203: Electrical installations technology  
**Handout 12: Control circuits**

**Learning outcome**

The learner will:

1. know wiring systems of electrical installations.

**Assessment criteria**

The learner can:

3.1 describe principles of operation of different **circuit types.**

**Range**

**Circuit types**: Lighting, power and heating, alarm and emergency systems, data communications, control circuits, ring final, radial.

**Control circuits**

BS 7671 Definitions define an ‘***Auxiliary circuit***’ as a “*Circuit for transmission of signals intended for control, detection, supervision or measurement of the functional status of a main circuit*”; a control circuit is therefore classified as an auxiliary circuit. **Section 557** of BS 7671 deals with the requirements of auxiliary circuits.

The principle of any control circuit is to turn a load on or off; this could be achieved by a simple switch. However, we may wish to control equipment automatically, depending on the situation of one or more sensors. An example of this is a thermostat and a time clock to control a heating system.

A control circuit could be defined as a circuit that uses control devices, eg stop buttons, start buttons, limit switches, temperature sensors, relays, etc, to turn loads on and off. Sometimes, control circuits operate at lower voltages than the power circuits that they control.

Apart from lighting circuits that are covered elsewhere, probably the simplest control circuit that an electrician needs to be familiar with is the direct on line (dol) starter for a motor. The circuit is shown below:

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| 01 dol starter.png |

The control circuit above is indicated by the thinner wires, whereas the motor cables are the thicker ones.

Control circuits for industrial processes can be very complicated with large cabinets full of relays, contactors and timers with inputs from many different types of sensors. Wiring and fault-finding on these requires the provision of good wiring and schematic diagrams.

Another control circuit that the electrician may need to install in domestic premises is a central heating control system. There are different configurations, depending on the system arrangement, and these are generally identified by a single letter. Below is the arrangement for one of the common configurations: the **Y‑Plan**.

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| 02 Y-Plan.png |