

## AUXILIARY STARTER MOTOR SYSTEM/MECHANISM FOR FAULT DIAGNOSIS PURPOSE IN AUTOMOBILE GARAGE

AKILARAVIND T R -UG Scholar, Department of Automobile, Bannari Amman Institute of Technology-Erode.  
CHRISTY JEBA Y -UG Scholar, Department of Automobile, Bannari Amman Institute of Technology-Erode.  
SRI RAM GOUTHAM T- UG Scholar, Department of Automobile, Bannari Amman Institute of Technology-Erode.  
SARAVANAN B - Professor, Department of Automobile, Bannari Amman Institute of Technology-Erode.

### Abstract

Nowadays most of the automobile garage doesn't have a proper system to analysis the starter motor system. For a real time analysis we need to remove the starter motor system and then we need to analysis the starter motor system. If there is any other problem in the engine the labor check the starter motor first and then only check the engine, so the cost of the service has been increased for the service. By analyzing and realizing these real time problems we have came with a new idea to create a new tool for to diagnosis the problem without removing the starter motor from the starter motor system, therefore the cost for the service is reduced and time is saved for the labor and also for the customer.

### INTRTODCTION

The starter motor system is primary system to actuate the ignition system, which plays an important role in the automobile system. There are many ways to diagnosis the starter motor system before that we need to identify the problem which is faced on the starter motor. First we should know about the parameters of the starter motor system and the working of the starter motor system. The working of the starter

motor system is a motor which converts the electrical energy into mechanical energy the mechanical energy is transmitted through a belt medium to actuate the ignition system, which the starter motor is attached on the engine case so the distance of between the starter motor and the crank is reduced.

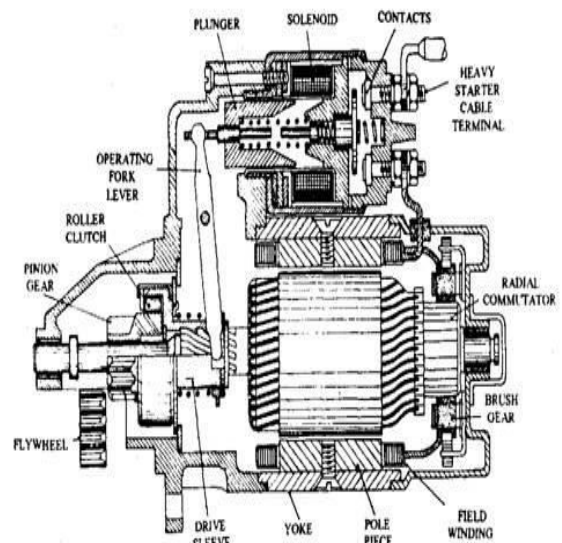


Figure 1

The figure 1 represents the parts of the starter motor, every part on the starter motor is important; we need to know about every parts of the starter motor to find the problems occurring in the starter motor system

Induction vehicles are exceptionally reliable, rugged, and green machines for numerous commercial applications [1–3]. However, the vehicles are liable to 3 instructions of faults: mechanical-, electrical-, and environmental-associated faults. The electrical-associated faults of induction vehicles end result from section failure, unbalanced deliver voltage or current, section collection reversal, earthing fault, overloading, damaged bars and stop ring, insulation failure, and brief circuits [4]. Most of those faults result in the burning of the windings. Frequent burning of windings of induction vehicles needs to be a extreme risk to small and medium scale production industries that use the vehicles as high movers for production in addition to processing equipment [1]. A lot of beneficial time and sources are misplaced in seeking to rewind or update burnt vehicles. Rewound vehicles have been pronounced to have decreased output and coffee performance that would bring about long time power and tracking losses in [3]. Efficiency lack of among 0.5–0.7 % became pronounced in [5]. Although the impact of rewinding on motor performance appears to be negligible, attention downtime, expertise, and further fee are incurred within side the process. Therefore, there's a want to lessen the instances of burnt windings to the barest minimum.

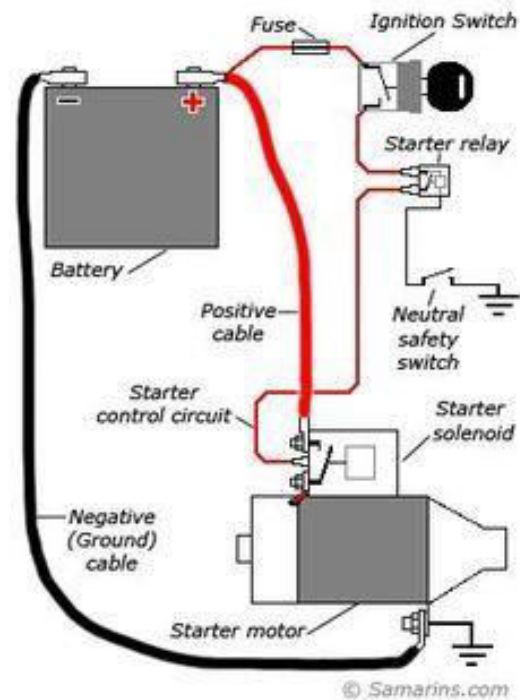


Figure 2

## EXISTING SYSTEM

The olden way is to crank the engine with the help of an Aalen key which is in a huge size which is inserted in the crank case to the engine then it is actuated with the help human power which is rotated with the help of hand. It takes higher time to actuated the system and it requires a lot of human effort to do and it requires a high torque to ignite the engine



Figure 3

The figure 3 represents the older way to crank the engine which is used before the implementation of the starter motor system which is before 1903

But there is on similar existing system which is related to the tool which is used to check the starter motor.

## LITERATURE SURVEY

A starter motor for an engine consists of a motor casing product of electrically conductive cloth and an stop bracket constant to at least one stop of the motor casing. The stop bracket accommodates a base with brush cages integrally shaped therewith, brushes hooked up within side the brush cages and a conductor electrically related to the brushes and motor casing. The base is a unmarried piece product of electrically insulating cloth and coaxial mounting holes are shaped within side the base and motor casing for fasteners to restoration the starter motor to a housing of the engine. Starter motor converts electric power via a battery into mechanical rotating power. These vehicles paintings below heavy load. They produce large electricity in a brief time and in a small volume. Starter motor conveys its rotating power with a pinion to the flywheel. For beginning inner combustion engine, the rotating second of starter vehicles have to be asked being greater. The starter motor should be rotating the flywheel at a minimal beginning speed. It should additionally retain aid rotation for the duration of preliminary combustion to keep momentum till the engine can preserve operation. The starter motor turns for about three seconds for the duration of every beginning try. In every try the starter motor tools bounces out and meshes with the flywheel connected to the engine crankshaft. During the compression cycle of every cylinder, the starter motor torque is high, ensuing in better pressure at the starter tools teeth. Because of the dearth of over modern protection, the conventional starter manipulate via solenoid without difficulty reasons

brief circuit and bums out starter. So the starter motor and its additives are subjected to both mechanical fault like wear, fractures of shifting components or electric faults like brief interrupted circuit and get in touch with resistance growth etc. This paper makes a specialty of the want of digital manipulate unit primarily based totally beginning machine with a few sensible observations made and additionally kingdom of fee of battery is likewise discussed. Uncertainties within side the machine models, the presence of noise and the stochastic conduct of numerous variables lessen the reliability and robustness of the fault prognosis methods. For overcoming those sorts of problems, this look at proposes the fault prognosis of starter vehicles primarily based totally on fuzzy good judgment methodology. A starter motor is a serial wound dc motor that is used for walking the Internal Combustion Engine (ICE). If a fault happens with the starter motor, the ICE cannot be run. Especially in emergency vehicles (which include ambulance, hearth place engine, etc), starter motor faults reasons another faults. In this look at, a fuzzy good judgment primarily based totally fault detection machine has been advanced for implementation on emergency vehicles. Information of the modern and the voltage of a starter motor is obtained after which practiced on a fuzzy good judgment fault prognosis machine (FLFDS). For this purpose, a graphical person interface (GUI) software program is advanced through the use of Visual Basic 6.zero programming language. FLFDS is powerful in detection of six kinds of starter motor faults. The proposed machine may be utilized in a Quality Control unit of producers and maintenance-repairing units.

## PROPOSED SYSTEM

The main work of the tool is to crank the engine when the starter motor is not in a working condition or when there is any other fault in the engine the tools is actuated with the help of electrical energy. It is works on the same principal

of starter motor as similar to power transmission method. The power is transmitted through a belt medium the power is transmitted from the tool to the engine crank belt with the help of a pulley.

## DESIGN

The design part is carried out using an computerized aided design (CAD) software; CATIA V5 software is used to design the part model and assemble the part model

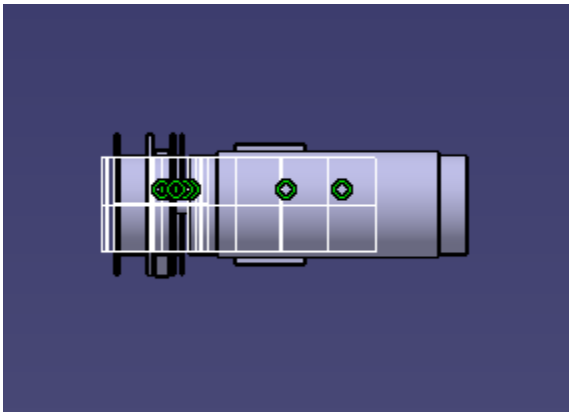


Figure 4

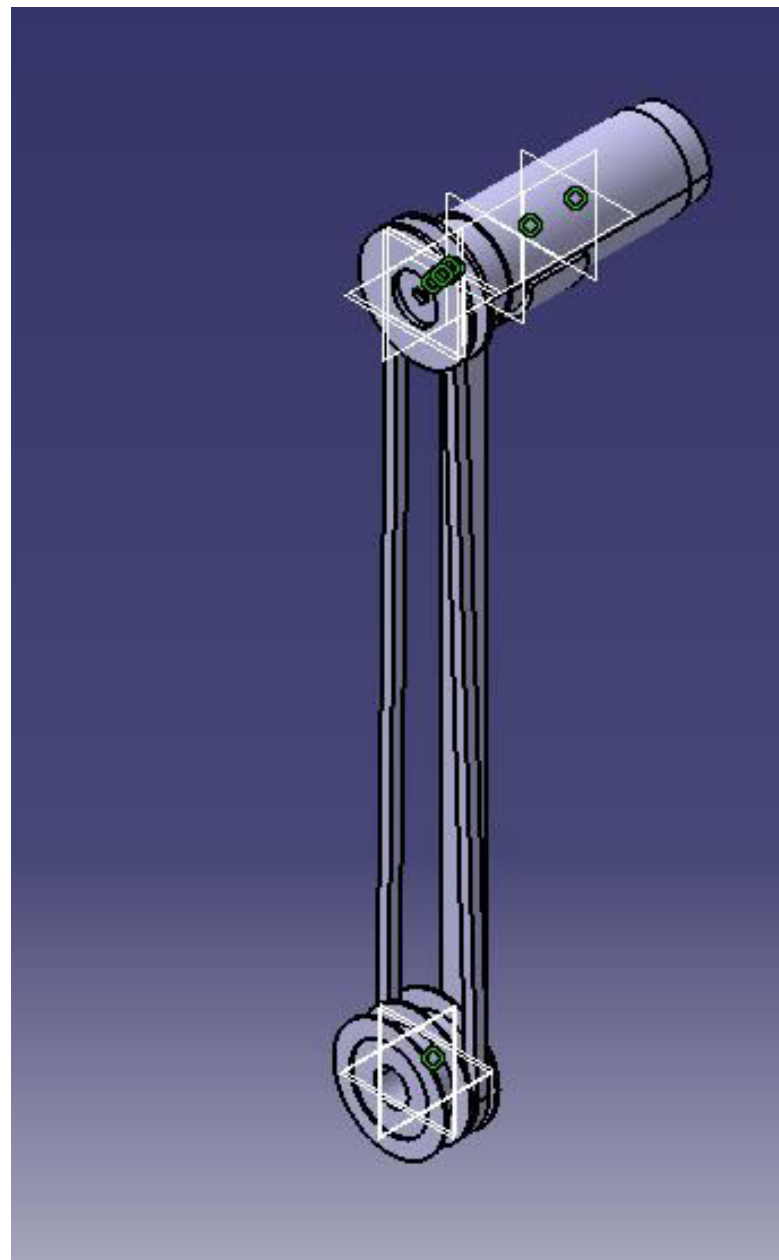


Figure 5

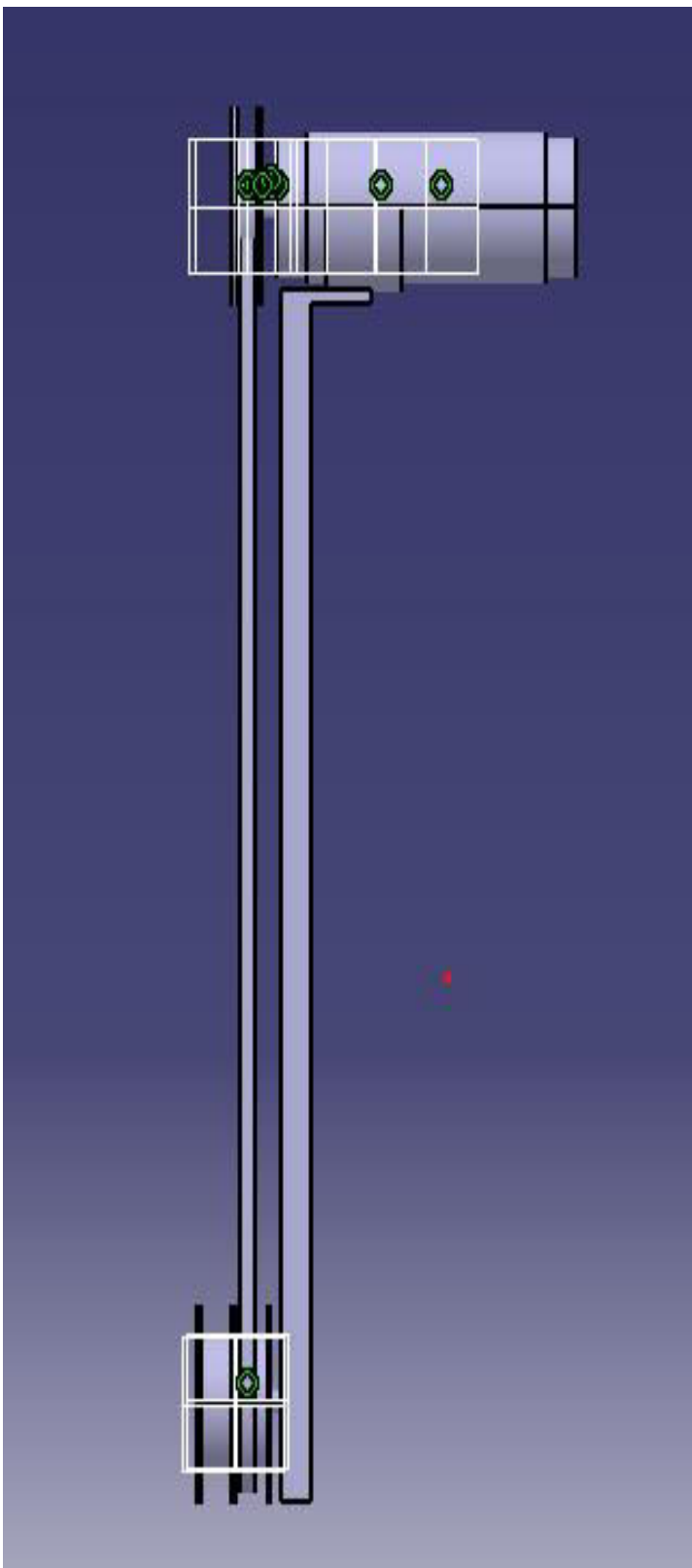


Figure 6

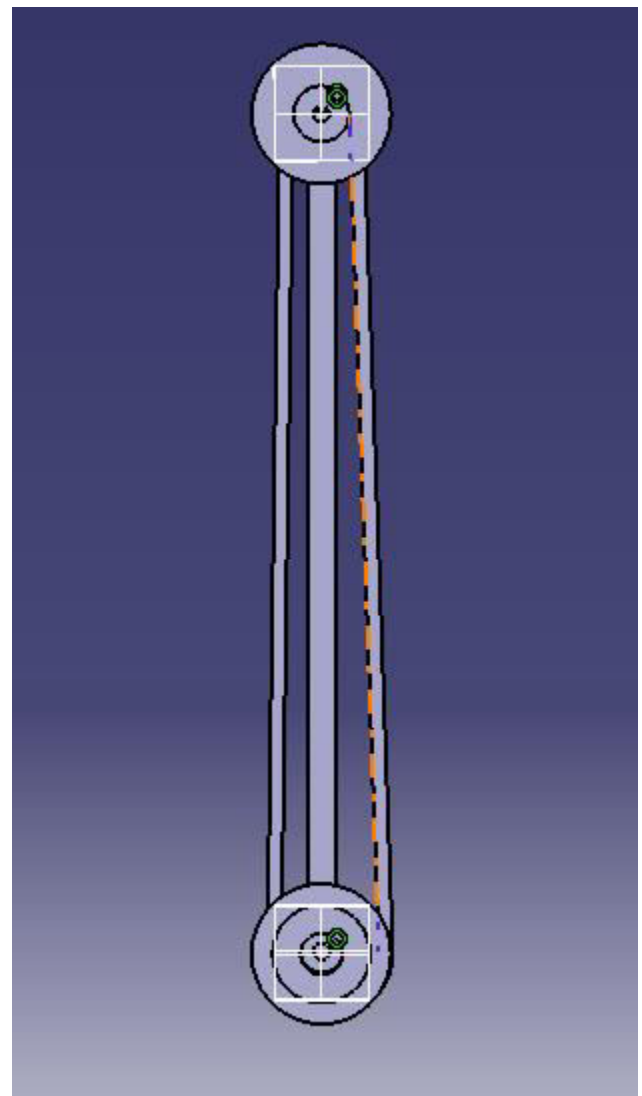


Figure 7

The figure 4 represents the top view of the tool, the figure 5 represents the isometric view, the figure 6 represents the side view and the figure 7 represents the front view of the tool.

### ALGORITHM

**STEP I** – Connect the wiring to the tool and make sure the tool is in working condition.

**STEP II** – install the tool on the engine.

**STEP III** – start the tool.

**STEP IV** – note down the fault in the engine.

**STEP V** – remove the tool.

**STEP VI** – diagnosis the fault.

## MODULE

**STARTER MOTOR:** starter motor is a primary device used to actuate the tool; a 12V motor is used here

**PULLEY:** pulley is used to transmit the power to the engine.

**BEARING:** A double Z bearing is used here to give a strong bound and to make the pulley moment free.

**BELT:** belt is used to transmit the power from the motor to the pulley.

**FRAME:** The frame is used to hold the total parts of the system

## CONCLUSION

The proposed tool is achieved while trying to find a solution for a real time problem which is occurred in the garage in the starter motor system. it helps in reduce the service cost of the service and also reduces the time to find the problem occurred in the engine. In future it can be modified and can also connect with the IOT devices to find the problems.

## REFERENCES

[1]. IGBT based Induction Motor Soft Starter by Sneha M Mukare, 'IOSR Journal of Electronics and Communication Engineering' (IOSR-JECE) ISSN: 2278-2834, ISBN: 2278-8735, PP: 27-32.

[2]. Energy Efficient Battery Management by Carla-Fabiana Chiasserini, Member, and Ramesh R. Rao, Senior Member, 'IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS', VOL. 19, NO. 7, JULY 2001).

[3]. An Overview of Microcontroller Unit: From Proper Selection to Specific Application by Manas Kumar Parai, Banasree Das, Gautam Das, 'International Journal of Soft Computing and Engineering', (IJSCE) ISSN: 2231-2307, Volume-2, Issue-6, January 2013.

[4]. Battery Monitoring System using Microcontroller by S. N. Patil, Sangmeshwar S. Kendre, Dr. R. C. Prasad 'International Journal of Computer Applications', (0975 – 8887) Volume 28–No.6, August 2011).

[5]. An overview of Automobile Starting System Faults and Fault Diagnosis Methods by. Chandramohan.G, Senthil Kumar.M., Rudramoorthy.R, Ashok Kumar.L, Suresh Kumar.R. 'ARPN Journal of Engineering and Applied Sciences', VOL. 7, NO. 7, JULY 2012 ISSN 1819-6608.

[6]Mr.Vishnurameshkumar.R is an Assistant professor in Automobile Engineering Department, Dr.Mahalingam College of Engineering and Technology, Pollachi, Tamilnadu. His research area is in Automotive Electrical system. He has presented paper in 1 International conference. Mr.Kingsly.A is an UG Scholar in Automobile Engineering Department, Dr.Mahalingam College of Engineering and Technology, Pollachi, Tamilnadu. Mr.Karthikeyan.P is an UG Scholar in Automobile Engineering Department, Dr.Mahalingam College of Engineering and Technology, Pollachi, Tamilnadu. Mr.Muthukumaran.R is an UG Scholar in Automobile Engineering Department, Dr.Mahalingam College of Engineering and Technology, Pollachi, Tamilnadu. Mr.Saran.B is an UG Scholar in Automobile Engineering Department, Dr.Mahalingam College of Engineering and Technology, Pollachi, Tamilnadu.