American International University- Bangladesh
Department of Electrical and Electronic Engineering
EEE 4227: Power System Protection Laboratory

Title: Determination of Time Current Characteristics (TCC) curve of a rewireable fuse.

Introduction:

Fuse is essentially a small piece of metal connected in between two terminals mounted on insulated base which forms a series part of the circuit. The objectives of the lab are:

1) To be familiarize with rewireable fuses.
2) To draw time current characteristics curve.

Theory and Methodology:

The duty of a rewireable fuse wire is to carry the normal working current safely without heating the wire but when the normal operating current is exceeded it should rapidly heat up to the melting point and eventually circuit is opened. It can provide two types of protection.

1. Short circuit protection
2. Over load protection

The melting point follows inverse characteristics between the melting time and the melting current. At normal rated current the fuse element will never be heated to its melting point. At overloaded current the melting will occur after certain time. As the amount of overloading is increased the melting time will be shorter.

Pre-Lab Homework:

Study about rewireable fuses.

Apparatus:

1. Current Injector.
2. Clamp on meter.
3. Rewireable Fuse Wire (2 - 6 A).
4. Wooden Board fitted with Fuse Holder.
5. Connecting Wire.

Precautions:

1. Try to maintain safe distance from the current injector; do not touch the current output terminals.
2. Try to avoid using the same fuse holder every time. Allow some time to cool them after use.

3. While taking readings of *'current'* from the clamp ammeter and current injector display, justify the readings.

Experimental Procedure:

Connect the current injector set to a 230 V supply line as shown in figure 2.1. There are two output current terminals, one is of 0-20A and other is 0-200A. Use 0-20A output terminal. Set the output current at a desired value by changing the current varying knob. This can only be achieved by shorting the output terminals by a thick wire. Keeping the knob position at the desired current value, switch off the current injector and connect the fuse holder fitted with fuse wire across the output terminals. Then switch on the injector. The desired current flows through the fuse wire. Measure the blow out time of the fuse wire. As the increased current flows through the fuse wire, the fuse blow out time reduces. Measure & record the currents and the corresponding fuse and blow out time in the table 2.1.

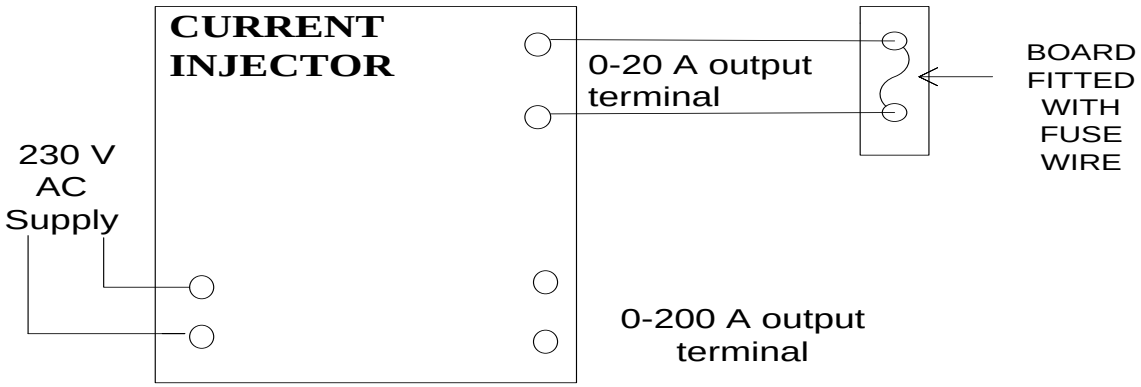

Fig 2.1. Experimental setup for TCC

Use the tabulated values in table 1 to plot the value of current (A) against time (s) to obtain the TCC.

Table 2.1

Sl. No	Current (A)	Fuse blow out time (Sec).
1		
2		
3		
4		
5		

Questions for report writing:

1. Draw the TCC curve on a graph paper from the data of table 2.1. Use Current in the X-axis and time in Y-axis.
2. Discuss the special feature for selecting the fuse rating for the protection of motor.

Reference(s):

1. Alexandra Von Meier ,"Electric Power Systems: A Conceptual Introduction" .
2. Sunil S Rao ,"Switchgear Protection and Power Systems" .