Tutorial 7

ET0917 / ET0817 / ET0832

HARDWARE COMPONENTS INTERFACING TO PLC

AND

PRACTICAL CONSIDERATION OF SAFETY

Learning Outcome
Hardware Components Interfacing to PLC

List the hardware components commonly used with PLC systems

Identify commonly used industrial sensors and describe their characteristic and applications

Describe basic circuitry and applications for discrete I/O modules

Q1 - MCQ

The door of the system is sensed by a Limit Switch. Select the correct I/O for PLC to interface with the limit switch.

a) Analog Input

b) Analog Output

c) Digital Input

d) Digital Output

Q2 - MCQ

An ultrasonic level sensor measures the actual height of the water in the frequently flooded drains and report to control station. Select the correct I/O for PLC to interface with the ultrasonic level sensor.

a) **Analog Input**
b) Analog Output
c) Digital Input
d) Digital Output

Q3 - MCQ

A cooling tower speed is controlled by the variable speed drive and the speed would vary according to the 4-20mA signal from the PLC. Select the correct I/O for PLC to interface with the variable speed drive.

a) Analog Input

b) Analog Output

c) Digital Input

d) Digital Output

Q4 - MCQ

An industrial tower lamp is used to indicate different status of the system by lighting up different colour LED, or buzzer. Select the correct I/O for PLC to interface with the tower lamp.

a) Analog Input

b) Analog Output

c) Digital Input

d) **Digital Output**

Q5 - MCQ

An engineer wish to be able to detect metallic object that is on the conveyor system. Please help to select the correct type of sensor to interface with PLC.

a) Capacitive sensor

b) Inductive sensor

c) Ultrasonic sensor

d) NPN sensor

Learning Outcome
Practical Consideration of SAFETY

Implement safety logic including interlock and overload to electrical circuit

Explain the function of master control relay, safety PLC and safety system

Design control circuits interfacing to PLC

Q6 - MCQ

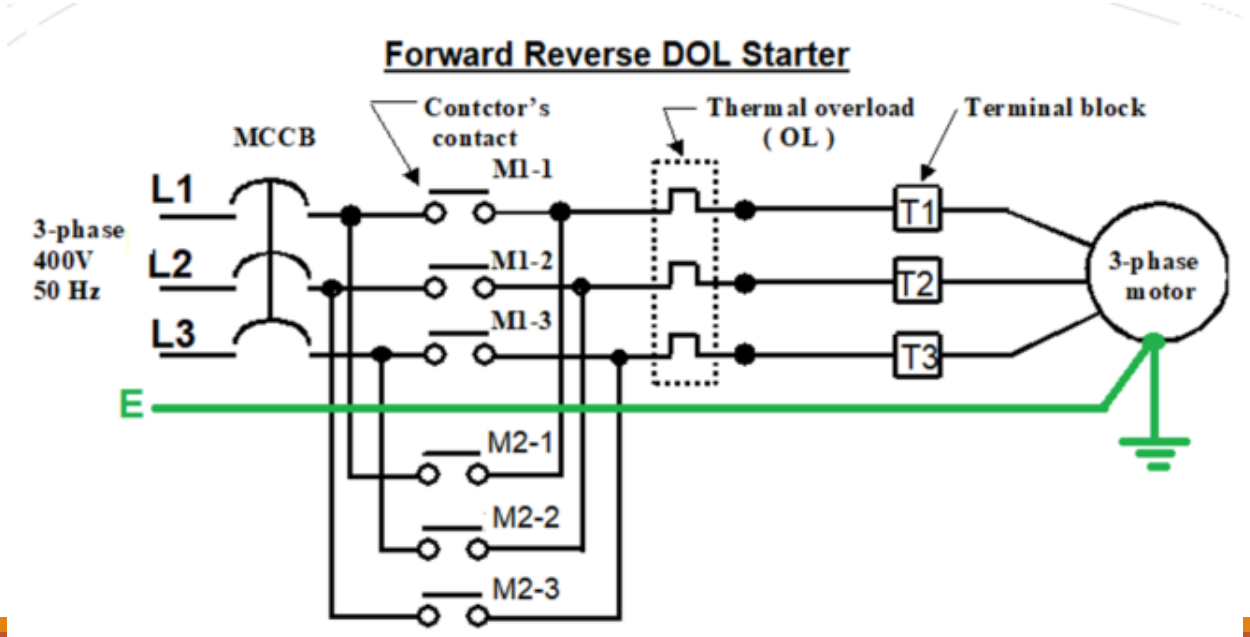
The 3-phase motor is capable of running forward or reverse by turning on contactor M1 or M2. What should be done to ensure M1 and M2 do not turn on at the same time as it would result in line to line short-circuit.

a) Add an Emergency Stop

b) Add a Master Control Relay

c) **Interlock contactors M1 and M2**

d) Add a thermal overload relay for M2



Q7 - MCQ

Which is NOT true for an Emergency Stop Button

a) Typically normally closed contact

b) Latches upon activation, turn knob to release

c) Typically used to cut off outputs to ensure safety

d) Typically has an integrated circuit which would perform a shut down sequence to return process to a safe state

Q8 - MCQ

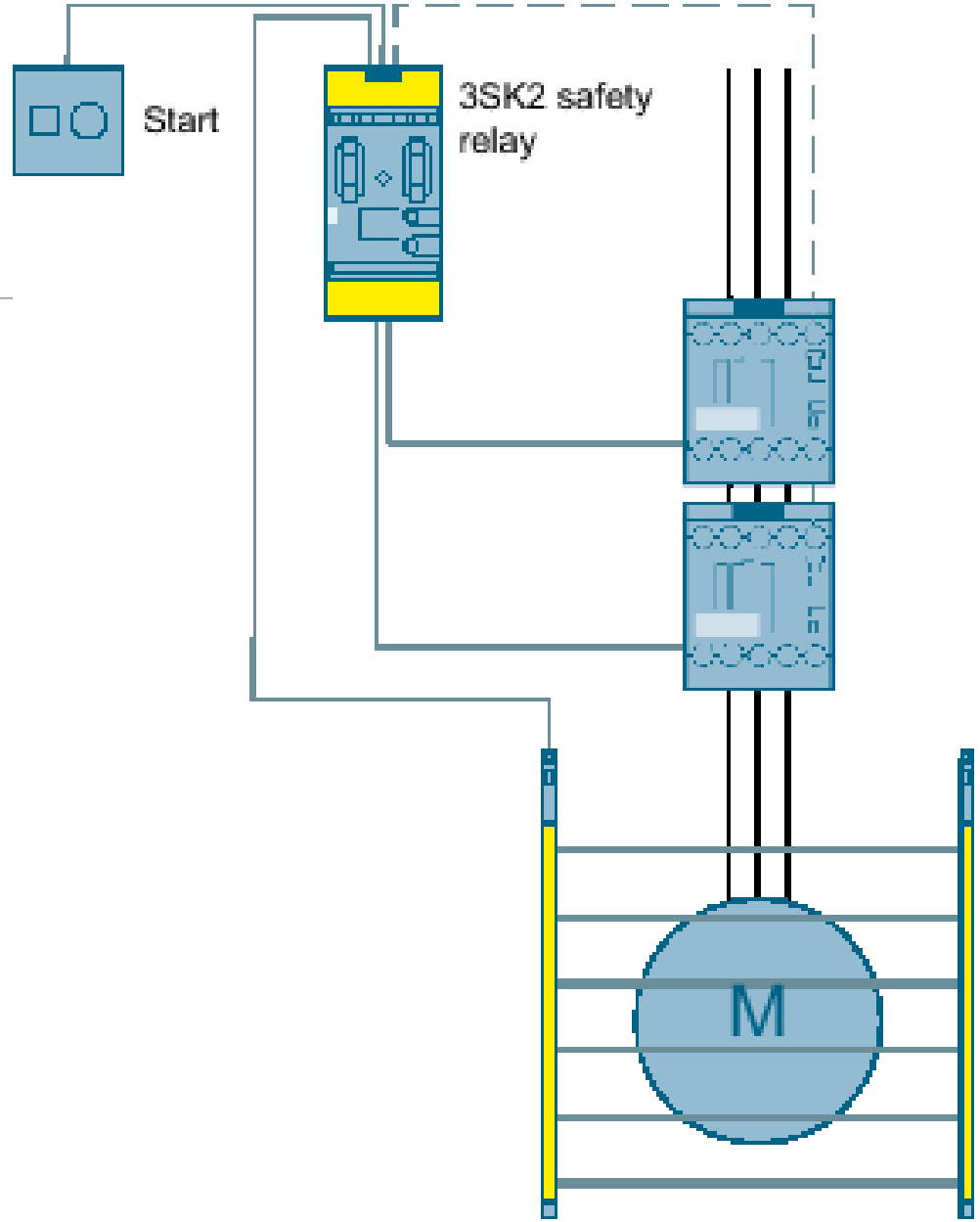
The light curtain is used with a safety relay. Upon activation of light curtain, the contactor of the motor would cut-off. Select the **wrong** statement about safety components.

a) Light curtain is a detecting component

b) Safety relay is an evaluating component

c) Contactors are reacting components

d) Safety relay is reacting component



Q9 - MCQ

Safety design risk reduction should be implemented to ensure safety. Select the correct sequence

a) **Safe Design -> Technical Measures -> User Information**
b) Technical Measures -> Safe Design -> User Information
c) User Information -> Safe Design -> Technical Measures
d) Technical Measures -> User Information -> Safe Design