JBT LEKTRO

AIRCRAFT TOWING VEHICLES

AIRCRAFT TOWING PROCEDURES

version 11-13-2019

LEKTRO

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LIST OF REVISIONS

Change Date	Edition / Revision	List of Effective Pages	Change Description
November, 2019	1.00	ALL	New manual to eliminate redundancies in Operations Manuals and replace old Capture Tables.

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TABLE OF CONTENTS

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TABLE OF DANGER, WARNING, AND CAUTION STATEMENTS

DANGER

A DANGER STATEMENT INDICATES A SITUATION THAT MUST BE AVOIDED. FAILURE TO COMPLY WITH THE DANGER STATEMENT WILL RESULT IN SERIOUS BODILY INJURY, DEATH OR PROPERTY DAMAGE, INCLUDING DAMAGE TO THE VEHICLE!

WARNING

A WARNING INDICATES A PROCEDURE THAT MUST BE FOLLOWED OR A CONDITION THAT MUST BE OBSERVED. FAILURE TO COMPLY WITH THE WARNING MAY RESULT IN SERIOUS BODILY INJURY, DEATH OR PROPERTY DAMAGE, INCLUDING DAMAGE TO THE VEHICLE!

CAUTION

A CAUTION INDICATES A PROCEDURE THAT MUST BE FOLLOWED OR A CONDITION THAT MUST BE OBSERVED. FAILURE TO COMPLY WITH THE CAUTION MAY RESULT IN DAMAGE TO VEHICLE AND VOID WARRANTY, OR DAMAGES TO OTHER PROPERTY, INCLUDING THE AIRCRAFT!

The following statements of danger, warnings and cautions are used in this manual. Read all of them and follow the instructions when performing the procedures.

DANGER

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WARNING

CAUTION

CAUTION

CAUTION

DANGER

DANGER

CAUTION

CAUTION

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CHAPTER 1

INTRODUCTION

This chapter introduces you to the aircraft towing procedures for your LEKTRO tractor and includes the following topics:

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1.1 ABOUT THIS MANUAL

This section describes the formatting and general layout of this *Aircraft Towing Procedures* Manual. It also describes the additional documentation supplied with your LEKTRO tractor.

1.1.1 FORMATTING CONVENTIONS

This manual uses several formatting conventions to present information of special importance.

Lists of items, points to consider, or procedures that do not need to be performed in a specific order appear in bullet format:

- Item 1
- Item 2

Procedures that must be followed in a specific order appear in numbered steps:

1. Perform this step first.
2. Perform this step second.

This manual also contains safety callouts where appropriate, as described in *“TABLE OF DANGER, WARNING, AND CAUTION STATEMENTS” on page xi*.

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1.1.2 ORGANIZATION

This manual contains the following chapters:

- **CHAPTER ONE: INTRODUCTION:** Introduces you to this *Aircraft Towing Procedures Manual* with descriptions of both this manual and related LEKTRO tractor manuals. This chapter also includes information for contacting JBT LEKTRO, Inc. See *"INTRODUCTION" on page 1-1*.
- **CHAPTER TWO: USING GATES, STRAPS, AND WINCHES:** Describes how to use the Winch Strap, Strut Strap, and the various gates available for your LEKTRO tractor. See *"USING STRAPS, GATES AND WINCHES" on page 2-1*.
- **CHAPTER THREE: BASIC AIRCRAFT CAPTURE METHOD:** Describes how to perform a general aircraft towing operation including capture, moving the aircraft, and releasing the aircraft. See *"GENERAL TOWING PROCEDURE" on page 3-1*.
- **CHAPTER FOUR: SPECIAL AIRCRAFT CAPTURE METHODS:** Describes procedures to be used in situations where the general towing procedure described in Chapter Three does not apply. See *"SPECIAL TOWING SITUATIONS & PROCEDURES" on page 4-1*.
- **APPENDIX A: AIRCRAFT CAPTURE TABLES:** Contains a table that allows you to determine the correct LEKTRO tractor model and towing procedure to use for a wide variety of aircraft types. See *"CAPTURE TABLES" on page A-1*.

1.1.3 RELATED DOCUMENTATION

The following additional documentation is available for your LEKTRO tractor:

- **Operations Manual:** Describes tractor specifications, components, and basic operations such as driving and charging the batteries.
- **Service Manual:** Describes preventive and corrective maintenance procedures to keep your LEKTRO tractor running reliably.
- **Parts Manual:** Lists the parts included in your LEKTRO tractor should you ever need to order replacements.

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1.2 GENERAL SAFETY

DANGER

FAILURE TO FOLLOW ALL OF THE GENERAL SAFETY PRECAUTIONS IN THIS SECTION PLUS THE OTHER SAFETY WARNINGS AND CAUTIONS IN THIS MANUAL MAY CAUSE DEATH, PERSONAL INJURY, AND / OR PROPERTY DAMAGE.

1.2.1 RESPONSIBILITY

The tractor operator, tractor owner, and JBT LEKTRO, Inc. have the following responsibilities:

- **Operator:** The tractor operator has overall responsibility for the safe operation of the tractor and aircraft under tow, as well as the safety of all personnel affected by the towing operation. Where required, the operator will assign wing walkers and / or signaling personnel to assist in the safe movement of the tractor and aircraft. This responsibility extended to performing and documenting pre-use safety checks before first use of the tractor on each work shift, as described in this manual.
- **Owner:** The tractor owner is responsible for ensuring the following:
  - > Operating personnel are formally trained and qualified to operate the tractor.
  - > The tractor is maintained and serviced only by qualified and authorized personnel as prescribed in both this manual and the accompanying *Service Manual*, unless specifically directed otherwise by JBT LEKTRO, Inc.
- **JBT LEKTRO, Inc.:** JBT LEKTRO, Inc. is responsible for ensuring that all information pertinent to safe tractor operation, maintenance, and service is both current and available to the owner or owner's agent on a timely basis.

1.2.2 PRECAUTIONS

- Always report any tractor damage or serviceability issue to a supervisor immediately.
- Always understand all operating instructions before using the tractor.
- Always comply with all published operating instructions and airport traffic safety regulations while using the tractor.
- Always drive the tractor only while properly positioned completely within the Operator Compartment, with either the arm rests in the horizontal deployed position or the seat belt fastened, depending on tractor equipment.
- Always ensure that all loads being moved are secured.
- Always ensure that the tractor is moving at a speed of 2 mph (3 km / h) or greater before applying maximum drive power.
- Always avoid sudden stops.
- Always apply the brake gradually when towing aircraft.

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- Always reduce speed and increase braking distance when driving in wet or slippery conditions.
- Always remain completely within the Operator Station until the tractor is completely stopped and properly secured.
- Always turn the Motive Power Switch to the OFF position before leaving the tractor unattended.
- Always leave the corresponding battery compartment deck cover(s) open while charging the Motive Power Battery and / or GPU batteries.
- Never transport any passengers on any portion of the tractor other than in the passenger position in the Operator Compartment.
- Never exceed the rated maximum towing capacity of the tractor.
- Never tow aircraft at speeds exceeding the maximum safe towing speed for the specific LEKTRO tractor model.
- Never initiate turns at high speed.

1.2.3 WARNINGS

WARNING

ALL DATA IN THIS MANUAL IS INTENDED FOR PLANNING AND GUIDANCE PURPOSES ONLY. ALWAYS TAKE ACTUAL AIRCRAFT WEIGHT, CLEARANCES, AND CURRENT CONDITIONS INTO ACCOUNT, AND ALWAYS MONITOR THE SAFETY OF THE TOWING OPERATION.

Numerous factors can cause actual aircraft weight and clearance to vary from that shown in this manual, including but not limited to:

- Aircraft center of gravity.
- Undercarriage condition.
- Ramp conditions.
- Aircraft loading.
- Modifications to a specific aircraft.
- Aircraft-OEM certification or published approval specifications or stipulations always supersede any information or procedures described in this manual.

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1.3 HOW TO USE THIS MANUAL

Before towing an aircraft, you must ensure that all of the following conditions have been met:

- All of the general safety rules listed in *"GENERAL SAFETY" on page 1-4* are being followed.
- The LEKTRO tractor that you are using is capable of towing that specific type of aircraft. See the tractor *Operating Manual* for specifications and weight limits.
- You select and follow the towing procedure specified for that specific type of aircraft.

To do this:

1. Review and follow all of the instructions listed in *"GENERAL SAFETY" on page 1-4*.
2. Determine the exact type of aircraft that you will be towing.
3. Locate the exact type of aircraft that you will be towing using the alphabetical table in *"CAPTURE TABLES" on page A-1*. See *"READING THE CAPTURE TABLE" on page 1-7* for instructions on how to read and interpret the Capture Table.
4. In the **TRACTOR MODEL** column of the Capture Table, review the list of LEKTRO tractors that are compatible with this type of aircraft.
   > A rectangle icon (▬) indicates that the listed LEKTRO tractor model is fully capable of towing this type of aircraft.
   > A triangle icon (▼) indicates that the listed LEKTRO tractor is only capable of towing this type of aircraft under certain circumstances, such as if the airplane is at empty weight.
   > A blank space indicates that the listed LEKTRO tractor model is not capable of towing this type of aircraft under any circumstances.

CAUTION

NEVER ATTEMPT TO TOW ANY AIRCRAFT USING A LEKTRO TRACTOR MODEL THAT IS NOT LISTED AS BEING CAPABLE OF TOWING THAT AIRCRAFT TYPE.

5. In the **PROCEDURE** column of the Capture Table, note the procedure to use for this aircraft type. This will be a number that corresponds to a numbered section in this manual. For example, the notation 3.4 means that you should use the procedure listed in Section 3.4 of this manual to tow this type of aircraft.
6. Note any remarks, limitations or other information in the **SPECIAL ATTENTION / REMARKS** column for this aircraft type and adjust the towing procedure accordingly, if needed.
7. Capture, tow, and release the aircraft in accordance with all of the safety warnings and instructions that you reviewed in Steps 1-6.

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1.4 READING THE CAPTURE TABLE

The table in *"CAPTURE TABLES" on page A-1* contains the following columns:

- **MAKE:** Manufacturer (Original Equipment Manufacturer (OEM) / licensee / upgrader).
- **MODEL:** Specific aircraft model or comparable / derivative series.
- **MTOW:** Maximum Take Off Weight. The highest weight in each series is used. In some cases, the maximum ramp weight (including taxi fuel) may be substituted. This value will slightly exceed the MTOW for that aircraft.

> *Note*
>
> *All weight data provided in this manual is typical for the indicated aircraft model and is based on manufacturer information.*

> If shown, the notation **(W)** in this column indicates that the listed weight data shown is typical for the aircraft model indicated and is based on manufacturer's information.

If two values appear in this column, then they will be separated as follows:

> A **dash** (-) indicates a range of values between the low and high listed values.

> A **slash** (/) indicates either of the two values, but none in between those values.

- **OEW:** Operating Empty Weight. The heaviest version is shown, such as for a passenger version over a cargo version. The empty weight with equipment is substituted when the OEW is not available.
- **tractor MODEL:** This column indicates capability to tow the aircraft using the Cradle by tractor model, as follows:

> **83.6:** 8360

> **CAUTION**
>
> ***THIS DOCUMENT IS NOT FOR USE WITH THE 8350 TRACTOR.***

> **86:** 8600A, 8600A-EZ, 8600A-M

> **86.5 X:** 8650AX, 8650AX-EZ

> **87:** 8700C, 8700C-EZ, 8700CX, 8700CX-EZ

> **AP 87.5:** 8750C, 8750C-EZ

> **87.5 AL:** 8750C-AL, 8750C-AL-700, 8750C-ALM

> **87.5 X:** 8750CX, 8750CX-AL, 8750CX-ALM, 8750CX-EZ

> **88:** 8800SDA or 8800SDA-EZ

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> **88.5:** 8850SDA, 8850SDA-EZ, 8850SDA-AL-100, 8850SDA-AL-100 / 50, or 8850SDA-M

> **89.25:** 8925SDB

> **89:** 8900SDB

> **89.5:** 8950SDB

> **89.5-AL:** 8950SDB-AL

> **89.5-AL-250:** 8950SDB-AL-250

The following symbols in these columns indicate tractor capability, as follows:

> **—:** tractor can accommodate full OEW to MTOW range of the specified aircraft.

> **▼:** tractor weight capacity can accommodate a portion of the potential weight range for the specified aircraft. Determine the actual ramp weight before towing.

CAUTION

ALWAYS VERIFY THIS INFORMATION BASED ON ACTUAL AIRCRAFT WEIGHT, LOAD DISTRIBUTION, UNDERCARRIAGE CONDITION, AND RAMP CONDITIONS AT THE TIME OF TOWING.

- **PROCEDURE:** Numeric reference to subsections within Chapter 4 (*Special Towing Situations & Procedures*) in the *88 / 89 Series Aircraft Towing Vehicle Operation Manual*. For example, 11 refers to Section 4.11 *Pintle Hook*. The procedure described in the *Operation Manual* will include any required adapters or other tools.

  Note

  The general procedures described in Chapter 3 (General Towing Procedure) of this manual apply in all situations and are referenced in Chapter 4 of this manual as appropriate.

- **SPECIAL ATTENTION / REMARKS:** Lists any precautions and Strut Strap installation procedure variances that apply to the specific aircraft model. Alternatively, this column may list some general notes that apply when towing this aircraft type.

1.4.1 PINTLE HOOK TOWING

Aircraft that do not appear in *"CAPTURE TABLES" on page A-1* may not be capable of being towed via capture on the Cradle. Approach such an aircraft with caution and, if unable to capture the aircraft safely, tow using the Pintle Hook or Pintle Hook Adapter and a conventional Tow Bar. Refer to *"PINTLE HOOK" on page 4-38* for instructions.

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CHAPTER 2

USING STRAPS, GATES AND WINCHES

This chapter describes the following topics:

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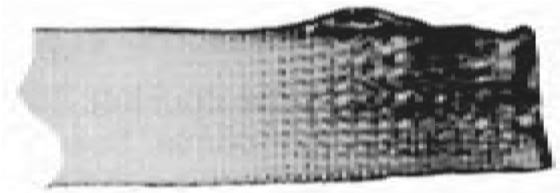
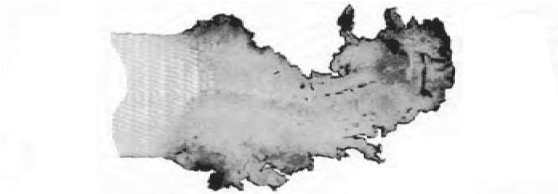
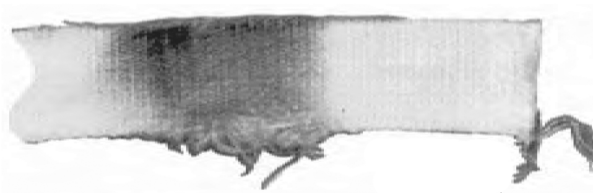
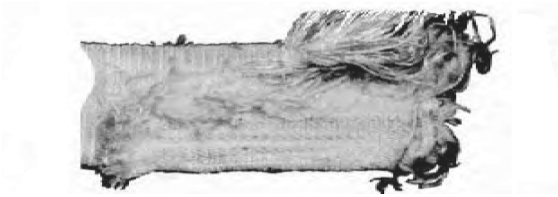
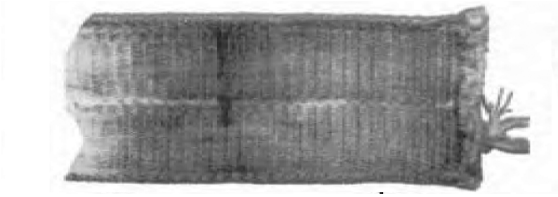
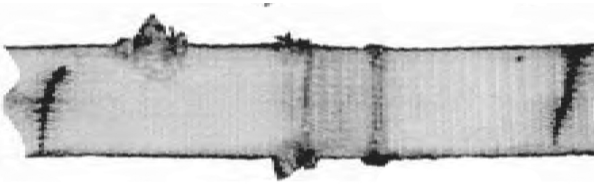
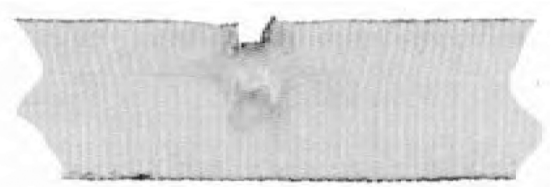
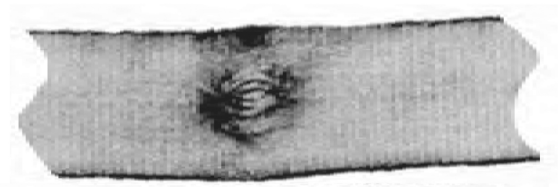
2.1 STRAP INSPECTION

To prevent accidental aircraft release, inspect the Winch Strap and Strut Straps along with all metal fittings to ensure they are in sound working condition. When inspecting the straps, look for any of the following:

		
HEAT DAMAGE	**ACID DAMAGE**	**ABRASION DAMAGE**
		
TENSILE BREAK (RED WARNING YARN SHOWING)	**CUTS**	**FACE CUTS**
		
CUT WITH TENSILE DAMAGE	**PUNCTURES AND SNAGS**	

Be sure to also look for the following:

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- Any areas with exposed red core warning yarns. This condition indicates that woven face yarns have been either cut or worn through, or tensile fractured. Do not confuse this with the straight red centerline on the surface of the Winch Strap.
- Strap hardening and / or fading to a white color due to extended UV or arc-welding exposure.
- Any sign of deterioration from exposure to chemical agents. Straps are impervious to most chemicals; however, exposure to acids, bleaching agents, ethers, and aldehydes may weaken them.
- Winch Hook and Strut Strap “D” ring pitting, corrosion, bending, or cracking.
- Damaged, missing, or inoperable Winch Hook latch and spring.

The Winch Strap and all Strut Straps must be replaced after 364 tractor operating hours or when routine inspection reveals any damage or abnormal wear, whichever comes first.

2.1.1 STRAP CONSTRUCTION

Your LEKTRO tractor may be equipped with either sling webbing or mil-spec webbing.

- Sling webbing has surface yarns connected from side to side that protect the core yarns and position all surface and tensile yarns to work together to support the load. Wear or damage to the face yarns causes immediate strength loss. Red core warning yarns provide a visual damage warning that indicate the strap must be replaced.
- Mil-spec webbing does not have red core warning yarns. This strap type supports the entire load with exposed surface yarns. Surface damage to a mil-spec strap causes greater strength reduction.

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2.1.2 ENVIRONMENTAL FACTORS

- Nylon and polyester are seriously degraded at temperatures above 200°F (93°C).
- Prolonged exposure to UV light adversely affects nylon and polyester. Slings become bleached and stiff when exposed to sunlight or arc welding.
- Many chemicals have an adverse effect on nylon and polyester, as shown here.

CHEMICAL	NYLON	POLYESTER
Acids	**NO**	OK*
Alcohols	OK	OK
Aldehydes	OK	**NO**
Alkalis	OK	**NO**
Bleaching agents	**NO**	OK
Dry cleaning solvents	OK	OK
Ethers	OK	OK
Halogenated hydrocarbons	OK	OK
Hydrocarbons	OK	OK
Ketones	OK	OK
Oils (crude)	OK	OK
Oils (lubricating)	OK	OK
Soap and detergents	OK	OK
Water and seawater	OK	OK
Weak alkalis	OK	OK

*Concentrated sulfuric acid will disintegrate the strap.

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2.2 USING THE GATES

This section describes how to use the Side Gates, Extended Rear Gate, and Front Gate. It also describes using the Cradle Adapter Post.

2.2.1 USING THE SIDE GATES

Note

The 83 is not equipped with Side Gates.

In most cases, position the Side Gates in their most outward positions to allow the aircraft wheel to pivot on the Cradle in case a steering limit is approached and steering system back pressure occurs. Moving the Side Gates in helps prevents aircraft wheel movement, such as when towing aircraft with very light nose weights.

To move the Side Gates:

1. Retract the Side Gate Anchors from the Side Gate Anchor Holes.
2. Slide the Side Gates to the desired location.
3. Insert the Side Gate Anchors into the appropriate Side Gate Anchor Holes.
4. If needed, place Chine Protectors over the Side Gates with the padded sides facing inward to prevent aircraft tire chines from contacting the slotted Side Gate edges.

See Chapter 4 of the *Operation Manual* for your tractor for a description of the Side Gate components.

2.2.2 USING A FIXED EXTENDED REAR GATE

Note

The 83 does not use a fixed Extended Rear Gate.

This section describes how to install and remove the optional fixed Extended Rear Gate (Chapter 4 of the *Operation Manual* for your tractor).

2.2.2.1 INSTALLING THE FIXED EXTENDED REAR GATE

To install the fixed Extended Rear Gate:

1. If needed, remove the Side Gates (if equipped).
2. Lower the fixed Extended Rear Gate on to the Receiving Brackets on the Cradle.
3. Connect the linkage from the fixed Extended Rear Gate to the Winch Limit Switch on the back wall of the Cradle.

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2.2.2.2 REMOVING THE EXTENDED REAR GATE

To remove the removable Extended Rear Gate:

1. Lift the Extended Rear Gate from its position on the Side Gates.
2. Store the Extended Rear Gate in one of the Side Compartments.

Position the Side Gates in their outer positions, and then lock them into position.

2.2.3 USING A REMOVABLE EXTENDED REAR GATE

This section describes how to install and remove an optional removable Extended Rear Gate (see the *Operation Manual* for your tractor).

2.2.3.1 INSTALLING THE EXTENDED REAR GATE

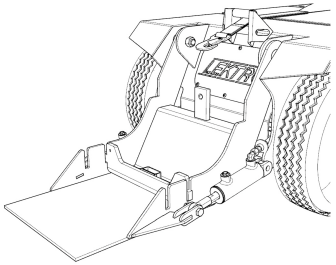
To install the removable Extended Rear Gate:

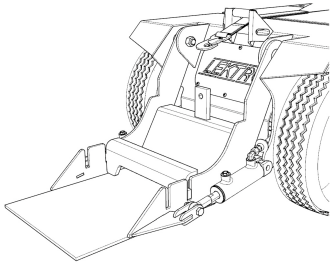
1. Determine how to install the gate:

> **Note**
>
> *Not all Side Gates can be installed in more than one position.*

> If the aircraft being towed has obstructing protrusions or linkages, then install the Extended Rear Gate with the cutout side facing up.

> If the aircraft has no obstructions, then install the Extended Rear Gate with the cutout side facing down.





2. Determine the appropriate location for the Extended Rear Gate on either the Cradle or Side Gates. This will be the set of slots on either the Cradle side walls or Side Gates that will position the Extended Rear Gate far enough back to allow the aircraft nose wheel to fully rest on the Cradle but also forward enough to prevent any part of the aircraft fuselage or landing gear from contacting the tractor.
3. Slide the Extended Rear Gate on to the appropriate set of Cradle or Side Gate slots.

2.2.3.2 REMOVING THE EXTENDED REAR GATE

To remove the removable Extended Rear Gate:

1. Lift the Extended Rear Gate from its position on the Cradle or Side Gates.
2. Store the Extended Rear Gate as follows:
   > **83, 86, 87:** Store the gate on the fixed Cradle Adapter Post.
   > **AP 88, 89:** Store the gate in one of the Side Compartments.
3. If equipped, position the Side Gates in their outer positions, and then lock them into position.

2.2.3.3 CENTER FILL PLATE

To install the Center Fill Plate (see Chapter 4 of the *Operation Manual* for your tractor):

1. Insert the post on the bottom of the Fill Plate into the pocket on the Extended Rear Gate.
2. Drop the Fill Plate into place.

2.2.4 USING A REMOVABLE FRONT GATE

Note

The 83 does not use a removable Front Gate.

This section describes how to install and remove a Front Gate (see Chapter 4 of the *Operation Manual* for your tractor).

2.2.4.1 INSTALLING THE FRONT GATE

To install the Front Gate:

1. Position the Side Gates as required (see *"USING THE SIDE GATES" on page 2-5*):
   > **Vertical Front Gate:** Move the Side Gates inward as needed to accommodate the aircraft tire assembly, and then lock them into position.
   > **Horizontal Front Gate:** Move the Side Gates to their outermost positions.
2. Remove the Front Gate gate from the Side Compartment, and install it in the front slots on the Side Gates, as follows:
   > **Vertical:** White protective strip facing upward and the straight vertical side facing toward the aircraft tire.
   > **Horizontal:** Smooth side facing the aircraft landing gear.

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2.2.4.2 REMOVING THE FRONT GATE

To remove the Front Gate:

1. Lift the gate from its position on the Side Gates.
2. Store the Front Gate in one of the Side Compartments.
3. Position the Side Gates in their outer positions, and then lock them into position.

2.2.5 USING A HYDRAULIC FRONT GATE

Note

The 83 does not use a hydraulic Front Gate.

If equipped, you can raise or lower the Hydraulic Front Gate using either or both of the following methods, depending on the tractor configuration:

- To raise the Hydraulic Front Gate, push and hold the Hydraulic Front Gate Switch up.
- To lower the Hydraulic Front Gate, push and hold the Hydraulic Front Gate Switch down.
- Release the switch when the Hydraulic Front Gate reaches the desired height.

2.2.6 USING THE RETRACTABLE CRADLE ADAPTER POST

Note

83, 86, and 87 tractors use a fixed Cradle Adapter Post.

If equipped, this section describes how to extend and retract the Cradle Adapter Post (see Chapter 4 of the *Operation Manual* for your tractor).

2.2.6.1 EXTENDING THE CRADLE ADAPTER POST

To extend the Cradle Adapter Post:

1. Push the Latch Lever rearward, toward the back wall of the Cradle.
2. Pull the Cradle Adapter Post fully forward.
3. Release the Latch Lever to lock the Cradle Adapter Post into position.
4. Verify that the Cradle Adapter Post is locked in the extended position.

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2.2.6.2 RETRACTING THE CRADLE ADAPTER POST

To retract the Cradle Adapter Post:

1. Push the Latch Lever rearward, toward the back wall of the Cradle.
2. Push the Cradle Adapter Post fully rearward.
3. Release the Latch Lever to lock the Cradle Adapter Post into position.
4. Verify that the Cradle Adapter Post is locked in the retracted position.

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2.3 USING WINCH & STRUT STRAPS

This section describes how to use the Winch Strap and Strut Strap.

2.3.1 STRAP WARNINGS

DANGER

FAILURE TO FOLLOW EACH OF THE WARNINGS LISTED IN THIS SECTION MAY CAUSE A STRAP TO SNAP, COME LOOSE, AND / OR CONTACT PERSONS OR EQUIPMENT. ANY OF THESE CONDITIONS CAN CAUSE PERSONAL INJURY AND / OR DAMAGE TO EQUIPMENT OR PROPERTY.

- **Verify that the Winch Strap and Strut Strap are in serviceable condition:** Always verify that both straps are free from all of the defects described in *"STRAP INSPECTION" on page 2-2*.
- **Prevent unexpected tractor movement:** Always have the tractor operator be the only person to operate the Winch.
- **Remain clear of the strap while towing:** Always be aware that a broken strap may snap in a manner similar to a rubber band, and remain well clear.
- **Maintain control of the Winch Strap:** Always keep a minimum of three full wraps of strap on the Winch Drum before starting to winch an aircraft on to the Cradle.
- **Remain clear of the strap while towing:** Never allow your body, clothing, or body-mounted accessories (including jewelry) to touch the strap.
- **Maintain control of the Winch Strap:** Never apply load on the Winch with the Winch Strap fully extended.

2.3.2 MANUAL WINCH (83)

On an 83 with a manual Winch, use the Winch Strap as follows:

- **To reel in the Winch Strap:** See *"REELING IN THE WINCH STRAP" on page 2-11*.
- **To pay out the Winch Strap:** See *"PAYING OUT THE WINCH STRAP" on page 2-11*.

2.3.2.1 REELING IN THE WINCH STRAP

To reel in the Winch Strap:

1. Pull the Winch Lock out.
2. Turn the Winch Handle clockwise to reel in the Winch Strap.
3. Verify that the Winch is holding the load before you release the Winch Handle.

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2.3.2.2 PAYING OUT THE WINCH STRAP

To pay out the Winch Strap:

1. Push the Winch Lock in.
2. Turn the Winch Handle counterclockwise to pay out the Winch Strap.
3. Verify that the Winch is holding the load before you release the Winch Handle.

2.3.3 MANUAL WINCH (86 / 87)

On an 86 or 87 tractor equipped with a manual Winch, use the Winch Strap as follows:

- **To reel in the Winch Strap:** See *"REELING IN THE WINCH STRAP" on page 2-11*.
- **To pay out the Winch Strap:** See *"PAYING OUT THE WINCH STRAP" on page 2-11*.

2.3.3.1 REELING IN THE WINCH STRAP

To reel in the Winch Strap:

1. Securely attach the Winch Handle to the Low Speed Shaft, making sure that the clip in the handle engages with the groove in the shaft.

> *Note*
>
> *You may use the High Speed Shaft to reel in the Winch Strap when no aircraft is attached.*

2. Place the Ratchet Plunger Pin in the deep slot in a horizontal position.
3. Turn the Winch Handle to reel in the Winch Strap. The Ratchet Plunger Pin should bob up and down as the Winch Strap is wound onto the Winch Spool.
   - > When using the Low Speed Shaft, turn the Winch Handle counterclockwise.
   - > When using the High Speed Shaft, turn the Winch Handle clockwise.

> *Note*
>
> *If the Winch Handle refuses to turn, remove the Ratchet Plunger Pin from the slot, turn it 180 degrees, and then replace it in the slot.*

4. Verify that the Ratchet Plunger Pin is fully engaged and holding the load before you release the Winch Handle.
5. Remove the Winch Handle from the shaft, and then place the Winch Handle Stop Tube over the Low Speed Shaft to prevent accidental release.

2.3.3.2 PAYING OUT THE WINCH STRAP

To pay out the Winch Strap:

1. Securely grip the Winch Handle, and then apply force to allow easy disengagement of the Ratchet Plunger Pin.
   - > When using the Low Speed Shaft, apply force counterclockwise.

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> When using the High Speed Shaft, apply force clockwise.

2. Pull the Ratchet Plunger Pin up, and then rotate it 90 degrees.
3. Press the Brake Handle.
4. Carefully turn the Winch Handle while maintaining pressure on the Brake Handle to prevent loss of control and sudden tension release.

   > When using the Low Speed Shaft, apply force clockwise.

   > When using the High Speed Shaft, apply force counterclockwise.

5. Reengage the Ratchet Plunger Pin, and then verify that it bobs up and down while turning the Winch Handle in the same direction as Step 4.
6. Verify that the Ratchet Plunger Pin is fully engaged and holding the load before you release the Winch Handle.
7. Remove the Winch Handle from the shaft, and then place the Winch Handle Stop Tube over the Low Speed Shaft to prevent accidental release.

2.3.4 HYDRAULIC WINCH (86+)

On an 86, 87, 88, or 89 tractor equipped with a hydraulic Winch Motor, use the Winch Strap as follows:

- To reel in the Winch Strap, move any Winch Strap Motor Control Switch to the RETRACT position. If equipped, the Winch Strap Motor Control Switch mounted on the Instrument Panel overrides both the fender-mounted controls and the Winch Limit Switch, allowing you to adjust Winch Strap tension during a tow, such as if you need to adjust Cradle height or compensate for sloping terrain.
- To pay out the Winch Strap, move any Winch Strap Motor Control switch to the EXTEND position.

See Chapter 4 of the *Operation Manual* for your tractor for the locations of the Winch Strap Motor Control switches.

DANGER

KEEP YOUR BODY AWAY FROM THE WINCH STRAP AND FAIRLEAD ASSEMBLY WHILE OPERATING THE WINCH CONTROLS.

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2.3.5 USING A STRUT STRAP

To use a Strut Strap:

1. Select a Strut Strap with a length that keeps the “D” rings and Winch Hook from contacting the fairlead rollers on the tractor or the shiny part of the aircraft landing gear strut when the aircraft is winched into the final capture position.

CAUTION

DO NOT ALLOW THE “D” RINGS TO TOUCH THE SHINY PART OF THE AIRCRAFT STRUT.

CAUTION

DO NOT ALLOW THE WINCH STRAP TO MOVE OR DAMAGE THE NOSE WHEEL OLEO STRUT, SENSORS, HYDRAULIC LINES, OR OTHER STRUT ATTACHMENTS OR AIRCRAFT COMPONENTS.

2. Inspect both the Strut Strap and Winch Strap for damage or excessive wear.
3. Verify that the Protective Sleeve is clean and free from dirt and grit that can damage the shiny oleo surface before each use and during scheduled servicing (see the *Service Manual*).

Note

The Protective Sleeve can be removed from the Strut Strap for cleaning.

See *“GENERAL TOWING PROCEDURE” on page 3-1* for instructions on capturing and towing an aircraft, and *“SPECIAL TOWING SITUATIONS & PROCEDURES” on page 4-1* for aircraft-specific instructions.

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CHAPTER 3

GENERAL TOWING PROCEDURE

This chapter describes the aircraft towing procedure, which encompasses the following topics:

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3.1 OVERVIEW

This chapter describes the general towing procedure that is suitable to most of the aircraft types that fall within the following weight capacity ranges supported by LEKTRO aircraft tractors:

- **83:** 15,000lb (16,804kg)
- **86 / 87:** 30,000 to 85,000lb (13,608 to 38,555kg)
- **88 / 89:** 115,000 to 280,000 lb (52,163 to127,005 kg).

Note

If special configurations or conditions warrant and safety precautions have been adapted, then variations to the published procedures are acceptable provided they are documented by the owner / operator and approved by JBT LEKTRO, Inc. Where possible, any such variations must use the procedures contained in this chapter that are closest to the custom procedure as a starting point.

The general towing procedure consists of the following steps:

1. Position the gates, if the tractor is not equipped with a load-sensing turntable on the Cradle. Aircraft are usually towed with the Side Gates in their outermost positions and without using an Extended Rear Gate. If needed, you may:

   > Move the Side Gates, if equipped. See *"USING THE SIDE GATES" on page 2-5*.

   > Use an Extended Rear Gate, if needed to ensure clearance between the aircraft and tractor. This gate may be either removable (see *"USING A REMOVABLE EXTENDED REAR GATE" on page 2-6*) or fixed (permanently attached to the Cradle; see *"USING A FIXED EXTENDED REAR GATE" on page 2-5*).

   > Use a Front Gate to either help keep the aircraft wheel on the Cradle in case of Winch Strap or related component failure or to prevent a Tow Bar from contacting the Side Gates when using a Pintle Hook to tow an aircraft. See *"USING A REMOVABLE FRONT GATE" on page 2-7*. Some LEKTRO tractors may be equipped with a permanently-mounted hydraulic Front Gate, which is described in *"USING A HYDRAULIC FRONT GATE" on page 2-8*.

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2. Approach the aircraft. You will generally approach and tow from the front of the aircraft; however, certain situations may allow or require you to position the tractor under the aircraft, either ahead or aft of the nose gear, provided that adequate clearance is available and that the landing gear is locked against collapse. You may also need to approach and tow from the rear of the aircraft if it is equipped with a conventional (tail dragger) landing gear.

   > *"APPROACHING THE AIRCRAFT" on page 3-4* describes the basic aircraft approach procedure.

   > *"UNDERBELLY TRACTOR POSITIONING" on page 4-30* describes the under-aircraft approach procedure (88 and 89 only).

   > *"CONVENTIONAL (TAIL WHEEL) GEAR" on page 4-21* describes towing an aircraft from the tail wheel.

   > *"PAWL ADAPTER" on page 4-34* describes towing an aircraft using a Pawl Adapter attached to the gear strut.

3. Capture the aircraft.

   > *"CAPTURING THE AIRCRAFT" on page 3-6* describes the general aircraft capture method.

   > *"SPECIAL TOWING SITUATIONS & PROCEDURES" on page 4-1* describes a variety of special aircraft capture methods, including positioning gates and / or adapters where necessary.

4. Tow the aircraft, making sure to have either sufficient visibility of the intended path or additional marshaling personnel to assist the operator in safely moving the aircraft.

   > Over short distances (e.g. pushback), you will generally drive the tractor forward while pushing the aircraft.

   > Over longer distances (e.g. moving the aircraft from the ramp to a hangar), you will generally drive the tractor in reverse while pulling the aircraft.

5. Release the aircraft, and then move the tractor away from the aircraft.

   > *"RELEASING THE AIRCRAFT" on page 3-17* describes the basic release and withdrawal procedure.

   > *"SPECIAL TOWING SITUATIONS & PROCEDURES" on page 4-1* describes a variety of special aircraft release and withdrawal procedures where necessary under specific conditions.

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3.2 APPROACHING THE AIRCRAFT

To approach the aircraft:

1. Follow all of the **BEFORE DRIVING** and **DRIVING THE TRACTOR** procedures described in the *Operation Manual* for your tractor.
2. Stop the tractor at least 30’ (10 m) from the aircraft by pressing the Service Brake Pedal.
   > If the vehicle stops as expected, then proceed to Step 3.
   > If the vehicle requires additional effort and / or distance to stop, then abandon the approach and select a different tractor for the towing operation.
3. Verify that all required gates are properly positioned and installed, as described in *“OVERVIEW” on page 3-2*. Adjust, if needed.
4. Proceed toward the aircraft as follows:
   > To capture the aircraft forward of the nose wheel, approach the aircraft at walking speed from in front of the aircraft nose wheel in line with the direction the tire is pointing (i.e. the nose wheel's direction of travel).
   > To capture the aircraft aft of the nose wheel when underbelly towing is planned because of hangar density and there is sufficient clearance (e.g. Gulfstream G-II to V Global Express), approach the aircraft at walking speed, maneuver the tractor under the aircraft, and then approach the nose wheel in line with the direction the tire is pointing, as described in *“UNDERBELLY TRACTOR POSITIONING” on page 4-30* (88 and 89 only).

WARNING

ALWAYS KEEP YOUR HEAD, HAIR, BODY, CLOTHING, AND THE TRACTOR AWAY FROM ALL BELLY ANTENNAE AND DRAIN MASTS DURING THE APPROACH.

Note

See “CONVENTIONAL (TAIL WHEEL) GEAR” on page 4-21 for instructions on approaching a conventional (taildragger) aircraft.

5. Stop the tractor approximately 3’ (1 m) from the aircraft wheel.
6. Lower the Cradle to approximately 2” (5 cm) off the ground.
   > **83:** Use the Cradle Release Lever to lower the Cradle until it is just above the ground.
   > **86 and larger:** Use the fender-mounted Cradle Control Switch to lower the Cradle until it is just above the ground.

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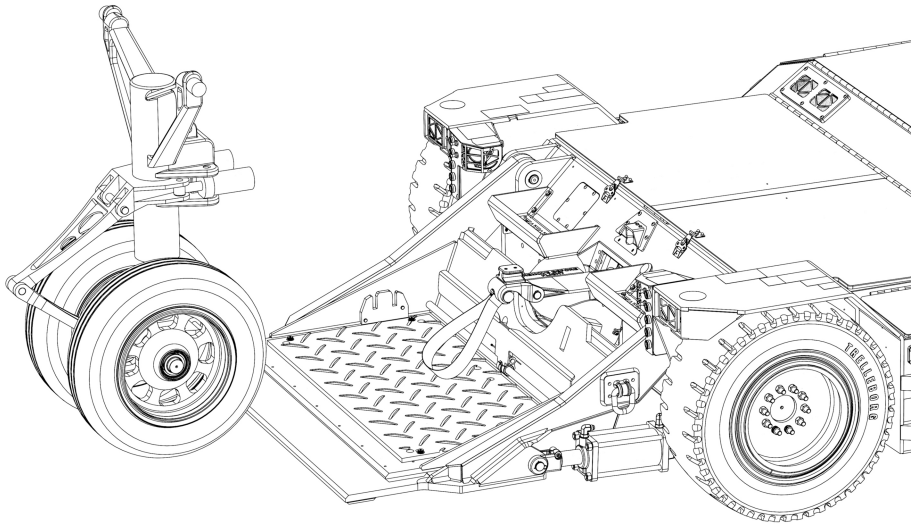
7. Verify that one or both of the following conditions are met:
   > Aircraft parking brake is ON.
   > Wheel chocks are in place forward of the main gear.
8. If installed, remove the wheel chock from the nose wheel.
9. Approach the aircraft, and then stop the tractor so that the Cradle is 2” (5 cm) from the edge of the nose wheel tire.
10. Lower the Cradle all the way to the ground, and then raise the Cradle just off the ground. See the *Operation Manual* for your tractor for instructions on raising and lowering the Cradle.
11. Inch the tractor forward until the Cradle just touches the aircraft nose wheel tire.



12. Move the appropriate motor control to the NEUTRAL position:
    > **83 / 86 / 87:** Motor Control Lever.
    > **88 / 89:** Direction Selector.
13. Set the Parking Brake, as follows:
    > **83 / 86: 87:** Step off the Dead Man Brake Pedal.
    > **88 / 89:** Pull the Parking Brake Knob out, and verify that the Brake Pressure Warning Light turns ON.

Proceed to *“CAPTURING THE AIRCRAFT” on page 3-6* when ready to capture the aircraft.

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3.3 CAPTURING THE AIRCRAFT

When capturing the aircraft:

- It is generally best to stand on the left side of the tractor where you can easily access the fender controls, if equipped. See the *Operation Manual* for your tractor for details.

> *Note*
>
> *The 83 does not have fender-mounted controls.*

- If you are conducting multiple towing operations, you may leave Strut Strap attached to the Winch Strap by one of its “D” rings.

The general capture method will vary based on Aircraft Protection System configuration:

- If your tractor is either not equipped with an Aircraft Protection System or is equipped with a single-level Aircraft Protection System, then see *“CAPTURE PROCEDURE: NO / SINGLE APS” on page 3-7*.
- If your tractor is equipped with a multi-level Aircraft Protection System, then see *“CAPTURE PROCEDURE: MULTI APS” on page 3-11*.

3.3.1 CAPTURE WARNINGS

DANGER

FAILURE TO FOLLOW EACH OF THE WARNINGS LISTED IN THIS SECTION MAY CAUSE THE AIRCRAFT TO TIP AND CAUSE DEATH OR SERIOUS INJURY TO PASSENGERS, CREW, AND / OR GROUND PERSONNEL. IN ADDITION, DAMAGE TO THE AIRCRAFT OR TRACTOR COULD OCCUR, AND THIS DAMAGE MAY LEAD TO A FUTURE INCIDENT THAT CAUSES DEATH OR SERIOUS BODILY INJURY.

- **Monitor clearances:** Always verify that there is enough clearance to safely approach, capture, tow, and release the aircraft. Actual capture clearances may vary from those described in this chapter and in *“SPECIAL TOWING SITUATIONS & PROCEDURES” on page 4-1* because of varying aircraft weight and balance conditions and ramp surfaces
- **Monitor strap tension:** Always monitor the Winch Strap tension when raising or lowering the Cradle, and adjust the Winch Strap as needed to prevent possible damage to the aircraft. Raising the Cradle may change the position of the aircraft attachment point relative to the tractor and cause the Winch Strap to tighten or loosen.
- **Prevent metal-to-metal contact:** Never allow any metal strap fitting to contact the shiny oleo strut on the aircraft.
- **Protect aircraft components:** Never install the Strut Strap around the aircraft strut in such a way that it could chafe

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against or damage any part of the aircraft wheel assembly, tired, hydraulic lines, “up” locks, cam plates, and / or sensors during capture and towing.

- **Protect tractor and aircraft components:** Never allow any part of the aircraft other than the nose wheel tire to contact any metal surface on the tractor. If contact appears likely, then either readjust the gates or use an adapter, as appropriate.
- **Maintain aircraft balance:** Never fully raise the Cradle unless it is necessary to lower the aircraft tail to clear an obstacle, such as a hangar door or roof beam. Raising the aircraft nose wheel too high can shift the aircraft center of gravity and could, in some situations, cause the aircraft to top onto its tail.

3.3.2 CAPTURE PROCEDURE: NO / SINGLE APS

This procedure applies when the tractor is equipped as follows:

- No Aircraft Protection System
- Single-Level Aircraft Protection System

CAUTION

DO NOT USE THIS PROCEDURE TO TOW ATR AIRCRAFT. YOU MUST USE A TRACTOR EQUIPPED WITH A MULTI-LEVEL AIRCRAFT PROTECTION SYSTEM THAT INCLUDES A SPECIFIC ATR LEVEL.

Note

The 83 does not have an Aircraft Protection System.

To capture the aircraft:

1. Verify that the tractor is correctly positioned, as described in either *“APPROACHING THE AIRCRAFT” on page 3-4* or in the applicable procedure in *“SPECIAL TOWING SITUATIONS & PROCEDURES” on page 4-1*, as appropriate.
2. If necessary, readjust the gates to meet aircraft requirements.
3. Ensure that the aircraft wheel steering system, hydraulic system, mechanical linkage, and / or restrictions are configured to allow the gear to turn within the aircraft’s prescribed limits.

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4. Attach one end of the Strut Strap to the Winch Strap using one of the “D’” rings.
5. Pay out sufficient Winch Strap to allow the Strut Strap to be installed on the aircraft.

> **Note**
>
> *Do not pay out to where the Winch Strap starts to rewind. If this occurs, reverse the Winch Strap direction until it begins to rewind in its original direction, and then resume capturing the aircraft.*

6. Wrap the Strut Strap around the nose wheel strut counterclockwise as seen from above. While doing so, verify all of the following, and replace the Strut Strap if needed:
   - > The Strut Strap is not twisted or positioned in such a way as to damage any part of the nose or tail wheel assembly during the capture and towing operations.
   - > The Strut Strap is short enough to prevent the Strut Strap, “D” rings, and Winch Strap Hook from contacting the Winch Motor structure when installed on the aircraft towed.
   - > The Strut Strap is long enough to prevent the Strut Strap, “D” rings, and Winch Strap Hook from dragging on the nose wheel tire during capture or contacting the aircraft strut structure during towing when installed on the aircraft.

> **Note**
>
> *The standard 29” (60 cm) Strut Strap is the correct length for most aircraft types. Optional Strut Strap lengths and / or configurations may be required for some aircraft. See the 88 or 89 Series Parts & Schematics manual for the part number.*

   - > The Protective Sleeve is clean and free from grease, dirt, and / or grit that may scratch the aircraft nose wheel oleo strut. Install a clean Protective Sleeve, if needed.
7. Center the Protective Sleeve on the Strut Strap to ensure that only the Protective Sleeve comes in direct contact with the aircraft.

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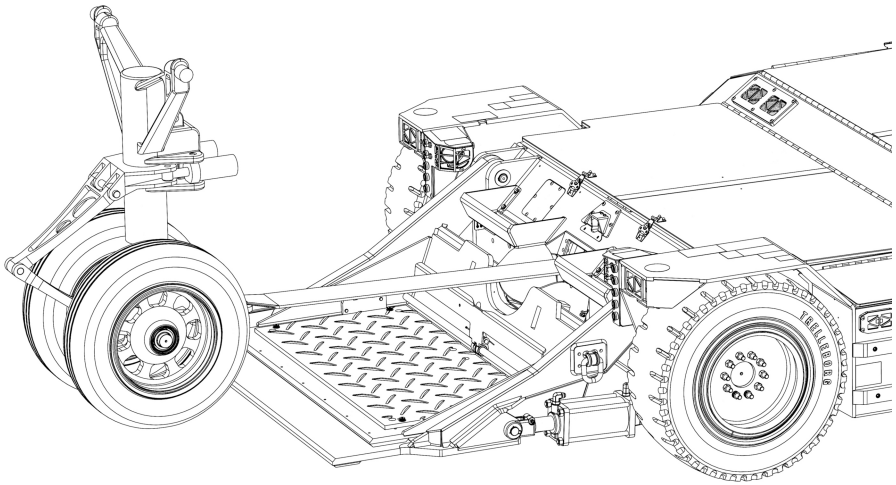
8. Attach the other end of the Strut Strap to the Winch Strap using the other “D” ring, and then verify that both “D” rings are securely attached to the Winch Strap Hook.



9. If needed, refer to the following sections for additional instructions:

   > *“SLOPE TOWARD TRACTOR OR AIRCRAFT ENGINES RUNNING” on page 4-62* if the aircraft parking surface is sloped toward the tractor, or if the aircraft engine(s) are running.

   > *“AIRCRAFT ON PASSENGER LOADING BRIDGE” on page 4-63* if the aircraft is positioned on a passenger loading bridge.

   > *“WINTER OPERATIONS” on page 4-63* if you are towing the aircraft in wet, snowy, or slippery conditions with reduced traction.

10. Remove all chocks from the tractor side of the aircraft wheels.

11. Release the aircraft parking brake.

12. Winch the aircraft onto the Cradle, making sure to keep the wheels centered on the Cradle, until the nose wheel tire touches the Back Wall, Rear Gate, or Winch Stop Switch.

    > If the tractor is equipped with a manual Winch, then see *“MANUAL WINCH (83)” on page 2-10* or *“MANUAL WINCH (86 / 87)” on page 2-11*, as appropriate.

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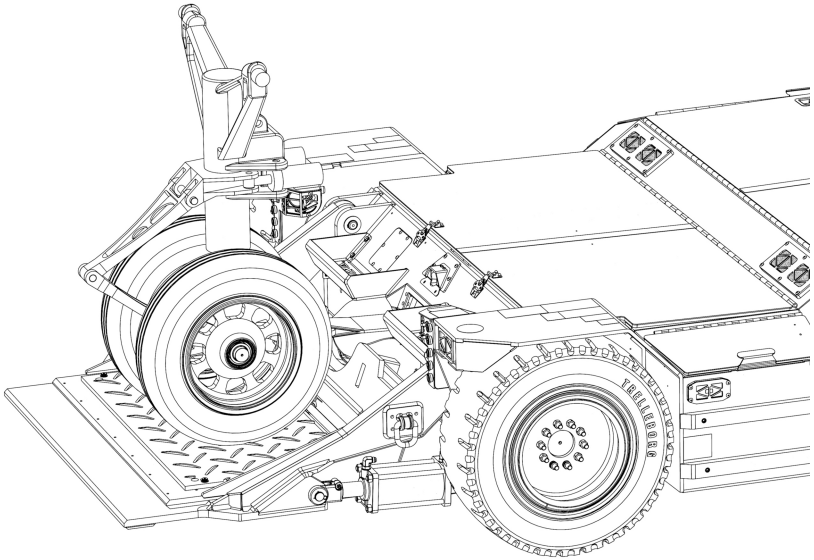
> If the tractor is equipped with a hydraulic Winch (86 or larger only), then see *"HYDRAULIC WINCH (86+)" on page 2-12*.



13. If equipped, install / raise the Front Gate as a backup aircraft wheel stop to prevent the aircraft wheel from coming off the Cradle if the Winch or Winch Strap fails. See *"USING A REMOVABLE FRONT GATE" on page 2-7* or *"USING A HYDRAULIC FRONT GATE" on page 2-8*.
14. Raise the Cradle enough to allow it to clear ground obstacles while towing the aircraft. Monitor the Winch Strap while you are raising the Cradle:
    > If the Winch Strap tightens to where tension is evident, then extend the Winch Strap as needed to maintain correct tension on the aircraft wheel.
    > If the Winch Strap loosens to where slack is evident, then retract the Winch Strap as needed to maintain correct tension on the aircraft wheel.
    > If the tractor is equipped with a single-level Aircraft Protection System, then the Cradle Height Limiter will limit the maximum Cradle height in order to minimize torque loads on the aircraft nose landing gear.
15. Remove all remaining wheel chocks from the aircraft and stow them securely on the tractor.

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3.3.3 CAPTURE PROCEDURE: MULTI APS

This procedure only applies when the tractor is equipped with a multi-level Aircraft Protection System. To capture the aircraft:

1. Verify that the tractor is correctly positioned, as described in either *"APPROACHING THE AIRCRAFT" on page 3-4* or in the applicable procedure in *"SPECIAL TOWING SITUATIONS & PROCEDURES" on page 4-1*, as appropriate.
2. Determine the type of aircraft being towed and the correct Aircraft Protection System level to use for this towing operation.

CAUTION

IF YOU ARE TOWING AN ATR AIRCRAFT, THEN YOU MUST USE A TRACTOR EQUIPPED WITH A MULTI-LEVEL AIRCRAFT PROTECTION SYSTEM THAT INCLUDES AN ATR OPTION. NEVER SELECT ANY OTHER LEVEL WHEN TOWING AN ATR AIRCRAFT.

Note

The type of aircraft being towed, number of available Aircraft Protection System levels, and individual tractor configuration will determine the level to select when winching and towing the aircraft.

3. Ensure that the aircraft wheel steering system, hydraulic system, mechanical linkage, and / or restrictions are configured to allow the gear to turn within the aircraft's prescribed limits.
4. Attach one end of the Strut Strap to the Winch Strap using one of the "D'" rings.
5. Unwind sufficient Winch Strap to allow the Strut Strap to be installed on the aircraft.

Note

Do not unwind to where the Winch Strap starts to rewind. If this occurs, reverse the Winch Strap direction until it begins to rewind in its original direction, and then resume capturing the aircraft.

6. Wrap the Strut Strap around the nose wheel strut counterclockwise as seen from above. While doing so, verify all of the following, and replace the Strut Strap if needed:
   - > The Strut Strap is not twisted or positioned in such a way as to damage any part of the nose or tail wheel assembly during the capture and towing operations.
   - > The Strut Strap is short enough to prevent the Strut Strap, "D" rings, and Winch Strap Hook from contacting the Winch Motor structure when installed on the aircraft towed.

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> The Strut Strap is long enough to prevent the Strut Strap, “D” rings, and Winch Strap Hook from dragging on the nose wheel tire during capture or contacting the aircraft strut structure during towing when installed on the aircraft.

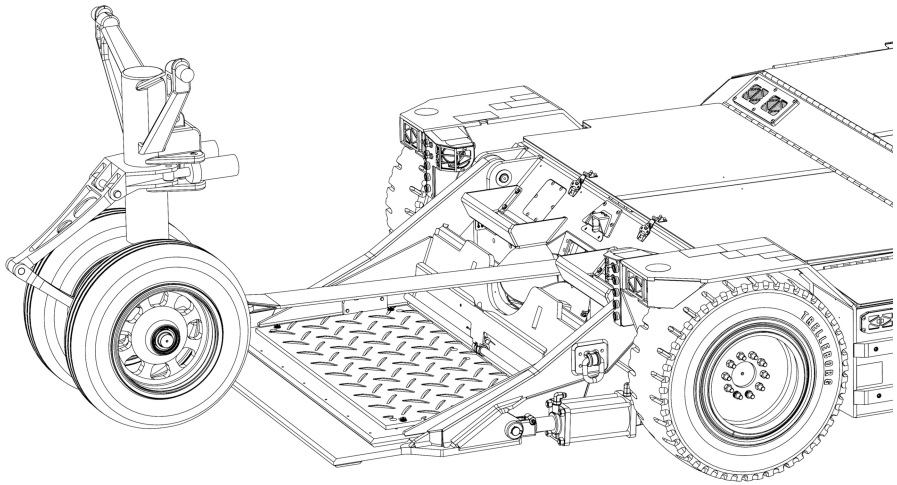
Note

The standard 29” (60 cm) Strut Strap is the correct length for most aircraft types. Optional Strut Strap lengths and / or configurations may be required for some aircraft. See the 88 or 89 Series Parts & Schematics manual for the part number.

> The Protective Sleeve is clean and free from grease, dirt, and / or grit that may scratch the aircraft nose wheel oleo strut. Install a clean Protective Sleeve, if needed.

7. Center the Protective Sleeve on the Strut Strap to ensure that only the Protective Sleeve comes in direct contact with the aircraft.

8. Attach the other end of the Strut Strap to the Winch Strap using the other “D” ring, and then verify that both “D” rings are securely attached to the Winch Strap Hook.



9. If needed, refer to the following sections for additional instructions:

> *“SLOPE TOWARD TRACTOR OR AIRCRAFT ENGINES RUNNING” on page 4-62* if the aircraft parking surface is sloped toward the tractor, or if the aircraft engine(s) are running.

> *“AIRCRAFT ON PASSENGER LOADING BRIDGE” on page 4-63* if the aircraft is positioned on a passenger loading bridge.

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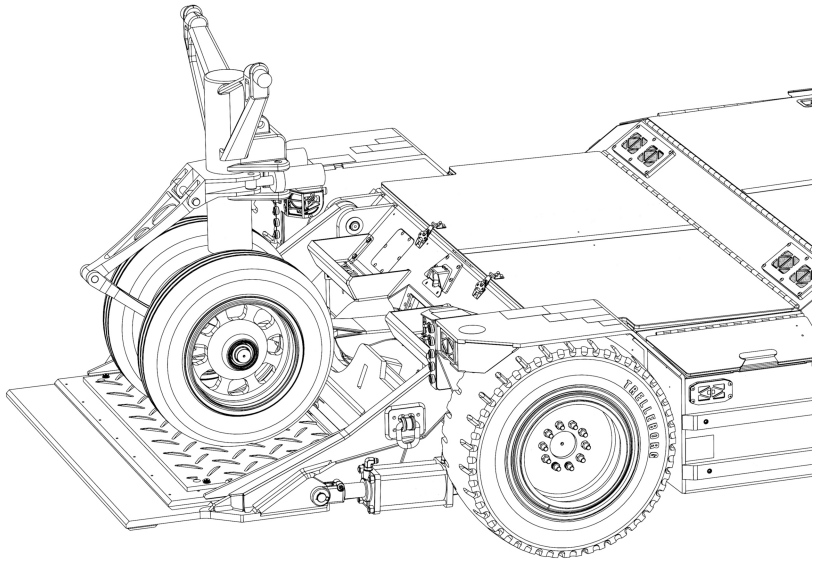
> *"WINTER OPERATIONS" on page 4-63* if you are towing the aircraft in wet, snowy, or slippery conditions with reduced traction.

10. Remove all chocks from the tractor side of the aircraft wheels.
11. Release the aircraft parking brake.
12. Press the appropriate Aircraft Protection System button that corresponds to the correct level for the aircraft you are capturing.
13. Winch the aircraft onto the Cradle, making sure to keep the wheels centered on the Cradle, until the nose wheel tire touches the Rear Gate or Winch Stop Switch.



14. If equipped, install / raise the Front Gate as a backup aircraft wheel stop to prevent the aircraft wheel from coming off the Cradle if the Winch or Winch Strap fails. See *"USING A REMOVABLE FRONT GATE" on page 2-7* or *"USING A FIXED EXTENDED REAR GATE" on page 2-5*.
15. Raise the Cradle enough to allow it to clear ground obstacles while towing the aircraft. Monitor the Winch Strap while you are raising the Cradle:
    > If the Winch Strap tightens to where tension is evident, then extend the Winch Strap as needed to maintain correct tension on the aircraft wheel.
    > If the Winch Strap loosens to where slack is evident, then retract the Winch Strap as needed to maintain correct tension on the aircraft wheel.
    > The Cradle Height Limiter will limit the maximum Cradle height in order to minimize torque loads on the aircraft node landing gear.
16. Wait approximately five seconds for the Aircraft Protection System to stabilize and obtain an accurate aircraft nose weight reading. The selected Aircraft Protection System level may change if the detected weight is outside the range you selected in Step 12.
17. Remove all remaining wheel chocks from the aircraft and stow them securely on the tractor.

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3.4 TRANSPORTING THE AIRCRAFT

When transporting the aircraft:

- Keep the aircraft wheel and lower strut within the prescribed or indicated aircraft steering system turn limits. Limits may depend on aircraft configuration at the time of tow.
- Assign and position wing-walking and signaling personnel as required to safely move the aircraft, especially when visibility is restricted.
- For smoother acceleration when starting a tow movement, apply gentle pressure to both the Service Brake Pedal and either the Accelerator Pedal or Motor Control Lever, and then gradually release the Service Brake Pedal.

CAUTION

DO NOT APPLY BOTH POWER AND BRAKING FOR AN EXTENDED PERIOD OF TIME, AND DO NOT APPLY EXCESSIVE PRESSURE TO THE ACCELERATOR PEDAL OR MOTOR CONTROL LEVER, AS THIS COULD DAMAGE THE DRIVE MOTOR.

- As soon as possible while towing, determine your ability to handle the aircraft by observing the aircraft and tractor reaction when you gently press the Service Brake Pedal.
- If the aircraft is parked in a congested area, then slowly maneuver the aircraft clear of the congestion. Stop to perform visual inspections and reverse the direction as required to avoid colliding with other objects.
- Periodically confirm that the aircraft nose wheel to remains positioned on the Cradle and well clear of the tractor structure. If the tractor is equipped with the optional Camera, you can do this by checking the CCTV monitor mounted on the left instrument panel.
- When positioning the aircraft in a congested area, slowly maneuver the aircraft into the intended parking position. Assign and position wing-walking and signaling personnel as required to safely move the aircraft, especially when visibility is restricted. Stop to perform visual inspections and reverse the direction as required to avoid colliding with other objects.
- If the tractor is equipped with an Aircraft Protection System, then see *“APS TRANSPORT” on page 3-15*.

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3.4.1 TRANSPORT WARNINGS

DANGER

FAILURE TO FOLLOW EACH OF THE WARNINGS LISTED IN THIS SECTION MAY CAUSE THE AIRCRAFT TO COLLIDE WITH PERSONS OR PROPERTY, AND COULD ALSO RESULT IN LOSING CONTROL OF THE TOW.

- **Remain within aircraft steering limits:** Always keep the towing operation within the aircraft turn limits. JBT LEKTRO, Inc. is not responsible for damage resulting from operating beyond these limits.
- **Monitor aircraft movement:** Always monitor how the aircraft responds when you press the Accelerator Pedal or Motor Control Lever. If the aircraft does not begin moving, or if resistance continues when the Accelerator Pedal or Motor Control Lever is at or near its maximum setting, then release the Accelerator Pedal or Motor Control Lever immediately, and then verify that:
  - > All wheel chocks have been removed.
  - > The airplane parking brake has been released.
  - > There are no obstacles preventing aircraft movement.
  - > Aircraft weight is within tractor limits.

  Contact JBT LEKTRO, Inc. for assistance, if needed.
- **Monitor the aircraft wheel:** Always monitor the aircraft wheel that is on the Cradle. If the wheel twists or moves during towing in a way that compromises clearance or that could damage the aircraft, then stop the towing operation immediately, release the aircraft as described in *"RELEASING THE AIRCRAFT" on page 3-17*, and then repeat the approach and capture procedure based on the current wheel position and orientation.

3.4.2 APS TRANSPORT

When the tractor is equipped with an Aircraft Protection System:

- The yellow Torque Caution Light illuminates and an alarm sounds when the towing operation exceeds the configured maximum safe torque for the aircraft being towed. The alarm stops sounding and the light turns off when the torque falls below the safe maximum. You may continue the towing operation.
- The red Torque Warning Light illuminates and an alarm sounds when the towing operation exceeds a level that could damage the aircraft nose landing gear. If this happens, see the *Operation Manual* for your tractor for reset instructions.
- If the Aircraft Protection System experiences a fault, then you may continue the towing operation. Be aware that Motor and Brake limits will be disabled, allowing maximum acceleration and braking, which could apply excessive torque to the aircraft nose landing gear. Meanwhile, the Winch will be limited to Level 1 (the lowest setting) if the tractor is equipped with a multi-level Aircraft Warning System. See the *Operation Manual* for your tractor for fault indications and troubleshooting.

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CAUTION

ALWAYS LIMIT ACCELERATION, BRAKING, AND TURNING WHEN THE AIRCRAFT PROTECTION SYSTEM LIMITS ARE DISABLED.

If the tractor is equipped with a multi-level Aircraft Protection System, then:

- The tractor will override the level you specified when capturing the aircraft if it determines that the aircraft weight falls within a different level.
- You may override the set level at any time by pressing and holding the desired level button for three seconds.
  - > Selecting a lower level will reduce the maximum acceleration and brake forces that may be applied. Torque cautions and warnings will operate in accordance with the currently-selected level.

DANGER

REDUCING THE MAXIMUM ALLOWABLE BRAKING FORCE MAY INCREASE THE RISK OF COLLISION BECAUSE IT CAUSES LONGER STOPPING DISTANCES. REDUCED BRAKING FORCE MAY EVEN RENDER THE TRACTOR UNABLE TO STOP, DEPENDING ON FACTORS SUCH AS AIRCRAFT WEIGHT AND RAMP SLOPE.

  - > Selecting a higher level will increase the maximum acceleration and brake forces that maybe applied. Torque cautions and warnings will operate in accordance with the currently-selected level.

CAUTION

INCREASING THE MAXIMUM ALLOWABLE ACCELERATION AND BRAKING FORCES MAY CAUSE EXCESSIVE TORQUE TO BE PLACED ON THE AIRCRAFT NOSE LANDING GEAR WITHOUT WARNING TO THE OPERATOR, BECAUSE THESE WARNINGS DEPEND ON THE SELECTED LEVEL AND NOT THE ACTUAL AIRCRAFT WEIGHT.

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3.5 RELEASING THE AIRCRAFT

This section describes both the general and airline pushback aircraft release procedures:

3.5.1 GENERAL RELEASE PROCEDURE

To release and withdraw from the aircraft once the towing operation concludes:

1. Chock the main landing gear forward and aft of the wheels and / or set the aircraft brakes, as required.
2. If installed, remove the Front Gate from the Cradle or lower the Hydraulic Front Gate.
3. Pay out enough Winch Strap to allow you to disconnect the Strut Strap (or interface tool, if used; see *"SPECIAL TOWING SITUATIONS & PROCEDURES" on page 4-1*). See the following, as appropriate for your tractor:
   > *"MANUAL WINCH (83)" on page 2-10*.
   > *"MANUAL WINCH (86 / 87)" on page 2-11*.
   > *"HYDRAULIC WINCH (86+)" on page 2-12*.
4. Carefully remove the Strut Strap or other interface tool from the landing gear.

CAUTION

NEVER ALLOW ANY METAL FITTINGS TO CONTACT THE SHINY OLEO STRUT.

5. Stow the Strut Strap or interface tool in a Side Compartment.
6. Lower the Cradle until it is just above the ground.
   > **83:** Use the Cradle Release Lever to lower the Cradle until it is just above the ground.
   > **86 and larger:** Use the fender-mounted Cradle Control Switch to lower the Cradle until it is just above the ground.
7. Slowly back the tractor away from the aircraft wheel until the Cradle is clear of the aircraft tire(s).
8. Chock the aircraft wheel, if required.
9. Retract the Winch Strap sufficiently to prevent it from contacting the ground while the vehicle is in motion.

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3.5.2 AIRLINE PUSHBACK RELEASE PROCEDURE

To release and withdraw from the aircraft once the airline pushback operation concludes:

1. Instruct the flight crew to set the parking brake.
2. If installed, remove the Front Gate from the Cradle or lower the Hydraulic Front Gate.
3. Use the fender-mounted Winch Control Switch to extend enough Winch Strap to allow you to disconnect the Strut Strap (or interface tool, if used; see *"SPECIAL TOWING SITUATIONS & PROCEDURES" on page 4-1*).
4. Carefully remove the Strut Strap or other interface tool from the landing gear, and keep it in your hand.

CAUTION

NEVER ALLOW ANY METAL FITTINGS TO CONTACT THE SHINY OLEO STRUT.

5. Use the fender-mounted Cradle Control Switch to lower the Cradle until it is just above the ground.
6. Slowly back the tractor away from the aircraft wheel until the Cradle is clear of the aircraft tire(s).
7. If applicable, remove the Bypass Pin from the aircraft nose landing gear.
8. Show the flight crew the Strut Strap or other interface tool before dispatching the flight.

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CHAPTER 4

SPECIAL TOWING SITUATIONS & PROCEDURES

This chapter describes specialized aircraft towing procedures under the following situations:

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4.1 LOW NOSE WEIGHT

Aircraft with rear-mounted engines and / or that have an aft center of gravity at the time of a towing operation require a Hold-Down Adapter to prevent the tail from tipping and possibly striking the tarmac during handling.

Examples include, but are not limited to:

- Aero Commander
- Beech Jet
- Citation
- Diamond Jet

Some of the most commonly used Hold-Down adapters include:

- **Lear / Aero Commander Hold-Down:** This is used for the 83 tractor. See *"SINGLE NOSE WHEEL / FORMED HOLD-DOWN ADAPTER" on page 4-2*.
- **Formed plate:** This design may be used for most towing applications. See *"SINGLE NOSE WHEEL / FORMED HOLD-DOWN ADAPTER" on page 4-2*.
- **Standard hoop:** This design may also be used for most towing applications. See *"SINGLE NOSE WHEEL / HOOP HOLD-DOWN ADAPTER" on page 4-4*. If you are towing a Lear 40 / 45 / 70 / 75 jet, then you must use both this adapter and the LEKTRO Lear 40 / 45 / 70 / 75 Adapter. See *"SINGLE NOSE WHEEL & OFFSET STRUT" on page 4-8*.
- **Dual-wheel:** A Dual-Wheel Adapter must be used for towing aircraft with dual nose wheels and light nose wheel weight, such as the Citation-X. See *"DUAL NOSE WHEELS" on page 4-6*.

4.1.1 SINGLE NOSE WHEEL / FORMED HOLD-DOWN ADAPTER

This section describes how to tow aircraft with a single nose wheel and low nose weight using the formed plate Hold-Down Adapter (or Lear / Aero Commander Hold-Down for the 83).

This procedure applies to a variety of aircraft, such as (but not limited to):

- Aero Commander
- Beech Jet
- Citation (except Citation-X)
- Diamond Jet

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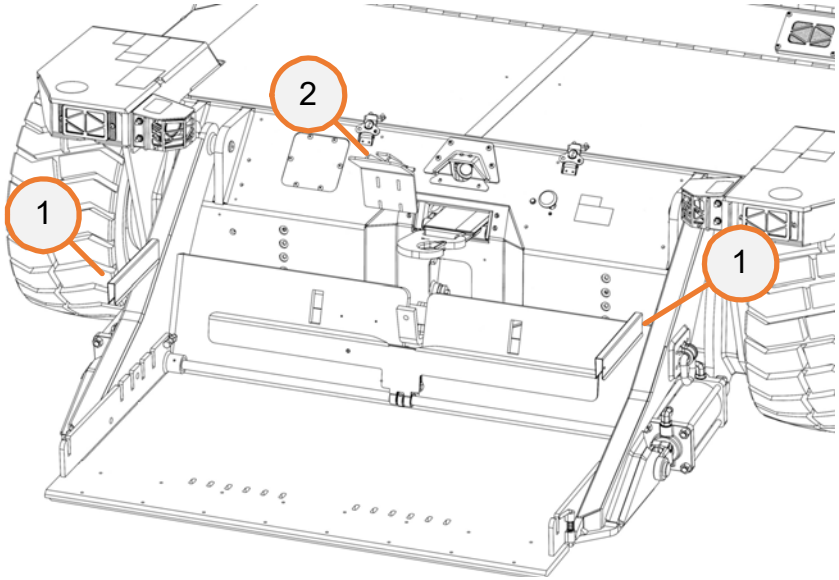
4.1.1.1 STEP ONE: INSTALL CHINE PROTECTORS & ADAPTER

To install the Chine Protectors and formed plate Hold-Down Adapter:

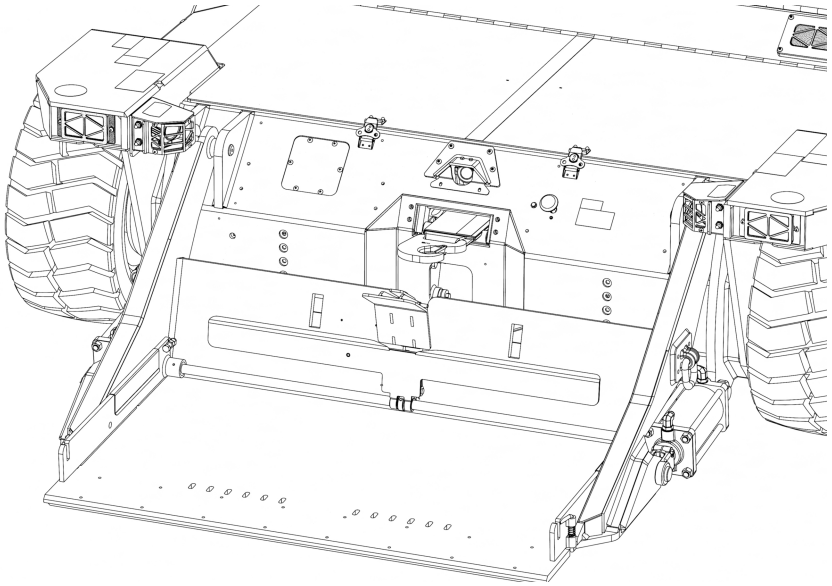


1. If the aircraft nose wheel is fitted with splash-deflecting chines, then install Chine Protectors over the rear slots of the Side Gates.
2. If equipped, extend the Cradle Adapter Post. See *"USING THE RETRACTABLE CRADLE ADAPTER POST" on page 2-8*.
3. Retract the spring-loaded latch on the back of the formed plate Hold-Down Adapter by pushing the Latch Lever towards the adapter body.
4. Insert the Cradle Adapter Post into the sleeve on the formed plate Hold-Down Adapter, and align the hole in the sleeve with the Latch Pin.
5. Release the spring-loaded latch to lock the adapter on the hitch, and then pull up on the adapter to verify that it is secured in place.

4.1.1.2 STEP TWO: ROUTE & ATTACH THE STRUT STRAP

To route and install the Strut Strap:

1. Route the Winch Strap over the Hold-Down Adapter.



2. Pay out the Winch Strap enough to attach one end of the Strut Strap.

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3. Position the tractor by the aircraft forward of the nose wheel, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*.

4. Attach the Strut Strap to the aircraft landing gear as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.1.1.3 STEP THREE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle, being sure that the Hold-Down Adapter is containing the nose wheel.

2. Adjust both Side Gates on the Cradle inward to contain the nose wheel tire, leaving between ½" and 1" (1 and 2.5 cm) clearance between the Side Gates and the aircraft tire. See *"USING THE SIDE GATES" on page 2-5*.

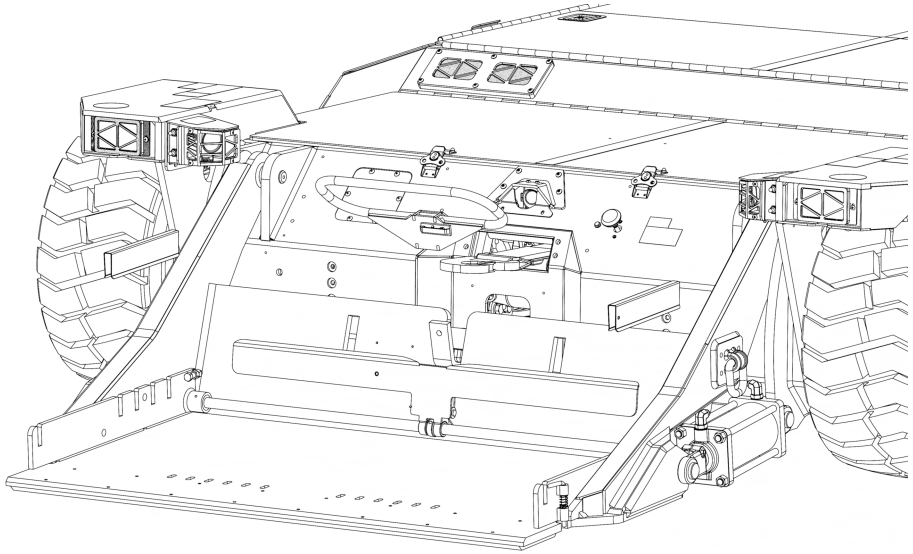
3. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.1.1.4 STEP FOUR: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

4.1.2 SINGLE NOSE WHEEL / HOOP HOLD-DOWN ADAPTER

This section describes how to tow aircraft with a single nose wheel and low nose weight using the hoop Hold-Down Adapter.



This procedure applies to a variety of aircraft, such as (but not limited to):

- Aero Commander
- Beech Jet
- Citation (except Citation-X)
- Diamond Jet

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- Learjet (except Lear 40 / 45 / 70 / 75; see *"LEARJET 40 / 45 / 70 / 75 AIRCRAFT WITH PEP MODIFICATION" on page 4-43*.)

4.1.2.1 STEP ONE: INSTALL CHINE PROTECTORS & ADAPTER

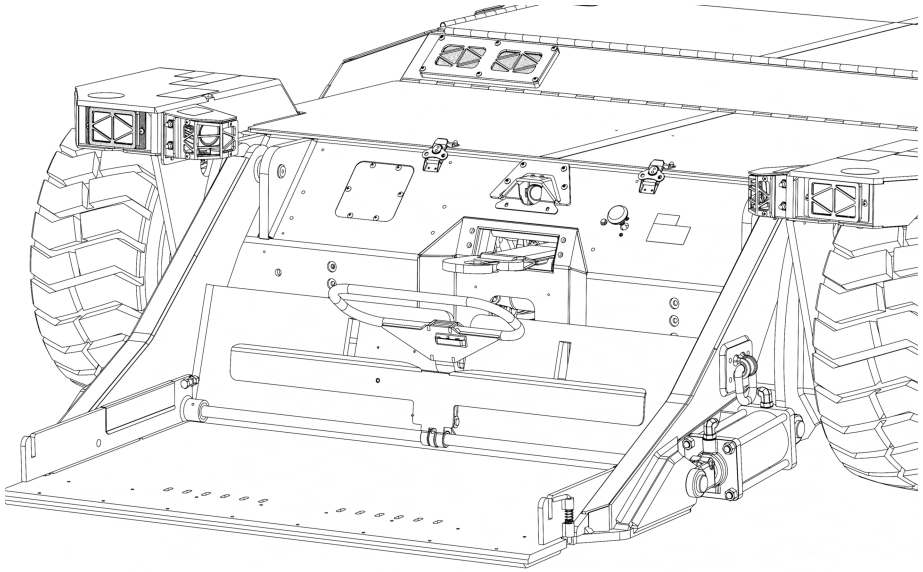
To install the Chine Protectors and hoop Hold-Down Adapter:

1. If the aircraft nose wheel is fitted with splash-deflecting chines, then install Chine Protectors over the rear slots of the Side Gates.
2. Extend the Cradle Adapter Post. See *"USING THE RETRACTABLE CRADLE ADAPTER POST" on page 2-8*.
3. Retract the spring-loaded latch on the back of the hoop Hold-Down Adapter by pulling the Latch Pin away from the adapter body.
4. Insert the Cradle Adapter Post into the sleeve on the hoop Hold-Down Adapter, and align the hole in the sleeve with the Latch Pin.
5. Release the spring-loaded latch to lock the adapter on the hitch, and the pull up on the adapter to verify that it is secured in place.

4.1.2.2 STEP TWO: ROUTE & ATTACH THE STRUT STRAP

To route and install the Strut Strap:

1. Route the Winch Strap over the top horizontal bar of the Hold-Down Adapter.



2. Extend the Winch Strap enough to attach one end of the Strut Strap.
3. Position the tractor by the aircraft forward of the nose wheel, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*.
4. Attach the Strut Strap to the aircraft landing gear as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

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4.1.2.3 STEP THREE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

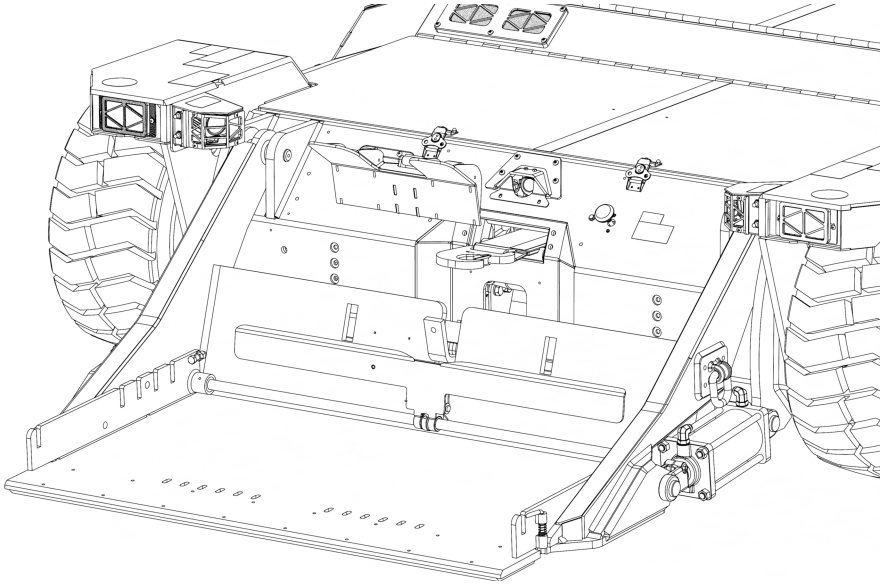
1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle, being sure that the Hold-Down Adapter is containing the nose wheel.
2. Adjust both Side Gates on the Cradle inward to contain the nose wheel tire, leaving between ½" and 1" (1 and 2.5 cm) clearance between the Side Gates and the aircraft tire. See *"USING THE SIDE GATES" on page 2-5*.
3. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.1.2.4 STEP FOUR: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

4.1.3 DUAL NOSE WHEELS

This section describes how to tow aircraft with dual nose wheels and low nose weight using the Dual-Wheel Adapter.



This procedure applies to a variety of aircraft, such as (but not limited to) the Citation-X.

4.1.3.1 STEP ONE: INSTALL THE ADAPTER

To install the Dual-Wheel Adapter:

1. Extend the Cradle Adapter Post. See *"USING THE RETRACTABLE CRADLE ADAPTER POST" on page 2-8*.
2. Insert the Cradle Adapter Post into the sleeve on the Dual-Wheel Adapter, and align the hole in the sleeve with the Latch Pin.

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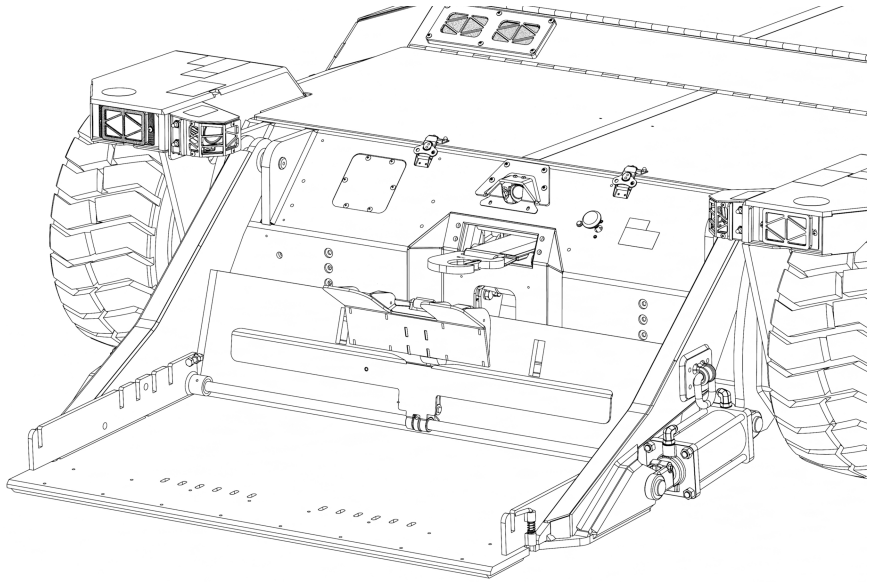
3. Insert the Pin through both the adapter and hitch, and then secure the Pin in place by inserting the Locking Clip.
4. Release the spring-loaded latch to lock the adapter on the hitch, and the pull up on the adapter to verify that it is secured in place.

4.1.3.2 STEP TWO: ROUTE & ATTACH THE STRUT STRAP

To route and install the Strut Strap:

1. Route the Winch Strap over the Dual-Wheel Adapter.



2. Pay out the Winch Strap enough to attach one end of the Strut Strap.
3. Position the tractor by the aircraft forward of the nose wheel, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*.
4. Attach the Strut Strap to the aircraft landing gear as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.1.3.3 STEP THREE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle, being sure that the Hold-Down Adapter is containing the nose wheel.
2. Adjust both Side Gates on the Cradle inward to contain the nose wheel tire, leaving between ½" and 1" (1 and 2.5 cm) clearance between the Side Gates and the aircraft tire. See *"USING THE SIDE GATES" on page 2-5*.
3. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.1.3.4 STEP FOUR: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

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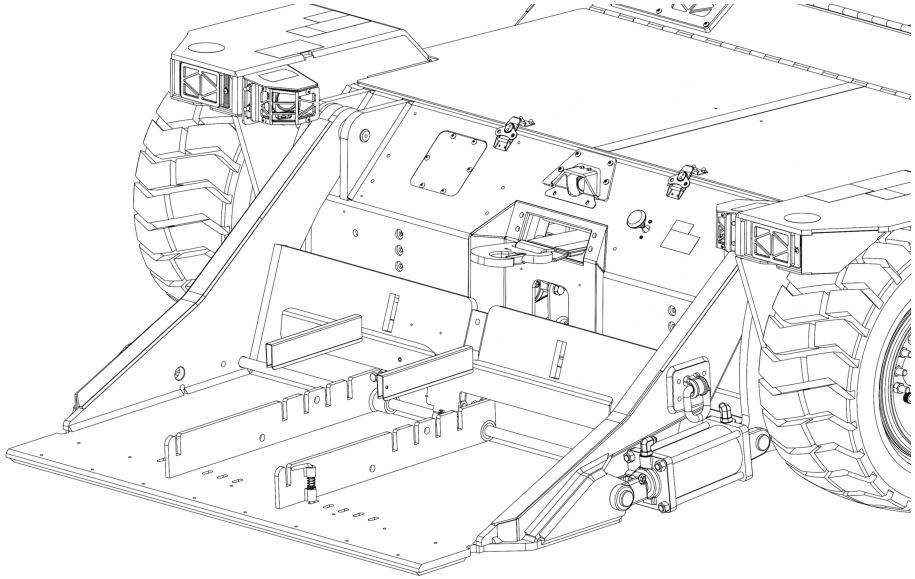
4.2 SINGLE NOSE WHEEL & OFFSET STRUT

This procedure is used on aircraft where the Strut Strap must be installed on a portion of the aircraft nose wheel strut which is offset from the centerline of the aircraft nose wheel.



This procedure reduces the chance of scraping the Strut Straps against the aircraft nose wheel while winching the aircraft on to the Cradle in a straight line by keeping the Winch Strap as close to the center of the Cradle, with the aircraft nose wheel offset to one side of the Cradle.

Note

This section describes capturing an aircraft with a nose wheel strut that is offset to the right, as seen from the rear of the aircraft. To capture an aircraft with a nose wheel strut that is offset to the left, simply move the Side Gates to the opposite side of the Cradle.

4.2.1 STEP ONE: PREPARE THE CRADLE

To prepare the Cradle:

1. If the aircraft nose wheel is fitted with splash-deflecting chines, then install Chine Protectors over the rear slots of the Side Gates.
2. Determine the direction and amount of offset between the strut attachment point and the nose wheel tire.
3. If equipped, position the Side Gates to accommodate the offset such that the Winch Strap will remain centered over the Cradle during capture and towing. This will place the aircraft nose wheel toward the side of the cradle. See *“USING THE SIDE GATES” on page 2-5*.

4.2.2 STEP TWO: ROUTE & ATTACH THE WINCH STRAP

To route and install the Strut Strap:

1. Position the tractor by the aircraft forward of the nose wheel, as described in *“APPROACHING THE AIRCRAFT” on*

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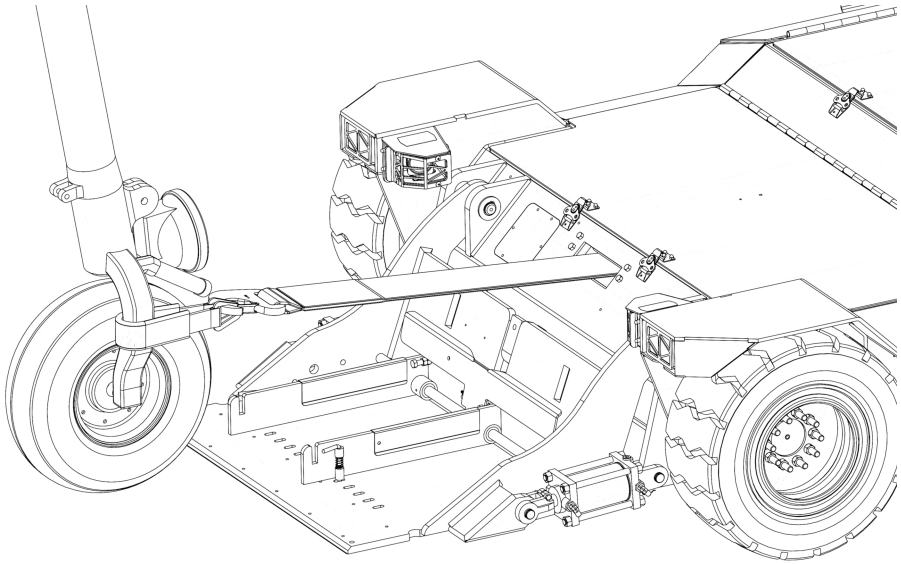
page 3-4, except position the tractor slightly off to one side in order to capture the aircraft nose wheel between the Side Gates.

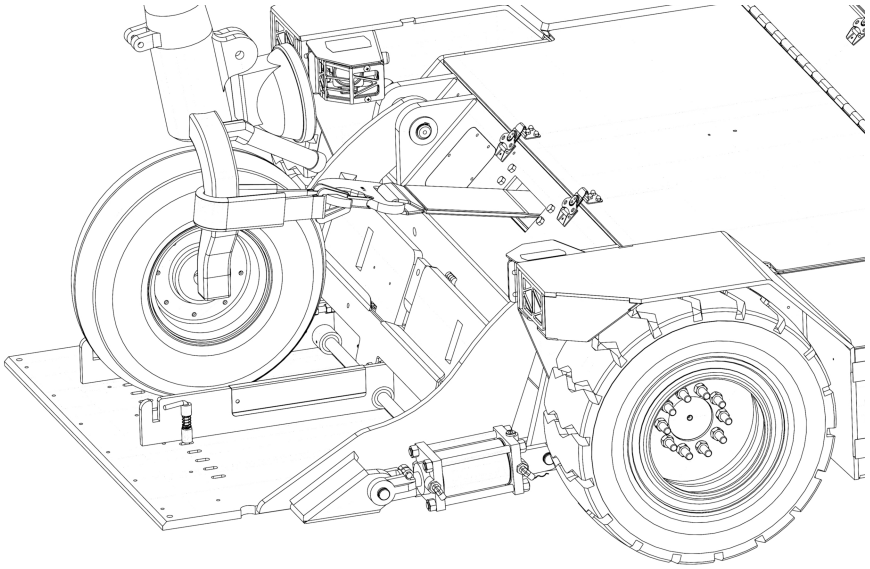
2. Attach the Strut Strap to the aircraft landing gear as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.



4.2.3 STEP THREE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle.
2. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.



4.2.4 STEP FOUR: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

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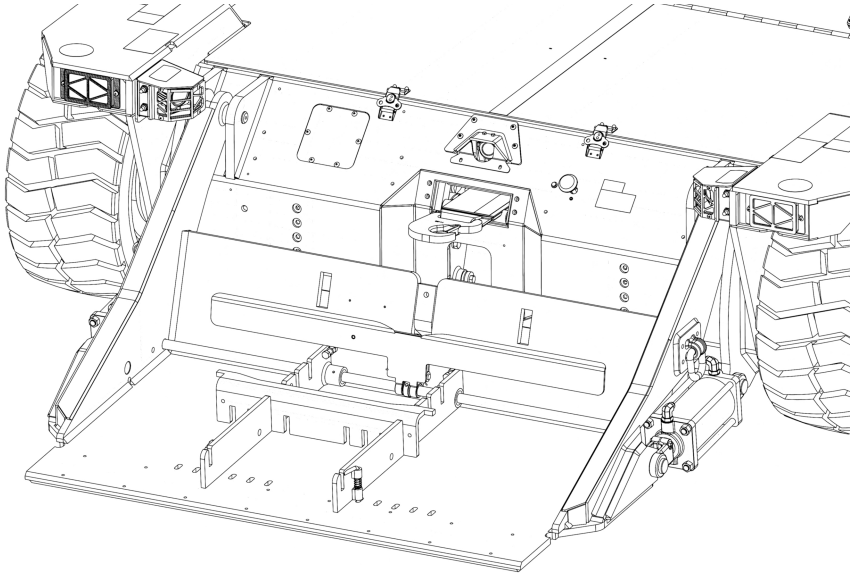
4.3 FRONT PROTRUSIONS & SMALL TIRE DIAMETER

This procedure is intended for aircraft with torque links or other front protrusions that have small tire sizes, as follows:

- **83-87:** Under 10” (25 cm).
- **88 / 89:** Under 12” (30 cm).



This procedure uses a steel Extended Rear Gate that attaches to the Cradle (or Side Gates, if equipped).

4.3.1 STEP ONE: INSTALL THE REAR GATE

To install the Extended Rear Gate:

1. Adjust the Side Gates inward as required to contain the aircraft tire(s) and allow installing the Removable Extended Rear Gate. See *“USING THE SIDE GATES” on page 2-5*.
2. Install the Extended Rear Gate in the appropriate slots in the Cradle (or Side Gates, if equipped) so as to stop the aircraft sufficiently forward on the Cradle to prevent damage to the front protrusion or other aircraft component. See *“USING A REMOVABLE EXTENDED REAR GATE” on page 2-6*.

4.3.2 STEP TWO: ROUTE & ATTACH THE WINCH STRAP

To route and install the Strut Strap:

1. Pay out the Winch Strap enough to attach one end of the Strut Strap.
2. Position the tractor by the aircraft forward of the nose wheel, as described in *“APPROACHING THE AIRCRAFT” on page 3-4*.
3. Attach the Strut Strap to the aircraft landing gear as described in *“CAPTURING THE AIRCRAFT” on page 3-6*.

4.3.3 STEP THREE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

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1. Use the capture procedure described in *“CAPTURING THE AIRCRAFT” on page 3-6* to winch the aircraft on to the Cradle, being sure that the Hold-Down Adapter is containing the nose wheel.
2. If equipped, adjust both Side Gates on the Cradle inward to contain the nose wheel tire, leaving between ½” and 1” (1 and 2.5 cm) clearance between the Side Gates and the aircraft tire. See *“USING THE SIDE GATES” on page 2-5*.
3. Lift the Cradle, as described in *“CAPTURING THE AIRCRAFT” on page 3-6*.

4.3.4 STEP FOUR: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *“TRANSPORTING THE AIRCRAFT” on page 3-14* and *“RELEASING THE AIRCRAFT” on page 3-17*, respectively.

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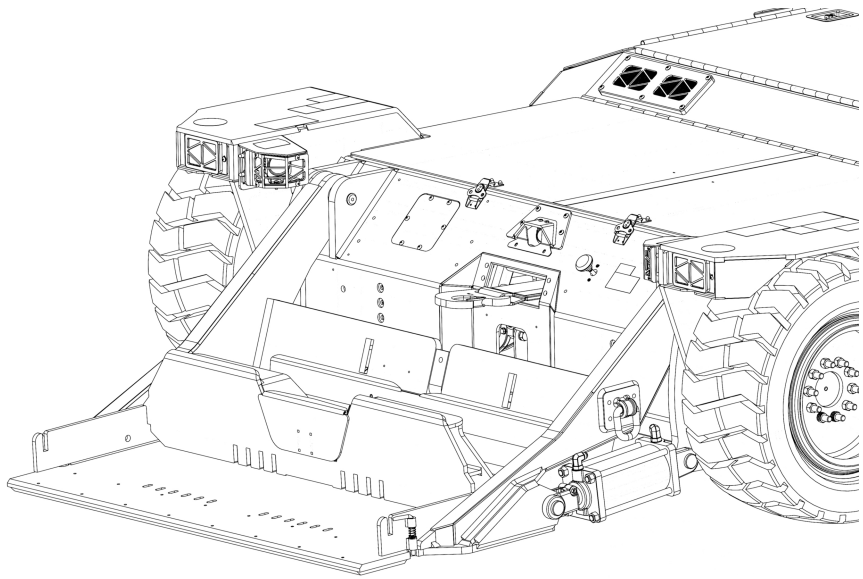
4.4 FRONT PROTRUSIONS & LARGE TIRE DIAMETER

This procedure is intended for aircraft with torque links or other front protrusions that have large tire sizes, as follows:

- **83-87:** 10” (25 cm) or more.
- **88 / 89:** 12” (30 cm) or more.



This procedure uses either of the following options:

- Removable Extended Rear Gate (left), which can be installed, adjusted, and removed as needed to tow a variety of aircraft. See the *Operating Manual* for your tractor and *“USING A REMOVABLE EXTENDED REAR GATE” on page 2-6*.
- Fixed Extended Rear Gate (right), which is permanently mounted to the Cradle. See *“USING A FIXED EXTENDED REAR GATE” on page 2-5*. This is used when most or all of the aircraft being towed have front protrusions and intermediate to larger nose wheel diameters.

4.4.1 STEP ONE: INSTALL THE EXTENDED REAR GATE

To install the Extended Rear Gate:

- **Removable:** See *“USING A REMOVABLE EXTENDED REAR GATE” on page 2-6*.
- **Fixed:** See *“USING A FIXED EXTENDED REAR GATE” on page 2-5*.

If the strut protrusion and / or Winch Strap angle is more than 7” (17 cm) above the ground at the tire face, then install the Center Fill Plate as described in *“CENTER FILL PLATE” on page 2-7*. Otherwise, if the clearance is between 4” (10 cm) and 7” (17 cm), then remove the Center Fill Plate.

4.4.2 STEP TWO: ATTACH THE STRUT STRAP

To attach the Strut Strap:

1. Extend the Winch Strap enough to attach one end of the Strut Strap.

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2. Position the tractor by the aircraft forward of the nose wheel, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*.
3. Attach the Strut Strap to the aircraft landing gear as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.4.3 STEP THREE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle.

CAUTION

IF YOU ARE TOWING AN ATR AIRCRAFT, THEN YOU MUST USE A TRACTOR EQUIPPED WITH A MULTI-LEVEL AIRCRAFT PROTECTION SYSTEM THAT INCLUDES AN ATR OPTION. NEVER SELECT ANY OTHER LEVEL WHEN TOWING AN ATR AIRCRAFT.

2. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.
3. Monitor the nose wheel to ensure the protrusions remain clear of the Cradle and tractor body.

4.4.4 STEP FOUR: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

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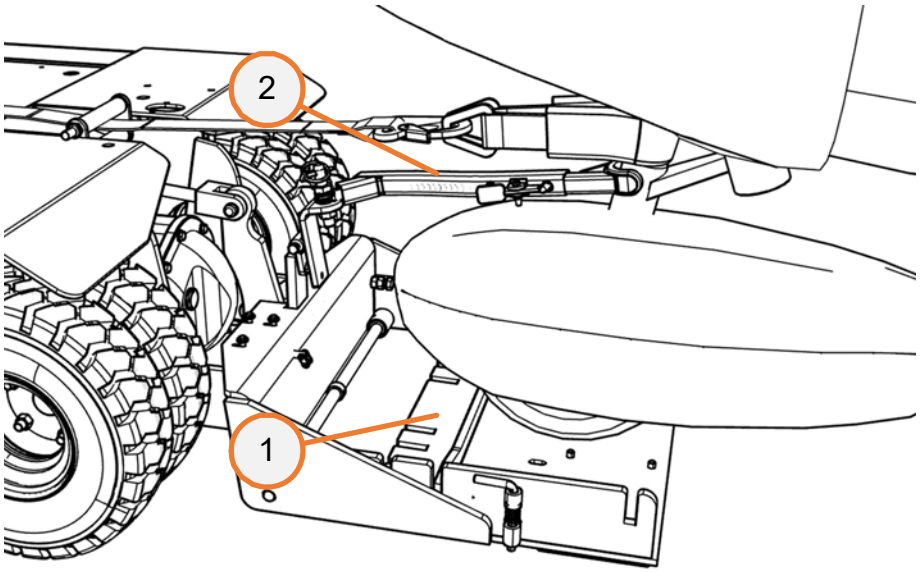
4.5 WHEEL PANTS / SPATS

This procedure is intended for aircraft with wheel pants or spats installed.



This procedure requires the following components:

- **Steel Extended Rear Gate (1):** Acts as a last-resort stop that prevents the aircraft nose wheel from advancing far enough on the Cradle to crash the wheel pants / spats into the Cradle / tractor.
- **Hold-Back Bar (2):** Works in concert with the Winch Strap to maintain the aircraft nose wheel at a fixed distance from the rear wall of the Cradle, thereby protecting the wheel pants / spats.

4.5.1 STEP ONE: INSTALL THE EXTENDED REAR GATE & HOLD-BACK BAR

To install the Extended Rear Gate:

1. If equipped, adjust the Side Gates to their furthest outside positions. See *"USING THE SIDE GATES" on page 2-5*.
2. Rotate the Extended Rear Gate 90 degrees so that the tall side is facing the Cradle, and then install it the in the appropriate slots in the Cradle (or Side Gates, if equipped) so as to stop the aircraft sufficiently forward on the Cradle to prevent damage to the wheels or spats. See *"USING A REMOVABLE EXTENDED REAR GATE" on page 2-6*.

CAUTION

NEVER INSTALL THE STEEL EXTENDED REAR GATE VERTICALLY, AS THIS COULD DAMAGE THE WHEEL PANTS / SPATS.

3. Install the nose wheel Hold-Back Bar on the shaft that is located on the front of the tractor, just to the right of the Winch Strap fairlead.

4.5.2 STEP TWO: ROUTE & ATTACH THE WINCH STRAP

To route and install the Strut Strap:

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1. Pay out the Winch Strap enough to attach one end of the Strut Strap.
2. Position the tractor by the aircraft forward of the nose wheel, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*.
3. Attach the Strut Strap to the aircraft landing gear as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.5.3 STEP THREE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft nose wheel onto the Cradle, as follows:
   > Keep the aircraft nose wheel as close as possible to the Cradle centerline.
   > Continue winching until the aircraft nose wheel tire is positioned about 1" (3 cm) forward of the Rear Gate.
2. Press the Hold-Back Bar Adjuster Lock Lever to release the locking pin.
3. Extend the Hold-Back Bar toward the nose wheel strut, and then lock the Adjuster Lock Lever into position when the end of the Hold-Back bar is approximately 1" (3 cm) from the nose wheel strut.
4. Winch the aircraft forward until both of the following occur simultaneously:
   > The nose wheel strut contacts the Hold-Back Bar.
   > The aircraft nose wheel contacts the steel Removable Extended Rear Gate.
5. Verify all of the following:
   > The nose wheel strut is in firm contact with the Hold-Back Bar.
   > The aircraft nose wheel tire is resting firmly against the steel Removable Extended Rear Gate.
   > No other part of the aircraft is touching any part of the tractor.

Note

The nose wheel strut may be deflated to where there is inadequate strut exposure for both the Hold-Back Bar and the Strut Strap. In this case, the strut must be inflated before towing the aircraft.

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Note

Some nose wheel struts angle rearward to such a degree that the Hold-Back Bar slips up and becomes ineffective. If this happens, the operator may need to position the Hold-Back Bar under the Strut Strap prior to winching the aircraft.

Note

Do not use the Front Gate when towing an aircraft with wheel pants / spats.

4.5.4 STEP FOUR: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.
When transporting the aircraft:

- Periodically check the aircraft nose wheel to ensure that the wheel pants / spats remain clear of the tractor structure.
- Check the aircraft nose wheel at each of the following times to ensure that the wheel pants / spats remain clear of the tractor structure:
  - > Immediately before entering a turn.
  - > At regular intervals while turning.
  - > Immediately after completing the turn.

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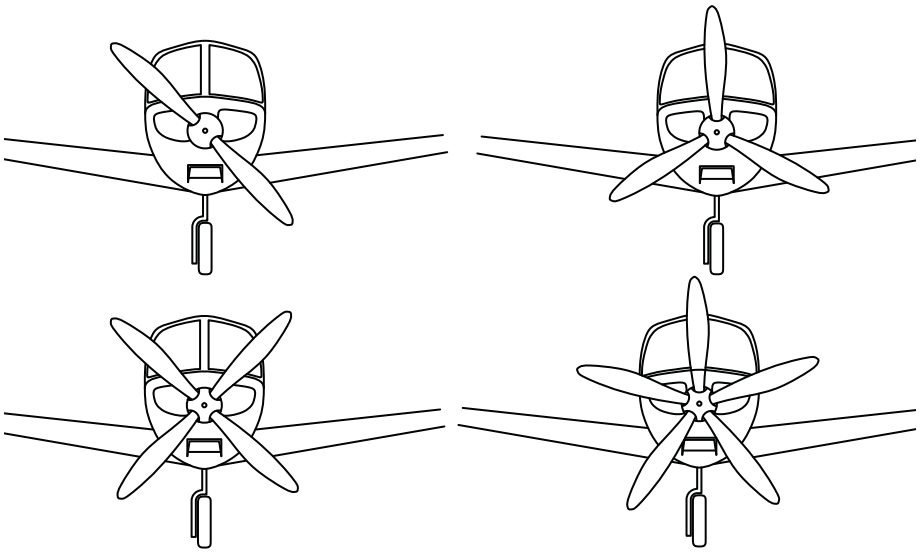
4.6 NOSE-MOUNTED PROPELLER

Aircraft with nose-mounted propellers are towed using either:

- The general procedure described in *"GENERAL TOWING PROCEDURE" on page 3-1*.
- Any of the specialized procedures described in this chapter.



The location of the propeller blades in relation to the work area and the tractor creates several unique hazards that require special care to avoid causing death, injury, and / or damage to the aircraft or tractor.

WARNING

A SPINNING PROPELLER CAN CAUSE DEATH OR SERIOUS BODILY INJURY IF IT STRIKES A PERSON, EVEN WHEN IT IS SPINNING SLOWLY. ALWAYS REMAIN WELL CLEAR OF THE PROPELLER.

See the following, as appropriate to the type of aircraft being towed:

- **Piston engine aircraft:** See *"PISTON ENGINE PROPELLER WARNINGS" on page 4-19*.
- **Turbine engine aircraft:** See *"TURBINE ENGINE PROPELLER WARNINGS" on page 4-19*.

4.6.1 PISTON ENGINE PROPELLER WARNINGS

DANGER

FAILURE TO FOLLOW EACH OF THE WARNINGS LISTED IN THIS SECTION WHEN TOWING A PISTON ENGINE AIRCRAFT WITH A NOSE-MOUNTED PROPELLER MAY CAUSE THE PROPELLER TO STRIKE PERSONS OR PROPERTY.

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When towing a piston engine aircraft with a nose-mounted propeller:

- **Prevent engine ignition:** Always verify that all of the following conditions are met before any personnel approaches or moves the propeller:
  - > Engine ignition system is OFF, if equipped.
  - > Fuel pump(s) are OFF, if equipped.
  - > Carburetor mixture control is set to LEAN CUTOFF, if equipped.
  - > Magneto switch is set to OFF, if equipped. Also, check for any placards or other warnings about live magnetos, and follow all listed precautions.

  Depending on the aircraft configuration, moving the propeller by hand may start the engine if all of the above precautions are not met, as applicable for the specific aircraft type.
- **Maintain adequate clearance:** Always rotate the propeller as shown in the previous image to provide maximum clearance between the propeller blades and the tractor.
- **Maintaining adequate clearance:** Always monitor the clearance between the propeller blades and the tractor when positioning the tractor to the aircraft, and reposition the blades as required to maintain adequate clearance.
- **Maintain adequate clearance:** Always monitor the propeller blade clearance while towing, especially when turning or driving across an irregular ramp surface, and reposition the blades as required to maintain adequate clearance.

4.6.2 TURBINE ENGINE PROPELLER WARNINGS

DANGER

FAILURE TO FOLLOW EACH OF THE WARNINGS LISTED IN THIS SECTION WHEN TOWING A TURBINE ENGINE AIRCRAFT WITH A NOSE-MOUNTED PROPELLER MAY CAUSE THE PROPELLER TO STRIKE PERSONS OR PROPERTY.

When towing a turbine engine aircraft with a nose-mounted propeller:

- **Be alert for windmilling:** Always monitor the propeller position when servicing or towing the aircraft. Propellers on aircraft with turbine engines are prone to “windmilling,” even at low wind speeds. The slipstream caused by towing the aircraft may cause or exacerbate windmilling.
  - > If possible, move the aircraft propeller control to the “full feather” position to minimize or prevent windmilling.
  - > If available, use Propeller Restraint Straps / Boots as prescribed by the aircraft owner to hold the propeller in position and prevent windmilling.
  - > If needed, reposition the propeller as required during the towing process.
- **Provide adequate clearance:** Always rotate the propeller as shown in the previous image to provide maximum clearance between the propeller blades and the tractor.

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- **Monitor propeller clearance:** Always monitor the clearance between the propeller blades and the tractor when positioning the tractor to the aircraft, and reposition the blades as required to maintain adequate clearance.
- **Maintain adequate clearance:** Always monitor the propeller blade clearance while towing, especially when turning or driving across an irregular ramp surface, and reposition the blades as required to maintain adequate clearance.

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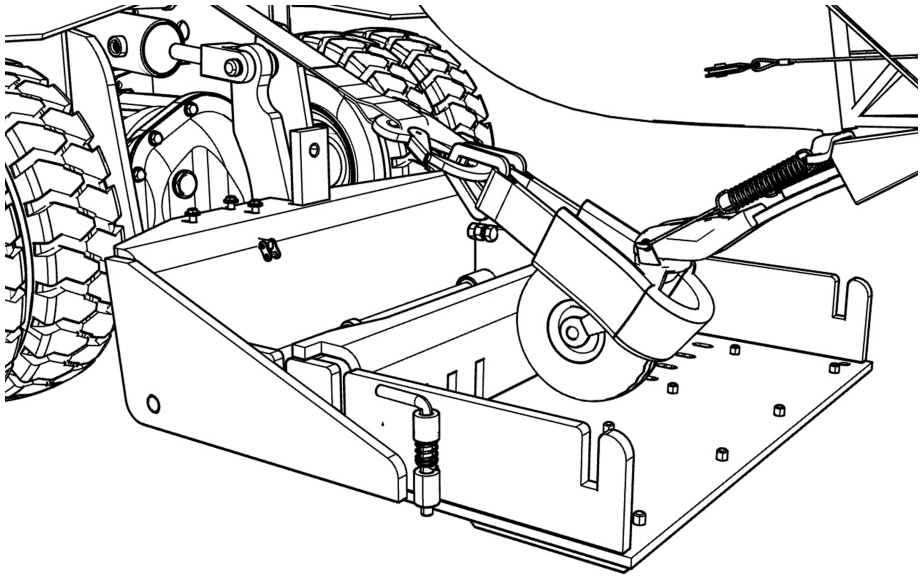
4.7 CONVENTIONAL (TAIL WHEEL) GEAR

On an aircraft with conventional (taildragger) landing gear, the tail wheel is offset from the pivot point where the tail wheel assembly attaches to the aircraft. This offset provides a natural caster effect that helps the pilot steer the aircraft while taxiing.



Steering a tail wheel aircraft is normally done using one of the following methods:

- **Differential braking:** This configuration allows the tail wheel to turn freely. The pilot steers the aircraft by pressing one brake pedal. For example, to turn left, the pilot will apply the left brake.
- **Rudder pedals:** This configuration links the tail wheel to the rudder pedals. The pilot steers the aircraft by pressing the rudder pedals. For example, to turn left, the pilot will step on the left rudder pedal. This configuration moves both the tail wheel and rudder at the same time.
- **Steering wheel:** This configuration is not common. It uses a dedicated steering wheel to turn the rudder pedals. The steering system is completely independent of the braking and rudder systems.

The method used to steer the aircraft is important, because a tail wheel that is linked to a steering system (rudder pedals or steering wheel) requires special care to avoid damaging the steering mechanism.

Additional caution is required when towing a taildragger aircraft, because of the close proximity of the elevator and rudder. This requires special precautions, such as installing the removable Extended Rear Gate to keep the aircraft far enough forward on the Cradle to prevent striking the tail assembly.

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4.7.1 STEP ONE: INSTALL THE EXTENDED REAR GATE

Determine whether sufficient clearance exists to prevent any portion of the elevator or rudder from touching the tractor during capture or any movement of the tractor during transport, including turns.

- If needed, install the removable Extended Rear Gate, as described in *"USING A REMOVABLE EXTENDED REAR GATE" on page 2-6*.
- If the removable Extended Rear Gate does not provide enough clearance, then follow the procedure described in *"LONG REACH & LOW CLEARANCE" on page 4-24*.

4.7.2 STEP TWO: ATTACH THE STRUT STRAP

To attach the Strut Strap:

1. Pay out the Winch Strap enough to attach one end of the Strut Strap.
2. Position the tractor by the aircraft aft of the tail wheel, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*.
   > If the tail wheel can spin freely, then proceed to Step 3.
   > If the tail wheel is linked to a steering system and cannot be released, then align the Winch Strap with the tail wheel so as to avoid putting sideways force on the strut during capture and towing.
3. Attach the Strut Strap to the aircraft landing gear as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.7.3 STEP THREE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle.
   > Continually monitor the winching operation to ensure that the tail assembly will not touch any portion of the tractor.

CAUTION

SOME TAILDRAGGER AIRCRAFT MAY NOT HAVE ADEQUATE CLEARANCE TO ALLOW TOWING WITH YOUR MODEL OF LEKTRO TRACTOR. IF YOU ARE UNCERTAIN, THEN INCREMENTALLY WINCH THE AIRCRAFT ONTO THE CRADLE WHILE CONTINUALLY MONITORING CLEARANCES.

Note

You may be able to gain extra vertical space between the elevator and the tractor by securing the flight control yoke or column in the full back position using the pilot seat belt, which raises the back of the elevator.

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> If the tail wheel begins to deflect sideways, then push the aircraft in the direction of the deflection to straighten the assembly as you winch the wheel on to the Cradle.

2. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.7.4 STEP FOUR: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

CAUTION

CONTINUALLY MONITOR CLEARANCES DURING TOWING, ESPECIALLY WHEN CROSSING ROUGH PAVEMENT OR DURING TURNS. YOU MAY NEED TO RESTRICT TURNS TO KEEP THE ELEVATOR AND / OR RUDDER CLEAR OF THE TRACTOR.

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4.8 LONG REACH & LOW CLEARANCE

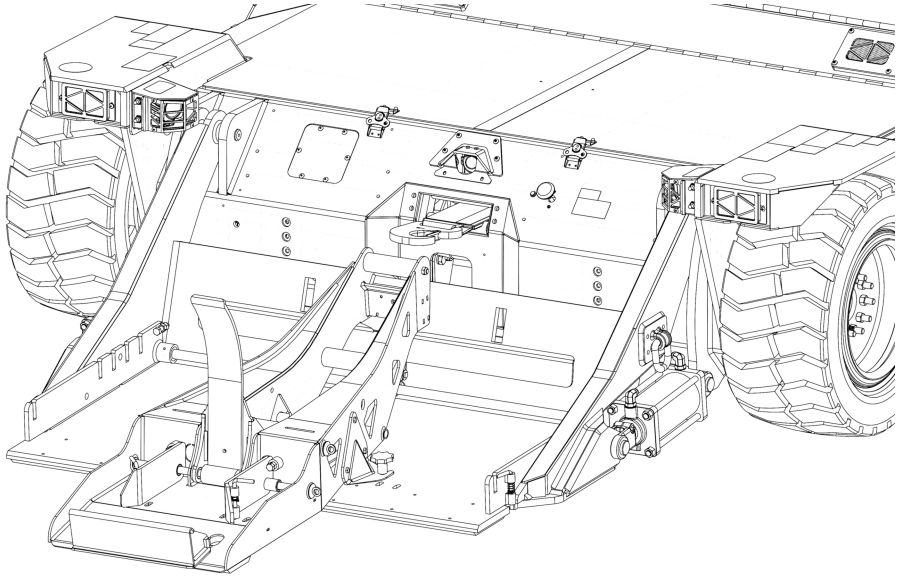
Note

This procedure is not applicable for 83 tractors.

This procedure applies to fixed-wing or helicopter aircraft that have a long reach to the nose wheel and / or restrictive propeller or fuselage clearance, such as:

- Augusta 109A
- Beechcraft-Raytheon TBM-700 MK II
- Dauphin AS365-366 (with radome)
- MU-2 Marquise
- Sikorsky S-76B
- taildragger aircraft with a long reach and low tail assembly / empennage that cannot be safely towed using the procedure described in *"CONVENTIONAL (TAIL WHEEL) GEAR" on page 4-21*.

The Long Reach Adapter accommodates single or dual aircraft nose wheels and provides the required Nose Landing Gear Door (NLG Door) clearance during capture and release.



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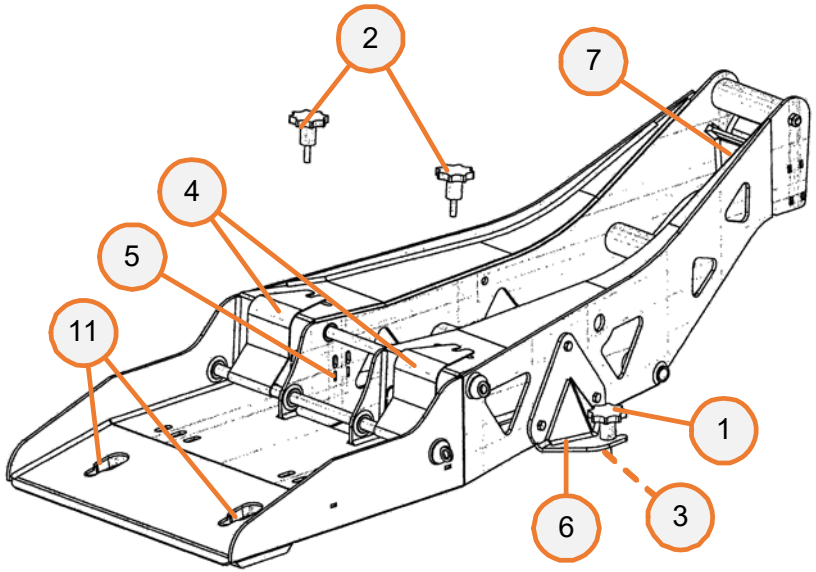
The Long Reach Adapter may be configured to tow specific aircraft nose landing gears before or after being installed on the tractor. It is manufactured of aluminum for ease of handling. See the *Operating Manual* for your tractor.



This part has the following components:

- **Anchor Knob Bolts (1):** Secure the adapter to the Cradle.
- **Anchor Shafts (2):** Secure the Hold-Back Brackets to the adapter.
- **Anchor Shaft Clips (3; *not shown*):** Secure the Anchor Shafts (2) to the adapter.
- **Dual-Wheel Hold-Back Brackets (4):** Serve as stops for dual aircraft wheels.
- **Single-Wheel Hold-Back Bracket (5; *not shown*):** Servers as a stop for a single aircraft wheel. Mounts in the center section indicated. See image on previous page.
- **Adapter Bracket (6):** Secures the adapter to the Cradle.
- **Adapter Sleeve (7):** Secures the adapter to the Cradle Adapter Post.
- **Adapter Sleeve Pin (8; *not shown)*:** Aligns the adapter over the Cradle Adapter Post.
- **Adapter Sleeve Clip (9; *not shown*):** Secures the Adapter Sleeve Pin.
- **Winch Limit Switch Plate (10; *not shown*):** This is installed by JBT LEKTRO, Inc. and cannot be configured by the tractor operator / owner.
- **Chock (11; *not shown*):** Helps hold the aircraft nose wheels against the Hold-Down Bracket. Mounts in the slots indicated.

CAUTION

NEVER USE THIS ADAPTER FOR AIRCRAFT TYPES OTHER THAN THOSE FOR WHICH IT WAS ORDERED AND CONFIGURED UNLESS JBT LEKTRO, INC. HAS REVIEWED AND APPROVED THE CONFIGURATION FOR USE WITH THESE AIRCRAFT TYPES, AS THIS COULD DAMAGE THE AIRCRAFT OR TRACTOR.

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Note

The Long Reach Adapter may be configured to provide specialized tail-drop towing for use in situations where a hangar door frame and / or roof beam overhead clearance is too low for the height of a specific aircraft type. See "TAIL DROP USING LONG-REACH ADAPTER" on page 4-49.

4.8.1 STEP ONE: CONFIGURE THE ADAPTER

If the Long Reach Adapter is already configured for the aircraft you are towing, then proceed to "STEP TWO: INSTALL THE ADAPTER" on page 4-27. Otherwise, configure the Long Reach Adapter as appropriate:

- **dual-wheel:** See "DUAL-WHEEL CONFIGURATION" on page 4-26.
- **single-wheel:** See "SINGLE-WHEEL CONFIGURATION" on page 4-26.

4.8.1.1 DUAL-WHEEL CONFIGURATION

To configure the Long Reach Adapter for towing aircraft with dual nose wheels:

1. If installed, remove the Single-Wheel Hold-Back Bracket.
   a. Remove the Anchor Shaft Clips from the ends of the Anchor Shafts.
   b. Pull the two Anchor Shafts out of the adapter.
   c. Remove the bracket.
2. If not already installed, install two Dual-Wheel Hold-Back Brackets.
   a. Insert the upper Anchor Shaft into the adapter.
   b. Place the two Dual-Wheel Hold-Back Brackets in position in the adapter.
   c. Thread the lower Anchor Shaft through the adapter and brackets.
   d. Secure the Anchor Shafts using the Anchor Shaft Clips.
   e. Thread the Anchor Knob Bolts through the brackets and into the adapter.
3. Slide the Dual-Wheel Hold-Back Brackets on the shaft as needed to match the tire tracks.
4. Tighten the Anchor Knob Bolts.

4.8.1.2 SINGLE-WHEEL CONFIGURATION

To configure the Long Reach Adapter for towing aircraft with a single nose wheel, you will need to install the Single-Wheel Hold-Down Bracket.

1. Remove the Anchor Shaft Clips from the ends of the Anchor Shafts.
2. Pull the two Anchor Shafts out of the adapter.
3. Place the Single-Wheel Hold-Back Bracket in position in the adapter.

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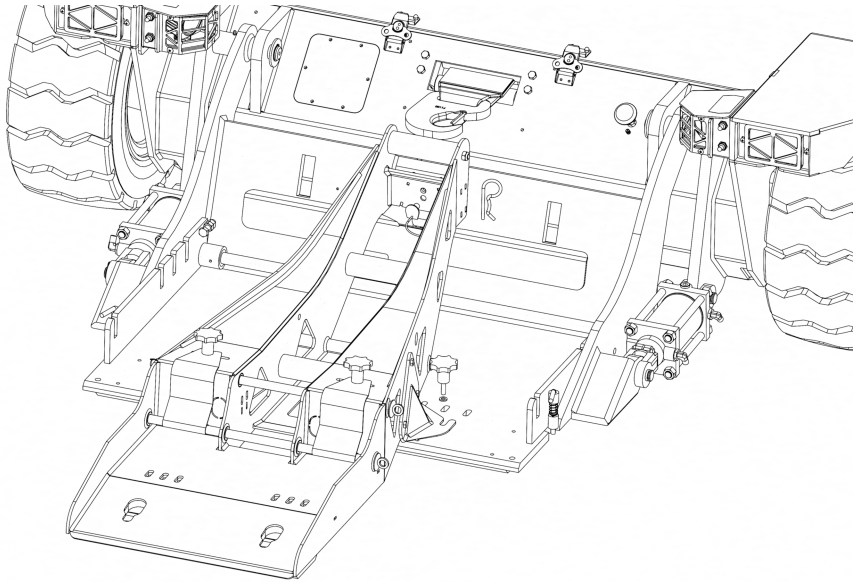
4. Thread the Anchor Shafts through the adapter and bracket(s).
5. Secure the Anchor Shafts using the Anchor Shaft Clip(s).

> **Note**
>
> *If installed, the Dual-Wheel Hold-Down Brackets may remain in place.*

4.8.2 STEP TWO: INSTALL THE ADAPTER

To install the Long Reach Adapter on the Cradle:

1. Adjust both Side Gates to their outermost positions, as described in *"USING THE SIDE GATES" on page 2-5*.
2. Extend the Cradle Adapter Post, as described in *"USING THE RETRACTABLE CRADLE ADAPTER POST" on page 2-8*.
3. Lift the adapter onto the Cradle.



4. Position the Adapter Sleeve directly over the Cradle Adapter Post.
5. Lower the adapter and align the holes in the sleeve with the hole in the hitch.
6. Insert the Adapter Sleeve Pin through the holes in the sleeve and the hitch, and secure it using the Adapter Sleeve Clip.
7. Insert one Adapter Bolt & Washer through each of the two Adapter Brackets, and tighten until snug.

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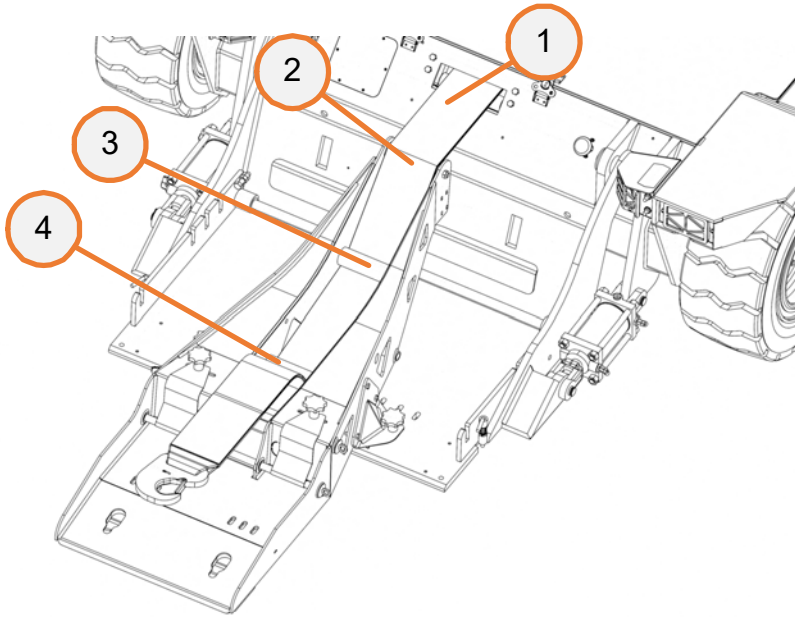
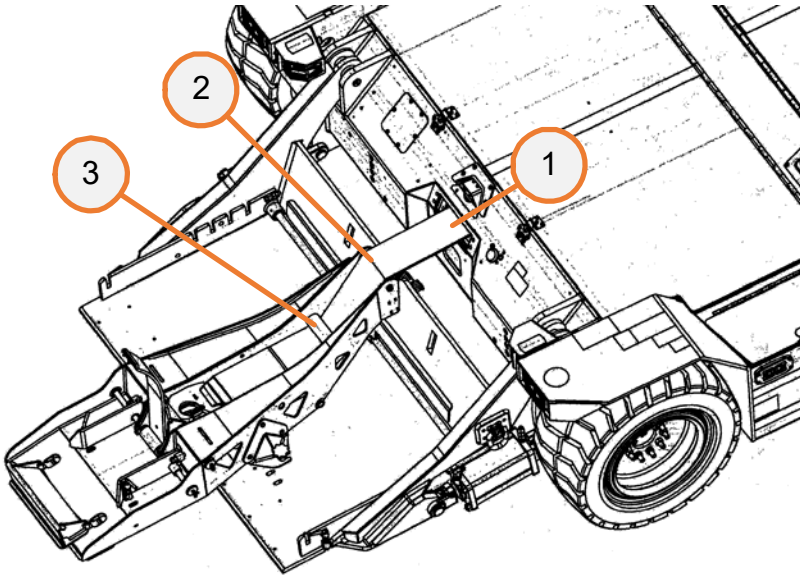
4.8.3 STEP THREE: ROUTE THE WINCH STRAP

Route the Winch Strap as follows:

- **Dual aircraft wheels:** Route the Winch Strap (1) over the Rear Adapter Roller (2), under the Middle Adapter Roller (3), and under the Front Adapter Roller (4).



- **Single aircraft wheel:** Route the Winch Strap (1) over the Rear Adapter Roller (2) and under the Middle Adapter Roller (3). Do not route it under the Front Adapter Roller (4).



4.8.4 STEP FOUR: ATTACH THE STRUT STRAP.

To attach the Strut Strap:

1. Extend the Winch Strap enough to attach one end of the Strut Strap.
2. Position the tractor by the aircraft forward of the nose wheel, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*.

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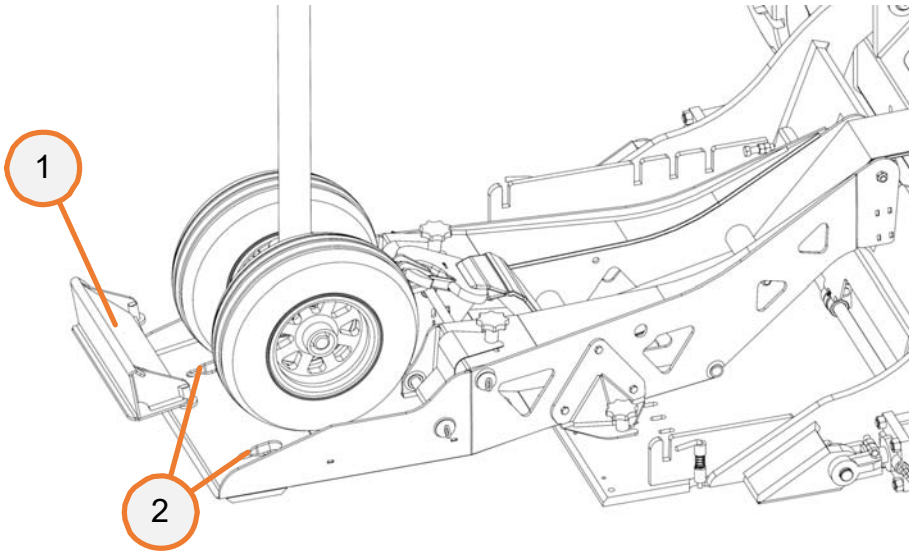
3. Attach the Strut Strap to the aircraft landing gear as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.8.5 STEP FIVE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle.
2. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.
3. Install the Wheel Chock (1) by sliding it on to the Key Slots (2) in the adapter.



The buttons on the bottom of the Wheel Chock are offset to provide two positions on the adapter.

a. Choose the best position to chock the aircraft wheel(s).

b. Place the two buttons into the Key Slots.

4.8.6 STEP SIX: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

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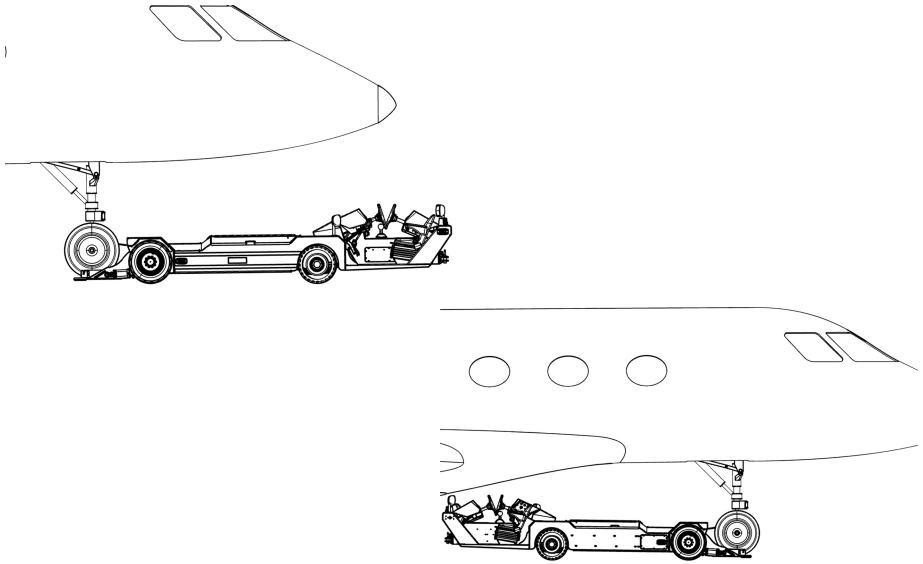
4.9 UNDERBELLY TRACTOR POSITIONING

Note

This procedure is not applicable for any of the stand-up LEKTRO tractors (83, 86, 87).

This procedure is only intended for use with a low-profile LEKTRO tractor (8800SD and 8850SD) when towing aircraft with sufficient fuselage-to-ground clearances to permit underbelly tractor positioning, where aircraft must be maneuvered in tight spaces, such as hangars. The tractor may be positioned either forward or aft of the nose wheel.



This procedure applies to the Gulfstream II, III, IV, V, and similarly-configured aircraft.

4.9.1 CAPTURE FORWARD OF NOSE WHEEL

Approach and capture the aircraft as described in *"APPROACHING THE AIRCRAFT" on page 3-4* and *"CAPTURING THE AIRCRAFT" on page 3-6*, respectively, being sure to also disconnect the torque links if the nose wheel turning limits may be exceeded at any time during the towing operation.

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4.9.2 CAPTURE AFT OF NOSE WHEEL

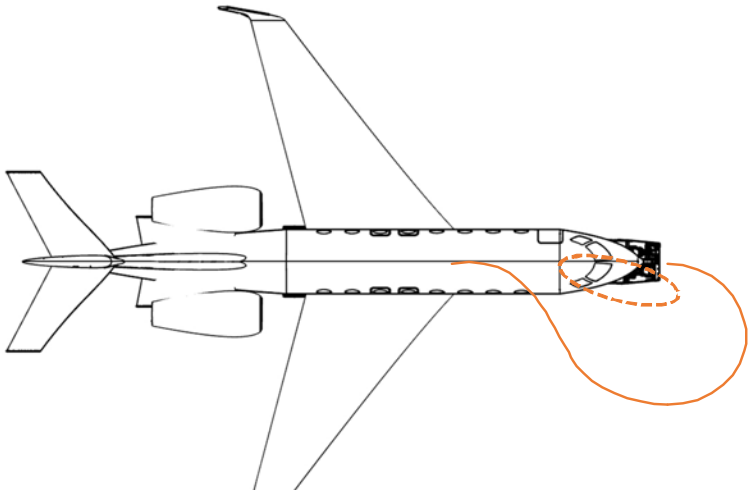
Approach and capture the aircraft as described in *"APPROACHING THE AIRCRAFT" on page 3-4* and *"CAPTURING THE AIRCRAFT" on page 3-6*, respectively, except as follows:

- Down-lock the landing gear to prevent collapse during towing.
- Verify that sufficient vertical clearance exists between all aircraft surfaces (including antennae and drain masts) and the tractor to allow safe tractor positioning and aircraft towing.
- Disconnect the torque links if the nose wheel turning limits may be exceeded at any time during the towing operation.
- When approaching the aircraft:
  - > Move the tractor at walking speed.
  - > Maneuver the tractor under the aircraft.
  - > Approach the nose wheel in line with the direction the tire is pointing.

4.9.3 DUAL FORWARD / AFT REPOSITIONING DURING TOW

This procedure repositions the tractor in either of the following ways when halfway through a turn:

- From forward to aft of the aircraft nose wheel.
- From aft to forward of the aircraft nose wheel.



This procedure:

- Stops the aircraft halfway through the turn.
- Requires slightly less space to accomplish than the single-motion turn described in *"SINGLE FORWARD / AFT REPOSITIONING DURING TOW" on page 4-32*.
- Requires the aircraft to be stopped and put into motion with the towing force occurring at 90 degrees to the aircraft centerline.

To perform this maneuver:

1. Ensure that adequate precautions have been taken to down-lock the landing gear to prevent collapse.
2. Ensure that the torque links have been disconnected and that the aircraft nose wheel is free to rotate through 360 degrees.

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3. When sufficient space is available to safely execute the turn, turn the tractor Steer Wheels fully in the desired direction of the turn.
4. Monitor Winch Strap tension during the turn, and extend or retract the strap as required.

CAUTION

WINCH STRAP TENSION WILL CHANGE DURING THE TURN WHEN TOWING AIRCRAFT WITH A SLANTED NOSE WHEEL STRUT (SUCH AS GULFSTREAM III, IV, AND V AIRCRAFT) WHERE THE STRUT STRAP CANNOT BE SECURED VERTICALLY ABOVE THE NOSE WHEEL. THIS MAY CAUSE THE AIRCRAFT TO BECOME IMPROPERLY SECURED AND MAY ALSO DAMAGE THE NOSE WHEEL STRUT ASSEMBLY.

5. Stop the tractor when it has pivoted to a position 90° to the aircraft fuselage centerline.
6. Move the Direction Selector to the opposite direction.
   > If in FORWARD, move to REVERSE.
   > If in REVERSE, move to FORWARD.
7. Turn the tractor Steer Wheels fully in the opposite direction of the turn that you selected in Step 3.
   > If space is at a premium toward the side of the aircraft where the tractor will be turning, then position the aircraft nose toward the opposite side before commencing the turn.
   > If you are unable to position the aircraft nose to complete the turn, then you may need to proceed by making several forward / aft maneuvers.

CAUTION

ALWAYS STATION WING WALKERS AND OTHER SIGNALING PERSONNEL TO MONITOR CLEARANCE WHEN MANEUVERING IN TIGHT SPACES, TO HELP PREVENT COLLISIONS.

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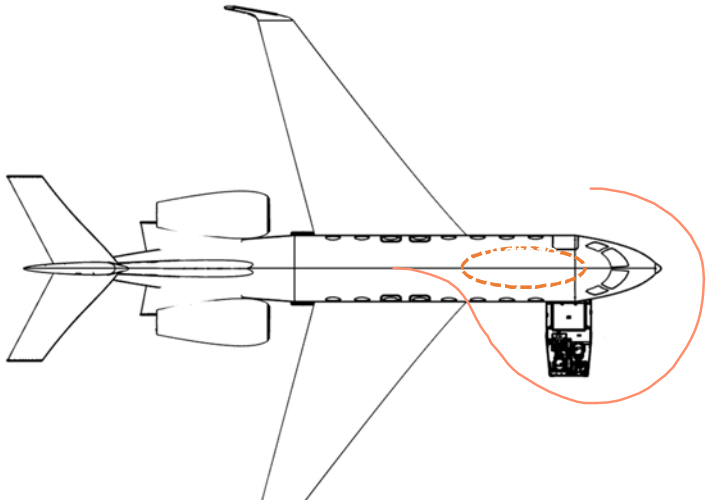
4.9.4 SINGLE FORWARD / AFT REPOSITIONING DURING TOW

This procedure repositions the tractor in either of the following ways during a single continuous turn:

- From forward to aft of the aircraft nose wheel.
- From aft to forward of the aircraft nose wheel.



This procedure:

- Turns the aircraft in a smooth arc.
- Requires space to both turn the tractor and accommodate aircraft yaw during the turn.
  - > The aircraft nose yaws in the direction of the tractor.
  - > The aircraft tail yaws in the opposite direction of the tractor.

The large amount of space required for this procedure is best suited for outdoor areas with adequate apron clearance.

To perform this maneuver:

1. Ensure that adequate precautions have been taken to down-lock the landing gear to prevent collapse.
2. Ensure that the torque links have been disconnected and that the aircraft nose wheel is free to rotate through 360°.
3. When sufficient space is available to safely execute the turn, turn the tractor Steer Wheels fully in the desired direction of the turn.
4. Monitor Winch Strap tension during the turn, and extend or retract the strap as required.

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CAUTION

WINCH STRAP TENSION WILL CHANGE DURING THE TURN WHEN TOWING AIRCRAFT WITH A SLANTED NOSE WHEEL STRUT (SUCH AS GULFSTREAM III, IV, AND V AIRCRAFT) WHERE THE STRUT STRAP CANNOT BE SECURED VERTICALLY ABOVE THE NOSE WHEEL. THIS MAY CAUSE THE AIRCRAFT TO BECOME IMPROPERLY SECURED AND MAY ALSO DAMAGE THE NOSE WHEEL STRUT ASSEMBLY.

5. Stop the tractor when it has pivoted a full 180° to the aircraft fuselage centerline.
6. Move the Direction Selector to the opposite direction.
   > If in FORWARD, move to REVERSE.
   > If in REVERSE, move to FORWARD.
7. Continue the towing maneuver.

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4.10 PAWL ADAPTER

Note

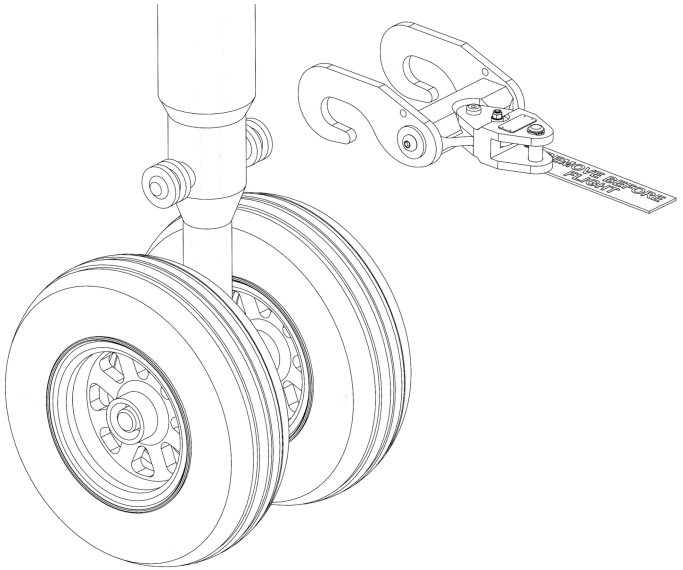
This procedure is only applicable for the LEKTRO 8650 and larger tractors. It is not applicable for 83 or 8600 tractors.

Some aircraft require the use of a Pawl Adapter instead of the Strut Strap in order to meet certification requirements, make the capture process easier, and / or protect sensitive nose landing gear components against accidental contact and possible damage. Two capture methods are available when using a Pawl Adapter:

- **Standard method:** This method may be used with a variety of aircraft, including but not limited to the ERJ-135 / 140 / 145 and Phenom 100 / 300, Falcon 50 / 900 / 2000 / 7X / 8X, Hercules C-130, Boeing 727 / 737 / 757, and Airbus 220 / 318-321. These aircraft do not have any front protrusions that require the use of a fixed or removable Extended Rear Gate. See *"STANDARD PAWL ADAPTER METHOD" on page 4-34*.
- **Special method:** This method requires a fixed or removable Extended Rear Gate because of front protrusions that could otherwise contact the tractor, such as the DHC-8 (also called the Dash-8; all series), and ATR-42 / 52 / 72 / 82. This method may also be used to improve ergonomics for aircraft such as the B-737 (all series). See *"SPECIAL PAWL ADAPTER METHOD" on page 4-36*.

4.10.1 STANDARD PAWL ADAPTER METHOD

Use this method when towing aircraft that do not have front protrusions that could contact the tractor and where there is adequate clearance to easily connect and disconnect the Pawl Adapter.



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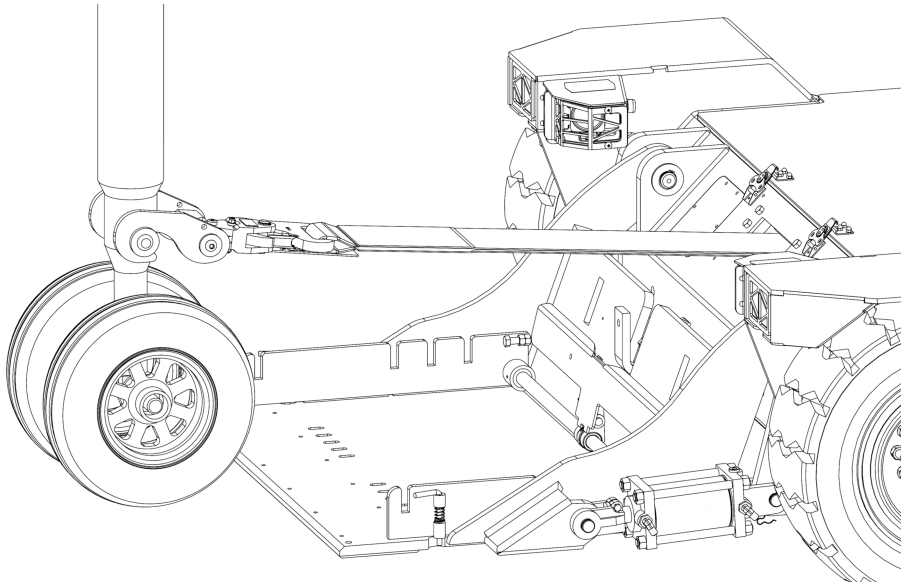
4.10.1.1 STEP ONE: ATTACH THE PAWL ADAPTER

To install the Pawl Adapter:

1. Extend the Winch Strap enough to attach one end of the Pawl Adapter.
2. Position the tractor by the aircraft forward of the nose wheel, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*.
3. Attach the Pawl Adapter to the aircraft nose gear pawl, as shown here.



4.10.1.2 STEP TWO: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle, being sure to monitor the aircraft nose wheel to ensure that any protrusions remain well clear of the Cradle and tractor body.

CAUTION

IF YOU ARE TOWING AN ATR AIRCRAFT, THEN YOU MUST USE A TRACTOR EQUIPPED WITH A MULTI-LEVEL AIRCRAFT PROTECTION SYSTEM THAT INCLUDES AN ATR OPTION. NEVER SELECT ANY OTHER LEVEL WHEN TOWING AN ATR AIRCRAFT.

2. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.10.1.3 STEP THREE: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft, as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

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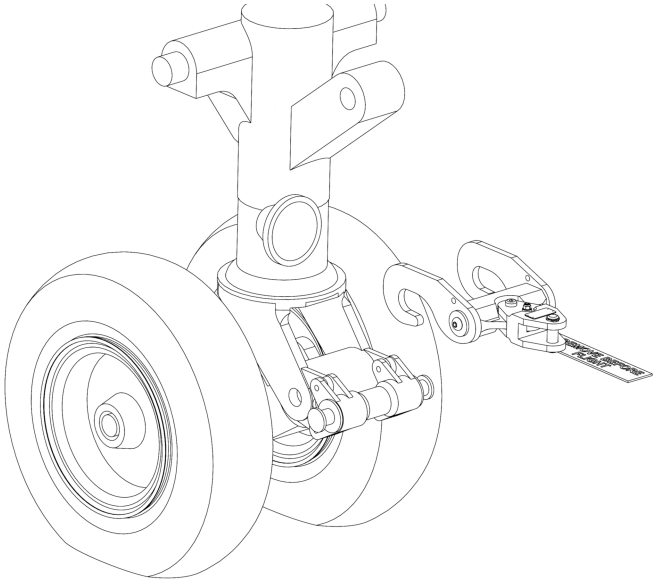
4.10.2 SPECIAL PAWL ADAPTER METHOD

Use this method when towing aircraft that include front protrusions that could contact the tractor, and / or where there is limited clearance in which to connect and disconnect the Pawl Adapter.



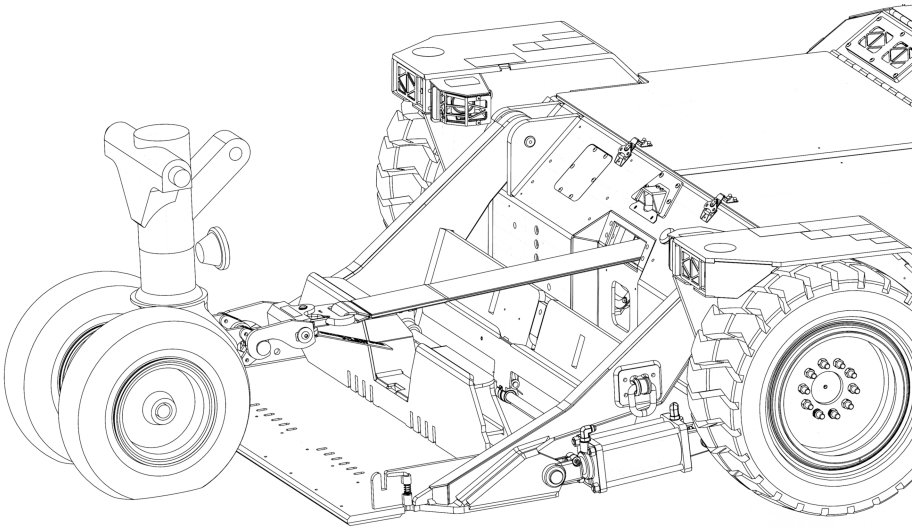
4.10.2.1 STEP ONE: INSTALL THE EXTENDED REAR GATE

This towing method requires the fixed or removable Extended Rear Gate to ensure clearance between the aircraft front protrusions and the Cradle or tractor body. If the tractor is not equipped with a fixed Extended Rear Gate, then install the removable Extended Rear Gate, as described in *"USING A REMOVABLE EXTENDED REAR GATE" on page 2-6*.

4.10.2.2 STEP TWO: ATTACH THE PAWL ADAPTER

To install the Pawl Adapter:

1. Extend the Winch Strap enough to attach one end of the Pawl Adapter.
2. Position the tractor by the aircraft forward of the nose wheel, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*.
3. Attach the Pawl Adapter to the aircraft nose gear pawl, as shown here.



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4.10.2.3 STEP THREE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle, being sure to monitor the aircraft nose wheel to ensure that any protrusions remain well clear of the Cradle and tractor body.
2. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.10.2.4 STEP FOUR: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

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4.11 PINTLE HOOK

Note

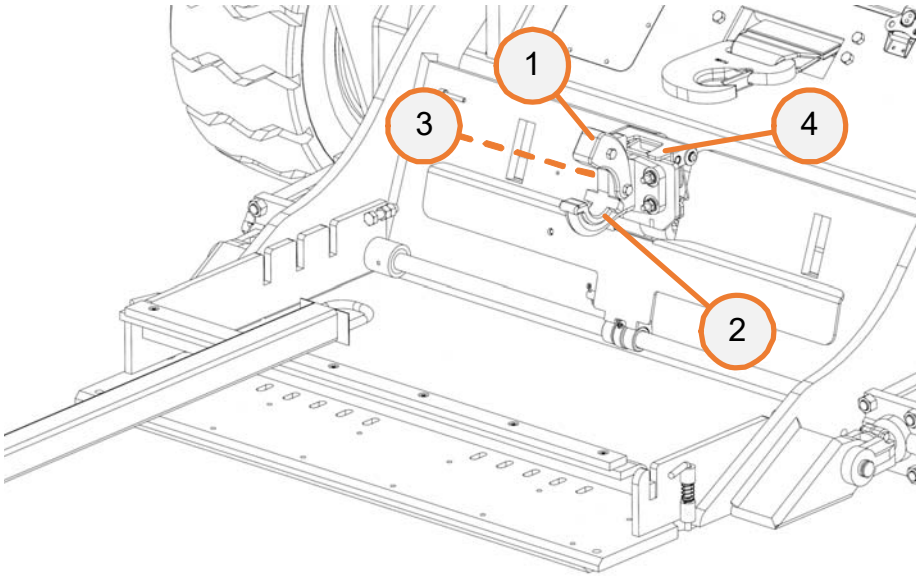
This procedure is not applicable for 83 tractors. JBT LEKTRO, Inc. does not sell Tow Bars.

The Pintle Hook performs utility towing functions, such as moving air conditioning units, ground power units, lavatory servicing carts, or tub carts. It may also be used for towing aircraft with a Tow Bar.

Your tractor may be equipped with either or both of these optional Pintle Hook configurations:

- Portable Pintle Hook Adapter that mounts on the Cradle Adapter Post.
- Fixed Pintle Hook bolted to the center of the tractors rear frame.

The Pintle Hook or Pintle Hook Adapter appears as follows:



This part has the following components:

- **Upper Jaw (1):** Movable upper jaw.
- **Lower Jaw (2):** Fixed bottom jaw.
- **Safety Pin (3; *hidden*):** Prevents the Upper Jaw (1) from accidentally releasing the Tow Bar.
- **Backing Plate (4):** Pintle Hook Adapter only; secures the adapter to the Cradle Adapter Post.

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4.11.1 STEP ONE: INSTALL FRONT GATE & PINTLE HOOK ADAPTER

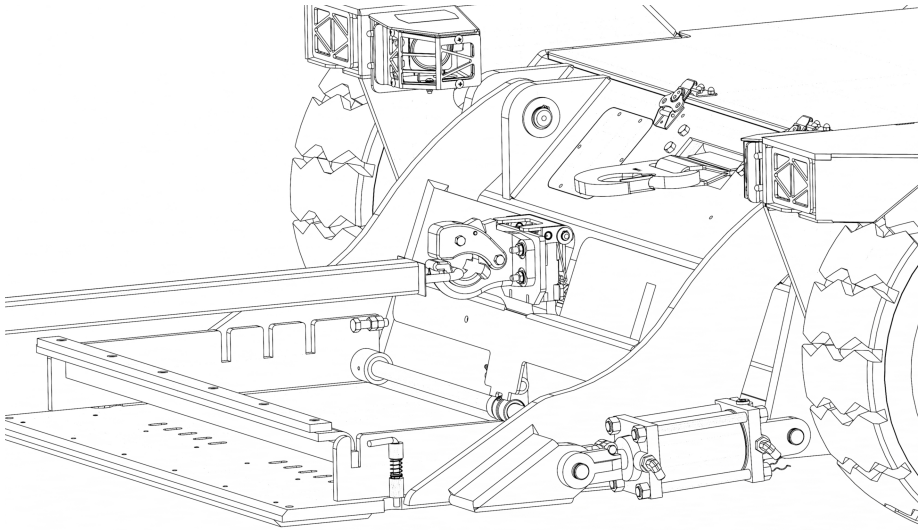
If the tractor is not equipped with a rear Pintle Hook, or if you need to install the Front Gate and Pintle Hook Adapter:

1. Install the Front Gate, as described in *"USING A REMOVABLE FRONT GATE" on page 2-7*.
2. If equipped, extend the Cradle Adapter Post. See *"USING THE RETRACTABLE CRADLE ADAPTER POST" on page 2-8*.
3. Hold the Backing Plate down.
4. Slide the Pintle Hook Adapter on to the Cradle Adapter Post.
5. Release the Backing Plate.

4.11.2 STEP TWO: ATTACH THE TOW BAR

To open and close either the front Pintle Hook Adapter or rear Pintle Hook:

1. Remove the Safety Pin from the Upper Jaw.
2. Unlock and raise the Upper Jaw to its fully open and locked position.
3. Place or remove the Tow Bar eye on the Lower Jaw.
4. Unlock and lower the Upper Jaw, and make sure that it locks in place.
5. Install the Safety Pin.



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4.11.3 STEP THREE: COMPLETE THE TOWING MANEUVER

When towing or pushing either the rear-mounted Pintle Hook or front-mounted Pintle Hook Adapter, be aware that the rear placement of the Steer Wheels will create rapid and large swinging movements when turning, and use only small and gradual steering inputs.

Further, bear in mind that using a Tow Bar places zero aircraft weight on the Cradle, making the tractor a relatively light vehicle. This reduces pull, traction, and braking effect compared to towing the same aircraft on the Cradle. Thus, the aircraft weight limit for Pintle Hook towing is restricted to the Zero Cradle Load limit for the current traction conditions.

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4.12 CHALLENGER CL 600 / 601 / 604 AIRCRAFT

Note

This procedure is not applicable for 83 tractors.

When towing a Challenger CL 600 / 601 / 604 aircraft, always place the Strut Strap on the shiny part of the oleo strut below the lip on the upper barrel.

Placing the Strut Strap higher can cause the strap to contact the Centering Proximity Switch on the aircraft nose gear, which can cause an erroneous reading that prevents nose wheel retraction.

DANGER

A MISALIGNED CENTERING PROXIMITY SWITCH THAT CAUSES THE NOSE WHEEL TO NOT RETRACT ON TAKEOFF WILL CAUSE AN IN-FLIGHT EMERGENCY.

Aside from this precaution, tow this aircraft type as described in *"GENERAL TOWING PROCEDURE" on page 3-1*.

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4.13 FALCON 10 / 100 AIRCRAFT

Dassault Falcon-10 or -100 series aircraft have a single 17 1/2" nose wheel with a protruding front knuckle and trailing arm strut configuration. To tow this aircraft:

- Use the fixed or removable Extended Rear Gate with Fill Plate installed in the furthest-out position, as described in *"USING A REMOVABLE EXTENDED REAR GATE" on page 2-6* and *"CENTER FILL PLATE" on page 2-7*. This provides adequate clearance between the nose gear lower arm and the top of the gate.
- The resulting tire position on the Cradle prevents use of the Front Gate, but performing all of the other procedures described in *"CAPTURING THE AIRCRAFT" on page 3-6* will ensure a secure capture.
- In some rare instances, excessive aircraft nose weight or strut piston decompression may position the lower strut arm downward and reduce the clearance to the Extended Rear Gate to the point where normal aircraft bounce range may result in contact. If this occurs, you may need to use the smaller Extended Rear Gate and / or move the aircraft slowly and cautiously while avoiding abrupt Accelerator Pedal / Motor Control Lever application when the main gear is against any resistance, such as hangar door tracks.
- If the aircraft nose wheel starts to climb the small Extended Rear Gate, then immediately stop, pull the aircraft clear, and then recapture the nose wheel while making sure not to over-tighten the Winch Strap. Resume the tow and try either a different push path angle or pulling the aircraft over obstructions.

Note

The short Winch Strap length beyond the fairlead with a captured Falcon-10 provides exigency retention of the aircraft in event the nose wheel does climb the small Extended Rear Gate.

To tow a Falcon-10 or -100:

1. Move both Side-Gates to their innermost positions before installing either the small or large removable Extended Rear Gate with Fill Plate, as described in *"USING A REMOVABLE EXTENDED REAR GATE" on page 2-6*. Install this gate in the furthest-out set of Side Gate slots.
2. Capture the aircraft, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*. Do not over-tighten. Always adjust Winch Strap tension after lifting the Cradle.
3. Complete the towing operation, as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*. When pushing the aircraft, proceed with extra caution when encountering hangar door tracks, drain sumps, or any other roll-resistance, being sure to closely monitor the nose wheel reaction.

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4.14 LEARJET 40 / 45 / 70 / 75 AIRCRAFT WITH PEP MODIFICATION

Note

This procedure is not applicable for 83 tractors.

This section describes how to tow Lear 40 / 45 / 70 / 75 aircraft that have a retrofit nose gear squat switch. The actuator rod on this switch extends from the nose gear lower barrel to the upper strut barrel, alongside the oleo strut. These aircraft will be damaged if towed using the normal LEKTRO Strut Strap installation around the oleo strut. Towing this aircraft requires using the Learjet 40 / 45 / 70 / 75 Yoke Adapter.

CAUTION

THIS PROCEDURE ONLY APPLIES TO LEARJET 40 / 45 / 70 / 75 AIRCRAFT. USING THIS PROCEDURE ON ANY OTHER LEAR AIRCRAFT RISKS CAUSING THE NOSE WHEEL TO CLIMB ON TO THE FRONT DECK OF THE TRACTOR DURING TOWING, WHICH MAY DAMAGE THE AIRCRAFT AND / OR TRACTOR.

4.14.1 STEP ONE: INSTALL THE HOOP ADAPTER

To install the hoop Hold-Down Adapter:

1. If equipped, extend the Cradle Adapter Post. See *"USING THE RETRACTABLE CRADLE ADAPTER POST" on page 2-8*.
2. Retract the spring-loaded latch on the back of the hoop Hold-Down Adapter by pulling the Latch Pin away from the adapter body.
3. Insert the Cradle Adapter Post into the sleeve on the hoop Hold-Down Adapter, and align the hole in the sleeve with the Latch Pin.
4. Release the spring-loaded latch to lock the adapter on the hitch, and the pull up on the adapter to verify that it is secured in place.

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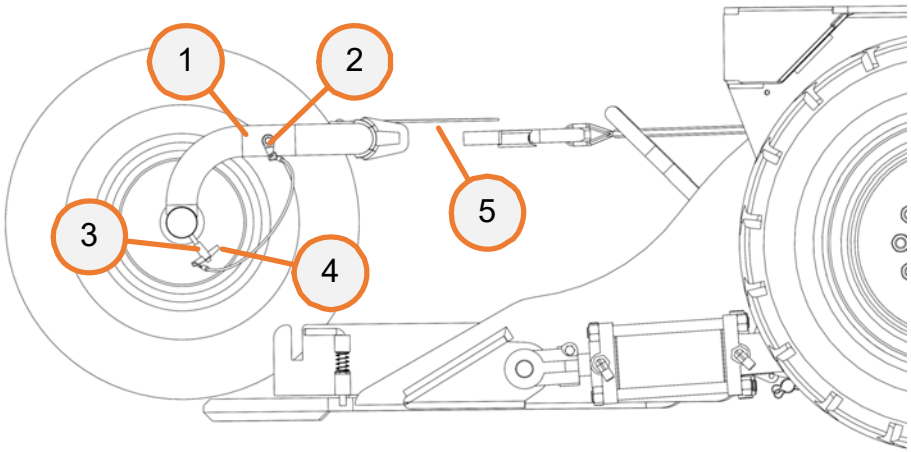
4.14.2 STEP TWO: INSTALL THE YOKE ADAPTER

The Lear 40 / 45 / 70 / 75 Yoke Adapter appears as follows:



This part has the following components:

- **Adapter Body (1):** Main body of the adapter.
- **Fixed Connection Pin (2):** Connects the adapter to the aircraft.
- **Sliding Connection Pin (3):** Connects the adapter to the aircraft.
- **Quick Disconnect Pin (4):** Secures the Sliding Connecting Pin in position.
- **Eye (5):** Connects the adapter to the Winch Hook on the tractor.

To install the Lear 40 / 45 / 70 / 75 Yoke Adapter on the aircraft:

1. Remove the Quick Disconnect Pin from the Adapter Body, and then move the Sliding Connection Pin to its outer position.
2. Align the Fixed Connecting Pin with the left side of the aircraft nose wheel hub, and then insert it into the axle lug-hole.
3. Align the Sliding Connection Pin with the right side of the aircraft nose wheel hub, and then fully insert it into the axle lug hole.
4. Replace the Quick Disconnect Pin in the Adapter Body.
5. Gently lower the attached Lear 40 / 45 / 70 / 75 Yoke Adapter to the ground.

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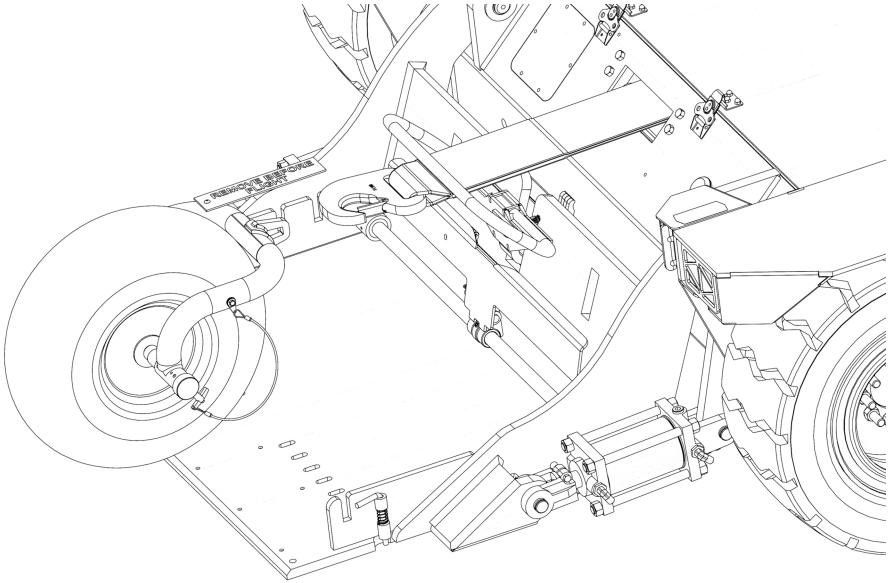
4.14.3 STEP THREE: ROUTE & ATTACH THE WINCH STRAP

To route and install the Strut Strap:

1. Position the tractor by the aircraft forward of the nose wheel, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*, except stop approximately 4" (10 cm) from the forward edge of the Lear 40 / 45 / 70 / 75 Yoke Adapter.
2. Route the Winch Strap through the center opening of the hoop Hold-Down Adapter.



3. Extend the Winch Strap enough to attach the Winch Hook to the Eye on the adapter.
4. Connect the Winch Hook to the Eye on the adapter.
5. Retract the Winch Strap to remove all slack.

4.14.4 STEP FOUR: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle, being sure that the Hold-Down Adapter is containing the nose wheel.
2. Adjust both Side Gates on the Cradle inward to contain the nose wheel tire, leaving between ½" and 1" (1 and 2.5 cm) clearance between the Side Gates and the aircraft tire. See *"USING THE SIDE GATES" on page 2-5*.
3. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.14.5 STEP FIVE: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

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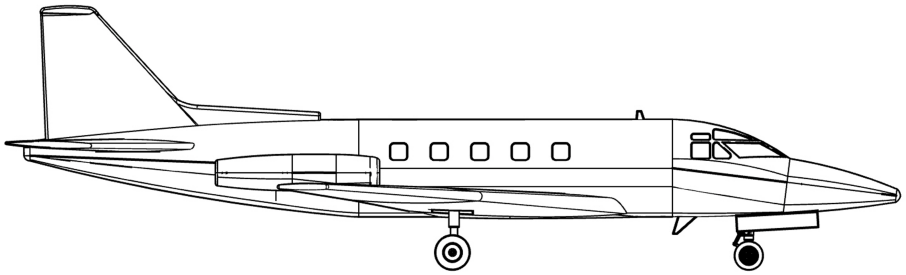
4.15 SABRELINER AIRCRAFT

Note

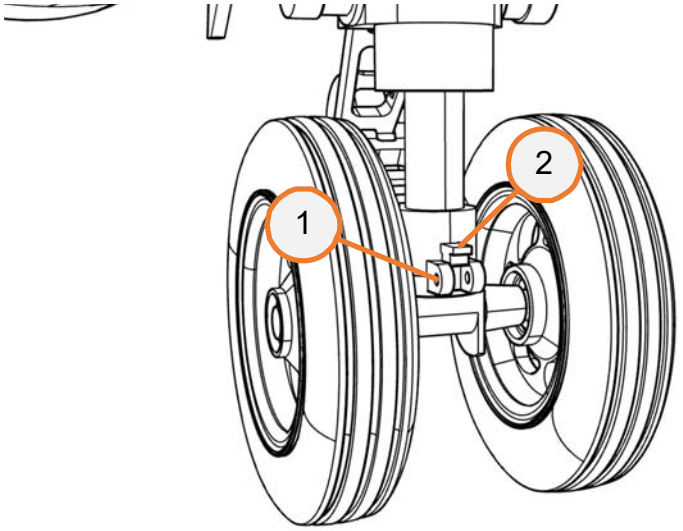
This procedure is not applicable for 83 tractors.

This procedure applies to Sabreliner 65 / 75A / 80 and derivative models.



The Sabreliner nose gear strut shown below has the following components:

- **Nose Gear Steering Collar Brackets (1):** Used to attach the Sabreliner Tow Bar.
- **Steering Lock Lever (2):** This spring-loaded lever disconnects the nose gear from the steering mechanism when pushed upward. When disconnected, the aircraft nose wheel is free to rotate through 360°.



CAUTION

IF THE STEERING LOCK LEVER IS NOT DISENGAGED, THEN THE NOSE WHEEL CANNOT TURN FREELY, WHICH MAY DAMAGE THE STEERING SYSTEM.

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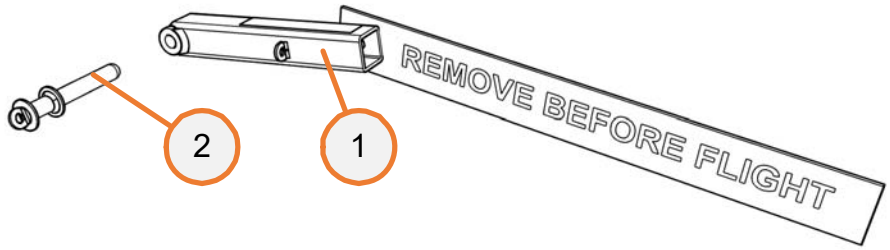
The Sabreliner Tow Bar appears as follows:



This part has the following components:

- **Sabreliner Tow Bar (1):** Connects the aircraft nose gear to the Winch Hook.
- **Securing Pin (2):** Secures the Sabreliner Tow Bar to the Nose Gear Steering Collar Brackets. This pin is wired to the tow bar to prevent loss.

4.15.1 STEP ONE: INSTALL THE SABRELINER TOW BAR

To install the Sabreliner Tow Bar:

1. Hold the Sabreliner Tow Bar by the shank at an angle of approximately 45° below horizontal.
2. Insert the lug end of the Sabreliner Tow Bar between the Nose Gear Steering Collar brackets.
3. Push the Steering Lock Lever aft and upward until the lug hole in the Sabreliner Tow Bar is aligned with the holes in the Nose Gear Steering Collar Brackets.
4. Insert the Securing Pin through the holes in the brackets and tow bar until fully seated.
5. The aircraft steering system is now ready for towing with 360° of freedom.

4.15.2 STEP TWO: ATTACH THE WINCH STRAP

To attach the Winch Strap:

1. Pay out the Winch Strap enough to attach the Winch Hook to the Sabreliner Tow Bar.
2. Position the tractor by the aircraft forward of the nose wheel, as described in *“APPROACHING THE AIRCRAFT” on page 3-4*.
3. Attach the Winch Strap Hook to the Sabreliner Tow Bar.

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4.15.3 STEP THREE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle.
2. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.15.4 STEP FOUR: TRANSPORT THE AIRCRAFT

Transport the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

4.15.5 STEP FIVE: RELEASE THE AIRCRAFT

To release the aircraft:

1. Release the aircraft, as described in *"RELEASING THE AIRCRAFT" on page 3-17*.
2. Withdraw the tractor until clear of the aircraft.
3. Chock the aircraft wheels and / or set the aircraft parking brake.
4. Remove the Securing Pin, and then remove the Sabreliner Tow Bar.
5. Verify that the Nose Gear Steering Lock Lever is fully forward in the engaged position on the nose wheel steering collar.

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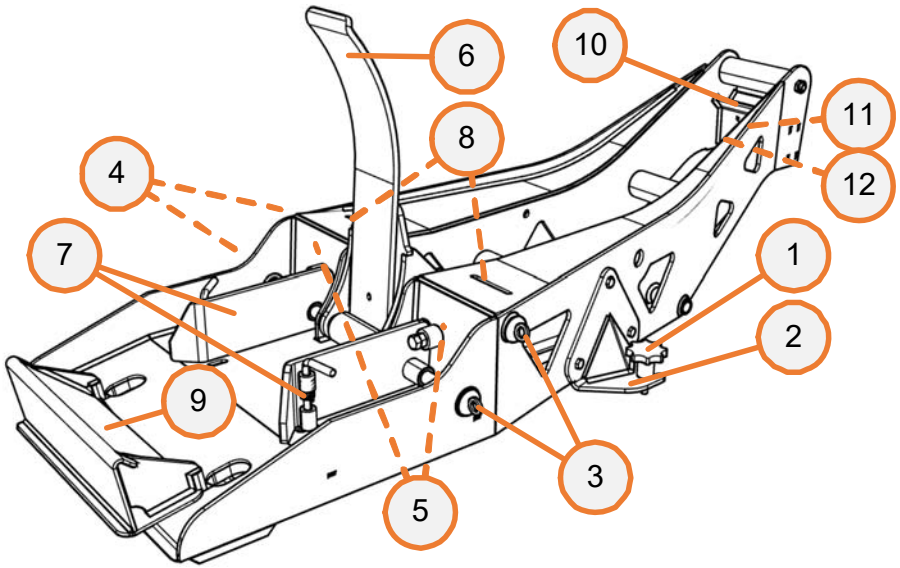
4.16 TAIL DROP USING LONG-REACH ADAPTER



Note

This procedure is not applicable for 83 tractors.

The Long Reach Adapter can provide specialized tail-drop towing in situations where hangar door frame and / or roof beam overhead clearances are too low for the tail height of a specific aircraft. This adapter has the following capacities:

- **86 / 87:** Nose wheel weight capacity of up to 3,200 lbs (1,451 kg) and can lift the aircraft nose wheel up to 16 3/8” (41.6 cm) when the Cradle is raised all the way
- **88 / 89:** Nose wheel weight capacity of up to 3,200 lbs (1,451 kg) and can lift the aircraft nose wheel up to 17 3/8” (44.1 cm) when the Cradle is raised all the way.

This lowers the aircraft tail by an amount that varies by specific aircraft model, based on the calculated Tail Drop Ratio ratio for that aircraft model. See the *Operating Manual* for your tractor for weight capacities and maximum lift distances by LEKTRO tractor model.

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This part has the following components:

- **Anchor Knob Bolts and Washers (1):** Secure the adapter to the Cradle.
- **Adapter Brackets (2):** Secure the adapter to the Cradle.
- **Anchor Shafts (3):** Secure the Hold-Back Brackets to the adapter.
- **Anchor Shaft Clips (4):** Secure the Anchor Shafts (2) to the adapter.
- **Dual-Wheel Hold-Down Brackets (5; *not shown*):** Hold dual nose wheels against the adapter during raising while providing adequate landing gear door clearance, and are aircraft-specific.
- **Single-Wheel Hold-Down Bracket (6):** Holds a single nose wheel against the adapter during raising while providing adequate landing gear door clearance, and is aircraft-specific.
- **Side Gates (7):** Used to steady the landing gear when towing a single-wheel aircraft.
- **Adapter Bolts & Washers (8; *not shown*):** Secure the Dual-Wheel Hold-Down Brackets to the adapter.
- **Chock (9):** Helps hold the aircraft nose wheels against the Hold-Down Bracket.
- **Adapter Sleeve (10):** Secures the adapter to the Cradle Adapter Post.
- **Adapter Sleeve Pin (11; *not shown)*:** Aligns the adapter over the Cradle Adapter Post.
- **Adapter Sleeve Clip (12; *not shown*):** Secures the Adapter Sleeve Pin.

> **Note**
>
> *The Long Reach Adapter may be configured to provide towing for aircraft with long reaches and / or low clearances between the aircraft nose and nose wheel. See "LONG REACH & LOW CLEARANCE" on page 4-24.*

> **Note**
>
> *You may also use a High-Lift Adapter for tail-drop operations. See "TAIL DROP USING HIGH-LIFT ADAPTER" on page 4-57.*

4.16.1 STEP ONE: CALCULATE TAIL DROP AMOUNT

To calculate the maximum amount of tail drop for a specific aircraft:

1. Obtain the following measurements:
   > **Distance A:** Horizontal distance from main landing gear (ground pitch pivot point) to the highest point on the tail.

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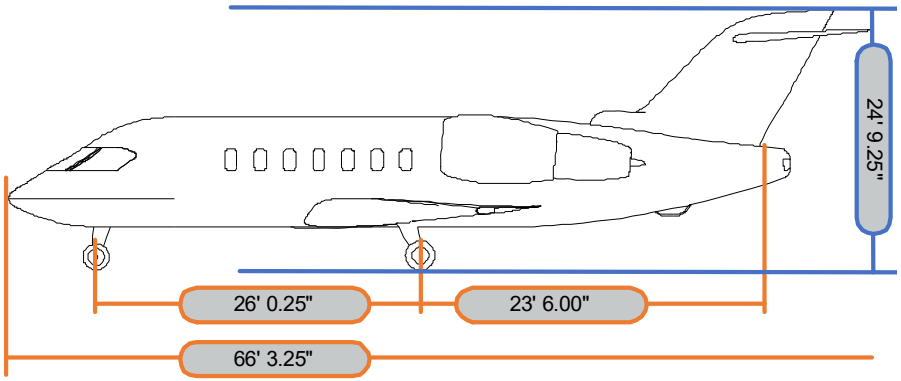
> **Distance B:** Horizontal distance from nose landing gear (ground steering point) to the main landing gear (the wheelbase).

2. Divide Distance A by Distance B to obtain the Tail-Drop Ratio.
3. Multiply the amount of nose wheel lift by the Tail-Drop Ratio to obtain the maximum amount of tail drop for that aircraft.

For example:



In this example:

- **Distance A** is 23 feet, 6 inches, or 282” (716.3 cm).
- **Distance B** is 26 feet, 0.25 inches, or 312 1/4” (312.25” or 793.1 cm).
- **Tail Drop Ratio** is 312.25 / 282 = 1.10727.

Note

Many aircraft have a Tail Drop Ratio greater than 1.

In this example:

- **Maximum Nose Lift** is 17 3/8” (17.375” or 44.1 cm).
- **Maximum Tail Drop** is 17.375 * 1.10727, or approximately 19” (48.2 cm).
- **Dropped Tail Height** is 297 1/4” - 19” = 278 1/2” (23’ 2 1/4” or 707.4 cm).

JBT LEKTRO, Inc. can provide the Tail Drop Ratio for any aircraft type to a customer upon request. See the *Operation Manual* for your tractor for information on how to contact JBT LEKTRO, Inc.

CAUTION

THIS CALCULATION PROVIDES THE THEORETICAL MAXIMUM TAIL DROP. THE ACTUAL TAIL DROP DISTANCE THAT CAN BE ACHIEVED VARIES BASED ON THE AIRCRAFT CENTER OF GRAVITY AND UNDERCARRIAGE CONDITION AT THE TIME OF LIFT. ALWAYS STATION GUIDE PERSONS AS NEEDED TO VISUALLY CONFIRM OVERHEAD OBSTRUCTION CLEARANCE WHILE PERFORMING THIS MANEUVER.

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4.16.2 STEP TWO: CONFIGURE THE ADAPTER

If the Long Reach Adapter is already configured for the aircraft you are towing, then proceed to *"STEP TWO: INSTALL THE ADAPTER" on page 4-27*. Otherwise, configure the Long Reach Adapter as appropriate:

- **dual-wheel:** See *"DUAL-WHEEL CONFIGURATION" on page 4-26*.
- **single-wheel:** See *"SINGLE-WHEEL CONFIGURATION" on page 4-26*.

4.16.2.1 DUAL-WHEEL CONFIGURATION

To configure the Long Reach Adapter for towing aircraft with dual nose wheels:

1. If installed, remove the Single-Wheel Hold-Down Bracket.
   a. Remove the Anchor Shaft Clips from the ends of the Anchor Shafts.
   b. Pull the two Anchor Shafts out of the adapter.
   c. Remove the bracket and Side Gates.
2. If not already installed, install two Dual-Wheel Hold-Down Brackets.
   a. Verify that you have selected the correct brackets for the aircraft you will be towing.
   b. Insert the upper Anchor Shaft into the adapter.
   c. Place the two Dual-Wheel Hold-Down Brackets in position in the adapter.
   d. Thread the lower Anchor Shaft through the adapter and brackets.
   e. Secure the Anchor Shafts using the Anchor Shaft Clips.
   f. Thread the Anchor Knob Bolts through the brackets and into the adapter.
3. Slide the Dual-Wheel Hold-Down Brackets on the shaft as needed to match the tire tracks.
4. Tighten the Anchor Knob Bolts.

4.16.2.2 SINGLE-WHEEL CONFIGURATION

To configure the Long Reach Adapter for towing aircraft with a single nose wheel, you will need to install the Single-Wheel Hold-Down Bracket.

1. Remove the Anchor Shaft Clip from the end of the lower Anchor Shaft.
2. Pull the lower Anchor Shaft out of the adapter.
3. Place the Single-Wheel Hold-Down Bracket and Side Gates in position in the adapter.
4. Thread the lower Anchor Shaft through the adapter, gates, and bracket.
5. Secure the Anchor Shaft using the Anchor Shaft Clip.

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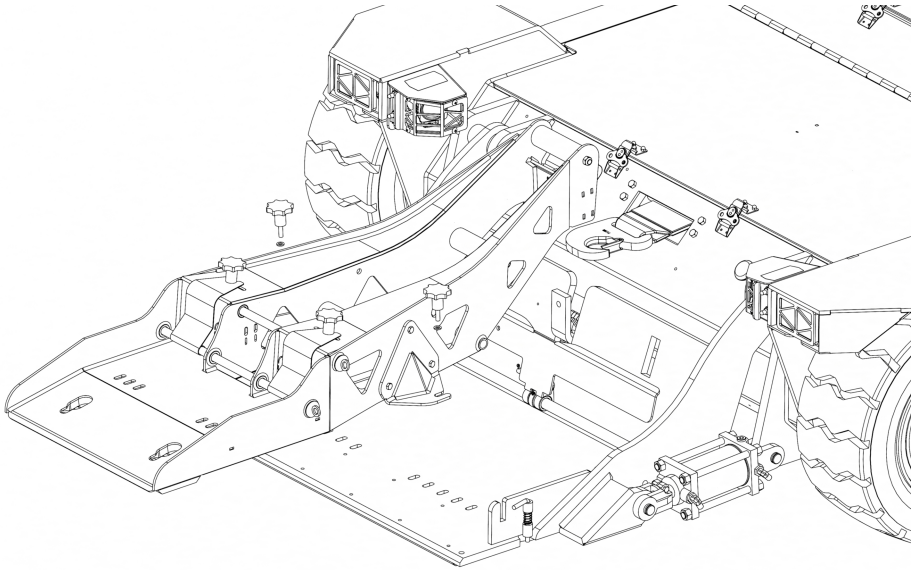
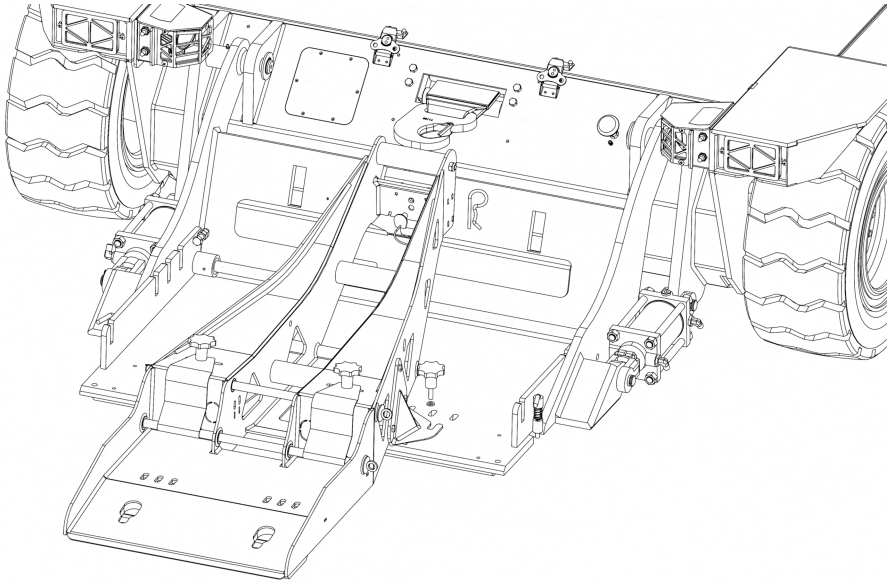
4.16.3 STEP THREE: INSTALL THE ADAPTER

To install the Long Reach Adapter on the Cradle:

1. Adjust both Side Gates to their outermost positions, as described in *"USING THE SIDE GATES" on page 2-5*.
2. Extend the Cradle Adapter Post, as described in *"USING THE RETRACTABLE CRADLE ADAPTER POST" on page 2-8*.
3. Lift the adapter onto the Cradle.



4. Position the Adapter Sleeve directly over the Cradle Adapter Post.
5. Lower the adapter and align the holes in the sleeve with the hole in the hitch.
6. Insert the Adapter Sleeve Pin through the holes in the sleeve and the hitch, and secure it using the Adapter Sleeve Clip.



7. Insert one Adapter Bolt and Washer through each of the two Adapter Brackets, and tighten until snug.

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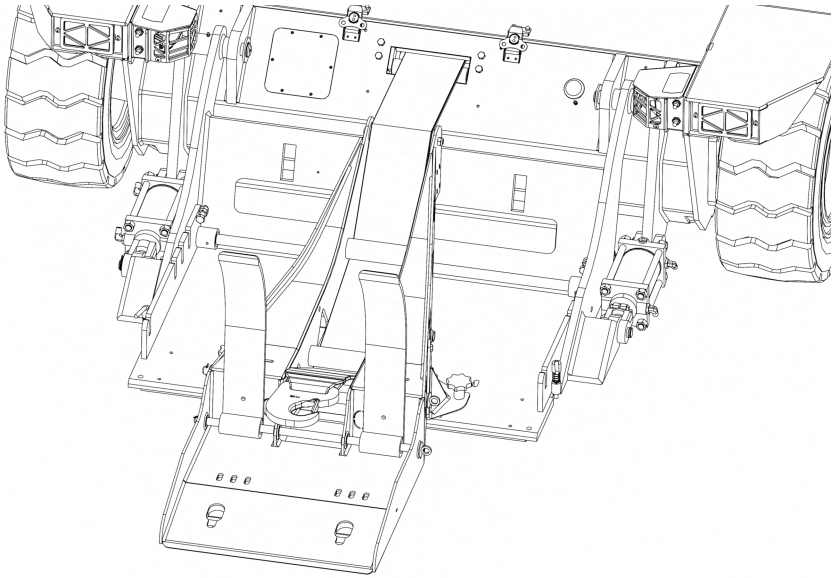
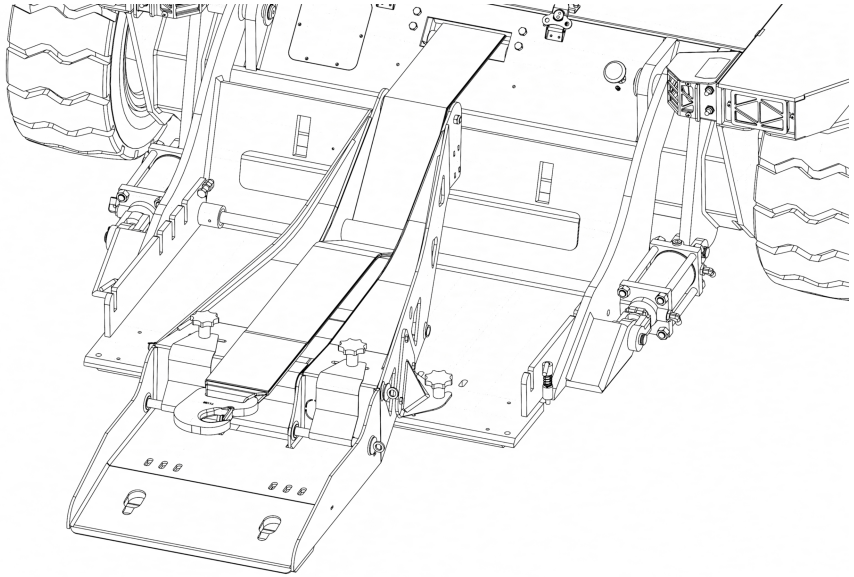
4.16.4 STEP FOUR: ROUTE THE WINCH STRAP

Route the Winch Strap as follows:

- **Dual aircraft wheels:** Route the Winch Strap (1) over the Rear Adapter Roller (2), under the Middle Adapter Roller (3), and under the Front Adapter Roller (4).



- **Single aircraft wheel:** Route the Winch Strap (1) over the Rear Adapter Roller (2) and under the Middle Adapter Roller (3). Do not route it under the Front Adapter Roller (4).



4.16.5 STEP FIVE: ATTACH THE STRUT STRAP.

This procedure requires using the 24” x 4” (60 cm x 10 cm) Strut Strap. To attach the Strut Strap:

1. Extend the Winch Strap enough to attach one end of the Strut Strap.
2. Position the tractor by the aircraft forward of the nose wheel, as described in *“APPROACHING THE AIRCRAFT” on page 3-4*.

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3. Attach the Strut Strap to the aircraft landing gear as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

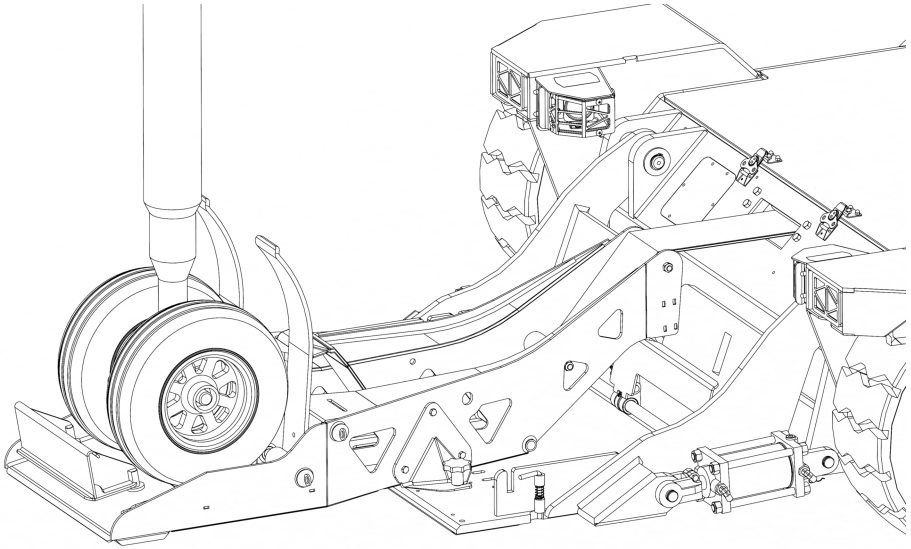
   > If you are towing a dual-wheel aircraft, then route the Winch and Strut Straps between the two hold-down brackets.

   > If you are towing a single-wheel aircraft, then route the Winch Strap and Strut Strap over the hold-down bracket.

4.16.6 STEP SIX: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Lift the Cradle approximately 1" (2.5 cm), so that the Hold-Down Bracket(s) can easily pass over the top of the aircraft nose wheel(s).
2. Approach the aircraft on the strut centerline, until the leading edge of the Cradle is approximately 1" (2.5 cm) away from the nose wheel tire(s). If needed, have a helper signal when the Cradle is in position.
3. Use the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6* to winch the aircraft on to the Cradle. Continue winching until the tire(s) push open and come into full contact with the spring arc(s) of the Hold-Down Bracket(s).
4. Lift the Cradle, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.
5. Install the Wheel Chock (1) by sliding it on to the Key Slots (2) in the adapter.



The buttons on the bottom of the Wheel Chock are offset to provide two positions on the adapter. Place the Wheel Chock in the upper position, closer to the aircraft tire(s).

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4.16.7 STEP SEVEN: TRANSPORT & RELEASE THE AIRCRAFT

Transport and release the aircraft as described in *"TRANSPORTING THE AIRCRAFT" on page 3-14* and *"RELEASING THE AIRCRAFT" on page 3-17*, respectively.

Only perform the tail-drop maneuver when needed to clear a hangar door frame, overhead roof beam, or other obstacle. At all other times, lower the Cradle to the normal towing position.

CAUTION

ALWAYS HAVE PERSONNEL MONITORING OVERHEAD CLEARANCE WHEN PERFORMING THE TAIL DROP MANEVER.

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4.17 TAIL DROP USING HIGH-LIFT ADAPTER

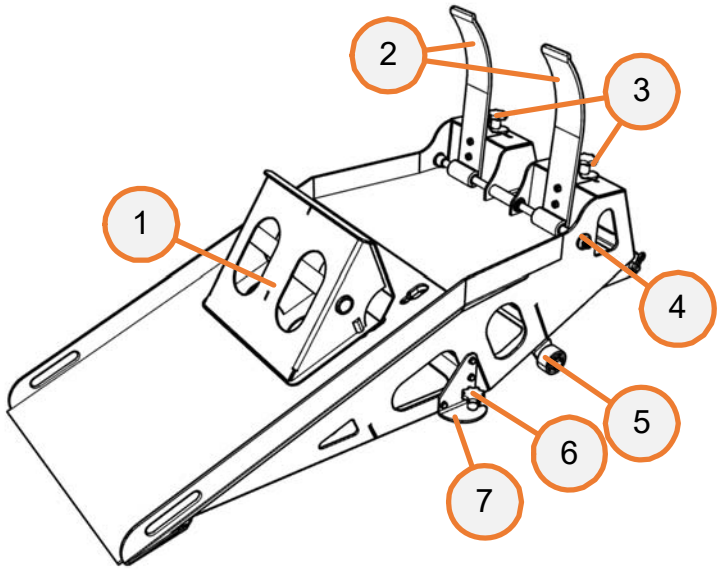
Note

This procedure is not applicable for 83 tractors.

The High-Lift Adapter can provide specialized tail-drop towing in situations where hangar door frame and / or roof beam overhead clearances are too low for the tail height of a specific aircraft with dual nose wheels. See the *Operation Manual* for your tractor.

This adapter has the following nose wheel weight / lift capacities:

- **86 / 87:** 7,000 lbs (3,175 kg) and can lift the aircraft nose wheel up to 19 3/8” (49.2 cm) when the Cradle is raised all the way.
- **88 / 89:** 10,000 lbs (4,535 kg) and can lift the aircraft nose wheel up to 23 1/4” (59 cm) when the Cradle is raised all the way.



This lowers the aircraft tail by an amount that varies by specific aircraft model, based on the calculated Tail Drop Ratio ratio for that aircraft model.

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This part has the following components:

- **Chock (1):** Helps hold the aircraft nose wheels against the Hold-Down Brackets. Includes a grab bar for easy carrying and positioning.
- **Dual-Wheel Hold-Down Brackets (2):** Hold dual nose wheels against the adapter during raising while providing adequate landing gear door clearance, and are aircraft-specific.
- **Bracket Locking Knobs (3):** Secure the dual-wheel Hold-Down Brackets in position on the adapter.
- **Mounting Pins and Clips (4):** Secure the Hold-Down Brackets (2) to the Cradle.
- **Positioning Wheels (5):** Help move the adapter when the tractor is moving with the Cradle lowered.
- **Anchor Knob Bolts (6):** Secure the adapter to the Cradle.
- **Mounting Tabs (76):** Secure the adapter to the Cradle.

Note

You may also use a Long Reach Adapter for tail-drop operations. See "TAIL DROP USING LONG-REACH ADAPTER" on page 4-49.

4.17.1 STEP ONE: CALCULATE TAIL DROP AMOUNT

Calculate the maximum amount of tail drop for a specific aircraft using the formula and procedure described in *"STEP ONE: CALCULATE TAIL DROP AMOUNT" on page 4-50*.

4.17.2 STEP TWO: CONFIGURE THE ADAPTER

Adjust the Dual-Wheel Hold-Down Brackets to the proper width for the aircraft tires:

1. Loosen the Bracket Locking Knobs.
2. Slide the Dual-Wheel Hold-Down Brackets in or out as needed.
3. Tighten the Bracket Locking Knobs.

4.17.3 STEP THREE: INSTALL THE ADAPTER

To install the High-Lift Adapter on the Cradle:

1. Adjust both Side Gates to their outermost positions, as described in *"USING THE SIDE GATES" on page 2-5*.
2. Install the Chock on the High-Lift Adapter.
3. Place the High-Lift Adapter on the floor or apron surface where the tractor can approach it in a straight line.
4. Remove the Mounting Clips and Mounting Pins from the Mounting Tabs.

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5. Lower the Cradle to approximately 1” (2.5 cm) off the ground.
6. Ensure that the aircraft is secure (stairs up and all belly doors / access panels closed), with the steering system in normal towing configuration, and that there is adequate clearance for the aircraft to move forward 54” (137 cm) on to the adapter.
7. Approach the aft side of the High-Lift Adapter, being sure to align the tractor with the adapter centerline.
8. Stop the tractor when the front edge of the Cradle is underneath the High-Lift Adapter, but before making contact with the adapter.
9. Manually balance the High-Lift Adapter on its wheels, and then push the adapter until both Mounting Tabs are fully and evenly inserted into the two cut-out slots on the back wall of the Cradle.

WARNING

KEEP YOUR HANDS AND FINGERS AWAY FROM THE MOUNTING TAB AREA.

Note

You may hold the Chock grab bar and / or grasp the adapter body when moving the High-Lift Adapter into position on the Cradle.

4.17.4 STEP FOUR: ATTACH THE STRUT STRAP

To attach the Strut Strap:

1. Pay out the Winch Strap enough to attach one end of the Strut Strap.
2. Position the tractor by the aircraft forward of the nose wheel, as described in *“APPROACHING THE AIRCRAFT” on page 3-4*.
3. Attach the Strut Strap to the aircraft landing gear as described in *“CAPTURING THE AIRCRAFT” on page 3-6*.
   > If you are towing a dual-wheel aircraft, then route the Winch and Strut Straps between the two hold-down brackets.
   > If you are towing a single-wheel aircraft, then route the Winch Strap and Strut Strap over the hold-down bracket.

4.17.5 STEP FIVE: WINCH AIRCRAFT ONTO CRADLE

When winching the aircraft on to the Cradle:

1. Ensure that large wheel chocks (rubber 6” triangle cross-section recommended) are installed against only the aft sides of the main gear tires, that all chocks are removed from the front sides of all tires, that the aircraft parking brakes are released.

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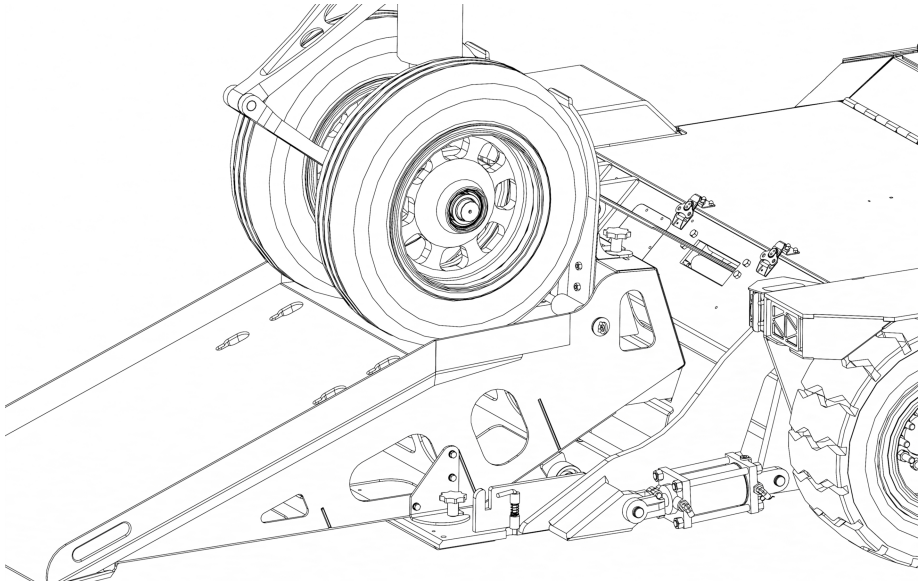
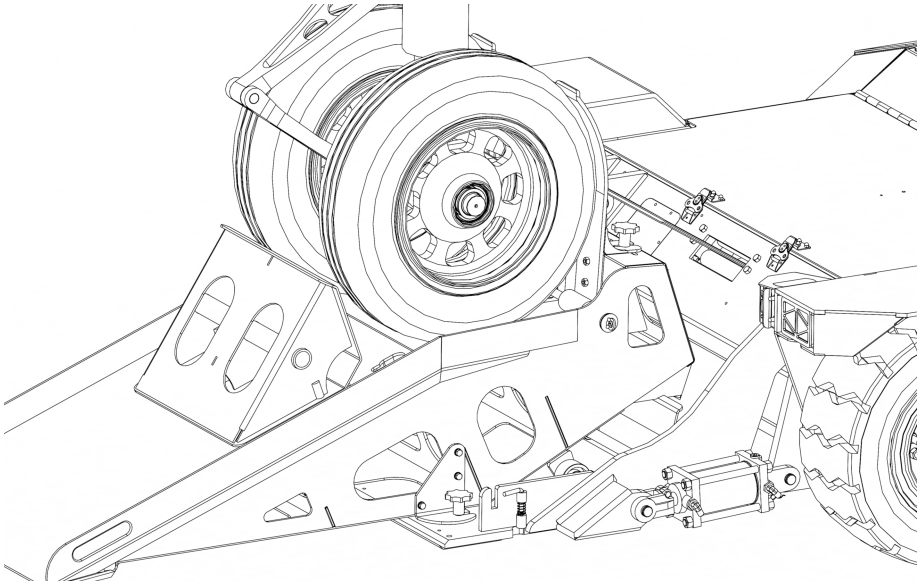
2. Lift the Cradle approximately 1” (2.5 cm), so that the Hold-Down Bracket(s) can easily pass over the top of the aircraft nose wheel(s).
3. Approach the aircraft on the strut centerline, until the leading edge of the Cradle is approximately 1” (2.5 cm) away from the nose wheel tire(s). If needed, have a helper signal when the Cradle is in position.
4. Use the capture procedure described in *“CAPTURING THE AIRCRAFT” on page 3-6* to winch the aircraft on to the Cradle. Continue winching until the tire(s) push open and come into full contact with the spring arc(s) of the Hold-Down Bracket(s).



5. Lift the Cradle, as described in *“CAPTURING THE AIRCRAFT” on page 3-6*.
6. Install the Wheel Chock by sliding it on to the Key Slots in the adapter.



The buttons on the bottom of the Wheel Chock are offset to provide two positions on the adapter. Place the Wheel Chock in the upper position, closer to the aircraft tire(s).

4.17.6 STEP SIX: TRANSPORT THE AIRCRAFT

To transport the aircraft:

1. Transport the aircraft as described in *“TRANSPORTING THE AIRCRAFT” on page 3-14*.

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2. Only perform the tail-drop maneuver when needed to clear a hangar door frame, overhead roof beam, or other obstacle. At all other times, lower the Cradle to the normal towing position.

CAUTION

ALWAYS HAVE PERSONNEL MONITORING OVERHEAD CLEARANCE WHEN PERFORMING THE TAIL DROP MANEVER.

3. When the Cradle is fully raised, place one Uplock Fitting on each of the two Cradle Lift Cylinders to prevent accidental lowering of the Cradle, as described in the *Operating Manual* for your tractor.

4.17.7 STEP SEVEN: RELEASE THE AIR-CRAFT

To release the aircraft:

1. Take up any slack in the Winch Strap and remove the wheel chock fitting from behind the aircraft nose gear wheel. Stow the chock fitting on tractor front deck.
2. Remove the Uplock Fittings, if still installed.
3. Lower the Cradle until the High-Lift Adapter lightly contacts the ground.
4. Ensure that the aircraft main wheels are chocked fore and aft on both sides, with the aft chocks firmly contacting the aircraft tires and the forward chocks providing a small amount of clearance.

CAUTION

FAILURE TO PROPERLY CHOCK THE AIRCRAFT COULD RESULT IN A RUNAWAY IF THE WINCH STRAP FAILS.

5. Raise the Cradle until the leading edge of the High Lift Adapter is about 1/4” (0.6 cm) above the ground.
6. Proceed to the driver position. Slowly release Winch Strap tension using the Cradle Raise / Lower Switch while slowly backing the tractor and High-Lift Adapter out from under the aircraft nose wheel. Maintain just enough Winch Strap tension to keep the aircraft main gear wheels from pressing into the chocks.
7. Continue backing the tractor and paying out the Winch Strap until the aircraft nose wheel is on the ground just clear of the High-Lift Adapter.
8. Remove the Strut Strap from the nose wheel strut, being sure not to allow the “D” rings to contact the shiny oleo strut.
9. Back tractor slowly away from the aircraft until well clear before raising the Cradle.

CAUTION

RAISING THE CRADLE TOO SOON COULD CAUSE IT TO STRIKE AND DAMAGE THE AIRCRAFT.

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4.18 SPECIAL CAPTURE CONSIDERATIONS

Certain conditions may require modifications to the standard aircraft towing procedure described in *"GENERAL TOWING PROCEDURE" on page 3-1* or specialized towing procedures described in this chapter, as appropriate. These conditions include (but are not limited to):

- **Ground slopes toward tractor:** See *"SLOPE TOWARD TRACTOR OR AIRCRAFT ENGINES RUNNING" on page 4-62*.
- **Aircraft engines are running:** See *"SLOPE TOWARD TRACTOR OR AIRCRAFT ENGINES RUNNING" on page 4-62*.
- **Aircraft is parked at a passenger bridge:** See *"AIRCRAFT ON PASSENGER LOADING BRIDGE" on page 4-63*.
- **Winter operations:** See *"WINTER OPERATIONS" on page 4-63*. These procedures apply during cold, wet, and / or slippery conditions, regardless of the time of year.
- **Hot weather operations:** See *"HOT WEATHER OPERATIONS" on page 4-64*. These procedures apply during periods of hot weather.

4.18.1 SLOPE TOWARD TRACTOR OR AIRCRAFT ENGINES RUNNING

It is not uncommon for the ramp or apron surface on which an aircraft is parked to be sloped toward the tractor. A situation with identical potential effects exists when the aircraft engine(s) is / are running. Either case may cause an aircraft to roll toward the tractor without being winched, and possibly without warning.

Modify the standard capture procedure as follows:

1. Chock the aircraft forward of the main wheels and / or set the aircraft brakes. This prevents the aircraft from rolling forward and possibly causing death, injury, and / or damage.
2. Approach the aircraft, as described in *"APPROACHING THE AIRCRAFT" on page 3-4*.
3. Lower the Cradle sufficiently to allow it to move under the aircraft tire(s).
4. Connect the Strut Strap to the aircraft, as described in *"CAPTURING THE AIRCRAFT" on page 3-6*.
5. Release the tractor Parking Brake, as described in the *Operating Manual* for your tractor.
6. If equipped, move the Direction Selector toward the aircraft, as described in the *Operating Manual* for your tractor.
7. If equipped, use the Winch Strap Motor Control Switch on the left Instrument Panel to pull the tractor toward the aircraft. In some cases, you may need to use some forward driving power to slide the Cradle under the aircraft nose wheel(s).

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The Winch Limit Switch will automatically stop the Winch Motor when the aircraft is properly positioned.

Complete the rest of the capture procedure described in *"CAPTURING THE AIRCRAFT" on page 3-6*.

4.18.2 AIRCRAFT ON PASSENGER LOADING BRIDGE

The aircraft capture and lift sequence must be delayed until the loading bridge has been retracted from the aircraft, in order to prevent possible injuries and damage to the aircraft and / or bridge.

Proceed with the capture and tow operation as described in either *"GENERAL TOWING PROCEDURE" on page 3-1* or this chapter, as appropriate, once the bridge has been full fully retracted and the aircraft fuselage is clear of obstacles such as:

- Passenger bridge.
- Fixed facilities.
- Ground support vehicles and equipment.

4.18.3 WINTER OPERATIONS

This section describes special considerations and procedures to be used during cold / wet conditions that typically occur during winter, but that could happen at any time of year.

4.18.3.1 SLIPPERY CONDITIONS

When operating in slippery conditions:

- Always install chains, studded tires, or other traction devices when snow or ice surface conditions warrant.
- Apply regulation grit to the initial tow or pushback tractor path.
- Accelerate gradually, and reduce tractor speed as conditions warrant.
- For aircraft with wing- and / or tail-mounted engines, delay engine start until after pushback and release when conducting live engine pushback operations.
- Keep aircraft momentum steady by entering and exiting turns more gradually and by making wider turns than normal.
- Gradually reduce speed before entering a turn. Never decelerate abruptly.
- If aircraft momentum causes the tractor Drive Wheels to slide sideways during a turn, then immediately release the Accelerator Pedal / Motor Control Lever or Service Brake Pedal (whichever pedal you were pressing at the time), and then steer into the slide until the slide stops. Next, correct the steering as needed to continue the original path, and accelerate slowly.

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4.18.3.2 BATTERY ENDURANCE

During conditions of extreme cold with temperatures of -13° F (-25° C) or colder:

- Park the tractor in a protected and heated location when left for an extended period.
- Charge the Motive Batteries (and GPU Batteries, if equipped) whenever one hour or more is available, to keep the specific gravity, and thus the acid level high, and prevent freezing.

4.18.4 HOT WEATHER OPERATIONS

The following precautions apply during operations in extremely hot weather:

- **Thermal shutdown prevention:** Towing during extremely hot weather causes heat to build up in the Controller and Drive Motor. In rare cases, this may reduce the tractor speed or even trigger a protective “thermal shutdown” that causes the tractor to stop. JBT LEKTRO, Inc. recommends driving the tractor for 3-5 minutes with zero load immediately after any of the following:

  > Aircraft tow at very low speed.

  > Aircraft tow under heavy load due to ground slope and / or aircraft weight.

  This short drive will force cooling air through the tractor to dissipate the built-up heat in the Controller and the surrounding heat-sink chassis metal, while the Controller is running in “1A Bypass” and not handling any electrical current or building up any additional heat.

  Further, consider parking the tractor in the shade with the deck lids open when not in use, to further facilitate cooling.

- **Batteries:** Check battery electrolyte levels frequently during hot weather, and add water as required. Batteries can consume 3 to 4 times the water they do during cooler periods because of increased evaporation caused by the often surprisingly high ambient temperatures just above the apron surface.

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APPENDIX A

CAPTURE TABLES

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
A																				
AASI	Jetcruzer 450 / 500 P	5,500	2,450	■	■	■	■	■	■	■	■	■							3	
AASI	Jetcruzer 650	6,500	3,500	■	■	■	■	■	■	■	■	■							3	
Adam Aircraft	A-500 (push / pull twin with two tail booms)	7,050	5,160	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Set 3-bladed prop.
Adam Aircraft	A-700 (light jet with two tail booms)	TBD	TBD		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Aeritalia / Alenia	G91 Y / T Fighter / Recon	19,180	8,598			■	■	■	■	■	■	■	■	■	■	■	■		3	Use Extended Rear Gate on 86 / 87 to maximize radome clearance.
Aermacchi / Atlas	MB-326 / Impala MK1 / MK2	10,090	5,920	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Trailing arm strut. Use Side Gates to prevent fender contact.
Aermacchi	MB-339 A	13,000	6,913	■	■	■	■	■	■	■	■	■							4.3	Use Extended Rear Gate to maximize trailing arm bounce clearance.
Aero Boero	115 Trainer	1,768	1,226	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate for extra empennage clearance.
Areo Boero	180 RVR / 180 PSA	1,962	1,327 / 1,411	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate for extra empennage clearance.
Aero Boero	150 Ag	2,206	1,300	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate for extra empennage clearance.
Aero Boero	260 Ag	2,976	1,521	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy access tail wheel.
Aero Commander (also see “Rockwell Commander,” “Gulfstream Commander,” and “Twin Commander”)	Lark / Darter	2,250 / 2,475	1,280 / 1,532	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.5	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Aero Commander / Meyers (also see “Rockwell Commander,” “Gulfstream Commander,” and “Twin Commander”)	Aero Commander 200 / Meyers 200	3,000	1,870 / 1,940	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Aero Commander	Aero Commander L 3805	4,600	2,800	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.
Aero Commander	Aero Commander 500 / 500 A / B	6,000 / 6,250	3,850 / 4,255	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.
Aero Commander	Aero Commander 520	5,400	3,800	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.
Aero Commander	Aero Commander 560 / 560 A / E / F	7,000	4,690	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.
Aero Commander	Aero Commander 680 / E / F	8,500 / 9,000	5,600 / 6,021	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.
Aero Commander	Grand Commander 680 FL / FLP / 700 / 720 / 800	8,500	5,600	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.
Aero Commander	Turbo Commander 680 T / W	8,500	5,600	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.
Aero Commander	Turbo Commander 681 Hawk / 685 Courser	9,400	5,647 / 5,783	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.
Aero Commander	Turbo Commander 690 / 690 A / B / C / D / 840 / 900	10,250-10,700	6,195	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.
Aero Commander	Turbo Commander 695 / 695 A / B / V / 980 / 1000 / 1200	10,350-11,700	6,700	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.
Aero Commander / Rockwell	Shrike 500S / Shrike Commander 500U	6,750	4,635	■	■	■	■	■	■	■	■	■			■	■			4.1	Use Hold-Down Adapter and Side Gates.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL														METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Aero Commander (also see IAI - Westwind 1)	Jet Commander 1121	22,850	12,700			■	■	■	■	■	■	■			■	■			Use Westwind Adapter, and contain lower torque link between Strut Straps.
Aero Vodochody	L-29 Delfin	7,804	5,027			■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.3	Forward knuckle clears OK. Recommend using Extended Rear Gate.
Aero Vodochody / Aero Holding	L-39 Albatross	10,029-12,362	7,617 / 7,859			■	■	■	■	■	■	■	■	■	■	■	■	4.3	Attach Strut Strap around oleo and through upper pivot arms. Main gear straps available.
Aero Vodochody / Aero Holding	L-59 / L39 MS	11,883-15,432	8,885			■	■	■	■	■	■	■	■	■	■	■	■	4.3	Attach Strut Strap around oleo and through upper pivot arms. Main gear straps available.
Aero Holding	Aero Ae 270 W / P Ibis Utility Transport	7,275	3,942	■	■	■	■	■	■	■	■	■						3 and 4.6	Set 3-bladed prop. Watch windmlling and nose wheel door.
Aeronautica Macchi / Northwest	Conestoga / Ranger	4,700	2,848	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.7	On tail dragger version, use Extended Rear Gate to clear rudder.
Aeronca	L-3 / 65TC Defender	1,260	793	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Aeronca	15AC Sedan	2,050	1,150	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Aeronca / Champion / Bellanca	7AC / 7CCM Champ	1,220-1,300	740-810	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Aeronca / Champion	7EC / 7FC (90) Traveler / Tri-Traveler	1,450	860	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7 or 3	On tail dragger version, use Extended Rear Gate to clear rudder.
Aeronca / Champion	7EC / 7TC (150 Traveler / Tri-Traveler	1,500	968	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7 or 3	On tail dragger version, use Extended Rear Gate to clear rudder.
Aeronca / Champion	11 AC Chief / IICC Super Chief	1,290 / 1,350	820			■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Aerospatiale (Also see Socata for TB-)	IAR-823 Light	3,307	TBD	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Aerospatiale	AS-315B Lama / Cheetah Helicopter	4,300	2,251	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.3	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Aerospatiale	AS-316 B / C Alouette III Helicopter	4,850	2,520	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed.
Aerospatiale	AS-319B Astazou Helicopter	4,960	2,527	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed. “ORB” radome will clear OK.
Aerospatiale	AS-321 F / G / H / JA Super Frelon Helicopter	28,660	15,141			■	■	■	■	■	■	■							3 or 4.8	If long-radome equipped, use Long Reach Adapter.
Aerospatiale (also see Eurocopter)	AS-330 / L Puma Helicopter	16,315	8,303			■	■	■	■	■	■	■							4.8	Long, low reach. Use Long Reach Adapter with dual-tab backstop.
Aerospatiale (also see Eurocopter)	AS-332 L 1 / 2 / M Super Puma Helicopter	18,960 / 20,503	9,535 / 10,274			■	■	■	■	■	■	■							4.8	Long, low reach. Use Long Reach Adapter with dual-tab backstop.
Aerospatiale	IAR-825 TP Triumf Trainer	5,842	2,645	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop. Watch windmilling.
Aerospatiale	SN6021 Corvette	14,550	7,738			■	■	■	■	■	■	■	■	■	■	■	■		4.4	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed and Side Gates at the innermost positions.
Augusta / Westland	A109 C / K (See Special Attention for retract version)	5,997-6,283	2,495-3,638			■	■	■	■	■	■	■			■	■			4.8	Use Long Reach Adapter. Run Winch Strap under forward roller to clear doors.
Augusta / Westland	A109 LUH (See Special Attention for retract version)	5,997-6,283	2,495-3,638		■	■	■	■	■	■	■	■			■	■			4.8	Use Long Reach Adapter. Run Winch Strap under forward roller to clear doors.
Augusta / Westland	A109 Power (See Special Attention for retract version)	5,997-6,283	2,495-3,638		■	■	■	■	■	■	■	■			■	■			4.8	Use Long Reach Adapter. Run Winch Strap under forward roller to clear doors.
Augusta / Westland	Grand	5,997-6,283	2,495-3,638		■	■	■	■	■	■	■	■			■	■			4.8	Use Long Reach Adapter. Run Winch Strap under forward roller to clear doors.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Augusta / Westland (also see Westland)	A129 Mangusta Attack	9,039	5,575		■	■	■	■	■	■	■	■							4.7	Use Extended Rear Gate to maximize fin clearance.
Augusta Westland (also see Westland)	EH-101 / US101 Multi-role Helicopter	31M500	19,000								■	■	■	■	■	■	■		4.3	Front torque links clear OK. Must use 88 / 89 because of heavy nose weight.
Augusta Westland / Leonardo	AW119	6,293	TBD																	Helicopter dolly required.
Augusta Westland (also see Westland)	AW139	14,991 / 15,420	7,985				▼	▼	▼	▼	■	■	■	■	■	■	■		4.8	Long Reach Adapter required.
Augusta Westland / Leonardo	AW139	14,100	7,985		■	■	■	■	■	■	■	■		■	■				4.8	Long Reach Adapter required.
Augusta Westland / Leonardo	AW149	18,298	TBD		■	■	■	■	■	■	■	■		■	■				4.8	Long Reach Adapter required.
Augusta Westland (also see Westland)	AW169	10,582	TBD				▼	▼	▼	▼	▼	▼	■	■	■	■	■		4.8	Long Reach Adapter required.
Augusta Westland / Leonardo	AW169	14,110	6,124		■	■	■	■	■	■	■	■		■	■				4.8	Long Reach Adapter required.
Augusta Westland (also see Westland)	AW189	18,298	TBD				▼	▼	▼	▼	▼	▼	■	■	■	■	■		4.8	Long Reach Adapter required.
Augusta Westland / Leonardo	AW189	18,298	TBD								■	■		■	■				4.8	Long Reach Adapter required.
Air Tractor	AT-301 / 301A	7,400 / 7,700	3,800-3,850	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear gate for extra rudder clearance.
Air Tractor	AT-302 / 302A	7,200 / 6,600	3,250 / 3,350	■	■	■7	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear gate for extra rudder clearance.
Air Tractor	AT-400 Turbo	7,800	3,550	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear gate for extra rudder clearance.
Air Tractor	AT-401 / 402	TBD	TBD	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear gate for extra rudder clearance.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Air Tractor	AT-501	TBD	TBD	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear gate for extra rudder clearance.
Air Tractor	AT-502 / 502A	9,200 / 10,500	4,190	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear gate for extra rudder clearance.
Air Tractor	AT-503	9,200	4,490	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear gate for extra rudder clearance.
Air Tractor	AT-602 (Sept. 96)	12,000	TBD	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear gate for extra rudder clearance.
Air Tractor	AT-802	16,500	6,300	▼	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear gate for extra rudder clearance.
Airbus	A220 -100	139,000	111,000									▼	▼	■	■	■	■		4.10.1	Pawl Adapter required.
Airbus	A220 -300	154,000	123,000											■	■	■	■		4.10.1	Pawl Adapter required.
Airbus	A318	150,796	89,948									▼	▼	▼	■	■	■		4.10.1	A318 - A321 Pawl Adapter required.
Airbus	A319 / ACJ (Corporate Jet)	145,505	82,578									▼	▼	■	■	■	■		4.10.1	A318 - A321 Pawl Adapter required.
Airbus	A320 (-200)	149,914	88,460									▼	▼	■	■	■	■		4.10.1	A318 - A321 Pawl Adapter required.
Airbus	A321	182,984	105,746									▼	▼	▼	▼	■	■		4.10.1	A318 - A321 Pawl Adapter required.
Airbus	H160 Helicopter	12,500	TBD	TBD															TBD	TBD
Airbus	H175 Helicopter	17,196	TBD	TBD															TBD	TBD
Akron / Funk Aircraft Co.	Funk Model B	1,350	890		■	■	■	■	■	■	■	■							4.7 and 4.8	Long Reach Adapter required to reach tail wheel.
Alberta Aerospace	Phoenix Fanjet (Jet Squalus) two-seat jet trainer	TBD	TBD	■	■	■	■	■	■	■	■	■							4.3	Use Extended Rear Gate and strap the strut arm below the oleo to clear forward door.
Alenia	G222 / C-27A Spartan Tactical Transport	61,730	34,610								■	■							4.3	
All American Aircraft	Ensign	1,450	900	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4	
Alon / Ercoupe	Alon Ercoupe A-2	1,450	930	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Alpha Airlines - Russia	SM-92 Finist STOL	4,850	2,976	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	
American Eagle-Lincoln / Roose	Eaglet	922 / 1,050	509 / 638	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear gate for extra rudder clearance.
American / Gulfstream / TLM	Cheetah AA-5A Traveler / Cheetah AA1	2,200	1,180	■	■	■	■	■	■	■	■	■							4.5	Place Hold-Back Bar below Strut Strap to prevent slide-up.
American / Gulfstream / TLM	Tiger AG-5B / Tiger AA5	2,400	1,311	■	■	■	■	■	■	■	■	■							4.5	Place Hold-Back Bar below Strut Strap to prevent slide-up.
Anderson Greenwood	Anderson Greenwood (Pusher Prop)	1,400	850	■	■	■	■	■	■	■	■	■							3	
Antonov / PZL Mielec	An-2 “Colt” / Antek Transport Biplane	12,125	7,605		■	■	■	■	■	■	■	■							4.7	Use Extended Rear Gate @ furthest-out slot with Side Gates. See tail wheel aft.
Antonov	An-12 Transport	134,480	61,700								▼	▼	▼	■	■	■	■		3	
Antonov	An-26 Transport	52,911	33,113				■	■	■	■	■	■	■	■	■	■	■		4.4	Trailing arm strut. Use Extended Rear Gate with Center Fill Plate.
Antonov PZL Mielec	An-28 / M-27 Skytruck PT	14,330	8,267	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.4	Trailing arm strut. Use Extended Rear Gate with Center Fill Plate.
Antonov	An-32 / Transport (strap around upper arm)	59,525	38,158								■	■	■	■	■	■	■		4.4	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed. Very heavy nose weight ratio.
Antonov	An-38 Regional	19,360	10,648		■	■	■	■	■	■	■	■							4.4	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed.
Antonov	An-72 / An-74 “Coaler”	72,250-76,060	42,000								■	■	■	■	■	■	■		3	Long, extra-low nose plus heavy nose weight restricts tractor to 8800 / 50 and 89 Series.
Arrow Aircraft and Motor	Arrow Sport F	1,675	1,172		■	■	■	■	■	■	■	■							4.7	Use Extended Rear Gate to clear rudder. 83 is too tight. Use 84 Long Reach.
Arctic Aircraft	S1 B2 Arctic Tern	1,900	1,073	■	■	■	■	■	■	■	■	■							4.7	Use Extended Rear Gate to clear rudder.
Arctic Aircraft	S-4 Privateer	2,250	1,148	■	■	■	■	■	■	■	■	■							4.7	Use Extended Rear Gate to clear rudder.
ASL Hagfors Aero AB	OPUS 280	1,165	750	■	■	■	■	■	■	■	■	■							3	Strap at bottom strut arm in front of bungees.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Atlas	Cheetah DZ / EZ Mirage III Conversion	30,200	15,500-14,550								■	■	■	■	■	■	■		3	Long, extra-low nose plus probe restricts tractor to 8800 / 50 and 89 Series.
Atlas / Aermacchi	Impala MK1 / MK2 / MB-326	10,090	5,920	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Trailing arm strut. Use Side Gates to prevent fender contact.
Atlas-Denel - South Africa	Atlas / Aerotech ACE Turboprop Trainer	4,850	3,406	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop. Watch for windmilling. Restricted turn angle.
Atlas-Denel - South Africa	CSH-2 Rooivalk Attack Helicopter	19,290	13,029	▼	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy-reach tail wheel.
Auster / Beagle Auster	Auster (145)	2,200	1,480	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate to clear rudder.
Avia Baltika	LAK - XE / XA	1,433 / 1,590	882 / 970	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.5	Attach Strut Strap just above wheel pant.
Aviasud	AE206 Mistral / US	860	452	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.5 and 4.6	Set 3-bladed prop for max clearance.
Aviasud	AE 207 Mistral Twin	992	507	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.5 and 4.6	Set 3-bladed prop for max clearance.
Aviat (see Christen / Aviat)	A-1 Husky	1,800	1,190	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate for extra rudder clearance.
Aviatka / MIA - Russia	900 Acrobat	1,576	1,300	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate for extra rudder clearance.
Aviation Scotland	ARV-1 Super 2 / K1 Super 2	1,100	703	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Avions de Transport Regional	ATR-42 300 / 320	36,817	22,685		▼	▼	■	■	■	■	■	■							4.4 and 4.9	Low nose gear door. Use Extended Rear Gate. ATR Pawl Adapter required. tractor must be equipped with multi-level APS that includes an ATR option.
Avions de Transport Regional	ATR-42 500	41,006	24,207		▼	▼	■	■	■	■	■	■							4.4 and 4.9	Low nose gear door. Use Extended Rear Gate. ATR Pawl Adapter required. tractor must be equipped with multi-level APS that includes an ATR option.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL														METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Avions de Transport Regional	ATR-72	50,706	27,558		▼	▼	■	■	■	■	■	■						4.4 and 4.9	Low nose gear door. Use Extended Rear Gate. ATR Pawl Adapter required. tractor must be equipped with multi-level APS that includes an ATR option.
AVRO - British Aerospace	RJ 70 Avrojet	84,000-95,000	52,508					▼	▼	▼	▼	■	■	■	■	■	■	3	Raise Cradle high; forward doors drop on electric power cutoff or spike.
AVRO - British Aerospace	RJ 85 Avroliner	93,000-97,000	54,354					▼	▼	▼	▼	■	■	■	■	■	■	3	Raise Cradle high; forward doors drop on electric power cutoff or spike.
AVRO - British Aerospace	RJ 100 Avroliner	97,500-101,500	56,185					▼	▼	▼	▼	■	■	■	■	■	■	3	Raise Cradle high; forward doors drop on electric power cutoff or spike.
AVRO - British Aerospace	RJ 115 Avroliner	101,500	56,728					▼	▼	▼	▼	■	■	■	■	■	■	3	Raise Cradle high; forward doors drop on electric power cutoff or spike.
Ayres	Turbo Thrush S2R	6,000	4,500		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate for empennage clearance.
Ayres	Thrush S2R - R 1340	6,900	3,700		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate for empennage clearance.
Ayres	Thrush S2R - R 1820	10,000	4,990		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate for empennage clearance.
Ayres	Loadmaster Single-prop twin freighter	19,190	9,000		■	■	■	■	■	■	■	■	■	■	■	■	■	3	
B																			
BAF / British Aerospace	Viscount 800	72,500	41,565				▼	▼	▼	▼	▼	■	■	■	■	■	■	3	
Basler	Turbo-67 DC-3	28,750	15,700		■	■	■	■	■	■	■	■						4.7 and 4.8	Use Long Reach Adapter. Capture tail wheel pivoted toward aircraft front.
Beagle / BAe	SA-3-120 Bulldog 120 Series trainer	2,350	1,475	■	■	■	■	■	■	■	■	■						3	
Beagle - England	Beagle Pup (150)	1,900	1,090	■	■	■	■	■	■	■	■	■						3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Beagle - Auster	Husky (160) (280)	2,000	1,200	■	■	■	■	■	■	■	■	■							3	
Beechcraft	Beech 18 / D-185 / C-45	8,750-10,450	5,770-5,910		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7 or 4.8	Use Extended Rear Gate in forward-most position to clear fuselage; or use Long Reach Adapter.
Beechcraft / Volpar / Dumond / etc.	Beech H18 Super-Liner	9,900	5,845	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.7	Use Extended Rear Gate on taildragger versions, to clear fuselage.
Beechcraft	“Staggerwing” D-17S / F-17 / G-17	4,250	2,540 / 2,800		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7 & 4.8	Use Long Reach Adapter to access the tail wheel.
Beechcraft - Raytheon	Musketeer 23 / A23 / Custom III 23 (160 / 5)	2,450	1,365	■	■	■	■	■	■	■	■	■		■	■	■	■		3 or .5	
Beechcraft - Raytheon	Musketeer Sport III / Super III / R (200)	2,450	1,365	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	
Beechcraft - Raytheon	Sundowner (180) / Sundowner R (200)	2,450	975 / 1,365	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	
Beechcraft - Raytheon	Sierra 24R (200)	2,750	1,696	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Sport / Sport III (150)	2,150 / 2,350	1,423 / 1,365	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.2	Attach Strut Strap below strut fairing.
Beechcraft - Raytheon	Skipper / PD285 (115)	1,675	1,100	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Travelair 95 (180)	4,200	2,635	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Twin Bonanza 50 / B-C 50 (260) (275)	6,000	3,940	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Twin Bonanza D 50 (295)	6,300	4,100	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Twin Bonanza E / F 50 (340)	7,000	4,460	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Queen Air B 80 / Queen Airliner	8,800	5,277	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Bonanza / Debonair 33 (225)	3,000	1,745	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Beechcraft - Raytheon	Bonanza / Debonair 33A (285)	3,400	2,107	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Bonanza 35 / A35 (185) (205) (225)	2,550	1,458	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Bonanza B35 (196)	2,650	1,575	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Bonanza C35 / D35 (205)	2,700	1,650	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Bonanza E35 / G35 (225)	2,775	1,722	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Bonanza H35 (240)	2,900	1,833	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Bonanza J35 / M35 (250)	2,900	1,820	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Bonanza N35 / P35 (260)	3,125	1,855	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Bonanza S35 / V35 (285)	3,400	1,970	■	■	■	■	■	■	■	■	■		■	■				3	Use Extended Rear Gate with 89 tractor.
Beechcraft - Raytheon	Turbo Bonanza V35 (285)	3,400	2,027	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Bonanza 36 / A36 / B36 (285)	3,600	2,295	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Turbo Bonanza A36AC / B36TC (300)	3,650 / 3,850	2,433 / 2,262	■	■	■	■	■	■	■	■	■		■	■				3	Use Extended Rear Gate with 89 tractor.
Beechcraft - Raytheon	Duchess 76	3,900	2,466	■	■	■	■	■	■	■	■	■							3	
Beechcraft - Raytheon	Baron 55 / 56	5,100-5,300	3,070 / 3,291	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Baron 58	5,500	3,481	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Baron 58 P / 58 TC	6,200	4,026	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Baron 58	5,500	3,481	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft / Fuji / Canada Car	T-34 Mentor	2,975	2,246	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	YT-34 Turbine Mentor	5,500	2,990	■	■	■	■	■	■	■	■	■							3 and 4.6	Set 3-bladed prop on turbo version. Watch for windmilling.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Beechcraft - Raytheon	Duke 60	6,775	4,500	■	■	■	■	■	■	■	■	■							3	CAUTION: NOSE GEAR IS WEAK WHEN AIRCRAFT IS PULLED FORWARD (OK when pushed aft). Only perform smooth, low-load tows.
Beechcraft - Swearingen	King Air A90 / B90 / C 90 / Taurus	9,650-10,1000	5,772-6,675	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft / Swearingen	King Air E90 / T-44 / Taurus	10,100	6,052	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	King Air F90	10,950	6,622	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	King Air A100 / B100	11,500 / 11,800	6,797 / 7,088	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Super King Air 200 / B200 / B200 SE	12,500	8,102	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Super King Air 300 / 300 LW	12,500	8,550	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	Super King Air 350	15,000	9,062	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	99 / A99 / B99 Airliner	10,400 / 10,995	5,675 / 5,777	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	1900 D Airliner	16,950	10,550	▼	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap through lower torque link arm and around oleo strut.
Beechcraft - Raytheon	Starship 2000 A	14,900	10,329	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Beechcraft - Raytheon	BeechJet 400 A / T-1A Jayhawk	15,780 / 16,100	10,329	▼	■	■	■	■	■	■	■	■							4.1	Use Hold-Downs, Side Gates, and Chine Adapters. On 88 tractors, move the remote down.
Beechcraft - Raytheon	Premier I	12,500	10,000	■	■	■	■	■	■	■	■	■							4.1	Use Hold-Downs, Side Gates, and Chine Adapters.
Beechcraft - Raytheon / Pilatus	T-6A Texan II JPATS Trainer / PC-9	4,960	3,715		■	■	■	■	■	■	■	■							4.6 and 4.8	Set 4-bladed prop. Long Reach Adapter required.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Bell	Aircobra P-39 / Kingcobra P-63	8,800	6,375	■	■	■	■	■	■	■	■	■		■	■			4.1	Nose light. Use hold-down and Side Gates. Set 4-bladed prop.
Bell - Boeing	V-22 Osprey VTOL	60,500	31,886								▼	▼	■	■	■	■	■	3	Heavy nose weight. Use Extended Rear Gate for extra nose clearance.
Bell Helicopter	222	8,250	4,874		■	■	■	■	■	■	■	■						4.3	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed, or Long Reach Adapter.
Bell Helicopter - Textron	230 / 430	8,400 / 8,600	5,097								■	■						4.10	
Bell Helicopter - Textron. IPTN	412-HP / SP / EP (w / optional tricycle gear)	11,900	6,759		■	■	■	■	■	■	■	■						3 or 4.5	May have wheel pants.
Bellanca / Champion / Aeronca	7ACA / 7CCM Champ	1,220-1,300	740-810	■	■	■	■	■	■	■	■	■						4.6	Use Extended Rear Gate to clear rudder.
Bellanca / Champion	7ECA Citabria (108) / (115)	1,650	980 / 1,060	■	■	■	■	■	■	■	■	■						4.6	Use Extended Rear Gate to clear rudder.
Bellanca / Champion	7GCAA / 7KCAB / 7GCBC Citabria (150)	1,650	1,150	■	■	■	■	■	■	■	■	■						4.6	Use Extended Rear Gate to clear rudder.
Bellanca / Champion	8CAB Decathlon / Super Decathlon	1,800	1,260-1,315	■	■	■	■	■	■	■	■	■						4.6	Use Extended Rear Gate to clear rudder.
Bellanca / Champion	8GCBC / 7GCBC Scout	2,150 / 1,650	1,315 / 1,037	■	■	■	■	■	■	■	■	■						4.6	Use Extended Rear Gate to clear rudder.
Bellanca	Senior Pacemaker	5,600	2,900	■	■	■	■	■	■	■	■	■						4.6	Use Extended Rear Gate to clear rudder.
Bellanca	Senior Skyrocket	5,600	3,520	■	■	■	■	■	■	■	■	■						4.6	Use Extended Rear Gate to clear rudder.
Bellanca	Aries T-250	3,150	1,888	■	■	■	■	■	■	■	■	■						3	
Bellanca	Viking / Super Viking 17-30 / 31 (260)	3,325	1,900-2,217	■	■	■	■	■	■	■	■	■						3	
Bellanca	Turbo Viking / Turbo Super Viking 17-31	3,325	2,350	■	■	■	■	■	■	■	■	■						3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Bellanca	Junior 14-7 / 14-9	1,650	912 / 943		■	■	■	■	■	■	■	■							4.6	Use Extended Rear Gate or Long Reach Adapter to clear rudder.
Bellanca	Cruisair 14-7 / 14-9 / 14-13	1,750	1,050		■	■	■	■	■	■	■	■							4.6	Use Extended Rear Gate or Long Reach Adapter to clear rudder.
Bellanca	Cruisemaster 14-19-2 / -3	2,700 / 3,000	1,640 / 1,850		■	■	■	■	■	■	■	■							4.7	Use Extended Rear Gate or Long Reach Adapter to clear rudder.
Bellanca	Cruisemaster 14-19	2,600	1,525		■	■	■	■	■	■	■	■							4.7	Use Extended Rear Gate or Long Reach Adapter to clear rudder.
Beriev -Russia	M-12 Amphibian Rec.	64,925	TBD				▼	▼	▼	▼	■	■	■	■	■	■	■		4.7	Easy access to tail wheel.
Beriev - Russia	Be-32 Regional / Light transport	16,090	10,495		■	■	■	■	■	■	■	■							3	Forward knuckle clears OK. Use Extended Rear Gate if heavy.
Boeing / McDonnell Douglas	Boeing 717 / MD-95	114,000	65,900								▼	■	■	■	■	■	■		3	Verify that actual ramp weight is within tractor limits.
Boeing	B737-100 / 200	115,500-128,100	60,200-65,900								▼	▼	▼	■	■	■	■		3 or 4.10	Verify that ramp weight is within tractor limits. Pawl Adapter recommended for ergonomics and to avoid strap squeeze.
Boeing	B737-300	124,500-138,500	70,300-71,560								▼	▼	▼	■	■	■	■		3 or 4.10	Verify that ramp weight is within tractor limits. Pawl Adapter recommended for ergonomics and to avoid strap squeeze.
Boeing	B737-400	138,500-150,000	73,700-75,550								▼	▼	▼	■	■	■	■		3 or 4.10	Verify that ramp weight is within tractor limits. Pawl Adapter recommended for ergonomics and to avoid strap squeeze.
Boeing	B737-500	133,500	66,000								▼	▼	▼	■	■	■	■		3 or 4.10	Verify that ramp weight is within tractor limits. Pawl Adapter recommended for ergonomics and to avoid strap squeeze.
Boeing	B737-600	140,000	69,000								▼	▼	▼	■	■	■	■		3 or 4.10	Verify that ramp weight is within tractor limits. Pawl Adapter recommended for ergonomics and to avoid strap squeeze.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Boeing	B737-700 / BBJ	149,000	73,200								▼	▼	▼	■	■	■	■		3 or 4.10	Verify that ramp weight is within tractor limits. Pawl Adapter recommended for ergonomics and to avoid strap squeeze.
Boeing	B737-800 / BBJ2	168,500 / 171,500	82,800 / 94,000									▼	▼	▼	■	■	■		3 or 4.10	Verify that ramp weight is within tractor limits. Pawl Adapter recommended for ergonomics and to avoid strap squeeze.
Boeing	B737-900 / BBJ3	187,700	98,500									▼	▼	▼	■	■	■		3 or 4.10	Verify that ramp weight is within tractor limits. Pawl Adapter recommended for ergonomics and to avoid strap squeeze.
Boeing	B737 MAX 7 / 8 / 9	159,4000-194,700	TBD									▼	▼	▼	■	■	■		3 or 4.10	Verify that ramp weight is within tractor limits. Pawl Adapter recommended for ergonomics and to avoid strap squeeze.
Boeing	B727-100	152,000-169,000	98,000									▼	▼	▼	■	■	■		3 or 4.10	Verify weight in tractor range. 88 light only. Pawl Adapter recommended.
Boeing	B727-200	184,800-209,500	98,400-102,900									▼	▼	▼	■	■	■		3 or 4.10	Verify weight in tractor range. 88 light only. Pawl Adapter recommended.
Boeing	B727-200F	203,100	95,000									▼	▼	▼	■	■	■		3 or 4.10	Verify weight in tractor range. 88 light only. Pawl Adapter recommended.
Boeing	B757-200 / 200F	230,250-255,000	126,000 / 112,800										▼	▼	▼	▼	■		3 or 4.10	Verify weight in tractor range. Pawl Adapter recommended.
Boeing	KC135 A / B Stratotanker	297,000	98,466									▼	▼	▼	▼	▼	▼		3	Verify that ramp weight is within tractor limits.
Boeing / Vertol / Kawasaki	BV / KV-107 / CH / UH-46 Sea Knight	19,000-23,000	10,700-13,342				■	■	■	■	■	■	■	■	■	■	■		3	
Boeing Helicopter	CH-113 Labrador / CH-113A Voyageur	21,400	11,251		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Boeing - Sikorsky	RAH-66 Comanche Combat Helicopter	10,100-17,174	9,187		■	■	■	■	■	■	■	■							4.7	Use Extended Rear Gate to maximize tail wheel door clearance.
Boeing - Stearman	“Kaydet” PT-13 / -17 / -18 / -27 / N2S	2,717	1,936		■	■	■	■	■	■	■	■							4.7 and 4.8	Long Reach Adapter required to access tail wheel.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Bombardier (also see Canadair)	Global 5000	87,950	50,830					▼	▼	▼	■	■	■	■	■	■	■		3	
Bombardier (also see Learjet)	Global Express	95,250	50,300					▼	▼	▼	▼	■	■	■	■	■	■		3	
Bombardier	Global Express XRS	98,250	51,200					▼	▼	▼	▼	■	■	■	■	■	■		3	
Bombardier	Global Express 6500	99,500	52,230								▼	■	■	■	■	■	■		3	
Bombardier	Global Express 7500	114,850	61,700								▼	■	■	■	■	■	■		3	
Bombardier	Global Express 8000	104,800	54,300								▼	■	■	■	■	■	■		3	
Bombardier	Challenger-300	37,650	22,350		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	CL 300 / 350 Overlay Plate and 1” x 23” Choker Strip required for 88 / 89.
Bombardier	Challenger-350	40,600	24,800		▼	▼	■	■	■	■	■	■	■	■	■	■	■	■	3	CL 300 / 350 Overlay Plate and 1” x 23” Choker Strip required for 88 / 89.
Bombardier / Canadiar	Challenger-600	40,550-41,400	23,285		▼	▼	■	■	■	■	■	■	■	■	■	■	■	■	4.11	Always keep Strut Strap on oleo strut clear of Centering Prox Switch.
Bombardier / Canadair	Challenger-601 / 601-3A / R / CC-144	42,250-45,250	25,585		▼	▼	■	■	■	■	■	■	■	■	■	■	■	■	4.11	Always keep Strut Strap on oleo strut clear of Centering Prox Switch.
Bombardier	Challenger 604	48,300	27,500		▼	▼	■	■	■	■	■	■	■	■	■	■	■	■	4.11	Always keep Strut Strap on oleo strut clear of Centering Prox Switch.
Bombardier	Challenger 650	48,200	27,150			▼	■	■	■	■	■	■	■	■	■	■	■	■	TBD	TBD
Bombardier	Challenger 800 (was Corporate RJ)	53,250	33,900			▼	▼	■	■	■	■	■	■	■	■	■	■	■	3	Only attach Strut Strap on chrome oleo strut section. 1” Strut Strap allowed.
Bombardier / Canadair	CRJ-100 / 200 (CL-65)	47,450	30,100			▼	■	■	■	■	■	■	■	■	■	■	■	■	3	Only attach Strut Strap on chrome oleo strut section. 1” Strut Strap allowed.
Bombardier	CRJ-100 ER / 200 ER	51,000	30,122			▼	▼	■	■	■	■	■	■	■	■	■	■	■	3	Only attach Strut Strap on chrome oleo strut section. 1” Strut Strap allowed.
Bombardier	CRJ 100 LR / 200 LR	53,250	30,122			▼	▼	■	■	■	■	■	■	■	■	■	■	■	3	Only attach Strut Strap on chrome oleo strut section. 1” Strut Strap allowed.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL														METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Bombardier (also see Challenger 800)	Corporate RJ / Canadair SE	53,250	33,900			▼	▼	■	■	■	■	■	■	■	■	■	■	3	Only attach Strut Strap on chrome oleo strut section. 1” Strut Strap allowed.
Bombardier	Challenger 800 (was Corporate RJ)	53,250	33,900				▼	■	■	■	■	■	■	■	■	■	■	4.11	Always keep Strut Strap on oleo strut clear of Centering Prox Switch.
Bombardier	CRJ-700	75,250	44,000				▼	▼	■	■		■	■	■	■	■	■	3	Use 8750B-AL-700 or 8850SDA-AL-100, as certified by OEM.
Bombardier	CRJ-900	84,750	47,000				▼	▼	▼	▼		■	■	■	■	■	■	3	Use 8850SDA-AL-100 as certified by Bombardier for CRJ-9002
Bombardier / Canadiar	CL-215 Amphib. Water Bomber	43,500 (land)	27,938		▼	▼	■	■	■	■	■	■	■	■	■	■	■	3	
Bombardier / Canadair	CL-215 Water Bomber / Utility	43,850 / 37,700	27,040 / 26,400		▼	▼	■	■	■	■	■	■	■	■	■	■	■	3	
Bombardier / Canadair	CL-415 M Turbo Water Bomber	43,850 (land)	28,000		▼	▼	■	■	■	■	■	■	■	■	■	■	■	3	
Bombardier (also see De Havilland)	DHC - 8Q - 200 “Dash 8Q 200”	36,500	22,454				■	■	■	■	■	■	■	■	■	■	■	4.4 and 4.9	Wide track / protrusion. Use Extended Rear Gate with Center Fill Plate removed and DHC-8 Pawl Adapter.
Bombardier (also see De Havilland)	DHC - 8Q - 400 “Dash 8Q 400”	63,450	36,553				▼	■	■	■	■	■	■	■	■	■	■	4.4 and 4.9	Wide track / protrusion. Use Extended Rear Gate with Center Fill Plate removed and DHC-8 Pawl Adapter.
Bombardier (also see Canadair CRJs)	CRJ-900 Canadiar Regional Jet	84,750	47,000									■	■	■	■	■	■	3	Use 8850SDA-AL-100 as certified by Bombardier.
British Aerospace	BAC 145 Jet Provo	9,200	TBD	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.3	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed.
British Aerospace	BAC 167 Strikemaster	11,500	6,195	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.3	Froward knuckle. Use Extended Rear Gate with Center Fill Plate removed.

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
British Aerospace / Beagle	SA-3-120 Bulldog 120 Series Trainer	2,350	1,475	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
British Aerospace / Handley Page	Jetstream III	12,500	8,450	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Front torque links. Use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / M D	T-45 Goshawk	14,081	9,834	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Watch Launch arm clearance on Navy version.
British Aerospace / Raytheon	Hawker Hunter Mk 9 / Mk 66	24,000 / 23,500	13,270								■	■							3	Long / low reach restricts tractor to 8800 / 8850
British Aerospace / Raytheon	Jetstream 31 / Super 31 / 32	15,212 / 16,204	9,570 / 10,092		■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Front torque links and wide 18 3 / 4” track. Use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / Raytheon	Jetsream 41	24,000	14,250		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
British Aerospace / Raytheon	Jetstream 51	49,000	30,000		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	
British Aerospace / Raytheon	Jetstream 61 / Jetstream ATP	52,200	31,400			▼	■	■	■	■	■	■	■	■	■	■	■		3	
British Aerospace / Raytheon	Jetstream 71	60,000	36,000			▼	▼	■	■	■	■	■	■	■	■	■	■		3	
British Aerospace / Raytheon	Hawk 50 Trainer / Light Strike	16,200	8,267		■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Front torque links. Use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / Raytheon	Hawk 60 / Hawk 100 Trainer / Light Strike	18,739	8,845 / 9,700		■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Front torque links. Use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / Raytheon	Hawk 200 Light Strike	20,061	9,810		■	■	■	■	■	■	■	■							4.3	Front torque links. Use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / Raytheon	BAe / HS Buccaneer / Blackburn	62,000	56,000					■	■	■	■	■	■	■	■	■	■		4.3	8750 or larger OK. 8700 not recommended, even at OTOW.
British Aerospace / Raytheon	BAe Harrier GR MK3 / AV-8A / AV-8S	25,200	13,535								■	■	■	■	■	■	■		4.3	Long reach to nose gear.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
British Aerospace / Raytheon	BAe Harrier GR MK4 / TAV-8A / TAV-8S	26,200	15,100								■	■	■	■	■	■	■		4.3	Long reach to nose gear.
British Aerospace / Raytheon	BAe Sea Harrier FRS Mks 1 / 51	26,200	14,050								■	■	■	■	■	■	■		4.3	Long reach to nose gear.
British Aerospace / Raytheon	HS125-600 “Hawker”	25,500	12,845		■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.4	If counterweight protrusion, use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / Raytheon	HS 125-700 “Hawker” / Protector	25,500	12,845		■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.4	If counterweight protrusion, use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / Raytheon	HS 125-700 II “Hawker”	25,500	14,400		■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.4	If counterweight protrusion, use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / Raytheon	HS 125-800 / A “Hawker”	27,400	15,120		■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.4	If counterweight protrusion, use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / Raytheon	Hawker 800 / C29-A / U-125A	27,400	16,000		■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.4	If counterweight protrusion, use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / Raytheon	Hawker 1000 (see Raytheon for new Hawkers)	31,000	18,000		▼	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.4	If counterweight protrusion, use Extended Rear Gate with Center Fill Plate removed.
British Aerospace / Raytheon	HS-748 / BAe Super 748	51,000	27,176								■	■	■	■	■	■	■		3	25” wide track.
British Aerospace / Raytheon	HS 748 MF / Andover C Mk 1	50,000	27,666								■	■	■	■	■	■	■		3	25” wide track.
British Aerospace / Raytheon (also see AVRO RJs)	BAe 146-100	84,000	52,500				▼	▼	▼	▼	■	■	■	■	■	■	■		3	Raise Cradle high; forward doors drop on electric power cutoff or spike.
British Aerospace / Raytheon	BAe 146-200	93,000	54,300				▼	▼	▼	▼									3	Raise Cradle high; forward doors drop on electric power cutoff or spike.
British Aerospace / Raytheon	BAe 146-300	97,000	56,000					▼	▼	▼									3	Raise Cradle high; forward doors drop on electric power cutoff or spike.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
British Aerospace / Raytheon	BAe 111-500	104,500	54,582								■	■	■	■	■	■	■		3	
British Aerospace / Raytheon	BAe 111-475	98,500	51,731								■	■	■	■	■	■	■		3	
Britten-Norman / Pilatus	BN2A / B Islander (see Special Attention)	6,600	4,244	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	For remaining Islander / Trilander / Defender fleet, see “Pilatus.”
Buchanan - Australia	BAC-204 “Ozzie Mozzie” Light	1,323	771	■	■	■	■	■	■	■	■	■							4.5	Attach Strut Strap around lowest part of forward strut brace.
Burkhart Grob / Shorts	Grob / Bavarian G115 / D Light	2,028	1,455	■	■	■	■	■	■	■	■	■							3 or 4.5	
C																				
California Helicopter / Sikorsky	S-58T Twin Turbine Conversion	13,000	7,577		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7 and 4.8	Use Long Reach Adapter due to low clearance to dual tail wheel.
Callair / Intermountain Mfg.	Callair A -1 / -2 / -3	1,550	1,000 / 975	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate to maximize rudder clearance.
Camair / North American / Ryan	Callair Twin Navion	4,500	3,000	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Canadair (also see Bombardier)	Challenger 600	40,550-41,400	23,285		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	Always keep Strut Strap on oleo strut clear of Centering Prox Switch.
Canadiar| (also see Bombardier)	Challenger 601 / 601-3A / R / CC-144	42,250-45,250	25,585		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	Always keep Strut Strap on oleo strut clear of Centering Prox Switch.
Canadair - Bombardier	CL-215 Amphib-Water Bomber	43,500 (land)	27,938		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	
Canadair - Bombardier	CL-215T Water Bomber / Utility	43,850 / 37,700	27,040 / 26,400		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	
Canadair - Bombardier	CL-415 M Turbo Water Bomber	43,850 (land)	28,000		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Canadair / Avro Canada	CT 114 Tutor	14,000	6,400		■	■	■	■	■	■	■	■							4.8	Long Reach Adapter required.
CASA / Messerschmidt	Hisopano HA-1112 / BF-109 Fighter	6,090	4,180		■	■	■	■	■	■	■	■							4.8	Long Reach Adapter required to reach tail wheel.
CASA	HA-200 / BV / C Seata Jet Trainer	7,000	5,200	■	■	■	■	■	■	■	■	■	■	■	■	■			3	Side Gates recommended.
CASA	C-212 Series 200 Aviocar	16,424	9,072	▼	▼	▼	■	■	■	■	■	■	■	■	■	■			3	
CASA	C-212 Series 300 Aviocar	16,975	9,072	▼	▼	▼	■	■	■	■	■	■	■	■	■	■			3	
CASA	C-212 Series ASW / SAR	18,519	10,000	▼	■	■	■	■	■	■	■	■	■	■	■	■			3	Extended nose radome.
CASA	CASA 3000	62,391	37,919			▼	▼	■	■	■	■	■	■	■	■	■			3	
CASA / Enaer Chile	C-101 Aviojet / T / A-36 Halcon / E-25	13,890	7,666		■	■	■	■	■	■	■	■	■	■	■	■			4.3	
CASA / IPTN - Airtech / TAI	CN-235 / CN-235 MIL / CN-235 M	31,745	20,725		▼	■	■	■	■	■	■	■		■	■				4.8	Low nose door. Use Long Reach Adapter.
CASA / IPTN - Airtech	N - 250 -100	54,675	30,126			▼	■	■	■	■	■	■	■	■	■	■	■	■	3	Low nose wheel door clearance.
CASA	C-205	51,146	TBD								■	■							3	Low nose wheel door clearance.
CASA	C-295	51,147	24,251	TBD															TBD	TBD
Century Aerospace Corp.	Century Jet	5,550	2,950		■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Cessna	T-50 Bobcat	5,700	4,050		■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7 or 4.8	Use Extended Rear Gate or Long Reach Adapter to access tail wheel.
Cessna	120 / 140 / 140 A	1,450	785 / 890	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7 or 4.8	Use Extended Rear Gate for extra empennage clearance. Set elevators up.
Cessna / Reims Cessna	150 / 150 Acrobat / F-150 / F-A150	1,600	1,104 / 1,122	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.5	88 / 89 capable on non-wheel-fairing versions.
Cessna	152 Commuter / 152 Acrobat / 152 II	1,670	1,081 / 1,118	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.5	88 / 89 capable on non-wheel-fairing versions.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Cessna	170 / 170 A / 170 B / L-19 Bird Dog	2,200-2,400	1,205-1,614	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7 or 4.8	88 / 89 capable on non-wheel-fairing versions.
Cessna / Reims Cessna	172 Skyhawk / Skyhawk II / F-172 / T-41	2,450	1,393-1,600	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	88 / 89 capable on non-wheel-fairing versions.
Cessna	172 Hawk XP / II	2,550	1,531 / 1,557	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	88 / 89 capable on non-wheel-fairing versions.
Cessna	180 Skywagon	2,550 / 2,800	1,643 / 1,694	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	88 / 89 capable on non-wheel-fairing versions.
Cessna	177 / 177 B / Cardinal / Cardinal II	2,500	1,533 / 1,560	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	88 / 89 capable on non-wheel-fairing versions.
Cessna	177 Cardinal RG / Cardinal RG II	2,800	1,707 / 1,768	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	88 / 89 capable on non-wheel-fairing versions.
Cessna	Cutlass / Cutlass II	2,550	1,480 / 1,500	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.5	88 / 89 capable on non-wheel-fairing versions.
Cessna	Cutlass RG / RG II	2,650	1,615 / 1,644	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	88 / 89 capable on non-wheel-fairing versions.
Cessna	182 Skylane / Skylane II	3,100	1,734-2,000	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	88 / 89 capable on non-wheel-fairing versions.
Cessna / Reims Cessna	182 Skylane RG / F-Skylane RG	3,100	1,782	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	88 / 89 capable on non-wheel-fairing versions.
Cessna	182T / 182 Super Skylane	3,600	1,835	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	88 / 89 capable on non-wheel-fairing versions.
Cessna	T182T / 182 Turbo Super Skylane	3,600	1,935	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	88 / 89 capable on non-wheel-fairing versions.
Cessna	182 Turbo Skylane / Turbo Skylane II	3,100	1,752 / 1,797	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	88 / 89 capable on non-wheel-fairing versions.
Cessna	182 Turbo Skylane RG / Skylane RG II	3,100	1,827	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Cessna	182 Turbo Skylane RG II	3,100	1,870	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Cessna	185 / 185 E / A185 E / Skywagon II	3,200 / 3,350	1,752	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy tail wheel access and good rudder clearance.
Cessna	AG Carryall 185 (300)	3,350	1,895	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy tail wheel access.
Cessna	190 / 195 / LC-126	3,350	2,100		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Use Long Reach Adapter. Low clearance to tail wheel.
Cessna	Staionair 6 / Turbo Stationair 6	3,600	1,896 / 2,273	■	■	■	■	■	■	■									4.5 and 4.6	Set 3-bladed prop. If using 88, then use Hold-Back Option.
Cessna	Stationair 7 / 8 / Turbo Stationair 7 / 8	3,800	2,076 / 2,273	■	■	■	■	■	■	■									4.5 and 4.6	Set 3-bladed prop. If using 88, then use Hold-Back Option.
Cessna	205 / 206 / 207 Skywagon / Super Skylane	3,600 / 4,200	1,896 / 2,400	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5 and 4.6	Set 3-bladed prop. 88 / 89 capable on non-wheel-fairing versions.
Cessna	208 / 208A Caravan 1 / U-27A	8,000	3,800	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	88 / 89 capable on non-wheel-fairing versions.
Cessna	208B Caravan 1 / Grand Caravan	8,785	4,100	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop. Attach Strut Strap below rear brace.
Cessna	Denali	TBD	TBD	TBD															TBD	TBD
Cessna - Reims	406 / F406 Caravan II	9,360	4,961	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop. Attach Strut Strap below rear brace.
Cessna	210 Centurion	3,850	2,220	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Set 3-bladed prop. Raise the Cradle a minimal amount, to avoid oleo full-extend lock-in.
Cessna	210 Turbo Centurion	4,100	2,320	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop. Raise the Cradle a minimal amount, to avoid oleo full-extend lock-in
Cessna	P-210 Pressurized Centurion / II	4,100	2,471	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop. Raise the Cradle a minimal amount, to avoid oleo full-extend lock-in
Cessna	AG Wagon / AG Truck 188	4,000 / 4,200	2,140 / 2,214	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Good rudder clearance.
Cessna	AG Carryall 188	3,350	1,902	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Good rudder clearance.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Cessna	AG Husky- Turbo T188	4,400	2,306	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Good rudder clearance.
Cessna / Summit	336 / 337 Skymaster / Sentry 02-337	4,630 / 5,200	2,695 / 3,160	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Watch forward gear door if in dropped position; will clear.
Cessna	T337 Turbo Skymaster	4,500	2,795	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Watch forward gear door if in dropped position; will clear.
Cessna	337 Pressurized Skymaster	4,700	3,061	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Watch forward gear door if in dropped position; will clear.
Cessna	T303 Crusader	5,150	3,364	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Cessna	310 / 310 II / Turbo / R / Clipper	4,700 / 5,535	2,695-3,714	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Cessna	318 / T-37	7,500	6,000	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Cessna	318E / A-37 Dragonfly	14,000	6,211	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Cessna	320 A-C / F Skyknight	4,990 / 5,300	3,190 / 3,273	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Cessna	335	5,990	3,749	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Cessna / RAM	340 A / I / III / RAM 4 / 6	5,990	3,966 / 4,286	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Cessna - Columbia (also see Coumbia / Lancair)	400 Corvallis	3,600	2,500	■	■	■	■	■	■	■	■	■		■	■				3	Attach Strut Strap above hold back arm, on oleo strut below strut fairing. Use a Cantering Adapter with C-350 caps.
Cesnna	408 Skycourier	TBD	TBD	TBD															3	TBD
Cessna	411 / 411 A	6,500	3,865	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Verify that Strut Strap is on oleo strut, not around lower strut cam plate.
Cessna	414 / 414 A / Chancellor / II / III	6,750	4,354 / 4,764	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Verify that Strut Strap is on oleo strut, not around lower strut cam plate.
Cessna	401 / 402 / B / C Businessliner / Utiliner	6,850	4,077 / 4,336	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Verify that Strut Strap is on oleo strut, not around lower strut cam plate.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Cessna / RAM	421 C Golden Eagle / II / III	7,450	4,578 / 4,979	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Verify that Strut Strap is on oleo strut, not around lower strut cam plate.
Cessna	404 Titan Ambassador / Courier / Freighter	8,400	4,804	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Verify that Strut Strap is on oleo strut, not around lower strut cam plate.
Cessna	Conquest I / II	8,600-9,850	5,600-5,687	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Verify that Strut Strap is on oleo strut, not around lower strut cam plate.
Cessna	Corsair	8,200	4,846	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Verify that Strut Strap is on oleo strut, not around lower strut cam plate.
Cessna	Citation Mustang	8,645	5,600	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation Mustang 2	10,700	7,004	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation 500 S / N 1-70	10,850	6,650	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation 500 S / N 71-302	11,500	6,650	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation I 500 / 501 S / N 303 and up	11,850	6,631	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation Jet 525	10,400	6,275	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation II 550 thru S / N 626	13,300	7,725	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation II 550 S / N 627 and up	14,100	7,725	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation SII S550	15,000	7,725	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation II 551	12,500	7,725	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Cessna	Citation CJ1	10,600	6,160	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation CJ2	12,375	7,583	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation CJ3	13,870	8,430	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation CJ4	17,230	10,254	▼	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation Bravo 550	14,800	8,059	■	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation V Encore / + 560	15,900 / 17,030	8,826 / 10,500	▼	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Attach Strut Strap around tow bar boss at fork top.
Cessna	Citation V Ultra 560	16,300	8,826	▼	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Attach Strut Strap around tow bar boss at fork top.
Cessna	Citation Excel 560 XL	20,200	12,400	▼	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Attach Strut Strap around tow bar boss at fork top.
Cessna	Citation III 650 thru S / N 099	21,000	12,900	▼	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation III 650 S / N 100 and up	22,000	12,900	▼	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation VI 650	22,000	12,900	▼	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation VII 650	22,450	12,900	▼	■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Downs and Chine Protectors, and move Side Gates in after capture.
Cessna	Citation Latitude 680A	30,800	18,656		▼	■	■	■	■	■	■	■							4.1.3	Nose light. Attach Strut Strap through torque links under towbar-lug-tubes, or use Citation-X Hold-Down Adapter.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Cessna	Citation Sovereign 680	30,300	18,150		▼	■	■	■	■	■	■	■		■	■			4.1.1 or 4.1.2	Nose light. Attach Strut Strap through torque links under towbar-lug-tubes, or use Citation-X Hold-Down Adapter.
Cessna	Latitude 680A	30,300	21,430		▼	■	■	■	■	■	■	■	■	■	■	■	■	4.1.2	Use Citation-X Hold-Down Adapter.
Cessna	Longitude 700	39,700	TBD		▼	▼	■	■	■	■	■	■	■	■	■	■	■	4.1.1 or 4.1.2	Nose light. Attach Strut Strap through torque links under towbar-lug-tubes, or use Citation-X Hold-Down Adapter.
Cessna	Hemisphere	TBD	TBD				■	■	■	■	■	■	■	■	■	■	■	4.1.2	Use Citation-X Hold-Down Adapter.
Cessna	Citation X 750	34,390	21,390		▼	■	■	■	■	■	■	■		■	■			4.1.3	Nose light. Attach Strut Strap through torque links under towbar-lug-tubes, or use Citation-X Hold-Down Adapter.
Cessna - Textron	JPATS Citation Jet / 526 Trainer	14,100	7,725	■	■	■	■	■	■	■	■	■						4.1.1 or 4.1.2	Nose light. Attach Strut Strap through torque links under towbar-lug-tubes, or use Citation-X Hold-Down Adapter.
Champion Aircraft / Bellanca	7ACA / 7CCM Champ	1,220-1,300	740 / 810	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Champion Aircraft / Aeronca	7EC / 7FC (90) Traveler / Tri-Traveler	1,450	860	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.7	Use Extended Rear Gate to clear rudder on taildragger version.
Champion Aircraft / Aeronca	7EC / 7FC (150 Traveler / Tri-Traveler	1,500	968	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.7	Use Extended Rear Gate to clear rudder on taildragger version.
Champion Aircraft / Aeronca	11 AC Chief / 11CC Super Chief	1,290 / 1,350	820	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Champion Aircraft / Bellanca	7ECA Citabria (108) / (115)	1,650	980 / 1,060	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Champion Aircraft / Bellanca	7GCAA / 7KCAB / 7GCBC Citabria (150)	1,650	1,150	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Champion Aircraft / Bellanca	8KCAB Decathlon / Super Decathlon	1,800	12,60-1,315	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear gate to clear rudder.

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Champion Aircraft / Bellanca	8GCBC / 7GCBC Scout	2,160 / 1,650	1,315 / 1,037	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear gate to clear rudder.
Champion Aircraft	Lancer High-Wing Twin	2,450	1,790	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Chance-Vought	F4U Corsair	12,309	8,694		■	■	■	■	■	■	■	■							4.7 or 4.8	Long Reach Adapter required for 86.
Christen Industries / Aviat	Pitts Special S-1 / S1-T Biplane	1,150	720 / 830	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Extended Rear Gate recommended to maximize rudder clearance.
Christen Industries / Aviat	Pitts Special S-2A / S-2B Biplane	1,575 / 1,625	1,000 / 1,150	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Extended Rear Gate recommended to maximize rudder clearance.
Christen Industries / Aviat	Pitts Special S-2S Biplane	1,500	1,100	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Extended Rear Gate recommended to maximize rudder clearance.
Christen Industries / Aviat	Husky A-1	1,800	1,190	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Easy tail wheel reach. Extended Rear Gate recommended to maximize rudder clearance.
Christen Industries	Eagle II Aerobatic Biplane	1,600	1,025	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Extended Rear Gate recommended to maximize rudder clearance.
Cirrus Design Corp	Cirrus SR20 Composite 4-place	3,000	2,050	■	■	■	■	■	■	■	■	■		■	■				4.6 and 4.10	Sloping strut / wheel pants. Use Cantering Adapter with SR20 / 22 Caps.
Cirrus Design Corp	Cirrus SR22 Composite 4-place	3,400	2,250	■	■	■	■	■	■	■	■	■		■	■				4.6 and 4.10	Sloping strut / wheel pants. Use Cantering Adapter with SR20 / 22 Caps.
Cirrus Design Corp	SF50 Vision Jet	6,000	3,572	■	■	■	■	■	■	■	■	■							3	
Columbia / Lancair	Columbia 300	3,400	2,250	■	■	■	■	■	■	■	■	■		■	■				4.5 and 4.6	Attach Strut Strap above Hold-Back Bar, on oleo below strut fairing. Use Cantering Adapter with C350 Caps.
Columbia / Lancair	Columbia 350	3,400	2,300	■	■	■	■	■	■	■	■	■		■	■				4.5 and 4.6	Attach Strut Strap above Hold-Back Bar, on oleo below strut fairing. Use Cantering Adapter with C350 Caps.
Columbia / Lancair (also see Cessna 400)	Columbia 400 Corvallis	3,600	2,500	■	■	■	■	■	■	■	■	■		■	■				4.5 and 4.6	Attach Strut Strap above Hold-Back Bar, on oleo below strut fairing. Use Cantering Adapter with C350 Caps.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Commander / Gulfstream	Commander 112 / Alpine	2,550 / 2,950	1,500 / 2,035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3-bladed prop. (Also see Aero Commander / Gulfstream.)
Commander / Gulfstream	Commander 114 Gran Turismo A / B / TC / AT	3,260	2,070	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3-bladed prop.
Comair	Firecat (S2-A / CS2F Tracker Conversion)	26,000	15,200		■	■	■	■	■	■	■	■		■	■				4.3	Nose light, and nose gear door. Use Firecat Adapter.
Comair	Turbo Firecat	27,500	15,177		■	■	■	■	■	■	■	■		■	■				4.3	Nose light, and nose gear door. Use Firecat Adapter.
Comair	F-27 (-500C) Firefighter	45,000	23,471		▼	▼	■	■	■	■	■	■	■	■	■	■	■	■	3	Attach Strut Strap around nose gear upper arm.
Comair	DC-6 Water Bomber	120,000	56,000						▼	▼	▼	■	■	■	■	■	■	■	3	Heavy nose weight ratio.
Comair	CV-580 Aerial Tanker	58,156	31,500				▼	■	■	■	■	■	■	■	■	■	■	■	3	Heavy nose weight ratio.
Consolidated / Vultee	PBY-5A Catalina	34,000	17,564				■	■	■	■	■	■							4.2	Use offset Strut Strap attachment due to high wishbone strut.
Convair	CV-240	41,790	27,600				■	■	■	■	■	■	■	■	■	■	■	■	3	Heavy nose weight ratio.
Convair	CV-340	47,000	29,486				■	■	■	■	■	■	■	■	■	■	■	■	3	Heavy nose weight ratio.
Convair	CV-440	49,100	31,305				▼	■	■	■	■	■	■	■	■	■	■	■	3	Heavy nose weight ratio.
Convair	CV-580 / CC-109 “Cosmopolitan”	58,000	30,740				▼	■	■	■	■	■	■	■	■	■	■	■	3	Abnormally heavy nose weight ratio.
Curtis-Wright	C-46 Commando	45,000	29,483				▼	■	■	■	■	■	■	■	■	■	■	■	4.8	Use Long Reach Adapter to clear empennage.
D																				
Dassault	Mirage III / 5 D / E / R / R2Z / RD	30,200	15,500-14,550								■	■	■	■	■	■	■	■	3	Long reach / low clearance requires 88 / 89.
Dassault	Mirage 50	30,200	15,765								■	■	■	■	■	■	■	■	3	Long reach / low clearance requires 88 / 89.
Dassault	Mirage IV Bomber	73,800	31,965				▼	■	■	■	■	■	■	■	■	■	■	■	3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Dassault	Mirage F1 B / C / D / E / R	35,715	16,314		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	
Dassault	Mirage 2000	23,940	16,775		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Dassault	Rafale B / C / D / M	47,399	21,319				■	■	■	■	■	■	■	■	■	■	■		3	Carrier M version launch arm clears tractor OK.
Dassault / -Breguet	Atlantique 2 Patrol	101,850	56,659					▼	▼	▼	▼	■	■	■	■	■	■		3	
Dassault / -Breguet	HU-25A Guardian / Guardian 2	33,510	19,575		▼	▼	■	■	■	■	■	■	■	■	■	■	■		4.4	Use Extended Rear Gate with Center Fill Plate installed.
Dassault / -Breguet	Falcon 10 / 100 (Mystere-Falcon)	19,300	11,145		■	■	■	■	■	■	■	■							4.4	Use large Rear Gate with Center Fill Plate installed, and Side Gates in furthest-out slots.
Dassault / -Breguet	Falcon 20 / 200 (Mystere-Falcon)	32,000	18,190		▼	■	■	■	■	■	■	■	■	■	■	■	■		4.4	Use Extended Rear Gate with Center Fill Plate installed.
Dassault / -Breguet	Falcon 20G / H	32,000	18,190		▼	■	■	■	■	■	■	■	■	■	■	■	■		4.4	Use Extended Rear Gate with Center Fill Plate installed.
Dassault	Falcon 2000	35,000	19,700			■	■	■	■	■	■	■	■	■	■	■	■		3	Use Falcon 50 / 900 / 2000 Interface Tool, per certification. Retract stairs.
Dassault / -Breguet	Falcon 50	38,800-40,780	20,170			▼	■	■	■	■	■	■	■	■	■	■	■		3	Use Falcon 50 / 900 / 2000 Interface Tool, per certification. Retract stairs.
Dassault	Falcon 900 B / T18 / ASDF / EX	45,500	23,402			▼	■	■	■	■	■	■	■	■	■	■			3	Use Falcon 50 / 900 / 2000 Interface Tool, per certification. Retract stairs.
Dasault	5X	TBD	TBD	TBD															3	**CERTIFICATION PENDING.**
Dassault	Falcon 6X	77,460	45,920				▼	▼	■	■	■	■		■	■		■		3	Use Falcon 7X / 8X Interface Tool, per certification.
Dassault	Falcon 7X	69,000	34,272				■	■	■	■	■	■	■	■	■	■	■		3	Use Falcon 7X / 8X Interface Tool, per certification. Retract stairs.
Dassault	8X	73,000	41,000				▼	■	■	■	■	■	■	■	■	■	■		3	Use Falcon 7X / 8X Interface Tool, per certification. Retract stairs.
Dassault / Dormier	Alpha Jet MS 1 / 2	17,637	7,749		■	■	■	■	■	■	■	■							4.3	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed, and Side Gates in furthest-out slots.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
De Havilland	Dragon Rapide	5,550	3,230		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear gate to maximize rudder / empennage clearance.
De Havilland Canada	DHC-1 Chipmunk	1,930	1,158		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear gate to maximize rudder / elevator clearance.
De Havilland Canada / Airtech	DHC-2 Beaver / Airtech DHC-2 PZL	5,100	3,000 / 3,129		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7 or 4.8	Use Extended Rear Gate for empennage clearance; recommend Long Reach Adapter.
De Havilland Canada	DHC-2 MKIII Turbo Beaver	5,370	2,290		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7 or 4.8	Use Extended Rear Gate for empennage clearance; recommend Long Reach Adapter.
De Havilland Canada / AIrtach	DHC-3 Otter / Airtech DHC-3-1000	8,000	4,431		■	■	■	■	■	■	■	■		■	■			4.7 and 4.8	Long Reach Adapter required.
De Havilland / Aeroflight Ind.	DH-3 Turbine Otter	8,000	3,900		■	■	■	■	■	■	■	■		■	■			4.7 and 4.8	Long Reach Adapter required.
De Havilland Canada	DHC-4 Caribou	28,500	18,260		■	■	■	■	■	■	■	■	■	■	■	■	■	3	Watch front nose gear door. Raise Cradle for extra clearance.
De Havilland Canada	DHC-5 Buffalo	49,200	25,106				■	■	■	■	■	■	■	■	■	■	■	3	
De Havilland Canada	DHC-6 Twin Otter 300	12,500	7,415	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Use 44” Strut Strap. Attach strap around rubber at oleo bottom. Ensure lower torque link fully down / sandwiched in Strut Strap.
De Havilland Canada	DHC-6M and MR (Military) 300	14,000	7,561-9,788	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Use 44” Strut Strap. Attach strap around rubber at oleo bottom. Ensure lower torque link fully down / sandwiched in Strut Strap.
De Havilland Canada	DHC-7 “Dash 7”	43,500	27,000			▼	■	■	■	■	■	■	■	■	■	■	■	3	
De Havilland Canada	DHC-8 “Dash-8” 100 A / E-9A / CC-142	34,500	22,600			▼	■	■	■	■	■	■	■	■	■	■	■	4.4 and 4.10	Wide track / protrusion. Use Extended Rear Gate with Center Fill Plate removed and Dash-8 Pawl Adapter.
De Havilland / Bombardier	DHC-8 “Dash-8” 100 B	36,300	22,648			▼	■	■	■	■	■	■	■	■	■	■	■	4.4 and 4.10	Wide track / protrusion. Use Extended Rear Gate with Center Fill Plate removed and Dash-8 Pawl Adapter.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL														METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
De Havilland / Bombardier	DHC-8 Dash-8" 200 A / 200B	36,300	22,886			▼	■	■	■	■	■	■	■	■	■	■	■	4.4 and 4.10	Wide track / protrusion. Use Extended Rear Gate with Center Fill Plate removed and Dash-8 Pawl Adapter.
De Havilland / Bombardier	DHA-8 "Dash-8" 300 A	41,100 / 43,000	25,700			▼	■	■	■	■	■	■	■	■	■	■	■	4.4 and 4.10	Wide track / protrusion. Use Extended Rear Gate with Center Fill Plate removed and Dash-8 Pawl Adapter.
De Havilland / Bombardier	DHC-8 "Dash-8" 300 B / E (Series continued)	43,000	25,700			▼	■	■	■	■	■	■	■	■	■	■	■	4.4 and 4.10	Wide track / protrusion. Use Extended Rear Gate with Center Fill Plate removed and Dash-8 Pawl Adapter.
De Havilland / Bombardier	DHC-8Q-200 "Dash 8Q 200"	36,500	22,454			▼	■	■	■	■	■	■	■	■	■	■	■	4.4 and 4.10	Wide track / protrusion. Use Extended Rear Gate with Center Fill Plate removed and Dash-8 Pawl Adapter.
De Havilland / Bombardier	DHC-8Q-400 "Dash 8Q 400"	63,450	36,553			▼	■	■	■	■	■	■	■	■	■	■	■	4.4 and 4.10	Wide track / protrusion. Use Extended Rear Gate with Center Fill Plate removed and Dash-8-400 Pawl Adapter.
DHI - South Korea	Daewoo KTX-1 Yeo-Myoung	5,470	3,153	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3- or 4-bladed prop. Turbo prop; watch for windmilling/
Diamond Aircraft	DA-20 Evolution / Eclipse / Katana	1,764	1,090	■	■	■	■	■	■	■	■	■		■	■			4.5	Use Cantering Adapter with DA-20 Caps.
Diamond Aircraft	DA-40 Diamond Star	2,535	TBD	■	■	■	■	■	■	■	■	■		■	■			4.5	Use Cantering Adapter with DA-20 Caps.
Diamond Aircraft	DA_42 Twin Star (MPP version, see remarks)	3,935	2,270	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Use Multi-Purpose Platform with Camera Turret and Long Reach Adapter.
Dornier Claudius / Seastar	Seastar CD-2 Amphib	10,154	4,520-6,781	■	■	■	■	■	■	■	■	■						4.3	
Dornier	Do 27 STOL Observer	3,500	2,000		■	■	■	■	■	■	■	■		■	■			4.7 and 4.8	
Dornier	Do 28 / D-2 Skyservant	8,852	5,132	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	
Dornier	Do 128-6	9,590	5,600	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Dornier / DASA	Do 228 - 100 / 101	12,566 / 13,183	6,570 / 6,592	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Dornier / DASA	Do 228 - 200 / 201 / 212	12,566 / 14,109	6,803-8,370	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Dornier / DASA	Do 328 - 110 Turboprop	31,019	20,723		▼	■	■	■	■	■	■	■	■	■	■	■	■		3	Option 091K001 required, per SB-328-09-572
Dornier - Fairchild (also see Fairchild-Dornier)	Do 328 - 300 Jet	33,841	20,282		▼	■	■	■	■	■	■	■	■	■	■	■	■		3	
Dornier - Fairchild	Do 328 - 310ER Jet	34,795	20,573		▼	■	■	■	■	■	■	■	■	■	■	■	■		3	Option 091K001 required, per SB-328-09-572
Dornier Seastar Malaysia	Seastar CD-2 Amphib	10,141	6,781	■	■	■	■	■	■	■	■	■							4.3	
Douglas Aircraft Co.	A-26 Invader / B-26 (Counter) Invader	35,000 / 37,000	22,370		▼	■	■	■	■	■	■	■	■	■	■	■	■		3	
Douglas Aircraft Co.	DC-3 Dakota / C-47	25,200	16,865		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	
Douglas Aircraft Co.	DC-4 / C-54	65,000	35,000					▼	■	■	■	■	■	■	■	■	■		3	
Douglas Aircraft Co.	DC-6 / 6A / 6B	97,200 / 106,000	51,400 / 49,767							▼	▼	■	■	■	■	■	■		3	
Douglas Aircraft Co. (also see McDonnell Douglas)	DC-7	143,000	72,763									▼	▼	■	■	■	■		3	
E																				
Eagle Aircraft - Australia	Eagle X - TS Light Aircraft	1,433	930	■	■	■	■	■	■	■	■	■							4.5	Attach Strut Strap around oleo below strut fitting.
Ector	Ector Super Mountaineer / L-19 Civil	2,800	1,483	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate to maximize rudder clearance.
Eclipse Aviation	Eclipse 500	5,680	3,390	■	■	■	■	■	■	■	■	■							3	No hold-down required.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
EHI Westland / Augusta	EH 101 Helicopter Multi-Role	28,660 / 31,500	19,840-20,500							■	■	■	■	■	■	■	■		3	Extremely high nose weight ratio.
Elmwood Aviation	CA-05 Christavia Mk 1	1,300	745	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate at most forward position to clear rudder.
Elmwood Aviation	CH-8 Christavia Mk 4	2,300	1,150	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate at most forward position to clear rudder.
Embraer / FAMA	CBA-123 Vector Pusher-Turboprop	20,994	15,090		■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Use Extended Rear Gate to clear front torque links.
Embraer - Brazil / Brazil	EMB-201 / 202 Ipanema Agricultural	3,968	2,293		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	
Embraer / Shorts	EMB-312 Toucan / Tucano	7,000	4,123	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop. Raise Cradle high, and watch for windmilling.
Embraer / Northrop	EMB-312H Super Toucan / Super Tucano	7,033	5,335	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 5-bladed prop. Raise Cradle high, and watch for windmilling.
Embraer	EMB-314 Super Toucan / Super Tucano	11,646	TBD	■	■	■	■	■	■	■									3	
Embraer	C-390	164,000	TBD										■	▼	■	■	■		TBD	TBD
Embraer	KC-390	178,574	TBD	TBD															TBD	TBD
Embraer - Brazil / Brazil	Embraer-195 / LR	112,312 / 115,631	59,700 / 65,690								▼	■	■	■	■	■	■		3	High nose gear weight requires 8850 or larger.
Embraer	Embraer-190 / Linnear-1000 Corporate	114,539	65,029								▼	■	■	■	■	■	■		3	
Embraer	Embraer-175	85,860	49,598								▼	■	■	■	■	■	■		3	
Embraer	Embraer 170 / LR	82,355 / 106,922	44,400 / 48,055								▼	■	■	■	■	■	■		3	
Embraer	175-E2	98,767	78,705								■	■	■	■	■	■	■		3	
Embraer	190-E2	124,340	72,752									▼	▼	■	■	■	■		3	
Embraer	195-E2	135,585	TBD								■	■	■	■	■	■	■		3	

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Embraer	ERJ-145 XR Regional Jet	52,910	27,500		▼	▼	■	■	■	■		■	■	■	■	■	■	3	8850SDA / -AL version should be -100 / 50 dual-limiter version.
Embraer	ERJ-145 ER Regional Jet	45,415	25,722		▼	▼	■	■	■	■		■	■	■	■	■	■	3	8850SDA / -AL version should be -100 / 50 dual-limiter version.
Embraer	ERJ-145 LR Regional Jet	48,500	26,470		▼	▼	■	■	■	■		■	■	■	■	■	■	3	8850SDA / -AL version should be -100 / 50 dual-limiter version.
Embraer / Harbin-Embraer	ERJ-145 RJ / SA / AEW / RS / MP / ASW	48,721	27,351		▼	▼	■	■	■	■		■	■	■	■	■	■	3	8850SDA / -AL version should be -100 / 50 dual-limiter version.
Embraer	ERJ-140 Regional Jet	46,737	24,548		▼	▼	■	■	■	■		■	■	■	■	■	■	3	8850SDA / -AL version should be -100 / 50 dual-limiter version.
Embraer	ERJ-135 LR Regional Jet	44,092	24,554		▼	▼	■	■	■	■		■	■	■	■	■	■	3	8850SDA / -AL version should be -100 / 50 dual-limiter version.
Embraer	ERJ-135 ER Regional Jet	41,888	23,554		▼	▼	■	■	■	■		■	■	■	■	■	■	3	
Embraer	ERJ-135 Regional Jet	41,800	24,548		▼	▼	■	■	■	■		■	■	■	■	■	■	3	
Embraer	Phenom 100	10,582	7,220	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.1.1 or 4.1.2	Use Phenom 100 Pawl Adapter
Embraer	Phenom 300	17,968	11,783	▼	■	■	■	■	■	■	■	■	■	■	■	■	■	4.1.1 or 4.1.2	Use Phenom 300 Pawl Adapter
Embraer	Legacy 450	35,163	25,287	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Embraer	Legacy 500	38,347	23,400	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Embraer	Legacy 600	49,604	30,081			▼	■	■	■	■	■	■	■	■	■	■	■	3	
Embraer	Legacy 650	53,572	31,217			▼	■	■	■	■	■	■	■	■	■	■	■	3	
Embraer	Lineage 1000	114,539	65,029								▼	■	■	■	■	■	■	3	
Embraer	Legacy Shuttle 19-seat business configuration	4,313	27,007				■	■	■	■		■	■	■	■	■	■	3	8850SDA / -AL version should be -100 / 50 dual-limiter version.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Embraer	EMB-120 / ER Brasilia	25,529-26,433	16,645 / 16,667		■	■	■	■	■	■	■	■	■	■	■	■	■		3	Keep Side Gate fully out to avoid contacting low wheel rim. Ensure static drag wire does not catch under Cradle.
Embraer	EMB-110 / P Bandeirante	12,345	7,915	■	■	■	■	■	■	■	■	■							3	Keep Side Gate fully out to avoid contacting low wheel rim. Use aluminum Extended Rear Gate. Ensure static drag wire does not catch under Cradle.
Embraer	EMB-121 / A Xingu Twin	12,500	8,179	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Trailing arm. Use Extended Rear Gate. Attach Strut Strap behind upper arm.
Embraer	EMB-111 Surveillance	15,432	8,598		■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	If ECM radome fitted, use Long Reach Adapter on 8600.
Embraer	Praetor 500	17,040	10,391		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Embraer	Praetor 600	19,440	11,503		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Enair - Chile	Namchu-Aguilucho / Eaglet ECH-02	1,760	1,200	■	■	■	■	■	■	■	■	■							3	Attach Strut Strap between oleo and aft linkage.
Enair (for Enaer A-36 . T-36, see CASA / Enair)	T-35 Pillan	2,900	1,836	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop and watch for windmilling.
Enair	T-35 DT Pillan Turbo	2,950	2,080	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop and watch for windmilling.
EPA Aircraft Co.	EPA NAC 6 Fieldmaster / Firemaster	6,000	3,900	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	For maximum 5-bladed prop clearance, use Extended Rear Gate and raise Cradle high.
Epervier Aviation - Belgium	Epervier ARV Very Light	1,653	992	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Ercoupe	Ercoupe 415 C / D / G	1,400	815	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Ercoupe / Alon	Alon Ercoupe A-2	1,450	930	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Ercoupe / Forney	Forney Ercoupe F-1	1,400	890	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Ercoupe / Mooney	Mooney Ercoupe A-2-A	1,450	930	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Ercoupe / Mooney	Mooney Cadet M-10	1,450	950	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Ethiopian Airlines / Schweizer	Eshet AG-Cat Super B Turbine	7,020	3,150	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Easy tail wheel reach. Attach Strut Strap below strut arm.
Eurocopter	AS-332 L1 Super Puma Multi-Role	18,960	9,832		■	■	■	■	■	■	■	■							4.8	Long, low reach. Use Long-Reach Adapter with Dual-Wheel Hold-Back Brackets.
Eurocopter	AS-332 L2 Super Puma MK II	20,502	10,274		■	■	■	■	■	■	■	■							4.8	Long, low reach. Use Long-Reach Adapter with Dual-Wheel Hold-Back Brackets.
Eurocopter	AS-532 Cougar MK I	19,841	9,546-9,920		■	■	■	■	■	■	■	■							4.8	Long, very low reach. Use Long Reach Adapter. Watch antennae blade(s).
Eurocopter	AS-532 Cougar MK II	21,495	10,493		■	■	■	■	■	■	■	■							4.8	Long, very low reach. Use Long Reach Adapter. Watch antennae blade(s).
Eurocopter	AS-365 N2 / 3 / -366 Dauphin / HH-65A Dolphin	9,369 / 9,479	4,974		■	■	■	■	■	■	■	■	■	■	■	■			4.3 or 4.8	Use Extended Rear Gate; if long radome / probe, then use Long Reach Adapter.
Eurocopter	EC-155B Dauphin	10,582	5,573		■	■	■	■	■	■	■	■							4.8	Long reach and low clearance. Use Long Reach Adapter.
Eurocopter	AS 565 Panther	9,369	4,971		■	■	■	■	■	■	■	■	■	■	■	■	■		4.3 or 4.8	Use Extended Rear Gate; if long radome / probe, then use Long Reach Adapter.
Eurocopter	HAP / HAC / PAH-2 Tiger Attack	13,227	7,275		■	■	■	■	■	■	■	■	■	■	■	■	■		4.3 and 4.7	Use Extended Rear Gate for empennage clearance.
Eurocopter	AS-321 F / G / H / JA Super Frelon Helicopter	28,660	15,141		■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.8	If radome equipped, use Long Reach Adapter.
Eurocopter Jagdflugzeug	Eurofighter 2000 DA1 / DA4	46,297	21,495		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	
Excalibur	Exaclibur Queenaire 800 / 8800	8,000 / 8,800	5,400 / 5,800	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Extra Flugzeugbau	EA 300 Aerobatic	2,094	1,389		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy tail wheel reach.
Extra Flugzeugbau	E400 Pressurized Composite Single	4,230	2,660	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
F																				
Fairchild (also see Swearingen)	Fairchild 300 / Merlin III A / B / C	13,230	8,200	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Fairchild	Metro III / Metro III A / Expediter	14,500	8,737	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Fairchild	Fairchild IV C / Merlin IV C	14,500	9,100	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Fairchild	Metro III H	16,000	9,028		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Fairchild	Metro 23 / Merlin 23 / Expediter I / 23 / C-26	16,500	9,500		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Fairchild	Fairchild 400	16,500	9,686		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Fairchild - Dornier	Do 328 - 300 / ER Jet	33,841	20,282		▼	■	■	■	■	■	■	■	■	■	■	■	■		3	Do not exceed OEM-mandated yellow 60° precautionary turn limit line.
Fairchild - Dornier	Do 328 - 310 / ER Jet	34,795	20,573		▼	■	■	■	■	■	■	■	■	■	■	■	■		3	Do not exceed OEM-mandated yellow 60° precautionary turn limit line.
Fairchild-Hiller / Porter	PC-6 Turbo-Porter STOL / UV-20 A	4,850-6,100	2,601-2,685		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Extended tail wheel provides good clearance.
Fairchild - Republic	A-10A Thunderbolt II	50,000	24,959		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	
Fairchild Republic	T-46A	6,817	5,184	■	■	■	■	■	■	■	■	■							3	
Fairchild Republic	AT-46A	6,966-8,266	5,190	■	■	■	■	■	■	■	■	■							3	
Fairchild - SAAB	340 A	28,000	17,415		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
FFA - Switzerland	AS 202 Bravo -18A / 26A	2,094-2,645	1,543 / 1,748	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
FLS Aerospace	Optica OA7-300	2,899	2,090		■	■	■	■	■	■	■	■							4.3 or 4.8	Use either Long Reach Adapter, or Extended Rear Gate in forward-most position because of low clearance.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
FLS	Sprint 160 / Club Sprint	1,306 / 11,00	1,920 / 1,650	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
FMA - Argentina	IA-58 / A / C / 66 Pucara Attack	14,991	8,862	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
FMA - Argentina	IA-63 Pampa Jet Trainer	11,023	6,219	■	■	■	■	■	■	■	■	■							4.3	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed, and attach Strut Strap around strut above arm / inside light.
FMA - Vought - Local	IA-63 Pampa 2000 JAPATS	11,023	6,219	■	■	■	■	■	■	■	■	■							4.3	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed, and attach Strut Strap around strut above arm / inside light.
Fokker / Fairchild Hiller	FH-227	43,500	22,923		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap around nose gear upper arm.
Fokker / Fairchild Hiller	F-27 Mk 200 / 400M / 500 / 600	45,900	25,307 / 26,800		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap around nose gear upper arm.
Fokker	F-50	45,900	27,602		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap around nose gear upper arm.
Fokker	F-60	50,596	27,583		▼	▼	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap around nose gear upper arm.
Fokker	F-28 Mk 4000 (jet)	73,000	38,900								■	■	■	■	■	■	■		3	
Fokker	F-70 / F-70 ER (jet)	84,000 / 88,000	50,930 / 52,470								■	■	■	■	■	■	■		3	
Fokker	F-100 / F-100 ER (jet)	98,000 / 101,000	56,000 / 58,640								▼	■	■	■	■	■	■		3	
Forney / Ercoupe	Forney Ercoupe F-1	1,400	890	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Fournier Avions	Fournier RF-47 Light Trainer	1,323	838	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Fuji	Fuji T-5 Primary Trainer	3,979	2,385	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop. Watch for windmilling.
Funk / Akron	Funk Model B	1,350	890		■	■	■	■	■	■	■	■							4.7 and 4.8	Long Reach Adapter required to access tail wheel.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
GAF - Australia	Nomad N22B	8,500	4,400		■	■	■	■	■	■	■	■	■	■	■	■	■	3	
GAF - Australia	Nomasd N24A	9,400	5,266		■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Galaxy Aerospace / IAI (also see IAI for Westwinds)	Astra SP / 1125	23,500	13,225		■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Galaxy Aerospace / IAI (also see Gulstream)	Astra XP / G-100 / 150	13,700-15,100	24,650-26,250		■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Galaxy Aerospace / IAI	Galaxy / G-200	34,850-35,000	19,200			■	▼	▼	▼	■	■	■	■	■	■	■	■	4.4 or 4.8	
Ganzavia KFT - Hungary	Ganzavia GAK-22 Dino	1,587	948	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Gavilan-Columbia / GATS-USA	EL-1 Model 358 Utility Transport	4,500	2,800	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3-bladed prop. Rear Gate recommended to clear trailing arm strut.
General Dynamics / Lockheed	F-16 “Fighting Falcon” A / B / C / D	27,185-42,300	18,200-28,200		▼	▼	■	■	■	■	■	■	■	■	■	■	■	3	Restricted standing head clearance.
General Avia	General Avia F 22 Primary Trainer	1,984	1,290	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
General Avia	General Avia F 22 R Pinguino Sport	1,873	1,268	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
General Avia	General Avia F 220 Airone Touring	2,535	1,543	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Gippsland Aeronautics	Gippsland GA_200 Agricultural	3,748	1,698	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Easy access to tail wheel.
Great Lakes Aircraft Corp. / Co.	2T-1 / 2T-1A-1 / 2T-1A-2 Sport Trainer	1,580-1,800	910-1,230	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	
Great Plains	Sonerai II / IIL / II-LT / II-LTS	1,150	500	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to maximize rudder clearance.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Grob Aerospace	G 115 B / C1 / C2 / D1 / D2 / Bavarian	2,028	1,433-1,455	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.5	Wheel pants. Attach Strut Strap through torque links. If oleo strut covered, run above links. 88 / 89 Cradle on non-fairing version.
Grob Aerospace	G 115T Acro Trainer	2,976	1,847-1,962	■	■	■	■	■	■	■	■	■							3	Oleo strut is covered. Attach Strut Strap over lower cover clamp below links.
Grob Aerospace	GF 200 Touring-Pusher	3,527	TBD	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Grob Aerospace	G 850 Strato 2C Long-Endurance Surveillance	25,794	12,786		■	■	■	■	■	■	■	■							3	Wingspan = 185’ 4.5”. Use guide persons. Long reach to nose gear.
Grob Aerospace	G 180 Utility Jet	TBD	TBD		■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Grumman / Resorts Intl.	G-III Albatross / UF-2 / HU-16B	30,800 (land)	23,500					▼	■	■	■	■	■	■	■	■	■	■	4.4	Nose heavy. Use Extended Rear Gate to clear left door.
Grumman (also see Northrop)	F4F “Wildcat” / FM-2 “Wildcat”	5,876	4,425		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required to access tail wheel.
Grumman	F6F “Hellcat”	12,500-15,400	9,153		■	■	■	■	■	■	■	■		■	■				3	
Grumman	F8F “Bearcat”	9,300	7,070		▼	▼	■	■	■	■	■	■		■	■				4.7 and 4.8	High tail weight. Long Reach Adapter required to reach tail wheel.
Grumman	E-2C Hawkeye / Daya EWAC	53m267	39,373				▼	■	■	■	■	■	■	■	■	■	■	■	4.4	Use Extended Rear Gate to clear low launch arm and front nose wheel door.
Grumman	C-2A Greyhound	54,354	39,373				▼	■	■	■	■	■	■	■	■	■	■	■	4.4	Use Extended Rear Gate to clear low launch arm and front nose wheel door.
Grumman	S-2 Tracker	29,000	13,840		▼	▼	■	■	■	■	■	■	■	■	■	■	■	■	4.3	Use Extended Rear Gate. Watch front door on bounce. Raise Cradle.
Grumman / IMP / Bedek	S-2T Turbo Tracker	29,000	13,840		▼	▼	■	■	■	■	■	■	■	■	■	■	■	■	4.3	Use Extended Rear Gate. Watch front door on bounce. Raise Cradle.
Grumman	A-6E Intruder	60,400	27,613			▼	▼	▼	■	■	■	■	■	■	■	■	■	■	4.4	Use Extended Rear Gate to clear front launch arm.
Grumman	EA-6B Prowler	65,000	31,572			▼	▼	▼	■	■	■	■	■	■	■	■	■	■	4.4	Use Extended Rear Gate to clear front launch arm.
Grumman	F-14 “Tomcat”	74,349	40,104				▼	▼	■	■	■	■	■	■	■	■	■	■	3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Grumman	TBM-3A Avenger	18,250	TBD		■	■	■	■	■	■	■	■							4.7 or 4.8	Watch tail hook.
Grumman / Schweizer	G-164 Ag-Cat	4,200	2,600	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy access to tail wheel. Attach Strut Strap below strut arm.
Grumman / Gulfstream American	Super Ag-Cat	4,500	2,690	■	■	■	■	■	■	■	■	■							4.7	Easy access to tail wheel. Attach Strut Strap below strut arm.
Grumman / Gulfstream American	Gulfstream I Turbo-Prop / VC-4A / TC-4C	35,000	21,900			■	■	■	■	■	■	■	■	■	■	■	■		3	
Grumman / Gulfstream American	AA-1 Yankee / AA-1A / B Trainer / TR-2	1,500-1,560	963-1,039	■	■	■	■	■	■	■	■	■		■	■				4.9	Sloping strut and wheel pants. Use Cantering Adapter with Grumman caps.
Grumman / Gulfstream American	AA-1C T-Cat / Lynx	1,600	1,066	■	■	■	■	■	■	■	■	■		■	■				4.9	Sloping strut and wheel pants. Use Cantering Adapter with Grumman caps.
Grumman / Gulfstream American	AA5 / A Traveler / Cheetah	2,200	1,200	■	■	■	■	■	■	■	■	■		■	■				4.10	Sloping strut and wheel pants. Use Cantering Adapter with Grumman caps.
Grumman / Gulfstream American	AA5 / B Tiger	2,400	1,285	■	■	■	■	■	■	■	■	■		■	■				4.10	Sloping strut and wheel pants. Use Cantering Adapter with Grumman caps.
Grumman / Gulfstream American (also see Socata Tangara)	GA-7 Cougar Light Twin	3,800	2,588	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Gulstream / Rockwell	Commander 112 / 112TC	2,800 / 2,950	1,173 / 1,834	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop.
Gulstream / Rockwell	Commander 114	3,140-3,260	1,790-2,070	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop.
Gulstream / Rockwell	Commander Alpine	2,950	2,035	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop.
Gulstream / Rockwell	Commander Gran Turismo	3,272	2,070	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop.
Gulstream / Rockwell / Twin (also see Aero Commander)	Commander Jetprop 690 / 840 / 980	10,325	6,195 / 6,702	■	■	■	■	■	■	■	■	■		■	■				4.1.1 or 4.1.2	Nose light. Use Hold-Down Adapter and Side Gates.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Gulstream / Rockwell / Twin (also see Aero Commander)	Commander Jetprop 900	10,700	7,079	■	■	■	■	■	■	■	■	■		■	■			4.1.1 or 4.1.2	Nose light. Use Hold-Down Adapter and Side Gates.
Gulstream / Rockwell / Twin	Commander Jetprop 1000	11,200	7,289	■	■	■	■	■	■	■	■	■		■	■			4.1.1 or 4.1.2	Nose light. Use Hold-Down Adapter and Side Gates.
Gulstream / Rockwell / Twin	Commander Jetprop 1200	11,750	7,475	■	■	■	■	■	■	■	■	■		■	■			4.1.1 or 4.1.2	Nose light. Use Hold-Down Adapter and Side Gates.
Gulfstream Aerospace (see Grumman for G-1)	G-II	65,500	36,000			▼	▼	▼	■	■	■	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace	G-III / C-20A	69,700	38,000			▼	▼	▼	■	■	■	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace	G-IV / IV SP / C-20 (SR4A)	74,600	42,500				▼	▼	■	■	■	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace	G-V	85,100	45,500				▼	▼	▼	▼	■	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace	G-350	71,300	42,700				▼	▼	■	■	■	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace	G-450	74,300	43,000				▼	▼	■	■	■	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace	G-500	85,500	48,000				▼	▼	▼	▼	■	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace	G-550	91,400	48,300				▼	▼	▼	▼	▼	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace	G-600	91,600	54,440				▼	▼	▼	▼	▼	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace	G-650	99,600	54,000				▼	▼	▼	▼	▼	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace	G-650ER	103,100	60,500					▼	▼	▼	▼	■	■	■	■	■	■	3 or 4.9	underbelly tow / push OK with 88 / 89.
Gulfstream Aerospace / IAI (also see Galaxy IAI)	G-100 / 150 / Astra XP	13,700-15,100	TBD		■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Gulfstream Aerospace / IAI	G-200 / Galaxy	34,850-35,000	19,200				▼	▼	▼	■	■	■						4.4 or 4.8	Use Extended Rear Gate with 88.
Gulfstream Aerospace	G-280	39,600	24,150				▼	▼	■	■	■	■						4.4 or 4.8	Use aluminum Extended Rear Gate with 87X, 87.5X, 87.5X-AL, and 88.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
H																				
Handley Page / Century	Jetstream III	12,500	8,450	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Front torque links. Use Extended Rear Gate.
Harbin - China	HAMC Y-11 Yunshuji Transport	7,715	5,520	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Nose wheel yoke usually clears, but use Extended Rear Gate if low.
Harbin - China	HAMC Y-12 Yunshuji Transport	9,921	6,261	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Nose wheel yoke usually clears, but use Extended Rear Gate if low.
Harbin - Europcopter	HAMC Z-9 Haitun (AS 365 Dauphin 2)	9,039	4,519		■	■	■	■	■	■	■	■		■	■			4.8	Use Marquise / Dauphin Long Reach Adapter.
Harkov	AN-74-200 Transport	73,000	TBD					▼	▼	▼	■	■	■	■	■	■	■	3	
Harlow Engineering	Harlow PJC-2	2,600	1,700		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear empennage when turning.
Hawk Industries	Gafhawk 125	14,500	6,800	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Trailing knuckle. Use Extended Rear Gate to maximize clearance.
Hawker see British Aerospace for HS125)	Sea Fury	12,350	9,240		■	■	■	■	■	■	■	■		■	■			4.7 and 4.8	Long Reach Adapter required. Capture tail wheel pivoted to aircraft front.
Hawker	Tempest IV	12,975	9,220		■	■	■	■	■	■	■	■		■	■			4.7 and 4.8	Long Reach Adapter required. Capture tail wheel pivoted to aircraft front.
Helio Aircraft	Helio Courier 700 / 800 Super Courier / U10	3,400	2,080	■	■	■	■	■	■	■	■	■		■	■			4.7 or 4.8	Use Extended Rear Gate or Long Reach Adapter to clear rudder.
Helio Aircraft	Helio Courier H-295 / 395 / 391 Super Courier	3,400	2,080	■	■	■	■	■	■	■	■	■		■	■			4.7 or 4.8	Use Extended Rear Gate or Long Reach Adapter to clear rudder.
Helio Aircraft	Trigear Courier HT-295	3,400	2,080	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Tricycle gear version. Set 3-bladed prop.
Helio Aircraft	Helio Stallion	5,100	2,860		■	■	■	■	■	■	■	■		■	■			4.7 or 4.8	Use Extended Rear Gate or Long Reach Adapter to clear rudder.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
HOAC Austria Flugzeugwerk	HOAC DV-20 Katana	1,609	1,091	■	■	■	■	■	■	■	■	■		■	■			4.5	Use Cantering Adapter with DA-20 caps.
Honda Jet	HA-420	9,953	TBD	■	■	■	■	■	■	■	■	■						4.1.1 or 4.1.2	Use Hold-Down Adapter.
Howard Aircraft Corp.	Howard DGA-15	4,350	2,700		■	■	■	■	■	■	■	■		■	■			4.7 and 4.8	Use Long Reach Adapter to reach tail wheel.
IBIS Aerospace	Ae 270	8,818	5,653		■	■	■	■	■	■	■	■	■	■	■	■	■	4.4 or 4.8 and 4.6	Set 4-bladed prop. Use Extended Rear Gate with Fill Plate and raise Cradle high.
IAR / ICA - Romania	INAV IAR-823 Training / Touring	2,623-3,307	2,000-2,094	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
IAV Bacau	YAK-52 Trainer	2,844	2,205	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
IAV Buchresti	ROM BAC 1-11-495	98,500	51,339						▼	▼	▼	■	■	■	■	■	■	3	
IAV Buchresti	ROM BAC 1-11-560	104,500	55,774						▼	▼	▼	■	■	■	■	■	■	3	
IAV Craiova	IAR-99 Soim / Hawk	12,072	6,878	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Ensure adequate nose probe clearance.
IAV Craiova	IAR-99 Soim / Hawk	12,072	6,878								■	■	■	■	■	■	■	3	Ensure adequate nose probe clearance.
IG JAS / SAAB	JAS-39 Gripen Attack / Recon	18,740	14,600									▼		■	■	■	■	4.3 or 4.4	Front torque links and long, low reach. Use large Rear Gate.
Ilyushin	IL-38 / IL-18 / IL-20	140,000	79,367								■	■	■	■	■	■	■	4.4	Front torque links. Use Extended Rear Gate with Center Fill Plate removed.
Ilyushin	Il-114 Regional Pax / Cargo	50,045	33,070			▼	■	■	■	■	■	■	■	■	■	■	■	3	High nose weight.
Interavia	1-3 Aerobatic	2,343	1,675		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Easy access to tail wheel.
ISAE - USA	ISAE Omega 2	2,100	1,300	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Israel Aircraft Industries	Kfir C1 / C2 / TC2 / C7 / TC7 / F21A	36,376	16,060			■				■	■	■	■	■	■	■	■	3	Forward knuckle and long, low reach. Use Large Rear Gate with Center Fill Plate removed.

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Israel Aircraft Industries	Arava 102 / 201 / 202	15,000-17,000	8,816 / 9,063		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Israel Aircraft Industries	Westwind 1 / 1121 / Commodore / Jet-Commander	22,850	12,700		■	■	■	■	■	■	■	■		■	■					Use Westwind Adapter. Contain lower torque link between Strut Straps. Ensure upper torque link is pinned up.
Israel Aircraft Industries	Westwind 2 / 1123 / 1124 A	23,500	13,250		■	■	■	■	■	■	■	■		■	■					Use Westwind Adapter. Contain lower torque link between Strut Straps. Ensure upper torque link is pinned up.
Israel Aircraft Industries / Galaxy (also see Gulfstream)	Astra SP / 1125 G-100	23,500	13,225		■	■	■	■	■	■	■	■	■	■	■	■	■			Use Westwind Adapter. Contain lower torque link between Strut Straps. Ensure upper torque link is pinned up.
Israel Aircraft Industries / Galaxy	Astra SPX / G-100 / G-150	24,650-26,250	13,700-15,100		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Israel Aircraft Industries / Galaxy	Galaxy / G-200	34,850-35,000	19,200				▼	▼	▼	▼	■	■							4.4 or 4.8	Use Extended Rear gate with 88.
J																				
Jabiru Aircraft	Jabiru LSA Light Sport	1,540	755	■	■	■	■	■	■	■									3 or 4.5	Sloping, solid sprung strut. Attach Strut Strap above Hold-Back Bar.
Jetstream / British Aerospace (also see BAe)	Jetstream 31 / Super 31	15,200 / 16,204	9,570 / 10,092		■	■	■	■	■	■	■	■	■	■	■	■	■		4.4	Low torque links and wide 18 3 / 4” track require Side Gates set to furthest-out positions.
Johnson Alrcraft / AM Co.	Johnson Rocket 185 / Texas Bullet	2,250	1,550	▼	■	■	■	■	■	■	■	■		■	■				3 or 4.8	Tail wheel version requires Long Reach Adapter.
Jurca (Marcel)	Jurca MJ5 Sirocco	1,499	947		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	
Junkers / CASA	Ju-52 / 3M “Tante Ju” / CASA 352	TBD	TBD		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy access to tail wheel.
K																				

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
KA - Korean Air	KA CHK-91 Chang-Gong 91	2,700	1,850	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
KAMOV	Ka-26 Helicopter Twin	7,165	4,300-4,885	■	■	■	■	■	■	■	■	■							3	Dual spread nose gears. Capture one. Use Extended Rear Gate. Raise Cradle high.
Kawasaki	Kawasaki T-4 Jet Trainer	16,535	8,356		■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Probe on nose.
Kawasaki - Boeing / Vertol	BV / KV-107 / CH / UH-46 Sea Knight	19,000-23,000	10,700-13,342		■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Probe on nose.
Kawasaki / Lockheed	P-3C	137,760	73,000								▼	▼	▼	■	■	■	■		3	Verify that actual ramp weight is within tractor range.
Kazan Helicopters	MI-17 M Utility	13,000	TBD								■	■	■	■	■	■	■		4.4	Front torque links. Heavy nose weight. 88 or larger.
Kelowna Flightcraft - Canada	KFC CV 5800	63,000	33,166								■	■	■	■	■	■	■		3	Abnormally heavy nose weight.
Kelowna Flightcraft - Canada	KFC CV 5800	63,000	33,166								■	■	■	■	■	■	■		3	Abnormally heavy nose weight.
King's / Angel	Angel 44 Pusher Twin	5,800	3,880	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
L																				
Lake Amphibian Inc.	Buccaneer LA-4-200 / LA-4	2,690 / 2,400	1,555 / 1,600	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Extended Rear Gate required to clear low nose wheel door.
Lake Amphibian Inc.	Renegade LA-250 / Turbo 270	3,050	1,850 / 1,930	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Extended Rear Gate required to clear low nose wheel door.
Lancair International	Lancair 235 / 320 / 360	1,685	1,040	■	■	■	■	■	■	■	■	■							3	
Lancair International	Lancair IV	2,900	1,750	■	■	■	■	■	■	■	■	■							4.5	Attach Strut Strap below Hold-Back Bar.
Lancair International	Lancair ES / Super ES / Tigress	2,900	1,750	■	■	■	■	■	■	■	■	■							4.5	Attach Strut Strap below Hold-Back Bar.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Lancair / Columbia	Columbia 300	3,400	2,250	■	■	■	■	■	■	■	■	■							4.5 and 4.6	1” x 29” Strut Strap recommended. Attach Strut Strap and Hold-Back Bar on oleo strut below strut fairing. Set 3-bladed prop.
Lancair / Columbia	Columbia 350	3,400	2,300	■	■	■	■	■	■	■	■	■							4.5 and 4.6	Attach Strut Strap. Install and cushion Hold-Back Bar on oleo strut below strut fairing. Set 3-bladed prop.
Lancair / Columbia	Columbia 400	3,600	2,500	■	■	■	■	■	■	■	■	■							4.5 and 4.6	Attach Strut Strap. Install and cushion Hold-Back Bar on oleo strut below strut fairing. Set 3-bladed prop.
Lancair / Bombardier	Learjet 31 A	16,500	10,400		■	■	■	■	■	■	■	■							4.1	Use Hold-Down Adapter, Side Gates, and Chine Protectors.
Lancair / Bombardier	Learjet 35 A / 36 A / C-21 A	18,300	10,422		■	■	■	■	■	■	■	■							4.1	Use Hold-Down Adapter, Side Gates, and Chine Protectors.
Lancair / Bombardier	Learjet 40	20,600	13,428		■	■	■	■	■	■	■	■							4.1.4 or 4.14	IF PEP-EQUIPPED, THEN 8.14 REQUIRED.
Lancair / Bombardier	Learjet 45	21,500-20,000	13,629		■	■	■	■	■	■	■	■							4.1.4 or 4.14	IF PEP-EQUIPPED, THEN 8.14 REQUIRED.
Lancair / Bombardier	Learket 45XR	21,750	13,729		■	■	■	■	■	■	■	■							4.1.4 or 4.14	IF PEP-EQUIPPED, THEN 8.14 REQUIRED.
Lancair / Bombardier	Lear 60	23,750	14,746		■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Down Adapter, Side Gates, and Chine Protectors.
Lancair / Bombardier	Learjet 70	21,500	13,715		■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Down Adapter, Side Gates, and Chine Protectors.
Lancair / Bombardier	Learjet 75	21,000	13,890		■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Down Adapter, Side Gates, and Chine Protectors.
Learjet - Gates	Lear 24	13,500	7,530		■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Down Adapter, Side Gates, and Chine Protectors.
Learjet - Gates	Lear 25	15,000	8,040		■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Down Adapter, Side Gates, and Chine Protectors.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Learjet - Gates	Lear 25G	16,300	8,268		■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Down Adapter, Side Gates, and Chine Protectors.
Learjet - Gates	Lear 50	21,000	12,500		■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Down Adapter, Side Gates, and Chine Protectors.
Learjet - Gates	Lear 55	21,000	13,452		■	■	■	■	■	■	■	■							4.1.1 or 4.1.2	Use Hold-Down Adapter, Side Gates, and Chine Protectors.
LET Kunovice	L-200D Morava (Light Twin)	4,400	2,992	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap around oleo strut and through torque links.
LET Kunovice	L-410 / L-420 UVP Turbojet	12,786 / 14,550	8,212 / 8,785		■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.3	Trailing arm and forward protrusions. Use Extended Rear Gate with Center Fill Plate removed.
LET Kunovice	L-610	31,967	20,326		▼	▼	■	■	■	■	■	■	■	■	■	■	■	■	4.4	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed.
Lockheed	P-38 “Lightning”	21,600	12,780	▼	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Lockheed	Model 10-Electra / 20-Lodestar / Ventura	24,000	15,000				■	■	■	■	■	■	■	■	■	■	■	■	4.7 and 4.8	Use Long Reach Adapter. Capture tail wheel pivoted to aircraft front.
Lockheed	Model 12	8,650	6,090		■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7 or 4.8	Long Reach Adapter recommended to clear empennage, else Extended Rear Gate required.
Lockheed	L749 Constellation / C-29	133,000	73,016						▼	▼		▼	▼	■	■	■	■		3	
Lockheed	L188 Electra	116,000	57,300						▼	▼	▼	■	▼	■	■	■	■		3	
Lockheed / Canadair / Kawasaki	T-33 / A “Shooting Star”	11,965	8,400	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Lockheed	S-3A / B Viking / US-3A / KS-3A	47,602	24,150		▼	▼	■	■	■	■	■	■	■	■	■	■	■	■	3	Very long reach to nose wheel.
Lockheed - Martin	L382 C-130H-30 Hercules	155,000-175,000	76,469-80,242									▼		▼	■	■	■		3	Verify ramp weight within 8850 tractor range. Raise Cradle only 2”.
Lockheed - Martin	L-100-20 / 30 Hercules Commercial	155,000	74,629 / 77,905									▼	▼	▼	■	■	■		3	Verify ramp weight within 8850 tractor range. Raise Cradle only 2”.

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Lockheed - Martin	L1 / 285 P3 Orion / CP-140 Aurora-Arcturus	139,760	73,000									▼	▼	■	■	■	■	3	Verify ramp weight within 8850 tractor range. Raise Cradle only 2”.
Lockheed - Martin / General Dynamics	F-16 “Fighting Falcon” A / B / C / D	27,185-42,300	18,200-28,200		▼	■	■	■	■	■	■	■		■	■	■	■	3	Standing head clearance restricted.
Lockheed - Martin	F-117 “Nighthawk”	52,5000	29,500								■	■		■	■	■	■	3	Long, low reach restricts tractor to low-profile tractor models.
Lockheed / Canadair	T-33 “Shooting Star”	11,965	8,400	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Lockheed / GD / Canadair	F-86 Sabre	TBD	TBD		■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Lockheed / GD / Canadair	F-104 Starfighter	31,000	14,900								■	■	■	■	■	■	■	3	Long, low reach restricts tractor to low-profile models.
LTV / Chance - Vought	A-7 Corsair / TA-7C	42,000	19,111		▼	▼	■	■	■	■	■	■	■	■	■	■	■	3	
Luscombe	Phantom	1,725	960		■	■	■	■	■	■	■	■		■	■			4.8	Long Reach Adapter required to clear low belly and rudder.
Luscombe	8A / 8E / 8F SIlvaire	1,260 / 1,400	665 / 810		■	■	■	■	■	■	■	■		■	■			4.7 or 4.8	Long Reach Adapter recommended to clear empennage, else Extended Rear Gate required.
Luscombe	11-A Sedan	1,280	2,280		■	■	■	■	■	■	■	■		■	■			4.7 or 4.8	Long Reach Adapter recommended to clear empennage, else Extended Rear Gate required.
Luscombe	11-E Spartan 185 / Spartan 210 (Tricycle)	1,400	2,480		■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.5	Tricycle gear and wheel pants. Use Hold-Back Bar.
M																			
Machen / Piper	Superstar 650 / 680 / 700 (Aerostar 600 1 / 2)	6,315	4,106		■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Macavia / Cessna	Macavia Turbine 207	4,000	1,088	■	■	■	■	■	■	■	■	■						4.5 and 4.6	Set 3-bladed prop. Turbine. Watch for windmilling.
Marsh / Grumman	TS-2F Turbo Tracker	29,000	13,840		▼	▼	■	■	■	■	■	■	■	■	■	■	■	4.3	Use Extended Rear Gate. Watch front door on bounce. Raise Cradle to clear.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Marsh / Schweizer	G-164 C-T Turbo Cat Agricultural	7,020	3,150	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy to reach tail wheel. Attach Strut Strap below strut arm.
Martin	Martin 2-0-2	39,900	26,930		▼	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Maule Air Inc.	Maule M-4 -180 Jetasen / Astro Rocket	2,300	1,250	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Long Reach Adapter required to clear rudder.
Maule Air Inc.	Maule M-4 -210 Rocket	2,300	1,120	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Long Reach Adapter required to clear rudder.
Maule Air Inc.	Maule M-4 -220 Strata Rocket	2,300	1,220	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Long Reach Adapter required to clear rudder.
Maule Air Inc.	Maule M-5 - 180	2,300	1,300	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Long Reach Adapter required to clear rudder.
Maule Air Inc.	Maule M-5 - 210 Lunar Rocket	2,300	1,350	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Long Reach Adapter required to clear rudder.
Maule Air Inc.	Maule M-5 - 235	2,300	1,400	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Long Reach Adapter required to clear rudder.
Maule Air Inc.	Maule M-5 -235 Super Rocket	2,500	1,450	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Long Reach Adapter required to clear rudder.
Maule Air Inc.	Maule M-7 -180	2,500	1,365	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Long Reach Adapter required to clear rudder.
Maule Air Inc.	Maule M-7 -235	2,500	1,500	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Long Reach Adapter required to clear rudder.
Maule Air Inc.	MX-7 / MXT Star / Super Rocket	2,200 / 2,750	1,330-1,475	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Long Reach Adapter required to clear rudder.
McDonnell Douglas (also see Douglas Aircraft for early types)	DC-3	25,200	16,865		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Use Long Reach Adapter. Capture tail wheel pivoted to aircraft front.
McDonnell Douglas	A-4 Skyhawk A / E / D / D2	27,420	10,800	▼	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	High nose clearance.
McDonnell Douglas	F-4 Phantom II A-S	61,795	31,853			▼	▼	■	■	■	■	■	■	■	■	■	■	■	4.3	Forward torque links above tires.
McDonnell Douglas	AH-64 Apache Longbow / Petan	21,000 / 22,200	11,30 / 14,650		■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Attach Strut Strap below tail wheel horizontal strut and above wheel guard.
McDonnell Douglas	F / A-18 Hornet A-D / E-F	56,000 / 66,000	23,800 / 30,564							■	■	■	■	■	■	■	■	■	3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
McDonnell Douglas	F-15 Eagle A-J	81,000	32,000							▼	■	■	■	■	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.
McDonnell Douglas	DC-9-20	98,000	52,880								▼	■	■	■	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.
McDonnell Douglas	DC-9-30 / C-9B	108,000 / 110,000	60,0000-65,283								▼	■	■	■	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.
McDonnell Douglas	DC-9-40	121,000	58,880								▼	▼	▼	■	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.
McDonnell Douglas	DC-9-50	121,000	61,880								▼	▼	▼	■	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.
McDonnell Douglas	MD-81	140,000	77,888								▼	▼	▼	■	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.
McDonnell Douglas	MD-88	149,500	77,976								▼	▼	▼	■	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.
McDonnell Douglas / SAIC	MD-90 -30 / -30T / -50 / -55	156,000 / 172,500	88,000 / 91,900									▼	▼	▼	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.
McDonnell Douglas / SAMF / Boeing	MD-95-30 / Boeing 717	114,000	65,900								▼	■	■	■	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.
McDonnell Douglas / SAIC	MD -82 / -83	149,000-160,000	78,000 / 79,686									▼	▼	■	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
McDonnell Douglas	MD-87	149,500	73,000 / 74,880								▼	▼	▼	■	■	■	■		3	Verify ramp weight within 88 range. Unable to fit Front Gate. Brake rider in cockpit and headset voice comms required.
McDonnell Douglas	DC-8 61 / 62 / 63 “Stretch”	325,000-350,000	149,000-153,749												▼	▼	▼		3	Verify ramp weight within 8950 range. Brake rider in cockpit required.
McDonnell Douglas / BAe	T-45 Goshawk	14,081	9,834		■	■	■	■	■	■	■	■	■	■	■	■	■		3	Navy version: Launch arm clearance OK, but use caution.
McDonnell Douglas / BAe	Harrier II AV-8B / GR MK5	29,750	12,922								■	■	■	■	■	■	■		3	Long reach to nose gear.
Melex USA / PZL	Melex Wilga 80-550 STOL	2,866	1,984	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy reach to extended tail wheel.
Melex USA / PZL	Melex Turbine Dromader Ag / Firefighter	11,684	6,305		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required.
Melex USA / PZL	Melex M-26 Iskierka	3,086	2,072	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop (piston).
Messerschmitt	Bf-108 / Me-108 Taifun	3,087	1,887		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required.
Messerschmitt / CASA	Bf-109 / Hisopano HA-1112 fighter	6,090	4,180		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required.
Messerschmitt	209 Monsun BO209 -150 / -160 / S	1,807	1,067	■	■	■	■	■	■	■	■	■							3 or 4.5	Wheel pants on no-retract model. Watch oleo cover.
Messerschmitt	320 Hansa Executive / Feeder Jet	20,280	11,960	▼	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Forward wing sweep cancels engine weight; hold-down not required.
Meyers Aircraft	Meyers OTW -125 / -145 / -150	1,910	1,340		■	■	■	■	■	■	■	■		■	■				4.8	Long Reach Adapter required.
Meyers Aircraft	Meyers 200 / Aero Commander 200	3,000	1,940 / 1,870	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Mikoyan	MiG-AT Advanced Jet Trainer	12,037	TBD		■	■	■	■	■	■	■	■	■	■	■	■	■		3	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed.
Mikoyan	MiG-15 / bis	TBD	TBD		■	■	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap through bottom links. Side Gates recommended.

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Mikoyan	MiG-17 / F	TBD	TBD		■	■	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap through bottom links. Side Gates recommended.
Mikoyan	MiG-21 “Fishbed”	20,725	12,882		■	■	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap around oleo strut and through links. 86, use Extended Rear Gate to clear nose cone.
Mikoyan	MiG-29 “Fulcrum”	36,375	17,250					▼	■	■	■	■	■	■	■	■	■		3	Heavy nose. Attach Strut Strap on inside of flex hoses and around oleo strut.
Mikoyan	MiG-23 “Flogger” A-K	41,670	22,485			▼	▼	▼	■	■	■	■	■	■	■	■	■		3	Verify that Strut Strap clears nose wheel fender.
Mikoyan	MiG-25 “Foxbat	82,500	44,100								■	■	■	■	■	■	■		3	Long, low reach restricts tractor to low-profile tractor models.
Mikoyan	MiG-31 “Foxhound”	93,700	60,055								▼	■	■	■	■	■	■		3	Verify that actual ramp weight is within 88 weight range.
MIL / PZL Swidnik	Mi-2 Helicopter	7,826-8,157	5,344		■	■	■	■	■	■	■	■		■	■				4.8	Low nose requires Long Reach Adapter.
MIL	Mi-24 “Hind” Attack Helicopter	24,250	18,520	DO NOT TOW WITH LEKTRO tractorS															N / A	LONG REACH WITH NOSE WEIGHT TOO HIGH FOR LONG REACH ADAPTER.
MIL	Mi-8 / Mi-14 / Mi-17 / Mi-171 / V “Hip” Helicopter	28,660	15,653			■	■	■	■	■		■	■	■	■	■	■		4.4	Long, low, heavy nose with trailing arm. Use Extended Rear Gate.
MIL	Mi-6 “Hook” Helicopter	93,700	60,055								▼	■	■	■	■	■	■		3	Long, low reach. Watch front belly antennae clearance; may prohibit towing.
MIL	Mi-26 “Halo” Helicopter	123,450	62,170								▼	▼	▼	■	■	■	■		3	Long, low belly clearance.
MIL	Mi-28 “Havoc” Attack Helicopter	25,705	17,846		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7 or 4.8	Either keep tail wheel in taxi position for stabilizer clearance, or use Long Reach Adapter.
Mitsubishi	MU-2 Solitaire	10,470	7,010		■	■	■	■	■	■	■	■		■	■				4.8	Extra long, low reach. Use Marquise or Long Reach Adapter.
Mitsubishi / Cavenaugh	MU-2 Marquise	11,575	7,650		■	■	■	■	■	■	■	■		■	■				4.8	Extra long, low reach. Use Marquise or Long Reach Adapter.
Mitsubishi	Diamond I	14,430	9,300	■	■	■	■	■	■	■	■	■							4.1	Use hold-down.

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Mitsubishi	Diamond 1A and II	14,630	9,410	■	■	■	■	■	■	■	■	■							4.1	Use hold-down.
Mitsubishi	A6M-5 “Zero”	6,350	TBD		■	■	■	■	■	■	■	■							4.7	Use Extended Rear Gate for rudder clearance.
Mitsubishi / GD-Lockheed	FS-X / F-16C	48,722	21,000				■	■	■	■	■	■	■	■	■	■	■	■	3	Standing head clearance restricted.
Mitsubishi	MRJ70	81,200	47,840								■	■	■	■	■	■	■	■	TBD	**CERTIFICATION PENDING.**
Mitsubishi	MRJ70ER	84,200	47,840								■	■	■	■	■	■	■	■	TBD	**CERTIFICATION PENDING.**
Mitsubishi	MRJ70LR	88,600	47,840								■	■	■	■	■	■	■	■	TBD	**CERTIFICATION PENDING.**
Mitsubishi	MRJ90	87,300	49,800								■	■	■	■	■	■	■	■	TBD	**CERTIFICATION PENDING.**
Mitsubishi	MRJ90ER	91,400	49,800								■	■	■	■	■	■	■	■	TBD	**CERTIFICATION PENDING.**
Mitsubishi	MRJ90LR	94,400	49,800								■	■	■	■	■	■	■	■	TBD	**CERTIFICATION PENDING.**
Monocoupe Corp.	Monocoupe 90A	1,610	1,000	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate for rudder clearance.
Montana Coyote Inc.	Montana Coyote	1,850	1,050	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Easy to access tail wheel. Use Extended Rear Gate for maximum clearance.
Mooney Aircraft	Mite M-18 / L / C	TBD	520	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Mooney Aircraft / Ercoupe	Mooney Ercoupe A2-A	1,450	930	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Mooney Aircraft	M-10 Cadet	1,450	950	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Mooney Aircraft / Aerostar	Mark 20 (150)	2,450	1,415	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Attach Strut Strap around widest section below oleo strut.
Mooney Aircraft / Aerostar	Mark 20 / A / B / C / G Ranger / Statesman (180)	2,575	1,525	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Attach Strut Strap around widest section below oleo strut.
Mooney Aircraft / Aerostar	Mark 20 / E / F Chaparral / Executive (200)	2,575	1,600	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Attach Strut Strap around widest section below oleo strut.
Mooney Aircraft	Mark 20J / Mark 201 (200)	2,740	1,640	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Attach Strut Strap around widest section below oleo strut.
Mooney Aircraft	Mark 20K / Mark 231 (210)	2,900	1,800	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Attach Strut Strap around widest section below oleo strut.

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Mooney Aircraft	Turbo Mark 231	2,900	1,900	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap around widest section below oleo strut.
Mooney Aircraft	Mark 22 Mustang / Executive (310)	3,680	2,380	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap around widest section below oleo strut.
Mooney Aircraft	Mark 205 MSE / M20M	2,740	1,784	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap around widest section below oleo strut.
Mooney Aircraft	TLS (270) / M2oR Ovation (280)	3,200	2,012	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop. Attach Strut Strap around widest section below oleo strut.
Murphy Aviation	Renegade II / Spirit Biplane	850	400	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate, and set elevators up with seat belt for maximum clearance.
Murphy Aviation	Rebel	1,450	725	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate for rudder clearance.
Mustang Aeronautics	M-II / Mustang II	1,600	1,050	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7 or 4.8	Use Extended Rear Gate for rudder clearance. Alternatively, use Long Reach Adapter.
N																				
Nakajima	“Kate” Torpedo Bomber / AT-6 based replica	6,100	TBD		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7 or 4.8	Use Extended Rear gate.
Nakajima	“Oscar” / “Hayabusa” / Type-1 Model-2	5,500	TBD		■	■	■	■	■	■	■	■		■	■				4.7 or 4.8	Use Extended Rear gate.
NAMC	YS-11 / C Transport	56,659	TBD				▼	▼	■	■	■	■	■	■	■	■	■		3	Heavy nose weight ratio.
Nanchang - NAMC / Yakovlev	CJ-6A / YAK-18 A	3,088	2,415	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Light on nose wheel when fueled. Keep Strut Strap tight. Use caution when towing.
Nanchang - NAMC	A-5M / K	21,537-26,869	14,833								■	■	■	■	■	■	■		3	Extra long reach / low clearance requires 88 / 89
NIPPI / NAMC	YS-11 / EA Electronic Tracker	56,659	TBD				▼	▼	■	■	■	■	■	■	■	■	■		3	Heavy nose weight ratio.
North American / Ryan (also see Ryan)	Navion Rangemaster G / G-1 / H (260 / 285)	3,315	1,950	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
North American / Ryan	Navion NA (185-225)	2,750	1,700	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
North American	AT-6 / SNJ Texan / Harvard	5,300	4,158		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Use Long Reach Adapter. Capture tail wheel pivoted toward aircraft front.
North American	T-28 Trojan / Fennec	6,759 / 11,500	5,111 / 6,300	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
North American	P-51 / D Mustang	11,600	7,125		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Use Long Reach Adapter. Capture tail wheel pivoted toward aircraft front.
North American	B-25 Mitchell	27,000-33,500	21,100		■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Northrop / Grumman	F-5 Tiger	18,000	9,500								■	■	■	■	■	■	■		3	Long reach / low clearance requires 88 / 89.
Northrop / Grumman	T-38 Talon	12,050	6,500								■	■	■	■	■	■	■		3	Attach Strut Strap around oleo strut, not lower strut.
Northrop / Grumman	F-5 A / B C / F-116A / D / IN-5A / B	20,500 / 20,677	8,085 / 8,361								■	■	■	■	■	■	■		3	Long reach / low clearance requires 88 / 89.
Northrop / Grumman	F-5 E / F Tiger II	25,152	10,576								■	■	■	■	■	■	■		3	Long reach / low clearance requires 88 / 89.
Northwest Ind. / Aeronautica	Ranger / Conestoga	4,700	2,848	▼	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.7	On taildragger version, use Extended Rear Gate for rudder clearance.
O																				
ONE Aviation	Kestrel K-350	8,870	5,550	■	■	■	■	■	■	■	■	■							3	
P																				
PAC / AMF - Pakistan	Mushshak (Proficient) Training / Observation	1,984-2,205	1,424	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
PAC / AMF - Pakistan	Shahbaz (Falcon) Training / Observation	2,227-2,888	1,675	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Pacific Aerospace - New Zealand	PAC Airtrainer CT4 B / C / E	2,650 / 2,600	1,750	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Pacific Aerospace - New Zealand	PAC Fletcher FU24-954 Agricultural	5,430	2,620	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop (piston).
Pacific Aerospace - New Zealand	PAC Cresco 08-600 / -750 Ag	6,450 / 8,250	2,950	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	Set 3-bladed prop (turbo). Watch for windmilling.
Pacific Aerospace - New Zealand	PAC 750XL	7,500	3,100	■	■	■	■	■	■	■									3 and 4.6	Set 3-bladed prop (turbo). Watch for windmilling.
Panavia	Tornado ADV / F MK2 / ECR	60,000	31,970								■	■		■	■				4.4	Long, low reach restricts tractor to low-profile 88 / 89 series.
Panavia	Tornado IDA / GR MK 1 / 4	60,000	31,065								■	■		■	■				4.4	Long, low reach restricts tractor to low-profile 88 / 89 series.
Partenavia / Taneja	P68C / P68TC / P68 Observer 2	4,386-4,594	2,866	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.5	88 / 89 may only be used on versions without wheel fairings.
Partenavia / Taneja	AP 68 TP-600 Viator / Spartacus	6,614	3,704		■	■	■	■	■	■	■	■							3	Long, low nose reach.
Pazmany	PL-2	1,600	974	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piaggio	Avanti P-180 / GP-180 Corporate	9,800	6,200		■	■	■	■	■	■	■	■							4.4	Canard wings and low belly. Use Extended Rear Gate for maximum clearance.
Piaggio	P166-DL3SEM Utility Multi-Role	9,480	5,926		■	■	■	■	■	■	■	■							3 or 4.8	Use Long Reach Adapter if equipped with chin-mounted radar.
Piaggio / Douglas	PD 808 Vespa-Jet Light Transport / ECM	18,000	10,650	▼	■	■	■	■	■	■	■	■		■	■				4.1	Use Hold-Downs, Side Gates, and Chine Adapters.
Pilatus / Fairchild Hiller	PC-6 Turbo-Porter STOL / UV-20	4,850-6,100	2,601-2,685	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Extended tail wheel provides good clearance.
Pilatus	PC-7 / PC-7 MK II	4,960 / 7,055	3,680		■	■	■	■	■	■	■	■	■	■	■	■	■		4.4 and 4.6	Set 4-bladed prop. Use Extended Rear Gate with Center Fill Plate installed. Raise Cradle.
Pilatus / Beechcraft-Raytheon	PC-9 / PC-9 MK II	4,960	3,715		■	■	■	■	■	■	■	■	■	■	■	■	■		4.4 and 4.6	Set 4-bladed prop. Use Extended Rear Gate with Center Fill Plate installed. Raise Cradle.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Pilatus	PC-12 Transport / -F Freighter / Eagle-Recon	8,818	5,261 / 4,814		■	■	■	■	■	■	■	■	■	■	■	■	■	4.4 and 4.6	Set 4-bladed prop. Use Extended Rear Gate with Center Fill Plate installed. Raise Cradle.
Pilatus	PC-12 (5-bladed prop)	8,818	5,261 / 4,814		■	■	■	■	■	■	■	■	■	■	■	■	■	4.8	Use Long Reach Adapter.
Pilatus	PC-24	17,650	13,450	▼	■	■	■	■	■	■	■	■	■	■	■	■	■	N / A	**CERTIFICATION PENDING.**
Pilatus / Britten-Norman	BN2 A / B Islander	6,600	4,114-4,244	■	■	■	■	■	■	■	■	■		■	■			3	May be nose light. Recommend Lear / Citation Hold-Down Adapter.
Pilatus / Britten-Norman	BN2T Turbine Islander	7,000	4,040	■	■	■	■	■	■	■	■	■		■	■			3	May be nose light. Recommend Lear / Citation Hold-Down Adapter.
Pilatus - Norman / IAC	BN2A MK III Trilander / Tri-Commustar	10,000	6,100	■	■	■	■	■	■	■	■	■		■	■			3	
Pilatus / Britten-Norman	Defender 4000 BN2T-4S	8,500	5,200	■	■	■	■	■	■	■	■	■		■	■			3 or 4.11	Pintle Hook and Tow Bar only required for MSSA version with oversize radome.
Piper Aircraft	Cub J-3 / J-4 / J-5 PA-12	1,200-1,450	680-830		■	■	■	■	■	■	■	■	■	■	■	■		4.7 or 4.8	Use small Rear Gate to clear rudder, and set elevators up with seat belt for maximum clearance.
Piper Aircraft	Vagabond PA-15 / PA-17	1,100	620		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Piper Aircraft	Clipper PA-16	1,500	800		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Piper Aircraft	Super Cub PA-18 - 150	1,750	1,062		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Piper Aircraft	Pacer PA-20 -115 / 125 / 135	1,950	1,010		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to clear rudder.
Piper Aircraft	Tri-Pacer PA-22 -125 / 135 / 150 / 160	1,950-2,000	1,110-1,040	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.5	
Piper Aircraft	Caribbean PA-22 -150	2,000	1,104	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.5	
Piper Aircraft	Colt PA-22 -108	1,650	940	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.5	
Piper Aircraft	Apache PA-23 -150 / 160	3,800	2,280	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Piper Aircraft	Apache PA-23 -235	4,800	2,735	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Piper Aircraft	Apache PA-23 -250 / -250T	5,200	3,183 / 3,322	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Comanche PA-24 -180 / 250 / 260	2,550-3,100	1,475-1,728	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Companche PA-24 -400	3,600	2,110	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Brave / Pawnee PA-25 - 150 / 235 / 260	4,400 / 2,900	2,225 / 1,479		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7 or 4.8	Ag. truck. Use Extended Rear Gate or Long Reach Adapter to clear empennage.
Piper Aircraft	Cadet PA-28 -161	1,600	1,100	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft / Aero Boero	Tomahawk PA-28 / PA-38	1,670	1,175	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	
Piper Aircraft	Cherokee / Cruiser PA-28 - 140 / -150	1,950	1,180	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	Only use 88 / 89 if no wheel fairings present.
Piper Aircraft	Cherokee Warrior II PA-28	2,440	1,348	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	Only use 88 / 89 if no wheel fairings present.
Piper Aircraft	Warrior III PA-28-161	2,440	1,533	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	Only use 88 / 89 if no wheel fairings present.
Piper Aircraft / EMB Neiro	Cherokee Archer II / Challenger PA-28	2,550	1,413	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	Only use 88 / 89 if no wheel fairings present.
Piper Aircraft	Archer III PA-28 -181	2,550	1,689	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	Only use 88 / 89 if no wheel fairings present.
Piper Aircraft	Arrow PA-28R -201	2,750	1,612	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft / EMB Neiro	Arrow II / III PA-28 R / RT -180 / -200 / -201 / T	2,750	1,612	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft / EMB Neiro	Turbo Arrow IV PA-28 RT - 201T / Corisco	2,900	1,667	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Pathfinder PA-28 -235	3,000	1,565	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	Only use 88 / 89 if no wheel fairings present.
Piper Aircraft	Dakota PA-28 - 236	3,000	1,610	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	Only use 88 / 89 if no wheel fairings present.
Piper Aircraft	Turbo Dakota OPA-28 - 201T	3,150	1,660	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Piper Aircraft	Twin Comanche PA-30 / 39 -160	3,725	2,210	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft / EMB Neiro	Navajo C / CR PA-31 / 31P -300 / -310	6,500 / 7,800	3,991 / 4,842	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Chieftain PA-31 -350 / T-1020 / T-1023	7,000	4,450	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Mojave PA-31P -350	7,200	5,070	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Cheyenne I and II PA-31 T / T2	9,000 / 9,474	5,110	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Cherokee Six PA-32 -260 / -300	3,400	1,779 / 1,846	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	
Piper Aircraft / EMB Neiro	Lance II / Saratoga II / TC PA-32 -300 / -301 / R / T	3,600	2,011 / 2,464	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5 and 4.6	Attach Strut Strap around oleo strut and both sides of lower scissor, below apex bolt.
Piper Aircraft / EMB Neiro / PZL Mielec	Seneca II PA-34 -200 / -220 / T	4,570 / 4,750	2,841 / 3,004	■	■	■	■	■	■	■	■	■							3	Set 3-bladed prop, if applicable.
Piper Aircraft	Pocono PA-35	9,500	4,900	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Brave PA-36 0285 / 0399 / -375 / -400 / AG	3,900-4,800	2,544	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7 or 4.8	
Piper Aircraft	Cheyenne I PA-42	8,700	4,900	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Cheyenne II PA_42	9,000	4,976	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Cheyenne III PA-42	10,500	5,621	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Cheyenne III (1980) / IIIA PA-42	11,000 / 11,200	6,240 / 6,837	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Cheyenne 400 LS PA-42	11,950	7,759	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Saratoga II HP PA-32R -301	3,600	2,396	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Piper Aircraft	Saratoga II TC PA-32R - 301T	3,600	2,465	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft	Seminole PA-44 -180	3,800	2,603	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Piper Aircraft (see also Meridian)	Malibu PA-46 -10 P	4,100	2,350	■	■	■	■	■	■	■	■	■							3	
Piper Aircraft	Malibu - Mirage PA-46 - 350 P / Matrix	4,300	2,790	■	■	■	■	■	■	■	■	■							3	
Piper Aircraft	Mirage PA_46 -350 P	4,340	3,120	■	■	■	■	■	■	■	■	■							3	
Piper Aircraft	Seneca V PA-34 -220T	4,750	3,413	■	■	■	■	■	■	■	■	■							3	
Piper Aircraft	Meridian PA-46 -500 TP / JetProp DLX / DX	4,850	3,394		■	■	■	■	■	■	■	■		■	■				7 or 4.8	Use Long Reach Adapter.
Piper Aircraft	Aerostar PA-60 -600 / -601 / -602P	5,500-6,000	3,735-4,125	■	■	■	■	■	■	■	■	■							3	
Piper Aircraft	Aerostar PA-60 -700 / P	6,315	4,275	■	■	■	■	■	■	■	■	■							3	
Piper Aircraft	T-1040 Turbo Commander	9,000	4,800	■	■	■	■	■	■	■	■	■							3	
Promavia SA	Promavia Jet Squalus F1300 Trainer	5,291	2,866	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
PZL Mielec - Poland	I-22 / M-92 / M-93 Iryda Support	15,212-16,755	10,000-10,450		■	■	■	■	■	■	■	■							4.3	Long protruding forward knuckle. Use Extended Rear Gate with Center Fill Plate removed.
PZL Mielec / Antonov	M-27 Skytruck PT / An-28	14,330	8,598	■	■	■	■	■	■	■	■	■		■	■				4.3	Trailing arm nose gear. Use Extended Rear Gate with Center Fill Plate removed to clear knuckle.
PZL Mielec - Antonov	An-2 Antek Transport Biplane	12,125	7,605		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Use Long Reach Adapter. Capture tail wheel pivoted toward aircraft front.
PZL Mielec / Piper	M-20 Mewa / Seneca II PA-34-200T	4,563	2,910	■	■	■	■	■	■	■	■	■							3	
PZL Mielec - Poland / Melex	M-18 Dromader Ag / Firefightert	9,259-11,684	6,063-6,305		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Use Long Reach Adapter. Capture tail wheel pivoted toward aircraft front.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
PZL Mielec - Poland / Melex	M-2 Iskierka (Little Spark)	3,086	2,072	■	■	■	■	■	■	■	■	■							3 and 4.6	Set 3-bladed prop (piston).
PZL Swidnik / MIL	Mi-2 Helicopter	7,826-8,157	5,344		■	■	■	■	■	■	■	■		■	■				4.8	Low nose. Use Long Reach Adapter.
PZL Warszawa-Okecie / Melex	PZL-104 Wilga 80 STOL	2,866	1,984	■	■	■	■	■	■	■	■	■		■	■				4.7	Easy reach to extended tail wheel.
PZL Warszawa-Okecie	PZL-105L “Flaming” General Light	4,078	2,535		■	■	■	■	■	■	■	■		■	■				4.7 or 4.8	Extended fuselage taper. Use Long Reach Adapter if aircraft is sitting low.
PZL Warszawa-Okecie	PZL-106B “Kruk” Agricultural	6,614-7,716	3,946 / 4,585	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy reach to extended tail wheel.
PZL Warszawa-Okecie	PZL-106BT “Turbo Kruk” Ag	7,716	3,704	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy reach to extended tail wheel.
PZL Warszawa-Okecie / Socata	PZL-110 “Koliber” 150 / Socata Rallye	1,874	1,208	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Forward knuckle clears OK.
PZL Warszawa-Okecie	PZL-111 “Koliber”	2,535	1,433	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Forward knuckle clears OK.
PZL Warszawa-Okecie	PZL-126P “Mrowka”	1,267	800	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Forward knuckle clears OK. Attach Strut Strap high to clear fender.
PZL Warszawa-Okecie	PZL-130T Turbo-Orlick	4,409-5,952	2,866-3,527	■	■	■	■	■	■	■	■	■							3	Watch fender. If used, position Side Gates with care.
Q																				
Questair, Inc.	Questair Spirit Sportplane	1,700	1,025	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Only use 88 / 89 if no wheel fairings present.
R																				
RAM Aircraft Corp / Cessna	RAM-421-C / 421-CW Conversion	7,560	4,800	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Attach Strut Strap to oleo strut, not around lower strut cam plate.
RAM Aircraft Corp	RAM 340 4 / 6 Conversion	5,990	3,966 / 4,286	■	■	■	■	■	■	■	■	■							3	

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Raytheon Aircraft	Premier I	12,500	8,300	■	■	■	■	■	■	■	■	■							4.1	Use Hold-Downs, Side Gates, and Chine Adapters.
Raytheon Aircraft	Hawker 800XP	27,400	16,000		■	■	■	■	■	■	■	■		■	■				3 or 4.4	If counterweight protrusion, use Extended Rear Gate with Center Fill Plate removed.
Raytheon Aircraft	Hawker Horizon / 4000	37,500	21,555		▼	▼	■	■	■	■	■	■		■	■				3	
Rearwin Aircraft	Skyranger 185	1,450	9120	■	■	■	■	■	■	■	■	■		■	■				4.7	Use Extended Rear Gate for added rudder clearance.
Reims / Cessna	F 406 Caravan II	9,360	4,961	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Set 3-bladed prop. Watch for windmilling.
Republic / Seabee	Seabee RC-3 Amphib	3,000	2,950		■	■	■	■	■	■	■	■							4.8	Use Long Reach Adapter to clear rudder.
Republic	P-47 G “Thunderbolt”	12,500-13,360	9,900	■	■	■	■	■	■	■	■	■							3	
RFB Rhein-Flugzeugbau	RFB MFI-10C Vipan / Phoenix	2,583	1,433	■	■	■	■	■	■	■	■	■							4.7	Easy access to tail wheel.
Rockwell	OV-10 Bronco LARA	14,444	6,893	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.4 or 4.8	Use Extended Rear Gate. On some models, nose probe may require Long Reach Adapter.
Rockwell Commander (also see Aero, Gulfstream, or Twin Commander)	Lark / Darter	2,250	1,280	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.5	
Rockwell Commander	Thrush 600 / 800 Agricultural	6,000	3,700 / 4,100	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate to clear empennage.
Rockwell Commander	Shrike 500S / Shrike Commander 500U	6,750	4,635	■	■	■	■	■	■	■	■	■		■	■				4.1	Use Hold-Down Adapter and Side Gates.
Rockwell Commander	Rockwell Commander 681 Hawk	9,400	5,647 / 5,783	■	■	■	■	■	■	■	■	■		■	■				4.1	Use Hold-Down Adapter and Side Gates.
Rockwell Commander	Rockwell Commander 685	9,000	6,021	■	■	■	■	■	■	■	■	■		■	■				4.1	Use Hold-Down Adapter and Side Gates.
Rockwell Commander	Rockwell Commander Jetprop 690 / A / B / C	10,250	6,195	■	■	■	■	■	■	■	■	■		■	■				4.1	Use Hold-Down Adapter and Side Gates.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Rockwell Commander	Rockwell Commander Jetprop 840 / 980	10,325	6,195 / 6,702	■	■	■	■	■	■	■	■	■		■	■			4.1	Use Hold-Down Adapter and Side Gates.
Rockwell Commander	Rockwell Commander 700	6,947	4,704	■	■	■	■	■	■	■	■	■						4.1	Use Hold-Down Adapter and Side Gates.
Rockwell Commander / Gulfstream	Rockwell Commander 112 / 112TC	2,800 / 2,950	1,173 / 1,834	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3-bladed prop.
Rockwell Commander / Gulfstream	Rockwell Commander 114	3,140-3,260	1,790-2,070	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3-bladed prop.
Rockwell Commander / Gulfstream	Rockwell Commander Alpine	2,950	2,035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3-bladed prop.
Rockwell Commander / Gulfstream	Rockwell Commander Gran Turismo	3,272	2,070	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3-bladed prop.
Rockwell / DASA	X-31 A EFM	15,935	11,410								■	■	■	■	■	■	■	3	
Rockwell / Fuji	Rockwell / Fuji 700	6,947	4,704	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Rockwell / Sabreliner	Sabreliner 40 / T-39	20,172	11,250	▼	■	■	■	■	■	■	■	■	■	■	■	■	■	416	Use Sabreliner Adapter. Watch counterweight.
Rockwell / Sabreliner	Sabreliner 60 / 75	21,000	13,000	▼	■	■	■	■	■	■	■	■	■	■	■	■	■	4.16	Use Sabreliner Adapter. Watch counterweight.
Rockwell / Sabreliner	Sabreliner 75A	23,000	13,200	▼	■	■	■	■	■	■	■	■	■	■	■	■	■	4.16	Use Sabreliner Adapter. Watch counterweight.
Rockwell / Sabreliner (also see Sabreliner)	Sabreliner 65	24,000	14,154	▼	■	■	■	■	■	■	■	■	■	■	■	■	■	4.16	Use Sabreliner Adapter. Watch counterweight.
Roose / American Eagle-Lincoln	Eaglet	922 / 1,050	509 / 638		■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Use Extended Rear Gate to maximize rudder clearance. Long Reach Adapter recommended.
Romareo	Rombac 1-11	104,500	55,704						▼	▼	▼	■	■	■	■	■	■	3	
RTAF - DAE Thailand	RTAF-5 Forward Air Control	4,600	3,628	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Ruschmeyer Luftfahrttechnik	Ruschmeyer R 90-230 RG	2,976	1,980	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 4-bladed prop.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Ruschmeyer Luftfahrttechnik	Ruschmeyer R 90-420 AT Prototype	3,500	TBD	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.6 and 4.8	Set 5-bladed prop. Long nose and low prop require Long Reach Adapter.
Ryan / North American (also see North American)	Navion	2,750	1,782	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Ryan / North American / Camair	Twin Navion	4,500	3,000	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
S																				
SAAB - Scania	SK 60 / SAAB 105 Trainer / Recon	10,714-14,330	6,757	■	■	■	■	■	■	■	■	■						3	Fender clears OK. Watch for radome.
SAAB - Scania	J 35J / J35A-F Draken Attack / Recon	33,070-35,275	TBD								■	■	■	■	■	■	■	4.4	Use Extended Rear Gate to clear fender. Low belly or radome clearance.
SAAB - Scania	JA-37 Viggen Interceptor	37,478	TBD								■	■	■	■	■	■	■	3	Long, low reach to nose gear.
SAAB - Scania / IG JAS	JAS_39 Gripen Attack / Recon	18,740	14,600								■	■	■	■	■	■	■	4.4	Forward torque links and long, low reach. Use Extended Rear Gate with Center Fill Plate removed.
SAAB - Scania / Fairchild	340 A	28,000	17,145		■	■	■	■	■	■	■	■	■	■	■	■	■	3	
SAAB - Scania	340 B / 340 B Plus / AEW_C	29,000	17,945		▼	▼	■	■	■	■	■	■	■	■	■	■	■	3	
SAAB - Scania	2000 Regional Turboprop	48,500	29,762				■	■	■	■	■	■	■	■	■	■	■	3	
Sabreliner Corporation (also see Rockwell)	Sabreliner 80 / 75 A	23,000	13,200	▼	■	■	■	■	■	■	■	■	■	■	■	■	■	4.16	Use Sabreliner Adapter. Watch counterweight.
Sabreliner Corporation	Sabreliner 65	24,000	14,154	▼	■	■	■	■	■	■	■	■	■	■	■	■	■	4.16	Use Sabreliner Adapter. Watch counterweight.
SAC / Shenyang	J-8 Fighter	41,890	26,455		▼	▼	■	■	■	■	■	■	■	■	■	■	■	3	High nose allows easy access.
SAC / Shaanxi	Y7 / Y7-100 / Y7-200A / B Regional	48,060	31,300-32,849				■	■	■	■	■	■	■	■	■	■	■	3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Sadler	A-22 Lasa / A-22J Fanjet Surveillance	2,150 / 2,800	850 / 1,200	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Use Extended Rear Gate for added knuckle clearance.
Shafer / AMI	Douglas DC-3-65TP Cargomaster Turbo	26,900	15,800				■	■	■	■	■	■		■	■				4.7 and 4.8	Use Long Reach Adapter. Capture tail wheel pivoted toward aircraft front.
Schweizer	SA2-37A / RG-8A Interdiction	3,500	2,025	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Easy access to tail wheel.
Schweizer	SA2-38A Surveillance / Interdiction	3,500	2,025	■	■	■	■	■	■	■	■	■							3	
Schweizer / Marsh	Ag-Cat Super B 60 / 450B	7,020	3,650 / 3,325	■	■	■	■	■	■	■	■	■							4.7	Easy access to tail wheel. Attach Strut Strap below strut arm.
Schweizer / Ethiopian Airlines	Ag-Cat Super B Turbine / Eshet	7,020	3,150	■	■	■	■	■	■	■	■	■							4.7	Easy access to tail wheel. Attach Strut Strap below strut arm.
Schweizer / Grumman	G-164 Ag Cat	4,200	2,600	■	■	■	■	■	■	■	■	■							4.7	Easy access to tail wheel. Attach Strut Strap below strut arm.
Seabird Aviation - Australia	SB7L - 360A Seeker	2,039	1,301	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Easy access to tail wheel. Use Extended Rear gate to clear outboard tail fins.
Sepecat / Dassault - BAe	Jaguar Strike	34,612	15,432								■	■	■	■	■	■	■	■	4.3	Forward knuckle. Long, low reach.
Sequoia	300 Sequoia Aerobatic / Utility	2,400 / 2,800	1,800	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Ensure Strut Strap is clear of door structure.
Sequoia / General Avia	F 8L Sequoia Falco	1,880	1,212	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Ensure Strut Strap is clear of door structure.
Shinmaywa - Japan	US-1A / SS-2A SAR / Fire Amphib	99,200 (land)	51,367								▼	■	■	■	■	■	■	■	4.4	Forward torque links and low reach. Use Extended Rear Gate with Center Fill Plate removed.
Shorts	SC 7 Skyvan 3 / 3M / 3M-200	12,500-15,000	7,344-8,307								■	■	■	■	■	■	■	■	3	
Shorts - Bombardier	330-200 / 330-UT / Sherpa C23-A	22,900	14,727				■	■	■	■	■	■	■	■	■	■	■	■	4.4	Long nose and trailing arm. Use Extended Rear Gate with Center Fill Plate in forward-most position.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Shorts - Bombardier	360 / -300 Regional Airliner	26,100-27,100	16,900-17,350				■	■	■	■	■	■	■	■	■	■	■		4.4	Long nose and trailing arm. Use Extended Rear Gate with Center Fill Plate in forward-most position.
SIAI - Marchetti / Waco	S 205 / S 202 / Waco Vela S 220 / S 208	2,755-3,306	1,630-1,785	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
SIAI - Marchetti / Southwest	PN 333 Riviera Amphib	3,270	2,300	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
SIAI - Marchetti	SF-260 / TP / W / M	2,646 / 2,866	1,717 / 1,664	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 and 4.6	On turbine version, set 3-bladed prop. Watch for windmilling.
SIAI - Marchetti / Augusta	Augusta S 211 A Light Attack	7,716	4,453	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Sikorsky Helicopter	S-58 Choctaw / H34	13,000	8,500		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Low clearance to dual tail wheels. Use Long Reach Adapter.
Sikorsky Helicopter	S-61 / SH-3 / CH-124 A / B Sea King	20,500	15,400								■	■	■	■	■	■	■		4.7	Low tail boom.
Sikorsky Helicopter	S-62 Skycrane	37,000	25,000				■	■	■	■	■	■	■	■	■	■	■		3	
Sikorsky Helicopter	S-65A / C CH-53A / D Sea Stallion	35,000-38,238	22,400-23,569				■	■	■	■	■	■	■	■	■	■	■		4	If refueling boom equipped, use 8800 / 8850 only.
Sikorsky Helicopter	S-70 C Blackhawk (NOT Seahawk)	20,250	10,158				■	■	■	■	■	■		■	■				4.7 or 4.8	Use Extended Rear Gate in forward-most position. Seahawk tail wheel is not accessible.
Sikorsky Helicopter	S-70 / A / UH-60A Blackhawk / HH-60 (NOT Seahawk)	20,000-22,000	10,600-12,642				■	■	■	■	■	■		■	■				4.7 or 4.8	Use Extended Rear Gate in forward-most position. Seahawk tail wheel is not accessible.
Sikorsky Helicopter	AUH-76	10,300	5,610-6,680		■	■	■	■	■	■	■	■		■	■				4.8	Low nose wheel clearance. Use Long Reach Adapter.
Sikorsky Helicopter	S-76 / S-76 A / S-76 Mark II	10,300	5,600		■	■	■	■	■	■	■	■		■	■				4.8	Low nose wheel clearance. Use Long Reach Adapter.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Sikorsky Helicopter	S-76B / H-76 Eagle / S-76 C	11,700 / 11,400	6,641-6,282		▼	▼	■	■	■	■	■	■		■	■			4.8	Low nose wheel clearance. Use Long Reach Adapter.
Sikorsky Helicopter	S-92 (stretched CX ONLY)	26,500	17,600			■				■	■	■	■	■	■	■	■	3	Stretch CX is only towable model. Nose gear weight too high for Long Reach Adapter.
Sino Swearingen	SJ30-2	13,600	8,000		■	■	■	■	■	■	■	■	■	■	■	■	■	3	Dual nose wheels.
Sivel	SD 27	730	380	■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	Trailing nose wheel. Attach Strut Strap at bottom of strut arm.
Skyfox Aviation - Hedaro	Skyfox CA_22 / 25 Light Trainer	992 / 1,146	604 / 661			■	■	■	■	■	■	■	■	■	■	■		4.7	Use Extended Rear Gate to maximize rudder clearance.
Skyfox Aviation	Kitfox IV	1,200	475			■	■	■	■	■	■	■						4.7	Use Extended Rear Gate to maximize rudder clearance.
Slingsby	T-67 Firefly B / C / C2 / C3 / M Mk II Trainer	2,150	1,510	■	■	■	■	■	■	■	■	■						3	
Slingsby	T-67M 200 Firefly	2,250	1,543	■	■	■	■	■	■	■	■	■						3	
Slingsby	T-67M 260 / T 3 A Firefly	2,525	1,780	■	■	■	■	■	■	■	■	■						3 and 4.6	Set 3-bladed prop.
SME - Malaysia	MD3 -160	1,940-2,337	1,455	■	■	■	■	■	■	■	■	■						4.5	Sloped strut. Place Hold-Back Arm below Strut Strap.
Socata / PZL Mielec	TB-9 Tampico “Club” / TB-10 Tobago	2,300 / 2,530	1,400-1,477	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.5	Only use 88 / 89 if wheel pants not equipped.
Socata	TB-200 Tobago XL	2,700	1,500	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.5	Only use 88 / 89 if wheel pants not equipped.
Socata	TB-20 / 21 Trinidad	2,943 / 3,086	1,700-1,819	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 or 4.5	Only use 88 / 89 if wheel pants not equipped.
Socata	TB-30 Epsilon Piston Trainer	2,755	2,055	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.3	Forward knuckle. Set 2-bladed prop. Use Extended Rear Gate with Center Fill Plate removed.
Socata	TB-21 TC Trinidad	3,200	1,870	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	High front torque links clear OK. Set 2-bladed prop.

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Socata / Grumman American	Tangara / Cougar GA-7 Light Twin	3,800	2,588	■	■	■	■	■	■	■	■	■							3	
Socata / TBM	TBM 700	6,595	4,025	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Long Reach Adapter required. Set 4-bladed prop. Carry with Cradle high.
Socata / TBM	TBM 850	6,595	4,025	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Long Reach Adapter required. Set 4-bladed prop. Carry with Cradle high.
Socata / TBM	TBM 900	7,394	4,629	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Long Reach Adapter required. Set 5-bladed prop.
Socata / Waco	Rallye - Minerva 150-STG / 180GT	1,920 / 2,315	1,170 / 1,260	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	
Socata / Waco	Rallye - Minerva 220	2,500	1,450	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	
Socata / Waco	Rallye - Minerva 235 / E	2,640	1,525	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.5	
Soko	J-1 / RJ-1 Jastreb	11,243	6,217	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	High forward knuckle clears OK.
Soko	G-2A Galeb	7,438-9,480	5,775	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	High forward knuckle clears OK.
Soko	G-4 Super Galeb / Avioane IAR-93	14,110	7,573	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Soko -Avioane	Soko J-22 Orao / Avioane IAR-93	20,994-24,427	12,100-13,558		■	■	■	■	■	■	■	■	■	■	■	■	■		4.3	
Spencer Amphibian	Spencer S-12-E / D	3,200	2,190	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Stearman / Boeing	“Kaydet” PT -13 / 17 / -18 / 27 / N2S	2,717	1,936		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required to access tail wheel.
Stinson	10A Voyager	1,625	948		■	■	■	■	■	■	■	■		■	■				4.7	Long Reach Adapter required for 88 / 89
Stinson	108-1 (150) Voyager	2,230	1,206	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy to reach tail wheel.
Stinson	108 -2 / 3 Voyager / Station Wagon (165)	2,400	1,300	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	Easy to reach tail wheel.
Stoddard - Hamilton	Glasair II-S / Glasair I	2,000-2,100	1,200-1,325	■	■	■	■	■	■	■	■	■		■	■				3 or 4.8	Use Long Reach Adapter on tail-wheel version.

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				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
Stoddard - Hamilton	Glasair III / Glasair II	2,400	1,550	■	■	■	■	■	■	■	■	■		■	■			3	
Sukhoi	SU-31 T / U Aerobatic	2,134	1,482		■	■	■	■	■	■	■	■		■	■			4.7 and 4.8	Low reach to tail wheel. Use Long Reach Adapter.
Sukhoi	SU-29 LL Aerobatic	2,655	1,698		■	■	■	■	■	■	■	■		■	■			4.7 and 4.8	Low reach to tail wheel. Use Long Reach Adapter.
Sukhoi	SU-32	99,208	48,502				▼	▼	▼	▼	▼	■	■	■	■	■	■	3	
Sukhoi	SU-38 Agricultural	3,637	2,139	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Easy to reach tail wheel.
Sukhoi	SU-54 Advanced Trainer / Combat	20,745	10,560								■	■	■	■	■	■	■	4.3	Forward knuckle. Use Extended Rear Gate.
Sukhoi	SU-7B “Fitter-A”	29,750	19,000								■	■	■	■	■	■	■	3	
Sukhoi	SU-15 “Flagon”	35,275	TBD								■	■	■	■	■	■	■	4.4	Forward knuckle. Use Extended Rear Gate.
Sukhoi	SU-25 “Frogfoot” / Su-28	38,800	20,950								■	■	■	■	■	■	■	3	High forward knuckle clears well.
Sukhoi	SU-17 / 20 / 22 “Fitter”:	39,050 / 41,887	22,000 / 23,737								■	■	■	■	■	■	■	3	Long tow reach.
Sukhoi	SU-39 Anti-tank	42,990	TBD								■	■	■	■	■	■	■	3	Long tow reach. Watch fender supports.
Sukhoi	SU-27 “Flanker” / SU-33 “Flanker D”	63,000 / 62,240	TBD								■	■	■	■	■	■	■	3	Attach Strut Strap to oleo strut through lower torque link. Watch fender.
Sukhoi	SU-30	72,750	TBD								■	■	■	■	■	■	■	3	Attach Strut Strap to oleo strut through lower torque link. Watch fender.
Sukhoi	SU-24 “Fencer”	87,520	41,885								▼	■	■	■	■	■	■	3	Long tow reach.
Sukhoi	SU-34 Bomber	97,800	TBD								▼	■	■	■	■	■	■	4.4	Low forward knuckle. Use Extended Rear Plate with Center Fill Plate removed.
Sukhoi	SU-35	98,000	TBD								▼	■	■	■	■	■	■	3	Wire run near oleo strut. Pass Strut Strap inside of wire.
Summit / Cessna	Sentry O2-337	5,200	3,160	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Supermarine	Spitfire I	5,332	TBD		■	■	■	■	■	■	■	■		■	■			4.7 and 4.8	Use Extended Rear Gate to clear rudder.
Swearingen / Beechcraft	Taurus 90 / A09 / B90 / C90 / E90	9,650-10,100	5,772-6,675	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Swearingen / Sino Swearingen	SJ30	13,600	8,000	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	Dual nose wheels.
Swearingen / Fairchild (also see Fairchild for Merlin / Metros)	Merlin IV	12,500	7,900	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
Swearingen / Fairchild	Merlin III	13,230	8,200	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
T																				
Taylorcraft	Twosome BC-12D / Ranch Wagon	1.200 / 1,150	730 / 670		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required to clear rudder.
Taylorcraft	Classic F-21 / F-21A / F-21B / F-22	1,500	990-1,040		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required to clear rudder.
Taylorcraft	Sportsman F-19	1,500	900		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required to clear rudder.
Taylorcraft	15 / 20	2,200	1,275		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required to clear rudder.
Taylorcraft	Tandem Trainer DC-65	1,500	990		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required to clear rudder.
Tecnam - Italy	Tecnam O92 Echo Trainer / Club	992	573	■	■	■	■	■	■	■	■	■		■	■				4.3 and 4.6	Forward knuckle. Set 3-bladed prop. Use Extended Rear Gate with Center Fill Plate removed.
Tempco / Globe	Swift	1,710	1,139		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Use Long Reach Adapter to access tail wheel.
Tempco	Buckaroo	1,975	1,350		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Use Long Reach Adapter to access tail wheel.
Thurston Aeromarine	Thurston TA16 Seafire	3,200	1,950	■	■	■	■	■	■	■	■	■		■	■				3	Nose light. Use Lear / Citation Hold-Down Adapter.
Thurston Aeromarine	Thurston TA19 Seamaster	8,600	4,860	■	■	■	■	■	■	■	■	■		■	■				3	Nose light. Use Lear / Citation Hold-Down Adapter.
Thurston / Canadian Amphib	Thurston TSC-1A3 Teal III	2,300	1,500	■	■	■	■	■	■	■	■	■		■	■				3	Nose light. Use Lear / Citation Hold-Down Adapter.
TLM Aerospace also see American / Gulfstream)	Cheetah AA1	2,200	1,180	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.5	Place Hold-Back Bar below Strut Strap to prevent riding up.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250		
TLM Aerospace	Tiger AA5	2,400	1,311	■	■	■	■	■	■	■	■	■	■	■	■	■	■		4.5	Place Hold-Back Bar below Strut Strap to prevent riding up.
Tornado	F 2A Tiara Trainer	TBD	TBD								■	■	■	■	■	■	■		4.4	Low reach. Use Extended Rear gate because of front torque links.
Transall	C-160 Tanker / Transport	112,435	63,935								▼	■	■	■	■	■	■		3	Verify ramp weight within 8800 range.
Transavia - Australia	PL-12 Airtruk / Skyfarmer	4,244	2,242	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3-bladed prop.
Trans-Regional	Catpass 250	12,500	8,000	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Trident - Canada	Trigull 320 Amphib	3,800	2,500	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	Easy nose wheel access.
Tupolev	Tu-34	4,118	TBD	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
Twin Commander (also see Aero Commander)	Commander Jetprop 1200	11,750	7,475	■	■	■	■	■	■	■	■	■		■	■				4.1.1 or 4.1.2	Nose light. Use Lear / Citation Hold-Down Adapter and Side Gates.
U																				
Univair	Univair Stinson 108-3 (200)	2,400	1,300	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.7	Easy reach tail wheel.
UTVA	UTVA-75A / 75A-21	2,513	1,587	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	
V																				
Valmet Aviation - Finland	PIK-19 Muhinu / PIK-23 Towmaster	1,750-1,918	1,300	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	2-bladed prop.
Valmet Aviation - Finland	Redigo L-90 P	2,976-4,189	2,183	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3-bladed prop.
Valmet Aviation - Finland	Redigo L-80 TP	3,968	1,852	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3 and 4.6	Set 3-bladed prop.
Valmet Aviation - Finland	L-70 Vinka / Miltrainer	2,293-2,756	1,691	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3	2-bladed prop.

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Varga / Morrisey / Shinn	2150 Kachina (150)	1,817	1,125		■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.8	
Varga / Morrisey / Shinn	2180 (180)	1,817	1,175	▼	■	■	■	■	■	■	■	■	■	■	■	■	■		3 or 4.8	
Vickers	VC2 Viscount	72,500	41,565				▼	▼	▼	▼	■	■	■	■	■	■	■		3	
VisionAire	VisionAire Vantage Business Single Jet	6,350	3,975	■	■	■	■	■	■	■	■	■	■	■	■	■	■		3	
W																				
Waco / Classic	Classic Waco F-5 / YMF-5 Super	2,770 / 2,950	1,940 / 1,985		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Must use Long Reach Adapter to access tail wheel.
Wag - Aero	Sport / Super Sport / Acro / Observer	1,400	720	■	■	■	■	■	■	■	■	■		■	■				4.7 or 4.8	Use Extended Rear Gate or Long Reach Adapter to clear rudder.
Wag - Aero	Wag-A-Bond Classic / Traveller	1,250 / 1,450	640 / 725	■	■	■	■	■	■	■	■	■		■	■				4.7 or 4.8	Use Extended Rear Gate or Long Reach Adapter to clear rudder.
Wag - Aero	2+2 Sportsman	2,200	1,080	■	■	■	■	■	■	■	■	■		■	■				4.7 or 4.8	Use Extended Rear Gate or Long Reach Adapter to clear rudder.
Westland / Augusta (also see Augusta)	EH-101 / US101 Multi-Role Helicopter	31,500	19,000								■	■		■	■				4.3	Front torque links clear OK. Heavy nose weight requires 88 / 89.
Westland Helicopters	Wessex Mk2 / Mk5	13,500	8,304 / 8,657				■	■	■	■	■	■		■	■				4.7 and 4.8	Use Long Reach Adapter because of low tail wheel clearance.
Westland Helicopters	Lynx	10,750	7,654				■	■	■	■	■	■							4.8 or 4.10	Use Tow Bar and Pintle Hook if equipped with thermal imager dome.
Westland Helicopters	Super / Battlefield Lynx	11,300	8,064				■	■	■	■	■	■							4.8 or 4.10	Use Tow Bar and Pintle Hook if equipped with thermal imager dome.

MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Westland Helicopters	Sea King	21,500	15,917		■	■	■	■	■	■	■	■	■	■	■	■	■		4.7	High tail allows easy access.
Wren Aircraft / Cessna	Wren 460 STOL	2,800	1,697	■	■	■	■	■	■	■	■	■		■	■				3 or 4.5	
WSK PZL - Mielec	M-27 Skytrack PT	15,700	8,642	▼	■	■	■	■	■	■	■	■		■	■				3	
WSK PZL - Mielec	Iryda M-93V Trainer / Light Attack	TBD	TBD		■	■	■	■	■	■	■	■		■	■				3	
WTA Inc. / Piper	Super Cub PA-18-150	1,750	946	■	■	■	■	■	■	■	■	■		■	■				4.7	Use Extended Rear Gate to clear rudder.
WTA / Piper	New Brave PA-36 -375 / 400 AG	2,544	3,900-4,800	■	■	■	■	■	■	■	■	■		■	■				4.7 or 4.8	Use Extended Rear Gate or Long Reach Adapter to access tail wheel.
Y																				
Yakovlev	YAK-55 / M Aerobatic	1,852	1,411	■	■	■	■	■	■	■	■	■		■	■				4.7	Use small Extended Rear Gate and Side Gates to clear rudder.
Yakovlev	YAK-50 Aerobatic	1,984	1,686		■	■	■	■	■	■	■	■		■	■				4.7 or 4.8	Use small Extended Rear Gate.
Yakovlev	YAK-54 Aerobatic	2,182	1,650	■	■	■	■	■	■	■	■	■		■	■				4.7	Use small Extended Rear Gate and Side Gates to clear rudder.
Yakovlev / Comecon Romania	YAK -52 / -53 Aerobatic	2,337	1,985	■	■	■	■	■	■	■	■	■		■	■				3	
Yakovlev / Nanchang	YAK -18A / PM / T / CJ-6A	3,088 / 3,637	2,415	■	■	■	■	■	■	■	■	■		■	■				3	Light on nose wheel when fueled. Keep Strut Strap tight. Use caution when towing.
Yakovlev	YAK-58	4,630	2,800	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4.3	Forward knuckle. Use Extended Rear Gate with Center Fill Plate removed. Move remote to lower clip.
Yakovlev	YAK-38 “Forger A” VSTOL	25,795	16,500								■	■	■	■	■	■	■	■	4.3	Long low reach. Use Extended Rear Gate.
Yakovlev	YAK-28 “Firebar” “Brewer”	44,000	TBD								■	■	■	■	■	■	■	■	4.3	Long low reach. Use Extended Rear Gate.
Yakovlev	YAK-40 Short-Haul Jet Transport	35,275	20,725		▼	■	■	■	■	■	■	■	■	■	■	■	■	■	3	

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MAKE	MODEL	MTOW (LBS) TYPICAL	OEW (LBS) TYPICAL	tractor MODEL															METHOD	SPECIAL ATTENTION / REMARKS
				83.6	86	86.5 X	87	87.5	87.5 AL	87.5 X	88	88.5	89.25	89	89.5	89.5 AL	89.5 AL-250			
Yakovlev	YAK-42 Pax Transport / YAK-142	125,660	76,092								▼	▼	▼	■	■	■	■		3	Verify ramp weight within 8800 / 8850 tractor range.
Z																				
Zenair	Heintz - Zenith CH-400	2,580	1,380	■	■	■	■	■	■	■	■	■	■	■	■	■			3 or 4.5	Only use 88 / 89 on versions without wheel pants.
Zenair	Zenith CH-200 / 250	1,500 / 1,610	930 / 990	■	■	■	■	■	■	■	■	■		■	■				3 or 4.5	
Zenair	Zenith CH-300	1,800	1,050	■	■	■	■	■	■	■	■	■		■	■				3 or 4.5	
Zenair	Zenith Zodiac CH-601 / HD / HDS	1,050 / 1,200	550-590	■	■	■	■	■	■	■	■	■		■	■				3 or 4.6 or 4.7	Nose wheel version: Set 3-bladed prop. Tail wheel version: Use Extended Rear Gate.
Zenair	STOL CH-701 / 701-AG	960	460	■	■	■	■	■	■	■	■	■		■	■				3	
Zenair	Zenith CH-2000 Trainer	1,600	TBD	■	■	■	■	■	■	■	■	■		■	■				4.5	Sloping strut. Attach Strut Strap above Hold-Back Bar.
Zlin Morovan	Zlin 42 / ZLin 142 / L Aerobatic	2,138-2,403	1,609	■	■	■	■	■	■	■	■	■		■	■				4.5	Attach Strut Strap above oleo cover.
Zlin Morovan	Zlin 242 L Aerobatic	2,400	1,565	■	■	■	■	■	■	■	■	■		■	■				4.5 and 4.6	Set 3-bladed prop. Attach Strut Strap above oleo cover.
Zlin Morovan	ZLin Z 50 L / ZLin Z 50 LS Aerobatic	1,587	1,256	■	■	■	■	■	■	■	■	■		■	■				4.7	Use Extended Rear Gate at forward-most position to clear rudder / empennage.
Zlin Morovan	Zlin 546 L Aerobatic	2,150	1,521	■	■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required to access tail wheel.
Zlin Morovan	Zlin 143 / L Trainer / Touring	2,381 / 2,975	1,830	■	■	■	■	■	■	■	■	■		■	■				4.5 and 4.6	Set 3-bladed prop. Attach Strut Strap above oleo cover.
Zlin Morovan	Zlin 137 T Agro Turbo	5,566	2,756		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required to access tail wheel.
Zlin Morovan	Zlin Z 37 T / Z 37 A Agro Turbo	5,291	2,976		■	■	■	■	■	■	■	■		■	■				4.7 and 4.8	Long Reach Adapter required to access tail wheel.

END OF TABLE

AIRCRAFT TOWING PROCEDURES

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Version 11/13/2019
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