



## POWER BOOSTER, MOTORIZED SUPERCHARGER FOR 2 WHEELER (ELECTRICAL SUPERCHARGER)

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### ABSTRACT

An electric powered supercharger is a particular form of supercharger that uses an electrically powered pressured-air system that carries an electric powered motor to pressurize the consumption air. By using pressurizing the air to be had to the engine consumption machine, the air becomes greater dense, and is matched with gasoline, producing the expanded horsepower to the wheels. The reason that large displacement engines make more strength and torque than smaller ones is that greater gas and air are to be had for combustion. Due to supercharging, a small displacement supercharged engine can produce comparable horsepower and torque to an evidently aspirated larger displacement engine. The centrifugal supercharger could be very much like a turbocharger, besides the centrifugal supercharger is driven through a belt off the engine, while the turbocharger is pushed via the pressure of the exhaust gases. Those sort of superchargers (or turbos) run at extraordinarily excessive speeds. To achieve these high speeds inside the centrifugal supercharger, there is an additional internal step-up power in the blower. Due to the layout of those devices, the faster the impeller spins the greater improve the blower makes. As a end result, these devices normally do not produce much power at low engine speeds due to the fact the impeller is not spinning fast sufficient to make a lot raise. If it have been even viable to tools the blower so that it would spin fast at low engine speeds, it would then make too much increase at better engine speeds. In those conditions, as speed of electrically operated supercharger is regulated via regulating electric voltage there by means of overcoming disadvantageous state of affairs passed off with traditional superchargers and turbochargers. On this task a lowering area cylinder is used as primary casing. This casing hosts a totally excessive rpm PMDC motor aligned with principal line of meeting. The motor is equipped with axial drift 4 blade turbine. At the the front cease of the primary casing a GI twine internet is provided to filter out foreign fabric to get entered into the principle assembly. Whilst at the rear give up of the principle casing another lowering region cylinder is affixed; at the give up of which a long hose pipe with ribbed wall is fitted. Predominant assembly of the task is connected with the aid of wires with a voltage regulating circuit. In which in the electrical energy is provided from the cars own battery. Circuit additionally provided with a reduce off transfer. The hose pipe is connected to the inlet of the air filter out of the automobile

**Keywords:** Supercharger, Gasoline, Turbocharger, Electrical, Battery, PMDC motor.

### 1. INTRODUCTION

As India has the top two wheels in the world it was asked to run project projects in the related field. This technique can boom the improve surest to increase common electricity output of the engine. Also this project may be very a great deal value powerful. An electric supercharger is a particular kind of supercharger that makes use of an electrically powered pressured-air gadget that includes an electric powered motor to pressurize the intake air. With the aid of pressurizing the air to be had to the engine consumption gadget, the air becomes extra dense, and is matched with extra gas, producing the. elevated horsepower to the wheels. With the continued motion towards global environmental protection, policies controlling the exhaust emissions and gas intake of motors are being enforced. Turbochargers have progressed the overall performance of diesel engines; presently, nearly all diesel vehicles are equipped with turbochargers. More and more gasoline engines are also being fitted with turbochargers to lower weight and increase efficiency. In recent years; engine controls have end up extensively assorted for the sake of each the environment and working overall performance. Variable geometry (VG) turbochargers, that can range the turbine capability in reaction to the engine load, are becoming increasingly famous. Additionally, electrification (and the set up of numerous electric devices in motors) produced the present era of hybrid and electric powered automobiles, and development maintains. Batteries also are expected to improve in reaction to this fashion. Cutting-edge electrification initiatives impacting turbochargers include the software of digital manipulate actuators. Furthermore, advances in power electronics have led to the development of extremely excessive pace motors/generators with a capacity of 100,000 rpm or higher, that are now available for use in turbochargers. In an electric powered supercharger the compressor is without delay related to an ultra-high speed motor, and the compressor boost stress is controlled via the motor pace, independent of the exhaust turbine.

A supercharger will increase the air consumption by compressing air above atmospheric pressure, without creating a vacuum. So the greater fuel can be introduced to the charge with the additional air inside the enhance. Making power tools larger than the compressor gear. Superchargers can spin at speeds as excessive as 50,000 to 65,000 rotations per minute (rpm). apart from just volumetric performance there may be growth in the consumption

temperature of the engine. When their will b boom in consumption pressure and temperature reduces ignition postpones and increase flame pace. Because of this each reasons to be able to affect bring about pre-ignite. Because of this supercharged petrol engines have lower compression ratio. The usage of decrease compression ratio and growth warmth losses because of better fee of specific heats and dissociation losses at higher temperature outcomes in decrease thermal efficiency for such engines. Consequently supercharged petrol engine have greater fuel consumption than clearly aspirated Engines. The quantity of air is increases in step with unit time via supercharging, particularly to attain more quantity of fuel burn in an engine and for this reason growth its power output. The intention of supercharging includes increasing the electricity output. To meet drivability and environmental policies, high-degree manipulate of car engines is currently present, and electrification is in progress. The electric supercharger wherein a compressor is driven by a BLDC motor rather than a Flywheel gets rid of turbo lag by means of utilizing the motor's high-speed reaction. An engine with electric supercharger offers greater similar gas consumption with an evidently aspirated engine, and it facilitate decrease in size of the engines. Electric Supercharger innovation can in all likelihood cope with absence of torque, which is moreover the result of faster slack.

## HISTORY

Warner examined with the idea, however had in no way produced component for manufacturing vehicle because of electricity intake, till Mercedes- Benz engines added, which used 48-volt electric to run device. An electric supercharger, each time supplied through normal inventory electric aggregators, runs autonomous of the motor to which it offers its lift. However, electrical power gobbled is often better than what a introduction line generator (for instance alternator) of the motor can flexibly Garret motion Inc. electric turbocharger for market passenger vehicles. The tool has electric motor between the turbocharger's wheels. The purpose of supercharging consists of increasing the electricity output.

## POWER SUPPLY FOR ELECTRIC SUPERCHARGER

An electric supercharger when supplied by using everyday inventory electric vehicles, runs freed from the motor to which it gives it does elevate. Electric energy completed is regularly higher than what a line generator is capable of for instance alternator of the motor can gracefully growth electric vitality. Larger alternators are therefore suited for take into account strength at some point of the motor run.

## OBJECTIVE

The main objective of this challenge is to construct an electric powered supercharger for 2 wheeler under the excessive pace circumstances.

- To design a safe and useful model electrical supercharger for 2 wheeler.
- To growth throttle response of the bike.
- To increase volumetric performance of the engine.
- To increase engine overall performance by using increasing quantity of oxygen in the air consumption.
- Utilizing wind power to generate power and price the battery.

## 2. CONSTRUCTION

In its production numerous additive are used in this paintings like four to 3 discount of 4 to 3 discount of p.c., Acrylic sheet, excessive rpm DC motor, 8mm MDF sheet, 2 mm aluminum sheet, hose pipe of percent, multi stand copper wires, plastic container, variable rheostat, ILP IC, and so on. First of all as 18000 rpm PMDC motor is set up with 4" diameter section of percent reducer with the help of and MDF sheet mounting. A six blade axial waft fan of zone 8cm made from 2mm thick acrylic sheet in mounted at the output shaft of this motor. every of those blade have place 2cm x 2. five cm at the transport a part of the reducer that is the four" diameter component a conical funnel is used to form the flowing nature of outlet at the cease to this funnel a hose pipe of diameter 3.5 cm is connected which in turn receives related immediately with the air filter of the car. The suction part that is the three" diameter of the reducer joint galvanize iron twine net is supplied to avoid the axial drift fan from getting dogged because of any foreign cloth on dreams whilst riding the car. The reducer forms the primary these days of the venture and is installed on the vehicle the use of aluminum strap. The battery affords preliminary power for ruins the motor. That's exceeded through a voltage law circuit container, this voltage regulator container consists of a TUP IC, a potentiometer, warmth sinks etc. This voltage regulator drops / varies voltage as in step with the potentiometer setting without dropping modern fee. therefore with the aid of placing potentiometer at diverse position the velocity of motor may be adjusted there via the waft of air can be adjusted whenever the makes use of runs the automobile and makes the motor ON by putting the toggle to on circumstance and adjust the potentiometer. The motor pumps inside the more quantity of pre-minimized air inside the air filter and but the engine supplied with a better pressurized air through great charging effect takes vicinity. That is how venture is built and it really works.

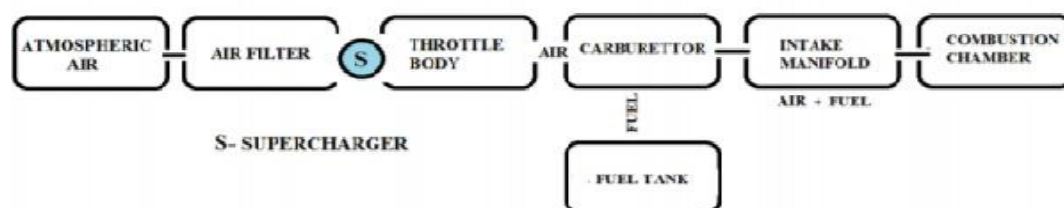


Fig. 1 – block diagram

### 3. WORKING

#### 3.1 Supercharging:

It's a well-known fact that the efficiency output of an engine increases with a boom in amount of air or amalgamation within the cylinder at the graduation of compression stroke as it lets in more quantity of fuel to burn. So that you can deliver in more air we are equipping the engines with a remarkable charger.

- Because of the decrease volumetric displacement of supercharged engine, frictional and thermal losses are much less.
- Brake power will boom about 30-45 % due to growth in supercharged stress as greater amount of fuel can be burnt inside the identical duration because the mass taken in line with stroke is increased.
- The supercharged engine's set up space requisite is greater small than that of clearly aspirated engine.
- It is quite simple for excessive pace engine.

#### 3.2 Working Principle

Furnished to the inner combustion engine which offers every consumption cycle of engine greater oxygen and letting it to burn the greater gasoline and do the paintings more and as a result will increase the

Greater strength. It given convex modeling steps so that it will define the problem as the instant set up cone program that now not most effective conveys the appropriate engine and buffer size but it offers the ideal manipulate and country trajectories for a given equipment willpower technique .

The subsequent specification is set up before consumption manifold. The main intention of the supercharger is to increase in stress of atmospheric air and will increase the temperature which results in improvement in combustion traits.

Via supercharging there's an increment in the brake horse strength of engine and additionally affects the price of the pollution emitted. Power supply for the electric superchargers: it's far furnished through the common stock of the electric accumulators which runs the unbiased of the engine that which presents its raise and as we recognize the electrically power consumed is higher than the production line generator of engine can deliver.

Compressor providing the raise and the losses are typically better than the direct kinematic linkage of the consumption air compressor to the engine crankshaft.

### 4. COMPONENTS

#### Air Filter

As the overall idea goes, air filter plays a miles extra essential function in a motorbike than a car, specially due to bike's smaller engine this is greater exposed to open air. The said filter out is likewise critical for rides through difficult and muddy terrains. Motorcycle air filters are in the main easy to hold, as they're cleanable and reusable and also are environmentally pleasant. Appreciably, majority of filters utilized in each day commutation bikes last for 15,000 to 20,000 kilometers, depending on excellent of the motorbike as well as its walking situations. The reason of the air clear out is to shield the engine from dirt and particles in air and improve airflow. It is also designed to beautify acceleration and lift the horsepower of the motorbike. A motorcycle calls for air to gas its hearth inside the engine. However, the air has a large quantity of dust and dirt which can accumulate on the engine, in turn hindering the engine's overall performance. The accumulated dust will decrease the electricity and pace of the motorcycle and after a positive time frame the engine may additionally simply shut down. Here is wherein the air clear out comes in because it filters the air and protects the engine from immoderate dust. We are a famed entity, indulged in production and providing a quality confident Honda motorbike Air clears out.

#### Motor

An instantaneous present day (DC) collection motor is an electric system that converts electric strength right into a mechanical energy. In ordinary motoring mode, most electric motors perform through the interaction between an electric powered motor's magnetic field and winding currents to generate force inside the motor. In sure programs, which includes in the transportation enterprise with traction motors, electric powered motors can perform in each motoring and generating or braking modes to additionally produce electrical power from mechanical electricity. In packages DC collection vehicles are used in fanatics, blowers and pumps, system equipment, family home equipment, strength gear, and disk drives. DC motors can be powered with the aid of direct present day (DC) resources, which includes from batteries, motor vehicles or rectifiers, or by using alternating contemporary (AC) assets, which include from the electricity grid, inverters or mills. Small cars may be discovered in electric powered watches. Standard-cause motors with distinctly standardized dimensions and traits offer convenient mechanical strength for commercial use.

#### Battery

So one can provide supply to the controller unit battery is used. Lead acid battery is used in this assignment. The lead-acid battery is a rechargeable battery. No matter having a totally low power-to-weight ratio and low electricity-to-quantity ratio, their ability to supply high surge currents means that

the cells keep an extraordinarily big power-to-weight ratio. These functions, along with their low cost, make them attractive to be used in motor vehicles to provide the excessive modern-day required by means of car starter vehicles.

Battery is a power supply of model from which electricity is delivering to all of the vehicles. Battery ability is a 12 Volt and 8Ah. There are one battery are used to supply energy.

**Controls: Standard 5A toggle switch**

That could be a heavy duty SPST toggle switch - you're essential on/off toggle. Rated for 2A at 250V or 4A at 125V. Includes a face plate and threaded nuts for mounting. Works superb with our missile switch cowl.

**Hose: Netted GI Sheet**

Hose Pipes locate huge use in each walk of our life. The Hose Pipes are synthetic in differing types, styles and sizes. Hose pipes are made of various types of substances to match the programs they're placed to. In olden days the Hose Pipes had been product of Rubber and its Compounds, which were very cumbersome, and couldn't be without difficulty moved from one vicinity to some other. Additionally they were given damaged effortlessly and it turned into hard to repair.

**ADVANTAGES**

- Runs on vehicular battery.
- Less costing than conventional supercharger
- Less costing than conventional turbocharger
- Doesn't require intercooler
- Easy for maintenance
- Electrical supercharger is less expensive than belt driven supercharger
- Electrical supercharger is decoupled from an engine via oversized energy storage

**DISADVANTAGES**

- Will increase cost of vehicle by fraction
- Regular checking is required
- Motor has to be high rpm

**FUTURE MODIFICATION**

- The project thus completed can further be modified on following basic points,
- Ram indicators can be used to increase the input pressure.
- The speed variation of motor can be made to run in synchronization with accelerator on engine speed sensor.
- Auxiliary pressure pipe can be attached to carburetor and can be operated using solenoid valve to adjust to sudden requirement condition

## 5. RESULT

speed	Quantity of petrol in (ml)	Distance travel by vehicle	Average km per litre
20 km/hr.	40 ml	2.2 km	55 km/lit
30 km/hr.	40 ml	2.3 km	60 km/lit
40 km/hr	40 ml	2.3 km	60km/lit
50 km/hr	40 ml	1.6 km	40 km/lit
60 km/hr	40 ml	1.4 km	35 km/lit

**8.1 Without containing supercharger average reading**

**Table No 1**

Speed	Time
20 km/hr.	4.31 sec
30 km/hr.	5.92 sec
40 km/hr	7.90 sec
50 km/hr	11.78 sec
60 km/hr	18.27 sec

**8.2 without containing supercharger power reading**

**Table No 2**

**8.3 With containing supercharger average reading**

Speed	Quantity of petrol in (ml)	Distance travel by vehicle	Average km per litre
20 km/hr.	40 ml	2.5 km	60 km/lit
30 km/hr.	40 ml	2.6 km	65 km/lit
40 km/hr	40 ml	2.8 km	70km/lit
50 km/hr	40 ml	2 km	50 km/lit
60 km/hr	40 ml	2.2km	55 km/lit

**Table No 3**

**.8.4 With containing supercharger power reading**

Speed	Time
20 km/hr.	2.86 sec
30 km/hr.	4.62 sec
40 km/hr	7.61 sec
50 km/hr	10.29 sec
60 km/hr	13.50 sec

**Table No 4**

## 6. CONCLUSION

Considering the vehicles growth in India and fee for this venture work seen a variety of capability for Indian industry put in force such task paintings. This isn't best powerful for growing the energy of automobile but also for growing the mileage as in low range no want to increase the carburetor strain. These project paintings can be oof fantastic use to Indian two wheeler enterprise, three wheeler and four industry A prototype of the electrical supercharger (a promising new turbocharger era in the face of stricter exhaust and fuel intake regulations) changed into produced and tested to verify its technical possibilities.

Further to the electrical supercharger, an electrically assisted turbocharger and an electric compressor for gasoline cells are being developed as applications of the extremely high pace motor. The future of the challenge seen vivid and promising.

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