



Assembly

Instructions

Wagon and Trailer Chassis Running Gear

Trailer chassis, 4, 6 and 8 wheel wagons

Including all road flex, surge brake and hydraulic disc brake variants.

HORST WELDING


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 **CAUTION**
Operational Hazard
Personal Protection Equipment
(PPE) is required during
assembly.



 **CAUTION**
Operational Hazard
Machine assembly should be done by
qualified personnel only.

**PLEASE REVIEW AND UNDERSTAND THE ASSEMBLY MANUAL
BEFORE ATTEMPTING TO ASSEMBLE THIS MACHINERY.**

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SAFETY



This Safety Alert Symbol means:
ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!

The Safety Alert symbol identifies important safety messages on the implement and in the manual. When you see this symbol, read and understand the message, be alert to the potential hazard in the message. Follow the instructions in the safety message.

SAFETY MESSAGES

Throughout this manual, the terms **DANGER, WARNING, CAUTION** and **IMPORTANT** are used to indicate the degree of hazard to personnel if proper safety procedures and guidelines are not followed. The appropriate term for each message has been selected using the following guide-lines:

DANGER - Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury, and includes most extreme situations typically for implement components which, for functional purposes, cannot be guarded.

WARNING - Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

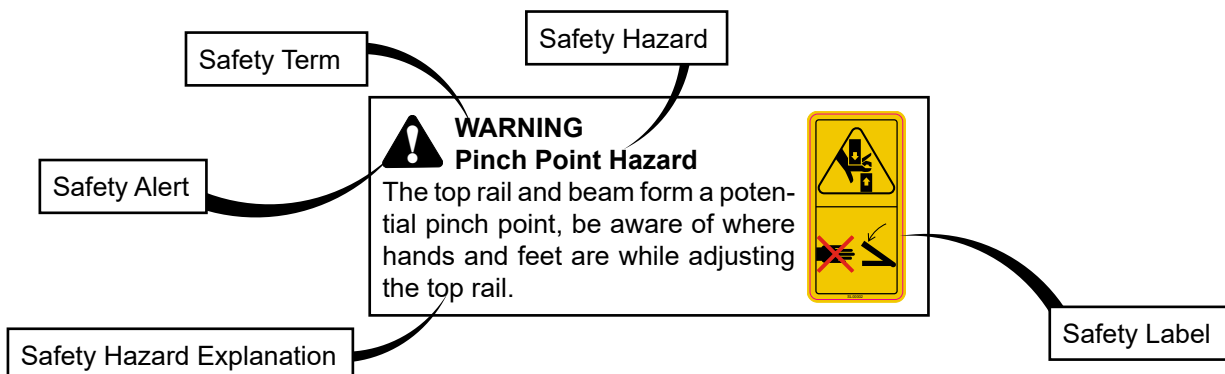
CAUTION - Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

IMPORTANT - Indicates a situation that could result in damage to the implement or other property.

In the owners manual, when a hazard is present you will see a safety message box. The box may contain:

- The safety alert symbol,
- The safety term
- The safety hazard
- The safety hazard explanation

When applicable you may also see the appropriate safety label displayed with the message, as shown below.

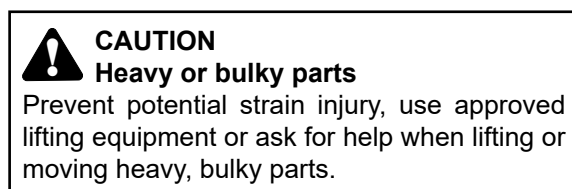
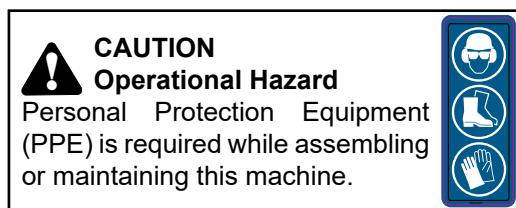


The safety information given in this manual does not replace any safety codes, insurance needs, government and local laws.

ASSEMBLY SAFETY

Read and understand the Assembly Manual and all safety signs before starting.

1. Follow good safety practices:
 - Keep service area clean and dry.
 - Be sure electrical outlets and tools are properly grounded.
 - Use adequate light for the job at hand.
2. Keep the assembly area neat and clean to prevent slipping or tripping.
3. Position in a large open area to allow access from all sides during assembly.
4. When using lifting equipment, place jack stands under the machine to securely stabilize it before working on, beside or under it during assembly.
5. Stay away from overhead power lines and obstructions when lifting the machine during assembly. Contact with power lines can cause electrocution. Contact with obstructions can damage components or cause them to fail.
6. Don't handle heavy and/or bulky components alone, ask for help.
7. Use properly sized tools, stands, jacks and hoists at all times.
8. Tighten all fasteners to their specified torque, then recheck before using the machine



REFERENCE INFORMATION

WHEEL TORQUE SPECIFICATION

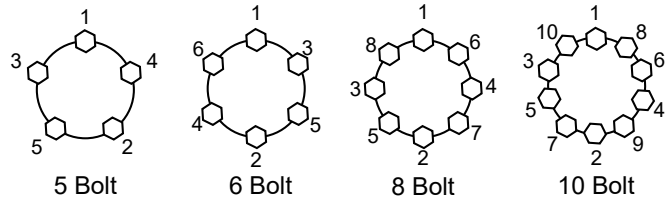
It is an extremely important safety procedure to apply and maintain proper wheel mounting torque on your trailer axle. Torque wrenches are the best method to assure the proper amount of torque is being applied to a fastener.

Wheel lugs should be torqued before first road use and after each wheel removal. Check and re torque after the first 10 miles, 25 miles, and again at 50 miles. Check periodically thereafter.

Note: Wheel lugs must be applied and maintained at the proper torque levels to prevent loose wheels, broken studs, and possible dangerous separation of wheels from your axle.

1. Start all lugs by hand to prevent cross threading.
2. Tighten lugs in sequence, as shown in the diagram.
3. Tighten the lugs - see chart

Wheel Nut / Bolt Size	Torque Dry		Torque Lubricated	
	lbs-ft	N-m	lbs-ft	N-m
1/2"	90	122	65	88
1/2" (brake drum)	100	136	75	102
9/16"	120	163	90	122
5/8"	180	244	130	176
3/4"	300	407	220	298



Wheel Lug Torque Sequence

TIRE PRESSURE

As a general guide for tire inflation, check the sidewall of the tire for the recommended tire pressure. It is important that tires are inspected after unit is assembled. Do not exceed maximum recommended tire pressure.

ALIGNMENT

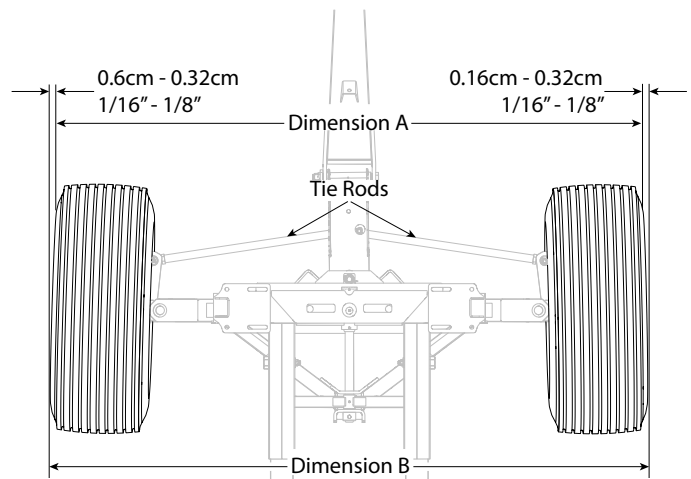
Alignment is set at the factory with proper toe-in settings. Check alignment, if adjustment is required, adjust by turning the tie rods on the front of the axle. Adjustments should be made by qualified personnel only.

To check alignment:

- Position the tongue parallel to the reach tubes
- Run a string or straight edge from front to back along the outside of the front and rear wheels, check both sides.
- The front wheel should toe-in approximately 0.06 - 0.32 cm ($\frac{1}{16}$ " - $\frac{1}{8}$ ") from back to front of the wheel.

To verify that correct toe-in adjustment is achieved,

- Measure across the front wheels, - dimension A
- Then across the back of the front wheels, - dimension B.
- Dimension A measurement should be approximately 0.32 - 0.64cm ($\frac{1}{8}$ " - $\frac{1}{4}$ ") less.



NOTE

Model 185F four wheel steer, requires same toe in specifications for the rear axle.

Quad steer axles: have the same toe in specifications on all four wheels.

BOLT TORQUE TABLE

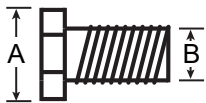
These tables are offered as the suggested maximum torque values for dry (not lubricated) threaded products and are only a general guide.

Check tightness of bolts periodically, replace hardware with the same strength bolt.

Torque specification for bolts are identified by their head markings as shown.

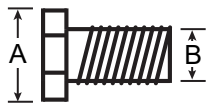
See the "Wheel Torque Specification" page for wheel bolt /nut torque settings

METRIC TORQUE SPECIFICATIONS



Wrench Size: "A"	Thread Size: "B" Fine	Class 8.8		Class 10.9		Thread Size: "B" Coarse	Class 8.8		Class 10.9	
		N-m	lbs-ft	N-m	lbs-ft		N-m	lbs-ft	N-m	lbs-ft
10 mm	6 x 0.75	---	---	---	---	6 x 1.0	11.3	8.3	16.5	12.2
13 mm	8 x 1.0	27	20	38	28	8 x 1.25	27.3	20.1	40.1	29.6
16 mm	10 x 1.25	52	38	73	54	10 x 1.5	54	40	49	36
18 mm	12 x 1.25	95	70	135	100	12.1.75	93	69	137	101
21 mm	14 x 1.5	150	111	210	155	14 x 2.0	148	109	218	161
24 mm	16 x 1.5	225	166	315	232	16 x 2.0	230	170	338	249
27 mm	18 x 1.5	325	240	460	339	18 x 2.5	329	243	469	346
30 mm	20 x 1.5	460	339	640	472	20 x 2.5	464	342	661	487
34 mm	22 x 1.5	610	450	860	634	22 x 2.5	634	468	904	667
36 mm	24 x 2.0	780	575	1100	811	24 x 3.0	798	588	1136	838
41 mm	27 x 3.0	---	---	---	---	27 x 3.0	1176	867	1674	1234
46 mm	30 x 2.0	---	---	---	---	30 x 3.0	1597	1178	2274	1677

SAE TORQUE SPECIFICATIONS



Wrench Size: "A"	Thread Size: "B" Fine	SAE 2		SAE 5		SAE 8		Thread Size: "B" Coarse	SAE 2		SAE 5		SAE 8	
		lbs-ft.	N-m	lbs-ft.	N-m	lbs-ft.	N-m		lbs-ft.	N-m	lbs-ft.	N-m	lbs-ft.	N-m
7/16"	1/4-28	6	8.1	10	13.6	14	19.0	1/4-20	5	6.8	8	10.8	12	16.3
1/2"	5/16-24	13	17.6	19	25.7	27	36.6	5/16-18	11	14.9	17	23.0	25	33.9
9/16"	3/8-24	23	31.2	35	47.4	49	66.4	3/8-16	20	27.1	31	42.0	44	59.6
5/8"	7/16-20	36	48.8	55	74.5	75	101.6	7/16-14	32	43.4	49	66.4	70	94.9
3/4"	1/2-20	55	74.5	85	115.2	120	162.6	1/2-13	49	66.4	75	101.6	107	145.0
13/16"	9/16-18	79	107.0	122	165.3	172	233.1	9/16-12	70	94.9	109	147.7	154	208.7
15/16"	5/8-18	110	149.1	170	230.4	240	325.2	5/8-11	97	131.4	150	203.3	212	287.3
1-1/8"	3/4-16	192	260.2	297	402.4	420	569.1	3/4-10	173	234.4	266	360.4	376	509.5
1-5/16"	7/8-14	184	249.3	474	642.3	668	905.1	7/8-9	166	224.9	429	581.3	606	821.1
1-1/2"	1.0-12	274	371.3	705	955.3	995	1348.2	1.0-8	250	338.8	644	872.6	909	1231.7

MODEL LIST

This assembly manual is for the following running gear models.

4-Wheel	6-Wheel	8-Wheel Quad Steer	Trailer Chassis
145 (8 ton)	245 (12 ton)	208 Quad (16 ton)	TR505 (20 ton)
185 (10 ton)	265 (14 ton)	308 Quad (20 ton)	TR605 (24 ton)
185F (6 ton)	325 (18 ton)	608 Quad (40 ton)	
205 (12 ton)	505 (22 ton)		
275 (14 ton)	605 (30 ton)		
285 (15 ton)			
365 (20 ton)			
365E (20 ton)			
485 (24 ton)			

Road Flex Models

4-Wheel	6-Wheel	8-Wheel Quad Steer	Trailer Chassis
185RF (10 ton)	325RF (18 ton)	308RF (20 ton)	TR505RF (20 ton)
205RF (12 ton)	505RF (22 ton)		TR605RF (24 ton)
285RF (15 ton)			
365RF (20 ton)			
485RF (24 ton)			

Check for missing or damaged parts. Contact the shipping company if damage is found.

For missing parts contact your dealer

For complete parts list visit

www.horstwagons.com



and click on '[Parts](#)'

The products used as examples in the illustrations generally apply to all models. Model specific instructions are identified in the manual.

The product is shipped from the factory in a partially disassembled configuration and attached to a pallet that provides easy moving and handling. Always use tools, equipment and lifting devices of appropriate size and capacity for the job.

When the machine is shipped, follow this safe assembly procedure:

1. Clear the area of bystanders, especially small children.
2. Be sure you have all the required tools before you start.
3. Prepare a clean, clear work area that is accessible from all sides.
4. Remove all the parts from the shipping package, and keep hardware in an accessible place (work bench etc)

 CAUTION Operational Hazard Personal Protection Equipment (PPE) is required while assembling or maintaining this machine.	
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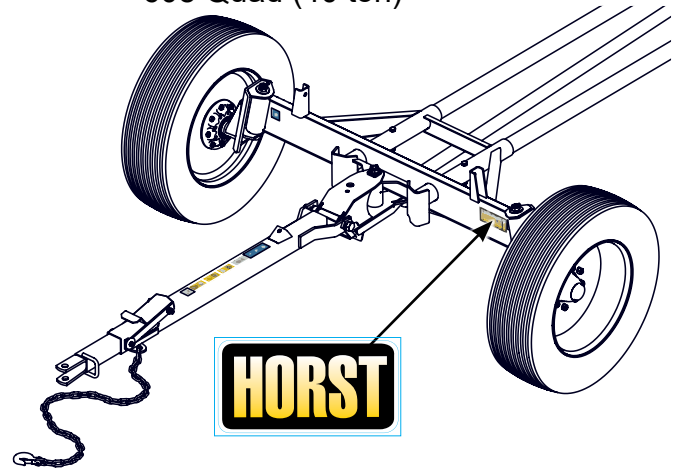
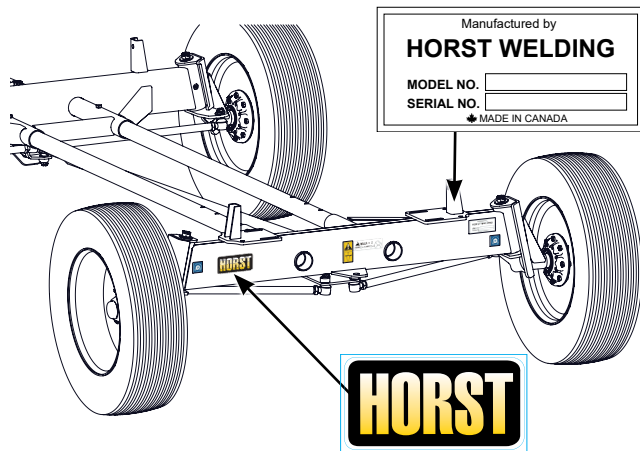
LABEL LAYOUT RUNNING GEAR

PRODUCT AND SERIAL LABELS - WAGONS

Product labels serial plate with locations on the equipment are shown in the illustrations below. Label locations are similar for all models listed, unless otherwise indicated.

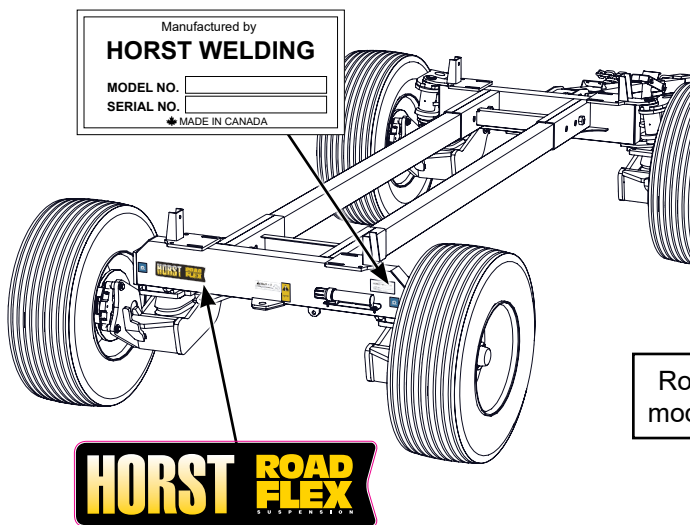
For Wagon Models:

- | | | |
|--------------------|--------------------|--------------------|
| •145 (8 ton) | •245 (12 ton) | •365E (20 ton) |
| •185 (10 ton) | •308 Quad (20 ton) | •485 (24 ton) |
| •185F (6 ton) | •325 (18 ton) | •505 (22 ton) |
| •208 Quad (16 ton) | •365 (20 ton) | •605 (30 ton) |
| | | •608 Quad (40 ton) |

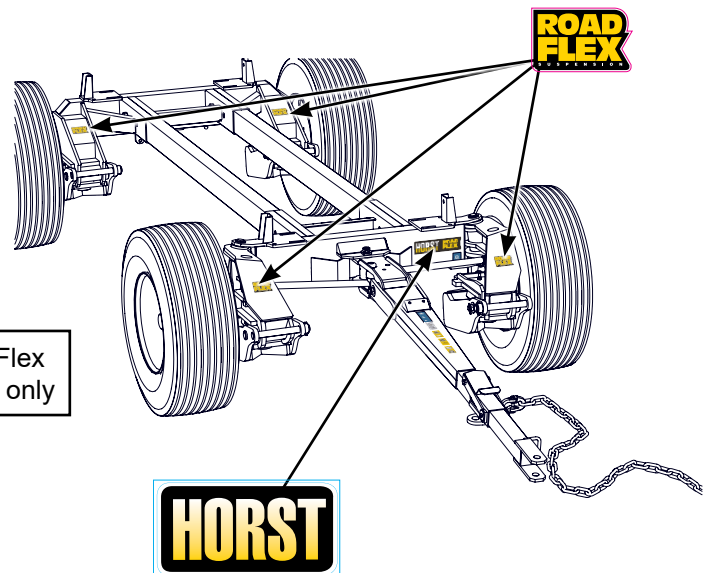


For Wagon Models:

- | | |
|-----------------|-----------------|
| •185RF (10 ton) | •365RF (20 ton) |
| •308RF (20 ton) | •485RF (24 ton) |
| •325RF (18 ton) | •505RF (22 ton) |



Road Flex models only



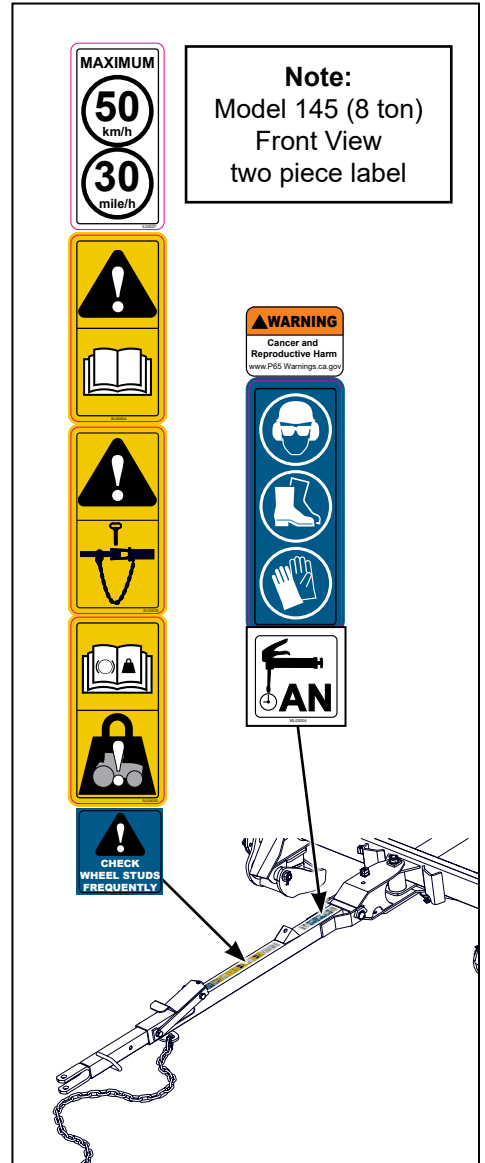
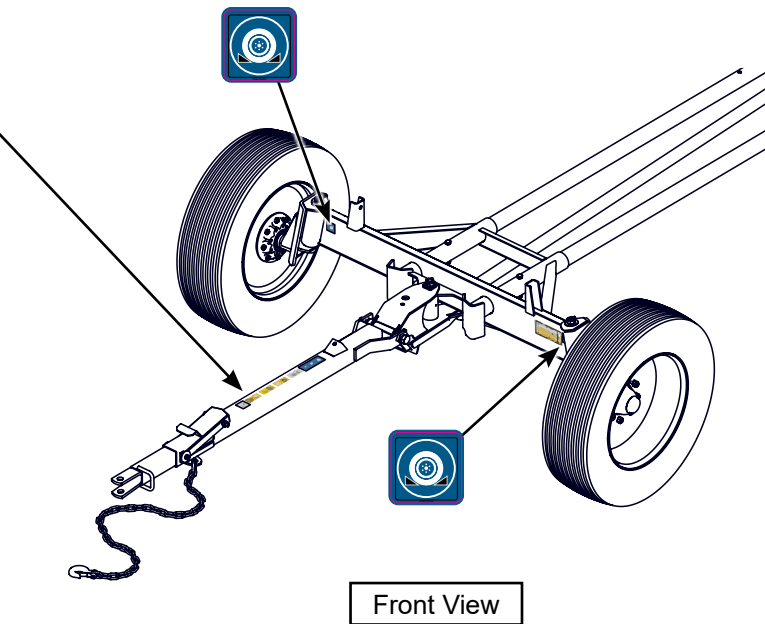
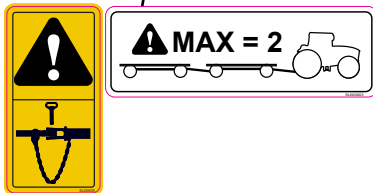
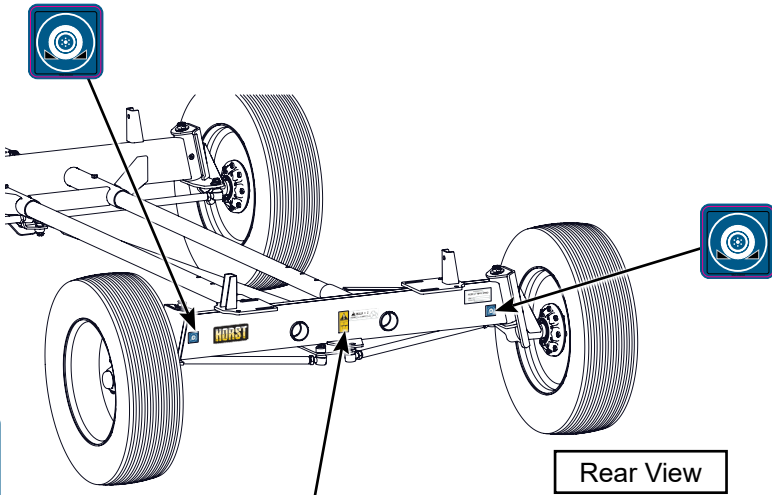
SAFETY LABELS - WAGONS

Safety signs and locations on the equipment are shown in the illustrations below. The Horst 275 wagon is illustrated however label locations are similar for all models listed, unless otherwise indicated.

Good safety practice requires that you familiarize yourself with the label and the safety message it is delivering. Be aware of the equipment or particular equipment feature that requires your SAFETY AWARENESS.

For Wagon Models:

- 145 (8 ton)
- 185 (10 ton)
- 185F (6 ton)
- 185RF (10 ton)
- 208 Quad (16 ton)
- 245 (12 ton)
- 308 Quad (20 ton)
- 308RF (20 ton)
- 325 (18 ton)
- 325RF (18 ton)
- 365 (20 ton)
- 365E (20 ton)
- 365RF (20 ton)
- 485 (24 ton)
- 485RF (24 ton)
- 505 (22 ton)
- 505RF (22 ton)
- 605 (30 ton)
- 608 Quad (40 ton)



If safety labels have been damaged or removed, new labels must be applied. New safety signs are available from your dealer or contact Horst Wagons

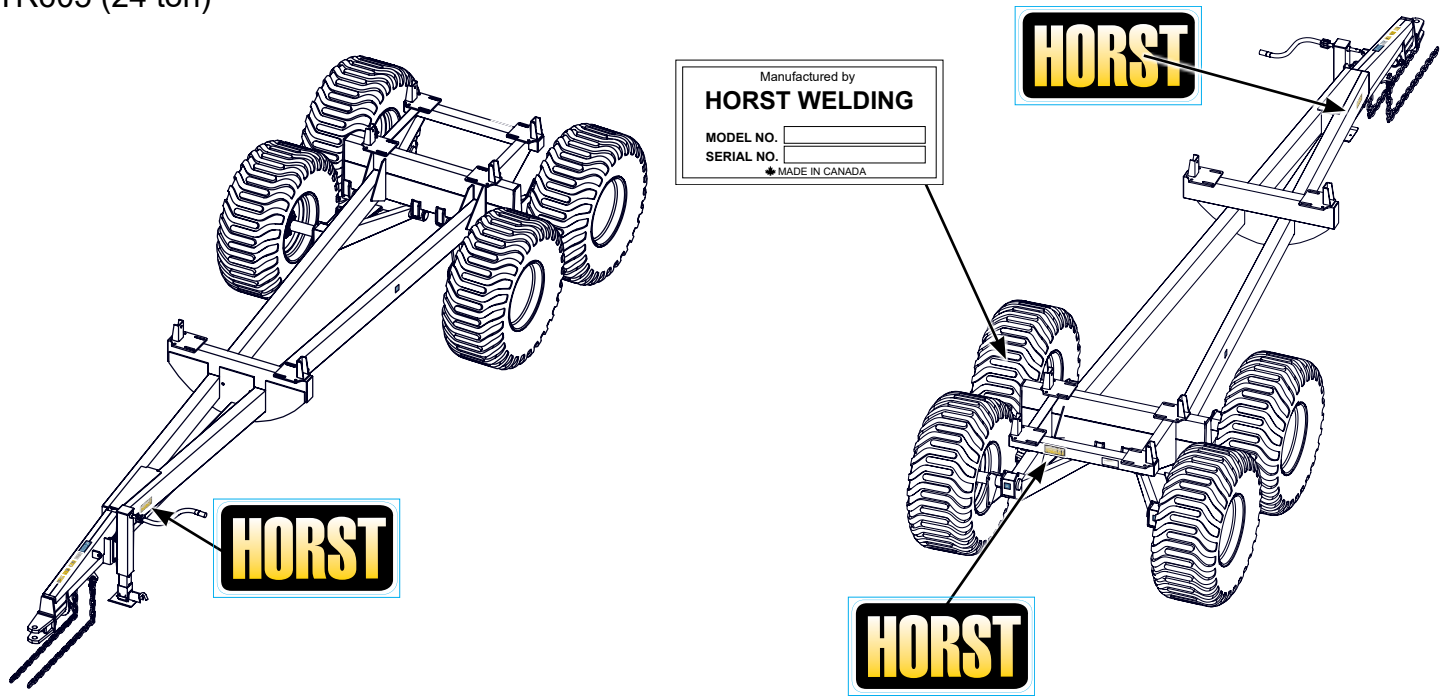
PRODUCT AND SERIAL LABELS - TRAILERS

Product labels serial plate with locations on the equipment are shown in the illustrations below. Label locations are similar for all models listed, unless otherwise indicated.

For Wagon Models:

TR505 (20 ton)

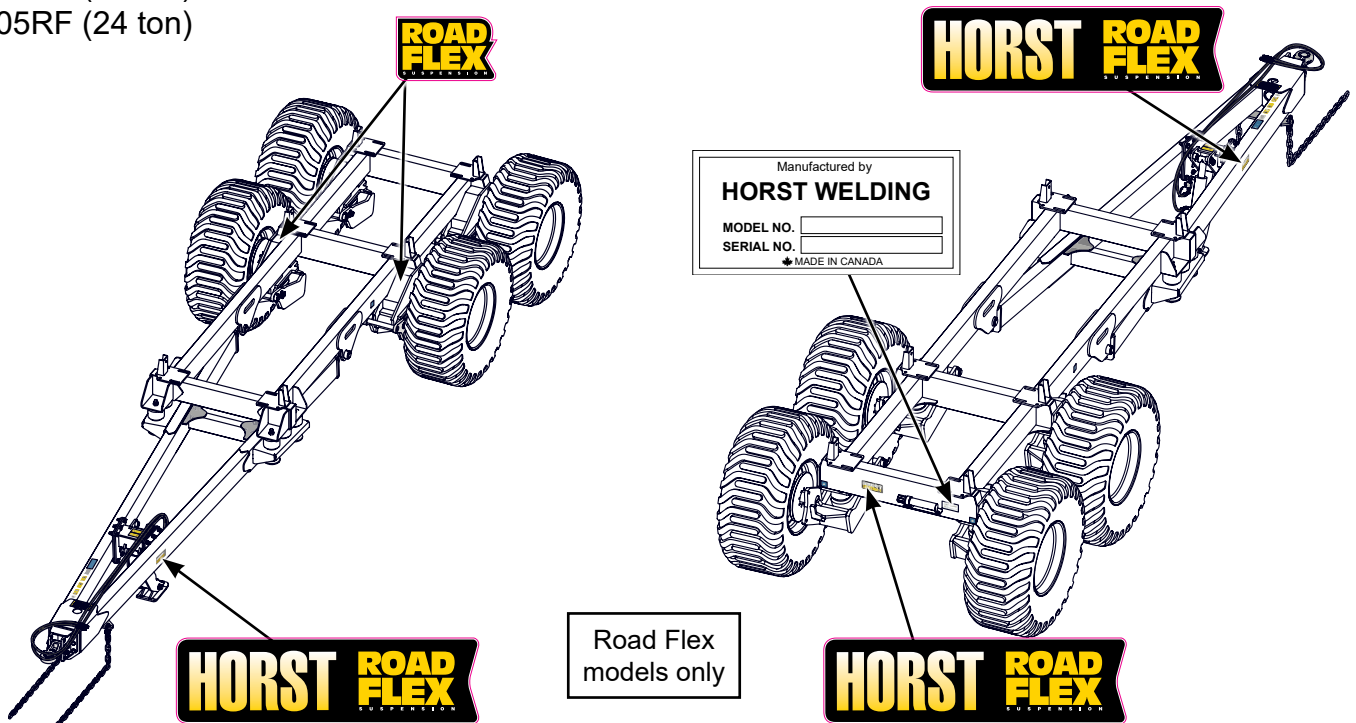
TR605 (24 ton)



For Wagon Models:

TR505RF (20 ton)

TR605RF (24 ton)



SAFETY LABELS - TRAILERS

Safety signs and locations on the equipment are shown in the illustrations below. Label locations are similar for all models listed, unless otherwise indicated.

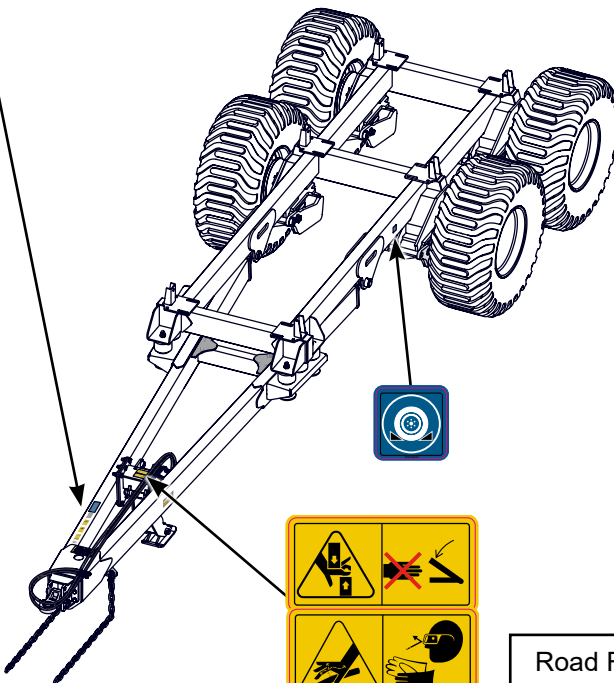
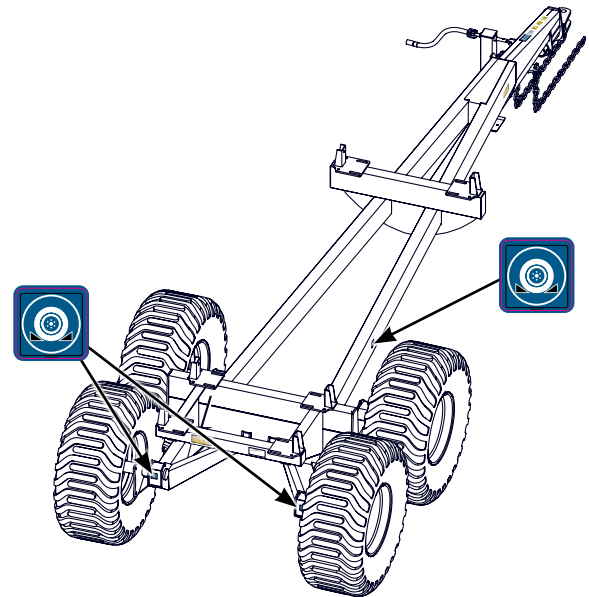
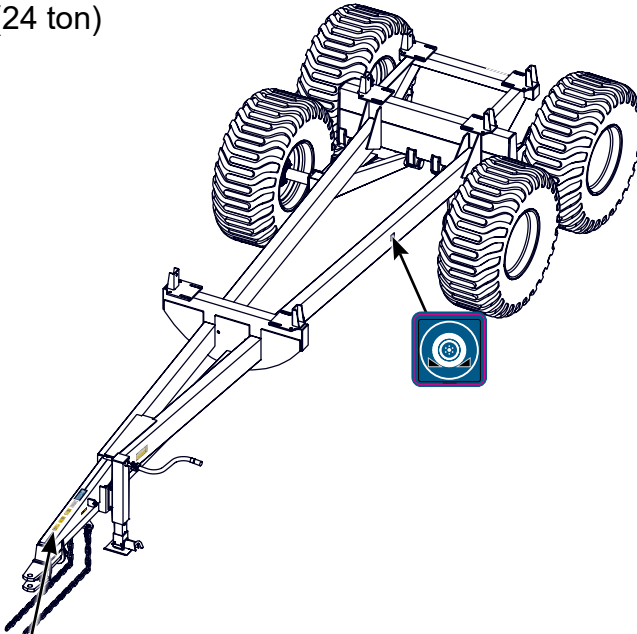
Good safety practice requires that you familiarize yourself with the label and the safety message it is delivering. Be aware of the equipment or particular equipment feature that requires your SAFETY AWARENESS.

If safety labels have been damaged or removed, new labels must be applied. New safety signs are available from your dealer or contact Horst Wagons

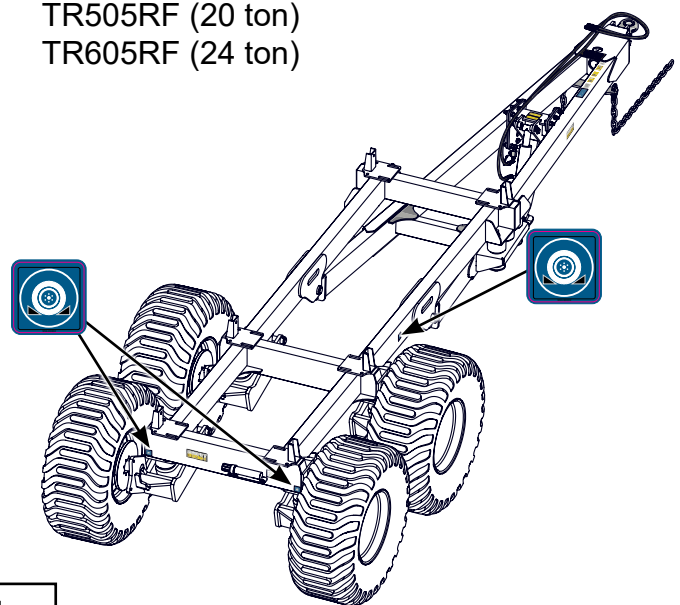
For Wagon Models:

TR505 (20 ton)

TR605 (24 ton)



For Wagon Models:
TR505RF (20 ton)
TR605RF (24 ton)



Road Flex models only

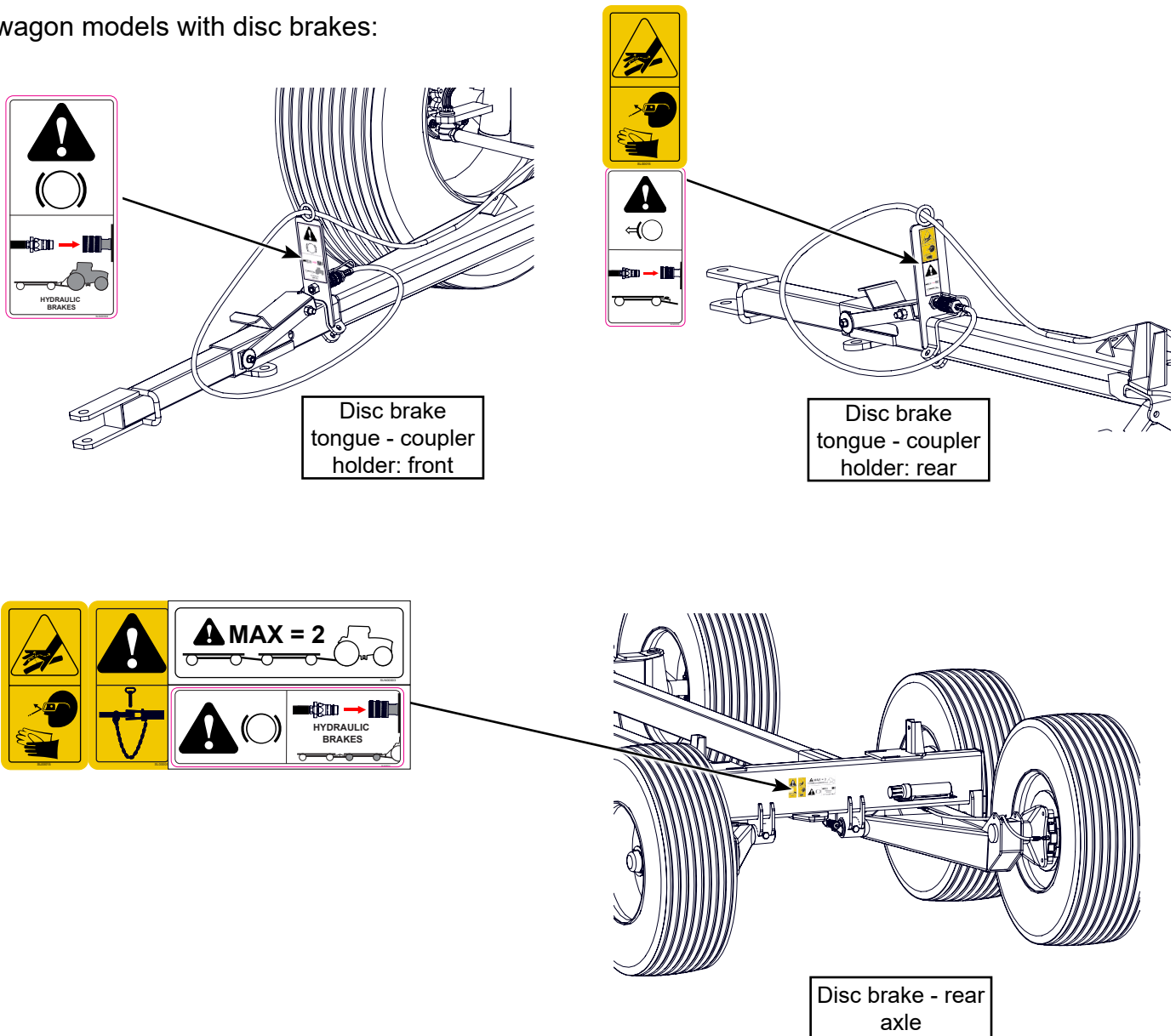
SAFETY LABELS - BRAKE MODELS

Additional labeling is required for optionally equipped brake models. Safety signs and locations on the equipment are shown in the illustrations below. Label locations are similar for all models listed, unless otherwise indicated.

Good safety practice requires that you familiarize yourself with the label and the safety message it is delivering. Be aware of the equipment or particular equipment feature that requires your SAFETY AWARENESS.

If safety labels have been damaged or removed, new labels must be applied. New safety signs are available from your dealer or contact Horst Wagons

For wagon models with disc brakes:

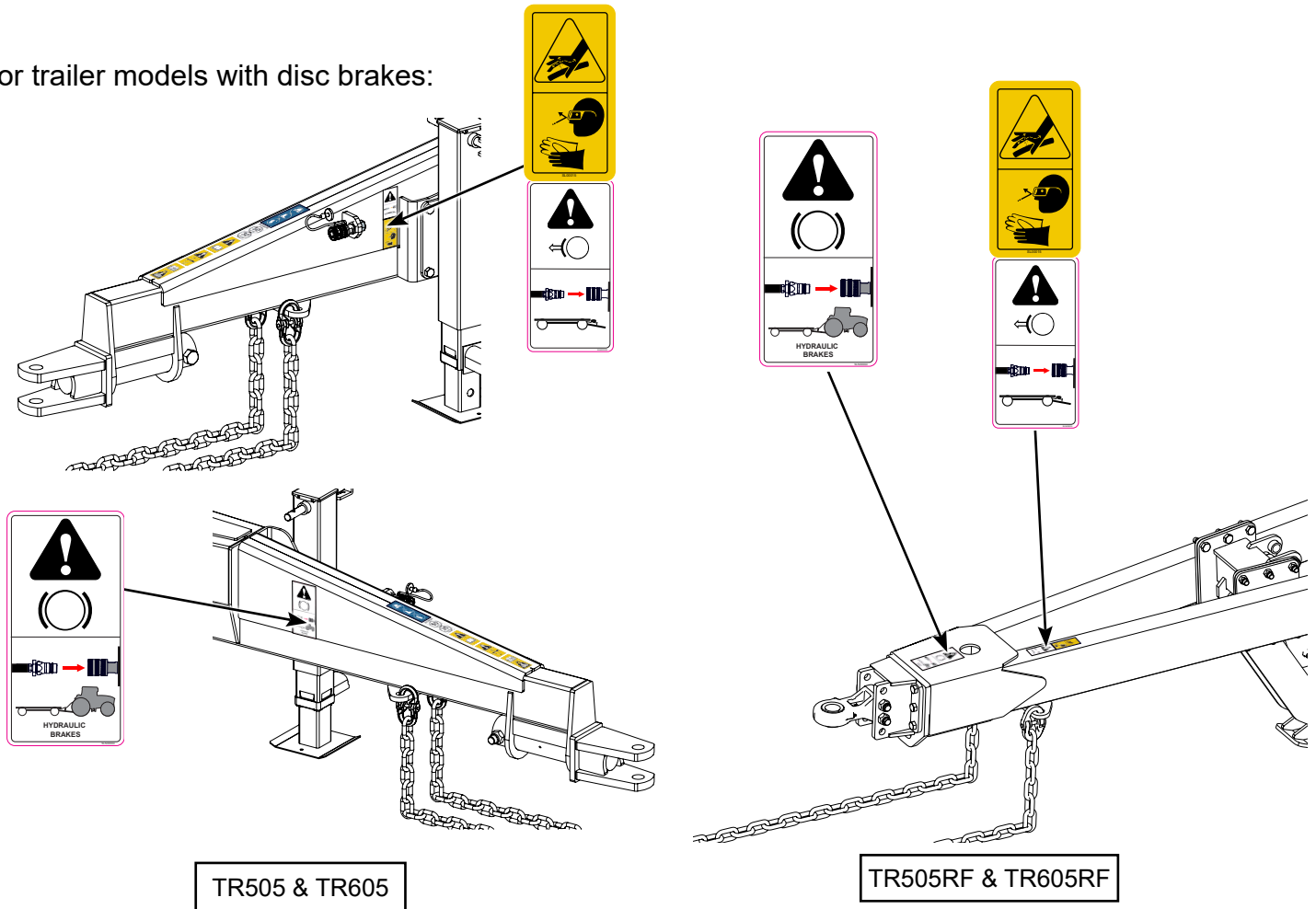


If labels need to be replaced:

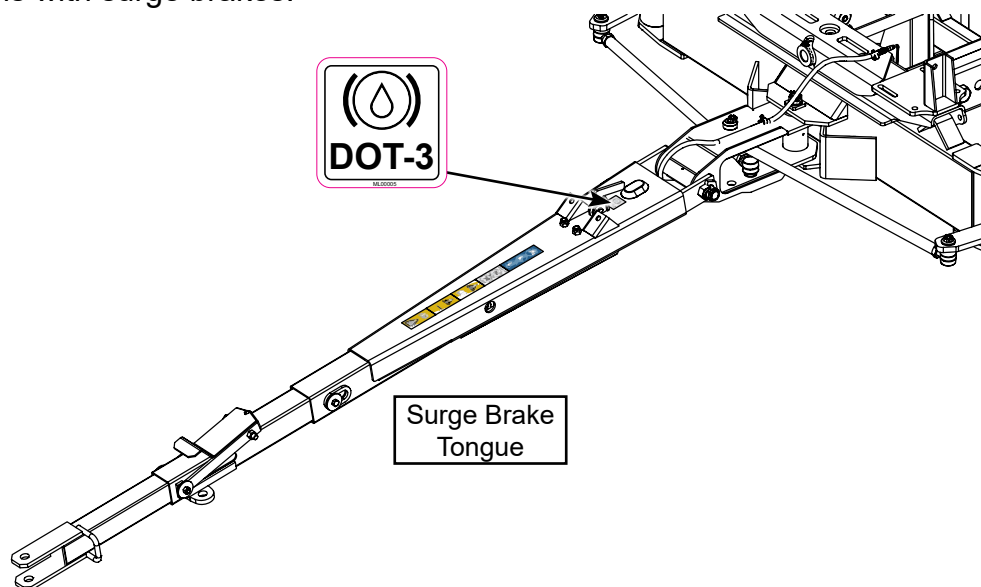
- Be sure that the installation area is clean and dry.
- Be sure temperature is above 50°F (10°C).
- Determine exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.

Additional labeling is required for optionally equipped brake models. Safety signs and locations on the equipment are shown in the illustrations below. Label locations are similar for all models listed, unless otherwise indicated. Good safety practice requires that you familiarize yourself with the label and the safety message it is delivering. Be aware of the equipment or particular equipment feature that requires your SAFETY AWARENESS.

For trailer models with disc brakes:



For wagon models with surge brakes:



SAFETY LABEL DESCRIPTIONS

Safety labeling is an important part of the overall safe use of the implement. Safety labeling alerts and warns against potential injury or death, and is important to follow these points to help keep your implement safe for you and others who may be using it.

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or have become illegible.



Caution: read and understand ALL safety and operating instructions in the manual, read and understand ALL safety labels located on the machine. The most important safety device on this equipment is an informed SAFE operator.



Warning: Before transport always have the safety chains attached, and a correct sized hitch pin installed and secured. Accidental implement disconnection could result in death or serious injury and or implement damage.



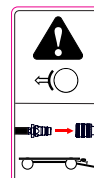
Caution: Hydraulic fluid is under pressure, be aware that hydraulic leaks could develop with out warning. Do not check for leaks with your hand or fingers while the system is pressurized, serious injury could result. Possible burns or poisoning from pressurized fluid injection.



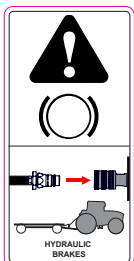
Warning: BE AWARE of minimum tractor weight required to tow a full capacity unbraked load. Check the specification chart for your wagon's minimum tractor weight.

Do not tow single or train loads more than 1.5 times the tractor weight. Ensure your towing vehicle has the weight capacity to tow and safely stop the loaded weight of the wagon or wagon train.

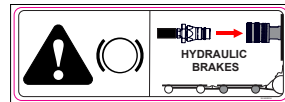
Unbraked towed loads that are too heavy for the tractor can cause loss of control when braking and may cause injury or death.



Caution: Attach the hydraulic brake line coupler to the coupler holder when the brake system is not in use while the towing or when parked. Pressure may build up in the brake circuit causing unwanted application of the brakes and loss of control if not connected to the coupler holder.

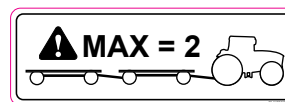


Caution: Attach the hydraulic brake line coupler to the brake port outlet on the tractor when hauling the trailer / wagon with a load. Do not attempt to attach this brake coupler to anything other than the brake outlet on the tractor.



Caution: A hydraulic coupler outlet for brakes is included on the rear wagon axle for connecting braked wagons in a train configuration,

Do not attempt to use this outlet for anything other than braking.



Caution: Wagon trains must be limited to a maximum of two wagons when fully loaded with a suitable capacity tractor.

Towing more than two fully loaded wagons is dangerous and could result in death or serious injury and or implement damage.



Important: Wagon components require lubrication every 1000 hrs or Annually. Failure to perform regular maintenance could result in damage to the implement or other property. See owners manual maintenance section.



Caution: Wagon components are rated at 50 km/h (30 mile/h) maximum speed. Potential for injury and damage if traveling above maximum travel speed rating. Weight capacity is lower at speeds above 32 km/h (20 mile/h) See Payload and GVWR Chart in owner manual.



Important: Use only certified DOT-3 brake fluid for surge brake system.



Caution: Block or chock the wheels. Loading or unloading the wagon presents a potential unintentional movement hazard. Chock wheels when loading or unloading or storing the wagon.



Caution: Personal Protection Equipment (PPE) is required when operating or maintaining this machine. Failure to wear PPE will result in personal injury.



Caution: check wheel lugs at each trip, See torque specification chart at the back of this manual.

ASSEMBLY INSTRUCTIONS



IMPORTANT

Procedure

Models may feature taper wheel bolts or taper wheel nuts.

Heavy duty models feature 3/4" wheel nuts with wheel bolt flange washers.

Ensure you select the appropriate setting on the torque chart.

STEP 1

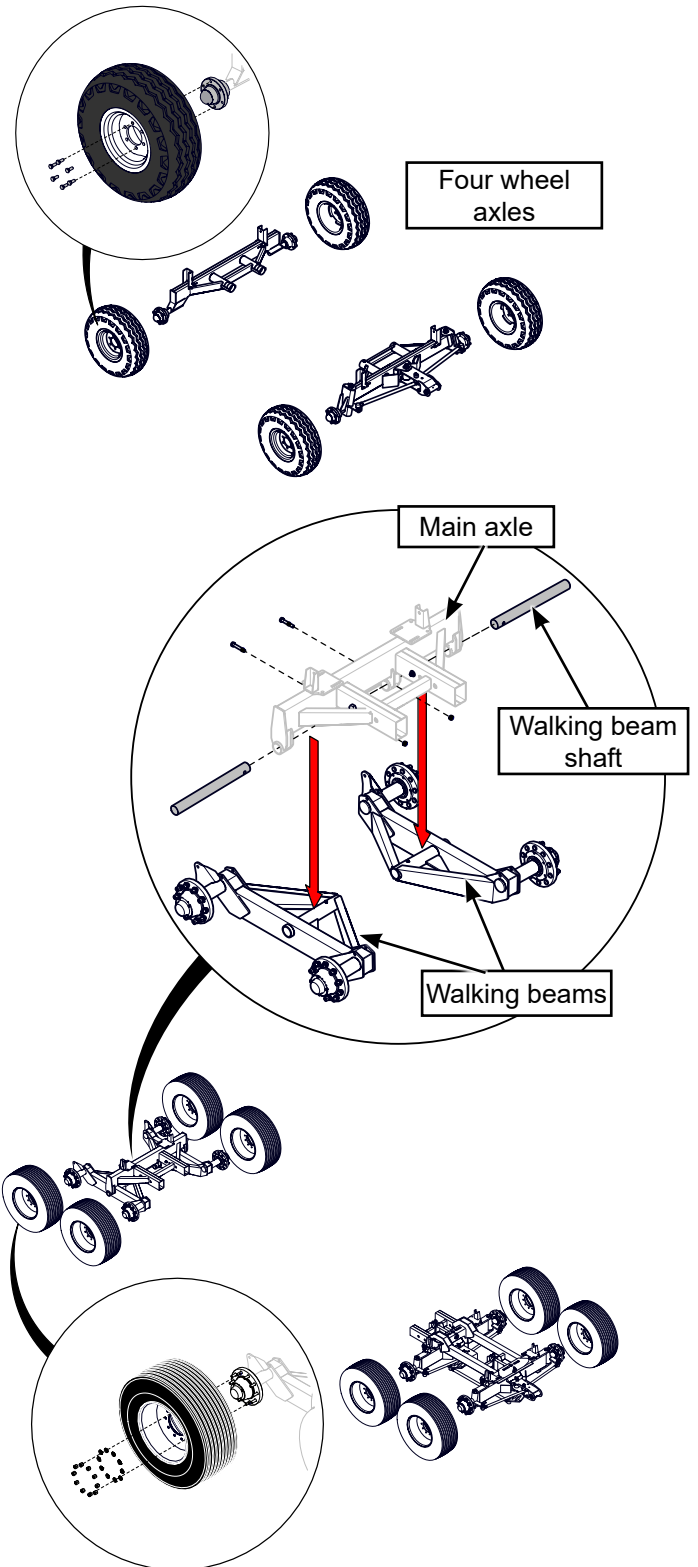
Alignment Note: alignment is preset at the factory and should not require any initial adjustment. See the 'Reference' section for more information.

FOUR WHEEL WAGON AXLE

- Place front and rear axles on stands or use a lifting device.
- Remove the wheel nuts/bolts and install wheels. (See wheel torque chart)

SIX AND EIGHT WHEEL WAGON AXLE

- Rear Axle:
 - Place both walking beams on the floor at approximately the axle width.
 - Using a lifting device, lift the rear main axle into position on the walking beams, align the beam shaft/tube holes.
 - Slide the walking beam shaft/tube through the outer bushings on the axle, and through the round tube in the walking beam.
 - Align the bolt holes on the inner bushing on the axle, and secure the beam shaft with the bolt and nut provided.
- Place front and rear axle assemblies on stands or use a lifting device.
- Remove the wheel nuts/bolts and install wheels. (See wheel torque chart)



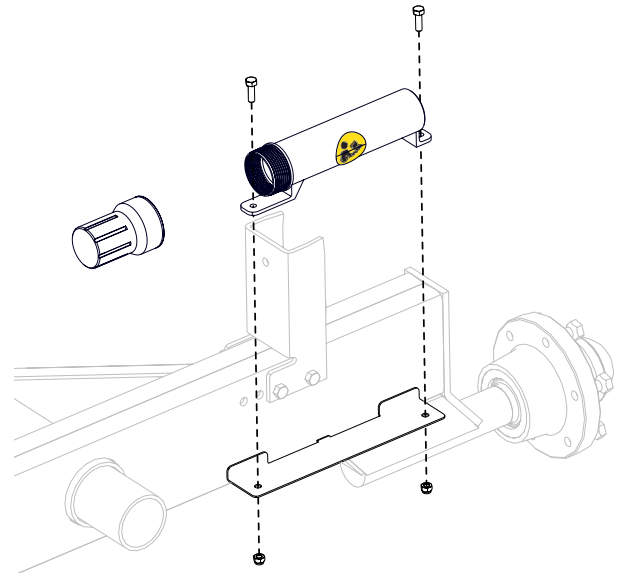
CAUTION

Heavy or bulky parts

Prevent potential strain injury, use approved lifting equipment or ask for help when lifting or moving heavy, bulky parts.

MANUAL TUBE MOUNTING

- The manual tube mounts on a bracket at the rear right side of the rear axle. Mounting is the same for all running gear.
- Remove the manual tube cap and remove the contents.
- Fit the manual tube up to the bracket as shown and install the two 5/16 x 1.0 bolts and locknuts provided.
- Ensure the nuts and bolts are secure, replace the manuals inside the tube, and replace the manual cap.



STEP 2

(Connects front and rear axles and set wheel base)

Horst wagons feature optional reach lengths.

Select round reaches offer wheel base adjustments up to 5 positions depending on the reach tube. in 6.0" increments.

All square reach models offer 3 position adjustments at each axle in 3.0" & 6.0" increments.

Determine what your wheelbase should be before proceeding.

ROUND REACH TUBE:

- While inserting the reach tubes into the receiver tubes in rear axle, insert the 1½" collar into space in rear receiver tubes. Secure with 5/8" x 4 ½" bolts and lock nuts provided.
- Repeat for the front end, insert into receiver tubes in front axle and secure with the 5/8" x 4 ½" bolts and lock nuts provided (no collar required).

SQUARE REACH TUBE:

- Insert each square reach tube into receiver tube in rear axle, and secure with the heavy duty 1 1/4 x 5 7/8" step bolt, washer and lock nut.
- Repeat for the front end, insert into receiver tubes in front axle and secure with the heavy duty 1 1/4 x 5 7/8" step bolt, washer and lock nut.

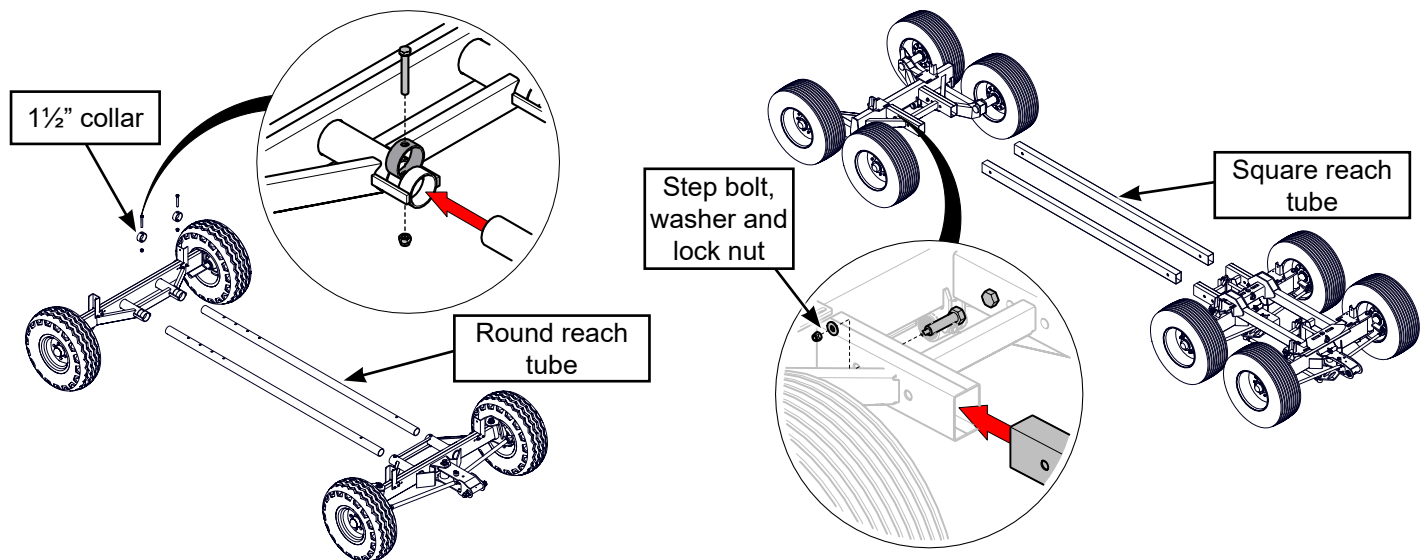
IMPORTANT Procedure

Model 145 has only one round reach tube but the process is the same as the dual round tube models.

Model 185F does not have the collar feature.

CAUTION Heavy or bulky parts

Prevent potential strain injury, use approved lifting equipment or ask for help when lifting or moving heavy, bulky parts.



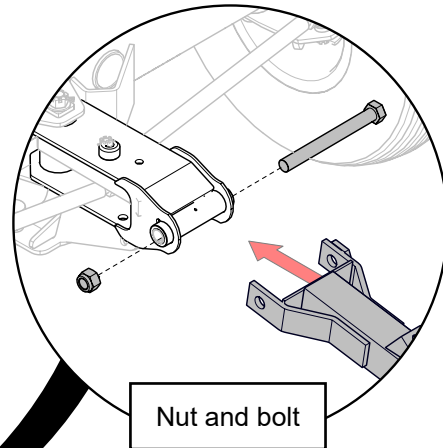
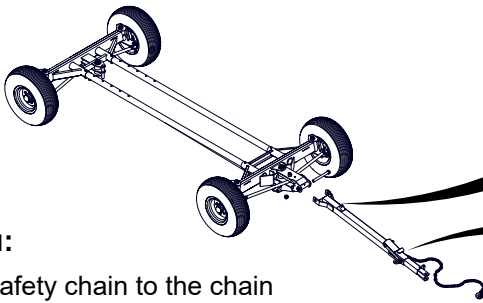
STEP 3

TONGUE: LOCKNUT AND BOLT:

Assembly is similar for pullout or surge brake tongue installation

- Remove the hex bolt and locknut from the tongue bracket assembly,
- Position the rear of the tongue on the bracket assembly, and from the left side of the tongue bracket, insert the hex bolt.
- Thread the locking nut onto the bolt and tighten until the bolt is snug against the plates.
- Do not over tighten.

Note: surge brake models have dual spring balancers as standard equipment, see options and accessories for installation instructions.

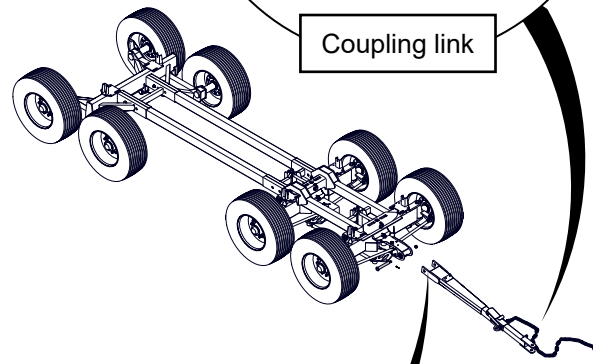
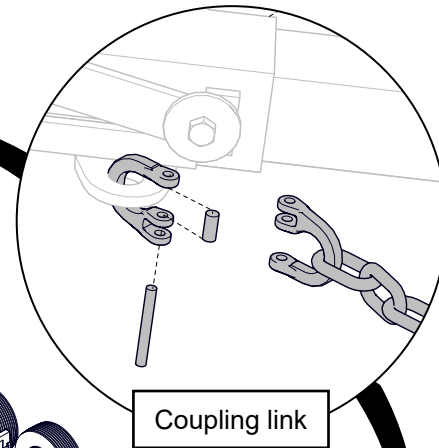


SAFETY CHAIN:

- Attach the safety chain to the chain flange on the tongue using the coupling link on the chain. Assemble the link with the coupling pin and locking collar as shown.

TONGUE: CASTLE NUT AND THREADED PIN:

- Remove the hex bolt and locknut from the tongue bracket assembly,
- Lift rear end of tongue and insert the pin in through holes in tongue and bracket on front axle.
- Thread the castle nut onto the pin and tighten until the bolt is snug against the plates.
- Install the cotter pin and secure.



IMPORTANT Procedure

Heavy duty models feature a castle nut and threaded pin instead of a nut and bolt on the tongue assembly.



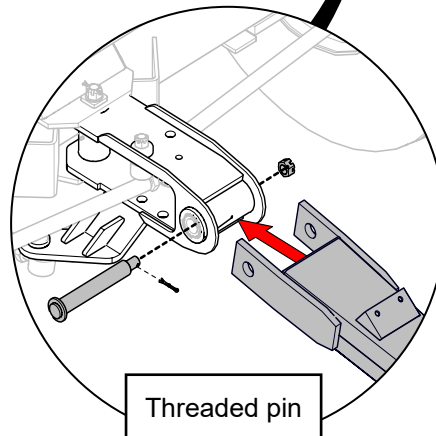
CAUTION Heavy or bulky parts

Prevent potential strain injury, use approved lifting equipment or ask for help when lifting or moving heavy, bulky parts.



CAUTION Operational Hazard

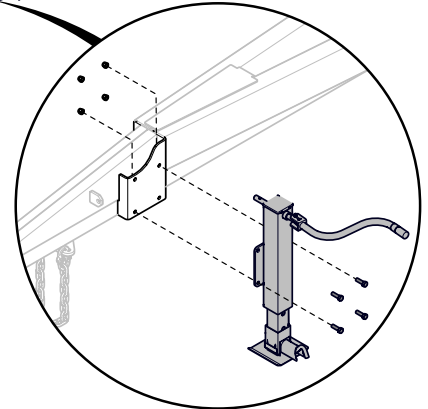
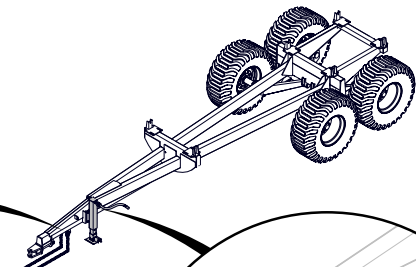
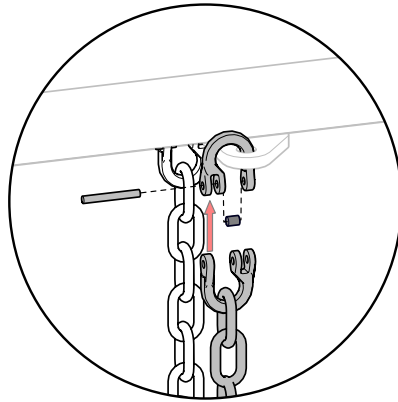
Chock wheels during assembly to prevent unwanted movement.



STEP 4

TONGUE JACK - TR505 & TR605

- Install tongue jack using four 5/8" x 2" bolts and lock-nuts.
- Attach the safety chain to the chain flange on the tongue using the coupling link on the chain. Assemble the link with the coupling pin and locking collar as shown.



CAUTION

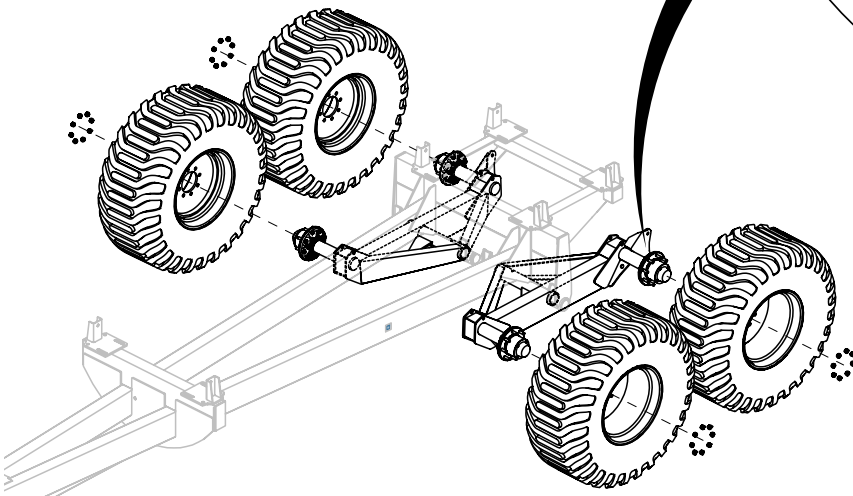
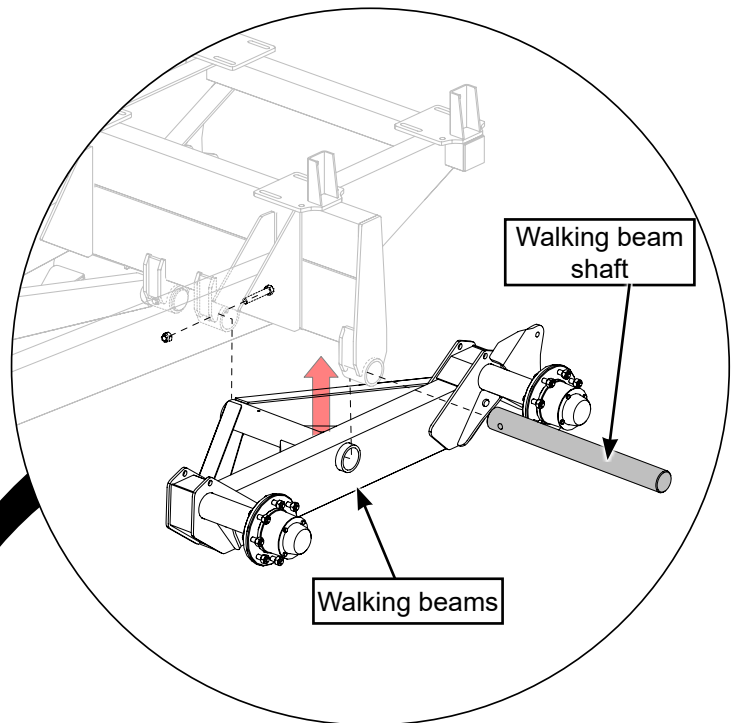
Operational Hazard

Chock wheels during assembly to prevent unwanted movement.



TRAILER CHASSIS AXLE -

- Using a lifting device, lift the trailer frame enough to place the walking beams under the frame.
- Place both walking beams on the floor under the frame, carefully lower the frame and align the beam shaft/tube holes.
- Slide the walking beam shaft/tube through the outer bushings on the axle, and through the round tube in the walking beam.
- Align the bolt holes on the inner bushing on the axle, and secure the pivot pin with the bolt and nut provided.
- Remove the wheel nuts/bolts and install wheels. (See wheel torque chart)

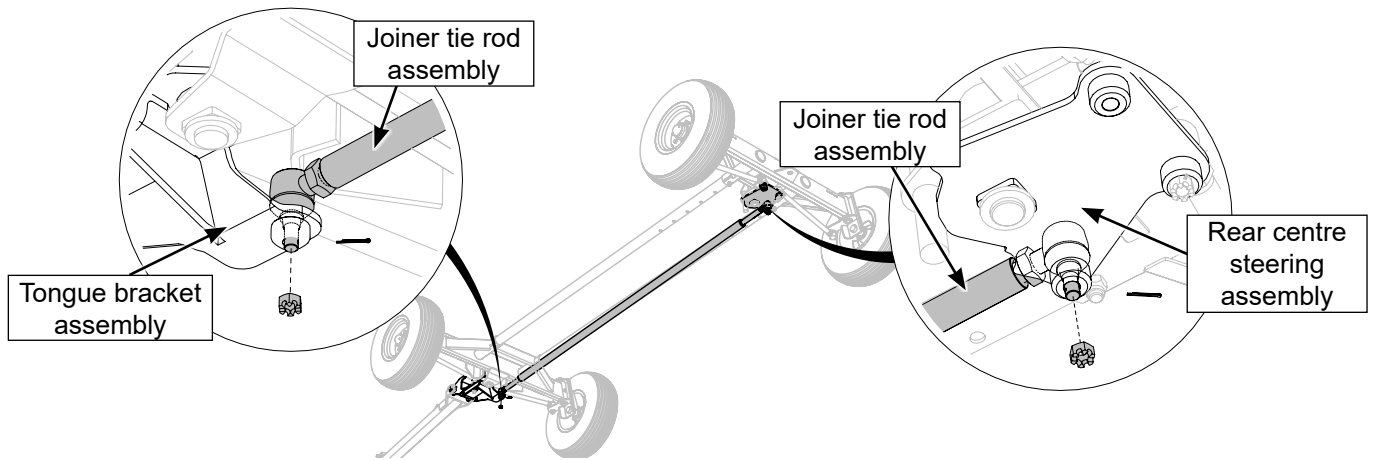


STEP 5

JOINER TIE ROD - MODEL185F

This step is specifically for model 185F four wheel steer wagon.

- Assemble the joiner tie rod at the front to the tongue bracket and at the rear to the rear steering assembly
- Attach the castle nuts and secure with the cotter pin.



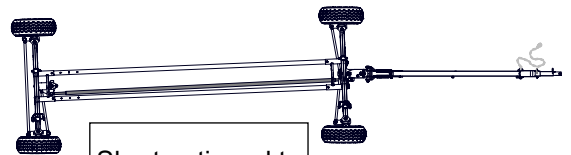
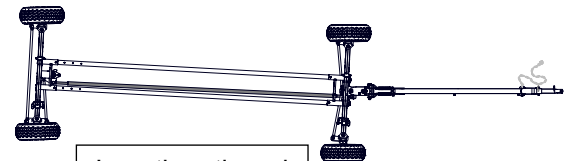
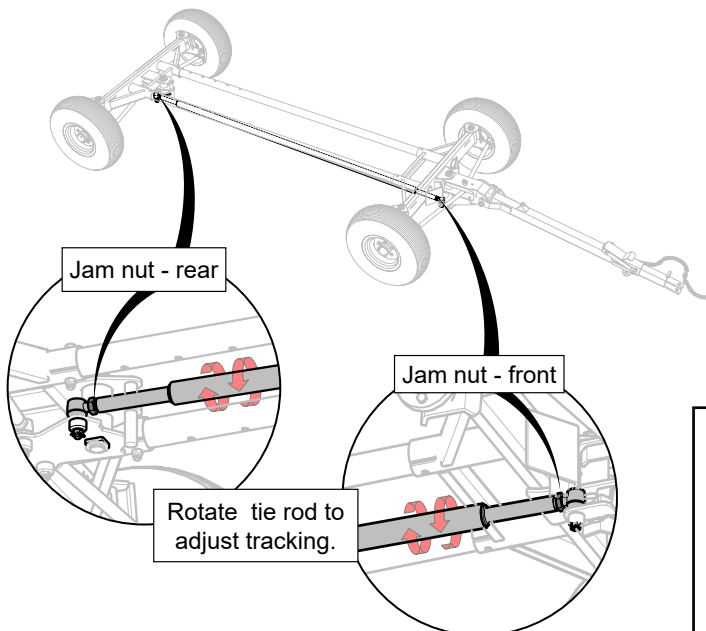
TRACKING ADJUSTMENT - MODEL185F

This step is specifically for model 185F four wheel steer wagon.

If the rear axle tracks excessively left or right of the front axle (dog track), then corrective adjustment is made by lengthening or shortening the joiner tie rod, between the front and rear steering brackets.

When making tracking adjustments, be aware that when the wagon is being trailed empty it should track slightly left. When the wagon is loaded it will track slightly to the right. The weight causes normal distortion to the steering geometry which affects the tracking when loaded.

- Loosen jam nuts at the front and rear of the joiner tie rod to allow free rotation of the tie rod.
- Rotate the tie rod appropriately to lengthen or shorten as required (see diagram below).
- When adjustment is complete, tighten the jam nuts to secure the setting.
- Test drive the wagon and check for front to rear tracking, repeat adjustment as required.



Alignment Note: Both axles are preset at the factory with .3175 - .635 cm (1/8" - 1/4") tow-in and should not require any initial adjustment. Adjustment may be required if steering components have been damaged or replaced. See the 'Reference' section for more information. Toe in adjustments should be made by qualified personnel.

OPTIONS AND ACCESSORIES

TONGUE SPRING BALANCER - WAGON MODELS

Assembly process is the same for both spring balancers.

- Raise and support the tongue at approximately a 30° angle.
- Carefully pre-assemble the spring balancer assembly as shown.
- Mount the balancer assembly spring end to the mount plate on the tongue with the bolt, lock washer and nut. (Note some models have a dual spring mount plate welded to the tongue)
- Mount the opposite end to the mounting hole in the tongue bracket with the bolt, lock washer and nut.
- Increase spring tension by threading the 5/8" nuts on eye bolts (approx. 2"- 3") until tongue can be lifted effortlessly.

Note: surge brake models do not require the spring balancer plate, springs attach directly to tongue.

CAUTION
Operational Hazard

Chock wheels during assembly to prevent unwanted movement.



WARNING
Pinch Point Hazard

Be aware of pinch points at the tongue pivot points and the springs.

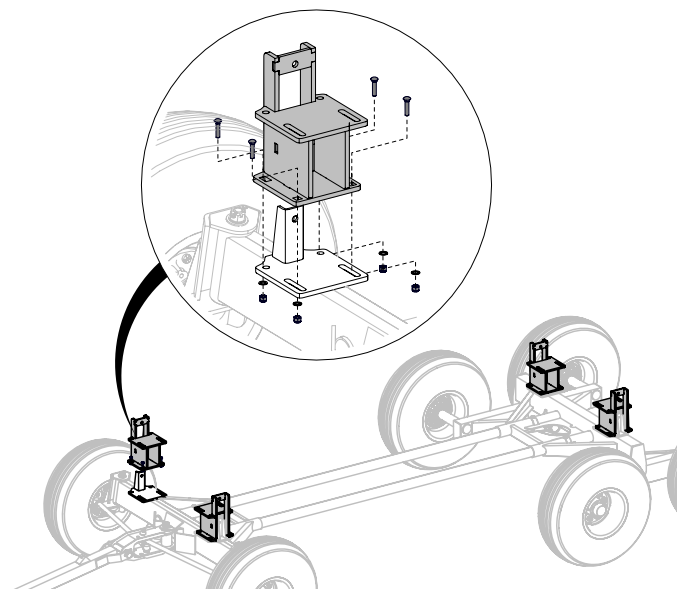
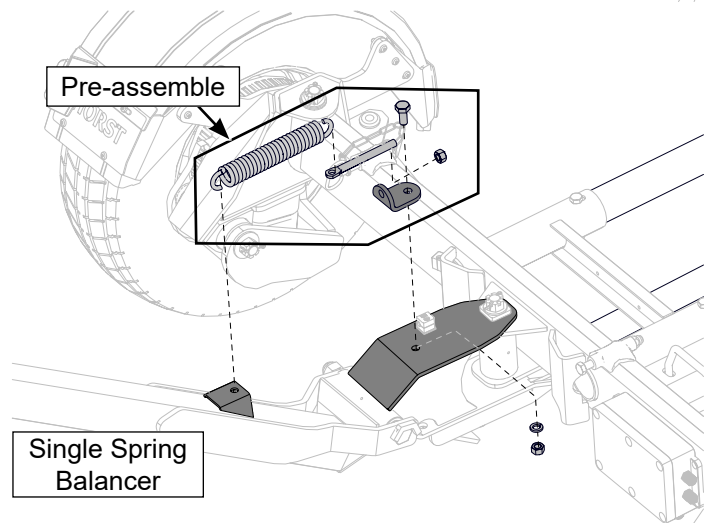
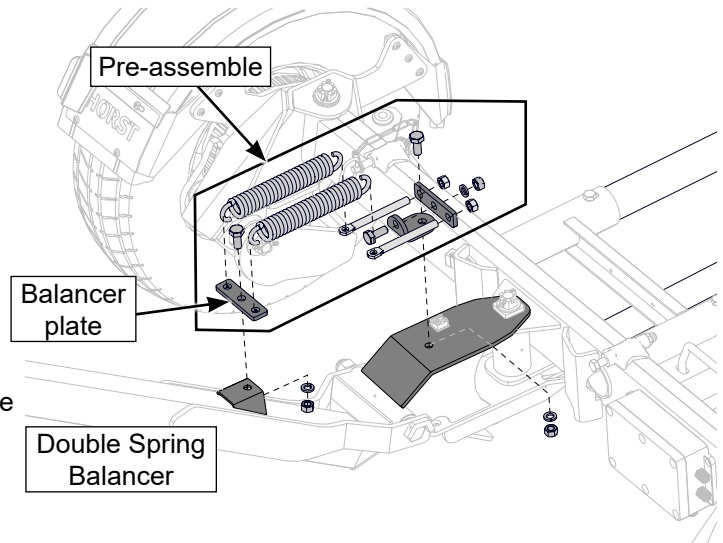
CAUTION
Operational Hazard
Personal Protection Equipment (PPE) is required while working in and around this machine.



RISER KIT

Assembly process is similar for all wagon and trailer models.

- Install the riser on each of the stake posts.
- Use four carriage bolts with washers and nylon insert locknuts.
- Tighten lock nuts to correct torque. (see torque chart)



HYDRAULIC SURGE DRUM BRAKES

Brake system assembly and adjustments should be made by qualified personnel only.

Hydraulic surge brakes come equipped with surge brake tongue which contains the actuating mechanism for the surge brakes and the hydraulic fluid reservoir.

Horst Wagon hydraulic surge brake assembly is similar for all models of wagons and surge brake options unless noted otherwise.

Horst brakes are engineered to be used with surge brake tongues.

BRAKE LINES.

All brake options

- Some forming of brake lines will be required, it is recommended to use a brake line bending tool to prevent brake lines from kinking.
- Tightening brake line connections: as a general rule from finger tight, continue tightening the nut until you feel it draw down tight, then tighten approximately 1/6" turn more.
- Do not over-tighten.

FRONT CONNECTION

Option:

- two wheel brake option on four wheel wagon
- two wheel brake option on six wheel wagon
- two wheel brake option on eight wheel wagon
- four wheel brake option on six wheel wagon
- four wheel brake option on eight wheel wagon

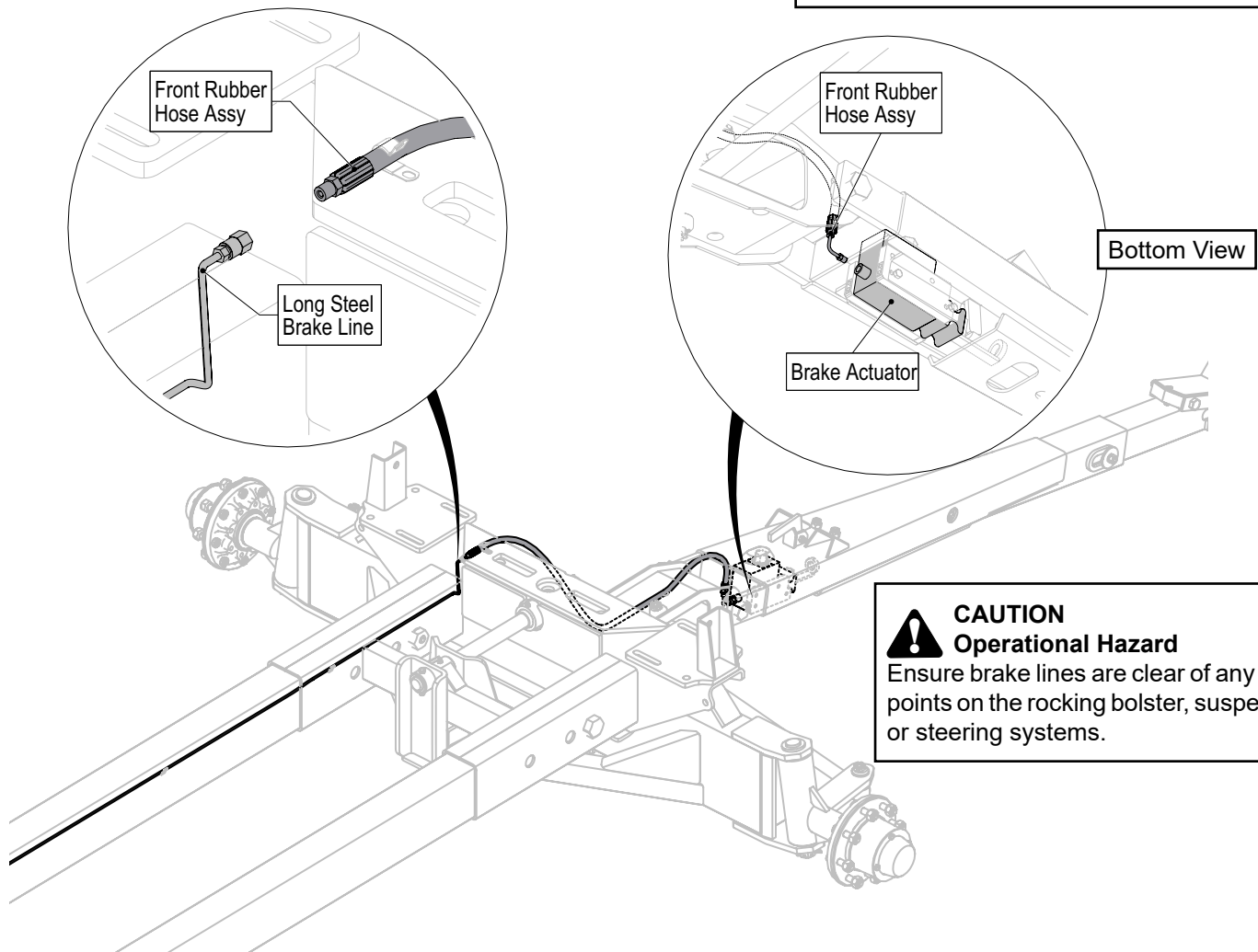
Refer to the illustration for more detail.

- Route the front rubber hose assembly from the top of the axle to under the tongue.
- Assemble the hose to the surge brake actuator as shown in the illustration.
- Form the long steel brake line as required and assemble the brake line to the rubber hose as shown in the diagram.



CAUTION Operational Hazard

Brake system assembly and adjustments should be made by qualified personnel only.



REAR TWO WHEEL DRUM BRAKE SYSTEM

Brake system assembly and adjustments should be made by qualified personnel only.

Option:

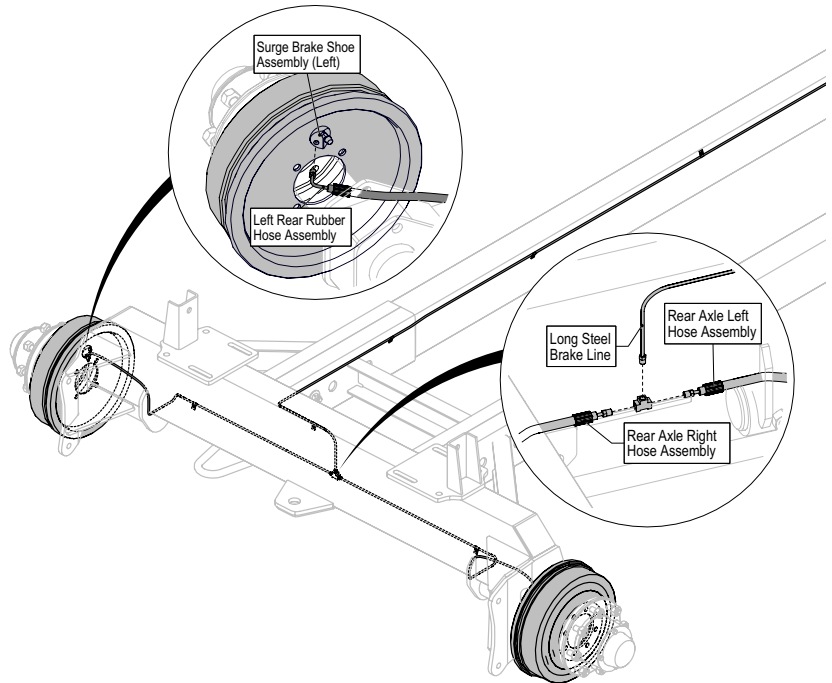
- two wheel brake option on four wheel wagon

Components required:

- 1 x Tee 0.125in pipe
- 1 x Left brake line - steel
- 1 x Right brake line - steel

Assemble all the components to the long steel brake line, use the illustration as reference.

- Form the long steel brake line as required.
- Assemble the Tee 0.125in pipe to the long brake line.
- Form the left brake steel line as required.
- Assemble left brake steel line to the Tee 0.125in and the then to calliper.
- Form the right brake steel line as required.
- Assemble right brake line to the Tee 0.125in and the then to calliper.



CAUTION Operational Hazard

Ensure brake lines are clear of any pinch points on the suspension system.

Two wheel brake on
four wheel wagon

WALKING BEAM TWO WHEEL DRUM BRAKE SYSTEM

Brake system assembly and adjustments should be made by qualified personnel only.

Option:

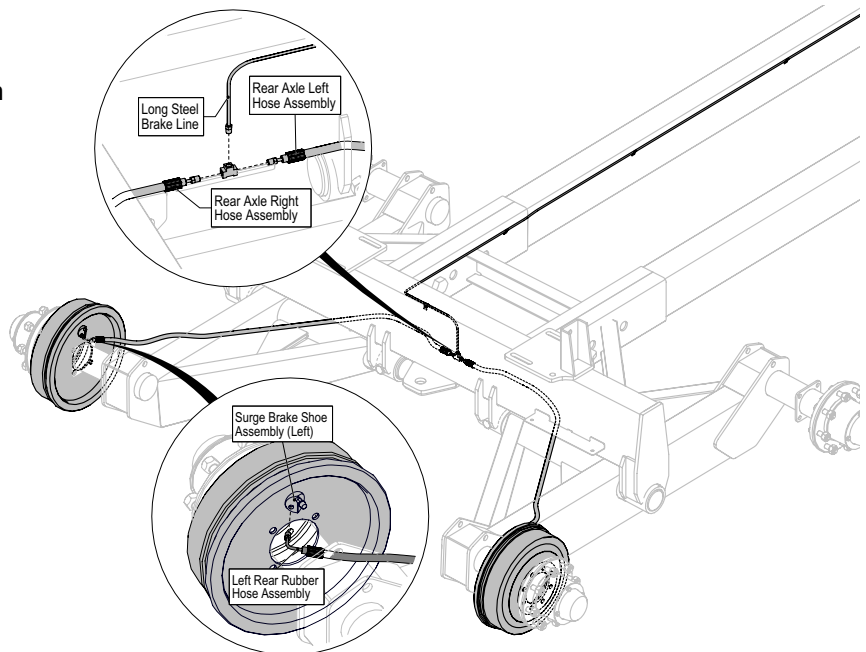
- two wheel brake option on six wheel wagon
- two wheel brake option on eight wheel wagon

Components required:

- 1 x Tee 0.125in pipe
- 1 x Left brake line - rubber
- 1 x Right brake line - rubber

Assemble all the components to the long steel brake line, use the illustration as reference.

- Form the long steel brake line as required.
- Assemble the Tee 0.125in to the long brake line.
- Route the left brake line as shown in the illustration.
- Assemble left brake line to the Tee 0.125in and the then to calliper.
- Route the right brake line as shown in the illustration.
- Assemble right brake line to the Tee 0.125in and the then to calliper.



Two wheel brake on six
or eight wheel wagon

WALKING BEAM FOUR WHEEL DRUM BRAKE SYSTEM

Brake system assembly and adjustments should be made by qualified personnel only.

Option affected:

- four wheel brake option on six wheel wagon
- four wheel brake option on eight wheel wagon

Components required:

- 1 x Rear Axle Left Hose Assembly
- 1 x Rear Axle Right Hose Assembly
- 1 x Right Rear Rubber Hose Assembly
- 1 x Right Front Rubber Hose Assembly
- 1 x Left Front Rubber Hose Assembly
- 1 x Left Rear Rubber Hose Assembly
- 3 x Tee 0.125in pipe



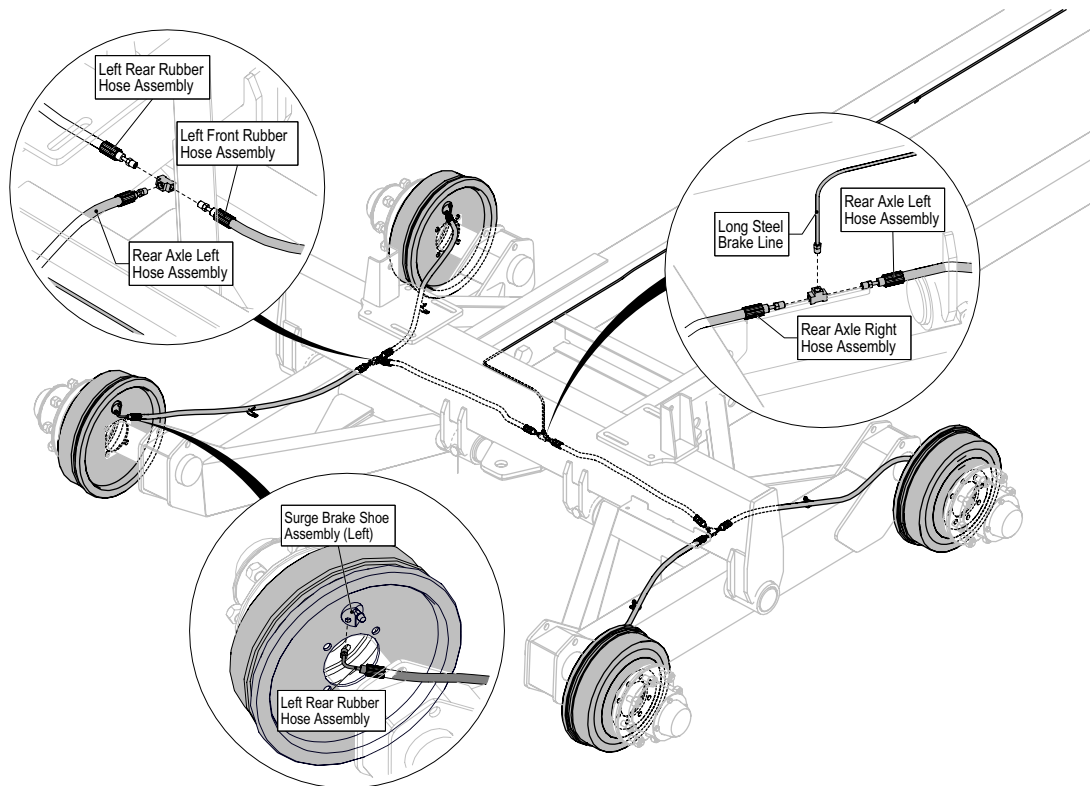
CAUTION

Operational Hazard

Brake system assembly and adjustments should be made by qualified personnel only.

Assemble all the components to the long steel brake line, use the illustration as reference.

- Form the long steel brake line as required.
- Assemble the Tee 0.125in to the long brake line.
- Assemble rear axle left hose assembly to the Tee 0.125in and route as shown in the illustration.
- Assemble the second Tee 0.125in to the rear axle left hose.
- Assemble left rear rubber hose to the second Tee 0.125in and the then to left rear calliper.
- Assemble left front rubber hose to the second Tee 0.125in and the then to left front calliper.
- Assemble rear axle right hose assembly to the Tee 0.125in and route as shown in the illustration.
- Assemble the third Tee 0.125in to the rear axle right hose.
- Assemble right rear rubber hose to the third Tee 0.125in and the then to right rear calliper.
- Assemble right front rubber hose to the third Tee 0.125in and the then to right front calliper.



CAUTION

Operational Hazard

Chock wheels during assembly to prevent unwanted movement.



CAUTION

Operational Hazard

Ensure brake lines are clear of any pinch points on the suspension system.

SECURING THE BRAKE LINES

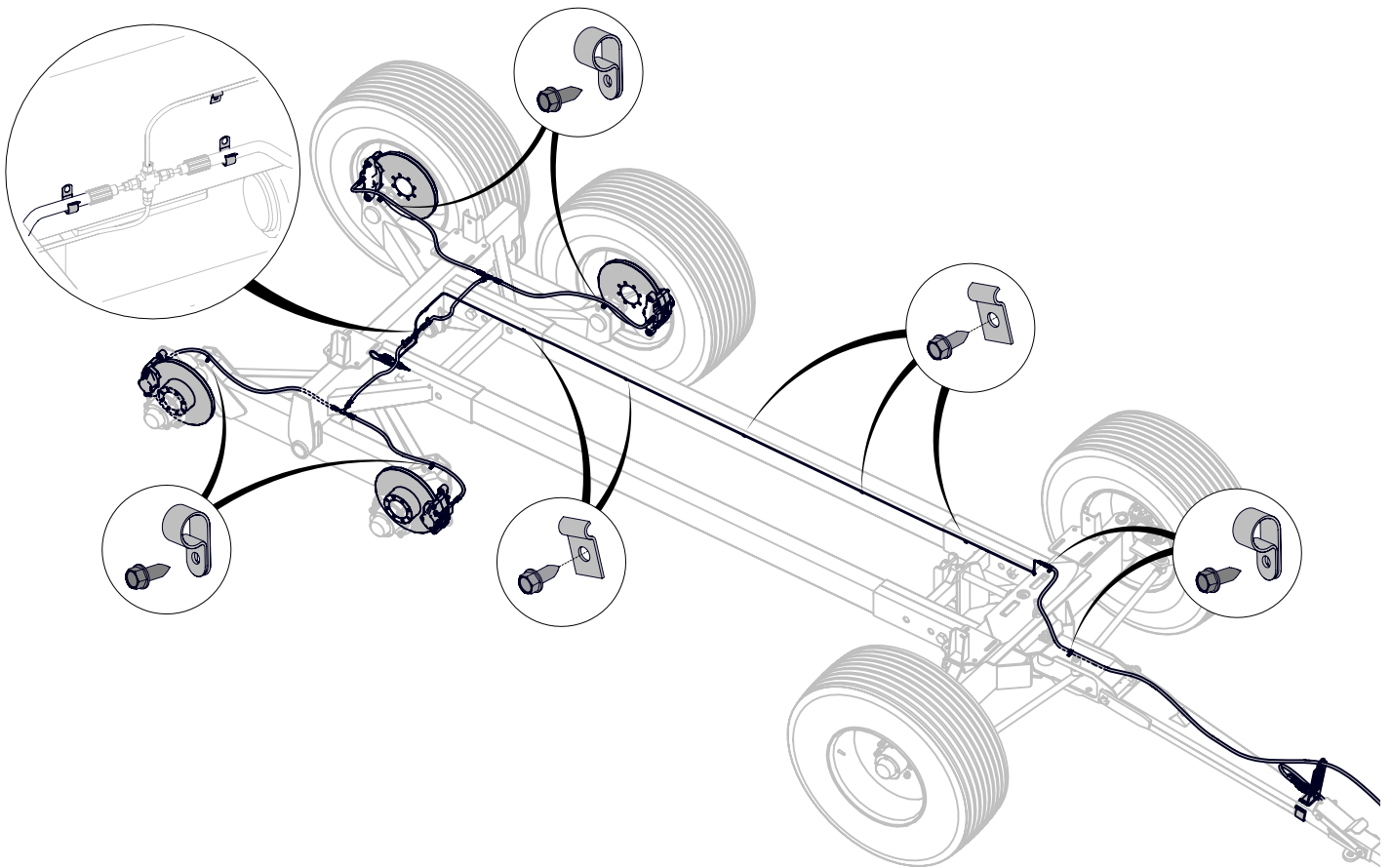
Brake system assembly and adjustments should be made by qualified personnel only.

Use the illustration of the six wheel wagon below as a guide to secure all the brake lines in place on your model disc or drum brake equipped wagon.

Each brake equipped wagon is shipped with:

- Flex brake line clamps
- Steel brake line clamp
- Self drilling screws

Ensure that there is enough slack at pivot points to avoid pinching or pulling of the brake lines.



**CAUTION
Operational Hazard**

Ensure brake lines are clear of any pinch points on the suspension system.



**CAUTION
Operational Hazard**

Brake system assembly and adjustments should be made by qualified personnel only.

FILL AND BLEED HYDRAULIC SURGE DRUM BRAKE

Brake system assembly and adjustments should be made by qualified personnel only.

Bleeding the brake system is required to ensure there are no air pockets in the brake system. Use the illustration of the six wheel wagon below as a guide to the brake system fill and bleed process on your model surge drum brake equipped wagon.

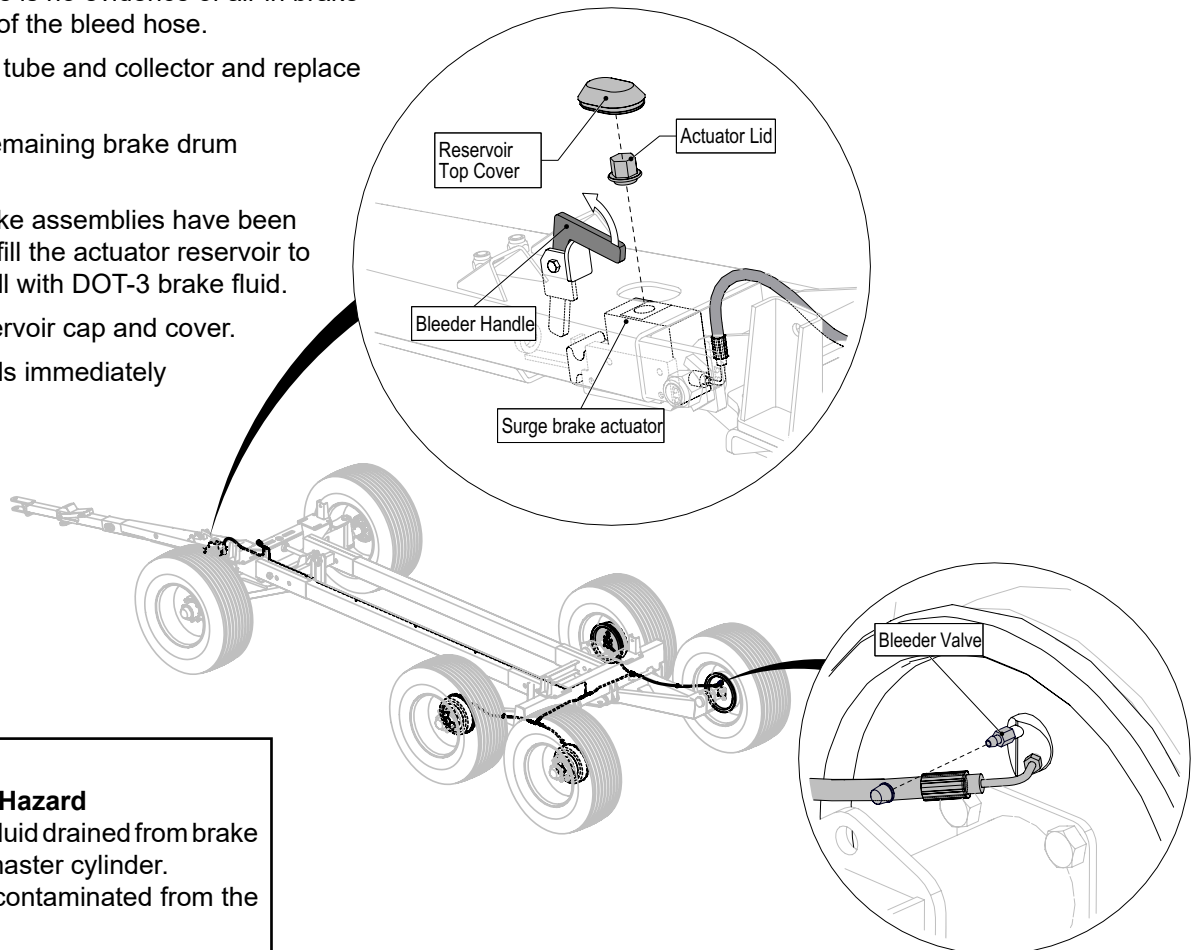
To bleed brakes, you need one person to pressurize the system and one to open the bleeder valve on the brake assembly.

Use the surge brake actuator bleeder handle to pressurize the brake system and a clear tubing and collection bottle to collect the fluid at the brake drum assembly.

At the wagon tongue, remove the reservoir top cover, unscrew the reservoir cap and fill the surge brake actuator reservoir with DOT-3 brake fluid. Do not allow the reservoir to empty or you will need to start the process over. **DO NOT** allow brake fluid to contact painted surfaces since it will damage the finish.

Start the process at the rear axle, then move to each brake assembly from rear to front.

- At the brake assembly, remove the bleeder valve dust cap.
- Attach the clear tube and collector on the bleeder stem on one of the rear brake assemblies.
- To begin pumping the brake fluid through the brake lines pump the bleeder handle for several strokes until there is solid resistance.
- Keep check on the fluid level in the reservoir, do not allow the reservoir to empty.
- Follow this process to begin bleeding:
 - Pull on the bleeder handle and hold.
 - Open the bleeder valve, when there is no resistance on the bleeder handle, close the bleeder valve.
 - Release the bleeder handle, then again pull and hold.
 - Open the bleeder valve, to release the air / fluid and then close the bleeder valve.
- Repeat until there is no evidence of air in brake fluid coming out of the bleed hose.
- Detach the clear tube and collector and replace dust cap.
- Repeat for the remaining brake drum assemblies.
- When all the brake assemblies have been bled, check and fill the actuator reservoir to three quarters full with DOT-3 brake fluid.
- Replace the reservoir cap and cover.
- Wipe up any spills immediately and wash the area with water.



CAUTION

Operational Hazard

DO NOT use brake fluid drained from brake system in refilling master cylinder. Brake fluid can be contaminated from the system.

HYDRAULIC DISC BRAKES - WAGONS

Brake system assembly and adjustments should be made by qualified personnel only.

Horst Wagon hydraulic disc brake assembly is similar for all models of wagons and brake options unless noted otherwise.

Horst brakes are engineered to be used with the tractors dedicated rear line hydraulic brake port.

BRAKE LINES.

All brake options

- Some forming of brake lines will be required, it is recommended to use a brake line bending tool to prevent brake lines from kinking.
- Tightening brake lines: as a general rule from finger tight, continue tightening the nut until you feel it draw down tight, then tighten approximately 1/6" turn more.
- Do not over-tighten.

BRAKE LINE HOLDER

All brake options

- Assemble the brake line holder to the trailer tongue with the bracket and two 1/2" x 2" bolts and lock nuts.
- Assemble the #8 bulk head fitting into the bracket.
- Assemble the female ISO 5676 flat face coupler to the bulk head fitting.
- Thread the front brake hose through the ring at the top of the brake holder up to the front axle.

FRONT CONNECTION W/O FRONT BRAKE SYSTEM

Option:

- two wheel brake option on four wheel wagon
- two wheel brake option on six wheel wagon
- two wheel brake option on eight wheel wagon
- four wheel brake option on six wheel wagon
- four wheel brake option on eight wheel wagon

Assemble the Eaton 202X3 (.125 Adapter) to the front hydraulic brake hose.

Form the long steel brake line as required and assemble the brake line to the adapter as shown in the diagram.

FRONT CONNECTION WITH FRONT BRAKE SYSTEM

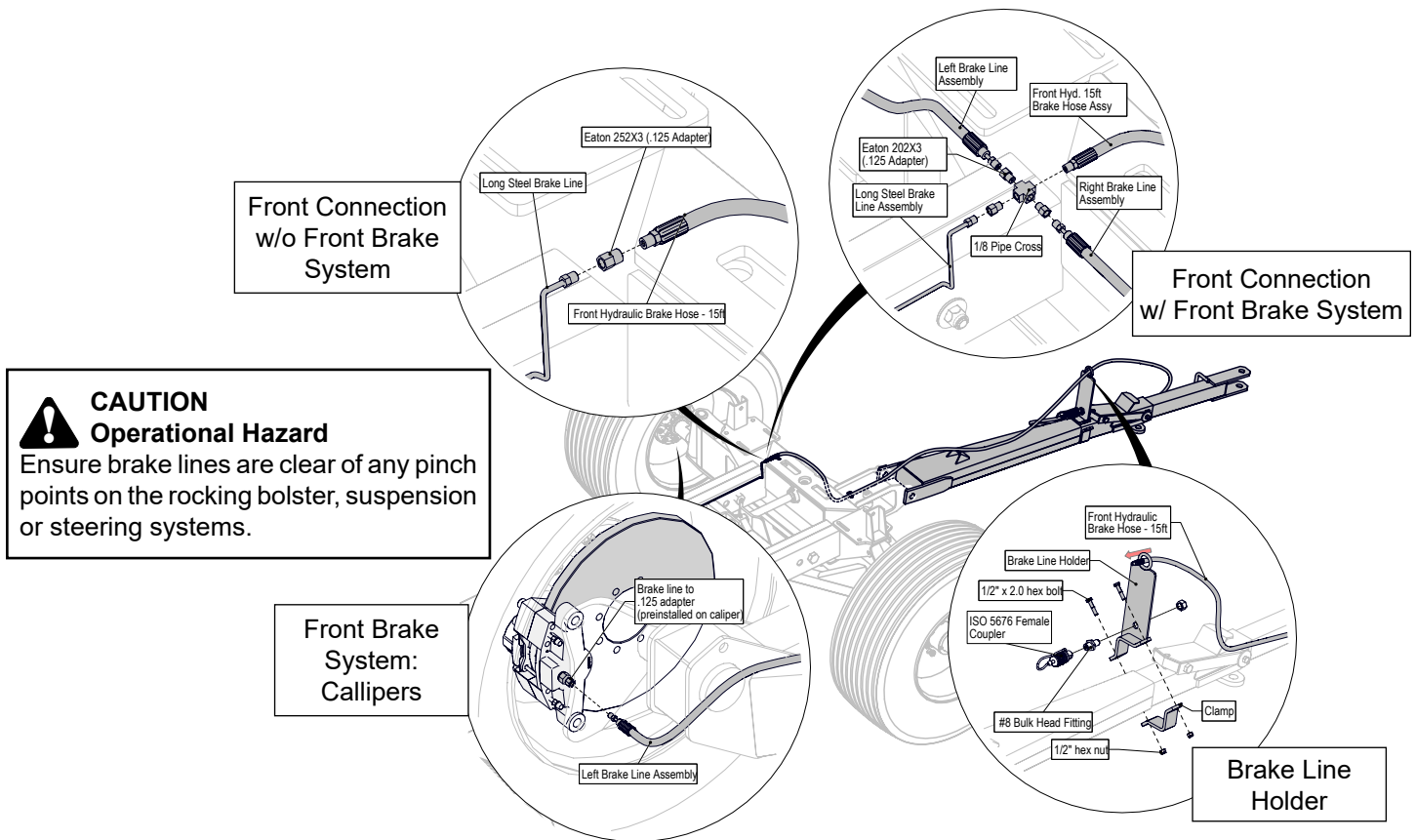
Option:

- four wheel brake on four option

Components required:

- 1 x long steel brake line
- 1 x 1/8 pipe cross
- 3 x Eaton 202X3 (.125 Adapter)
- 1 x Left brake line
- 1 x Right brake line
- 1 x Front hydraulic brake hose

- Assemble all the components to the front hydraulic brake hose. Be sure to leave plenty of line slack over pivot points to avoid damage from stretching or pinching the brake lines.
- Assemble left & right brake lines to the callipers.
- Form the long steel brake line as required.
- Assemble Tee to front brake hose.
- Assemble remaining connections as shown in the diagram.



REAR TWO WHEEL DISC BRAKE SYSTEM

Brake system assembly and adjustments should be made by qualified personnel only.

Option:

- two wheel brake option on four wheel wagon

Components required:

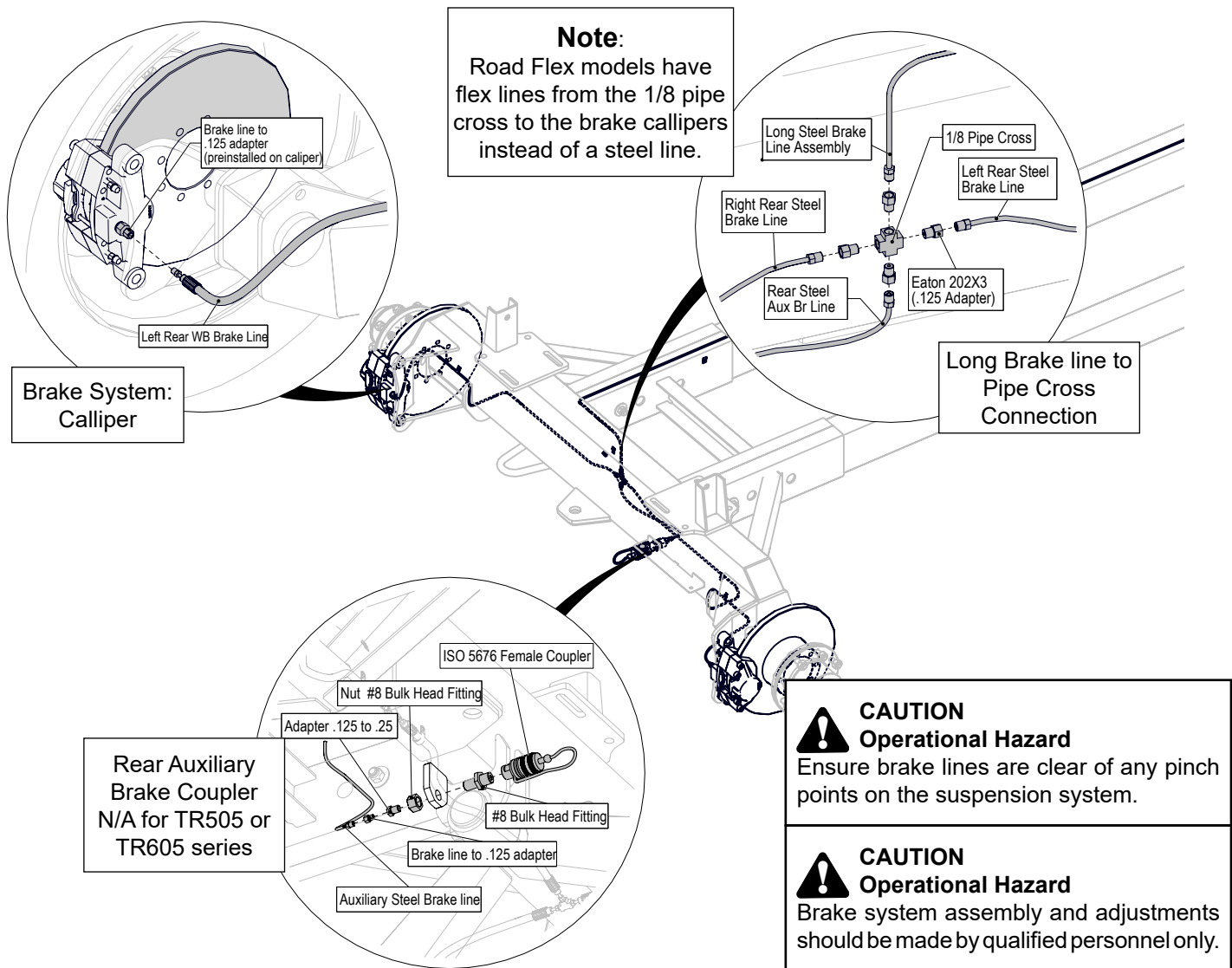
- 1 x 1/8" pipe cross
- 4 x Eaton 202X3 (.125 Adapter)
- 1 x Left brake line - steel
- 1 x Right brake line - steel

Rear Auxiliary Brake Coupler Assembly
(n/a for TR505/605 series)

- 1 x Left Front WB Brake Line
- 1 x Aux Brake Line
- 1 x #8 bulk head fitting
- 1 x (.125 - .25 Adapter)
- 1 x ISO 5676 female coupler
- 2 x Tee 0.125in pipe

Assemble all the components to the long steel brake line, use the illustration as reference.

- Form the long steel brake line as required.
- Assemble the four Eaton .125 adaptors to the 1/8" cross pipe.
- Attach the cross pipe assembly to the long brake line.
- Form the left brake steel line as required.
- Assemble left brake line to the cross pipe and then to calliper.
- Repeat the previous two steps for the right side.
- Assemble the #8 bulk head fitting to the rear outlet holder on the axle.
- Assemble the ISO 5676 female coupler to the bulk head fitting.
- Assemble the .125 - .25 adapter to the bulk head fitting.
- Attach the Eaton .125 adaptor to the .125-.25 adapter.
- Attach the aux brake line to the adapter and to the 1/8" cross pipe.



WALKING BEAM TWO WHEEL DISC BRAKE SYSTEM

Brake system assembly and adjustments should be made by qualified personnel only.

Option:

- two wheel brake option on six wheel wagon
- two wheel brake option on eight wheel wagon

Components required:

- 1 x 1/8 pipe cross
- 4 x Eaton .125X3 (.125 Adapter)
- 1 x Left brake line - rubber
- 1 x Right brake line - rubber

Rear Auxiliary Brake Coupler Assembly
(n/a for TR505/605 series)

- 1 x Left Front WB Brake Line
- 1 x Aux Brake Line
- 1 x #8 bulk head fitting
- 1 x (.125 - .25 Adapter)
- 1 x ISO 5676 female coupler
- 2 x Tee 0.125in pipe

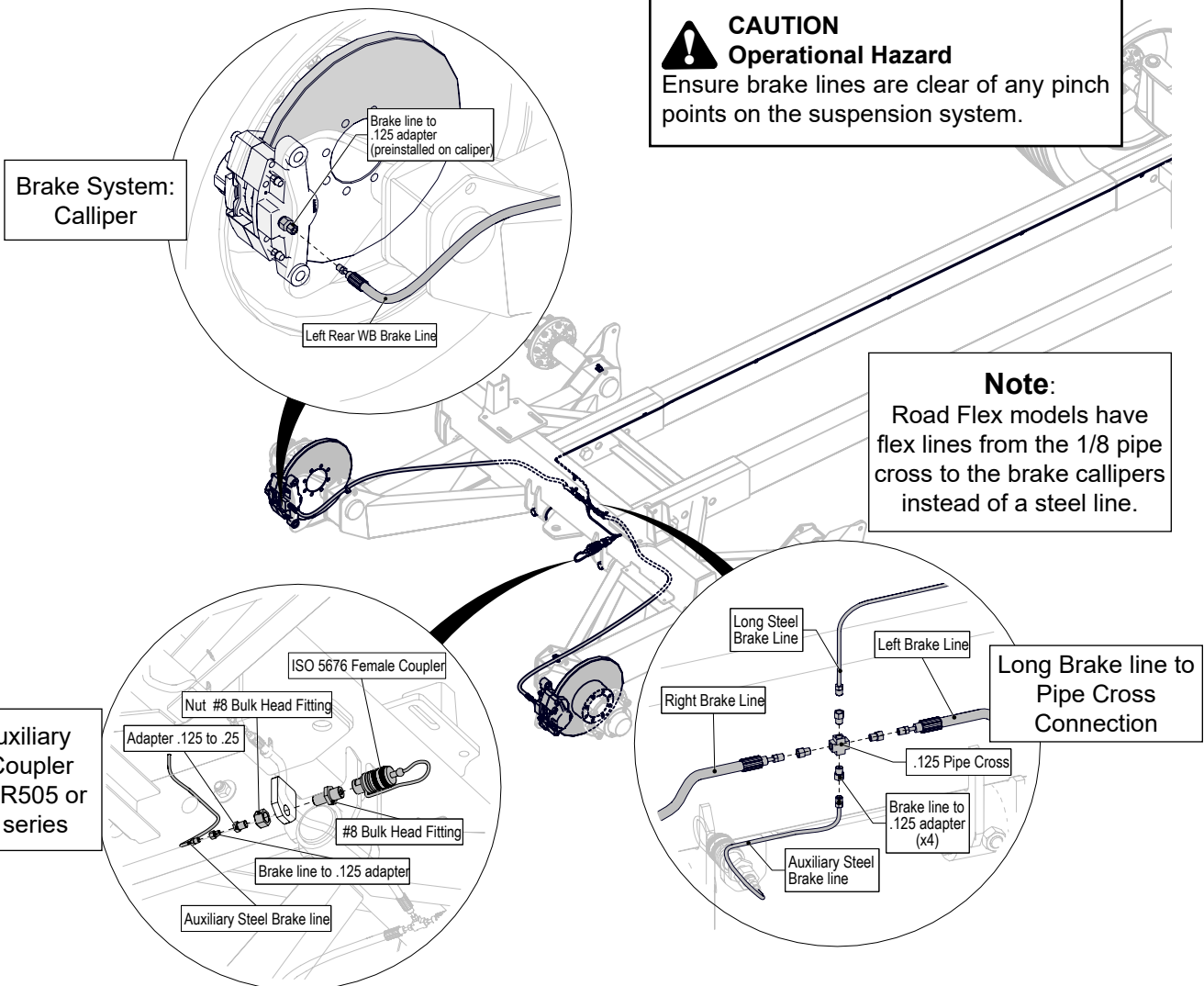
Assemble all the components to the long steel brake line, use the illustration as reference.

- Form the long steel brake line as required.
- Assemble the four Eaton .125 adaptors to the 1/8" cross pipe.
- Attach the cross pipe assembly to the long brake line.
- Route the left rubber brake line as shown in the illustration.
- Assemble left rubber brake line to the cross pipe and the then to calliper.
- Repeat the previous two steps for the right side.
- Assemble the #8 bulk head fitting to the rear outlet holder on the axle.
- Assemble the ISO 5676 female coupler to the bulk head fitting.
- Assemble the .125 -.25 adapter to the bulk head fitting.
- Attach the Eaton .125 adaptor to the .125-.25 adapter.
- Attach the aux brake line to the adapter and to the 1/8" cross pipe.



CAUTION Operational Hazard

Ensure brake lines are clear of any pinch points on the suspension system.



WALKING BEAM FOUR WHEEL DISC BRAKE SYSTEM

Brake system assembly and adjustments should be made by qualified personnel only.

Option:

- four wheel brake option on six wheel wagon
- four wheel brake option on eight wheel wagon

Components required:

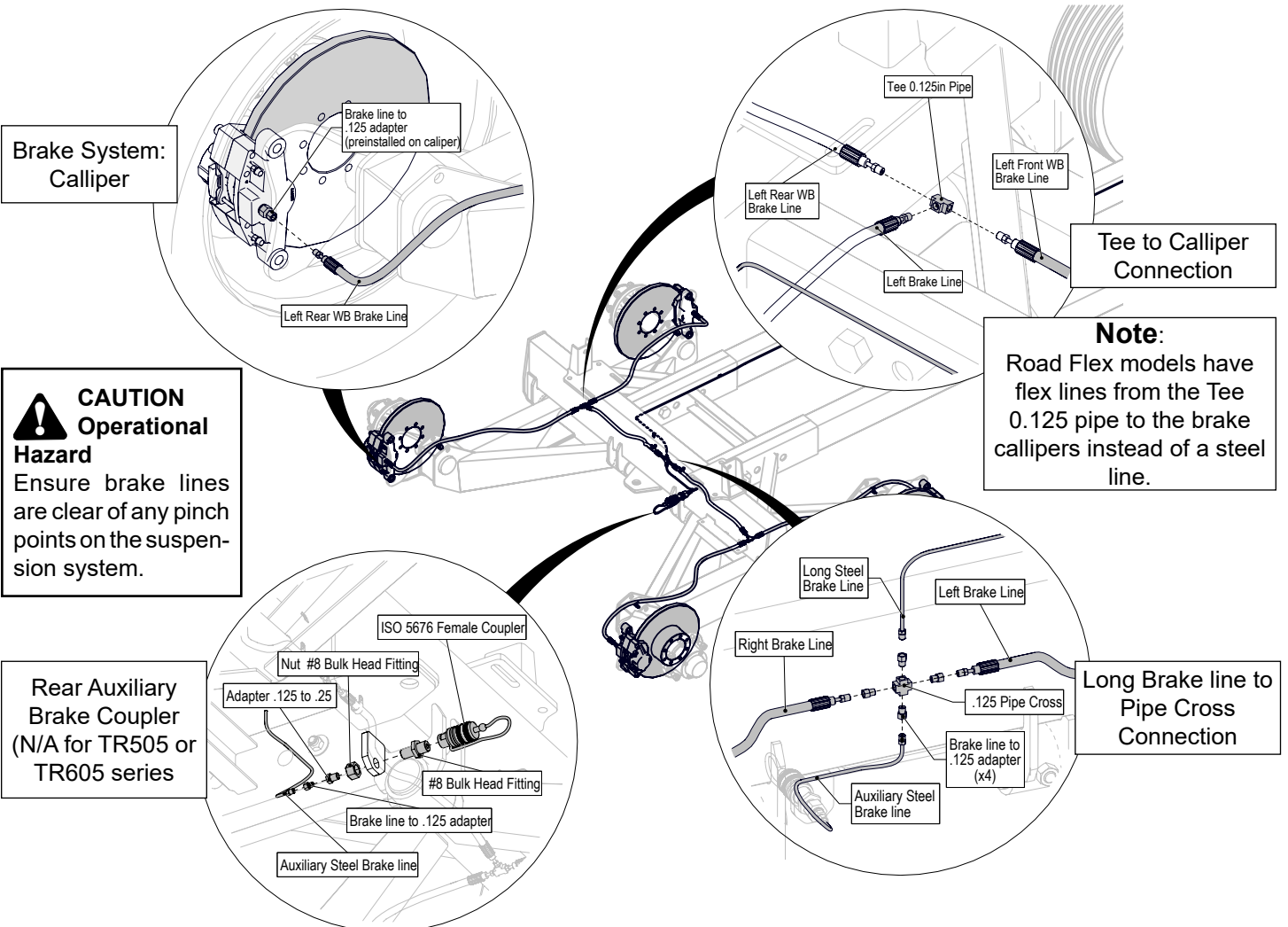
- 1 x 1/8" pipe cross
- 5 x Eaton .125" Adaptor
- 1 x Left brake line
- 1 x Right brake line
- 1 x Right Rear WB Brake Line
- 1 x Right Front WB Brake Line
- 1 x Left Rear WB Brake Line
- 1 x Left Front WB Brake Line

Rear Auxiliary Brake Coupler Assembly
(n/a for TR505/605 series)

- 1 x Left Front WB Brake Line
- 1 x Aux Brake Line
- 1 x #8 bulk head fitting
- 1 x (.125" - .25" Adapter)
- 1 x ISO 5676 female coupler
- 2 x Tee 0.125in pipe

Assemble all the components to the long steel brake line, use the illustration as reference.

- Form the long steel brake line as required.
- Assemble the four Eaton .125" adaptors to the 1/8" cross pipe.
- Attach the cross pipe assembly to the long brake line.
- Assemble left brake line to the cross pipe and the tee 0.125".
- Assemble the left rear & front WB brake line to the tee then to callipers.
- Repeat the previous two steps for the right side.
- Assemble the #8 bulk head fitting to the rear outlet holder on the axle.
- Assemble the ISO 5676 female coupler to the bulk head fitting.
- Assemble the .125"-.25" adapter to the bulk head fitting.
- Attach the Eaton .125" adaptor to the .125"-.25" adapter.
- Attach the aux brake line to the adapter and to the 1/8" cross pipe.



HYDRAULIC DISC BRAKES - TR SERIES TRAILERS

FRONT CONNECTION & BRAKE LINE HOLDER

Brake system assembly and adjustments should be made by qualified personnel only.

Option:

- Two wheel brake option TR505 & TR605 trailers
- Two wheel brake option TR505RF & TR605RF trailers
- Four wheel brake option TR505 & TR605 trailers
- Four wheel brake option TR505RF & TR605RF trailers

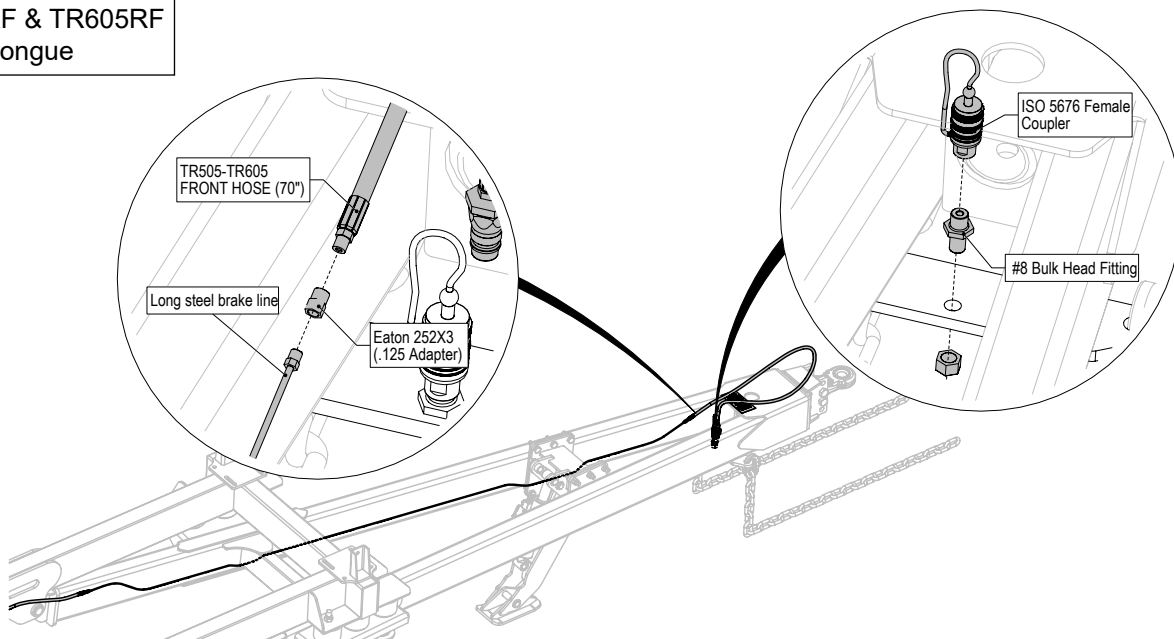
Components required:

- 1 x Eaton 252X3 (.125 Adapter)
- 1 x Long steel line (145")
- 1 x Front hose (70")
- 1 x 8 bulk head fitting
- 1 x ISO 5676 coupler female

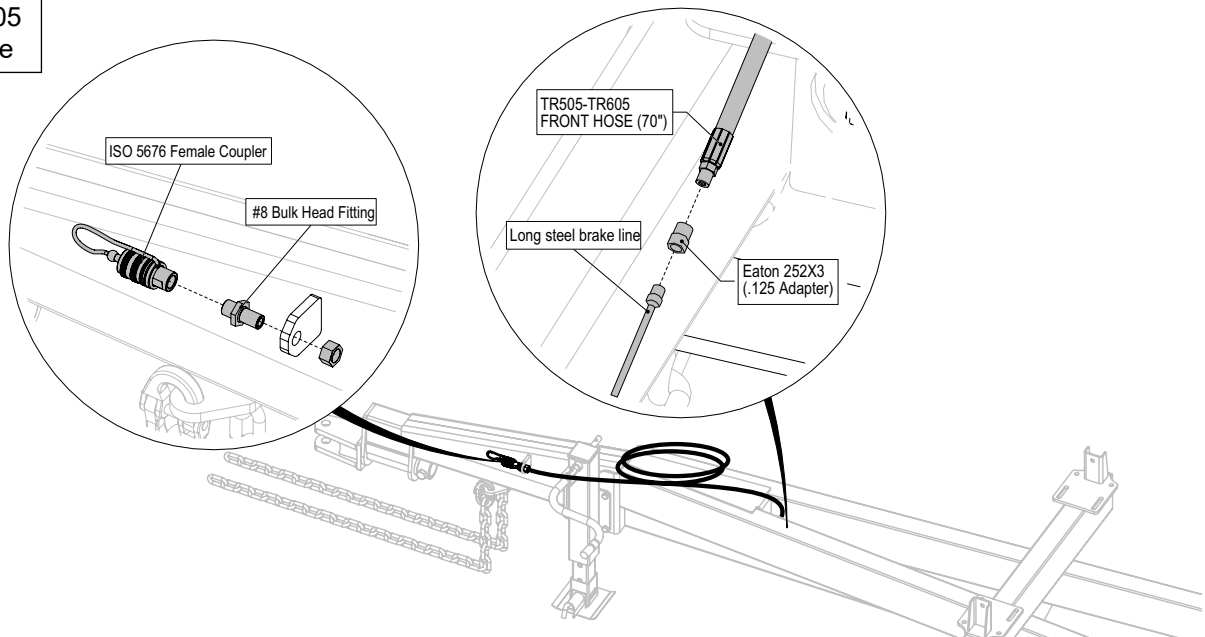
Assembly: refer to appropriate diagram below for specific models.

- Assemble the #8 bulk head fitting into the tongue bracket.
- Assemble the female ISO 5676 coupler to the bulk head fitting.
- Assemble the eaton adapter to the front hose.
- Attach the front hose assembly to the long steel brake line
- Connect the male coupler to the female coupler

TR505RF & TR605RF
tongue



TR505 & TR605
non RF tongue



TR SERIES TWO WHEEL BRAKE LINE / CALIPER CONNECTION

Brake system assembly and adjustments should be made by qualified personnel only.

Option:

- two wheel brake option TR505 & TR605 trailers
- two wheel brake option TR505RF & TR605RF trailers

Components required:

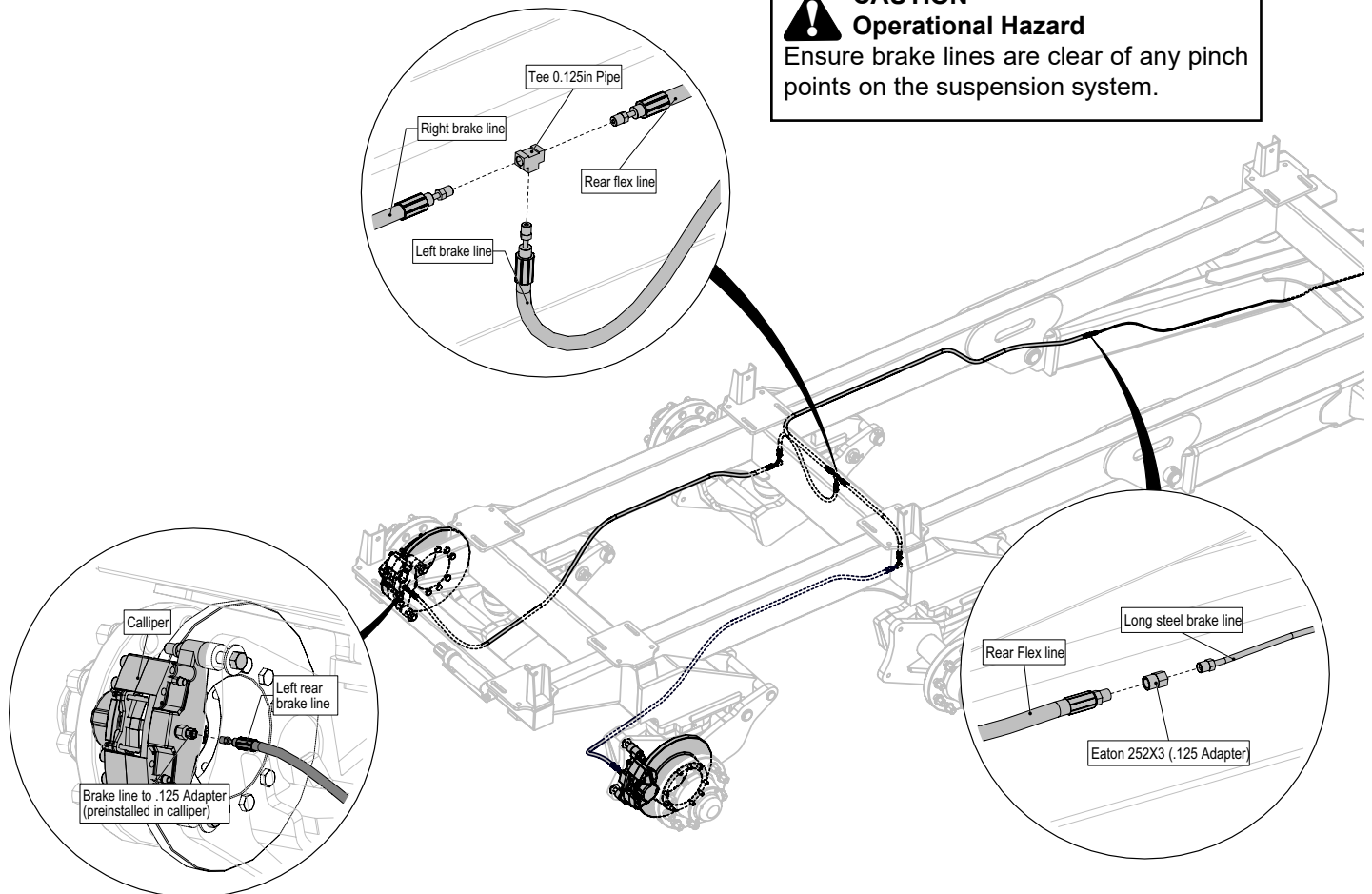
- 1 x Tee 0.125in pipe
- 1 x Eaton 252X3 (.125 Adapter)
- 1 x Right rear brake line (##")
- 1 x Rear flex line
- 1 x Left rear brake line (##")

Assemble all the components to the long steel brake line, use the illustration as reference.

TR605RF is shown but assembly is similar for all TR series.

- Form the long steel brake line as required.
- Attach the Eaton .125 adapter to the long steel line
- Connect the rear flex line to the adapter.
- Attach the tee connector to the rear flex line.
- Connect the left and right brake lines to the tee
- Route the left brake line as shown in the illustration.
- Assemble the left brake line to the rear left calliper.
- Repeat the previous two steps for the right side.

CAUTION
Operational Hazard
Ensure brake lines are clear of any pinch points on the suspension system.



TR SERIES FOUR WHEEL BRAKE LINE / CALIPER CONNECTION

Option:

- Four wheel brake option TR505 & TR605 trailers
- Four wheel brake option TR505RF & TR605RF trailers

Components required:

- 3 x Tee 0.125 pipe
- 1 x Eaton 252X3 (.125 Adapter)
- 1 x Right rear brake line (80")
- 1 x Right front brake line (45")
- 1 x Rear flex line
- 1 x Left brake line (27")
- 1 x Right brake line (20")
- 1 x Left front brake line (45")
- 1 x Left rear brake line (80")



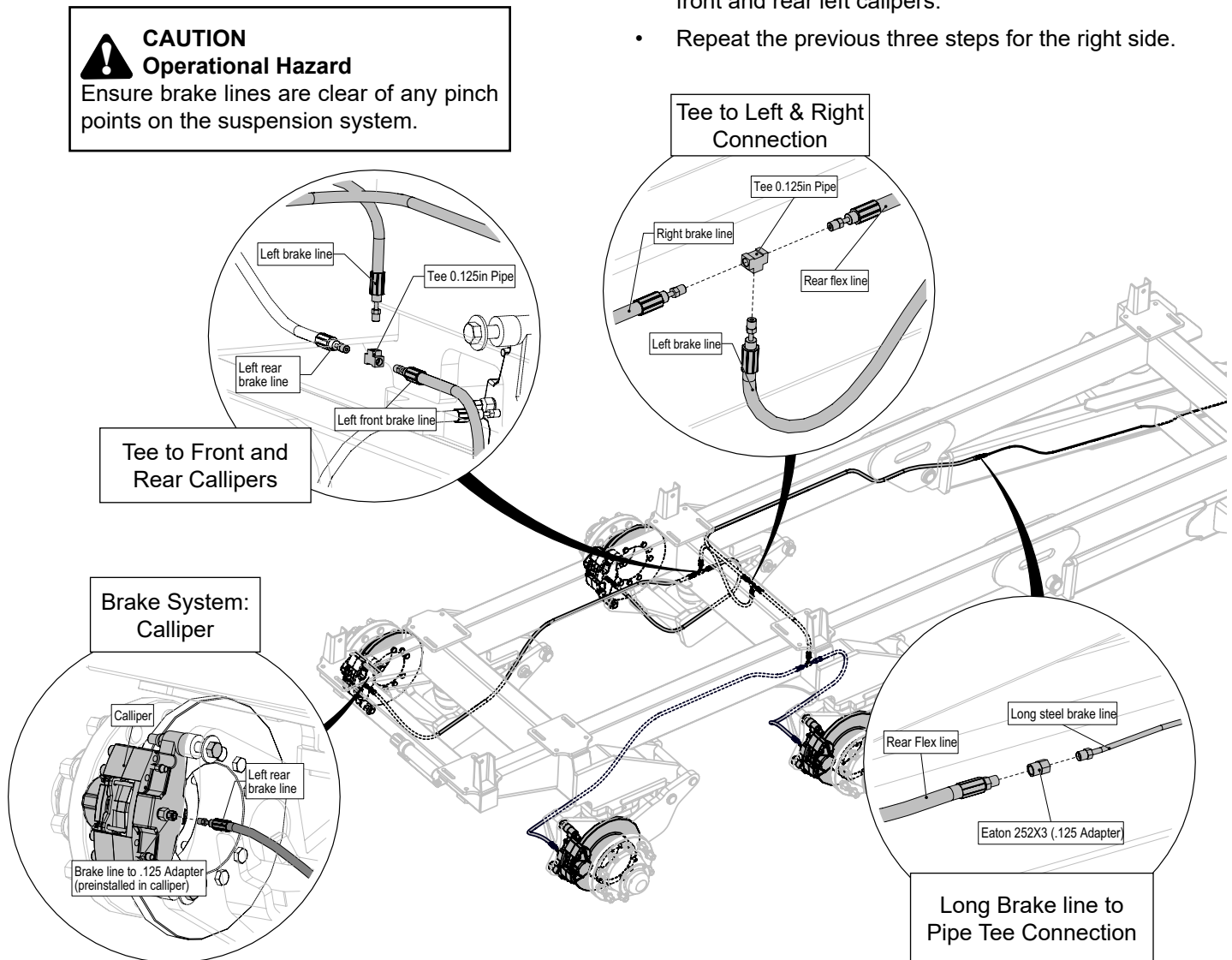
CAUTION Operational Hazard

Ensure brake lines are clear of any pinch points on the suspension system.

Assemble all the components to the long steel brake line, use the illustration as reference.

TR605RF is shown but assembly is similar for all TR series.

- Form the long steel brake line as required.
- Attach the Eaton .125 adapter to the long steel line
- Connect the rear flex line to the adapter.
- Attach the tee connector to the rear flex line.
- Connect the left and right brake lines to the tee
- Route the left brake line as shown in the illustration.
- Assemble the tee connector to left brake
- Assemble the left front and left rear brake lines to the front and rear left calipers.
- Repeat the previous three steps for the right side.



CAUTION Operational Hazard

Brake system assembly and adjustments should be made by qualified personnel only.

SECURING THE BRAKE LINES

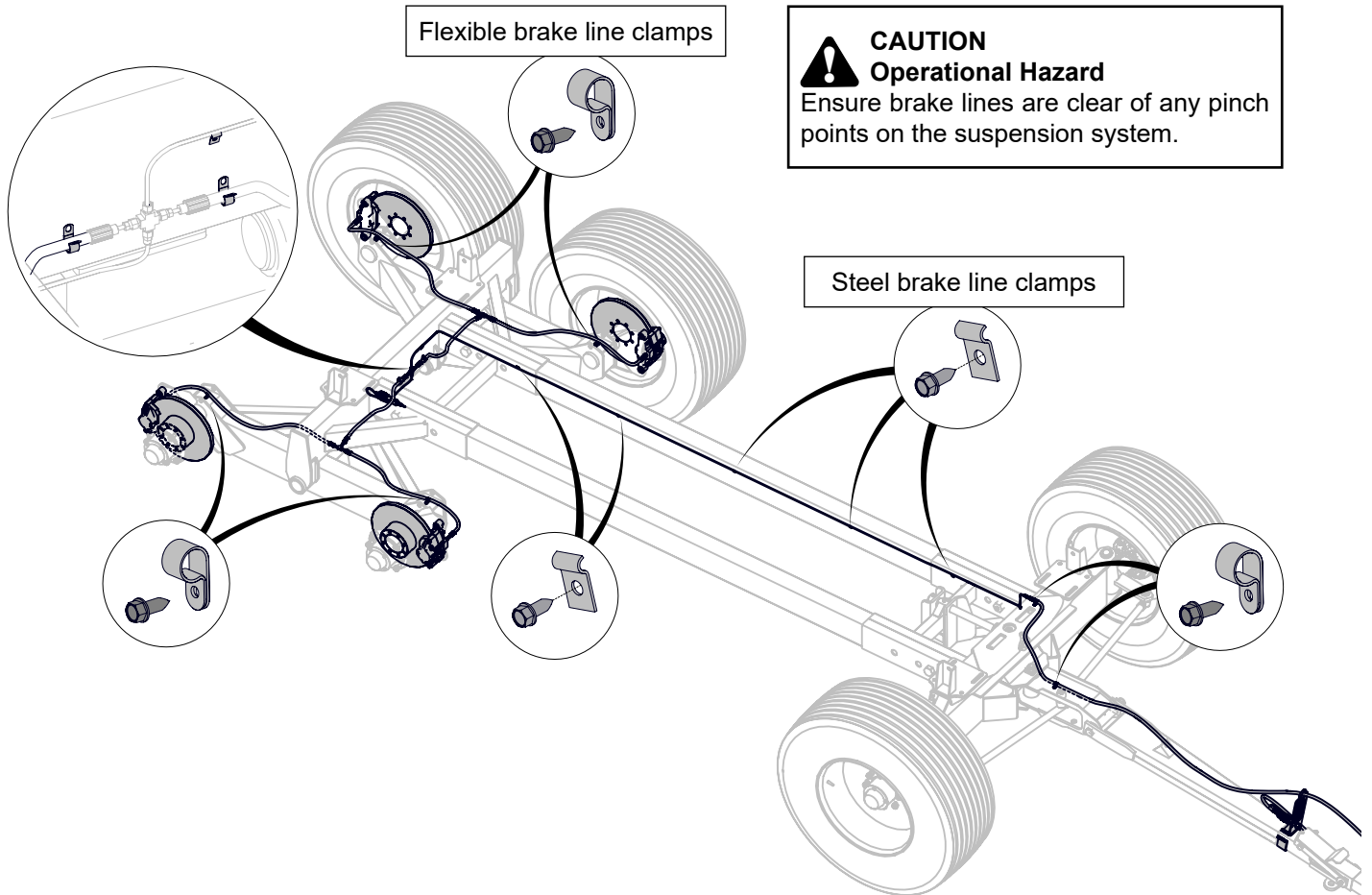
Brake system assembly and adjustments should be made by qualified personnel only.

Use the illustration of the six wheel wagon below as a guide to secure all the brake lines in place on your model disc or drum brake equipped wagon or trailer.

Each brake equipped wagon or trailer is shipped with:

- Flexible brake line clamps
- Steel brake line clamp
- Self drilling screws

Ensure that there is enough slack at pivot points to avoid pinching or pulling of the brake lines.



CAUTION
Operational Hazard
Chock wheels during assembly to prevent unwanted movement.



CAUTION
Operational Hazard
Brake system assembly and adjustments should be made by qualified personnel only.

FILL AND BLEED HYDRAULIC DISC BRAKE

Brake system assembly and adjustments should be made by qualified personnel only.

Bleeding the brake system is required to ensure there are no air pockets in the brake system. Use the illustration of the six wheel wagon below as a guide to the brake system fill and bleed process on your model disc brake equipped wagon.

Use a vacuum pump to draw hydraulic fluid through the brake system.

Do not use a tractor as an hydraulic power source. Tractor hydraulic systems operate under extremely high pressure. Injury may occur from a concentrated high-pressure stream of hydraulic fluid. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.

Prepare a container with hydraulic fluid at the front brake hose so the vacuum pump has a source of hydraulic fluid to draw from. Insert a ISO 5676 female coupler into the male coupler on the hose and insert the coupler assembly in the container of hydraulic fluid. Do not allow container to empty or you will need to start the process over.

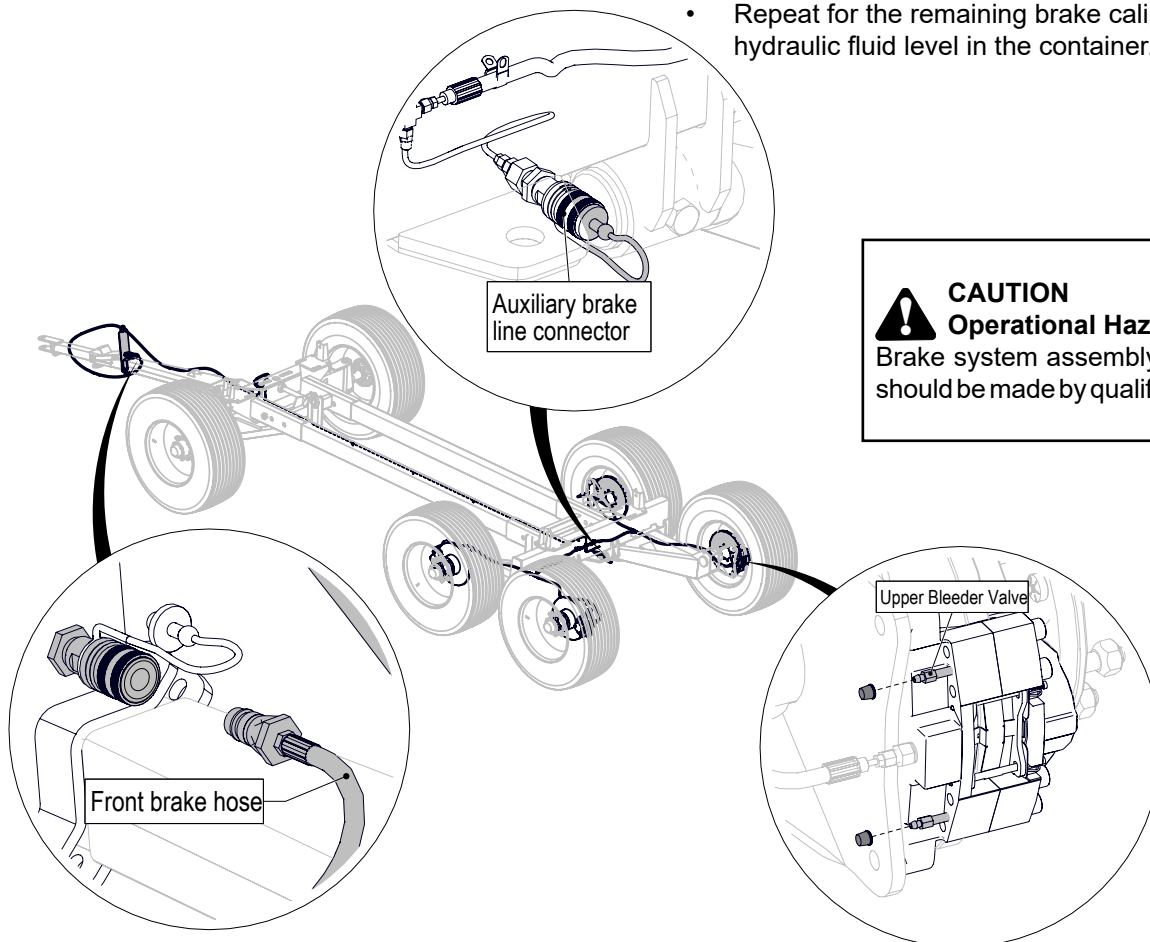
Start the process at the auxiliary brake line connector at the rear axle, then move to each brake caliper from rear to front.

At the auxiliary brake line connector:

- Attach a special bleed hose (male ISO 5676 coupler on an open ended hose) to the female ISO 5676 coupler.
- Connect the end of the bleeder hose to the vacuum pump.
- Activate the pump to begin the bleeding process.
- Bleed until there is no evidence of air in hydraulic fluid coming out of the bleed hose.
- Detach the bleed hose assembly from the coupler.

At the brake calipers:

- Remove the bleeder valve dust cap.
- Attach the vacuum pump bleed hose on the upper bleeder stem on one of the rear calipers.
- Activate the pump to create a vacuum.
- Open the bleeder valve begin the bleeding process.
- Use the pump to bleed until there is no evidence of air in brake fluid coming out of the bleed hose.
- Close the bleeder valve and detach the pump.
- Repeat for the lower bleeder valve.
- Repeat for the remaining brake calipers, check hydraulic fluid level in the container.



CAUTION Operational Hazard

Brake system assembly and adjustments should be made by qualified personnel only.

DIGI-STAR SCALE SYSTEM

Digi-Star system assembly is similar for all models of wagons unless noted otherwise. Review the EZ2500 Digi-Star operators manual before proceeding with this installation.

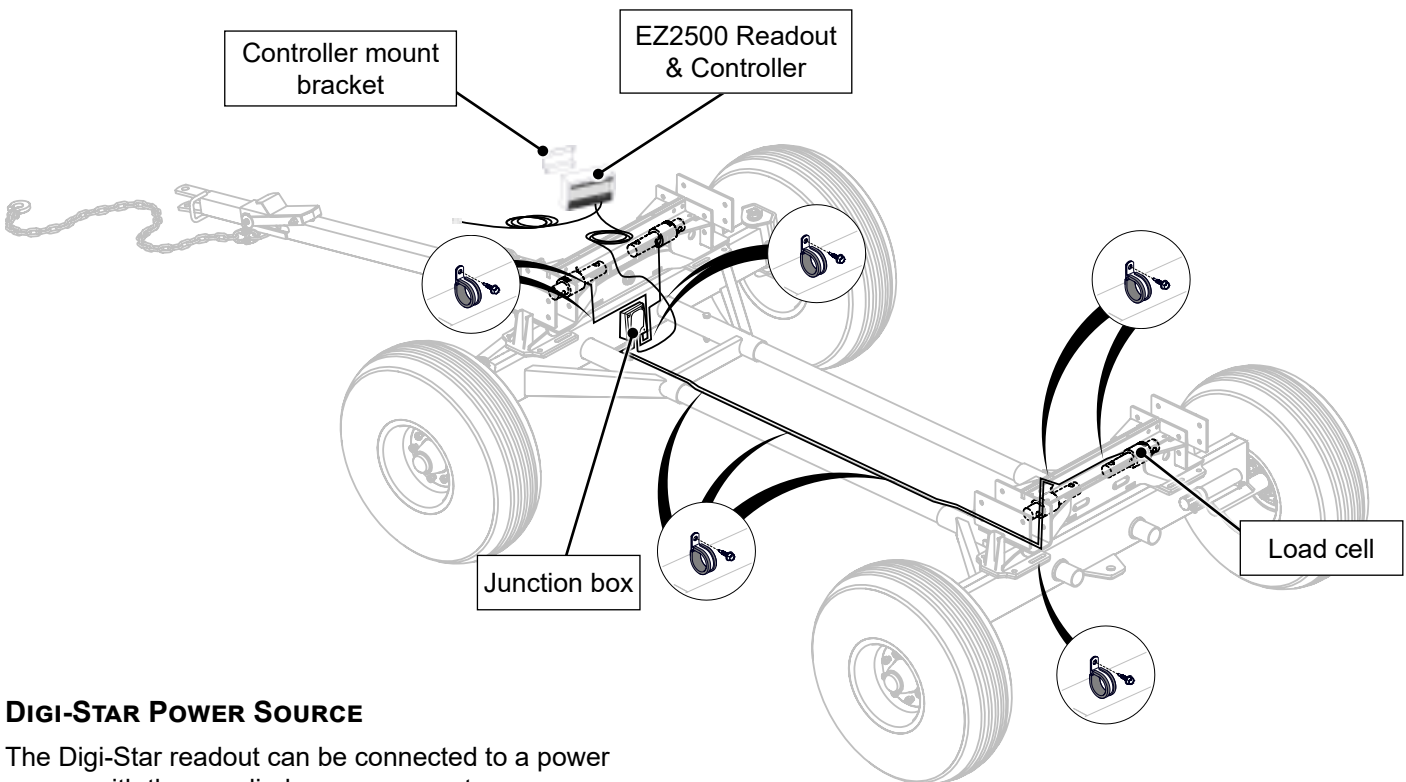
Digi-Star scale system load cells are pre-assembled into the bolsters of the wagon, but need to have the cables routed, connected to the junction box and secured.

Follow the diagram below to route the cabling using the cable clamps and fasteners supplied.

Mount the junction box on the inside of the front axle as shown, In order to obtain maximum protection from moisture, perform the following steps:

- Ensure the housing assembly is on a flat surface where 4 mounting corners are equally supported.
- Remove top cover. Pre-drill four holes in a 4.25 x 5.5 pattern. Pre-drilling mounting holes will insure the screws will remain straight during installation.
- Install the junction box using four screws-#8-18 and flat washer. A ¼ nut driver drill attachment will be required. Do not over tighten mounting hardware.
- Install load cell cables and indicator cable. Remove gland nut from each strain relief. Insert cable through gland nut and verify that the rubber sleeve remains in the strain relief while inserting cable. Install colored wires snugly into terminal blocks. A terminal block legend is provided on the PC board. Tighten gland nut securely. The wire should be tugged on and the cable remains securely in place.
- Make sure cover o-ring is in place and tighten top cover securely.

When mounting the read out, use the bracket and mounting hardware supplied. Mount on a secure flat surface safe from potential damage.



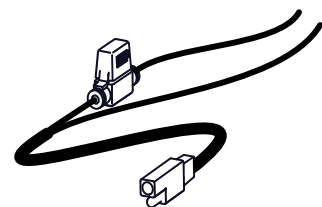
DIGI-STAR POWER SOURCE

The Digi-Star readout can be connected to a power source with the supplied power connector.

Connection to the vehicle electrical panel is possible with the fused panel lead cable.

Consult the vehicle operators manual before making any electrical connections.

Fused Panel Lead



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