

071605T4MCT

MECHATRONIC TECHNOLOGY LEVEL 5

ENG/OS/MC/CR/03/5

Maintain Mechatronic Systems Instrumentation and Control

July/August 2025



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

PRACTICAL ASSESSMENT

4 HOURS

INSTRUCTIONS TO CANDIDATE

- i. DO NOT write on the question paper.
- ii. DO NOT switch ON power without assessor's permission.
- iii. The assessor will assess your performance at critical points and may record your performance using audio-visual means.

This paper consists of FOUR (4) printed pages.

Candidate should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

In this practical, you are required to perform motor speed control through PLC and variable frequency drive.

TASK 1: CIRCUIT SETUP AND CONFIGURATION

1. Connect the wiring of the main circuit and control circuit as shown in figure 1.
2. Adjust the required drive parameters using the manual provided.
3. Input the PLC ladder program shown in figure 2 into the programming software.
4. Troubleshoot the program and upload to the PLC.
5. Fine-tune the sensor's sensitivity to ensure proper obstacle detection.

TASK 2: SYSTEM TESTING AND DATA COLLECTION

6. Activate the sensor, measure its output voltage relative to ground with a multimeter, and record the results.
7. Press and hold switch 1 (SW1) to initiate the start command, causing the motor to run forward. Keep the switch engaged, measure the motor's rotation speed using a tachometer, and record the data
8. Activate the sensor and monitor the motor's rotation speed. Measure the speed with a tachometer and note the results.
9. Deactivate the sensor and activate switch 2 (SW2). Observe the motor's rotation speed, measure it with a tachometer, and record the findings.
10. Enable both the sensor and switch 3 (SW3). Monitor the motor's rotation speed, measure it with a tachometer, and record the results.

TASK 3: DOCUMENTATION

11. Document your results.
12. Disassemble the circuits after evaluation and store the components in the designated area.

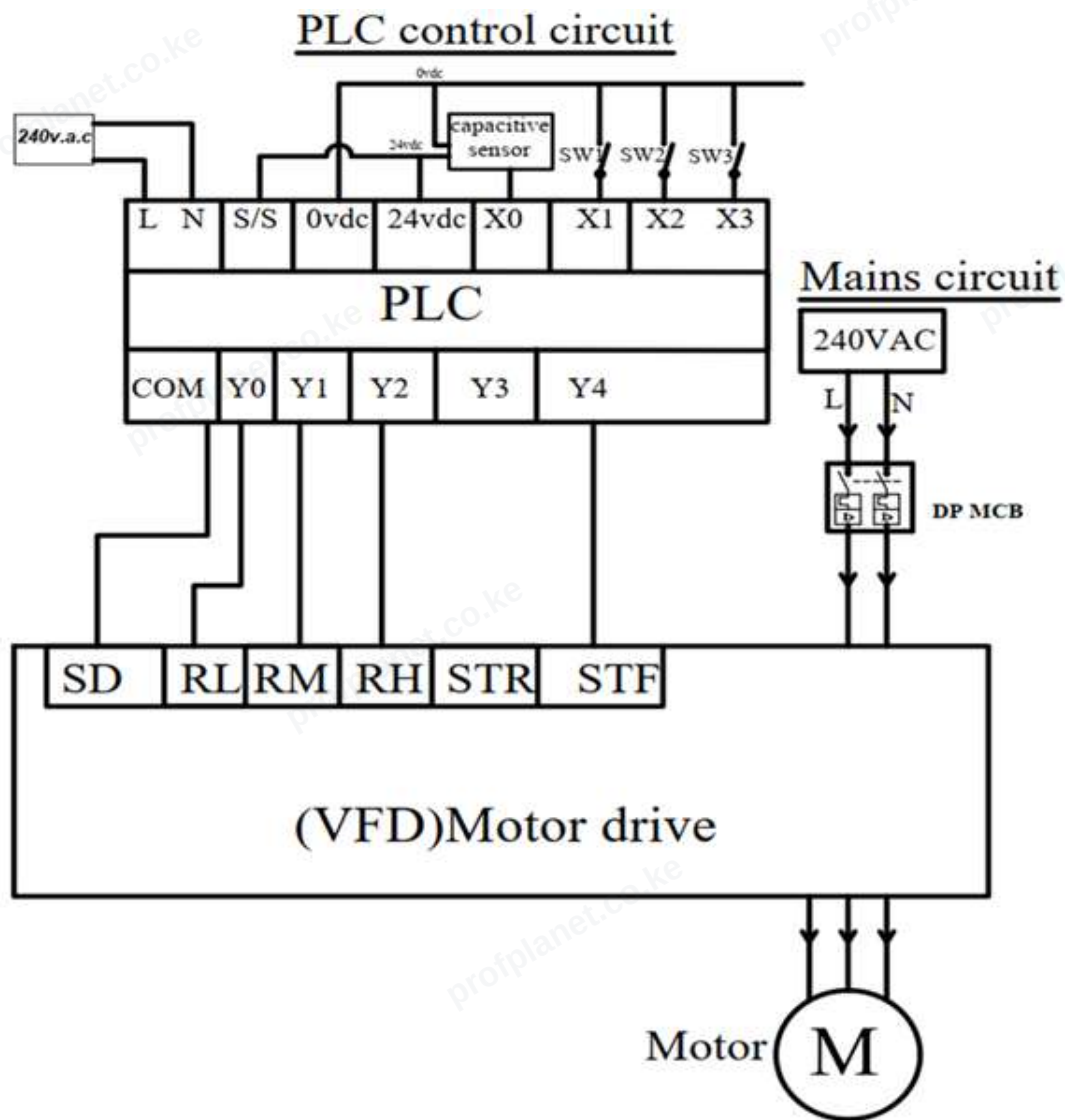


Figure 1

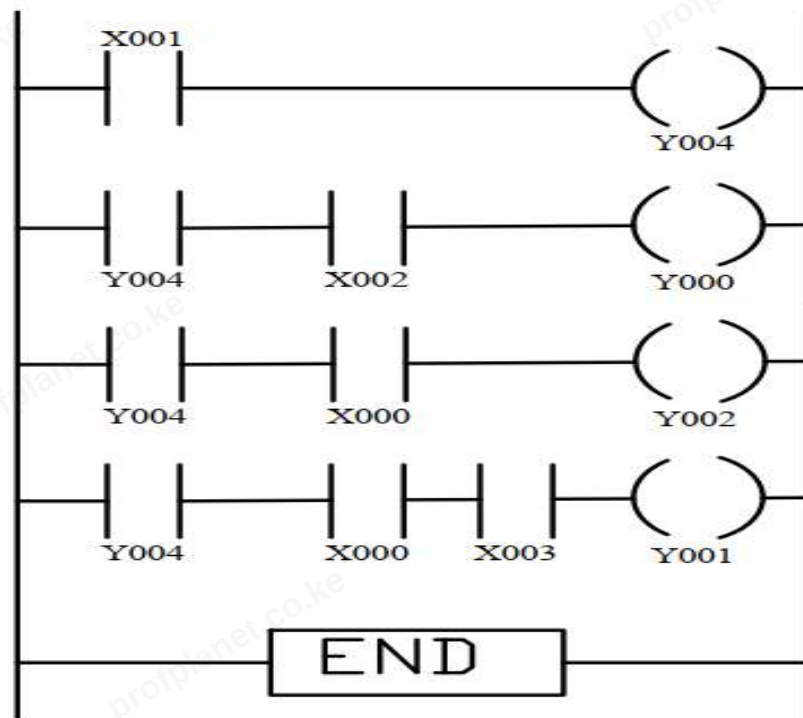


Figure 2

RESOURCES:

- i. Computer with PLC programming
- ii. PLC
- iii. variable frequency drive
- iv. VFD operating manual
- v. Digital tachometer
- vi. double pole MCB
- vii. Capacitive sensor
- viii. Set of screw drivers
- ix. 3 phase AC motor
- x. Connecting cables
- xi. Power supply
- xii. Multimeter
- xiii. Holding switches