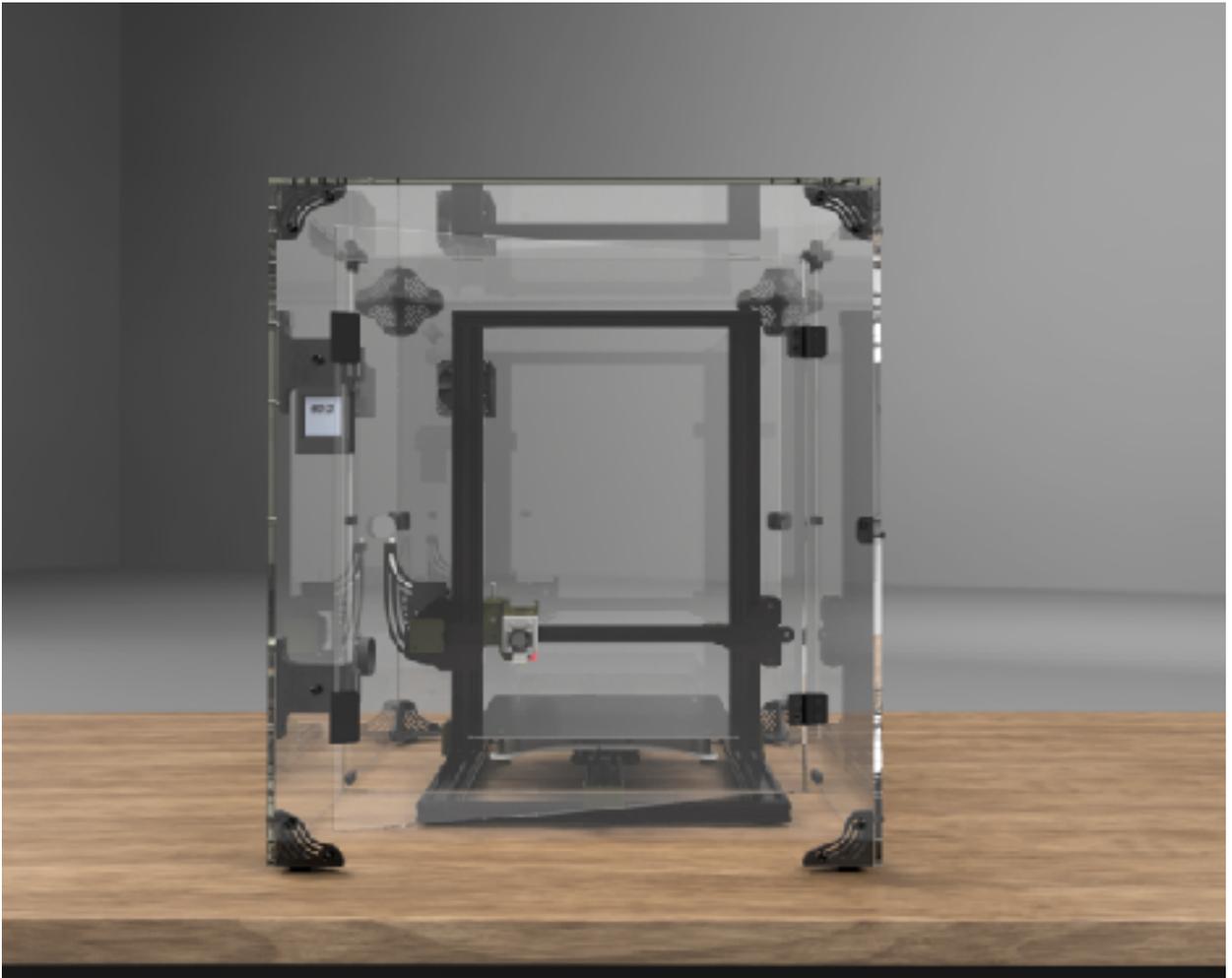# CR-10 Enclosure Kit

Installation Manual 1.3

(Shipped July 2018)

This page intentionally left blank.

Is This Manual for *Your* Kit?

This installation manual covers R3 version of the enclosure shipped in July, 2018. If you have an earlier version of the enclosure please read previous versions of the manual.

You Really Do Want to Read the Directions

Hey, we get it. You just got your new enclosure kit and want to start using it as fast as possible. How hard can assembling a few plastic or wood panels possibly be? Its not really that hard, assuming you're following the directions, but try to use brute force and you'll end up working your way through your vocabulary of swear words. While the acrylic pieces in the kit are strong and difficult to harm accidentally, they are still plastic and will break if bent far enough. The ghosts of the broken panels that have gone before you have become much stronger than you could ever imagine, and are whispering into your ear, "just be a little careful".

The basic process follows this iterative pattern for the acrylic panels. The wood panels don't have covers, and so you can just connect those directly.   Take the acrylic panel out and lay it down flat on a table. Then, **CAREFULLY, SLOWLY, and with DELIBERATION remove the covering** on both sides. Pull horizontally to the sheet to reduce the lateral forces that would bend the panel.
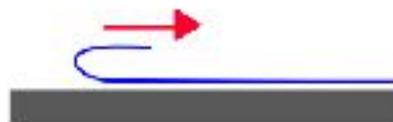
Connecting screws should be tightened only a little more than hand tight. Use enough force and even this high quality acrylic will crack.

Don't Panic If You See This!

When acrylic is cut on the CNC the covering plastic can get rough edges. Don't Worry! The actual edge of the acrylic is still smooth and looks great; this is just a cosmetic issue with the plastic or paper cover. We check each panel for rough edges and try to sand away all of the rough plastic covering, but sometimes a cruft or two gets away.
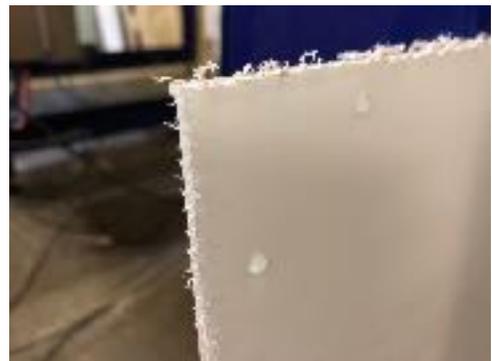
Before you Start

Is your CR-10 Customized?

If your printer is stock then no customization is needed. If you have customized the printer, you should examine any modifications to make sure they don't block the panels.

If part of one of the panels is blocked, you can use a jigsaw (or equivalent) to customization one or more panels. **This should be done before removing the plastic or paper covers on the acrylic panels. Cutting acrylic requires great care as the plastic is prone to crack if mishandled.**

Preparing the Printer

Remove any filament from the hot end (will require heating the hot end) and remove the filament spool from the spool holder.

Turn the printer off and unplug the power cable from the printer's power supply.

Assemble Panels

The front panels are made from thicker 1/4" acrylic to provide more structural rigidity for the doors. Do not try to bend the 1/4" acrylic!

1.   Identify the Corner Connectors

Each of the corners on the enclosure will be held together by the connectors pictured below. There are only two versions L and R, which can be identified by the letters stamped on the inside. The opposite connectors are identical, i.e. Bottom Right is the same as Top Left. In all cases the surface of the connector with the cutout pattern faces front or back.

Top Left

Top Right

Bottom Left

Bottom Right
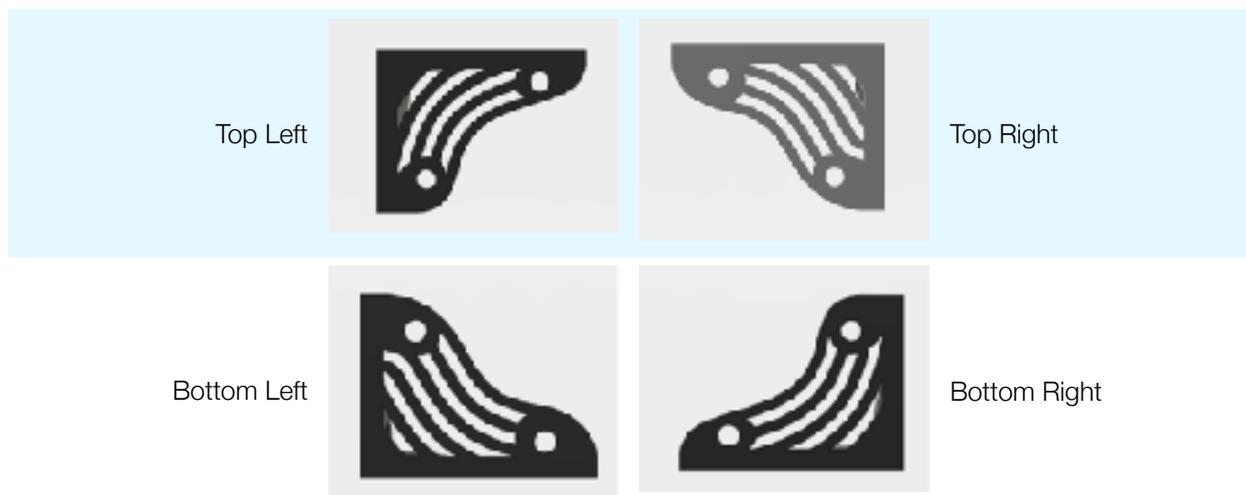
2. Attach The Door Frame Corners

The front door is designed so that the latches are on the left. Attach the corner connectors on the **back side** of the door frame using the provided cap head 14mm screws. See the photos below. The top of the connector should be flush with the top of the acrylic.
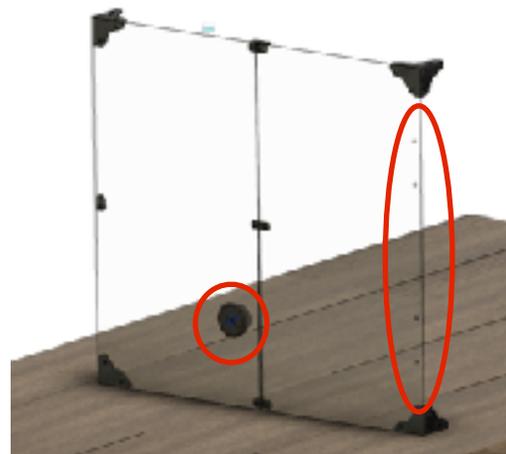
3. Assemble the Left Side

The left-side consists of two panels, front and rear. The rear panel is distinguishable by its small hole for a cable grommet. Insert the grommet as pictured before attaching the front of the left-side to the door frame.

The front left-side panel is identifiable from the holes along the leading edge to attach the latch mounts.

To attach the two panels you'll need three connectors: One three hole "mid-panel top connector, and two "split-panel connectors". Use the M4 10mm screws for acrylic and M4 12mm screws for wood. The connectors should be attached on the inside of the panel.


Once all three connectors are attached, connect the front corners to the previously assembled front of the enclosure. The two panels will now be able to stand upright on their own.

4. Assemble Latch Mounts

Locate the magnetic latches and use the **wood screws** to attach them to the latch mounts. Hand tighten and make sure they're secure, but do not over tighten or they may strip. The latch can be later adjusted front-to-back to make sure the door is flush with the door frame.

Each latch mount is attached via three screws. Two M4 10mm cap heads are used to attach the latch mount to the side, while a 30mm cap head secures the latch mount to the door frame.
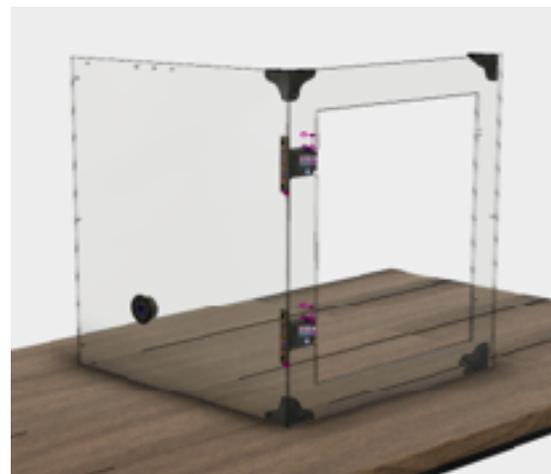
5. Assemble Back

The view to the right is of the back of the enclosure when viewed from the front. The four corner connectors are mirror images of the front. The large hole is either for an air filter (purchased separately) or can be covered up by a plastic disc using short M4 10mm screws.

If assembling the Charcoal Air Filter, confirm the direction of the fan's air filter by plugging it into a USB power supply before attaching to the filter and back of the enclosure using M4 cap head 30mm or 40mm screws depending on the depth of the particular fan.


The air filter should look like this after being attached. Note that its easier to insert the screws from the inside, and put the nuts next to the filter housing.

6. Attach Back to Left Side

Attach the corner connectors on the back to the left side of the enclosure using M4 12mm cap head screws.

Next, attach the mid-panel connector/stabilizer holding the back onto the left side. Note that the holes are even on each panel.
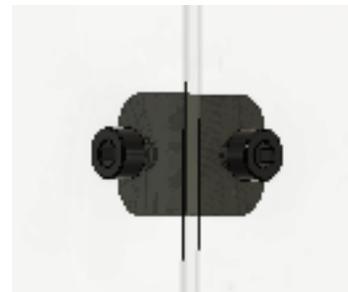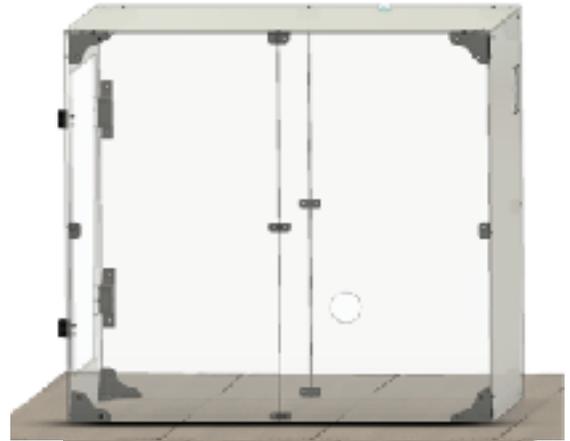
7. Assemble the Right Side

The two remaining short panels are for the right side. Align the panels so that the 3 holes along the inside edge match each other. The panels are identical. If you are using wood panels, then one side will be the "good side" which should be oriented to the outside of the enclosure. It should be apparent by the wood quality, i.e. lack of knots which side this is.
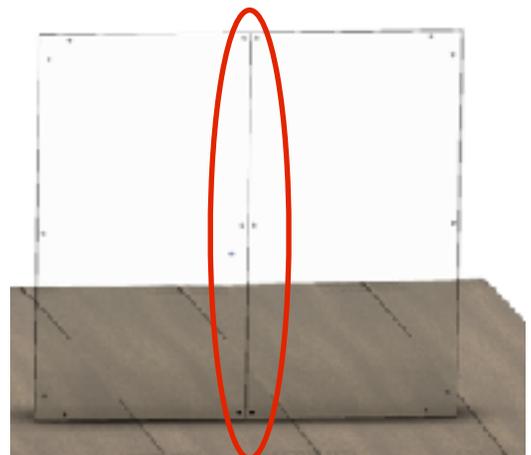
The three connectors should be attached on the inside of the panel. The top has three holes, while the bottom two have only two holes.

Once the right side is assembled from the two panels, attach it to the four corner connectors as before.Once the corner connectors are screwed in, connect the two front and back mid-panel connectors.
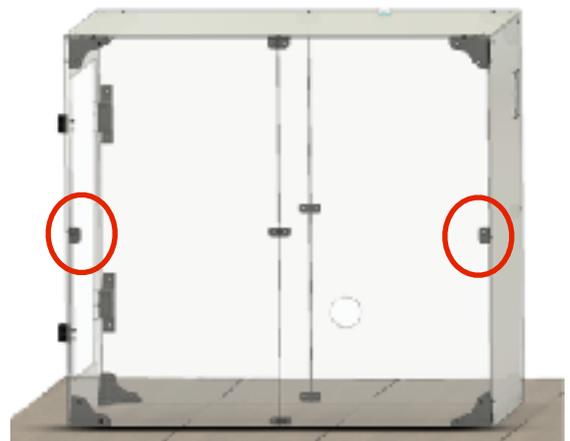
8. Assemble Door

Attach the hinges to the door and door frame using M4 flat head 12mm screws and nuts. There will be some play in the hole size so that you can adjust the door to swing freely.

Attach the door knob using a 12mm flat head screw and nut.

Now that the latches are mounted its time to connect the strike plates. Each plate comes with a squishy adhesive covering the same size of the plate. Carefully attach the adhesive side to the acrylic at the location of each latch. Then, adjust the width of the metal strike plate so that it is held on by the pressure of the two sides of the plate. The adhesive covering will keep the metal of the strike plate from scratching the acrylic.

9. Attach Top

Use access through the door to attach the top of the enclosure using M4 12mm screws. The hole to feed through filament will be on the left-rear, shown circled in red.

Remember to attach the sides to the top at the point where the side panels split.
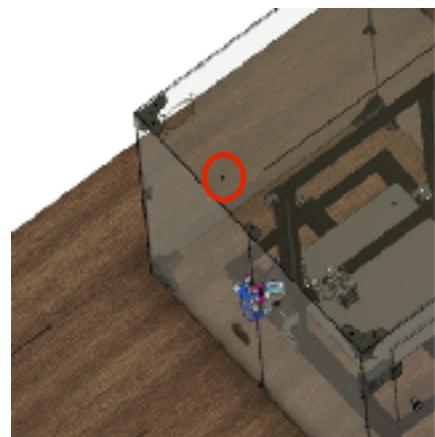
10. Attach Feet (Optional)

The feet are optional, and raise the enclosure from the surface slightly. If you've also purchased an air filter, it helps bring in air from the outside to run through the filter, at the expense of lowering the ambient temperature inside the box.

11. Attach Cables

Use of the cable grommet is optional!

If you simply feed the cables under the enclosure, then *you'll be able to remove the enclosure at any time*. The problem is the cables that connect to the hot end and extruder won't be able to reach the very top of the range when printing objects that are 450mm or higher. If you wish to both be able to remove the enclosure and print higher than that, there are relatively inexpensive cable extenders available on eBay.

To insure that people who don't want to go to the trouble of buying new cables can still use the enclosure, the grommet is designed to allow the extruder and Y-motor cables to fit inside the enclosure when printing at the very top of the printer's range. The other cables won't be able to easily reach through the grommet and should be left as-is, and will feed through the bottom of the enclosure.

As mentioned before, if you go this route, to remove the enclosure when using the grommet you'll need to remove the extruder and Y-motor cables beforehand. We have been able to completely change out the hot end, install a new bed, and do other modifications through the very large front door, and thus never need to remove the enclosure, but other people may want to remove the enclosure regularly. Its your choice.

12. Sealing Gaps

Once the enclosure is completely put together, its time to make sure that each of the panels is held tightly to each adjoining panel. The connectors are designed with a small amount of play that allows you to make small adjustments for the perfect fit.

1. Loosen screws on the panel to move.
2. Push that panel into place. You may need a friend to hold it there.
3. Re-tighten the screws to hold the panel.

Repeat the product, going around the enclosure looking to make sure all of the panels are flush to each other.

Accessories

Optional Spool Holder

Early models had an integrated spool holder, but it was replaced with the optional (purchased separately) spool holder shown at the right. You can simply sit the spool holder on the top of the enclosure, or optionally secure it to the side of the enclosure to keep it from falling off the enclosure as the printer vibrates the table.

Note the location of the spool holder is for the mostly stock CR-10 extruder location. Those of you who have heavily customized the hot end can feel free to drill holes and move the spool holder where appropriate.

Of course, you are free to use whatever type of freestanding spool holder you wish; there are hundreds of designs available on Thingiverse.

.
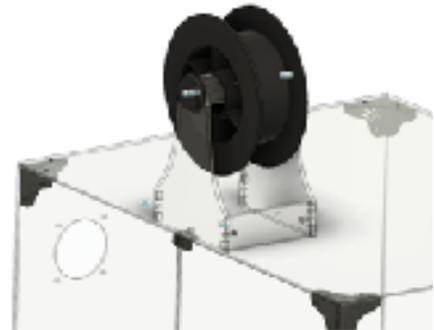
Filament Guide

The filament guide is also optional, but does make it easier for the filament to make the 90 degree change from the top into the horizontal extruder mechanism.   This type of 90 degree

bend doesn't work with really brittle filament such as metal infused copper or bronze, and in those cases you can simply bypass the guide altogether and send the filament directly into the extruder.

The filament guide attaches to the Y motor (vertical motion) by removing the two nuts, placing the guide's holes over the two screws, and then replacing the nuts.

The illustration to the right shows how the runout sensor fits between the guide and the extruder.
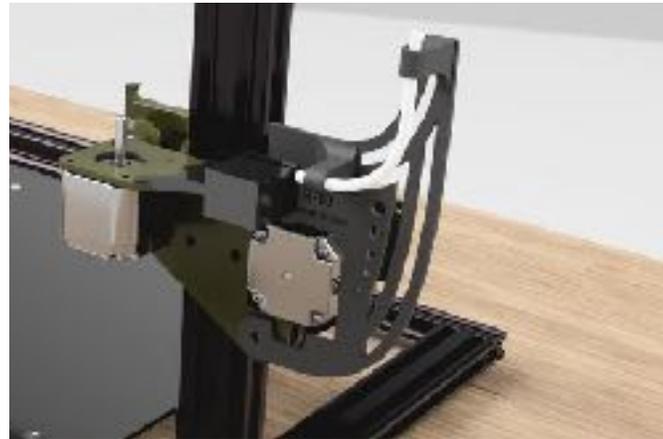
Bed Clips

In order to make the size of the enclosure as small as possible, there may be little room on the front of the bed for clips that stick out.   If you find the enclosure needs a little more room, attach the clips to the bed, and then use needle-nose pliers to remove the clips.


Customizations

Spool Holder Location Changes

There are lots of reasons to customize your enclosure. Those of you who want to change how filament is brought into the enclosure should feel free to drill holes as appropriate. **With acrylic, be very careful to tape the area first on both the inside and outside, and use very little pressure when drilling to gradually remove the plastic.** If you do not follow these instructions the plastic is liable to chip or crack the enclosure. Its not hard to do, but if you simply force the bit into the plastic with no tape it will crack and chip.

Tool Holder

Our favorite customization is to add magnetic tool holders to the side. One end can be attached via the same hole as the corner connectors, but the other end will require drilling a single hole.
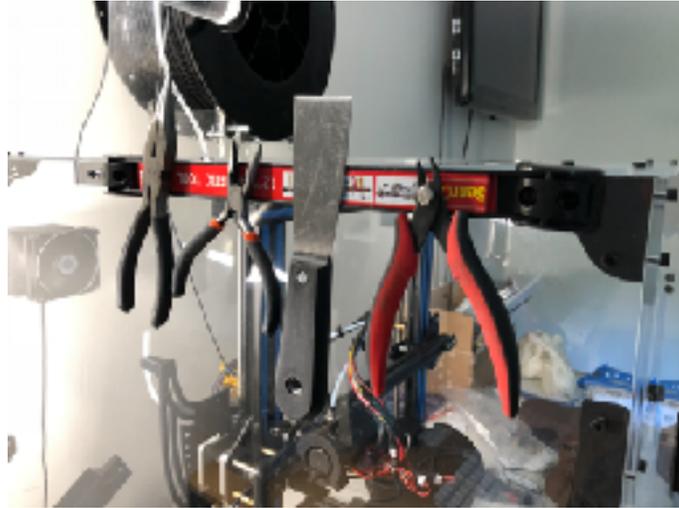
Upgraded Bed Heaters

The next most common modification is a better heater bed, including the 120V bed. Not only does the 120V version heat up faster than the hot end, it will go up to 120C so you can print ABS.   The key to doing this mod with an enclosure, is to make sure you adjust any cable holders for the bed heater to not stick out the rear as on the stock heater. We have ours adjusted to completely fit under the bed, giving the maximum front to back room in the enclosure.