

CIRFAN Installation Guide

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This installation guide for Air Circulation Kit (CIRFAN) is solely distributed to our clients, who have purchased the CIRFAN kit. Once you are done with this guide, please send us your feedback, comments, and/or suggestions (via e-mail to [aubेरins@gmail.com](mailto:auberins@gmail.com)) so that we may continue making improvements to this guide. Your help is greatly appreciated!

Important Note: Please read through the entire guide before attempting any kind of installation.

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Adding the CIRFAN kit to an electric smoker oven involves tampering the smoker oven from its original status using power tools, which could result in electric shock, burns, other serious personal injury. This kit is for users with proper power tool handling experience only. Attempting to modifying your electric smoker may void its warranty. You, the user, will assume full responsibility for any modifications undertaken. Auber Instruments Inc is not liable for any damage caused to your property as a result of improper use.

1. Parts List

Please refer to Figure 1 for the parts that are included in this kit. In the picture, starting from the top left corner and go clockwise, the items are:

- (1) control box
- (1) a bag of small accessories
 - 4 x self-tapping screws (M3 thread)
 - 1 x long bolt (M3 x 40)
 - 1 x small washer (M3)
 - 1 x small spring washer (M3)
 - 1 x small nut (M3)
 - 1 x large washer (10 mm I.D., 20 mm O.D.)
 - 1 x large nut (M10)
- (1) 12V DC power adapter
- (1) cross-flow fan (frame and impeller)
- (1) DC motor

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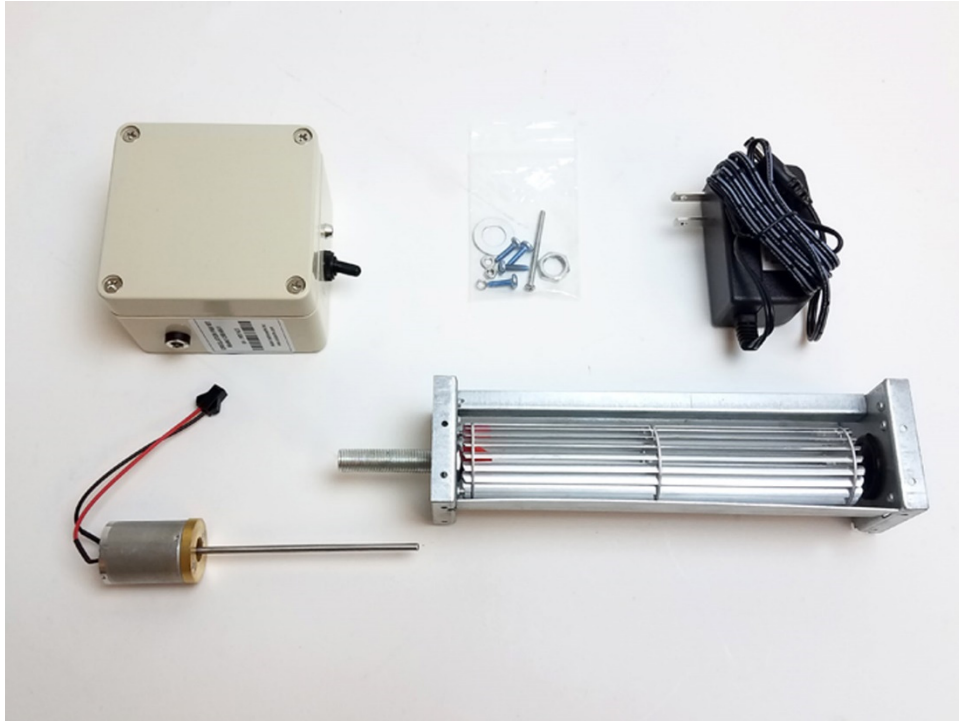


Figure 1. The CIRFAN kit contains a few parts (start from the top-left corner and go clockwise): a control box, a bag of accessories (screws/nuts/washers), a 12V DC power adapter, a cross-flow fan, and a DC motor.

2. Tools Needed

When installing the fan, you'll need to drill two holes from the inside of the smoker: one bigger hole the sidewall, and one small hole on the backwall. When installing the control box, you'll need to drill four small mounting holes on the sidewall from the outside. Here are the tools you'll need:

- Power drill
- Drill bits of 13/32" (11 mm), 1/8" (3.2 mm), and 3/32" (2.4 mm)
- Ruler
- Marker (sharpies)
- Cross-head screw driver
- Painter's tape
- A small piece of aluminum tape
- File, wrench, pliers, and etc.
- (Optional) Hand rivet nut setter (or nut/thread hand riveter)

3. How is the Kit Assembled

In this section, we will explain how the fan are supposed to be assembled together.

3.1. Accessories

In the kit, there is a bag of screws, washers, and nuts. Please see the picture in Figure to identify each item in the bag and separate them into three groups.

Group #1, including a long M3 bolt, one small washer, one spring washer, and a M3 hex nut, is for fixing the fan frame to the backwall of the smoker.

Group #2, including a large washer and a M10 hex nut, is for mounting the fan/motor assembly to the sidewall of the smoker.

Group #3, including four self-tapping M3 screws, is for mounting the control box to the smoker. The thread of these self-tapping screw is metric M3 thread. To mount the control box, the wall of the smoker needs to be pre-drilled with 3/32" (or 2.4 mm) holes. Don't use any drill that is larger than 7/64" (2.77 mm), otherwise, there is not enough material to form thread.

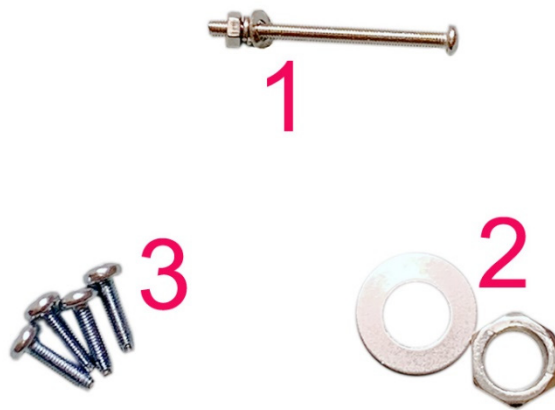


Figure 2. The items in the assessor bay can be divided into 3 groups.

3.2. The Fan/Motor Assembly

When you receive your kit, the fan and the motor are not assembled together. After installation, the fan should be mounted inside the smoker, motor will stay outside the smoker, and they should be screwed together by the mounting tube like in the picture below. The name of each part of the fan/motor assembly is also labelled.

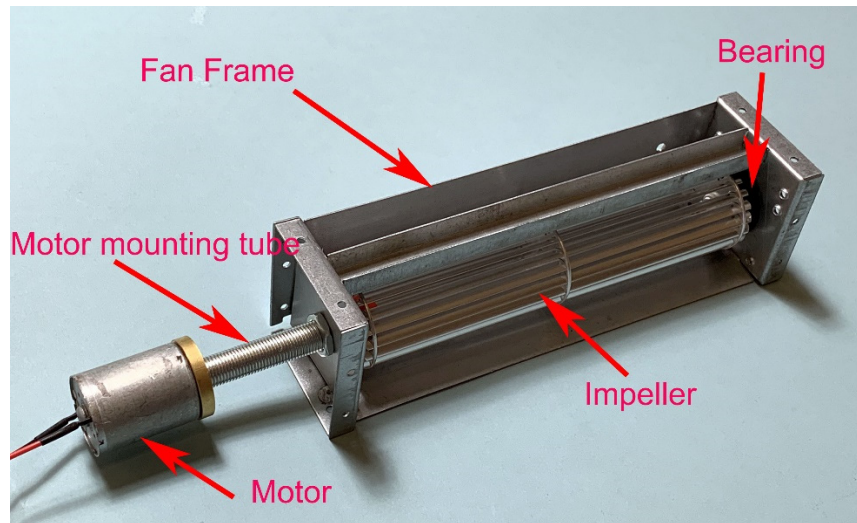


Figure 3. The names of each part in the fan/motor assembly.

Fan Frame

The fan frame is shown in Figure 4. There is a small hole on the fan frame for fixing the frame to backwall of the smoker (pointed by a red arrow). The group #1 bolt in Figure 2 should be used on this mounting hole. On the right-hand side of the frame, there is a piece of black silicone bushing that holds a ball bearing (see Figure 5). The short shaft on the fan impeller (Figure 6) should be inserted to this bearing. On the left-hand side of the frame, there is a piece of mounting tube with male M10 thread. During installation, use the Group #2 accessories (big washer and M10 nut in) on this mounting-tube to fix the frame to the sidewall of the smoker. Then the motor should be mounted to the end of this mounting tube.



Figure 4. The frame of the fan.

The bearing assembly (Figure 5) has a ball bearing in the center pocket of the black silicone bushing. The bearing can be moved freely in the silicone bushing pocket. The shaft of the impeller can be slide in and out of the ball bearing hole. It has a loose fit.

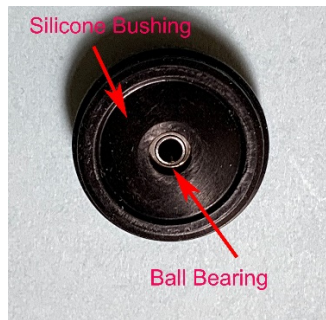


Figure 5. The bearing assembly on the right side of the fan frame.

Fan Impeller

When you receive the fan, the impeller of the fan is only loosely assembled to its frame on the right-hand side. The picture in Figure 6 shows the impeller itself when it is removed from the frame. On the right-hand side of the impeller, there is a short shaft, which should be inserted into the ball bearing in the black silicone bushing on the frame. On the left-hand side of the impeller, there is a piece of red silicone rubber bushing (Figure 7) with a hole in the center. During installation, the shaft of the motor will be pushed into the hole on this piece of rubber bushing. The shaft of the motor will be coupled with the impeller by the friction between shaft and silicone bushing.

Installation Tip: Please be slow and gentle when you insert the motor shaft to the red silicone bushing during installation because you won't be able to see where the shaft or the hole is. Try to use the tip of the shaft to find the hole on the bushing first, and then slowly apply force to push the shaft in. Don't force the shaft in if the resistance is too high, otherwise you might tear the silicone bushing.

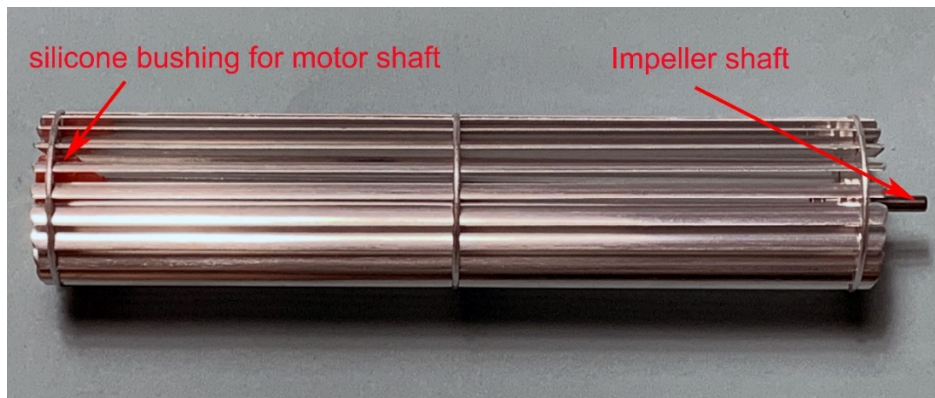


Figure 6. Fan impeller.

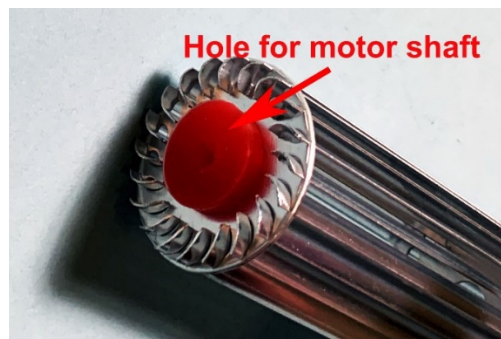


Figure 7. The red silicone rubber busing for coupling the impeller with the motor's shaft.

DC Motor

On the top of the DC motor is the mounting plate, which has been tapped with female thread that matches the thread on the mounting tube of the fan frame. During installation, the motor should be hand-tightened to the mounting tube. Please do NOT use wrench to tighten it.

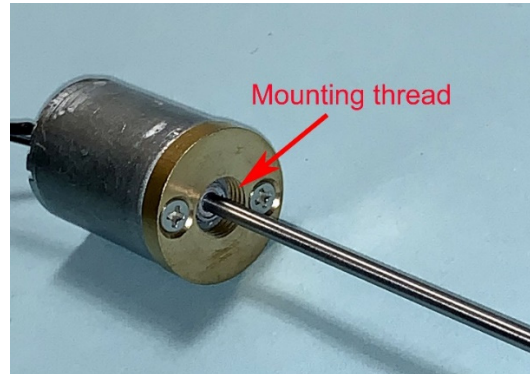


Figure 8. DC motor.

3.3. How Does It Work

After the motor and the fan are assembled together, adjust the impeller's position so that neither end is touching the frame (see Figure 9). Keep at least 1/16" space on each side. Spin the impeller by your finger to test if the impeller can spin freely. Your finger shouldn't feel any resistance. If there is resistance, the motor might not have been mounted correctly. You can back out the motor two or three turns and reinstall it again.

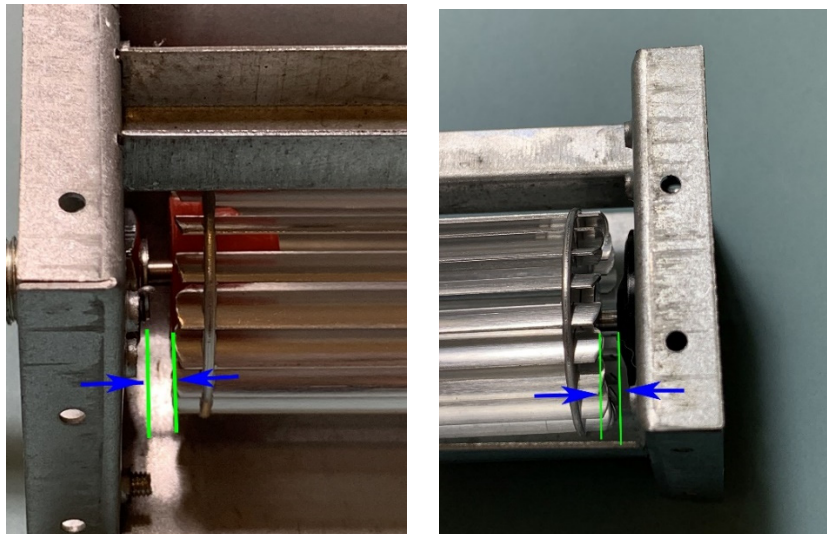


Figure 9. Leave enough clearance between the impeller and the frame on both ends.

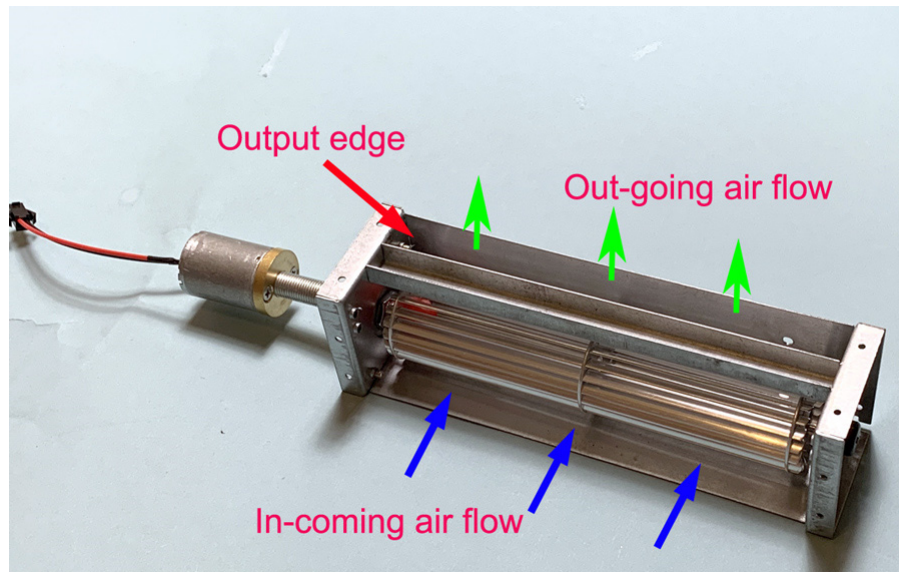


Figure 10. The direction of the air flow.

The Figure 10 show the direction of the air flow. When the motor is running, the impeller wheel draws air into its bottom as shown by the blue arrow, and send air flow out from its back as shown by the green arrows.

This kit was designed to be mounted on the lower-left side of a smoker, just above where the heater is. Only the fan is mounted inside the smoker. The motor and the control box are mounted outside of the smoker. The picture in Figure 11 shows the final look after the kit has been installation on a 6-rack Bradley Smoker.

Our tests show that the best way to circulate the air in a smoker is to mount the fan at the lower-back corner and so it forms an air-flow from the bottom to the top. If your smoker has no place at the bottom for installing the fan, the next best choice is to mount the fan at the top corner and to form a top-down air flow. It is not recommended to blow air horizontally.



Figure 11. The CIRFAN kit installed on a smoker.

Important Notes

- 1. Before you start installing this kit, please try assembling these three components (motor, fan frame, and impeller) together to get familiar with the assembling process and how much force is needed. Please also refer to the video link on our product page.*
- 2. The current motor/fan configuration is designed to be installed on the lower-left corner, in which the out-going air flow is pointing up. It can NOT be installation on the lower-right corner. If you want a CirFan kit for the lower-right corner, a different impeller is needed. Please contact us.*

4. Installation

4.1. Preparation

Clean the inside of the smoker, remove all the racks except the lowest rack and the v-shaped the drip tray, and lay down the smoker on the ground.

IMPORTANT -- *Critical things that need to be reminded.*

The position of the fan frame is critical. The bottom rack should be put to the top of the double-rail rack holder. The fan's top needs to be just underneath the bottom rack (or wired basket), almost touching it. If it is positioned too low, you will not be able to remove the drip tray; if it is too high, the bottom rack would be sitting on the fan.

First, please make sure there is enough room for the fan between the bottom of the lower rack and the drip tray. There should be about **1/2 inch distance between the bottom of the fan and the V-shaped drip tray** to allow the tray to be placed and removed in the future. In the picture below, we put the rack on top of the side rail to leave enough space for the fan. The top of the fan frame is in touch with rack (the top red line), and the bottom of the fan frame (lower red line) is still about 1/2 inch (or 1 cm) above the edge of the v-shaped drip tray (yellow line). This is to ensure that the drip tray can still be removed after we installing the fan. In later steps, we will drill a hole on the **left** side of the wall, and move the fan to the left (shown in red arrow).

IMPORTANT: Bradley made two types of rack holder. The older version is a single-rail rack holder. The newer version (as in this picture) has double-rail (or a slotted rail) rack holder. For the newer version, please make sure you **put the rack on the top of the rack holder, not between the rails**. If you put the rack between the rails, there will be no room for the fan or to lift the drip tray.



Figure 12. Check if there is enough space for installing the fan.

Remove the V-shaped drip tray, the fan, and only leave the lower rack in. Use a sharpie pen to mark some dots along the bottom of the rack on the backwall. Then, remove the rack. With the help of a ruler, draw a straight line that connects all the dots. This line should essentially be the same line as the top red line in the previous picture. The picture below in Figure 13, we marked black dots (pointed by red arrows), removed the basket, and draw a straight line with a ruler to connect these three dots.

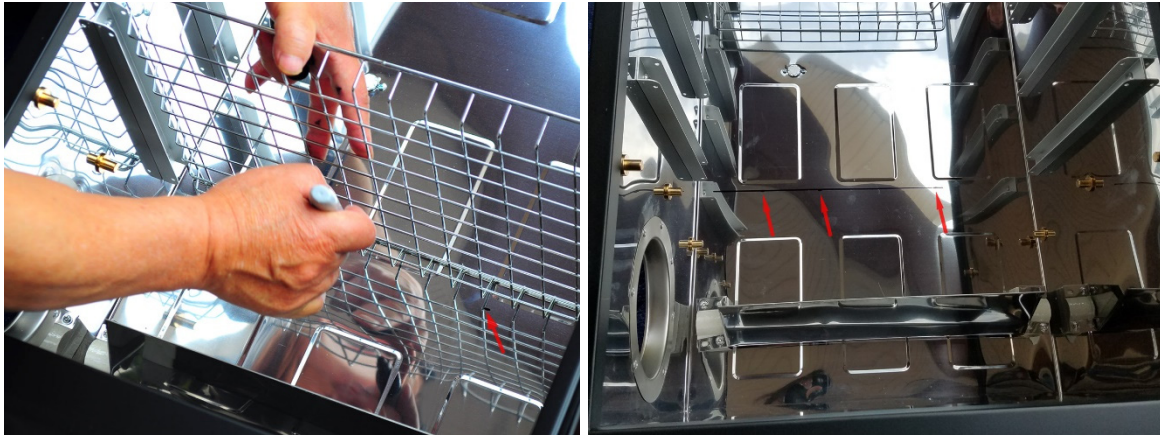


Figure 13. Draw a line to mark where the top edge of the fan should be.

Before we continue to the next step, remove the impeller from the fan frame. Gently pry the loose end up, and pull the axle on the other end out of its bearing.

Next, place the fan frame against the backwall, align the top edge of the fan frame to the black line we just drew, and push it all the way to the left side so the tip of the motor mounting tube is pushed against the sidewall. Use a sharpie to trace the edge the threaded tube on the sidewall. See the picture in Figure 14. You can estimate and mark where the center is.

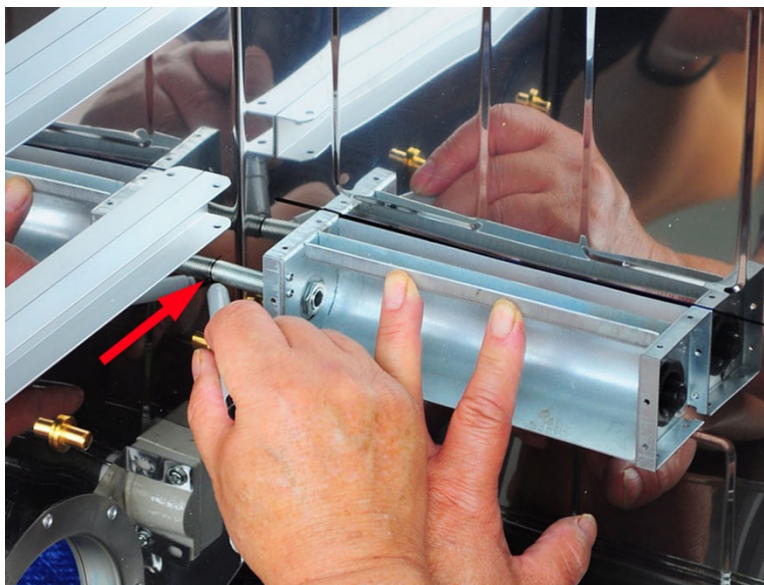


Figure 14. Trace the edge of the mounting tube to mark where the hole should be drilled.

4.2. Drill the first hole on the sidewall for connecting the fan and the motor

In this step, we will drill a 13/32" (or 0.40" or 11 mm) hole on the sidewall. The wall of this smoker has an inner layer made of stainless steel (aluminum for older model), an outer layer made of power coated steel, and the insulation layer in-between. You'll need to drill through all these layers. If you have a center punch or a pin punch (or even a nail), knock a small indent on the center so that the drill bit will

not slip away. If your smoker has stainless steel inner wall, start with a 3/32" drill bit to drill a small hole will make it easier. Then move onto a bigger drill bit to drill through the sheet metals.

Tip: Another way to drill the hole is that first, use a small drill bit to drill through the wall from inside, and then use a big drill bit to drill through the wall again from the outside.

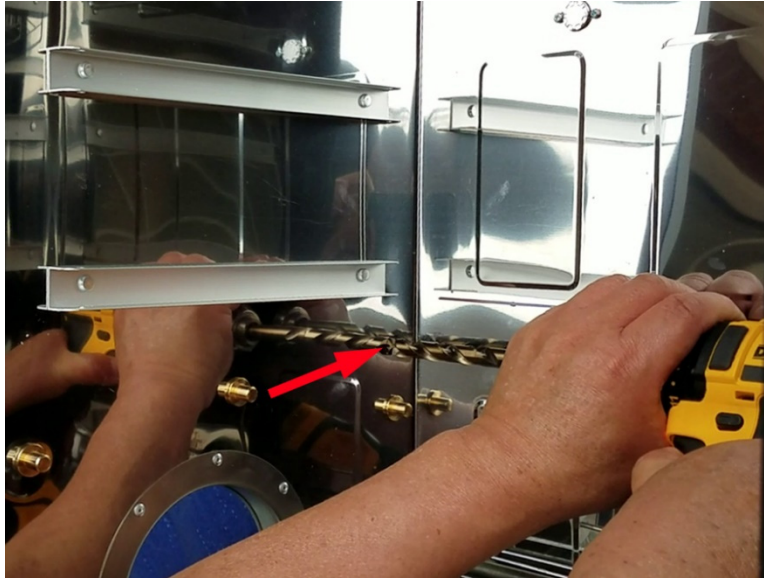


Figure 15. Drill a hole on the side wall. The red arrow points to the mark we just traced along the edge of the mounting tube.

When you finish drilling the hole, place the fan against the backwall, try gently pushing the fan towards the drilled hole and see if the threaded tube goes through the drilled hole. Please do NOT force it to go through, which can bend the tube. The threaded tube should go through the hole without touching the wall. If it does, you need to enlarge the hole. Use pliers, files, and hammer to deburr and fatten the edges. The final edge should be flat and smooth. It can be a little bit challenging to keep the drill bit go perfectly straight, and so you may end up with a bigger hole than we actually needed. In that case, you can cover some part of the hole with aluminum tapes in later steps.

4.3. Drill the second hole on the backwall

First, we need to mark down where the second hole should be drilled. Insert the threaded tube through the hole we just drilled, align the top of the fan frame to the black line. Do NOT push the fan too hard toward the left. Leave a 3/64" (or 1 mm) gap between the fan frame and the sidewall (pointed by the blue arrow in Figure 16). Use a marker pen to mark the hole (pointed by the red arrow in Figure 16).

Then, remove the frame. Use a center punch to punch a small indent at the center of the mark. Next, use a 1/8" drill bit (or a 3.1~3.5 mm) to drill through the backwall.

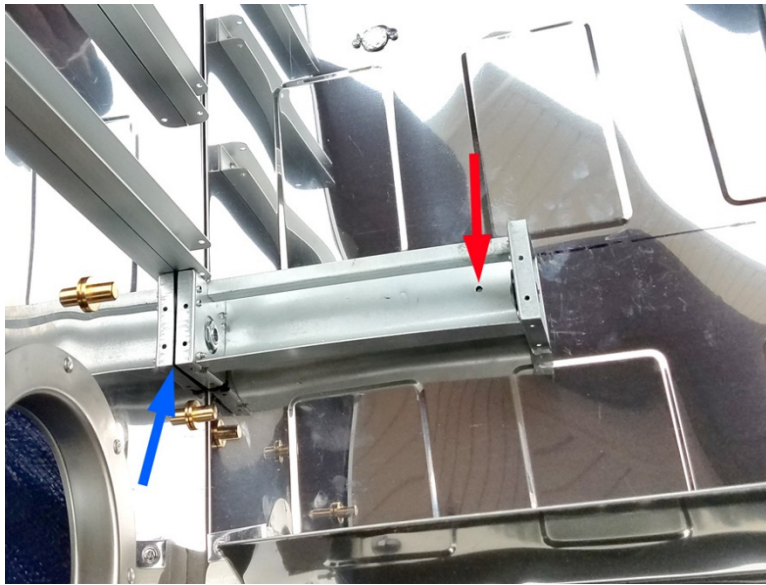


Figure 16. Place the frame in position and mark the second hole to be drilled (pointed by the red arrow).

Important Note – Another way to mount the frame.

Instead of drilling a hole through the backwall and using a long bolt to fix the frame of the fan, you can install a rivet nut on the inner wall if you have a nut/thread rivet tool. A rivet nut is a tubular rivet with internal threads, and it can be blind-installed from one side. If you use a rivet nut here, you only need to drill a hole through the inner layer of the backwall. The outer surface of the backwall will be intact. But this approach may not work for some older models of the Bradley Smokers where the inner wall is just a thin layer of aluminum sheet.

The picture below (Figure 16-A) shows a rivet nut installed in a Masterbuilt smoker. You can use 10-24 thread rivet nut. (An example of a Nut/thread Hand Riveter: <https://amzn.to/2SAtWUm> . An example of the rivet nut: <https://amzn.to/32JHsJT>)

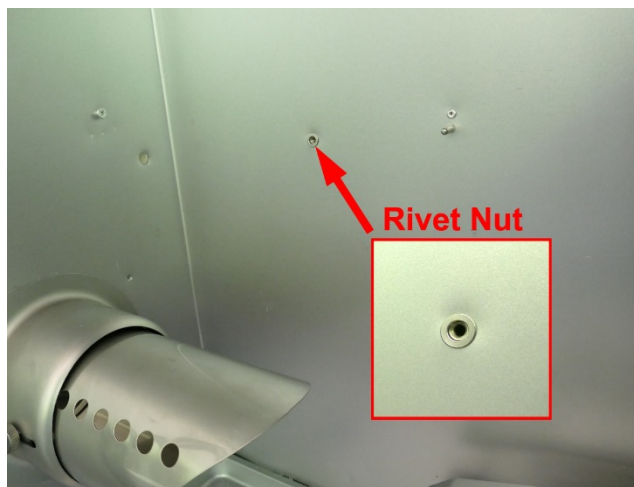


Figure 16-A. Installing a rivet nut for mounting the frame of the fan.

4.4. Install the fan frame

Now we can fix the fan frame to the smoker. Put the fan frame back in position. Align the small hole on the frame with the hole we just drilled, and insert the long M3 bolt through the holes. As shown in Figure 17, put the small washer, the small spring washer, and the M3 nut on the bolt, then tighten the nut lightly with a small wrench (just slightly tighter than finger-tight). If you install a rivet nut here, please use screws with matching thread to fix the frame. Please do NOT over tighten it as it may compress the wall and change the alignment between the fan and the hole on the sidewall.

Important Note -- Critical things that needs to be reminded.

Don't tighten the frame mounting nuts too hard because the smoker wall contains insulation material. It will be crashed if the nut is tightened too hard.

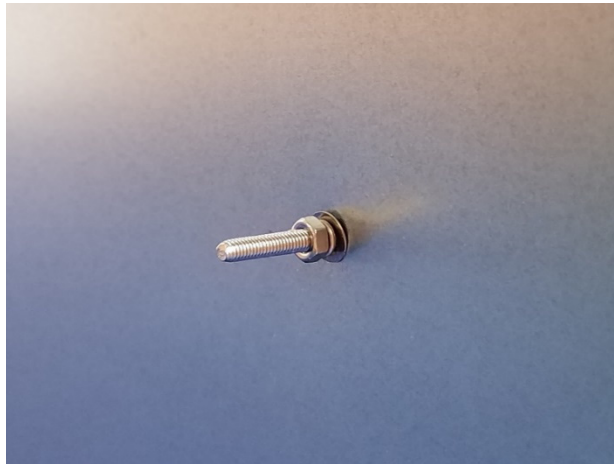


Figure 17. Put the small washer, spring washer, and M3 hex nut to mounting bolt.

Next, put the big washer to the threaded motor mounting tube that is sticking out from the sidewall. If there is a big gap that can't be covered by the washer, apply some aluminum tape to cover the gap. Then, screw the M10 nut on the threaded tube. Be careful not to overtighten it.



Figure 18. Use a small piece of aluminum tape to cover the drill hole that can't be covered by the big washer.

4.5. Install the motor

First, put the fan blades back to the frame by inserting its axle (shaft) to the bushing on the right side of the frame. Then, insert the shaft of the motor into the threaded tube from outside. As the shaft reaches the red silicone bushing, which is on the left-side of the fan blade, try to align the center hole of the red silicone bushing with the motor shaft. Be gentle and slow while you try to find the hole on the silicone bushing with the tip of the motor shaft. Don't push too hard or too fast until you feel the tip is in the hole, otherwise the silicone bushing may get torn. Once the tip of the shaft is in the center hole, push the shaft in till the brass plate on the motor reaches the threaded tube. Adjust the fan blade position with your right hand by pushing it towards the left slightly. Now, use your left hand to turn the motor clockwise, let the female thread on the brass plate to engage with the threaded on the tube. Keep turning the motor in till it is hand-tight.

Important Note -- Critical things that need to be reminded

When you insert the shaft into the silicone bushing on the impeller, please be patient. Don't push too hard if you can't feel the tip of the shaft is in the hole. Placing a flash light near the bushing can help.

The wires on the motor can get in the way while you install the motor. Be careful to not give stress on the wire when you are turning the motor.

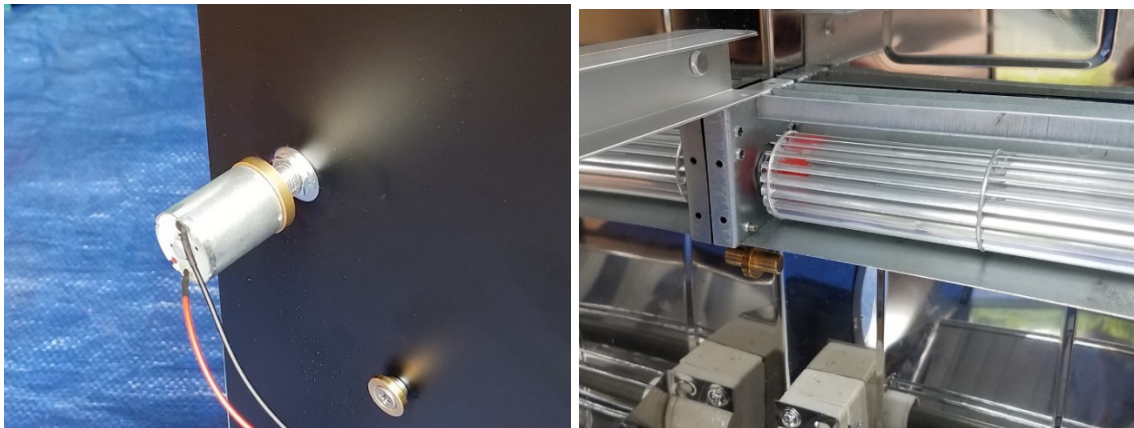


Figure 19. Place the fan impeller back to the frame, and install the motor.

4.6. Mount the control box

In this step, we will mount the control box on the sidewall of the smoker to give the motor a housing and the necessary wire connections. First, remove the top cover of the control box by loosening all four screws. There is a hole on the bottom of the box that the motor can fit through. The hole is surrounded by a layer of silicone rubber gasket to prevent water leaks in through the gaps between the control box and the smoker. Position the control box against the sidewall like what is shown in picture in Figure 20. The toggle switch should face forward. Slightly push the box upwards from the bottom (in the direction that the green arrow points to), so the center of the hole on the box (pointed by the red arrow) is slightly above the motor's shaft. It will fine as long as the gap between the bottom of the motor and box wall is not less than 0.07" (1.8 mm). This is to leave more room for installing or removing the smoke generator. Use

painter's tape to hold the box in position. You can draw reference lines on the sidewall of the smoker if you want to keep the top edge of the control box horizontal.

Important Note -- Critical things that need to be reminded

The control box needs to be moved up slightly after it is fed through the motor. Otherwise, it can be difficult to mount or remove the smoke generator because the smoke generator needs to be lift up for removing. But the gap between the motor and the bottom of the control box should be no less than 0.07" (1.8 mm).

In this step, we used 4 self-tapping screws to mount the control box. However, you can also choose to tap rivet nuts to mount the box.

Then we need to drill four pilot holes for the mounting screws. Four yellow arrows in the picture in Figure 20 point to the spots where we should drill. At each spot, first drill through the outer wall of the smoker, and then apply the self-tapping screw. Use 3/32" (2.4 mm) drill bit. Please take extra care in aligning the control box and drilling the second hole. Once you have two screws tapped in, the rest two should be relatively simple. Do NOT tighten each screw in the beginning. When you finish tapping all four screws, then tighten all four of them evenly, and make sure the control box is mounted against the smoker firmly.

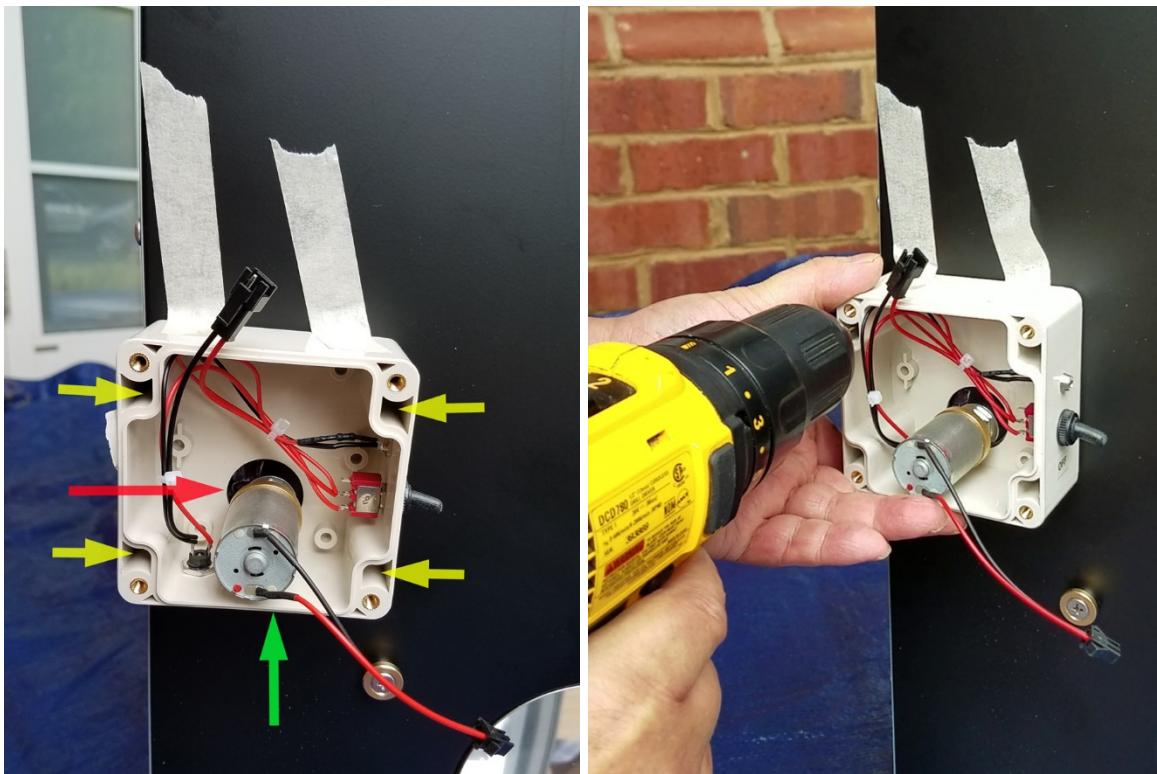


Figure 20. Place the control box around the motor and drill 4 mounting holes for the box.

4.7. Finish the installation

The rest of the installation are quite simple. Connect the connector from the DC motor to the connector from the power input jack. Please make sure you match the tab and notch from each connector. Tuck the

wires inside the box. Then apply the cover and re-install all four screws that were removed from the box. Please note that the gasket seal of the cover is asymmetric. You need to look the pattern of the gasket to figure out the direction to place the cover back on.

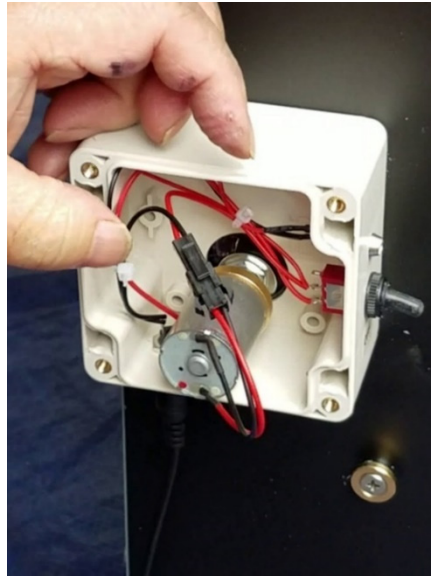


Figure 21. Connect the motor with the power input jack by joining the two connectors together.

5. Power on/off the circulation fan

Connect the 12 V DC power adapter to the DC jack on the bottom of the control box. Flip the toggle switch up to the ON position. The green indicator should turn on and the fan should start running. Simply flip the toggle switch to OFF position to turn the fan off.



Figure 22. Flip the toggle switch up to turn on the fan.

Additional Tip #1 – Adjusting the fan speed with an adjustable DC adapter.

The motor in this kit can accept voltage from up to 24 V DC. The rotation speed of this motor generally changes linearly with its power supply voltage. If you want to adjust the fan speed, you can use a 3 ~ 24 VDC Adjustable AC/DC Adapter (example: <https://amzn.to/2JLUYnJ>) to supply the power.

Additional Tip #2 – Location of the wall-mount probe.

If an Auber's wall-mount probe is installed on the smoker for monitoring and controller the cabinet temperature in the smoker, please avoid installing the probe in the hot air stream. We recommend you install the wall-mount probe on the right half of the backwall, about 4 inches from the inner sidewall on the right, and about 3/8" below the top rack.

6. Acknowledgment

We would like to thank Eric for sharing pictures with us, and providing valuable feedbacks and suggestions!

(END)