

"The Boss" Tail-Dragger Aircraft Tug Assembly Instructions

Visit

<https://www.minimaxtugs.com/Assembly-s/2125.htm>
for a DeWalt 20V assembly video or scan QR
Code with your smartphone camera



Visit

<https://www.minimaxtugs.com/Assembly-s/2126.htm>
for a DeWalt 60V assembly video or scan QR
Code with your smartphone camera



1. Carefully unpack the 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" boxed in wrenches, (1/8" Allen wrench for Milwaukee power system) and large adjustable wrench to assemble your tug.
2. **DEWALT 20 Volt Drill:** Locate the 1/2" drive shaft inside the long white handle tube and slide the driveshaft UP inside the handle tube 3-4" and insert the end of the driveshaft with three flats into the DeWalt drill chuck.



Figure 1

- a. Be sure the flats align with the jaws in the chuck and are seated on the jaw tips. Only insert into the chuck of the drill the length of the machined flats on the driveshaft.
- b. Tighten chuck of drill by hand as hard as you can and set the numbered torque selector to the drill bit image position, and set speed selector switch on top of drill to setting 1
- c. Rotate drill per image [Fig. 1] with Minimax label facing up. Tighten compression clamp nut to prevent drill from rotating in handle tube. Do not tighten nut by using black handle. Install charged battery.

3. **DEWALT DRILL 60 Volt:** Locate the 1/2" drive shaft inside the long white handle tube. Slide the driveshaft UP inside the handle tube 3-4" and insert the end of the driveshaft with three flats into the Dewalt drill chuck.

- a. Be sure the flats align with the jaws in the chuck and are seated on the jaw tips. Tighten with the provided chuck key (in hardware bag) as tight as you can. With the drive shaft installed in the drill, insert it into the expanded white handle tube end.



Figure 2

- i. 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.
- b. 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. 3].
- c. 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.

4. Install wheels onto axels with 1/4" x 2" bolts and lock nuts. The wheel hubs are designed to be somewhat loose on the drive axel to protect the drive train gears and also aid in turning your tug. Air tires to **22-25 PSI** and maintain this air pressure at all times.



Figure 3

5. Install the main frame [Fig.3] onto the tug with 4- 5/16" X 3/4" bolts and speed nuts. **NOTE IT IS INSTALLED OFFSET.**

6. Install the casters onto the sway bar with 8- 5/16" x 3/4" bolts and nuts. Install the sway bar onto the main frame [Fig.4] with the 1/2" x 7" bolt, lock washer and flat washer and tighten securely. Note that sway bar bolt is offset. (Facing tug from front, short side should be to the left.) Insert foot pedal

arm into lifting lever socket.



Figure 4

7. Be sure the stainless-steel compression clamp is fit onto the tug handle receiver approx. 1/8" from the top. Install the battery into the drill and note that it "snaps" into place. Install the handle tube into the tug receiver fully to black depth mark (1-7/8") rotating as necessary or lightly "bumping" the drill trigger to engage the square drive socket. Tighten compression clamp snugly with drill in the position shown above. **It is critical that this connection is always tight while the tug is in use.**
8. Familiarize yourself with the drill operation and assure that the drive wheels rotate in both directions and that the drill trigger rheostat and speed changer (if equipped) function properly.
9. Position your tug with lifting cradle [Fig.4] in its lowest position steering it toward a 1:00 position to the right side of the tail wheel. Turn the tug CCW pivoting on the left drive wheel and position the tail wheel between the tug rear shoe and adjustable pin and firmly against the lifting bar. Tire air pressure and other factors will dictate the best spacing. We recommend adjusting the space between the tug rear shoe and pick-up pin at three fourths the tail wheel diameter to start. Adjust the aircraft tail wheel tire to rest as low as possible between the rear shoe and lifting pin for best towing performance. While adjusting for fit, securely tighten the lifting pin before lifting aircraft. Damage to the adjustment slot or lifting cradle may result otherwise. Once adjusted and satisfied of fit, tighten lifting pin securely in slot.
10. Beware that the maximum lifting capacity of the tug is **250 lbs.** To lift tail wheel, press the foot pedal down and to the right to clear locking pin. Press foot pedal to the left to engage locking pin and release pressure. Reverse to lower tail wheel. Aircraft tire should clear +/- 1" above surface. Slowly pull the drill trigger all the way in to move aircraft. When stopping, slowly let off on the drill trigger until plane stops. Avoid sudden 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.

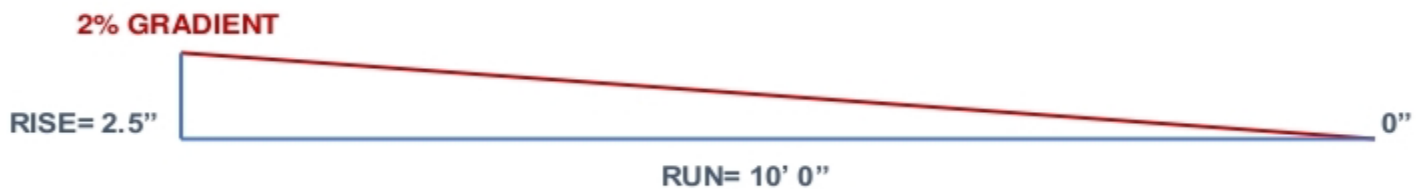
Understanding these operational tips will make moving your aircraft easy and enjoyable.

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.