



PF45™ Pistol Frames, 80% Instructions

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If your questions can’t be answered here, call support at 1-800-517-1243 Option 4 or send a Customer Support ticket through <https://www.polymer80.com/contact>

Please read the instructions completely before doing any work.

Introduction

Thanks for choosing our products, we appreciate your business. Polymer80 products are designed with quality in mind, but also with the idea that this should be a fun experience. The Polymer80 pistol frame that you build will be the pride and joy of your gun safe because you brought it to life with your own hands. Each time you pick up this firearm, you'll feel a sense of pride and accomplishment. You'll feel quality in the field, a smooth operating pistol that feels good in the hand, that has the latest in ergonomic features that make you a better shooter with a more accurate gun. It's the best of both worlds, and every person here at Polymer80 absolutely believes this to our core.

The following instructions are designed to work with the PF45 only.

The instructions are critical to understanding the details of how to build the pistol frame properly. **These instructions override any Polymer80 produced video or any other online videos/reviews**, because videos are difficult to update and control in terms of current versioning. Therefore, this is the control document which guarantees you the latest information required to finish your pistol project properly.

These instructions will guide you through the process of milling and installing the locking block rail system (LBRS) and rear rail module (RRM). There are many different techniques utilized to build our frames but in general. Remember to read these instructions completely before completing any work.

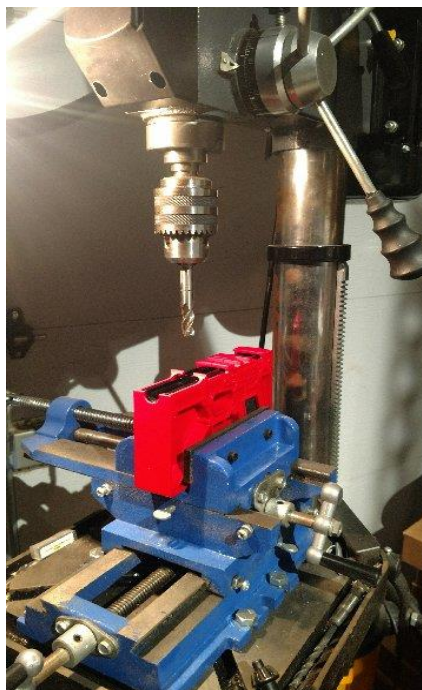
There are key details concerning how to mill and drill in this document that may surprise even the most experienced gunsmith or machinist. Please read the instructions to ensure your project is completed with quality and satisfaction. Below you can see the Polymer80 PF Series Family photo.



Warnings & Issues That Impact Warranty Coverage

Polymer80, Inc. stands by our product and offers excellent no-hassle warranty coverage. However, there are limits to coverage, particularly when the customer damages the product through poor craftsmanship or improper control during the milling process, and when they drill holes using the wrong tools. Additionally, after the milling is completed, the build process seems to be where most people get into trouble, particularly during assembly and cleaning. Here are key areas that you need to watch for:

1. **Drill the pin holes using our jig, hand drill and a drill press vise. DO NOT use a drill press either with or without a drill press vise or cross slide vise to drill your holes. Testing has shown while using a drill press the bit will not self-center in the jig and will result in poorly placed or irregular pin holes.**
2. Only use Loctite that is approved for contact with polymer-based products. Super Glue versions are not to be used on the polymer.
3. Chemicals: Generally, you do not use penetrating lubricants on polymer products, they can damage the material.
 - a. **Do not put acetone on the receiver.** Acetone will generally instantly destroy, tarnish, or weaken any polymer-based product.
 - b. Many oils are combined with rust penetrants or some other type of penetrant which can damage polymer-based products. Regular gun oil, high quality grease or simple household oils can be used.
 - c. Do not utilize brake cleaner (it has acetone in it) or rust penetrants, they penetrate through polymer.
4. **Do not overtighten the jig in any vise**, you can adversely adjust placement of holes to the pistol frame. Pin hole drill placements are critical on the pistol frame function. Taping the jig closed with Blue painters' tape or black electrical tape also helps hold the jig together.
5. Using a cross slide vise and end mill bit (End mill bit no longer provided) to remove the front and rear tabs to allow for the installation of the Locking Block Rail System (LBRS) and Rear Rail Module (RRM) remains our preferred method.



P80-45 Series Frames - Parts List

Part Description	ITEM SKU	Qty per Kit
PF45 Pistol Frame Lower	PF80-PF45	1
Red Jig for the PF45	P80-PJ45	1
Locking Block Rail System Pin, 3mm diameterx25mm long	MSC-PFP-PIN-3MM	1
Trigger Mechanism Housing Pin, 3mm diameter x 25mm long pins	MSC-PFP-PIN-3MM	1
Locking Block Rail System	P80-LBRS940V2	1
Rear Rail Module	P80-PFP-45RRM1	1
M3 Drill Bit – For drilling the Trigger Mechanism Housing pin hole	MKI-Drill-M3	1
M4 Drill Bit - For drilling the trigger pin hole	MKI-Drill-M4	1



Methods of Finishing your PF45 Receiver:

The goal of finishing your PF45 receiver is to execute the following with the assistance of the jig:

- a. The holes for the pins, on each side of the receiver.
- b. Remove the barrel block and smooth out the top of the receiver (Start with 220 Sandpaper and work your way up) to allow the barrel and slide fit later in the build process.
- c. Remove the front and rear tabs to allow for the installation of the Locking Block Rail System (LBRS) and Rear Rail Module (RRM)
- d. Install the Polymer80 Locking Block Rail System (LBRS) provided with the kit.
- e. Install the Rear Rail Module provided with the kit.

These instructions will guide you through the process of milling and installing the locking block rail system (LBRS) and rear rail module (RRM). There are many different techniques utilized to build our frames but in general, we will cover utilizing a drill press which has a cross vise installed on the drill press table. We will not go into much detail for those who have milling machines; the assumption is that a user at this level would already have strong milling and technical skills, allowing them to adapt to the following instructions.

Multiple techniques:

Different techniques will result in different qualities of finish. The evolution of the milling process has changed over the years. Our preferred method remains to use an end mill (The end mill bit is not included). Again, we prefer you utilize a drill press with a cross vise because it is faster, requires less time to set up, and you have absolutely the most control if you use the cross vise properly.

In all cases, use the included jig and drill bits and always level the jig in your vise:

Drill the pin holes using our jig, hand drill and a drill press vise. DO NOT use a drill press either with or without a drill press vise or cross slide vise to drill your holes. Testing has shown while using a drill press the bit will not self-center in the jig and will result in poorly placed or irregular pin holes.

For finish work, we prefer to use hand tools and sheets of sandpaper (Wet sanding works best, start at 220 grit and work your way up) rather than a Dremel tool for clean up because of the precision control and feel that is required. **A Dremel tool in the untrained hands can damage your new build extremely fast. So be careful if you chose to use a different technique.**

Example Tools

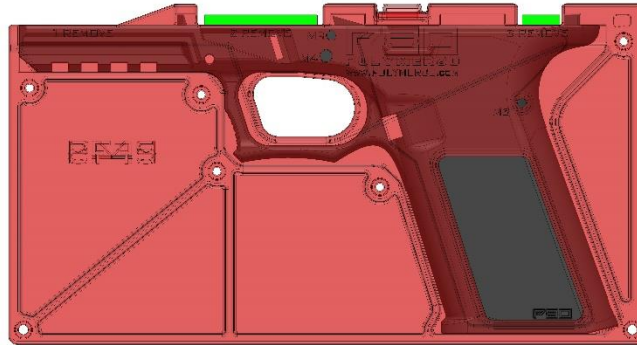
Example Tools	Additional Information
Cross Slide Vise	Accurately moves your work in a horizontal and longitudinal for precise positioning
Drill Press Vise	Holds your work firmly while reducing vibration when drilling
Drill Press	Ensures the end mill will be held precisely for milling the taps and removing the barrel block area.
Level	Utilized to ensure the drill press table is flat
Sandpaper	220 grit to fine tune milled areas and to clean up any rough edges of the nylon blended polymer utilized in the frame (Wet sanding works best)
Bench Vise	Utilized to hold the jig in place during the drilling process
Hand Drill	Used to drill the pin holes
Small Hammer and Punch	To install the pins

Additional tools to help refine the fit and finish of the frame to the slide: Small hand files, flat sharpening stone, 220 grit sandpaper to clean up any areas that were left rough cut, or a Dremel tool with fine sanding wheel.

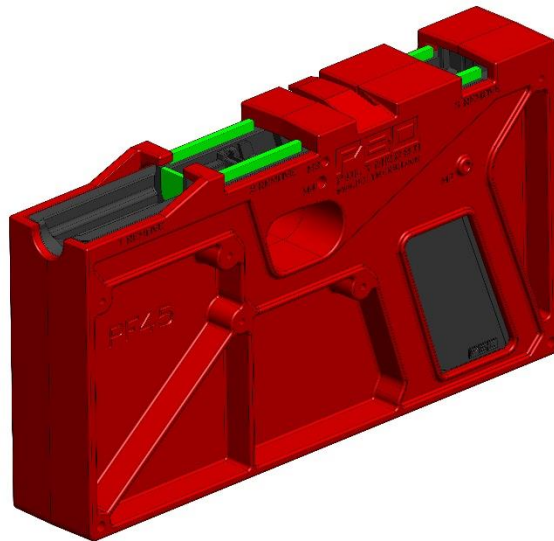


The Features and Description of the Jig

The Jig features a numerical system with indicators and drill bit sizes imbedded in the jig. There are three holes on each side of the jig. Make sure to use the appropriately sized drill bits that are included to drill the pin holes. The top jig features are designed to guide you. Remove only the exposed frame slide guards shown in **green** below. You **should not** cut into the **red** ABS polymer of the jig along the top of the jig. You will be **ONLY** removing the **green** colored areas shown below. If you remove any **red**, then you are milling outside of the intended areas and will permanently damaging the frame.



Be sure the PF45 frame is inserted into the jig properly before any drilling and milling procedures are conducted.



The large end mill bit is used to clear the temporary rails (Shown in **green**) along the top and barrel block which is located where the recoil spring assembly will eventually be installed, inside the pistol frame.

Critical Do's and Don'ts

1. Make sure the jig is free of any burrs along the edges of the jig. You may need to remove any rough edges along the jig to ensure the jig closes properly.
2. **Drill the pin holes using our jig, hand drill and a drill press vise. DO NOT use a drill press either with or without a drill press vise or cross slide vise to drill your holes. Testing has shown while using a drill press the bit will not self-center in the jig and will result in poorly placed or irregular pin holes.** The biggest problems from our builds came when testers attempted to drill the two pin holes (The front and rear rails) using the jig in the upright position in a drill press or table vise. The jig should be placed flat in a drill press vise and tighten (**Do not squeeze or over tighten any vise used**) from the top and bottom when **hand drilling** the pin holes.
3. When drilling the pin holes, you **don't** need to squeeze the jig to the point of deformation or crushing. **Snug, not crushed** is what you are trying to achieve. Taping the jig closed with Blue painters' tape or black electrical tape also helps hold the jig together.

Preparation

(Assumes you are using a Drill Press, a Cross Slide Vise, Drill Press Vise or a Bench Vise)

1. Prep the drill press. When using a drill press, the spinning chuck head of the drill press needs to be firmly attached by slamming it with a mallet up into the press, or the vibration of the below procedure can sometimes make the entire head fall out (Destroying things in the process).
2. The table of the drill press must be level.
3. If you decide to use our preferred method and use an end mill with a cross slide vise installed on the drill is the absolute fastest and most secure way to finish this part. Using tools like a fret cutter, X-Acto Knife, Zip Sander or a Dremel can provide you an accurate build as well in properly trained hands.

Side Note: We utilize the cross slide vise in various ways and for different projects, as it's a great tool that can be mounted on the drill press table semi-permanently by bolting it down (drill holes and mount with nut/bolt combo's or thread the holes and bolt it down. It can be utilized for many other projects.

Final Mental Prep: Building a firearm takes craftsmanship and pride, **so don't be in a hurry!** Slow down and work precisely and methodically, **Measuring Twice and Cutting Once!!** After you drill something out, you can't put it back. Therefore, approach things conservatively. In my personal experience, if I'm feeling like I may be lacking patience, I just stop. I'll put the tools down, walk away from the bench and go take care of whatever made me be in a hurry in the first place. This sounds sort of simple, but I've destroyed too many things in the past from my lack of patience.

High Level Steps

1. **PERFORM THIS STEP FIRST! Drill the holes FIRST! Do not start the tab or barrel block area removal process until the holes have been drilled properly.**
2. Drill the holes in a drill press vise; you can and should use a **hand drill** to finish the holes.
3. You can use our preferred end mill bit method or one of the many other proven ways to take off the top rails.
4. Removing the interior barrel block area in the designated indented area only to carefully remove a slot that will allow the spring and guide rod on your Slide to move freely.

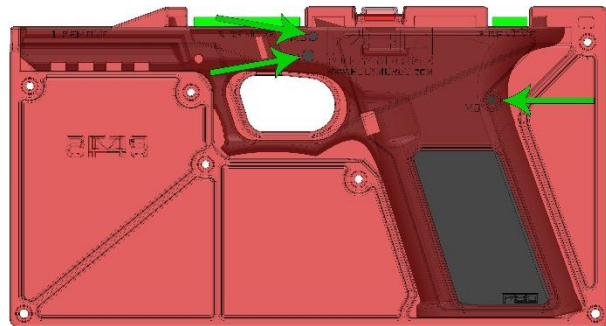
5. Install the Locking Block Rail System which includes the slide rails; and then use one of the provided pins to pin down the front legs of the locking block.
6. On the Rear Rail Module (the stainless-steel rear rails), slide that around the Trigger Mechanism Housing (not included as part of this kit) and install using the second pin that is included with the kit.
7. Assemble your firearm (Instructions for assembling a PF45 are not included in this document) by finishing the installation of the trigger, trigger pin, slide lock, slide stop, etc. to finish the entire build of the lower frame. Again, we aren't providing full instructions on how to assemble the entire PF45 Frame, but much of that information is found online.

Pin Hole Drilling Procedure (**PERFORM THIS STEP FIRST!**)

4. Insert the Pistol Frame in the Red Jig. Drill the side holes as indicated below using a Drill Press vise and hand drill. The drill bits are provided in the kit. Remember to make sure the jig is free of any burrs along the edges of the jig. You may need to remove any rough edges along the jig to ensure the jig closes properly. Taping the jig closed with Blue painters' tape or black electrical tape also helps hold the jig together.
 - a) You can **and should** use hand a drill to finish the three side holes on each side (Total 6 holes)
 - b) Drill one side at a time **DO NOT attempt to drill through both sides of the frame from one side of the jig**. In other words, flip the jig to the other side in the vise once the first side is done, and drill the other side independently.
 - c) Do this for all six holes, pay attention to the M3 vs M4 hole indicators on the Jig.

Drilling Tips:

- Make sure the jig is free of any burrs along the edges.
- While you are drilling, make sure the jig is not over tightened.
- Over tightening will displace the drill holes if you are crushing the jig. Snug, not crushed.
- **Make sure the drill chuck is not hitting the vise itself while drilling.**

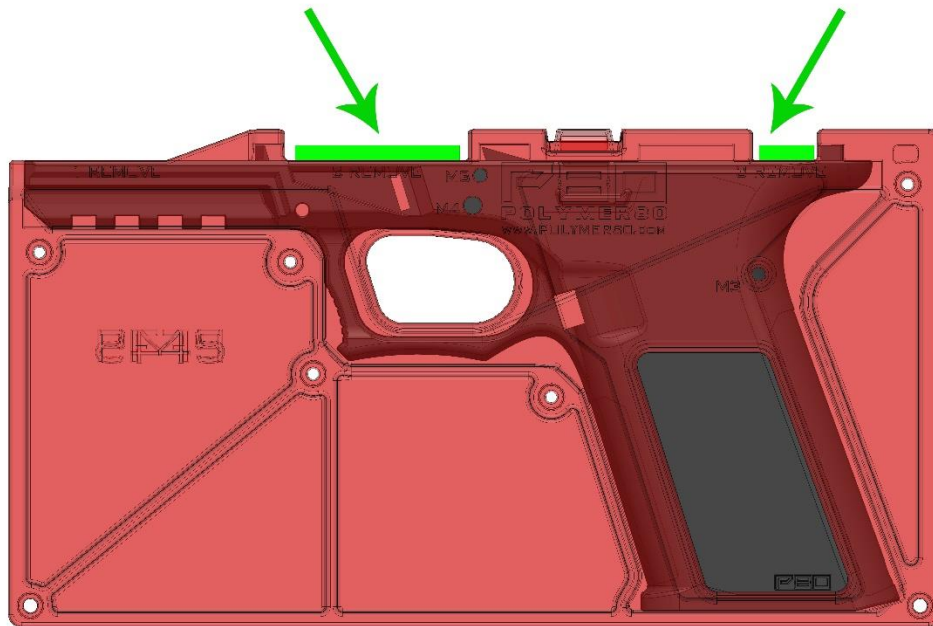


Top Rail Block Milling Procedure

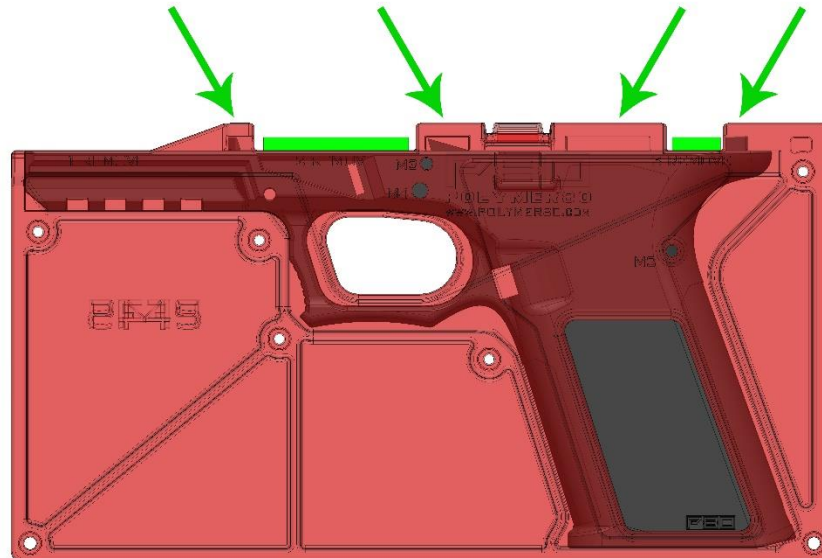
Using an end mill "bit", otherwise called "end mill" is the preferred method.

1. Leave the frame in the jig and place the jig into our cross slide vise. Install the end mill in the Drill Press, adjusting the table so you don't necessarily need to move the chuck head up or down. Get it even with the top of the frame but leave a little bit of room and slowly mill away the polymer where the green arrows are indicated below.
2. There is no need to get overly aggressive at this stage. You can always leave a little extra material to sand down by hand or use a Dremel with a fine sanding wheel to refine the top part of the frame to attain a smooth and clean finish. **Remember the use of a Dremel in the untrained hands can cause a lot of damage.**

During this procedure, you are only removing the material that protrudes above this area in green:



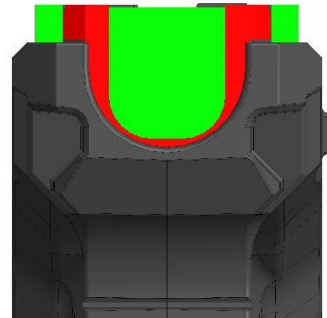
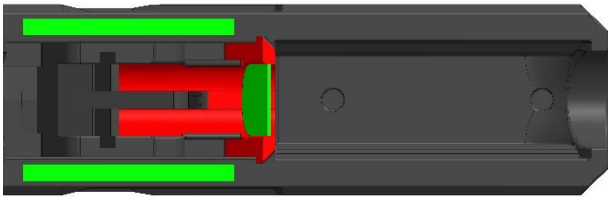
DO NOT REMOVE THESE RED TOWERS. Don't mill the red jig on the top.



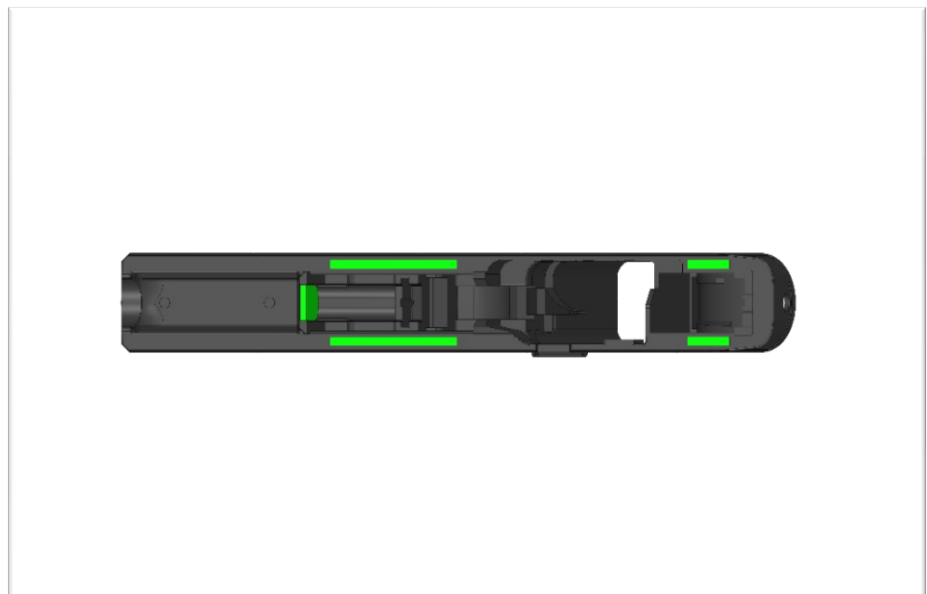
Barrel Block Milling Procedure

Using an end mill to mill out the Barrel Block is probably the most complex procedure, so please pay careful attention to the areas that need to be removed vs the areas that should not be removed: You can also use one of the many other proven ways to remove the interior barrel block. **DO NOT REMOVE THE DUST COVER AREA AS INDICATED IN RED.** Only remove the green colored areas.

- 1) **DO NOT REMOVE** THE POLYMER INDICATED IN RED BELOW.



- 2) Adjust the drill press so you can put the Jig and Frame upright (pictured below), so the end mill is pointing down through the nose of the jig and frame and facing you. Make sure the end mill and the chuck do not interfere with the jig as you plunge carefully down and slowly mill out the green area. You can leave a little bit of material and finish with a 1/4inch round file later. Remove **ONLY THE GREEN AREA.**



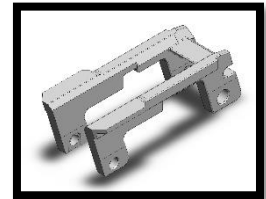
Remove only the green area on the barrel block. There's a relief in the material that's visible on both sides. This indicates the edge of the milling area.



Remove only the green area on the barrel block. There's a relief in the material that's visible on both sides. This indicates the edge of the milling area.

Installing the Locking Block Rail System (LBRS)

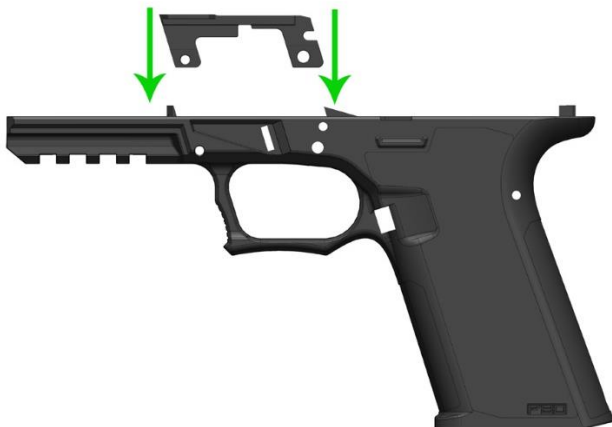
Once you are finished with the milling, it's time to install the Locking Block Rail System. The patent pending system is a hardened stainless-steel component with a black nitride surface treatment. The LBRS features a multi-functional design efficiently incorporating the locking block and slide rails, and it provides the strength behind the slide stopping block buffer.



LBRS

- Install the locking block by lightly tapping it into place. Align it as indicated below (Some slight hand fitment maybe necessary)
- Utilize one of the provided 3mm x 25mm black pins. Tap the pin with a hammer all the way through the side hole and front legs of the LBRS. The pin should be equally distributed across the pistol frame.

Step a:

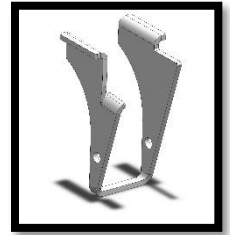


Step b: Tap the small P80 pin into the front hole



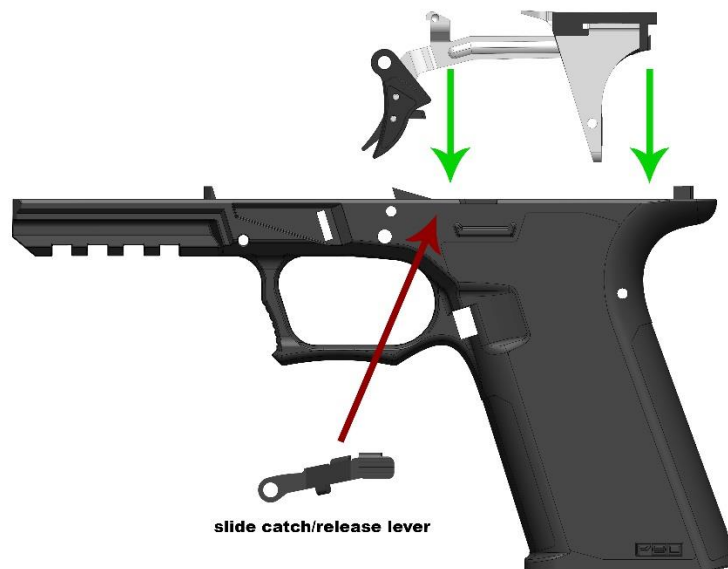
Installing the Frame Parts Kit (not included with this kit) and the Rear Rail Module (RRM)

(To complete this process, you'll need a Frame Parts Kit with the trigger kit, trigger mechanism housing and all other parts are sold separately).



RRM

- 1) After the LBRS has been installed, as described in the previous instructions, install the Magazine Catch Spring, gently tapping the pin into the hole inside the magwell with a hammer and punch. The pin sticks up into the Magazine Catch area approximately 2mm when completed. Install the Magazine Catch using long needle nose pliers to nudge the pin in place on the inserted Magazine Catch until it snaps into the safety switch hole.
- 2) Install the slide stop lever Spring and Stop (**See page 14**)
- 3) Install Trigger Mechanism Housing and Trigger:
 - a) Slide the RRM around the trigger mechanism housing. Install the entire unit (Including the trigger, trigger bar, etc.) into the rear housing hole and the trigger hole (Assuming the trigger bar and trigger are already attached to the trigger mechanism housing).



- 4) Install the Slide Release Lever, sliding it alongside the Trigger and aligning the hole on the Lever with the hole on the Trigger and Trigger Pin hole on the side of the frame (The trigger pin will be found in the frame parts kit you ordered).
 - a) Now tap the Trigger Pin (4mm by 25mm black pin) through the Trigger Pin hole. Remember to make sure your slide release lever is lined up properly.
 - b) This is the toughest installation step because a small hammer and punch may be required to line up the trigger and slide release lever.

The system should be ready to test with your slide and barrel now. Make sure no loaded magazine are used!! – **BE SAFE, TEST WITH UNLOADED GUN!**

Installation of slide lock spring (included in kit)

- 1) Drop the included slide lock coil spring into hole at center of slide lock area.
- 2) Use a small punch through one side of the slide lock slot to completely cover and depress spring to bottom of slot.
- 3) Insert slide lock lever into opposite side of slot at an upward angle and push over the top of the punch.
- 4) Pull out punch while simultaneously pushing slide lock further into slot.
- 5) Fully insert slide lock and check for functionality when complete.



Final Pistol Build, Tuning and Fitment

As mentioned above, to complete the PF45 pistol frame builds, you'll need a frame parts kit, a slide and barrel and possibly the slide parts kit if the slide doesn't already come complete. The use of a flat sharpening stone to polish the locking block and rear rails may be necessary in the final steps of tuning. This is mainly due to variances in slide and barrel tolerances, **some hand fitting and polishing may be required of your rails.**

Tight Fitting Rear Rail Module with the Trigger Mechanism Housing:

When putting the RRM (rear rail module) and Trigger Mechanism Housing together in the frame, it can be very tight. Here's the basic procedure you should follow to complete the frame.

- 1) Ensure all parts are fully seated and held secure during installation of pins
- 2) Attempt to install pin normally from one side with all parts (frame/RRM/trigger housing)
- 3) Attempt to install pin normally from **other** side with all parts (frame/RRM/trigger housing)
- 4) Attempt to install pin while using second pin for alignment from opposite side with all parts (frame/RRM/trigger housing)
- 5) Attempt to install pin without trigger housing (This will allow the pin to "set" the RRM in the frame without the constraint of aligning the trigger housing)
- 6) Re-attempt installation of pin normally or while using alignment pin from opposite side with all parts (frame/RRM/trigger housing)

Finally: If the rail module and the pins with the frame cannot be installed (With **no** trigger mechanism housing installed), do the following:

- 7) Take the RRM out of the frame. Take the small M3 drill bit (Installed on your drill), push all the way through and pull out of the RRM to clean up the holes. **DO NOT** re-drill your frame at this point. You can clean up your holes with a deburr tool and lightly wet sand the holes without enlarging the holes. This is only to clean out the holes.
- 8) Attempt re-installation of all parts put together.
- 9) If the plating on the RRM starts to chip and come off during this process it normally will not affect the guns performance, you can lightly sand the area and remove the rest of the plating. **Removing the plating does not affect the structural integrity.**

Fitment to Slide and Testing

MAKE SURE THE GUN IS NOT LOADED!

Once you put the slide and frame together it could be slightly stiff at first, therefore use gun lubricant along the slide rails and other touch points to get things working smoothly. If you're familiar with how a frame and slide feel, then you'll have a baseline for the feel that you're attempting to achieve of your new Polymer80 build. Remember it may take a few hundred rounds to get the desired feel after proper break-in.

Don't put the magazine in while testing this, and don't use a loaded magazine. BE CAREFUL, ensure that the pistol is unloaded.

Again, you'll want to test without the magazine at first. Rack the slide back and forth, get the kinks worked out and finally test to make sure the pistol is going into battery. Battery position is when the slide moves all the way forward, bringing the barrel up and into its proper position flush with the top surface of the slide.

It should go into battery, even when you pull the slide back one inch, and cleanly let go.

Now point the gun upwards making gravity the enemy and continue pulling back one inch and letting go. It should go into battery each time. At the very beginning, it's possible that it doesn't go into battery each time but keep racking it back and forth with lubricant to get the roughness worked out. Remember due to variances in slide and barrel tolerances, some hand fitting and polishing may be required of your rails.

Now it's time to go the range and test with live ammunition. Have fun, be careful and put several hundred rounds down range to allow the system to work smoothly together, especially if you are using a new slide/barrel combo.

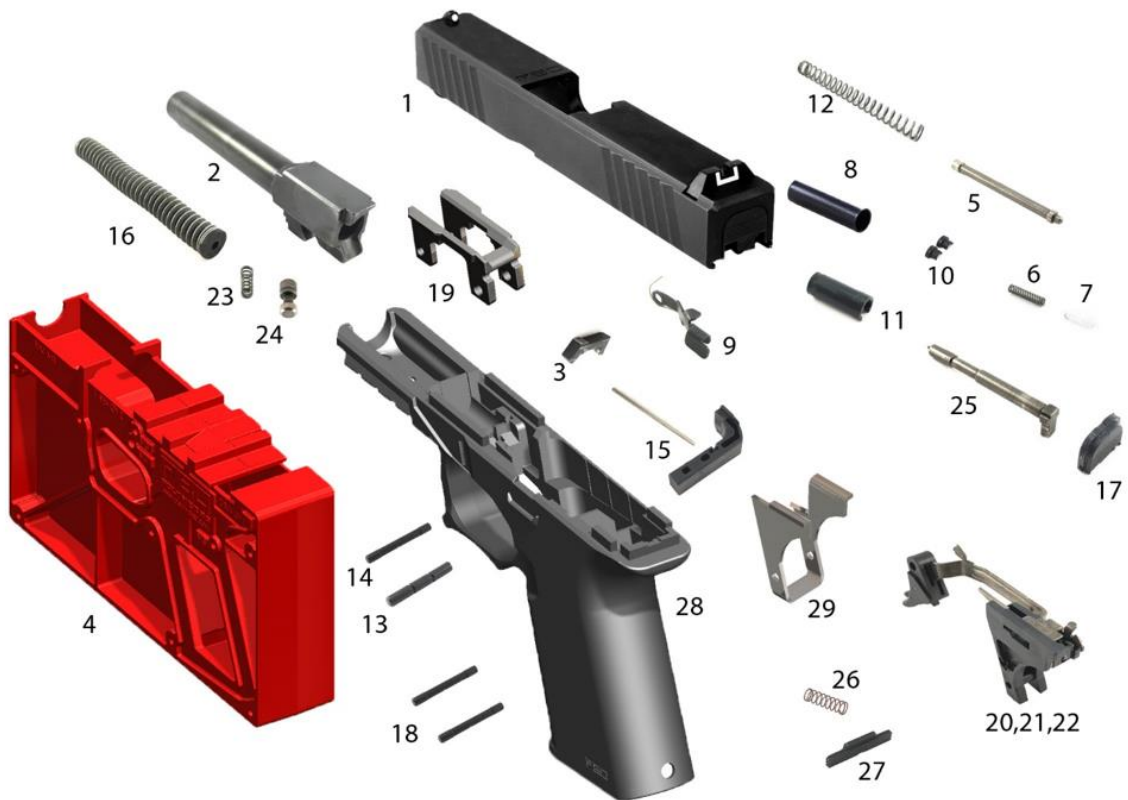
Note: Most of the issues we see in testing are related to a **new barrel**, whether that be in combo with a new slide or even a factory slide. If that's the case, and if you happen to have a compatible known working slide and barrel combo, use that combo to isolate whether or not a new barrel/slide combo is the source of any battery failure modes.

Congratulations! You are now the proud owner of a PF45 pistol frame, a pistol that you built and tuned yourself. Welcome to our growing 2nd Amendment family. You are purposefully exercising your rights to own, build and operate firearms.

Parts List

(not all parts are included within the Polymer80 standard 80% kit)

Provided below is a convenient complete list of parts that are needed to finish your own PF940 series pistol frame. We have included a list of retailers that offer the necessary parts on our website. Make sure you purchase the correct kit for the size of pistol frame you are building.



Complete Pistol Parts List with P80 Frame, Jig and Custom Components	
1) Polymer80 PF45 Slide (sights sold separately)	16) Recoil Spring/Guide Rod Assembly
2) Barrel	17) Slide Cover Plate
3) Extractor	18) Polymer80 front and rear pins
4) Jig	19) Locking Block Rail System (LBRS) (provided by Polymer80)
5) Extractor Depressor	20) Trigger Mechanism Housing 21) Trigger, 22) Trigger Bar
6) Extractor Depressor Spring	23) Firing Pin Safety
7) Spring Loaded Bearing	24) Firing Pin Safety Spring
8) Firing Pin Channel Liner	25) Firing Pin
9) Slide Stop Lever	26) Slide Locking Lever Coil Spring
10) Spring Cups	27) Slide Locking Lever
11) Firing Pin Spacer Sleeve	28) Frame (Polymer80 PF940 series frame kit)
12) Firing Pin Spring	29) Rear Rail Module (RRM)
13) Trigger Pin	
14) Polymer80 Trigger Mechanism Housing Pin	
15) Magazine Release and Spring	

CHECK BACK ON OUR INSTRUCTIONS SECTION OF THE WEBSITE PERIODICALLY. WE CONTINUE TO ADD INFORMATION THAT WILL EXPAND AND REFINE THE INSTRUCTIONS OVER TIME.

**If your questions can't be answered here, call support at 1-800-517-1243 Option 4
or send a Customer Support ticket through
<http://www.polymer80.com/contact>**