



Class: 4th Stage
Subject: Control Lab
Lecturer: Dr. Essam Zuhair, Eng. Aceel
Talib Hussain
E-mail: [aceel.talib@mustaqbal-
college.edu.iq](mailto:aceel.talib@mustaqbal-college.edu.iq)



(Control Laboratory)

Experiment No. 00(1)

(Introduction of control element)

Prepared by

(Eng. Aceel Talib Hussain)

Exp.NO. (1):- Introduction of control elements.

Contactors :-

Contactors are mechanical switching devices capable of making, carrying & breaking electric current under normal circuit conditions including operating overload conditions.

A contactor is

Electromagnetically operated switches which can be operated remotely. Contactors may be capable of making & breaking short circuit currents, if they are designed for short circuit of the control circuit, namely.

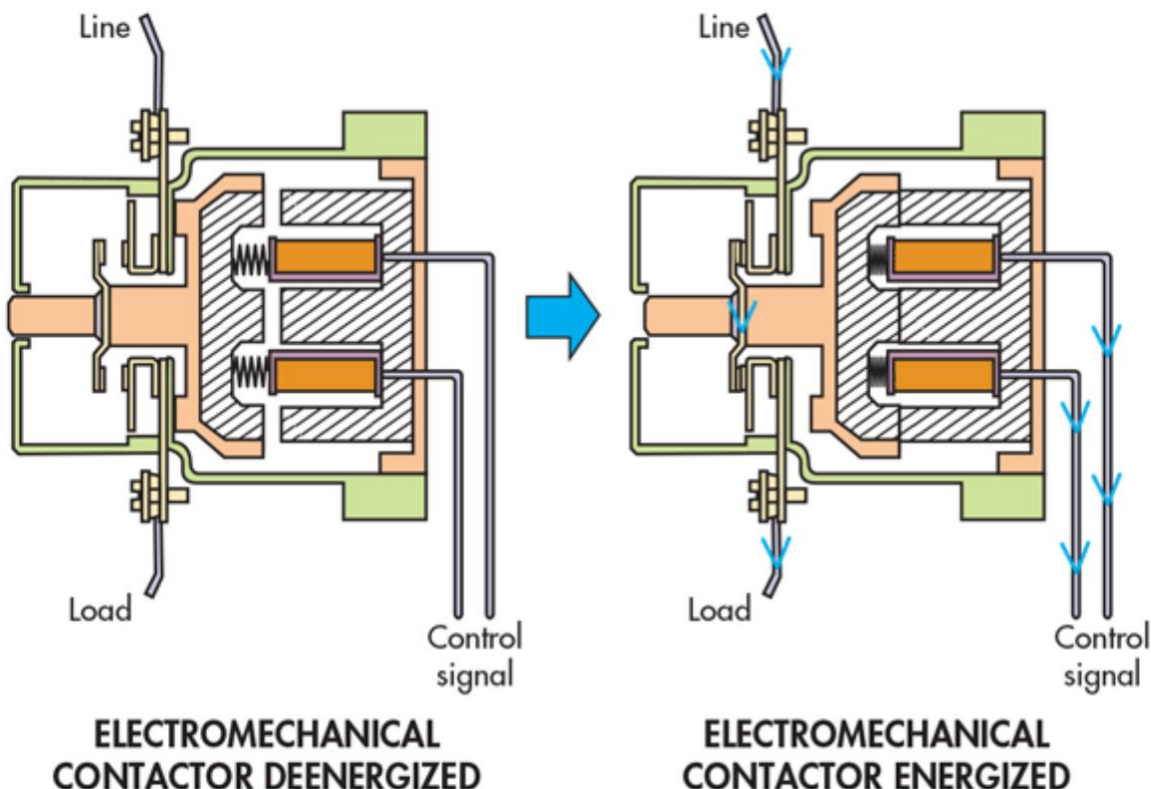
-Some terms & definitions

Electromagnetic contactor:- a contactor in which the operating & closing of main contacts is achieved by means of an electromagnet.

Electropneumatic contactor :- A contactor in which the force for closing & opening the main contacts is provided by an electrically operated pneumatic device.

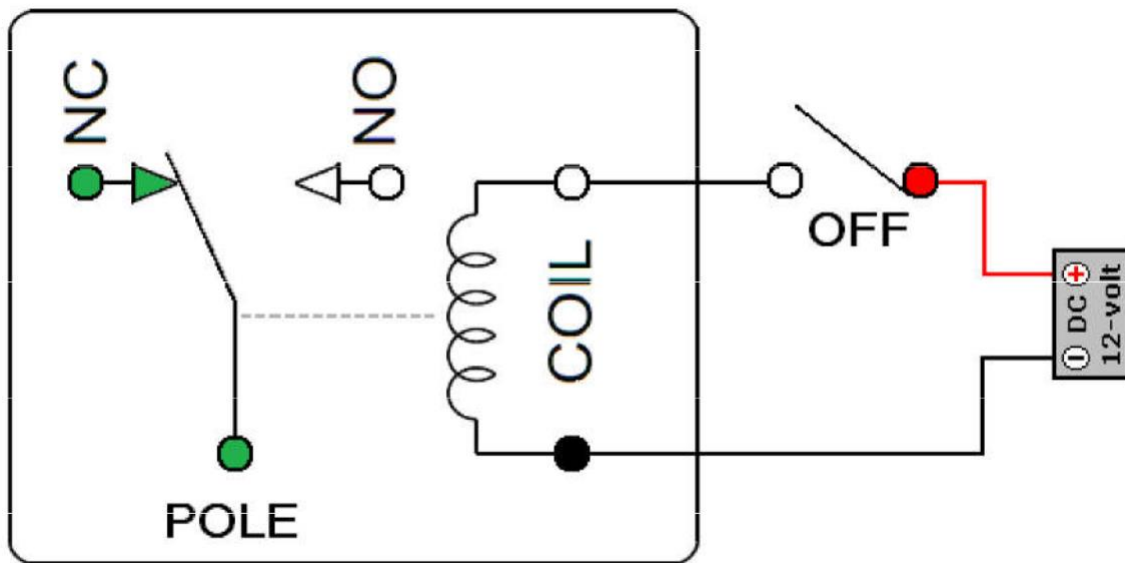
Main circuit :- the conducting parts of the contactor designed to close & open the current flow from the supply to load through the main circuit of the contactor.

Main contacts:- the contacts in the main circuit to carry the load current when the contactor is in the closed position.



Control unit :- the circuit which is energized or de-energized electrically for opening & closing operation the contactor / (switching and protection SGP)

Auxillary circuit:- the circuit other than main & control circuit is called auxillary circuit



relay

RELAY:-

A relay is an electrically operated or electromechanical switch composed of an electromagnet, an armature, a spring and a set of electrical contacts. The electromagnetic switch is operated by a small electric current that turns a larger current on or off by either releasing or retracting the armature contact, thereby cutting or completing the circuit. Relays are necessary when there must be electrical isolation between controlled and control circuits, or when multiple circuits need to be controlled by a single signal.

Timer switch

A time switch (also called a timer switch or simply timer) is a timer that operates

An electric switch controlled by the timing mechanism.

The switch may be connected to an electric circuit operating from mains power, including via

a relay or contactor; or low voltage, including battery-operated equipment in vehicles. It may be built into power circuits (as with a central heating or water heater timer), plugged into a wall outlet with equipment plugged into the timer instead of directly into the power point; or built into equipment as, for example, a sleep timer that turns off a television receiver after a set period.



Fuse

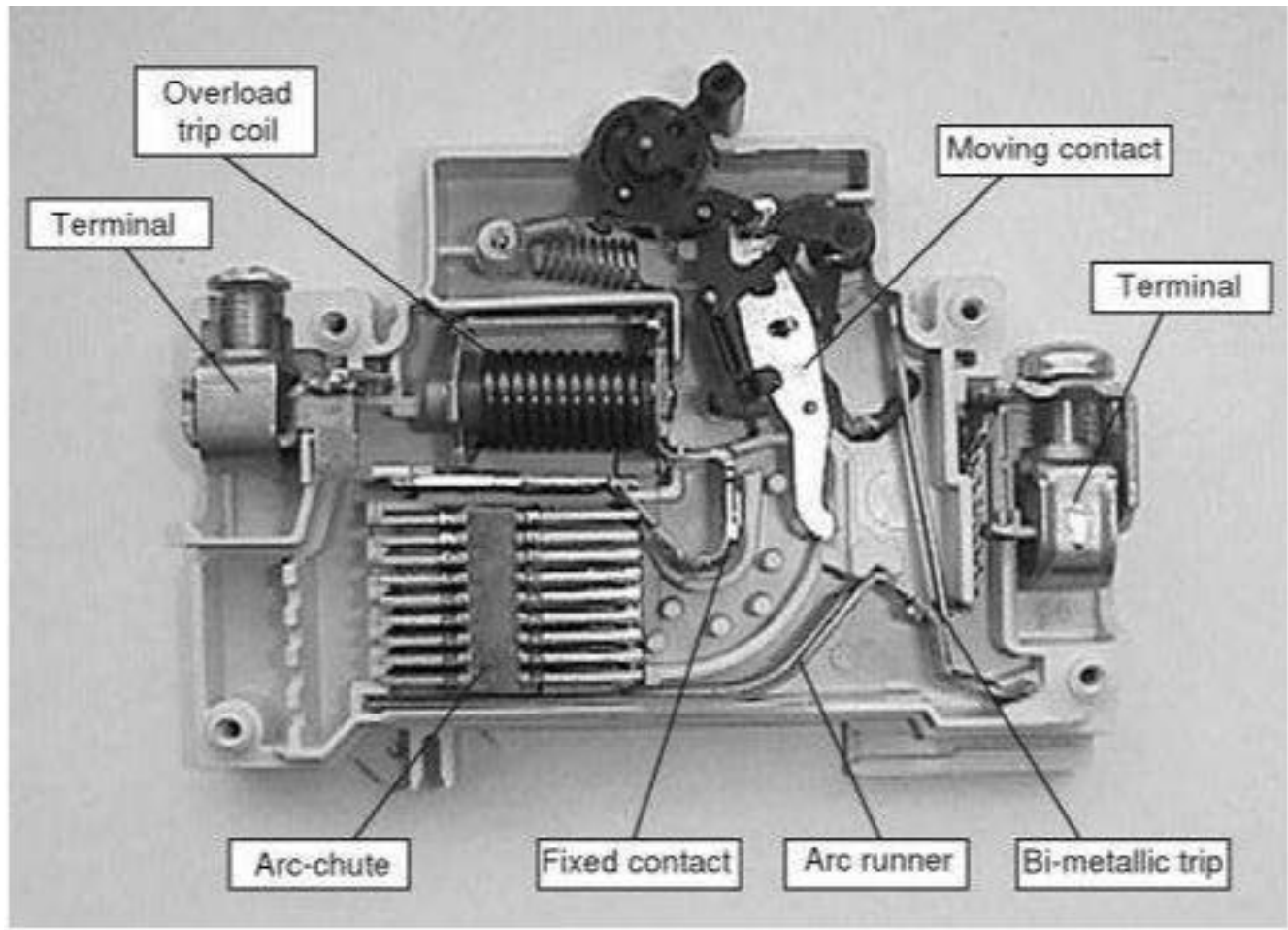
The fuse is a protecting device of simplest form. It consists of a small piece of metal when excessive current flows through it. The metal elements melts & the current is interrupted & the circuit gets

Disconnected from the supply .Thus it protects the circuit from dangerous excessive current. So fuse

Is used to interrupts a fault current .It is simple protective device which works on the principal of current interruption, if current through it becomes excessive.

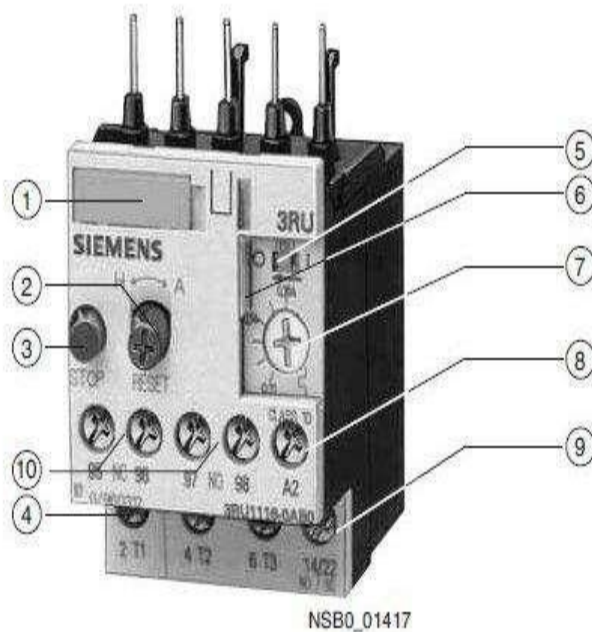


Circuit breaker



A circuit breaker contains an element that heats, bends and triggers a spring which shuts the circuit down. Once the element cools, and the problem is identified the breaker can be reset and the power restored.

Overload relay



- ① Equipment designation label
- ② Manual/automatic RESET selector switch
- ③ STOP button
- ④ Complete order number on the front of the device
- ⑤ Switching position indication and TEST function
- ⑥ Transparent cover, sealable (secures adjuster knob for rated motor current, TEST function and Manual/Automatic RESET setting)
- ⑦ Adjuster knob for rated motor current
- ⑧ Repeat coil terminal (only with size S00 for mounting onto contactors)
- ⑨ Auxiliary switch repeat terminal (only with size S00 for mounting onto contactors)
- ⑩ 1 NO + 1 NC

A relay that opens a circuit when the load in the circuit exceeds a preset value, in order to provide overload protection; usually responds to excessive current, but may respond to excessive values of power, temperature, or other quantities. Also known as overload release.

Discussion:

Explain Briefly:

- 1- What are the (contactor – relay – timer switch – fuse – circuit breaker – overload – relay)
- 2- How it works.
- 3- What are the purpose from it .