

**AQUA LOGIC'S MULTI-TEMP® and TITAN Series chiller and heat pumps**  
**MT- 1 thru MT- 8 and HP- 1 thru HP- 5**

**INSTALLATION & OPERATING INSTRUCTIONS**

Effective 8-2016

Thank you for purchasing an Aqua logic chiller and or heat pump. It has been designed and built to provide years of reliable, trouble-free service. It provides a precise water temperature control up to +/- 1.0°F (0.7°C) accuracy and features a continuous LCD display of the current fluid temperature.



**BEFORE INSTALLING THE CHILLER**  
**READ BOTH WARRANTY AND INSTALLATION INSTRUCTIONS.**

## Important: Unpacking your chiller or heat pump

This chiller was properly packed and accepted by the transportation company for shipment. It is the responsibility of the transportation company to deliver it to you in perfect condition.

### **APPARENT DAMAGE OR LOSS**

If, upon delivery, the shipping container or equipment indicates DAMAGE IN TRANSIT, such damaged goods should not be accepted until the transportation company's agent has noted on the freight bill, which he will give you, the nature and extent of the damage. If any part of this shipment is LOST IN TRANSIT, have the shortage noted on the freight bill by the agent.

### **CONCEALED DAMAGE**

If, when this equipment is unpacked, shipping damage is discovered which was not apparent upon delivery, notify the transportation company IMMEDIATELY to inspect the damaged equipment. The inspector is REQUIRED to provide you with a DAMAGE INSPECTION report.

**THIS INSPECTION MUST BE REQUESTED WITHIN FIFTEEN (15) DAYS OF DELIVERY. DO NOT MOVE DAMAGED SHIPMENTS FROM POINT OF DELIVERY. RETAIN ALL CONTAINERS AND PACKING FOR INSPECTION.**

Protect yourself. File your claim immediately with the transportation company! Remember, Aqua logic Inc. is not responsible for any damage after the carrier accepts a shipment. Claim for FULL VALUE REIMBURSEMENT should be made by you against the transportation company. Replacement of the damaged equipment should be requested by the purchaser as a new order.

### **WARNING!!!**

**THIS DEVICE USES HIGH VOLTAGE ELECTRICAL POWER FOR OPERATION.**

**SAFETY PRECAUTIONS MUST BE OBSERVED.**

**CAREFULLY READ AND OBSERVE THE FOLLOWING TO AVOID ELECTRICAL SHOCK  
OR SEVERE DAMAGE TO THE EQUIPMENT.**

- We recommend, as with all electrical equipment used in or around water, that you connect your electrical equipment to a ground-fault interrupt (GFI) protection circuit.
- **ALWAYS** turn the power off for the equipment at the source (circuit breaker) if there is any electrical problem, the electrical equipment or controller has been submerged in water.
- **ALWAYS** make sure that the electrical circuit you connect your electrical equipment to is rated at least 20% higher than the maximum current rating on the equipment.
- **ALWAYS** make sure that you operate the equipment at the correct voltage.
- Do **NOT** attempt to turn off the power at the chiller or controller if a problem occurs. Disconnect unit at the main power panel.

Do **NOT** attempt to repair equipment. Call Aqua Logic for instructions.

## Very Important!

1. Allow only qualified licensed personnel to supply electric power to chiller or heat pump. Installation must be done in accordance with local and national electrical code. Multi-Temp Chillers and Titan heat pumps need a fusible disconnect installed within five feet. The chiller or heat pump needs a dedicated power supply. **Do not** share the power feed to with any other peripheral devices such as pumps, ultraviolet light sterilizers, or filters. Interlock device prevents the chiller from energizing without the pump being on.
2. Double check electrical specifications on unit's electrical access cover plate making sure of voltage, amperage, phase, and cps before energizing. (**Do not** remove any covers with electrical power on.)
3. Some control packages include condenser fan cycling, and timed switches that delay certain functions on initial start-up. Consult Aqua Logic Inc. for exact details before attempting servicing.
4. **Fluid must flow through the chiller or heat pump at all times.** See specification sheet for minimum and maximum flow rates. Flow rates less than specification may result in evaporator freeze up and cracking PVC plastic evaporator shells. Aqua Logic Inc. does not warranty evaporator shells operating under low flow conditions.
5. Incoming water pressure to the inlet of the evaporator must not exceed 40 psi. Pressures over 40 psi may cause damage to the evaporator shells not covered under warranty.

## Installation Instructions:

Installation must proceed in accordance with national building and electrical codes by qualified technicians only.

The chiller or heat pump you have purchased uses Trane condensing units. Consult specification labels on condensing unit for particular details concerning electronic parts, electrical wiring, voltages, amperage, cps, and refrigerant type. These labels are on the backs of covers that require removal to view.

1. Place the chiller or heat pump in a well ventilated area with the condenser fins pointing toward prevailing winds, or source of fresh air intake. Ambient air temperature must never exceed 110° sustained.
2. Aqua Logic Inc. recommends the chiller be mounted outdoors with a protective cover. Outdoor covers must be built allowing ample air flow on five sides.
3. If the chiller is to be located in a building, we recommend providing a source of fresh air such as a hole in an outside wall the size of the condenser fins. Position heat pump within 4' of the air source. Duct and seal condenser fins to outside air if possible.
4. If the chiller must be inside a building without access to outside air, locate unit at least 3' from any single wall and 4' to 6' from any adjacent wall. Locate in such a way as to prevent air recycling. Recycled air may not provide condenser with adequate heat exchange.

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- 5. The evaporator located under the condensing unit, has 2" PVC slip connections on both inlet and outlet. Make sure that inlet and outlet flow is followed if designated.

## Safety Precautions

- 1. Always wear safety eye wear and work gloves when installing equipment.
- 2. Never assume electrical power is disconnected. Disconnect and check with meter.
- 3. Keep hands out of fan areas when power is connected to equipment.
- 4. R-410a escaping into the air can cause frost-bite burns.
- 5. R-410a is toxic when burned.

## Very Important!

- 1. Before making power available to the chiller, check to see if all fan blades can spin freely. Shipping may have caused fan blades to not turn freely. If this is the case, do not apply power until repaired!
- 2. Fluid must flow through the chiller or heat pump at all times. See specifications sheet for minimum and maximum flow rates. Flow rates under specifications may result in evaporator freeze up and cracking PVC plastic evaporator shells.
- 3. Double check specifications on condensing unit making sure of voltage, amperage, phase, and hertz before energizing.
- 4. Some control packages include condenser fan cycling, and timed switches that delay certain functions on initial start-up. Please consult Aqua Logic Inc. if necessary for exact details of your particular unit.

## Initial Start-up: Read all of the instructions before energizing unit.

**Caution:** It's important to allow the oil in the compressor(s) to warm-up at least 8 hours before starting up the unit. If the ambient air temperature is below 60°F, apply power to the unit and set controller so the compressor(s) do not energize or by-pass the heat exchanger water supply so the flow switch will not activate the unit.

Adjust temperature set point to desired water temperature. When the thermostat calls for cooling, a delay timer will start the system after 3 minutes. The chiller will pull the water temperature down to the set point, and shut the unit down. When the water temperature

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rises above the differential setting, the chiller will repeat the delay cycle and cool down to temperature set point.

## Very Important!

1. Target fluid temperature is limited to a range of 40° F to 80° F on all standard MultiTemp Chillers. Without special factory installed equipment, possible damage to the unit can occur when attempting to access fluid temperatures outside this range. Aqua Logic, Inc.'s warranty does not apply to application temperatures under 40°F or above 80° F without special factory modifications.
2. Water going to the chiller should be protected by filters to keep debris from collecting in the evaporator shells. Clogged shells lead to heat exchange problems and will void the warranty.
3. Improperly installed or out of adjustment rapid sand filters or fluidized beds can put sand into the stream of water flowing into the chiller. This condition is similar to "sand blasting" and may abrade holes in plumbing lines or the titanium coils. Conditions like these would void the Aqua Logic, Inc. warranty.

### **40° F to 80° F Fluid Temperature Applications**

Wetted parts contain titanium, PVC plastic, rubber, and polymer. These materials are non-reactive with fresh and salt water. You must consult with Aqua Logic, Inc. if any other fluids are to be pumped through the chiller.

If humid or wet conditions exist where chiller is to be located, care must be taken to prevent water from getting on electrical components. Fins on condensing unit are made from aluminum and are subject to rapid corrosion, especially near sea water. Fins are thin to aid in heat exchange. Bent fins reduce efficiency and just brushing up against them can bend them over. Heat pumps should be located away from high traffic areas.

The chiller operates by virtue of a thermostat that senses water temperature inside the probe well. When the temperature set point is satisfied, the supply of refrigerant to the evaporator is stopped. This initiates a pump down, and the compressor shuts off. When the thermostat calls for cooling, the supply of refrigerant is re-established to the evaporator, but the system has a time delay of approximately 3 or 5 minutes before the compressor goes on again.

## **Multi-Temp Chiller Temperature Controller Set-up**

This digital controller has been pre-programmed with all the necessary parameters to ensure reliable service and operation. The controller is pre-set from the factory with a temperature range from 30 °F to 100 °F with a display resolution of 1 degree °F and with a 1 °F temperature differential.

### **Temperature Controller Setpoint Set-up**

To modify the set point\* temperature. Press and release the "SET" button. SP will be displayed. Press the "SET" button again and the pre-programmed set point temperature will be displayed. Press the up arrow ▲ to increase or the down arrow ▼ to decrease the set point.

Once the desired set point value has been selected, do not touch any of the keys for 1 minute or press the "SET" and the "DOWN" ▼ arrow at the same time. The control will then revert to displaying the current water temperature, but will now control the water temperature to the desired set point.



This indicates that the chiller or heater should be energized.



### **Temperature Differential:**

When the water has reached the set point temperature, the chiller will switch off and will not switch back on until the water temperature has changed by 1 °F. This value is known as the temperature differential between on and off cycles. Refer to the temperature control parameters table to change the settings.

### **Display Calibration and Program Parameters**

If the displayed water temperature on the control is different from the system water temperature, than an adjustment to the control can be done. The easiest way to calibrate the control is to press and hold the "Set" button for 8 seconds. The parameter "O" will be displayed. Wait 4 seconds. Then press the "SET" button and the "SP" will be displayed. Use the down ▼ or up ▲ arrow until you see the menu parameter "P1". Then press the "SET" button one time. The display will show "0". Press the up or down arrows to adjust to the temperature offset. Once you have set the correct temperature offset, press "SET" button one more time and then wait 1 minute or press the "SET" and the "DOWN" ▼ arrow buttons at the same time to quit the programming. The display should return to the water temperature. The display should read correct water temperature readout.

See page 7 "DC SINGLE STAGE TEMPERATURE CONTROL PROGRAMMABLE PARAMETERS TABLE" to change other settings

To adjust other parameters in the control contact Aqua Logic, Inc. for help.  
PH: 858.292.4773 or email: [info@aqualogicinc.com](mailto:info@aqualogicinc.com)

## DC-24S SINGLE STAGE TEMPERATURE CONTROL PROGRAMMABLE PARAMETERS TABLE

| Parr. | Description                       | Units   | Range                          | Factory Settings | Note Change |
|-------|-----------------------------------|---------|--------------------------------|------------------|-------------|
| 1     | SP1 Set Point                     | Degrees | r1 to r6                       | 75               |             |
| 2     | r0 Differential / Hysteresis      | Degrees | 1 to 20°                       | 1                |             |
| 3     | r1 Lower value set point          | Degrees | -50 to 150 °C<br>-50 to 302 °F | 30°F             |             |
| 4     | r2 Higher value set point         | Degrees | -50 to 150 °C<br>-50 to 302 °F | 100°F            |             |
| 5     | d0 Heating or Cooling             | Option  | Ht or Co                       | Co               |             |
| 6     | d2 Time for Defrosting            | Minutes | 0 to 59                        | 0                |             |
| 7     | d8 Interval Time between Defrosts | Hours   | 0 to 24                        | 0                |             |
| 8     | c0 Min. time stop for compressor  | Minutes | 0 to 59                        | 0                |             |
| 9     | c1 Continuous cycle time          | Hours   | 0 to 24                        | 0                |             |
| 10    | c2 On time of fault cycle         | Minutes | 0 to 99                        | 0                |             |
| 11    | c3 Off time of fault cycle        | Minutes | 0 to 99                        | 0                |             |
| 12    | P0 Temperature scale selection    | Option  | °C / °F                        | F                |             |
| 13    | P1 Ambient Probe Adjustment       | Degrees | -10 to 10°                     | 0                |             |
| 14    | H5 Parameter Access Code          | Number  | 0 to 99                        | 0                |             |
| 15    | H6 Probe input type               | Option  | Ptc / Ntc                      | Ptc              |             |
| 16    | t0 Max. temperature on display    | Degrees | -50 to 150 °C<br>-50 to 302 °F | 100°F            |             |

### PARAMETER DESCRIPTIONS

**SP = Set Point.** Temperature desired to regulate the machine. Can vary from r1 to r2.

**r0 = Differential. Heating:** If temperature is  $\geq$  SP then output is OFF. If temperature is  $<$  SP - r0 then output is ON. **Cooling:** If temperature is  $\geq$  SP + r0 then output is ON. If temperature is  $<$  SP then output is OFF.

**r1 = Lower Set Point Limit.**

**r2 = Upper Set Point Limit.**

**d0 = Heat or Cooling Control.** Ht = heating control, Co = cooling control.

**d2 = Not used**

**d8 = Not used.**

**c0 = Minimum Time for Compressor to be OFF.** Minimum time for the compressor to stop until it can start again.

**c1 = Continuous Cycle Time.** The remaining time for a continuous cooling cycle.

**c2 = ON Time** of fault cycle, during probe error.

**c3 = OFF Time** of fault cycle, during probe error.

**P0** = Selection of Engineering units between F and C.

**P1 = Ambient Probe Calibration.** Offsets temperature in degrees to adjust the ambient probe.

**H5 = Access Code to Parameters.** Factory-set to 0.

**H6 = Selection of Input Probe Type:** PTC or NTC.

**t0 = Temperature Display Limit.** Maximum temperature shown on the display, although the real temperature can be greater.

### OPERATION IN CASE OF ERROR

If the probe or thermostat memory should fail, the chiller or heater will turn off.

### Error Messages

In normal operation, the probe temperature will be shown. In case of alarm press the "SET" and the "DOWN" ▼ arrow buttons at the same time to quit the alarm. An error messages will be shown:

- **Er** – Memory error
- **--** Shorted –circuited probe error
- **oo**– Open probe

## **Titan Heat Pump Temperature Controller Set-up**

This digital controller has been pre-programmed with all the necessary parameters to ensure reliable service and operation. The controller is pre-set from the factory with a temperature range from 30 °F to 100 °F with a display resolution of 1 degree °F and with a 1 °F temperature differential.

### **Temperature Controller Setpoint Set-up**

**Note: Always have the chiller set point (Out1) equal or higher than the heater (Out2) set point. DO NOT OVERLAP THESE SET POINTS**

### **To modify the Set Points SP1 and SP2.**

Press the "SET" button. OUT1 LED and out1 set value will flash on the display.  
Modify the out1 set point value using up arrow ▲ to increase or the down arrow ▼ to decrease the set point.

Press the SET button to store the out1 set point value and advance to out2 set point value.

Modify the out2 set point value using up arrow ▲ to increase or the down arrow ▼ to decrease the set point.

Press the SET button to store the value and return to home screen.  
OUT1 Indicates that the chiller and the OUT2 is the heater is energized.



### **Operation Modes**

When in the cooling mode (Out1) the water temperature needs to go above the set point by one degree for it to activate the chiller. It will turn off once the water temperature has reached set point.

In the heating mode (Out2) the water temperature has to go down below the set point by one degree to activate the heater. It will turn off once the water temperature has reached the set point.

### **Temperature Differential:**

When the water has reached the set point temperature, the chiller or heater will switch off and will not switch back on until the water temperature has changed by 1 °F. This value is known as the temperature differential between on and off cycles. Refer to the temperature control parameters table to change the settings.

### **Display Calibration and Program Parameters**

If the displayed water temperature on the control is different from the system water temperature, than an adjustment to the control can be done. The easiest way to calibrate the control is to press and hold the "Set" button for 8 seconds. The parameter "O" will be displayed. Wait 4 seconds. Then press the "SET" button and the "SP1" will be displayed. Use the down ▼ or up ▲ arrow until you see the menu parameter "P1". Then press the "SET" button one time. The display will show "0". Press the up or down arrows to adjust to the temperature offset. Once you have set the correct temperature offset, press "SET" button one more time and then wait 1 minute or press the "SET" and the "DOWN" ▼ arrow buttons at the same time to quit the programming. The display should return to the water temperature. The display should read correct water temperature readout.

See page 9 "TEMPERATURE CONTROL PROGRAMMABLE PARAMETERS TABLE" to change other settings

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## DC-24D TEMPERATURE CONTROL PROGRAMMABLE PARAMETERS TABLE

| Parr | Description                    | Units   | Range         | Def. Set | Note |
|------|--------------------------------|---------|---------------|----------|------|
| SP1  | Set Point 1 out1 (CHILLER)     | Degrees | r4 to r6      | 75       |      |
| SP2  | Set Point 2 out2 (HEATER)      | Degrees | r5 to r7      | 75       |      |
| r0   | Dependency SP1 – SP2           | Range   | ind / dep     | ind      |      |
| r1   | Differential for SP1           | Degrees | 0.1 to 20     | 1        |      |
| r2   | Differential for SP2           | Degrees | 0.1 to 20     | 1        |      |
| r3   | Band differential              | Degrees | 0.1 to 20     | 1        |      |
| r4   | Lower value for SP1            | Degrees | -99 to r6     | 30       |      |
| r5   | Lower value for SP2            | Degrees | -99 to r7     | 30       |      |
| r6   | Higher value for SP1           | Degrees | r4 to 302     | 100      |      |
| r7   | Higher value for SP2           | Degrees | r5 to 302     | 100      |      |
| r8   | Regulation or operating mode   | Range   | On1/On2/nEU   | on1      |      |
| A0   | Alarm differential             | Degrees | 0.1 to 20     | 1        |      |
| A1   | Maximum alarm probe 1          | Degrees | 0.1 to 99     | 100      |      |
| A2   | Maximum alarm probe 2          | Degrees | 0.1 to 99     | -        |      |
| A3   | Minimum alarm probe 1          | Degrees | 0.1 to 99     | 35       |      |
| A5   | Alarm verification time        | h-m     | 0.0 to 18     | 1        |      |
| A4   | Minimum alarm probe 2          | Degrees | 0.1 to 99     | -        |      |
| A6   | Alarm probe 1 selection        | Range   | AHL/Ano/AH/AL | AHL      |      |
| A7   | Alarm probe 2 selection        | Range   | AHL/Ano/AH/AL | Ano      |      |
| c0   | Minimum relay stop time        | Minutes | 0 to 240      | 0        |      |
| c1   | Operation relay 1              | Range   | dir/inv       | Inv      |      |
| c2   | Operation relay 2              | Range   | dir/inv       | Dir      |      |
| c3   | Default relay 1                | Range   | Opn/Clo       | Opn      |      |
| c4   | Default relay 2                | Range   | Opn/Clo       | Opn      |      |
| P0   | Temperature scale selection    | Range   | °C / °F       | F        |      |
| P1   | Calibration water probe 1      | Degrees | -20 to 20     | 0        |      |
| P2   | Calibration water probe 2      | Degrees | -20 to 20     | 0        |      |
| P3   | Decimal Point                  | Option  | no / yes      | yes      |      |
| P4   | Probe displayed                | Option  | sd1/sd2       | sd1      |      |
| P5   | Number of probes               | Option  | 1 / 2         | 1        |      |
| H0   | Factory reset values           | Option  | 0             | 0        |      |
| H1   | Keyboard protection            | Option  | no / yes      | no       |      |
| H2   | Operation led OUT1             | Option  | dir/inv       | dir      |      |
| H3   | Operation led OUT2             | Option  | dir/inv       | dir      |      |
| H4   | Address for serial communicate | Range   | 0 to 999      | 0        |      |
| H5   | Access code to parameters      | Range   | 0 to 999      | 0        |      |
| H6   | Probe Type                     | Option  | PTC / NTC     | PTC      |      |

### Error Messages

In normal operation, the probe temperature will be shown. In case of alarm press the “SET” and the “DOWN” ▼ arrow buttons at the same time to quit the alarm. An error messages will be shown:

- **Err** – Memory error.
- **Erp** – Error of probe not shown on display.
- **AH1** – Maximum temperature alarm.
- **AL1** – Minimum temperature alarm.
- -- Shorted –circuited probe error
- **oo**– Open probe

### OPERATION IN CASE OF ERROR

If the probe or thermostat memory should fail, the heat pump will turn off.

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## Chiller / Heat Pump Maintenance

### Heat Exchanger Cleaning:

The heat exchanger should be cleaned approximately every 12 months or as needed to allow proper performance. On some models this process may be done without removal of the heat exchanger shell. (i.e., water flushing system)

**WARNING:**

When using bleach and acid special care should be observed.  
Always wear hand, eye and body protection. Use rubber gloves.

**DO** pour acid or bleach into the water. **DO NOT** pour water into acid or bleach solution.  
**DO NOT** perform acid and bleach flushing at the same time. The gas generated by the mixture is poisonous and can result in serious injury or death.

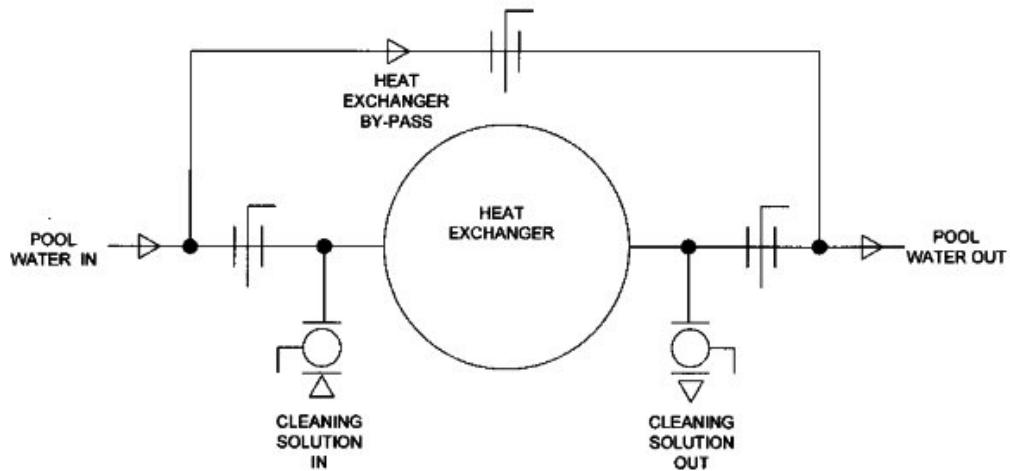
#### To remove organic deposits from titanium tube bundle without removing the shell:

1. Isolate the heat exchanger. (see drawing next page)
2. Mix 1 part bleach to 3 parts distilled water in 20 gallon tank or larger container.
3. Circulate via pump the solution through heat exchanger for approximately one to two hours or as needed.
4. Thoroughly rinse heat exchanger with clean water.

#### To remove mineral deposits from titanium tube bundle:

Use the same steps as above, but use muriatic acid instead of bleach. Be sure to follow the muriatic acid manufacturer's instructions for use and safety.

## Heat exchanger by-pass plumbing



### Condensing unit maintenance:

The condensing unit should be cleaned approximately every 12 months or as needed to allow proper performance.

**Note:** If located near the ocean, every 6 months a fresh water wash down of the condenser fins should be done to prolong the life of the chiller or heat pump.

1. Clean and inspect the condenser coil for dirt and debris built-up.(If dirty, use compressed air or a pressure washer to clean)
2. Visually inspect connecting refrigerant lines and coils for evidence of oil leaks. (If there is oil residue you may have a refrigerant leak. Call your local HVAC tech)
3. Check wiring for loose connections.



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## CHILLER AND HEAT PUMP PACKAGES LIMITED WARRANTY TERMS

(PLEASE READ CAREFULLY):

Effective 3 / 2015

### Limited Warranty

Aqua Logic, Inc. packaged water chiller and heat pumps have a **one (1) year** parts and **90 day** labor warranty. Heat exchanger (evaporator) has a **one (1)** year parts only warranty.

**An extended condensing unit only five year parts and labor warranty is available for an additional charge. This must be added at the time of purchase.**

The limited warranty covers only the parts and labor based upon Aqua Logic service cost and Aqua Logic is not liable for field repair work without prior written or verbal agreement with Repair Authorization (RA) number with a fixed maximum charge.

The warranty applies only to the original purchaser and is not transferable.

The warranty covers only the repair or replacement of Aqua Logic products and is limited to Aqua Logic's cost of defective parts.

Once Aqua Logic determines that the defect is due to parts or workmanship and that the product is under warranty, Aqua logic will repair or replace the product solely at their discretion.

### Our warranty does not include the following:

- Damage caused by freezing, inadequate or no water flow.
- Damage caused by improper installation or maintenance by user or their agent.
- Damage caused due to misapplication of the product.
- Damage caused by corrosion, abuse, accident, alteration or improper use.
- Damage caused by flood, fire, earthquake, tornado or other acts of God.
- Damage caused by electrical spikes, surges, brownouts or improper voltage or amperage.
- Damage caused by failure of any third party equipment (ie., controller, pump, etc.)
- Incidental damage to other equipment, property or livestock.
- Damage caused by a contractor in the field with poor installation technique ie., incorrect plumbing size between other equipment.

In the event of a defect or failure of the product, immediately contact Aqua logic for assistance. Aqua Logic will at their discretion:

- Provide user-replaceable parts to restore the unit to proper operation.
- Provide a Repair Authorization (RA) number with a specified dollar limit for a qualified technician to provide a field repair.
- Provide a Return Authorization (RA) number to return the unit with prepaid freight in wood crate that fully protects the unit from damage to: Aqua Logic, Inc., 9558 Camino Ruiz, San Diego, CA 92126
- Include the serial number as well as proof of purchase and /or a copy of the original bill of sale along with the RA number. COD shipments will be refused

## **Chiller / Heat Pump Start-up**

|                          |  |
|--------------------------|--|
| Job Name                 |  |
| Date                     |  |
| Model No.                |  |
| Serial No.               |  |
| Unit Run Volts / phase   |  |
| Unit Run Amps            |  |
| Water flow rate (GPM)    |  |
| Incoming Water Temp (°F) |  |
| Freon Suction (PSI)      |  |
| Freon Liquid (PSI)       |  |
| Superheat °F             |  |

### **Start-up procedure:**

**Caution:** It's important to allow the oil in the compressor(s) to warm-up at least 8 hours before starting up the unit. If the ambient air temperature is below 60°F, apply power to the unit and set controller so the compressor(s) do not energize or by-pass the heat exchanger water supply so the flow switch will not activate the unit.

1. Remove the cover of the unit. (If applicable)
2. Attach refrigeration suction and liquid hoses and an Amp / Volt meter to the unit.
3. Turn on water pump to heat exchanger. Note: (Make sure water flow rate is within published rate of the chiller.)
4. Adjust the controller below the indicated water temperature to turn on the unit. (After 2-5 minutes the compressor should activate.)
5. Once the compressor(s) are running for approximately 15 minutes, record the information that's listed above.
6. For Heat Pumps, cycle the unit from chilling to heating to make sure the reversing valve is functioning.

Comments:

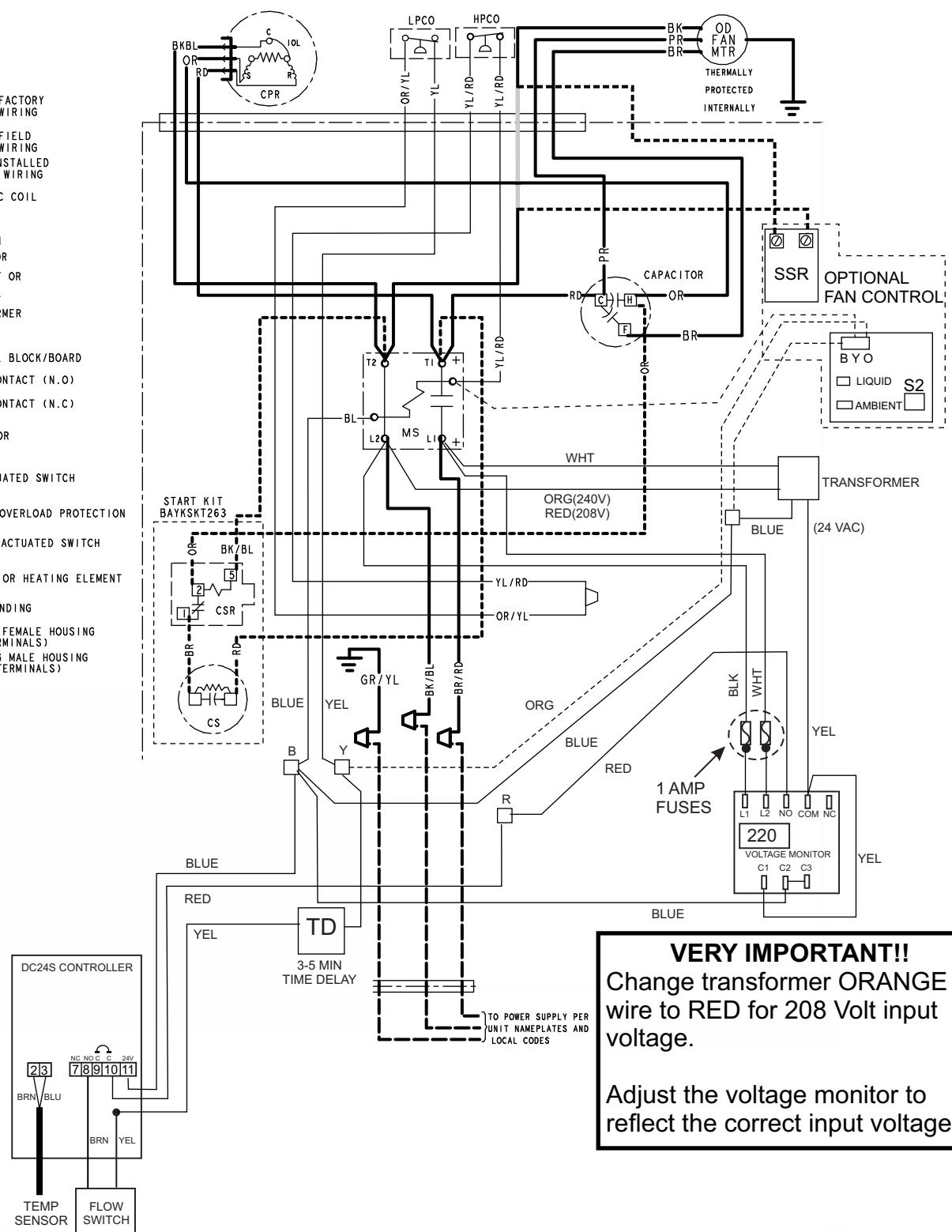
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## WIRING FOR CHILLER MODELS: MT-1.5 (1.5 HP), MT-1(2HP), MT-3 (3 HP), MT-5 (4HP) AND MT-7(5 HP) TRANE UNITS 208-240V 1PH

5/2017

### LEGEND

- 24 V LINE V FACTORY WIRING
- - - 24 V LINE V FIELD WIRING
- - - FIELD INSTALLED FACTORY WIRING
- ~ MAGNETIC COIL
- GROUND
- JUNCTION CAPACITOR
- △ WIRE NUT OR TERMINAL
- TRANSFORMER
- FUSE
- TERMINAL BLOCK/BOARD
- - - RELAY CONTACT (N.O.)
- - - RELAY CONTACT (N.C.)
- THERMISTOR
- TEMP ACTUATED SWITCH
- INTERNAL OVERLOAD PROTECTION
- PRESSURE ACTUATED SWITCH
- RESISTER OR HEATING ELEMENT
- MOTOR WINDING
- [1 2 3] POL. PLUG FEMALE HOUSING (MALE TERMINALS)
- [1 2 3] POL. PLUG MALE HOUSING (FEMALE TERMINALS)





DSP  
Digital  
Single  
Phase

## Motor Protector / Power Monitor Installation and Operation Instructions

### OVERVIEW:

The DSP-1 Line Voltage Monitor provides continuous monitoring of the power and control signals used to operate any single phase load. Protected devices can include motors, pumps, fans, compressors and other devices.

The DSP-1 protects these devices by keeping a constant watch over the supplied voltage, and when the voltage goes outside of a voltage and tolerance that you select, the DSP-1 opens its control relay.

The time required to respond to the out-of-tolerance conditions is user adjustable and may be set to short times for sensitive devices or longer times to help eliminate nuisance tripping.

When the DSP-1's relay opens, the delay timer starts. This timer keeps track of the time since the output was turned off and prevents the protected equipment from restarting too soon. The delay is also user adjustable. It is particularly useful for the protection of compressors, where an attempted rapid restart can cause a stalled condition and motor burnout.

### INSTALLATION:

Installation of the DSP-1 is simple and straightforward.

#### DISCONNECT ALL POWER BEFORE STARTING THE INSTALLATION OF THE DSP-1

### MOUNTING:

Select a cool, dry location for the mounting of the DSP-1. Keep in mind that the front of the unit has the operator controls and the digital display. The front of the DSP-1 should be clear of obstructions and allow easy access to the control buttons. A suitable location may be in the control enclosure, near the motor starter or compressor contactor.

The DSP-1 should be mounted on a metal surface with two #8 sheet metal screws.

### WIRING:

If the voltage being monitored is tapped from a high current source, branch circuit protection (fuse or circuit breaker) as described in the National Electric Code should be provided. Since the current drawn by the DSP-1 is a fraction of an Amp, the branch protection can be selected for the wire type used. Typically, a fuse rated at 1 Amp will provide the required protection.

### PINOUT DESCRIPTION

#### L1 & L2

Connect the voltage being monitored to the DSP-1's L1 and L2 terminals. This voltage will also power the DSP-1 and should come from a

source such as the line side of the contactor being controlled.

#### NC, NO and COM

These terminals connect to the relay output. The relay closes when the line voltage is within the selected tolerance, the control voltage is on and the delay timer has expired. Typically you would connect the COM and NO terminals in series with the control circuit, motor starter or contactor coil.

#### C1, C2 and C3

Connect a control voltage to C1 and C2. The DSP-1 responds to voltage between 18 and 250 Volts and draws only a fraction of an Amp. To allow the use of a 24 Volt thermostat an internal anticipator load is provided by connecting C2 to C3. Be sure to only connect C3 for 24 Volt or lower operation.

### SETUP

After completing the installation, Apply power to the system. The DSP-1's display will show the incoming line voltage. The OVER or UNDER indicators may also be visible depending on the factory versus your incoming line voltage.

Pressing the SELECT button will sequence the display through the following parameters:

VOLTAGE SET POINT  
TOLERANCE SET POINT  
RESPONSE TIME  
DELAY TIME  
(BACK TO THE LINE VOLTAGE DISPLAY)

The DSP-1's  
LCD DISPLAY

|       |       |     |
|-------|-------|-----|
| OVER  | UNDER | MEM |
| 888   | .     | %   |
| VAC   |       |     |
| RESP. |       |     |
| DELAY |       |     |

If you press SELECT and do not change a parameter by pressing the up or down arrow keys, the DSP-1 automatically returns to displaying the line voltage in 7 seconds.

To set the desired voltage range press the SELECT button once. The VAC indicator will flash, (indicating that you are in the set voltage mode). Press the up or down arrows to change the setting to the voltage range that you desire. You may press and hold the up or down keys to accelerate the setting of any parameter.

## SETUP CONTINUED

To set the desired line voltage tolerance (in percent) press the SELECT button a second time. The % indicator will flash (indicating that you are in the set tolerance mode).

Press the up or down arrows to change the setting to the tolerance range that you desire.

To set the desired delay time (in seconds) press the SELECT button a third time. The DELAY indicator will flash (indicating that you are in the set delay time mode).

Press the up or down arrows to change the setting to the response time that you desire.

To set the desired response time (in seconds and tenths of seconds) press the SELECT button a fourth time. The RESP indicator will flash (indicating that you are in the set response time mode).

Press the up or down arrows to change the setting to the response time that you desire.

The new settings are saved in permanent memory when the display returns to displaying the line voltage. The new settings may be verified by pressing the select button to sequence through the various parameters.

## OPERATION WITHOUT A CONNECTION TO THE CONTROL INPUT

To enable operation of the DSP-1 without control voltage connected to the input, a special sequence of key presses is required.

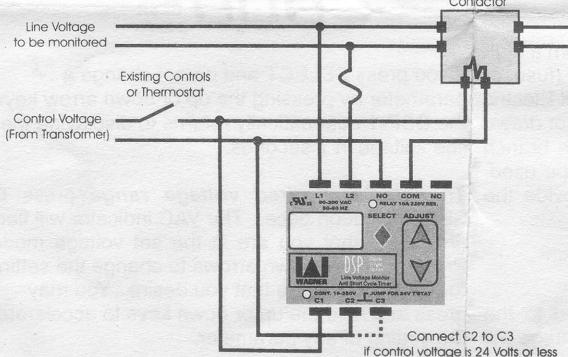
To turn on the control bypass press and hold the UP arrow key then also press the SELECT key. The control LED will begin to blink twice. This double blink is the indication that the control input is bypassed.

To turn off the control bypass simply press and hold the DOWN key then also press the SELECT key. The control LED will stop blinking or just blink once if a control voltage is present.

## SPECIFICATIONS

- ✓ Operating Voltage: 90 to 300 Volts
- ✓ Voltmeter Range: 70 to 325 Volts
- ✓ Tolerance Limits: 6 to 18%
- ✓ Hysteresis 3% of selected operating voltage
- ✓ Response Timer: 0.1 to 10 seconds
- ✓ Delay Timer: 1 to 720 seconds
- ✓ Output Relay: 10 Amps, 250 VAC resistive, single-pole/double-throw
- ✓ Control Input: 18 to 250 VAC with anticipator load for 24 volt thermostats

## Typical Wiring Diagram



## OPERATIONAL CHARACTERISTICS

When presented with a voltage of 70 volts or lower, the DSP1 displays "Lo", the output relay is turned off, the delay timer is started and the response timer is disabled. Only when the voltage returns to normal and the delay time has elapsed is the relay allowed to energize.

When the DSP1 is presented with a voltage higher than 324 volts the display will indicate OVER 325 and the control LED will go out. The display will flash over 325 until the voltage returns to 324 volts or less. Note: Any voltage over 324 volts is treated as an overvoltage condition regardless of the voltage or tolerance settings.

To prevent tripping on a 1 volt change, the DSP1 automatically calculates cut-out and cut-in voltages for both overvoltage and undervoltage. The cut-out voltage is always based on the user voltage and tolerance settings, while the cut-in voltage is 3% closer to the nominal voltage setting. This quality is sometimes referred to as hysteresis.

You may test the display by pressing the UP & DOWN keys at the same time. Press SELECT to continue normal operation.

### Factory Settings:

208 volts  
12% tolerance  
2 second response  
30 second delay



**WAGNER**  
MANUFACTURING

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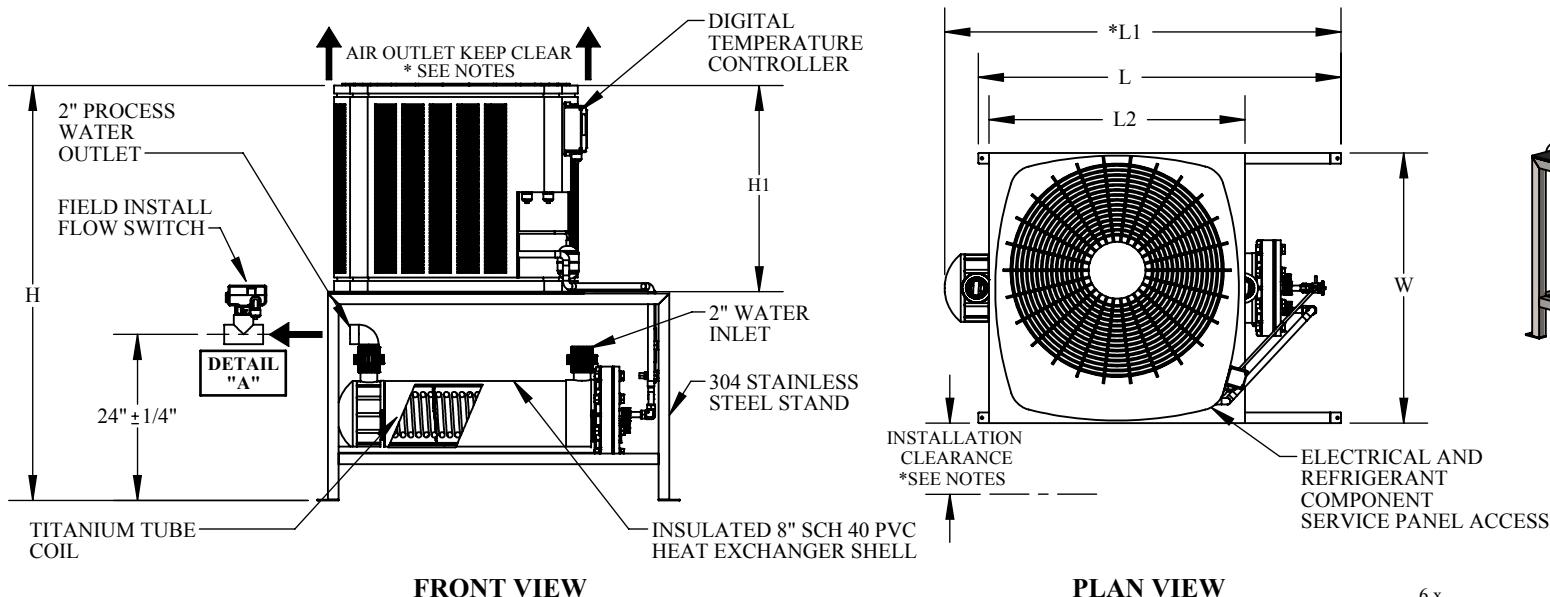
Designed in the USA

Assembled in China

DW006423-1

# MT-1 THRU MT-8 SPECIFICATION

FOR INDOOR OR OUTDOOR FRESH AND SALT  
WATER APPLICATIONS



| MULTI-TEMP WATER CHILLERS |                          |               |                |                       |                   |     |     |     |     |     |     |                        |
|---------------------------|--------------------------|---------------|----------------|-----------------------|-------------------|-----|-----|-----|-----|-----|-----|------------------------|
| MODEL NO.                 | NOMINAL TONS / BTUH / KW | VOLTS / PHASE | AMPS RLA / LRA | WATER FLOW RATE (GPM) | *AIR OUTLET (CFM) | H   | H1  | L   | *L1 | L2  | W   | SHIPPING WEIGHT (lbs.) |
| MT-1                      | 2 / 24K / 7              | 208 - 230 / 1 | 9 / 58         | 20 / 40               | 1550              | 59" | 29" | 44" | n/a | 31" | 33" | 370                    |
| MT-3                      | 3 / 36K / 10.5           | 208 - 230 / 1 | 14 / 72        | 20 / 40               | 2175              | 63" | 33" | 44" | n/a | 31" | 33" | 396                    |
| MT-4                      | 3 / 36K / 10.5           | 208 - 230 / 3 | 12 / 77        | 20 / 40               | 2175              | 66" | 37" | 44" | n/a | 31" | 33" | 386                    |
| MT-4-460                  | 3 / 36K / 10.5           | 460 / 3       | 6 / 35         | 20 / 40               | 2175              | 66" | 37" | 44" | n/a | 31" | 33" | 386                    |
| MT-5                      | 4 / 48K / 14             | 208 - 230 / 1 | 21 / 109       | 30 / 60               | 2500              | 59" | 29" | 51" | n/a | 36" | 38" | 474                    |
| MT-6                      | 4 / 48K / 14             | 208 - 230 / 3 | 15 / 91        | 30 / 60               | 2500              | 63" | 33" | 51" | n/a | 36" | 38" | 474                    |
| MT-6-460                  | 4 / 48K / 14             | 460 / 3       | 7 / 46         | 30 / 60               | 2500              | 63" | 33" | 51" | n/a | 36" | 38" | 474                    |
| MT-7                      | 5 / 60K / 17.5           | 208 - 230 / 1 | 27 / 158       | 30 / 60               | 3700              | 70" | 41" | 51" | 56" | 36" | 38" | 520                    |
| MT-8                      | 5 / 60K / 17.5           | 208 - 230 / 3 | 19 / 137       | 30 / 60               | 3700              | 70" | 41" | 51" | 56" | 36" | 38" | 528                    |
| MT-8-460                  | 5 / 60K / 17.5           | 460 / 3       | 9 / 52         | 30 / 60               | 3700              | 70" | 41" | 51" | 56" | 36" | 38" | 500                    |

\*NORMAL OPERATING AMBIENT AIR TEMPERATURE: 50°F - 115°F.

\*ADD LOW AMBIENT HEAD PRESSURE CONTROL FOR OPERATING IN AMBIENT AIR TEMPERATURES FROM 0°F TO 50°F.  
CONSULT AQUA LOGIC IF OPERATING AT TEMPERATURES OUTSIDE THESE RANGES.

\*ALL CONDENSING UNITS HAVE A 13 SEER RATING.

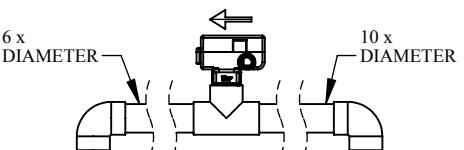
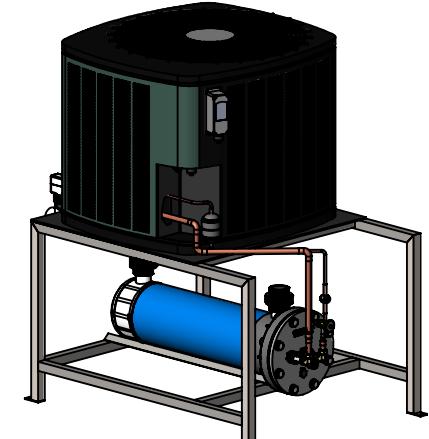
\*L1 DIMENSION ARE FOR MODELS MT-7 & MT-8 CHILLERS.

## NOTES:

- TOP DISCHARGE AREA SHOULD BE UNRESTRICTED FOR 60 INCHES MINIMUM.
- UNIT SHOULD BE PLACED SO ROOF RUN-OFF WATER DOES NOT POUR DIRECTLY ON UNIT.
- MINIMUM CLEARANCE FOR PROPER OPERATION IS 12 INCHES FROM WALLS, SHRUBBERY, FENCES, ETC.
- MINIMUM CLEARANCE BETWEEN ADJACENT UNITS IS 72 INCHES.
- ALL DIMENSIONS ARE APPROXIMATE AND CAN CHANGE AT ANY TIME.

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| DRAWING #      | SHEET TITLE                         |
|----------------|-------------------------------------|
| PDF-0052       | MULTI TEMP AIR COOLED WATER CHILLER |
| Arnaldo Guzman | MT-1 THRU MT-8 SPECIFICATIONS       |
| 2/8/2017       | 1:27                                |
| REVISION       | 1 OF 1                              |
| DATE           | SCALE                               |



## IMPORTANT!

### DETAIL "A"

FLOW SWITCH MUST BE FIELD INSTALLED  
HORIZONTALLY WITH NO LESS THAN 10  
TIMES THE DIAMETER OF STRAIGHT PIPE  
ON THE INLET SIDE AND NO LESS THAN 6  
TIMES THE DIAMETER ON THE OUTLET  
SIDE.

### OPTIONS:

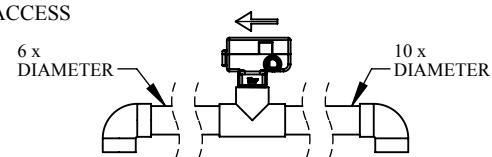
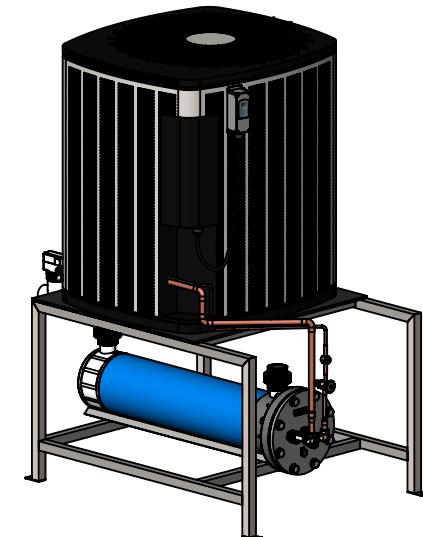
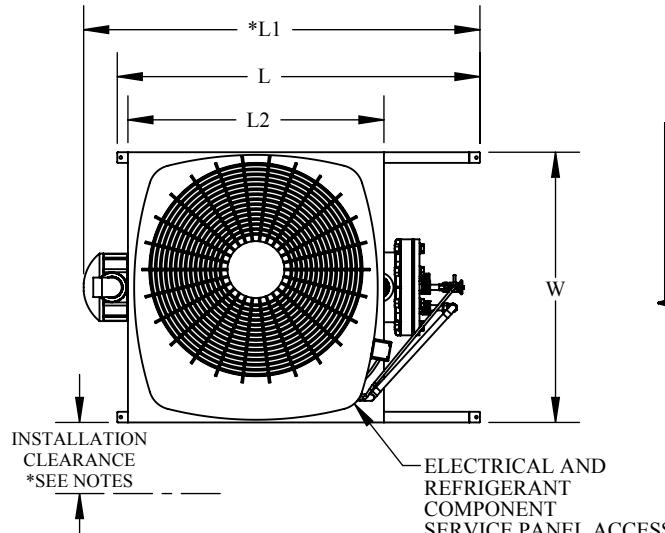
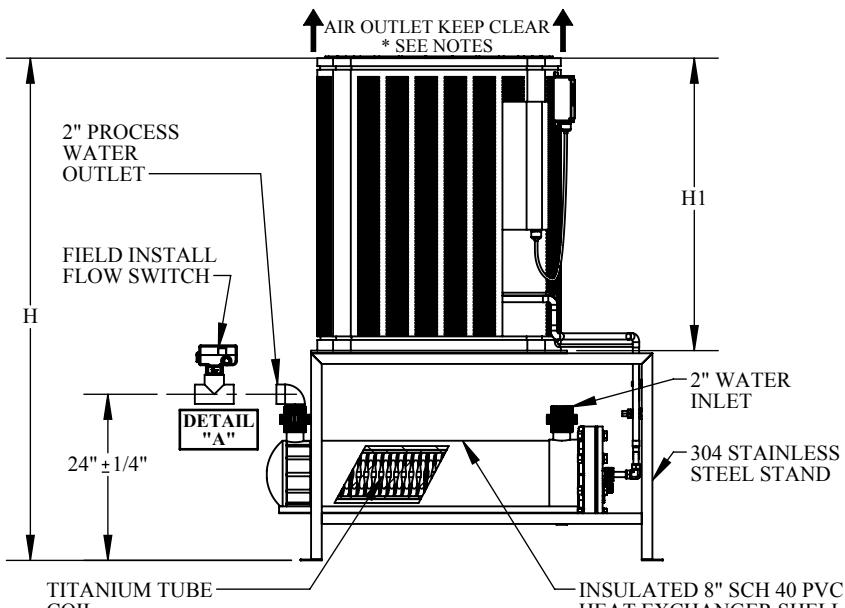
- SCH 80 SHELL CONSTRUCTION.
- 316 STAINLESS STEEL STAND AND HARDWARE.
- LOW AMBIENT HEAD PRESSURE CONTROL.
- COASTAL MARINE CONDENSER COATING.



9558 Camino Ruiz, San  
Diego, CA 92126

# HP-1 THRU HP-53 SPECIFICATION

FOR INDOOR OR OUTDOOR FRESH AND SALT  
WATER APPLICATIONS



## IMPORTANT! DETAIL "A"

- FLOW SWITCH MUST BE FIELD INSTALLED HORIZONTALLY WITH NO LESS THAN 10 TIMES THE DIAMETER OF STRAIGHT PIPE ON THE INLET SIDE AND NO LESS THAN 6 TIMES THE DIAMETER ON THE OUTLET SIDE.

## OPTIONS:

- SCH 80 SHELL CONSTRUCTION.
- 316 STAINLESS STEEL STAND AND HARDWARE.
- LOW AMBIENT HEAD PRESSURE CONTROL ON COOLING MODE ONLY.
- COASTAL MARINE CONDENSER COATING.

| TITAN HEAT PUMPS |                          |               |                |                       |                   |     |     |     |     |     |     |                        |
|------------------|--------------------------|---------------|----------------|-----------------------|-------------------|-----|-----|-----|-----|-----|-----|------------------------|
| MODEL NO.        | NOMINAL TONS / BTUH / KW | VOLTS / PHASE | AMPS RLA / LRA | WATER FLOW RATE (GPM) | *AIR OUTLET (CFM) | H   | H1  | L   | *L1 | L2  | W   | SHIPPING WEIGHT (LBS.) |
| HP-1             | 1.5 / 18K / 5.2          | 208-240 / 1   | 6 / 38         | 20 / 40               | 1550              | 59" | 29" | 44" | n/a | 31" | 33" | 406                    |
| HP-2             | 2 / 24K / 7              | 208-240 / 1   | 8.7 / 57       | 20 / 40               | 1550              | 63" | 33" | 44" | n/a | 31" | 33" | 389                    |
| HP-3             | 3 / 36K / 10.5           | 208-240 / 1   | 14 / 91        | 20 / 40               | 2175              | 63" | 33" | 51" | n/a | 36" | 38" | 500                    |
| HP-33            | 3 / 36K / 10.5           | 208-240 / 3   | 10.9 / 74      | 20 / 40               | 2175              | 63" | 33" | 51" | n/a | 36" | 38" | 495                    |
| HP-33-460        | 3 / 36K / 10.5           | 460 / 3       | 5.5 / 38       | 20 / 40               | 2175              | 63" | 33" | 51" | n/a | 36" | 38" | 495                    |
| HP-4             | 4 / 48K / 14             | 208-240 / 1   | 18.6 / 94      | 30 / 60               | 2500              | 67" | 37" | 51" | n/a | 36" | 38" | 518                    |
| HP-43            | 4 / 48K / 14             | 208-240 / 3   | 13.7 / 101     | 30 / 60               | 2500              | 67" | 37" | 51" | n/a | 36" | 38" | 515                    |
| HP-43-460        | 4 / 48K / 14             | 460 / 3       | 7.1 / 51       | 30 / 60               | 2500              | 67" | 37" | 51" | n/a | 36" | 38" | 515                    |
| HP-5             | 5 / 60K / 17.5           | 208-240 / 1   | 25 / 148       | 30 / 60               | 3700              | 75" | 45" | 51" | 56" | 36" | 38" | 553                    |
| HP-53            | 5 / 60K / 17.5           | 208-240 / 3   | 18.6 / 139     | 30 / 60               | 3700              | 75" | 45" | 51" | 56" | 36" | 38" | 538                    |
| HP-53-460        | 5 / 60K / 17.5           | 460 / 3       | 9 / 71         | 30 / 60               | 3700              | 75" | 45" | 51" | 56" | 36" | 38" | 538                    |

\*NORMAL OPERATING AMBIENT AIR TEMPERATURE: 50°F - 115°F.

\*ADD LOW AMBIENT HEAD PRESSURE CONTROL FOR OPERATING IN AMBIENT AIR TEMPERATURES FROM 0°F TO 50°F.

CONSULT AQUA LOGIC IF OPERATING AT TEMPERATURES OUTSIDE THESE RANGES.

\*ALL CONDENSING UNITS HAVE A 14 SEER RATING.

\*L1 DIMENSION ARE FOR MODELS HP-5 & HP-53 CHILLERS.

### \*NOTES:

- TOP DISCHARGE AREA SHOULD BE UNRESTRICTED FOR 60 INCHES MINIMUM.
- UNIT SHOULD BE PLACED SO ROOF RUN-OFF WATER DOES NOT POUR DIRECTLY ON UNIT.
- RECOMMENDED CLEARANCE FOR PROPER OPERATION AND MAINTENANCE IS 24" FROM WALLS, SHRUBBERY, FENCES, ETC.
- MINIMUM CLEARANCE BETWEEN ADJACENT UNITS IS 72 INCHES.
- ALL DIMENSIONS ARE APPROXIMATE AND CAN CHANGE AT ANY TIME.

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| DESCRIPTION                |            | SHEET TITLE                       |        |
|----------------------------|------------|-----------------------------------|--------|
| TITAN HEAT PUMP AIR COOLED |            | HP-1 THRU HP-53<br>SPECIFICATIONS |        |
| DRAWN BY                   | DATE       | REVISION                          | SCALE  |
| Arnaldo Guzman             | 11/13/2015 | 1:27                              | 1 OF 1 |