



# Design and Fabrication of Pre-Filter Cover Plate Spanner

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## ABSTRACT

**Filter Spanner:** It is a tool used to provide grip and mechanical advantage in applying torque to turn objects. The pre-filter traps large particles such as dust, oil, and carbon (from the compressor), and pipe scale and rust (from the pipe work) and thus protects the sterilizing filter and increases its lifetime. The Pre-filter has a wrench that has a whole, projection, or hook at one or both ends of the head for engaging with a corresponding device on the object that is to be turned. While cleaning water filter we face problem while opening it, so with the help of spanner we can modify water filter in a case that it will be easier to clean the filter. For making spanner for cover plate of water filter proper measurement are taken with help of digital vernier caliper, depth vernier is used to measure depth and product is of acrylic plastic, and laser cutting is used to make product. Spanner is built on upside of filter so that it will be easy to clean the filter without removing any arrangement, grip problem is solved in this way.

**Keywords:** Pre-filter housing cover, Spanner, Acrylic plastic

## I. INTRODUCTION

The principal objective of installing the RO water purifier is to get pure and healthy water to drink. Therefore, cleaning the filters and maintaining it is imperative. The frequency of cleaning depends on the nature of the water source. If the water source has a high TDS proportion, there is a need to clean the filters more frequently. The TDS and the heavy metal residues can stick to the RO membranes thus affecting its performance over a period. Prior to further purification by other filters, a pre-filter is used to filter dust, pollen, fibers, and other visible pollutants. This filter also keeps the purifier from becoming clogged with these physical contaminants, increasing its lifespan.

In the UK, Ireland, Australia, and New Zealand spanner is the standard term. The most common shapes are called open-ended spanner and ring spanner. The term wrench is generally used for tools that turn non-fastening devices (e.g. tap wrench and pipe wrench), or may be used for a monkey wrench an adjustable pipe wrench.

In North American English, wrench is the standard term. The most common shapes are called open-end wrench and box-end wrench. In American English, spanner refers to a specialized wrench with a series of pins or tabs around the circumference. (These pins or tabs fit into the holes or notches cut into the object to be turned.) In American commerce, such a wrench may be called a spanner wrench to distinguish it from the British sense of spanner. Higher quality wrenches are typically made from chromium-vanadium alloy tool

steels and are often drop-forged. They are frequently chrome-plated to resist corrosion and for ease of cleaning. Hinged tools, such as pliers or tongs, are not generally considered wrenches in English, but exceptions are the plumber wrench (pipe wrench in British English) and Mole wrench (sometimes Mole grips in British English). The word can also be used in slang to describe an unexpected obstacle, for example, "He threw a spanner in the works" (in U.S. English, "monkey wrench"). While cleaning water filter we face problem while opening it, so with the help of spanner we can modify water filter in such case that it will be easier to clean the filter. For making spanner for cover plate of water filter proper measurement are taken with help of digital vernier caliper ,depth vernier is used to measure depth and product is of acryl plastic, and laser cutting is used to make product. Spanner is built on upside of filter so that it will be easy to clean the filter without removing any arrangement, grip problem is solved in this way.

#### **Size:**

To determine the size of pre-filter housing cover you need, you'll first need to measure the dimensions of your pre-filter housing. Take a measuring tape and measure the diameter of the housing. Make sure to measure accurately to ensure that you get the right fit. Once you have the diameter measurement, you can look for a pre-filter housing cover that matches that size. If you need any further assistance or have any other questions, feel free to ask. Size 1 (2.5" x 9.75"), standard size for most under sink and reverse osmosis units, Size 2 (2.5" x 20") and Size 3 (4.5" x 10"), for moderate-flow whole house units, and Size 4 (4.5" x 20") for high-flow whole house filters.

#### **Use:**

A pre-filter housing cover is used to protect the pre-filter housing of an air filtration system from damage, dust, and other debris. It helps to extend the lifespan of your pre-filter and improve the overall efficiency of your air filtration system. It is important to replace the pre-filter housing cover regularly to ensure that your air filtration system is working effectively and to avoid any damage to the pre-filter housing.

**Materials:** Pre-filter housing covers can be made from a variety of materials such as durable plastic, metal, or fabric. The material used will depend on the specific pre-filter housing cover that you choose to purchase. Some pre-filter housing covers also come with additional features such as UV protection, antimicrobial coatings, and insulation to protect your air filtration system from environmental factors and maintain the cleanliness of the air.

**Applications:** Pre-filter housing covers are widely used in various applications where air filtration systems are present, such as residential and commercial buildings, hospitals, schools, and manufacturing facilities. They are used to protect pre-filters from dust, debris, and other contaminants that can clog the filter and reduce its effectiveness. This helps to ensure that the air filtration system operates at optimal levels, which is crucial in maintaining a healthy environment. Pre-filter housing covers are also commonly used in outdoor air intake systems to protect the pre-filters from rain, snow, and other weather elements.

**Specifications:** Pre-filter housing covers come in different specifications, depending on the brand, size, and material used. Some common specifications that you may want to consider include:

- (1) **Size:** Pre-filter housing covers come in different sizes to fit a range of pre-filter housing diameters. -  
**Material:** The material used can vary, but most are made of durable plastic, metal, or fabric. Additional features.
- (2) UV protection or antimicrobial coatings.
- (3) Pre-filter housing cover color: To suit different environments and preferences.

- (4) Installation method: Some pre-filter housing covers may require special tools or installation methods, while others can be easily installed with adhesive or snaps
- (5) Environmental factors: Consider the environmental factors that your pre-filter housing cover will be exposed to. For example, if your air filtration system is located in an area with high moisture or UV exposure, you may want to choose a cover with additional protection. These are just some of the specifications to consider when choosing a pre-filter housing cover.

**Opening spanner:** A pre-filter housing cover opening spanner is a tool used to help remove and install pre-filter housing covers on air filtration systems. It is designed to fit the specific size and shape of the cover, allowing for a secure grip and ease of use. The opening spanner is commonly used in settings where pre-filter housing covers need to be removed and replaced regularly, such as in commercial buildings, hospitals, and manufacturing facilities. If you need to purchase a pre-filter housing cover opening spanner, you may be able to find one online or at a local hardware store. Just make sure to choose the correct size for your pre-filter housing cover.

**Pre-filter:** A pre-filter traps large particles such as dust, oil, and carbon (from the compressor), and pipe scale and rust (from the pipe work) and thus protects the sterilizing filter and increases its lifetime

A Pre-filter is used to filter dust, pollen, fibers and other pollutants. This purifier also keeps the purifier from becoming clogged with these physical contaminants, increasing its lifespan.

#### **Filter cartridge housing:**

Filter housings are vessels that hold replaceable cartridges, elements, bags or media. They hold one or many filters at varying pressures. This permits high flow rates and long service life while ensuring proper filtration of fluids.

## **II. RESEARCH GAP**

There was not such a special spanner before, which can open the cover plate of pre-filter housing. So this product characteristic is as follows:

It has reduced efforts while opening the cover-plate such that we have to require a less grip for the spanner, so the setup and its operation are very easy.

At first, we have a spanner for pre-filter housing which can only open the bottom side of its housing which requires more grips and takes more time to open its housing. But we can't open the cover plate of pre-filter housing with this spanner.

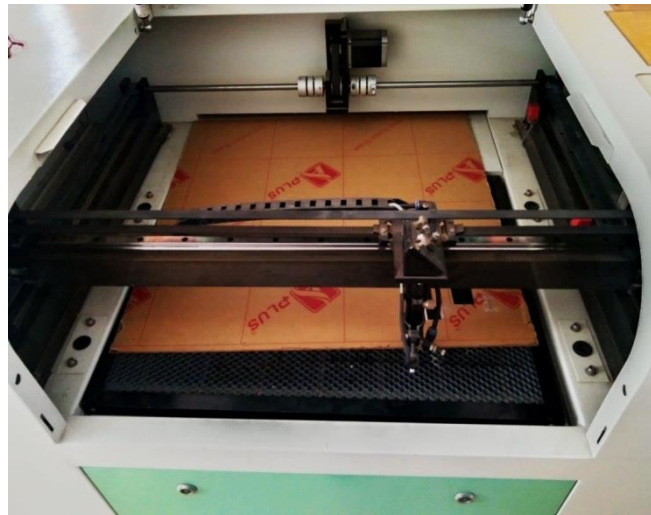
Now there is no need for physical work done while opening the cover plate from topside of Pre filter housing by using this new spanner manufactured.

## **III.PROJECT OBJECTIVES**

Opening spanner objectives are as follows:

- 1) To provide a tool for safely and easily removing and installing pre-filter housing covers on air filtration systems. It allows for a secure grip on the cover, reducing the risk of damage or injury during maintenance.
- 2) Ensure that your pre-filter housing covers are properly installed and removed by using a pre-filter housing cover opening spanner, you can ensure that your pre-filter housing covers are properly installed and removed, which helps to maintain the effectiveness of your air filtration





**Fig. 3 Laser Cutting Machine**

Above shown diagram is of laser cutting machine with the help of laser cutting machine we have given path according to design made on the software i.e. “solid works”.

Then command of the designed product of solid works software is given to the laser cutting machine made up of acrylic plastic material.

So like this we have made the spanner for the opening cover plate of Pre-filter housing and now we have to connect that spanner at the top side of the filter.

## V. CONCLUSION

After working on this project we have concluded that looking at the work of spanner for cleaning the Pre-filter is looking small thing but in fact it very necessary while cleaning as the following points consideration:

- 1) Time saving.
- 2) Less complicated / easy to operate.
- 3) Grip can be gotten easily with fast speed.
- 4) No need to open a full filter for cleaning.

Future work can be focus on:

- 1) We can modify this mechanism again into a very simpler mechanism by again reducing efforts. We can manufacture a spanner which can vary in size by a scrolling mechanism which we can see in vernier caliper.
- 2) Enhancement in design can lead to increased efficiency of product and also the work.
- 3) Thus such manufacturing of products can be a new and different mechanism for future generation.

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