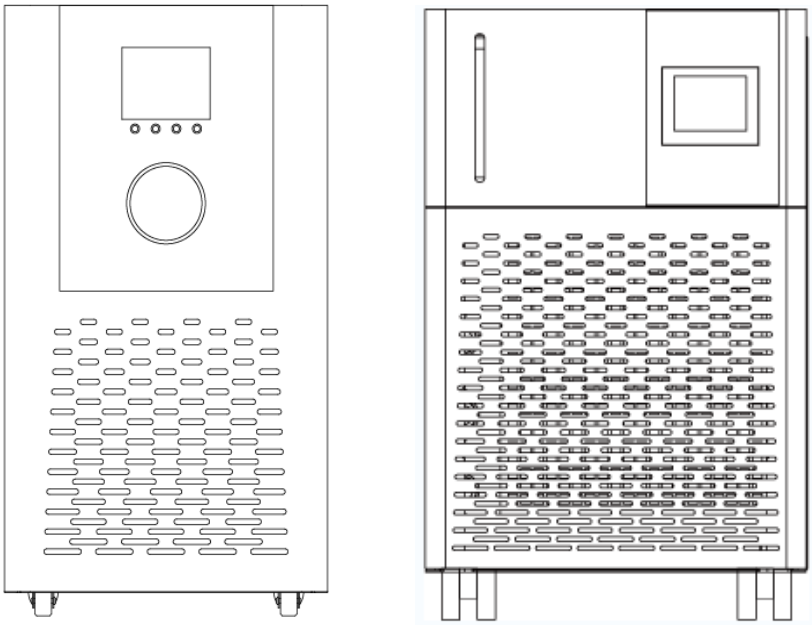
LabTech



H50/150 SMART SERIES

WATER CHILLERS

USER MANUAL

Thank you for selecting our water chillers.

We are sure that you will be completely satisfied with the performance of this new unit entering your laboratory. We invite you to read carefully this user manual and to keep it close to the instrument for convenient and fast consulting. For any possible clarification or any request for assistance please contact either our local Representative or:

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INDEX

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LABTECH
H50-500
Smart H150-1000, Smart H150-1500, Smart H150-2100, Smart H150-3000
H150-5000, H150-7000, H150-9000

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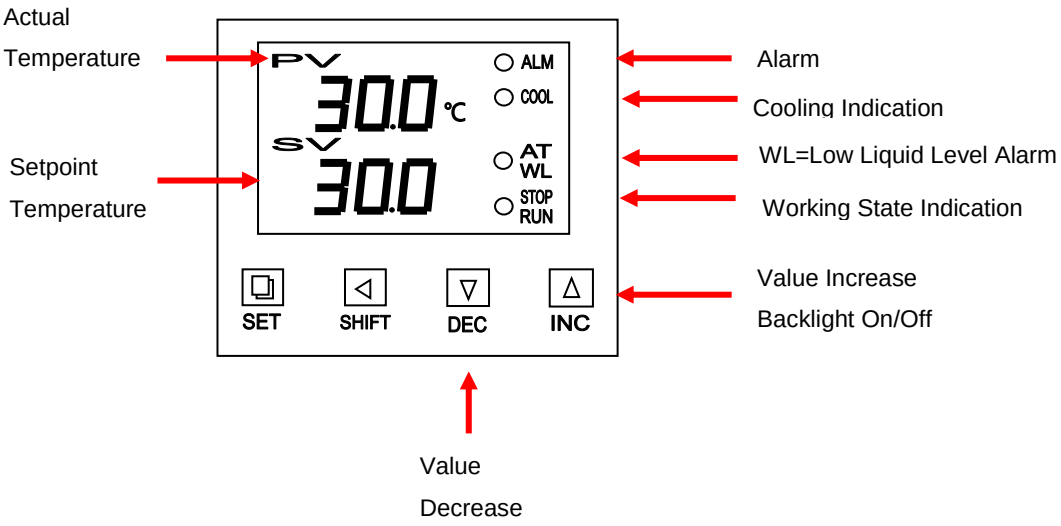
1. INTRODUCTION

H50

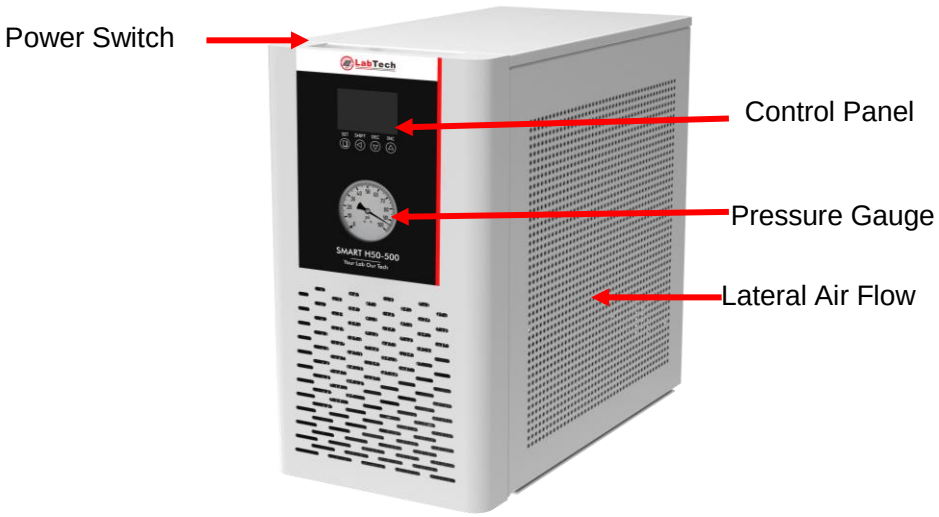
CONTROL PANEL

The controller panel consists of the following keys:



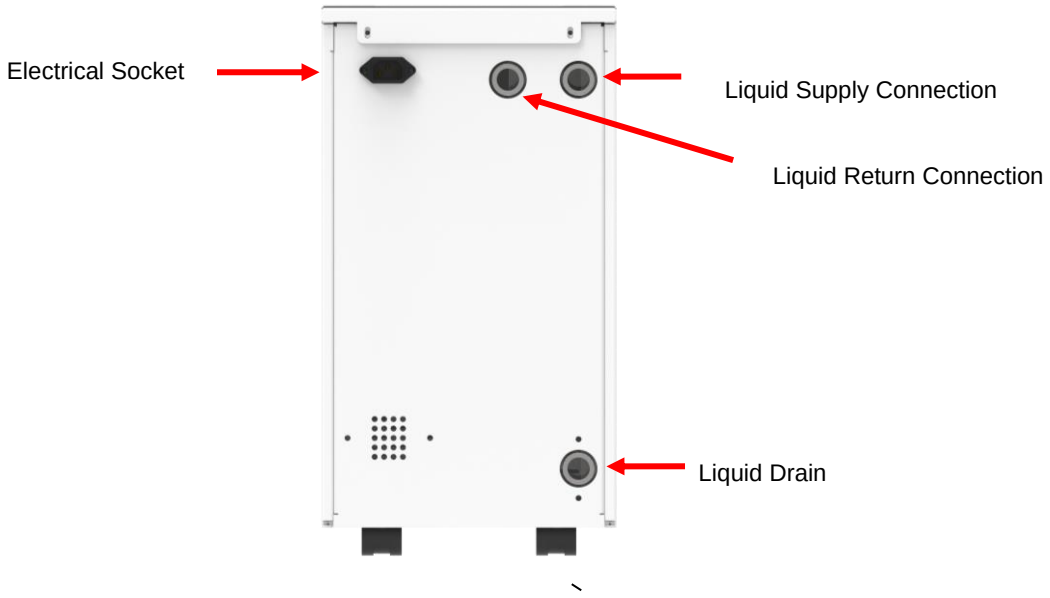
FRONT VIEW

The front panel consists of the following parts:



REAR VIEW

The rear panel consists of the following parts:



SPECIFICATION

The H50 series recirculating water chiller is designed to provide continuous supply of cooling fluid at a constant temperature and flow rate. The unit consists of an air-cooled refrigeration system, a plate heat exchanger, a recirculating pump, a reservoir and a microprocessor temperature controller.

Technical specification:

Model	H50-500 /115V	H50-500 /DF
Temp. control range	-5℃～35℃	
Temp. control mode	PID	
Cooling mode	Compressor cooling	
Temp. stability	±0.3 ℃	
Refrigerant	R134A	
Cooling capacity/W	500W@25℃	
Pump capacity	3L/min@10psi	
Reservoir volume	1,8L	
Pressure	1Bar	
Weight	28Kg	
Dimension(LxWxHmm)	480×250×500mm	

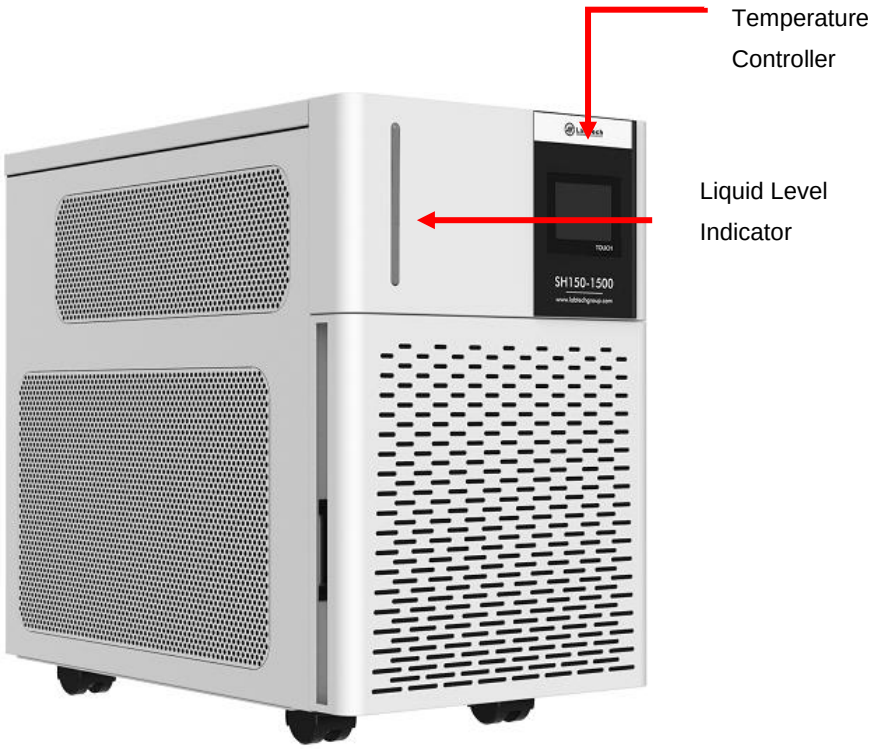
NOTE: the value of temperature stability is tested in standard operating mode.

SMART H150

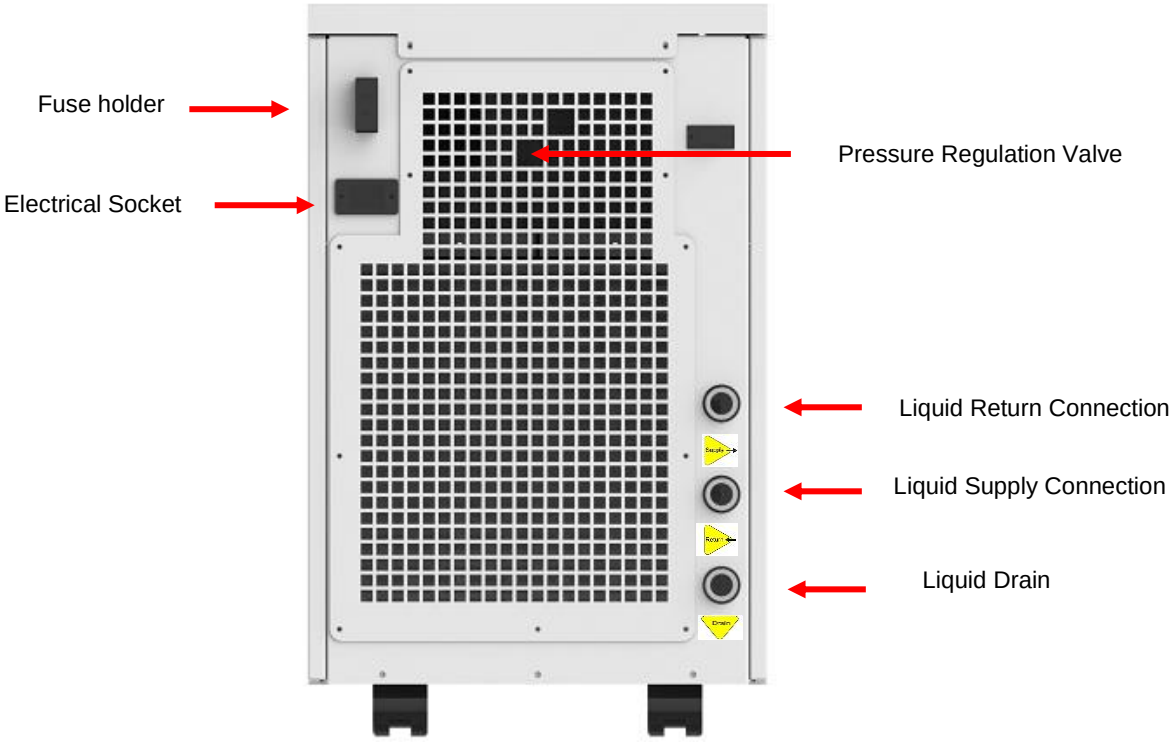
CONTROL PANEL

Touch controller H150 Series:

FRONT VIEW



REAR VIEW


Fuse holder
Electrical Socket
Pressure Regulation Valve
Liquid Return Connection
Liquid Supply Connection
Liquid Drain

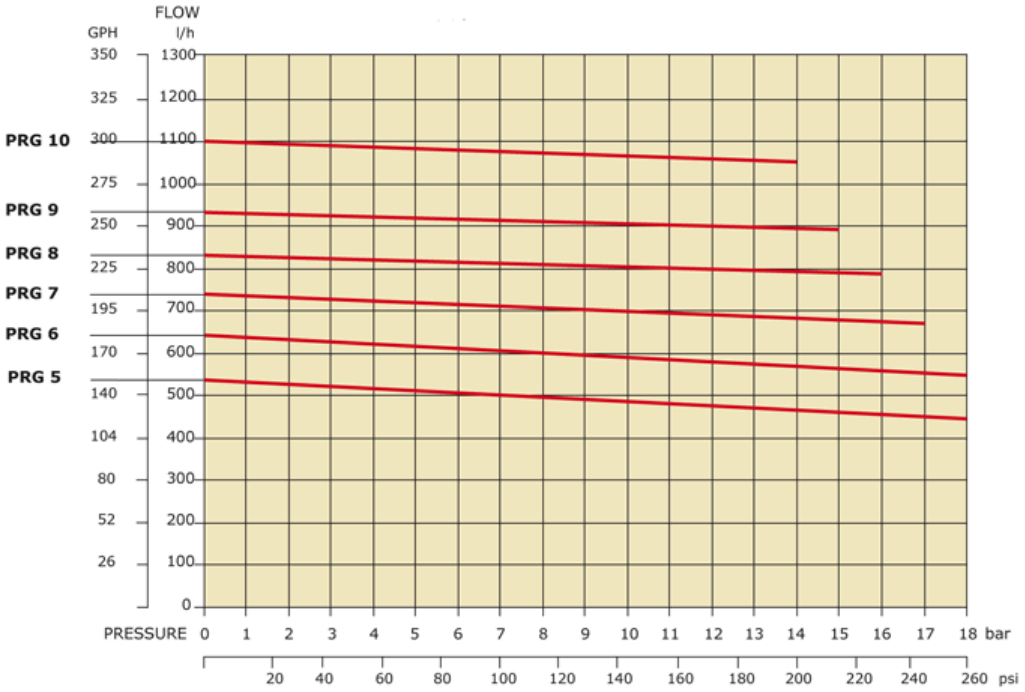
SPECIFICATION

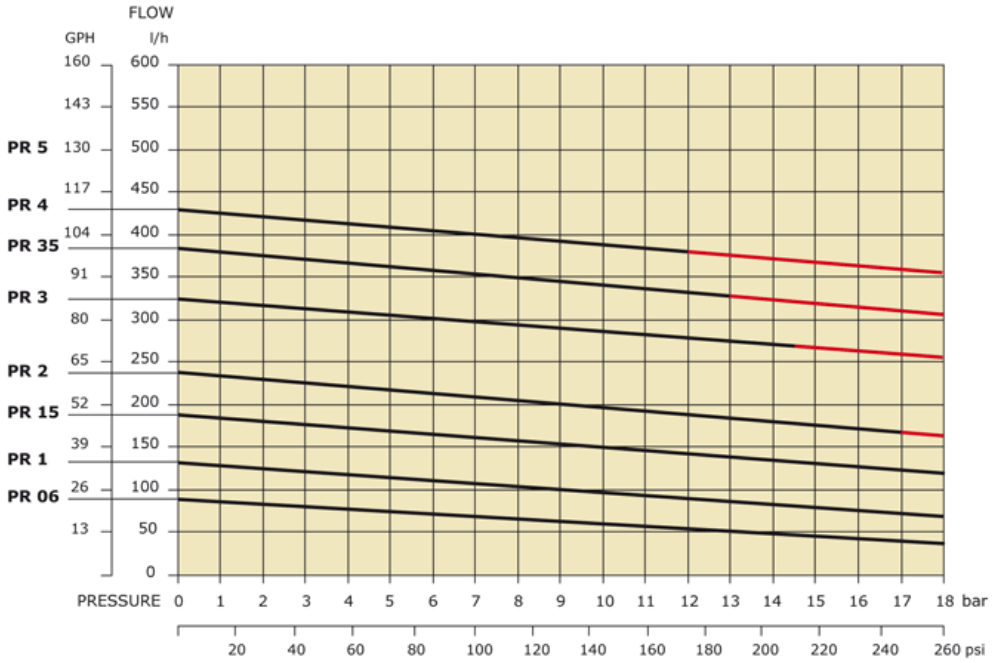
Model	Smart H150-1000N	Smart H150-1000NLT	Smart H150-1500NS	Smart H150-2100NS	Smart H150-2100NSLT	Smart H150-3000NS
Temp. control range	8 ～35 ℃	-20~35℃	8 ～35 ℃	8 ～35 ℃	-20~35℃	8 ～35 ℃
Temp. control mode	PID					
Cooling mode	Compressor cooling					
Refrigerant	R134A					
Temp. stability	±0.1 ℃					
Cooling capacity	1000W@25℃	1000W@25℃ 100W @-15℃	1500W@25℃	2100W@25℃	2100W@25℃ 200W @-15℃	3000W@25℃
Pump capacity	5L /min	5L /min	5L /min	13L /min	13L /min	13L /min
Reservoir volume	2.2L	2.2L	3.5L	3.5L	3.5L	3.5L
Recirculating pump	PR4	PR4	PR4	PRG8	PRG8	PRG8
Weight	56Kg	56Kg	72Kg	80Kg	80Kg	85Kg
Dimension(LxWxHmm)	560x360x590		650x385x625	740x460x700		

Model	H150-5000N	H150-7000N	H150-9000N
Temp. control range	8 ～35 ℃		
Temp. control mode	PID		
Cooling mode	Compressor cooling		
Refrigerant	R404A		
Temp. stability	±0.2 ℃		
Cooling capacity	5000W@25℃	7000W@25℃	9000W@25℃
Pump capacity	13L /min	13L /min	13L /min
Reservoir volume	22L	22L	22L
Recirculating pump	PRG8	PRG8	PRG8
Weight	170Kg	170Kg	170Kg
Dimension(LxWxHmm)	690x640x1100	690x640x1100	690x640x1100

NOTE: the value of temperature stability is tested in standard operating mode.

MAGNETIC PRG & PR SERIES PUMP CAPACITY





2. SAFETY RULES

General Information

Please read carefully this user manual before starting to use the instrument and follow its prescriptions with the utmost care. This user manual is part of the delivery, hence must be always kept together with the instrument on its working place.

It is imperative that every person operating with this system has read and fully understood this manual. The non-observance of the instructions contained herein or improper use may involve damages/injuries that are not covered by product liability.

Electrical safety

The instrument has to be used within the rated voltage. Prior to use, please check if the wire is aged. In case of aged wires, please contact the after-sales service for inspection.

It is forbidden to disassemble the instrument and to connect internal circuit parts, in order to avoid a short circuit or open circuit.

Fire safety

Numerous reagents are flammable and explosive. When the solvent vapor concentration reaches a certain level, it would be flammable and could cause fire. The instrument should be kept away from the sources of ignition and high temperature places. If there is solvent pungent smell, carefully check whether there is gas or liquid leakage, and turn off the power.

Chemical safety

The instrument is an instrument for organic chemical sample pretreatment. The involved chemical solvents have harmful effects on the human health. Despite the instrument is fully closed and features full vent design, it is recommended to pay attention to the personal safety during the use. Regular check of liquid waste barrels as well as working conditions of the vent fan are required to avoid the risk of leakage caused by corrosion and to avoid the formation of organic solvent vapors affecting operators' health. If there is a fault, please contact the after-sales service.

Recommendation

Never place the unit in a location where excessive heat, moisture, or corrosive materials are present.

The unit construction provides extra protection against the risk of electrical shock by grounding appropriate metal parts. The extra protection may not function unless the power cord is connected to a properly grounded socket. It is the user's responsibility to assure that a proper ground connection is provided.

Never connect the inlet or outlet fitting to your building water supply or any water pressure source.

Never use flammable or corrosive fluids with this unit.

Do not use automotive antifreeze. Commercial antifreeze contains silicates that can damage the pump seals. Use of automotive antifreeze will void the manufacturer's warranty.

Transport the unit with care. Inclination angle must be less than 60 degrees otherwise the refrigeration system could be damaged. Sudden jolts or drops can damage the refrigeration system.

Pay attention to all warning labels and never remove them.

Never operate a damaged or leaking equipment.

Never operate the unit without the cooling fluid in the reservoir.

Always turn off the unit and disconnect the power cord from the power source before performing any service or maintenance procedure or before moving the unit.

Never operate the equipment with a damaged power cord.

Performance of installation, operation or maintenance procedure other than those described in this manual may result in a hazardous situation and may void the warranty.

Never use water (including distillated and deionized) in units installed in environments where temperatures go down below 5°C. We recommend 1:1 mixture of water and glycol to avoid liquid freezing.

3. INSTALLATION

3.1 POSITIONING THE INSTRUMENT

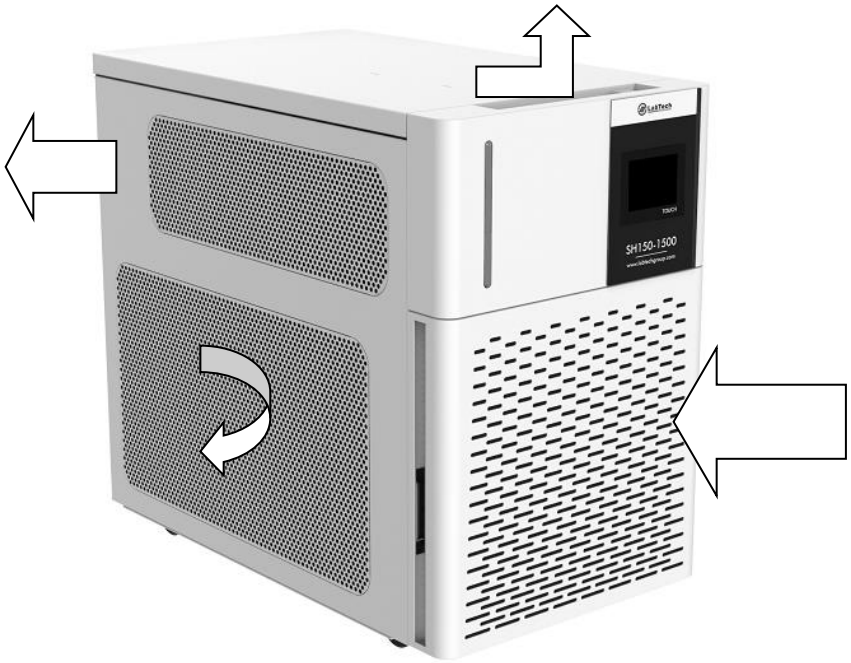
The unit should be located in a clean environment where ambient temperature is between 10℃ and 35℃ (50℉ to 94℉). Max relative humidity: 80%, only indoor use, not for wet conditions. Max. operation altitude should be less than 2000 m.

Never place the unit in a location where excessive heat, moisture, or corrosive materials are present.

The unit has an air-cooled refrigeration system. The air is drawn through the front of the unit and discharged through the rear and side panels. The unit must be properly positioned so that the intake and discharge are not impeded. A minimum clearance of 1 meter (nearly 3 feet) on all vented sides is necessary for adequate ventilation. Inadequate ventilation will cause a reduction in cooling capacity and, in extreme cases, compressor failure.

Excessively dusty areas should be avoided and a periodic cleaning schedule should be done (see Chapter 8, Maintenance).

The unit will retain its full rated capacity in ambient temperatures up to approximately 25℃ (77℉). Reduce the cooling capacity 1% for every 0.5℃ (1℉) above 25℃ (77℉), up to a maximum ambient temperature of 35℃ (94℉).



3.2 ELECTRICAL REQUIREMENTS

The unit provides extra protection against the risk of electrical shock by grounding appropriate metal parts. The extra protection may not function unless the power cord is connected to a properly grounded socket. It is the user's responsibility to assure a proper ground connection is provided.

The following power options are available:

Unit	Voltage/V	Frequency /Hz	Phases	Circuit Capacity/A	Fuse	IP Degree	Power consumption /W	Dissipated heat load BTU/h
H50-500/DF	230	50/60	1	2	4	20	460	1800
H50-500/115	115	60	1	4	10	20	460	1800
Smart H150-1000N	230	50/60	1	6	8	20	1300	3500
	115	60	1	10	10	20	1300	3500
Smart H150-1500NS	230	50/60	1	10	16	20	1700	5200
	115	60	1	20	20	20	1700	5200
Smart H150-2100NS	230	50/60	1	10	16	20	2300	7200
	115	60	1	20	25	20	2300	7200
Smart H150-3000NS	230	50/60	1	13	16	20	2900	10300
H150-5000N	230	50	1	15	16	20	3450	17000
H150-7000N	400/440	50/60	3	9A/P	10	20	4100	23900
H150-9000N	400/440	50/60	3	10A/P	10	20	5900	30800

The unit is supplied with a European power cable. It is used to be connected with power supply. Plug the cord into socket and plug the rear into electric socket of the unit. Then the unit is ready to be used.

3.3 PLUMBING REQUIREMENTS

H50

The plumbing connections are located on the rear of the unit and labeled "SUPPLY" and "RETURN". Remove the plastic protective caps from both plumbing connections. Install the barbed adapters to these connections.

Connect the fitting "SUPPLY" to the hose feeding the inlet of your application.

Connect the fitting "RETURN" to the hose from the outlet of your application. Clamp all

connections.
Connect the ball valve to "DRAIN" position of the chiller and turn ball valve off.
Never connect the fitting to the tap water supply or any water pressure source.
It is important to keep the distance between the unit and the instrument to be cooled as short as possible. Tubing should be straight and without bends. If diameter reductions must be made, they should be made on the inlet and outlet of the instrument to be cooled, not on the chiller.

Smart H150

The liquid plumbing connections are located on the rear of the unit and labeled "SUPPLY" and "RETURN". The connections are 1/2-inch Female Pipe Thread. Units with 1/2-inch fittings are supplied with 1/2-inch barbed adapters.
Remove the plastic protective caps from both plumbing connections. Install the barbed adapters to these connections.
Connect the fitting "SUPPLY" to the hose feeding the inlet of the instrument to be cooled. Connect the fitting "RETURN" to the hose from the outlet of the instrument to be cooled. Clamp all connections. Connect the ball valve to "DRAIN" position of the chiller and turn ball valve off. Never connect the fitting to the tap water supply or any water pressure source.

It is important to keep the distance between the unit and the instrument to be cooled as short as possible. Tubing should be straight and without bends. If diameter reductions must be made, they should be made on the inlet and outlet of the instrument to be cooled, not on the chiller.

When fittings have to be changed or the chiller is not used for a long period, be sure to drain all liquid out of the unit. Shut down the unit at first, then put a cup on the ground and disconnect the fitting from the instrument cooled then let the fluid in the tank flow out into the cup and disconnect the fitting on the chiller. Before positioning the unit in the storage be sure the drain tap is closed.

3.4 FLUIDS

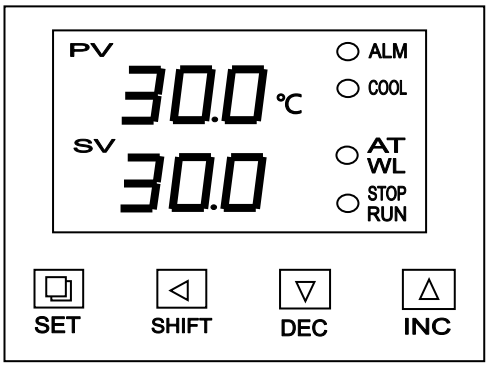
Never use flammable or corrosive fluids with this unit. Do not use automotive antifreeze. Commercial antifreeze contains silicates that can damage the pump seals. The use of automotive antifreeze will void the warranty.

Fluids should be pure and contain no impurities such as grains. Otherwise, the impurities may damage the pump. The use of unpurged fluids will void the warranty. Fluids should be replaced every 6 months.
Whenever fluid is replaced, please kindly add water cleanser into fluid to keep cleaning. For H50-500/Smart H150-1000N/Smart H150-1000NLT/Smart H150-2100NS/
Smart H150-2100NSLT/Smart H150-3000NS, the volume is 2~3 drops.
For H150-5000/H150-7000, the volume is 5~6 drops.

Note: please use mixture liquids of water 50% and glycol 50% when setpoint the is lower than 5℃. Malfunctions caused by using incorrect cooling fluids will void the warranty.

4. OPERATION PROCEDURE

4.1 LCD CONTROLLER



CHANGE SETPOINT

Press SET to enter the temperature set interface, use ▽ △ buttons to decrease or increase the setpoint temperature. ◁ is a transposition key. Press SET again to save and quit the temperature set interface.

ALARMS

A. High/low temperature alarm

Alarm code L-A will be displayed and the buzzer alarm sound when the temperature is overshoot and 5℃, or more, lower than the setpoint temperature. The refrigeration system will stop automatically.

Alarm code H-A will be displayed and the buzzer alarm sound when the temperature is overshoot and 5℃, or more, higher than the setpoint temperature. The refrigeration system will stop automatically.

Switch off the chiller and restart it.

B. Water level alarm

When the water level is lower than the limit, the water level indicator "WL" will be displayed and the buzzer alarm sounds. The refrigeration system will stop automatically.

Fill the water tank and the compressor will restart automatically after 1 minute.

Note: the buzzer can be stopped by pressing any key.

4.2 TOUCH CONTROLLER

4.2.1 MAIN INTERFACE

a) Heating output indicator: the icon is switched ON when the unit is heating
b) Cooling output indicator: the icon is switched ON when the unit is cooling

c) Real time measurements: process parameters are shown on real time. Liquid InLet and Flowrate parameters are options and can be removed from the display from FACTORY SETTING

d) Date and time: date and local time. Enter the SYSTEM SETTING window menu to modify them.

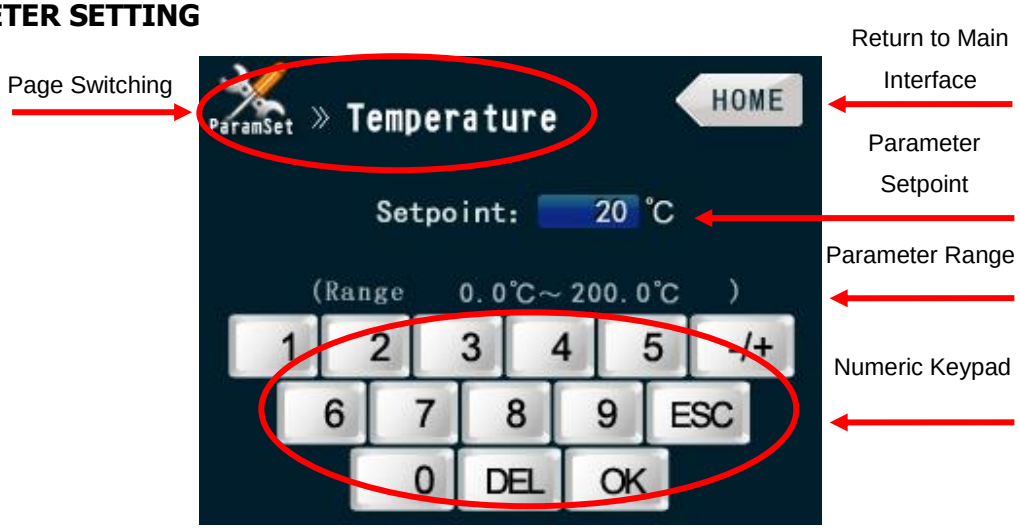
e) Running/Alarm status: shows the unit status between Running and Alarm. Available alarms: Temperature Over-range > Liquid Level > Gas Pressure > Liquid Pressure > Flow Rate >Self Testing > High Temperature > Low Temperature. Running mode indicates the unit is working properly.
f) Running time: partial running time from the unit switch ON. When the unit is switched OFF the timer is reset. Maximum time period: 10.000 hours.
g) Menu: enter the main MENU
h) Set temperature: shows the temperature setpoint value. Touch it to show the TEMPERATURE SETTING window.

4.2.2 MAIN MENU

a) HOME: touch HOME button to return to the MAIN INTERFACE WINDOW

b) HELP: touch HELP button to show the USER MANUAL

PARAMETER SETTING



a) Page Switching: touch the area to change page under PARAMSET

b) Parameter Setpoint: touch the value to activate the area (numbers will become yellow). Use the numeric keypad to modify it. To confirm the new value touch OK button.

c) Parameter Range: parameter setting range.

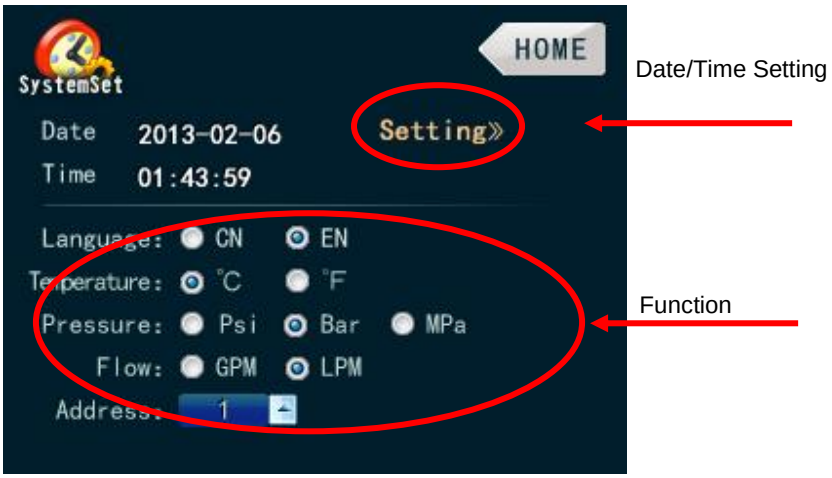
d) Numeric Keypad: keypad can only be used when the value area is activated (yellow). For negative values touch the -/+ button in advance. Once the new value is displayed press OK to confirm (numbers will become white). Touch ESC button to cancel modifications and display the default value. Touch DEL button to delete the last digit selected.

e) HOME: touch HOME button to return to the MAIN INTERFACE WINDOW

f) Parameters Setting Table

NAME	PARAMETER	DESCRIPTION	(RANGE)
Temperature	Setpoint	Value of Temperature	(-20.0～35.0°C)
TAlarm	HTL	High temperature alarm (Active when the Temperature absolute value Alarm is selected)	(0.0～100.0°C)
	LTL	Low temperature alarm (Active when the Temperature absolute value Alarm is selected)	(-20.0～HTL°C)
	HDev	High deviation value of temperature (Active when the Temperature deviation value Alarm is selected)	(0.0～35.0°C)
	LDev	Low deviation value of temperature (Active when the Temperature deviation value Alarm is selected)	(-35.0～0.0°C)
TempLimit	High	High temperature range value	(-20.0～70.0°C)
	Low	Low temperature range value	(-20.0～High°C)
LiquidPressure	Setpoint	Liquid pressure value	(0～10)Bar
LiquidFlowrate	Setpoint	Liquid flow rate value	(2～18) LPM

SYSTEM SETTING



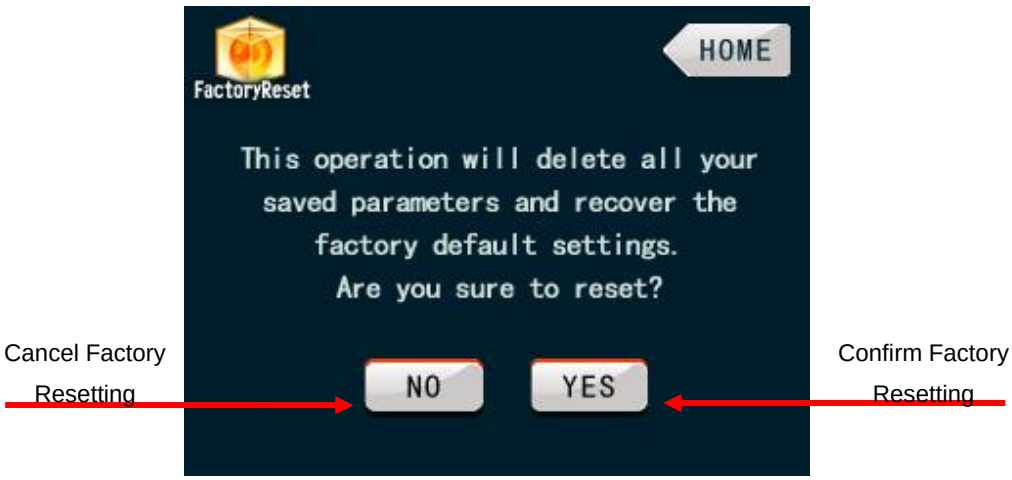
a) Date/Time Setting: touch SETTING to modify date and time.

b) Functions: touch desired values to change in the MAIN INTERFACE WINDOW.

c) Communication COM: touch 1 to 8 COM to set the proper communication port with a target instrument.

FACTORY RESET

Touch YES button to restore default parameters



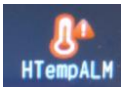
Note: always contact the LabTech Service Team for assistance before modifying or changing the factory setting. Any malfunction due to improper setting is not covered by the warranty.

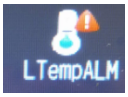
4.2.3 ALARMS

a). TEMPERATURE ALARM

Temperature Over-range Alarm: alarm code "----" is shown and the buzzer alarm sounds when the temperature measured in the liquid tank is lower than the low temperature limit or higher than the high temperature limit, or the PT100 temperature sensor is open circuit / short circuit. The controller automatically shuts down the solenoid valve to stop liquid cooling.

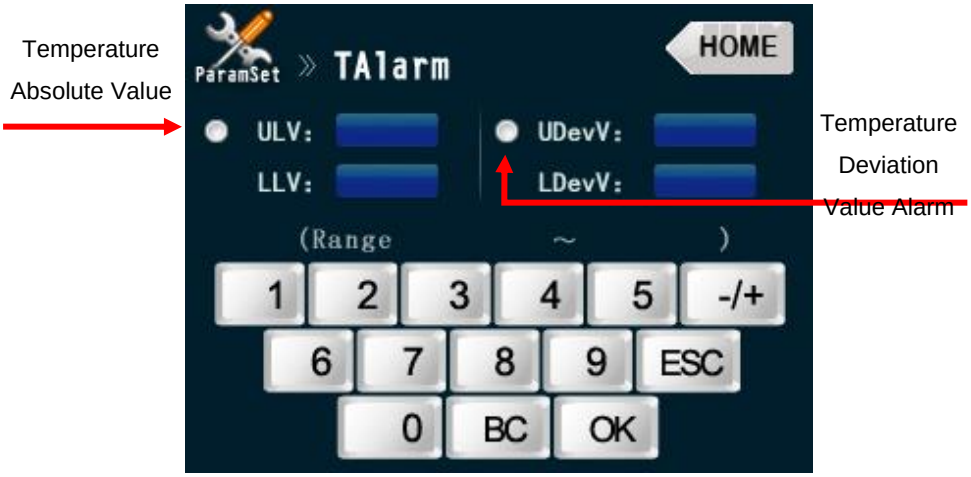
Temperature Absolute Value Alarm: when the temperature measured in the liquid tank is

higher than High Limit Value Temperature (HTL) or lower than Low Limit Value Temperature (LTL), the buzzer alarm sounds and a warning alarm 

or 

is shown to indicate overcooling or overheating. HTL and LTL can be set in the PARAMSET – TAlarm window. The controller automatically shuts down the solenoid valve to stop liquid cooling.

Temperature Deviation Value Alarm: when the temperature measured in the liquid tank is higher than "Set value of temperature + High deviation value (HDev)", a warning alarm displays to indicate over heat. When the temperature measured in the liquid tank is lower than "Set value of temperature - Low deviation value (LDev)", the buzzer alarm sounds and a warning alarm is shown to indicate over cooling. HDev and LDev can be set in the PARAMSET – TAlarm window. The controller automatically shuts down the solenoid valve to stop liquid cooling.



Note:

1) Switch OFF and ON the chiller to restart the normal unit working state after an alarm was activated.

2) The Temperature Deviation Value Alarm is not working while self-testing process is performed.

3) The Temperature Deviation Value Alarm is not working after re-switch ON the unit or the temperature set value changes.

4) Before the compressor starts running, the Temperature Deviation Value Alarm is active, whereas the Temperature Absolute Value Alarm is valid.

b). LIQUID LEVEL ALARM (Optional)

When the low liquid level sensor is activated for more than 10 seconds, the touch controller displays liquid level alarm and the buzzer sounds. The controller automatically shuts down the solenoid valve to stop liquid cooling. The unit turns back to normal state once the proper liquid level in the tank is reached.

c). LIQUID PRESSURE ALARM

When the pressure sensor detects that the liquid circuit pressure is higher than the set value + high pressure limit or is lower than set value – low pressure limit for more than 5 seconds, the touch controller shows liquid pressure alarm 

and the buzzer sounds. The unit turns back to normal state once the proper liquid level in the tank is reached.

d). LIQUID FLOW RATE ALARM (Optional)

When the Switch Times alarm is activated, the touch controller shows flow rate abnormal alarm and the buzzer sounds if the flow switch has been off for more than 5 seconds.

When the Water Flow Rate Analogy Amount alarm is activated, the touch controller shows flow rate abnormal alarm and the buzzer sounds if the flow sensor detects a flow rate higher than set value + high limit value or lower than set value – low limit value. The unit turns back to normal state once the proper liquid level in the tank is reached.

Note: the buzzer can be stopped by pressing any key.

4.2.4 START UP/SHUT DOWN

Before starting the unit, double-check all electrical and plumbing connections.

Open the top panel of the water tank, remove its cap and fill it with water by using a funnel.

For H50 series, it is better to exhaust the air in the pump before the first use, just put the supply tube in a container, switch on the unit for few seconds and leave flow out air and water.

Place the switch of the unit to the up position, the controller will flash and the unit will start.

Place the switch of the unit to the down position, the unit will shut down.

NOTE: if you want to turn on the unit at once after shut down, please wait for 10 seconds.

4.2.5 PRESSURE REGULATION VALVE OF SMART H150

The Pressure Relief Valve is used to adjust the unit's fluid flow/pressure.

NOTE: The valve is factory preset for the most common applications and normally requires no further adjustment. It is factory preset in order not to exceed 60 Psi (4.0Bar).

Before adjusting the valve turn the unit off. Locate the circular regulation valve opening on the rear of the unit.

Turn the threaded stem fully counterclockwise.

If the unit is not connected to the instrument to be cooled install a loop of hose equipped with a shut-off valve between the supply and return fittings.

Turn the unit on.

Use the pressure gauge to see the regulation valve setting.

Turn the threaded stem valve clockwise. Continue until the gauge indicates 60 psi (4Bar) or the desired setting.

NOTE: the regulation valve may drip if the threaded stem is backed out too much.

5. MAINTENANCE

5.1 RESERVOIR CLEANING

Periodically inspect the fluid inside the reservoir. If cleaning is necessary, flush the reservoir with a cleaning fluid compatible with the circulating system and the cooling fluid.

The cooling fluid should be replaced periodically. Replacement frequency depends on the operating environment and running time.

Before changing the cooling fluid ensure that it is at a safe handling temperature.

When fittings have to be changed or the chiller is not used for a long period, be sure to drain all liquid out of the unit. Shut down the unit at first, then put a cup on the ground and disconnect the fitting from the instrument cooled then let the fluid in the tank flow out into the cup and disconnect the fitting on the chiller. Before positioning the unit in the storage be sure the drain tap is closed.

5.2 CONDENSER CLEANING

For proper operation, the unit needs to pull a substantial amount of air through a condenser. A buildup of dust or debris on the fins of the condenser will lead to a loss of cooling capacity.

The lower front of the unit has a one-piece grid assembly. Gently remove it using hands by prying. Use care not to scratch the paint.

Periodic vacuuming of the condenser fins is necessary. The cleaning frequency depends on the operating environment. After initial the installation we recommend a monthly visual inspection of the condenser. After several months the cleaning frequency will be established.

Use care when cleaning the condenser fins, they can easily bend.

5.3 FILTER REPLACEMENT

If the water circuit of the unit is equipped with a filter system, please change the filter cartridge periodically.

6. TROUBLE SHOOTING

6.1 UNIT DOES NOT START

Check the cord; ensure it is plugged in.

Check the position of the circuit breaker on the front of the unit. It has to be in the upper position.

Check the voltage of power supply.

NOTE: several starting attempts may be necessary on units with a Low Flow Switch and configured to shut down with a low flow fault.

6.2 UNIT DOES NOT CIRCULATE FLUID

Check the water level in the reservoir. Fill, if necessary.

Check the instrument being cooled for restrictions in the cooling line.

Check the pump strainer.

Check the pressure gauge, adjust the relief valve as necessary.

6.3 INADEQUATE TEMPERATURE CONTROL

Verify the setpoint.

If the temperature continues to rise, make sure the instrument to be cooled heat load does not exceed the rated specification.

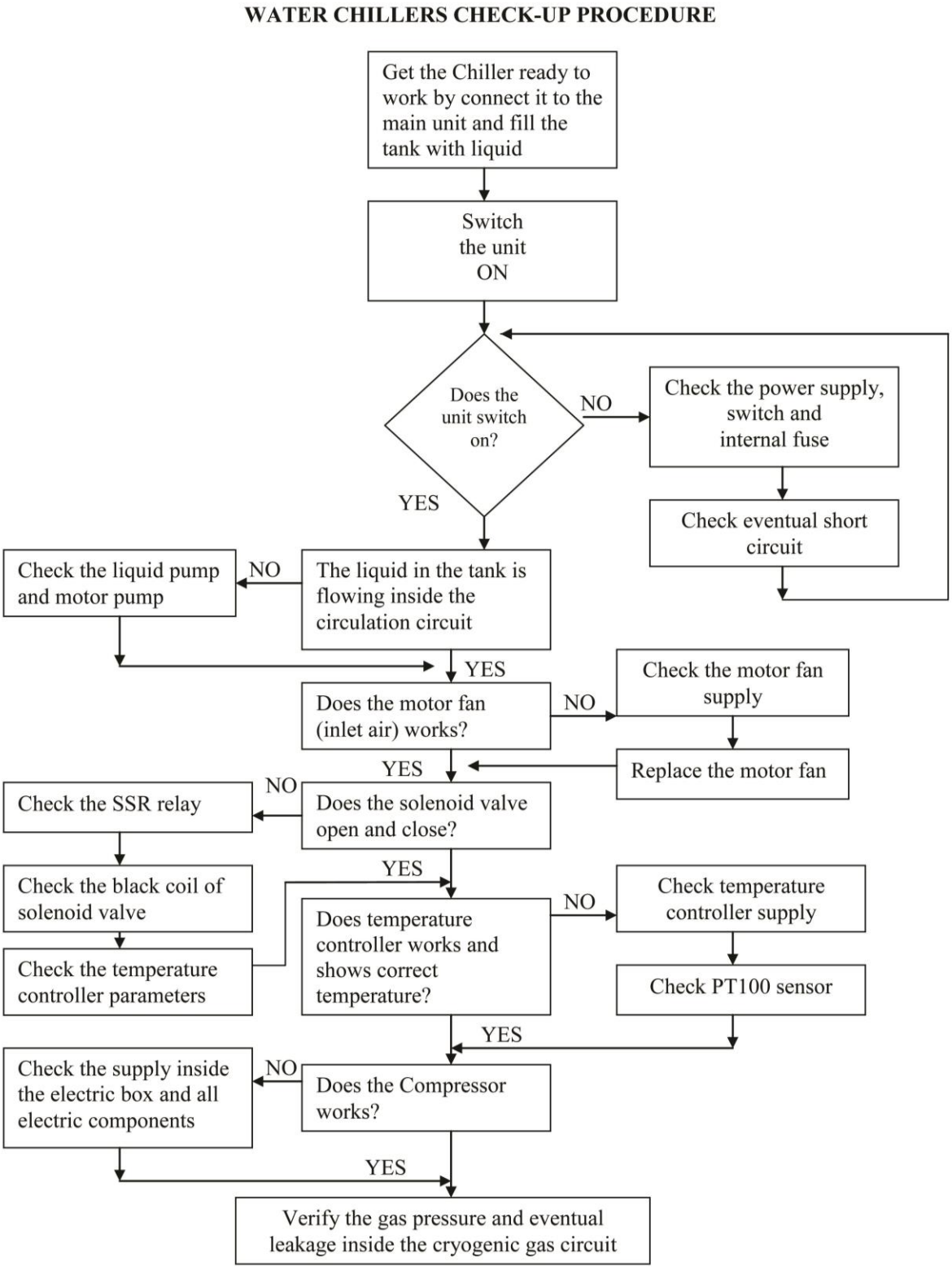
Make sure the air intake and discharge are not impeded and the ambient temperature does not exceed +35℃.

Make sure the condenser is free of dust and debris.

6.4 LEAKAGE

Due to vapor contained in the atmosphere, condensation may occur outside the tubes when the temperature of the refrigeration system is lower than the ambient: specially when the humidity of the atmosphere is high, while the set point is lower, the condensation will be more evident. To avoid such results, a dehumidifier should be use or the temperature set higher.

7. FLOW CHART


WATER CHILLERS CHECK-UP PROCEDURE
Get the Chiller ready to work by connect it to the main unit and fill the tank with liquid
Switch the unit ON
Does the unit switch on?
NO
Check the power supply, switch and internal fuse
Check eventual short circuit
YES
The liquid in the tank is flowing inside the circulation circuit
NO
Check the liquid pump and motor pump
YES
Does the motor fan (inlet air) works?
NO
Check the motor fan supply
Replace the motor fan
YES
Does the solenoid valve open and close?
NO
Check the SSR relay
Check the black coil of solenoid valve
Check the temperature controller parameters
YES
Does temperature controller works and shows correct temperature?
NO
Check temperature controller supply
Check PT100 sensor
YES
Does the Compressor works?
NO
Check the supply inside the electric box and all electric components
YES
Verify the gas pressure and eventual leakage inside the cryogenic gas circuit

8. SERVICE

The LABTECH worldwide technical support network consists of highly trained Field Service Engineers, Technical Support Specialists and Service Coordinators who are ready to quickly assist customers with answers and solutions to service needs and application questions.

For any possible clarification or any request for assistance please contact either our local Representative or:

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