

Wing Rigger™ FAQ

Version 8.0



1. How does the gas spring work?



Wing Rigger was the first commercial rigging system offering a gas spring assist. The gas spring, located inside the main column, pushes upward on the wing saddle with a continuous lifting force related to the pressure in the gas spring.

Raising and lowering the wing without a helper becomes easy. The main column is equipped with two lock knobs; the top knob locks the telescoping inner column to the base while the lower knob independently locks the gas spring position. Since the gas spring has inherent damping characteristics, vertical movement is smooth and easily controlled.

2. Will the gas spring last?

Since the Wing Rigger gas spring is inside the main column, it is protected from the elements. Hundreds of Wing Riggers have been in service for many years without a single report of lost pressure. Gas springs are commonly used in automotive and industrial applications that involve harsher operating conditions. That said, the Wing Rigger gas spring is easily replaced. They can be ordered from McMaster Carr (see FAQ #4 below).

3. How much lifting force should the gas spring produce?

The idea of the gas spring is to provide a lifting assist so that the solo users can assembly a sailplane without great exertion of effort. In previous generations of the Wing Rigger, all units were supplied with a 70 lb (32 kg) gas spring. Now in model 8, we've expanded on that idea by offering any gas spring force in 10 pound increments from the 70 lbs (standard) up to 130 lbs (59kg). We suggest a spring force of about .7 times the wing panel weight. So, for example, a 140 pound ASW-27 wing works best with a 100 pound nominal spring which makes the wing essentially float in the vertical; mitigated only by friction.

The reason for the .7 factor is twofold. First, when using the Wing Rigger, some of the wing panel weight will be supported at the root spar stub hanging in the fuselage. The second reason is that the nominal gas spring force is specified at full extension but the force increases a bit as the spring is compressed. So, a 100 pound spring will produce more like 110 lbs of lifting force when the unit is operating half compressed, and even more if the spring is compressed further. Clearly the .7 factor is only approximate since the span-wise positioning of the Wing Rigger determines how much weight will be supported at the spar stub and the height-wise positioning determines how much additional force the spring produces due to its degree of compression.

4. Can I change the gas spring force in my Wing Rigger?

Changing the gas spring force is done by replacing the spring with one of a different force value. If your Wing Rigger is equipped with other than that standard 70 lb spring, the force value is normally indicated on the bottom of your unit. If for example, you currently have a 110 lb spring and want to try a lighter spring, you might order a 90 lb or 100 lb spring from McMaster Carr (www.mcmaster.com). The springs cost around \$15 and are easy to change.

To remove the gas spring... remove the bolt at the bottom of the main column and remove the lower column knob; then slide the gas spring assembly out the bottom of the column. Transfer the lower fitment and the upper fitment to the new spring and install in the main column.

The following specifications and part numbers are for the gas springs used in the Wing Rigger standard column as well as the short and the tall variant. The specifications may be useful for customers outside North America who may wish to find a local equivalent:

- threaded ends are M6 threads
- rod diameter is .32" (8mm)
- cylinder diameter is ~.75" (18 - 20mm)

Variants	Extended Len	Compressed Len	Stroke	McMaster PN*
Short	15.63" (397mm)	9.33" (237mm)	6.30" (160mm)	9416K17
Standard	18.62" (473mm)	10.35" (253mm)	8.37" (213mm)	9416K19
Tall	22.36" (568mm)	12.52" (318mm)	9.84" (250mm)	9416K2

**The indicated McMaster part numbers are for each dimensional family of springs – When ordering you will additionally specify the spring force desired (up to 130 lbs).*

The gas spring cylinder produces a friction force in addition to its lifting force. One consequence of the friction is that it makes the lifting spring force not especially critical. A wing that's balanced with a 90 lb spring will likely also be effectively suspended with a 80 lb spring or a 100 lb spring; friction essentially takes up the difference over a certain range. Moreover, achieving a force balance is not wholly important; earlier Wing Rigger models are used quite successfully with 70 lbs spring assist for all glider types.

5. How does Wing Rigger lateral adjustment work?

In addition to the up/down control mediated by the gas spring, Wing Rigger can be adjusted for wing fore and aft position. This lateral control feature makes it possible to align the wing perfectly to the fuselage with minimal efforts.



Wing Rigger operates on three wheels. The two outer wheels carry the running load while the center wheel is offset vertically and functions primarily like a rolling 'kick stand'. When the unit is loaded with a glider wing, this center wheel is automatically lifted off the ground as the Wing Rigger is leveled by its payload.

The two outside wheels are mounted on an axle which slides in linear ball bearings (new to model 8). A rubberized knob is provided to lock the axle position. The axle knob operates on a split cylinder locking mechanism inside the axle support tube. This new axle locking mechanism provides excellent gripping force with just a modest twist of the lock knob.

Recent improvements in model 8 have extended the lateral adjustment range to 13 inches from 9.5" in the previous model.

IMPORTANT: Never tighten the axle lock knob when the axle is not in place as doing so can distort the split cylinder lock mechanism.

6. Why are there two knobs on the main column?

The two knobs serve entirely different functions. The lower knob locks the gas spring position to set the operating height of the unit. This knob is always left tight except when actually making a height adjustment.

The upper knob serves to solidly attach the saddle assembly to the base. A large aluminum nut block clamps and sandwiches the two telescoping square tubes to make a rigid assembly. The upper knob should always be tightened before transporting a wing with the Wing Rigger. Once the wing has been moved into position, it's usually OK to leave the upper knob loose if that is convenient. Though, a simple operating procedure is to keep both knobs tight except while adjusting height.

In practice, glider solo assembly and disassembly is often done with no change in height required at the Wing Rigger – especially for a trailer setup that is equipped with a fuselage ramp jack. While sighting the wing pin alignment, it's usually quicker to jack the fuselage than it is to walk out to mid-span to adjust the Wing Rigger height. But when height adjustment is occasionally needed differentially at one wing, the easily operated Wing Rigger height control makes the process efficient. Uneven ground, for example, can be one reason that one may adjust the Wing Rigger height.

When breaking down the Wing Rigger for stowage, only the upper knob need be released. With the lower, gas spring knob left tight, the height position is retained and the unit remains configured for the next occasion of use.

7. What's the best way to preload the gas spring?

Units are shipped with the gas spring compressed and in normal usage the spring will remain locked at the last operating position. So, as a practical matter, there shouldn't be a need to preload or compress the spring by hand. But, if a mistake happens, the lower knob might be inadvertently released without the weight of the wing to hold the spring down. In that case it may become necessary to preload it. There is a certain technique that makes doing this pretty easy:

Stand facing the Wing Rigger with your feet astraddle the third wheel. Fully loosen both column knobs. Lay your torso onto the padded Wing Rigger saddle and lean your body weight onto the saddle. As the saddle is lowered, reach down and lock the lower knob. For this to work, your body weight must be greater than the gas spring lifting force; if it isn't, you'll probably need to seek an assistant.

8. Can Wing Rigger be used in wind?

Most users will be cautious if the wind is gusting to 10 MPH. As one gains experience with the Wing Rigger, you'll establish your own criterion for solo assembly and how best to operate in gusty conditions. Even in stronger wind, one can profitably use the Wing Rigger to carry the weight of the wing while deploying an assistant to help stabilize. If an assistant is used in windy conditions, consider having him walk aside the Wing Rigger to aid stability if it should be necessary.



Always aim your trailer directly into the wind. As you pull a wing out of the trailer, the wind will run span-wise down the length of the wing which does not produce a tipping force. Rotate the wing to the flat position before maneuvering the wing into position for assembly. Keeping the wing flat also greatly reduces any tipping force that the wind can impose. While maneuvering the wing in the flat position, hold the spar with one hand and the leading edge firmly with the other hand to prevent it from lifting or diving.

A Wing Rigger partisan once disassembled his sailplane completely alone at a remote airstrip in a 20 MPH wind with driving rain in the middle of the night. It can be done after experience with the unit has been obtained in breezy conditions.



9. Can Wing Rigger serve for tying-out overnight?

A Wing Rigger saddle makes a secure mid-span anchor for one wing. Pictured here is one way to tie down using the Wing Rigger saddle (sans base unit). This configuration securely distributes the tie-down load over the glider's wing surface. Moreover, nothing touches your glider's trailing edge or flap.

A webbing strap or rope is looped around the trailing edge keeper pad then over the leading edge cuff and cinched to the tie down cable or anchor. The wing is supported by a wing stand placed just outboard of the Wing Rigger saddle. If you also have a wing wheel and a second wing stand, then a similar configuration might be used on the opposite wing with rope or strap pulled over the leading edge portion of the wing wheel saddle. Experienced pilots will also block the main wheel and secure the tail of the glider too.

10. How will the Wing Rigger saddle fit my glider's airfoil?

We offer a couple different size saddles to generally match with the size of the wing. But the fact is that matching the generic saddle shape to your airplane's airfoil is only approximate. The inside surface of the Wing Rigger saddle is lined with dense felt which provides effective cushioning for your wing. The wing's weight is distributed across the width of the saddle. Wing Rigger generally produces less localized pressure on the wing surface than do flat wing stands that are in common use.

Essentially all popular composite glider types have already been fitted with a Wing Rigger. We maintain a database. When you tell us your glider type, we will likely know from past experience how to configure your unit. For less common gliders that we haven't fitted, we can make an assessment from airfoil information and 3-view drawings.

11. Can Wing Rigger accommodate two-place glider wings?



For two-place gliders and a few single place gliders with big wings, we offer an extended chord variant. The 'XC'

Wing Rigger has additional degrees of freedom in the saddle configuration to fit big gliders like the Blanik, Duo Discus, DG-1000, Twin Astir, PW-6, Pipstrel Taurus and Arcus. The XC

saddle is also used for certain single place gliders like the Pilatus, the Swift and the Ka6. The XC wing saddle is made in two parts with adjustable extension. It also accommodates variation in wing camber as the upper and lower saddle elements have a small range of angular compliance. Wing Rigger sales for two-place sailplane applications have accelerated in recent years as the XC saddle has gained a reputation for great performance across every application. Wing Rigger model 8 now also uses a heavier gauge sliding axle that significantly improved stiffness for the heavy wing ships.

Pictured here is the XC saddle used on a two-place PW-6 sailplane:



12. Will Wing Rigger store inside my trailer?

Wing Rigger breaks down to a compact storage footprint. Most users find that storage inside the front compartment of their trailer works well enough even when the compartment is shared with a host of other necessities. With many trailers (Cobra and the like), users are able to keep the wheels installed on the Wing Rigger base unit for even greater convenience. The alternative is that the wheels can be easily removed by a quarter turn on the locking shaft collars. The third wheel strut is equipped with pushbutton disconnect.



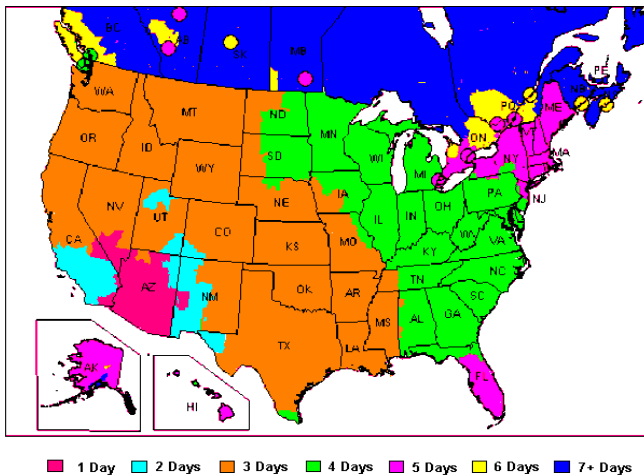
Some pilots store the saddle assembly in the aft part of their trailer for convenient access. One strategy is to place the saddle in its upright position around the wing itself as pictured here. This often works well for gliders with swept back leading edge (an ASW-27 is shown). You'll want to use sufficient elastic bands or other attachment to make sure that the saddle can't shift position on a bumpy road.

It is a good idea to store Wing Rigger components in such a way that they will not rattle and abrade in your trailer's storage compartment. A small moving blanket works well to pad and isolate the Wing Rigger components. Wrapping the unit also serves to keep moisture away from the unit in humid climates. A small moving blanket is provided with each Wing Rigger unit for exactly those purposes.



13. How are Wing Riggers shipped?

Wing Rigger is shipped in a box that is custom made for the product. It is a double wall carton with full overlap flaps. The carton is 27"x11"x22" and weighs about 47 pounds with the packaging materials. Quoted shipping charges include the cost of the custom box and packaging.



For shipments inside the United States and to Canada we generally use Fed-X Ground service. Delivery time is typically 2-5 days to US destinations and 6 or 7 days to Canada as shown on the map. Shipments are FOB Origin: Mesa, Arizona. We will send an email as soon as your unit is shipped out which includes your FedEx tracking number and an estimate as to when to expect delivery. Fed-Ex does require a phone number – please be sure to provide a phone number when ordering.

Most International deliveries are shipped by Fed Ex International Economy service. This is a fast and economical air service to many countries. We procure insurance on your behalf for all international shipments.

When overseas deliveries may be combined in a group of six or more units, delivery by sea freight and trucking becomes economical. Sea freight provides an opportunity for savings when a collective purchase can be arranged. The savings increases with the number of units that are combined on a pallet. In this case, each Wing Rigger unit is individually packaged in a double wall carton. The lot is strapped to a pallet. Transit time by sea freight is, of course, longer than transit time by air.

International shipments typically pass through your customs agency when the item arrives in country; it is then forwarded to the recipient. We include a commercial invoice in multiple copies that are affixed to the carton for customs purposes. Though there is no specific harmonizing code for sailplane rigging aids, we have successfully used harmonizing code 8805.10 for international shipments. We describe the product on the commercial invoice with language similar to the following: ***Wheeled dolly for moving and supporting a sailplane wing during rigging and de-rigging operations.***

14. What maintenance might be required?

If it should become necessary, wipe off any dirt accumulation on the sliding axle and inside the linear ball bearings. Wing Rigger does not require lubrication.

Occasionally (perhaps annually) wipe down the exposed black oxide surfaces with a rag lightly dampened with light machine oil to protect the black oxide steel parts and maintain their appearance.

Wing Rigger should always be stored out of the weather. If the unit gets wet, it should be dried off before storage. In humid environments, wrap the unit to protect against moisture in storage.

15. What is the preferred method of purchase?

In general, customers use email to effect their purchase. Please be sure to include your aircraft type. Please include your address to allow quoting shipping cost and please include your phone number as that is required by the shipper. Purchases are prepaid.

We do not take credit cards as credit card company fees are excessive for small businesses. PayPal charges have become similarly exorbitant and discouraged for that reason. The preferred method of payment for US customers is by Intuit Payment Network; this is a bank to bank transfer method that is free for you and cost us just \$.50 per transaction. It makes your purchase immediate and it saves you from the need to mail a check while it saves us on trips to the bank. Of course, mailing a check is quite OK too. Please make checks payable to MM Fabrication LLC.

The link for payment by Intuit Payment Network is:

<https://ipn.intuit.com/pay/MMFabricationLLC>

Please use your own name as "Invoice/Reference #". You will need your bank routing number and account number which are both printed on your checks.

For international customers, the best method of payment is by either mailing a bank draft in US dollars or by sending a bank to bank international wire transfer. A wire transfer is more immediate but there are normally fees at both ends. If you wish to use a wire transfer, please request wire instructions from us. A bank draft should be payable to MM Fabrication LLC and mailed to:

MM Fabrication LLC
PO Box 1623
Moriarty, NM 87035
USA

16. Does Wing Rigger have a warranty?

Yes. We'll work to resolve any problem that you might encounter (a rarity to be sure).

Wing Rigger business succeeds by word of mouth. We need to have all of our customers completely satisfied.

Disclaimer *We will not assist on matters of personal injury or consequential damage.*

Other Questions?

Please reference the ***Wing Rigger Quick Start card*** supplied with your unit for guidance related to the one-time adjustment of the trailing edge keeper and the saddle rotation stop.

We're happy to address other questions that you may have. Please contact:

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