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A Review on Automatic Star Delta Starter

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ABSTRACT: This paper is review on automatic star delta starter, to assemble Automatic Star Delta Starter we required three contactors, circuit breakers, overload relay and electromechanical timer for setting the time in starting position. At the time of starting The motor must be in delta position during a normal run and hence we are comfortable to use the starter. This device is suitable for 440 volt 50 Hz Ac supply. In Delta connection the voltage is the same as that of phase voltage so full voltage is applied if we run the motor in delta connection. In Star connection current is in different phases but line voltage is root three times that of the phase voltage. So, the voltage is reduced which results in reduction of current if the motor is started in star connection. At the idle condition of motor short circuited transformer at secondary side. Because all rotor bars are connected together to form a close path it will draw 8 to 10 times larger current than rated current & hence to reduce this heavy current we use automatic star delta starter at the time of starting of the motor.

KEYWORDS: Low Starting torque, switching automatically Star-delta, Timer, Simulation.

I. INTRODUCTION

.The star-delta starter method is the reduced voltage starting method of induction motor. Most induction motors are started directly on line, but when very large motors are started with the help of starters. Voltage reduction during star-delta starting is achieved by physically rearranging the motor windings. During starting the motor windings are connected in star connection and this reduces the voltage across each winding 3. This also reduces the torque by a factor of three After a period of time the windings are reconfigured as delta and the motor runs normally. Star/Delta starters are probably the most common reduced voltage starters for the starting of induction motors. They are used in an attempt to reduce the start current applied to the motor during start. Very large induction motors are started that way, they cause a disturbance of voltage on the supply lines due to large starting current surges. To limit the starting current surge, large induction motors are started at reduced voltage and then have full supply voltage reconnected when they run up to near rotated speed.

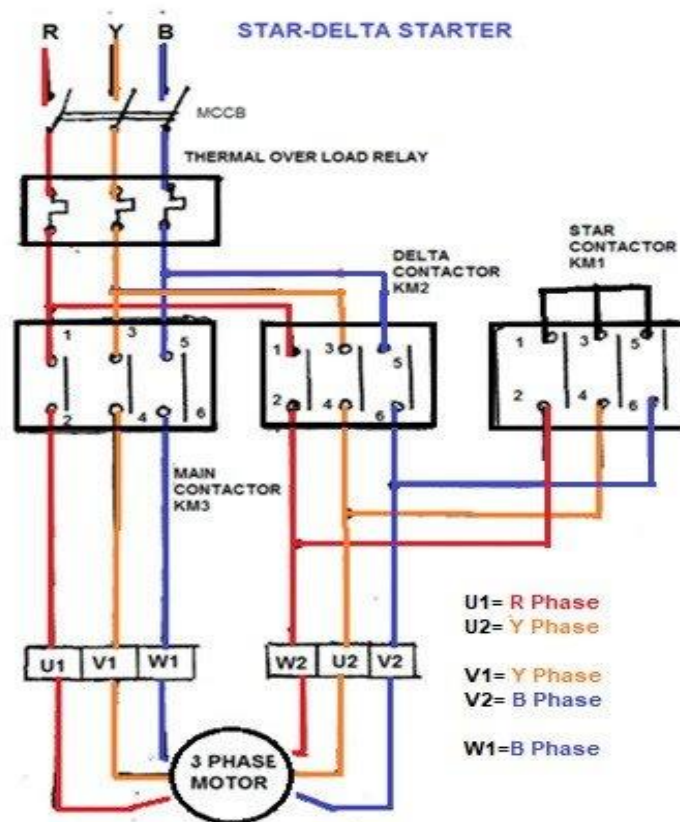


Fig.1.. Circuit Diagram of Automatic Star-Delta Starter

The star-delta starter method is the reduced voltage starting method of induction motor. Most induction motors are started directly on line, but when very large motors are started with the help of starters. Voltage reduction during star-delta starting is achieved by physically rearranging the motor windings. During starting the motor windings are connected in star connection and this reduces the voltage across each winding 3. This also reduces the torque by a factor of three. After a period of time the windings are reconfigured as delta and the motor runs normally. Star/Delta starters are probably the most common reduced voltage starters for the starting of induction motors. They are used in an attempt to reduce the start current applied to the motor during start. Very large induction motors are started that way, they cause a disturbance of voltage on the supply lines due to large starting current surges. To limit the starting current surge, large induction motors are started at reduced voltage and then have full supply voltage reconnected when they run up to near rotated speed.

II LITERATURE SURVEY

KrunalJayswal, Jay Modi ; "Automatic star delta starter" In this paper we can see that induction motor starts properly using the star delta starter and helps to reduce the starting high current and torque. Article DOI:10.21474/IJAR01/6965 DOI URL:<http://dx.doi.org/10.21474/IJAR01/6965>.

MrunalKolhe, Ranjan Kumar, SurajDhanvijay, Prof C. J. Sharma; "Implementation in Automatic Star Delta Starter with ProtectionScheme" In this paper they have designed automatic start Delta starter successfully as well as the assemble protection scheme of thermal overload relay. ISSN: 2349-6002.

Swapnil R. Badge, Nitin M. Sonune, Akshay P. Wakekar, HemantS.Ulmal, Rugved R. Deshmukh; "Automatic Star Delta Starter Using Relay with anElectronic Adjustable Timer" in this Paper design Automatic star delta starter. In that they used relay with an electronic adjustable timer and they are successfully done this.<http://www.ghrcema.raisoni.net/TRPCS-2K17.php>



III. PROPOSED SYSTEM DEVELOPEMENT

A) **Thermal overload relay** :- A thermal overload relay works in the principle of electro-thermal properties in a bimetallic strip. When the bimetallic strips heat up, the trip contact is activated that in turn breaks the power supply to the contactor coil, de-energizing it and breaking the current flow to the motor.



Fig.2. Thermal overload relay

B) **Main contractor** :- A current passes through an electromagnet, a strong magnetic field is produced in it, these magnetic field cause attracts the moving core of the contactor. At a time of starting condition the electromagnet coil draws lots of current, upto its inductance increases when the metal core enters the coil. The moving contact is attached to the moving core; the magnetic field produce by the electromagnet holds both moving and fixed contacts together. When the contactor coil is de-energized, gravity or a spring returns the electromagnet core to its initial position and opens the contacts.



Fig.3. Main contractor



- C) **Star contactor** :-The star contactor serves to initially short the secondary terminal of the motor U2, V2, W2 for the start sequence during the initial run of the motor from standstill. This provides one third of DOL current to the motor, thus reducing the high inrush current inherent with large capacity motors at start up.
- D) **Timer** :- A Timer is a control device that outputs a signal at a present time after an input signal is received. The pointers on the Timer do not move along with time like the hands of a clock do. Therefore, two operation indicators are provided on the upper left of the Timer to identify the timer status.



Fig.4. Timer

No contact:- The no contact are the device which can normally open as per the named in normal conditions but if we energizing or switching it a contact will be closed.

Nc contact:- The nc contact are the device which can normally closed as per the named in normal conditions but if we energizing or switching it a contact will be open.

Circuit breaker :- A circuit breaker is a device which break the circuit automatically in abnormal condition and make or break circuit manually in healthy condition.



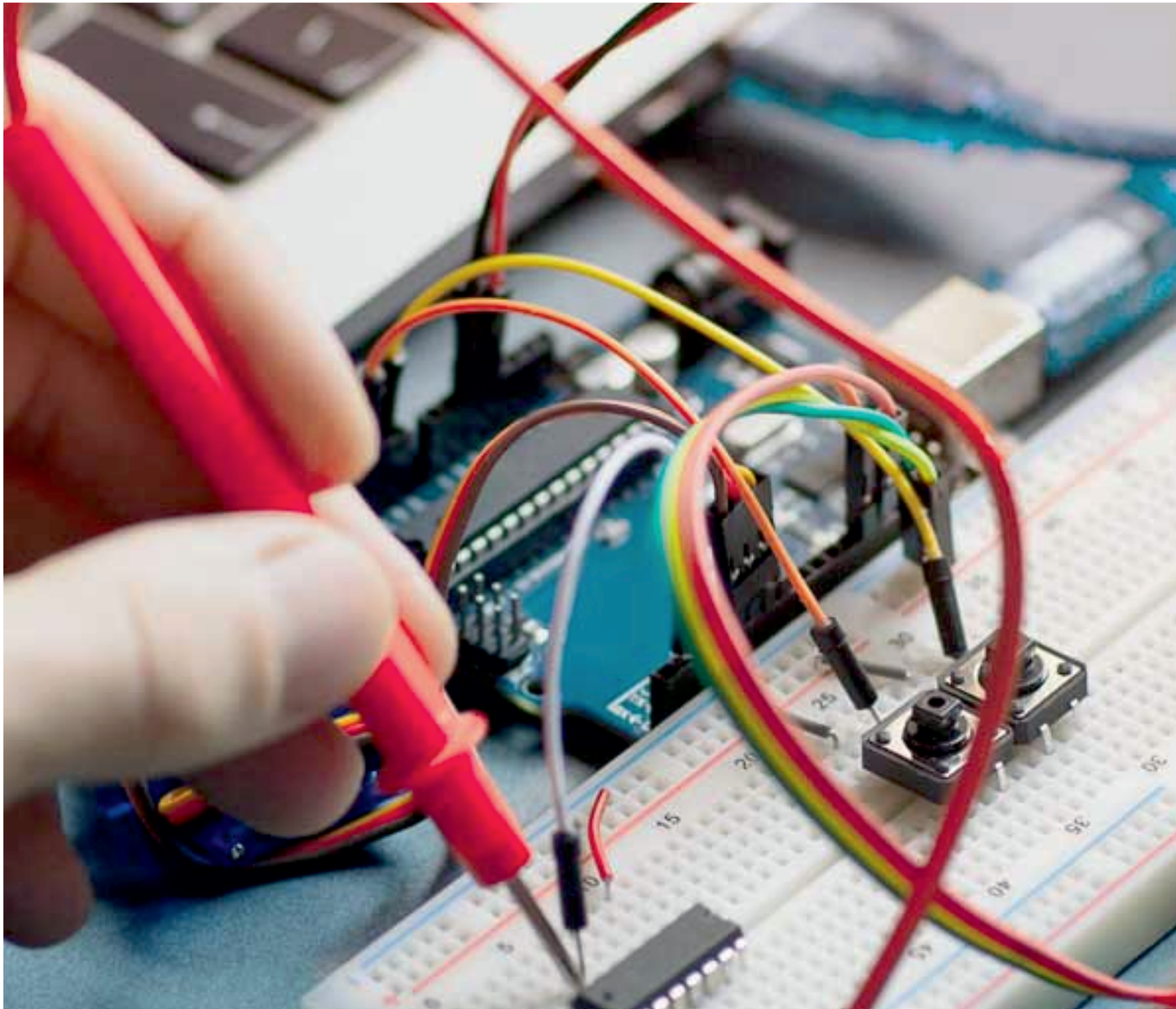
Fig 5 .Breaker

IV.CONCLUSION

The main purpose of this starter is used for low to medium voltage and light starting torque motors. It is the cheapest way to reduce the starting current and it is in the order of 3-4 times that in case of direct online starting of induction motor. In this circuit It can be easily installed the relays, commutator and the timer circuit. It avoids manual switching of star/delta, save human power and prevent the motor from single phasing. The project is designed to provide low starting voltage. This is achieved by using star to delta conversion. The automatic star delta starter employs a unique starting circuit to start an Induction motor automatically that cannot be observed in the traditional star delta starter. Star/Delta starters are probably the most common reduced voltage starters in the 50Hz industrial motor worlds tar/delta Starter is able to reduce the start current applied to the motor then after sometime full load current is applied to the motor. Since in star connection current is same in different phases while line voltage is the root three times the phase voltage. So, the voltage is reduced (results to reduce current) if motor is started as star. It can save 8 to 10 time current draw at the time of starting.

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