AQUA LOGIC'S MULTI-TEMP® and Titan water-cooled Series chiller and heat pumps 230V 1ø

INSTALLATION & OPERATING INSTRUCTIONS

Effective 6-20

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 LED display of the current fluid temperature.



Models:
MT-1-WC thru MT-8-WC
HP-3-WC thru HP-5-WC



Models:
MT-4-WCV thru MT-8-WCV
MT-9-WCV thru MT-20-WC-460
HP-3-WCV thru HP-5-WCV
HP-6-WC thru HP-20-WC

BEFORE INSTALLING THE CHILLER

READ BOTH WARRANTY AND INSTALLATION INSTRUCTIONS.

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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.

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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 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 and condenser overheating the unit causing premature compressor failure. 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 60 psig. Pressures over 60 psi may cause damage to the evaporator shells not covered under warranty.

6. Incoming water pressure and temperature to the condenser inlet must not exceed 120 psig and 85 °F and below 55 °F (Contact Aqua Logic for water temperatures above 85 °F and below 55 °F)

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 electrical box 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.

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NOTICE TO THE INSTALLATION CONTRACTOR

208-240V 1 or 3PH UNITS

VERY IMPORTANT!!

BEFORE START-UP, SET-UP THE VOLTAGE MONITOR TO READ SAME AS THE MAIN POWER INPUT VOLTAGE TO THE UNIT.

FOR 208V SERVICE, SWITCH THE TRANSFORMER PRIMARY INPUT VOLTAGE ORANGE (240V) WIRE TO RED (208V) WIRE.

Installation Instructions:

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

For chiller or heat pump specifications see label on cover of the unit for particular details concerning model number, voltages, amperage, water flow rates and refrigerant type.

1. Place the chiller or heat pump to be mounted indoors on a flat level cement pad. Allowing at least 2 feet from any walls and having access on all four sides and at least 5 feet above for removal of heat exchanger PVC shell for cleaning.

2. IMPORTANT!! Install pool side flow switch in to the PVC plumbing correctly. See FLOW SWITCH installation diagram.

3. Ambient air temperature must never exceed 110°F sustained.

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

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 or heat pump 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

Heat exchanger 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. Condensing unit parts are made from aluminum, steel and are subject to rapid corrosion, especially near sea water.

The chiller or heat pump 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 the compressor shuts off. When the thermostat calls for cooling or heating, 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.

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Chiller Temperature Controller



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.

Controller Setpoint Set-up

To modify the set point* temperature. Touch and release the “SET” button. SP will be displayed. Touch the “SET” button again and the pre-programmed set point temperature will be displayed. Touch 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 touch 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.

OUT1-This indicates that the chiller will 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 next page “SINGLE STAGE TEMPERATURE CONTROL PROGRAMMABLE PARAMETERS TABLE” to change other settings

To adjust other parameters in the control contact Aqua Logic, Inc. for help.
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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 -50 to 302 °F	30°F	
4	r2	Higher value set point	Degrees	-50 to 150 °C -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 -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 ≥ SP then output is OFF. If temperature is < SP - r0 then output is ON. **Cooling**: If temperature is ≥ 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

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Heat Pump Temperature Controller



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.

Touch 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.

Touch 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. Touch the SET button and the DOWN arrow ▼ to store the value and return to home screen.

OUT1 Indicates that the chilling mode and the OUT2 is the heating mode is energized. (Both OUT1 and OUT2 should **never** be on at the same time)

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.

NOTE: Both OUT1 and OUT2 should **never** be on at the same time.

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 touch and hold the "Set" button for 8 seconds. The parameter “O” will be displayed. Wait 4 seconds. Then touch the “SET” button and the “SP” will be displayed. Use the down ▼ or up ▲ arrow until you see the menu parameter "P1". Then touch the “SET” button one time. The display will show “0”. Touch the up or down arrows to adjust to the temperature offset. Once you have set the correct temperature offset, touch "SET" button one more time and then wait 1 minute or touch 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 next page “DUAL STAGE TEMPERATURE CONTROL PROGRAMMABLE PARAMETERS TABLE” to change other settings

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DUAL STAGE 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	Ano	
A7	Alarm probe 2 selection	Range	AHL/Ano/AH/AL	Ano	
c0	Minimum relay stop time	Minutes	0 to 240	1	
c1	Operation relay 1	Range	dir/inv	Dir	
c2	Operation relay 2	Range	dir/inv	inv	
c3	Default relay 1	Range	Opn/Clo	Opn	
c4	Default relay 2	Range	Opn/Clo	Opn	
P0	Temperature scale selection	Range	ºC / ºF	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.
- **AL**1 – Minimum temperature alarm.
- **--** Shorted –circuited probe error
- **oo-** Open probe

OPERATION IN CASE OF ERROR

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

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Chiller or 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.



Water-cooled Condenser Cleaning:

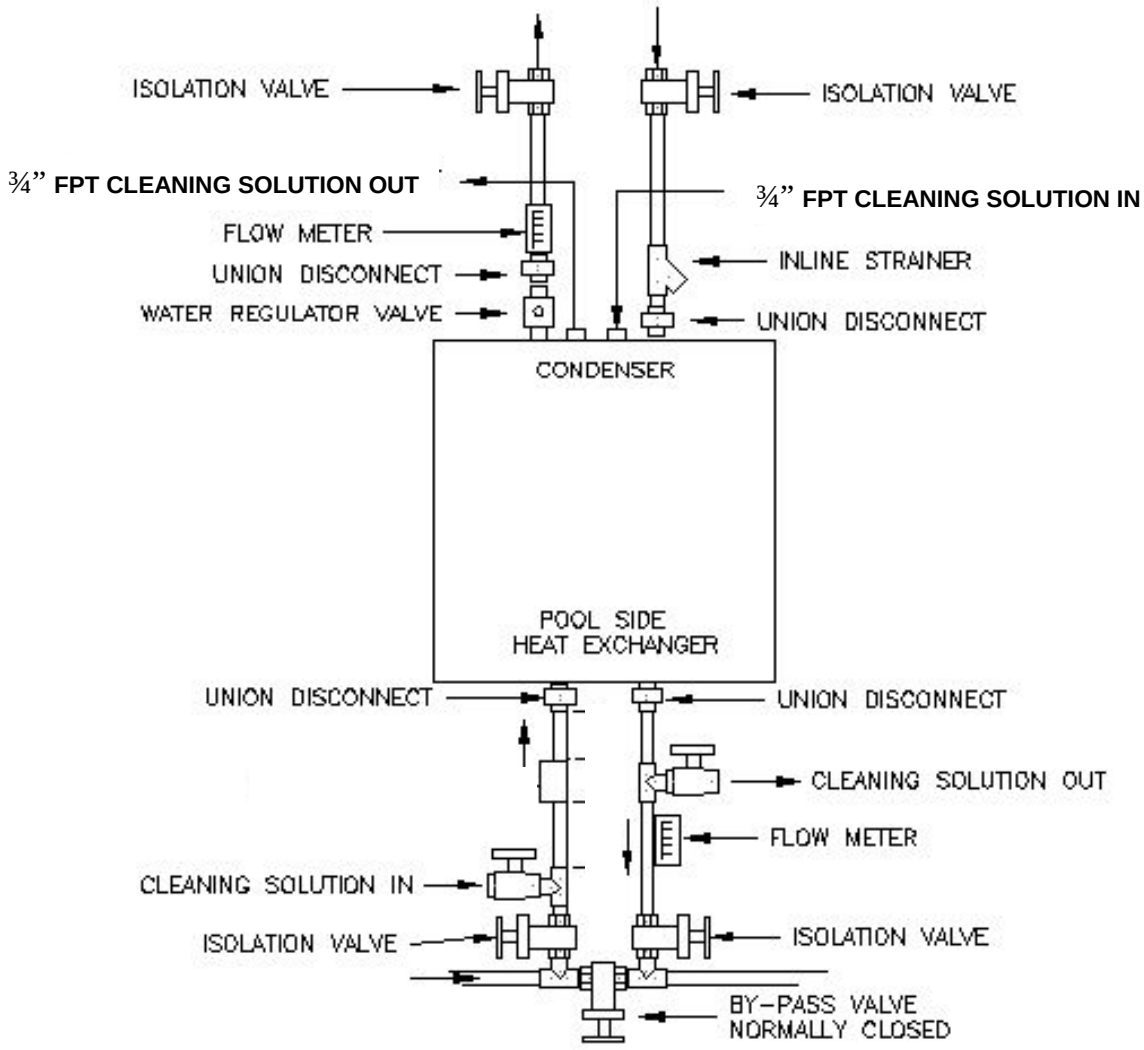
The condenser should be cleaned approximately every 12 months or as needed to allow proper performance.

Use mix of 1 part acid to 3 parts distilled water.
To remove mineral deposits:

1. Isolate condenser from water supply.
2. Remove threaded brass pipe plugs.
3. Connect recirculation flushing system to chiller / heat pump. (see drawing next page)
4. Circulate the cleaning solution for at least one hour
5. Flush condenser with clean water.
6. Install brass pipe fittings and check for water leaks.

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Chiller or Heat pump by-pass plumbing



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Troubleshooting Your Chiller

While your Aqua Logic chiller or heat pump has been designed and manufactured to provide years of reliable service, there may be an occasion where the unit does not operate correctly. The following chart provides guidelines to restore the unit to service or to provide information in helping us to diagnose and repair the chiller.

Items marked with an asterisk (*) should be performed only by Aqua Logic or a qualified electrical or refrigeration technician upon authorization from Aqua Logic. Call Aqua Logic **BEFORE** calling in a technician (See notes on the next page).

Chiller or Heat pump doesn't run.

Possible Cause	Possible Solution
Chiller is not connected to power.	Connect chiller to electrical supply.
There is no power to the chiller.	Reset circuit breaker or replace fuse.
Compressor does not operate.	Repair any loose wiring in chiller.*
Possible controller failure.	Replace controller

Chiller or heat pump runs but doesn't shut off and water temperature drops below setpoint.

Sensor not properly sensing the water temperature.	Check sensor position in dry sensor well. May be sensing air/ water mixture.
Controller not properly programmed	Program controller according to controller instructions.
Defective controller or sensor	Troubleshoot controller using controller instructions.

Chiller or heat pump appears to be running properly but water is not chilling or heating adequately.

Excessive mineral accumulation in condenser coil.	Remove accumulated minerals using procedure on page 8.
Inadequate water flow.	Make sure any filters ahead of chiller or heat pump are clean. Make sure pump is rated to provide proper flow. Make sure there are no kinks in the flexible hoses. Make sure there are no obstructions in the plumbing. Make sure that ice hasn't built up in heat exchanger or coil.
Excessive organic (slime) accumulation in heat exchanger or coil.	Remove accumulated organics using procedure on page 8.
Excessive mineral accumulation in heat exchanger or coil.	Remove accumulated minerals using procedure on page 8.
Refrigerant levels may be low.	Have refrigeration technician take pressure readings and inspect for leaks and recharge system in necessary.*
Other	Call Aqua Logic, Inc. for assistance.*

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Chiller or heat pump runs for a few minutes and shuts off (short cycles).

Controller indicator shows that controller is cycling chiller on and off.	Make sure controller sensor is installed fully in the sensor well in the heat exchanger. This can cause a false temperature reading.
Low or no water flow to condenser	

Controller indicates chiller or heat pump is "ON" but chiller or heat pump is shutting off (short cycles)**.**

Water temperature too high. (Heat exchanger)	Lower water temperature within normal range.
Defective compressor overload relay.	Replace compressor high-temp overload relay.*
Compressor doesn't run.	Replace defective compressor.*
Refrigerant levels may be low or gone.	Have refrigeration technician take pressure readings and inspect for leaks and recharge system in necessary.*
Compressor very noisy.	Have technician inspect for correct refrigerant pressures.*

Controller indicates chiller or heat pump is "ON" but chiller or heat pump is off.

Three phase monitor has fault displayed.(If equipped)	See instructions for fault explanation.
High pressure cutout trip.	Low or no water flow to condenser. Check water flow and reset pressure switch. (see picture below)
Heat exchanger flow switch trip. Water flow to heat exchanger low or off.	Make sure any filters ahead of chiller or heat pump are clean. Make sure pump is rated to provide proper flow. Make sure there are no kinks in the flexible hoses. Make sure there are no obstructions in the plumbing. Make sure that ice hasn't built up in heat exchanger or coil.
Low pressure cutout trip. Refrigerant levels may be low or gone.	High/low pressure cutout has disconnected the power. Have refrigeration technician take pressure readings and inspect for leaks and recharge system as necessary.*

Notes:

We recommend that you call Aqua Logic **(858) 292-4773** for technical assistance **BEFORE** attempting any repairs on your chiller.

In accordance with our published warranty, Aqua Logic will not pay for repairs or service on any of our chillers (in or out of warranty) without prior approval in writing or a verbal Repair Authorization (RA) issued by Aqua Logic, Inc.

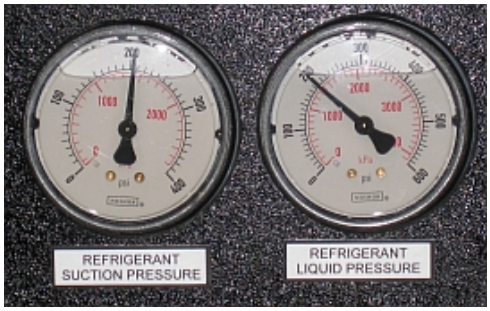


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Hi / Low refrigerant pressure cutout switch

The pressure switch serves a both a high and low refrigerant safety cutout to protect the chiller. If there is no water or low water flow through the condenser the pressure will build-up and cause the switch to trip off. Also, when there a refrigerant leak, the switch will protect the chiller from functioning.

To reset the switch:



1. Check liquid and suction refrigerant gauges to see which one is causing the pressure switch to cutout.
2. Locate the hole on the clear cover.
3. Insert finger in the hole and press the brass button. (See Chiller Trouble Shooting Chart Page 11)



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TROUBLE SHOOT INDICATOR LIGHTS

● Voltage Monitor ● HI / Low Pressure ● Pool Flow switch ● Cycle ● Power 	Check for main power disconnect or power switch.
● Voltage Monitor ● HI / Low Pressure ● Pool Flow Switch ● Cycle ☼ Power 	Check voltage monitor for faults or settings.
☼ Voltage Monitor ● HI / Low Pressure ● Pool Flow Switch ● Cycle ☼ Power 	Check HI / LOW Refrigerant pressure cutout switch. Maybe low on refrigerate or high condenser water temperature or no water flow. Check pressure gauges for low refrigerant charge. Once problem is fixed, push the reset button on the front of the switch.
☼ Voltage Monitor ☼ HI / Low Pressure ● Pool Flow Switch ● Cycle ☼ Power 	Check for the required pool water flow rate through unit. If the water rate is below the rating required the flow will turn the unit off.
☼ Voltage Monitor ☼ HI / Low Pressure ☼ Pool Flow Switch ● Cycle ☼ Power	Unit is functioning correctly. The amber CYCLE light will go on and off when compressor is cycling on and off. Check temperature controller to see if the Out1 is on the display. **Note: The unit has a 3 to 5 minute time delay before the unit will turn on between on /off cycles.**



Aqua Logic®, Inc.
9558 Camino Ruiz. • San Diego, CA 92126
Tel: (858) 292-4773 • Fax: (858) 279- 0537 • Email: info@aqualogicinc.com • www.aqualogicinc.com

CHILLER AND HEAT PUMP
LIMITED WARRANTY TERMS
(PLEASE READ CAREFULLY)**:**

All Aqua Logic Multi-temp Water-cooled Chillers and Titan Water-cooled Heat Pumps are warranted against defects and workmanship for a period of one (1) year from the date of original end-user purchase. The limited one year 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.

On split chiller and heat pump installations, Aqua Logic will not warranty refrigerate components and copper lines between condenser and heat exchanger.

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 refrigeration technician in the field with poor installation technique ie., incorrect refrigerant copper line size between condensing unit and heat exchanger, bad brazed copper joints and dirty copper lines.

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 (RMA) number with a specified dollar limit for a qualified technician to provide a field repair.
- Provide a Return Authorization (RMA) number to return the unit with original packaging to Aqua Logic, Inc., 9558 Camino Ruiz, San Diego, CA 92126 by prepaid freight. You need to include the serial number as well as proof of purchase and /or a copy of the original bill of sale along with the RMA number. COD shipments will be refused

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Chiller / Heat Pump Start-up

Customer / Job Name:			Location / Building / Exhibit				
Service Company Name			Service Tech Name				
			Phone / Cell no.				
			Email:				
Start-Up Date		Time:		Start		Finish	
Model No.			Manufactured Date:				
Serial No.							
Unit Run Volts / phase 1 or 3			L1-L2		L2-L3		L1-L3
Unit Run Amps			L1		L2		L3
Evaporator water flow rate			GPM				
Evaporator entering water temperature			(˚F)		PSIG		
Evaporator leaving water temperature			(˚F)		PSIG		
Condenser water flow rate			GPM				
Condenser entering water			(˚F)		PSIG		
Condenser leaving water			(˚F)		PSIG		
Refrigerant type							
Refrigerant Suction Side			PSIG		(˚F)		
Refrigerant Liquid Side			PSIG		(˚F)		
Superheat ˚F							
Comments:							

Start-up procedure:

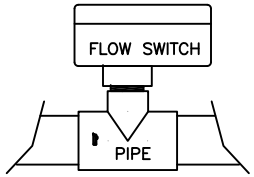
Caution: It's important to allow the oil in the compressor(s) to warm-up at least 24 hours before starting up the unit. If the ambient air temperature is below 60˚F, apply power to the unit and set controller so the compressor(s) do not energize or by-pass the heat exchanger water supply so the flow switch will not activate the unit.

1. Remove the cover of the unit. (If applicable)
2. Attach refrigeration suction and liquid hoses or use the gauges on unit. Attach an Amp / Volt meter to the unit.
3. Turn on water pump to heat exchanger (Evaporator) and the condenser.
   Note: (Make sure water flow rate is within published flow rate of the chiller / heat pump.)
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 correctly.

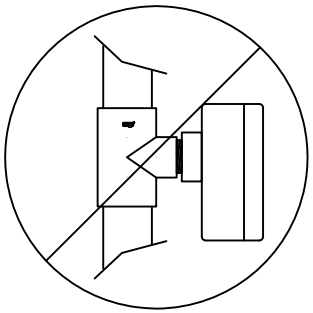
I certify that this unit above is functioning correctly at the time of start-up and is ready for operation.

Service Tech Sign		Customer Sign:		Date:	

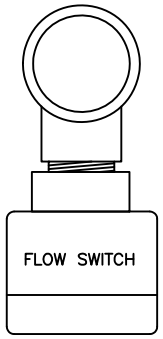
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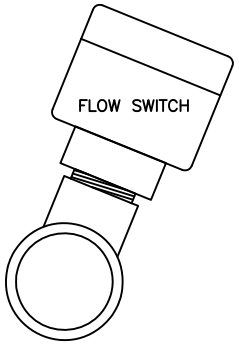
YES



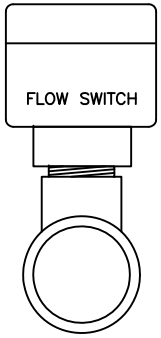
DO NOT MOUNT VERTICALLY



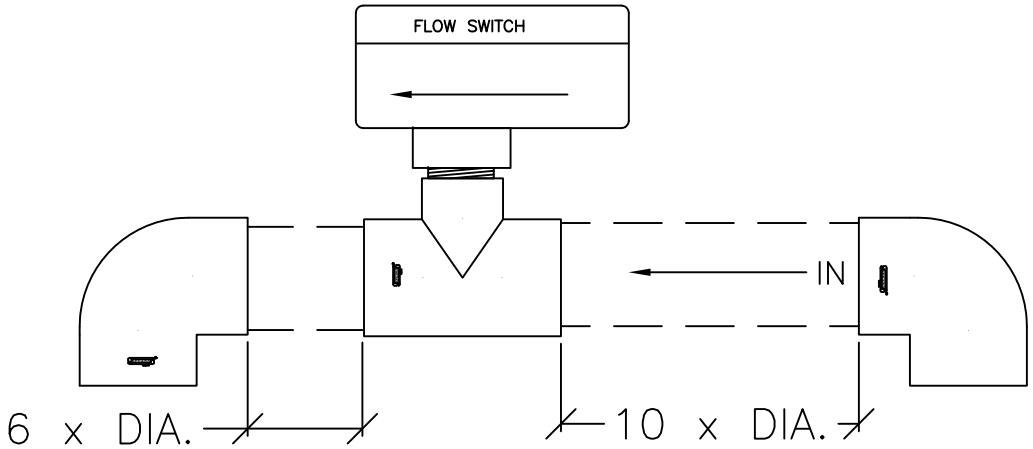
NO



NO



YES

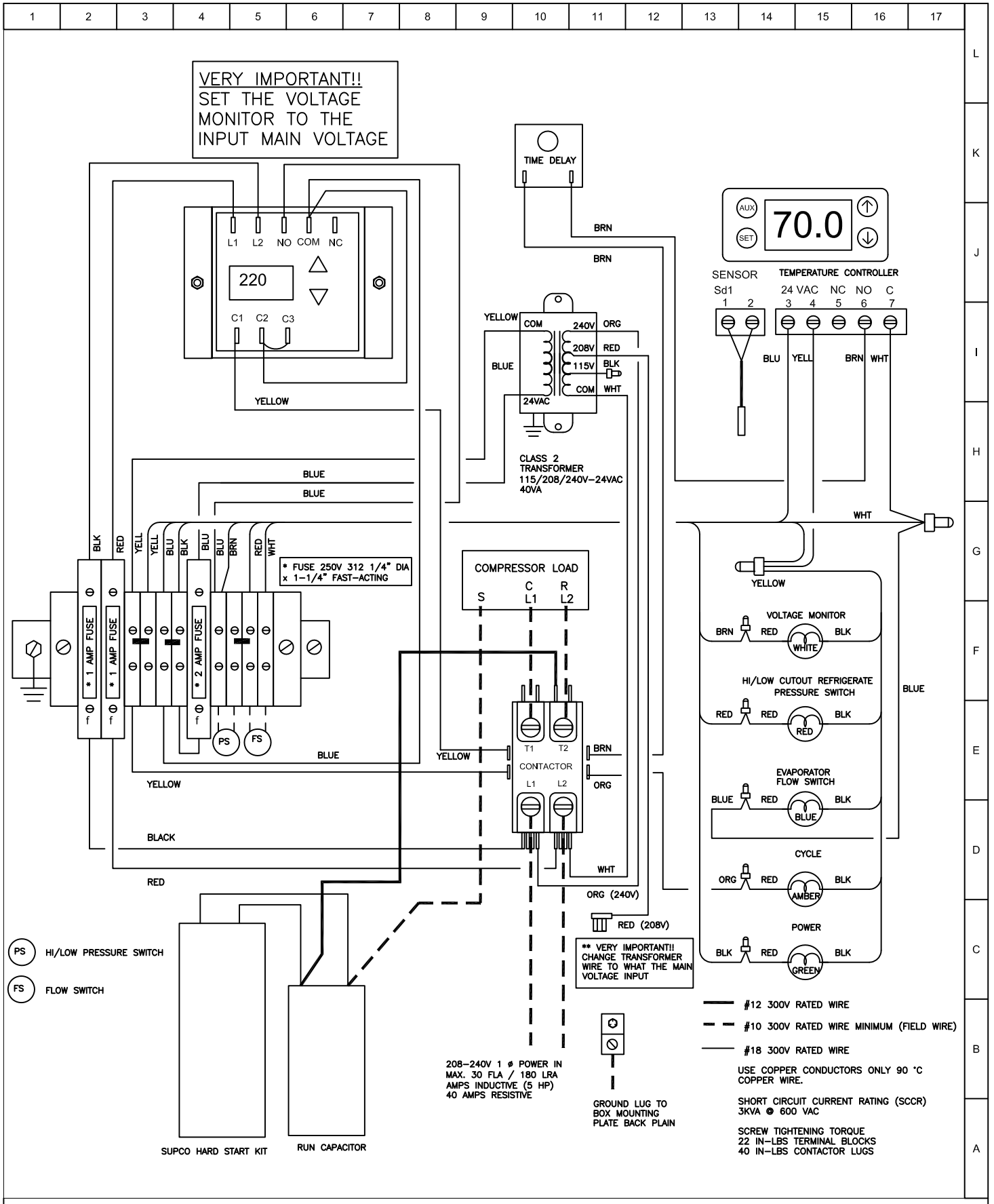


INSTALLATION NOTE:

"FLOW CONTROL" FLOW SWITCH AND TEE FITTING IS FIELD INSTALLED ON TOP OF A HORIZONTAL STRAIGHT PIPE WITH NO LESS THAN 10 TIMES THE DIAMETER OF STRAIGHT ON THE INLET SIDE AND NO LESS THAN 6 TIMES THE DIAMETER ON THE OUTLET SIDE

TITLE	FLOW SWITCH PLUMBING NOTE	PROJECT	FLOW SWITCH	FILE	C:\AutoCad Files\Controls\3in Flow Switch Plumbing Note 4-24-13.dwg	DRAWING NO	FS-01	EDITED	11/13/2015	SCALE	1:1
		CLIENT	AQUA LOGIC INC			DRAWN BY	CEPPS	CREATED	4/24/2013	PAGE	1 of 1

AQUA LOGIC, INC
9558 CAMINO RUIZ,
SAN DIEGO, CA 92126



AQUA LOGIC, INC. 9558 Camino Ruiz, San Diego, CA 92126 Ph: 858.292.4773 Fax: 858.279.0537 www. *aqualogicinc.com*

TITLE	MT-WC-230-1 CONTROL BOX WIRING MODELS# MT-1-WC, MT-3-WC, MT-5-WC, MT-7-WC	PROJECT	AQUA LOGIC	FILE	C:\Users\cepps\Documents\AutoCad Files\MT Chillers\MT wiring\MT WC Electrical\MT-WC-230-1 Control Box Wiring 230V 1PH 6-20.dwg	DRAWING NO	00	EDITED	6/18/2020	SCALE	1:1
		CLIENT	AQUA LOGIC			DRAWN BY	CE	CREATED	7/18/2019	PAGE	1 of 1

WAGNER

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 straight forward.

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.

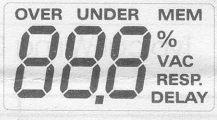
SETUP

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



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.

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 hysterisis.

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

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.

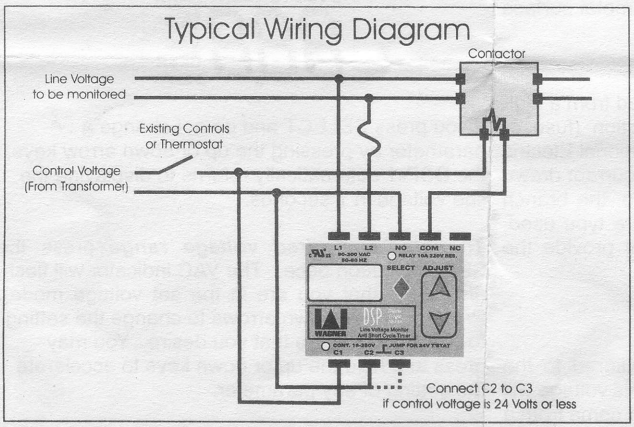
To turn on the control bypass press and hold the UP arrow key then also press the SELECT key. The control LED will begin to blink twice. This double blink is the indication that the control input is bypassed.

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%
✓ Hysterisis	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



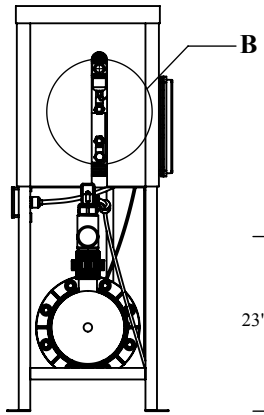
Factory Settings:

208 volts
12% tolerance
2 second response
30 second delay

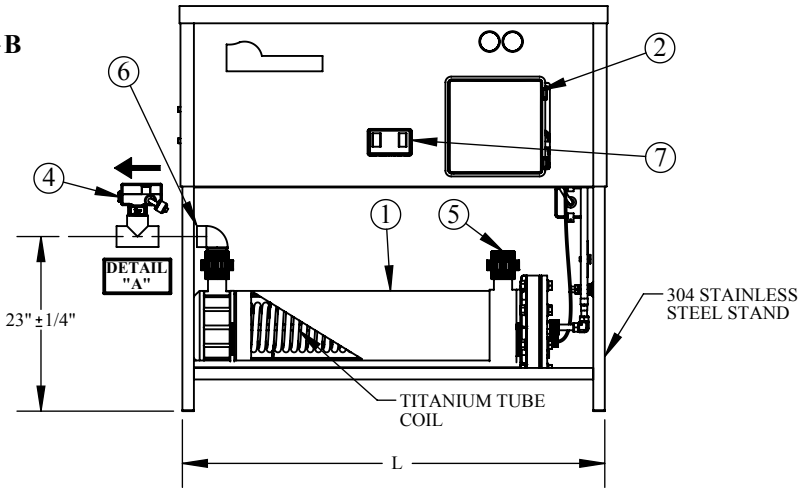
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www.diversitech.com
Designed in the USA
Assembled in China
DW006423-1

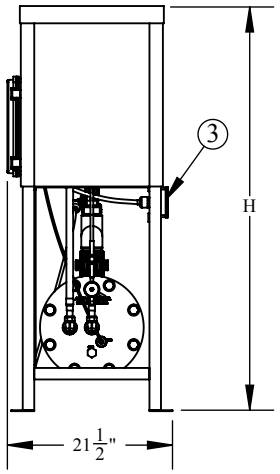
MT-1 THRU MT-8 WATER COOLED WATER CHILLER



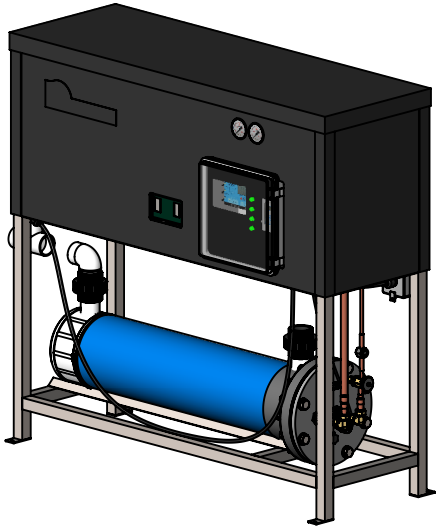
LEFT VIEW



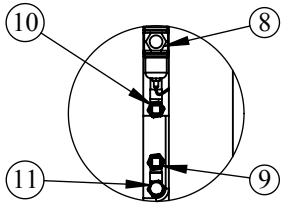
FRONT VIEW



RIGHT VIEW

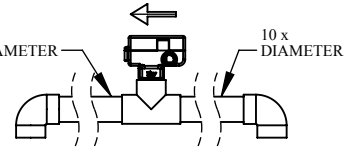


NO.	NAME
1	EVAPORATOR-TITANIUM TUBE / 8" SCH 40 PVC SHELL
2	TEMPERATURE CONTROLLER / NEMA 4X ELECTRICAL CONTROL BOX
3	JUNCTION BOX FOR SUPPLY POWER
4	WATER FLOW SWITCH (SEE NOTE FOR INSTALLATION)
5	2" NPS EVAPORATOR WATER INLET
6	2" NPS EVAPORATOR WATER OUTLET
7	LOW / HI REFRIGERANT PRESSURE SAFETY CUTOUT
8	CONDENSER WATER OUTLET
9	CONDENSER WATER INLET
10	CONDENSER WATER FLUSH OUTLET
11	CONDENSER WATER FLUSH INLET



DETAIL B

NOTES:
· WATER STOPS FLOWING THROUGH THE CONDENSER WHEN THE CHILLER IS IN THE OFF CYCLE.
· WATER FLOW RATE THROUGH THE EVAPORATOR NEEDS TO BE AT THE MAXIMUM FLOW RATE WHEN WATER TEMPERATURE IS 55°F AND BELOW.



**** IMPORTANT!**
-DETAIL "A"
-FLOW SWITCH MUST BE FIELD INSTALLED VERTICALY ON A HORIZONTAL STRAIGHT PIPE WITH NO LESS THAN 10 TIMES THE PIPE DIAMETER ON THE INLET SIDE AND NO LESS THAN 6 TIMES THE DIAMETER ON THE OUTLET SIDE.

MULTI-TEMP WATER-COOLED CHILLERS													
MODEL NO.	NOMINAL TONS / BTUH	VOLTS / PHASE	R-410A REFRIGERANT CHARGE LBS / OZ	AMPS RLA / LRA	EVAPORATOR WATER FLOW MIN/MAX *(GPM)	CONDENSER WATER FLOW MIN/MAX *(GPM)	CONDENSER WATER CONNECTIONS SIZE (FPT)	L	H	DRY WEIGHT (LBS.)	SHIPPING WEIGHT (LBS.)	SHIPPING DIMS
MT-1-WC	2 / 24,000	208-240 / 1	3 / 5	13.8 / 127	20 / 40	2 / 4	1/2"	43"	53"	320	415	49" x31" x 60"
MT-3-WC	3 / 36,000	208-240 / 1	3 / 10	16.6 / 175	20 / 40	2 / 5	1/2"	43"	53"	330	430	49" x 31" x 60"
MT-4-WC	3 / 36,000	208-240 / 3	3 / 10	12.7 / 128	20 / 40	2 / 5	1/2"	43"	53"	330	430	49" x 31" x 60"
MT-4-460-WC	3 / 36,000	460 / 3	3 / 10	7.5 / 63	20 / 40	2 / 5	1/2"	43"	53"	330	430	49" x 31" x 60"
MT-5-WC	4 / 48,000	208-240 / 1	4 / 12	17.3 / 129	30 / 60	3 / 7	3/4"	55"	53"	350	450	62" x 31" x 60"
MT-6-WC	4 / 48,000	208-240 / 3	4 / 12	13 / 156	30 / 60	3 / 7	3/4"	55"	53"	350	450	62" x 31" x 60"
MT-6-460-WC	4 / 48,000	460 / 3	4 / 12	8 / 75	30 / 60	3 / 7	3/4"	55"	53"	350	450	62" x 31" x 60"
MT-7-WC	5 / 60,000	208-240 / 1	7 / 5	23 / 129	30 / 60	4 / 8	3/4"	55"	53"	360	460	62" x 31" x 60"
MT-8-WC	5 / 60,000	208-240 / 3	7 / 5	19.3 / 225	30 / 60	4 / 8	3/4"	55"	53"	360	460	62" x 31" x 60"
MT-8-460-WC	5 / 60,000	460 / 3	7 / 5	9.8 / 114	30 / 60	4 / 8	3/4"	55"	53"	360	460	62" x 31" x 60"

OPTIONS:
· SCH 80 PVC SHELL CONSTRUCTION.
· 316 STAINLESS STEEL STAND AND HEX BOLTS.

· ALL UNITS ARE 60 HZ.
*CONDENSER FLOW RATE IS BASED ON A MINIMUM OF 55°F AND MAXIMUM OF 75°F WATER TEMPERATURE. CONSULT WITH THE FACTORY IF THE WATER TEMPERATURE IS OUTSIDE THESE PARAMETERS.
· ALL DIMENSIONS ARE APPROXIMATE AND CAN CHANGE AT ANY TIME.

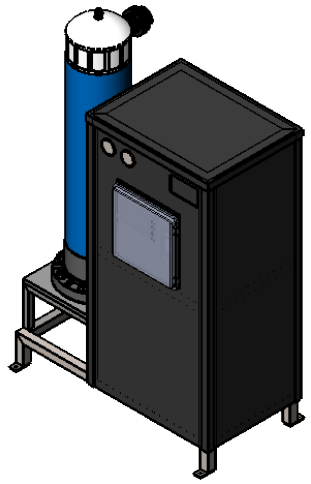
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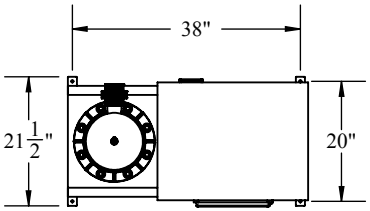
DESCRIPTION	DRAWING #	SHEET TITLE
MT-1 THRU MT-8 WATER COOLED WATER CHILLER	PDF-0060	MT-1 THRU MT-8 SPECIFICATIONS

DRAWN BY	DATE	REVISION	SCALE	SHEET #
Arnaldo Guzman	2/5/2016		1:25	1 OF 1

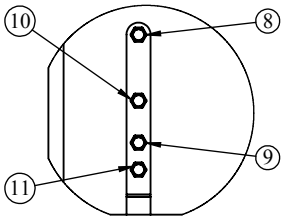
MT-1 THRU MT-8-WCV WATER COOLED CHILLER



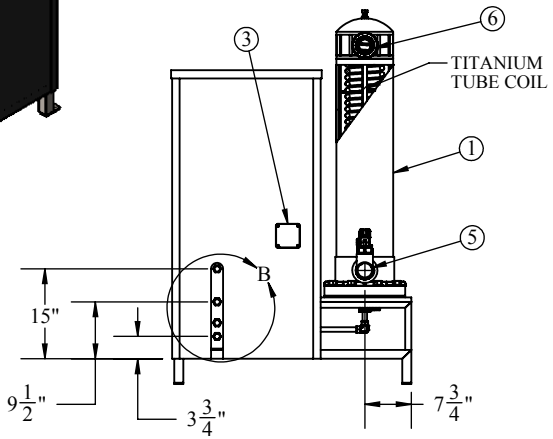
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6	2" NPS SLIP UNION EVAPORATOR WATER OUTLET
7	LOW / HI REFRIGERANT PRESSURE SAFETY CUTOUT
8	CONDENSER WATER OUTLET
9	CONDENSER WATER INLET
10	CONDENSER WATER CLEAN OUT OUTLET
11	CONDENSER WATER CLEAN OUT INLET
12	REFRIGERANT PRESSURE GAUGES



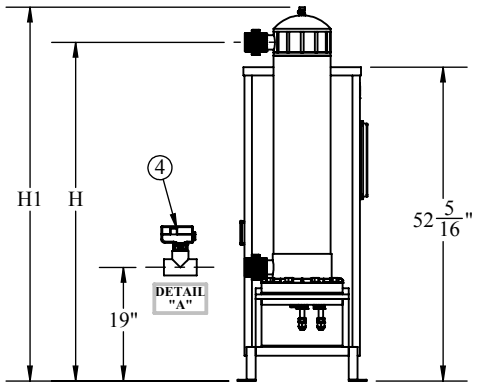
PLAN VIEW



DETAIL B

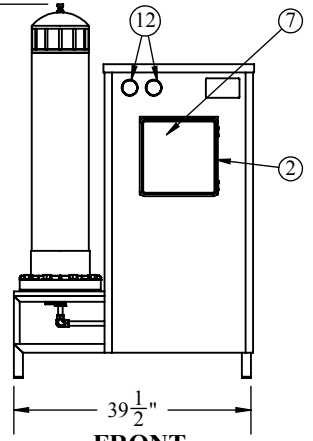


BACK

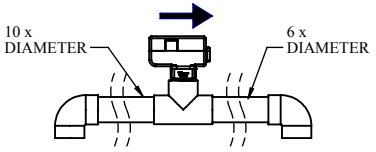


LEFT

CL-SHELL
REMOVAL CLEARANCE



FRONT



**** IMPORTANT!**
-DETAIL "A"
-FLOW SWITCH MUST BE FIELD INSTALLED VERTICALY ON A HORIZONTAL STRAIGHT PIPE WITH NO LESS THAN 10 TIMES THE PIPE DIAMETER ON THE INLET SIDE AND NO LESS THAN 6 TIMES THE DIAMETER ON THE OUTLET SIDE.

MULTI-TEMP WATER-COOLED CHILLERS

MODEL NO.	NOMINAL TON / BTUH	VOLTS / PHASE	R-410A REFRIGERANT CHARGE LBS/OZ	AMPERAGE RLA / LRA	EVAPORATOR WATER FLOW MIN/MAX (GPM)	CONDENSER WATER FLOW MIN/MAX (GPM)	CONDENSER WATER CONNECTION (NFPT)	H	H1	CL	DRY WEIGHT (LBS.)
MT-1-WCV	2 / 24,000	208-240 / 1	3 / 5	13.8 / 127	20 / 40	2 / 4	1/2"	34"	n/a	25"	320
MT-3-WCV	3 / 36,000	208-240 / 1	3 / 10	16.6 / 175	20 / 40	2 / 5	1/2"	41"	n/a	32"	330
MT-4-WCV	3 / 36,000	208-240 / 3	3 / 10	12.7 / 128	20 / 40	2 / 5	1/2"	41"	n/a	32"	330
MT-4-460-WCV	3 / 36,000	460 / 3	3 / 10	7.5 / 63	20 / 40	2 / 5	1/2"	41"	n/a	32"	330
MT-5-WCV	4 / 48,000	208-240 / 1	4 / 12	17.3 / 129	30 / 60	3 / 7	3/4"	49"	54 7/8"	39"	350
MT-6-WCV	4 / 48,000	208-240 / 3	4 / 12	13 / 156	30 / 60	3 / 7	3/4"	49"	54 7/8"	39"	350
MT-6-460-WCV	4 / 48,000	460 / 3	4 / 12	8 / 75	30 / 60	3 / 7	3/4"	49"	54 7/8"	39"	350
MT-7-WCV	5 / 60,000	208-240 / 1	7 / 5	23 / 129	30 / 60	4 / 8	3/4"	56 1/2"	62 3/8"	47"	360
MT-8-WCV	5 / 60,000	208-240 / 3	7 / 5	19.3 / 225	30 / 60	4 / 8	3/4"	56 1/2"	62 3/8"	47"	360
MT-8-460-WCV	5 / 60,000	460 / 3	7 / 5	9.8 / 114	30 / 60	4 / 8	3/4"	56 1/2"	62 3/8"	47"	360

NOTES:
- WHEN THE CHILLER IS IN THE OFF CYCLE,WATER FLOWING THROUGH THE CONDENSER IS STOPPED.
- WATER FLOW RATE THROUGH THE EVAPORATOR NEEDS TO BE AT THE MAXIMUM FLOW RATE WHEN WATER TEMPERATURE IS 55°F AND BELOW.
- ALL UNITS ARE 60 HZ.
- CONDENSER FLOW RATE IS BASED ON A MINIMUM OF 55°F AND MAXIMUM OF 75°F WATER TEMPERATURE. IF OPERATING OUTSIDE THESE PARAMETERS CONTACT AQUA LOGIC TECHNICAL SUPPORT.
- ALL DIMENSIONS ARE APPROXIMATE AND CAN CHANGE AT ANY TIME.

OPTIONS:
- SCH 80 PVC SHELL CONSTRUCTION.
- 316 STAINLESS STEEL STAND AND HEX BOLTS.

aqua LOGIC
Aquatic Design, Manufacturing & Integration
9558 Camino Ruiz, San Diego, CA 92126

BALLON LEGEND
ITEM NO.
QTY.

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DESCRIPTION			
MT-1 THRU MT-8-WCV WATER COOLED CHILLER.			
DRAWN BY	DATE	REVISION	SCALE
	4/24/2018		

DRAWING #	SHEET TITLE
PDF-0230	MT-1 THRU MT-8-WCV SPECIFICATIONS

SHEET # 1 OF 1