXET	0.2	1.1	3.0	0.75	1.8	9.0	6.7	5.3	6
		1.12	3.3		1.8	9.0	7.1	5.7	
40EXET	0.2	1.1	3.0	0.75	1.8	9.0	6.7	5.3	6
		1.12	3.3		1.8	9.0	7.1	5.7	
50EXET	0.2	1.1	3.0	0.75	1.8	9.0	6.7	5.3	6
		1.12	3.3		1.8	9.0	7.1	5.7	
65EXET	0.2	1.1	3.0	0.75	1.8	9.0	6.7	5.3	6
		1.12	3.3		1.8	9.0	7.1	5.7	
80EXET	0.2	1.1	3.0	0.75	1.8	9.0	6.7	5.3	6
		1.12	3.3		1.8	9.0	7.1	5.7	
100EXET	0.2	1.1	3.0	0.75	1.8	9.0	6.7	5.3	6
		1.12	3.3		1.8	9.0	7.1	5.7	
130EXET	0.2	1.1	3.0	0.75	1.8	9.0	8.5	6.8	6
		1.12	3.3		1.8	9.0	8.7	7.0	
160EXET	0.2	1.1	3.0	0.75	1.8	9.0	8.5	6.8	6
		1.12	3.3		1.8	9.0	8.7	7.0	
200EXET	0.4	1.6	4.2	0.75	1.8	9.0	10.6	8.5	6
		1.65	4.4		1.8	9.0	10.7	8.6	
255EXET	0.4	1.6	4.2	0.75	1.8	9.0	10.6	8.5	6
		1.65	4.4		1.8	9.0	10.7	8.6	
320EXET	0.4	1.6	4.2	0.75	1.8	9.0	11.9	9.5	6
		1.65	4.4		1.8	9.0	12.1	9.7	
400EXET	0.4	1.6	4.2	0.75	1.8	9.0	11.9	9.5	6
		1.65	4.4		1.8	9.0	12.1	9.7	
500EXET	0.4	1.6	4.2	0.75	1.8	9.0	11.9	9.5	6
		1.65	4.4		1.8	9.0	12.1	9.7	
630EXW2ST	0.4	1.6	4.2	0.75	1.8	9.0	16.2	12.9	6
		1.65	4.4		1.8	9.0	16.3	13.1	
700EXW2ST	0.4	1.6	4.2	0.75	1.8	9.0	16.2	12.9	6
		1.65	4.4		1.8	9.0	16.3	13.1	
800EXW2ST	0.4	3.9	11.9	0.75	1.8	9.0	17.7	14.1	6
		3.8	12.8		1.8	9.0	17.8	14.3	
900EXW2ST	0.4	3.9	11.9	0.75	1.8	9.0	17.7	14.1	6
		3.8	12.8		1.8	9.0	17.8	14.3	
1000EXW2ST	0.4	3.9	11.9	0.75	1.8	9.0	17.7	14.1	6
		3.8	12.8		1.8	9.0	17.8	14.3	
1120EXW4ST	0.4	4.7	12.5	0.75	1.8	9.0	24.6	19.7	6
		4.5	13.0		1.8	9.0	25.0	20.0	
1250EXW4ST	0.4	4.7	12.5	0.75	1.8	9.0	24.6	19.7	6
		4.5	13.0		1.8	9.0	25.0	20.0	
1400EXW4ST	0.4	4.7	12.5	0.75	1.8	9.0	24.6	19.7	6
		4.5	13.0		1.8	9.0	25.0	20.0	
1500EXW4ST	0.4	4.7	12.5	0.75	1.8	9.0	24.6	19.7	6
		4.5	13.0		1.8	9.0	25.0	20.0	
1600EXW4ST	0.4	4.7	12.5	0.75	1.8	9.0	24.6	19.7	6
		4.5	13.0		1.8	9.0	25.0	20.0	
1680EXW4ST	0.4	4.7	12.5	0.75	1.8	9.0	24.6	19.7	6
		4.5	13.0		1.8	9.0	25.0	20.0	
1800EXW4ST	0.4	6.5	20.3	0.75	1.8	9.0	36.9	29.5	6
		6.2	21.0		1.8	9.0	37.4	29.9	
1900EXW4ST	0.4	6.5	20.3	0.75	1.8	9.0	36.9	29.5	6
		6.2	21.0		1.8	9.0	37.4	29.9	
2000EXW4ST	0.4	6.5	20.3	0.75	1.8	9.0	36.9	29.5	6
		6.2	21.0		1.8	9.0	37.4	29.9	

Process and Instrumentation

The following System Flow and P & I diagram are used for quoting and bidding. Temperatures and pressures on this graphic are representative; actual values may differ.



LD22004

FIGURE 6 - YHAU STEAM CHILLER FLOW DIAGRAM

Process and Instrumentation (Cont'd)

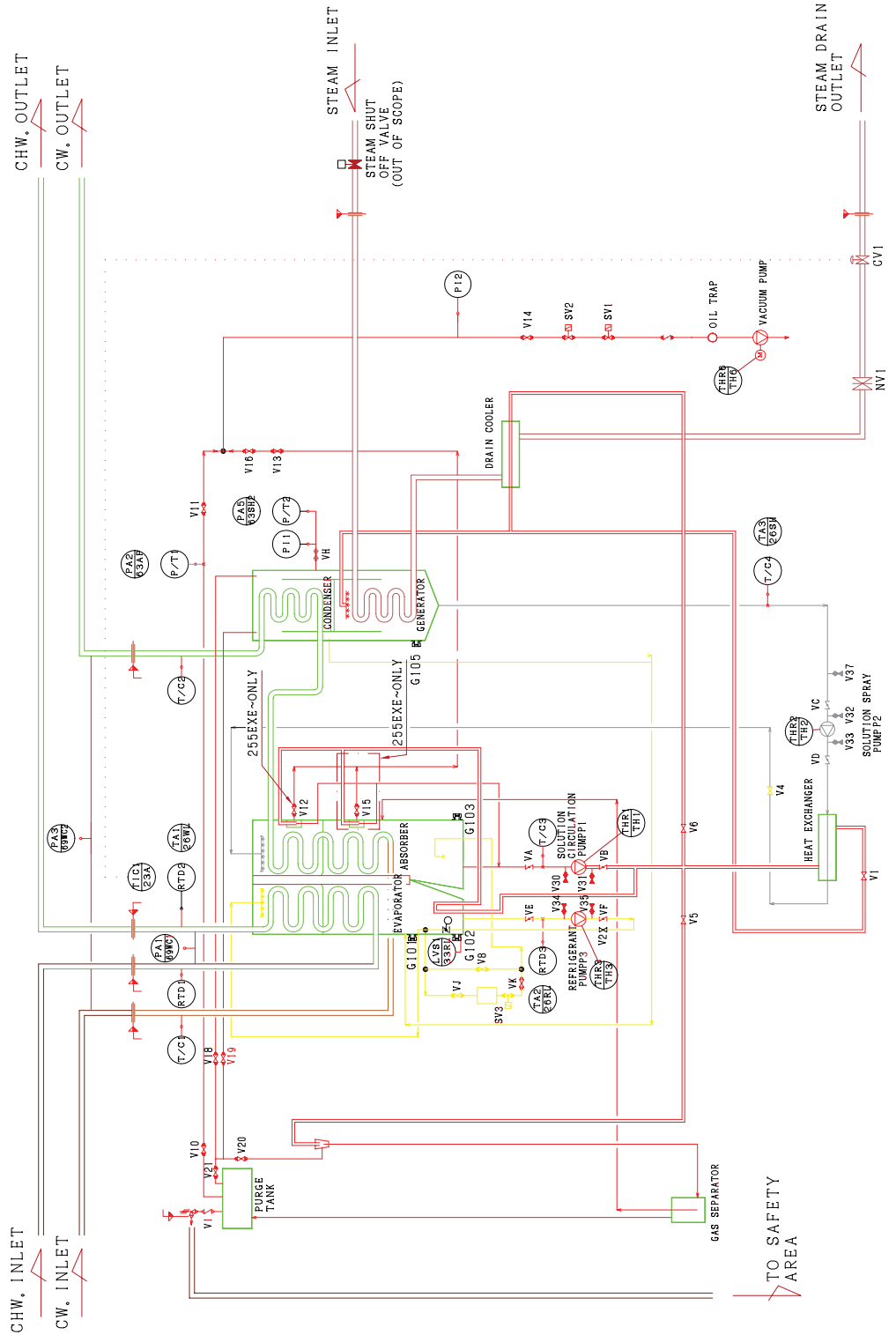


FIGURE 7 - YHAU STEAM CHILLER EXE SERIES P & I DIAGRAM

Guide Specifications

GENERAL

Provide Single-Stage Steam Absorption Chillers capable of producing chilled water per the capacities shown on drawings and schedules.

Each chiller will be of hermetic design and factory helium leak tested.

The chiller ships as a one-piece assembly charged with nitrogen. A modulating control valve is shipped loose for field installation.

All unit mounted controls and control panels are factory mounted, wired, tested, and shipped pre-installed as integral components of the chiller.

Purchase price includes start-up service and parts and labor warranty for a period of one year from start-up or eighteen months from delivery, whichever occurs first.

BASE UNIT INCLUDES:

- DIN flanges for Europe and GB flanges for other countries for Chilled water, Cooling water. Mating flanges are not included
- Solution Heat Exchanger
- Hermetic Solution Circulation Pump, Solution Feeding Pump and Refrigerant Pump
- Pump Isolation Valves
- Compact 8 bar(g) for Europe and 10 bar(g) for other countries waterboxes for Chilled water
- Compact 8 bar(g) for Europe and 10 bar(g) for other countries waterboxes for Cooling water for Models up to C500EXET
- Marine type waterboxes for Cooling water for models C630EXW2ST through C2000EXW4ST
- Undercoat YORK Caribbean blue paint (Munsell 4.65G 4.50/2.85) for Chiller main body
- Epoxy paint inside Chilled waterboxes and Cooling waterboxes
- Control Panel
- Power supply 380 V / 3 phase / 50 Hz, 3 wires for Europe, 4 wires for other countries
- Pressure release valve for over pressure relief 0.8 bar(g)
- Chilled water pressure differential switch
- Compound gauge
- Automatic Purge System including Purge Pump
- 4-20 mA Remote Temperature Reset Control for Chilled water
- Initial Startup
- CE marking for Europe
- Steam Condensate Control Valve

Guide Specifications (Cont'd)

- LiBr (Lithium Bromide + Lithium Molybdate Inhibitor)
- Deionized water Refrigerant
- 2-Ethyl Hexyl Alcohol
- Modbus / RTU / TCP
- Factory end of line run test.

NOTE: Model C2000EXW4ST is shipped dry. LiBr solution and refrigerant water are shipped in barrels and are charged at job site.

BASE UNIT DOES NOT INCLUDE:

- Cold surface insulation (Option)
- Hot surface insulation
- Cooling water pressure differential switch (Option)
- Solution charge of Model C2000EXW4ST
- Factory performance test (Option)

CONSTRUCTION

The chiller consists of a generator, solution heat exchanger, absorber, condenser and an evaporator. To minimize the risk of corrosion, the evaporator dispersion tray and the absorber dispersion tray are stainless steel.

The evaporator, absorber, condenser and generator are of shell and tube construction. The steam generator is designed for 3 bar(g) and tested to 4.35 bar(g) for Europe, 3.9 bar(g) for other countries. A shell-side pressure releasing valve is furnished and set to blow at 0.8 bar(g).

The evaporator cycle and the absorber cycle consists of two-stages (upper stage and lower stage). This technology makes absorber solution concentration weak, which enables to extend the machine life. Furthermore, this technology makes generator solution temperature lower than the ordinary machine, which enables to utilize lowered hot water temperature as driving heat source.

The steam generator is falling liquid film type.

The plate type solution heat exchanger is equipped to preheat the diluted solution and achieve higher efficiency.

The unit is hermetically tight and built to very stringent standards. It operates under a better vacuum, which improves performance and reliability ensuring design performance to GB/T 18431-2014. Standard (2.03×10^{-6} Pa·m³/s).

Guide Specifications (Cont'd)

TUBE MATERIALS

The generator tubes are 0.8 mm wall thickness stainless steel (S22053), and allow for the removal of the tubes from either end of the machine. Evaporator and Absorber tubes are Low Residual Phosphorus Deoxidized Copper (C1201) finned type and wall thickness before finning is 0.6 mm.

The condenser tubes are 0.6 mm wall Low Residual Phosphorus Deoxidized Copper (C1201).

WATERBOXES

Waterboxes are removable to permit tube cleaning and replacement. Water circuit tubing is replaceable from either end of the absorption unit. All waterboxes and associated water circuit nozzles and tube bundles are designed for 8 bar(g) and water tested to 11.6 bar(g) for Europe, 10 bar(g) and water tested to 12.5 bar(g). Vent and drain connections are provided on each waterbox. All the water connections are equipped with DIN flanges for Europe, GB flanges for other countries. Mating flanges are not included. Inside of waterboxes and waterbox covers are coated with epoxy paint.

AUTOMATIC DECRYSTALLIZATION SYSTEM

The chiller has an anti-crystallization system. The absorber and the evaporator are located side by side in the same shell and separated by the eliminator. When the concentration rate of Lithium Bromide in the chiller goes up, the water level at the evaporator shall increase and automatically spill over to the absorber and the concentration rate of the solution at the absorber will go down.

PUMPS

The solution and refrigerant pumps are hermetically sealed, self-lubricating, totally enclosed, factory-mounted, wired and tested. Motor windings are not exposed to lithium bromide or water. The suction and discharge connections for each pump are fully welded to the unit piping to minimize the opportunity for leaks. Suction and discharge connections are equipped with factory installed isolation valves to permit quick and easy servicing of pumps. The pump durability is designed to operate for a total of 60,000 hours. The parts of pumps such as bearings and sealing gaskets are to be inspected every 20,000 hours and replaced depending on necessity.

FULLY AUTOMATIC PURGING SYSTEM

The chiller is equipped with a fully automatic purging system to remove non-condensable gases from the unit during operation. Non-condensables are collected by an ejector and accumulated in the purge tank. The chiller can dictate the pressure increase in the purge tank and automatically remove the non-condensable gas through the operation of an electric vacuum pump.

The purge pump is an oil rotary double-stage design, and is furnished complete with a motor and all required accessories. The purge pump is shipped mounted on the chiller and connecting hose is factory installed. The purge pump oil is charged at the job site.

Guide Specifications (Cont'd)

LITHIUM BROMIDE AND REFRIGERANT CHARGE

Lithium bromide contains lithium molybdate corrosion inhibitor to minimize the rate of ferrous metal corrosion on both the solution and refrigerant sides of the unit. Deionized water is supplied for the refrigerant charge. Solution and refrigerant is charged to the chiller at the factory before the shipment. All chillers are shipped fully charged with lithium bromide and refrigerant, except for model 2000EXW4ST. The lithium bromide and refrigerant of the 2000EXW4ST unit is shipped separately in barrels.

STEAM CONDENSATE CONTROL VALVE

Steam single effect chillers are furnished with a steam condensate control valve with the actuator motor. The valve features a cast iron or carbon steel body. The steam condensate control valve assembly is capable of modulating steam flow continuously from approximately 20% to 100% of the maximum design chiller capacity into the chiller. The actuator motor is powered from the chiller's Control Panel. The Actuator motor position is to be controlled via the Control Panel through a 4-20 mA DC control signal.

CONTROL PANEL

Each unit is furnished complete with a factory mounted and pre-wired control system. The control panel enclosure is equipped with hinged access door with lock and key. Protection rating of the control panel are IP42. All temperature sensors and other control devices necessary to sense unit operating parameters to be factory mounted and wired to panel. The control panel includes a touch panel showing all system parameters in various languages with numeric data in Metric units

The operating program is stored in non-volatile memory (SRAM) to eliminate chiller failure due to AC power failure.

Capacity Control - The control panel automatically controls the input steam flow rate to maintain the programmed leaving chilled water set-point for cooling loads ranging from approximately 20% to 100% of design. The input steam flow rate can be manually adjustable from the control panel to any setting between minimum and maximum when automatic operation is not desired and when hot water input is not being inhibited by a specific operating condition.

MAIN SCREEN

1. Equipment Status:

- Chiller Stop/Operating/Failure Activating
- Solution Circulation Pump, Solution Spray Pump, Refrigerant Pump ON/OFF
- Purge Pump ON/OFF
- Chilled Water Pump/Cooling Water Pump ON/OFF

2. Operation Status:

- Startup
- Generator Pressure
- Generator Concentration
- Valve Low Limit

Guide Specifications (Cont'd)

- Temperature Control
 - Thermo OFF
 - Load Limit
 - Dilution Operation
 - Set Point of Chilled Water Leaving Temperature
 - Capacity Control Valve Control Output
 - Chilled Water Entering/Leaving Temperature
 - Cooling Water Entering/Leaving Temperature
 - Refrigerant Temperature
 - Absorber Temperature
 - Generator Temperature
 - Purge Tank Pressure
3. Condition Lamps:
- Chiller Stop/Operation
 - Local/Remote
 - Failure/Alarm
4. Operation button:
- Chiller Stop/Operation
 - Local/Remote Mode Select

DATA SCREEN

1. Measured Value:
- Chilled Water Entering Temperature (°C)
 - Chilled Water Leaving Temperature (°C)
 - Cooling Water Entering Temperature (°C)
 - Cooling Water Leaving Temperature (°C)
 - Evaporator Refrigerant Temperature (°C)
 - Absorber Temperature (°C)
 - Generator Temperature (°C)
 - Generator Pressure (kPa)
 - Generator Concentration (%)
 - Purge Tank Pressure (kPa)
 - Control Valve Output (%)

Guide Specifications (Cont'd)

2. Operation Hours:

- Chiller Operation Hours
- Solution Pump Operation Hours
- Refrigerant Pump Operation Hours

3. Frequency:

- Chiller Operation Times
- Start Times
- Failure Times
- Alarm Times
- Purge Times

4. Trend:

- Chilled Water Temperature
- Cooling Water Temperature
- Generator Temperature

5. History Menu:

- Hourly Operation History (12 hours)
- Minute Operation History (12 minutes)
- Failure History (6 times)
- Alarm History (6 times)

FAILURE/ALARM SCREEN

1. Failure:

- Monitoring Interlock
- Chiller High Pressure
- Chilled Water Time Out
- Cooling Water Time Out
- Operation Interlock
- Cooling Water Pump Interlock
- Chilled Water Suspension
- Chilled Water Overcooled
- Refrigerant Overcooled
- Low Cooling Water Inlet temperature

Guide Specifications (Cont'd)

- Control Sensor Abnormal
- CPU Abnormal
- Generator High Temperature
- Solution Circulation Pump Abnormal
- Solution Spray Pump Abnormal
- Refrigerant Pump Abnormal

2. Alarm:

- Generator High Pressure Prevention Control
- Generator High Concentration Prevention Control
- Abnormal Purge Frequency
- Purge System Abnormal
- Chilled Water Overcool Prevention Control
- Refrigerant Overcool Prevention Control
- Cooling Water Tube Fouling
- Refrigerant Pump Stop
- Generator High Temperature Prevention Control
- Low Cooling Water Inlet Temperature
- High Cooling Water Inlet Temperature
- Recording Sensor Abnormal
- Low Battery
- ELB Trip

SETTING SCREEN

1. Control Parameter:

- Setting Method Local/Remote
- Setting Base Temperature
- Remote Setting Differential
- Set Point (display)
- Automatic Stop Temperature
- Automatic Restart Temperature

Guide Specifications (Cont'd)

2. Valve Operation:

- Control Valve Mode Auto/Manual
- Capacity Control Valve Position Setting

3. Operation Switch:

- Forced Dilution ON/OFF
- Refrigerant Pump Auto/Stop
- Purge Mode Auto/Manual
- Manual Purge ON/OFF

4. Select Language:

- Japanese, English, Chinese, German, and Italian

5. Date & Time

Touch panel mechanical specification -

- Screen size : 10.4 inches
- Electrical power supply : DC 24 V
- Electrical power consumption : Less than 17 W
- Display : TFT 65,536 colors
- Graphic mode : 640 x 480 dot. (VGA)

Communication – Modbus communication as standard.

- Modbus/RTU
- Modbus/TCP

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