Product & Training Manual

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TANDEM CHILLERS

Part of a group of companies that have been supplying chillers to a variety of markets for over 35 years.

Our core business is

- process or industrial cooling systems
- supply chilled water, tower water or fluid cooler systems (both dry and wet)
- complete pump tank modules with double, triple or multiple pumps
- inline and side stream filtration and automatic chemical treatment packages
- our chillers are available as water cooled, indoor air-cooled, remote air-cooled and out door air cooled condensers
- our products are made to cool either the product, the process machine or both
- we also supply medium temperature chillers with freon 404A for skating and curling rinks as well as ice storage systems to reduce peak cooling loads on buildings
- our chiller product temperature range is from -40 F to 70 F using different refrigerants like 134a, 404A, 407C or 410A

For our process customers we are responsible for

- sizing the cooling load and the type of cooling system
- selecting the number and type of chillers or cooling towers considering both current and future needs
- based on the cooling load we then select and size the pumps, the tank, the type of filtration and chemical treatment required
- in some applications we install fittings and valves on the tanks so that future pumps can be added as the company expands. Some pump systems have five pumps and circulate up to 2540 gpm

TEMPERATURE CORPORATION

Temperature Corporation supplies the cooling equipment with the customer being responsible for the installation, or it supplies the cooling equipment with complete plant water piping drawings and the customer's installation company would install the system. In the Toronto area we do complete "Turnkey System".

FIRST CHOICE PORTABLE CHILLERS INC.

First-Choice supplies self-contained air cooled or water cooled portable chillers (chillers complete with pump, tank set and casters) to a variety of industries where a stand-alone chiller is required to cool either the product, the machine or both.

TANDEM CHILLERS INC.

Tandem started designing its first modular chiller 7 years ago with a limited number of scroll compressor chillers and screw compressor chillers available in freon 22. We brought our vast knowledge to the design of our modular chillers:

1. The chiller would be of ***sound mechanical and refrigeration design***.
2. We designed our chillers so they could be removed for service ***without shutting down the rest of the chilling system***.

This design seemed so natural we cannot see why our competition does not do it. If we had told our process customers that we had to shut down their plant so we could do service on the cooling system we would have been thrown out of their plant. Why should an air-conditioning customer expect anything different.

Tandem Chillers is always developing new and innovative products for our customers, currently we are developing:

- Air-to-Water heat pump chillers.
- Chillers using the Turbocor centrifugal 134a compressor.

Today, we have the widest selection of chillers and freons available. *In this document we will explain more about our chillers that are capable of being removed for service, new product lines and why our chillers are superior to our competitors.*

COMPRESSORS

Scroll compressors are the only ones that operate with high pressure 410A, screw and reciprocating operate with low pressure 404A, 407C or 134a.

SCROLL

– operate at 3500 rpm, generally two (2) per chiller with dual refrigeration circuits.

DIGITAL SCROLL

– operate at 3500 rpm and unloads down to 20% of full load using 20% of its energy, largest model currently available is 15 hp.

ROTARY SCREW

– operate at 3500 rpm, one per chiller with single refrigeration circuit, are unloaded in steps 100%, 75%, 50%, 25% and off.

SEMI-HERMETIC RECIPROCATING PISTON

– operate at 1750 rpm, one or two per chiller, single or dual refrigeration circuits, not available in a small foot print.

CHILLING SYSTEMS

Chillers can be supplied as a stand-alone where only one chiller is purchased or modular to operate in a group. When stand-alone is used we highly recommend hot gas by-pass or that one of the compressors is a digital scroll to prevent compressor shot cycling and better control of the cooling load. Stand-alone chillers sense the entering water.

Modular chillers can be grouped up to 12 chillers and do not require the hot gas by-pass or digital scroll since there are more compressors to stage, this prevents compressor shot cycling and better control of the cooling load.

Most of the chiller groups operate with a "constant flow with variable temperature" building system. The water flow is constant and the chilled water temperature changes as the building load changes. The compressors are staged on the leaving water temperature to match this varying load.

The other approach is "variable flow or stepped flow with a constant temperature". This system generally has a primary and secondary loop, the water flow is changed by variable speed pumps with VFD in steps to suit the chiller flow requirements, motorized valves in the evaporator circuit of each chiller open when the chiller is started and closes when the chiller is stopped.

The flow steps must match the flow that each chiller requires to prevent the chiller evaporator from freezing.

When the chillers are operating they will be operating at or near 100% all the time or will be off. Since the flow is varied the return water to the chiller will be constant, at or near 54°F.

There will be no energy saving with a scroll compressor system other than that saved by the pump(s) with VFD, since with either chilling system the scroll compressors are cycled off when not in use.

A system with screw compressor chillers will save considerable energy since the screw compressors will be operating at 100% most of the time or will be off. They will not be operating at inefficient points like 25% or 50% of full load.

STANDARD CHILLERS

Standard chillers sense only the leaving chilled water to stage the compressors in the group and are designed to operate at standard cooling tower water temperatures, 65°F to a maximum of 100°F. These chillers can be grouped up to 12, we could go more but do not see a need and the main headers across the back would get too large, 8" to 10". Customers prefer two systems – two groups of chillers when the system is large.

CHILLING SYSTEMS *…continued*

HEAT RECLAIM CHILLERS

You have two types: One is heating all the time while the other can chill during the summer months and heat during the winter months. This is not a reversing chiller, the condenser water needs to be changed from cooling tower during the summer months to a heating loop during the winter months.

– 410A heat reclaim chillers can operate with 140°F leaving hot water off the condenser.

– 134a heat reclaim chillers can operate with 155°F leaving hot water off the condenser.

Heat Reclaim chillers sense both loops, in the chilling mode they sense the leaving chilled water, in the heating mode they sense the leaving condenser water to maintain a constant leaving hot water temperature.

Generally all the chillers in this group are either cooling or heating, but not both. You can supply the system with *Main Header Movable Chiller Valves* so that some chillers can cool and some heat. See details of movable valves below.

High condensing chillers are standard chillers with larger electrics – fuses, wire size, contactors, etc. as the compressor operates at higher condensing temperatures with higher run amps.

HEAT PUMP CHILLERS

Can operate in either direction, as a standard chiller in one direction and as a heat reclaim chiller in the other direction. Our chillers are designed so that the forward direction is the heating mode and the reverse direction is the cooling. These chillers are set up to heat more than cool.

The chiller is also designed the same as a heat reclaim with larger electrics and additional safeties to protect the compressor and can operate at 140°F leaving hot water in the heating mode.

There are restrictions on the compressor that affect the leaving water temperature as the source water goes lower in temperature from 55°F the maximum leaving water temperature drops. *(see APPENDIX High Temperature page00)*

MAIN HEADER MOVABLE CHILLER VALVES (MHMCV)

Used with heat reclaim and water to water heat pump chillers. Each chiller has a pair of motorized on-off valves between chillers on the load side water headers. These valves allow some of the chillers to be heating and some to be cooling at the same time. Chiller selection for heating or cooling is controlled by the system Remote Master and these changes can be selected by the BMS or by the system water temperature.

The system would select the number of chillers to operate in the heating mode or cooling mode the same way as the Remote Master selects a compressor to run in cooling only mode. The system has to be set as to which loop takes priority (heating or cooling).

Heat Pump chillers operating on ground source system require only two motorized valves, other chillers have four valves for a standard system where both headers need to be changed.

CONDENSING UNITS

Are chillers without evaporators and expansion valves, they are supplied with suction accumulators to protect the compressors from liquid.

CONDENSERLESS CHILLERS

Are chillers with no condensers, generally they operate with remote air cooled condensers, sometimes with remote water cooled condenser. They are supplied with receivers and optional head pressure control valves to flood the condenser with low ambient winter operation down to -25°F.

CHILLING SYSTEMS *…continued*

CHILLER CONTROLLER

Chiller controller is a "programmable type controller" with the program developed by Tandem Chillers to operate and protect our chillers. The chiller controller is supplied with a four (4) line liquid crystal display located in the control panel door on indoor chillers and inside the panel on our outdoor chillers. The chiller controller displays the operating and fault conditions in English.

REMOTE MASTER CONTROLLER

The Remote Master has two (2) main functions, one to stage the compressors on temperature demand and two to communicate this information between the chillers and BMS or DDC.

It is required when operating with two or more chillers in a group and can control up to 12 scroll compressor chillers by cycling the compressors for 24 steps of capacity control or 12 screw compressor chillers for 48 steps of capacity control (four steps of unloading on each compressor).

The Remote Master can communicate with the Building Management System (BMS) in BACnet IP, BACnet MS/TP, LonWorks or Modbus.

SINGLE POINT POWER

We do not offer a buss bar system, only one competitor offers this type of system. We do not recommend it as it blocks the chiller from being removed for service and the large disconnect blocks one or both ends of the chiller from being serviced.

We offer a remote mounted circuit breaker panel that is wall mounted close to the chillers and a single power feed is connected to the panel from the building and power is taken from it to each chiller. The panel has a circuit breaker for each chiller in the system to isolate it for service.

Our panels are available in 400 amp, 600 amp and 800 amp, we can match your customers building power requirements.

WE SUPPLY THE ONLY CHILLER THAT CAN BE REMOVED FOR SERVICE ***WITHOUT*** SHUTTING DOWN THE REST OF THE SYSTEM.

OTHER MODULAR CHILLERS

Other chillers are modular in assembly only but when assembled they treat the group of chillers as one large chiller with multiple compressors.

We compare other chillers to driving three cars with a long pole through the side windows connecting all the cars together, as long as all the cars are mobile you can move or travel, if one fails you are stuck.

Our approach would be to take the time and strap the pole to the bumper of the three cars, if one car fails you disconnect and the other two can go on their way.

It is an easier and less expensive design to place the headers on the front and back of the chillers but you are blocked in and cannot move, this is further compounded if you add an electrical buss bar system.

The buss bar system is installed in each chiller at the job site and they are bolted together thus making it impossible to remove the chiller. They block one end of the chiller group with a large fused disconnect not allowing any access for service on that end, and if the total system operating amps is over 500 amps they install another large fused disconnect on the other end. Now both ends are blocked for service.

How to Service the Competitors Chillers

No service is done until the winter shut-down and the chillers can be taken out of service long enough for the repairs to be done. In some parts of the country there is no or minimal winter time to do service on the chillers, they are needed all year round.

OR

All the chillers are shut-off and taken out of service, the water drained from the four main headers, if a buss bar system is used it must be disconnected before the damaged chiller can be removed. Four (4) blank headers are installed where the chiller was located, jumper cables must be installed between the chillers from where the buss bar system was removed, finally the system is filled with water and started up. This procedure has to be reversed when the chiller has been repaired and ready to be installed.

This not a very satisfactory way to perform service, many hours are accumulated just to re and re the chiller and you have not repaired it yet. We like to give our customers the choice of when to service the chillers.

TANDEM CHILLERS

Our chillers are modular in ASSEMBLY and modular in DISASSEMBLY, we treat our "modular chilling system" as being made up of stand-alone chillers coupled together up to a maximum of twelve chillers.

How to Service a Tandem Chiller

If the chiller can not be repaired in place, the four (4) isolation valves on the branch headers to the evaporator and condenser are shut-off, the eight (8) uni-strut clamps holding the header to the chiller are removed, the grooved coupling between the valve and the evaporator or condenser is taken apart, the main power cable to the chiller is disconnected (disconnect main power first), the chiller lifted by using a lever and a 1" bar or water pipe placed under the chiller, the chiller is rolled forward.

Half way out you can remove either compressor, all the way out you can remove the evaporator or condenser.

Reverse this procedure to reinstall the chiller.

This can be done *when you choose* not when the system is shut-down.

OUR PRODUCT LINE

WATER COOLED DUAL SCROLL COMPRESSOR CHILLERS

Range – dual 10 hp up to dual 40 hp compressors. Most use freon 410A, but available in 134a and 407C

Water Cooled Chillers Model WXO	• Standard Condensing Temperature chillers • Maximum entering condenser water temperature 100°F * Dimensional drawing **D-1** (same for all scroll water cooled chillers) * Flow schematic **F-1** (same for all scroll water cooled chillers)
Water Cooled Heat Reclaim Chillers Model WHRX	• High Temperature Heat Reclaim Chillers • Maximum leaving condenser water temperature 140°F
Water Cooled Heat Reclaim Chillers Model WHRXX	• Extra High Temperature Heat Reclaim Chillers with freon 134a • Maximum leaving condenser water temperature 155°F
Water Cooled Heat Pump Chillers Model WHPX	• High Condensing Temperature Reversing chillers • Maximum leaving condenser water temperature 140°F
Water Cooled Heat Pump Chillers with MHMCV	• Main Header Movable Chiller Valves that allow some chillers to operate in heating mode while others can operate in a cooling mode.
Water Cooled Condensing Units Model WCU	• Standard Condensing Temperature units • Maximum entering condenser water temperature 100°F * Dimensional drawing **D-2** (same for all scroll condensing units)
Condenserless Chillers Model WCL	• Generally used with remote air cooled condenser • Maximum entering condenser air temperature 100°F • Option for a fan speed control or flooded condenser * Dimensional drawing **D-2** (same for all scroll condenserless chillers)

Models: WX, WHRX, WHRXX, WCU, WCL – 010, 020, 030, 040, 050, 070 and 080. *X denotes new high efficiency chillers.*

OUTDOOR AIR-COOLED DUAL SCROLL COMPRESSOR CHILLERS

Range – dual 10 hp to dual 17.5 hp compressors. Most use freon 410A, but available in 134a and 407C

Outdoor Air Cooled Chillers Model VO	• Standard Condensing Temperature chillers • Maximum entering condenser air temperature 100°F • Option for fan speed control or flooded condenser * Dimensional drawing **D-3** (same for all scroll air cooled)
Outdoor Air Cooled Condensing Units Model VCU	• Standard Condensing Temperature units • Maximum entering condenser air temperature 100°F • Option for fan speed control or flooded condenser
Outdoor Air Cooled Free Cool Units	• Cools from 54°F with 32°F ambient temperature or lower

Models: V, VCU – 010, 015, 020, 025, 030, 035 and 060.

We supply air cooled chillers for higher altitudes up to 6000' and higher **entering air conditions up to 115°F** and larger chillers up to dual 40 hp compressors, these are not modular chillers.

OUR PRODUCT LINE *…continued*

SINGLE ROTARY SCREW COMPRESSOR CHILLERS

Range – 60 hp to 140 hp compressors. Most use freon 407C, but are available with the new high efficiency screw in 134a

Water Cooled Screw Compressor Chillers Model WX	• Standard Condensing Temperature chillers • Maximum entering condenser water temperature 100°F * Dimensional drawing **D-4** (same for all screw water cooled chillers) * Flow schematic **F-2** (same for all screw water cooled chillers)
Water Cooled Condensing Units Model WCU	• Standard Condensing Temperature units • Maximum entering condenser water temperature 100°F * Dimensional drawing **D-5** (same for all screw condensing Units)
Condenserless Chillers Model WCL	• Generally used with remote air cooled condenser • Maximum entering condenser air temperature 100°F • Option for fan speed control or a flooded condenser * Dimensional drawing **D-5** (same for all screw condenserless chillers)

Models: W, WCU, WCL – 060, 070, 080, 090, 100, 120 and 140

SINGLE AND DOUBLE PUMP PACKAGES

Single pump package, series SP- and dual pump packages series DP-, both can be purchased for indoor applications that sit beside the chillers or roof mounted with a weatherproof housing and electrical control panel. They can be supplied for either chilled water or condenser water flow.

- Pump range from 1.5 hp to 50 hp.
- Pump flow from 30 gpm up to 1000 gpm.
- Pump pressures from 35 hf (15 psi) to 150 hf (65 psi).
- Pump motor speed 1750 rpm and 3500 rpm.
- TEFC motors, totally enclosed fan cooled.
- Indoor and outdoor packages.
  * Dimensional drawing **D-6**
  * Flow schematic **F-4**

OUR PRODUCT LINE *...continued*

INLINE FILTERS

One of our competitors uses stainless steel strainers inside their inlet headers, this seems an easy fix but if they need to be cleaned the whole system needs to be shut down, the water drained out of the headers, the headers taken apart, the strainer pulled out and cleaned and the process reversed to install them.

We recommend inline strainers with isolation valves either side of the filter for service, the filter can also be located in the pump suction to protect both the pump and chillers or in the main inlet headers before the chillers to protect both the evaporator or condenser.

We offer a cast iron flanged basket strainer with a 3/64" perforated screen or an all stainless steel flanged filter with a 30 mesh screen with a manual or automatic flush.

Size range from 3" to 10" pipe size.

* Dimensional drawing D-7

CHILLER CONTROLLER

Chiller controller is a "programmable type controller" with the program developed by Tandem Chillers to operate and protect our chillers. The chiller controller is supplied with a four (4) line liquid crystal display located in the control panel door on indoor chillers and inside the panel on our outdoor chillers. The chiller controller displays the operating and fault conditions in English.

As a stand-alone chiller the controller sets each compressor's minimum run time, minimum off time based on our dead band temperature control program.

When the chiller is part of a group of chillers, the remote master controls the staging of the compressors and the chiller controller protects the chiller compressor and its components.

- Senses chilled water in and out temperature.
- Chilled water flow with a paddle type flow switch.
- Senses refrigerant high and low pressure for each circuit.
- Senses suction temperature for each circuit.
- Compressor internal fault sensor in compressor windings.
- Senses condenser water in and out on heat reclaim and heat pump.
- Senses discharge temperature on heat reclaim and heat pump chillers

OPTIONS THAT CAN BE ADDED TO THE CHILLER CONTROLLER

- Current sensor for each compressor.
- Paddle type flow switch for condenser water.

OUR PRODUCT LINE *…continued*

GEOTHERMAL – WATER SOURCE CHILLERS

- All of our water cooled chillers can operate on ground source water to cool their condensers with the addition of motorized condenser water regulating valve for head pressure control.
- Our heat reclaim chillers can extract the heat form the ground source water and supply hot water to the building. The leaving load side (condenser) hot water temperature is dependent on the leaving evaporator water temperature.
- Our heat pump chillers can operate on ground source water:

In the forward direction they extract the heat from the ground source water and the unit supplies hot water the building hot water loop.

In the reverse direction the condenser heat is removed by the ground source water and the unit supplies cool water the building chilled water loop.

For both heat reclaim and heat pump chillers the lower the evaporator leaving water temperature the lower the leaving hot water temperature. *(see Capacity Load Chart pages 33 to 36)*

REMOTE MASTER

- 12" x 12" x 6" deep NEMA (EEMAC) 4/12 enclosure.
- On-off switch and power on light.
- An eight (8) line liquid crystal display.
- Requires its own 120 volt supply separate from the chiller power.
- Stages up to 12 scroll compressor chillers – 24 steps of capacity control by cycling compressors.
- Stages up to 12 screw compressor chillers – 48 steps of capacity control by unloading compressors, four steps.
- Can operate as a "constant flow system" or a "stepped flow system".
- Sets minimum run time and minimum off time, stage up time and stage down time of each compressor.
- Stages compressors on a first in/first out basis with a force rotation if a compressor is 10 hours out of step.
- Temperature program is used to stage compressors on leaving water temperature, field selectable for entering. If the remote master fails, chillers automatically work on their own. When the remote master comes back on line the chillers automatically report back to it.
- Daisy chain from remote master to all the chillers, pump packages and free cool units.
- Senses and displays entering and leaving chilled water temperature.
- Senses and displays entering and leaving condenser water temperature.
- Set up to control chillers on leaving water temperature, can be changed to entering.

Inputs

for remote start, main header chilled water and condenser water paddle type flow switch.
4 to 20 ma inputs for main header paddle wheel flow sensors.

Outputs

to start chilled water pumps, condenser water pumps, other auxiliary equipment and alarm fault.
0 to 10 VDC and 4 to 20 MA outputs for proportional control.

Communications with BMS or DDC in BACnet IP, BACnet MSTP, Modbus or Lon Works.

WATER COOLED DUAL SCROLL COMPRESSOR CHILLER

Mechanical Specifications *(see appendix D-1, page 21) (see appendix F-1, page 28)*

STANDARD WATER COOLED CHILLER 410A

- Dual high efficiency 3500 rpm SCROLL compressors.
- Rubber mounted to chiller frame.
- Dual circuit evaporator 316L plates copper brazed insulated with ¾" armaflex type insulation.
- Refrigeration rating 650 psi at 383°F.
- Water rating 400 psi at 383°F.
- Chilled water paddle type flow switch.
- Leaving chilled water freeze safety.
- 6" schedule 40 steel main and branch headers with grooved couplings.
- Liquid line sight glass moisture indicator.
- Thermal expansion valve.
- Dual circuit condenser, 316L plates copper brazed.
- Refrigeration rating 650 psi at 383°F.
- Water rating 400 psi at 383°F.
- 6" schedule 40 steel main and branch headers with grooved couplings.
- NEMA 1 control panel with on-off switch power on light.
- 460V and 600V door disconnect and compressor fuses up to 60 amp, circuit breaker 70 amp and up.
- 208V and 230V compressor circuit breakers (neither door disconnect or fuses will fit inside control panel).
- Compressor contactors.
- 24 VAC - 250VA control transformer with primary and secondary fuses.
- Chiller controller, senses and displays all operating and fault conditions with liquid crystal display located on the control panel door.

STANDARD OPTIONS AVAILABLE (add to any chiller)

- Four (4) isolation valves two (2) for evaporator and two (2) for the condenser for chiller removal.
- Line voltage fused crankcase heater on both compressors for water cooled chillers when mechanical room is not heated (always included on Condenserless chillers and Outdoor air cooled chillers).
- Refrigeration pressure relief valve, one per circuit.
- Refrigeration pressure relief valve "change over valve assembly" to allow replacement of pressure relief valve without loss of freon.
- Liquid line solenoid and filter dryer for water cooled (always included on Condenserless and Outdoor air cooled chillers).
- Sound blankets for both compressors to reduce noise by 6 dBA (insulating the panels on our chiller does not reduce the sound since the back and bottom are open.
- Solenoid operated hot gas by-pass with shut-off valve on both circuits.
- Single phase current sensor to display compressor run amps and be can used to stop compressor at higher than normal operating amps.
- Chiller condenser water metal paddle flow switch.
- Main header cast iron basket strainer with 3/64" perforated stainless steel filter basket.
- Main header stainless steel strainer with 30 mesh screen filter basket.

WATER COOLED DUAL SCROLL COMPRESSOR CONDENSING UNIT

Mechanical Specifications *(see appendix D-2, page 22)*

All the same specifications as STANDARD WATER COOLED CHILLER 410A with no brazed plate evaporator, thermal expansion valves, flow switch, chilled water header or branch circuit headers. Supplied with a suction accumulator to protect the compressor.

Options are the same as STANDARD OPTIONS for water chiller but with no manual or motorized valves or filters for evaporator.

DUAL SCROLL COMPRESSOR CONDENSERLESS CHILLER – Mechanical Specifications *(see appendix D-2, page 22)*

All the same specifications as STANDARD WATER COOLED CHILLER 410A but with no brazed plate condenser, condenser header and branch circuit headers. Supplied with a small liquid receiver.

Options are the same as STANDARD OPTIONS for water chiller but with no manual or motorized valves or filters for condenser with the addition of a larger liquid receiver and head pressure control valve to flood the condenser for low ambient control to -20°F.

If you have a remote air cooled condenser line, you can supply your own or we can supply one with the chiller.

WATER COOLED DUAL SCROLL COMPRESSOR HEAT RECLAIM CHILLER – Mechanical Specifications

All the same specifications as the water cooled 410A chiller with the addition of suction and discharge temperature sensors and larger electrics – fuses, wire size and compressor contactors to allow the compressors to operate at higher run amps required at the higher condensing temperature.

STANDARD OPTIONS AVAILABLE (add to any chiller)

- Four (4) isolation valves two (2) for evaporator and two (2) for the condenser for chiller removal.
- Line voltage fused crankcase heater on both compressors for water cooled chillers when mechanical room is not heated (always included on Condenserless chillers and Outdoor air cooled chillers).
- Refrigeration pressure relief valve, one per circuit.
- Refrigeration pressure relief valve "change over valve assembly" to allow replacement of pressure relief valve without loss of freon.
- Liquid line solenoid and filter dryer for water cooled (always included on Condenserless and Outdoor air cooled chillers).
- Sound blankets for both compressors to reduce noise by 6 dBA (insulating the panels on our chiller does not reduce the sound since the back and bottom are open.
- Solenoid operated hot gas by-pass with shut-off valve on both circuits.
- Single phase current sensor to display compressor run amps and be can used to stop compressor at higher than normal operating amps.
- Chiller condenser water metal paddle flow switch.
- Main header cast iron basket strainer with 3/64" perforated stainless steel filter basket.
- Main header stainless steel strainer with 30 mesh screen filter basket.

WATER COOLED DUAL SCROLL COMPRESSOR EXTRA HIGH HEAT RECLAIM CHILLERS

Mechanical Specifications

STANDARD WATER COOLED CHILLER 134a

- Dual high efficiency 3500 rpm SCROLL compressors.
- Rubber mounted to chiller frame.
- Dual circuit evaporator 316L plates copper brazed insulated with ¾" armaflex type insulation.
- Chilled water paddle type flow switch.
- Refrigeration rating 435 psi at 383°F.
- Water rating 400 psi at 383°F.
- Leaving chilled water freeze safety.
- 6" schedule 40 steel main and branch headers with grooved couplings.
- Liquid line sight glass moisture indicator.
- Thermal expansion valve.
- Dual circuit condenser, 316L plates copper brazed.
- 6" schedule 40 steel main and branch headers with grooved couplings.
- Refrigeration rating 435 psi at 383°F.
- Water rating 400 psi at 383°F.

Larger electrics to allow the compressors to operate at higher run amps.

- NEMA 1 control panel with on-off switch power on light.
- 460V and 600V door disconnect and compressor fuses up to 60 amp, circuit breaker 70 amp and up.
- 208V and 230V compressor circuit breakers (as neither door disconnect or fuses will fit inside control panel).
- Compressor contactors.
- 24 VAC - 250VA control transformer with primary and secondary fuses.
- Chiller controller, senses and displays all operating and fault conditions with liquid crystal display located on the control panel door.
- Suction and discharge temperature sensors.

STANDARD OPTIONS AVAILABLE (add to any chiller)

- Four (4) isolation valves two (2) for evaporator and two (2) for the condenser for chiller removal.
- Line voltage fused crankcase heater on both compressors for water cooled chillers when mechanical room is not heated (always included on Condenserless chillers and Outdoor air cooled chillers).
- Refrigeration pressure relief valve, one per circuit.
- Refrigeration pressure relief valve "change over valve assembly" to allow replacement of pressure relief valve without loss of freon.
- Liquid line solenoid and filter dryer for water cooled (always included on Condenserless and Outdoor air cooled chillers).
- Sound blankets for both compressors to reduce noise by 6 dBA (insulating the panels on our chiller does not reduce the sound since the back and bottom are open.
- Solenoid operated hot gas by-pass with shut-off valve on both circuits.
- Single phase current sensor to display compressor run amps and be can used to stop compressor at higher than normal operating amps.
- Chiller condenser water metal paddle flow switch.
- Main header cast iron basket strainer with 3/64" perforated stainless steel filter basket.
- Main header stainless steel strainer with 30 mesh screen filter basket.

WATER COOLED DUAL SCROLL COMPRESSOR WATER TO WATER HEAT PUMP CHILLERS

Mechanical Specifications *(see appendix F-5, page 32)*

STANDARD WATER COOLED CHILLER 410A

- Dual high efficiency 3500 rpm SCROLL compressors.
- Rubber mounted to chiller frame.
- Dual circuit evaporator 316L plates copper brazed insulated with ¾" armaflex type insulation.
- Refrigeration rating 650 psi at 383°F.
- Water rating 400 psi at 383°F.
- Leaving chilled water freeze safety
- 6" schedule 40 steel main and branch headers with grooved couplings.
- Liquid line sight glass moisture indicator.
- Cooling thermal expansion valve.
- Heating thermal expansion valve.
- Four way reversing valve.
- Check valve.
- Dual circuit evaporator/condenser, 316L plates copper brazed insulated with ½" armaflex type insulation.
- Refrigeration rating 650 psi at 383°F.
- Water rating 400 psi at 383°F.
- 6" schedule 40 steel main and branch headers with grooved couplings.

Larger electrics to allow the compressors to operate at higher run amps.

- NEMA 1 control panel with on-off switch power on light.
- 460V and 600V door disconnect and compressor fuses up to 60 amp, circuit breaker 70 amp and up.
- 208V and 230V compressor circuit breakers (as neither door disconnect or fuses will fit inside control panel).
- Compressor contactors.
- 24 VAC - 250VA control transformer with primary and secondary fuses.
- Chiller controller, senses and displays all operating and fault conditions with liquid crystal display located on the control panel door.
- Suction and discharge temperature sensors.

STANDARD OPTIONS AVAILABLE (add to any chiller)

- Four (4) isolation valves two (2) for evaporator and two (2) for the condenser for chiller removal.
- Line voltage fused crankcase heater on both compressors for water cooled chillers when mechanical room is not heated (always included on Condenserless chillers and Outdoor air cooled chillers).
- Refrigeration pressure relief valve, one per circuit.
- Refrigeration pressure relief valve "change over valve assembly" to allow replacement of pressure relief valve without loss of freon.
- Liquid line solenoid and filter dryer for water cooled (always included on Condenserless and Outdoor air cooled chillers).
- Sound blankets for both compressors to reduce noise by 6 dBA (insulating the panels on our chiller does not reduce the sound since the back and bottom are open.
- Solenoid operated hot gas by-pass with shut-off valve on both circuits.
- Single phase current sensor to display compressor run amps and be can used to stop compressor at higher than normal operating amps.
- Chiller condenser water metal paddle flow switch.
- Main header cast iron basket strainer with 3/64" perforated stainless steel filter basket.
- Main header stainless steel strainer with 30 mesh screen filter basket.

OUTDOOR AIR COOLED DUAL SCROLL COMPRESSOR CHILLER

Mechanical Specifications *(see appendix D-3, page 23) (see appendix F-3, page 30)*

STANDARD AIR COOLED CHILLER 410A

- Dual high efficiency 3500 rpm SCROLL compressors.
- Rubber mounted to the frame.
- Line voltage crankcase heaters, fused and off when compressor is operating.
- Dual circuit evaporator 316L plates copper brazed insulated with ¾" type armaflex type insulation.
- Refrigeration rating 650 psi at 383°F.
- Water rating 400 psi at 383°F.
- Chilled water paddle type flow switch.
- Leaving chilled water freeze safety.
- 6" schedule 40 steel main and branch headers with grooved couplings.
- Pressure relief valve each circuit.
- Liquid line sight glass moisture indicator each circuit.
- Liquid line filter dryer each circuit.
- Liquid line solenoid with 24 VAC coil each circuit.
- Thermal expansion valve each circuit.

10 ton, 15 ton and 20 ton models: One single micro-channel all aluminum condenser with dual refrigeration circuits, 650 psi rated. Two (2) 1½" hp 840 rpm 30" diameter low noise fans, with fan cycling of the second fan.

25 ton, 30 ton and 35 ton models: Two single micro-channel all aluminum condensers single refrigeration circuit, 650 psi rated. Two (2) 2 hp 1140 rpm 30" diameter low noise fans, with fan cycling of the second fan.

- NEMA 4 control panel with on-off switch power on light.
- 460V and 600V door disconnect and compressor fuses up to 60 amps, circuit breaker from 70 amps and up.
- 208V and 230V no door disconnect and compressor circuit breakers (neither door disconnect or fuses will fit inside door panel).
- Compressor and fan contactors.
- 24 VAC - 250VA control transformer with primary and secondary fuses.
- Chiller controller, senses and displays all operating and fault conditions with liquid crystal display located on the chiller controller inside the control panel.

STANDARD OPTIONS AVAILABLE (add to any chiller)

- Two (2) isolation valves two (2) for evaporator and condenser for chiller removal.
- Refrigeration pressure relief valve "change over valve assembly" to allow replacement of pressure relief valve without loss of freon.
- Fan speed control of both fans for low ambient control down to 0°F.
- Flooded condenser with liquid receiver and head pressure control valves for low ambient control down to -25°F.
- Sound blankets for both compressors to reduce noise by 6 dBA (insulating the panels on our chiller does not reduce the sound since the back and bottom of the housing is open.
- Solenoid operated hot gas by-pass with shut-off valve on both circuits.
- Main header cast iron basket strainer with 3/64" perforated stainless steel filter basket.
- Main header stainless steel strainer with 30 mesh screen filter basket

OUTDOOR AIR COOLED DUAL SCROLL COMPRESSOR CONDENSING UNIT
Mechanical Specifications

All the same specifications as STANDARD AIR COOLED CHILLER 410A with no brazed plate evaporator, flow switch, chilled water header or branch circuit headers. Supplied with a suction accumulator to protect the compressor.

Options are the same as STANDARD OPTIONS for water chiller but with no manual or motorized valves or filters for evaporator.

OUTDOOR AIR COOLED DUAL FAN FREE COOL UNIT – Mechanical Specifications

STANDARD AIR COOLED FREE COOL UNIT 30% PG WATER/GLYCOL

- Two (2) copper tube and aluminum fin cooling coils.
- Six (6) rows with 12 fins per inch.
- Grooved water piping between coils for common in and out connections.
- Two (2) 2 hp 1140 rpm 30" diameter low noise fans, with fan cycling of the second fan.
- NEMA 4 control panel with on-off switch power on light.
- Through-the-door non-fused disconnect.
- Fan three phase fuses and contactors.
- 24 VAC - 250VA control transformer with primary and secondary fuses.
- Interlock to start fans.
- Cycling of both fans for capacity control.

We offer one model and it supplies 20 tons of cooling from 54 F to 44 F with a 32 F ambient air temperature.

STANDARD OPTIONS AVAILABLE (add to any unit)

- Free cool controller to communicate with system Remote Master.
- Two (2) isolation valves for service.
- Fan speed control of both fans for more accurate control of leaving fluid.

WATER COOLED ROTARY SCREW COMPRESSOR CHILLER

Mechanical Specifications *(see appendix D-4, page 24) (see appendix F-2, page 29)*

STANDARD WATER COOLED CHILLER 407C

- Single Rotary Screw compressor.
- Suction and discharge service valves (not supplied by some of our competitors).
- 120 volt crankcase heater.
- Rubber mounted to the frame.
- Single circuit evaporator 316L plates copper brazed insulated with ¾" armaflex type insulation.
- Refrigeration rating 450 psi at 383°F.
- Water rating 400 psi at 383°F.
- Chilled water paddle type flow switch.
- Leaving chilled water freeze safety.
- 6" or 8" schedule main header and branch headers with groove couplings two (2) grooved evaporator valves.
- Liquid line sight glass moisture indicator.
- Replaceable core filter dryer.
- Electronic expansion valve that also acts as a liquid line solenoid.
- Single circuit brazed plate condenser, 316L plates copper brazed.
- Refrigeration pressure relief valve.
- Refrigeration rating 450 psi at 383°F.
- Water rating 400 psi at 383°F.
- 6" or 8" schedule main header and branch headers with groove couplings two (2) grooved evaporator valves.
- NEMA 1 control panel with on-off switch power on light.
- Compressor circuit breaker with through-the-door handle to turn off (disconnects power).
- Part Wind Start with two (2) compressor contactors with solid state overloads and time delay relay.
- 24 VAC – 250 VA chiller controller transformer with primary and secondary fuses.
- 120 VAC – 250 VA control voltage transformer with primary and secondary fuses.
- Chiller controller senses and displays all operating and fault conditions with a four (4) line liquid crystal display located in the control panel door.

STANDARD OPTIONS AVAILABLE (add to any chiller)

- Refrigeration pressure relief valve "change over valve assembly" to allow replacement of pressure relief valve without loss of freon.
- Condenser water paddle type flow switch (similar to the evaporator).
- Main header cast iron basket strainer with 3/64" perforated stainless steel filter basket.
- Main header stainless steel strainer with 30 mesh screen filter basket.

WATER COOLED ROTARY SCREW COMPRESSOR CONDENSING UNIT

Mechanical Specifications *(see appendix D-5, page 25)*

All the same specifications as STANDARD WATER COOLED CHILLER 407C with no brazed plate evaporator, flow switch, chilled water header or branch circuit headers. Supplied with a suction accumulator to protect the compressor.

Options are the same as STANDARD OPTIONS but with no manual or motorized valves or filters for evaporator.

SINGLE ROTARY SCREW COMPRESSOR CONDENSERLESS CHILLER

Mechanical Specifications *(see appendix D-5, page 25)*

All the same specifications as STANDARD WATER COOLED CHILLER 407C with no brazed plate condenser, condenser water header or branch circuit headers. Supplied with a small liquid receiver.

Options are the same as STANDARD OPTIONS for water chiller with no manual or motorized valves or filters for condenser with the addition of a larger liquid receiver and head pressure control valve to flood the condenser for low ambient control to -25°F.

If you have a remote air cooled condenser line you can supply your own or we can supply one with the chiller.

SINGLE AND DUPLEX PUMP PACKAGES

Mechanical Specifications *(see appendix D-6, page 26) (see appendix F-4, page 31)*

We supply a single pump package, model SP- and dual pump packages model DP-, they can be purchased for indoor applications that sit beside the chillers or roof mounted with a weatherproof housing and electrical control panel. They can be supplied for either chilled water or condenser water flow.

- Formed galvanized steel or structural steel welded base frame.
- Galvanized steel formed bolted side panels and top.
- Pump(s) mounted to the base frame.
- Schedule 40 steel grooved suction and discharge headers with grooved in and out connections.
- Pump suction shut-off valve.
- Pump suction grooved strainer.
- Pump discharge check.
- Pump discharge shut-off valve.
- Pump discharge pressure gauge with isolation valve.
- Discharge header flow switch.
- Weather proof control panel with through-the-door non-fused disconnect, power on light.
- 24 VAC - 250 VA control transformer with primary and secondary fuses.
- Pump hand-off-auto switches for manual operation of pump(s).
- Pump three phase fuses.
- Pump starters with thermal overloads.
- Both a mechanical and electrical interlock to prevent both pumps from operating at the same time.
- Pump controller with display mounted to the controller, displays operating and fault conditions in English.
- Pump controller will communicate with the system Remote Master and the pumps can be started and stopped.

STANDARD OPTIONS AVAILABLE (add to any pump package)

- Expansion tanks with air purge, automatic air vent and dual purpose pressure reducing - pressure relief assembly.
- Compression tanks with air purge and dual purpose pressure reducing - pressure relief assembly.
- Third pump future stand-by.
- Buffer tanks.
- Glycol feeder packages.

INLINE MAIN HEADER BASKET STRAINERS

Mechanical Specifications *(see appendix D-7, page 27)*

CAST IRON BASKET STRAINER, MODEL BFC

- 125 lb rating, higher pressure ratings available.
- 3/64" stainless steel perforated filter basket.
- Inlet and outlet butterfly isolation valves.
- Flanged in and out or grooved connections.
- From 3" to 10", other sizes available.

STAINLESS STEEL BASKET STRAINER, MODEL TS

- 125 lb rating, higher pressure ratings available.
- 20 mesh to 80 mesh screen basket.
- Inlet and outlet butterfly isolation valves.
- Flanged in and out connections.
- From 2" to 10", other sizes available.
- 1 ½" side bottom manual or automatic debris flush port.
- Inlet and outlet pressure gauges

STANDARD OPTIONS AVAILABLE (add to stainless steel)

- Automatic purge motorized blow down valve operated on a time basis.
- Alarm operated by differential pressure across the filter basket.

BASIC REMOTE MASTER – Installation

Supplied with the Remote Master are four (4) sensor wells and four (4) temperature sensors.

1. The Remote Master enclosure mounts to the wall close to the main water headers and chillers.
2. The Remote Master requires 120V single phase power with a ground connect to L1 and L2, supplied from a separate source than the chiller power.
3. The wells are installed in the main chilled water and condenser water headers, the sensor well has a ¼" male pipe thread and needs an appropriate female fitting welded in the steel headers. The wells are then threaded into the fittings.
4. The temperature sensors are inserted in the wells and connected to the appropriate points on the remote master terminal strip.
5. A 20 ga. shielded twisted pair of stranded copper wire must be connected from the Remote Master to all the chillers in the group. The connection point is marked as "pLAN network".
6. Depending on the type of communications purchased, your controls person will connect to our "serial card" with appropriated cable and plug.
7. Turn on switch and the display should light up and display the following:

First line:	Tandem Chillers.
Second line:	Project Number: xxxx-xxxx
Third line:	Toll free number 887-513-8330

You have now completed the installation of the Remote Master.

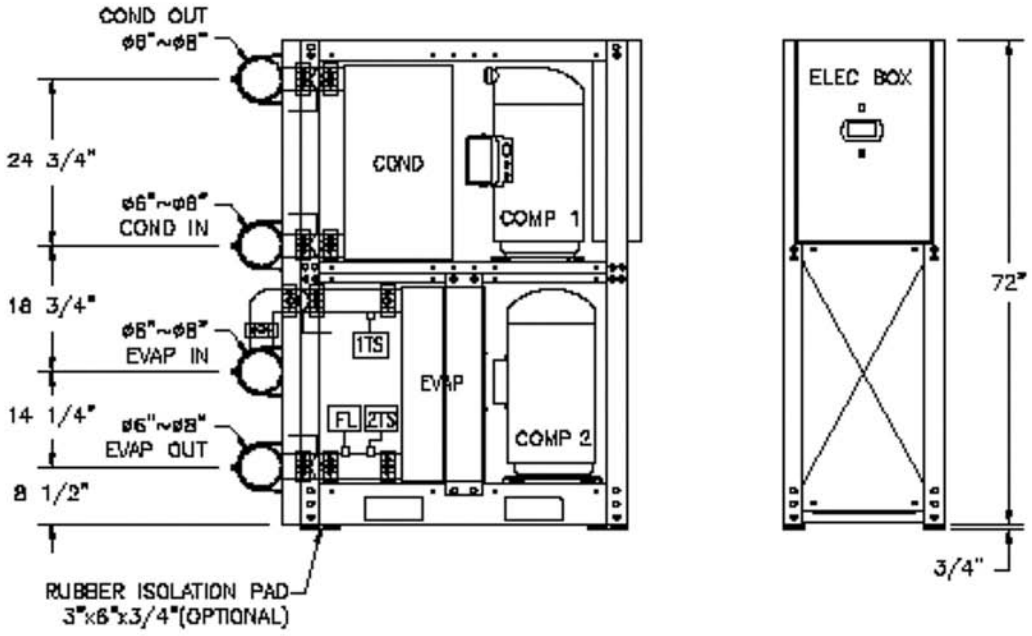
BASIC CHILLER – Installation

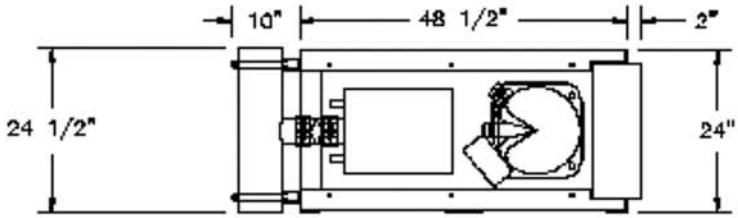
1. The chillers are shipped assembled with headers across the back. The chillers all have front and top panels and the end units are complete with end panels.
2. The chillers must be checked when received and off-loaded from the truck, any damage must be noted at this time on the bill of lading to make a claim against the trucking company.
3. After the chillers are uncrated they can be moved by fork lift truck or by pallet truck, they can also be rolled on 1" round bar or pipe.
4. The headers across the back of the chiller will set the distance the chillers are to be apart, our units do not bolt together or need to be placed on square tubes on the floor.
5. With the number of grooved couplings used in the headers, the headers are then attached to the chiller with uni-strut clamps. The chillers can be assembled easily on an uneven concrete floor.
6. Move the chillers into a straight row and connect the chiller headers together, we include the 6" or 8" grooved clamps.
7. The main building water connections can be same end or opposite end connections. When connecting up to six (6) or more chillers opposite end connections are better to equalize the main header pressure drop, but when using a 6" or 8" headers across the back of the chillers this is not a major concern.
8. Connect chillers to Remote Master. See above for Remote Master installation.
9. Each chiller will require its own three phase power connection from a wall mounted fused disconnect, or the chillers can be connected to a "single point circuit breaker panel" which is field installed and wired.

You have now completed the installation of a Basic Chiller.

WATER COOLED DUAL SCROLL CHILLER D-1

30 TON TO 70 TON WATER COOLED SCROLL COMPRESSOR CHILLER



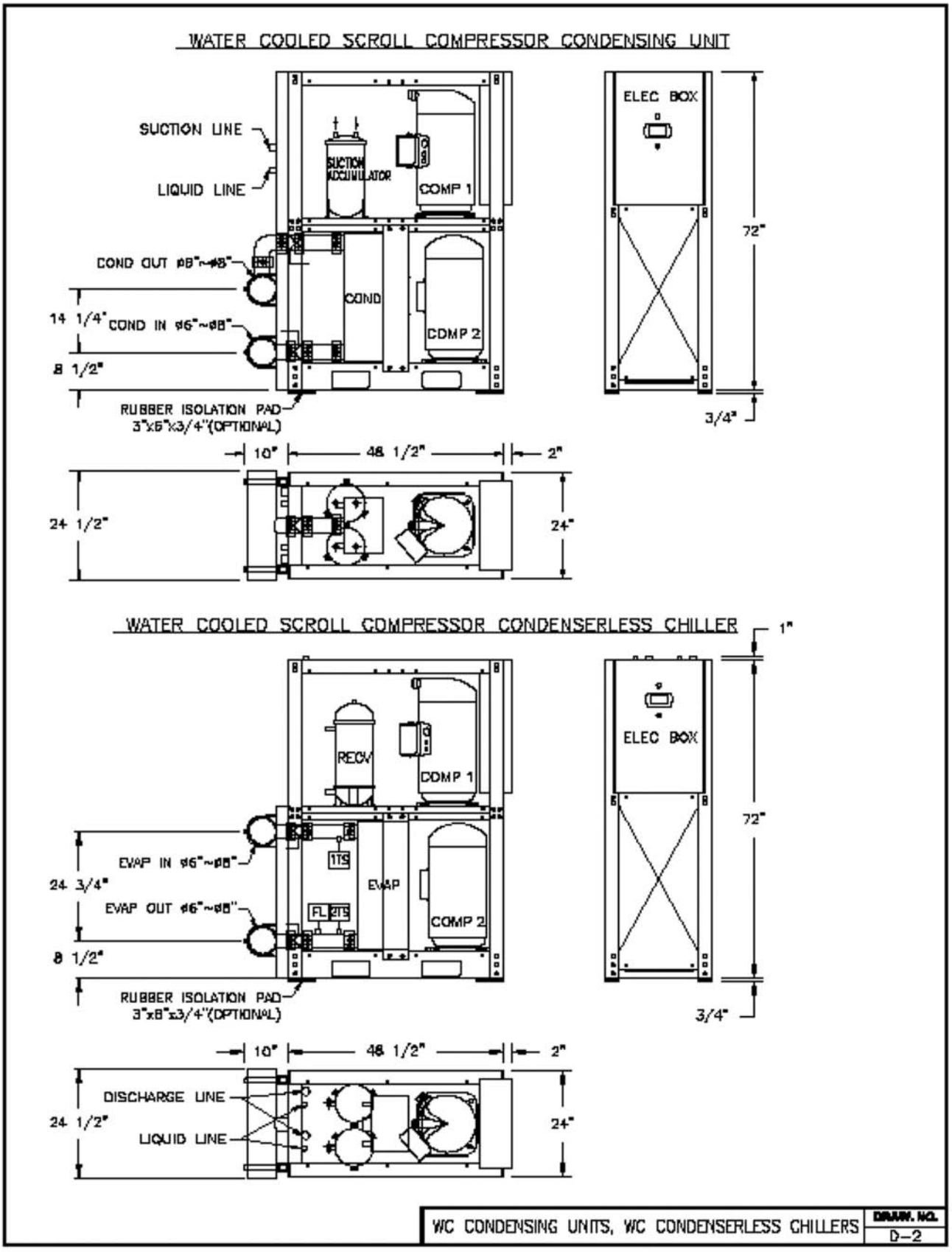


NOTES:

1. CASING: HEAVY 12 GAUGE S.S. & G.S. FRAME BOLTED TOGETHER, 22 GAUGE S.S. & G.S. PANELS.
2. WATER PIPING: SCH. 40 STEEL HEADERS AND BRANCH PIPING WITH ISOLATION VALVES.
3. REFRIGERATION PIPING: ACR TYPE L SEAMLESS COPPER TUBING.
4. EVAPORATING FLOW: DESIGN FLOW 2.4 GPM/TON.
5. CONDENSING FLOW: DESIGN FLOW 3.0 GPM/TON.
6. COMPRESSOR: SUCTION GAS COOLED DUAL SCROLL COMPRESSORS WITH OIL SIGHT GLASS, INTERNAL MOTOR PROTECTION AND OPTIONAL EXTERNAL "BAND TYPE" CRANKCASE HEATER.
7. CONTROLS: COMPRESSOR CONTACTOR, CONTROL TRANSFORMER 24/1/60, MANUAL RESET HIGH PRESSURE SWITCH SAFETY, HIGH AND LOW PRESSURE SENSORS, EVAPORATOR LEAVING WATER FLOW SWITCH, EVAPORATOR ENTERING AND LEAVING WATER TEMPERATURE SENSORS, NEMA 1 ELECTRICAL BOX, COMPRESSOR AND TRANSFORMER FUSES.

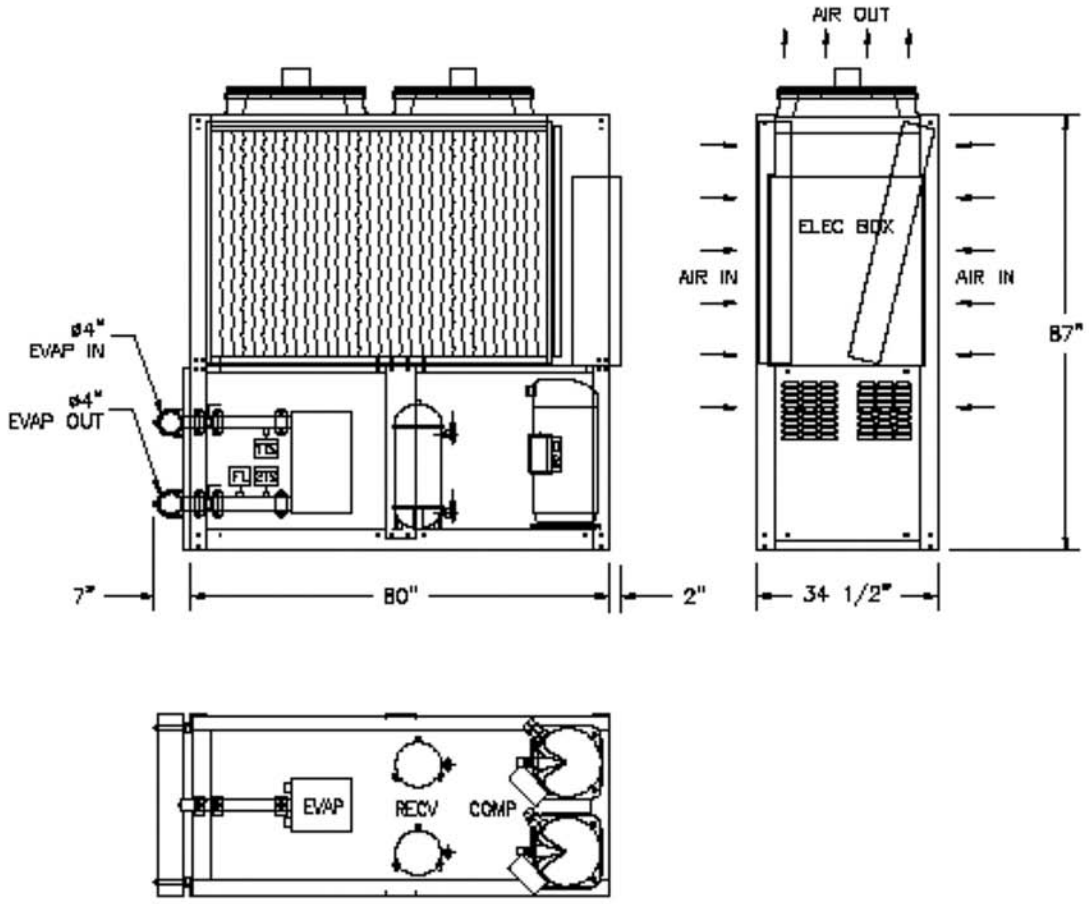
WATER COOLED CHILLERS	DRAW. NO. D-1

WATER COOLED DUAL SCROLL CONDENSING & CONDENSERLESS UNIT D-2



OUTDOOR AIR COOLED DUAL SCROLL COMPRESSOR CHILLER D-3

10 TON TO 35 TON AIR COOLED CHILLER

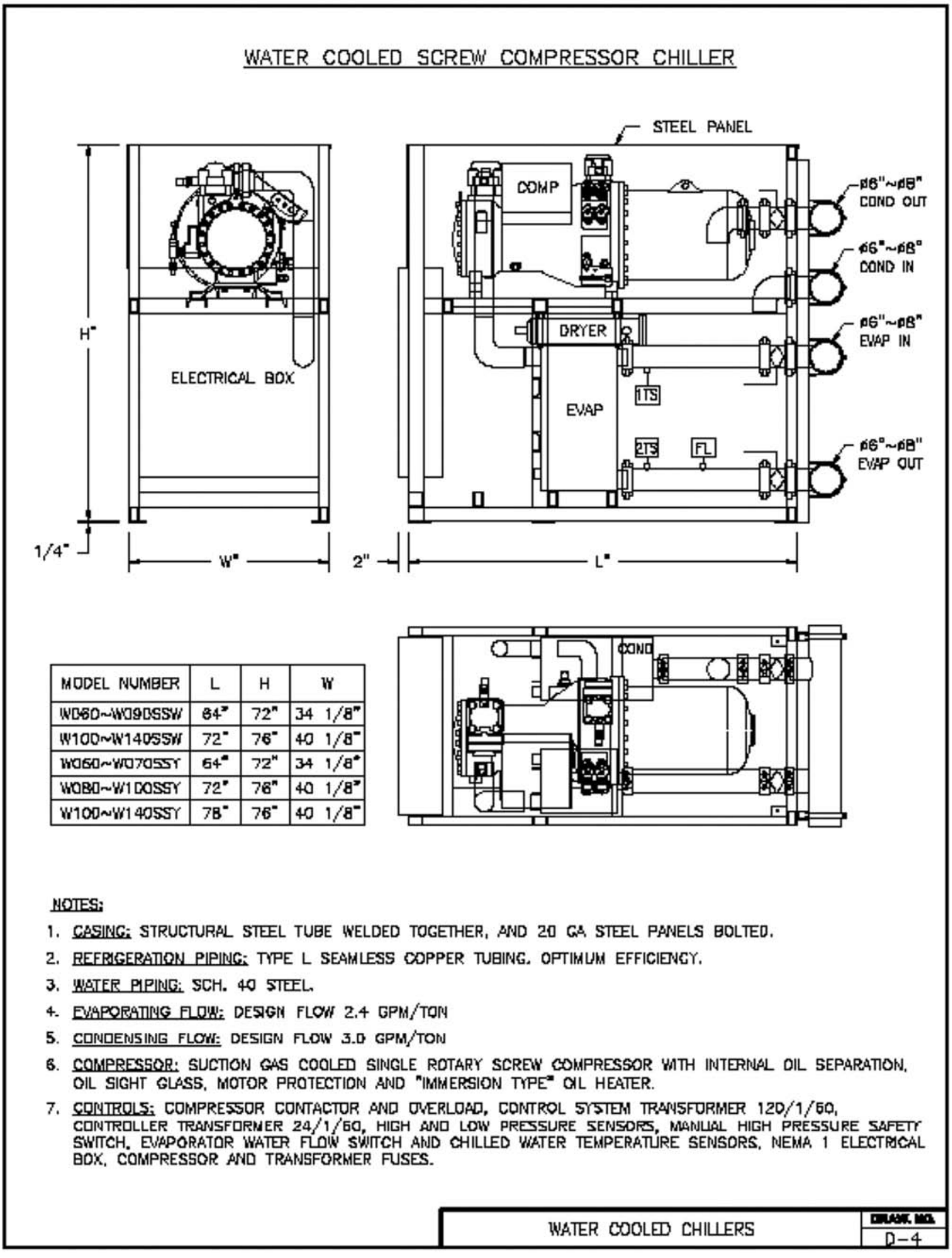


NOTES:

1. CASING: HEAVY 12 GAUGE GALVANIZED STEEL FRAME AND 22 GAUGE GALVANIZED STEEL PANELS, BOLTED TOGETHER.
2. COIL: HEAVY WALL COPPER TUBES ARE MECHANICALLY EXPANDED IN SELF-SPACED ALUMINUM CORRUGATED PLATE FINS. COIL IS PRESSURE TESTED TO 700 PSI AND DRIED WITH NITROGEN.
3. FAN: INSTALLED ON 2.0 HP MOTOR WITH 1140 RPM. EACH MOTOR HAS INTERNAL OVERLOAD PROTECTION. 26" DIA. FANS BLADES WITH A GALVANIZED STEEL SPUN VENTURI TO PROVIDE MAXIMUM FAN EFFICIENCY AND MINIMUM NOISE.
4. REFRIGERATION PIPING: TYPE L SEAMLESS COPPER TUBING.
5. WATER PIPING: SCH. 40 STEEL
6. EVAPORATING FLOW: DESIGN FLOW 2.4 GPM/TON.
7. COMPRESSOR: SUCTION GAS COOLED DUAL SCROLL COMPRESSORS WITH OIL SIGHT GLASS, INTERNAL MOTOR PROTECTION AND EXTERNAL "BAND TYPE" CRANKCASE HEATER.
8. CONTROLS: COMPRESSOR AND FAN CONTACTOR, OPTIONAL FIRST FAN WITH SPEED CONTROL, SECOND FAN WITH PRESSURE CYCLING. CONTROL TRANSFORMER 24/1/60. HIGH AND LOW PRESSURE SENSOR, MANUAL RESET HIGH PRESSURE SAFETY, EVAPORATOR WATER FLOW SWITCH AND FREEZE THERMOSTAT, NEMA 4 CONTROL PANEL, COMPRESSOR, FANS AND TRANSFORMER FUSES.

V-COIL AIR COOLED CHILLERS	DRAWING NO. D-3

WATER COOLED ROTARY SCREW COMPRESSOR CHILLER D-4



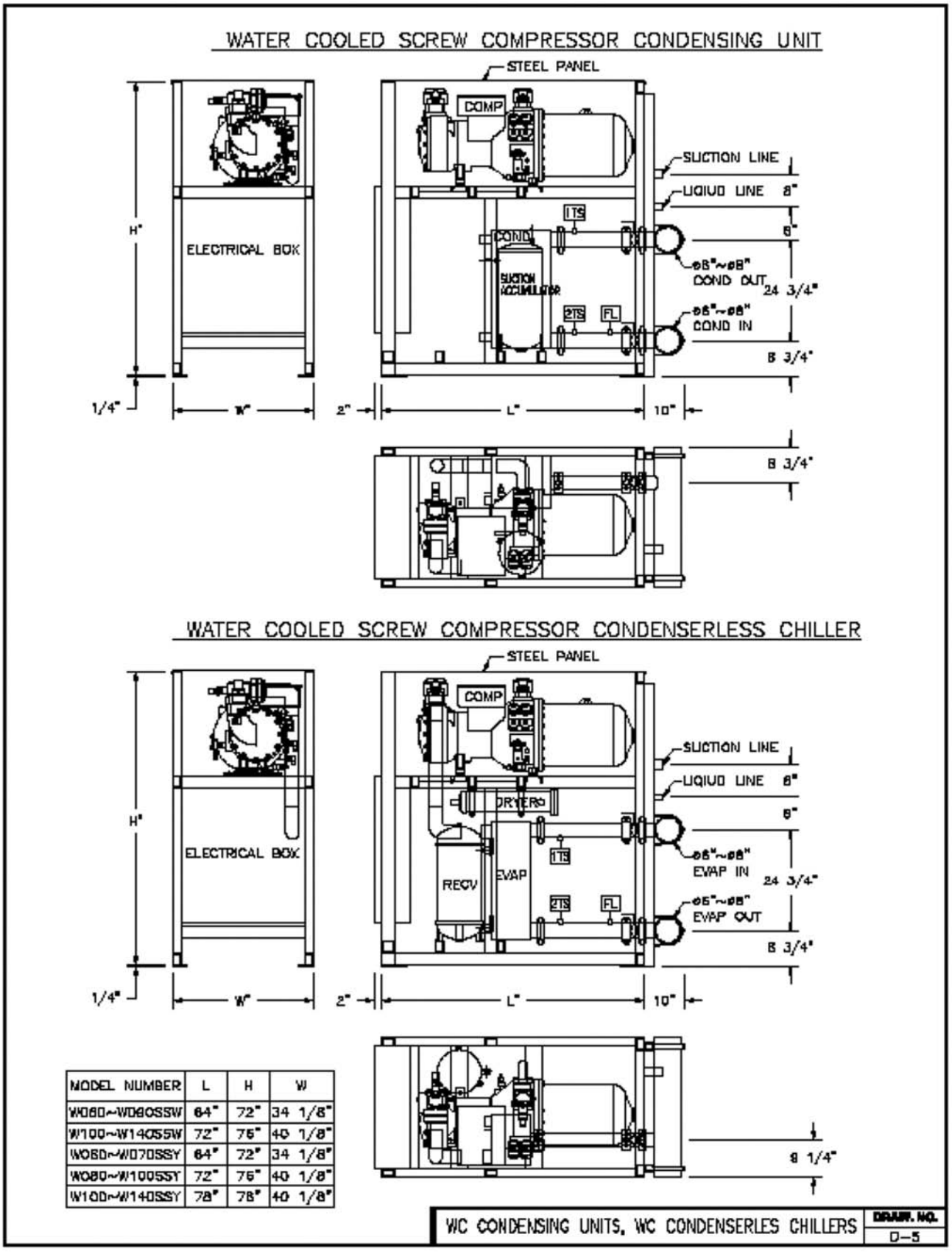
MODEL NUMBER	L	H	W
W060~W090SSW	64"	72"	34 1/8"
W100~W140SSW	72"	76"	40 1/8"
W060~W070SSY	64"	72"	34 1/8"
W080~W100SSY	72"	76"	40 1/8"
W100~W140SSY	78"	76"	40 1/8"

NOTES:

1. CASING: STRUCTURAL STEEL TUBE WELDED TOGETHER, AND 20 GA STEEL PANELS BOLTED.
2. REFRIGERATION PIPING: TYPE L SEAMLESS COPPER TUBING. OPTIMUM EFFICIENCY.
3. WATER PIPING: SCH. 40 STEEL.
4. EVAPORATING FLOW: DESIGN FLOW 2.4 GPM/TON
5. CONDENSING FLOW: DESIGN FLOW 3.0 GPM/TON
6. COMPRESSOR: SUCTION GAS COOLED SINGLE ROTARY SCREW COMPRESSOR WITH INTERNAL OIL SEPARATION, OIL SIGHT GLASS, MOTOR PROTECTION AND "IMMERSION TYPE" OIL HEATER.
7. CONTROLS: COMPRESSOR CONTACTOR AND OVERLOAD, CONTROL SYSTEM TRANSFORMER 120/1/60, CONTROLLER TRANSFORMER 24/1/60, HIGH AND LOW PRESSURE SENSORS, MANUAL HIGH PRESSURE SAFETY SWITCH, EVAPORATOR WATER FLOW SWITCH AND CHILLED WATER TEMPERATURE SENSORS, NEMA 1 ELECTRICAL BOX, COMPRESSOR AND TRANSFORMER FUSES.

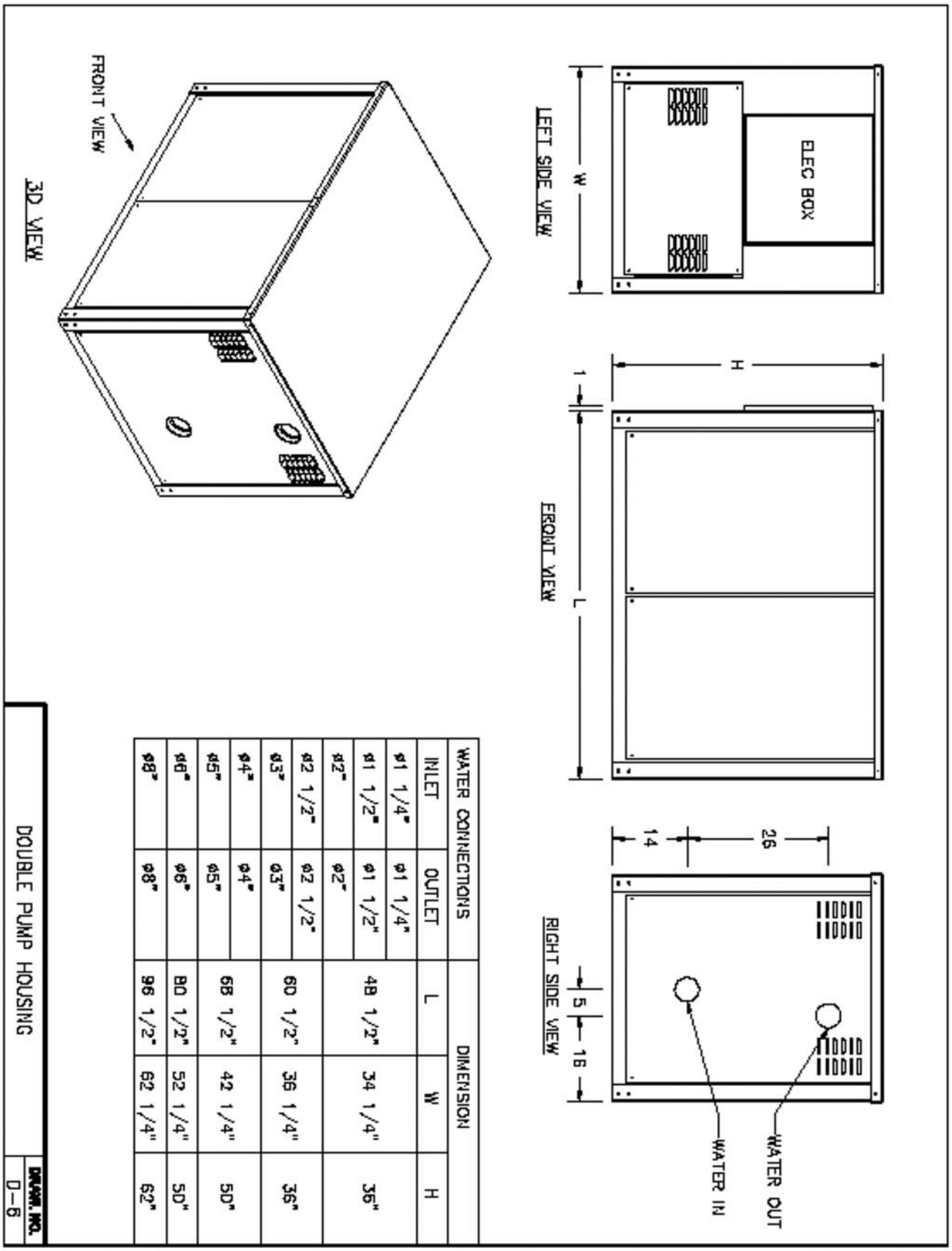
WATER COOLED CHILLERS	DRAW. NO. D-4

WATER COOLED ROTARY SCREW COMPRESSOR CONDENSING UNIT D-5



MODEL NUMBER	L	H	W
WC60~WC60SSW	64"	72"	34 1/8"
W100~W140SSW	72"	76"	40 1/8"
WC60~WC70SSY	64"	72"	34 1/8"
WC60~W100SSY	72"	76"	40 1/8"
W100~W140SSY	78"	78"	40 1/8"

SINGLE AND DUPLEX PUMP HOUSING D-6

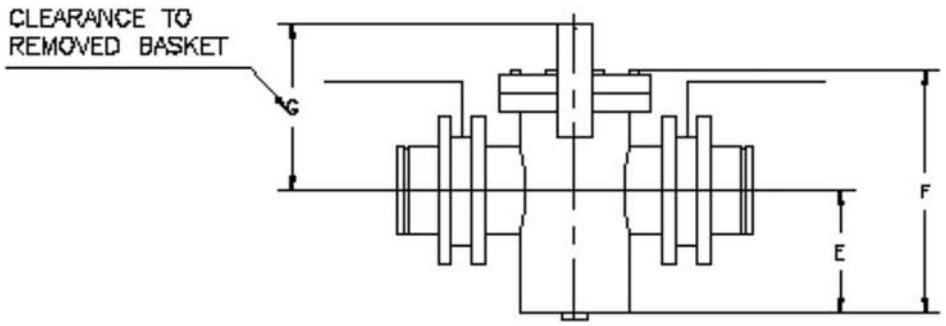


WATER CONNECTIONS		DIMENSION		
INLET	OUTLET	L	W	H
ø1 1/4"	ø1 1/4"	48 1/2"	34 1/4"	36"
ø1 1/2"	ø1 1/2"			
ø2"	ø2"			
ø2 1/2"	ø2 1/2"	60 1/2"	36 1/4"	36"
ø3"	ø3"			
ø4"	ø4"	68 1/2"	42 1/4"	50"
ø5"	ø5"			
ø6"	ø6"	80 1/2"	52 1/4"	50"
ø8"	ø8"	96 1/2"	62 1/4"	62"

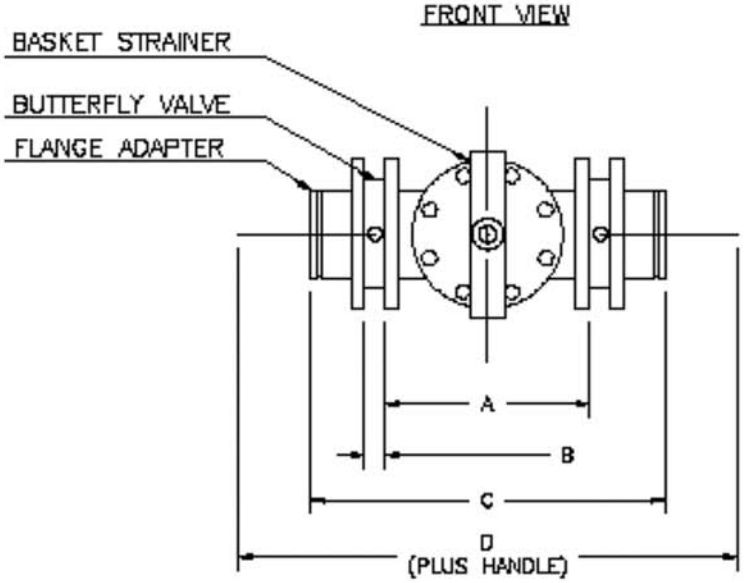
DOUBLE PUMP HOUSING

DRAWN NO. D-6

INLINE MAIN HEADER BASKET STRAINERS D-7



FRONT VIEW



TOP VIEW

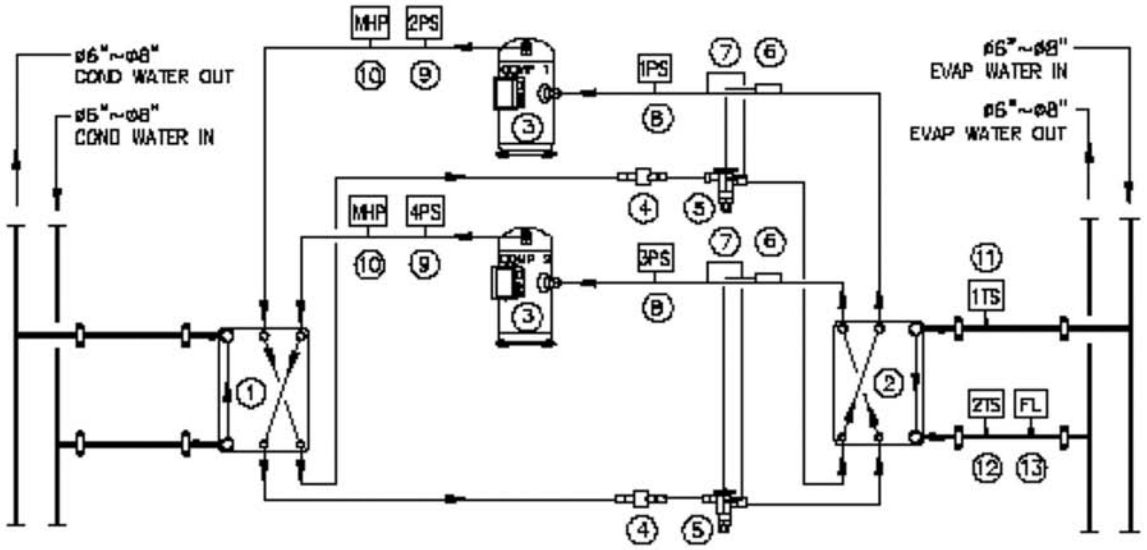
DIM	WGT(LBS)	A	B	C	D	E	F	G
3"	103.8	9 7/8"	1 3/4"	19 3/8"	30 11/16"	6 1/2"	10 1/2"	8"
4"	192.0	11 1/2"	2 1/32"	23 1/4"	32 5/16"	8"	14 9/16"	10 1/2"
6"	280.0	14 7/8"	2 3/16"	27 1/4"	35 11/16"	8 5/8"	15 1/4"	12"
8"	500.0	18 11/16"	2 3/8"	29 7/16"	46 11/16"	11 3/4"	20 3/4"	15"
10"	725.0	20 1/8"	2 17/32"	33 1/4"	48 1/8"	13 3/4"	24 1/4"	15"

BASKET STRAINER BFC-125 | DRAW. NO. D-7

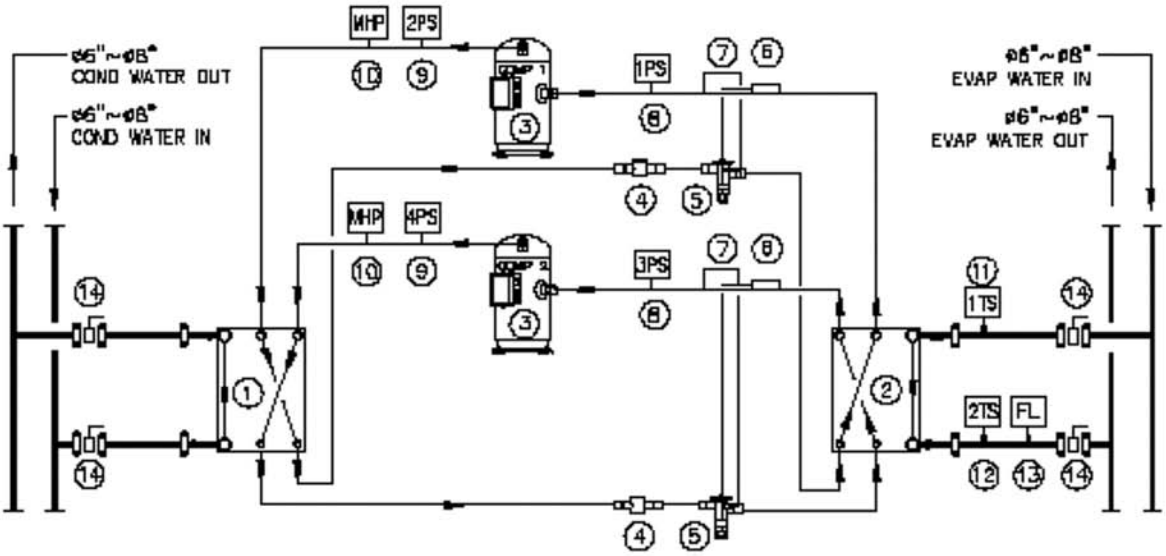
WATER COOLED DUAL SCROLL COMPRESSOR CHILLER F-1

LEGEND		ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
———	REFRIGERANT PIPING & FITTING	1	1	WC CONDENSER BRAZED PLATES	8	2	COMP LOW PRESSURE SENSOR
		2	1	EVAPORATOR BRAZED PLATES	9	2	COMP HIGH PRESSURE SENSOR
———	CHILLED WATER PIPING	3	2	SCROLL COMPRESSOR	10	2	MANUAL HIGH PRESSURE SWITCH
▯	FLEXIBLE COUPLING	4	2	SIGHT GLASS MOISTURE INDICATOR	11	1	EVAP ENTERING WATER TEMP SENSOR
		5	2	TXV THERMAL EXPANSION VALVE	12	1	EVAP LEAVING WATER TEMP SENSOR
		6	2	TXV TEMPREATURE SENSOR	13	1	FLOW SWITCH
		7	2	TXV EQUALIZER LINE	14	4	WATER SHUT-OFF VALVE

CHILLER WATER AND REFRIGIRATION SCHEMATIC (NO VALVES)

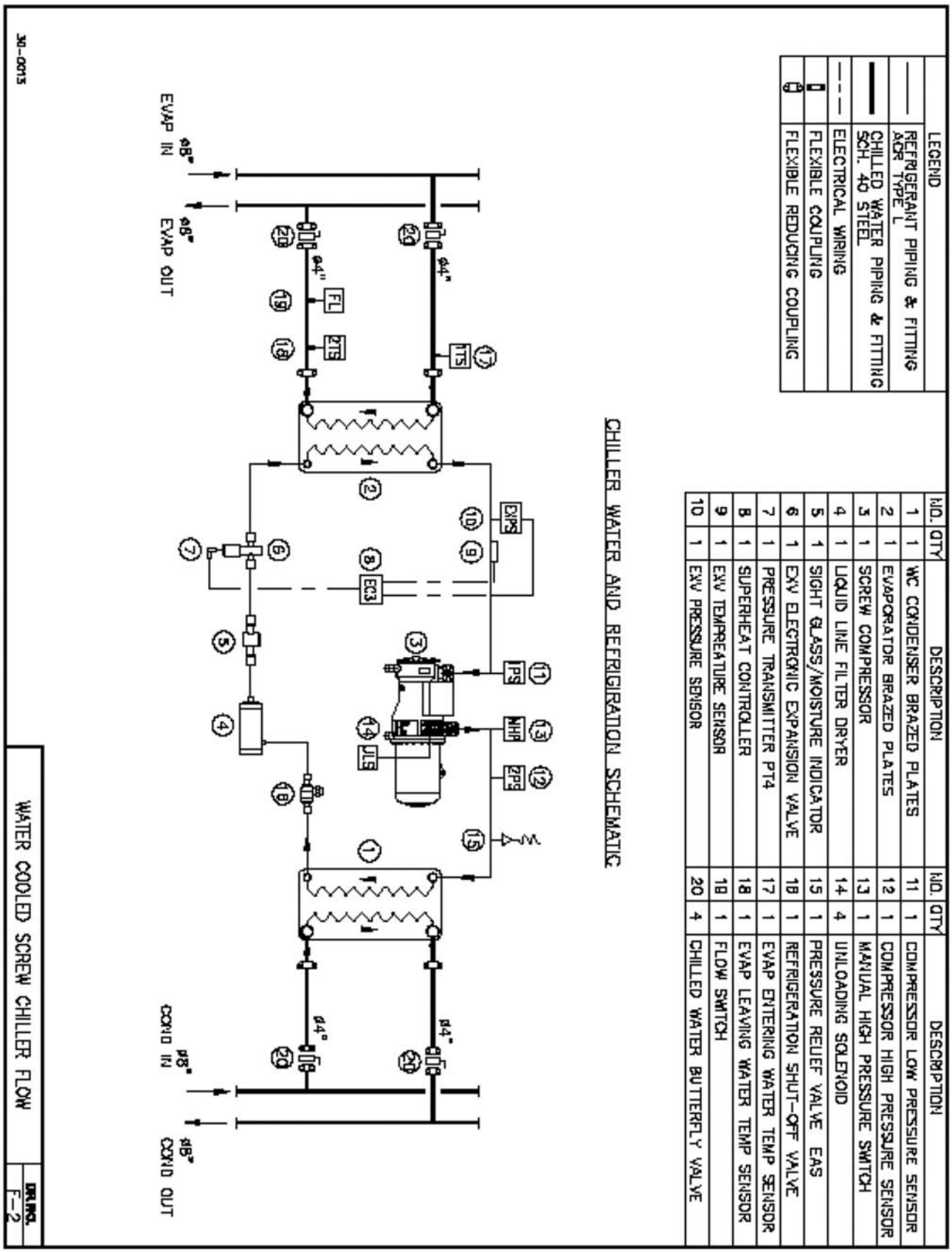


CHILLER WATER AND REFRIGIRATION SCHEMATIC (WITH VALVES)



30-0016 | WATER CDOLED SCROLL CHILLER FLOW | DR NO. F-1

WATER COOLED ROTARY SCREW COMPRESSOR CHILLER F-2



NO.	QTY	DESCRIPTION
1	1	WC CONDENSER BRAZED PLATES
2	1	EVAPORATOR BRAZED PLATES
3	1	SCREW COMPRESSOR
4	1	LIQUID LINE FILTER DRYER
5	1	SIGHT GLASS/MOISTURE INDICATOR
6	1	EXV ELECTRONIC EXPANSION VALVE
7	1	PRESSURE TRANSMITTER PT4
8	1	SUPERHEAT CONTROLLER
9	1	EXV TEMPREATURE SENSOR
10	1	EXV PRESSURE SENSOR

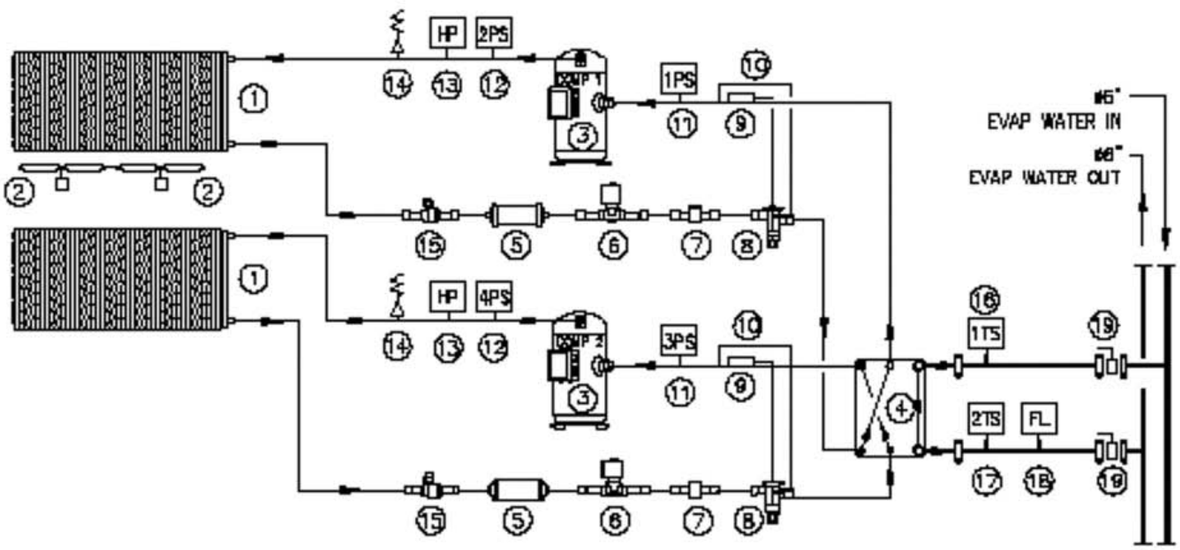
NO.	QTY	DESCRIPTION
11	1	COMPRESSOR LOW PRESSURE SENSOR
12	1	COMPRESSOR HIGH PRESSURE SENSOR
13	1	MANUAL HIGH PRESSURE SWITCH
14	4	UNLOADING SOLENOID
15	1	PRESSURE RELIEF VALVE EAS
16	1	REFRIGERATION SHUT-OFF VALVE
17	1	EVAP ENTERING WATER TEMP SENSOR
18	1	EVAP LEAVING WATER TEMP SENSOR
19	1	FLOW SWITCH
20	4	CHILLED WATER BUTTERFLY VALVE

OUTDOOR AIR COOLED DUAL SCROLL COMPRESSOR CHILLER F-3

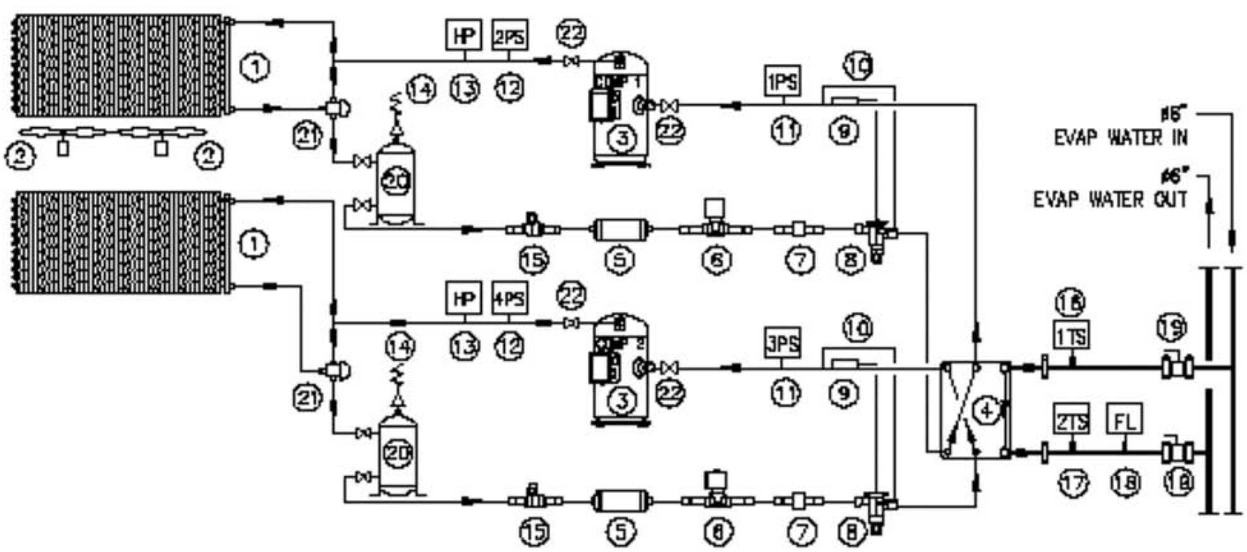
LEGEND	
	REFRIGERANT PIPING & FITTING ACR TYPE L
	THREADED WATER PIPING & FITTING SCH. 40
	GROOVED WATER PIPING & FITTING SCH. 40
	UNION
	FLEXIBLE COUPLING

NO.	QTY	DESCRIPTION	NO.	QTY	DESCRIPTION
1	2	AC CONDENSER COIL	12	2	COMP HIGH PRESSURE SENSOR
2	2	PROPELLER FAN	13	2	HIGH PRESSURE SWITCH
3	2	SCROLL COMPRESSOR	14	2	PRESSURE RELIEF VALVE
4	1	EVAPORATOR DUAL CIRCUIT	15	2	REFRIGERATION SHUT-OFF VALVE
5	2	LIQUID LINE FILTER DRYER	16	1	EVAP ENTERING WATER TEMP SENSOR
6	2	LIQUID LINE SOLENOID VALVE	17	1	EVAP LEAVING WATER TEMP SENSOR
7	2	SIGHT GLASS/MOISTURE INDICATOR	18	1	FLOW SWITCH
8	2	TXV THERMAL EXPANSION VALVE	19	2	CHILLED WATER SHUT-OFF VALVE
9	2	TXV TEMPREATURE SENSOR	20	2	RECIEVER WITH ROTOLOCK VALVES
10	2	TXV EQUALIZER LINE	21	2	HEAD PRESSURE REGULATING VALVE
11	2	COMP LOW PRESSURE SENSOR	22	4	ROTOLOCK VALVES

CHILLED WATER AND REFRIGIRATION SCHEMATIC



CHILLED WATER AND REFRIGIRATION SCHEMATIC (FLOODED CONDENSER)



30-0090

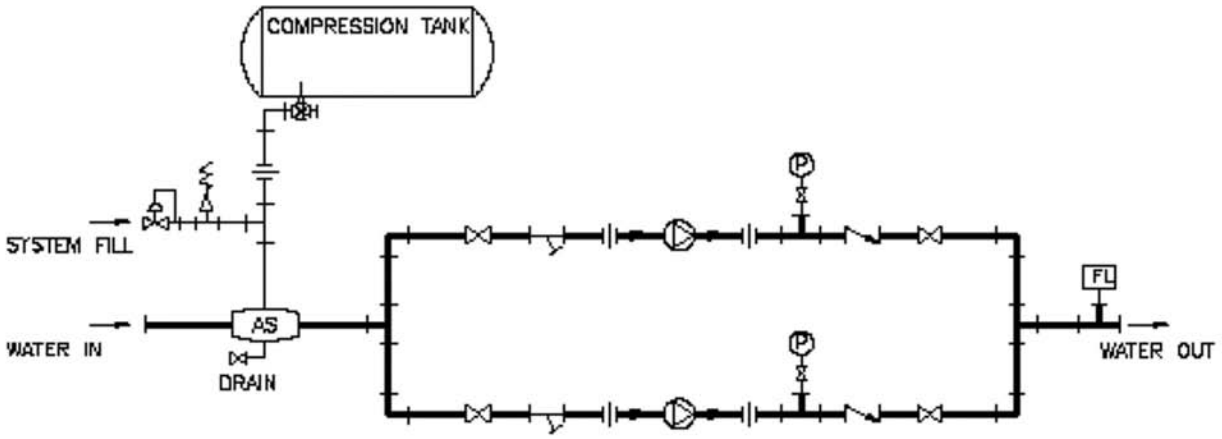
OUTDOOR AIR COOLED CHILLER FLOW

DRWG. NO. F-3

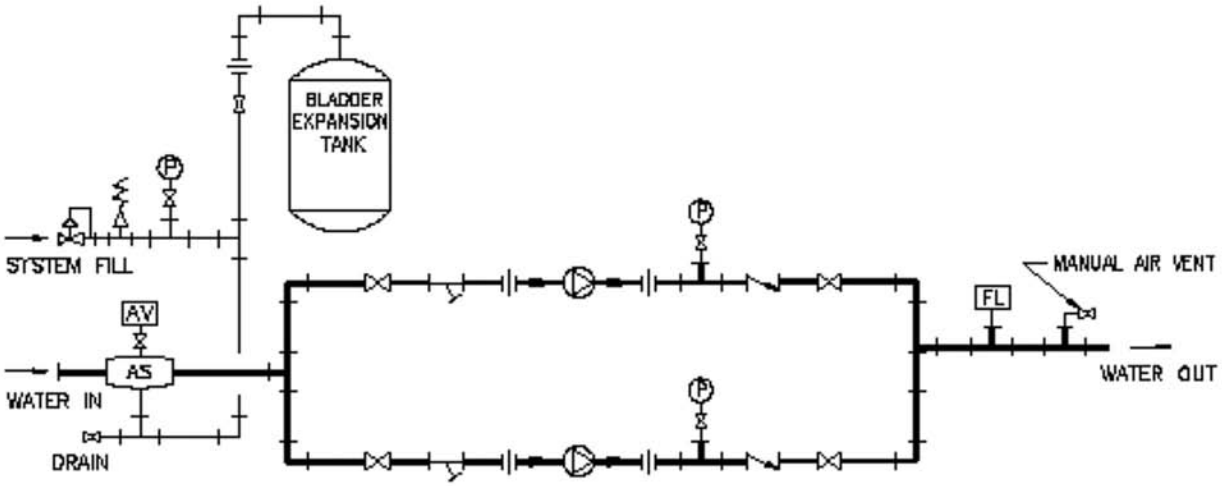
SINGLE AND DUPLEX PUMP PACKAGES WATER FLOW SCHEMATIC F-4

LEGEND					
	PUMP	AV	AIR VENT		DUAL UNIT VALES REDUCING VALVE: 12 PSI RELIEF VALVE: 30 PSI
	STRAINER	AS	AIR SEPARATOR		
	SHUT-OFF VALVE	FL	FLOW SWITCH		ELBOW
	CHECK VALVE	P	PRESSURE GAUGE		TEE
	TANK DRAINER-AIR CHARGER		UNION		WATER PIPING

WATER FLOW SCHEMATIC WITH COMPRESSION TANK



WATER FLOW SCHEMATIC WITH EXPANSION TANK



30-0003

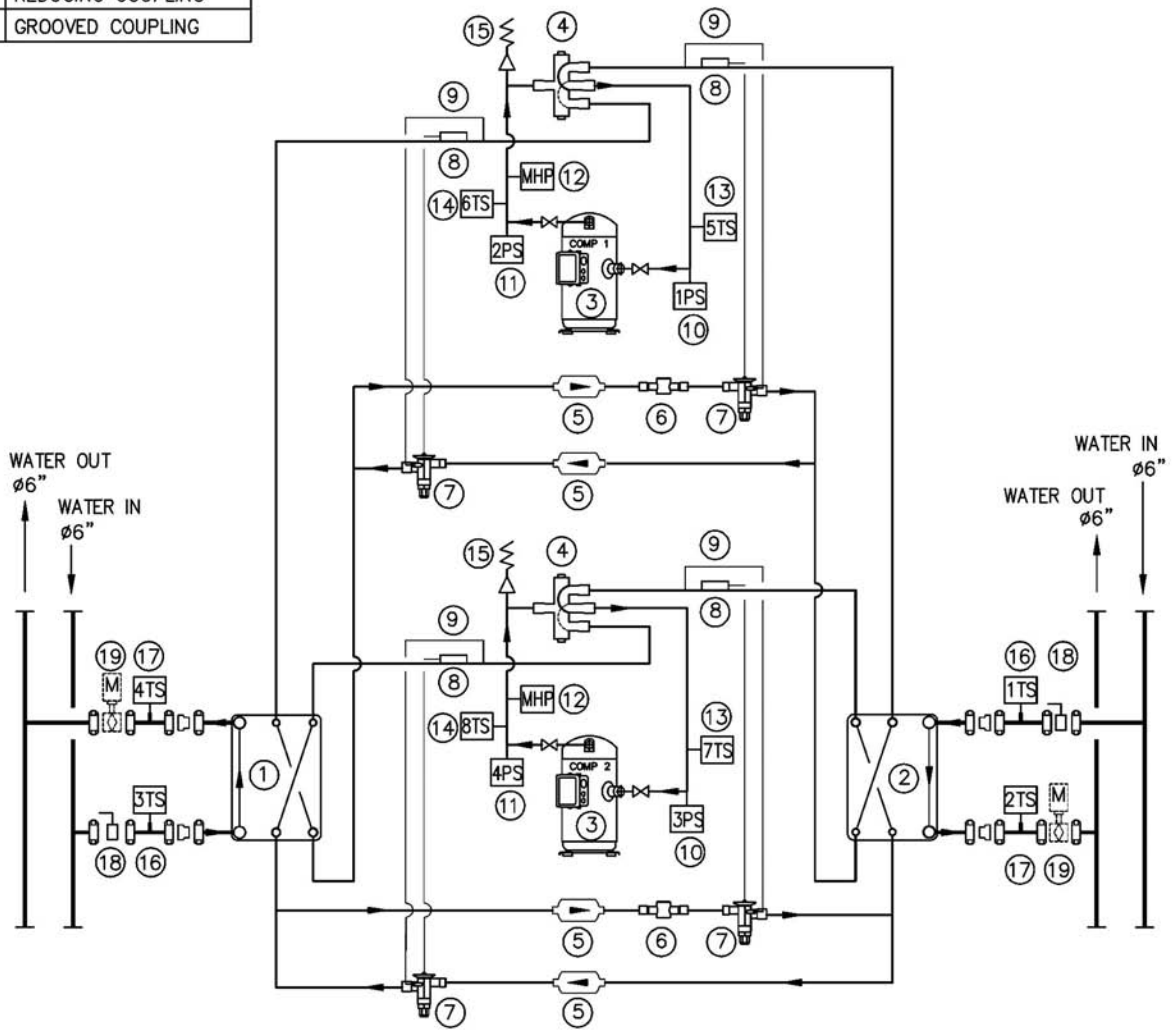
WATER FLOW SCHEMATIC | DRAWING NO. F-4

WATER TO WATER HEAT PUMP F-5

NO.	QTY	DESCRIPTION	NO.	QTY	DESCRIPTION
1	1	WC CONDENSER BRAZED PLATES	11	2	COMP HIGH PRESSURE SENSOR
2	1	EVAPORATOR BRAZED PLATES	12	2	MANUAL RESET HIGH PRESSURE SWITCH
3	2	SCROLL COMPRESSOR WITH ROTOLOCK VALVES	13	2	COMP SUCTION LINE TEMP SENSOR
4	2	4-WAY REVERSING VALVES	14	2	COMP DISCHARGE LINE TEMP SENSOR
5	4	LIQUID LINE CHECK VALVE	15	2	PRESSURE RELIEF VALVE
6	2	SIGHT GLASS MOISTURE INDICATOR	16	2	EVAP/COND ENTERING WATER TEMP SENSOR
7	4	TXV THERMAL EXPANSION VALVE	17	2	EVAP/COND LEAVING WATER TEMP SENSOR
8	4	TXV TEMPREATURE SENSOR	18	2	ENTERING WATER SHUT-OFF VALVE OPTIONAL
9	4	TXV EQUALIZER LINE	19	2	LEAVING WATER MOTORIZED VALVE OPTIONAL
10	2	COMP LOW PRESSURE SENSOR			

LEGEND	
	REFRIGERANT PIPING ACR TYPE L
	WATER PIPING SCH. 40 BLACK STEEL
	REDUCING COUPLING
	GROOVED COUPLING

CHILLER WITH MANUAL AND MOTORIZED WATER VALVES



WATER TO WATER HEAT PUMP | DRAW. NO. F-5

WATER COOLED HIGH EFFICIENCY HEAT RECLAIM CHILLER R410A – WHRX050DZV

Leaving Chilled Water °F	Leaving Condenser Water Temperature									
	105°F					110°F				
	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]
24	31.9	41.31	9.3	532,742	3.71	30.7	43.65	8.4	517,815	3.47
26	33.3	41.43	9.6	540,963	3.82	32.1	43.78	8.8	534,520	3.58
28	34.7	41.55	10.0	558,726	3.94	33.5	43.90	9.2	551,748	3.68
30	36.2	41.66	10.4	577,048	4.06	34.9	44.02	9.5	569,516	3.79
32	37.8	41.78	10.8	595,946	4.18	36.4	44.13	9.9	587,840	3.90
34	39.4	41.89	11.3	615,436	4.30	38.0	44.25	10.3	606,737	4.02
36	41.0	42.01	11.7	635,534	4.43	39.6	44.36	10.7	626,223	4.13
38	42.7	42.12	12.2	656,256	4.56	41.2	44.48	11.1	646,314	4.26
40	44.4	42.24	12.6	677,619	4.70	42.9	44.59	11.5	667,027	4.38
42	46.2	42.36	13.1	699,639	4.84	44.6	44.70	12.0	688,377	4.51
44	48.1	42.48	13.6	722,332	4.98	46.4	44.82	12.4	710,381	4.64
46	50.0	42.60	14.1	745,715	5.13	48.3	44.93	12.9	733,056	4.78
48	52.0	42.72	14.6	769,804	5.28	50.2	45.05	13.4	756,417	4.92
50	54.0	42.85	15.1	794,616	5.43	52.2	45.17	13.9	780,482	5.06
55	59.4	43.19	16.5	859,910	5.83	57.4	45.48	15.1	843,825	5.43
60	65.1	43.56	17.9	930,076	6.25	63.0	45.82	16.5	911,918	5.83
	115°F					120°F				
24	29.5	46.14	7.7	512,055	3.25	28.3	48.78	7.0	506,483	3.04
26	30.9	46.27	8.0	528,321	3.34	29.6	48.92	7.3	522,117	3.13
28	32.2	46.40	8.3	544,911	3.44	30.9	49.06	7.6	538,236	3.21
30	33.6	46.52	8.7	562,112	3.54	32.2	49.19	7.9	554,856	3.30
32	35.0	46.64	9.0	579,850	3.64	33.6	49.31	8.2	571,994	3.40
34	36.5	46.76	9.4	598,141	3.75	35.1	49.43	8.5	589,667	3.49
36	38.1	46.88	9.7	617,001	3.86	36.6	49.55	8.9	607,889	3.59
38	39.7	46.99	10.1	636,448	3.97	38.1	49.67	9.2	626,678	3.70
40	41.3	47.10	10.5	656,497	4.08	39.7	49.78	9.6	646,050	3.80
42	43.0	47.21	10.9	677,164	4.20	41.3	49.89	9.9	666,022	3.91
44	44.7	47.32	11.3	698,466	4.32	43.0	50.00	10.3	686,609	4.02
46	46.5	47.43	11.8	720,419	4.45	44.7	50.11	10.7	707,827	4.14
48	48.4	47.54	12.2	743,040	4.58	46.5	50.22	11.1	729,694	4.26
50	50.3	47.66	12.7	766,344	4.71	48.4	50.32	11.5	752,225	4.38
55	55.3	47.95	13.8	827,703	5.06	53.2	50.60	12.6	811,568	4.70
60	60.7	48.26	15.1	893,692	5.42	58.5	50.89	13.8	875,419	5.04

Notes:

1. All performance data is based on a 10°F chilled water temperature drop through the evaporator, and 10°F rise through the condenser.
2. kW – Total Power Input in kWatts
3. EER – Energy Efficiency Ratio for COOL Mode (Btuh / Watts)
4. THR – Total Heat Rejection for HEAT Mode (Btuh)
5. COPHR - Coefficient of Performance for Heat reclaim

WATER COOLED HIGH EFFICIENCY HEAT RECLAIM CHILLER R410A – WHRX050DZV

Leaving Chilled Water °F	Leaving Condenser Water Temperature									
	125°F					130°F				
	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]
24										
26										
28										
30										
32	32.2	52.15	7.4	564,296	3.17					
34	33.6	52.27	7.7	581,336	3.26					
36	35.0	52.40	8.0	598,908	3.35	33.4	55.41	7.2	590,078	3.12
38	36.5	52.51	8.3	617,026	3.44	34.8	55.54	7.5	607,513	3.20
40	38.0	52.63	8.7	635,709	3.54	36.3	55.66	7.8	625,493	3.29
42	39.6	52.74	9.0	654,971	3.64	37.8	55.77	8.1	644,033	3.38
44	41.2	52.85	9.4	674,830	3.74	39.4	55.89	8.5	663,150	3.48
46	42.9	52.96	9.7	695,301	3.85	41.0	56.00	8.8	682,861	3.57
48	44.6	53.07	10.1	716,401	3.95	42.6	56.10	9.1	703,181	3.67
50	46.4	53.17	10.5	738,146	4.07	44.3	56.21	9.5	724,127	3.77
55	51.1	53.44	11.5	795,438	4.36	48.9	56.47	10.4	779,337	4.04
60	56.1	53.71	12.5	857,119	4.67	53.8	56.72	11.4	838,815	4.33
	135°F					140°F				
24										
26										
28										
30										
32										
34										
36										
38										
40	34.5	58.87	7.0	615,424	3.06					
42	36.0	58.99	7.3	633,229	3.14					
44	37.5	59.10	7.6	651,592	3.23	35.6	62.51	6.8	640,175	3.00
46	39.0	59.22	7.9	670,528	3.32	37.0	62.63	7.1	658,325	3.08
48	40.6	59.33	8.2	690,056	3.41	38.6	62.74	7.4	677,046	3.16
50	42.3	59.43	8.5	710,189	3.50	40.1	62.85	7.7	696,355	3.25
55	46.6	59.69	9.4	763,284	3.75	44.3	63.11	8.4	747,302	3.47
60	51.3	59.94	10.3	820,527	4.01	48.8	63.36	9.2	802,277	3.71

Notes:

1. All performance data is based on a 10°F chilled water temperature drop through the evaporator, and 10°F rise through the condenser.
2. kW – Total Power Input in kWatts
3. EER – Energy Efficiency Ratio for COOL Mode (Btuh / Watts)
4. THR – Total Heat Rejection for HEAT Mode (Btuh)
5. COPHR - Coefficient of Performance for Heat reclaim

WATER COOLED HIGH EFFICIENCY HEAT RECLAIM CHILLER R134A - WHRXX050DZY

Leaving Chilled Water °F	Leaving Condenser Water Temperature									
	120°F					125°F				
	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]
24	17.5	31.05	6.8	316,032	2.98					
26	18.4	31.19	7.1	327,038	3.07					
28	19.3	31.34	7.4	338,474	3.16					
30	20.2	31.50	7.7	350,349	3.26					
32	21.2	31.67	8.0	362,667	3.35	20.5	33.43	7.4	360,501	3.16
34	22.2	31.84	8.4	375,439	3.45	21.5	33.59	7.7	372,874	3.25
36	23.3	32.02	8.7	388,669	3.56	22.5	33.76	8.0	385,709	3.35
38	24.4	32.20	9.1	402,366	3.66	23.6	33.93	8.3	399,013	3.44
40	25.5	32.38	9.5	416,537	3.77	24.7	34.10	8.7	412,795	3.55
42	26.7	32.55	9.8	431,189	3.88	25.8	34.28	9.0	427,060	3.65
44	27.9	32.73	10.2	446,330	3.99	27.0	34.46	9.4	441,818	3.76
46	29.1	32.90	10.6	461,966	4.11	28.2	34.64	9.8	457,073	3.87
48	30.4	33.07	11.0	478,105	4.24	29.5	34.82	10.2	472,835	3.98
50	31.8	33.22	11.5	494,754	4.36	30.8	34.99	10.6	489,110	4.09
52	33.2	33.37	11.9	511,921	4.49	32.2	35.15	11.0	505,905	4.22
54	34.6	33.50	12.4	529,612	4.63	33.6	35.31	11.4	523,228	4.34
56	36.1	33.62	12.9	547,835	4.77	35.0	35.46	11.8	541,086	4.47
58	37.6	33.73	13.4	566,598	4.92	36.5	35.58	12.3	559,486	4.60
60	39.2	33.82	13.9	585,907	5.08	38.0	35.71	12.8	578,436	4.74
	130°F					135°F				
30										
32										
34										
36	21.8	35.67	7.3	383,215	3.15					
38	22.8	35.82	7.6	396,095	3.24					
40	23.9	35.98	8.0	409,456	3.33	23.1	38.05	7.3	406,620	3.13
42	25.0	36.15	8.3	423,303	3.43	24.1	38.20	7.6	420,017	3.22
44	26.1	36.32	8.6	437,645	3.53	25.2	38.35	7.9	433,911	3.31
46	27.3	36.50	9.0	452,488	3.63	26.4	38.51	8.2	448,310	3.41
48	28.5	36.67	9.3	467,840	3.74	27.6	38.68	8.6	463,221	3.51
50	29.8	36.85	9.7	483,709	3.84	28.8	38.85	8.9	478,651	3.61
52	31.1	37.02	10.1	500,101	3.96	30.1	39.02	9.3	494,608	3.71
54	32.5	37.19	10.5	517,023	4.07	31.4	39.19	9.6	511,098	3.82
56	33.9	37.36	10.9	534,484	4.19	32.8	39.36	10.0	528,130	3.92
58	35.4	37.51	11.3	552,490	4.31	34.2	39.53	10.4	545,709	4.04
60	36.9	37.66	11.7	571,490	4.44	35.7	39.69	10.8	563,844	4.16

Notes:
1. All performance data is based on a 10°F chilled water temperature drop through the evaporator, and 10°F rise through the condenser.
2. kW – Total Power Input in kWatts
3. EER – Energy Efficiency Ratio for COOL Mode (Btuh / Watts)
4. THR – Total Heat Rejection for HEAT Mode (Btuh)
5. COPHR - Coefficient of Performance for Heat reclaim

WATER COOLED HIGH EFFICIENCY HEAT RECLAIM CHILLER R134A - WHRXX050DZY

Leaving Chilled Water °F	Leaving Condenser Water Temperature									
	140°F					145°F				
	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]
30										
32										
34										
36										
38										
40										
42										
44	24.3	40.58	7.2	430,717	3.11					
46	25.5	40.72	7.5	444,640	3.20	24.5	43.16	6.8	441,578	3.00
48	26.6	40.87	7.8	459,077	3.29	25.6	43.28	7.1	455,510	3.08
50	27.8	41.02	8.1	474,037	3.38	26.8	43.41	7.4	469,967	3.17
52	29.1	41.18	8.5	489,526	3.48	28.0	43.54	7.7	484,957	3.26
54	30.4	41.35	8.8	505,553	3.58	29.3	43.69	8.0	500,487	3.36
56	31.7	41.51	9.2	522,123	3.68	30.6	43.84	8.4	516,564	3.45
58	33.1	41.68	9.5	539,244	3.79	31.9	43.99	8.7	533,195	3.55
60	34.5	41.84	9.9	556,924	3.90	33.3	44.15	9.1	550,388	3.65
	150°F					155°F				
30										
32										
34										
36										
38										
40										
42										
44										
46										
48										
50										
52	27.0	46.14	7.0	481,000	3.05					
54	28.2	46.26	7.3	496,002	3.14					
56	29.4	46.38	7.6	511,553	3.23	28.3	49.17	6.9	507,192	3.02
58	30.7	46.51	7.9	527,662	3.32	29.5	49.27	7.2	522,746	3.11
60	32.1	46.65	8.3	544,336	3.42	30.9	49.38	7.5	538,868	3.20

Notes:
1. All performance data is based on a 10°F chilled water temperature drop through the evaporator, and 10°F rise through the condenser.
2. kW – Total Power Input in kWatts
3. EER – Energy Efficiency Ratio for COOL Mode (Btuh / Watts)
4. THR – Total Heat Rejection for HEAT Mode (Btuh)
5. COPHR - Coefficient of Performance for Heat reclaim

WATER COOLED HIGH EFFICIENCY HEAT RECLAIM CHILLER R410A – WHRX050DZV

HIGH TEMPERATURE – WATER COOLED HIGH EFFICIENCY HEAT RECLAIM CHILLER R410A – WHRX050DZV

Leaving Chilled Water °F	Leaving Condenser Water Temperature																							
	105°F				110°F				115°F				120°F											
	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]
24	31.9	41.31	9.3	532,742	3.71	30.7	43.65	8.4	517,815	3.47	29.5	46.14	7.7	512,055	3.25	28.3	48.78	7.0	506,483	3.04				
26	33.3	41.43	9.6	540,963	3.82	32.1	43.78	8.8	534,520	3.58	30.9	46.27	8.0	528,321	3.34	29.6	48.92	7.3	522,117	3.13				
28	34.7	41.55	10.0	558,726	3.94	33.5	43.9	9.2	551,748	3.68	32.2	46.4	8.3	544,911	3.44	30.9	49.06	7.6	538,236	3.21				
30	36.2	41.66	10.4	578,048	4.06	34.9	44.02	9.5	569,516	3.79	33.6	46.52	8.7	562,112	3.54	32.2	49.19	7.9	554,856	3.30				
32	37.8	41.78	10.8	595,946	4.18	36.4	44.13	9.9	587,840	3.90	35.0	46.64	9.0	579,850	3.64	33.6	49.31	8.2	571,994	3.40				
34	39.4	41.89	11.3	615,436	4.30	38.0	44.25	10.3	606,737	4.02	36.5	46.76	9.4	598,141	3.75	35.1	49.43	8.5	589,667	3.49				
36	41.0	42.01	11.7	635,534	4.43	39.6	44.36	10.7	626,223	4.13	38.1	46.88	9.7	617,001	3.86	36.6	49.55	8.9	607,889	3.59				
38	42.7	42.12	12.2	656,256	4.56	41.2	44.48	11.1	646,314	4.26	39.7	46.99	10.1	636,448	3.97	38.1	49.67	9.2	626,678	3.70				
40	44.4	42.24	12.6	677,619	4.70	42.9	44.59	11.5	667,027	4.38	41.3	47.10	10.5	656,497	4.08	39.7	49.78	9.6	646,050	3.80				
42	46.2	42.36	13.1	699,639	4.84	44.6	44.70	12.0	688,377	4.51	43.0	47.21	10.9	677,164	4.20	41.3	49.89	9.9	666,022	3.91				
44	48.1	42.48	13.6	722,332	4.98	46.4	44.82	12.4	710,381	4.64	44.7	47.32	11.3	698,466	4.32	43.0	50.00	10.3	686,609	4.02				
46	50.0	42.60	14.1	745,715	5.13	48.3	44.93	12.9	733,056	4.78	46.5	47.43	11.8	720,419	4.45	44.7	50.11	10.7	707,827	4.14				
48	52.0	42.72	14.6	769,804	5.28	50.2	45.05	13.4	756,417	4.92	48.4	47.54	12.2	743,040	4.58	46.5	50.22	11.1	729,694	4.26				
50	54.0	42.85	15.1	794,616	5.43	52.2	45.17	13.9	780,482	5.06	50.3	47.66	12.7	766,344	4.71	48.4	50.32	11.5	752,225	4.38				
55	59.4	43.19	16.5	859,910	5.83	57.4	45.48	15.1	843,825	5.43	55.3	47.95	13.8	827,703	5.06	53.2	50.60	12.6	811,568	4.70				
60	65.1	43.56	17.9	930,076	6.25	63.0	45.82	16.5	911,918	5.83	60.7	48.26	15.1	893,692	5.42	58.5	50.89	13.8	875,419	5.04				
	125°F					130°F					135 °F					140°F								
24																								
26																								
28																								
30																								
32	32.2	52.15	7.4	564,296	3.17																			
34	33.6	52.27	7.7	581,336	3.26																			
36	35.0	52.40	8.0	598,908	3.35	33.4	55.41	7.2	590,078	3.12														
38	36.5	52.51	8.3	617,026	3.44	34.8	55.54	7.5	607,513	3.20														
40	38.0	52.63	8.7	635,709	3.54	36.3	55.66	7.8	625,493	3.29	34.5	58.87	7.0	615,424	3.06									
42	39.6	52.74	9.0	654,971	3.64	37.8	55.77	8.1	644,033	3.38	36.0	58.99	7.3	633,229	3.14									
44	41.2	52.85	9.4	674,830	3.74	39.4	55.89	8.5	663,150	3.48	37.5	59.10	7.6	651,592	3.23	35.6	62.51	6.8	640,175	3.00				
46	42.9	52.96	9.7	695,301	3.85	41.0	56.00	8.8	682,861	3.57	39.0	59.22	7.9	670,528	3.32	37.0	62.63	7.1	658,325	3.08				
48	44.6	53.07	10.1	716,401	3.95	42.6	56.10	9.1	703,181	3.67	40.6	59.33	8.2	690,056	3.41	38.6	62.74	7.4	677,046	3.16				
50	46.4	53.17	10.5	738,146	4.07	44.3	56.21	9.5	724,127	3.77	42.3	59.43	8.5	710,189	3.50	40.1	62.85	7.7	696,355	3.25				
55	51.1	53.44	11.5	795,438	4.36	48.9	56.47	10.4	779,337	4.04	46.6	59.69	9.4	763,284	3.75	44.3	63.11	8.4	747,302	3.47				
60	56.1	53.71	12.5	857,119	4.67	53.8	56.72	11.4	838,815	4.33	51.3	59.94	10.3	820,527	4.01	48.8	63.36	9.2	802,277	3.71				

Notes: **1.** All performance data is based on a 10°F chilled water temperature drop through the evaporator, and 10°F rise through the condenser. **2.** kW – Total Power Input in kWatts **3.** EER – Energy Efficiency Ratio for COOL Mode (Btuh / Watts) **4.** THR – Total Heat Rejection for HEAT Mode (Btuh) **5.** COPHR - Coefficient of Performance for Heat reclaim

HIGH TEMPERATURE – WATER COOLED HIGH EFFICIENCY HEAT RECLAIM CHILLER R134A - WHRXX050DZY

Leaving Chilled Water °F	Leaving Condenser Water Temperature																			
	120°F					125°F					130°F					135°F				
	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]	Tons	kW[2]	EER[3]	THR[4]	COPHR[5]
24	17.5	31.05	6.8	316,032	2.98															
26	18.4	31.19	7.1	327,038	3.07															
28	19.3	31.34	7.4	338,474	3.16															
30	20.2	31.50	7.7	350,349	3.26															
32	21.2	31.67	8.0	362,667	3.35	20.5	33.43	7.4	360,501	3.16										
34	22.2	31.84	8.4	375,439	3.45	21.5	33.59	7.7	372,874	3.25										
36	23.3	32.02	8.7	388,669	3.56	22.5	33.76	8.0	385,709	3.35	21.8	35.67	7.3	383,215	3.15					
38	24.4	32.20	9.1	402,366	3.66	23.6	33.93	8.3	399,013	3.44	22.8	35.82	7.6	396,095	3.24					
40	25.5	32.38	9.5	416,537	3.77	24.7	34.10	8.7	412,795	3.55	23.9	35.98	8.0	409,456	3.33	23.1	38.05	7.3	406,620	3.13
42	26.7	32.55	9.8	431,189	3.88	25.8	34.28	9.0	427,060	3.65	25.0	36.15	8.3	423,303	3.43	24.1	38.20	7.6	420,017	3.22
44	27.9	32.73	10.2	446,330	3.99	27.0	34.46	9.4	441,818	3.76	26.1	36.32	8.6	437,645	3.53	25.2	38.35	7.9	433,911	3.31
46	29.1	32.90	10.6	461,966	4.11	28.2	34.64	9.8	457,073	3.87	27.3	36.50	9.0	452,488	3.63	26.4	38.51	8.2	448,310	3.41
48	30.4	33.07	11.0	478,105	4.24	29.5	34.82	10.2	472,835	3.98	28.5	36.67	9.3	467,840	3.74	27.6	38.68	8.6	463,221	3.51
50	31.8	33.22	11.5	494,754	4.36	30.8	34.99	10.6	489,110	4.09	29.8	36.85	9.7	483,709	3.84	28.8	38.85	8.9	478,651	3.61
52	33.2	33.37	11.9	511,921	4.49	32.2	35.15	11.0	505,905	4.22	31.1	37.02	10.1	500,101	3.96	30.1	39.02	9.3	494,608	3.71
54	34.6	33.5	12.4	529,612	4.63	33.6	35.31	11.4	523,228	4.34	32.5	37.19	10.5	517,023	4.07	31.4	39.19	9.6	511,098	3.82
56	36.1	33.62	12.9	547,835	4.77	35.0	35.46	11.8	541,086	4.47	33.9	37.36	10.9	534,484	4.19	32.8	39.36	10.0	528,130	3.92
58	37.6	33.73	13.4	566,598	4.92	36.5	35.58	12.3	559,486	4.60	35.4	37.51	11.3	552,490	4.31	34.2	39.53	10.4	545,709	4.04
60	39.2	33.82	13.9	585,907	5.08	38.0	35.71	12.8	578,436	4.74	36.9	37.66	11.7	571,490	4.44	35.7	39.69	10.8	563,844	4.16
	140°F					145°F					150 °F					155°F				
30																				
32																				
34																				
36																				
38																				
40																				
42																				
44	24.3	40.58	7.2	430,717	3.11															
46	25.5	40.72	7.5	444,640	3.20	24.5	43.16	6.8	441,578	3.00										
48	26.6	40.87	7.8	459,077	3.29	25.6	43.28	7.1	455,510	3.08										
50	27.8	41.02	8.1	474,037	3.38	26.8	43.41	7.4	469,967	3.17										
52	29.1	41.18	8.5	489,526	3.48	28.0	43.54	7.7	484,957	3.26	27.0	46.14	7.0	481,000	3.05					
54	30.4	41.35	8.8	505,553	3.58	29.3	43.69	8.0	500,487	3.36	28.2	46.26	7.3	496,002	3.14					
56	31.7	41.51	9.2	522,123	3.68	30.6	43.84	8.4	516,564	3.45	29.4	46.38	7.6	511,553	3.23	28.3	49.17	6.9	507,192	3.02
58	33.1	41.68	9.5	539,244	3.79	31.9	43.99	8.7	533,195	3.55	30.7	46.51	7.9	527,662	3.32	29.5	49.27	7.2	522,746	3.11
60	34.5	41.84	9.9	556,924	3.90	33.3	44.15	9.1	550,388	3.65	32.1	46.65	8.3	544,336	3.42	30.9	49.38	7.5	538,868	3.20

Notes: **1.** All performance data is based on a 10°F chilled water temperature drop through the evaporator, and 10°F rise through the condenser. **2.** kW – Total Power Input in kWatts
3. EER – Energy Efficiency Ratio for COOL Mode (Btuh / Watts) **4.** THR – Total Heat Rejection for HEAT Mode (Btuh) **5.** COPHR - Coefficient of Performance for Heat reclaim

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