

Cessna (wheel pants) Aircraft Tug Assembly Instructions



[Fig.1]



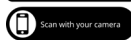
[Fig.2]



[Fig. 3]

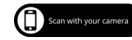
Visit

<https://www.minimuxtugs.com/Assembly-s/2106.htm>
for a **DeWalt 20V** assembly video or scan QR
Code with your smartphone camera



Visit

<https://www.minimuxtugs.com/Assembly-s/2104.htm>
for a **DeWalt 60V** assembly video or scan QR
Code with your smartphone camera



1. Carefully unpack contents of shipping carton and locate the charger and battery. The battery may or may not be installed in the drill. Plug in the charger and charge the battery for at least one hour. You will need a 1/2" and two 7/16"(10mm if you have black axle bolts) boxed-in wrenches and two large adjustable wrenches to assemble your tug.
2.
 - a. **DEWALT DRILL 20 Volt:** Locate the 1/2" drive shaft and chuck the end with three flats into the Dewalt drill. Be sure the flats align with the jaws in the chuck and are seated on the jaw tips. Tighten by hand as hard as you can with the drill in the **drill bit image** position, and in speed selector switch setting **1**. With the drive shaft installed in the drill, insert it into the expanded white handle tube end and push the drill into the white handle tube as far as it will go noting that it fits squarely to the drill collar. Rotate drill per image above [Fig 1]. Tighten compression clamp with a 7/16" wrench. Move to step 3.
 - b. **DEWALT DRILL 60 Volt:** Locate the Chuck Lock [Fig.3] in the hardware bag. Now locate the 1/2" drive shaft inside the long white handle tube.
 - i. Slide the driveshaft UP inside the handle tube 3-4".
 - ii. Slide the Chuck Lock over the top of the driveshaft with the tabs pointing toward the drill. and insert the end of the driveshaft with three flats into the Dewalt drill chuck. Be sure the flats align with the jaws in the chuck and are seated on the jaw tips.
 - iii. Tighten with the provided chuck key (in hardware bag) as tight as you can.
 - iv. Align the tabs of the Chuck Lock with the grooves on the drill chuck, ensuring that the Chuck Lock's holes align with those in the chuck. Adjust the chuck's tightness if necessary.

- v. Apply the provided Loctite to the three set screws, then insert them into the threaded holes of the Chuck Lock. Securely tighten using the provided hex key wrench.
 - vi. With the drive shaft installed in the drill, insert it into the expanded white handle tube end. Align the two pins on the drill with the collars on the white handle tube [Fig. 2] and push the drill into the white handle tube as far as it will go, noting that it fits squarely to the drill collar. Insert the two large bolts and washers from the hardware bag through the collars on the white handle tube and thread into the pins of the drill [Fig. 2]. Gently tighten the two bolts with a 5/8" wrench. **DO NOT OVERTIGHTEN**. These just need to be snug. Then tighten the stainless-steel compression clamp securely with a 7/16" wrench.
3. Install wheels onto axles with 1/4" x 2"(these may be 10mm) bolts and lock nuts. The wheel hubs are designed to be somewhat "loose" on the drive axel to protect the drive train gears and aid in turning your tug. Air tires to **22-25 PSI** and always maintain this air pressure.
 4. Install the riser into the lower most holes of your tug. [Fig.4] **Position with arrow on bottom of riser mounting plate pointing toward aircraft**. Secure with 4- 5/16" X 3/4" bolts and speed nuts. Install fork assembly with 3/4" x 3-1/2" bolt, (Lubricate with oil or grease) lock washer and nut onto of riser. Tighten so that fork is slightly stiff to swivel by hand. The fork assembly has been bench assembled and adjusted by our technicians. There may be minor scratches in the paint as such.
 5. Install the battery into the drill and note that it "snaps" into place. Install the handle tube/drill assembly into the tug receiver fully to the black depth marker line rotating as necessary or lightly "bumping" the drill trigger to engage the square driveshaft into the square drive socket.
 6. **DEWALT 20V** Rotate the drill as shown [Fig. 5] Move to step 8.
 7. **DEWALT 60V** Rotate the drill as shown [Fig. 4] ensuring the slot in the receiver is aligned with the hole in the bottom of the handle tube. Install the small 1/4"-20 x 1/2" bolt [Fig. 6] through the receiver and into the handle tube.
 8. Be sure the stainless-steel compression clamp [Fig. 6] is positioned onto the tug handle receiver flush with the top. Tighten compression clamp snugly (Approx. 13 ft/lbs.) *It is critical that this connection is always tight while the tug is in use.*
 9. Familiarize yourself with the drill operation and assure that the drive wheels rotate in both directions using the drill forward/reverse switch and that drill rheostat and speed changer (if equipped) function properly.



[Fig. 4]



[Fig. 5]



[Fig. 6]

10. Gently lift fork locking bar to clear catch pin and open forks fully. Attach tug to your aircraft nose gear positioning left fork onto aircraft left tow pin as you position the opened right fork onto the right tow pin and close until locking bar "Snaps" onto the catch pin. You are now ready to tow your plane. Apply down pressure on the tug handle and slowly pull the drill trigger all the way in to move your plane. When stopping, slowly let off on the drill trigger until plane stops. You can control towing speed with the trigger rheostat or speed changer.
11. To remove the tug from aircraft, gently lift locking bar to clear catch pin, open right fork, turn tug left to disengage left tow pin. Power drill in reverse to back away from aircraft. Avoid sudden under-load starts and stops as this can damage the transmission gears in your tug. Maintain tug per "Use and Care Guide".

NEVER LEAVE TUG ATTACHED TO AIRCRAFT WHILE NOT IN USE!

Practice makes perfect! Thank you for buying a Minimax Aircraft Tug!

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USE AND CARE GUIDE

For best results using your Minimax Aircraft Tug please read and understand the following:

- Aircraft must not exceed 4,000 lbs. gross weight. (Unless tug specifically engineered by Minimax)
- Always make sure the tires on your aircraft are aired to the manufacturer's specifications. **Low aircraft tire pressure is the number one reason for poor towing performance.**
- Given maximum aircraft gross weight, 2% (2.5" rise in 10' run) grade is maximum towing capacity using our Dewalt 60V cordless power system.
- Our tractor tire driven tugs are most effective "pushing" your aircraft due to simple mechanical advantage. This is a benefit as most aircraft are hangered tail first up-slope to the hangar. Pulling your plane uphill will require extra down pressure on the handle. As our tugs are light weight, some down force may be required to maintain tire traction while towing. Especially when first getting the airplane moving.
- Always keep your battery charged. New Lilon battery technologies have improved that batteries are unaffected by overcharging and will accept 2000 charges. A fully charged battery will provide enough power to move your aircraft (*depending on model*) on a hard level surface the length of a football field!
- Always maintain tug tire pressure as noted on tires or instructions . Tractor tire driven tugs are NOT for use on turf unless equipped with snow tires or chains. Turf must be hard, level and dry.
- Our tugs are designed for use on hard level surfaces such as asphalt or concrete. Our Dewalt 20v Lilon system will provide plenty of power as such. Grades up to 2% may require our Dewalt 60V cordless power system depending upon the weight of your aircraft.
- Curbs or door tracks up to 1" high may require ramps at main wheel crossing points. Please read our [Performance Checklist](#) to determine if our product is suitable for your particular towing needs. Cracks in the surface wider than 3" should be filled in with like material. Gritty and sandy surfaces should be swept clean for adequate tire traction. Tires will roughen after a few uses and provide better traction as they wear.
- Our Dewalt 60V cordless power system will provide ample power crossing curbs as high as 1" at 90 degrees ([ramps may be required](#)) with a gradient not higher than 2%.
- Ours and all tugs of this design category are considered "assist" tugs and are not designed for continuous sharp turn towing as they do not have transaxles. Lifting tug to adjust nose wheel position in turns may be required. Our tugs will provide on average 6 or more cycles (1 cycle= 50') of continuous towing on a hard, level surface on one battery charge depending on the weight of your aircraft.
- Please remember operating your Aircraft tug on inclines can pose a risk of serious personal injury and/or property damage! Always use good judgment while operating your tug, NEVER leave attached to aircraft while not in use.
- On drive roller style tugs, keep the chain and sprockets free from grit and grime and oiled with a good quality chain lube. Failure to keep chain and sprockets lubricated will result in premature chain breakage. Lubricate bushings with 20 weight non detergent oil..
- The transmission on our tugs is filled with synthetic gear oil and should not require any maintenance.
- The transmission drive shaft receiver socket is packed with grease. Re-grease every 10 hours of continuous use.
- Clean tug with products such as ArmorAll multi-purpose cleaner and keep dry for long service life.

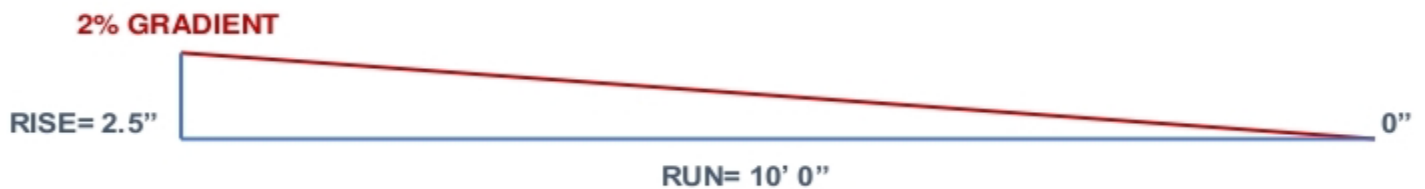
Understanding these operational tips will make moving your aircraft easy and enjoyable.

PERFORMANCE CHECK-LIST

If moving your aircraft has become difficult and will weigh in on your decision to take a flight, it is probably time to consider purchasing an aircraft tug. There are several factors to consider in your decision making to help ensure you purchase the proper tug with the right power source. As pilots, we can all agree that you can never have too much power when you really need it.

Minimax Aircraft Tugs are highly engineered and designed to be affordable, light-weight, portable, and capable of towing aircraft to 4,000 lbs. gross weight. With this said, there are some considerations which should be understood before purchasing. Namely, what is the slope into your hangar and what type door track or curb do you have to cross to hangar your aircraft.

Slope is calculated as a percentage of rise and run with 45° being 100%. (i.e. 2.5" rise in 10' run = 2%)



To understand slope (gradient) consider for every 1% gradient the energy required to move an object up-slope will increase by 15%. This means at 1% gradient your aircraft is now 15% harder to move. At maximum 2% gradient it is 30% harder to move. Our tugs will move your aircraft and negotiate a maximum 2% gradient. Any gradient over this is enough for your aircraft to roll under its own weight. 6% gradient is the generally accepted maximum allowed in mountainous road construction.

Door tracks or thresholds are typically the most problematic area of moving one's aircraft, but are relatively simple to overcome. On a level surface, if you have a 1" high curb or door track, a ramp 36" long x 1" high tapered to 1/8" will create a gradient of 2%. For every 1/4" of obstacle height the ramp must be at least 9" long. We have found that most Cabinet Shops will come to your hangar to measure and estimate making the ramps (2-pcs. tapered hardwood 8" wide) for each aircraft main wheel. The aircraft nose wheel typically does not require a ramp.

LOW AIRCRAFT TIRE AIR PRESSURE IS THE NUMBER ONE REASON FOR POOR TOWING PERFORMANCE!

In our experience this condition can make moving your aircraft extremely difficult. For safety's sake and easy towing, it's good practice to often check aircraft tire air pressure.

Our cordless electric tugs are considered "assist" tugs in the industry and are not designed for continuous, long distance towing over 500' at a time or continuous tight radius turning as they do not have transaxles. Although the tug itself will function without issue in these conditions, the Lithium Ion battery providing power to the drill will by design shut down to prevent damage from over-heating. The battery will automatically reset to function once cooled. Auto reset can take 10-30 minutes.