



# INSPISSATOR

- Stainless Steel •
- Microprocessor based •

**All warranties stand void and safety features are nullified if the grounding (earth) in the electrical supply is not proper.**

***The Inspissator needs a single phase, 220V AC electrical supply capable of delivering 20A current to power two 1.5kW heaters.***



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## **ZENITH ENGINEERS**

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## PHYSICAL DESCRIPTION

1. The Inspissator consists of two systems.
  - A. The Media Bottle Unit (MBU) made from stainless steel, with tray, water tank and heaters.
  - B. The controller unit (CU) with an LCD display, microprocessor based controller, cascaded relays, MCB and power supplies.
2. The controller unit should be placed at some distance from the media bottle unit. Since the MBU releases steam, placing the units separately avoids steam condensation on the CU, thus preventing water short-circuits and rusting.
3. Looking at the front of the CU, there is:
  - a. A backlit LCD display with 16x2 alphanumeric characters,
  - b. A rotary knob around the center of the panel, and
  - c. A rocker switch.
4. On the back of the CU, is:
  - a. An MCB,
  - b. Two 32A capable power sockets (generally seen used for air conditioners),
  - c. A small 5A fuse,
  - d. One 3-pin (5A type) wire cord, and
  - e. One long aluminium cable with external an earth wire tied around it.

5. The MBU is a double walled cabinet made from stainless steel sheet, with a door on the top. The bottom is made from a water tank having four 1.5kW water immersion heaters. There are four wheels for easy movement of MBU.
- There is a 10mm port towards the top on the back wall of the MBU through which the temperature sensor cord is leaving the MBU. On the inside of this port, a silicone tube encloses this sensor cord and at the end is a stainless steel RTD sensor (Pt100).
  - Above this port is another 1” port from which an ‘L’ shaped SS tube comes out. This is the steam-escape port that releases steam from inside the MBU and avoids pressure build-up inside.
  - Around the middle, on the inside of the MBU are two steel square pipes bolted at an angle, one each, to the two sides. The media-bottle holding tray has two square pipes welded to it. These pipes of the tray will rest on the square pipes bolted to the sides. The tray loaded with media bottles will, therefore, be hanging in space above the water tank midway in the MBU.
  - On the back of the MBU, towards the bottom, there are two sets of plastic casing pipes, each having two sets of power cords with 32A plugs. In total there are four 32A plugs, one each for the heater in the water tank inside the MBU. Two are to be used at a time. The extra two are standby heaters that can be used individually in case any of the heaters burn out.
  - On the bottom inside the MBU of the water tank is a water outlet nipple. An ordinary rubber pipe connects to this nipple and can be used to drain the water by bringing the pipe below the level of the water tank. To stop the water flow, the drain pipe is lifted up and passed through the bracket screwed at the back of the MBU and let to hang. The pipe level is now above the water tank level and the water will not drain out.

## ELECTRICAL CONNECTIONS

### To connect the Media Bottle Unit to the Controller Unit:

On the back of the MBU, towards the bottom, there are two sets of plastic casing pipes, each having two sets of power cords with 32A plugs. In total there are four 32A plugs, one each for the heater in the water tank inside the MBU. Two are to be used at a time. The extra two are standby heaters that can be used individually in case any of the heaters burn out.

1. Plug any two of the heater power cords, to the sockets in the back of the CU.
2. There is a female-type sensor plug with three pins and grey-blue Teflon<sup>®</sup> wire that comes out of the back of the MBU. This plugs into its socket at the back of the CU.
3. Place the CU away from the MBU so that any steam condensation from the MBU doesn't happen on the CU.

## To connect the Controller Unit to Electrical Power Supply:

On the back of the CU, there is one 3-pin (5A type) wire cord, and one long aluminium cable with an external earth wire tied around it.

The 5A 3-pin cord provides power to the microprocessor based controller inside (along with the relays and LCD display etc.).

The long aluminium cable with the external earth wire is for providing high amperage electrical supply to the heaters.

1. Connect both these (cord and cable) to a power supply, ENSURING PROPER GROUNDING.
2. Switching ON the Miniature Circuit Breaker (MCB) at the back of the CU completes the circuit from the electrical power supply to the cascaded relay inside the CU. This relay is operated by the microprocessor temperature controller (depending on the set and actual temperature inside the MBU).
3. The rocker switch on the front panel of the CU will provide electrical power to the microprocessor based temperature controller inside the CU.



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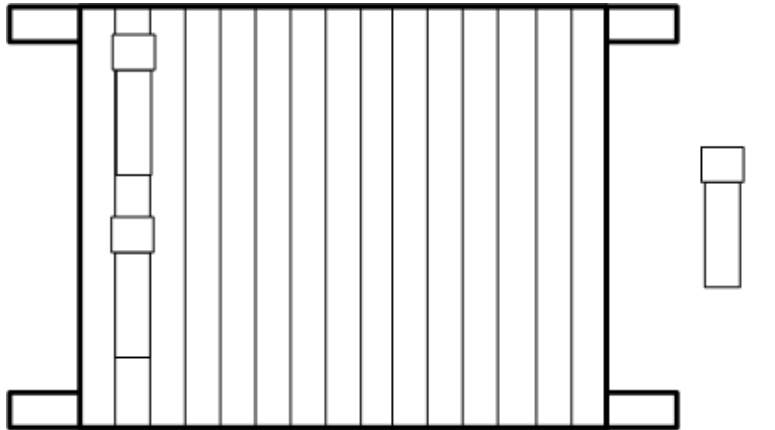
## Filling the Water Tank in the MBU with Water:

1. Ensure that the drain pipe towards the back of the MBU is hung on the bracket. This stops any draining of water from the water tank.
2. Pour water into the water tank to fill the tank. The level should be about 1" less than the water tank rim.
3. There is no harm in filling the tank fully, however the heat-up time in this case will be more. Heat-up means time it takes to reach the set temperature.

**ALWAYS USE DISTILLED WATER**

## Loading the tray with media bottles:

1. The stainless steel tray is made from steel wires. Place media bottles in it so that they are aligned to the steel wires.

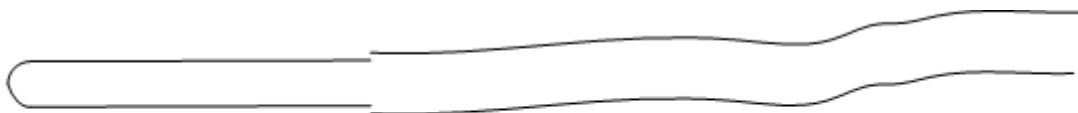


2. Place media bottles on the tray creating a layer of media bottles that covers the whole tray.
3. The stainless steel wired tray is about 4" high. So above the first layer of bottles, a second and third layer of bottles can be placed. Even a fourth layer can be placed to increase the capacity.
4. Now open the door of the MBU. Lift the tray and place it carefully inside the MBU. The stainless steel square pipes welded to the tray will rest on the stainless steel square pipes bolted to the sides on the inside of the MBU.
5. Ensure that the tray is kept in its place and not dropped from a few inches on to the bolted square pipes. This will usually take 2-4 persons to do properly since the weight of over 250 media bottles is going to be substantial.

## Placing the temperature Sensor:

The temperature is detected through a 3-wire Pt100, RTD sensor embedded inside a stainless steel thermowell. The wires are run through a silicone pipe inside the MBU. The stainless steel thermowell that is outside this silicone pipe is the actual sensor.

1. Once the tray is loaded with the media bottles and kept in the MBU, the sensor is to be placed. The silicone tube is flexible, so the sensor can be placed anywhere in the MBU.
2. Place the sensor between the media bottles in the tray. Preferably it should be placed above the first layer of bottles, between the first and the second layer of media bottles. If there is no second layer of bottles, then place the sensor on top of the first layer.



Place this part  
between the tubes

## Starting up the Inspissator:

1. Ensure that:
  - a. Water tank is primed with water,
  - b. Temperature sensor is placed between the media bottles,
  - c. Temperature sensor is connected to the back of the CU,
  - d. Power cables from the heaters are connected to the back of CU,
  - e. Power cords from the back of CU are connected to the power supply.
2. On the controller unit, turn on the MCB, and switch on the rocker switch.
3. The start-up screen on the LCD should display:

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and to indicate the user and serial number:

CMC, Vellore  
Serial INSPI - xxx

4. Finally:

030°C, Set=085°C

5. Rotate the knob in the front of the control panel. The SET value should increase or decrease. This is the value of the temperature that is desired.

## Starting up the Inpsissator (contd.):

6. The first three characters i.e. 030°C in the example above is the actual temperature that is read out from the sensor.
7. Once this has been done and within a few moments, if the set temperature is more than the actual temperature, the heater relay will switch on and there will be a sound of the relay actuating. The screen will now display:

030°C, Set=085°C  
Heater ON

8. The heaters now start to heat. Gradually the temperature will rise till the set temperature. Once that happens, the relay will turn off with another sound of relay de-actuating. The screen will then display:

085°C, Set=085°C  
Heater OFF

9. While this is happening, steam escapes from the L-shaped tube at the back of the MBU.
10. Let the Inspissator operate for the time the inspissation needs to be done.
11. To shut down the Inspissator, switch off the rocker switch and the MCB of the CU.

### Opening the MBU:

1. After the time is completed, let the Inspissator stand for some time to let it cool down.
2. **THERE IS GOING TO BE A LOT OF STEAM INSIDE THE INSPISSATOR, WHICH IS DANGEROUS TO ANYBODY WHO OPENS THE TOP DOOR OF THE INSPISSATOR. SO LET THE INSPISSATOR COOL DOWN FOR AT LEAST 30-45 MINUTES AFTER SHUTTING DOWN THE CONTROLLER UNIT. EVEN THEN OPEN THE DOOR AFTER WEARING GLOVES AND COVERING THE ARMS WITH SOME CLOTH OR TOWEL, SO THAT THE STEAM DOES NOT BURN THE OPERATOR. WHILE OPENING THE OPERATOR SHOULD TURN HIS FACE AWAY FROM THE INSPISSATOR.**
3. Please the above instructions very carefully to avoid any accidents and mishaps.
4. Once the door is opened and the steam escapes lift up the tray, very carefully. The media bottles should have been inspissated.



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## TROUBLESHOOTING:

1. In case any of the heater burns out, remove its cord from the back of the CU and attach another of heater cords to continue operation.
  2. At times, if the electrical power supply cannot meet the load of the heaters, the MCB may switch off. Switch it on to turn on the heaters.
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