TruckWings®

Preventative Maintenance Guide

The following guide applies to:
Gen 2 TruckWings for CNG
Gen 3 TruckWings for CNG, Diesel, and Electric

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TruckWings by ConMet

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Introduction

This maintenance and use guide provides recommended operating/use conditions, intervals, and procedures for ensuring uninterrupted operation of your TruckWings.

Operating/Use Conditions

TruckWings are designed to operate in the same on-road conditions and environments in which the truck is able to operate.

Driver Inspection (Trip Inspections)

Before each trip, a basic inspection that includes the following items should be performed by the driver as part of their pre-trip inspection of the truck.

- Check that the panels are retracted against the back of cab.
    - If the panels do not retract with the TruckWings Controller toggle cover down, notify terminal immediately to be reseated. Damage will occur if panels are not retracted in the presence of a trailer.
- From the ground, check that TruckWings panels are held securely against the back of the cab by pulling on the panel.
    - If excessive play is noted in either side panel, prior to drive set the TruckWings Controller to the middle position and notify terminal service or repair facility upon return.
- Check for TruckWings components that are damaged (cracked or bent) and fasteners that appear loose, disconnected, or are missing.
    - If individual rivets or fasteners appear loose or missing, it is safe to drive but notify terminal service or repair facility upon return.
    - If severe panel or frame damage is visible that may cause parts to detach from vehicle, notify terminal immediately to be reseated. Do not drive the vehicle in this condition.
- From the ground, listen for any audible air leaks from the actuators behind the panels.
    - If a leak is audible, it is OK to drive but notify terminal service or repair facility upon return.

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Maintenance Procedures

General Maintenance Requirements and Notes

When the truck comes in for any maintenance or repair, including Preventative Maintenance Inspection (PMI), the TruckWings should be inspected and looked over thoroughly according to the procedures specified in this document.

TruckWings moving parts should be kept relatively clean and free from dirt and debris.

It is recommended that trucks exposed to road salt or other types of anti-icing chemicals open the Wings during the washing process to wash the moving parts. Wings should remain closed when driving through an automated truck wash.

It is not recommended that lubricants be applied to any of the TruckWings moving parts. They use a special anti-friction material that could be damaged. Lubrication internal to the airflow system with 10W pneumatic oil is recommended.

When replacing any bolts, nuts, or washers, Stainless Steel fasteners must not be used. Carbon steel Grade 8 fasteners plated or coated for high corrosion resistance such as Hot Dip Galvanized or Zinc Aluminum Flake should be used to maintain the same level of corrosion resistance.

When replacing nuts, all-metal, distorted-thread lock nuts with the specified coatings above must be used.

Any replacement bolts, nuts, or washers must be Grade 8 or equivalent.

⚠ WARNING:

TruckWings is a large scale aerodynamic system that functions dynamically in a continuous and ongoing fashion throughout truck operation. Performing complete and ongoing inspections for wear/damage and related maintenance are essential to maintaining proper running order of TruckWings and ensuring safe operation.

Failure to properly inspect and maintain TruckWings may result in an inoperative system and/or may lead to failures that risk damage and injury.

It is most important to notice anything that is abnormally loose or worn and report to terminal maintenance immediately.

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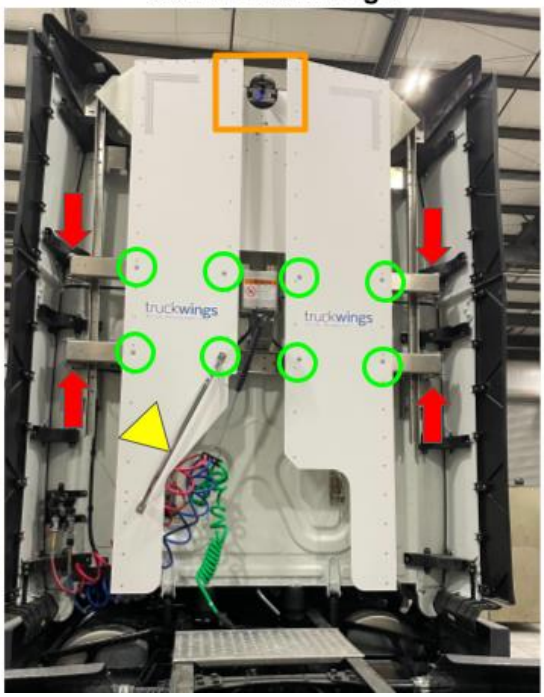
Preventative Maintenance Inspection Guide

Perform each step at every PM event. If any of the steps below reveal an issue requiring further diagnosis or repair, consult the TruckWings Troubleshooting & Repair Guide to resolve. If further assistance is required, contact TruckWings Technical Support.

#	Inspection Step
1	**Inspect closed TruckWings from the back of cab** Maintain 3 points of contact and access the catwalk. › Pull on each side panel to check for excessive play in bushings or metal-on-metal contact (Red arrows). › Ensure grab handle and reinforcement is secure against the panel. (Yellow triangle) › Check that all panel-to-hinge fasteners are tight (Green circles) › Ensure the Trailer Sensor is undamaged and pointing directly towards the trailer (Orange square). **Gen 2 TruckWings**  **Gen 3 TruckWings** 

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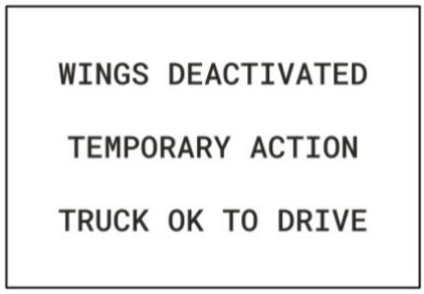
Inspect TruckWings Controller from inside cab

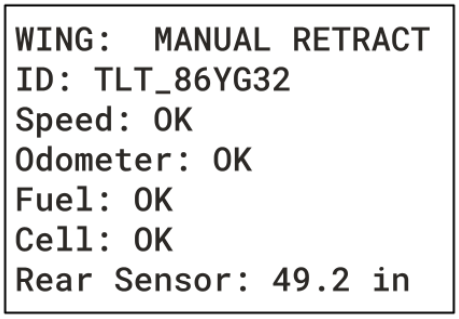
Enter the cab and turn key to ON

- Check the screen on the TruckWings Controller with the toggle cover closed in the DOWN position.
- If the following message is displayed, the TruckWings have been disabled at the request of a technician. If TruckWings appear functional with no pending repairs, contact TruckWings Support to remotely restore automatic operation to the TruckWings.



If screen displays this message, contact TruckWings Technical Support at TruckWingsCustomerService@conmet.com **or (415) 857-0263**

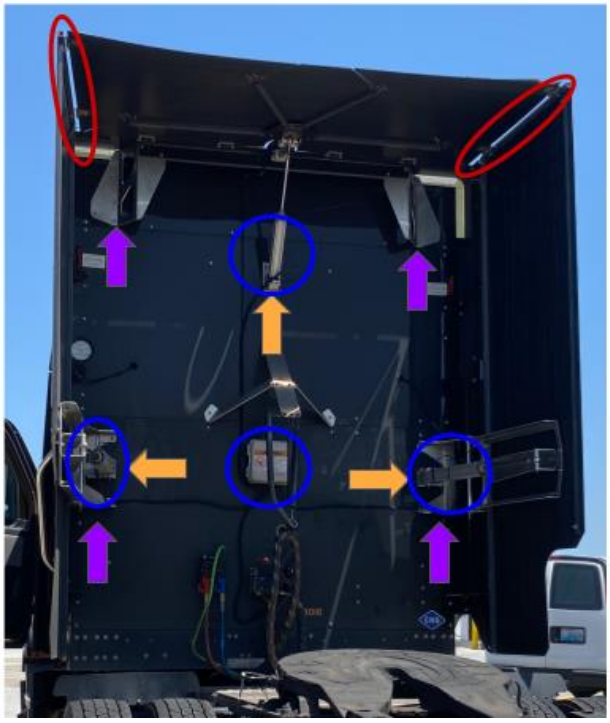
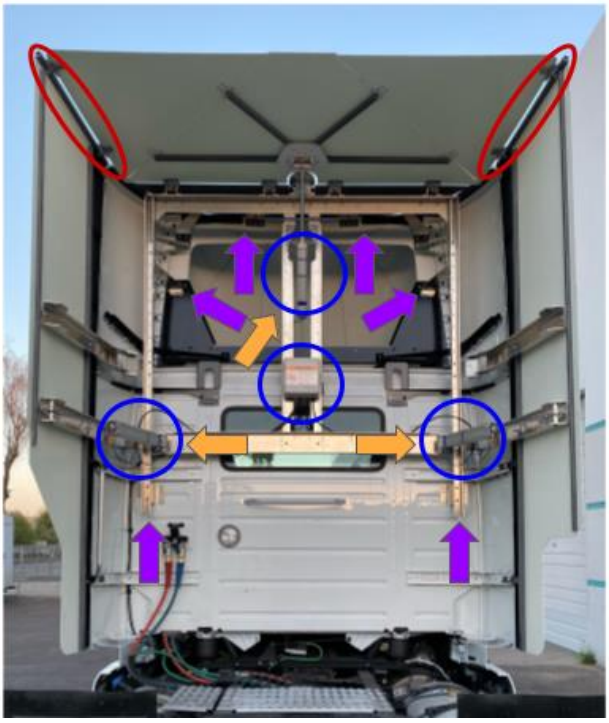
- Flip the toggle position on the TruckWings Controller to the MIDDLE position. Screen should show as below. DIST value will vary.



- Check CAN values of Speed, Odometer, and Fuel read OK.

Ensure back of cab is clear and announce “TruckWings Opening”

- To deploy TruckWings, toggle position on the TruckWings Controller to the UP position.
- Check that TruckWings deploy fully.

3	**Inspect open TruckWings from the ground** › Check that all three panels are undamaged and flush to each other at the joints and all hinges are connected. (Red circles) › Check all frame mounts are secure against the cab, and that no fasteners or rivets are missing. (Purple arrows) › Listen for any leaks coming from actuator cylinders, fittings, or airflow control assembly. (Blue circles) › Check for loose hardware or worn spacers in actuator-to-cab joints. (Orange arrows) Return to cab. Ensure back of cab is clear and announce “TruckWings Closing” › Set Controller toggle position to DOWN to close TruckWings. **Gen 2 TruckWings**  **Gen 3 TruckWings** 

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Recommended Maintenance Schedule

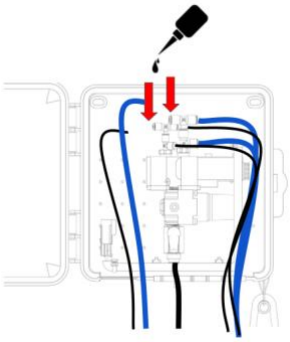
Refer to the following step-by-step instructions for recommended maintenance actions.

Maintenance Step	Perform every 150,000 mi
Airflow Cylinder Lubrication	●
Side Panel Hinge Bushing Service	●

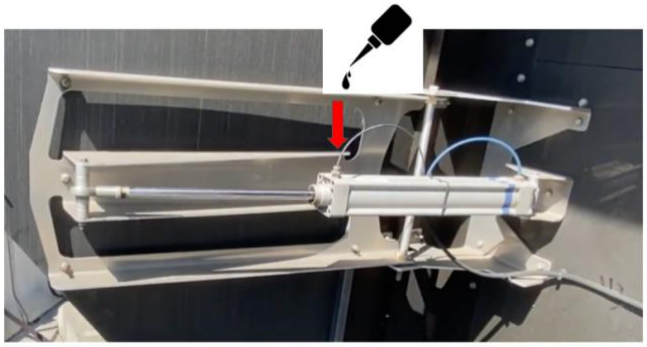
Airflow Cylinder Lubrication

With the TruckWings in Safe to Service Mode, apply a small amount of SAE 10W oil or equivalent into one port on each of the bottom actuators and control valve.

1. Remove a blue and black air line from the Airflow Control Valve.
2. Apply a drop of oil into each port.
3. Replace air lines and close the Airflow Box.



4. Disconnect black airline on a bottom actuator.
5. Apply a drop of oil into the port.
6. Replace air line.
7. Repeat for the opposite cylinder.



Side Panel Hinge Bushing Service (Gen 3 TruckWings for All Models)

Required Repair Kit	TruckLabs P/N
SIDE PANEL HINGE BUSHING KIT, X02	XS-004002-1

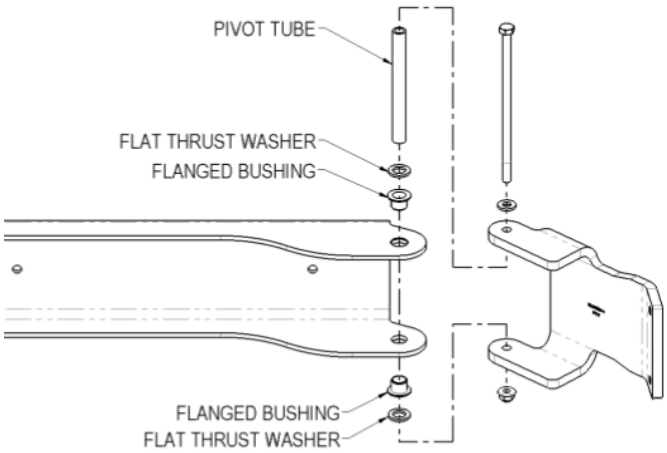
1. Position step ladder on vehicle to access Side Panel Hinges.
2. Disconnect a Side Panel Hinge from its Cab Hinge by removing the pivot bolt between the two hinges. Discard hardware and pivot tube.
3. Pull Side Panel away from Cab Hinge. Remove thrust washers and plastic bushings from Side Panel Hinge and discard.
4. Install new plastic bushings in the Side Panel Hinge.
5. Insert new pivot tube through bushings and center vertically in Side Panel Hinge.
6. Add thrust washers between the Side Panel Hinge and the Cab Hinge at both bottom and top flanges.
7. Carefully place Side Panel Hinge assembly back in Cab Hinge.

   NOTE: Do not allow thrust washers to be pinched or dislodged.
8. Insert 1/2” bolt through Pivot Tube. Use a new, 1/2" lock nut and tighten until the pivot tube does not spin.

⚠ CAUTION:

Do not overtighten - pivot tube can collapse.

9. Repeat for the remaining three hinges.

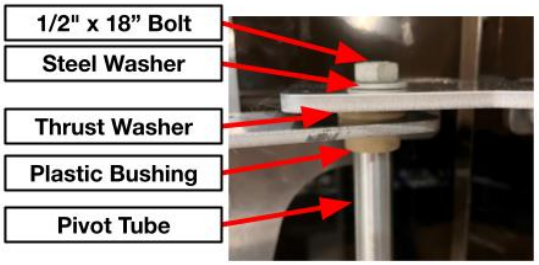


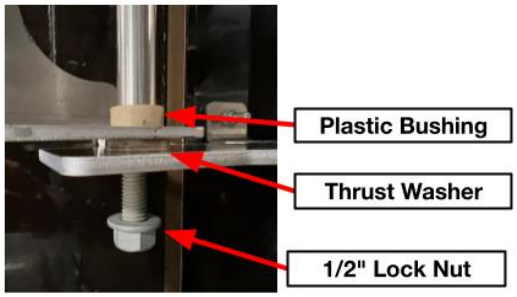
Side Panel Hinge Bushing Service (Gen 2 TruckWings for CNG)

Required Repair Kit	TruckLabs P/N
SIDE PANEL HINGE BUSHING KIT, COMPLETE	Reference Parts Catalog

1. Position step ladder on vehicle to access Side Panel Hinge pivot.
2. Disconnect the Side Panel Hinge from the Cab Hinge by removing the long pivot bolt between the two hinges. Discard hardware and pivot tube.
3. Pull Side Panel away from Cab Hinge. Remove plastic bushings from Side Panel and discard.
4. Use Bushing Service Spreader Tool P/N XS-010783-1 to spread Cab Hinge flanges apart prior to reassembly and install of Side Panel Hinge.
5. Install new plastic bushings in the Side Panel Hinge.
6. Insert new pivot tube through bushings and center vertically in Side Panel Hinge.
7. Add thrust washers between the Side Panel Hinge and the Cab Hinge at both bottom and top flanges.
8. Carefully place Side Panel Hinge assembly back in Cab Hinge.

   NOTE: Do not allow thrust washers to be pinched or dislodged.
9. Release and remove Spreader Tool.
10. Insert 1/2”x18” bolt through Pivot Tube. Add anti seize lubricant to new bolt threads before adding a new, 1/2" lock nut when reassembling Side Panel Hinge to Cab Hinge. **Use a torque wrench to tighten to 25 ft-lbs.**
11. Repeat for the opposite side.





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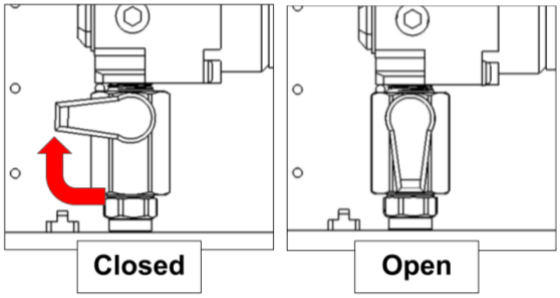
Putting TruckWings in Service Mode

⚠ WARNING:

Failure to follow this procedure may result in the unintended movement of TruckWings while servicing. Do not work within a deployed TruckWings envelope while the system is pressurized.

Before servicing any part within the TruckWings system or working on the back of cab, place the system in Safe to Service mode by performing the following:

1. **Open the TruckWings system by flipping the toggle switch UP** on the TruckWings Controller while the tractor is stationary and unhooked from a trailer.
2. Move to the catwalk and **disable airflow to TruckWings** by turning the ball valve on the Airflow Control Assembly to **Closed.**



3. **Drain the air tanks** by pumping the brake pedal repeatedly until the air pressure gauge on the dash reads **0 PSI.**
4. **Remove keys from ignition** to prevent any unwanted attempts of starting the motor and truck building up air pressure.
5. **If required for repair, prop the TruckWings open** by pushing trapezoid to fully deployed position and inserting the TruckWings Prop Tool (XS-010782-1).
6. **Perform repair(s) as needed.**
7. **Remove the upper cylinder holder if installed**. Reconnect any disconnected tubing.
8. **To return TruckWings to normal operation, ensure the vehicle's air pressure gauge reads 0 PSI.** Turn the ball valve on the Control Valve Assembly vertically to **Open**. Close the lid on the Control Valve Assembly and reinstall carabiner.
9. **Close the toggle cover on the TruckWings controller.**
10. The TruckWings will close when the secondary air tank is filled to above **80 PSI.**

Torque Specifications

For all repair activities, the following torque specifications must be used:

For **metal-on-metal connections** (mounts components), torque M8 fasteners to 215 to 255 in-lb.

For **composite connections** (side panels to side panel hinge arms and triangle to side panel), tighten fastener until fastener will not turn. Do not overtighten as panel FRP tube material can crush or FRP plastic panel can dimple or crack.

For **actuator spacers** (both ends of all three actuators), tighten until all slack is removed and spacers will not spin. Do not overtighten as aluminum spacers can crush. NOTE: plastic thrust washers captive between the spacers and actuator should also be free to spin and should have a small amount of vertical/lateral freeplay.

For **small hinges** (panel-to-panel and trapezoid to frame), tighten until all slack is removed and the bolt will not spin relative to three-hole hinge leaf. Do not over tighten and deform the hinge leaf.

For **composite-bumper connections** (side panel to side panel hinge arms), tighten fastener until bushing is compressed to approximately 0.75” (Bushings have a 1” free height).

For **main side panel hinges**, tighten until all slack is removed and spacers will not spin. Do not over tighten as aluminum spacers can crush. NOTE: plastic thrust washers captive between the spacers and side panel hinge arm should also be free to spin and should have a small amount of vertical/lateral free play.