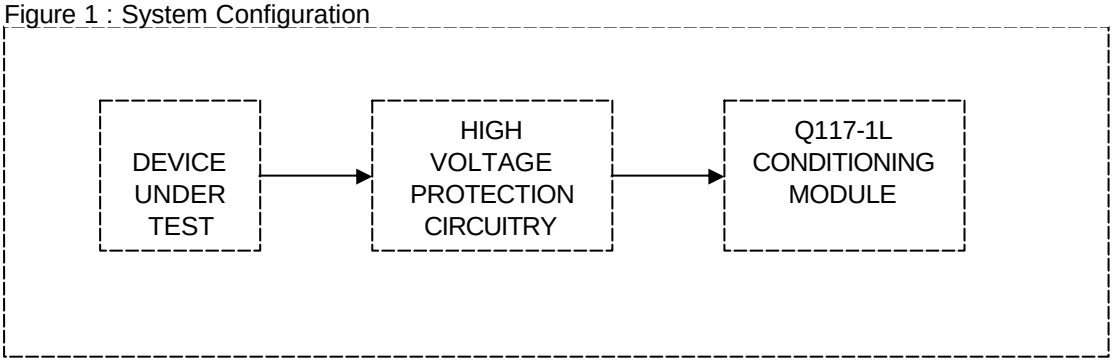
AN040706: Reflex51 – Life Testing Using Inductive Loads

Overview

Life testing using inductive loads can generate back EMF transients of varying magnitudes (In excess of 400 volts). The Reflex 51 active conditioning modules (Part number: Q117-1L) will only tolerate an absolute maximum input voltage of 400 volts, otherwise damage may occur to the unit. This application note describes a suitable input protection circuit that has been designed to limit the voltage at the input of the active conditioning module. The circuit is designed to be implemented as a separate assembly that resides between the device under test and the active conditioning module BNC input. The block diagram in figure 1 identifies the required system configuration changes.

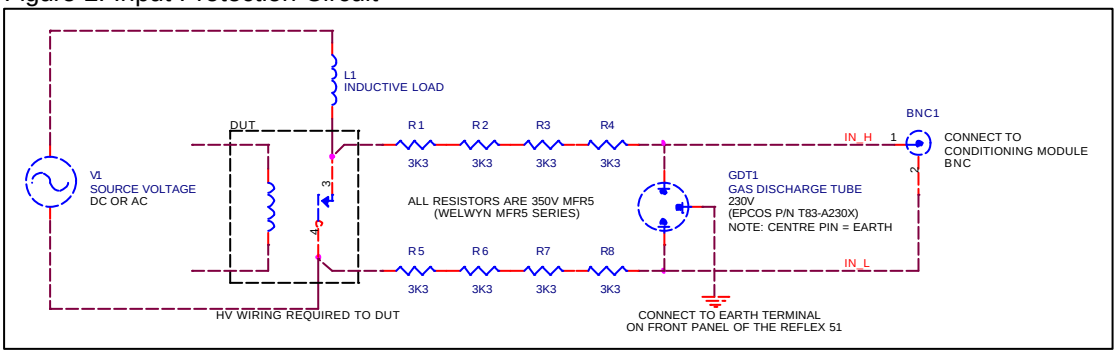
Figure 1 : System Configuration



Hardware Modification

Applied Relay Testing recommends that the input protection circuit detailed in figure 2 is used in life test environments where back EMF transients in excess of 400V are expected.

Figure 2: Input Protection Circuit



If a back EMF transient of greater the 230V occurs across the device under test, the gas discharge tube (GDT1) will suppress the BNC voltage to 230V +/- 20%, preventing damage to the conditioning module. As the circuit is going to experience high voltage transients, all connections between the protection circuit and device under test should be made using suitable high voltage cabling. The BNC1 output should be connected to the appropriate conditioning module input using a standard 50

Ohm coaxial cable. The earth connection of the gas discharge tube (Centre pin of GDT1) should be connected to the earth terminal on the front panel of the Reflex 51.

Circuit Specification:

Transient voltage suppression (Max):	1000 Vrms (1414 Vpeak), 6% max duty cycle/10ms max transient pulse width.
Continuous input voltage (Max):	300 Vrms (424 Vpeak)

NOTE: The circuit has only been designed to protect the conditioning module against voltage transients of 1000 volts RMS. To avoid exceeding the power rating of the series input resistors DO NOT apply a continuous load voltage greater than 300 Vrms.

Software Modifications

Testing of the input protection circuit identified that a 3% scale factor correction needs to be added to all voltage measurements that the Reflex 51 acquires during normal operation. This 3% scaling factor correction should be added to the voltage measurements within the Reflex51 test program, as shown in figure 3.

Figure 3: Software Scale Factor Correction

Old test program commands:

```
NO1_VDrop := M1.Value
```

New test program commands:

```
NO1_VDrop := M1.Value * 1.03 //1.03 is the 3% scale factor correction
```