Testing Fixtures for Load Break Switches

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Abstract

A load break switch is a sort of switching device considerably utilized in medium-voltage programs at distribution structures. For that motive, it is of wonderful importance that it really works nicely, and for this to manifest, it wishes to pass several forms of tests. This venture focuses on one of the most critical assessments designed for load spoil switches and that is the so-called making check. A making take a look at for load spoil switches wishes to be done with the assist of some simple circuit because of laboratory capability barriers A load break transfer is a disconnect transfer that has been designed to offer making or breaking of detailed currents. This is performed through addition of device that increases the working velocity of the disconnect transfer blade and the addition of some form of device to adjust the arcing phenomena and permit the secure interruption of the arc ensuing when switching load currents. Efficient trying out of switching structures is important to offer new services speedy and to reduce development expenses. This paper offers the design, implementation and takes a look at of a machine that's used to automate the checking out gadget for switching devices with multiple modules. This device allocates hardware assets, which include check equipment and inter module connector ports, routinely constructs a take a look at environment for each test object, and executes test scripts. It can reduce the complexity of scheduling hardware and putting in the test environment, lessen the checking out cycle time, and enhance hardware useful resource utilization. This is a automated checking out fixture that video display units the circuit conductivity and the resistance parameter internal a managed surroundings

Keywords: *Switches, Rotary switches, Isolator, Opto Isolator switches, Pneumatic Pressure, Raspberry Pi, Step down Transformer, High Voltage, AC, DC, Pneumatic air cylinders*

I. INTRODUCTION

A switch is a tool that's designed to break the current go with the flow in a circuit, in other phrases, it may make or ruin an electrical circuit. Every electrical and electronics software makes use of at least one switch to carry out ON and OFF operation of the tool. So the switches are the part of a manage system and without it, manage operation can't be accomplished. A transfer can carry out functions, particularly completely ON (by means of final its contacts) or fully OFF (via opening its contacts).When the contacts of a transfer are closed, the transfer creates the closed route for current drift and subsequently load consumes the electricity from supply. When the contacts of a switch are open, no strength might be consumed by way of the load. Isolator Switches are designed to isolate an electrical circuit from its energy supply. Isolator switches does no longer have any interruption potential. It has no making or breaking capacity. Isolator switches are only meant to be operated on open circuit. That approach, Isolator switches have to be closed on open circuit after which different approach of device to energize line or isolator switches must be opened after starting upstream device to de-energize line.

Isolator switches are simply mechanical device and it could conduct everyday operational currents as well as under quick circuit modern-day for defined period. A load spoil transfer is a disconnect transfer that has been designed to provide making or breaking of special currents. This is done through addition of gadget that will increase the operating pace of the disconnect switch blade and the addition of some sort of gadget to modify the arcing phenomena and allow the secure interruption of the arc resulting when switching load currents.

Efficient trying out of switching systems is critical to offer new services fast and to reduce improvement costs. This paper gives the design, implementation and take a look at of a device which is used to automate the testing machine for switching gadgets with a couple of modules This gadget allocates hardware sources, which consist of take a look at gadget and inter-module connector ports, routinely constructs a test environment for each test object, and executes test scripts.framework and make upgrades. 3D printing enables us to effectively make as good as ever designs.

Fig.1 Isolator Switch

It can reduce the complexity of scheduling hardware and putting in the take a look at environment, lessen the checking out cycle time, and improve hardware aid usage. This is a automatic testing fixture that monitors the circuit conductivity and the resistance parameter interior a controlled environment.

II. EXISTING SYSTEM

The existing system consist of a testing kit which has a testing base synchronized with the a two parallel 8 tooth holder which is embedded to a Pneumatic air cylinders which enables the mobility of the jaws, there two types of base which are designed to suit the base of different types of load break switches .This system is incorporated with a conductivity testing circuit to ensure the conductivity across the terminals and a timer circuit to customize the piston movements. When the system is powered these pistons moves the jaws and they provide a firm grip to hold the switches. A separate circuit to check the conductivity of the switch is installed. The conductivity is ensured with the indication of LED.
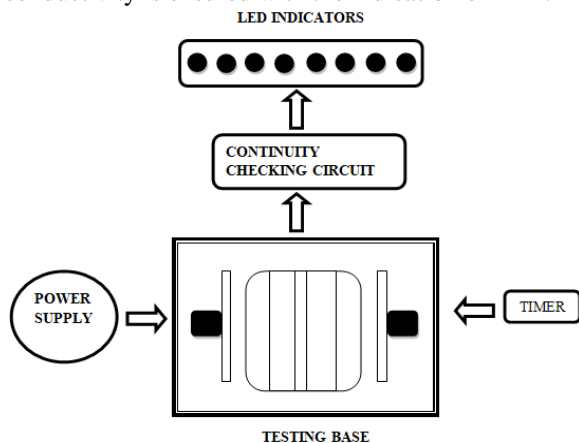

Fig 2.1 Block diagram of Continuity Testing Kit

A. Raspberry Pi:

Raspberry Pi is the call of a sequence of single-board computer systems made through the Raspberry Pi Foundation, a UK charity that objectives to train people in computing and create less difficult get right of entry to to computing education. Raspberry Pi is the call of a chain of unmarried-board computers made via the Raspberry Pi Foundation, a UK charity that aims to teach humans in computing and create less difficult get right of entry to computing schooling. The raspberry pi is of two models, they are model A and model B. The foremost difference between model A and version B is USB port.

Model A board will consume less electricity and that does not encompass an Ethernet port. But, the model B board consists of an Ethernet port and designed in china. The raspberry pi comes with a set of open supply technologies, i.e. Communique and multimedia web technologies. In the yr 2014, the muse of the raspberry pi board released the pc module that packages a version B raspberry pi board into module for use as part of embedded systems, to encourage their use.

B. Pneumatic air cylinders:

Pneumatic cylinders (now and again known as air cylinders) are mechanical gadgets which use the energy of compressed gas to produce a force in a reciprocating linear movement. Like hydraulic cylinders, something forces a piston to transport in the desired route. The piston is a disc or cylinder, and the piston rod transfers the pressure it develops to the item to be moved. Engineers occasionally choose to use pneumatics because they're quieter, cleaner, and do no longer require big quantities of area for fluid storage. Because the running fluid is a fuel, leakage from a pneumatic cylinder will now not drip out and contaminate the environment, making pneumatics extra proper in which cleanliness is a demand.

C. Salzer switches:

Salzer's brand new LB collection of load destroy switches and photograph voltaic switches comply with brand new specifications for modern low voltage devices. It is diagnosed in the marketplace for its super electric characteristics together with compact design; make contributions to area saving installation and operational convenience. The primary production and layout of the transfer makes it exceedingly compact, safe and reliable. It is manufactured the usage of polyamide glass stuffed fabric which is diagnosed for its insulation. It is exceedingly dependable to face up to quick circuit currents. It is used for isolators, primary switch, inverter packages and emergency ON and OFF. We offer various panel

mounting alternatives too such as the front mounting, rear mounting and enclosure mounting.
energy supplies are now and again called electric powered energy converters. Some energy supplies are separate standalone portions of gadget, at the same time as others are constructed into the burden home equipment that they power.

All power materials have a electricity input connection, which receives electricity inside the form of electric cutting-edge from a supply, and one or greater strength output connections that supply current to the burden. The source energy may additionally come from the electrical
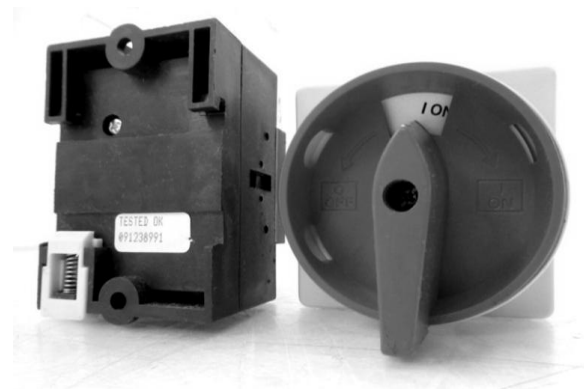

Fig-2.2:Salzer Switch

D. Timer:

A timer is a specialised form of clock used for measuring precise time intervals. Timers may be classified into two predominant types. A timer which counts upwards from zero for measuring elapsed time is frequently called a stopwatch, even as a device which counts down from a specified time c program language period is greater usually known as a timer. A simple instance of this type is an hourglass. Working technique timers have two predominant agencies: Hardware and Software timers. Most timers provide an illustration that the time c programming language that were set has expired. Time switches, timing mechanisms which spark off a transfer, are on occasion also referred to as timers.

Power supply:

A strength deliver is an electrical device that energy supplies are now and again called electric powered energy converters. Some energy supplies are separate standalone portions of gadget, at the same time as others are constructed into the burden home equipment that they power. All power materials have a electricity input connection, which receives electricity inside the form of electric cutting-edge from a supply, and one or greater strength output connections that supply current to the burden. The source energy may additionally come from the electrical electricity grid, which include an electrical outlet, energy garage

gadgets consisting of batteries or fuel cells, generators cells. Thus the conductivity is ensured and the switches pass those screening are moved to the packing phase and the alternative which fails the take a look at are subjected to correction

RISC OS:

RISC OS is a computer running system in the beginning designed via Acorn Computers Ltd in Cambridge, England. First launched in 1987, it changed into particularly designed to run at the ARM chipset, which Acorn had designed simultaneously to be used in its new line of Archimedes personal computers. RISC OS takes its call from the RISC reduced preparation set computing structure supported.

Kernel:

The RISC OS kernel is single-tasking, the cooperative multitasking is provided by the Window Manager module and controls handling of interrupts DMA services, memory allocation and the video display

III. PROPOSED SYSTEM

In this proposal we have designed an testing kit that checks the conductivity of the switches across the terminals and also calculates the resistance across the terminals to ensure that the switches meet their specifications .This will be integrated to the already existing system which consist of a testing kit which has a testing base synchronized with the a two parallel 8 tooth holder which is embedded to a pneumatic air cylinder which enables the mobility of the jaws. When the system is powered these pistons moves the jaws and they provide a firm grip to hold the switches. A separate circuit to check the conductivity of the switch is installed. The conductivity is ensured with the indication of LED. There is also a timer circuit installed to maintain and to customize the interval timings of the cylinders. This regulates the piston movements.

Working Principle:

In this concept as proven in parent four.10 we have designed a checking out kit that checks the conductivity of the switches throughout the terminals and also calculates the resistance throughout the terminals to ensure that the switches meet their specifications of a load wreck switch. . A load wreck transfer is a disconnect transfer that has been designed to provide making or breaking of detailed currents. This is substances electric powered strength to an electrical load. The number one characteristic of a energy supply is to transform electric present day from a source to an appropriate voltage, present day and frequency to strength the weight. As a result

executed by using addition of device that will increase the working speed of the disconnect transfer blade and the addition of some sort of device to regulate the arcing phenomena and permit the secure interruption of the arc resulting whilst switching load currents. Efficient checking out of switching systems is crucial to provide new services fast and to reduce improvement prices. Therefore to have a particular calculation/measurement the self resistance of all components are taken into consideration and the core values are received.
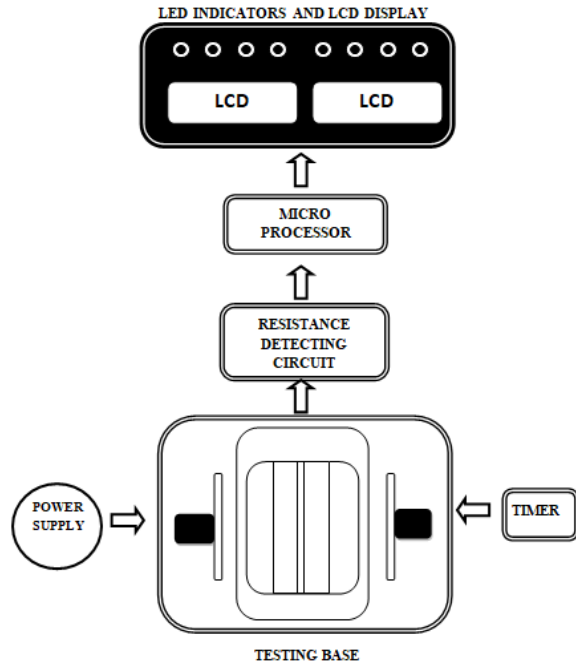

Fig-3.1: Block diagram of IAC Testing Kit

The switches are examined with a load and their parameters like current, voltage & resistance are measured and analyzed. Since the circuit are biased with their additives using a engaging in medium(connecting wires) the self resistance of every and each thing topics.

These obtained values are then installed right into a circuit .This circuit will then automate the procedure of finding resistance for the transfer that are placed in the trying out base . After which the values will automatically received.

These values obtained have to fit the center values calculated. So an assessment between the acquired value and the calculated core fee has to be accomplished.

IV. CONCLUSION

Thus the load break isolators are tested by subjecting it to the range of various ac voltages. The load break isolators are connected to a basic resistance defining circuits and a series of resistive values for the load break isolators are obtained and tabulated. In order to make the readings precise and accurate the self resistance factors for every material is considered. Considering the average values of the obtained resistance value for the load break isolators of range 25 amps, 35 amps and 45 amps three designated values .for the above mentioned range of isolators are obtained .These three values are embedded into a decision making system so as to automate the testing process of isolators .When a load break isolators are placed in the testing base . Initially a piston thrusts the needles in to the terminals of the isolator the, an active load testing mechanism in the resistance obtaining circuit obtains the resistance value of each isolators placed in the testing base. These obtained values are then matched to the values that are embedded to the decision making device. The decision making device then compares the values and sends the pulses to the indicating circuit to display the results. The followings can be concluded based on the results obtained from testing system.

- The output voltage was found to be very insensitive to load resistance and inductance.
- The overall resistance and conductivity are measured and displayed on the output unit.
- Load resistance is matched with the core resistance value based on which the indications are made.
- The switches that match the criteria are passed and others are subjected to corrections.

Future works:

The advancement in the testing fixtures system is non ending process and a new technology is always in progress. In terms of hardware there is always a better choice when there is evolution in terms of new technology. Whenever a new or a better hardware found in terms of efficiency and cost there exists advancement in this module. The major further improvements would essentially reduce the human interference in terms of handling the device. An introduction of a precise device handling robot like delta robots for pick and place of isolators may fully automate the process of testing and effectively increasing the efficiency in terms accuracy and speed. The cost should be compromised whenever a automatic system is integrated to the an existing system. But this greatly enhances the performance in terms of speed there by increasing the productivity range to a greater extends.

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