

AUTOMATIC STEAM CAKE MAKER

I have introduced an idea to make Steam Cake (Puttu) easier. Since it can be connected to our smartphone it will become a smart and user friendly device for every kitchen.

To make my idea alive, I have made a prototype with wood.

It's made with the help of lathe. Basically it has 3parts

1. Induction Cooktop (The base section)
2. The putt holder and water carrier vessel (The mid section)
3. Top lid (The top section)

INDUCTION COOKTOP

This part consist of all the control circuits and master power supply circuits. Which are permanently assembled to make the device user friendly. The Bluetooth device is also attached within this section. The attached power supply cord can be directly connected to 230V 50Hz Mains AC Socket.

A dedicated Android or iOS app can be built to connect with this device. With in the Bluetooth connectivity range, this device can be operated. By carrying the base part alone it can be used as a Portable Induction Cooktop.



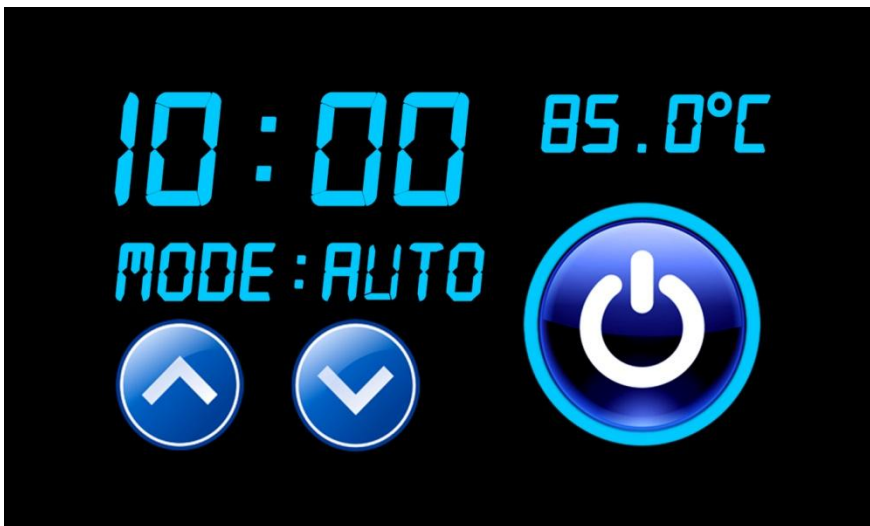


The surface of the Induction Cooktop.

THE Puttu HOLDER AND WATER CARRIER VESSEL

This part consist of water vessel and the Rice flour holder. On its surface an OLED Display is provided to view the device status as well as it's working temperature and timing details.





There is display provided for the temperature info, Timing details and other settings. Three buttons are also included. Power button is used for Switching the device ON and OFF. UP & DOWN buttons are provided for temperature adjustments.

TOP LID

It is a covering of the entire system. Small holes are provided as the exhaust for the steam. It also acts as a protective lid.

FINAL OUTLOOK

The final Outlook may be look like this. Total height of the product is approximately 250mm and the width is approximately 160mm.



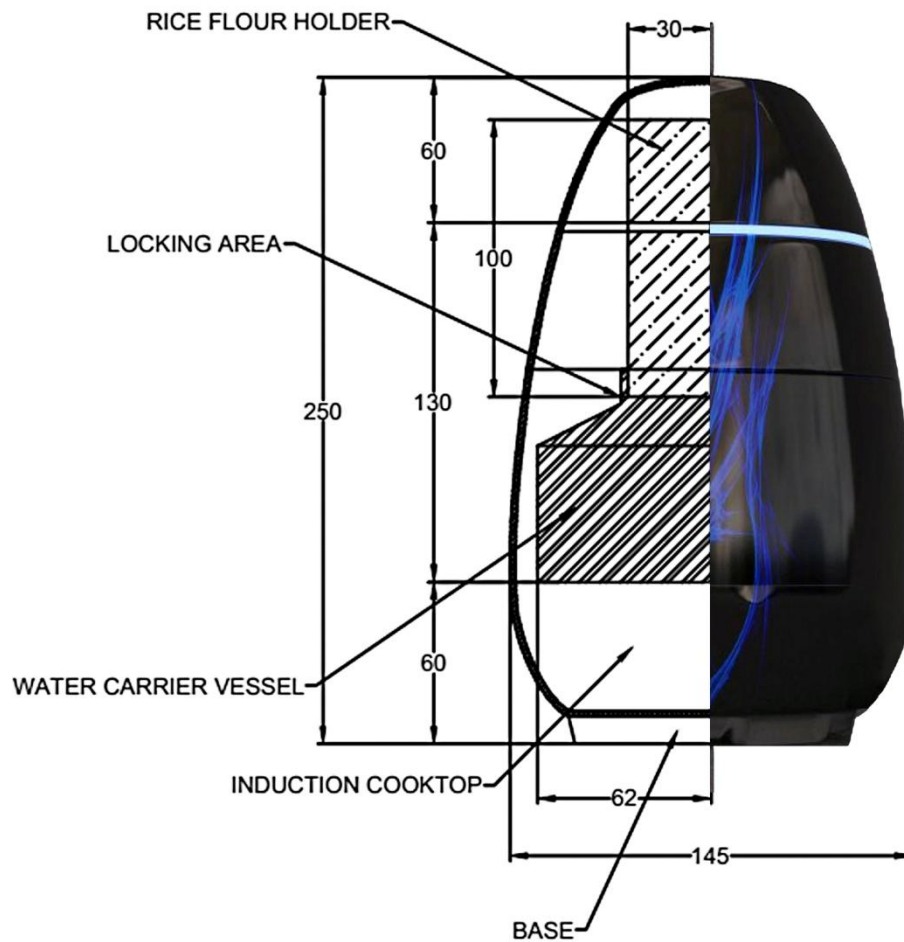
WORKING OF DEMO CONSTRUCTION

For Explanation purpose we have included an **Arduino Nano**, **Bluetooth module**, **Pixel LED**, **Power board** etc... inside the induction cooktop part. While powering up the device the Arduino board will be booted and by using a smartphone this device can be paired to the phone. Before the connection a Blue light can be seen under the lid ring. If the connection is succeeded it will turns to Green. And if the cooking is completed a Red light can be observed. A beep sound can be also heard while booting the device. After cooking the another beep sound can be heard. The input power can be up to 250v 50Hz AC.

HOW TO USE THIS DEVICE ?

We are just required to fill up the water container with sufficient quantity of water and fill the steam cake container with Roasted Rice flour (*puttu podi*) along with necessary ingredients and just switch ON the device then set it to automatic mode, it will remind you with an alert when the cooking is completed. Now you can release the top cover to have your delicious Steam cake.

HALF CROSS SECTIONAL VIEW OF THE DEVICE



All the above dimensions are in mm and those dimensions are actual.

It consist of mainly Three Parts as explained earlier,

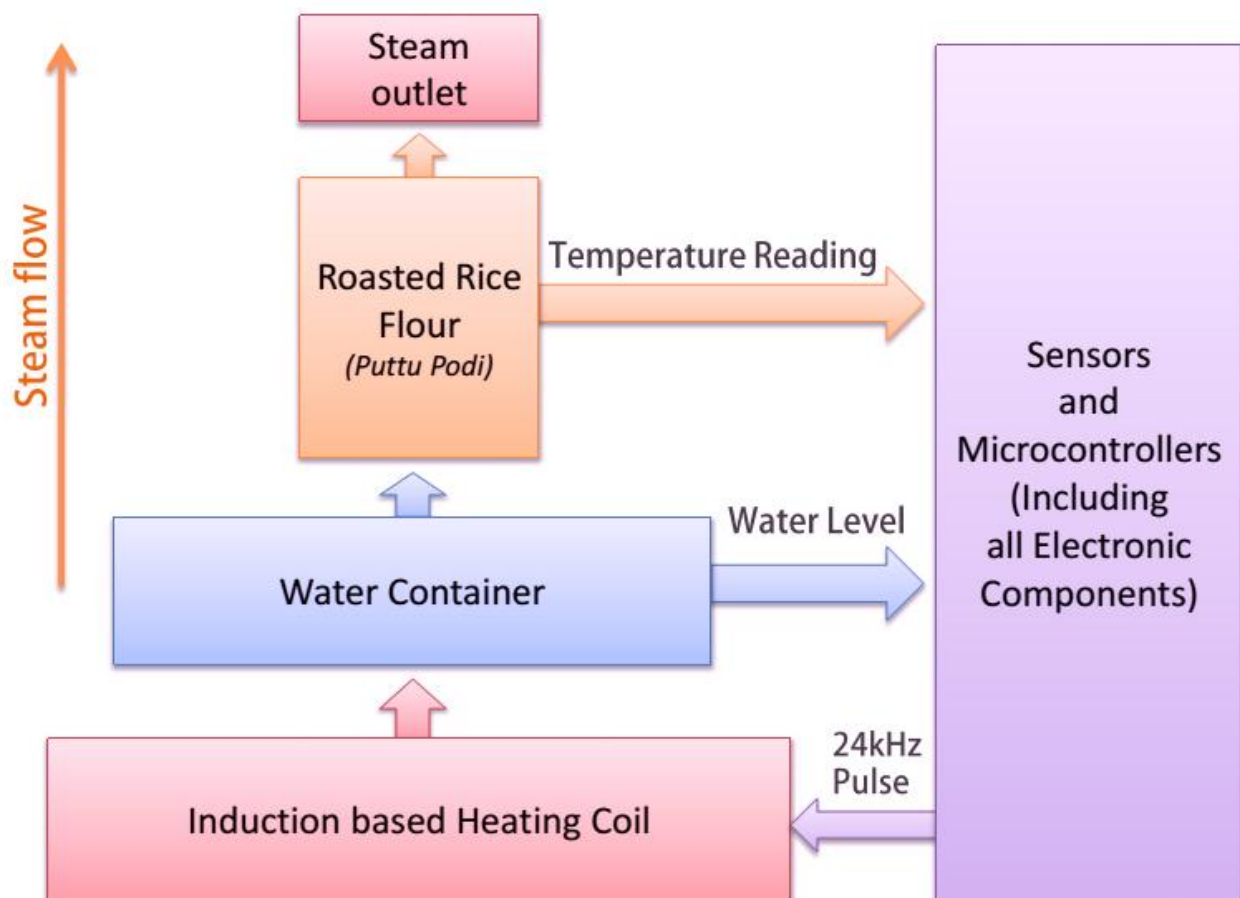
- Induction Cooktop
- Water carrier vessel
- Rice flour holder

Actual Construction & Working

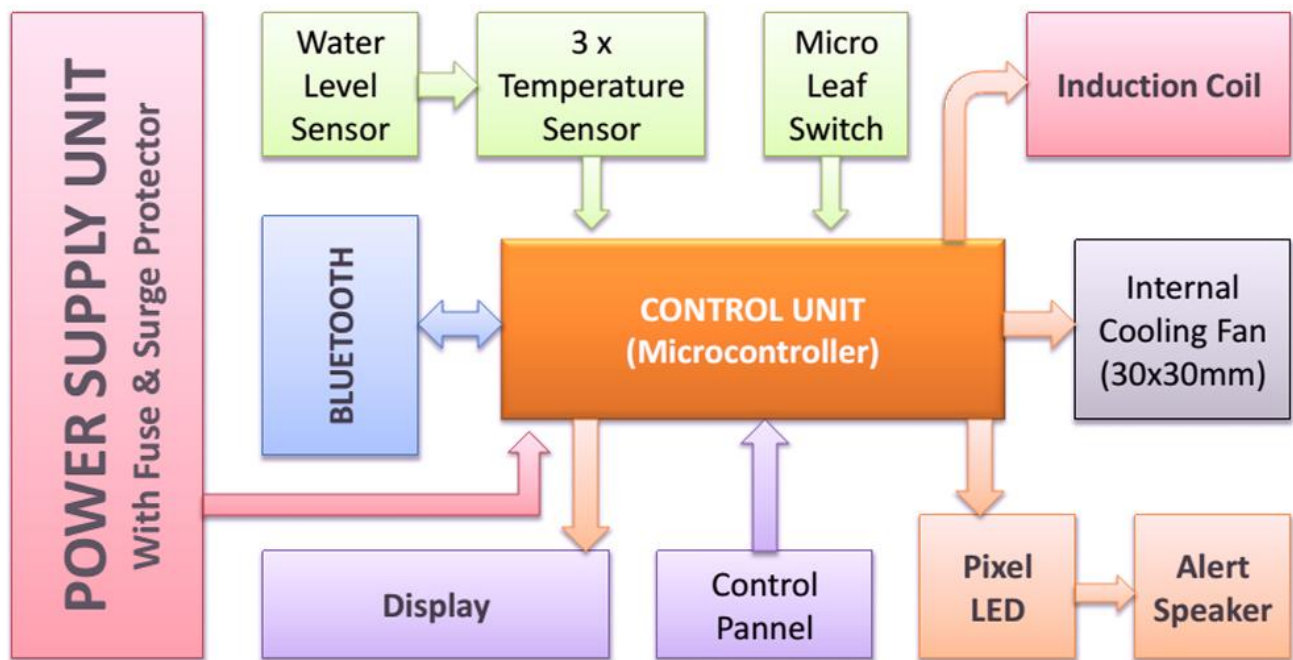
Within the device shielding it consist of a coil and this coil is energised in a well controlled manner by the help of dedicated sensors and microcontrollers. And thus uses energy only when needed.

On the top of the coil there will be an easily removable metallic flat based vessel for water boiling. It consist of one inlet port and the same will be act as a steam release hole. On the top of it, hollow cylinders are fixed with base cap or base plate. it has holes on them for stream ejection. The whole system is within single strong enclosure.

OVERALL WORKING FLOW CHART



ELECTRICAL & ELECTRONICS COMPONENTS BLOCK DIAGRAM



In this design we have introduced 2 thermistors on the surface of the cylinder. One on the top surface and the other on the bottom surface of the cylinder. This is used to read the real time temperature of the cake. Another temperature sensor is placed on the vessel.

A water level sensitive probes are provided to measure the level of water and act accordingly. At inlet opening lid there is a leaf switch to make sure the lid is closed before operating the device (For Human Safety).

As the coil is energised by controlled 24kHz Pulse, it heats up the Metallic water container and thus boils the water in it and converts it to steam. This steam is directed towards the cylindrical container with roasted Rice flour. This steam cooks it in to a steam cake. When the top surfacetemperatre is aproximately equal to the bottom surface temperature, The microcontroller will suddenly cuts off the 24kHz control pulse to the coil. The cut off threshold, Temperature, Timingscan be manually adjusted (If needed) by the user through the User Interface.

An LED strip is provided to get a visual indication. The colour tone of the light is changed according to the state of the device and this we can predict the cooking status without even touching it.

A buzzer is provided to inform the user with the status of the device. This helps the user to predict the status of the device

UNIQUENESS OF THE PRODUCT

- ❖ This device has high energy efficiency since it uses Induction principle to work. Compared to traditional methods, its energy consumption is dramatically low.
- ❖ You can use this device anywhere as you wish.
- ❖ No need to check for the status of the cooking. It will notify you when it is done.
- ❖ It can be also used as an Electric kettle.
- ❖ This device can be connected to smartphones via Bluetooth – for Diagnostic purpose (Like OBD [on-board diagnostics port] in the CAR) as well as device status indication via notification.
- ❖ User replaceable Electrical surge protectors.
- ❖ It can be used as a normal Induction cooktop whenever you want.
- ❖ This device works in a well controlled manner since dedicated sensors monitor the live condition of the system and adjust itself to work smoothly.
- ❖ The provided display and control switches help to handle the device easily.
- ❖ It gives a visual indication through vibrant colours by using PIXEL LEDs. Therefore you can easily predict the status of the device by just a look.
- ❖ Active temperature monitoring for better cooking.
- ❖ Active water level monitoring and level indication.

APPROXIMATE COST FOR A SINGLE PRODUCT

SL NO	ITEMS	COST
1	Induction coil	150
2	IGBT	180
3	0.96 Inch 4Pin I2C Blue Oled Display	240
4	Sensors	30
5	Bluetooth module	180
6	Basic electronic components	150
7	Power supply board & its associated components	450
8	2 pin mains AC cord wire and signal wires	90
9	Microcontroller (<i>ATmega328p</i>)	140
10	PCB	30
11	Pixel LED	140
12	Body parts and casing	200
13	Water container & Rice flour holder	300
14	Others (<i>Screws, Washers, Bolt, Nut etc..</i>)	30
GRAND TOTAL		Rs : 2310 /-

*[This Approximate rates are from the **Amazon** and from **Local Electronics Shops**.
Labour charges and **Factory expenses** are not included in this list]*

FINAL LOOK OF THE FACTORY MADE PRODUCT



After the final factory production the device may look like the above image and the dimensions would be 250mm (Height) and (145mm) Diameter.