PROTOCOL™

HOYT
ARCHERY



2027 PREMIER HUNTING

PROTOCOL IN-DEPTH

Hoyt Technical Collaborative · Whitepaper

PROTOCOL AX | PROTOCOL RX — IN-DEPTH

2027 PREMIER HUNTING · HOYT TECHNICAL COLLABORATIVE

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In the field.

PHOTO — HOYT ARCHERY

SECTION I

Protocol Series Overview

What are the differences in the AX and RX? The primary difference is riser material. The AX is made with aluminum. The RX is made with carbon.

Slight spec differences occur between axle-to-axle lengths, but otherwise the bows are largely complementary to one another. The RX will be lighter weight and will be warm to the touch on cold days due to the carbon riser. Other than that, they have the same cams, same limbs and limb pockets, same grip, same In-Line Accessory attachments and they both pass the same brutal durability tests.

Both are the right choice. Shoot both at your Hoyt Dealer and determine what matches your preferences and hunting style.

The Protocol Series Platform

The Protocol series was designed around platform priorities. Every element of the platform was maximized for precision and consistency, shot after shot.

The Protocol AX features a new riser design that continues to drive down shot volumes and post shot vibration, ready to deliver pure lethality in the field while giving bowhunters Hoyt's most stealthy, most enjoyable to shoot, most personally tailored package ever.

The Protocol RX builds on Hoyt's pioneering carbon fiber riser design with a riser that represents the foundation of a lightweight hunting platform and compromises nothing. The Protocol RX reduces weight, maintains RX-10's stellar sound and vibration metrics and gives us our stiffest carbon riser to date.

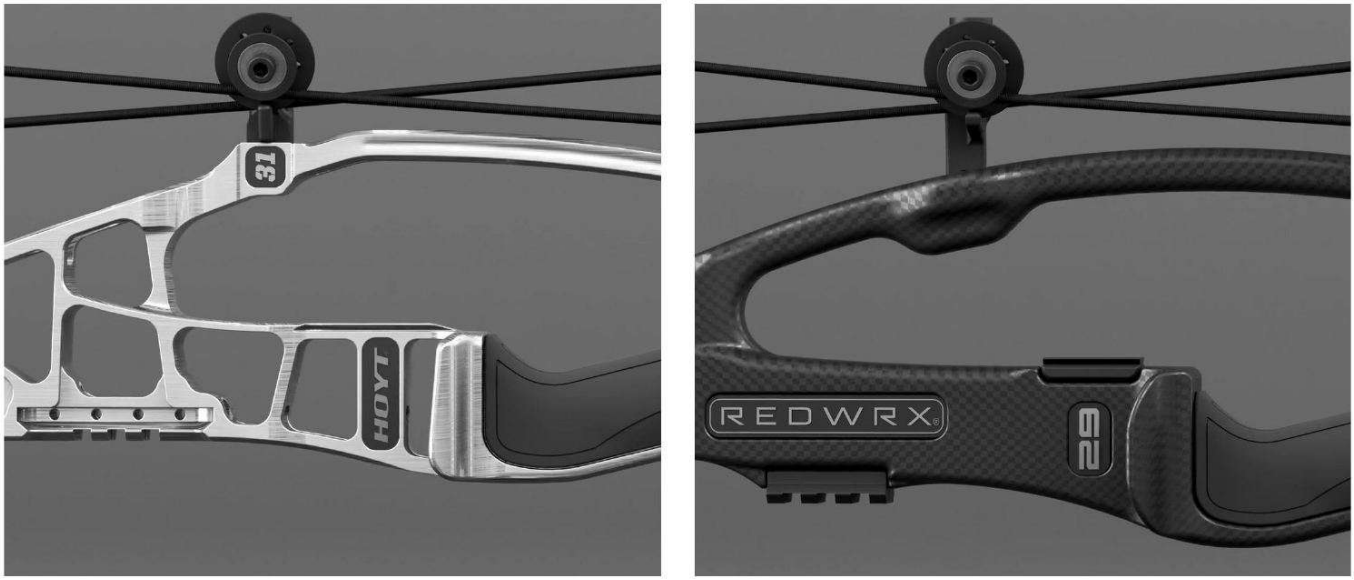


FIG. I-1 Protocol AX, machined aluminum riser (left). Protocol RX, carbon riser (right).
RENDER — HOYT ENGINEERING (FOREST)

Axle-to-Axle Length & String Angle Considerations

Longer bows are generally considered more stable, but in the past that stability came with added mass. So, you had to pick your poison when it came to a hunting bow. But not anymore. The Protocol series delivers **enhanced stability with a broader string angle that feels like longer ATA**, especially in the new Protocol AX 31 (compared to previous 29″ models), while reducing mass weight relative to ATA length compared to former Hoyt models. The result is a platform with the stability of a longer axle-to-axle bow and weight cut to optimize efficiency.

The Protocol series boasts **string angles similar to bows 1.5″ longer in axle-to-axle** from previous generations. A larger, more obtuse string angle gives a more comfortable anchor point and brings the peep sight closer to the eye.

The minimal vertical translation of the limbs at the axles creates that more obtuse string angle, and the longer riser designs work in tandem to create a bow that feels longer. Comparing only the axle-to-axle length measurement of a Protocol to that of bows that are 5–10 years old will not help an archer truly understand the feel and size of the current-gen bows. The same design features exist in our Concept XTS target bow lineup, which has seen the best archers in the world shifting from their favored 40″ axle-to-axle bows into an almost unanimous selection of the Concept XTS 37″.

The longer risers and more obtuse string angles are channeling preferences into bows of shorter axle-to-axle length. As always, test and choose according to your own needs and preferences.



FIG. I-2 Protocol RX at anchor.
PHOTO — HOYT ARCHERY



Protocol AX 31.

SECTION II

Protocol AX Series

Protocol AX 31

The Protocol AX 31 features stealthy riser upgrades. In side-by-side testing against the Alpha AX-3 29, the Protocol AX 31 produced:

- 24% decrease in sound intensity (approximately 8% volume reduction)
- 17.5% decrease in vibration response

This is the bow to choose for bowhunters seeking a compact, nimble package for tree stand, saddle or ground blind hunting who want the ultimate in stealth, while remaining more than capable for those hunting western big game in spot and stalk scenarios.

Protocol AX 33

The Protocol AX 33 receives the same riser upgrades, in our longest pure-hunting based aluminum bow. This is the bow to consider for archers that are longer in draw length, want the ultimate in stability at full draw, and seek versatility in their bow. The Protocol AX 33 is the jack of all trades bow that can fill any tag and is also at home in a heated backyard 3D rivalry. It is our most precision instrument for an aluminum riser hunting bow.



FIG. II-1 Protocol AX at full draw.
PHOTO — HOYT ARCHERY

SECTION III

Protocol RX Series

The goal of the Protocol RX series was not to compromise on any attribute of a hunting bow, but to strengthen the best quality of a carbon bow: low mass weight. Carbon should be light.

Both new models enhance maneuverability and a nimble feel in the field. At the same time, both new risers maximize the stiffness qualities of carbon construction to keep the bow steady at full draw and after the shot.

Protocol RX 29

Compared to the RX-10, the Protocol RX 29's short carbon riser delivers:

- Total bow weight loss: 4.24 lbs → 3.97 lbs
- Stiffest carbon riser to date — in-plane and out-of-plane stiffness increased by 46%
- Sound & vibration: excellent metrics maintained despite aggressive weight reduction
- Accessory mounting: Optimized quiver mounting locations and a lowered SL Side Bar mount position.

Protocol RX Ultra

Compared to the RX-10 Ultra, the Protocol RX Ultra delivers:

- Total bow weight loss: 4.51 lbs → 4.17 lbs (over 7.5% weight reduction)
- Stiffest Ultra riser to date in both in-plane and out-of-plane flex
- Sound & vibration: excellent metrics maintained despite aggressive weight reduction
- Accessory mounting: Optimized quiver mounting locations and a lowered SL Side Bar mount position.

Optimized Geometry

Even in shorter geometries than previous generations, the Protocol RX 29 matches the string angle of former 31" axle-to-axle models, and the Protocol RX Ultra carries that similarity to almost a 35" axle-to-axle bow. That means a compact, maneuverable hunting rig that holds and aims like a much longer bow.



FIG. III-1 Protocol RX in the field.
PHOTO — HOYT ARCHERY

SECTION IV

SD & LD Models

The Protocol lineup continues to cover archers at both ends of the draw length spectrum. The Protocol AX 31 SD reaches down to a 22.5″ draw length, while the Protocol AX 33 LD and Protocol RX Ultra LD reach out to 33″ — both rated at 355 fps at a 33″ draw length. (For archers looking for a carbon SD bow, the RX-10 SD is still available in the Hoyt lineup.)

Note: The Protocol AX 31 SD does not reach a 30″ draw length, so it is tested at its maximum draw length of 26.5″ and 70 pounds with a 350 grain arrow. Its speed rating is 312 fps. LD models are rated at their 33″ maximum draw length.

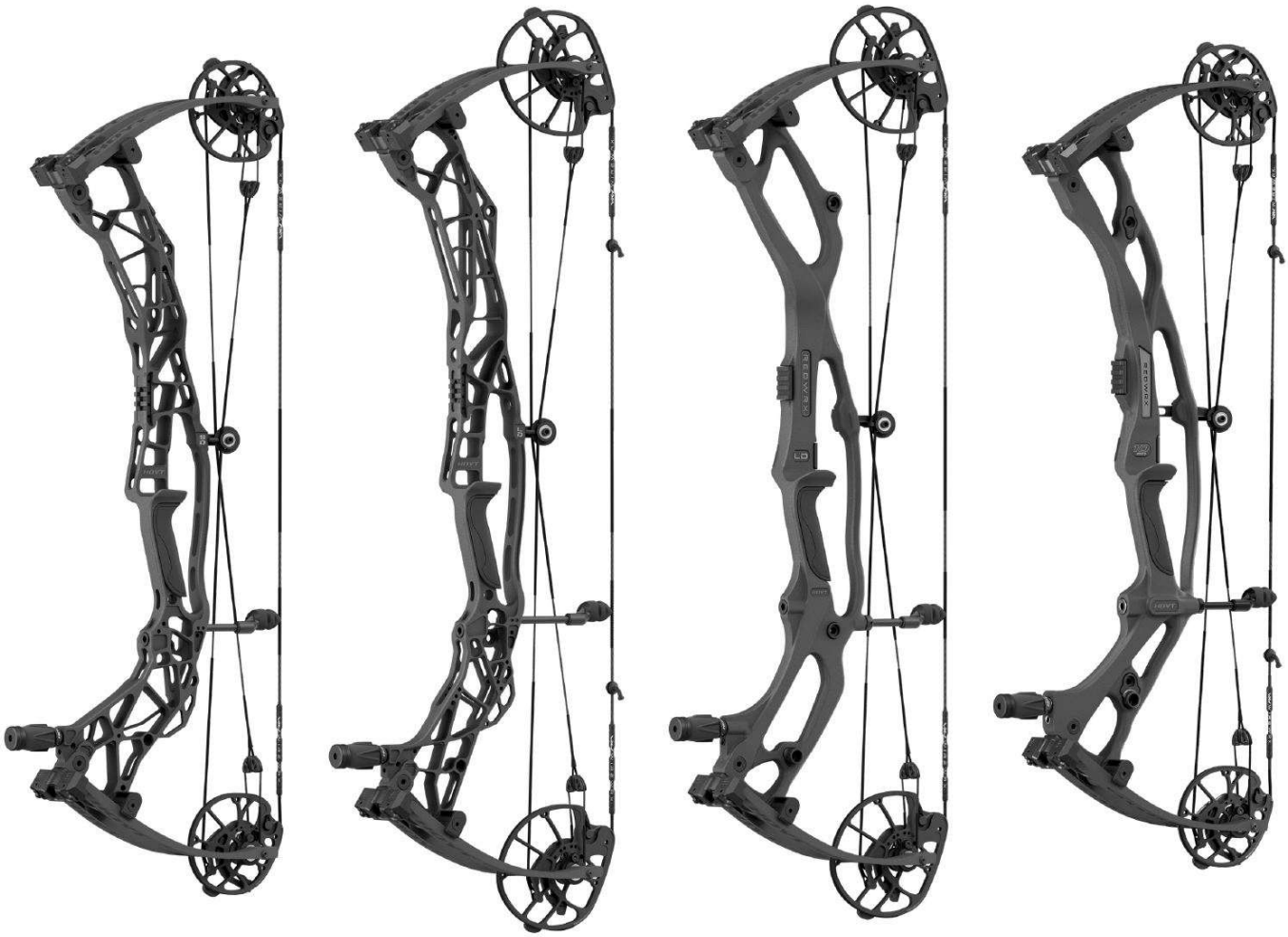


FIG. IV-1 Protocol AX 31 SD, Protocol AX 33 LD, Protocol RX Ultra LD and RX-10 SD, at the same scale.
RENDER — HOYT ENGINEERING

SECTION V

HBX Select Cam System

The engine of the 2027 Protocol AX and Protocol RX series is the all-new HBX Select Cam System. HBX Select is built on the foundation of the HBX Gen 4 cam, and before we changed anything, our engineers took a hard look at what Gen 4 did well and where it could be better.

What the HBX Gen 4 Cam Taught Us

The 5-track binary design of the HBX Gen 4 brought stability at full draw, improved alignment, and resistance to torque. Its optimized energy-storing mods gave archers at every draw length better performance compared to previous generation Hoyts, and against the competition.

But we also listened. Archers told us that the draw was smooth, but not as smooth as it was in the previous generation cam system. We realized our performance-centric mods were not as favorable to archers who value comfort over maximum speed, so we went to work on the next generation of HBX.

Keeping the Foundation

HBX Select keeps everything archers have come to expect from the HBX family:

- Stability between full draw and arrow delivery
- Top-end performance
- Maximized draw force curve efficiency
- A post-shot experience that maintains or lowers the sound and vibration profile Hoyt archers appreciate



FIG. V-1 HBX Select cam.
RENDER — HOYT ENGINEERING (FOREST)

V · CONTINUED

What We Changed

The key difference between HBX Select and HBX Gen 4 is in the front build-up of the draw force curve. Before reaching peak weight, the curve is softened. This smoother transition into peak weight reduces the effort needed at the front of the draw while still producing the high velocities of the HBX series cams. As the chart below shows, the two curves are virtually identical through the peak, valley and wall — the change is concentrated where archers feel it most.

HBX Select also introduces flexible mod options between the G4 and new ES mod systems (see Section VI), and the addition of WireWRX PR6 strings, which remove dampers without removing performance. Eliminating the dampers eliminates the wear, cutting, and tune-shifting issues we identified with Hole Shot V2, bringing improved consistency shot after shot.

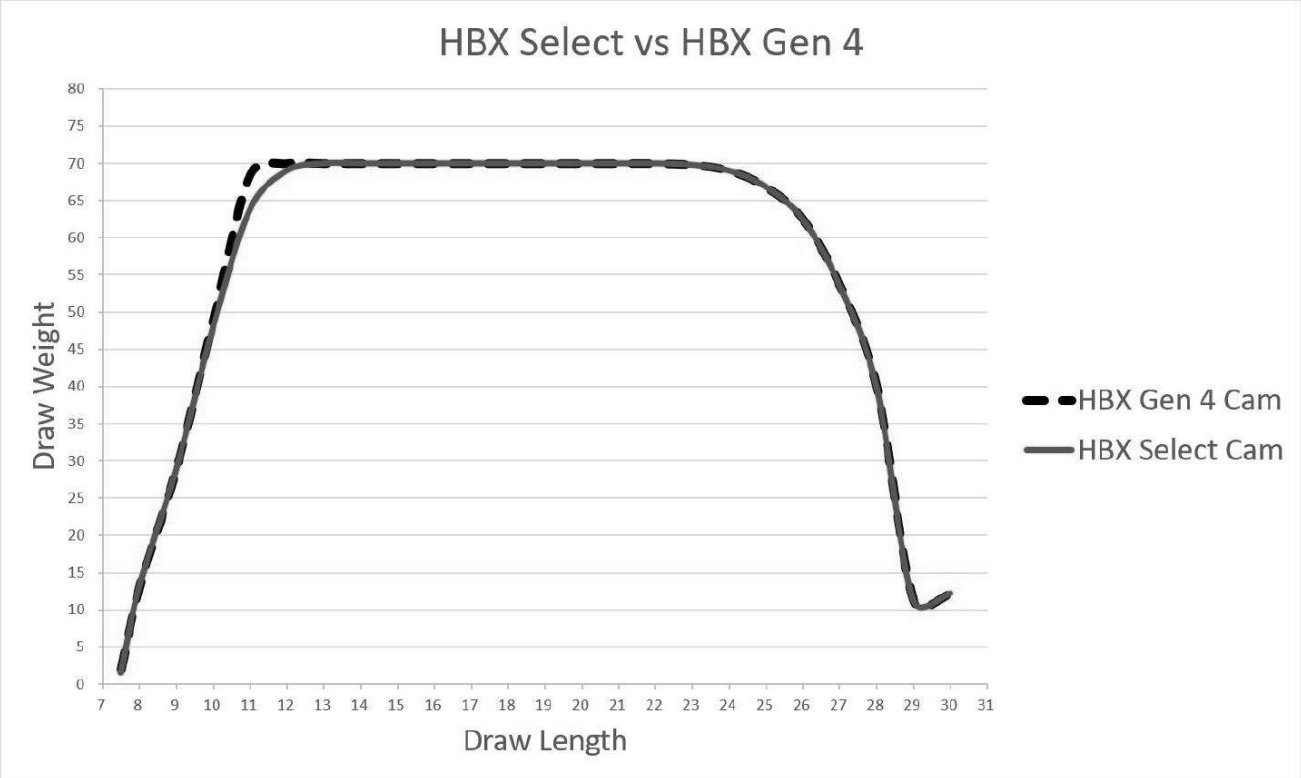


FIG. V-2 HBX Select vs HBX Gen 4. Draw weight (lb) against draw length (in).
CHART — HOYT ENGINEERING

SECTION VI

ES & G4 Mod Systems

HBX Select introduces the new ES mod system to complement the proven G4 mod system. The G4 mod provides full speed with the Hoyt smoothness you've come to love from our premier bows. The ES mod is Even Smoother, for those looking for added comfort while drawing their bow. Each system is made up of 5 mods to cover the full draw length range, allowing archers to choose the performance and draw feel they want — with the same adjustability points and identical draw length positions between the two systems.



ES mod G4 mod

FEATURE	ES MODS	G4 MODS
Draw	High Performance – Even Smoother Draw	Maximum performance – Smooth Draw
Standard wall position	"Hard"	"Xtra Hard"
Draw length adjustment	¾ inch	¾ inch
Let-off	85 / 80 / 75%	85 / 80 / 75%
Wall adjustment	"Xtra Hard" and "Hard"	"Xtra Hard" and "Hard"
Compatibility	Backward compatible with HBX Gen 4 cam models, including AX-90	Forward compatible with HBX Select cam models
Color	Anodized gray	Anodized black



FIG. VI-1 ES mod (left, anodized gray) and G4 mod (right, anodized black) on the HBX Select.
RENDER — HOYT ENGINEERING (FOREST)

VI · CONTINUED

ES & G4 Mod Systems

G4 Mods — Maximum Performance

G4 mods are designed to maximize energy storage. They deliver a draw cycle similar to the one customers have grown accustomed to, and they offer the highest speed and performance potential in the HBX Select system. The trade-off is that G4 mods require more effort before breakover.

ES Mods — Even Smoother Draw

ES mods are designed to reduce effort in the back half of the draw cycle, past the breakover point. They maintain the same front-half draw profile as the G4 mods, which better aligns with the archer's natural strength at the beginning of the draw, and they reduce perceived effort without dramatically sacrificing performance.



FIG. VI-2 ES vs. G4 Mods: 70# G4 against 70# ES.
CHART — HOYT ENGINEERING

Note: ES mods are back compatible on bows with HBX Gen 4 cams, including RX-9, RX-10, AX-2, AX-3, and AX-90. And G4 mods are forward compatible with HBX Select cam models. Draw length positions match between the two systems, so switching mod systems does not require re-learning your draw length settings.

SECTION VII

Draw Weight vs. Draw Effort

Draw weight is the number on the scale, but draw effort is what the archer actually feels.

An optimized curve for producing maximum performance is not always the best curve for achieving a preferred feel. While feel is totally subjective to each archer, we can assume that archers will prefer a bow that draws with less effort than one that requires more effort, all other things being equal.

The goal is to make the effort required to store energy as low as possible, while storing as much energy as possible. Total effort is determined by the energy stored through the draw cycle, and the shape of that draw cycle dramatically impacts the shooter's experience and perception of feel. The energy stored after breakover is a key differentiator in the ES vs G4 mods.

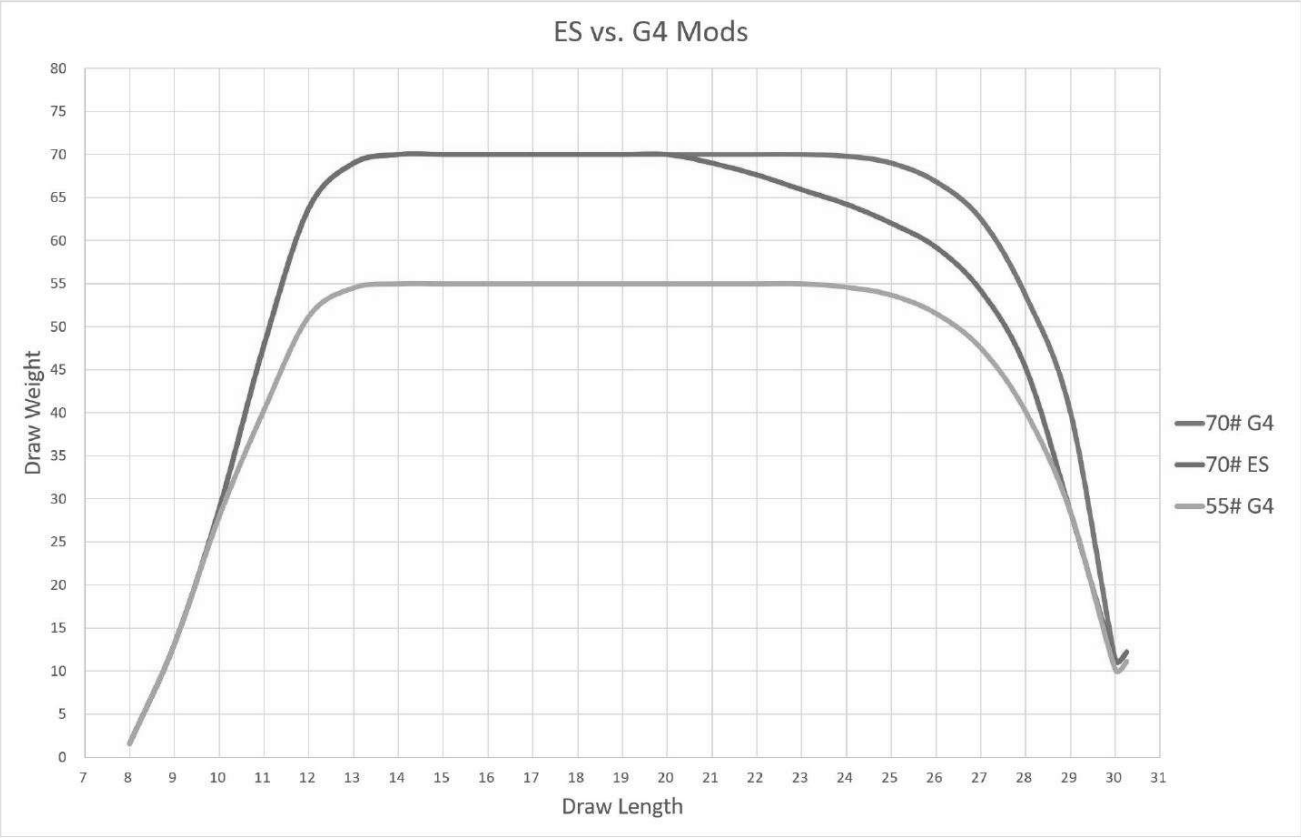


FIG. VII-1 Draw force curves: ES against G4, 70 lb and 55 lb.
CHART — HOYT ENGINEERING

SECTION VIII

Real-World Speed: ES vs. G4

The question every archer asks about a smoother draw is, “What does it cost me in speed?” The table below compares velocities for 70# G4, 70# ES in all four models of Protocol.

2027 Premier Bows Velocity Chart

Protocol AX 31 · Protocol RX 29

POSITION · DRAW	AX G4	AX ES	RX G4	RX ES
MOD 5				
A · 30"	342	332	340	333
B · 29 1/2"	332	321	330	324
MOD 4				
C · 29"	331	320	329	322
D · 28 1/2"	321	313	320	313
MOD 3				
E · 28"	322	313	324	314
F · 27 1/2"	315	305	317	306
MOD 2				
G · 27"	308	302	308	302
H · 26 1/2"	301	294	302	295
MOD 1				
I · 26"	296	290	298	290
J · 25 1/2"	289	283	291	283
K · 25"	283	278	285	278

Protocol AX 33 · Protocol RX Ultra

POSITION · DRAW	AX G4	AX ES	RX G4	RX ES
MOD 5				
A · 31"	350	341	347	338
B · 30 1/2"	339	332	336	329
MOD 4				
C · 30"	339	330	337	327
D · 29 1/2"	330	321	329	319
MOD 3				
E · 29"	329	321	329	320
F · 28 1/2"	321	313	321	313
MOD 2				
G · 28"	315	309	314	308
H · 27 1/2"	308	302	307	301
MOD 1				
I · 27"	302	297	303	297
J · 26 1/2"	296	290	296	290
K · 26"	290	284	291	284

At every draw length tested, the 70# ES setup gives up only 5–11 fps to the 70# G4. While the numbers give us the data, there is far more subjectiveness within “feel” of draw effort that is not measurable, but must be accounted for.

Note: Hoyt tests to ATA speed guidelines: 350 grain arrow, 70 lb draw weight, and 30" draw length (+/- ¼"). Velocities in fps.

SECTION IX

Choosing Your Mod System

ES Mods Are Right for...

- Archers who value the comfort of the draw over raw speed
- Archers who feel the need to lower their draw weight at any point in the year for one reason or another, but now won't need to with the option to switch to the ES Mod.
- Archers who want the comfort of a lower draw weight bow and the performance of a higher draw weight bow
- Archers who prefer an expanding shot and follow-through
- Archers shooting lighter mass weight bows — these will aim steadier thanks to the matching leverage of the standard back wall setting, longer valley, and front weight

G4 Mods Are Right for...

- Archers who want to maximize the velocity, kinetic energy, and momentum of the arrow
- Archers who anchor hard against the wall but don't want low dips while aiming
- Archers shooting heavier mass weight bows or longer stabilizers
- Archers who pull to stop at full draw with no movement or sponge in the wall

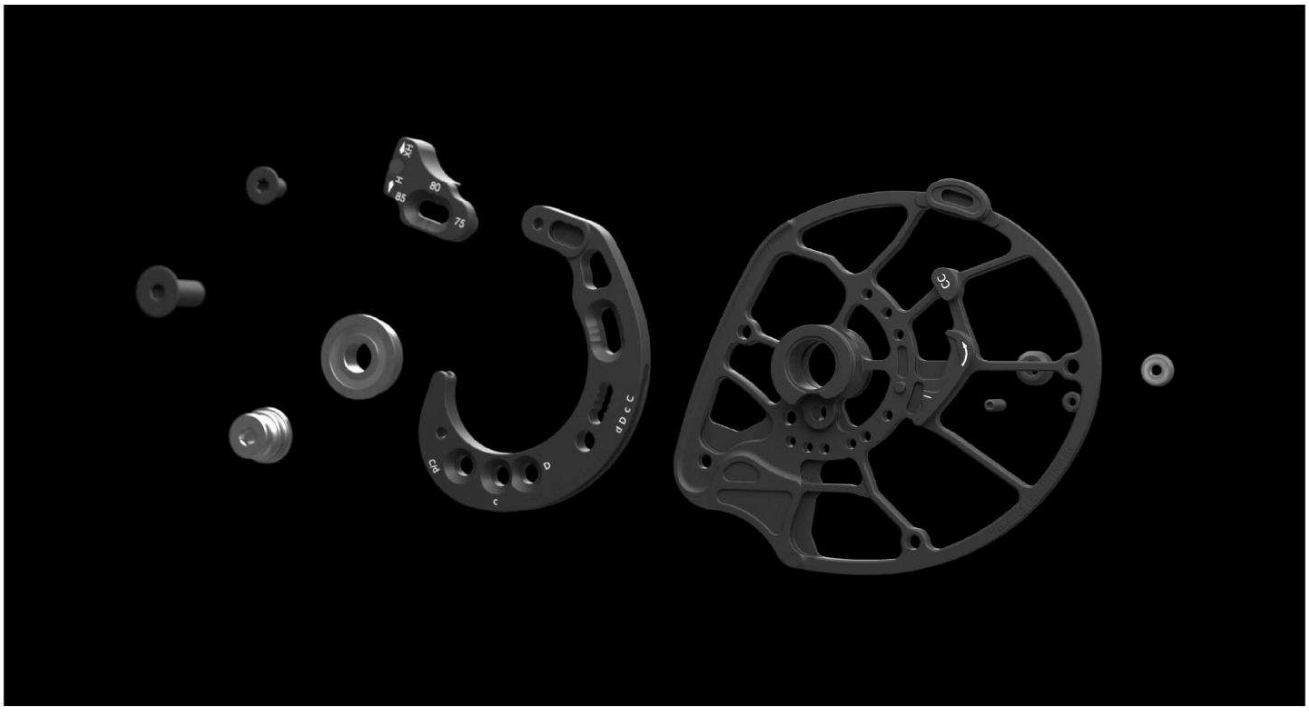


FIG. IX-1 HBX Select cam, exploded view.
RENDER — HOYT ENGINEERING (FOREST)

IX · CONTINUED

Real-world Case for Using Both Mods

- Early season hunts, when it's warm and you aren't wearing bulky clothes and fighting off the cold – G4 mods will be no problem.
- Late Season, when it's cold and you are shivering in a treestand, hoping you can pull your bow back when he shows – this is a great time to take advantage of the ES Mod with its smoother draw. By changing mods instead of decreasing poundage, your draw length won't change, tune will usually see a minimal shift, and you can easily adjust pin yardages or a sight tape to match the speed delta.
- Start out easy. We know what it's like when you get your bow out for the first time after the offseason. The shoulders are stiff and the bow feels heavy – start out with the ES mods and transition to the G4 mods after you are back on bow shape.

Alternative Uses

The 5–11 fps difference in the two module systems is a hard metric, but the subjectiveness in feel creates a personal decision that can expand what has been discussed in the data. 10 fps in speed represents about a 3.5 lb difference in draw weight. So, why would an archer opt for an ES mod and not just turn their G4 mod equipped bow down by 3.5 lbs to achieve an easier draw?

The answer lies in the dynamics of the draw force curve. The ES mod creates much less demand at the tail end of the draw force curve, where the cam is rolling over to transition into the valley and full let-off. This point in the draw cycle is the most critical for an archer's sensitivity to draw effort. In simulations run at Hoyt with our most highly experienced employees, the perception of draw force effort was determined to be easier on an ES mod at 70 lbs versus a G4 mod at 66.5 lbs, with both yielding the same speed. Both create a unique feel into the valley and at full draw, which is something archers should test to determine preference.

Because of the ES mods, archers who are not necessarily seeking an easier to draw bow may find that they can option themselves into a limb that is heavier than what they generally pick, i.e. a 75 lb limb instead of a 70 lb limb, and use the ES mod to create a different feel option.

Possibly the most sensible use for the ES mod is late season hunting. A serious bowhunter may choose to start the season with maximum speed and performance of the G4 mod, and switch to the ES mod as temperatures drop and the need for an easier drawing bow becomes more prevalent. Again, lowering the poundage with the limb bolts is an option, but this will also lengthen the draw length slightly, and late season is a time where people often want to short the draw length slightly to clear heavier clothing. Selecting between these modules is something that serious bowhunters should test and decide on for themselves with their own list of needs and subjectivities. Neither is the wrong answer and having the option is simply a matter of turning a wrench.



FIG. IX-2 HBX Select let-off foot: the 85, 80 and 75 percent positions, set with a T15 Torx key.
RENDER — HOYT ENGINEERING

SECTION X

XTS Tuning System

The 2027 Hoyt Protocol AX and Protocol RX Series feature the patent-pending XTS Tuning System, delivering quick, simple, and precise tuning—no press required. Unlike most systems that only fix left & right tears, XTS also corrects high & low tears, making it a complete solution, and XTS won't change your point of impact after tuning adjustments are made. Tuning your bow has never been this easy—or this precise.

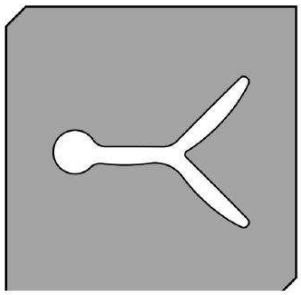


Image A · tail-right tear

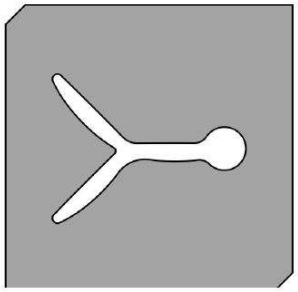


Image E · tail-left tear

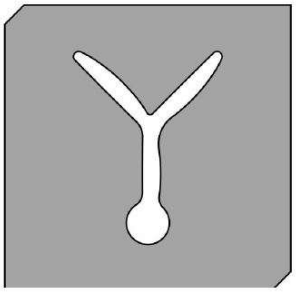


Image F · tail-high tear

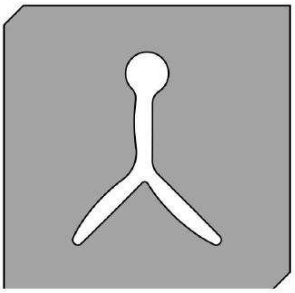


Image G · tail-low tear

Right tear: stiffen top right & bottom right limbs (as needed). Left tear: stiffen top left & bottom left limbs (as needed). High tear: weaken top limbs, stiffen bottom limbs (as needed). For a low tear, stiffen top limbs and weaken bottom limbs.

High and low tears can also indicate that the rest or nocking point need to be adjusted. For extreme left or right tears, spacer tuning may need to be used before XTS tuning is performed.



FIG. X-1 XTS pocket.
PHOTO — HOYT ARCHERY

X · CONTINUED

XTS Paper Tuning Guide

STEP 1

Position your arrow rest “straight down the middle” where it looks good to you. We recommend starting at 13/16" of center shot, but anywhere from 3/4 to 7/8 is an acceptable center shot measurement. Confirm all other macro tuning elements are set such as a correct nocking point, cam timing, vane clearance, etc.

STEP 2

Begin the tuning process by paper tuning your bow. Shoot an arrow through paper into a safe target/backstop.

STEP 3

If your arrow makes a tail-right tear in the paper (Image A), proceed to step 4.

> Note: This process will correct up to approximately a one-inch tear. If your initial tear is greater than one inch, you should consider moving your rest or doing a spacer swap before using the XTS tuning system. See spacer swap instructions in Section XI.

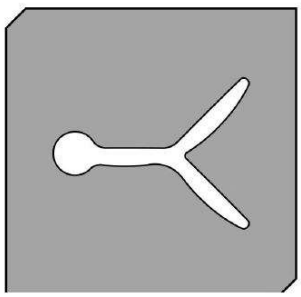


Image A · tail-right tear

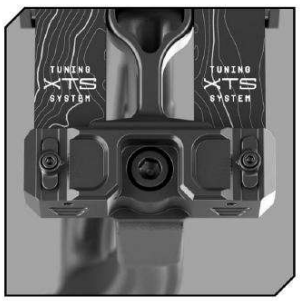


Image C · shuttle block screws

STEP 4

Position the bow so you are looking at the front of the bow and you can see the tuning adjustment holes in the pockets (Image B). To correct a tail-right tear, you will rotate the top right and bottom right tuning bolts clockwise to add resistance to the associated limb as needed depending on the size of the tear you are trying to correct. Begin by slightly loosening the shuttle block locking screws on the top of the top limb pocket with a 3/32 Allen wrench (Image C). Insert a 3/32 Allen wrench into the top right hole on the front of the pocket and engage the tuning bolt inside the pocket (Image D) and rotate it clockwise 1/2 turn to add resistance to the associated limb. Then insert the allen wrench into the top left hole and rotate the tuning bolt counter clockwise 1/2 a turn to decrease resistance in the associated limb.

> Hint: The larger the tear, the more you will need to turn the pocket tuning bolts. You can turn them as much as 3 turns in each direction from the factory starting position.

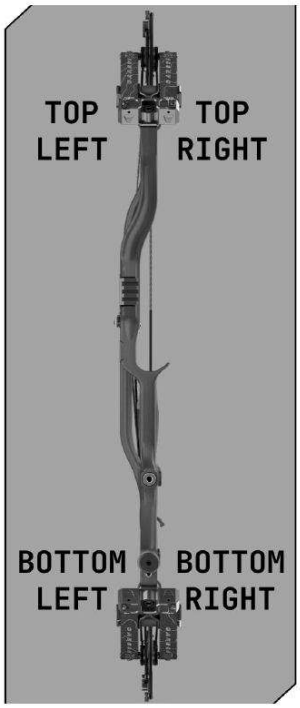


Image B · pocket front



Image D · tuning bolt

X · CONTINUED

XTS Paper Tuning Guide

STEP 5

Shoot your arrow through paper again and check your tear. If you still have a tail-right tear, repeat the process in step 4. You can repeat this process on the top limbs again or move to the bottom limbs. You will repeat this process a little at a time until you achieve a bullet hole. Once tuning is complete, retighten all Shuttle Block locking screws.

STEP 6

To correct a tail-left tear (Image E), you will repeat steps 4 and 5 except you will rotate the left tuning bolts clockwise to add resistance on the left side and you will rotate the tuning bolts on the right side counter clockwise to decrease resistance on the right side.

STEP 7

If you have a small tail-high (Image F) or a tail-low tear (Image G), you can also correct this with the XTS tuning system. However, it is best to confirm nock height and cam timing are correct before using XTS to correct a vertical tear. Once you confirm cam timing, proceed with the following to correct your small vertical tear. If you have a tail-high tear for example, you can correct it by removing turns from both tuning bolts in the top pocket and adding turns to the tuning bolts in the bottom pocket. Do the opposite to correct a tail-low tear.

> Note: Large high or low tears indicate a macro tuning issue such as poor fletching clearance, poor nock and rest height, cams not timed, etc. Correct these issues and use XTS to micro tune and correct small high and low tears.

If you have both a left or right tear and a high or low tear, correct the left or right tear before addressing the high or low tear.

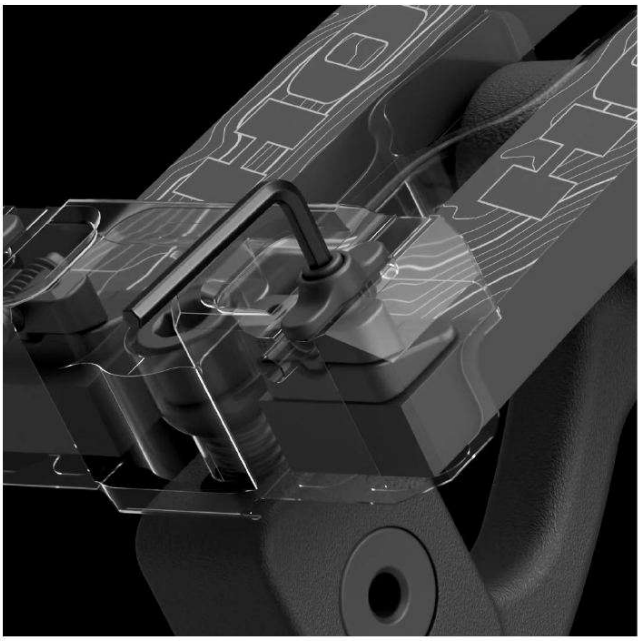


FIG. X-2 XTS pocket, shown cut away, with a hex key engaged.
RENDER — HOYT ENGINEERING (FOREST)

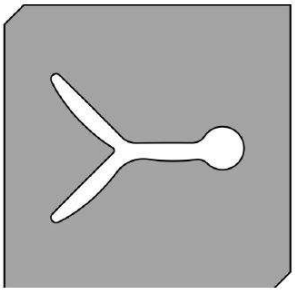


Image E · tail-left tear

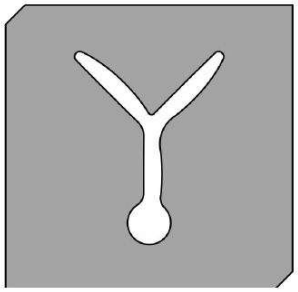


Image F · tail-high tear

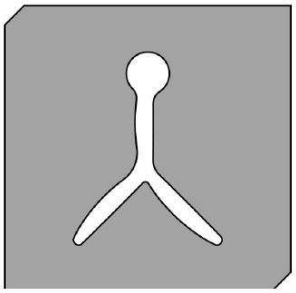


Image G · tail-low tear



Image H · home position

X · CONTINUED

General Truths, Hints, and Tricks about the XTS Tuning System

- The XTS tuning system can be used to dial in your broadheads if they aren't hitting the same spot as your field tips. For example, if your broadheads are hitting the target left of your field tips this is an indication your arrow is leaving the bow with a "tail-right" condition and you can correct this by following the tail-right tear paper tuning instructions. The same process can be used for bare shaft tuning. If your bare shaft hits left, it's an indication it's leaving the bow in a tail-right condition.
- You can use the XTS System to dial in your sight tape if you lose your zero due to a speed change. For example, if you set up your bow with your limb bolt bottomed out for maximum draw weight and later you lose a few feet of speed due to strings breaking in, a change in elevation, or any other reason, you can use the XTS System to increase your draw weight by a couple pounds to get back to your starting speed so your sight tape is good again. You would do this by simply adding resistance to all limbs by rotating all tuning bolts clockwise the same amount.
- If you end up "chasing your tail" while tuning the bow and you have found that you have made multiple adjustments to multiple pocket tuning bolts and you aren't sure where you are anymore, put everything back to home position by adjusting all pocket tuning bolts to the center line indicators (Image H) and start the tuning process again.
- XTS works best when correcting paper tuning tears less than one inch long. If you are tuning a bow with a tear greater than one inch, it's best to start with a spacer swap to decrease the size of the tear and then proceed with the XTS tuning adjustments.
- When adjusting the pocket tuning bolts, you should always make the opposite adjustment to the left limb as you made to the right limb to avoid a change to your draw weight. For example, if you turn your top right tuning bolt half a turn clockwise to correct a tail-right tear, you should match that by turning your top left tuning bolt half a turn counterclockwise.
- The same is true when correcting a tail-high or tail-low tear. If you add one turn to your top tuning bolts to correct a tail-low tear, you should remove one turn from your bottom pocket tuning bolts to avoid a change in draw weight.
- If you have both a left or right tear and a high or low tear, correct the left or right tear before addressing the high or low tear. Often after fixing the left or right tear, the high or low tear will go away.



IMAGE H Home position: center line indicators.
PHOTO — HOYT ARCHERY

SECTION XI

HBX Cam Spacer Tuning System

> Note: If your bow is not equipped with the XTS Tuning System, but is equipped with HBX cams, the following procedure can be used for tuning. Additionally, if your bow is equipped with the XTS Tuning System but you are experiencing a "large paper tear", you can use the procedure below to shift the cam to shrink the size of your tear and then refer to the XTS instructions for final tuning.

HBX Select cams can be tuned utilizing an aluminum cam spacer system. Below is a guide that will aid shooters in completing tuning shifts.

> Note: Cam spacer configurations do not need to match from top cam to bottom cam.

It is also important to note that grip pressure, an archer's natural torque, and stabilizer bias will influence the way that a bow tunes. It is Hoyt's recommendation to set centershot at 3/4" to 7/8" and use spacers to correct the paper tune as close as possible. If more correction is needed, then it can be found with arrow rest micro-adjustments.

To correct a tail LEFT tear you want to move the cam to the LEFT by increasing the spacer thickness on the right side of the cam and decreasing spacer thickness on the left side of the cam. To correct a tail RIGHT tear you want to move the cam to the RIGHT by increasing the spacer thickness on the left side of the cam and decreasing spacer thickness on the right side of the cam. (Left and right orientation is designated when looking at the cam from the rear of the bow, or the string side of the bow, not when looking at it from the front of the bow, or the riser side of the bow.)

It is best to adjust one cam at a time and test to see if the tear is corrected. If the tear is not corrected, make an adjustment to the other cam, too. If the tear still is not corrected, increase the spacing again. Continue increasing cam spacing until the tear is corrected. Always use the same color spacers on an individual cam.

The chart below is an example of how to correct a tear by swapping spacers. The larger the tear, the further up or down the chart you may have to travel to correct the tear. This chart is for reference only and may not match the "baseline" or starting position of the spacers on your bow, but the concept is still the same – move the cam the direction of the tear.

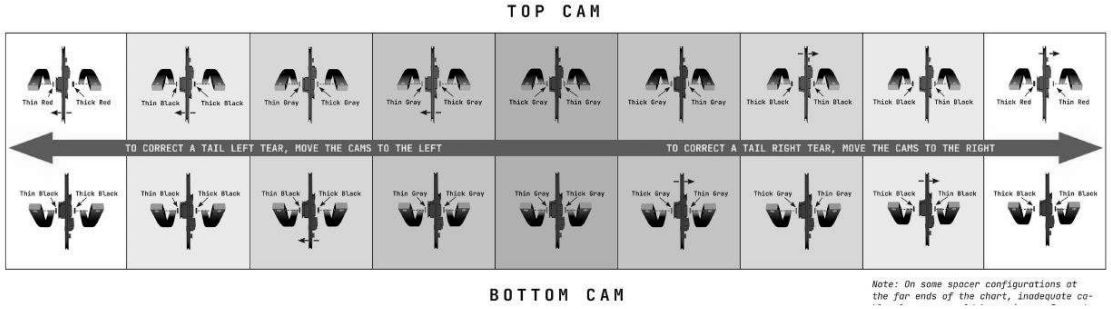


FIG. XI-1 HBX Cam Tune Table, top cam and bottom cam. To correct a tail left tear, move the cams to the left. To correct a tail right tear, move the cams to the right.

CHART — HOYT ENGINEERING

> Note: On some spacer configurations at the far ends of the chart, inadequate cable clearance could be an issue. Inspect for cable rub on the cam after making spacer adjustments.

SECTION XII

WireWRX String and Cables

WireWRX represents a project two years in the making, along with a significant investment in state-of-the-art string making equipment that was purpose-designed by Hoyt Engineers. WireWRX strings are designed as part of the bow system as a whole; and Hoyt bows are designed to operate at peak performance with WireWRX strings - we call that Hoyt Engineering Synergy. WireWRX strings are designed to achieve maximum speed and tunability, with minimal noise and vibration, ensuring your Hoyt is hunt ready straight from the factory.

It is critical to note that aftermarket string systems can often influence the speed, sound, vibration and tunability of the bow. Factors such as string material, serving material, twist rate, serving tension, finished diameters and end-loop length all play critical roles in harness function.

Hoyt's WireWRX specifications are as follows:

WIREWRX	SPECIFICATION
Material	BCY X99
String strand count	28
Cable strand count	28
Yoke strand count	16
Center serving diameter	.108-.115" service range
End serving diameter	.100-.110" service range



FIG. XII-1 WireWRX string colors.
RENDER — HOYT ENGINEERING (FOREST)

SECTION XIII

Durability Standards – 1500 Dry Fire Test

Hoyt bows stand out compared to all other bows on the market because of the riser design. The bridge section that runs behind the grip is called the TEC bar, which stands for Total Engineering Concept. It's the engineering feature that makes Hoyt bows unbelievably tough. How tough? Every Hoyt bow design has to pass a grueling 1500 dry-fire test before it is approved for production.

When a Hoyt engineer designs a new bow, he builds the first prototype to 80 pounds of draw weight and 30 inches of draw length and puts it in our automated dry-fire machine to begin the ultimate torture test. The machine does what it sounds like; it draws the bow back and cuts it loose and then grabs the string and does it again and again. The test will break many sets of strings, but if the riser cracks, breaks or bends at all, it doesn't pass the test and the engineers have to strengthen that area of the riser, make a new one, and do the test again.

The TEC riser design is what makes it possible for our risers to pass this test while also being super lightweight. Another huge benefit of the TEC design is that it allows us to have a smaller grip section than most other bows, which is important for accuracy because there is less surface area for hand torque to be unintentionally introduced, and it also makes for a more comfortable grip.

Hoyt limbs go through the same dry-fire torture test. They have to pass 1000 dry fires without failing, but it's worth saying that our limbs usually last the full 1500 dry fires when performing the riser dry-fire test, easily surpassing their requirement of 1000.

Having said that, it is not recommended to dry fire your bow.



FIG. XIII-1 Riser, grip, TEC bar and limbs.
RENDER — HOYT ENGINEERING

> Warning: Never dry fire your bow. To dry fire your bow, means to shoot the bow without an arrow. Never try drawing a bow that is too heavy for your strength or that does not fit your draw length as this could lead to an unintentional dry fire. A dry fire could cause your bow to break and cause death or serious injury to you or others. If your bow is dry-fired there could be both seen and unseen damage and it should be returned to Hoyt or taken to a Genuine Hoyt Retailer for inspection before any further use.

SECTION XIV

In-Line Accessory System and New Quiver Mounting Locations

Quiver Mounting Locations

As mentioned, both the Protocol RX and AX risers are all new. One of the updates to the risers is new quiver mounting locations. These have been moved outside of the riser footprint to bring the quiver closer to the archer, which improves bow balance and quiver accessibility. This seems like a small thing, but we don't overlook an improvement just because it's small. They all add up.



Protocol RX: quiver mount arms on the riser.

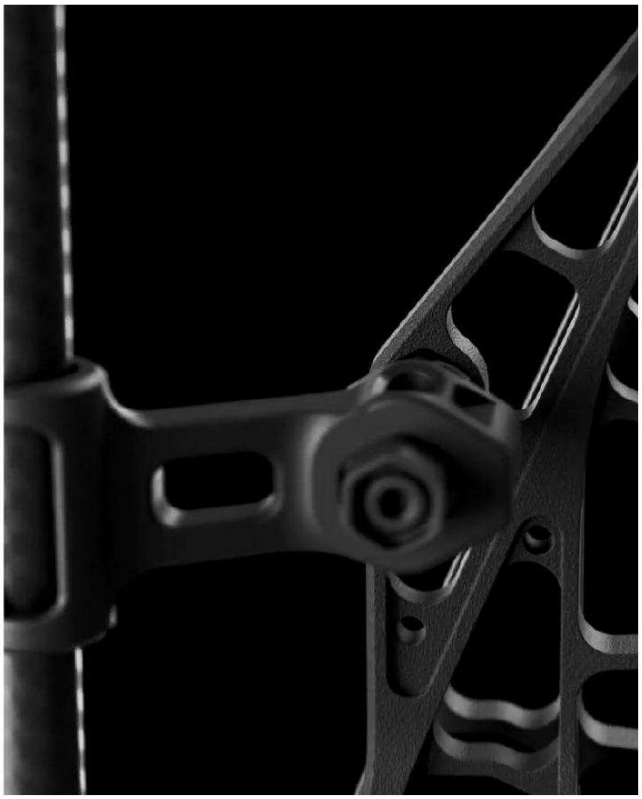




FIG. XIV-1 Quiver mount locations: Protocol AX (left) and Protocol RX (right).
RENDER — HOYT ENGINEERING (FOREST)

XIV · CONTINUED

In-Line System

By focusing on the shooting experience and thinking outside the box, Hoyt engineers broke out of the archery accessory paradigm and created a better system. For years, sights and rests have always been mounted on the side of the bow, which meant the quiver had to stick out further to clear the sight and rest, creating a bow that was side-heavy and wouldn't balance. Stabilizers and side bars could be used to offset these side mounted accessories, but that just added even more weight to your bow. By rethinking how accessories mount to the bow, we greatly reduced the overall weight of your hunting rig while improving the balance and accuracy of your bow.

An integrated Picatinny Rail on the front of your bow makes it possible to mount your sight on the front of your bow, keeping the weight in line with your riser instead of off to the side. The arrow rest mounts to the back of the riser using the Integrated Mounting System®, once again, keeping the weight in-line with your riser instead of off to the side. And now that the rest and sight aren't on the side of the bow, you no longer have clearance issues with your quiver and arrows and you can get the quiver closer to your bow, bringing its weight closer to the center line of the bow for a better balance point.

Stabilizer location was also challenged and improved in the In-Line system by adding a stabilizer bushing lower and farther forward on the riser. There are several advantages to this location including a lower center of gravity (CG) which means a lighter stabilizer will anchor the bow just as good in this location as a heavier stabilizer in the upper location. Also, because this location is farther forward on the bow, the included Short Stop 2.0 at only 2 inches in length puts the weight approximately the same distance in front of the bow as a 7 inch stabilizer in the upper location. So, overall, your hunting rig weighs significantly less due to a lighter and shorter stabilizer in the lower location but the stabilization benefits are just as good, if not better.

Our In-Line Accessories System is another example of Hoyt Engineering Synergy™ where two things are designed to work together to make them better together. Hoyt bows, when equipped with In-Line Accessories are over 10% quieter and have over 30% less vibration. This goes against the norm of accessories that add noise and vibration to your bow. Not to mention the overall weight of your accessorized bow will be lighter and it will balance better compared to ordinary, non In-Line accessories.



FIG. XIV-2 Protocol RX 29 with In-Line sight and rest.
PHOTO — HOYT ARCHERY



FIG. XIV-3 Protocol AX with In-Line accessories.
RENDER — HOYT ENGINEERING

SECTION XV

Black Stabilizer Bushings

All models of Protocol feature a redesigned stabilizer bushing that is black anodized to eliminate shine on stabilizer bushings that are not being utilized. It's a small, albeit noteworthy upgrade made at the request of many of our employees in their own desires to even the playing field against mature bucks.



FIG. XV-1 Protocol in the field.
PHOTO — HOYT ARCHERY

SECTION XVI

Specifications

Protocol AX 31 & 33

SPEC	AX 31	AX 33
ATA	31 5/16"	33 3/8"
Brace height	6"	6 1/2"
Draw length range	25"–30"	26"–31"
Velocity (fps)	342	339
Mass weight (lbs)	4.5	4.7
Draw weights (lbs)	80,75,70, 65,60,50	80,75,70, 65,60,50
Let-off (%)	85/80/75	85/80/75

Protocol RX 29 & Ultra

SPEC	RX 29	RX ULTRA
ATA	29 1/2"	33 1/16"
Brace height	6 5/8"	6 5/8"
Draw length range	25"–30"	26"–31"
Velocity (fps)	340	338
Mass weight (lbs)	3.9	4.1
Draw weights (lbs)	80,75,70, 65,60,50	80,75,70, 65,60,50
Let-off (%)	85/80/75	85/80/75

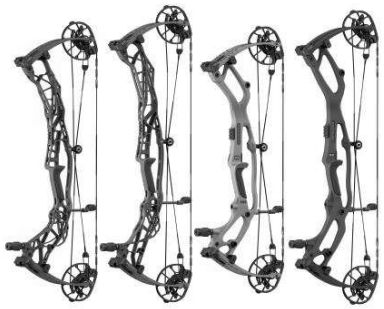


FIG. XVI-1 Protocol AX 31, Protocol AX 33, Protocol RX 29 and Protocol RX Ultra.

RENDER — HOYT ENGINEERING

Note Regarding Factory Specifications: Let-off and holding weight numbers are precision factors which archers should understand and note for their reference. However, data measured with consumer archery scales should not be treated as absolute. These scales should be treated as a reference only. Consumer archery scales vary from one draw to the next and can easily be manipulated to an incorrect reading if the scale is not drawn at the exact same angle and tempo each time. Variations in string and cable construction, serving diameters, and loop lengths can also cause variations in draw length, cam timing, let-off feel, and efficiency.

SD & LD Models

SPEC	AX 31 SD	AX 33 LD	RX ULTRA LD
ATA	31 3/16"	33 5/16"	33 1/4"
Brace height	5 1/2"	7 5/8"	7 5/8"
Draw length range	22 1/2"–26 1/2"	31 1/4"–33"	31 1/4"–33"
Velocity (fps)	312 (@ 26 1/2")	355 (@ 33")	355 (@ 33")
Mass weight (lbs)	4.3	4.8	4.27
Draw weights (lbs)	70, 65, 60, 50, 40	80, 75, 70, 65, 60, 50	80, 75, 70, 65, 60, 50
Let-off (%)	80	85/80/75	85/80/75



PROTOCOL™

