

AperturaTM
BALLISTICS

-VISETM

Installation and Test Procedure Manual

Thank You For Your Business

We at Apertura Ballistics LLC would like to thank you for purchasing a D-Vise, which we believe to be the most innovative and effective improvement in rifle precision since the rifled barrel, modern ammunition, and optics. That's a bold claim and we back it up.

Guarantee

Apertura Ballistics LLC is confident that once the D-Vise is properly installed on your firearm, the typical shot group size will be reduced. With a few exceptions discussed later, you should notice a reduction in dispersion with most types of commercial ammunition and hand loads. You should be able to find several that perform better in your firearm with the D-Vise installed than without it.

Apertura Ballistics LLC is so confident in this claim that we are offering a 60 day, no hassle, money back guarantee. If, within 60 days of your initial purchase, you are unhappy with your D-Vise for any reason you may return the D-Vise in its original packaging for a full refund, less the cost of shipping.

Performance Objective

The primary goal of the D-Vise is to make a meaningful improvement to the precision of your firearm. In other words, to make your firearm capable of shooting smaller average groups. A secondary goal is for you to be able to evaluate the reduction in group size in a mathematically and statistically valid way, without having to do all the math yourself, using a reasonable number of rounds. We provide a test procedure that does exactly that.

Theory of Operation

A key concept to understand about bullet dispersion is that what happens when the bullet is very near and exiting the crown is absolutely critical, much more important than what happens during the bullet's travel through the rest of the barrel. One of the largest, if not the largest, causes of dispersion is variation in the direction your bullets are pointed as they exit the barrel. Essentially, bullets are often very slightly loose as they exit the barrel which causes them to point in and therefore travel in slightly different directions. The amount of looseness we're referring to is often less than 1/1000th of an inch, but that's enough to cause significant shot dispersion. The D-Vise overcomes this problem by squeezing the region near the crown enough to very slightly reduce the bore diameter and ensure that the bullets are closely fitting and well guided as they exit the barrel.

Many people believe dispersion is largely caused by barrel vibration or harmonics, specifically in a direction perpendicular to the barrel axis. This is what is commonly referred to as "barrel whip". While barrel whip does have some effect, it is not the major effect.

There are some higher frequency harmonics that are theorized (in some cases with very solid theory) to be significant causes of dispersion, but these do not cause what is typically thought of as barrel whip. Instead, they mostly cause high speed variation in the bore diameter resulting in the slightly loose condition at the barrel crown described above.

It can be shown mathematically that the normal pressure inside the barrel causes a slight expansion of the bore behind the bullet as it travels down the barrel. This leads to bullets being slightly loose in the bore. The thinner and lighter a barrel is, the bigger this effect is and vice versa. We believe this is one reason heavy barrels often shoot tighter groups.

Of course, dispersion is also caused by poor barrel quality. There is a whole range of barrel quality and better barrels generally produce better precision. Poor barrel quality, such as barrels that show obvious defects or roughness in the bore, will cause the bullet to be slightly tighter and slightly looser at various parts of its travel through the bore, including as they exit the barrel.

And the list of causes could go on. The D-Vise can do a great deal to overcome many of these causes of dispersion, improve rifle precision, and reduce group sizes.

General Guidance

The D-Vise will generally improve rifle precision even with ammunition that is not of the highest quality. In our testing, it has even made some spectacularly bad ammunition shoot very respectable groups. However, for the best results, we recommend using an ammunition, either commercial or hand loaded, that is of reasonably good quality or as high of quality as possible, especially with regard to the quality of the bullet itself and with regard to consistent velocity. The D-Vise gets the bullets leaving the barrel in a consistent direction, but it's the quality of the bullet and the consistency of the velocity that keep them going in that direction all the way to the target.

Using higher quality ammunition may lead to a smaller percentage of group size reduction because you are starting with smaller groups. However, the overall size of the final groups after the D-Vise is installed will generally be smaller if you are using better ammunition. The percentage of group size reduction is not nearly as important as how small the final groups are.

Although the D-Vise does reduce shot dispersion in most cases, there are, of course, limitations. The D-Vise will likely not improve dispersion in the following cases:

1. If the bullets are too heavy for the barrel twist rate to stabilize them. In this case, the bullets are dispersing after they leave the barrel.
2. If the bullets are of such poor quality that their center of gravity is significantly off axis. Again, the bullets are dispersing after they leave the barrel.
3. If the ammunition has enough velocity variation that this variation is the primary cause of vertical dispersion at the distance to the target.
4. If the ammunition produces secondary pressure spikes. This is a situation where a secondary ignition of unburned powder occurs when the bullet is most of the way down the barrel. The resulting pressure spike expands the bore slightly causing bullets to exit in slightly different directions. To the shooter it just looks like ammunition that doesn't group very well with or without the D-Vise. The pressure can be so high that it will overcome the compression that the D-Vise puts on the end of the barrel. With or without the D-Vise such ammunition can potentially be dangerous to shoot and should be avoided.
5. If the rifle and ammunition combination are already shooting group sizes that leave no significant room for improvement. In this case there is already almost no bullet dispersion.

Warning

In order to safely and effectively install and use of the D-Vise, it is important that the owner, user, and installer of the D-Vise read this entire manual and strictly follow the warnings and instructions within. The D-Vise should be used only by those who are well-versed in the safe operation of firearms and who possess the technical skill to properly install it. Completion of a certified firearms safety course is highly recommended.

Always observe all rules of gun safety when handling or working on firearms, especially with regard to ensuring the firearm is unloaded. Apertura Ballistics LLC shall not be liable for any injury, death, or property damage that occurs as a result of negligent, or illegal, handling of firearms either while installing the D-Vise, or utilizing a firearm with the D-Vise installed.

Never attempt to install or remove the D-Vise on a loaded firearm. Remove all ammunition from the firearm chamber and magazine, and remove the bolt assembly, before proceeding. Make sure the firearms safety is on "safe". Open the firearm action and visually verify that the chamber is empty and leave the firearm action open throughout the duration of the installation process. If you are unsure about how to do this, do not proceed with installing the D-Vise until you have consulted your firearm's manual about the correct procedure for safely unloading your firearm.

Failure to follow these instructions will void this product's warranty, and may result in damage to your firearm, damage to the D-Vise, property destruction, serious injury, and/or death. Follow all assembly instructions and gun safety rules to ensure proper and safe assembly of the D-Vise onto your firearm. Apertura Ballistics LLC shall not be liable for any event that arises as a result of deviating from these instructions.

Not all tools required to assemble the D-Vise are provided with the D-Vise kit itself and with the installation kit. If at any time during this product's installation you do not have the correct tool to complete the assembly, stop immediately and do not proceed further until you have obtained the correct tools to assemble the D-Vise.

After you have successfully installed the D-Vise and before each subsequent use of the firearm on which it is installed, carefully inspect the D-Vise to ensure that the installation remains correct, that the D-Vise is secure on the end of the barrel, and that it is in good working order. If the D-Vise were to become loose on the barrel, it could result in it moving when the firearm is being fired. This could result in a bullet striking the D-Vise which could result in serious injury and/or death.

By installing the D-Vise on your firearm, you are acknowledging that you have read this manual and accept all product warnings, warranty terms, and liability limits contained within this document. You further acknowledge that you have the required tools and technical skills to install the D-Vise properly. If, after reading this manual, you are not certain you can assemble the D-Vise correctly, contact customer support and/or seek help from a licensed gun smith.

If you do not agree to any of these terms and conditions, do not proceed with the installation of the D-Vise and return the D-Vise to Apertura Ballistics LLC per the terms of the return policy.

D-Vise Kit

Your purchased product includes the following items:

- (1) Body
- (1) Muzzle Cap
- (1) Breech Cap
- (1) Collet
- (1) Threaded Sleeve or (3) Non-Threaded Sleeves, depending on the version
- (1) Thrust Washer

Installation Kit

The Installation Kit contains the following:

- (1) Assembly block
- (1) Installation tool
- (1) Set of caliber-specific gage pins (refer to the Gage Pin Table in the back of this manual)
- (1) Removal tool

It is highly recommended you purchase an Installation Kit.

The Assembly Block and Installation Tool are designed to minimize the risk of cosmetic damage to the D-Vise during installation and removal. Similarly, the removal tool is designed to remove the D-Vise with minimal risk of cosmetic damage. While these items are not absolutely required to assemble the D-Vise onto your firearm or remove it from your firearm, failure to use them will void your product warranty, as it is highly likely cosmetic damage will occur. These items may be purchased once and reused on multiple D-Vises. Replacements may be purchased separately if needed.

Warning:

You cannot assemble the D-Vise correctly and safely without the correct size gage pins. The required gage pins are precision ground with a diameter tolerance of ± 0.0001 inch. Do not attempt to substitute anything else to verify the correct bore diameter during the installation.

Although suitable gage pins are readily available from many sources, Apertura Ballistics LLC has assembled a set of pins suitable for each specific caliber, reducing the risk of inadvertently using incorrect pins. These caliber-specific kits contain only the required pins for a given caliber and may be purchased separately from Apertura Ballistics LLC. A set of gage pins may be reused to install multiple D-Vises on firearms of the same caliber, but installation on a different caliber requires a different caliber-specific gage pin set.

Additional Tools and Materials Required for Assembly

The following additional tools and materials are required to assemble the D-Vise to your firearm:

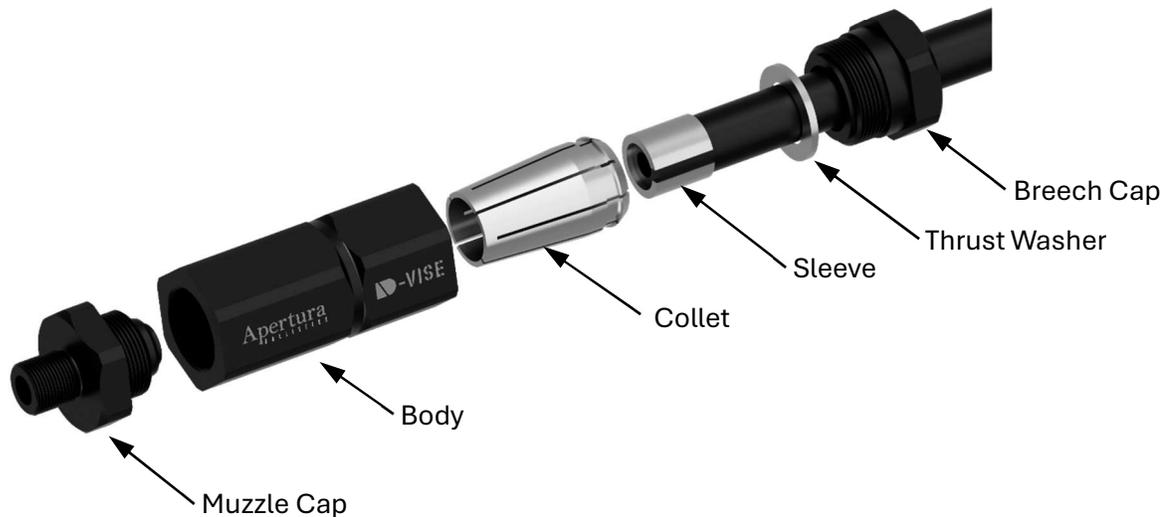
- A mid to large size bench vice (3-inch minimum jaw width) securely attached to a fairly rigid work bench or table and able to withstand up to 150 ft-lbs torque being applied to the D-Vise and Assembly Block when the Assembly Block is clamped in its jaws.
- A ½-inch drive breaker bar, torque wrench, or other suitable long handled socket wrench able to withstand up to 150 ft-lbs of torque.
- A lubricant suitable for the threads and collet. We recommend typical gun oils, fully synthetic motor oils, or anti-seize lubricant. Do not use lubricants that will plasticize over time, such as vegetable oil.



Benchmark Group Size Prior to D-Vise Installation

It is important to benchmark your firearm's group size per the Test Firing Procedure below prior to installation. It will be impossible to determine the effectiveness of the D-Vise if this step is skipped short of removing the D-Vise and starting over. See the Test Firing section of this document for information on how to test.

D-Vise Installation Instructions



1. Gather all necessary materials and tools as outlined above (D-Vise Kit, Installation Kit, and Additional Tools and Materials Required for Assembly) before attempting to assemble the D-Vise onto a firearm.
2. **Warning: Ensure the firearm is unloaded! If it is loaded, then unload it before proceeding further! Failure to follow this step may result in serious injury or death!**
3. **Warning: Ensure the barrel diameter meets the requirements printed on the D-Vise Kit box. If the D-Vise were to become loose on the barrel, it could result in it moving when the firearm is being fired. This could result in the bullet striking the D-Vise which could result in serious injury or death.**
 - a. With a threaded sleeve, attempting to install the D-Vise on a barrel with too large a diameter may result in the D-Vise not functioning as intended. Compression could be applied in the wrong location, directly on the barrel instead of on the sleeve. This could result in poor performance and/or damage to the exterior of the barrel.
 - b. With a non-threaded sleeve,
 - i. Attempting to install the D-Vise on a barrel with too large a diameter will result in difficulty assembling the sleeve onto the barrel and the collet onto the

sleeve. This could result in damage to the exterior of the barrel and incorrect assembly of the D-Vise.

- ii. Attempting to install the D-Vise on a barrel with too small a diameter may result in the D-Vise not properly compressing the barrel and/or being or becoming loose on the end of the barrel. Failure to compress the barrel properly will result in poor performance, but the D-Vise becoming loose on the barrel has the potential to result in injury and/or death as stated above.

4. Verify the bore diameter of your firearm.

Using the Gage Pins specified in the Gage Pin Table, measure the inner diameter of the barrel at the crown by finding the largest pin size that slides freely into the muzzle end of the barrel. The pin should slide at least an inch into the end of the barrel.

Gage Pin Table

Caliber	Bore Diameter (tol = Min+.002)		Pin1	Pin 2	Pin 3	Pin 4
	Minimum (inch)	Maximum (inch)	Min bore + .001 (inch)	Min bore (inch)	Min bore - .001 (inch)	Min bore - .002 (inch)
.223 / 5.56mm	0.219	0.221	0.220	0.219	0.218	0.217
.243 / 6mm	0.237	0.239	0.238	0.237	0.236	0.235
.250 / 6.35mm	0.250	0.252	0.251	0.250	0.249	0.248
.264 / 6.5mm	0.256	0.258	0.257	0.256	0.255	0.254
.277 / 6.8mm	0.270	0.272	0.271	0.270	0.269	0.268
.284 / 7mm	0.277	0.279	0.278	0.277	0.276	0.275
.308 / 7.62mm	0.300	0.302	0.301	0.300	0.299	0.298
.338 / 8.59mm	0.330	0.332	0.331	0.330	0.329	0.328

Caution:

Do not force a gage pin into the barrel bore or use a tool to drive it into barrel bore. Doing so will damage both the firearm and pin. If a pin becomes damaged it will be useless for measurement so replace it before proceeding. The correct pin will be the largest diameter pin that you can slide freely into the crown end of the barrel.

Barrels do not have perfect bore sizes and are not perfectly straight, so use caution to avoid having a pin become stuck in the barrel. If a pin does become stuck, use a cleaning rod to gently tap it back out. Do not use pliers or any other gripping tool to grab the outside diameter of the pin to pull it out since this will damage the pin and make it useless for measurement.

Once you have identified the largest pin that fits into the barrel, set it aside and make a note of its size. The size is the number printed on the side of the pin, for example .300". Write this number down to remember it.

Although the gage pins are in .001" increments which is sufficient for this measurement, it is possible to make a qualitative judgement of fit beyond the .001" increment. You may find it useful to note how the fit of the pin feels in the barrel. For example, it may feel like it is just barely sliding in and has fairly tight contact with the bore, or it may feel like it has a little bit of clearance and can be moved slightly side to side. This is a qualitative judgement that is not absolutely necessary, but you may want to use if you feel comfortable doing so.



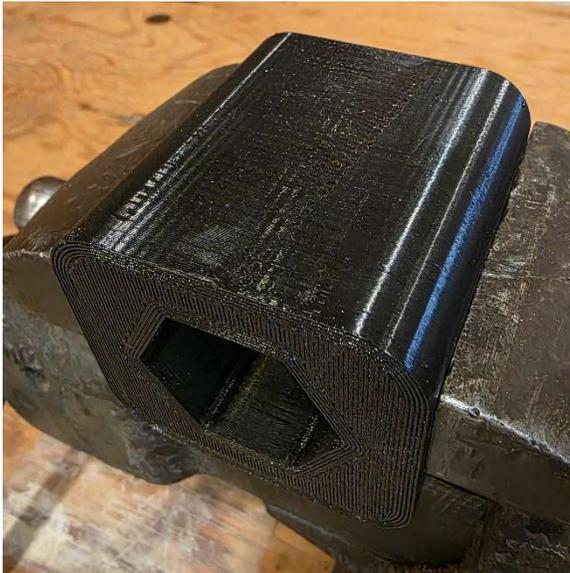
Example: A .301 gage pin does not fit in this barrel, but a .300 gage pin does.

5. Identify and set aside the gage pins that are .001" and .002" smaller than the largest pin size that slides freely into the muzzle end of the barrel, identified in the previous step. For example, if the pin identified and set aside in the previous step was a .300" diameter pin, then also identify and set the pins labeled .299" and .298" pin. These are the pins that will be used to verify proper barrel compression.
6. Place the Assembly Block into a bench vise with one edge sticking out slightly past the end of the vise jaws. Orient the block in the way you wish to have the D-Vise oriented on your firearm with either a flat side or a point of the hex pointing up. Clamp the Assembly Block into the bench vice with sufficient force to hold it in position but not much tighter.

For aesthetic purposes, you may wish to have the D-Vise oriented a certain way on your firearm. Make a note of which way the D-Vise is in the block such that you may orient your firearm properly in the next few steps.

Caution:

The Assembly Block is made from a softer material than the D-Vise to prevent cosmetic damage to the D-Vise during installation. It is strongly recommended that you do not simply clamp the D-Vise into a bench vise because so will likely result in cosmetic damage to the D-Vise and void your product warranty. The Assembly Block also engages the D-Vise on all six of the hex surfaces which holds it much more securely during the installation.



7. Apply a small amount of lubricant to the threads and inner surfaces of the Body, to the threads of the Muzzle Cap, to the threads of the Breech Cap, and to the end of the Breech Cap near the threads.

Caution:

Failure to apply lubricant will make it difficult, or impossible, to remove the D-Vise from the firearm without damaging the firearm, the D-Vise, or both during the removal process and will void the warranty.



8. The Body and Muzzle Cap are pre-assembled. If they have been disassembled for any reason complete this step to reassemble them.

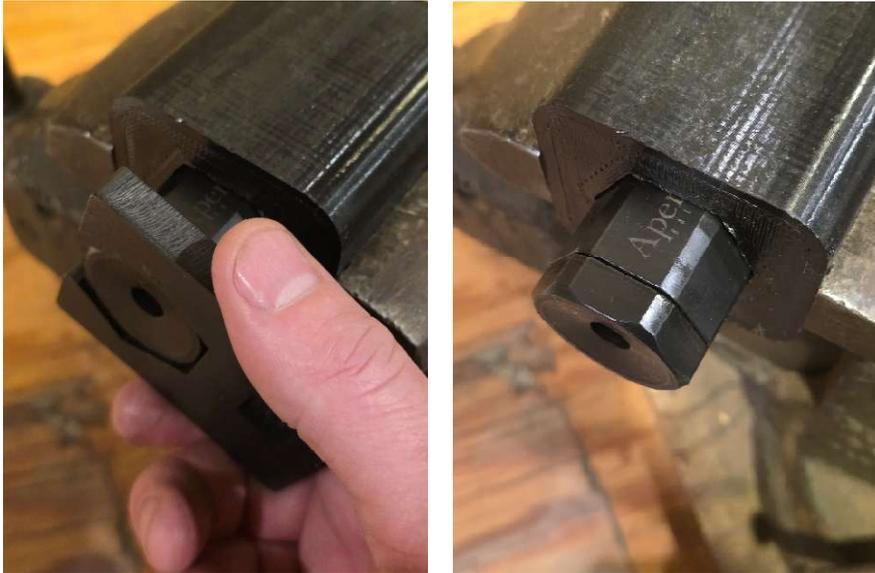
Apply a small amount of lubricant to the threads of the Muzzle Cap.

Thread the Muzzle Cap clockwise into the Body until the mating faces of the Body and Muzzle Cap meet. When the faces meet, it is likely there will be misalignment of the hex surfaces between the Body and the Muzzle cap. Turn the Muzzle Cap no more than 1/6 turn counterclockwise to line up the hex surfaces.

The threads are intentionally machined to have a very close fit. Hand assembly is preferred, but you may also use the Assembly Block, the Installation tool, and a breaker bar to complete this step.

Insert the Body into the Assembly Block so the Muzzle Cap is accessible past the end of the vise jaws. Tighten the vise slightly to help hold the Body securely in the Assembly Block. Turn the Muzzle Cap to the correct final location. Loosen the vise slightly to release the assembled

Body and Muzzle Cap. Set the assembled Body and Muzzle Cap aside. Leave the Assembly Block in the vise.



9. Determine which sleeve is appropriate for your firearm.
 - a. Threaded sleeves are for use only with threaded barrels. If you purchased a version with a threaded sleeve, then ensure the thread specification is correct to fit the threaded section at the end of your firearm's barrel.
 - b. Non-threaded sleeves are for use only with non-threaded barrels. Your D-Vise kit includes multiple sleeves which have the same outside diameter but different inside diameters. Select the sleeve that has the least clearance with your barrel.

10. Put the sleeve on the end of the barrel.

- a. If your barrel is a threaded barrel:

Remove any thread protector may be installed over the barrel threads.

Thread the Sleeve onto the end of the barrel until it stops or is flush with the end of the barrel, whichever comes first. The sleeve should be finger tight only.

If the threaded section on your barrel is longer than the sleeve, only thread the sleeve on until it is even with the end of the barrel. To achieve proper compression, it is important that the sleeve is not threaded onto the barrel past being even with the end.

If the threaded section of your barrel is shorter than the sleeve then the sleeve will protrude slightly past the end of the barrel.



b. If your barrel is not a threaded barrel:

Slide the sleeve onto the end of the barrel until it stops with the shoulder in contact with the barrel crown.



11. Apply a small amount of lubricant to the Breech Cap threads. Place the Breech Cap over the barrel of the firearm and move it down the barrel far enough to be out of the way. We suggest moving it down the barrel until it comes to rest against the stock or forearm.



12. Slide the Thrust Washer down the barrel until it comes to rest against the Breech Cap.

13. Apply a small amount of lubricant to the inside and outside of the collet and to the larger end. Slide the larger end over the sleeve until the smaller end is flush with the end of the sleeve.



End of Collet
flush with end
of Sleeve

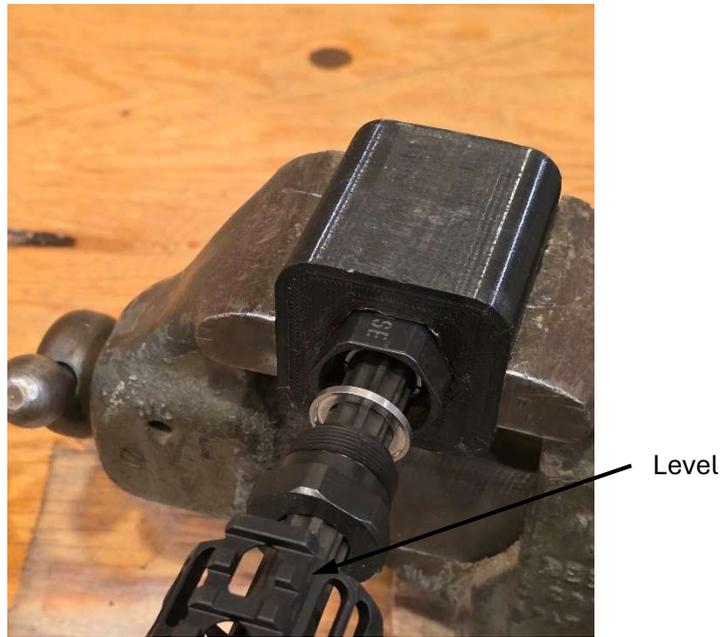
14. Place the assembled Body and Muzzle Cap over the end of the barrel and collet and slide towards the breech until the Muzzle Cap makes contact with the barrel crown.



15. Ensure the Assembly Block is mounted in the vise so one side is flush with the end of the jaws or protruding slightly. This is the side that will be used to tighten the D-Vise, so you must be able to turn the Installation Tool and the breaker bar clockwise from that side of the vise.
16. While keeping the assembled Body and Muzzle Cap in place on the barrel, insert the Body and Muzzle Cap into the Assembly Block leaving a little bit of the breech end of the Body exposed. Tighten the vise slightly to help hold the Body securely in the Assembly Block.



17. While keeping the barrel crown in contact with the Muzzle Cap and the barrel axis horizontal, rotate the firearm around the barrel axis to bring the scope to the top and ensure the orientation of the sides of the hex on the Body are to your preference. It is recommended to use some sort of a level reference on the firearm and on the assembly block to maintain the orientation during the remainder of the installation.



Caution:

Have another person hold the back of the firearm and support it. The Assembly Block is not intended to hold the unsupported weight of a firearm being held only at the muzzle. Failure to support the firearm from the back may result in it falling out of the Assembly Block and becoming damaged.

18. Move the Breech Cap and Thrust Washer forward to the Body and manually thread it into the Breech Cap into the Body hand tight but do not thread it in past the point where it makes contact with the Collet. Similar to the Muzzle Cap, the threads are intentionally machined to have a very close fit. Hand assembly is preferred, but it may be difficult or impossible to completely thread the Breech Cap into the Body by hand. If this is the case, thread it in until it becomes difficult to turn by hand and stop.

Caution:

Make sure the barrel is pressed forward against the Muzzle Cap before proceeding. Failure to do so will result in improper assembly.



Caution:

Failure to measure as instructed in these next steps will likely result in no improvement in the precision of the firearm and may result in permanent damage to your firearm.

19. Retrieve the 3 gage pins that were set aside earlier and insert the largest pin size that slides freely into the muzzle end of the barrel into the end of the barrel. Leave enough of the pin protruding beyond the face of the muzzle cap that you can still hold it with your fingers and slide it in and out of the end of the barrel. If it is difficult to hold the pin with your fingers, you may find it easier to slide it with a cleaning rod from each end. You need to be able to check and feel the fit of the gage pin as you tighten the Breech Cap on the D-Vise.





Example: The .300 gage pin was the largest one that fit in the barrel so start with that one.

20. At this point, you are ready to start tightening the Breech Cap which will start to reduce the bore diameter at the end of the barrel.

Note:

If at any point in this process a gage pin becomes inadvertently stuck in the end of the barrel, you can loosen it either by loosening the Breech Cap or by removing the D-Vise per the Removal Instructions below. Loosening the Breech Cap is not always sufficient and removal of the D-Vise may be required. An effective and simple way to avoid having a gage pin become inadvertently stuck is to tighten the Breech Cap slowly while sliding the gage pin back and forth in the end of the barrel. You will be able to feel when the barrel starts to grip the pin.

Note:

It is possible that tightening the Breech Cap will cause the firearm to rotate slightly relative to the Body. To keep the hex of the Body aligned in the desired orientation, it is recommended to start with the firearm rotated slightly counterclockwise by approximately 5° to 10°. As you begin tightening the Breech Cap, adjust the rotation of the firearm as necessary. If the firearm becomes slightly misaligned to the Body and adjustment becomes difficult, back off the Breech Cap slightly and realign the firearm. Once the D-Vise has sufficient grip on the barrel that the firearm can no longer be rotated by hand then further tightening of the Breech Cap will probably not cause any further rotation of the firearm.

Caution:

The amount of torque required on the Breech Cap will vary significantly from installation to installation. The torque depends greatly on the barrel material, outside diameter or thread size, and the bore diameter. The final torque could be as low as approximately 35 ft-lbs or it could be as high as 150 ft-lbs. Do not exceed 150 ft-lbs of torque. Above this torque you substantially increase the risk of damaging the D-Vise parts and possibly

breaking the Installation Block. If you believe you are approaching this level of torque, use a torque wrench instead of a breaker bar to verify the torque being applied. Exceeding 150 ft-lbs of torque will void the warranty.

Caution:

Do not use a pipe wrench, channel locks, pliers, power tool, or any other inappropriate tool to tighten the Breech Cap. Use only the Installation Tool. Doing so will likely cause cosmetic damage to the D-Vise and/or your firearm and will void your product's warranty.

Warning:

Do not use any power tool to tighten the Breech Cap. Power tools, such as a power socket driver, do not offer sufficiently fine control to properly tighten the Breech Cap which may cause serious damage to the D-Vise and/or your firearm and could potentially make the firearm unsafe to fire.

21. Using the Installation Tool and a breaker bar, slowly tighten the Breech Cap clockwise into the Body. Simultaneously slide the gage pin back and forth in the end of the barrel. Continue to tighten the Breech Cap until you feel the barrel starting to grip the gage pin. Depending on the initial clearance the gage pin had with the bore, this may happen very quickly or it may require a couple turns of the Breech Cap once the Breech Cap has engaged the collet. Remove the gage pin before it becomes too tight in the barrel to remove by hand or easily with a cleaning rod.





Clockwise rotation



22. If getting to the point where the barrel started to grip the gage pin required a couple turns of the Breech Cap, the barrel may have sufficient compression for the D-Vise to be effective. In this case, it is recommended to test fire the firearm to determine if there has been a significant reduction in group size per the Test Firing Procedure below.

Before proceeding, it may be necessary to further tighten the Breech Cap up to 1/6 turn to align the Breech Cap hex with the Body hex. Make sure the gage pin has been removed prior to this additional tightening of the Breech Cap. After tightening, loosen the bench vise and remove the firearm with the D-Vise installed from the Assembly Block.



Hex not aligned



Hex properly aligned

Warning:

If the Breech Cap has been tightened enough to reduce the bore diameter then the D-Vise should be very secure on the end of the barrel. Ensure the D-Vise is securely attached to the barrel and not loose. Grip it tightly with your hand and attempt to both rotate it and to pull it off. Be careful not to apply so much force that damage occurs to the firearm. If the D-Vise is loose, it could result in a bullet striking the D-Vise which could result in injury and/or death.

Warning:

Before shooting the firearm, it is critical to ensure that the Muzzle Cap is not overlapping with the bore of the barrel in any way. Use the smallest gage pin in the set to feel for the end of the barrel inside the Muzzle Cap's bore. The smallest gage pin should slide easily into the barrel's bore and in every direction around the bore you should be able to feel the end of the barrel with the end of the pin. If you cannot, then some portion of the Muzzle Cap may be blocking some portion of the barrel's bore. This is a very dangerous condition that would partially or completely block the bullet from exiting the barrel and could result in injury and/or death.

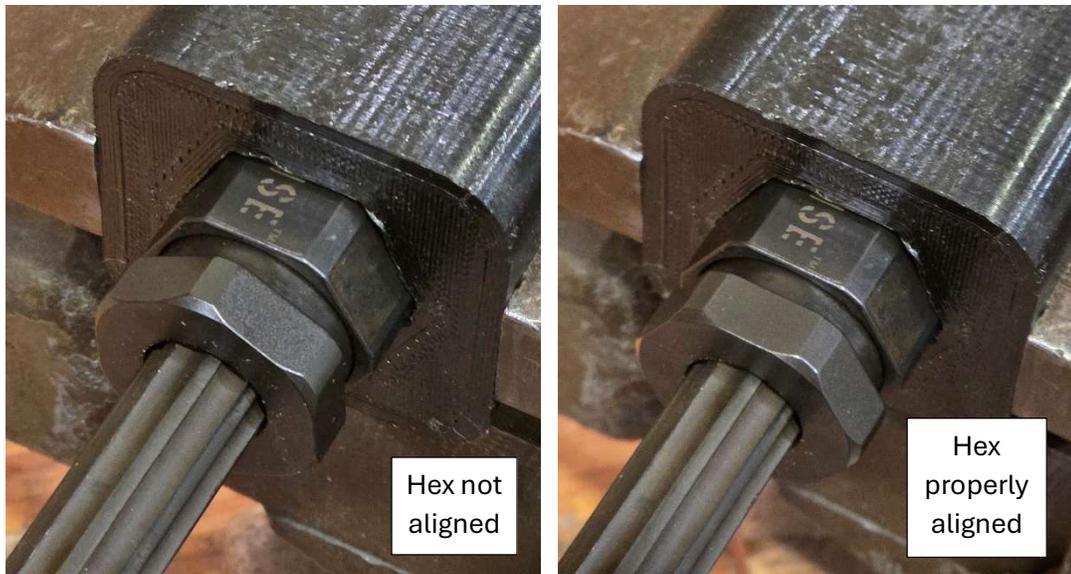
If a significant reduction in group size has been achieved, the installation is complete.

23. If the Breech Cap required less than a couple turns to start to grip the gage pin, or if test firing did not produce a significant reduction in group size, then additional tightening of the Breech Cap is required.

If you removed the firearm and D-Vise from the assembly block for test firing, make sure you put the assembly block back into the bench vise and the firearm and D-Vise back into the assembly block as described above.

Insert the next size smaller gage pin into the end of the barrel. This is the pin that is .001" smaller than the largest pin size that originally slid freely into the muzzle end of the barrel. This pin should slide freely in the end of the barrel.

24. Continue to slowly tighten the Breech Cap clockwise into the Body. Simultaneously slide the gage pin back and forth in the barrel. Continue to tighten the Breech Cap until the clearance feels similar to clearance the previous pin initially had before the Breech Cap was tightened. This point will be very nearly .001" compression of the end of the barrel. If you have difficulty determining this by feel, you may continue to tighten the Breech Cap until you feel the gage pin starting to be nearly gripped by the barrel. Remove the gage pin from the barrel.
25. It is likely that the Breech Cap and Body hex will not be properly aligned at this point. In this case, further tighten the Breech Cap up to 1/6 turn to align the Breech Cap hex with the Body hex. Make sure the gage pin has been removed prior to this additional tightening of the Breech Cap.



26. Insert the next size smaller gage pin into the end of the barrel. This is the pin that is .002” smaller than the largest pin size that originally slid freely into the muzzle end of the barrel. This pin should slide freely in the end of the barrel.

Warning:

If this pin does not slide freely in the end of the barrel it indicates that something was not done correctly during the installation and the Breech Cap has been tightened too far. Remove the D-Vise per the Removal Instructions below and redo the installation. Do not simply loosen the Breech Cap as it is unlikely this will correct the problem.

27. Attempt to insert the largest pin size that originally slid freely into the muzzle end of the barrel into the end of the barrel and verify that it can no longer be inserted. If it can be inserted into the barrel, then something was not done correctly during the installation and the D-Vise will not be effective at reducing the firearm’s group size. In this case, remove the D-Vise per the Removal Instructions below and redo the installation.

Warning:

If the Breech Cap has been tightened enough to reduce the bore diameter then the D-Vise should be very secure on the end of the barrel. Ensure the D-Vise is securely attached to the barrel and not loose. Grip it tightly with your hand and attempt to both rotate it and to pull it off. Be careful not to apply so much force that damage occurs to the firearm. If the D-Vise is loose, it could result in a bullet striking the D-Vise which could result in injury and/or death.

Warning:

Before shooting the firearm, it is critical to ensure that the Muzzle Cap is not overlapping with the bore of the barrel in any way. Use the smallest gage pin in the set to feel for the end of the barrel inside the Muzzle Cap’s bore. The smallest gage pin should slide easily into the barrel’s bore and in every direction around the bore you should be able to feel the end of the barrel with the end of the pin. If you cannot, then some portion of the Muzzle Cap may be blocking some portion of the barrel’s bore. This is a very dangerous

condition that would partially or completely block the bullet from exiting the barrel and could result in injury and/or death.

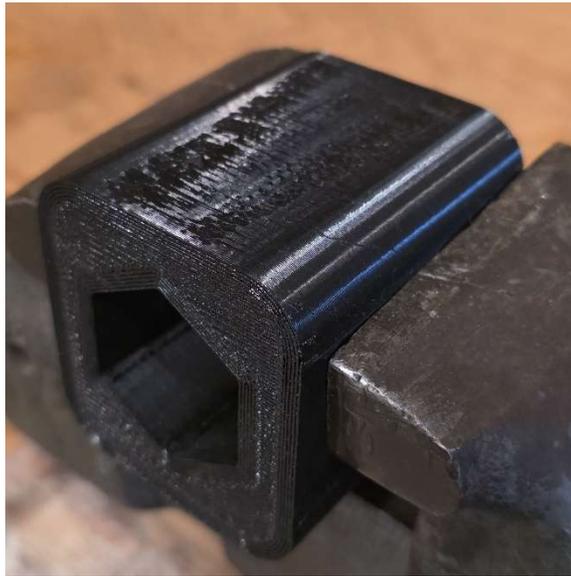
28. When the above steps have been successfully completed, you may loosen the bench vise and remove the firearm with the D-Vise installed from the Assembly Block.
29. The firearm and D-Vise are now ready to be test fired to determine how significant a reduction in group size has been achieved per the Test Firing Procedure below.

Congratulations on completing the D-Vise Installation Procedure.



D-Vise Removal Instructions

1. Removal requires the Installation Tool, Removal Tool, Assembly Block, and a 1/2-inch drive breaker bar. Gather all necessary materials and tools before attempting to remove the D-Vise from a firearm.
2. **Warning: Ensure the firearm is unloaded! If it is loaded, then unload it before proceeding further! Failure to follow this step may result in serious injury or death!**
3. Place the Assembly Block into a bench vise with one edge sticking out slightly past the end of the vise jaws. Clamp the Assembly Block into the bench vise with sufficient force to hold it in position but not much tighter. Ensure it is oriented in such a way that the Installation Tool will be able to be used to turn the Breech Cap counterclockwise.



4. Place the D-Vise into the Assembly Block so the entire Breech Cap is slightly protruding out one side. Tighten the bench vise slightly further until it grips the D-Vise.



Caution:

Have another person hold the back of the firearm and support it. The Assembly Block is not intended to hold the unsupported weight of a firearm being held only at the muzzle. Failure to support the firearm from the back may result in it falling out of the Assembly Block and becoming damaged, especially when the Collet is loosened.

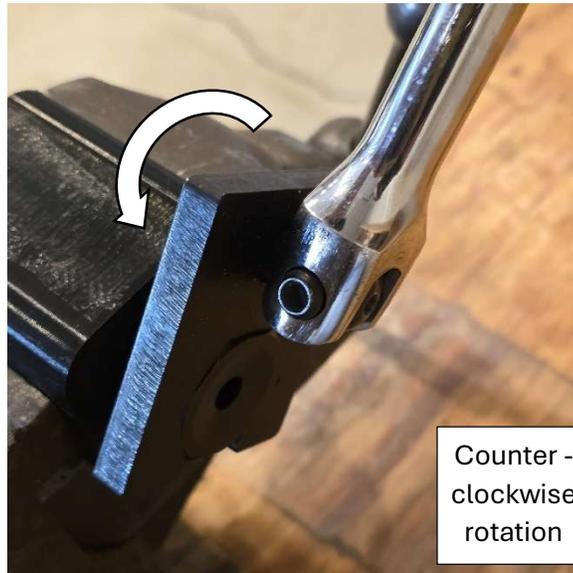
5. Use the Installation Tool and a breaker bar to loosen the Breech Cap by turning it counterclockwise. It is recommended to loosen the Breech Cap until it is approximately one full turn from coming free of the Body and the Breech Cap hex is aligned with the Body Hex. This will prevent the Breech Cap from moving around on the rifle unnecessarily.



6. Loosen the vise and reposition the Assembly Block and D-Vise as necessary so that the entire Muzzle Cap is slightly protruding out one side. Ensure it is oriented in such a way that the Installation Tool will be able to be used to turn the Muzzle Cap both counterclockwise and clockwise. Tighten the bench vise slightly further until it grips the D-Vise.



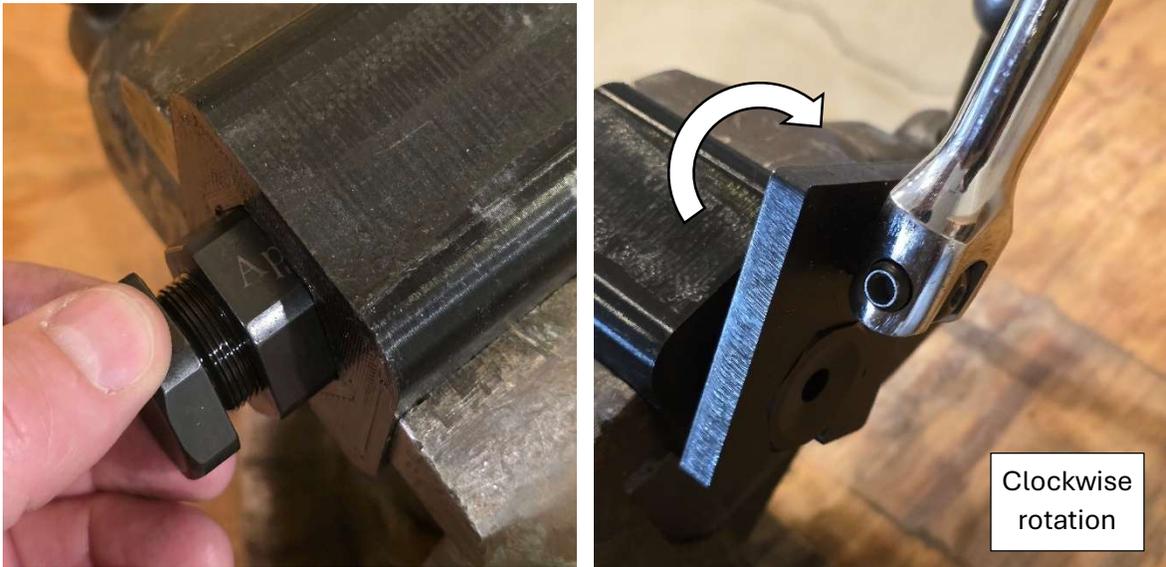
- Using the Installation Tool and a breaker bar, loosen the Muzzle Cap from the Body by turning it counterclockwise until it may be turned by hand and fully removed. Remove the Muzzle Cap fully from the Body.



- Place the Removal Tool onto the Muzzle Cap.



9. Re-install the Muzzle Cap onto the Body turning it clockwise. Turn the Muzzle Cap by hand at first and then using the Installation Tool and breaker bar until the face of the Removal Tool makes contact with the end of the Collet.



10. At this point the torque required to turn the Muzzle Cap will increase. Continue to turn the Muzzle Cap clockwise a fraction of a turn further until you feel the Collet come loose.

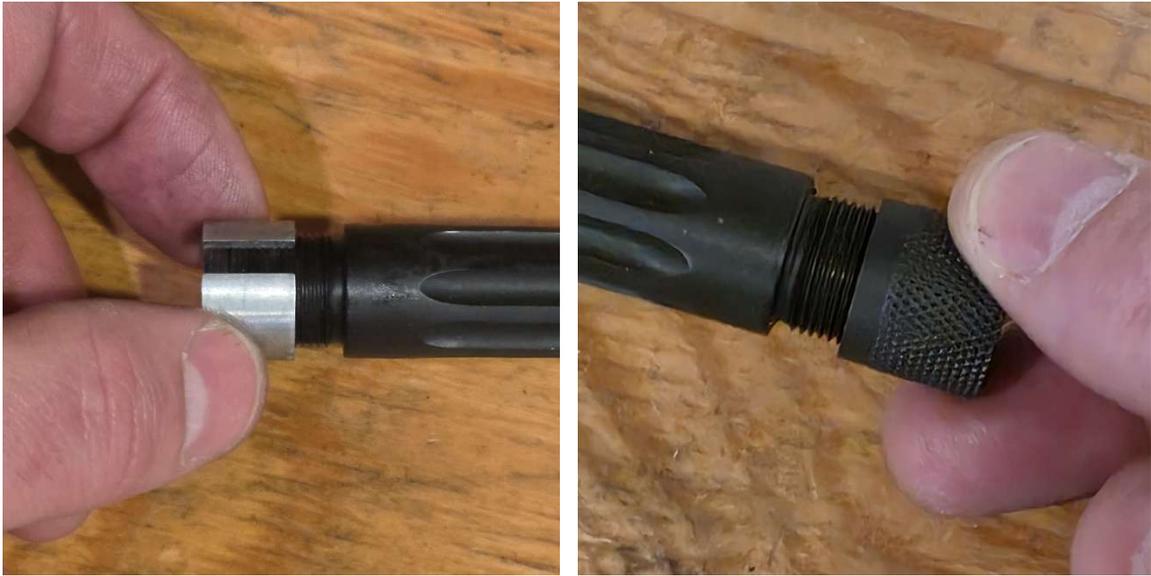
Caution:

Have another person hold the back of the firearm and support it. The firearm will be loosened from the D-Vise during this step. Failure to support the firearm from the back may result in it falling out of the Assembly Block and becoming damaged.

11. The D-Vise is now loose on the barrel. Unscrew the Breech Cap until it has been removed from the Body and then gently pull the firearm away from the D-Vise to slide the barrel out of the D-Vise.



12. Remove the sleeve and, if applicable, replace the barrel thread protector.



13. The D-Vise has now been successfully removed from the firearm and the firearm may be set aside.

14. Remove the Assembly Block and D-Vise from the bench vise and store the components in their original packaging.

Test Firing

Our goal for test firing is to provide you with an easy to use, meaningful, and mathematically valid measurement of how effective the D-Vise is at reducing group size for your combination of firearm and ammunition and to do so with using a reasonable number of rounds. In order to do this, you should test fire the combination of firearm and ammunition both before and after the installation using the Test Firing Procedure below, which has been designed for that purpose.

The Test Firing Procedure gives a statistically robust and meaningful set of results. All it requires you to do is enter the location of each round from the targets you shoot. All the math is done for you. The target provided is designed to make it easy to get the location of each round without actually measuring anything.

The Test Firing Procedure is optional. However, if you do not follow the procedure both before and after the installation, then you cannot say with any validity whether or not, or to what extent, the D-Vise has reduced the group sizes that your rifle is capable of shooting with a particular ammunition. You may be happy with the result without conducting the Test Firing Procedure, and that's ok. In this case you may test it however you prefer or just start using it. Should you decide later that you want to conduct the Test Firing Procedure, it is not a problem to remove the D-Vise, test, reinstall it, and test again.

The recommended minimum number of rounds for testing is 20 rounds before and after the D-Vise installation. More is better, but we believe that for most people 20 rounds is a good number. If you want a higher level of confidence, 30 rounds is probably plenty. The test spreadsheet supports up to 50 rounds but this should almost never be necessary. See below for further explanation.

Does my rifle shoot MOA?

This is the question everyone always wants to ask and understandably so. It's a good question, but it's also not as simple as yes or no. No rifle, no ammo, and no shooter will ALWAYS shoot MOA. So, a more proper question is this: **How often will I be able to shoot MOA with my rifle and ammo?**

Many marketing claims state that a rifle is "capable" of shooting MOA, but they never tell you how often. Even the worst rifle and ammunition combination will eventually shoot one group that is MOA if you fire enough rounds. To be meaningful, you need to know how often you can do it.

The Firing Test Procedure will determine how often you can expect to shoot a 3 round MOA group with the combination of rifle and ammo used in the test both before and after the D-Vise installation and how much of an improvement that is.

You can also change the size of 3-round group you want to look at to see how often you would shoot a different size group. If you want to look at half inch or 2 inch or any other size, you can do that by changing one number and get the result instantly.

About Measurement Validity

All measurements of group size and location use a limited number of rounds and are only estimates of the true capability of the firearm and ammunition combination. The goal is to determine a useful and confident estimate of both group size and group location. Here are some key points.

- There are many ways in which group size and location are measured. Without going into a very lengthy discussion on statistics, suffice it to say that most methods are not very good and can lead you astray very easily. They often do not provide an adequate estimate of variation.
- Measuring the extreme spread of a group is probably the most common group measurement. It is an easy way to measure group size, but it wastes ammunition (3 to 5 rounds for 1 data point), is not very useful for determining the actual bullet dispersion and is completely useless for determining the center of bullet dispersion.
- Single groups of 3 to 5 rounds are almost meaningless. More data is needed to get meaningful results. Even a few groups of 3 to 5 rounds can have little value unless they are extremely consistent or the differences between them are very large and/or unless the data is used correctly.
- With this test, every round is used to give you a data point. You can start to get a meaningful evaluation of group size and location with 10 rounds and the more you increase the round count the better the estimation becomes. By the time you get to 20, 25, or 30 rounds you get a pretty meaningful estimate of group size and location.
- If the data is handled properly, several groups of 3 to 5 rounds, or even individual rounds fired at individual targets, can be treated as a single group of many more rounds to get a much more meaningful measurement

Group Size and Location

There are many ways to measure groups size. There is really only one way to measure group location.

The most common way to measure group size is the extreme spread of 3 or 5 rounds. This is an easy field-expedient way to get a number for group size because all you need is a ruler or caliper and you can do the measurement right at the target. But it is actually not very useful. It does not tell us the location of the group and it gives us only one data point about the dispersion of the rounds.

The group location is the center of the group. It is simply the average location of each round in the horizontal direction and the average location of each round in the vertical direction.

A much better way to calculate the mean radius. This is the average distance that the shots are from the center location. This is a very meaningful measurement for group size, but it only tells us that half the rounds are closer to the group center and half are farther. Probably not the level of confidence we want. But, it is very useful to know that 96% of all rounds will lie within a circle with a radius that is twice the mean radius. So, for a simple example, if the mean radius is 0.5 inch, then 50% of the rounds will be in a circle with a radius of 0.5 inch or a diameter of 1.0 inch and 96% of the rounds will be in a circle with a radius of 1.0 inch or a diameter of 2.0 inch.

Arguably the most useful way is a method called Circular Error Probable, or CEP. CEP is an extension of mean radius. It tells us the percent of rounds that are within a certain distance of the group center. CEP50% means 50% of the rounds are within that distance of the group center and is equal to the mean radius. CEP90% means 90% of the rounds are within that distance of the group center. Etc. These values are a measurement of radius, so it is useful to double them to think of the diameter. Be aware that because the rounds are more clustered around the center, as the percent increases the radius or diameter increases more and more. For instance, the difference between CEP50% and CEP60% is much less than the difference between CEP80% and CEP90%, and CEP100% would be infinite.

Confidence

Besides measuring group size and location, the test procedure will calculate a value called “confidence”. This is the probability of not being wrong about the conclusion. It really is a measurement of how confident you can be in the result.

- A 90% confidence means there is a 90% chance that the result is real and not just the result of bad luck with the rounds that were fired. A 50% confidence means it is 50/50 that the result is real or not so it’s basically meaningless.
- Achieving a higher confidence requires more rounds to be fired than achieving a lower confidence.
- Detecting a small change in group size with a given confidence requires more rounds to be fired than detecting a large change in groups size with the same confidence.

The test will calculate three measures of confidence. All three will be shown in the Detailed Summary worksheet. The average of the three is reported in the Simple Summary worksheet. It is normal that these will have different values, but they all serve as a good way of providing guidance about the quality of the results.

- The confidence based on σ estimate confidence intervals will probably produce the lowest value for confidence, and considerably lower if shooting fewer than 30 rounds before and after the installation. It is the most conservative estimate and can produce a valid confidence estimate even if the shot dispersion is not normally distributed (bell curve distribution).
- The confidence based on Welch's T-Test will probably have a higher value. It does require the shot dispersion to be normal, but will usually produce a fairly reasonable confidence value even if the dispersion is slightly non-normal.
- The F-Test for Variance will produce a confidence value about the same as Welch’s T-Test as long as the shot dispersion is normal. However, if the shot dispersion deviates much from being normal, the confidence value can be off by quite a bit. It does have the advantage of allowing us to figure out the number of shots required to detect a certain reduction in groups size before we do the test, which is shown in the table below.

With that in mind, consider the table below when deciding how many rounds to shoot before and after the D-Vise Installation. The table assumes the same number of rounds were fired both before and after the D-Vise installation.

Confidence that group size shrank by a given percent for a given number of rounds fired before and after the D-Vise installation.

Rounds	Percentage of group size reduction							
	10%	15%	20%	25%	30%	40%	50%	75%
10	71%	76%	80%	84%	87%	92%	96%	100%
15	76%	81%	86%	90%	93%	96%	99%	100%
20	79%	85%	90%	93%	95%	98%	99%	100%
25	82%	88%	92%	95%	97%	99%	100%	100%
30	84%	90%	94%	97%	98%	100%	100%	100%
35	86%	92%	96%	98%	99%	100%	100%	100%
40	88%	93%	97%	98%	99%	100%	100%	100%
45	89%	95%	97%	99%	100%	100%	100%	100%
50	91%	96%	98%	99%	100%	100%	100%	100%

Be aware that a confidence value of 100% is not exactly 100%. Statistically, 100% confidence does not exist. But if it is over 99.5% it is displayed as 100% due to rounding.

This Welch's T-Test and F-Test for Variance both require the shot distributions to be statistically normal, which is less likely for a small number of rounds, especially below 20. Twenty rounds before and after the D-Vise Installation is sufficient to detect even a 10% reduction in group size with 79% confidence and will detect a 30% reduction in group size with 95% confidence. This is why the recommended minimum is 20 rounds before and after the D-Vise installation.

Test Firing Preparation

1. Choose one type of ammunition for the test. If you wish to test more than one ammunition type, conduct separate tests for each type.
2. Clean the firearm thoroughly prior to testing.
3. Plan to test 20 to 30 rounds before installation of the D-Vise and 20-30 rounds after installation. Although not absolutely necessary, it is best to test with the same number of rounds before and after installation.
4. It is necessary to ensure as much uniformity as possible in the ammunition to be tested before and after installation.
 - a. If you are testing commercial ammunition and it was purchased in multiple boxes, divide the rounds up into two groups for testing before and after installation by mixing an equal number of rounds from each box into each group.
 - b. If you are testing hand loaded ammunition, use rounds that were all loaded in one loading session, with one lot of powder, one box of bullets, and one box of primers.
5. The Apertura Ballistics website has a PDF of a target that is designed to be printed on 8-1/2 x 11 paper for this test. The target has a measurement grid that will be used to record the

location of each round on the target. It also has a diamond marked on it to use as an aid for aligning crosshairs when aiming at the target. Download and print as many of these targets as you need. It is recommended to shoot no more than 5 rounds on one target to make each shot easily identifiable.

6. The Apertura Ballistics website has files available in both Microsoft Excel and Google Sheets that is used to record the shot location data, perform all the calculations, and report the results. You may use either file format you prefer.

Test Firing Procedure

1. Label your targets so you do not mix them up.
2. Ensure that you are shooting from a very stable location. It is highly recommended to use both front and rear bags, or a bipod and a rear bag, or some other type of rest that will remove essentially all movement of the firearm while aiming and pulling the trigger. Steady aiming is key to getting a correct result.
3. Ensure that you are using a scope that allows you to clearly see the bullseye on the target. A minimum of 9x is recommended for 100 yards. Ensure that the scope is properly mounted, secure, and level.
4. There is no need to be concerned if the scope is not exactly zeroed. What matters is that all the rounds impact the target in the grid area.
5. Before installing the D-Vise...
 - a. Before starting the test, fire approximately 5 rounds through the firearm prior to starting the test to stabilize the barrel condition. These 5 rounds may be, but do not need to be, the same type of ammunition being tested.
 - b. Fire the chosen number of rounds at the targets. It is recommended to shoot no more than 5 rounds on one target to make each shot easily identifiable. For example, if you are firing 20 rounds, then use 4 targets.
6. Install the D-Vise per the instructions above.
7. After installing the D-Vise...
 - a. Before starting the test, fire approximately 5 rounds through the firearm prior to starting the test to stabilize the barrel condition.
 - b. The point of impact will likely be lower. Before firing the test rounds, adjust the scope as necessary to ensure all the rounds will impact the target in the grid area.
 - c. Fire the chosen number of rounds at the targets. It is especially important at this stage to shoot no more than 5 rounds on one target since the rounds should be much closer together. For example, if you are firing 20 rounds, then use 4 targets.

Test Firing Results

1. The spreadsheet contains information about what information needs to go where written in bold red. The values are entered into the cells colored yellow.
2. Only enter data into the worksheet called "Data".

- Never enter data into the worksheet called "Calculations". This will create errors in the summary.
- Enter your rifle and ammunition information and distance to the target into the spreadsheet.



Apertura Ballistics LLC D-Vise Test Firing Data Analysis

ENTER DATA IN THIS WORKSHEET ONLY.
Enter your data in the yellow cells below per the instructions shown in bold red.

All data is in inches.

Rifle Information	Enter rifle information here.		
Make:			
Model:			
Barrel Length:			Inches. Front of chamber to crown.
Barrel Profile:			Light, Medium, Heavy
Ammunition Information	Enter ammunition information here.		
Make:	Brand or hand loaded		
Description:			
Bullet:			
Bullet Weight:			grains
Approximate Average Velocity:			fps
Distance to target	Enter distance to target here.		
		yards	1 inch = 1 MOA at 100 yards
			2 inches = 1 MOA at 200 yards
			3 inches = 1 MOA at 300 yards
Note:	Recommended distance to target for testing most rifles is 100 yards.		
	Wind may have a measurable effect at 200 yards and further.		
	Velocity variation may have a measurable effect in vertical spread at 200 yards and further.		
	If a rifle is exceptionally accurate it may be beneficial to test at 200 or 300 yards to get more spread between shots.		

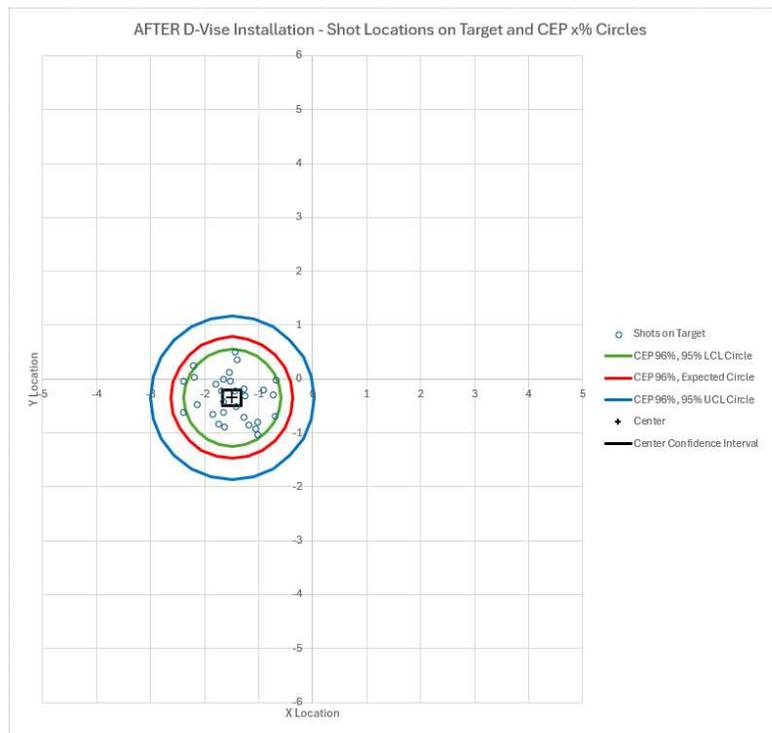
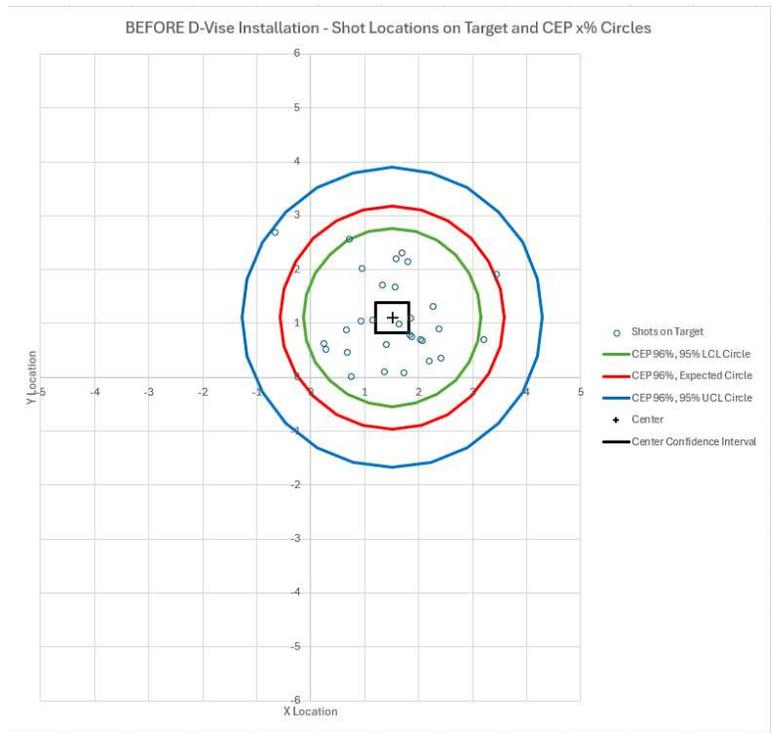
- Enter the X and Y coordinates for each round into the spreadsheet. It is not recommended to leave out "fliers" unless you are certain that you messed up a shot. Usually fliers are not fliers but are just part of the normal variation.

Shot Location Data					
Enter the X and Y coordinates for each round fired in the yellow cells below.					
X = horizontal location on target or distance from group center					
Y = vertical location on target or distance from group center					
BEFORE D-Vise Installation			AFTER D-Vise Installation		
Shots on Target			Shots on Target		
Round	X	Y	Round	X	Y
1	0.67	0.89	1	-1.44	0.50
2	3.44	1.92	2	-0.72	-0.29
3	2.38	0.91	3	-1.66	-0.61
4	1.41	0.61	4	-1.18	-0.86
5	0.24	0.63	5	-1.66	-0.01
6	1.83	0.79	6	-1.42	-0.52
7	1.80	2.15	7	-0.91	-0.20
8	1.56	1.69	8	-1.62	-0.88
9	2.19	0.30	9	-1.39	0.36
10	1.88	0.76	10	-1.80	-0.10
11	1.58	2.19	11	-1.68	-0.22
12	0.92	1.05	12	-1.85	-0.66
13	0.95	2.02	13	-1.25	-0.32
14	2.03	0.71	14	-2.39	-0.62

6. The results will now be displayed in the Simple Summary and Detailed Summary worksheets. The results include:
 - a. How much the group diameter and group area were reduced.
 - b. Three measures of confidence in the results.
 - c. A comparison of 3-shot groups size before and after the D-Vise installation.
 - d. A comparison of how likely you are to shoot a 1-inch 3-shot group before and after the D-Vise installation.
 - e. The horizontal and vertical adjustments to correctly zero your scope.
7. In the Detailed Summary worksheet, in the area at the top where the 3-shot groups are discussed you may change the “desired 3-shot group size” to whatever size you wish. It is set at 1.00 inch (1 MOA at 100 yards) by default.

Summary of Results					
For a circle containing any percentage of the shots...					
The group diameter was reduced:		45%	The statistically expected value for h		
The group circular area was reduced:		70%	The statistically expected value for h		
Confidence in the test results...					
Confidence based on σ estimate confidence intervals:		97%	Confidence is the chance that the gro		
Confidence based on Welch's T-Test:		100%	Valid	The confidence level at which the bet	
Confidence based on F-Test for Variance:		100%	Valid	Requires Distance R to be normally c	
A confidence value of 100% is not ex					
Comparison of 3-shot group size (extreme spread)...					
Desired 3-shot group size:		1.00 inch	Enter the desired 3-shot group size you wish to examine		
Before the D-Vise installation					
Average:		1.97 inch			
Standard Deviation:		0.73 inch			
Percent of groups less than		1.00 inch is	8%		
After the D-Vise installation					
Average:		1.07 inch			
Standard Deviation:		0.40 inch			
Percent of groups less than		1.00 inch is	46%		
Reduction in 3 Shot Group Size:		46%			
Increase in percent of groups less than		1.00 inch is	5.6	times.	
Scope Adjustment Required for correct zero...					
Before the D-Vise installation		1.5	Left	1.1	Down
After the D-Vise installation		1.5	Right	0.3	Up

8. A graph of the all the rounds' location on the targets and CEP circles are shown at the bottom of the Detailed Summary worksheet in the "group location and size comparison" section. A simplified version of these graphs is also shown in the Simple Summary worksheet.
 - a. In the simplest terms, if the circles are smaller after installation than before installation, the groups shrank.
 - b. The circles are determined by the confidence percent and the CEP%. You may change these values and the graphs will update accordingly. The confidence percent is set and 95% by default. The CEP% is set at 96% by default.
 - c. The red circle is the expected (statistically most likely) circle containing the given percentage of rounds. The CEP96% circle contains 96% of the rounds fired. Its radius is twice the mean radius. This is one of the best and most useful group size estimates.
 - d. The blue and green circles represent the confidence interval for the confidence level chosen. Using the default 95% confidence level and CEP96%, you are 95% certain that the true size of the CEP96% circle is smaller than the red circle and you are 95% certain that the true size of the CEP96% is bigger than the green circle.
 - e. The black cross at the center of the circles is the statistically most likely center of the group. This tells you how to adjust your scope. The black box around that cross represents the confidence interval in which the true center of the group could lie.
 - f. More rounds fired will produce a smaller confidence interval for a given level of confidence. In other words, the red and green circles will get closer to the blue circle.



9. You may find it useful to paste pictures of your targets into the spreadsheet. The space to the right of where you entered the X and Y coordinates is a good location for these.

Warranty

Apertura Ballistics LLC manufactures the D-Vise and Installation Kit to the highest levels of quality, reliability, and performance. The D-Vise is carefully packaged to avoid damaging the product during shipping and handling. All products ship with a warranty against defects in materials, manufacturing workmanship, and shipping damage.

Should your D-Vise and/or Installation Kit arrive with a defect in materials or manufacturing workmanship, or damaged from shipping, Apertura Ballistics LLC will cover the cost of shipping it back and shipping you a replacement D-Vise and/or Installation Kit. To receive this replacement service, any defect in materials or manufacturing workmanship, or damage from shipping, must be reported to Apertura Ballistics LLC within 10 days of receiving your device, otherwise the standard return policy applies.

Return Policy

Apertura Ballistics LLC will accept returns for any items within 60 days of initial purchase for a full refund minus the cost of shipping. Items must be returned undamaged and in their original packaging to receive a full refund.

Returns occurring after 60 days of initial purchase will be evaluated by Apertura Ballistics LLC on a case-by-case basis. Any refund granted on a return occurring after the initial 60 day period may be in the form of an equivalent value merchandise exchange, or a store credit with Apertura Ballistics LLC for the value of the returned goods which will expire within one year of issuing.

Liability Limitations

Apertura Ballistics LLC shall not be liable for any damage caused to your firearm due to failure to follow the D-Vise installation and usage instructions, or by negligence during or after the installation. If the instructions are followed and reasonable care is used, it will be nearly impossible to cause damage to your firearm.

Apertura Ballistics LLC shall not be liable for any damage, injury, or death caused by failure to follow the D-Vise installation and usage instructions, by failure to practice proper firearm safety, by user negligence, or by criminal use of the firearm on which the D-Vise is installed.

Installing or attempting to install the D-Vise shall constitute your agreement to these liability limitations.

Customer Support

For additional information or assistance please contact customer support through our website, AperturaBallistics.com. We will generally contact you within 24 hours or by the next business day.