Operator's Manual

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Revision: October 10, 2024

TABLE OF CONTENTS

OPERATING INSTRUCTIONS

A. Tug and Transmitter Start-Up

The Tiger Tug a very easy and simple vehicle to operate, allowing for safe and easy loading, moving and positioning of your helicopter.

The black handheld transmitter is paired to the receiver in the tug with a unique password code system that is set at the factory so the transmitter is ready to work upon arrival. Because of this discrete password code, the tug will only respond from the signal coming from this pairing. The transmitter will not respond to other radio signals in the area, even other remote control transmitter signals. For safety reasons, if the tug ever loses the signal from the pairing, the tug will stop until the problem is solved.

To turn on the tug and have the handheld transmitter start communicating with the tug follow these steps:

1. Turn on the On/Off switch located at the right rear of the tug.

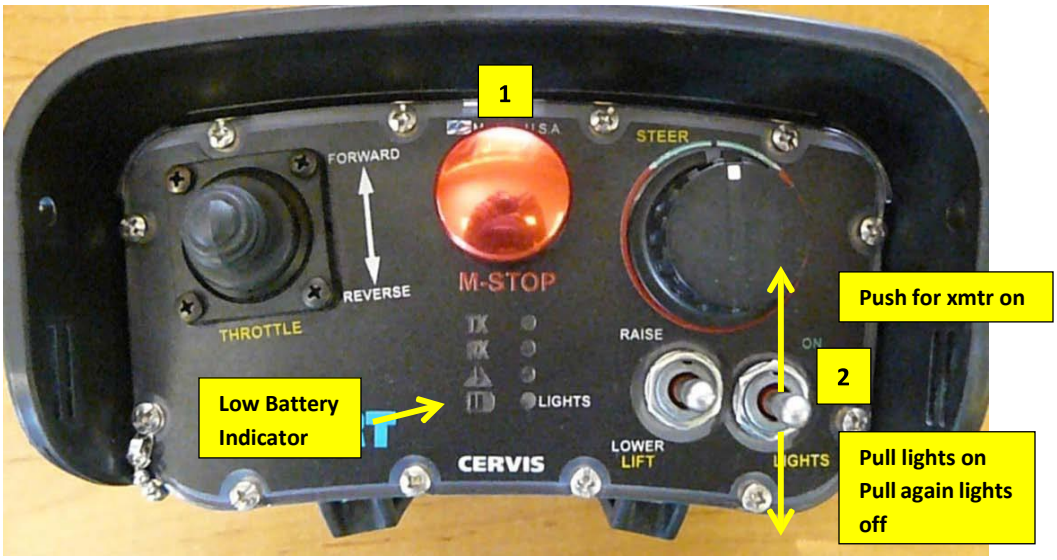
2. Pull up on the red MSTOP button on the handheld transmitter labeled 1 in the picture below.

3. Push forward on the “xmtr on" toggle switch labeled 2 in the picture below.

4. After a brief delay, the main contactor in the tug’s E-Box will click on. The green TX and yellow RX indicator lights will start flashing on the handheld transmitter when the tug and transmitter are communicating with each other.

5. A solid green TX light on the handheld transmitter indicates the transmitter is sending a command to the tug either through the steering knob or throttle switch.

B. Transmitter Operation



1. Pulling Switch 2 toward you will turn on the LED lights mounted in the front of the tug. If you pull switch 2 towards you again it will turn the LED lights off. There is an indicator light labeled "LIGHTS" in the bottom center of the handheld transmitter that will tell you if your lights are on or off.

2. The next toggle switch over to the left is the "raise/lower" switch for the hydraulic lift system. This switch is spring loaded to the center. Push it forward and the top frame of the tug will rise. Move the switch aft and the top frame will lower. Releasing the switch will stop the motion of the frame up or down immediately.

3. There is an electric parking brake mounted to the transaxle. The brake will set automatically whenever you push in the red MSTOP button on the transmitter or when you turn the tug switch off on the tug itself.

4. The low battery light on the handheld transmitter will begin flashing when the four AA batteries in the transmitter have about 25% life remaining. When the voltage drops below 2.0V then the transmitter will automatically shut down. If the handheld transmitter unit loses communication with the tug then the throttle will need to be returned to neutral before the tug will accept any command to move. This feature is for safety reasons so the tug will not start moving without the operator's knowledge when the communication link is reestablished. Similarly, if the LED lights were on then you would need to turn them on again.

C. Driving the tug

1. To operate your new Tiger Tug, turn On the On/Off switch located at the right rear of the tug. The electric brake on the tug will still be set.

2. Make sure the tug is on level ground before pulling up on the MSTOP button on the handheld transmitter.

3. When you pull up on the MSTOP button and engage the “xmtr on” switch the electric brake will be released. With the handheld transmitter energized the tug is now ready to be driven.

4. Advance the throttle level slowly and the tug will start moving. Move the throttle forward and the tug will start traveling in a forward direction. Release the throttle and the spring-loaded throttle switch will return to center, and the tug will coast to a stop. Move the throttle lever to the rear and the tug will travel in reverse.

5. The throttle is very sensitive and you can control your speed very precisely. You can move the tug extremely slow and precisely while in close proximity to the aircraft or travel up to 3 mph when not close to any obstructions.

6. When moving in one direction, you can slow the tug down and have it stop just by releasing the throttle lever. While advancing the throttle the farther you move it from center position the faster the tug will travel.

7. If your tug loses electrical power (for example, due to dead batteries), the parking brake can be released so you can push the tug. To release the brake, move the zinc plated lever at the rear of the transaxle upward.

Warning: Do not attempt to push or tow the tug with the electric motors still wired to the system. The motors will act like a generator and will send pulses back to the motor controller and damage it. Under the transaxle is a 3-position terminal block. Remove both motor wires from this terminal block and isolate the motors from the tug to move it short distances. If you need to move it a long distance then remove the chain couplings between the transaxle and the drive axle shafts on both sides so the tires can freewheel and not turn the motor at all.

8. Steering is accomplished by turning the steering knob in the direction you wish to turn. Left turns going forward are accomplished by moving the steering knob to the left. Right turns by moving the steering knob to the right. The actual limit of the steering is only about 50 degrees to either side of neutral.

Warning: While motionless you can easily move the steering tires through their limit of travel while the tug is unloaded. However, with the tug fully loaded with a helicopter on it, refrain from moving the steering wheels very much unless the tug is in motion. Damage could result to the steering link mechanism.

9. Do not stall the electric motor. When moving your tug over a hangar track, lip, or bump, keep the tug moving. DO NOT allow it to stop against the obstruction and continue to apply power to the electric motor. Electric motors are not designed for this and you can easily damage them. This is called a stalled condition and is harmful to electric motors. Instead, back up the tug and get a rolling start so the tug has enough momentum to carry the wheels over the bump.

Warning: Use extreme caution when operating on slippery surfaces like snow, ice or rain covered ramps. If conditions aren't safe then refrainfrom using the tug.

Exercise extreme caution on ramps with slopes. Stay clear of any obstacles and do not move across ramps where the incline is too steep to be handled safely.

10. **For safety reasons and to extend battery life and always push in the red MSTOP button on the transmitter to turn it off whenever you walk away from the transmitter or direct your attention away from the tug**. This sets the parking brake, cuts the power to the receiver and motor. When you have parked your tug, turn off both the red MSTOP on the transmitter unit and the tug's On/Off switch.

Warning: Only park your Tiger Tug on flat level surfaces. Do not park your tug on an incline or sloped surface.

D. Loading your helicopter

1. Make sure the top frame of the tug is lowered all the way prior to positioning the tug under your helicopter.

2. Check that the saddles are located correctly on the frame so that when the top frame of the tug is raised, the saddles nest correctly and are aligned with the front and rear cross tubes.

3. Slowly drive your tug under your helicopter staying directly centered between the helicopter skids.

4. Watch carefully so that the tug doesn't interfere with any lights, antennas or other equipment hanging under the helicopter belly.

5. Since you have the advantage of having a handheld wireless transmitter, you can stand right next to the saddles as you engage the raise switch and watch the tug's saddles rise into position. Only raise the helicopter as high as you need to safely move it in and out of the hangar and across the ramp.

E. Emergency Hydraulic Relief Valve

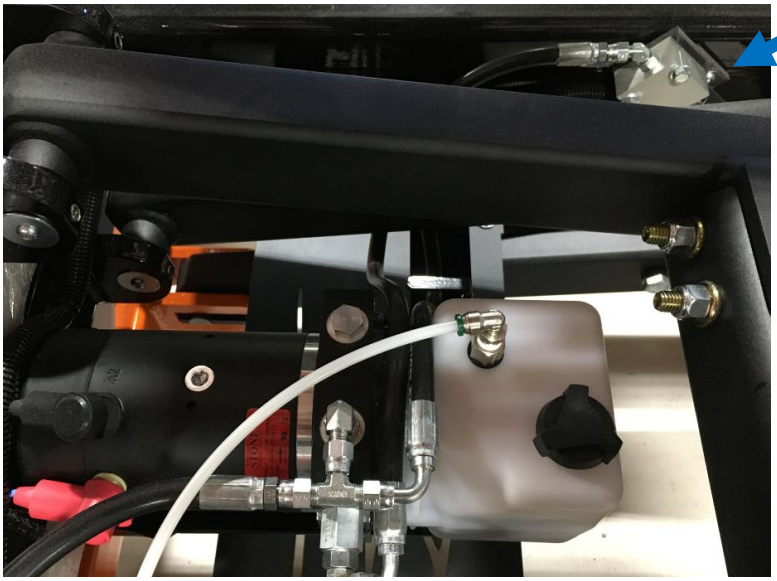
If the hydraulic lift system loses power and will not lower, there is an emergency valve that will release the hydraulic pressure and lower the top frame. The emergency relief valve is located on the left side mounted to the inside bottom frame. On the bottom of the valve is a red (or black) knob. Before activating this valve make sure your arms, legs and everything else are clear of the helicopter and tug frame that will come down when the valve is activated**. DO NOT PUT YOUR ARMS BETWEEN THE UPPER AND LOWER FRAME TO ACTIVATE THE VALVE**. Reach from underneath the bottom frame and push up on the red knob and rotate clockwise. The top frame will start coming down. If you push up on the knob it will stop moving. Pushing up and rotating counter clockwise will shut off the valve and return it to its normal operating position.

The following pages show the location of the hydraulic relief valves for the different tug models.

Warning: Do not put your hands and arms between the top frame and bottom frame to activate the emergency relief valve.

Model 5.0 Tugs:

View from above the bottom frame:



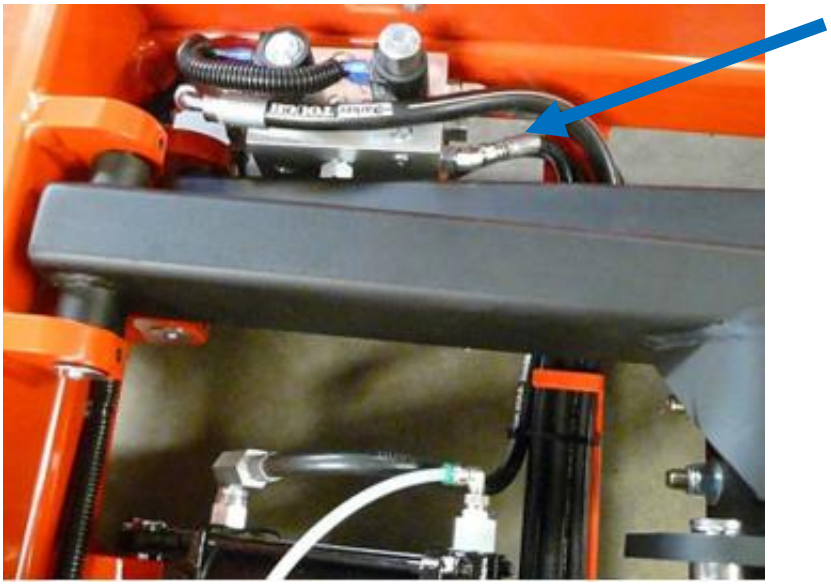
The hydraulic relief valve is on the bottom of the hydraulic manifold

View from below the bottom frame:

Relief Valve

Model 8.0, 8.0B, 8.0HD, 12.0 Tugs:

View from above the bottom frame:



The hydraulic relief valve is on the bottom of the hydraulic manifold

View from below the bottom frame:
Please note the lock ring may need to be loosened first before the relief valve can be turned.

Lock Ring

Relief Valve

BATTERY CARE

A. General

This section provides general instructions for good battery care.

B. Water

1. Keep the electrolyte liquid level above the separator protector. Low electrolyte liquid level can cause permanent damage to batteries.

2. Check the electrolyte liquid level once per month. Replace water lost to evaporation. Never add water to a discharged battery. Add distilled water only to a **fully charged battery**.

3. Never add sulfuric acid to a battery.

4. Do not transfer acid from one cell to another.

5. Never allow the batteries to stand in an uncharged state. Plate damage will occur.

C. Charging

1. The batteries should be recharged when the voltage drops below 24.0V as shown on the battery meter when the tug is at rest.

2. If battery is above 115 degrees F (46 degrees C) cool the battery before charging or operating.

3. The tug's On/Off toggle switch **MUST** be in the "Off" position during charging.

4. The charger is a smart charger and will complete the recharge automatically. The charger can be plugged in for an extended period of time provided that you monitor the electrolyte level in the battery periodically.

5. Read and understand the battery charger manual

D. Precautions

1. Keep the battery tops clean and dry.

2. Keep the vent caps tightly in place.

3. Do not use battery with specific gravity below 1.155.

4. Be sure batteries are in a well ventilated or open area while charging.

E. Safety

1. Always wear eye protection and rubber gloves when working with batteries.

2. Never wear jewelry, watches or rings while working around batteries.

3. When working on the tug, always remove all power leads from batteries. The battery pack is capable of extremely high currents and could cause serious damage or injury if short-circuited.

4. If battery acid is accidentally spilled on the skin, immediately flush the area with large amounts of water. Electrolyte splashed in the eyes is extremely dangerous! If this should happen, force the eye open and flood it with cool, clean water for approximately fifteen minutes. A doctor should be called immediately.

MAINTENANCE

Warning: All work on the Tiger Tug should be performed by competent repair personnel. Before performing maintenance, review all safety procedures.

A. General Maintenance

The following maintenance schedule should be followed to keep your Tiger Tug running trouble free for years.

MONTHLY

1. Check the security of the set screws on the motor drive shafts pillow blocks and chain sprockets. Blue Loctite can be used to prevent the screws from loosening due to vibration.

2. Check the security of the bolt and lock nut connecting the front steering actuator to the steering arm.

3. Check the security of the bolts holding the front steering arm rod end bearings to the steering king pin assembly.

4. Check mounting pins on fixed end of scissors that button head screws tight in place.

5. Check the roller chain on each drive shaft for tightness and wear.

6. Check the drive wheel hub Nylok nuts for tightness (200 ft-lbs / 271 Nm)

7. Check the drive wheel lug nuts for tightness (80 ft-lbs / 108 Nm)

8. Check the fluid level in the hydraulic fluid reservoir. Fill to 1/2" (1 cm) from the top with Dexron III automatic transmission fluid. Only fill reservoir when cylinders are retracted fully.

9. Check the security of the bolts on the cross tube between the inside scissor arms that is holding the top end of hydraulic cylinders. Bolts should be torqued to 90 ft-lbs / 122 Nm.

EVERY 6 MONTHS

1. Check hydraulic hoses for cracks and wear.

2. Grease the zerk fittings on the drive shaft pillow blocks.

3. Check the security of the pillow block mounting bolts.

4. Check the bolt and lock nuts on the motor/transaxle vertical height adjustment bracket, both the left and right side, for contact with the transaxle housing

5. Check the 4 transaxle horizontal mounting bolts (½"-13 x 4" hex head bolts). Do not over torque but make tight enough to squish the rubber sleeve. Hold your hand on the transaxle while gently going from forward to reverse. The transaxle should not move up nor down due to the applied torque.

6. On the front steering bracket assemblies, there is a dark grey nylon thrust washer around the steering kingpin bolts, both above and below the tug's frame. Inspect the thrust washers for wear. Contact Tiger Tugs if replacement is necessary.

7. Lubricate the pins at both ends of the hydraulic cylinder with ACF-50.

8. Check all electrical connections are secure.

9. Spray the terminals of the batteries with acid-proof coating as necessary.

10. Keep your Tiger Tug clean. Check for any unusual conditions, such as bent or broken parts.

11. Tire Replacement. Contact Tiger Tugs for proper tire and wheel replacement when necessary.

Warning: To avoid potential injury or equipment damage, use proper support and block tires when either end of tug is raised. Use blocks/jack stands capable of supporting 3,000 lbs.

B. Fluids & Lubrication

Fluid & Lubrication Points	Interval	Fluid & Lubrication Spec	Remarks
Hydraulic Pump Reservoir	Monthly	Dexron III Automatic Transmission Fluid	Check fluid level
Scissor Arm Pivots	6 months	ACF-50 Mil Spec MIL-PRF-81309	Fixed pins
Hydraulic Cylinders	6 months	ACF-50 Mil Spec MIL-PRF-81309	Lubricate both ends
Pillow Block Bearings	6 months	White Lithium Grease Mobilgrease 28 Or Equivalent	Zerk fittings

C. Repairs

1. Repairs on your Tiger Tug should be performed by competent repair personnel.

2. The batteries in your Tiger Tug must be replaced with like batteries. The charger has been designed to operate with this size battery. Do not substitute a higher or lower Amp/hour rated battery. All batteries should be replaced at the same time.

3. **Do not attempt to repair the electronic controller**. Contact Tiger Tugs for proper repair procedures.

4. Contact Tiger Tugs before making substitutions of any parts.

SAFETY

1. Make sure the tug is off prior to plugging in the battery charger

2. Do not turn on the power to the tug while the battery charger is plugged in.

3. Accelerate slowly. Always operate the tug as smoothly as possible to prevent damage to the tug or helicopter.

4. Do not leave the tug unattended when children are present.

Warning: Do not allow anyone to sit or ride on the Tiger Tug while in motion.

5. The tug is equipped with a safety brake, preventing the tug from moving when power is off. If your tug loses electrical power (for example, due to dead batteries), the parking brake can be released so you can push the tug. To release the brake, move the zinc plated lever at the rear of the transaxle upward

Warning: Do not attempt to push or tow the tug with the electric motors still wired to the system. The motors will act like a generator and will send pulses back to the motor controller and damage it. Under the transaxle is a 3-position terminal block. Remove both motor wires from this terminal block and isolate the motors from the tug to move it short distances. If you need to move it a long distance then remove the chain couplings between the transaxle and the drive axle shafts on both sides so the tires can freewheel and not turn the motor at all.

6. Operators are expected to know and observe all normal safety procedures for working around aircraft. The operator's knowledge of these general aviation safety procedures is a basic assumption for this manual. The omission of general aircraft safety procedures from the Tiger Tug Operator's Manual is no excuse for the operator's failure to apply them.

7. If the tug came equipped with the Ground Power Unit (GPU) option, the operator is expected to have a working knowledge of electrical characteristics of the specific aircraft being assisted. Damage to the aircraft's electrical system can occur from over voltage, lack of proper isolation

or incorrect polarity. Such mishaps are entirely preventable if the operator knows the aircraft characteristics and proceeds with care.

8. Carefully evaluate any incline or slope you plan on transitioning. Verify that it is not too steep to negotiate safely.

9. Your Tiger Tug, like any piece of machinery, should be operated by responsible personnel who are alert, attentive and aware of the potential for serious injury or death. Operators should not be under the influence of intoxicants, drugs or any substance that would alter or impair their actions or ability to make responsible and prudent judgments. No person should be allowed to operate the tug without reading and understanding this operator manual.

10. Eye protection and rubber gloves should be worn when adding water or working with the batteries. Remember that the current capability of the batteries is extremely high.

11. All switches need to be turned off before plugging in the tug for charging.

12. During the charging cycle, explosive hydrogen gas is expelled. Open flame or sparks must be avoided. Do not smoke near the batteries while charging.

13. Contact Tiger Tug before making substitutions of any parts.

TIGER TUGS
LIMITED WARRANTY

Tiger Tugs Acquisition Company, LLC warrants the equipment to be free from defective materials and workmanship under the use and service for which it is recommended.

Tiger Tugs Acquisition Company, LLC agrees to replace or repair, at our option, any defective parts, which in our judgment, do not conform to this Warranty, for a period of one (1) year from the date of delivery to the initial purchaser. Only the tug itself is covered for one (1) year. Said parts must be returned to Tiger Tugs Acquisition Company, LLC, transportation charges prepaid, and will be returned to the owner, transportation charges collect. This Warranty covers only parts considered defective and does not include the labor to replace said parts. All add-on options or accessories are covered by the warranty of the component manufacturer.

All parts replaced under the Warranty must be made available to Tiger Tugs Acquisition Company, LLC for inspection, to determine whether said parts are defective.

This Warranty does not cover tires, batteries, wear items or other accessories not manufactured by Tiger Tugs Acquisition Company, LLC because such items are warranted by the respective manufacturers of those parts.

This Warranty does not cover abuse, misuse, or damage caused by misapplication of the product.

This limited warranty sets forth all obligations of Tiger Tugs Acquisition Company, LLC in the event of defects discovered in Tiger Tugs Acquisition Company, LLC's tugs. If Tiger Tugs Acquisition Company, LLC determines that repair or replacement of our equipment is not feasible or possible, Tiger Tugs Acquisition Company, LLC's liability is limited to the actual amount paid for the tug. Tiger Tugs Acquisition Company, LLC shall in no event be liable to any party for lost profits, loss of use or any other damages, including commercial losses.