FEDERAL TVET AGENCY

PERFORM INSTALLATIN OF MOTOR CONTRO SYSTEM

NTQF Level II

Learning Guide #22

Unit of Competence: **Perform installation of motor controller system**

Module Title: **Performing installation of motor controller system**

LG Code: EEL EMD2 M02LO3-LG22

TTLM Code: EEL EMD2 M02TTLM 0919v1

LO3: Inspect electrical materials and tools

Instruction Sheet	Learning Guide #02

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

- check/inspect the delivered materials and tools
- identify defective/sub standard materials and Test
- Reporting Inspection/ check deliveries

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 –

- check/inspect/ test Delivered materials according to quantity, usage and specifications
- Identify Defective/Sub-standard electrical materials according to physical damaged and quality are reported to immediate superior
- Defective/sub-standard/wrong specification electrical materials are returned to warehouseman/stockman for

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3,-” **in page 3,5-6, and 8** respectively.
4. Accomplish the “Self-check 1, Self-check t 2, and Self-check 3” ,---” **in page 4,7, and 9** respectively
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, ” **in page 10.**
6. Do the “LAP test” **in page 11**

1. INSPECTION AND TESTING

1.1 IN-PROCESS INSPECTION AND TESTING

Suppliers shall establish and maintain documented procedures for inspections and tests of the equipment during manufacturing and assembly. The procedures shall provide for the verification by inspections or tests, at appropriate points in the manufacturing and assembly process, that the characteristics of the item conform to the requirement specified for that stage of the process. In general the verification should be made as close as possible to the point of realization of the characteristic. The in-process verification may include:

- Set-up and first piece inspection.
- Inspection or test by machine operator.
- Automatic inspection or test.
- Fixed inspection stations.

Equipment shall be held until the required inspection and test has been completed.

Equipment shall not be released for further use until it has been verified and the results of the verification are satisfactory.

1.2 FINAL INSPECTION AND TESTING

The contractor shall carry out all final inspection and testing in accordance with the quality plan and/or documented procedures to complete the evidence of the conformance of the finished equipment to the specified requirements. The quality plan and/or documented procedures for all final inspection and testing shall require that all specified inspections and tests, including those specified on receipt of equipment or in-process, have been carried out and that the results meet specified requirements. Inspections and tests procedures shall define:

- The location where the inspection or test is to be performed (supplier premises or client organization site or CERN site).
- The parameters to be measured.
- The characteristics or functions that have to be verified.
- The acceptance criteria, including any applicable standards or codes. The requirements for special tools, fixtures, gauges, test set-ups and measuring equipment. Special instructions relative to handling and storage of the equipment.
- Guidelines for the use of sampling inspection if appropriate.
- The data and records that are required and in which form.
- When and how the inspections and tests results are to be reported to the client organization. No equipment shall be dispatched until all activities specified in the quality plan and/or documented procedures have been satisfactorily completed and the associated data and documentation are available

Self-Check 1	Written Test

Part I: Enumeration

Direction: Write on blank space/List down the following

1. List at list three criteria of Inspections and tests procedures selecting laboratory equipment.
2. List two types of Inspection and Test

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet-2	Identify defective/sub standard materials and Test

2. CONTROL OF INSPECTION, MEASURING AND TEST EQUIPMENT

Suppliers shall establish and maintain documented procedures to control calibrate and maintain inspection, measuring and test equipment used to demonstrate the conformance of manufactured and/or assembled equipment to the specified requirements. Inspection, measuring and test equipment shall be used in a manner that ensures that the measurement uncertainty is known and is consistent with the required measurement capability. Where the availability of technical data pertaining to the inspection, measuring and test equipment is a specified requirement, such data shall be made available, when required by the client organization or its representative, for verification that the inspection, measuring and test equipment is functionally adequate. Measuring and test equipment that is found to be out of calibration shall be marked and removed from service until re-calibrated.

3. INSPECTION AND TEST STATUS

Suppliers shall establish and maintain documented procedures for the identification of the inspection and test status of equipment throughout manufacturing, assembly, installation and servicing. These procedures shall provide documentary proof that the equipment has been:

- Approved through the inspection processes, or
- Not inspected, or
- Inspected and failed.

The procedure shall ensure that only equipment that has been inspected successfully, or released under a "use-as-is" non-conformity concession, is delivered, used or installed.

3. HANDLING, STORAGE, PACKAGING AND DELIVERY

Suppliers shall establish and maintain documented procedures for the handling, storage, packaging and delivery of equipment.

3.1 HANDLING

The supplier shall provide methods of handling raw materials, client supplied

Equipment, subcontracted equipment, and finished equipment that ensure that Equipment is not damaged as it is moved during production, and when moved from

Production line to the storage area. Careful handling at all times and the use of Appropriate handling equipment is essential to prevent damage or deterioration.

3.2 STORAGE

The supplier shall use designated storage areas or stock rooms to prevent damage or deterioration of raw materials, client supplied items, subcontracted items and the finished equipment pending use or delivery. Appropriate methods for authorizing receipt to and dispatch from such areas shall be stipulated. In order to detect deterioration, the condition of items in stock shall be assessed at appropriate intervals.

3.3 PACKAGING

The supplier shall control packing, packaging and marking processes (including materials used) to the extent necessary to ensure conformance to the specified requirements.

3.4 PRESERVATION

Appropriate methods of equipment preservation shall be implemented (such as cold or chilled storage) while the equipment is under the supplier's control.

3.5 DELIVERY

The equipment must be protected during transportation and must be delivered in sound condition. Where third-party hailers are used the same responsibility applies. This applies to the quality of all equipment following final inspection and test procedures. All deliveries and/or collection by the client organization shall be documented.

Self-Check 2	Written Test

Part II: Enumeration

Direction: Write on blank space/List down the following

1. ---------- Is processes (including materials used) to the extent necessary to ensure conformance to the specified requirements.
2. ----------Is equipment that is found to be out of calibration shall be marked and removed from service until re-calibrated?

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet-3	Reporting Inspection/ check deliveries

3. INSPECTION AND TEST RECORDS

3.1 GENERALITIES

The supplier shall establish and maintain records that provide evidence that the

Equipment has been inspected and tested. The records shall show clearly whether the

Equipment has passed or failed the inspections and tests. Where the equipment fails
To pass any inspection or test, the procedure for control of non-conforming equipment shall apply.

3.2 TRACEABILITY OF MATERIALS, PARTS AND EQUIPMENT

To install, commission, operate and maintain the equipment, access to inspection and

Test records must be ensured over many years. This shall be achieved by storing and

Maintaining all the necessary inspection and test records in the Engineering Data

Management System (EDMS) used for the LHC project at CERN. This is a computer
System providing document management facilities for all kind of electronic documents

And data. Use of the CERN EDMS requires that all quality records be in computer

Readable forms. In cases where the use of a computer form is impractical, paper forms
May be used and scanned to produce a computer readable document.

3.3 CAPTURE OF INSPECTION AND TEST DATA

The capture and storage of inspection and test records at the supplier's premises may be carried out in one of two ways:

- Use of the CERN traveler application. This software tool is accessible with a World Wide Web browser such as Netscape. It enables on-line storage of inspection and test records in the CERN EDMS.
- Use of the supplier's own production follow-up system. Use of such a system will require appropriate formatting and structuring of the data and documents prior to their copy from the supplier system to the CERN EDM

Self-Check 3	Written Test

Part II: Enumeration

Direction: Write on blank space/List down the following

1. List at list three Types of INSPECTION AND TEST RECORDS.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Operation Sheet-1	
Operation Title	**Commercial and Industrial Inspections**
Purpose	**checking/inspecting the delivered the Commercial and Industrial Motor by using the inspection check list**

Procedure:

1. **Prepare Inspection Check List**
2. **Prepare Tools and Materials for Inspection**
3. **Identify area of Inspection**
4. **Inspect and test based on Inspection Check List**

Checklist 1-1: Motors (cont.)

✓	Item	Inspection Activity
☐	1.	Check motor control circuits for proper over current protection
☐	2.	Verify that motor controllers are provided for motors and that they are of the proper type and have adequate ratings, including Short-circuit current ratings.
☐	3.	Check MCCs for proper ratings, protection, workspace, and Dedicated space.
☐	4.	Verify that motor disconnects are of the proper type and rating. ,
☐	5.	Verify that controller disconnects are in sight of controllers, are Readily accessible, and have adequate workspace.
☐	6.	Verify that motor disconnects are in sight of motors, are readily accessible, and have adequate workspace.,

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

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

Task 1- Prepare Inspection check list for motor Control circuit