# 360° Welding Cutting Rotary Turn Table Welding Positioner

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**Abstract:** *Welding and cutting are the two most prominent operations in the fabrication industry. And both the operations usually require 2 or more people to perform them with speed. One or two people to hold the work and the other person to perform welding or cutting on the work. Sometimes it is also required to turn the work continuously in case of cylindrical structures to achieve sealing of the containers using welding. To make this task easier we here design a rotary welding turn table with chuck arrangement to allow for easy welding and cutting operations using a single operator. The table top welding turntable uses a geared motor arrangement with a firm design to rotate the chuck. This Motorized chuck is mounted on a horizontally movable arrangement so that work can be held in suitable position for the welding/cutting operations. The machine can be driven by a battery control that allows for easy operation and rotation speed control of the chuck.*

***Keywords: Welding, Cylindrical structures, Rotary welding Turn table, Cutting Operation,***

## 1. Introduction

Welding equipment that performs dedicated motions on a weld joint that is highly repeatable in shapes such as circles, arcs, and longitudinal seams is known as fixed automation welding. In most cases, the weld equipment operations are fixed to perform a simple geometric welding application.

The foundation of fixed welding automation is welding position equipment and machine systems, which typically include welding lathes, turn tables positioners, circle welders, and longitudinal seam welders. However, with the availability of 64-bit computers and refined FE instruments, welding engineers all over the world are increasingly skewed towards computer simulations of complex welding phenomena rather than the typical trial and error method on the shop floor, which is the most common practice nowadays. Because of the multifield (thermal, mechanical, metallurgy, etc.) interactions and complex geometries in real-world applications, predicting weld induced imperfections has proven to be a challenging and computationally intensive task. Welding machine systems are adaptable and can be used for a variety of weld automation applications. In most cases, the weld equipment operations are fixed to perform a simple geometric welding application. Here we developed a rotary welding turn table with chuck arrangement that allows for single handed welding and cutting to make welding and cutting easier.

### 1.1 Rotary Turn table

In metalworking, a rotary table is a precision work positioning device. It allows the operator to precisely weld or cut work around a fixed (usually horizontal or vertical) axis. The aim of this project is to create a 360-degree rotating rotary turn table Positioner. To rotate the chuck on the table top welding turntable, a geared motor arrangement with a company design is used. This motorized chuck is mounted on a horizontally movable arrangement to keep the work in a suitable position for welding and cutting operations.

### 1.2 Machine Components

To meet the machine's complete operation specifications, the "360° WELDING CUTTING ROTARY TURN TABLE WELDING POSITIONER" is made up of the following parts.

- ✓ DC Motor
- ✓ Chuck
- ✓ Base Frame
- ✓ Bearings
- ✓ Connecting Rods
- ✓ Motor Shaft
- ✓ Gearbox
- ✓ Mounts and Couplings
- ✓ Outer Panel
- ✓ Supporting Frame
- ✓ Mounts and Joints
- ✓ Screws and Bolts

### 1.3 Description of Equipment

- **Motor:** The operation of any electric motor is based on Electromagnetism. The Universal motor is a lightweight brushed motor that can run on direct current and is used in portable power tools and

appliances. The universal motor can operate on direct current but is a lightweight brushed motor used for portable power tools and appliances. The introduction of power electronics has changed the game. In certain cases, replacing DC motors with AC motors is feasible.

- **Spur Gear:** Spur gears are the most basic, and they take the shape of a cylinder or disc. The teeth extend radially, and the leading edges of these straight-cut gears are aligned parallel to the axis of rotation. A gear is also known as a cog informally. Geared devices can adjust a power source's speed, torque, and direction. Via their gear ratio, different-sized gears create a shift in torque, providing a mechanical advantage, and thus can be called a simple mechanical advantage.

- **Battery:** We are using a secondary form battery in our project. It's a rechargeable product. A battery is made up of one or more electrochemical cells that store chemical energy and convert it to electricity. Batteries have increased in popularity as they have become more Compact and useful for a variety of applications. Many environmental issues have arisen as a result of the use of batteries, such as toxic metal waste.

- **Bearing:** A bearing is a device that allows restricted relative motion between two pieces, most commonly rotation or linear movement.

  The bearing's design can, for example, allow for free linear movement of the moving part or free rotation around a fixed axis; or it may prevent motion by regulating the vectors of normal forces acting on the moving part.

- **Control Unit:** A microcontroller is a chip-based computer. The word micro denotes a small computer, while controller denotes that the device could be used to monitor objects, processes, or events. Since the microcontroller and its supporting circuits are commonly integrated into, or embedded in, the devices they power, another name for a microcontroller is embedded controller. It is a storage facility that is only used for a short period of time.

- **Couplings:** Coupling is a device used to connect two shafts together at their ends for the purpose of transmitting power. The primary purpose of couplings is to join two pieces of rotating equipment while permitting some degree of misalignment or end movement or both. In a more general context, a coupling can also be a mechanical device that serves to connect the ends of adjacent parts or objects.

- **Chuck:** A chuck is a specialized type of clamp used to hold radially symmetrical objects, such as cylinders. It contains the rotating tool in drills and mills, and the rotating workpiece in lathes. The chuck on a lathe is attached to the spindle, which rotates inside the headstock. An extra chuck can be mounted on the non-rotating tailstock for certain applications (such as drilling).

- **Gear:** A gear is a rotating circular machine part with cut teeth, or inserted teeth (called cogs) in the case of a cogwheel or gearwheel, which mesh with another toothed part to transmit torque. Geared devices can change a power source's speed, torque, and direction. Through their gear ratio, gears of various sizes produce a change in torque, producing a mechanical advantage, and thus may be called a simple machine.

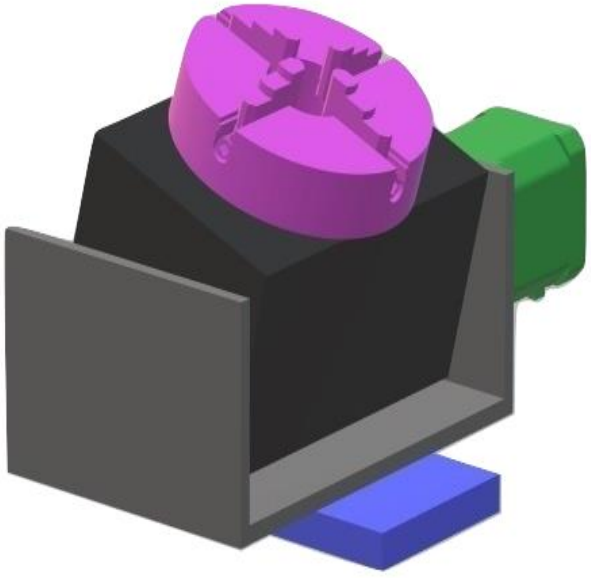
## 2. Literature Survey

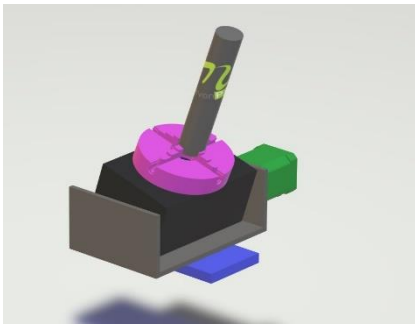
1. The temperature evolution of a deep-groove ball bearing in an oil-bath lubrication device is investigated both experimentally and theoretically. In a critical manner A radially loaded ball bearing is used as the test apparatus to determine the frictional torque as well as the temperature of the transient Oil, housing, and the outer race. The developed mathematical model allows for a detailed thermal analysis of the ball bearing, including frictional heat generation, heat transfer processes, and bearing thermal expansion.

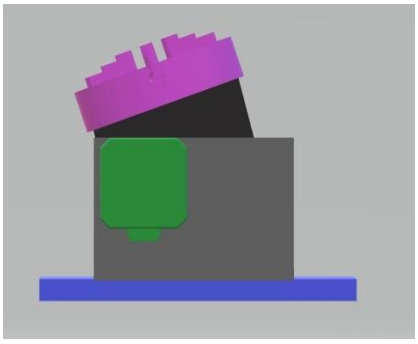
2. Fracture mechanics is being used more commonly to test the safety of welding crack-containing structures. Welding joints make up the bulk of the vehicle frame's joint sections. Cracks form and spread in the welding joint portion as a result of the impact and fatigue load, and the frame comes apart. As a result, the welding efficiency and fracture resistance of welding parts in structures must be improved. This research provides a most suitable welding method for lap joints using CO2 arc welding, which is commonly used in the telecommunications industry.

3. Most positioners have a C.G (centre of gravity) rating, which varies depending on the form and design of the positioner. The positioner's centre of gravity is a measurement of how much torque it has for rotation. The amount of tilt torque is also rated on the tilting positioners. The rating is not only from the face plate, but also from the centrifuge. The ranking is not only from the face plate down, but also from the positioner table's centre outward. If you're welding pipe elbows and Tees with offset loading, this is a critical consideration.

### 3. Block Diagram







**Side View**

**Machine Size:** 20 x 25 x 35 cm

**Fig 1. Drawing for 360° welding cutting rotary turn table welding positioner**

### 4. Proposed System

In this project the motor arrangement has the main role in the working of the model. A table is mounted on the frame such that it can be moved front and back with the help of bearing setup at the four corners of the table. A dc motor is mounted on the one end of the upper frame and the shaft of the motor is coupled with the chuck. When the motor is operated the table moves in x direction. The total setup is constructed on a single frame. The working principle of a weld positioner is the same for all work pieces whether big or small. They form a plane of rotation, which is perpendicular to the floor. You can place large sets of tooling on these positioners. The machine can be driven by a rf remote control that allows for easy operation and rotation speed control of the chuck. This makes it a completely adjustable rotating welding cutting table system. However, a weld positioner is more than just a rotating table and this rotary Welding turn table with chuck arrangement is to allow for easy welding and cutting operation using a single operator.

### 5. Conclusion

This project is made with pre planning, that it provides flexibility in operation Smoother operation by the medium of "360° WELDING CUTTING ROTARY TURN TABLE WELDING POSITIONER" in this equipment. It significantly reduces the fatigue of the operators as well as the amount of time needed for the operation. It generates a precise and noiseless operation. It efficiently manages the bulky assembly A lower-skilled worker is required. The controls are mounted in an ergonomic location on the front side of the assembly. This project is designed with the hope that it is very much economical and help full to many industries and workshops. This project helped us to know the periodic steps in completing a project work.

### 6. Future work

This project could be developed into an automated Turn table positioner by automating the rotation of the Rotary turn table. So that the welding process can be simplified and manpower requirements reduced. Robotic technologies can help automate this process. This aids in the attachment of the robotic arms to the turntable, with the arm serving as a holder for the welding material. As a result, welding can be done with precision using robotic arms, requiring less manpower. As a result, our long-term goal is to automate this 360-degree welding rotary turn table using Robotic Technology.

### 7. Application

1. This Project is used to make the welding process easier.

2. In welding it is used to make easy cutting

3. It is used in polishing during welding process.

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