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# Isotemp
# Immersion Circulators

Manual P/N U00438
Rev. 08/11/05

## Instruction and Operation Manual

Fisher Scientific

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# Isotemp Immersion Circulator

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# Preface

## Compliance

The CE label indicates units are compatible with the EU guideline 89/336/EEC (electromagnetic compatibility). The tests are carried out according to module H (official sheet L380 of the European Community). Our quality assurance system is certified according to DIN / ISO 9001.

The specialist basic standards to be applied are EN 50081-2 for interference emission and EN 50082-2 for interference resistance. The following tests were carried out:

| | |
|---|---|
| EN 50081 | EN 55011 class B (interference voltage) |
| | EN 55011 class B (interference radiation) |
| EN 50082 | EN 61000-4-2 (discharging static electricity) |
| | ENV 50140 (electromagnetic HF field (amplitude modulated)) |
| | EN 61000-4-4 (quick transient interference (variable)) |
| | ENV 50141 (high-frequency asymmetrical (amplitude modulated)) |
| | EN 61000-4-8 (magnetic field with power-engineered frequency) |

There are no limitations placed on usage. A declaration of conformity can be supplied with the ordered unit on request.

Other units with the CE label (i.e. monitors or analytical instruments) can be affected if their manufacturers accept an interference ( the flickering of a monitor) as the minimum operating quality under electromagnetic compatibility conditions. We recommend a minimum distance of approximately one meter from such units.

The CE-label also certifies conformity with the EU-directive 72/23/EWG (low voltage regulation). The applied standards are EN61010-1 and EN61010-2-010.

## Unpacking

Retain all cartons and packing material until the unit is operated and found to be in good condition. If the unit shows external or internal damage, or does not operate properly, contact the transportation company and file a damage claim. Under ICC regulations, this is your responsibility.

## Warranty

The Isotemp circulators distributed by Fisher Scientific ("Fisher"), Fisher warrants to the direct purchaser that the product will be free from defects in material or workmanship for a period of two years from the date of delivery. Fisher will repair or replace the product or provide credit, as its sole option, upon prompt notification and compliance with its instructions.

The Distributor warrants to Customer that upon prompt notification and compliance with Distributor's instructions, that the Distributor will repair or replace, at Distributor's sole option, any product which is defective in material or workmanship.

Distributor expressly disclaims all other warranties, whether expressed, implied or statutory, including the warranties of merchantability, and fitness for a particular purpose. Distributor's sole responsibility and the Customer's exclusive remedy for any claim arising out of the purchase of any product is repair or replacement, as described above. In no event shall Distributor's liability exceed the purchase price pain therefor; nor shall Distributor be liable for any claims, losses or damage of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages, howsoever arising, even if Distributor has been advised of the possibility of such damages.



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## Warnings

Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your unit. If you have any questions concerning the operation of your unit or the information in this manual, contact our Sales Department.

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

**Observe all warning labels.**

**Allow unit surfaces to cool before touching.**

**Never remove warning labels.**

**Always turn off the unit before connecting or disconnecting the power cord or other cables.**

**Always turn off the unit and disconnect the line cord from the power source before performing any service or maintenance procedures, or before moving the unit.**

**Never operate equipment with damaged line cords.**

**Refer service and repairs to a qualified technician.**

In addition to the safety warnings listed above, warnings are posted throughout the manual. These warnings are designated by an exclamation mark inside an equilateral triangle with text highlighted in bold. Read and follow these important instructions. Failure to observe these instructions can result in permanent damage to the unit, significant property damage, or personal injury or death.



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# General Information

## Description

The Isotemp Immersion Circulators are used to provide precise temperature control. The unit consists of a circulating pump, heater, temperature sensor, controller and a mounting device.

## Specifications

| **Model** | **2100** | **2150** |
|---|---|---|
| **Temperature Range** | 25°C to 100°C | 25°C to 200°C |
| **Controller** | Analog | Digital |
| **Temperature Stability** | ±0.2°C | ±0.02°C |
| **Heat Capacity** | 115/60 1000 watts<br>230/50 1500 watts | 115/60 1200 watts<br>220/50-60 2000 watts |
| **Pump Capacity** | 115/60 13.0 lpm @ 0 feet<br>220/50 11.3 lpm @ 0 feet | |
| **Weight**<br>*Pounds*<br>*Kilograms* | 9.0<br>4.1 | |
| **Power**[1] | 115V 60Hz, 220V 50Hz | |
| **Environmental Conditions** | | |
| *Operating Temperature* | 5°C to 40°C | |
| *Maximum humidity* | 80% RH | |

1. The supply voltage fluctuations should not exceed 10% of the nominal supply voltage.



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# Operation

## Site

**Never place the unit in an area of high humidity, or corrosive or dusty atmosphere. See specifications on page 3.**

## Assembly

Attach the supplied mounting bracket to the unit. Remove the set of screws and spacers on the rear of the unit then attach the bracket using these screws. Secure the unit to the tank using the bracket. The maximum wall thickness is 26 mm.

## Filling Requirements

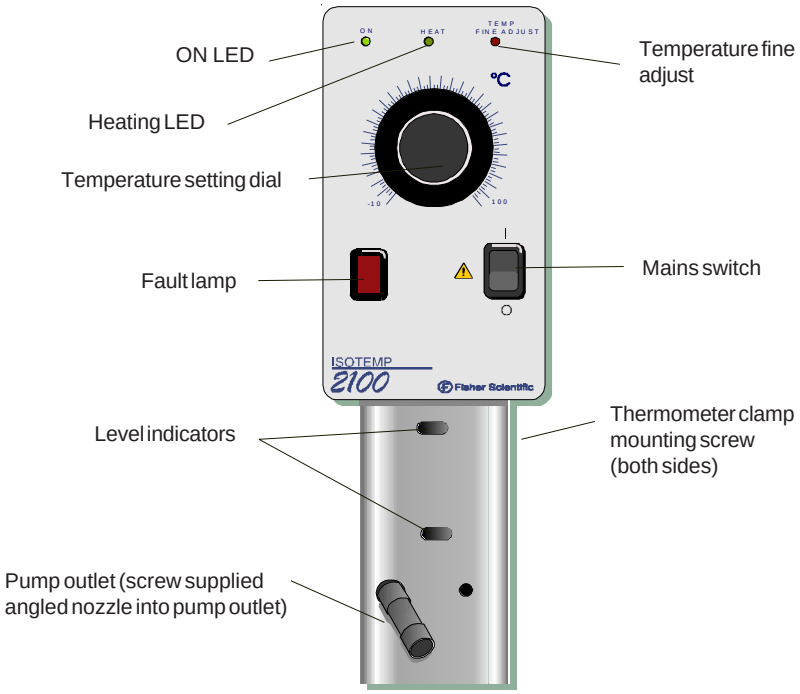
Fill the tank of the bath to be used with the Isotemp to ensure the pump assembly is submerged. Note the fluid minimum and maximum level marks on the unit.

**Never run the unit in an empty tank.**

Select a suitable heat transfer fluid that will not become exceedingly viscous at the lowest operating temperature. To obtain good temperature stability and pumping rates in any bath, we recommend using a fluid with a viscosity of 1.6 centipoise or less at 20°C.

**NOTE:** Higher viscosity fluids may trip the unit's High Temperature Cutout (HTC) which will shut down the unit.

**Never use flammable or corrosive fluids. Highly distilled and deionized water may be aggressive and cause material corrosion.**



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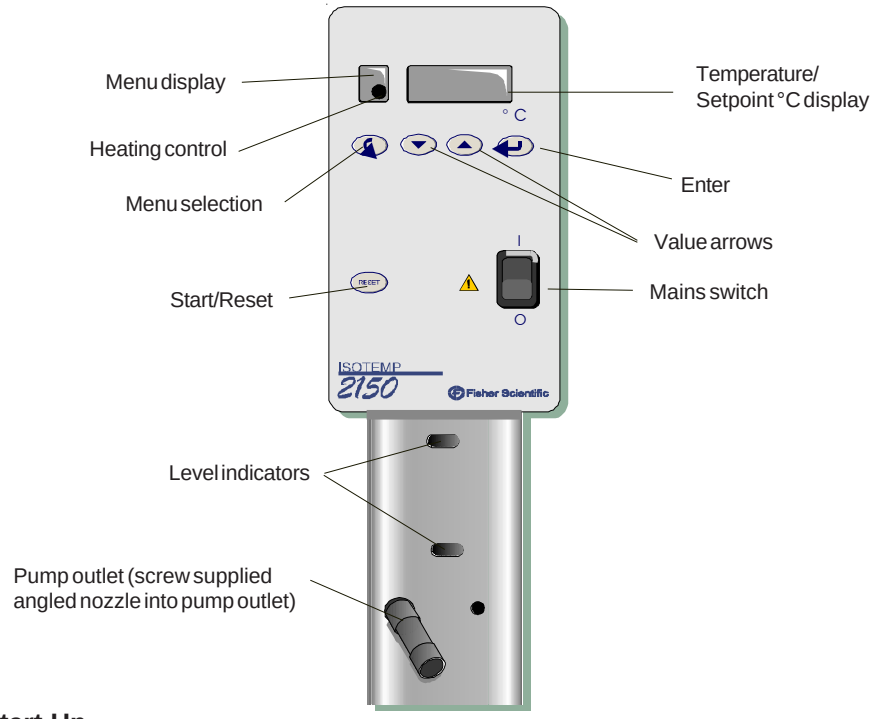


## Start Up

Place the **I/O** switch to the **I** position.

**2100**
The **ON** LED will illuminate and the heating LED will illuminate as needed.

**2150**
The °C display will run a self-test, then press the start/reset button and the °C display, after a brief self-test, will indicate the temperature of the fluid near the unit's control sensor. The heating control display will illuminate as needed.

## Temperature Adjustment

**2100**
Turn the dial to the desired temperature. Use a small screwdriver in the unit's fine adjust potentiometer for exact tuning. Use a thermometer (not supplied) to check the temperature.

**2150**
To display the temperature setpoint keep pressing the menu select key until S is displayed in the menu display. The °C display will indicate the setpoint.

If desired, change the setpoint using the value arrows until the desired setpoint is displayed. Press the enter key to accept the new setpoint value or the unit will default to the old setpoint.



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## Safety Features

All units are equipped with automatic thermally-triggered fuses located on the rear of the unit. Wait at least five seconds before resetting the fuses. Press the fuses to reset them. If the fuse trips again the unit has a defect and should be returned for servicing.

All units have a High Temperature Cutout (HTC). If the HTC temperature limit is exceeded the unit will shut down and, on 2100 units, the fault light will illuminate. On 2150 units, an alarm will sound and a fault message will be displayed.

Use the dial on the rear of the unit to adjust the approximate desired limit. To set an exact limit, run the bath to the desired limit and then slowly turn the dial counterclockwise until the unit cuts off. Without moving the dial, on 2100 units press the outer ring around the dial to reset the HTC. On 2150 units, press the start/reset button on the front of the unit.

**NOTE:** The fluid may have to cool before the unit will reset.

**In the event that the above fault condition occurs, remove power to the unit and corrected the fault condition prior to restarting.**



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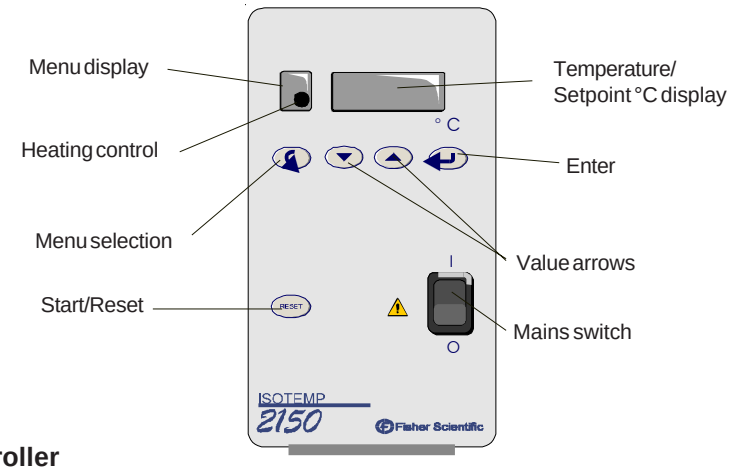
## 2150 Unique Operation




### Controller

**Displaying the software version**

Depress and hold any key and turn the unit on. The operating software version number (e.g. **n 1.5**) is displayed. Release the key.

**Adjusting temperature setpoint**

Press the menu key until **S** (for setpoint value) is shown on the small display. Increase or decrease the value shown on the display using the value keys.

If you keep one of the value keys depressed, the temperature changes slowly in tenths of a degree. Within a few seconds the temperature change rate will accelerate.

Once the desired value is displayed press the enter key. The new value is not saved and permanently stored unless the enter key is pressed. If not, the circulator continues to use the old setpoint value.

**NOTE:** If the symbols **S** and **H** in the menu display flash alternately, see Temperature limitation H in this section. If a fault message is displayed, see Troubleshooting.

After a short time the °C display automatically indicates the fluid temperature.

**Heating control indicator**

This small circular display lights up when heating is switched on (temperature setpoint is higher than the current temperature).

The display lights up constantly during the heating up phase. The display flashes during the control phase.

The display does not light up if heating is not activated (set temperature setpoint is lower than the current temperature).



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**Correction factor cS**

The °C display shows the actual temperature at the unit's control sensor ±0.1°C.

This temperature does not correspond directly to the temperature in the circulator's bath and even less to the temperature of any external connected system. The temperature difference is determined by measuring the actual current temperature using a suitable measuring device (calibrated or gauged thermometer). The difference is a correction factor ( **C** ) which can be entered and stored into the unit.

The resolution of the correction factor is 0.01°C, with a range of ±2.5°C.

To set the correction factor:

Press the menu key until **cS** is shown on the menu display.

Change the correction factor shown on the °C display using the value keys.

Press the enter key to store the new correction factor or the unit will continue to use the old factor.

The correction factor may have to be changed if the temperature setpoint is changed.

After a short time the °C display automatically indicates the fluid temperature.

Example:

Setpoint value programmed at the circulator = 70.7°C

Actual measured temperature in bath/system = 70.5°C

Delta T = 0.2°C

Enter the correction factor = +0.20°C

The temperature displayed at the circulator will now match the external system (70.5°C).

**Temperature limitation H**

If required by the application or the flash point of the selected heat transfer liquid, the circulator's high-end temperature range can be limited

Setting a limit helps avoid faults when operating the unit.

**NOTE**: Changing a limitation to a value below that of the already preset temperature setpoint value, automatically reduces the setpoint value to the limitation value.

To set the temperature limitation:

Press the menu key until **H** is shown at the menu display.

Change the value shown on the °C display using the value keys. Settings have a resolution of 1°C and can only be positive values.

Press the enter key to store the new temperature limit or the unit will continue to use the old factor.

After a short time the °C display automatically indicates the fluid temperature.



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# Maintenance & Troubleshooting

## Cleaning

Periodically clean the unit using a mild soapy solution and a soft, nonabrasive cloth.

**Do not use steel wool. It is abrasive and will lead to rusting.**

## Algae

We recommend the use of Chloramine-T, 1 gram per 3.5 liters.

## Checklist 2100/2150

**Unit will not start.**

Check for fault conditions. Unit made need a reset.

Check the fuses.

Check power source for correct voltage output.

Check line cord plug wiring, see electrical requirements.

**No external circulation.**

Check for obstructions in external system lines.

Circulation will cease when pump head is exceeded. Review specifications.

**Controller ceases operation.**

Ensure the fluid viscosity is 1.6 centipoise or less.

## Checklist 2150

**Power failure**

If the unit shuts down because of a power failure, once power is restored press the start/reset key before restarting the unit.

Units can be configured to automatically reset. This configuration is activated by pressing the menu key and simultaneously switching on the unit. The display will indicate **88888**. Press the reset button. Keep pressing the menu key until **8 ON** is shown in the menu display. This is the default setting. Use the value keys until **8 OFF** is displayed, then press enter. The unit will now start automatically.

When the display automatically returns to the fluid temperature, switch the unit off.

**Display cannot be altered**

The microprocessor can freezes under certain external conditions (e.g. mains voltage surges or electromagnetic disturbances). The unit will no longer react to further operator inputs and will display a random setpoint value (e.g. -90°C) which cannot be altered.

To clear the problem switch the unit off at the mains switch.

Keep both value keys depressed and switch the unit on. The display will indicate **88888**. Press the reset button.



Continued on next page.

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Release the keys as soon as you see **P CODE** shown on the °C display.

The microprocessor is now reset to its basic default settings.

All other parameters must now be reentered.

**Fault Displays**

If a fault occurs an alarm will sound and the °C display will indicate the fault condition.

The heating element and pump will automatically shut down. The following faults are possible:

**AL °C** Excess temperature

The fluid temperature is higher than the temperature set on the HTC. If this is not the case return the unit for servicing.

**AL -n** Low liquid level
There is not enough liquid in the bath. Fluid may have evaporated but also check for leaks. Top off if necessary.

**AL -P** Pump or motor overloading
The motor or pump is blocked. It can take 10 minutes or longer until the motor temperature cools enough so that the unit can be switched on again by pressing the start/reset key . If the circulator switches off again return the unit for servicing.

**AL -F** Sensor breakage or short circuit
The sensor is damaged. Please return the unit for repairs.

**AL -r** Undefined fault
This can be caused by a momentary fault, i.e. a fluctuating bath level when the filling level is very close to minimum.

Top off the unit.

In all other cases this unit must be checked by qualified service personnel.

**8 Err** Range exceeded
The fluid has exceeded the temperature limitation value. Switch the unit off and restart. In all other cases this unit must be checked by qualified service personnel.

**Fault eliminated?**
After the fault has been eliminated, the cause of the fault is shown on the °C display (e.g. **°°° F**). The preceding three zeros mean that the fault has been eliminated.

The start/reset key must be pressed in order to restart the unit.



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