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Bluetooth Based Agriculture Three in One Machine

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ABSTRACT: Here we are fabricating the Bluetooth based agriculture three in one machine is a new innovative model which is mainly used to water spraying, weeding and the seed sowing. Our main aim of this concept is to reduce the man power and also avoid time consumption and to utilize solar energy. To achieve the best performance from a seed drill or planter, the above factors are to be optimized by proper design and selection of the components required on the machine to suit the needs of the Crops. The seed drill or planter can play an important role in manipulating the physical environment.

I. INTRODUCTION

Agriculture is considered as the basis of life for the human species as it is the main source of food grains and other raw materials. It plays vital role in the growth of country's economy. It also provides large ample employment opportunities to the people. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, many farmers still use the traditional methods of farming which results in low yielding of crops and fruits. But wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved. Hence there is need to implement modern science and technology in the agriculture sector for increasing the yield. The machine can be advanced for sowing seeds in farm with particular distance between seed is adjusted.

It can automatically sow seeds in land. It can be also used as fertilizer sowing instead of seed. The basic requirements of this machine for small scale cropping, they should be suitable for small farms, simple in design and technology and versatile for use in different farm operations. An automatically operated template row planting will designed and developed to improve planting efficiency and reduce drudgery involved in manual planting method. Seed planting is also possible for different size of seed at variable depth and space between two seeds. In the present era the vast majority of the nations don't have adequate talented labor particularly in agrarian area and it influences the development of creating nations. Food preservation is very important to fulfill the food supply chain needed by the

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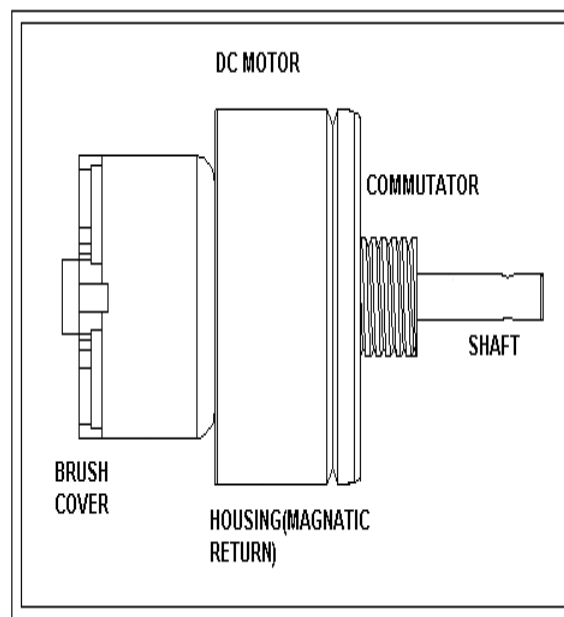
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developing countries like India. There is a huge need for preservation, protection, storage, distribution and consumption of food at later stage. There is a need to preserve the food grains from rodents invading at warehouses and also threat to destruction of stored crops, due to variation in temperature, excess humidity, fire, theft, rain, flood, etc.

The project includes smart warehouse management system which includes temperature and humidity maintenance, theft and fire detection in the warehouse and deliver the real time notifications through GSM without human intervention. So that stored food grains can be delivered as and when required (real time). Bluetooth Module HC-05 Bluetooth is a serial port convention module. It is a simple to utilize "Bluetooth" and intended for straightforward remote serial association setup. HC-05 Bluetooth module was associated with the same microcontroller to set up a duplex correspondence channel amongst itself and the android advanced Mobile Phones. Normal Bluetooth works for range up to 100 m. Bluetooth 5.0 ranges up to 400 m.



II. PRINCIPLES OF OPERATION

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.

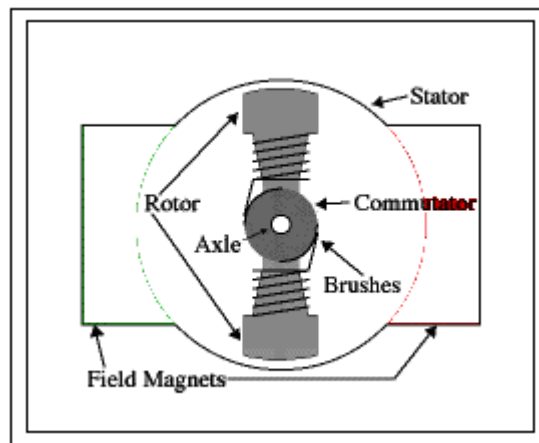
Let's start by looking at a simple 2-pole DC electric motor (here red represents a magnet or winding with a "North" polarization, while green represents a magnet or winding with a "South" polarization).

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Every DC motor has six basic parts -- axle, rotor (armature), stator, commutator, field magnet(s), and brushes. In most common DC motors, the external magnetic field is produced by high-strength permanent magnets. The stator is the stationary part of the motor -- this includes the motor casing, as well as two or more permanent magnet pole pieces. The rotor (together with the axle and attached commutator) rotates with respect to the stator. The rotor consists of windings (generally on a core), the windings being electrically connected to the commutator. The above diagram shows a common motor layout -- with the rotor inside the stator (field) magnets.

The geometry of the brushes, commutator contacts, and rotor windings are such that when power is applied, the polarities of the energized winding and the stator magnet(s) are misaligned, and the rotor will rotate until it is almost aligned with the stator's field magnets. As the rotor reaches alignment, the brushes move to the next commutator contacts, and energize the next winding. Given our example two-pole motor, the rotation reverses the direction of current through the rotor winding, leading to a "flip" of the rotor's magnetic field, driving it to continue rotating.

III. PROCESS

Sowing is the process of planting seeds. However, before sowing, good quality seeds (clean and healthy seeds) should be selected to produce a high yield.

Among the major field crops, oats, wheat, and rye are sowed, grasses and legumes are seeded, and maize and soybeans are planted. In planting, wider rows (generally 75 cm (30 in) or more) are used, and the intent is to have precise, even spacing between individual seeds in the row; various mechanisms have been devised to count out individual seeds at exact intervals.

Under intensive cropping, timeliness of operations is one of the most important factors which can only be achieved if appropriate use of

agricultural machines is advocated. Manual method of seed planting, results in low seed placement, spacing efficiencies and serious back ache for the farmer which limits the size of field that can be planted. To achieve the best performance from a seed planter, the above limits are to be optimized by proper design and selection of the components required on the machine to suit the needs of crops.

Hand-pushed and Transnational Journal of Science and Technology August 2012 edition volume2, No.728 tractor mounted row seeders(usually single and multiple row).Normally requires a well prepared seed-bed which may be ridged or flat bed. In the past, various types of design have been developed with different design

approaches which have their advantages and disadvantages and also operation a limitation. AdisaandBraid(2012) [1] designed and constructed a manually operated flute planter/fertilizer distributor

which was found to be 94% efficient in seed spacing but could not be used on the ridged seed bed and requires quite some effort and time to change seed drill size and seed spacing.

Methods

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DC MOTOR CALCULATION

SPECIFICATION:

Speed $N = 100$ RPM

Voltage $V = 12$ Volt

Current $I = 0.3$ A (loading condition)

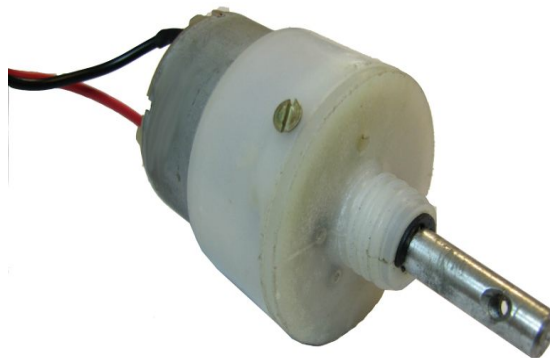
Current $I = 0.06$ A (No Load Condition)

Power $P = V \times I = 12 \times 0.3 = 3.6$ WATT

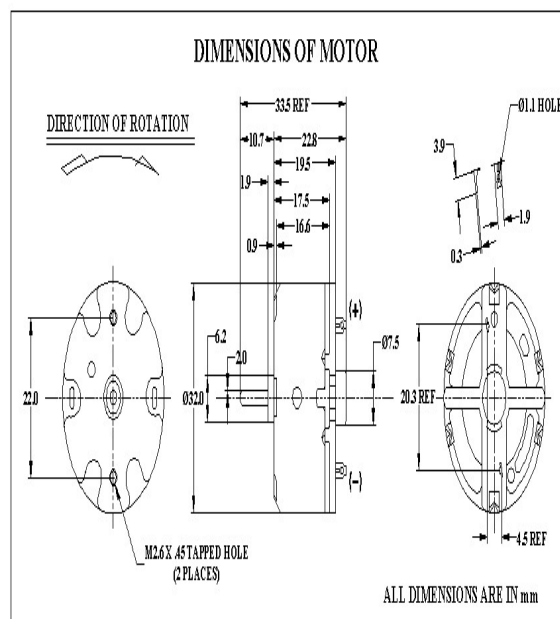
$P = 0.0048$ HP

Motor Efficiency = 36%

Motor shaft diameter = 6 mm



DRAWING FOR DC MOTOR

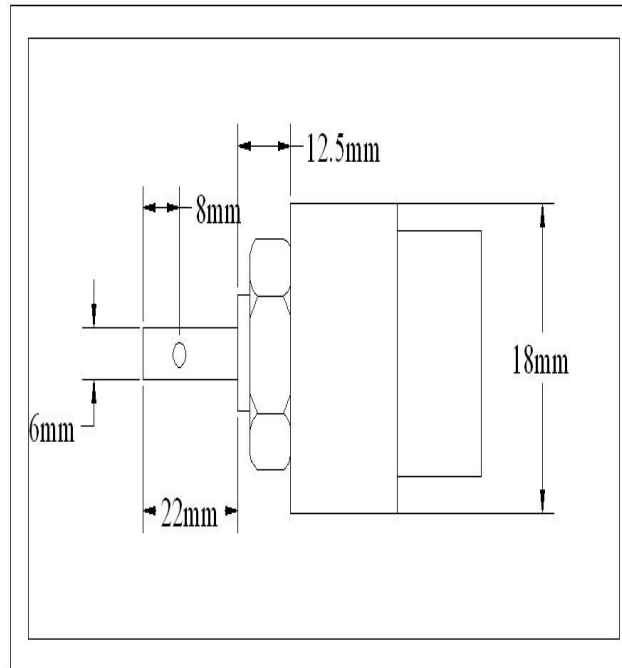


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FORMULEA

Good science project does not stop with building a motor. It is very important to measure different electrical and mechanical parameters of your motor and calculate unknown values using the following helpful formulas.

This formula could be used in many cases. You may calculate the resistance of your motor by measuring the consumed current and applied voltage. For any given resistance (in the motors it is basically the resistance of the coil) this formula explains that the current can be controlled by applied voltage.

Electrical power of the motor is defined by the following formula:

$$P_{in} = I * V$$

Where,

P_{in} – input power, measured in watts (W)

I – current, measured in amperes (A)

V – applied voltage, measured in volts (V)

Motors supposed to do some work and two important values define how powerful the motor is. It is motor speed and torque – the turning force of the motor. Output mechanical power of the motor could be calculated by using the following formula

$$P_{out} = T * \omega$$

Where,

P_{out} – output power, measured in watts (W)

τ – torque, measured in Newton meters (Nm)

ω – angular speed, measured in radians per second (rad/s).

Calculate angular speed if you know rotational speed of the motor in rpm:

$$\omega = N * 2\pi / 60$$

Where,

ω – Angular speed, measured in radians per second (rad/s);

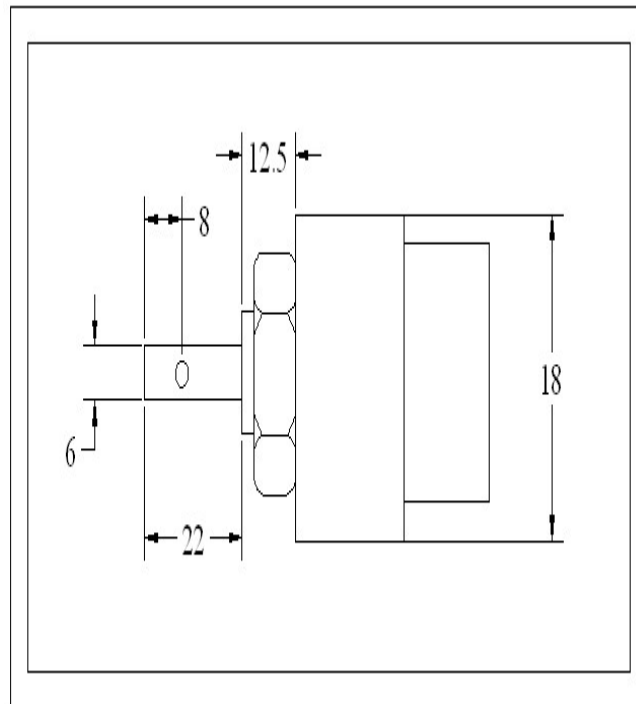
rpm – rotational speed in revolutions per minute;

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Where,

ω – Angular speed, measured in radians per second (rad/s);

rpm – rotational speed in revolutions per minute;

π – mathematical constant pi (3.14).

60 – Number of seconds in a minute.

Efficiency of the motor is calculated as mechanical output power divided by electrical input power:

$$E = P_{out} / P_{in}$$

Therefore

$$P_{out} = P_{in} * E$$

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After substitution we get

$$T * \omega = I * V * E$$

$$T * N * 2\pi / 60 = I * V * E$$

TORQUE OF THE MOTOR:

And the formula for calculating torque will be

$$T = (I * V * E * 60) / (N * 2\pi)$$

$$= (0.3 \times 12 \times 0.36 \times 60) / 100 \times 2\pi$$

$$\text{Torque} = 0.124 \text{Nm}$$

IV. RESULT AND DISCUSSION

The main components used in this project are wheel. Spray nozzle, tank, hopper, seed sprayer, water tank, weeder, battery

In our project all the components are placed on the base frame. There are four wheels to move this machine. The spraying nozzle is coupled with the motor to spray for moving the nozzle. Then the water is pumped from the water tank to the sprayer nozzle. The weeder is fixed in front of the machine and it is rotating with the help of the motor. The hopper and the motor setup is used for sowing the seeds. Seed sprayer set up consists of four pipes around the main in right angle to each other. The seed sprayer is used for spraying the seeds over the land. All motors are taken the energy from the storage battery. The battery is charged by the sun light by using the solar panel which is attached in this vehicle. After all the motors are switched ON, then the vehicle can be moved manually over the agricultural field. When the vehicle is started to move, at first the weeder will plough the field and the water is sprayed over it. Then seed is sprayed after that to the plowed field. This process will be continuously done. Then vehicle can be moved wherever we want to move in the agricultural field.

V. CONCLUSION

Thus Innovative agriculture three in one equipment's has remarkable influence in agriculture field. By using this innovative project of equipment we can save more time required for seed sowing, water spraying and weeding cutting process and also it reduces lot of laborer cost. Agriculture three in one machine is fabricated which can be used to sow seeds into the land after weed cutting and water spraying operation. The project is fully a design by running solar power. The cost of this machine is very low and easy to operate anyone in the field.

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