**Input Protection:**

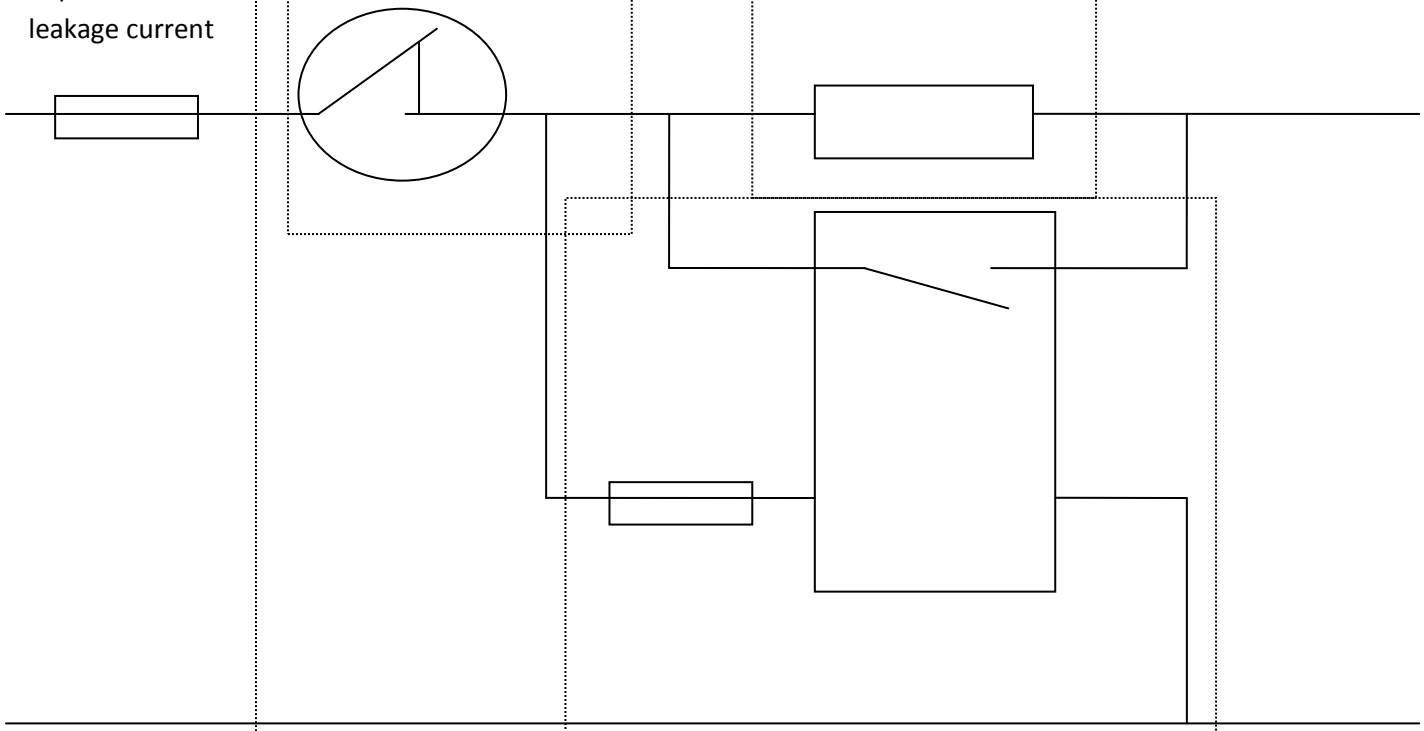
1) Fuse
2) MCB
3) RCBO – The use of an RCBO will depend on leakage current

**Thermal Limit Switch**

Mounted on the Power Resistor or on its heat sink. NC - opens when temperature is exceeded

**Power Resistor:**

See comments to the right hand side



**Timer Relay:**

Rated for at least 1.5X running current, closes after X amount of time based upon the setting.

Aux contact can be used for an enable signal for electronics further up. If a Mains rated coil ensure that a fuse is used to protect it.

**Power Resistor:**

Calculations:

Power ignoring Power factor:

$P = \sqrt{2} \times V \times I$

$P = I \times I \times R$

$V_{pk} = \sqrt{2} \times V$

$V = I \times R$

So to limit current to say 3A inrush, with a 230V supply:

$$\frac{230 * \sqrt{2}}{3} = 108.4 \text{ ohms}$$

P = 965W remember that while this is a big power resistor it will limit the peak inrush current very effectively – when looking at ratings remember that most power resistors have high rating for the few seconds you require if mounted to a heat sink, or designed as power resistors.

You must ensure that you supply enough current to the transformer for it to magnetise correctly.