

2021



**TEMISKO**

# Jeep Operations Manual

**OPERATIONS AND MAINTENANCE**

CREATED BY: PATRICK CHARTRAND



## 1 Scope

This manual is meant to build on existing knowledge of a standard trailer. Flatbeds and dry vans are considered standard trailers. The contents will only cover parts, procedures and maintenance that are unique to the jeep dolly. All other basic trailer parts, procedures and maintenance that are on standard trailers still apply.

The manual will cover many optional features that may not be installed on all jeeps. There are also features that only apply to certain models of jeep. It is up to the reader to identify and apply the correct procedure shown in this manual.



## 2 Contents

1	Scope .....	1
3	Glossary .....	3
4	Terminology.....	4
5	What is an axle group? .....	5
6	What is a Jeep? .....	6
7	Jeep setup Functions .....	8
7.1	Jeep Pre-Trip inspection .....	8
7.2	Moving the king pin.....	8
7.3	Sliding the fifth wheel.....	8
7.4	Pin on axle .....	9
7.5	Removable axle .....	10
7.6	Axle Chains .....	11
7.6.1	Setting the chain length.....	11
7.6.2	Chaining up an axle.....	12
7.7	Suspension Controls .....	12
7.7.1	Dump valve .....	12
7.7.2	Height Adjustment Valve.....	12
7.8	Resetting the air bags .....	13
7.8.1	Trailer Operation .....	14
7.8.2	Height Adjustment Valve.....	14
7.9	Gooseneck Extension(optional).....	14
7.10	Fifth wheel pivot locks (optional) .....	15
8	Load balancing.....	16
9	Safety.....	17
9.1	Danger Areas .....	17
9.2	Lifting.....	17
9.3	Unstable Condition.....	18
10	Maintenance.....	20
10.1	Recommended fluid types.....	20
10.2	Grease Maps.....	20
10.3	Axle alignment.....	20

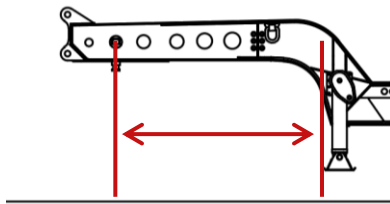
### 3 Glossary

**Riding height:** In the context of a suspension adjustment; this is the height between the bottom of the chassis to the middle of the axle.

**Leveling valve:** A valve that is connected to the suspension and the chassis of the trailer. This valve regulates the riding height

**Dump:** In the context of an air system; this is the action of exhausting all the compressed air. An air ride system is commonly dumped.

**Swing clearance:** This is the distance between the king pin and where the chassis drops down. This can also be referred to throat or swing.

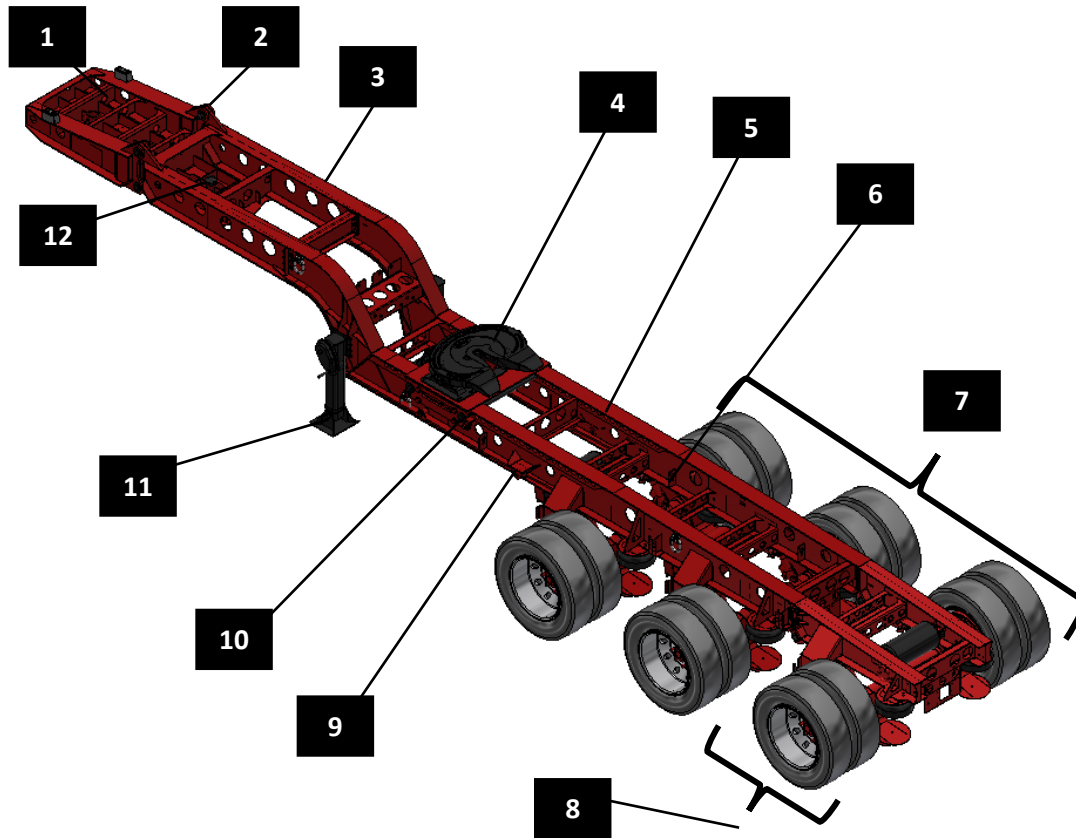


**R/S:** Abbreviation for road side. This will be used in place of right-left or Passenger-Driver side.

**C/S:** Abbreviation for curb side. This will be used in place of right-left or Passenger-Driver side.

## 4 Terminology

In the heavy haul industry, there are many names for the same parts. Presented here is the terminology used within this manual. The location and terminology of these parts is critical to the overall understanding of the trailer. Please take the time to familiarize yourself with all the parts as they will be further discussed in the manual.

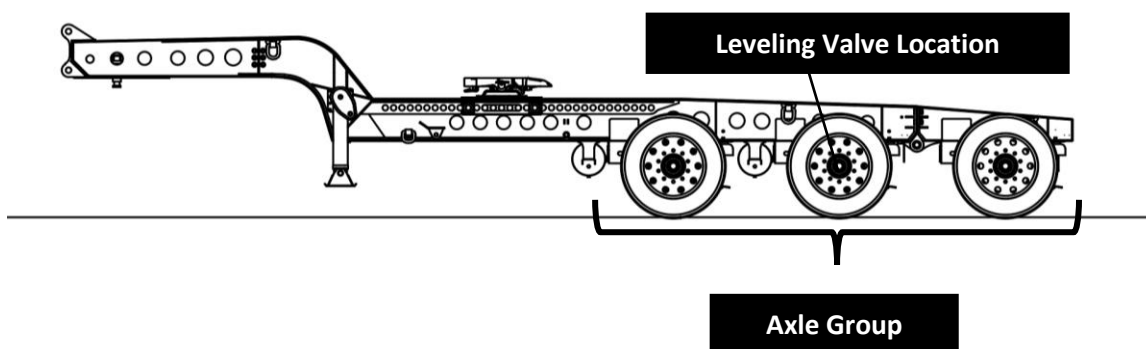


<u>Item</u>	<u>Description</u>
1	Gooseneck extension (AKA flipbox, optional)
2	Gooseneck extension joint (optional)
3	Gooseneck
4	Fifth wheel assembly
5	Fifth wheel slide (optional)
6	Chain on axle
7	Axle group (includes any removable axles)
8	Pin on axle (optional)
9	Removable axle (optional)
10	Fifth wheel slide locking pins (2X)
11	Landing gear
12	King pin (may be removable, optional)

## 5 What is an axle group?

An axle group is a set of axles that share the load between them. This set of axles can be 1 axle to as many as needed. The critical feature is that the load is transmitted evenly throughout all the axles. In air ride groups, all the air bags are connected together. The common air pressure in the entire system equalised the load on all axles within the group. The second item is a leveling valve. The leveling valve will add or remove air in the air bags to bring the suspension to the desired level. If the load is increased, the leveling valve will let air into the system to build up enough pressure to finally bring the suspension to the correct position.

It is particularly important to understand that higher axle loads = higher air bag pressure NOT suspension position. Air ride suspension will return to a pre-set height.



Air pressure gauges are connected on the groups air circuit. The pressure can be directly related to axle weight. It is also very important to note that **this chart is the weight per axle**. The weight must be multiplied by the number of axles it is connected to.

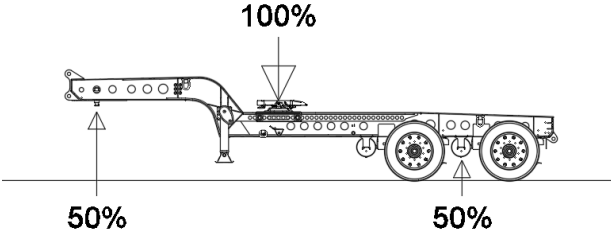
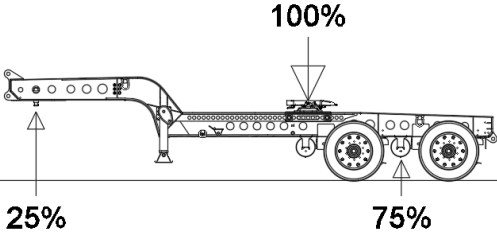
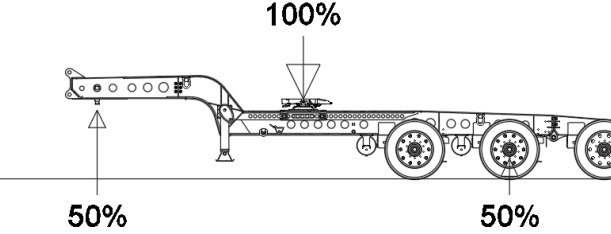
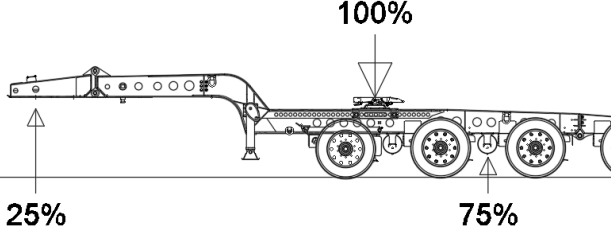
## 6 What is a Jeep?

There are many jeep styles and configurations that are designed to meet the varying state and provincial laws. Some jeeps are made in a modular fashion so they can be configured to suit different loads or to be able to conform to local laws. The function of the jeeps is to divide the load into 2.

A jeep can be simplified to a beam with 2X support points with a load applied between them. The figure below shows this simplification.



How much of the load is transferred to either reaction point depends of the location of the load along the frame. The further the load is moved towards one reaction point; the more weight will be on it. The front reaction point is the jeeps king pin. The rear reaction point is the center of the jeep's axle group. The figures below give multiple scenarios of jeep configurations and how it affects weight distribution.

	
<p>The fifth wheel is in the middle of the front and rear reaction point. This divides the load in 2.</p>	<p>With the fifth wheel moved backwards towards the axle group. The distance between the fifth wheel and the axle group is short compared to the king pin to the fifth wheel. More load will be on the axle group than the king pin.</p>
	
<p>The added axle moves the reaction point backwards on the axle group. The fifth wheel is in the middle of the front and rear reaction point. This divides the load in 2.</p>	<p>The added axle moves the reaction point backwards on the axle group. The fifth wheel is in the middle of the front and rear reaction point. This divides the load in 2.</p>



91 Ontario Street  
Notre-Dame-du-Nord, Qc J0Z 3B0  
T: 819-723-2416 F: 819-723-2467  
www.temisko.com

The front reaction point can be moved on certain jeeps as there are multiple locations available. The rear reaction point is always the center of the axle group. Visualizing the reaction points in relation to the fifth wheel will give the operator the key tool to balance the load.



## 7 Jeep setup Functions

Setting up the jeep requires special attention to detail. This attention to detail will ensure the proper setup and will eliminate or minimise the risk of improper load balancing.

### 7.1 Jeep Pre-Trip inspection

The pre-trip must be done before the jeep is put into service. This checklist will avoid missing any small detail prior to leaving.

- ✓ Walk around vehicle to ensure the area is clear
- ✓ Inspect the jaws of the fifth wheel
- ✓ Look for oil leaks
- ✓ Suspension limiting chains are adjusted properly
- ✓ Fifth wheel slide is locked
- ✓ All retaining clips on connection pins are installed
- ✓ Fifth wheel pivot locks are installed (optional item)
- ✓ Air ride controls are to “Leveling valve on”

### 7.2 Moving the king pin

The coupler plate has 2 king pin locations. This is to modify the swing clearance and the front reaction point. For the same fifth wheel position on the jeep, a front king pin position will transfer less weight than a rearward position. Follow the steps below to change it's location:

1. Lower the landing gear
2. Disconnect air and electrical connections
3. Uncouple the truck
4. Lift the king pin and place it in the desired hole
5. Re-couple the truck
6. Re-connect air and electrical connections
7. Raise the landing gear



### 7.3 Sliding the fifth wheel

The weight pressing down on the jeep's fifth wheel remains constant even if you slide it at another position. Sliding it forward will transfer more weight to the truck. Sliding it backwards will load the jeep's axle group. The weight is always divided between the two pivot at different ratios as it is moved. There exist 2 types of slides. The most common is the fifth wheel detailed

in this section. The second is the same model that are equipped on trucks. This last type of slide will not be detailed as this falls into common knowledge for tractor trailer operators.

The procedure below assumes that the jeep is coupled to a truck and the trailer is coupled to the jeep.

1. Move the equipment to level ground
2. Dump the air in the truck's and the jeep's suspension
3. Disconnect the supply line to the main trailer to set the brakes
4. Remove the load on the jeeps fifth wheel by actuating a gooseneck, landing gear or other methods
5. Move the jeep to nudge the fifth wheel assembly onto the opposite locking pin you want to remove. This will free up the locking pin you want to move.
6. Remove retaining clips on the 2x locking pins
7. Move the freed locking pin to the desired location
8. Move the jeep to slide the fifth wheel assembly until it contacts the new position
9. Install the second locking pin
10. Re-install retaining clips on locking pins



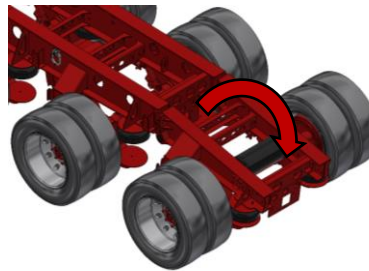
#### 7.4 Pin on axle

A pin on axle refers to an axle that can be added to the rear of the jeep. Installing or removing the pin on axle are the same steps but in the reverse order. The procedure below is for the removal of the pin on axle.

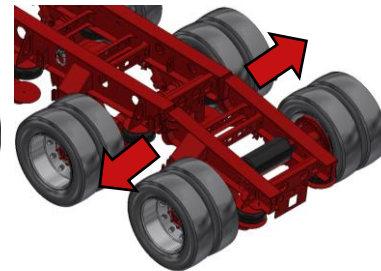
1. Keep the suspension at riding height
2. Set the parking brakes
3. Remove the 4X bolts on the top of the connection
4. Shut off the 3X air line valves on the gladhands
5. Remove the air and electrical lines and stow them in the pin on axle
6. The suspension will lower and open up the connection
7. Shorten the axle chains on the pin on axle
8. Use a forklift (or other suitable equipment) and a chain to support the front of the pin on
9. Feather the tension on the forklift to remove the bottom pins
10. Connect 2X chains on the rear of the pin on
11. Carry the pin on axle away from the jeep.



Remove the 4X bolts



With the air in the suspension dumped, the pin on will rotate to open the joint



Once the front of the pin on is supported, remove the bottom connection pins



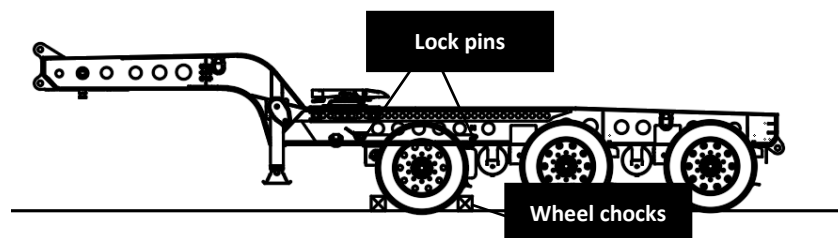
When installing the pin on, always make sure to have all the connection bolts installed because a gooseneck will press down on the back on the pin on causing it to tip up.

### 7.5 Removable axle

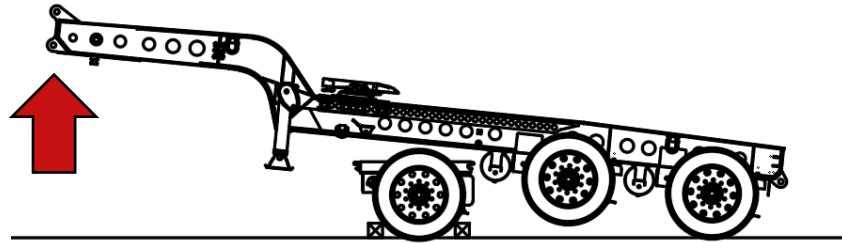
The removable axle is an axle that is installed under the frame of the jeep. Installing or removing the removable axle are the same steps but in the reverse order. The procedure below is for the removal of the removable axle.

1. Dump the air in the suspension
2. Shorten the axle chains on the removable axle
3. Set the parking brakes
4. Shut off the 4X air line valves on the gladhands
5. Remove the air lines and stow them in the removable axle
6. Install wheel chocks or blocks ahead and behind the axle
7. Uncouple the jeep from the truck
8. Use the landing gear to take up the work out the 2x locking pins
9. Use a forklift (or other suitable equipment) and a chain to lift the front of the jeep so the frame is disconnected from removable axle
10. Move the front of the jeep over and set the jeep back on the ground
11. Re-install the locking pins in the jeeps frame

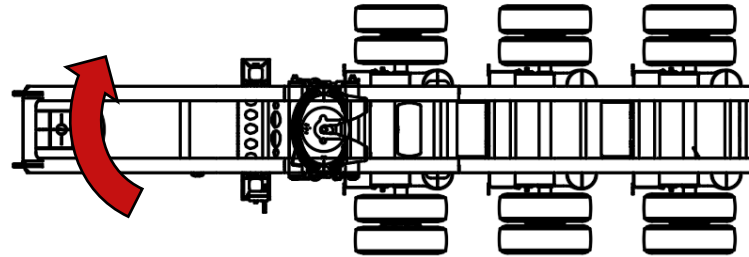
Air dumped, wheel chocks installed and lock pins removed



Lift the front of the jeep up until the frame is higher than the pin on axle



Move the front of the jeep away from the pin on axle and set it on the ground

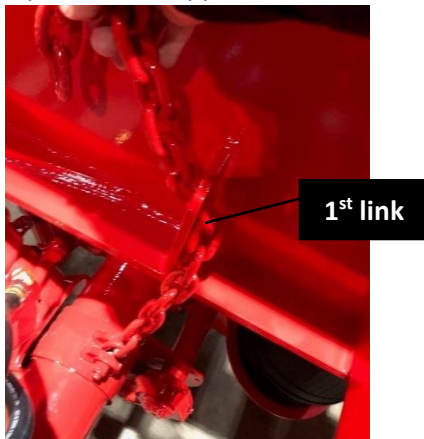


## 7.6 Axle Chains

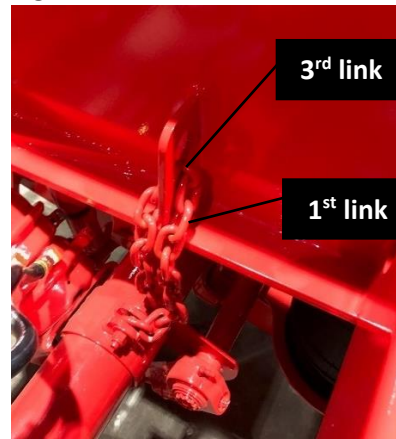
Axle chains have 2 functions. They are meant to limit the overextension of the suspension and to tie up an axle. Overextending an axle happens when a load is suddenly taken off the axle group without releasing the air pressure. This high air pressure will extend the bags and may top out the shock absorbers.

### 7.6.1 Setting the chain length

1. Allow the group height to settle to riding height
2. Pull the chain tight to start the count
3. Release the correct amount of links
  - a. 9" riding height = 3 links or 4.5 inches slack (most common)
  - b. 6.5" riding height = 2 links or 3 inches slack
4. Repeat on the opposite side to have matching lengths



Pull the chain tight  
 (first link cannot be inserted in slot)



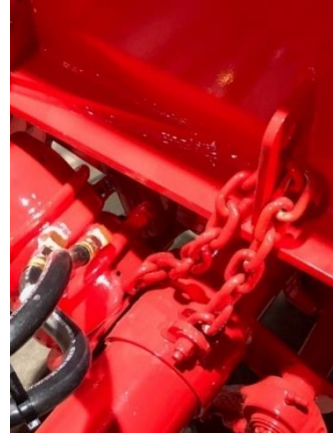
Release 3x links. (example is a 9" riding height)

### 7.6.2 Chaining up an axle

1. Dump the air out of the air system
2. Pull the chain to the shortest setting
3. Repeat on the opposite side to have matching lengths
4. Re-apply the air suspension to raise the axle



Air ride dumped; chain pulled to engage the shortest length



Chain at its shortest length



Never tie up the axle that has the leveling valve. The axle will never move down and the air pressure will build in the system. The axle group will not balance out properly and will cause premature failure.

## 7.7 Suspension Controls

Controlling the height of the suspension is very useful in many situations. At a minimum, the operator can exhaust (dump) all the air out of the air bags. The Height Adjustment Valve has multiple functions to alter the height of the suspension. There are other variations of height control but the two shown are the most common.

### 7.7.1 Dump valve

This valve connects the leveling valve to the air bags or bypasses the valve and exhausts (dump) the air out.

The dump Valve has 2 states:

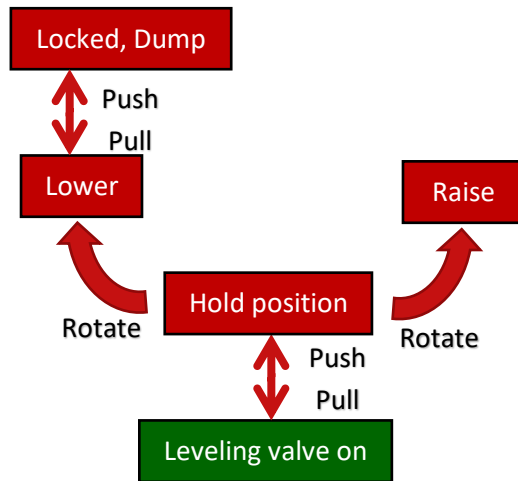
1. Leveling valve on (riding height)
2. Air ride dumped



### 7.7.2 Height Adjustment Valve

The second type of control is the optional height adjustment valve. Below is a logic diagram and photo of the valve. Once the height adjustment valve is in a Red state (indicated in diagram), the

leveling valve is bypassed and air in the group is locked. If there is an air leak in the circuit, the suspension will gradually lower. This is made for temporary height adjustments only. The green state is the only state to operate the trailer for long period of time.



Height adjustment valve

The height adjustment valve has 5 states:

1. Leveling valve on (riding height)
2. Hold position
3. Raise the suspension
4. Lower suspension
5. Dump

**Note:** some older models of Height Adjustment Valve that have the black lever have the same function except they do not lock to dump.

### 7.8 Resetting the air bags

The air bags may get folded under the pedestal if the suspension is extended with little air pressure. This occurs when a trailer is lifted when empty. The extended bags collapse and fold onto themselves when the suspension is later retracted. The air bags must be unfolded before operating the trailer on the road. Air bags can be unfolded by 2 methods.



Collapsed air bag when trailer is lifted



Air bag is folded onto itself when suspension is lowered

### 7.8.1 Trailer Operation

This method is the “natural” way to reposition the air bag. During normal trailer operation, the high air pressure and some suspension articulation will unfold the air bags. Some additional help may be needed by driving over rough terrain at slow speeds.

### 7.8.2 Height Adjustment Valve

This optional valve allows the operator to alter the height of the suspension.

1. Raise the suspension until the bags are fully extended
2. Return the suspension to riding height

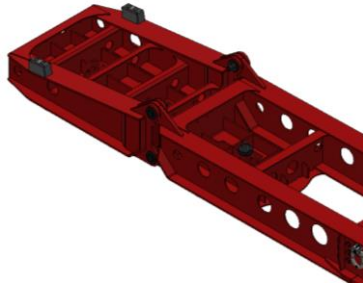
#### TIP:



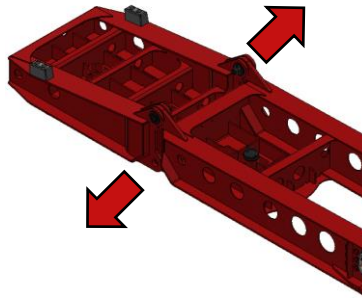
Collapsed air bags can be avoided by shortening the chains on axles to the minimum before lifting the trailer. The operator must remember to return the chains to the correct length before re-entering into service.

### 7.9 Gooseneck Extension(optional)

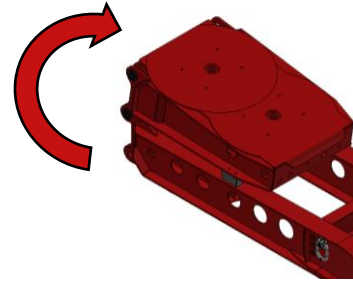
The gooseneck extension adds more swing clearance for a higher capacity truck. This allows the truck to slide the fifth wheel forward without hitting the axles when making a turn. The extension can be removed or flipped up to shorten the overall length or change the front weight transfer point.



Put the fifth wheel plate of the tuck under the extension and use the landing gear to take pressure off the bottom pins



Remove the bottom extension pins. Make sure the removable king pin is in the stationary coupler



Flip the neck extension with a forklift or other lifting device, re-install the pins in the extension

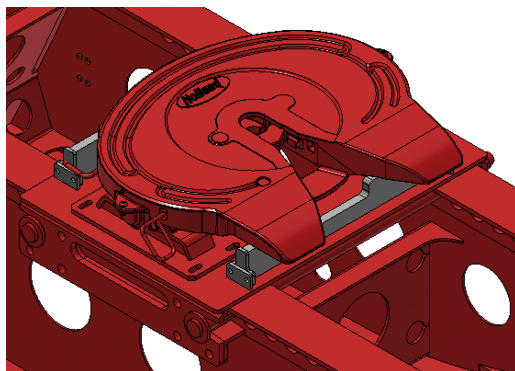
**TIP:**



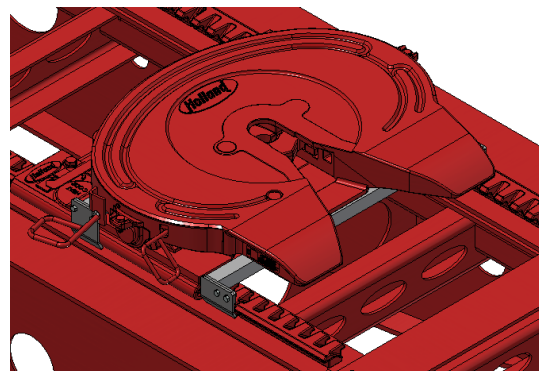
Take out the removable king pin from the extension before flipping it. This will avoid potentially damaging it.

### 7.10 Fifth wheel pivot locks (optional)

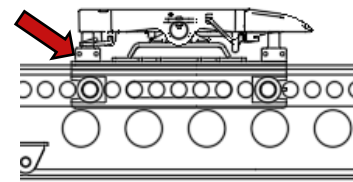
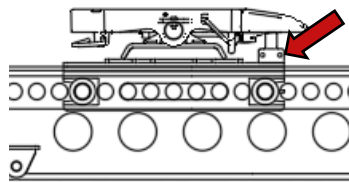
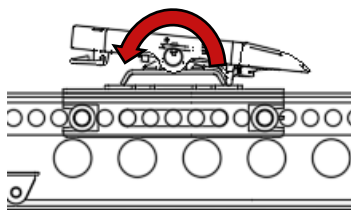
There are some hauling configurations that need to lock out the pivoting action of the fifth wheel. There is a dedicated model of locks for each fifth wheel slide type. Both types have the same procedure. Both types are shown below.



Pivot lock on Temisko slide



Pivot Lock on a Holand Fifthwheel





Tilt fitwheel back

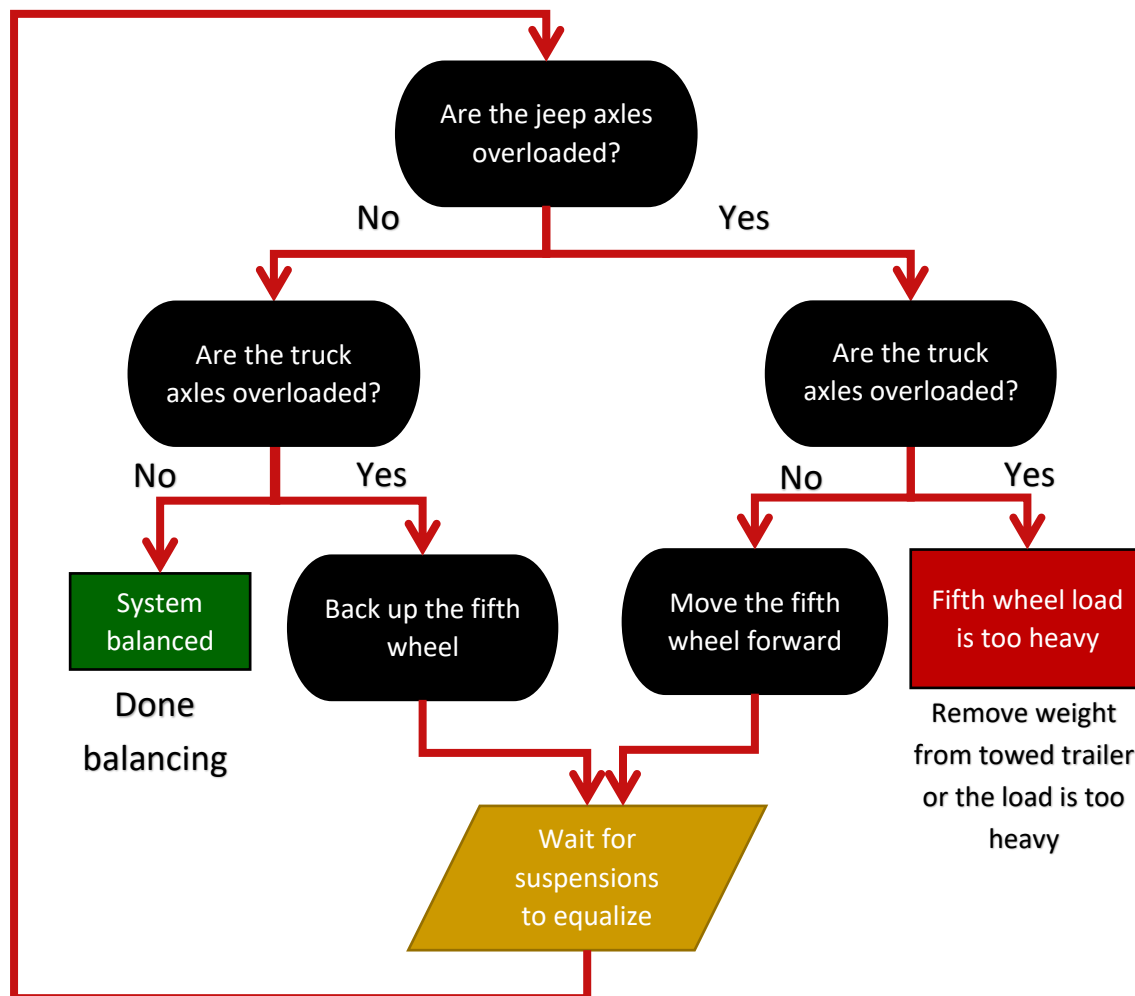
Install rear pivot lock

Install front pivot lock

## 8 Load balancing

Before starting the load balancing exercises, make sure to know the weights that is allowed on your trip. The operator needs to have a clear set of goals before starting the procedure.

The flow chart below assumes that the king pin is at the correct position for the given truck. Use the weight charts on the air ride system to monitor the weights on the groups. Ideally, a weight scale is close by to have accurate results.


**TIP:**

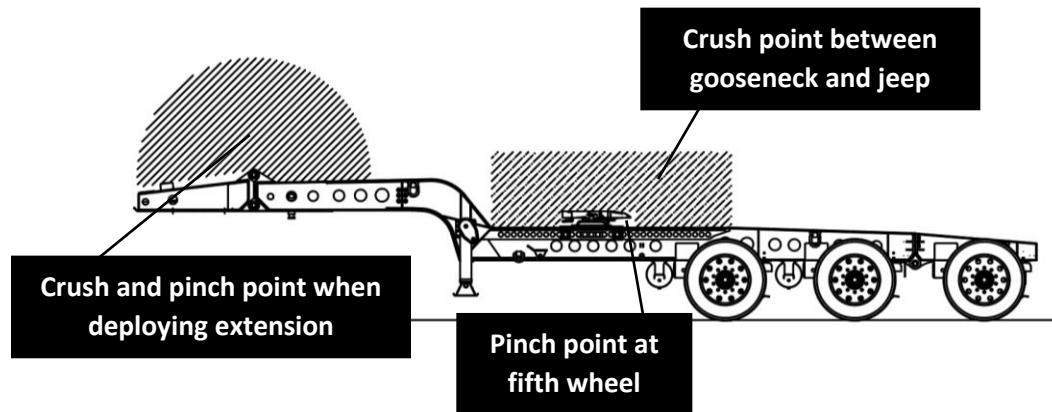

Add up all the axle weights and if they are higher than what is permissible, you will never be able to balance the load. There is no sense of performing this exercise when the number do not add up! A bit of math will save quite a bit of time.

## 9 Safety

Safely operating a jeep is the priority of the operator. There are safety concerns when the jeep is in and out of operation. Each item in this section must be understood to eliminate or mitigate the risk of injury or equipment damage.

### 9.1 Danger Areas

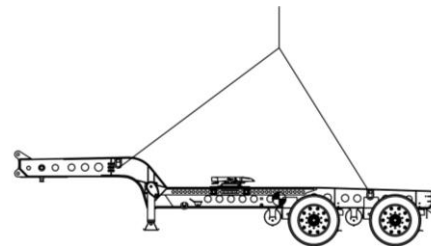
There are some safety concerns with a jeep. The booster has a wide range of motion that can cause serious concerns. Below is a diagram showing the danger zones on the jeep.



### 9.2 Lifting

When lifting a jeep, it is important to use the dedicated lifting points. Each point has a 18000lbs working load limit. It is the responsibility of the operator must use at least 3 lifting points and use enough chain length to not overload the lifting points.

The centre of gravity will move if an axle or accessory is added or removed. The figure shows a jeep lifted by a single point that is split in 3 to put the hook over the center of gravity. If the secondary chains are too short, the shallow angle will overload the lifting point.



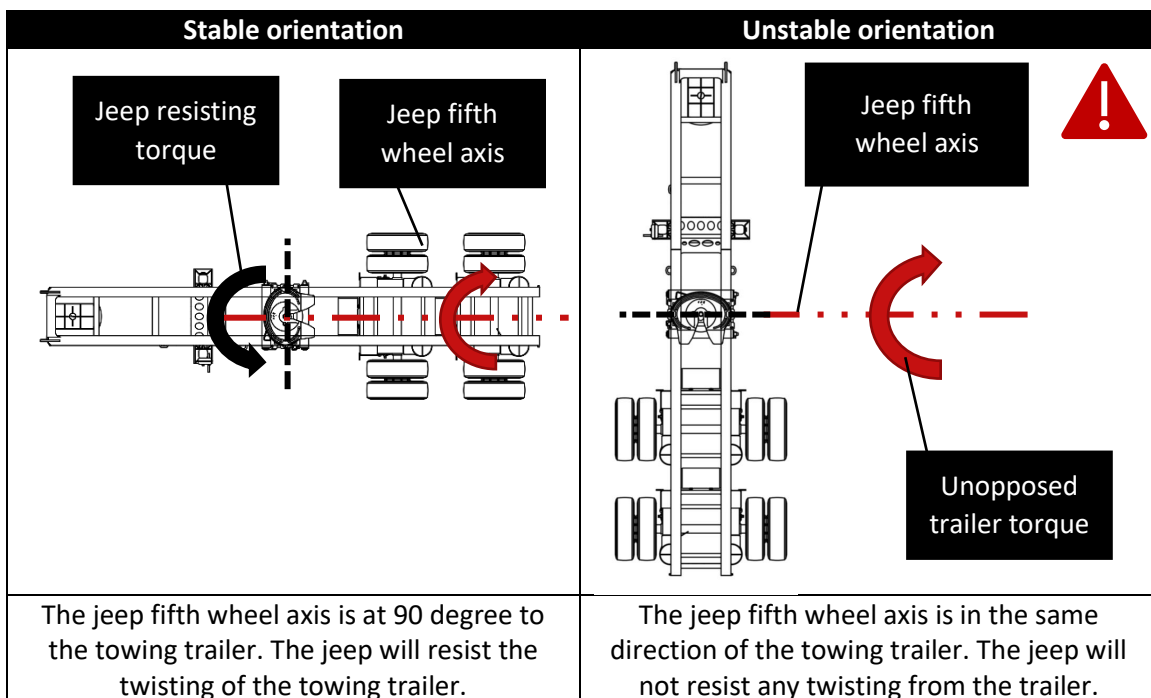
### 9.3 Unstable Condition

The orientation of the fifth wheel pivot axis is particularly important. When going straight, the jeep axis is perpendicular to the towing trailer. In this orientation, the jeep will be able to resist the twisting forces of the towing trailer such as uneven ground or cornering forces. Once the axis is in line with the towing trailer, the jeep can no longer aid in resisting the twisting force. Solely the towing trailer will have to resist this force.

In some instances, if the towing trailer is the sole unit resisting the twisting force, it may cause a tip over, structural damage or damage to the load itself. The operator needs to be aware of this potential danger and must adjust the driving speed accordingly.

For most low beds, this is of not much concern because the low beds carry loads very low to the ground and the bed itself will contact the ground with little twist. This becomes an issue when transporting high center of gravity and/or loads that will not touch the ground with much twisting motion.

Low Concern	High concern
Low bed	Jeep and dolly beam hauler
Half schnabel	Double schnabel
Perimeter frame	Belly bridge
	HD flatbeds
	Compressor haulers

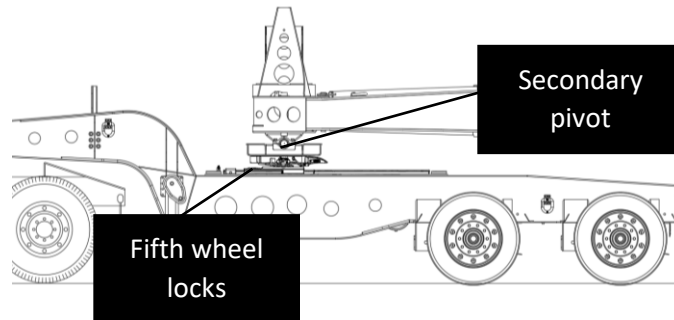


**TIP:**



The figure above shows a jeep dolly, but the same unstable condition exists with a truck as well.

A secondary pivot and fifth wheel locks are needed to keep the pivoting axis perpendicular with the jeep.



The figure above shows a gooseneck but a secondary pivot on a loading bunk can be installed also.

## 10 Maintenance

The table below outlines the periodic maintenance of a jeep

Service Item	Service Interval				
	Daily	Weekly	Monthly	6 Months	12 months
Grease points		SER			
Chassis			INS		
Fifth wheel jaw				INS	
Air system	INS				

INS – Inspect

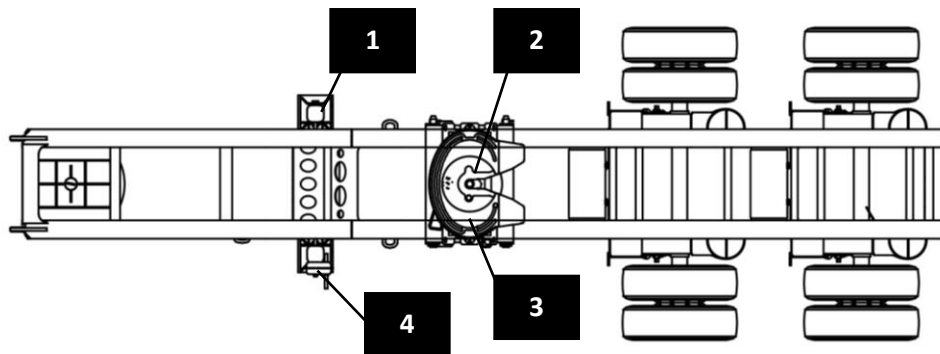
CHA- Change

SER- Service

### 10.1 Recommended fluid types

Location	Type	Refill quantity
Grease type	Synthetic NLGI Viscosity 2	Fill until visible discharge

### 10.2 Grease Maps



Item	Description
1	Landing gear
2	Fifth wheel jaw
3	Fifth wheel plate
4	Landing gear gearbox

### 10.3 Axle alignment

Axle alignment is done the same as a standard trailer. No special considerations are needed for this trailer type.