



**Basic Electronics Communication and Multimedia
Equipment Servicing
Level - II**

Learning Guide #30

Unit of Competence: Install and Repair Antenna and Satellite System

Module Title: Installing and Repairing Antenna and Satellite System

MO Code: EEL BEC2 MO5 09 19 LO4

TTLM Code: BEC2 LG4 09 19 V1

LO4: Repair Dish Drive Mechanism



Instruction Sheet

Learning Guide # 4

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

- Servo Motor Drive Mechanism
- Check the supply power to the motor.
- Check sensor/limit switch.
- Coaxial Cable, Termination, Continuity test
- Replacing defective parts

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

Specifically, upon completion of this Learning Guide, you will be able to –

- Installing, terminating and testing coaxial cable.
- Replacing defective parts of satellite and antenna system.

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number.
3. Read the information written in the information “Sheet ----, Sheet ---, and Sheet --”.
4. Accomplish the information “Sheet ---, Sheet ----, in page ”.
5. Try to answer self-check, you can ask your trainer for correction. If you finished answering the Self-check, take correction or explanation from your trainer if it is not clear.
6. If you scored a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, discuss with your trainer for further instructions or go back to learning operation sheet-----.
7. Submit your accomplished Self-check. This will form part of your training portfolio.
8. Read the information written in the “Information Sheet 2”. Try to understand what are being discussed. Ask you Instructor for assistance if you have hard time understanding them.

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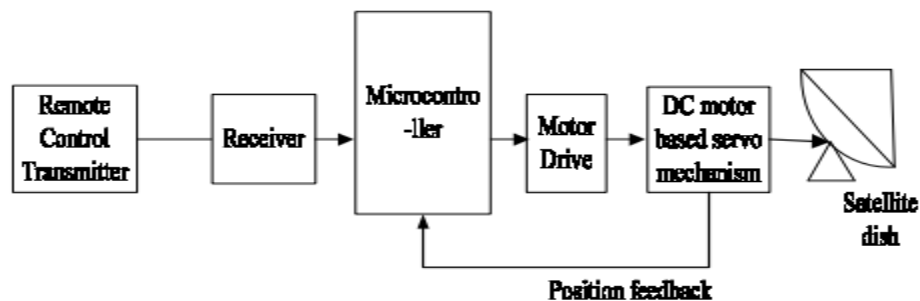
9. Accomplish the “Self-check 2” in page [redacted].
Ask from your teacher for correction (key answers) if any.
10. Read the information written in the “Information Sheets 3”. Try to understand what are being discussed and ask you teacher for assistance if you have hard time understanding them.
11. Accomplish the “Self-check -----” in page [redacted].
12. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (To get the key answer only after you finished answering the Self-check 3).
13. If you scored a satisfactory evaluation proceed to “Operation Sheet 1” in page [redacted], however, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
14. Read the “Operation Sheet 1” and try to understand the procedures discussed.

LO4:Repair Dish Drive Mechanism

Motor Driven Satellite dishes: Configured with a stepper motor. These can be controlled from the sky and moved to a suitable position according to a satellite position.

A dish that is mounted on a pole and driven by a stepper motor or a servo can be controlled and rotated to face any satellite position in the sky. Motor-driven dishes are popular with enthusiasts.

BLOCKDIAGRAM OF THE SYSTEM



4.1 .Supply power to motor is checked by voltmeter and power connector cable checked by ohmmeter

- ✓ When an electric motor fails to start, runs intermittently, runs hot, or continually trips its overcurrent device, there may be a variety of causes. Sometimes the trouble lies within the power supply, including branch circuit conductors or motor controller. Another possibility is that the driven load is jammed, binding or mismatched. If the motor itself

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has developed a fault, the fault may be a burnt wire or connection, a winding failure including insulation deterioration, or a deteriorating bearing.



- ✓ The basic procedure is to measure the start-up and running current for any motor while it is connected to a load. Compare the reading to documented or nameplate specifications. As motors age, the current drawn generally rises because winding insulation resistance drops. Excess current causes heat, which must be dissipated. Insulation degradation accelerates until there's an avalanche event, causing motor burn out.

4.2. Defective power connector cable is repaired /replaced according to the specification



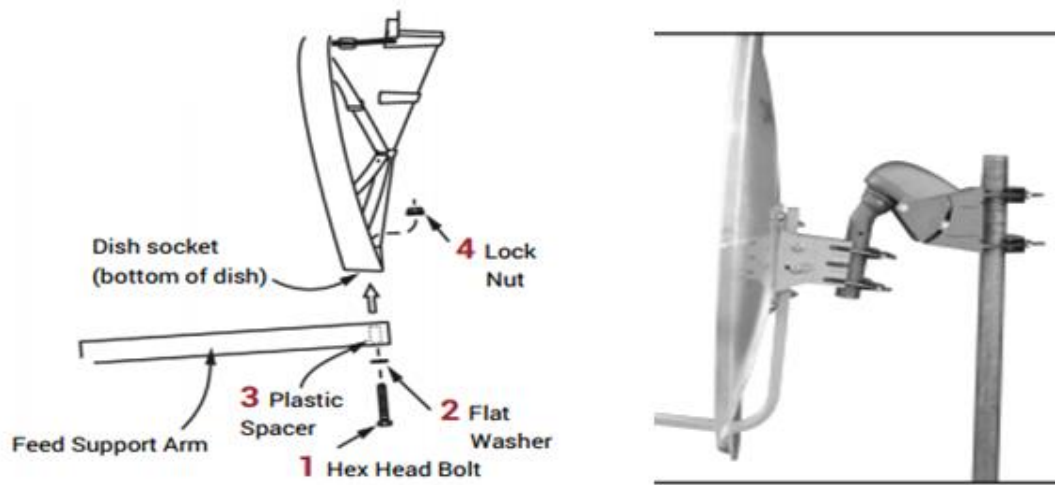
4.3. Mechanical arm is checked for normal operation

Attach the Satellite Feed Support Arm to the 60cm Elliptical Dish Attach the Satellite Feed Support Arm to the 60 cm Elliptical Dish using the remaining hex head bolt(1), flat

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washer (2), plastic spacer(3), and lock nut(4), as shown in fig below Ensure the slot at the opposite end is on the underside of the feed support arm. Tighten fully. Do not attach the LNB to the Satellite Feed Support Arm.



4.4. Defective mechanical arm and gear are repaired /replaced according to the manufacturer's specification/service manual

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.

Servicing the Gears: Gears translate the motor's power into torque that turns a can. This requires a feed gear at the edge of the can and at least one other larger gear inside the appliance. To check and replace gears:

Step 1: Inspect the feed gear and clean or replace if worn or broken.

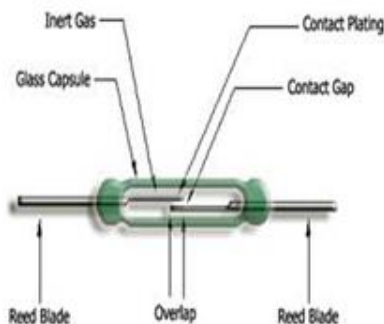
Step 2: Check internal gears by opening the appliance case and carefully removing gears. Teeth may be missing or warped, or the gears may simply need lubrication with a white lubricant. If the gears need to be replaced, make sure the replacement gears match exactly in every measure, including width, circumference, and number of teeth.

Step 3: If a replacement to a broken gear cannot be found, consider using a plastic or metal glue, as required, to repair the break. When done, carefully reassemble the gears and case, then test the appliance.



4.5. Sensor/limit switch is checked using ohmmeter and defective sensor/limit switch repaired /replaced according to the specification

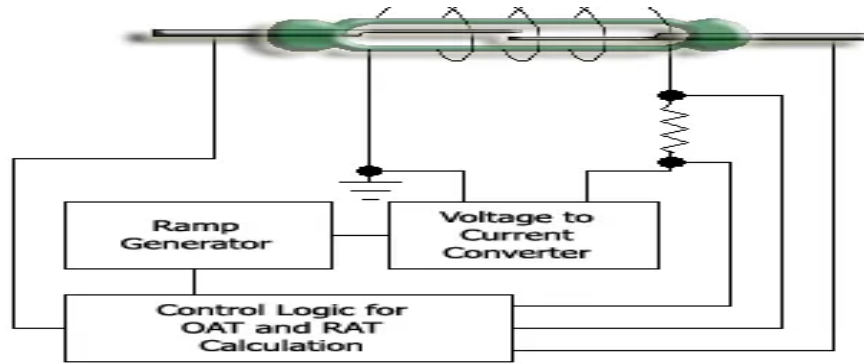
The reed switch is an electrical switch operated by an applied magnetic field. It consists of a pair of contacts on ferrous metal reeds in an airtight glass envelope. A reed sensor uses magnetic fields to open or close a switch. Unlike solid state, or other mechanical switches, a reed sensor consumes zero power as it operates based on the flux of the magnetic field. Reed switches respond to both magnetic poles (North and South).



Reed Switch

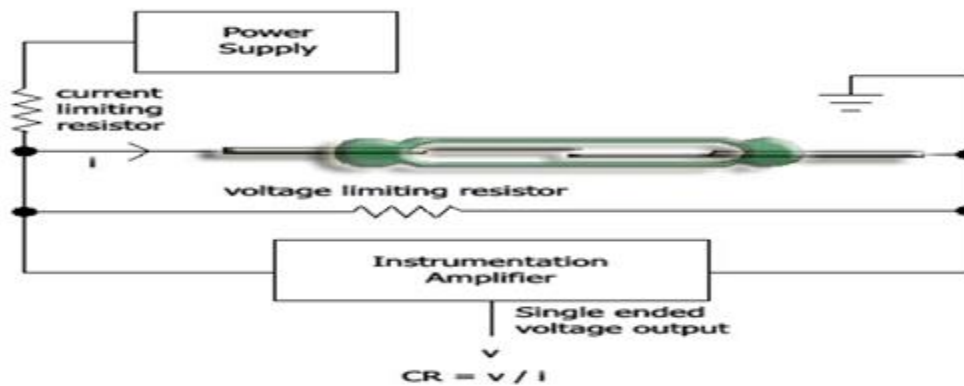


The current in the coil is then increased to the point where the reed switch operates, and then multiplied by the number of turns in the coil to give Operate AT. Contact resistance is measured across the contacts by forcing 10 mA test current and 100 mV, after giving 25% AT more than the Operate AT, which is known as Over-drive. Release AT is measured by decreasing the coil current from the Over-drive AT. Dynamic Contact Resistance is measured up to the switching frequency limit. All the measurements are carried out for 10 cycles.



Circuit for measurement of Ampere-Turn

Operate AT and release AT are calculated by measuring the voltage developed across a reference resistor, finding out the current through it, and multiplying the value by the number of turns of the test coil. Suitable compensations may be incorporated to cancel out the earth's magnetic field. The test coil may be of 5000 or 10000 turns to minimize positional errors.



The benefits for selecting a reed switch for an application include:

- ✓ Sealed unit so can be used for liquid / fluid level monitoring and measuring
- ✓ No wearing parts, so can open and close in the billions of operations
- ✓ Low current, Low voltage switch activation



- ✓ Zero Power consumption operation
- ✓ Rated for hazardous environments

4.6. Motor winding is checked using ohmmeter

Stepper motor repair

Stepper motors are a brushless DC electric motor that uses magnetism to partition a full rotation into a number of equal steps. They provide a motion-control positioning system for small applications such as 3D printing, packaging machinery and on small axis CNC machining.

Step 1: Unplug the appliance, open it up, and find the fault on the motor.

Step 2: Place one continuity tester probe to one side of the wire and the second probe on the other side of the wire. If the continuity light doesn't illuminate, the wire is blown and must be replaced.

Step 3: Attach a continuity tester or multimeter across the two wires on the field coil winding. If the circuit is open, replace the motor as a unit. You can get one of the exact size and rating from an appliance-parts store.

Step 4: Always check the bearings for wear that will cause the shaft to wobble. Remove the rotor to check for damage or excessive wear.



4.7. Faulty motor winding is repaired /replaced according to the manufacturer's specification

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electrical repair, rewinding, and testing.

- ✓ Providing a quality assurance program and warranty
- ✓ Replacing all broken and worn parts per OEM specifications
- ✓ Conducting stator core tests both before and after winding removal to check for stator core damage
- ✓ Repairing or replacing defective stator core laminations



- ✓ Calibrating all test equipment and measuring devices at least once yearly to the national standard to ensure accuracy
- ✓ Recording winding resistance and room temperature before and after repair to ensure that the resistance measured is within spec and balanced on all three phases
- ✓ Carrying out insulation resistance test, surge comparison tests, high-potential tests, nominal, and no-load testing
- ✓ Regulating power supply to ensure good power quality at the appropriate rated voltage for motor tests

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| Self Check #1 | Written Test |
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Name: _____ Date: _____

Time Start: _____ Time Finish: _____

Instruction: Answer all the questions provided correctly, if you have some clarification regarding the test just raise your hand and ask the assistance of the teacher.

Part I. Give Short answer for the following

1. What is Motor-driven dish? (3 points)
2. What are the possible root causes in satellite dish receiver? (4 points)

Note: Satisfactory rating – 3.5 points Unsatisfactory - below 3.5 points

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



Answer Sheet

Scored Points

Part I

1. _____

2. _____

