



Participant Guide

FIELD ENGINEER – RACW

LN ELE CE L4 ENG PG VER 2.01

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Foreword

LabourNet is a social enterprise that creates sustainable benefits for workers in the informal sector, by taking an end to end solution focused on plugging gaps in the ecosystem to the market, to address all the challenges faced by the workers in the unorganized sector This course is created to impart the skills necessary for working as **Field Engineer – RACW in Electronics Sector.**

This course is designed for the training model known as work integrated learning. Trainee will be imparted with knowledge through lecture in the industry premises for fixed duration every day. The trainer will be providing guidance for limited duration as and when required to ensure the trainee is acquiring the required skills to function as a **Field Engineer – RACW.**

The advantage of this model is that the trainee will be learning in the working environment and not many new facilities are required for training delivery, except sparing of the machinery and consumables for on-the job training under the guidance of the trainer.

This course is aligned to the QP developed for the occupation of Field Engineer – RACW (Reference ID: ELE/Q3105) under Electronics sector for the sub sectors Consumer Electronics.

Table of Contents

Foreword.....	2
Table of Contents.....	3
Key Competencies	4
Module 1- Introduction to Electronics & Generic Skills	4
Session Plan 1- Introduction to Electronics	4
Session Plan 2 - Hazard, Safety & Health	9
Session Plan 3 - Generic Skills	13
Module 2- Engage with Customer	17
Session Plan 4 - Customer Service	17
Module 3- Install Newly Purchased Refrigerator	20
Session Plan 5 - Introduction to Refrigerator	21
Session Plan 6 - Installation of Refrigerator	23
Module 4 - Attend to Service Complaints - Refrigerator	30
Session Plan 7 - Servicing of Refrigerator.....	31
Module 5 - Install Newly Purchased Air conditioner	35
Session Plan 8 - Introduction to Air Conditioner.....	35
Session Plan 9 - Installation of Air Conditioner	37
Module 6 - Attend to Service Complaints - Air Conditioner.....	43
Session Plan 10 - Servicing of Air Conditioner.....	44
Module 7 - Install Newly Purchased Washing Machine	47
Session Plan 11 - Introduction to Washing Machine.....	49
Session Plan 12 - Installation of Washing Machine	50
Module 8 - Attend to Service Complaints – Washing Machine	56
Session Plan 13 - Servicing of Washing Machine	56
Module 9 - Interact with Colleagues.....	61
Session Plan 14 – Customer Service.....	62

Key Competencies

Upon successful completion, the Learners will be able to:

- Understand the overview of electronics and generic skills
- Engage with Customer
- Install Newly Purchased Refrigerator
- Attend to Service Complaints - Refrigerator
- Install Newly Purchased Air Conditioner
- Attend to Service Complaints - Air Conditioner
- Install Newly Purchased Washing Machine
- Attend to Service Complaints - Washing Machine
- Interact with Colleagues

Module 1- Introduction to Electronics & Generic Skills

Module Objectives

At the end of the module, the participant will be able to perform the following:

- Describe working of conductor and insulator.
- Explain about electronic components.
- Differentiate about AC & DC.
- Describe electrical circuits - series and parallel connections
- Describe roles and responsibilities of a field engineer RACW
- Describe cause of electrical hazardous.
- Explain the use of various PPE used at workplace.
- Describe the causes that could lead to fire and explosions.
- Explain the importance of first aid.
- Communicate effectively with others
- Manage time and complete work on time
- Take certain decisions in absence of supervisor
- Explain about basic operations on computer

Session Plan 1- Introduction to Electronics

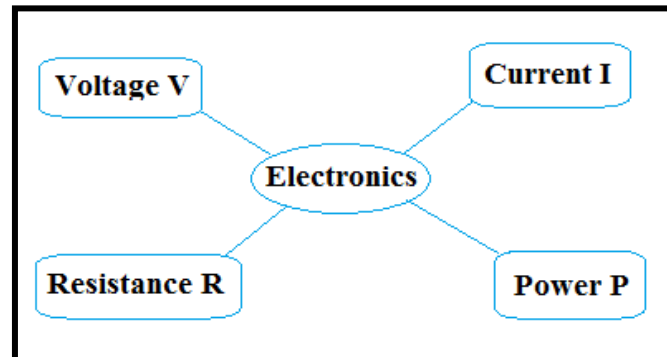
Session Objectives

At the end of the session, the trainee will be able to:

- Basic knowledge on electronics and electricity

1.1 Introduction to Electronics

Electronics is the branch of physics that deals with the emission and effects of electrons and the operation of electronic devices.



Electronic Quantities

Four main quantities:

- Voltage (volts) - V
- Current (amps) - I
- Resistance (ohms) - R
- Power (watts) - P

The main equations involved in the study of electronics are as follows:

- $V = I \times R$
- $P = V \times I$
- $P = I \times I \times R$

Units

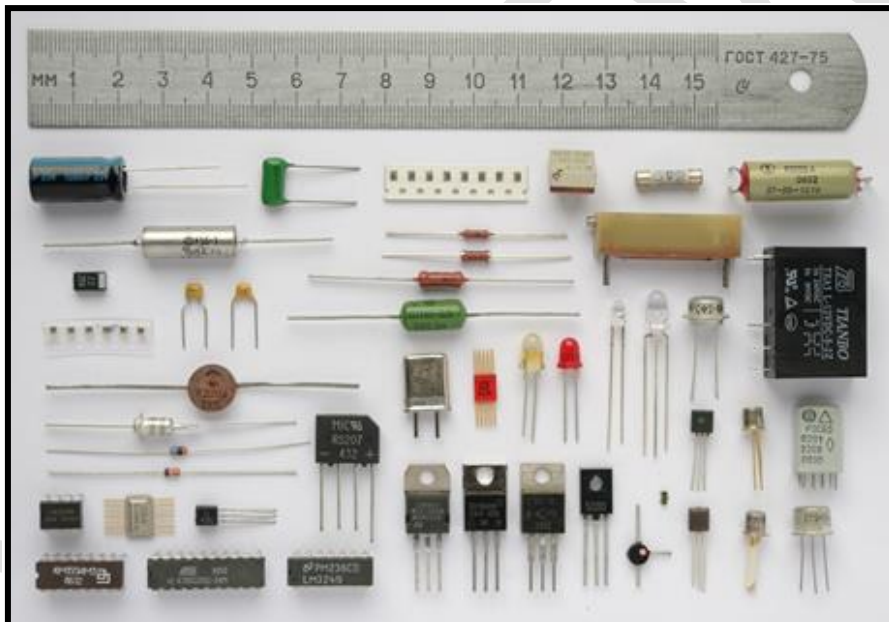
The commonly accepted units in electronics are metric. In accordance with the SI (System International), metric specifications given in the following table:

Term	Abbreviation	Value (scientific)	Value (Normal)
Tera	T	1×10^{12}	1,000,000,000,000
Giga	G	1×10^9	1,000,000,000
Mega	M	1×10^6	1,000,000
Kilo	k (lower case)	1×10^3	1,000

Units	-	1	1
Milli	M	1×10^{-3}	1 / 1,000
Micro	μ or u	1×10^{-6}	1 / 1,000,000
Nano	N	1×10^{-9}	1 / 1,000,000,000
Pico	P	1×10^{-12}	1 / 1,000,000,000,000

Electronic Components

An electronic component is any basic discrete device or physical entity in an electronic system used to affect electrons or their associated fields.



Electronic Components

Electronic components are of three types. These are described below:

- **Active Components (Energy donor)**

These components require external source to their operation. They produce energy in the form of voltage or current.

For Example: Diode, Transistors, SCR etc.

When we connect a diode in a circuit and then connect this circuit to the supply voltage, then diode will not conduct the current until the supply voltage reach to:

0.3V (In case of Germanium)

0.7V (In case of Silicon)

- **Passive Components (Energy acceptor)**

These components do not require external source to their operation. They store energy in the form of voltage or current.

For Example: Resistor, Capacitor, Inductor etc.

When we connect a resistor to the supply voltage, it starts work automatically without using a specific voltage.

- **Electromechanical Components**

They carry out electrical operations by using moving parts or by using electrical connections.

For Example: Switch

Electronic/Electrical Terminologies

A technician should understand these electronic/electrical terms before studying electronic components in detail.

Terminal (pole) - A point at which a conductor from an electrical component, device or network comes to an end, it provides a point of connection to external circuits.

For example - All electric batteries have two terminals (positive and negative)

Positive terminal - metal cap, Negative terminal - metal disc

The current flows from the positive terminal, and out through the negative terminal (positive (+) to negative (-) flow).



Battery

Points to remember:

- Some of the major players in India's telecom industry include:
 - ✓ - BSNL

- ✓ - Reliance
 - ✓ - Vodafone
 - ✓ - Airtel
 - ✓ - Tata
 - ✓ - Idea
- As per the data recorded in May 2012, India stood the second largest mobile phone users in the globe
 - According to the recent data, the total foreign direct investment inflows have been increased up to 10% from the last few years.
 - Help desk has overcome all the existing devices like telephone, email etc., at workplace.
 - Basically help desk is software developed specifically for companies to handle the communication between the employees.
 - Some of the important facts about help desk are:
 - ✓ Knowledge Management
 - ✓ Problem Management
 - ✓ Access Management
 - ✓ Service Catalogue

Exercise

Answer the following.

1. Define Electronics?

2. Define electronic components.

3. Define terminal (pole)?

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Session Plan 2 - Hazard, Safety & Health

Session Objectives

At the end of the session, the trainee will be able to:

- Describe cause of electrical hazardous.
- Explain the use of various PPE used at workplace.
- Describe the causes that could lead to fire and explosions.
- Explain the importance of first aid.

2.1 Electrical Hazards

Electrical hazards can happen if following things exist:

1. Improper grounding

- Grounding is the process used to eliminate unwanted voltage.
- A ground is a physical electrical connection to the earth.
- The ground pin safely returns leakage current to ground.
- Removing the ground pin removes an important safety feature.



2. Exposed Electrical Parts

- Exposed wires or terminals are hazardous.
- Never use a panel that has exposed wires.



3. Inadequate Wiring

- Use properly rated extension cords.
- Make sure your power tools are being used with a properly rated Extension cord.



4. Damaged Insulation

- Defective or inadequate insulation is a hazard.
- Insulation prevents conductors from contacting each other or you.



5. Overloaded Circuit

- Overloaded circuits can cause fires.
- Use proper circuit breakers.
- Never overload an outlet



6. Damaged Tools & Equipment's

- Do not use electric tools that are damaged.
- You may receive a shock or be electrocuted.



7. Wet Conditions

- Wet conditions are hazardous.
- Damaged insulation increases the hazard.
- Always avoid using tools in wet locations.
- Water increases the risk of electric shock.



2.4 First Aid

- First aid is the medical help given to any person suffering a sudden illness or injury.
- It includes initial intervention such as applying a plaster to a cut or dressing on wound prior to professional medical help. For example - awaiting an ambulance.

A first aid box with all basic things should be available at the working area.

Contents of first aid box

This depends on type of work and special risk which is present in the workplace. Hence there is no standard list of items to input in the box. The minimum requirement is mentioned below.

- Pair of gloves
- Large dressings x 2
- Medium dressings x 2
- Pack of gauze x1
- Small dressings x 2
- Eye pad x 2
- Triangular bandage x 2
- Crepe bandage x1
- Adhesive dressings x20 x 1
- Ice pack
- Cleaning wipes
- Clinical wastes bags
- tweezers
- safety pins x 10



Following correct procedures for first aid and seeking medical help is necessary.

Note: Do not attempt any of the following unless you are trained and certified

Exercise

Answer the following.

1. List the instances where electrical hazards can happen?

2. List few warnings of potential hazards.

3. Define PPE.

4. What is first aid?

5. What is fire extinguisher?

NOTES

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Session Plan 3 - Generic Skills

Session Objectives

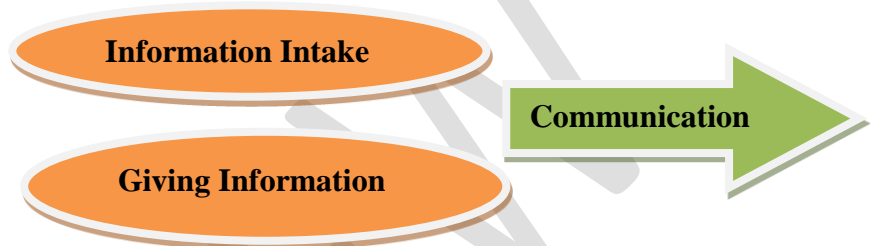
At the end of the session, the trainee will be able to:

- Communicate effectively with others
- Manage time and complete work on time
- Take certain decisions in absence of supervisor
- Explain about basic operations on computer

3.1 Introduction

The basic skills required for people at any workplace are:

- Listening
- Reading
- Speaking
- Writing



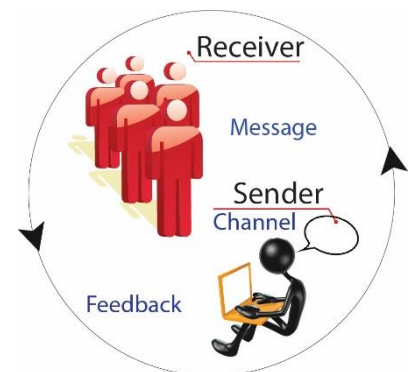
3.2 What is communication?

Communication is sending a message by speaking, writing or expressing.

Components of a communication: Sender, Channel and Receiver.

Communication could be broadly divided in three forms:

1. Verbal/Oral Communication
2. Non-Verbal Communication
3. Written Communication



3.3 Verbal Communication

The act of communicating a message, idea, feeling or thought by use of mouth is called Verbal Communication.

Few examples of Verbal Communication are:



Basic Etiquettes for face-to-face conversation:

- Body Language must be polite and positive
- Maintain eye contact
- Avoid postures like folded arms, yawning, biting lips etc.
- Speak clear and crisp sentences
- Speak easy to understand words in short sentences



Points to remember:

- Two common type of electric current - Direct current (DC) Alternating current (AC)
- Electronics is the branch of physics that deals with the emission and effects of electrons use of electronic devices.
- The most often used terms in electronics are voltage and current
- Ohm's law states - the current flows directly proportional to the applied voltage & inversely proportional to the resistance.
- A capacitor can store some energy in them. They act like a bucket
- LED are designed with a very large band gap so movement of carriers across their

depletion region emits photons of light energy

- When electrons flow in a conductor it is called Electricity
- An electrical circuit is a complete path/or paths for the electrons to follow.
- The material which allows the flow of electricity or electrons easily is called conductor.
- The material which stops the flow of electricity or electrons is called as Insulators.
- A series circuit is a circuit with only one possible path through which electricity can flow.
- Parallel circuits have multiple paths for the flow of electricity.
- The mains supply is delivered to houses using a three core wiring called the live neutral and the earth.
- Electrical energy = Power x time = $P \times t = VI t$ (if $P = VI$)
- A hazard is a situation that poses a level of threat to life, health, property, or environment.
- Never work with wet tools or clothing
- PPE designed to protect the wearer's body from injury or infection.
- Locks and Tags are warning signs.
- First aid is the medical help given to any person suffering a sudden illness or injury.
- A fire extinguisher is a device which is used to control a fire.
- There are different kinds of fire extinguishers to control different kinds of fire.
- ETHICS are the principle and standards of good character, proper conduct, and moral judgment.
- Communication includes listening skills, voice, speech, and conversational ability
- This job demands people with a pleasing personality & a vision for working in details to manage the assigned tasks.
- The basic skills required for people at any workplace are reading, writing, speaking and listening skills.
- Communication includes listening skills, voice, speech, and conversational ability
- The basic skills required for people at any workplace are reading, writing, speaking and listening skills.
- The ability to express your opinions, beliefs, feelings, and rights, honestly without any hindrances, in a manner that does not offend or hurts others is Assertiveness.
- The parts of the computer can be divided into two main components
- Hardware
- Software

Exercise

1. Define communication.

2. List the various types of communication.

3. What do you mean by assertiveness?

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Module 2- Engage with Customer

Module Objectives

At the end of the module, the participant will be able to perform the following:

- Engage with customer to understand customer complaint and requirements
- Interact with supervisor or superior to achieve targets
- Interact with the customer prior to visit
- Interact with customer at their premises
- Suggest possible solutions to customer
- Achieve productivity and quality as per company's norms

Session Plan 4 - Customer Service

Session Objectives

At the end of the session, the trainee will be able to:

- Engage with customer to understand customer complaint and requirements
- Interact with supervisor or superior to achieve targets
- Interact with the customer prior to visit
- Interact with customer at their premises
- Suggest possible solutions to customer
- Achieve productivity and quality as per company's norms

4.1 Customer Service

Interacting with customer prior to visit

The field engineer should have knowledge about these terms:

Customer service

Customer service is the service provided by the companies to their customer before, after and during the purchase of goods to ensure customer satisfaction. It helps to build a good relationship, loyalty and trust with the customer. A satisfied customer will consider the company for further services. Unsatisfied customer will never come back to avail any service resulting in loss and bad reputation of the company.

Warranty status

It is a written representation made by a seller or company of a product or service that a refund, repair or replacement will be made if the product or service proves defective or unsatisfactory within a given period of time.

Annual maintenance contract

It is a fixed fee service provided by the company for periodic maintenance of the appliance on yearly basis.

The technician who has to repair the appliance at the customer place, he should:

1. Check customer complaint registered at customer care. By doing this, you will get some idea about difficulty of customer.

A typical customer care format to register customer complaint is given below:

Sl. No.	Name of Customer & contact number	Type of equipment	Problem reported
1	Mr. Harish	AC	Noisy
2	Mr. Vivek Kumar	Refrigerator	Not cool enough
3	Mr. Sunil M	Washing Machine	Rinsing not working
4	Mr. Kishore Kumar	Refrigerator	Water outside the fridge

2. Call customer to confirm problem which is registered in customer care and fix time for visit.

The important points to be considered while interacting over call or in person with customer:

- Start the call with a nice greeting like good morning sir, hello sir. Make sure to be very polite and patient while talking to customer.
 - Smile when greeting a customer in person. Be polite with customer in any circumstances.
 - Be active during interaction.
 - Never judge the customer by their age or appearance.
 - Always make any personal calls when you are in break.
 - Keep a smile on your face while saying good bye to a customer.
3. Ask with the customer about warranty status of appliance and annual maintenance contract of the same.
 4. Anticipate possible problems, so that it will be easy to carry tools and parts accordingly.
 5. Confirm customer location and schedule a route plan to visit the customer place.



If you have to visit 4-5 customers in a day, then it is important to decide which place to go first. To decide this, you have to prepare a route plan for all the customers.

The place which is near by your place should visit first. Like this the timings and sequence of visits have to be scheduled. This will help in completing the daily target of a technician.

Points to remember:

- Customer service is the service provided by the companies to their customer before, after and during the purchase of goods to ensure customer satisfaction.
- Customer is the God here who brings revenue to the company which in turn creates jobs.
- Check the customer complaint registered at customer care and call customer to confirm problem and fix time for visit.
- Smile when greeting a customer in person.
- Anticipate possible problems, so that it will be easy to carry tools and parts accordingly.
- How you look creates an impression on your customer's mind, especially when you are meeting them for the first time.
- Smile, display confidence, and polite respect for the customer.
- Keeping eye contact with the customer is mandatory even if you are the world's

best listener.

- As it is very stressful and intense talking with customer, always remain calm and cool.
- Solution comes from identifying the problem with customer.
- Always be transparent about the problems with customer.
- If customer knows what changes he wants in plan then proceed with the order.
- Seek supervisor help if not able to handle.
- Technician should resolve all the customer's queries in a courteous manner.
- Prepare the most optimum route plan before going to the customer place so that it will be easy to complete daily target visits.

Exercise

1. Define warranty status.

2. Define annual maintenance contract.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Module 3- Install Newly Purchased Refrigerator

Module Objectives

At the end of the module, the participant will be able to perform the following:

- Explain principle of refrigeration
- Explain about how refrigerant works
- Explain about refrigeration cycle
- Describe various types of refrigerator

- Explain BEE star rating
- Describe electrical parts of frost free refrigerator
- Describe working of frost free refrigerator
- Describe about the tools used by a refrigerator technician
- Explain about the safety measures while using the tools
- Explain how to install a refrigerator
- Identify the basic tools required for installing the refrigerator
- Carryout installation of refrigerator by using required tools
- Discuss how to educate customer on the usage of refrigerator
- Discuss how to take customer feedback

Session Plan 5 - Introduction to Refrigerator

Session Objectives

At the end of the session, the trainee will be able to:

- Explain principle of refrigeration
- Explain about how refrigerant works
- Explain about refrigeration cycle
- Describe various types of refrigerator
- Explain BEE star rating
- Describe electrical parts of frost free refrigerator
- Describe working of frost free refrigerator

5.1 Introduction to Refrigeration

A process of removing heat from a closed container by reducing its temperature and maintained below normal temperature. The removed heat is released to a place where it will not make any difference.

Refrigeration system

The mechanism used for lowering the temperature in a body or a space, whose temperature is already below the surrounding temperature, is called the refrigeration system.

Exercise

1. Define refrigeration system.

2. What is refrigeration principle?

3. What is refrigerant?

PREVIEW

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Session Plan 6 - Installation of Refrigerator

Session Objectives

At the end of the session, the trainee will be able to:

- Describe about the tools used by a refrigerator technician
- Explain about the safety measures while using the tools
- Identify the basic tools required for installing the refrigerator
- Explain how to install a refrigerator
- Carryout installation of refrigerator by using required tools
- Discuss how to educate customer on the usage of refrigerator
- Discuss how to take customer feedback

6.1 Tools required by a Field Engineer RACW

To perform an electrical work, the right kinds of tools are required. Over the years, modern and specialized tools have been developed. However, there is a list of “must have” tools that every electrician must possess to carry out proper electrical work.

The following figure categorizes commonly used electrician tools:






Basic Tools	Measuring Tools	Cutting and Bending Tools	Power Tools	Testing Tools
<ul style="list-style-type: none"> • Wrench set • Screw driver set • Hex-head nut drivers • Pliers • Hammers • Allen key set • Files • Spanner 	<ul style="list-style-type: none"> • Measuring tape • Trisquare • Wire gauge • Pressure gauge • Refrigerant gauge 	<ul style="list-style-type: none"> • Knife • Drilling tools • Tube cutter • Tube bender 	<ul style="list-style-type: none"> • Drilling machine • Air blower • Caulking gun • Soldering Iron • Brazing Kit • Charging Kit 	<ul style="list-style-type: none"> • Electrical tester • Spirit level • Noise tester • Oscilloscope • Multimeter • Clamp meter • Thermometer • Leak detector • Vacuum Pump

As mentioned before every electrician needs basic tools to effectively carry out his task. These basic tools are explained in detail below:

Pliers

Pliers are used to grip something like a rod or wire or pipe. Electricians use it for twisting wires and sometimes even cutting wires. The structure of a plier consists of parallel handles, a pivot where the two handles join and jaws extending from the handles which are also parallel to each other. Some common types of pliers are listed in the table below:

Types of pliers and their uses

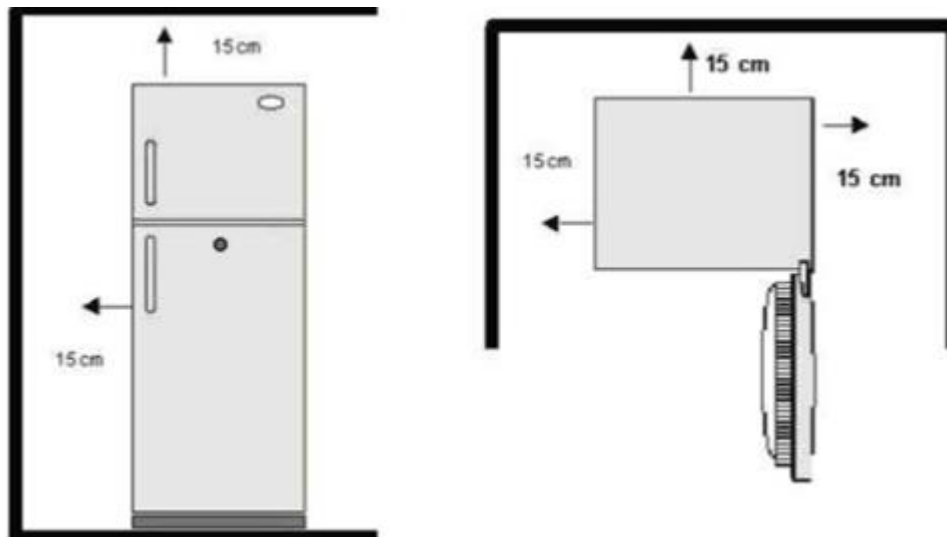
S. No	Pliers type	Use	Picture
1	Engineer's pliers	Gripping metal	
2	Flat nosed pliers	Holding small objects	
3	Electrician pliers	Gripping electrical wires	
4	Round nosed pliers	Bending wire into loops	
5	Slip joint pliers	Holding and manipulating electrical wires	

Depending upon the task in hand, the electrician can choose the right type of plier.

6.3 Installation of refrigerator

Location, Levelling & Clearance

- Select site with adequate air circulation around the refrigerator (150 mm at top, on both sides and rear)
- Site away from sunlight or direct heat or air draft or humid place.

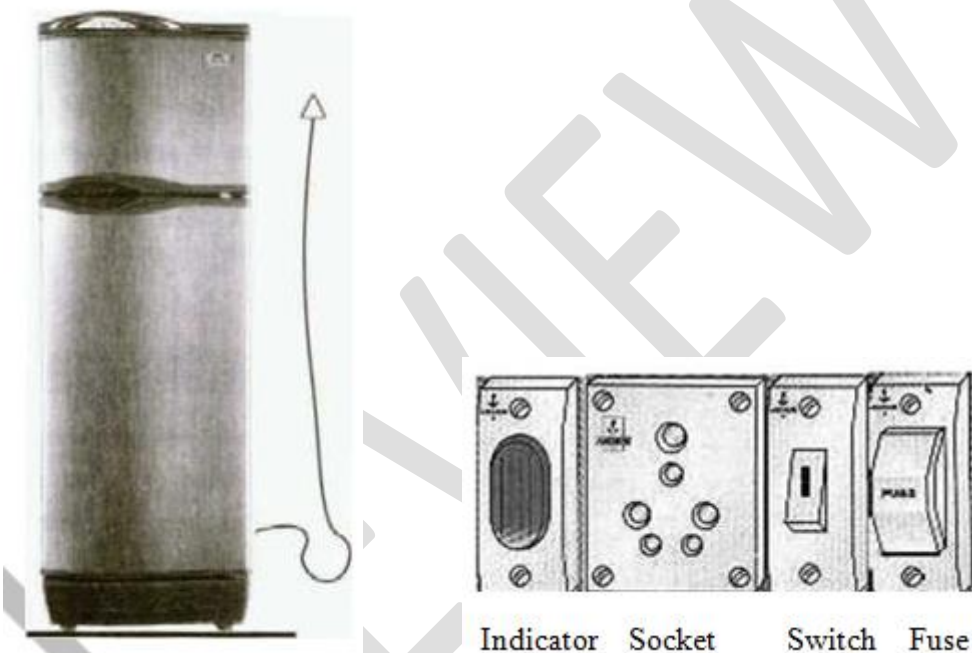


- Keep unpacked refrigerator near electrical power socket [on the wall, above 2-mtrs. height]. Don't extend wire and keep it hanging.
- Upon selecting site, place refrigerator in place by lifting it from front and sliding it behind with rollers (in models provided) for ease of movement. Refrigerator must always be in upright position.
- Adjust the front screws for accurate level and firmly position the refrigerator on a solid/firm floor.
- Remove shipping tapes and keep all accessories in their place.
- Clean the refrigerator with soft cloth from inside & outside.



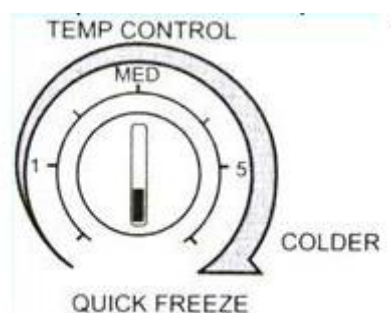
Power Supply

- Electric supply wall socket to be with 5 amps. fuse, indicator lamp & single pole switch. No extension board.
- Ensure the phase line to be on right side of socket & its connection through the switch.
- Confirm line voltage at the socket to be 160 – 250 Volts. In case of areas with power fluctuation, recommend Voltage Stabilizer - 0.5 KVA
- Ensure proper/strong earthing in socket at the top terminal. (No leakage)



General

- Set temperature controller to Maximum/Test un position/Rapid Cool
- Plug the refrigerator into an electrical wall socket and switch it ON
- Observe compressor and fan (frost free models) coming ON



Customer Education

Be sure to show all accessories placed inside refrigerator.

Explain the features and usage/benefits of the new refrigerator:

- Functions of Electronic Control - vacation mode, rapid cool mode etc.
- Rear rollers, movement
- Deep door, clean back design
- Chiller zone & other temperature zones - where to store what
- Liner and door panel with their shelves (purposes)
- Humidity controller of crisper tray
- Full Depth crisper with separator / Twin crisper
- Water evaporation pan & bottom tray
- Thermostat settings - should be on the basis of load in refrigerator and freezer compartments, temperature of the surroundings (ambient temperature)
- Inform where & whom to contact for demonstration.

Advice customer to:

- Keep door openings minimum & of short duration. Chimer will become operational after delay time of 90 seconds and will continue till the door is closed.
- Keep foodstuff & liquid duly covered. Store leafy vegetables in polythene bags.
- Avoid over loading and storing of hot! Warm food/eatables in the refrigerator. Allow adequate space for air circulation within.
- Avoid plastic spread sheet on the shelves.
- Keep insects and rodents away from refrigerator.
- Keep flammable sprays away from refrigerator
- What to do while going on holidays.
- Care while moving it elsewhere.

Explain:

- Cleaning procedure - internal and external. Do not splash water on the refrigerator.
- Food Storage - how where to keep various items
- Warranty / optional service contract - what is covered and what is not.
- Fill-up 1 year warranty / 4 years optional service contract for sealed system.
- Request customer to read the user manual pointing to key headings.
(Demonstrator must be aware of all relevant pages of user manual)

Tips on food storage

- Keep all frozen food in packed containers or wrapped in polythene or Al foil.
- Bread, Cake, Pastries, Butter should be kept properly wrapped or in containers.
- Loosely wrap all vegetables, especially the leafy ones in polythene bags.
- Fruits & vegetables having strong odor should be wrapped tightly.
- If fruits and vegetables are washed before storing, they should be thoroughly drained of all the water.
- Too much moisture can increase the possibility of spoilage or decay.
- Certain vegetables like French beans, Ladyfinger should not be washed before storing in refrigerator.
- Fruits like pineapple, melon, cucumber, tomato etc. should be wrapped in polythene bags & stored in crisper.
- Ice cream should always be stored in freezer with thermostat in coolest setting.
- Ice cream may still stay slightly soft. This is bound to happen as normally ice cream is stored at retailer in deep freezer which is at much lower temperature.
- The compartment shelves should not be covered with any kind of sheet so as to allow free circulation of cold air.
- Never store products that contain an inflammable propellant gas (cream dispensers, spray cans etc.) or any other explosive items.
- It is not recommended to store frozen foods in the freezer after thawing.

- Avoid keeping vegetables in front/near the cold air entry point of the Intel flow duct as it may lead to spoilage.

Points to remember:

- Refrigeration is a process of removing heat from a closed container where by its temperature is reduced and maintained below ambient or normal temperature.
- Refrigerant safety is straightforward: If the refrigerant stays contained in the cylinder or in the system then it presents little danger to people
- Specific hazards from refrigerant fall into three categories: Toxicity, Combustion/flammability/decomposition and pressure
- Tools, parts and equipments pertaining to the repairing of refrigerators
- Chlorofluorocarbons (CFCs) are a group of manufactured chemical compounds that contain chlorine, fluorine, and carbon. This group includes CFC-11, CFC-12, CFC-113, CFC-114, CFC-115, and many forms of Freon
- A refrigerant is a substance used to cause or provide cooling. A CFC (chlorofluorocarbon) refrigerant is a colorless, odorless gas that contains chlorine, fluorine and carbon
- A frost-free freezer has three basic parts: A timer, A heating coil and a temperature sensor
- Refrigeration systems have five mechanical components:
 - a compressor
 - a condenser
 - a throttling valve
 - an evaporator coil
 - a chemical refrigerant
- Multimeter is a device used to measure voltage, current and resistance in a circuit.
- An oscilloscope is a laboratory instrument commonly used to display and analyse the waveform of electronic signals
- A power drill or drilling machine is an electrical motor that rotates a replaceable drill bit to make a hole in wall, wood, plastic, or metal.
- Thermometers are instruments used for measuring temperatures.
- Soldering and Brazing are joining processes where parts are joined without melting the base metals.
- If soldering is not done properly, the electronic product could fail in its working. Such joints are known as dry joints.
- A substance which dissolves oxides and prevents further forming of oxides during brazing operation is called flux.
- Location, levelling & clearance are important things to consider while installing the refrigerator
- Provide sufficient gap (15 cms min.) on all sides, top & rear of refrigerator for proper air circulation
- Fill ice trays only 3/4 with water to allow expansion during freezing

- After successful completion of installation of refrigerator, it is important to request customer's feedback and signature on customer feedback form.

Exercise

1. List the tools required by a field engineer.

2. Define flux.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Module 4 - Attend to Service Complaints - Refrigerator

Module Objectives

At the end of the module, the participant will be able to perform the following:

- Explain about the tools used for servicing of refrigerator
- Identify the tools required for repairing the refrigerator
- Describe functioning of safety features of the components and other accessories of refrigerator
- Explain about the problems occur in refrigerator
- Demonstrate checking continuity in a component of refrigerator
- Demonstrate checking water inlet valve
- Demonstrate checking and replacing of relay, thermostat and PCB
- Demonstrate checking of compressor (motor) and overload protector
- Demonstrate checking of refrigerant leak
- Discuss to educate customer on maintenance of refrigerator to reduce further servicing.

Session Plan 7 - Servicing of Refrigerator

Session Objectives

At the end of the session, the trainee will be able to:

- Explain about the tools used for servicing of refrigerator
- Identify the tools required for repairing the refrigerator
- Describe functioning of safety features of the components and other accessories of refrigerator
- Explain about the problems occur in refrigerator
- Demonstrate checking continuity in a component of refrigerator
- Demonstrate checking water inlet valve
- Demonstrate checking and replacing of relay, thermostat and PCB
- Demonstrate checking of compressor (motor) and overload protector
- Demonstrate checking of refrigerant leak
- Discuss to educate customer on maintenance of refrigerator to reduce further servicing.

7.1 Troubleshooting Refrigerators

Understanding symptoms, identifying faults and provide possible solutions

This chart is to find out what is causing a problem with the refrigerator.

Symptoms	Check
Refrigerator does not run and the light does not work	<ul style="list-style-type: none"> • Make sure the refrigerator is plugged in securely • Check for a blown fuse or tripped circuit breaker • Test the power outlet for current • Inspect the electrical cord for damage • Eliminate use of an extension cord, if any is being used • Check the outlet voltage
Refrigerator does not run but the light works	<ul style="list-style-type: none"> • Check the temperature setting • Make certain there is a three inch space outside of the refrigerator between the walls and the back and sides and at least a one inch gap above, to allow for air flow • Clean the condenser coils • Unplug the refrigerator, wait two hours and plug it in. If you hear it running, a problem is causing the compressor to overheat • Test the temperature control • Test the evaporator fan

	<ul style="list-style-type: none"> • Test the defrost timer • Test the compressor relay • Test the overload protector • Test the compressor motor
Refrigerator light does not work	<ul style="list-style-type: none"> • Replace the bulb • Test the door switch
Refrigerator or freezer is not cold enough	<ul style="list-style-type: none"> • Check the temperature setting • Assure that there is enough room for air flow in the refrigerator or freezer • Check for air flow restrictions in vents • Test the temperature control • Clean the condenser coils • Check the door seals • Test the door switch • Test the defrost heater • Test the defrost timer • Test the evaporator fan • Check for a clogged drain tube • Check for refrigerant leak
Refrigerator or freezer is too cold	<ul style="list-style-type: none"> • Check the temperature setting • Test the temperature control
Refrigerator is noisy or makes strange sounds	<ul style="list-style-type: none"> • Hissing and popping is normal on frost free refrigerators, it is the defrost heater • Check that the refrigerator is level • Check the drain pan • Check the condenser fan • Check the evaporator fan • Inspect the compressor mounts
Refrigerator runs continuously	<ul style="list-style-type: none"> • Defrost the freezer • Clean the condenser coils • Check the door seals • Test the door switch • If you recently adjusted the temperature control, loaded the refrigerator or are in a humid location, it is not uncommon for a refrigerator to run for 24 hours or more before getting cool.

Refrigerator starts and stops frequently	<ul style="list-style-type: none"> • Clean the condenser coils • Check the outlet voltage • Test the condenser fan • Test the compressor relay • Test the overload protector • Test the compressor motor
Freezer does not defrost automatically	<ul style="list-style-type: none"> • Test the defrost timer • Test the defrost heater • Test the defrost thermostat
Refrigerator has an unpleasant odour	<ul style="list-style-type: none"> • Remove spoiled food • Clean refrigerator interior with a solution of hot water and baking soda • Clean the door seals • Remove breaker strips and check for wet insulation
Water on floor outside of refrigerator	<ul style="list-style-type: none"> • Check the drain pan • If you have an ice-maker, check the water supply hose going into and coming out of the water inlet valve
Water inside the refrigerator	<ul style="list-style-type: none"> • Clean the drain tube • If you have an ice-maker, check refrigerator and ice-maker for level
Icemaker won't make /dispense ice	<ul style="list-style-type: none"> • Water filter needs replacing • Water line is dogged or frozen • Ice is frozen together • Water valve is broken • Ice maker is broken
Doors pop open	<ul style="list-style-type: none"> • Unit needs to be levelled • Doors need adjusting • Door closure assembly is broken

Don't:

- Don't overfill your refrigerator or it won't cool as well.
- Don't chip away the frost in manual defrost freezers.
- Don't store your refrigerator unplugged for extended periods of time. Some units require continuous use to ensure proper lubrication of the compressor. If possible, plug in the refrigerator once every few months and let it run for a couple hours.
- Don't tip the refrigerator onto its side because oil from the compressor can run up into the filter/dryer and get trapped.

Points to remember:

- Employers must ensure that personnel who handle refrigerants are properly trained in their safe use and handling, and have reviewed the MSDS (material safety data sheet) for the refrigerant used.
- Make certain there is a three inch space outside of the refrigerator between the walls and the back and sides and at least a one inch gap above, to allow for air flow
- Unplug the refrigerator, wait two hours and plug it in. If you hear it running, a problem is causing the
- Use a continuity tester or multimeter to test for continuity
- Located inside or outside of your home is a fuse box that contains a fuse for each of your home's circuits
- When an electrical short occurs or the load on your circuit becomes too great, the fuse on that circuit burns out and breaks the circuit; this is what is referred to as a "blown fuse.

Exercise

1. What will you do if the refrigerator light does not work?

2. What will you do if the refrigerator or freezer is too cold?

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Module 5 - Install Newly Purchased Air conditioner

Module Objectives

At the end of the module, the participant will be able to perform the following:

- Explain principle of Air conditioner
- Explain about how refrigerant works
- Explain about Air conditioning system
- Describe various types of Air conditioner
- Explain BEE star rating
- Describe mechanical parts of air conditioner
- Describe working of window and split ac
- Describe about the tools used by an AC technician
- Identify the tools required for installing the AC
- Demonstrate the usage of tools for installing the AC
- Carry out soldering and brazing process
- Explain about the safety measures while using the tools
- Explain the installation of window and split air conditioner
- Demonstrate the installation of window and split air conditioner
- Carryout installation of AC by using required tools
- Discuss how to educate customer on the usage of ac
- Discuss how to take customer feedback

Session Plan 8 - Introduction to Air Conditioner

Session Objectives

At the end of the session, the trainee will be able to:

- Explain principle of Air conditioner
- Explain about how refrigerant works
- Explain about Air conditioning system
- Describe various types of Air conditioner
- Explain BEE star rating
- Describe mechanical parts of air conditioner
- Describe working of window and split ac

8.1 Air Conditioning Systems

Air conditioning (AC) is the process of changing the air properties such as temperature and humidity to conditions that are favorable to the occupants. We can simply say that an air conditioner does not cool the air, rather, removes the heat from the room which is being conditioned.

Refrigerator capacity

Normally refrigeration capacity of equipment described in Ton or Kcal/hr or BTU/hr.

Refrigeration Effect

Ton of Refrigeration (TR)

This term is used to indicate the capacity of the air conditioning system and is equal to the heat removal required to freeze one metric tonne of water at 0degC(32degF) into ice in 24 hours, that is, a heat removal rate of

$$\frac{(2000 \text{ lb}) \times (144 \text{ Btu/lb})}{24 \text{ hrs}}$$

(2000 lb being the weight of one metric tonne of water)

(144 Btu/lb-latent heat of solidification of water at 32degF) = 12000 Btu/hour or 3024 kcal/h or 3.52 kilowatt (kW)

Applications of AC

Comfort air conditioning:

Domestic, offices, shops, cinema halls, hospitals, computer centers, libraries, restaurants, hotels, night clubs, transportation, telephone exchanges, beauty salons, radio and TV stations, auditoriums, malls, museums, ships.

Industrial air conditioning:

- Laboratories: to make precise measurements
- To study the effect of temperature and moisture on living beings
- Control of humidity in multi-color printing i.e. if the humidity is not constant paper shrinks and causes poor registration of colors.
- Textile manufacture greatly depends on moisture control

- Dry air is required in steel manufacture as it improves the quality of steel and reduces the coal requirements per ton of steel produced
- Pharmaceutical industry needs refrigeration to reduce air borne bacteria and dirt to preserve products i.e. Gelatine capsules requires very dry air, and pills and tablets require air-conditioning to maintain their quality.
- Photographic products deteriorate rapidly at high temperatures and high humidity. Therefore their control is essential.
- Farm animals: air conditioning of farm houses improves the quality and quantity of milk

Exercise

1. Define air conditioning.

2. Abbreviate TR.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Session Plan 9 - Installation of Air Conditioner

Session Objectives

At the end of the session, the trainee will be able to:

- Describe about the tools used by an AC technician
- Identify the tools required for installing the AC
- Demonstrate the usage of tools for installing the AC
- Carry out soldering and brazing process
- Explain about the safety measures while using the tools
- Explain the installation of window and split air conditioner
- Demonstrate the installation of window and split air conditioner

- Carryout installation of AC by using required tools
- Discuss how to educate customer on the usage of ac
- Discuss how to take customer feedback

Tools required by a Field Engineer RACW

[Please refer Module 3](#)

Fasteners

[Please refer Module 3](#)

Soldering & Brazing

[Please refer Module 3](#)

9.1 Safety Measures to Be Followed

It is of prime importance that the AC technician reads the owner's manual before servicing the air conditioner. This section discusses in detail the safety procedures to be considered while installing the air conditioner.

Electrical System

- The voltage should be 230 volts (+/- 10%) with proper earthing. Power point should have 20 amp fuses.
- Suggested wire size of house for different length of electrical Point from the power meter:

A-C	Till 12 meters	12 - 24 meters	24 - 36 meters	36 - 48 meters	48 - 60 meters	Size of wire
0.8 / 1.0 TR	3/20	3/18	7/20	7/18	7/16	1.5mm ²
1.2 / 1.5 TR	3/18	7/18	7/18	7/16	7/16	2.5mm ²

(Sizes stated above are as per British system of electric wiring.

e.g. 3/18 denotes a single core cable/wire with 3 conductors of 18 standard wire gauge.)

- Do not extend the length of original cable provided with the unit.

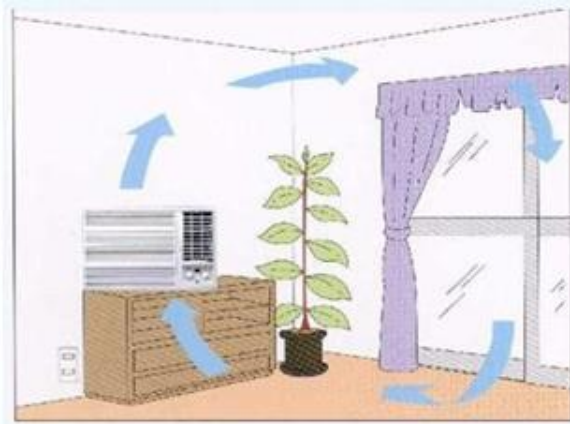
Site Selection for Air Conditioner

Do not install the air conditioner in a location where it will come into contact with the following elements:

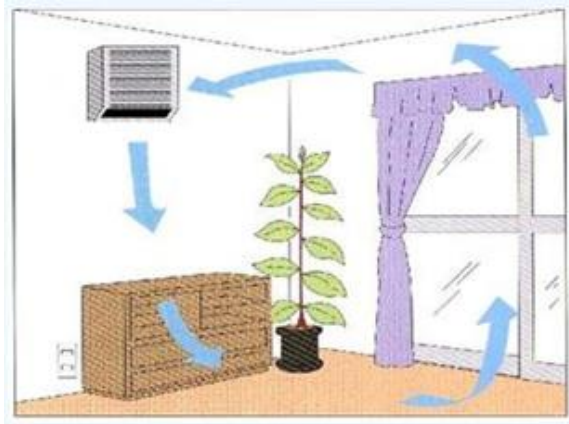
- Combustible gases
- Saline air
- Machine oil

- Sulphide gas
- Special environmental conditions

Air flow



Window AC



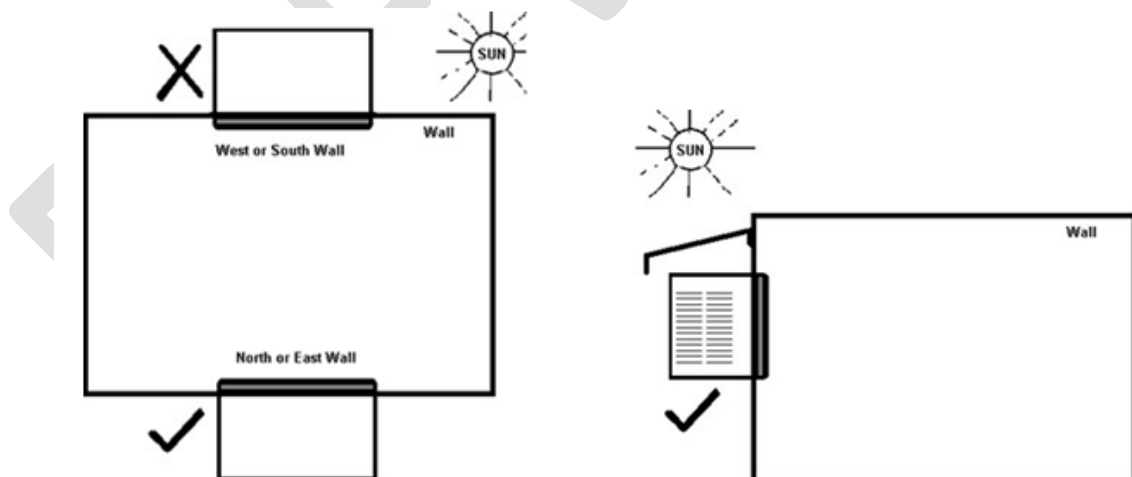
Split AC

9.2 Installation of Window Air Conditioner

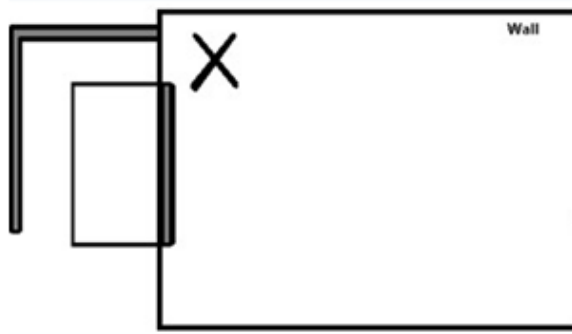
Site Selection

Avoid installing the air conditioner:

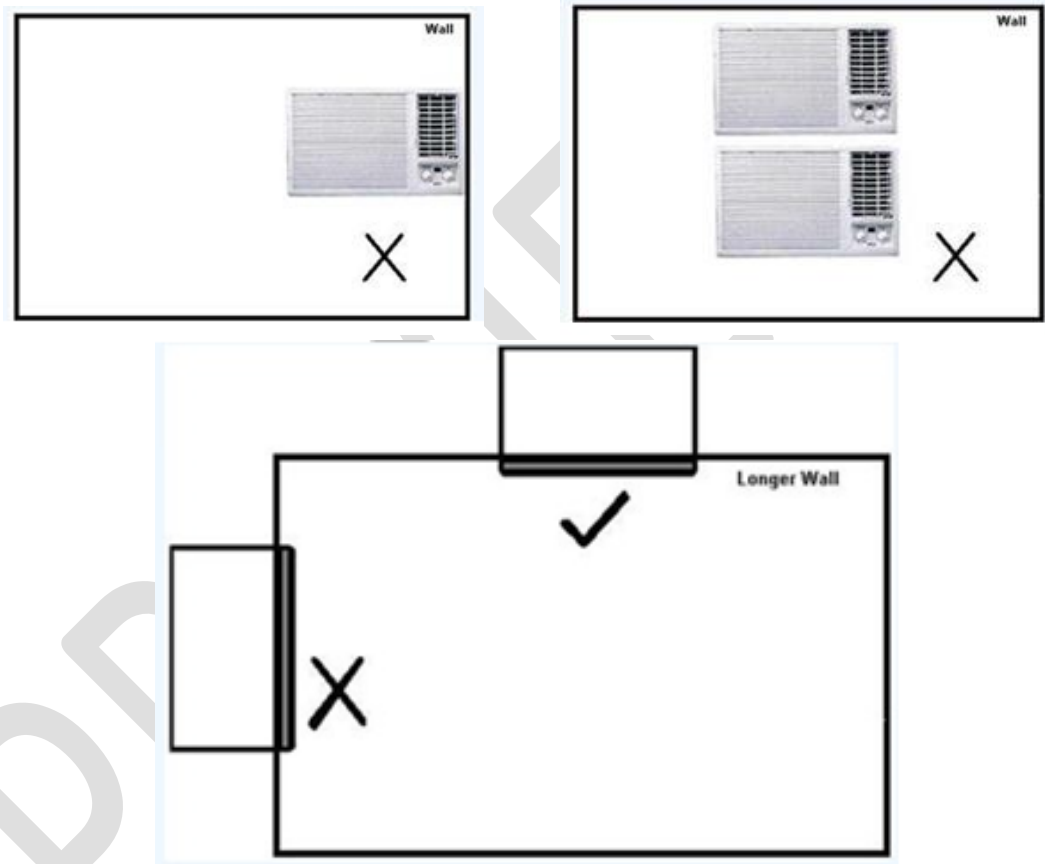
- In places where there is direct exposure to sunlight or near heat sources.



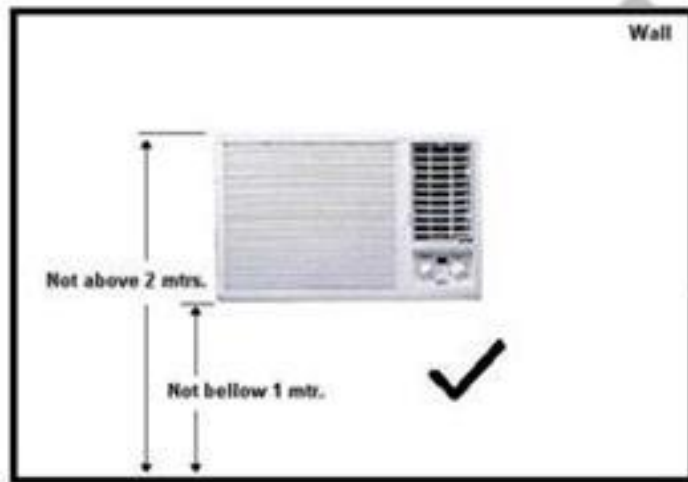
- In wet or damp areas
- In places where curtains, furniture or outer panel of window could hinder the outflow of air.



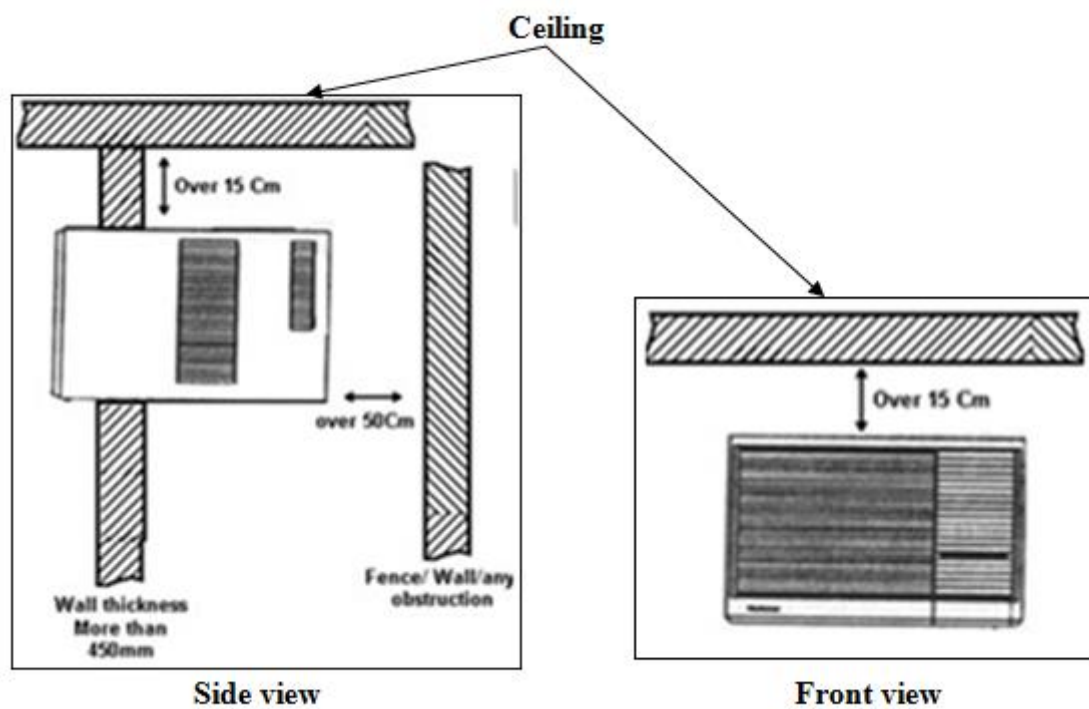
- Without leaving the required minimum space around the unit. Prefer the longer wall for installation.



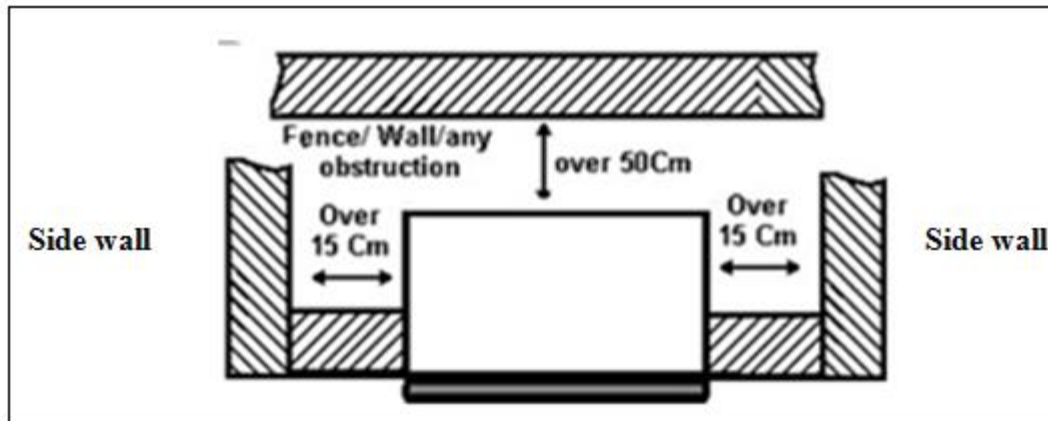
- Where there is insufficient ventilation
- On any surface that might break or cause vibrations
- Where the drainage pipe cannot be fit properly.
- Bottom of unit should not below 1 mtr & top above 2 mtr for proper air circulation & ease of servicing.



- Wall thickness ≥ 450 mm
- Distance from ceiling ≥ 15 cm
- Distance of wall/ any obstruction from front of AC ≥ 50 cm



- Distance from side walls ≥ 15 cm



Top view

Exercise

1. List the safety measures to be followed during installation.

2. List the checks to be made post installation.

Points to remember:

- During clearance process, care must be taken to keep the leftover food from spilling on the way to the wash area.
- Refrigerant safety is straightforward: If the refrigerant stays contained in the cylinder or in the system then it presents little danger to people
- Specific hazards from refrigerant fall into three categories: Toxicity, Combustion/flammability/decomposition and pressure
- Tools, parts and equipments pertaining to the installation of air conditioner
- Chlorofluorocarbons (CFCs) are a group of manufactured chemical compounds that contain chlorine, fluorine, and carbon. This group includes CFC-11, CFC-12, CFC-113, CFC-114, CFC-115, and many forms of Freon
- A refrigerant is a substance used to cause or provide cooling. A CFC (chlorofluorocarbon) refrigerant is a colorless, odorless gas that contains chlorine, fluorine and carbon
- Air conditioning systems have five mechanical components:
 - a compressor
 - a condenser

- a blower
- an evaporator coil
- a chemical refrigerant
- Multimeter is a device used to measure voltage, current and resistance in a circuit.
- An oscilloscope is a laboratory instrument commonly used to display and analyze the waveform of electronic signals
- A power drill or drilling machine is an electrical motor that rotates a replaceable drill bit to make a hole in wall, wood, plastic, or metal.
- Thermometers are instruments used for measuring temperatures.
- Soldering and Brazing are joining processes where parts are joined without melting the base metals.
- If soldering is not done properly, the electronic product could fail in its working. Such joints are known as dry joints.
- A substance which dissolves oxides and prevents further forming of oxides during brazing operation is called flux.
- With the proper gaps, the indoor unit can circulate air properly in the room.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Module 6 - Attend to Service Complaints - Air Conditioner

Module Objectives

At the end of the module, the participant will be able to perform the following:

- Explain about the tools used for servicing of air conditioner
- Identify the tools required for repairing the air conditioner
- Describe functions of the components of air conditioner
- Explain about the problems occur in air conditioner
- Demonstrate checking continuity in a component of AC
- Demonstrate checking and replacing of thermostat and PCB
- Demonstrate checking of refrigerant leak and charging the system

- Discuss to educate customer on maintenance of refrigerator to reduce further servicing

Session Plan 10 - Servicing of Air Conditioner

Session Objectives

At the end of the session, the trainee will be able to:

- Explain about the tools used for servicing of air conditioner
- Identify the tools required for repairing the air conditioner
- Describe functions of the components of air conditioner
- Explain about the problems occur in air conditioner
- Demonstrate checking continuity in a component of AC
- Demonstrate checking and replacing of thermostat and PCB
- Demonstrate checking of refrigerant leak and charging the system
- Discuss to educate customer on maintenance of refrigerator to reduce further servicing.

10.1 Troubleshooting Air Conditioners

To fix an air conditioner, the most important thing is to understand how an AC works and how to diagnose the problem.

Troubleshooting Air Conditioners

Understanding symptoms, identifying faults and provide possible solutions

This chart is to find out what is causing a problem with the AC and what can be the possible solutions.

Problem	Cause	Solution
AC is on but there is little/ no air coming from the vents	<ul style="list-style-type: none"> • The AC fuse is blown • Broken/ loose wires/ connections • The on/off switch is defective 	<ul style="list-style-type: none"> • Check and/or replace fuse • Check and/or repair connections • Replace switch
The air coming from vents is not cool enough	<ul style="list-style-type: none"> • Windows and air vent wings open • The compressor belt is slipping • Heater is on • Condenser is clogged with debris 	<ul style="list-style-type: none"> • Close windows and vent wings • Tighten or replace compressor belt • Shut heater off

	<ul style="list-style-type: none"> Refrigerant has escaped through a leak in the system Receiver/drier is plugged 	<ul style="list-style-type: none"> Clean the condenser
The air has an odor	<ul style="list-style-type: none"> Vacuum system is disrupted Odor producing substances on the evaporator case Condensation has collected in the bottom of the evaporator housing 	<ul style="list-style-type: none"> Clean the evaporator case Clean the evaporator housing drain
System is noisy or vibrating	<ul style="list-style-type: none"> Compressor belt or mountings loose Air in the system 	<ul style="list-style-type: none"> Tighten or replace belt; tighten mounting bolts
<p>Sight glass condition</p> <p>Constant bubbles, foam or oil streaks</p> <p>Clear sight glass but no cold air</p> <p>Clear sight glass but air is cold</p> <p>Clouded with milky fluid</p>	<ul style="list-style-type: none"> Undercharged system No refrigerant at all Receiver drier is leaking desiccant 	<ul style="list-style-type: none"> Check and charge the system
Large difference in temperature of lines	<ul style="list-style-type: none"> Undercharged system 	<ul style="list-style-type: none"> Charge and leak test the system
Compressor noise	<ul style="list-style-type: none"> Broken valves Overcharged Incorrect oil level Piston slap Broken rings Drive belt pulley bolts are loose 	<ul style="list-style-type: none"> Replace the valve plate Discharge, evacuate and install the correct charge Isolate the compressor and check the oil level. Correct as necessary

		<ul style="list-style-type: none"> • Replace the compressor
Condensation dripping in the passenger compartment	<ul style="list-style-type: none"> • Drain hose plugged or improperly positioned • Insulation removed or improperly installed 	<ul style="list-style-type: none"> • Clean the drain hose and check for proper installation • Replace the insulation on the expansion valve and hoses
Frozen evaporator coil	<ul style="list-style-type: none"> • Faulty thermostat • Thermostat capillary tube improperly installed • Thermostat not adjusted properly 	<ul style="list-style-type: none"> • Replace the thermostat • Install the capillary tube correctly • Adjust the thermostat
Low side low – high side low	<ul style="list-style-type: none"> • System refrigerant is low • Expansion valve is restricted 	<ul style="list-style-type: none"> • Evacuate, leak test and charge the system • Replace the expansion valve
Low side high – high side low	<ul style="list-style-type: none"> • Internal leak in the compressor - worn 	<ul style="list-style-type: none"> • Remove the compressor cylinder head and inspect the compressor. Replace the valve plate assembly if necessary.

Points to remember:

- Measuring continuity just means checking whether or not there is a good connection between any two points in the circuit.
- Cleaning the air conditioner's condenser & evaporator coils regularly will let the air conditioner run cooler with less energy and make you feel more comfortable.
- When the coil is soiled by a fairly light coating of dust and debris, it can often be successfully cleaned using a soft brush.
- Wash both Evaporator & Condenser Coils with Water Pressure & brush it with brass brush, Safe Guarding the Fins.

- Clean the dust fallen in the base tray with cotton waste

Exercise

1. What are the steps to be followed while cleaning air-conditioner coils?

2. Where is the thermostat sensor located?

3. List some common causes of air conditioner refrigerant leaks?

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Module 7 - Install Newly Purchased Washing Machine

Module Objectives

At the end of the module, the participant will be able to perform the following:

- Explain wash cycle
- Explain working principle of washing machine
- Describe various types of washing machine
- Identify the tools used by a washing machine technician
- Demonstrate the usage of tools for installing the washing machine
- Explain about the safety measures while using the tools
- Explain the installation of washing machine
- Carry out the installation of washing machine
- Install Newly Purchased air-conditioner
- Attend Service complaints – Air conditioner

PREVIEW

Session Plan 11 - Introduction to Washing Machine

Session Objectives

At the end of the session, the trainee will be able to:

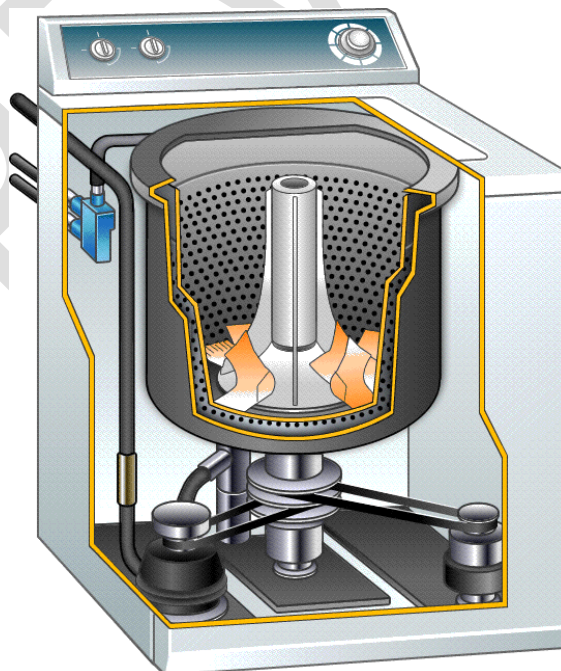
- Explain wash cycle
- Explain working principle of washing machine
- Describe various types of washing machine

11.1 Introduction to Washing Machine

A washing machine is a domestic appliance constructed for washing various types of clothes, towels and other linens without applying any physical efforts. With washing machine you don't have to rub the clothes with hand or squeeze them to remove the water from them.

Washing machine is also called as clothes washer or simply the washer. The washing machine enables you to wash your clothes automatically without having to supervise its operation.

All you have to do is put the clothes in the machine and select the wash mode. The washing machine automatically takes in the amount of water and detergent required and it also automatically sets the timer for washing, rinsing and drying as per the selected mode and the amount of clothes.



Exercise

1. Define a washing machine.

2. State the working principle of a washing machine.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Session Plan 12 - Installation of Washing Machine

Session Objectives

At the end of the session, the trainee will be able to:

- Explain wash cycle
- Explain working principle of washing machine
- Describe various types of washing machine

12.1 Installation of Washing Machine

Tools required by a Field Engineer RACW

[Please refer Module 3](#)

Fasteners

[Please refer Module 3](#)

Soldering & Brazing

[Please refer Module 3](#)

INSTALLATION OF WASHING MACHINE

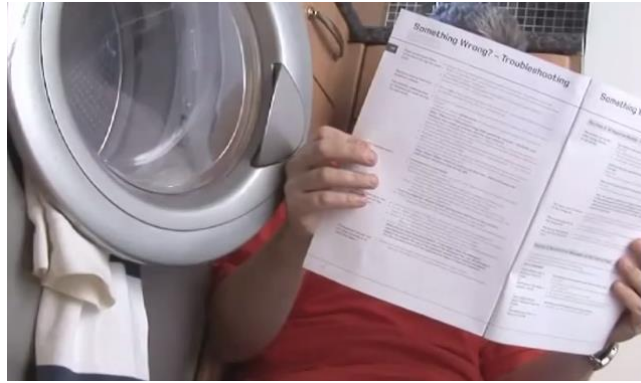
Step 1: Remove all the packaging and bracketing that the washing machine came in. These items kept the machine safe during delivery.



The washing machine will have transport pins that stop the drum from being damaged whilst in transit. They need to be removed before the washing machine is used, or the machine may vibrate and break while using. Remove all moving pins from the machine. Some machines will have only one pin, but some manufacturers use up to four.



Step 2: Check for instructions before discarding packaging. Manual comes with the machine.



Step 3: Attach the water supply. Washing machines are supplied with PVC hoses to link the water inlet at the back of the appliance to special miniature valves connected to the household plumbing.

The hoses are colour coded:

- Red for hot
- Blue for cold

Some new washing machines only need a cold inlet.



Step 5: Make sure the valve is turned off.



Step 6: Connect the hose by screwing it to the valve. Every connection should be tight.



PREVIEW

Step 7: Turn the valves on.



Step 8: Connect the waste system. The outlet from the washing machine must be connected to a waste system that will get rid of the dirty water.

The standpipe and trap is the standard method. The machine hose fits loosely into the pipe, so that dirty water won't be siphoned back into the machine.



Step 9: Always ensure the opening is at least 2 feet (0.6 mtr) above the floor.



After installation

- Don't plug it in until you've checked the main control button is turned off.
- Turn the taps/faucets on before using so that water flows through to the machine.
- Always read the instructions thoroughly before use; some washing machines have very sensitive electronics in them and it pays to know this before trying to do anything with all the button features.
- Teflon tape is very helpful in fixing small leaks on piping with threads.

Points to remember:

- The washing machine will have transport pins that stop the drum from being damaged whilst in transit
- Washing machines are supplied with PVC hoses to link the water inlet at the back of the appliance to special miniature valves connected to the household plumbing
- Connect the hose by screwing it to the valve. Every connection should be tight

Exercise

1. Discuss the steps involved in the installation of a washing machine.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Module 8 - Attend to Service Complaints – Washing Machine

Module Objectives

At the end of the module, the participant will be able to perform the following:

- Identify right fastener for the job and securely install all equipment and materials.
- Carry out repair and maintenance techniques of washing machine
- Identify the basic tools required for repairing the washing machine
- Describe functions of the components
- Describe the activities of servicing and repairing of washing machine.

Session Plan 13 - Servicing of Washing Machine

Session Objectives

At the end of the session, the trainee will be able to:

- Explain wash cycle
- Explain working principle of washing machine
- Describe various types of washing machine

13.1 Troubleshooting Washing Machines

Troubleshooting of washing machine

Symptom	Check
Washer does not work and makes no noise	<ul style="list-style-type: none"> • Check that the washer is plugged in securely • Check the circuit breaker or fuse box • Test the outlet for current • Check that the water supply valves are turned on • Inspect the filter screens • Test for overheating • Test the water level switch • Test the timer control • Test the lid switch • Test the water inlet valve • Inspect the water pump • Test the centrifugal switch

	<ul style="list-style-type: none"> • Test the motor
Washer does not work but it does make noise	<ul style="list-style-type: none"> • Check that the water supply valves are turned on • Inspect the filter screens • Test for overheating • Inspect the water pump • Test the water inlet valve • Test the motor
No water is entering the wash tub - or no hot water - or no cold water	<ul style="list-style-type: none"> • Check that the water supply valves are turned on • Inspect the water supply hoses for kinks • Check the filter screens • Test the water level switch • Test the water temperature switch • Test the timer control • Test the water inlet valve
The water fills the wash tub too slowly	<ul style="list-style-type: none"> • Check that the water valves are turned on full • Check the water pressure at the tap • Check the filter screens • Test the water inlet valve
The tub does not fill with enough water	<ul style="list-style-type: none"> • Test the water level switch • Check that the drain hose is positioned roughly as high as the top of the inner tub
The water overflows the wash tub	<ul style="list-style-type: none"> • Test the timer control • Test the water level switch • Inspect the air tube for damage • Test the water inlet valve
Water drains out during the wash or rinse cycle	<ul style="list-style-type: none"> • Check the drain control lever • Test the drain control coils • Check the cam bar

	<ul style="list-style-type: none"> • Test the timer control
Wrong temperature of water is used	<ul style="list-style-type: none"> • Water supply hoses may be reversed • Hot or cold water supply valve may be turned off • Water supply hose may be kinked • Check water inlet valve
Water drains out while it is filling	<ul style="list-style-type: none"> • Check the drain hose; it should be at least as high as the top of the wash tub, about 38 inches. <p>The drain hose must sit loosely in the house drain. Do not seal the air gap around the drain hose or a siphon will occur.</p>
Water drips into the wash tub when the washer is off	<ul style="list-style-type: none"> • Replace the water inlet valve
Water does not drain out of the wash tub	<ul style="list-style-type: none"> • Inspect the drain hose for kinks • Test the timer control • Test the lid switch (some models) • Inspect the water pump • Inspect the drive belt (belt drive only) • Inspect the motor coupler
Water is leaking onto the ground	<ul style="list-style-type: none"> • Inspect the water supply connections • Inspect the drain hose • Inspect the water pump • Inspect outer tub for cracks or corrosion • Inspect the tub seal • Inspect the tub bearing
Agitator does not move	<ul style="list-style-type: none"> • Test the lid switch • Inspect the motor coupler • Inspect the drive belt (belt drive only) • Inspect under the washer for snot (clutch) • Test the motor

	<ul style="list-style-type: none"> • Inspect the pulley • Test the transmission • Inspect the agitator • Inspect the pump coupling • Test the water level switch
Agitator movement is weak or moves in only one direction	<ul style="list-style-type: none"> • Inspect the agitator • Inspect the motor coupler • Inspect the drive belt (belt drive only) • Inspect under the washer for soot (clutch) • Test the motor • Inspect the pulley • Test the transmission • Inspect the pump coupling
Drum does not spin	<ul style="list-style-type: none"> • Test the lid switch • Test the timer control • Test the centrifugal switch • Test the water level switch • Inspect the motor coupler • Inspect the drive belt (belt drive only) • Inspect under the washer for soot (clutch) • Test the motor • Inspect the pulley • Test the transmission

<p>Clothes are too wet after spin cycle</p>	<p>This may be a spin problem or a drain problem</p> <p>Drain:</p> <ul style="list-style-type: none"> • Make sure the drain line is clear • Check the drain hose for a partial blockage • Inspect the water pump <p>Spin:</p> <ul style="list-style-type: none"> • Test the lid switch • Test the timer control • Test the centrifugal switch • Test the water level switch • Inspect the motor coupler • Inspect the drive belt (belt drive only) • Inspect under the washer for soot (clutch) • Test the motor • Inspect the pulley • Test the transmission
<p>Burning or electrical smell</p>	<ul style="list-style-type: none"> • Unplug the washer • Locate the source of the odor then read the instructions in the related section
<p>Foul or stale odour coming from washer or clothes</p>	<ul style="list-style-type: none"> • Check that the drain line is clear • Check the drain hose for kinks or blockages • Check pump for blockages • Check for buildup of soap in the outer tub • Check for article of clothing stuck in the outer tub

Points to remember:

- Linear motion (also called rectilinear motion) is a motion along a straight line, and can therefore be described mathematically using only one spatial dimension.
- Angular motion is the angle made during the motion of the body about the fixed axis.
- Revolutions per minute (abbreviated rpm, RPM, rev/min, r/min) are a measure of the frequency of rotation, specifically the number of rotations around a fixed axis in one minute.
- Torque is a measure of how much force acting on an object causes that object to rotate
- A motor is a mechanical or electrical device that creates motion
- Measuring continuity just means checking whether or not there is a good connection between any two points in the circuit.
- The pressure switch is what senses the water level using air pressure and tells your washer to stop filling with water.

Exercise

1. What do you mean by a gear?

2. Define linear motion.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Module 9 - Interact with Colleagues**Module Objectives**

At the end of the module, the participant will be able to perform the following:

- Identify importance of coordinating with superior or senior
- Describe importance of working in a team
- Prepare Plan and organize work to achieve targets and deadlines
- Carryout communication with supervisor and colleagues to achieve targets
- Describe feedback and its importance

Session Plan 14 – Customer Service

Session Objectives

At the end of the session, the trainee will be able to:

- Identify importance of coordinating with superior or senior
- Describe importance of working in a team
- Prepare Plan and organize work to achieve targets and deadlines
- Carryout communication with supervisor and colleagues to achieve targets
- Describe feedback and its importance

14.1 Interacting with supervisor

Interacting with supervisor or superior involves understanding work requirements, understanding target, understanding new operating procedures, report, resolve problem and receive feedback on work standards, customer satisfaction.

All of these are explained below:

Understanding work requirements, targets and incentives

- Typical working instructions is a document which explains the scope of the work, layout drawing, detailed instructions in a sequence, PPE to be used, hazards and PPE, tools & materials required for carrying out the job, checking, quality parameters.
- The worker should always insist for the working instructions from the senior and study the document.
- Ask clarifications to clearly understand the work before starting.
- They should also visually inspect the materials issues for quality and check with the senior before proceeding with the work.
- The worker should know about the time allotted for completing the job.

Learn about new product models, their features and functions

Communication

In every organization, once work is commenced, continuous monitoring is done to ensure that the work is completed as per the schedule. Worker i.e.; yourself, who is directly carrying out the task has the right information and the trainer will train you in preparing the status report as per the formats provided. Sometimes the work can be divided into

various activities and the status report will require ticking of what are the activities completed. In case few of the activities require long duration % of completion is to be indicated.

Typical Status Report as on -----(date) -----(time)			
Task	Start Time ----- (date) ----- (time)	Completion time ----- (date) ----- (time)	% of completion (shade %)
Tasks	Description	Completed ----- Not completed ----- (tick mark)	
1			
2			
3			

Points to remember:

- Working instructions is a document which explains the scope of the work
- The worker should always insist for the working instructions from the senior
- Working effectively in a team is very important to deal with daily issues
- Attuning with everybody in the team and working with them smoothly help to achieve goal and targets
- Together every one archives more
- Communication is the most important part of a team work
- One should have good communication skills to work effectively in a team
- Planning and organizing work not only help to meet the deadlines but also de-stress daily work load

Exercise

1. How will you handle over the work and receive feedback.

2. List the points to be considered while planning for execution of work.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.