

ELECTRICAL/ELECTRONICS EQUIPMENT SERVICING Level – II

Based on April 2022, Curriculum Version 1



**Module Title: Constructing and Repairing Electric
Mitad and Stove**

Module Code: EIS EEES2 M07 0322

Nominal duration: 80 Hours

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Acknowledgement

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Acronyms

AC.....	Alternating current
DC.....	Direct current
OHS	Occupational health and safety
LAP	learning assistance program
LED.....	light emitting diode
PCB.....	printed circuit board
ESD.....	electrostatic discharge
DMM.....	digital multi-meter
VOM.....	volt ohm meter
GFCI	Ground Fault Circuit Interrupter

Introduction to the Module

In Electrical/electronic equipment servicing filed; the: Constructing and Repairing Electric Mitad and Stove project helps to require to maintain and repair Electric Mitad and Stove includes constructing, diagnosing faults, dismantling, re-assembling, testing and preparing report.

This module is designed to meet the industry requirement under the Electrical/electronic equipment servicing occupational standard, particularly for the unit of competency: Constructing and Repairing Electric Mitad and Stove

Module units

- Prepare unit, tools, equipment and workstation
- Construct Electric Mitad and Stove
- Diagnose faults of the unit
- Maintain/repair the unit
- Test repaired unit

Learning objectives of the Module

At the end of this session, the students will able to:

- Prepare unit, tools, equipment and workstation
- Construct Electric Mitad and Stove
- Diagnose faults of the unit
- Maintain/repair the unit
- Test repaired unit

Module Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Unit one: Set up the unit, tools, equipment, and workstation

This learning unit is developed to provide the trainees the necessary information regarding the following content coverage and topics:

- OHS and PPE
- workplace for maintenance
- tools, test instruments
- Verifying repair/maintenance
- Preparation of workplace/equipment

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Prepare of OHS and PPE
- Arrange workplace for maintenance
- Prepare tools, test instruments
- Verify repair/maintenance
- Prepare workplace/equipment

1.1. Preparation of OHS and PPE

Personal Protective Equipment (PPE) is defined in the Occupational Safety and Health Administration (OSHA) as a tool used to protect workers from injury or illness caused by having contact with the dangers (hazards) in the workplace, whether they are chemical, biological, radiation, physical, electrical, mechanical and other. Exposures to hazards are reduced using PPE.

The types of Personal Protective Equipment.

Personal Protective Equipment can be classified according to target organs potentially affected of the risk of danger. Identification of hazard and risk assessment of a job, process and activity must be done first before deciding which type of PPE to be used.

Organ		Source of danger	PPE
1	Eye	splashes of liquid chemicals or metals, dust, catalyst powder, projectiles, gas, steam and radiation.	safety spectacles, goggles, face shield, welding shield
2	Ear	the sound with the noise level more than 85 dB.	ear plug, ear muff, canal caps.
3	Head	crushed by falling objects, hit by hard objects, rotating objects entangled hair	helmets, bump caps.
4	Respiratory	dust, steam, gas, lack of oxygen (oxygen deficiency).	respirators, breathing apparatus
5	Body	extreme temperatures, bad weather, splashes of liquid chemicals or metals, a blast from a leaking pressure, penetration of sharp objects, dust contaminated	boiler suits, chemical suit, vest, apron, full body suits, jackets.
6	Hand and Arm	extreme temperatures, sharp objects, crushed by heavy objects, electric shock, chemicals, skin infections.	gloves, armlets, mitts.
7	Foot	slippery floors, wet floors, sharp objects, falling objects, chemical splashes and liquid metals aberration.	safety shoes, safety boot leggings.

Table 1.1 Personal Protective Equipment

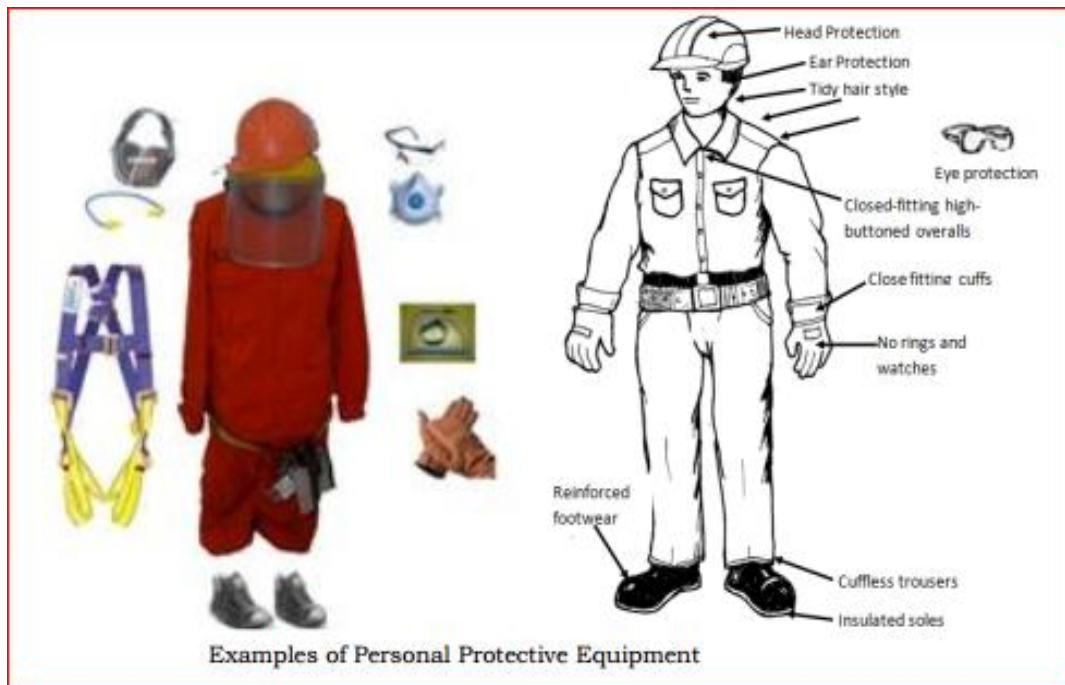


Figure 1.1 Personal Protective Equipment

1.2. Arranging workplace maintenance

In every electronic work, it is a must to prepare first the necessary tools, materials, equipment and well organized workplace needed as well as the information. Some of The following list of tools, materials, and equipment/but not limited/ are needed in maintaining and repairing domestic electronically controlled equipment/appliances and a sample of workshop organization shown below.

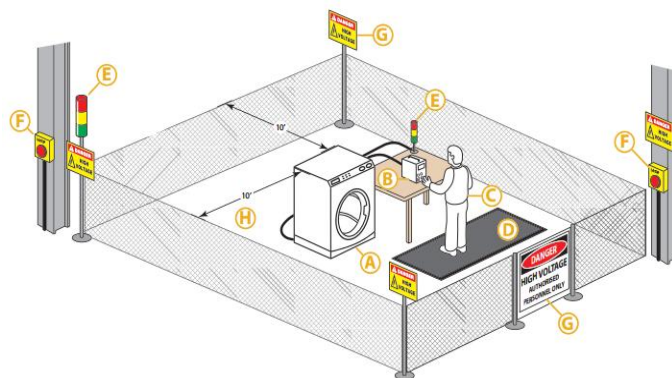


Figure 1.2 workshop organization

Table 1.2 workshop organization

A	DUT – This large DUT prevents you from using a product safety enclosure. Instead, other precautions must be taken to ensure a safe testing station.
B	The Hipot Tester – tester used to test the DUT.
C	Test Operator.
D	High Voltage Insulation Mat – This isolates you from ground which provides an additional means of protection when operating high voltage equipment.
E	Signal Tower Light – gives an indication as to the status of the testing area. A green light indicates the Hipot tester is not outputting high voltage and the test area is safe. A red light indicates that the Hipot tester is active and to stay clear of the test area.
F	Emergency Stop Button – An E-stop button is located on the perimeter of the test area. In the event of an emergency, someone outside the test area can hit the E-Stop button to immediately cut off power to the entire test station.
G	Warning Signs ⁴ – Mark the testing area with clearly posted signs that read: DANGER-HIGH VOLTAGE TEST IN PROGRESS. UNAUTHORIZED PERSONNEL KEEP AWAY.
H	Sectioned Off Test Area – Since the size of the DUT restricts the use of an enclosure, this test area is sectioned off by a mesh fence to keep unauthorized personnel away from the testing station. NEC (National Electric Code) and NFPA (National Fire Protection Agency) ⁵ stipulate that any unqualified workers shall not come within 10 feet of an EXPOSED energized circuit.

1.3. Preparing tools and test equipment

Preparing tools, test instruments: same of are listed below but not limited













		
Soldering Iron with stand	Soldering Lead	Desoldering Tool
		
Diagonal Cutting Pliers	Long Nose Pliers	Wire Stripper
		
Adjustable Plier	Philip Screwdriver	Flathead Screwdriver
		
Multitester/ Volt-Ohm-Milliammeter (VOM)	Combination Wrench	Utility Knife

Figure1.3 tools, test instruments

1.4. Repair & maintenance equipment

Maintenance recommendations are based on industry standards and experience in Reclamation facilities. However, equipment and situations vary greatly, and sound engineering and management judgment must be exercised when applying these recommendations. Other sources of information must be consulted (e.g., manufacturer=s recommendations, unusual operating conditions, personal experience with the equipment, etc.) in conjunction with these maintenance recommendations.

Types of maintenance

Maintenance is work done to correct, reduce, or counteract wear, failure, and damage to equipment. Maintenance of electrical and electronic equipment is divided into two main categories: PREVENTIVE (routine) and CORRECTIVE maintenance.

- **Preventive maintenance:** - consists of mechanical, electrical, and electronic checks to determine whether equipment is operating properly. It also consists of visual inspections of cabling and equipment for damage and to determine if lubrication is needed.
- **Corrective maintenance:** - isolates equipment failure by means of test techniques and practices; it also replaces defective parts and realigns or readjusts equipment to bring it back to proper performance

Maintenance and test procedures

Maintenance activities fall into three general categories:

A. Routine Maintenance: - Activities that are conducted while equipment and systems are in service. These activities are predictable and can be scheduled and budgeted. Generally, these are the activities scheduled on a time-based or meter-based schedule derived from preventive or predictive maintenance strategies. Some examples are visual inspections, cleaning, functional tests, and measurement of operating quantities, lubrication, oil tests, and governor maintenance.

B. Maintenance Testing: - Activities that involve using test equipment to assess condition in an offline state. These activities are predictable and can be scheduled and budgeted. They may be scheduled on a time or meter basis but may be planned to coincide with scheduled equipment outages. Since these activities are predictable, some offices consider them “routine maintenance” or “preventive maintenance.” Some examples are governor alignments and balanced and unbalanced gate testing.

C. Diagnostic Testing: – Activities that involve using test equipment to assess the condition of equipment after unusual events, such as equipment failure/ repair/replacement or when equipment deterioration is suspected. These activities are not predictable and cannot be scheduled because they are required after a forced outage. Each office must budget for these events. Some examples are governor troubleshooting, unit balancing, and vibration testing.

Maintenance procedures

- Prepare necessary tools, test instruments and personal protective equipment in line with job requirements
- Acquire service manuals and service information required for repair /maintenance as manufacturer’s specifications
- Conduct complete check-up of electronically-controlled domestic appliances
- Document the identified defects based on check-up conducted

1.5. Preparation of workplace/equipment

1.5.1. Location Workplace for repair

Building maintenance is work undertaken to keep, restore or improve every facility i.e. every part of a building, its services including maintenance operations to a currently acceptable standard and to sustain the utility and value of the facility.

The objective of setting workplace is: -

- To preserve machinery, building and services, in good operating condition.
- To restore it back to its original standards, and

(iii) To improve the facilities depending upon the development that is taking place in the building engineering.

1.5.2. Setting up a Safe Workstation

one of the best ways to prevent injury is to ensure that the test station is set up safely and securely. Test stations can be setup with or without direct protection depending on your requirements. Direct protection means that the operator cannot physically come into contact with an energized DUT/device under test/ while a test is running.

Sample Proper Arrangement and storage of tools and equipment



Figure 1.4 tools and equipment

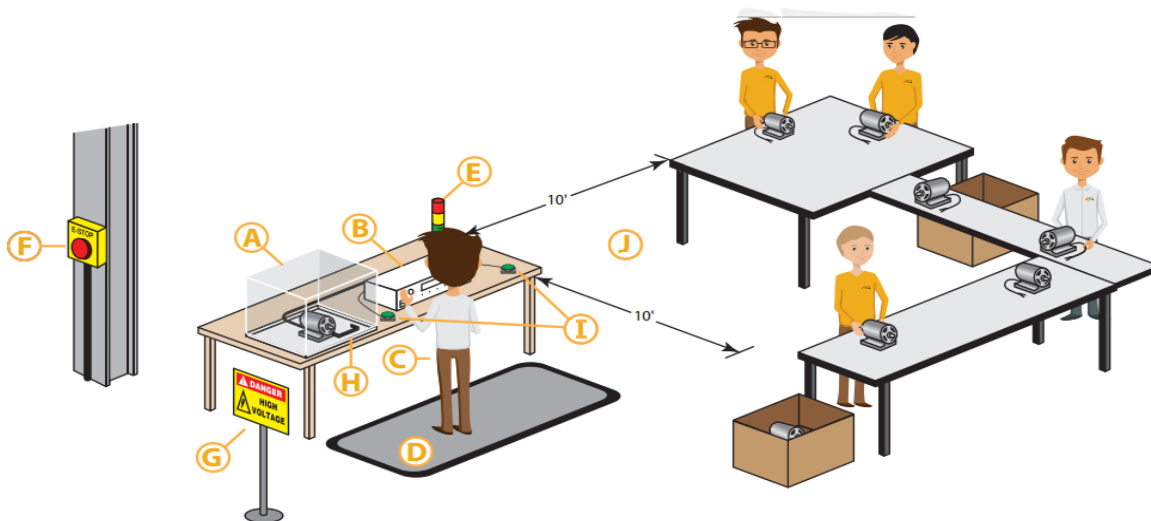


Figure 1.5 Safe Workstation

Station with protection against electric shock.



Self-check-1

Test-I Choose

Instruction: For the Following Questions You Are Given Four Alternatives Then Choose the Correct Answer and circle.

1, Activities that involve using test equipment to assess the condition of equipment after unusual events **(3 pt each)**

A, Routine Maintenance B, Diagnostic Testing C, Maintenance Testing D, all

2, Isolates equipment failure by means of test techniques and practices. **(3 pt each)**

A Diagnostic Testing B, Corrective maintenance C, Preventive maintenance D, Maintenance Testing

3, consists of mechanical, electrical, and electronic checks to determine whether equipment is operating properly. **(3 pt each)**

A Diagnostic Testing B, Corrective maintenance C, Preventive maintenance D, Maintenance Testing

4, The objective of setting workplace is **(3 points)**

A, To preserve machinery, building and services, in good operating condition.

B, To restore it back to its original standards, and

C, To improve the facilities depending upon the development that is taking place in the building engineering. D, all

5, A service manual consists of some or all of the f/f **(3 points)**

A, Safety & precautionary measures during disassembling

B, Dismantling or blow-up diagram

C, Block diagram of the equipment

D, All

6. Record all information during maintaining/repairing electronically-controlled domestic appliance. This may include but not limited to: **(3 points)**












A, Job report sheets B, Job order C, Bill of materials D, Block diagram of the equipment E, all

7, Service manual is the full written information provided by ----- **(3 points)**

A, manufacturer B, Technician C, seller D, teacher

Test II: short Answer writing

Instruction: Identify the tools, equipment and materials in maintaining and repairing a domestic equipment's and Write your answers on a separate sheet. **(10 pt each)**

1	2	3	4	5
				
6	7	8	9	10
 				

1. _____ 2. _____ 3. _____ 4. _____ 5. _____
6. _____ 7. _____ 8. _____ 9. _____ 10. _____

Test III: Say true or false

1, one of the best ways to prevent injury is to ensure that the test station is set up safely and securely.

A, True B, False

2, Test stations can be setup with or without direct protection depending on your requirements.

A, True B, False

Note: Satisfactory rating – above 60% Unsatisfactory - below 60%

You can ask you teacher for the copy of the correct answers

Operation sheet-1

Operation Title: Techniques for Preparing Workplace/equipment for maintenance

Purpose: To Prepare Workplace/equipment for maintenance

Instruction: Using the figure below and given equipments to Workplace/equipment for maintenance. You have given 30Minut for the task and you are expected to Preparing Workplace/equipment

Tools and requirement

- ✓ Multimeter
- ✓ Utility knife/stripper
- ✓ Wrenches (assorted)
- ✓ Allen wrench/key
- ✓ Screws (assorted)
- ✓ Pliers (assorted)

Procedures:

1. Prepare necessary tools, test instruments and personal protective equipment in line with job requirements.
2. Acquire service manuals and service information required for repair /maintenance as manufacturer's specifications.
3. Conduct complete check-up of electronically-controlled domestic appliances.
4. Document the identified defects based on check-up conducted

Quality Criteria: use service manuals and service information for maintenance.

Precautions: use the given necessary tools, test instruments.

LAP Test -1

Name: _____

Date: _____

Time started: _____

Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 4 hours.

Task 1. Preparing Workplace/equipment for maintenance

Task 2 Verifying maintenance history with the company procedures

Task3 Acquiring Service manuals and service information

Task4 Setting Workplace for repair

Task 5 Preparing tools, test instruments and personal protective equipment

Unit two: Construct Electric Mitad and Stove

This learning unit is developed to provide the trainees the necessary information regarding the following content coverage and topics:

- Producing Service manual
- Constructing Mitad and stove
- Testing and product
- Complying completion procedures and documentations
- Disposing Waste materials

This unit will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Produce Service manual
- Construct Mitad and stove
- Test and product
- Comply completion procedures and documentations
- Dispose Waste materials

2.1. Producing Service manual

Service manual is the full written information provided by the manufacturer regarding the equipment. This service manual usually accompanies the equipment at time of purchase. A service manual consists of some or all of the f/f

- Safety & precautionary measures during disassembling
- Dismantling or blow-up diagram
- Block diagram of the equipment
- Circuit diagram
- PCB lay out
- Parts-list
- Service manual/schematic diagram/parts list
- Operating instructions/User's/Owner's manual
- Component data sheet/handbook

Service information

Record all information during maintaining/repairing electronically-controlled domestic appliance.

This may include but not limited to:

1. Job report sheets
2. Job order
3. Bill of materials
4. Customer index
5. Service flowchart
6. stock and inventory record
7. Requisition slips (for acquisition of parts)
- supplier index

Directions: Provided with the defective domestic appliance use Maintain and Repair Form to gather and document the information about the appliance at hand. Follow the procedures below:

Resources:

Domestic appliance: -----

Receiving/Check-up Form

Procedure:

1. Conduct an initial interview to the owner of the appliance.
 - Ask what the problem is.

- Request for the details of the problem (how does it happen/since when/ nature of the problem)

2. As serviceman, you must confirm the problem/ complain.

3. Make an initial inspection/ testing of the appliance.

- Physical appearance
- Operating controls
- Power cord **etc.**

4. Take note of the information gathered and observed.

5. Accomplish Receiving and Repair Form.

Receiving and Repair Form

Customer's name: _____

Address: _____

Product/ Brand name: _____

Serial no: _____

Complain: _____

Electric..... Checklist (e.g. Refrigerator, washing machine, flat iron)

Part of equipment	condition	
	good	defective
Power cord		
Power switch		
•		
•		

customer's Signature _____ Date Repaired: _____

technician's Signature _____ Date Checked: _____

2.2. Construct Mitad and stove

Electric mitad (stove) is an electric device which is used to baking an injera. It is formed different materials metals and nonmetals. Conductors and insulators. it helps to produce human loss power and minimizing cost and destroy of forest for electric power uses or electric consuming countries.

2.2.1. General Purpose of Electric Mitad (stove)

There are various types of electric stoves or mithad(stove) for different purposes

Example:

- a. Small mitads from 56-57 cm in diameter and large mithad are also 58-62 cm in diameter
- b. For stove the diameter is 22mm, 45mm and 57mm
 - 22mm for home use
 - 45mm for restorandr hotels
 - 57mm for hotels

This electric mithad (stove) is the device basically used to convert electrical energy into heat energy. For this purpose this devices are constructed using heating elements or resistors. This device working a single-phase AC and different size and shape.

The main importance of electric mitad(stove) is

- a. save the time
- b. save a lot of many
- c. save human power

These are manufactured in different shape. The elements used in the mithads(stove) are designed for different wattage and the body is also manufactured for different shapes of mithad(stove). Some are cylindrical type and some are round shape type.

In the cylindrical type mithad(stove) the heating element made of nicrom strip-insulated with jeso. This type of mithad(stove) consists of cyliderical metal body with bottom cover of flat iron.

The round shape electric mithad consists of ring type moulded element of nicrom wire or strait nicrom wire and the strate nicrom

Material Required

The basic material that we need for all types of electric mithad(stove) are the following

1. Resistors (heating element)
2. Electrical wire
3. Cable
4. Connectors
5. Plugs
6. Sockets
7. Switch(DPST)
8. Terminals
9. Metal body- made from sheet metal and aluminum
10. Baking clay
11. Plaster of paris (jesso)
12. Screw(small bolt and nuts)
13. A piece of wood (handle)
14. Flat iron
15. Pipe(½ inch)
16. Sheet metal cutting sissor
17. Drill machine
18. Drill bit
19. Mithad(stove) (flat clay being grouved)

Egneous rock (stones)

2.2.2. Use of material to work Mithad

1. Resistors (Heating Element)

Resistors are available with different power (watage) rating on a 220V source.

Example: For Injera mithad the following type of resistors different by their crossection area can be used. 0.7 0.8 0.9 mm². Each type of resistor can have different power rating.

For example 0.8mm² resistor is available with 1500w , 1700w etc power ratings.

- 0.7mm² for stove
- 0.8 and 0.9mm² for mithad

2. **Electric conductor:** The conductors of a crossectional area used for electric mithads are the minimum size is 4mm².(2.5mm² for stove)



Figure 2.1 Electric conductor

3. **Cable:** This is required to connect the mithad to socket outlet. The right size can be calculated from the power and voltage rating of the mithad. Mithad needs three wires cable two for phase and neutral and the third for ground.



Figure 2.2 Cable

4. **Connector:** This are used to connect the conductor to the heating element. The current rating of the connector should not be less than the mithad current rating. The standard current rating of connector for this purpose is 25A. (16A for stove)

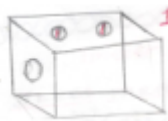


Figure 2.3 connector

5. **Plugs:** Plugs are also selected according to the wattage of the mithad. The standard plugs for electric mithad is rated 25A.(16A for stove)



Figure 2.4 Plugs

6. **Socket:** As for connectors and plugs a socket with right current rating is required. The standard current rating is 25A.(16A for stove)



Figure 2.5 socket

7. **Switch:** The current rating of the switch used should be large enough to make and breake the current drawn by the mithad. The standard is 25A breaker. (16A for stove)



Figure 2.6 breaker

8. **Terminals:** Are made to connect heating element ends to conductors and to connect two heating elements.

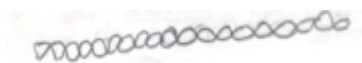


Figure 2.7 Terminals

9. **Sheet metal:** Used to make the body of electric mithad. The thickness is 1mm diameter (0.6mm diameter for stove)

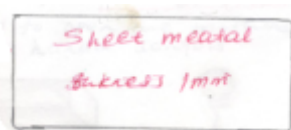


Figure 2.8 .Sheet metal

10. **Aluminum Sheet Metal:** to make the cover of mithad and the cover of the body limb.

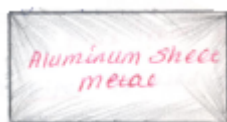


Figure 2.1

11. **Braking Clay:** Is used to make injera on the clay and the back part of the mithad is grooved



Figure 2.1

12. **Jeso:** Is used to cover the heating element

13. **Screw:** Is used to connect the mithad and its cover with screw.



Figure 2.1

14. **Flat Iron:**It is used to hold the mithad and make the body stranded.

15. **Pipe:** Is used to make the electric mithad legs

16. **Sheet Cutting Scissor:** To cut the sheet metals as the required size.



17. **Mithad (flat clay being grooved):** Mithad grooved on the back part for putting the heating element. (Mithad grooved on the front part for putting the heating element for stove).

Clay of Mithad

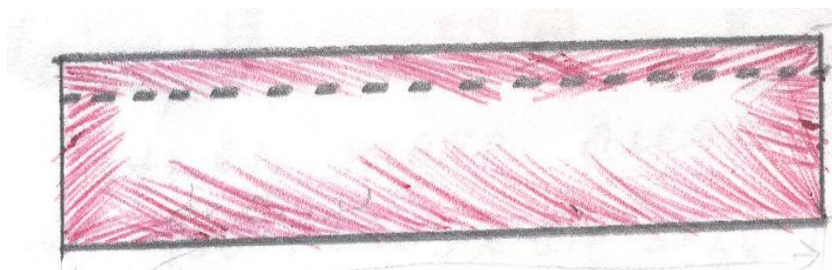
Clay of Stove



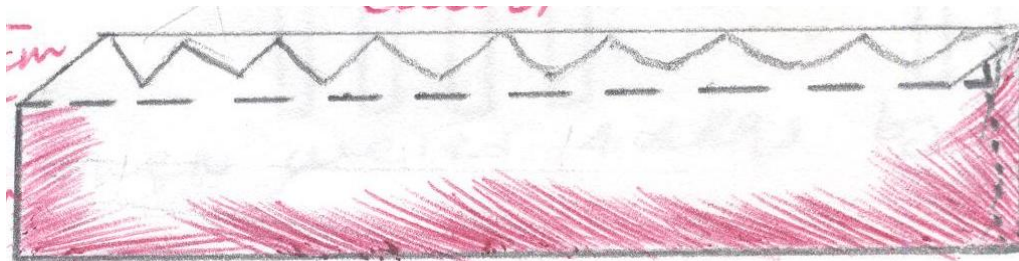
18. **Egneous rock(stone):** is used to fii the metal part of the mithad.

19. **Prepare the body of mithad**

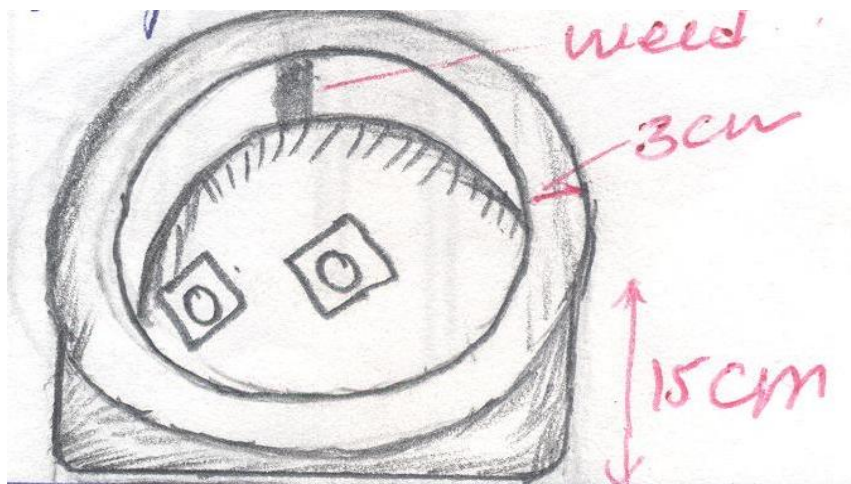
-cut the mild steel sheet metal length 230 cm and heigt 15 cm



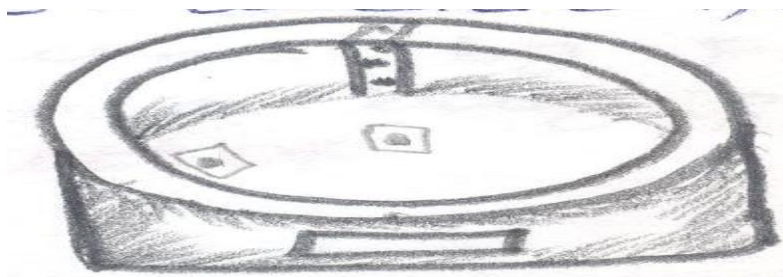
The 3 cm is must be bend to the outside. it used us the lip of the body of mithad. The lips cutting us from triangle otherwise it can't fit each other or it would be hard



After that you must make the mild still and round shape



Then weld the round body by welding

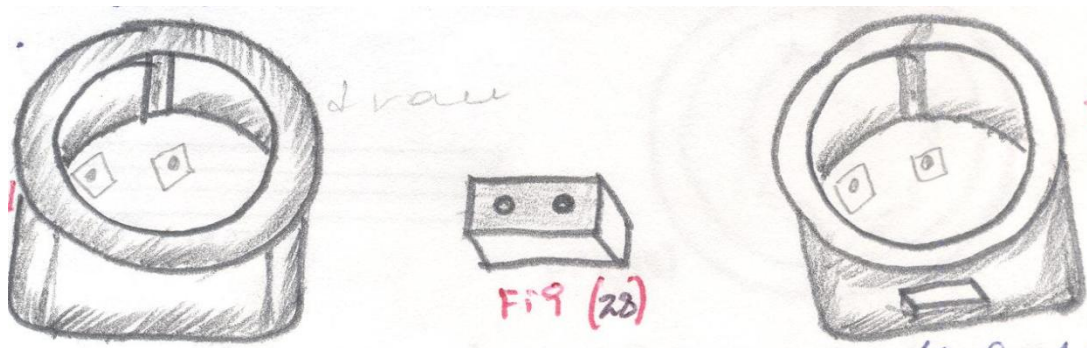


machine.

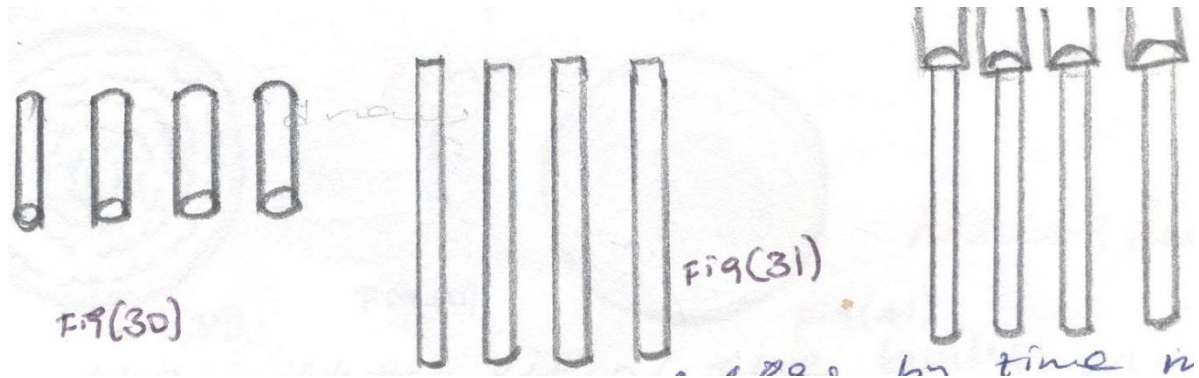
Then make the triangle height 7cm length 14 cm



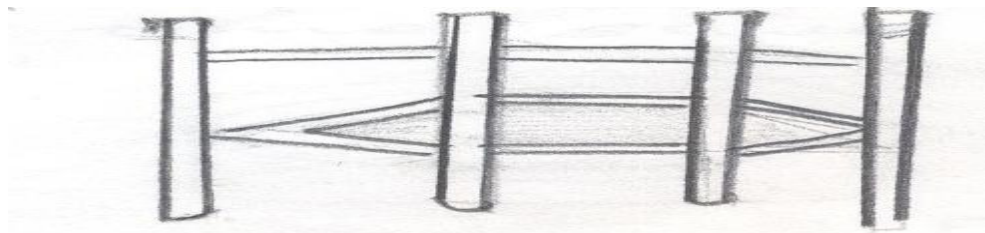
After that weld on the body and make hall on the fitted material in drill bit



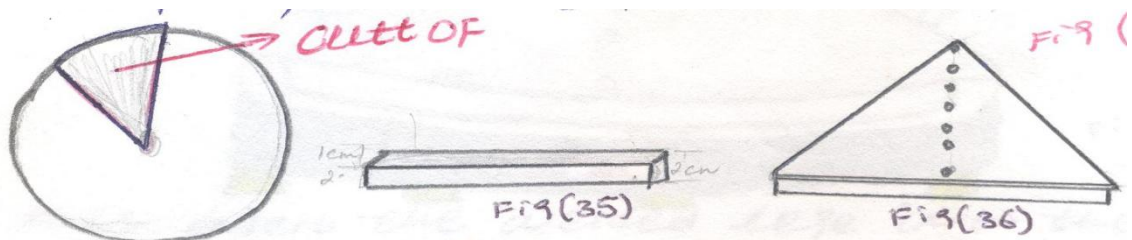
Then make a lag: the lag is moveable so you need 2 different size pipes for legs. The first leg is cut off 12cm the second is 65cm



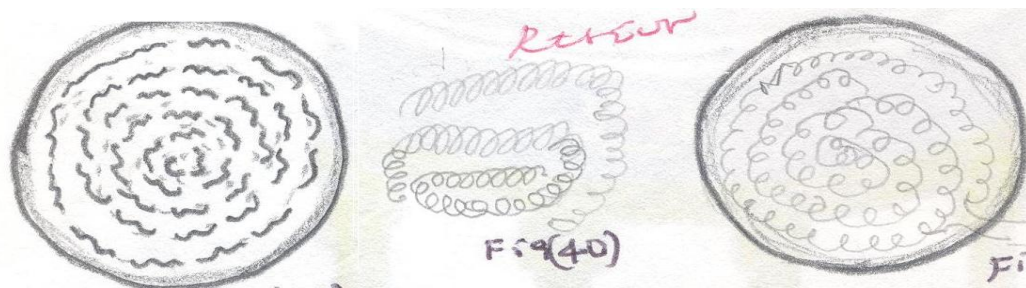
Then welded 4 legs by fine metal like this.



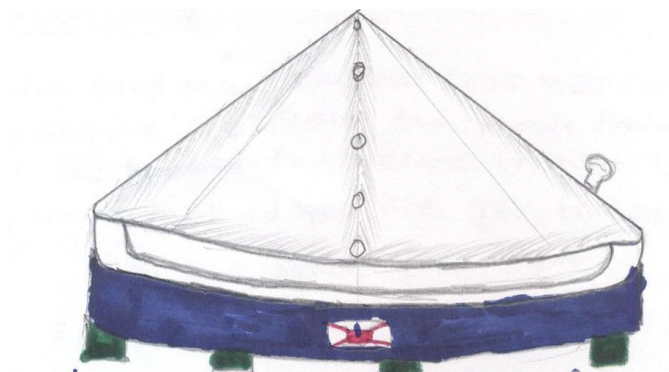
Then make formed from 0.8 mm² aluminum sheet metal. It would be cut from all 2m by 1.5m aluminum by formula $A=2\pi r^2$ shape of the body performed in



Finally heating element is slotted to being grooved mithad parallel and cover by gesso for a certain time up to dry of gesso



Then would the 12cm leg in to the body. Like this



Then insert the welded in to the small leg weld with the body .then z shape with clay in to the body .then connect heating element to switch paint the body .

The mithad look like this +



Final feature of stove look like this



2.3. Testing and product

Possible Faults In Electrical Mithad

Mithad does not work

Cause

Remedy

- | | |
|-------------------------------------|--|
| 1. Supply may be cut off | Check the supply with test lamp |
| 2. Disconnection of heating element | Check the continuity with series test lamp |

Electric Mithad Defects

1. **Will not Heat:** Check cord set, terminals connection and heating elements for an open circuit.
2. **Users receive shock from mithad:** Check for grounded heater element or ground fault due to wire connection to the body.
3. **The mithad does not work:** Check the back part of the resistor.
Check the switch.

2.4. Complying completion procedures and documentations

- Diagnose documentation is a technical communication document intended to give a user or customer information on how to solve and prevent those problems. It's commonly written for computer hardware, electronic goods, and software but they can be written for any product.
- Proper documentation would list every stage in the process from start to end. As we discussed troubleshooting is a logical and step by step process that must be followed every time. If problems and customers are not the same, then how can even the best troubleshooting staff survive without proper documentation? It is the life support for troubleshooting.
- Troubleshooting documentation is more often than not, lengthy and can be tiring to read. Anyone who is referring to such a document for a particular problem and its resolution should not need to go through the entire documentation to find it. A well-defined and crisply laid out index should be in place to make locating the area of interest easier. The index must also have some help words that describe in layman terms some of the tongue twisting troubleshooting terminology.
- Clearly worded documentation is important to improve efficiency. Even if memory fails under pressure, the troubleshooting staff can quickly recover from that by referring to the documentation. The customer will never need to know that the staff 'ran short' to start with. The end perception will be one of knowledge and efficiency. Happy staff and happier customer!
- The importance of documentation in troubleshooting and other areas comes from the fact that it is a recording of a crucial and creative process that focuses on problem resolution and problem prevention. It helps members of the same team or different teams work collaboratively on customer issues or internal troubleshooting issues for quicker resolutions.
- Documentation can be very inspiring and thought provoking if written well. They provide invaluable and indispensable data that make the entire troubleshooting process and customer service for a company more robust and sustainable.

Although it is often neglected in the troubleshooting process, documentation is as important as any of the other troubleshooting procedures. Documenting a solution involves keeping a record of all the steps taken during the fix-not necessarily just the solution.

For the documentation to be of use to other network administrators in the future, it must include several key pieces of information. When documenting a procedure, include the following information:

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- **Date**-When was the solution implemented? It is important to know the date because if problems occur after your changes, knowing the date of your fix makes it easier to determine whether your changes caused the problems.
- **Why**-Although it is obvious when a problem is fixed while it is done, a few weeks later, it might become less clear why that solution was needed. Documenting why the fix was made is important because if the same problem appears on another system, you can use this information to reduce time finding the solution.
- **What**-The successful fix should be detailed, along with information about any changes to the configuration of the system or network that were made to achieve the fix. Additional information should include version numbers for software patches or firmware, as appropriate.
- **Results**-Many administrators choose to include information on both successes and failures. The documentation of failures can prevent you from going down the same road twice, and the documentation of successful solutions can reduce the time it takes to get a system or network up and running.

Who-It might be that information is left out of the documentation, or someone simply wants to ask a few questions about a solution. In both cases, if the name of the person who made a fix is in the documentation, the person can easily be tracked down. This is more of a concern in environments in which there are a number of IT staff, or if system repairs are performed by contractors instead of company employees.

2.5. Disposing Waste materials

2.5.1 Land fill

In this process, the waste that cannot be reused or recycled are separated out and spread as a thin layer in low-lying areas across a city. A layer of **soil** is added after each layer of garbage. However, once this process is complete, the area is declared unfit for construction of buildings for the next 20 years. Instead, it can only be used as a playground or a park.

A. Incineration

Incineration is the process of controlled combustion of garbage to reduce it to incombustible matter such as ash and waste gas. The exhaust gases from this process may be toxic, hence it is treated before being released into the environment. This process reduces the volume of waste by 90 per cent and is considered as one of the most hygienic methods of waste disposal. In some cases, the heat generated is used to produce electricity. However, some consider this process, not quite environmentally friendly due to the generation of greenhouse gases such as carbon dioxide and carbon monoxide.

B. Waste Compaction

The waste materials such as cans and plastic bottles are compacted into blocks and sent for recycling. This process prevents the oxidation of metals and reduces airspace need, thus making transportation and positioning easy.

C. Biogas Generation

Biodegradable waste, such as food items, animal waste or organic industrial waste from food packaging industries is sent to bio-degradation plants. In bio-degradation plants, they are converted to biogas by degradation with the help of [bacteria](#), fungi, or other microbes. Here, the organic matter serves as food for the micro-organisms. The degradation can happen aerobically (with oxygen) or an aerobically (without oxygen). Biogas is generated as a result of this process, which is used as fuel, and the residue is used as manure.

D. Composting

All organic materials decompose with time. Food scraps, yard waste, etc., make up for one of the major organic wastes we throw every day. The process of composting starts with these organic wastes being buried under layers of soil and then, are left to decay under the action of microorganisms such as bacteria and fungi.

This results in the formation of nutrient-rich manure. Also, this process ensures that the nutrients are replenished in the soil. Besides enriching the soil, composting also increases the water retention capacity. In agriculture, it is the best alternative to chemical fertilizers.

E. Vermicomposting

Vermicomposting is the process of using worms for the degradation of organic matter into nutrient-rich manure. Worms consume and digest the organic matter. The by-products of digestion which are excreted out by the worms make the soil nutrient-rich, thus enhancing the growth of bacteria and fungi. It is also far more effective than traditional composting.

Self-check-2

Test-I: Choose

Instruction: For the Following Questions You Are Given Four Alternatives Then Choose the Correct Answer and circle

- 1, To be trouble shooter one must be a knowledge of A, tools needed B, basic electronic/electrical component C, basic electronic/electrical ckt analysis D, all of the above
- 2, Advising customers depend on (3 pt)
A, how to safe from accidents B, how to use equipment's C, how to safe the equipment's roomfuls D, When/how to clean the equipment's E. all
3. Make an initial inspection/ testing of the appliance. (3 pt each)
A. Physical appearance
B, Operating controls
C. Power cord. D. all

Test-II: Say true or false.

- 1, Troubleshooting is used in many fields such as engineering, system administration, electronics, automotive repair, and diagnostic medicine.
- 2, write basic steps of Troubleshooting.
- 3, Hot Test is the test performing with power source.
- 4, which one is the method to identifying non-functional tools and equipment.

Test III: short Answer writing

1. Write Types of testing?
2. Write down Basic steps of Troubleshooting?
3. Write down analog testing instruments?

Operation sheet-2.1

Operation Title: Reassemble units Techniques

Purpose: To Reassemble Units Techniques

Instruction: Using the figure below and given equipment's to Reassemble Units Techniques. You have given 30Minut for the task and you are expected to write the answer on the given line.

Tools and requirement

- ✓ Multi-meter
- ✓ Utility knife/stripper
- ✓ Wrenches (assorted)
- ✓ Allen wrench/key
- ✓ Screws (assorted)
- ✓ Pliers (assorted)

Procedures:

1. Visual inspection of the unit with power off
 2. Interview of customer re history of unit
 3. Be sure you understand how the domestic appliance (washing machine, micro-oven, refrigerator etc.) Operates. If possible, read the operation's manual first for its function and additional features.
 4. Operate the appliance according to manual to confirm defects
 5. Determine what the problem really is.
 6. Perform preliminary inspection to locate where the problem has originated.
 7. Perform closer inspection into the suspected parts or components.
 8. Use appropriate instrument in initial testing of the appliance.
 9. Plan your approach to repair the problem.
- **Quality Criteria:** the given Single phase power supply is troubleshooting properly.
 - **Precautions:** use the given multi-meter without damage.

LAP Test-2.2. Reassemble units Techniques

Name: _____

Date: _____

Time started: _____

Time finished: _____

Instruction I: Given necessary templates, tools and materials you are required to perform the following tasks within 4 hours.

Task 1. Check reassemble units electrical mitad and stove

Task 2. Pre-test procedure

Task 3. Identify System defect/fault symptoms

Task 4. Use testing instruments in accordance with user manuals and safety procedures

Task 5. Implement Proper troubleshooting procedures

Task 6. Test circuits

Task 7. Explain Identify defects and faults

Task 8. Check Control settings/adjustments

Task 9. Document Results of diagnosis and testing

Task 10. Advise/inform customers regarding the status and serviceability

Unit Three: Diagnose faults of the unit

This learning unit is developed to provide the trainees the necessary information regarding the following content coverage and topics:

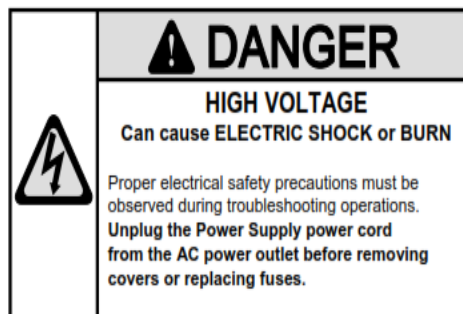
- troubleshooting procedures
- systematic pre-testing procedure
- Identifying System defect/fault symptoms.
- Testing instruments
- checking and isolating Circuits
- Identifying, verifying and documented electric mitad
- Explaining defects and faults
- Check Control settings/adjustments
- Documenting of diagnosis and testing
- Advising/informed Customers

This unit will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Implement troubleshooting procedures
- Observe systematic pre-testing procedure
- Identify System defect/fault symptoms.
- Test instruments
- check and isolating Circuits
- Identify, verify and documented electric mitad
- Explaining defects and faults
- Check Control settings/adjustments
- Document of diagnosis and testing
- Advise Customers

3.1. Implementing troubleshooting procedures



3.1.1. Application of trouble shooting technique

Troubleshooting is a method of finding the cause of a problem and correcting it. The ultimate goal of troubleshooting is to get the equipment back into operation. This is a very important job because the entire production operation may depend on the troubleshooter's ability to solve the problem quickly and economically, thus returning the equipment to service. Although the actual steps the troubleshooter uses to achieve the ultimate goal may vary, there are a few general guidelines that should be followed.

There are often cases where a familiar piece of equipment or system breaks down. In those cases, an abbreviated five-step troubleshooting process can be used to find the fault, get the system up and running. It is important to note that, although it is a five-step approach, the same basic guidelines of the seven-step troubleshooting method are followed. The steps are simply combined to be specific to the problem at hand.

3.1.2. General Trouble shooting Guide lines

The general guidelines for a good troubleshooter to follow are:

Use a clear and logical approach

- ❖ Work quickly
- ❖ Work efficiently
- ❖ Work economically
- ❖ Work safely and exercise safety precaution

The five-step troubleshooting techniques consist of the following:

1. Verify that a problem actually exists.
2. Isolate the cause of the problem.
3. Correct the cause of the problem.

4. Verify that the problem has been corrected.
5. Follow up to prevent future problems.

Within the four general guidelines previously mentioned, there are several action items that are important to the successful achievement of the goal of troubleshooting:

A. Verify that something is actually wrong.

A problem usually is indicated by a change in equipment performance or product quality. Verification of the problem will either provide you with indications of the cause if a problem actually exists or prevent the troubleshooter from wasting time and effort on "ghost" problems caused by the operator's lack of equipment understanding. Do not simply accept a report that something is wrong without personally verifying the failure. A few minutes invested up front can save a lot of time down the road. Troubleshooting any piece of equipment involves a systematic approach of observing the symptom, analyzing the possible causes, and checking these failures by test and measurement.

B. Identify and locate the cause of the trouble.

Trouble is often caused by a change in the system. A thorough understanding of the system, its modes of operation, and how the modes of operation are supposed to work, the easier it will be to find the cause of the trouble. This knowledge allows the troubleshooter to compare normal conditions to actual conditions.

C. Correct the problem.

It is very important to correct the cause of the problem, not just the effect or the symptom. This often involves replacing or repairing a part or making adjustments. Never adjust a process or piece of equipment to compensate for a problem and consider the job finished; correct the problem!

D. Verify that the problem has been corrected.

Repeating the same check that originally indicated the problem can often do this. If the fault has been corrected, the system should operate properly.

E. Follow up to prevent further trouble.

Determine the underlying cause of the trouble. Suggest a plan to a supervisor that will prevent a future recurrence of this problem.

3.2. Identifying System defect/fault symptoms.

3.2.1. Troubleshoot defects/faulty parts

Many times equipment failure is caused by troubles in the power supply/mechanical /resistor burned. If an electrical device ceases to operate, the most probable fault is power supply. Diagnosis it systematically mentioned below.

A. Verify that the power supply is faulted or not.

Troubleshooting any piece of equipment involves a systematic approach of observing the symptom, analyzing the possible causes, and checking these failures by test and measurement. Given that the system power is available and the power supply is connected to it, check the output of the power supply. If the output voltage is zero, or highly deviated value from its rated value the device is faulted.

B. Identify and locate the cause of the trouble

First check the fuse. If the fuse blows investigate the root cause of it before replacing. If the fuse is normal perform voltage test starting from the input side to the output side stage by stage until you get abnormal reading which is also the symptom of fault. Recall the transformer stages bellow, and apply voltage measurement at each stage using the following steps:

C. Power supply Test point (stages)

1. Adjust your multi-meter at AC range and $>220v$
2. Measure AC voltage at the input of the main CB between point A and B at (V_{AB})
3. Once faulty sage is identified, continue to investigate in the component level in that specific faulty stage. The possible cause of fault and their symptoms.

D. Correct the problem.

Once the root cause of a given fault is found, obviously the next task is to correct (trouble shoot) it. It is act of connecting the disconnecting circuit or replacing the faulted component with the same rated components. This is actually one type of maintenance task.

E. **Verify that the device reverts to its normal condition.** This is simply done by measuring the output voltage. If the fault still exist, repeat step 2 and 3 for the other fault.

F. Follow up to prevent further trouble.

If the fault is expected to be created by misuse of the power supply, for example if it were overloaded, consults the user how to use it in order to prevent the same fault in the future.

3.3. Pre-testing procedure

Pre testing is the process of testing before the post testing is done to identify the defect /faulty parts of the electronically controlled domestic equipment.

Why Test?

There are four main reasons why you should safety test your products prior to shipment

1. Safety	Ensure that the product is not going to pose a hazard to the end user.
2. Quality	Detect workmanship defects and prevent faulty components from being installed.
3. Cost Control	Identify production problems before a product is shipped, preventing costly recalls.
4. Liability	Prevent product liability suits because the responsibility of performing electrical safety tests ultimately rests on the manufacturer

Table 3.3. Safety test

3.3.1. General pre- testing procedures.

1. Visual inspection of the unit with power off
2. Interview of customer re history of unit
3. Be sure you understand how the domestic appliance (washing machine, micro-oven, refrigerator etc.) Operates. If possible, read the operation's manual first for its function and additional features.
4. Operate the appliance according to manual to confirm defects
5. Determine what the problem really is.
6. Perform preliminary inspection to locate where the problem has originated.
7. Perform closer inspection into the suspected parts or components.
8. Use appropriate instrument in initial testing of the appliance.
9. Plan your approach to repair the problem.

3.3.2. Importance of Testing

In Today's Electronics world, more time is required for testing rather than design and fabrication. When the circuit/device is developed, it is necessary to determine the functional and timing specifications of the circuit/device. When the multiple copies of a circuit are

manufactured, it is essential to test each copy to verify whether the manufacturing process has introduced any flaws. In order to meet the requirements of the consumer, it is essential to test the circuit effectively, before it is released into the market.

Good Testing leads to:

- Better quality products
- Good brand value for company
- Total Customer satisfaction improves yield in manufacturing

A. Testing Principle

During testing, a set of test stimulus are applied to the inputs of the Circuit/Device under test (CUT/DUT) and the output responses are analyzed. Circuits that produce the correct output responses for all input stimuli are considered as fault-free and the circuits that fail to produce a correct response are assumed to be faulty.

3.3.3. Types of Testing

A. Manual testing and Automated Testing:

Devices can be tested in two ways, manually and automatically. Testing Devices with human intervention is referred as Manual test. Testing devices with the help of programs or tools with minimal human intervention is referred as Automation test. Before Automation testing of any device, one must know how to test the particular device manually.

To identify system defects and fault symptoms follow the following basic steps

- Observe systematic pre-testing procedures in accordance with manufacturer's instructions
- Check and isolate circuits using specified testing procedures
- Document results of diagnosis and testing accurately and completely within the specified timeframe Explain identified defects and faults based on the result of diagnosis and testing
- Provide data/information regarding the status and serviceability of the unit as per procedure

3.4. Testing instruments

3.4.1. Instruments used to test Electric Mitad and Stove Power rating

A. Multi meter

Multi-meter is known as a multi-tester or VOM (Volt- Ohm Milli-ammeter). It is an all-in-one electronic measuring instrument that combines several measurement functions. Thus, it'll be able to troubleshoot issues with your circuit or electronic designs!

There are two types of multi-meter, but a typical multi-meter is capable of measuring voltage, current and resistance. We will go into more detail in the latter part of this guide.

A typical multi-meter nowadays looks like this:



Figure 2.1 Digital Capacitance Meter

3.4.2. Types of Multimeter

Although we mainly use digital multi-meter these days, as I briefly mentioned earlier, there are two types of multi-meter:

- Analog
- Digital

Let's talk about Resolution in multi-meter before stating their differences: The resolution of a multi-

A. Analog Multimeter

meter is the smallest part of the scale which can be shown, which is scale-dependent.

The analog multi-meters are more responsive to changes than digital multi-meters, thus it is able to give a more accurate reading. However, because it is so sensitive, this makes it hard to read and gives delays.



F. Digital Multimeter Figure 3.1 Typical Analog Multi-meters

3.5. Checking and isolating Circuits

Conventional Electric Mitad

Majority of producers -0.9 mm resistance

4 Kw starting & 3.8 Kw Avg. Steady pow

Single or double clay plate

8 -12 Kgs Clay plate

Startup time : 15 to 20min

Fixed position

4 Sq. mm Cable

25 A Switch(Kalki) and ACB

3.6. Identifying, verifying and documented electric mitad

Energy Efficiency (EE) standards and labels-

Labels:

- A. informative labels affixed to manufactured products (usually in the form of energy use, efficiency, or energy cost)
- B. give consumers the data necessary to make informed purchases.

Two types: endorsement labels and comparative labels.

Energy efficiency(EE) standards:

- C. procedures and regulations that prescribe the energy performance of manufactured products,
- D. sometimes prohibit the sale of products that are less efficient than a minimum level.

Rational for EE labels & standards:

- a. essential element in any government's portfolio of EE policies and climate-change-mitigation programs.
 - i. they can produce very large energy savings
 - ii. limiting energy demand growth without limiting economic growth
 - iii. require change in the behavior of a manageable number of manufacturers rather than the entire consuming public
 - iv. they treat all manufacturers, distributors, and retailers equally
 - v. the resulting energy savings are generally assured

Steps in the process of developing energy-efficiency labels and standards

- a) Decide Whether and How to Implement Energy Efficiency Labels and Standards
- b) Develop a Testing Capability
- c) Design and Implement a Labeling Program
- d) Analyzing and setting standards
- e) Design and Implement a Communication Campaign
- f) Ensure Program Integrity
- g) Evaluating the impact of labeling and standards programs

3.7. Explaining defects and faults

3.7.1. Possible Faults in Electrical Mithad

Mithad does not work

Cause

Remidy

Supply may be cut off

Check the supply with test lamp

Disconnection of heating element

Check the continuity with series test lamp

Electric Mithad Deffects

Will not Heat: Check cord set, terminals connection and heating elements for an open circuit.

Users receive shock from mithad: Check for grounded heater element or ground fault due to wire connection to the body.

The mithad does not work: Check the back part of the resistor. Check the switch.

3.8. Check Control settings/adjustments.

Your washing machine has three main settings: agitation, length, and temperature. These are the main features your machine has which allow you to tailor your wash to the fabrics you're cleaning.

- **Setting Agitation.** For delicate, you need less agitation. Sturdy items, cotton, synthetics, and heavily soiled garments need the most.
- **Setting length.** Fast cycles are great for lightly not clean enjera and alternative cooking.
- **Setting temperature.** With Ariel, you can cook enjera or bread at different temperature settings and get brilliant stain removal while saving energy. You cannot set the temperature higher than the wash default, only lower.

However, most electrical mitad and stove also come with other useful features such as a:

- **Digital display.** This display tells you how much time remains on your wash program.
- **Time delay.** This setting is useful if you want to run a wash cycle at night when electricity is cheaper, or you want the machine to wash your clothes just before you get home.
- **Load detection.** Some washing machines detect the washing load weight in the drum and can select the optimal cycle. This feature helps you save water and energy but is a feature found on premium models only.
- **Child lock.** This feature helps keeps curious little hands from using the controls or playing with the doors

3.9. Documentation of diagnosis and testing

- Diagnose documentation is a technical communication document intended to give a user or customer information on how to solve and prevent those problems. It's commonly written for computer hardware, electronic goods, and software but they can be written for any product.
- Proper documentation would list every stage in the process from start to end. As we discussed troubleshooting is a logical and step by step process that must be followed every time. If problems and customers are not the same, then how can even the best troubleshooting staff survive without proper documentation? It is the life support for troubleshooting.
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different teams work collaboratively on customer issues or internal troubleshooting issues for quicker resolutions.

- Documentation can be very inspiring and thought provoking if written well. They provide invaluable and indispensable data that make the entire troubleshooting process and customer service for a company more robust and sustainable.

Although it is often neglected in the troubleshooting process, documentation is as important as any of the other troubleshooting procedures. Documenting a solution involves keeping a record of all the steps taken during the fix-not necessarily just the solution **Date**-When was the solution implemented? It is important to know the date because if problems occur after your changes, knowing the date of your fix makes it easier to determine whether your changes caused the problems.

- Why**-Although it is obvious when a problem is fixed while it is done, a few weeks later, it might become less clear why that solution was needed. Documenting why the fix was made is important because if the same problem appears on another system, you can use this information to reduce time finding the solution.
- What**-The successful fix should be detailed, along with information about any changes to the configuration of the system or network that were made to achieve the fix. Additional information should include version numbers for software patches or firmware, as appropriate.
- Results**-Many administrators choose to include information on both successes and failures. The documentation of failures can prevent you from going down the same road twice, and the documentation of successful solutions can reduce the time it takes to get a system or network up and running.

Who-It might be that information is left out of the documentation, or someone simply wants to ask a few questions about a solution. In both cases, if the name of the person who made a fix is in the documentation, the person can easily be tracked down

3.10 . Advice to customers

- Advice is guidance about what someone should do. Advise is a verb that means to give someone advice about something. Despite their very similar spelling, advice and advise are pronounced differently.
- Below listed are few handling procedures of electrical mitad and stove** advice to customers'
 - ✓ **Scratch Damage:** Handle the display device with care to avoid scratching it.
 - ✓ **Moisture Damage:** Gently wipe off any moisture or let the device dry before using it.
 - Dirt and Stain:** Gently wipe off the stain with a soft lint-free cloth.
 - ✓ **Temperature Difference:** High temperature and humidity will degrade the performance of a display device.
 - ✓ **Pressure and Heat:** Display device should be mounted 4 mm or more away from Printed Circuit Boards.
 - ✓ **Accessories Usage:** Use only attachments and accessories specified or recommended by manual
 - ✓ **While Lightning:** Unplug the power supply during lightning storms or when unused for long periods of time.

Self-check 3.1.

Test I: short Answer writing

Instruction: write short answer for the given question. You are provided 4 minute for each question and each point has 5 Points.

1. Write Procedure of Cleaning and Care for Constructing and Repairing Electric Mitad and Stove maintenance.
2. Precautions for Safe Use to Excessive Electric Mitad and Stove maintenance.

Test II: Say True or False

1. The oven's electronic components are usually not located in its lower part.
2. CB settings may be changed when timer function is activated
3. Avoid fast cooling after soldering
4. Avoid any force on the body or leads during or immediately after soldering
5. Do not correct the position of an already soldered device by pushing, and pulling

Test III: Fill the blank space for the question provided given below.

1. _____ is an unbalanced electrical charge at rest
2. _____ is commonly known has been design specifically to protect employees in the work environment
3. _____ is serious detrimental effects on all semiconductor ICs and the system that contains them

Operation Sheet 3.1. Replace the defective component for repairing Mitad and Stove

Operation Title: 3.1. To replace the defective component for repairing Mitad and Stove

Purpose: To practice and demonstrate the knowledge and skill **to replace the defective component for repairing Mitad and Stove**

Instruction: Use the given select tools and equipment so that mitad and stove is usually done sure the skill to replace the defective component for repairing Mitad and Stove problems with the mitad and stove circuit cabinet diagram operates properly. For this operation you have given 4 Hour and you are expected to provide the answer on the given steps.

Consumable materials

pen & ink	Red, blue and black
Pencil	HP
drafting, graph paper	A1
tracing paper	A4
Eraser	Erase pencil
Heating plate	1000 watts
Circuit breaker	220V/25A
Circuit breaker	220V/20A
Heating plate	500 watts
Kalki switch	25A
Plug(25A)	25A
Resistor	1500Watt
Resistor	1000Watt
Resistor	300Watt
Three wire cable/3-line/	2mm ²
Three wire cable/3-line/	4mm ²
Local mitad	clay for mitad
Scriber, Weraja, and Jeso	for mitad making

Tools and Equipment

Soldering iron/gun	220V/50Hz
--------------------	-----------

Screwdriver (assorted)	Philips type
Screwdriver (assorted)	Hexagonal type
Screwdriver (assorted)	Flat type
Nut drivers (assorted)	Standard type
Multi-meter (analog/digital)	AC/200M-750V/DC/200M-1000V
Clamp meter	Multi - Function (Ampere, Voltage and Ohms)
Utility knife	5 pcs replaceable blade
Wire stripper	150mm length .3-4.5mm ϕ
Pliers (assorted)	130mm-155mm length
work bench	Length 2m, height 80 cm, Width 1.2
Test light	Lamp indicator
Cleaning brush	Outside cleaning of copper, steel, brass, aluminum tubes
Ball peen hammer	300gms-500gms
Tweezers	Stain less steel
Electric Mitad stand with all accessories.	Stand with all accessories.
Electric stove stand with all accessories	Stand with all accessories.

Procedure you follow to do it

- Step: 1** Prepare soldering tools and equipment's, new component to be replaced
- Step: 2** Disconnect the power before you replace/repair the faulty device
- Step: 3** remove the defective one by applying correct disordering technique.
- Step: 4** put in place the new component in the correct direction (keep correct polarity)
- Step: 5** solder it by applying good soldering technique
- Step: 6** Use properly grounded power outlets.
- Step: 7** Take care of not to touch high voltage side.

LAP Test – 3.1. To replace the defective component for repairing Mitad and Stove.

Instructions: Given necessary templates, tools, materials and equipment you are required to perform replace the defective component for repairing Mitad and Stove problems with replacement steps for safe performance for the following tasks within 5 hour.

Task - 1: Remove the pivot pin, and torsion bar;

Task - 2: Remove outside door handle;

Task - 3: Push out the guide pin to remove the hook from the handle

Task - 4: Remove the circuit breaker from the wall of mitad.

Task - 5: Remove the inside door handle

Task - 6: Unplug the power cord

Task - 8: Record your findings

Task - 9: Clean up area and return tools and materials to proper storage.

Precautions: select necessary templates, tools, materials and equipment before replace the defective component for repairing Mitad and Stove for Safe Performance on the given format.

Quality Criteria: the given replace the defective component for repairing Mitad and Stove for Safe Performance is with correct specification

Unit Four: Maintain/repair the unit

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Using Personal protective equipment's.
- Replacing defective parts/components.
- Observing Care and extreme precaution
- Replacing and Soldering Defective parts/components
- Performing Cleaning of units.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Use Personal protective equipment's.
- Replace defective parts/components.
- Observe Care and extreme precaution
- Replace and Solder Defective parts/components
- Perform Cleaning of units.

4.1. Personal Protective Equipment or PPE

It is commonly known has been design specifically to protect employees in the work environment. Not only is it important to protect employees but also to protect the employer from unwanted legal claims. Furthermore, PPE is often a legal requirement and it is the responsibility of the employer to ensure employees wear protective clothing and observe safety and health regulations. It is also a responsibility, which employees must take seriously.

4.1.1. Common Personal Protective Equipment (PPE)

During diagnose and troubleshoot Mechatronics system, the following Personal Protective Equipment or PPE are most commonly used.

- Safety hat
- Safety shoes
- Ear muffs
- Goggles
- Mask
- Gloves
- Safety belt/Harness



Figure: 4.1. PPE

4.1.2. If technicians not use appropriate PPE

The followings are some of the main risks of not using appropriate personal protective equipment:

- The lungs will be affected, example, from breathing in contaminated air
- The head and feet will be affected, example from falling materials
- The eyes, example from flying particles or splashes of corrosive liquids

- The skin will be affected, example from contact with corrosive materials
- The body will be affected, example from extremes of heat or cold.

4.2. Replacing defective parts/components.

Troubleshooting and repairing Mitad and Stove can be easy but you will get frustrated if you could not locate the spare parts. Sometimes the repair job can be done in few minutes. However, when finding the original parts, you may end up spending more time to locate the parts than when you do the repair work on SMPS. In order to make things easier, you may visit the blog at <http://www.JestineYong.com> under the category of Electronic suppliers to get the components you want. If possible, get back the same part number to avoid repeating failure in SMPS that you have repaired and also to maintain the specifications within acceptable limits with respect to line isolation and to minimize fire hazards. However, if you still could not get the exact replacement parts for substitution please refer to any semiconductor data books to search for replacement.

In data books there would be suggestions as to which part numbers are suitable for replacement. This kind of data book is a must for anyone who works in electronic repair line. Apart from that, you could also find your own replacement by comparing the specification between the original and the replacement transistor. Always look for the replacement that has the same or higher specification in terms of voltage and Ampere and Wattage.

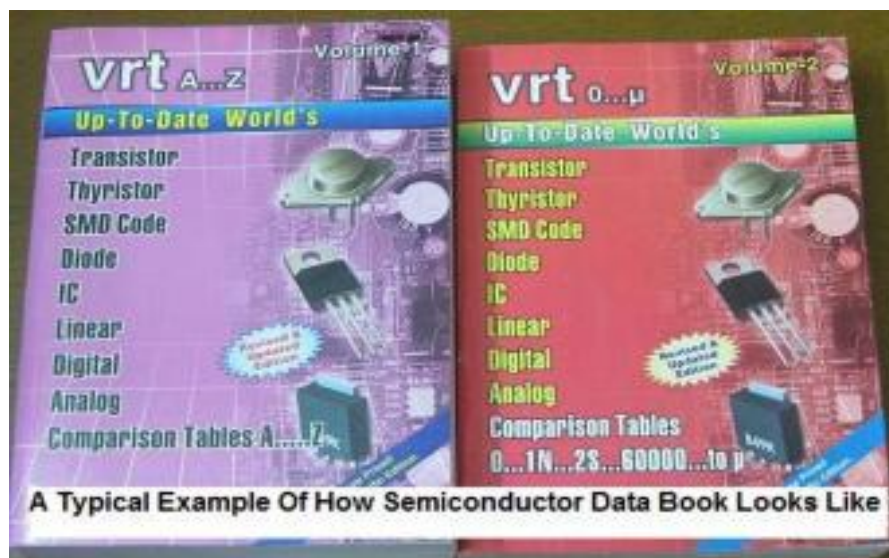


Figure: 4.2. Semiconductor Replacement data book

Note: Always use original part numbers for replacement purposes!

4.2.1. Location and the type of faulty component

Once the fault location and the type of faulty component is identified in the fault diagnosis section, obviously the next task is to correct (trouble shoot) it. It is act of connecting the disconnecting circuit or replacing the faulted component with the same type, rate and size components. The selection of components according to their correct specification and soldering skill are determining factor for the replacement is effective.

A. To replace the defective component:

- Prepare soldering tools and equipment's, new component to be replaced
- Remove the defective one by applying correct disordering technique.
- Put in place the new component in the correct direction (keep correct polarity)
- Solder it by applying good soldering technique

B. Safety

- Take care of not to touch high voltage side
- Wear apron, Glove, safety shoe
- Follow all cautions, warnings, and instructions marked on the equipment.
- Ensure that the voltage and frequency rating of the power outlet matches the electrical rating labels on the system.
- Use properly grounded power outlets.
- Disconnect the power before you replace/repair the faulty device
- Discharge capacitor first before replacing it.

4.3. Observing care and extreme precaution

4.3.1. Precautions to Be Observed Before and During Servicing

- (a) Do not operate or allow the stove to be operated with the door open.
- (b) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary:
 - (1) Interlock operation,
 - (2) Proper door closing,
 - (3) Seal and sealing surfaces (arcing, wear, and other damage),
 - (4) Damage to or loosening of hinges and latches,
 - (5) Evidence of dropping or abuse.

- (c) Before turning on stove power for any service test or inspection within the stove generating compartments, transmission line, and cavity for proper alignment, integrity, and connections.
- (d) Any defective or misadjusted components in the interlock, monitor, door seal, and stove generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner.
- (e) A Microwave leakage check to verify compliance with the Federal performance standard should be performed on each oven prior to release to the owner.

(iv) Include additional radiation safety precautions or instructions which may be necessary for particular oven designs or models, as determined by the Director, Center for Devices and Radiological Health or the manufacturer.

(6) **Warning labels.** Except as provided in paragraph (c) (6) (IV) of this section, microwave ovens shall have the following warning labels:

- (i) A label, permanently attached to or inscribed on the oven, which shall be legible and readily viewable during normal oven use, and which shall have the title emphasized and be so located as to elicit the attention of the user. The label shall bear the following warning statement:

4.3.2. Precautions for Safe Use to Excessive Energy

A. DO NOT Attempt to operate this stove with:

- I. Object Caught in Door.
- II. Door That Does Not Close Properly.
- III. Damaged Door, Hinge, Latch, or Sealing Surface.

B. A label, permanently attached to or inscribed on the external surface of the oven, which shall be legible and readily viewable during servicing, and which shall have the word “CAUTION” emphasized and be so located as to elicit the attention of service personnel. The label shall bear the following warning statement:

Caution: This device is to be serviced Only by Properly qualified Service Personnel.

Consult the Service Manual for Proper Service Procedures to Assure Continued Compliance with the Federal Performance Standard for microwave and stove for Precautions to be taken to Avoid Possible Exposure to Excessive Energy.

- (iii) The labels provided in accordance with paragraphs (II)(6)(i) and (ii) of this section shall bear only the statements specified in that paragraph, except for additional radiation safety warnings or

instructions which may be necessary for particular oven designs or models, as determined by the Director, Center for Devices and Radiological Health or the manufacturer.

(iv) Upon application by a manufacturer, the Director, Center for Devices and Radiological Health, Food and Drug Administration, may grant an exemption from one or more of the statements (radiation safety warnings) specified in paragraph (c)(6)(i) of this section. Such exemption shall be based upon a determination by the Director that the microwave oven model for which the exemption is sought should continue to comply with paragraphs (c) (1), (2), and (3) of this section under the adverse condition of use addressed by such precautionary statement(s). An original and two copies of applications shall be submitted to the Division of Dockets Management (HFA-305), Food and Drug Administration, 5630 Fishers Lane, rm. 1061, Rockville, MD 20852. Copies of the written portion of the application, including supporting data and information, and the Director's action on the application will be maintained by the

A. Branch for public review. The application shall include:

- The specific mitad and stove model(s) for which the exemption is sought.
- The specific radiation safety warning(s) from which exemption is sought.
- Data and information which clearly establish that one or more of the radiation safety warnings in paragraph (c)(6)(i) of this section is not necessary for the specified microwave oven model(s).
- Such other information and a sample of the applicable product if required by regulation or by the Director, Center for Devices and Radiological Health, to evaluate and act on the application.

4.4. Replacing and Soldering Defective parts/components

There are two basic forms of electronic component construction, those with leads for through-hole mounting and those for surface mounting. Through-hole mounting gives a very rugged construction and uses well established soldering methods. Surface mounting has the advantages of high packing density plus high-speed automated assembly. With all components, excessive forces or heat can cause serious damage and should always be avoided.

4.4.1. Soldering

- Avoid any force on the body or leads during or immediately after soldering
- Do not correct the position of an already soldered device by pushing, pulling or twisting the body

- Avoid fast cooling after soldering
- The maximum allowable soldering time is determined by:
- Package type
- Mounting environment
- Soldering method
- Soldering temperature
- Distance between the point of soldering and the seal of the component body

The maximum permissible temperature of the solder is 260 °C; this temperature must not be in contact with the joint for more than 5s. The total contact time of successive solder waves must not exceed 5s.

The component may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified storage maximum. If the PCB has been preheated, forced cooling may be necessary immediately after soldering to keep the temperature within the permissible limit.

4.4.2. Mounting

If the rules for handling and soldering are observed, the following mounting or process methods are allowed:

- Preheating of the printed-wiring board before soldering up to a maximum of 100 °C
- Flat mounting with the diode body in direct contact with the printed-wiring board with or without metal tracks on both sides and/or plated-through holes
- Flat mounting with the diode body in direct contact with hot spots or hot tracks during soldering
- Upright mounting with the diode body in direct contact with the printed-wiring board if the body is not in contact with metal tracks or plated-through holes

4.4.3. Repairing soldered joints

Apply the soldering iron to the component pin(s) below the seating plane, or not more than 2 mm above it. If the temperature of the soldering iron bit is below 300 °C, it may remain in contact for up to 10s. If it is over 300 °C but below 400 °C, it may only remain in contact for up to 5s.

4.4.4. Surface mount devices (SMDs)

Since the introduction of surface mount devices (SMDs), component design and manufacturing techniques have changed almost beyond recognition. Smaller pitch, minimum footprint area and

reduced component volume all contribute to a more compact circuit assembly. Consequently, when designing PCBs, the dimensions of the footprints are perhaps more crucial than ever before.

One of the first steps in this design process is to consider which soldering method, either wave or reflow, will be used during production. This determines not only the solder footprint dimensions, but also the minimum spacing between components, the available area underneath the component where tracks may be laid, and possibly the required component orientation during soldering. Although reflow soldering is recommended for SMDs, many manufacturers use, and will continue to use for some time to come, a mixture of surface-mount and through-hole components on one substrate (a mixed print).

The mix of components affects the soldering methods that can be applied. A substrate having SMDs mounted on one or both sides, but no through-hole components is likely to be suitable for reflow or wave soldering. A double-sided mixed print that has through-hole components and some SMDs on one side and densely packed SMDs on the other normally undergoes a sequential combination of reflow and wave soldering. When the mixed print has only through-hole components on one side and all SMDs on the other, wave soldering is usually applied.

To help with your circuit board design, this guideline gives an overview of both reflow and wave soldering methods and is followed by some useful hints on hand soldering for repair purposes, and the recommended footprints for SMD discrete semiconductor packages.

4.4.5. Reflow soldering process

There are three basic process steps for single-sided PCB reflow soldering, these are:

- Applying solder paste to the PCB
- Component placement
- Reflow soldering.

4.5. Performing Cleaning.

4.5.1. Procedure of Cleaning and Care

1. Turn off the oven and unplug the power cord from the wall when cleaning.
2. Keep the inside of the oven clean. When food splatters or spilled liquids adhere to oven walls, wipe with a damp cloth. Mild detergents may be used if the oven gets very dirty. Avoid using spray or other harsh cleaners. They may stain, streak or dull the door surface.

3. The outside of the oven should be cleaned with a damp cloth. To prevent damage to the operating parts inside the oven, water should not be allowed to seep into the ventilation openings.
4. Wipe the door and window on sides, the door seals and adjacent parts frequently with a damp cloth to remove any spills or spatters. Do not use abrasive cleaner.
5. A steam cleaner is not be used.
6. Do not allow the control panel to become wet. Clean with a soft, damp cloth. When cleaning the control panel, leave oven door open to prevent oven from accidentally turning on.
7. If steam accumulates inside or around the outside of the oven door, wipe with a soft cloth. This may occur when the microwave oven is operated under high humidity condition. And it is normal.
8. It is occasionally necessary to remove the glass tray for cleaning. Wash the tray in warm sudsy water or in a dishwasher.
9. The roller ring and oven floor should be cleaned regularly to avoid excessive noise. Simply wipe the bottom surface of the oven with mild detergent. The roller ring may be washed in mild, soapy water or in a dishwasher. When removing the roller ring, be sure to replace it in the proper position.
10. Remove odors from your oven by combining a cup of water with the juice and skin of one lemon in a microwaveable bowl. Microwave for 5 minutes. Wipe thoroughly and dry with a soft cloth.
11. If the light bulb burns out, please contact customer service to have it replaced.
12. The oven should be cleaned regularly and any food deposits should be removed. Failure to maintain the oven in a clean condition could lead to deterioration of surface that could adversely affect the life of the unit and could possibly result in a hazardous situation.

Self-check 4.1.

Test I: short Answer writing

Instruction: write short answer for the given question. You are provided 4 minute for each question and each point has 5 Points.

2. Write Procedure of Cleaning and Care for Constructing and Repairing Electric Mitad and Stove maintenance.
2. Precautions for Safe Use to Excessive Electric Mitad and Stove maintenance.

Test II: Say True or False

6. The oven's electronic components are usually not located in its lower part.
7. CB settings may be changed when timer function is activated
8. Avoid fast cooling after soldering
9. Avoid any force on the body or leads during or immediately after soldering
10. Do not correct the position of an already soldered device by pushing, and pulling

Test III: Fill the blank space for the question provided given below.

4. _____ is an unbalanced electrical charge at rest
5. _____ is commonly known has been design specifically to protect employees in the work environment
6. _____ is serious detrimental effects on all semiconductor ICs and the system that contains them

Operation Sheet: 4.1. Replace the defective component for repairing Mitad and Stove

Operation Title: 3.1. To replace the defective component for repairing Mitad and Stove

Purpose: To practice and demonstrate the knowledge and skill **to replace the defective component for repairing Mitad and Stove**

Instruction: Use the given select tools and equipment so that mitad and stove is usually done sure the skill to replace the defective component for repairing Mitad and Stove problems with the mitad and stove circuit cabinet diagram operates properly. For this operation you have given 4 Hour and you are expected to provide the answer on the given steps.

Consumable materials

pen & ink	Red, blue and black
Pencil	HP
drafting, graph paper	A1
tracing paper	A4
Eraser	Erase pencil
Heating plate	1000 watts
Circuit breaker	220V/25A
Circuit breaker	220V/20A
Heating plate	500 watts
Kalki switch	25A
Plug(25A)	25A
Resistor	1500Watt
Resistor	1000Watt
Resistor	300Watt
Three wire cable/3-line/	2mm ²
Three wire cable/3-line/	4mm ²
Local mitad	clay for mitad
Scriber, Weraja, and Jeso	for mitad making

Tools and Equipment

Soldering iron/gun	220V/50Hz
--------------------	-----------

Screwdriver (assorted)	Philips type
Screwdriver (assorted)	Hexagonal type
Screwdriver (assorted)	Flat type
Nut drivers (assorted)	Standard type
Multi-meter (analog/digital)	AC/200M-750V/DC/200M-1000V
Clamp meter	Multi - Function (Ampere, Voltage and Ohms)
Utility knife	5 pcs replaceable blade
Wire stripper	150mm length .3-4.5mm
Pliers (assorted)	130mm-155mm length
work bench	Length 2m, height 80 cm, Width 1.2
Test light	Lamp indicator
Cleaning brush	Outside cleaning of copper, steel, brass, aluminum tubes
Ball peen hammer	300gms-500gms
Tweezers	Stain less steel
Electric Mitad stand with all accessories.	Stand with all accessories.
Electric stove stand with all accessories	Stand with all accessories.

Procedure you follow to do it

Step: 1 Prepare soldering tools and equipment's, new component to be replaced

Step: 2 Disconnect the power before you replace/repair the faulty device

Step: 3 remove the defective one by applying correct disordering technique.

Step: 4 put in place the new component in the correct direction (keep correct polarity)

Step: 5 solder it by applying good soldering technique

Step: 6 Use properly grounded power outlets.

Step: 7 Take care of not to touch high voltage side.

LAP Test – 4.1. To replace the defective component for repairing Mitad and Stove.

Instructions: Given necessary templates, tools, materials and equipment you are required to perform replace the defective component for repairing Mitad and Stove problems with replacement steps for safe performance for the following tasks within 5 hour.

Task - 1: Remove the pivot pin, and torsion bar;

Task - 2: Remove outside door handle;

Task - 3: Push out the guide pin to remove the hook from the handle

Task - 4: Remove the circuit breaker from the wall of mitad.

Task - 5: Remove the inside door handle

Task - 6: Unplug the power cord

Task - 8: Record your findings

Task - 9: Clean up area and return tools and materials to proper storage.

Precautions: select necessary templates, tools, materials and equipment before replace the defective component for repairing Mitad and Stove for Safe Performance on the given format.

Quality Criteria: the given replace the defective component for repairing Mitad and Stove for Safe Performance is with correct specification

Unit Five: Test repaired unit

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Assembling and Reassembling Repaired units
- Testing and cleaning final units
- Compiling Service completion
- Disposing Waste materials

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Assemble and Reassemble Repaired units
- Test, and clean final units
- Compile Service completion
- Dispose Waste materials

5.1. Reassembling repaired units

Remove the CB including the shield case, permanent magnet, electric mitad and stove (all of which are contained in one assembly).

1. Disconnect all lead wires from the magnetron and lamp.
2. Remove the bracket mounting.
3. Remove the magnetron supporter
4. Remove the air cover.
5. Remove screws from the back panel.
6. Remove the essay noise filter.
7. Take out the fan motor.
8. Remove the oven lamp by pulling out from hole of air cover carefully. NOTE1: When removing the magnetron, make sure that its antenna does not hit any adjacent parts, or it may be damaged. NOTE2: When replacing the magnetron, be sure to remount the magnetron gasket in the correct position and make sure the gasket is in good condition.

5.1.1. Perform disassembling and assembling processes in accordance with OH&S

To perform assembling and disassembling processes tearing down the device in accordance with the device manual and OH & S policies and procedure by applying the workplace rule. Regarding safety necessary ideas have been already discussed in LO1 please refer to LO1 information sheet about OH&S policies and procedures.

- Use all required PPE and specific safety procedures for your activity.
- Protect your own Health and Safety and that of your co-workers;
- Not initiate or participate in the harassment of another worker; and
- Co-operate with your supervisor and anyone else with duties under the legislation.
- Avoid horseplay during your activity and follow your instruction sheet & instructor recommendation.

5.1.2. Supplies, materials and equipment preparation

For required activity necessary materials and equipment's must be supplied by the person who provides training. For example we are going to disassemble electrical mitad and stove. During your disassembling look your operation sheet and manual of the device.

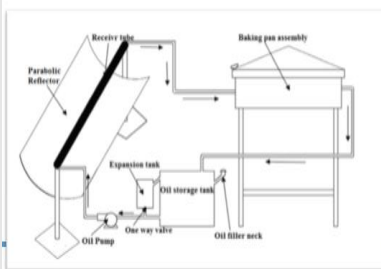
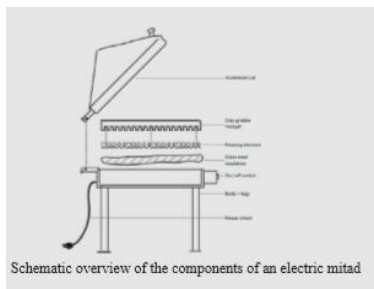
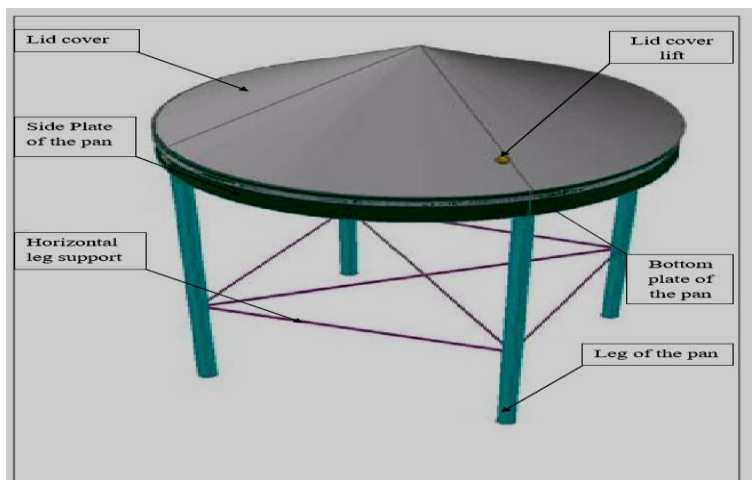
SUPPLIES, MATERIALS AND EQUIPMENT HAND TOOLS

- Full PPE
- pair of rubber gloves
- cutting pliers
- Phillips screwdriver, and
- Flathead screwdriver
- Personal Computer
- safety goggles
- Working area/bench



5.1.3. Assembly Instructions

- Lay stove (A) upside down on a padded surface with the underside accessible. Attach leg (B) to stove by inserting the tab on the top of the leg (B) into the corresponding slot on the bottom of the stove (A). Insert two screws (AA) into predrilled holes and tighten securely. Repeat with remaining three legs.



Schematic overview of the components of an electric mitad



Figure: 5.3.Schematic overview of the components of an electric mitad

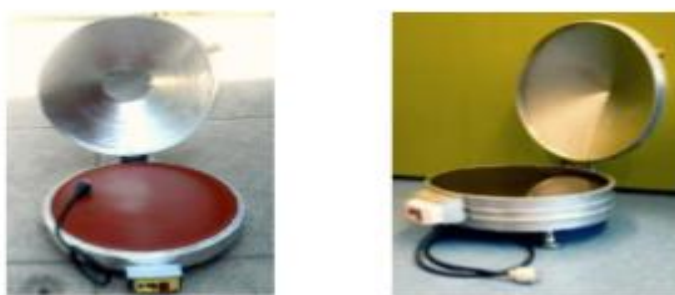


Figure: 5.4. Electrical mitad with clay plate (left) and electric mitad with MM-plate (right)

5.1.4. Operating Instructions

Once the unit has been properly connected to a ground electrical outlet, it is ready to operate. Note: Ensure the circuit breakers for power supply are turned on. CONTROL PANEL OPERATION Controls are located on the back of the unit near the top (see Figure 3). 1. Main ON/OFF power switch: This switch is located at the furthest right corner on the control panel when looking at the back of the unit. Turn the switch to ON and unit will be ready to operate. The "|" indicates ON and "O" indicates OFF. 2. Flame ON/OFF Switch: This switch is located in the middle between the Main ON/OFF switch and the Heater ON/OFF switch on the control panel when looking at the back of the unit. Turn the switch to ON and the flame effect will turn on. The "|" indicates ON and the "O" indicates OFF. 3. Heater ON/OFF Switch: This switch is located to the left of the Flame ON/OFF switch on the control panel. It has a symbol of the sun directly below it. 4. Thermostat Control Dial: This dial is located at the furthest left corner on the control panel. It has a symbol of a thermostat directly below it. Turn the dial clockwise past the number 8.

5.1.5. Reassembly Test

1. When mounting the door to the electrical mitad and stove, be sure to adjust the door parallel to the bottom line of the electrical mitad and stove face plate by moving the upper hinge and lower hinge in the direction necessary for proper alignment.
2. Adjust so that the door has no play between the inner door surface and electrical mitad and stove front surface. If the door assembly is not mounted properly, electrical mitad and stove energy may leak from the space between the door and electrical mitad and stove.
3. Do the electrical mitad and stove leakage test?

A. Replacement of circuit breaker

1. Disconnect the electrical mitad and stove from the power source.
2. When 25A circuit breaker blows out by the operation of switch failure, replace switch, and power relay.
3. When the above three switches operate properly, check if any other part such as the control circuit board, blower motor or high voltage transformer is defective.

5.2. Testing and cleaning reassembled units.

5.2.1. Cleaning and Care

1. **Turn off the electric mitad and unplug the power cord from the wall when cleaning.**
2. **Keep the inside of the mitad clean.** When food splatters or spilled liquids adhere to mitad walls, wipe with a damp cloth. Mild detergents may be used if the stove gets very dirty. Avoid using spray or other harsh cleaners. They may stain, streak or dull the door surface.
3. **The outside of the mitad or stove should be cleaned with a damp cloth.** To prevent damage to the operating parts inside the stove or mitad, water should not be allowed to seep into the ventilation openings.
4. **Wipe the door and window on sides,** the door seals and adjacent parts frequently with a damp cloth to remove any spills or spatters. Do not use abrasive cleaner.
5. **A steam cleaner is not be used.**
6. **Do not allow the control panel to become wet.** Clean with a soft, damp cloth. When cleaning the control panel, leave stove door open to prevent mitad and stove from accidentally turning on.

7. If steam accumulates inside or around the outside of the oven door, wipe with a soft cloth. This may occur when the electric mitad and stove is operated under high humidity condition. And it is normal.

5.2.2. Making measurements/Testing inside mitad and stove

WARNING: In general, I DO NOT recommends making any sorts of measurements on the high voltage components of a live electric mitad and stove. I only include this section for those who really want to know the details.

You may be tempted to break out your Radio Shack DMM and start poking away inside a live electric mitad and stove. DON'T! This isn't like a CD player! Most of the time, no measurements of any kind on the oven while it is operating will be needed to identify and correct the problem. However, where this is not the case, here are some guidelines to a long life:

WARNING: ALWAYS pull the plug and discharge the HV capacitor BEFORE doing anything inside! Never be tempted to make any changes of any kind while the oven is on - not even if your meter is being consumed by 5 foot flames!

- **High voltages - DON'T** even think about this unless you have a proper high voltage probe or meter, or a proper electric mitad and stove tester - AND KNOW HOW TO USE IT SAFELY. Even professionals have been killed performing measurements of this type using proper equipment! Luckily, current measurements can provide enough information to help make a diagnosis.

WARNING: The high voltage components inside an electric mitad and stove are at a NEGATIVE potential with respect to the chassis. DO NOT be tempted to interchange the probe and ground wire if you are using a high voltage probe on a meter with a POSITIVE input (e.g., for testing) and no polarity switch! The ground cable doesn't have anywhere near the required insulation. Get the proper equipment! With this set at a MAXIMUM of 10 percent, the voltage on the filament terminals should read from -220 to -250 V with respect to the chassis. A scope can also be used if it has a proper 10:1 probe as long as you aren't tempted to turn up the Variac any higher! The scope waveform should be close to a sinusoid with its positive tips at 0 V. Such reduced voltage tests won't identify problems that only occur at full voltage, however.

1.3. Compiling documentations.

1.3.1. Introduction Maintenance documentation

It is a record or the capturing of some event or thing so that the information will not be lost.

Service contract or in-house preventive maintenance is documented. This documentation is required for annual maintenance. Maintenance performed at other times, with the exception of routine cleaning, is documented.

The documentation includes:

- description of the maintenance;
- date it was done; and
- name of the service representative and company, or name of
- The analyst if maintenance provided internally.

1.3.2. Repair equipment is documented.

A. The documentation includes:

- initials of the analyst, and the date the problem was observed,
- description of the problem;
- date and initials of the analyst or service represent at performing the repair;
- synopsis of the repair; and
- Cost of repair, copy of the invoice and any additional information (not required).

B. Reading the service manual

It is difficult to repair any piece of complicated equipment without some service literature. It is possible to repair electronic equipment without the service manual, but it can be very time-consuming. You can lose a lot of valuable servicing time if you are without a good service manual. The service manual is a set of document prepared by the manufacturer to help the service technician to repair or service that set of equipment. A well written manual is the best servicing aid. It contains the following information:

- Describe how a circuit works
- Block diagram of the equipment
- Circuit diagrams
- Signal and voltage test points
- Adjustment procedure

- List of accessories
- List of spare parts with the part numbers, values, tolerances and ratings
- Fault diagnosis steps, generally in the form of flow charts
- Preventive maintenance layout
- Safety precautions to be observed while handling the equipment.

A service manual can be very expensive, but it is worth the investment. With the help of a service manual, a service technician or engineer can:

- Align, calibrate and test the equipment correctly to get the optimum output
- Locate a fault quickly
- Use the correct replacement part Conduct preventive maintenance correctly

By using the right service manual, as well as with the assistance of good tools, testing equipment and your own experience, you are set to multiply your troubleshooting power!!!

5.3. Disposing waste materials.

5.3.1. Introduction discarding of waste

Electronic waste (sometimes called e-waste) is a term used to describe electronics that are nearing the end of their useful life and are discarded, donated, or recycled. Although donating and recycling electronic devices conserves natural resources, you may still choose to dispose of e-waste by contacting your local landfill and requesting a designated e-waste drop off location. Be aware that although there are many options for disposal, it is your responsibility to ensure that the location chosen is reputable and certified

5.3.2. Disposal of E-waste is electronic waste.

This includes old computers and their components, cell phones, digital cameras and other electronic gadgets. There often are heavy metals and other hazardous components inside the electronics that require special care when disposing of them. They may also have personal information on the hard drives that can be copied, putting your identity at risk. This will require preparing the items for disposal.

Contact the manufacturer of the product and ask if it accepts e-waste for disposal. Apple, for example, will accept your old computer for disposal when you purchase a new one from them. Some manufacturers accept other brands' e-waste for a small fee.

Contact a nearby electronics retailer and inquire into its disposal programs. Best buy in its stores such small items as cell phone batteries and hosts recycling weekends for e-waste. Other retailers also offer similar programs.

Contact your city, county or private waste management office. Many offer e-waste programs or have e-waste events for customers. Contact private waste companies and recyclers to see if they accept e-waste. Research donation options. Such charities as Goodwill may accept your old electronics and computers as a donation. Some cell phone companies accept old phones and then donate them. Prepare your item for disposal. Remove any memory cards from phones or cameras. Reset the memory on the phone following the instructions in your model's manual. Erase everything on your computer's hard drive. Some recyclers will do this for you, but inquire about this service before bringing your e-waste to them.

Operation sheet 4.1. Conduct an electric mitad and stove leakage test

Operation Title: perform different leakage test for electric mitad and stove.

Purpose: To practice and demonstrate the knowledge and skill required perform different leakage test for electric mitad and stove for safe performance using service manuals and service information

Instruction: Given necessary, workshop, tools and materials and equipment's you are required to perform Door Seals, Door Class, Cabinet Vents, And Power Cord to Assure the stove Is In Compliance With the Performance Standard for electric mitad and stove.

Tools and materials

- electric mitad and stove as selected by instructor
- electric mitad and stove radiation detection meter as selected by instructor
- electric mitad and stove radiation detection probe for selected radiation detection meter
- Nine volt battery
- Operator's manual for selected meter and probe
- sixteen-ounce measuring beaker
- Pencil and paper
- Safety glasses

Procedure you follow to do it

STEP- 1: Put on: safety glasses

STEP- 2: Fill a beaker with 9 ounces of water that is about room temperature

STEP- 3: Place the load (the water) into the oven cavity and close the oven door

STEP- 4: Prepare your multi - meter as outlined in a previous job sheet

STEP- 5: Turn the fangs selector switch on the RF meter to the correct position

STEP- 6: Turn this electric mitad and stove ON

STEP- 7: Pick up the meter in one hand and the test probe with the spacer cone in the other

STEP- 8: Start at the upper left hand corner of the door seal %/it's the tip of the spacer cone slightly touching the door edge (Figure 1).

STEP- 9: Move the tip of the probe slowly across the top edge of the door until you reach a point where you get a reading

LAP Test 4.1. Perform different leakage test for electric mitad and stove

Instructions: Given necessary templates, tools, materials and equipment you are required to perform test the electric mitad and stove for safe performance for the following tasks within 5 hour

Task -1: Set the multiplier range at X10 and check the power cord at the point where it enters the oven cabinet

Task -2: Check all vents, air ducts, or any other openings in the oven cabinet at the X10 range, and if you don't get a reading, switch to the X1 range

Task -3: Record all readings in the appropriate chart in Figure 2 that accompanies this job sheet

Task -4: Turn the digital multi - meter OFF

Task -5: Turn the microwave oven OFF and unplug the power cord to the oven 0 Have your instructor check your charts in Figure 2

Task -6: Remove the spacer cone from the probe and the probe from the meter and replace everything in the meter carrying case

Task -7: Turn the digital multi-meter to proper storage and double-check the work area to make certain everything is in order.

Precautions: select necessary templates, tools, materials and equipment before performing different leakage test electric mitad and stove for Safe Performance on the given format.

Quality Criteria: the given performing different leakage test electric mitad and stove For Safe Performance is with correct specification

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