

 **VALTIR**

GUARD EN™

TRUCK MOUNTED ATTENUATOR
Without Hydraulic and Lighting System (Sold Separately)

PRODUCT MANUAL



PN 119615

REVISION A | JULY 2024

GUARD EN™

The GUARD EN™ system has been tested pursuant to the CEN/TS 16786:2018 standard.

Product Manual



15601 Dallas Parkway
Suite 525
Addison, Texas 75001



WARNING: The local highway authority, distributors, owners, contractors, lessors, and lessees are RESPONSIBLE for the assembly, maintenance, and repair of the GUARD EN™ system. Failure to fulfill these RESPONSIBILITIES with respect to the proper assembly, maintenance, and repair of the GUARD EN™ system could result in serious injury and/or death.



These instructions are for standard assembly specified by the appropriate highway authority. In the event the specified system assembly, maintenance, or repair would require a deviation from standard assembly parameters, contact a Valtir representative.

This manual must be available to the worker(s) overseeing and/or assembling the product at all times. For additional copies, contact Valtir at +1 214 589 8140 or visit www.Valtir.com.

The instructions contained in the manual supersede all previous information and manuals. All information, illustrations, and specifications in this manual are based on the latest GUARD EN™ system information available to Valtir at the time of printing. Valtir reserves the right to make changes at any time. Please contact Valtir to confirm that you are referring to the most current instructions.

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Customer Service Contacts

Valtir is committed to the highest level of customer service. Feedback regarding the GUARD EN™ system assembly procedures, supporting documentation, and performance is always welcome. Additional information can be obtained from the contacts below:

Valtir

Telephone:

+1-214-589-8140 (International)

Internet:

www.Valtir.com/contact

Abbreviations and Definitions

TMA Truck Mounted Attenuator

CEN/TS Technical Specification

PPE Personal Protective Equipment

Safety Symbols

This section describes safety symbols that may appear in this product manual. Read this manual for complete safety, assembly, operating, maintenance, repair, and service information.



Indicates Danger or Warning. Failure to read and follow this warning could result in serious injury or death to the workers and/or bystanders.



Indicates Caution or High Importance. Failure to follow this warning can result in improper performance, failure of operation, to serious injury or death in the event of a vehicle impact with the system.



Indicates Notifications or Reference. These denote important items but will not cause system damage or serious injury.

Safety Rules for Assembly

This manual must be kept in a location where it is readily available to persons who are skilled and experienced in the proper assembly, maintenance, or repair of the GUARD EN™ system. Additional copies of this manual are available from Valtir. Please contact Valtir if you have any questions concerning the information in this manual.



It is the responsibility of the installer to use proper safety precautions when operating power equipment and when moving heavy equipment or system components. Hand, eye, foot, and back protection is recommended.



Ensure that all of the Danger, Warning, Caution, and Important statements within this product manual are completely followed. Failure to follow this warning could result in serious injury or death in the event of a collision.

Important Introductory Notes

The performance of the GUARD EN™ system is dependent upon the proper assembly, deployment and future system maintenance. These instructions must be read in their entirety and understood before assembling the GUARD EN™. These instructions are to be used only in conjunction with the assembly of a GUARD EN™ and are for standard assemblies only as specified by the applicable highway authority.

In the event your system assembly requires or involves deviation from standard parameters, or during the assembly process a question arises, please contact Valtir Customer Service. No person should be permitted to assist in the assembly, maintenance, or repair of this system that does not possess the unique knowledge described herein. These instructions are intended for an individual who is qualified to both read and accurately interpret them as written. They are intended for the individual who is experienced and skilled in the assembly of highway products which are specified and selected by the highway authority.

If additional information is required, please contact Valtir Customer Service. If there are deviations, alterations, or departures from the assembly protocol specified in this manual, the GUARD EN™ system may not perform as tested and accepted.



DO NOT use any component part that has not been specified and/or approved for this system during assembly or repair.



DO NOT use the system without hydraulics.

Limitations and Warnings

The GUARD EN™ system was tested to meet the impact criteria, requirements, and guidelines of CEN/TS 16786:2018. These tests, specifically set forth by the CEN/TS, evaluate product performance by simulating those impacts involving typical vehicles on our roadways, including lightweight cars (approx. 900kg) and full-size car (approx. 2000 kg). A product can be certified for multiple test levels. This system is certified to the test level(s) shown below:

Speed Class 100 (100 km/hr)

These CEN/TS 16786:2018 tests are not intended to represent the performance of systems when impacted by every vehicle type or every impact condition existing on the roadway. This system is tested to Speed Class 100 under the test matrix criteria of CEN/TS 16786:2018.

Valtir expressly disclaims any warranty or liability from injury or damage to persons or property resulting from any impact, collision or harmful contact with products were assembled in consultation with Valtir or by third parties.

This GUARD EN™ system is intended to be assembled and maintained in accordance with specific county guidelines. The appropriate highway authority approved engineer should be careful to properly select, assemble, and maintain the product. Careful evaluation of the host vehicle, vehicle population type, speed, traffic direction, and visibility are some of the elements that require evaluation in the proper selection of a safety appurtenance by the appropriate specifying highway authority.

After an impact occurs, the product must be repaired to its original condition prior to placing back in service. When a safety product is impacted, it is mandatory that the highway authority inspect all the components for damage and repair and/or replace components as necessary. If the system is not repairable, a complete system replacement is required.



Do not assemble, maintain, or repair this system until you have read this manual thoroughly and completely understand it. Ensure that all Danger, Warning, Caution, and Important statements within the manual are completely followed. Please call Valtir at (214) 589-8140 if you do not understand these instructions or have questions.



Do not modify this system in any way (except hydraulics and lights) .



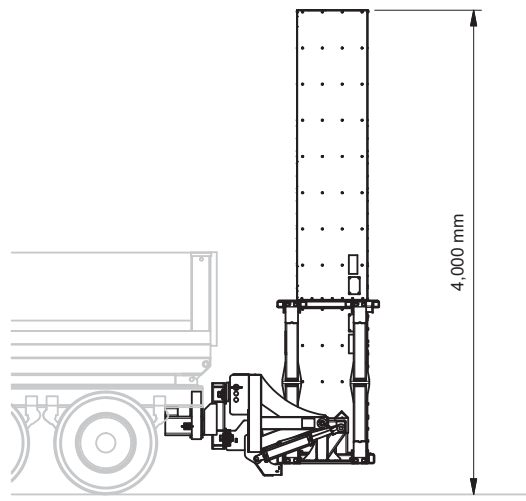
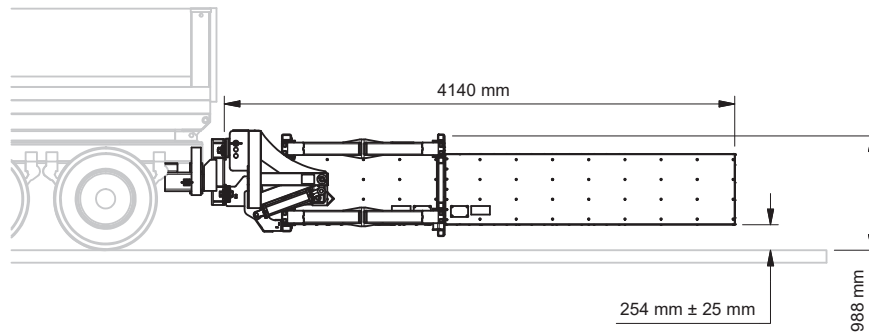
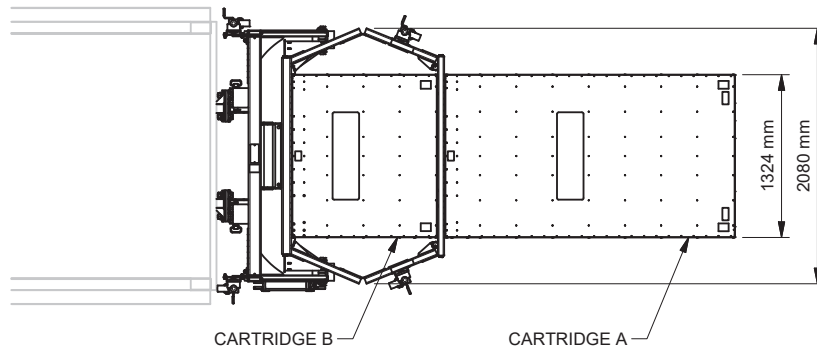
It is the sole responsibility of the project engineer and/or local highway authority and its engineer to ensure that this system and delineation used meet all local specifications.



It is the sole responsibility of the project engineer and/or local highway authority and its engineer to ensure that the assembly meets all appropriate local standards.

Technical Specifications

Weight	kg	Dimensions	mm
Cartridge B	86	Width	2,080
Cartridge A	116	Length	4,140
Frame	510	Height (Horizontal)	988
Jacks	58	Height (Vertical)	4,000
Total	770		



System Overview

The GUARD EN™ system has been shown to reduce the risk of injury to passengers of an errant vehicle and to the driver of the truck to which the system is attached when it is impacted within the applicable CEN/TS 16786:2018 criteria. The system attaches to the rear of a truck and may be used in stationary applications (e.g. as a truck blocking a work zone) and mobile operations (e.g. striping, sweeping, plowing, etc.).

Application Specifications

Definitions:

A **BARRIER VEHICLE** is a truck on which a GUARD EN™ TMA is attached while positioned upstream (towards the direction that traffic is approaching) of a work zone.

A **SHADOW VEHICLE** is a truck on which a GUARD EN™ TMA is attached and is following behind a moving operation such as striping, spraying, etc.

The use of a TMA on the back of a truck is intended to:

- Gradually decelerate the impacting vehicle, if such vehicle impacts within CEN/TS parameters.
- Protect the occupants of the impacting vehicle.
- Protect the barrier/shadow vehicle occupants.
- Reduce damage to the barrier/shadow vehicle.

Safety Instructions

For maximum safety, the operator should stand at the rear of the truck on the curb (Figure 2). When tilting the TMA, care should be taken to stay clear of all moving parts.

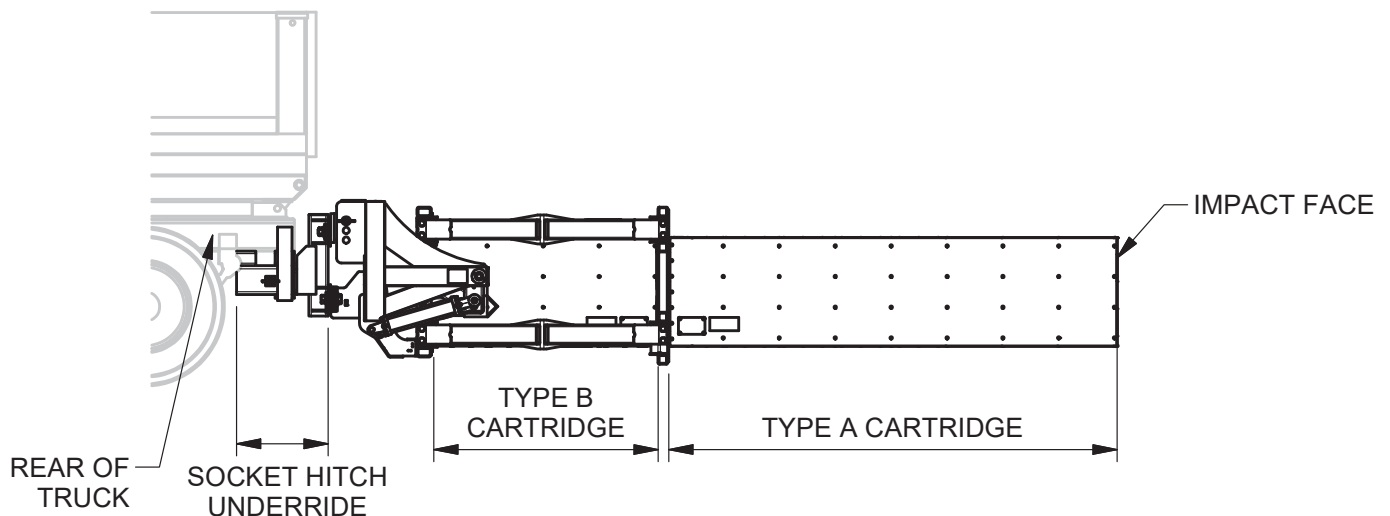


Figure 1

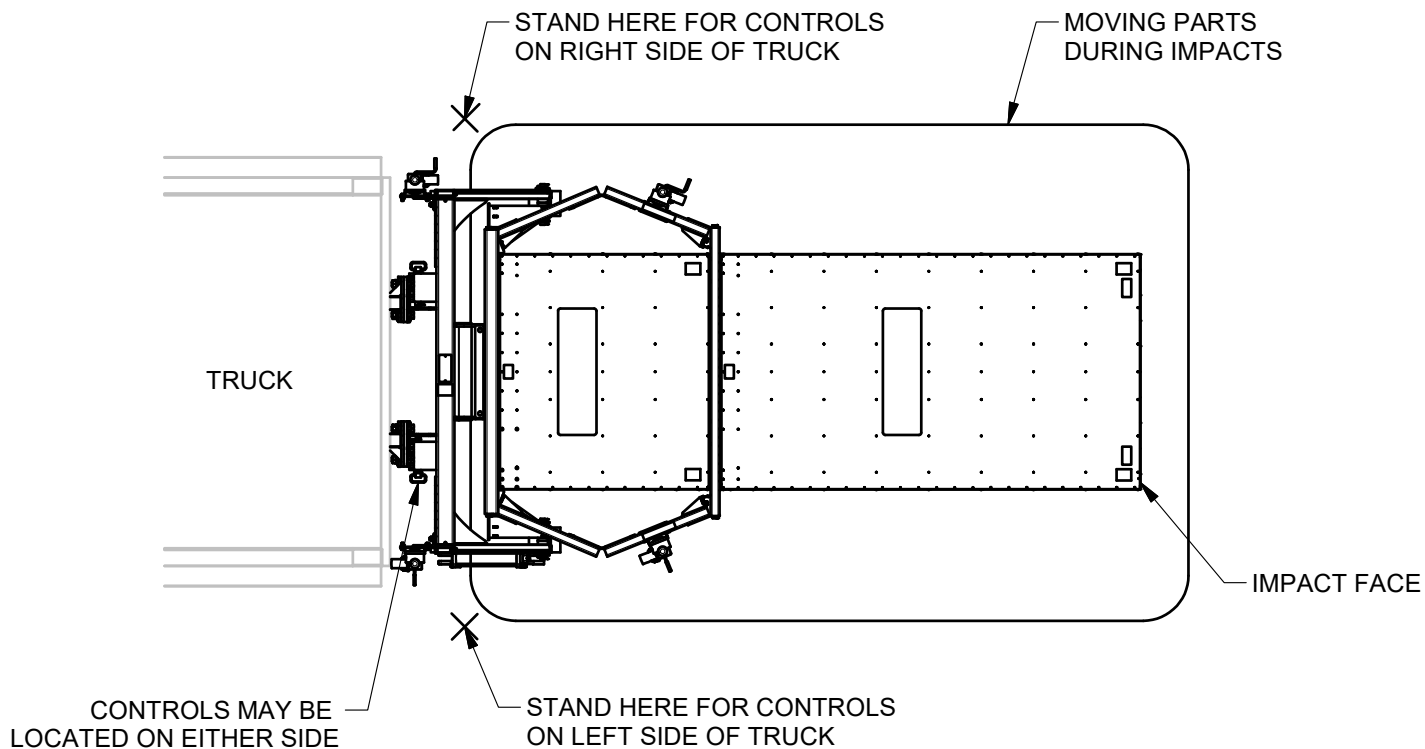


Figure 2

1. The TMA should be rigidly fastened to the truck. In the horizontal position, the rear bottom of the TMA should be $254 \text{ mm} \pm 25 \text{ mm}$ from the ground and level (Figure 3). The TMA must be left in the down position whenever possible. The TMA can only absorb the energy of an impacting vehicle within CEN/TS criteria in the down position.

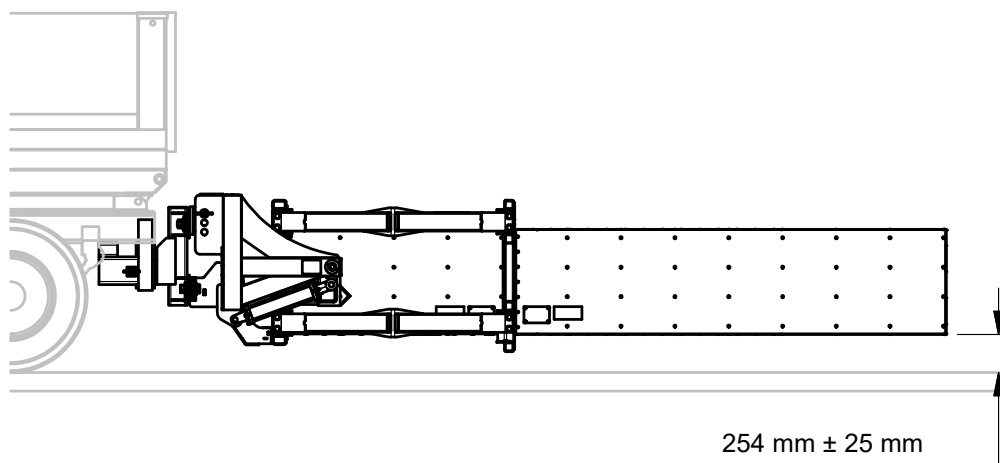


Figure 3

2. Optional Jacks may be used to support the TMA when it is not attached to the truck (Figure 4). The Jacks must be removed while the TMA is deployed (Figure 3).

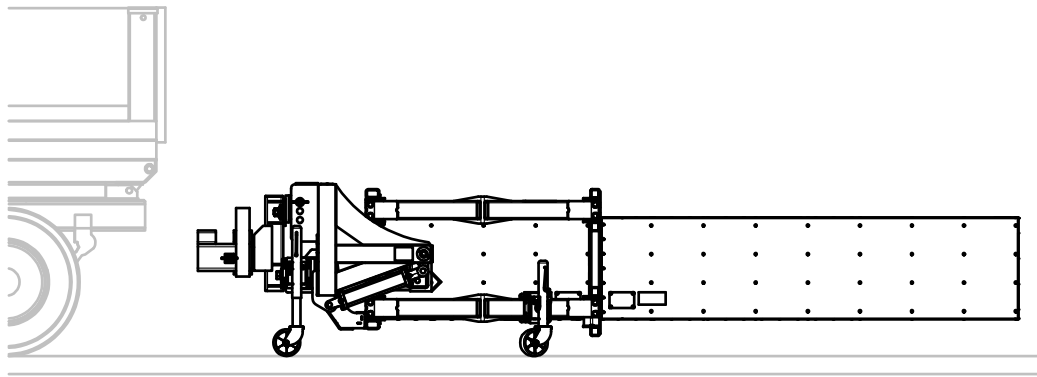


Figure 4

3. **Do not drag the TMA or place anything on its top: damage may result (Figure 5). Do not sit, stand, or lean on any part of the TMA.**

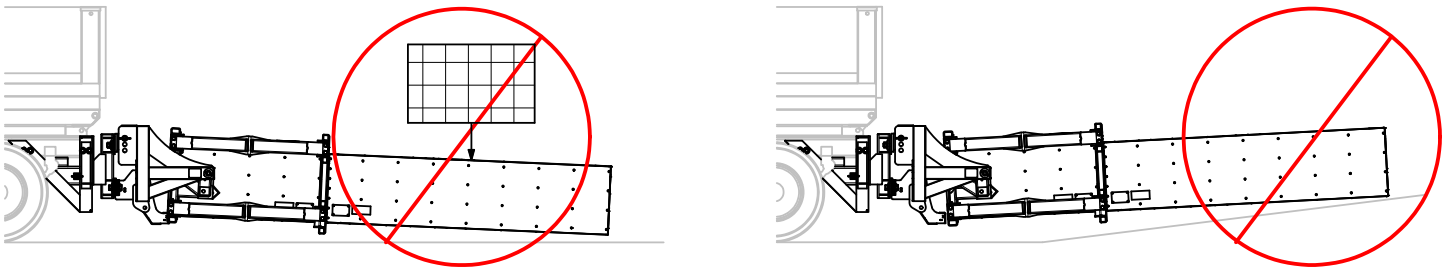


Figure 5

4. Before raising or lowering the TMA, the operator should be trained as to its proper operation. Refer to the Operation Instructions in this manual.

5. Be sure all persons are standing clear before raising or lowering the TMA. No one should be below the system when lowering it. Be sure the system is stopped and locked in full up position before allowing anyone directly behind the elevated system (Figure 6).

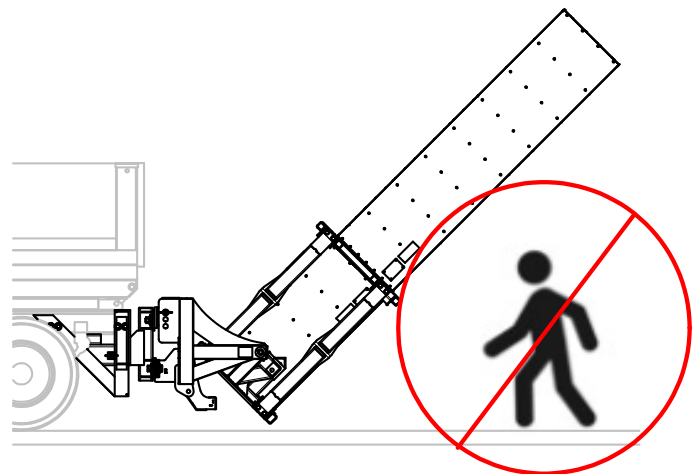


Figure 6



No one shall be allowed to stand behind or in the path of a moving or unlocked TMA. Failure to follow this warning could result in serious injury or death.

6. Ballast and other heavy objects **MUST BE ADEQUATELY ANCHORED** to the truck to prevent shifting during an impact as the force on the tie-down straps could be 20 times ballast weight.
7. The agency or authority responsible for the truck should inspect it for adequate operator safety equipment (e.g., seat belts, head rests, etc).
8. It is recommended that the GUARD EN™ TMA be mounted to trucks between 10,000 kg and 18,000 kg for as-tested impact performance.
9. Ensure that the performance and safety of the TMA is not impaired by damage or corrosion.



Failure to comply with these instructions can result in improper TMA performance and possible personal injury. This TMA is intended to be used as a crash attenuator on the rear of trucks which meet the design specifications for this system. The TMA should not be used for any other purpose.

10. Regular maintenance of the TMA is important for safe use. Refer to the Maintenance section of this manual for additional information.
 - Regular inspection of Frame members, Cartridges and pins is necessary to ensure proper system performance.
 - Regular maintenance of hoses is important. A broken or damaged hose may cause the system to lower at a faster and unsafe rate.
 - Keep electrical connections at the pump motor/solenoid clean to prevent arcing. Clean any hydraulic spills or leakage to prevent bodily injury, fire, etc.
11. The driver should be extra cautious while backing the truck with the TMA in the up or down position, so that injury and/or damage will not result.
12. The driver should be extra cautious while making turns with the TMA in the down position. The TMA extends beyond the end of the truck and will swing wide at corners.
13. The hydraulic assembly shall lift and lower the TMA system as described. Any other use may be hazardous to people or equipment.
 - Do not use the system to push a load.
 - Do not use the raised end of the system to support any load.
 - Do not use any part of the TMA for towing or hauling a load. This could cause the lift mechanism to malfunction and may affect impact performance.
 - Do not use the TMA as a ladder.

14. The system must be in the horizontal position to perform properly during an impact. Do not leave the system raised, even slightly, when on the job.
15. Ensure the truck is appropriate for attaching a TMA.

Controlling Skid Distance

The use of the GUARD EN™ system on the back of a truck will not:

- Affect the skid (roll ahead) distance of an impacted truck. KEEP WORK CREWS CLEAR!

Shadow or Barrier Vehicle Recommended Weight

Required shadow/barrier vehicle weight: 10,000 kg to 18,000 kg.

*Estimated Weight of Typical Vehicles

- Loaded 3/4-ton pickup truck - 6,000 lb [2,750 kg]
- Loaded 1-ton cargo truck - 10,000 lb [4,500 kg]
- Loaded 4-yard dump truck - 24,000 lb [11,000 kg]

Roll-Ahead Distance for Shadow Vehicles

Weight of Shadow Vehicle Moving	Prevailing Speed mph [km/h]	Weight of Impacting Vehicle to be Contained*			
		4,500 lb [2,040 kg]	10,000 lb [4,536 kg]	15,000 lb [6,804 kg]	24,000 lb [10,886 kg]
10,000 lb [4,536 kg]	60-65 [96-105]	100' [30 m]	175' [53 m]	225' [69 m]	275' [84 m]
	50-55 [80-88]	100' [30 m]	150' [46 m]	175' [53 m]	200' [60 m]
	45 [72]	75' [23 m]	100' [30 m]	125' [38 m]	150' [46 m]
15,000 lb [6,804 kg]	60-65 [96-105]	75' [23 m]	150' [46 m]	175' [53 m]	225' [69 m]
	50-55 [80-88]	75' [23 m]	125' [38 m]	150' [46 m]	175' [53 m]
	45 [72]	50' [15 m]	100' [30 m]	100' [30 m]	100' [30 m]
24,000 lb [10,886 kg]	60-65 [96-105]	75' [23 m]	100' [30 m]	150' [46 m]	175' [53 m]
	50-55 [80-88]	50' [15 m]	75' [23 m]	100' [30 m]	150' [46 m]
	45 [72]	50' [15 m]	75' [23 m]	75' [23 m]	100' [30 m]

*Note: Distances are appropriate for shadow vehicle speeds up to 15 mph [25 km/h].

Roll-Ahead Distance for Barrier Vehicles

Weight of Barrier Vehicle (Stationary)	Prevailing Speed mph [km/h]	Weight of Impacting Vehicle to be Contained*			
		4,500 lb [2,040 kg]	10,000 lb [4,536 kg]	15,000 lb [6,804 kg]	24,000 lb [10,886 kg]
10,000 lb [4,536 kg]	60-65 [96-105]	50' [15 m]	100' [30 m]	150' [46 m]	200' [60 m]
	50-55 [80-88]	25' [8 m]	75' [23 m]	100' [30 m]	150' [46 m]
	45 [72]	25' [8 m]	50' [15 m]	75' [23 m]	100' [30 m]
15,000 lb [6,804 kg]	60-65 [96-105]	25' [8 m]	75' [23 m]	100' [30 m]	150' [46 m]
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	50-55 [80-88]	25' [8 m]	25' [8 m]	50' [15 m]	75' [23 m]
	45 [72]	25' [8 m]	25' [8 m]	25' [8 m]	50' [15 m]

Source: "Use of Truck Mounted Attenuators in Work Zones" by Darcy Sullivan, P.E. and Jack B. Humphreys, P.E., University of Tennessee.

Truck Preparation

The truck must be equipped with a rigid underride or socket hitches attached to the rear of the chassis.

The truck support vehicle mass:

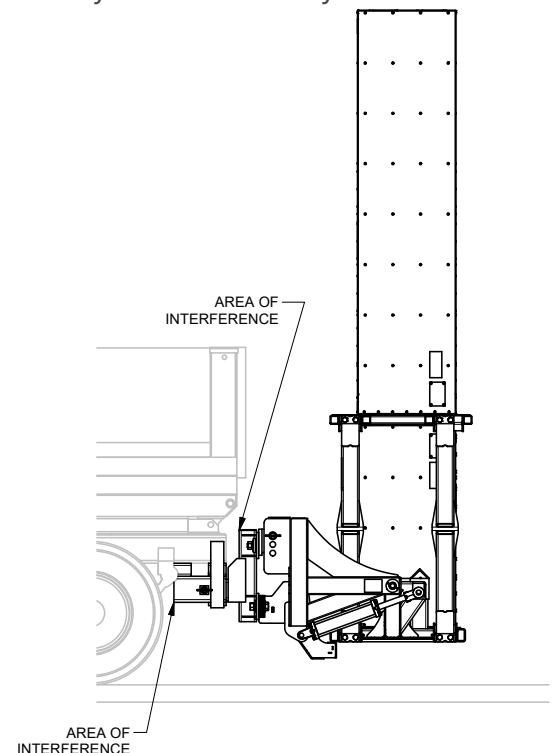
- Minimum mass: 10,000 kg
- Maximum mass: 18,000 kg

Valtir offers kits for both socket hitches and rigid underrides, or mounts may be fabricated by the customer. Mounts vary depending on truck frame height. Contact Valtir Customer Service for assistance.

1. Check for Interference

Before attempting to attach the socket receivers, check for interference problems.

Temporarily position underride socket receivers under truck frame as shown and check for interference problems. Interference problems with tail lights, springs, dump bodies (in up position), etc, need to be corrected before proceeding.



2. Mount Installation

Park truck on a level surface. The truck should be as close to the final driving weight as possible. If ballast must be added to achieve the 10,000 kg minimum weight, add it at this time. The ballast must be properly anchored to the truck to keep it in place during an impact. Ideally an adequately sized truck that requires no ballast should be used. Follow the instructions included in the kit.

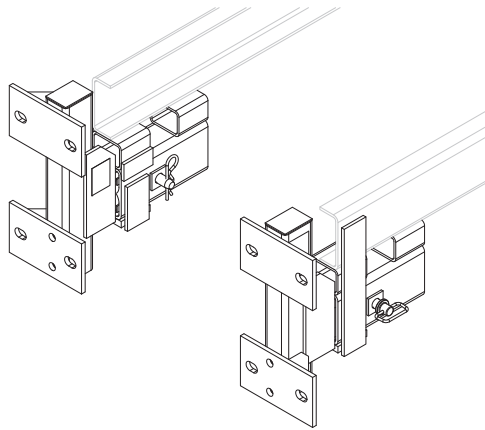


The truck frame is high carbon steel. To avoid cracking, do not weld or apply excessive heat to the bottom flange or weld forward of the rearmost leaf spring hangers.

Underride Selection:

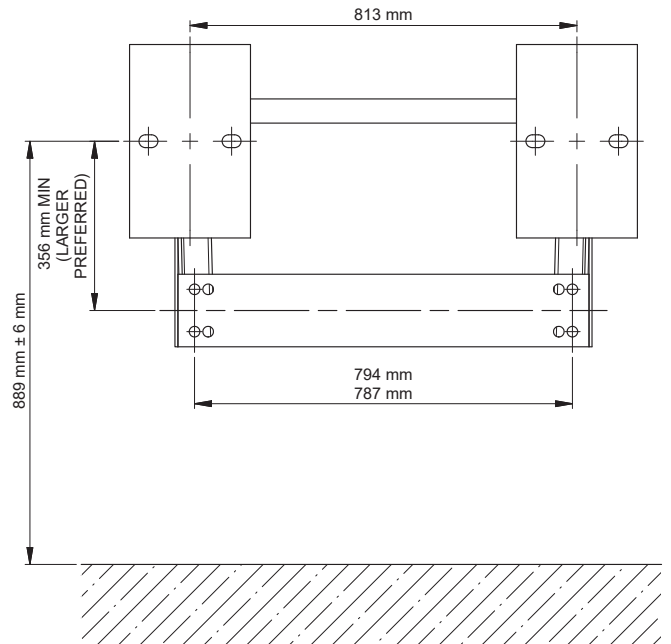
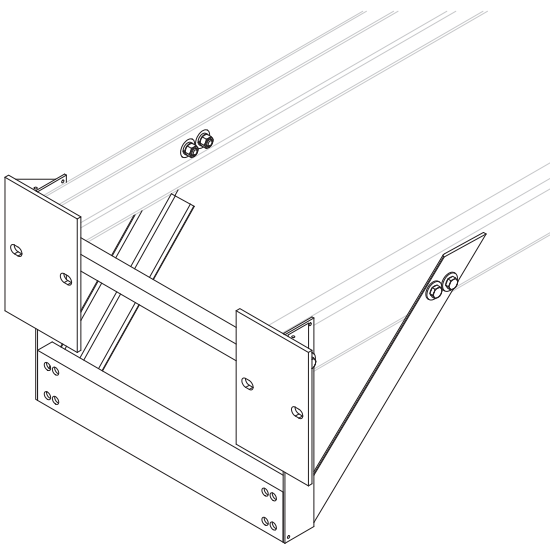
Socket Hitch

An underride allows easy and quick attachment and removal of the TMA. Only the sockets remain on the truck.



Rigid Underride

A rigid underride is a semi-permanent method of attachment. The TMA may still be attached and removed using pins but the entire mount remains on the truck.



3. Underride Assembly

With the truck at its actual driving weight and parked on a level surface, measure the distance from the ground to the bottom of the truck frame. A distance of 711 mm \pm 25 mm is required. Spacer Tubes may be added to the bottom of the frame to achieve this height.



The truck's springs may settle with the weight of the TMA, sometimes as much as 50 mm. Adjust the height to compensate for anticipated settling.

Measure distance from the back end of the frame forward to the rear-most leaf spring hanger. Look for any obstruction on the bottom of the frame that may interfere with the Socket Receiver. A minimum of 305 mm is required.

Position the Socket Receiver at the rear end of the frame so that the 3" x 15 1/4" [76 x 387 mm] flat bar is along the outside of the frame member and the Socket Receiver Assembly is flush with the end of the frame. If spacers are required, weld them to the Socket Receiver and lap the Spacer Splices (pieces of 3/8" x 2" x 4" [10 x 51 x 103 mm] flat bar) across the Socket Receiver and Spacer at the rear-most location. The top of the Socket Receiver shall be 711 mm \pm 25 mm from the level ground for proper system height.

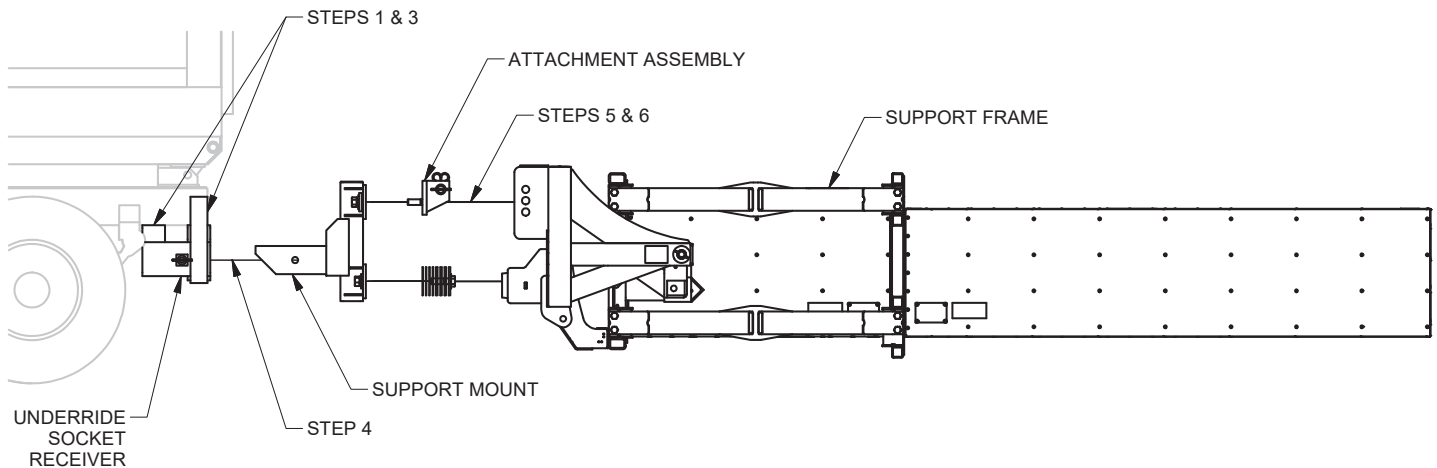
Weld the Socket Receiver to the bottom of the truck frame with the 3" x 15 1/4" [76 mm x 387 mm] flat bar on the outer side of the frame.

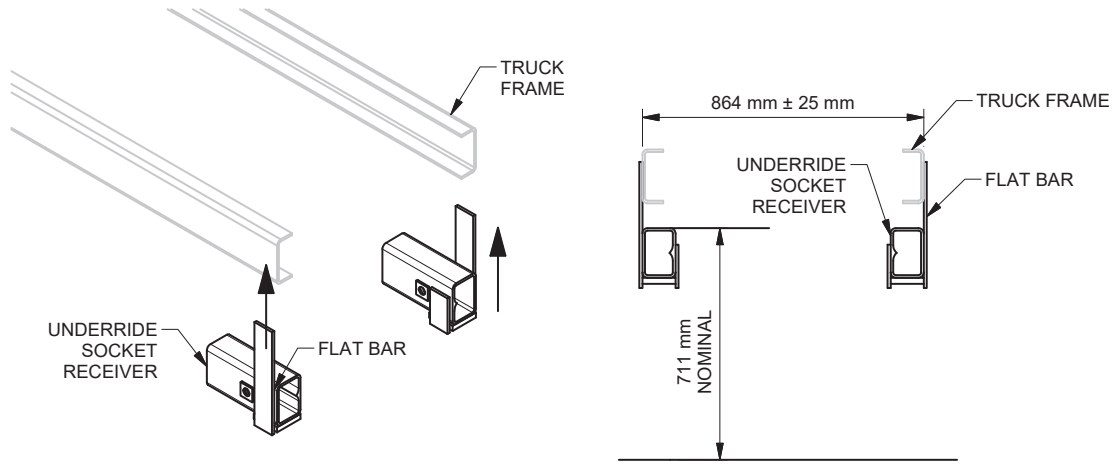


Welding must be performed by professional or certified welder.

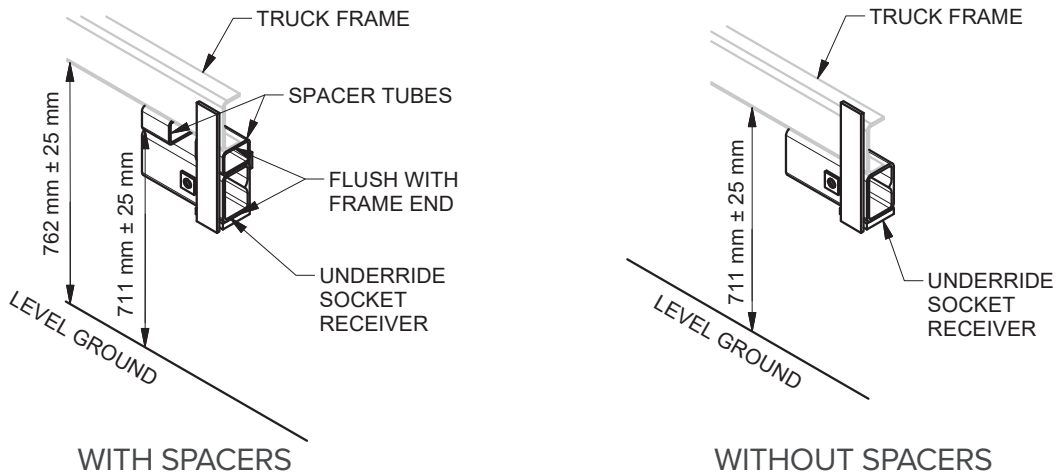


The truck frame is high carbon steel. To avoid cracking, do not weld or apply excessive heat to the bottom flange forward of the rear-most leaf spring hangers.



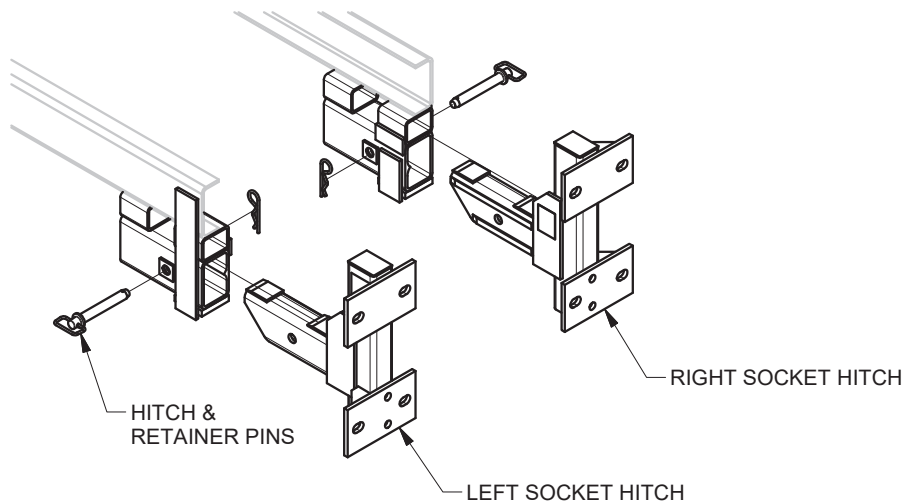


Left and right Underride Socket Receivers must be parallel and level with each other.



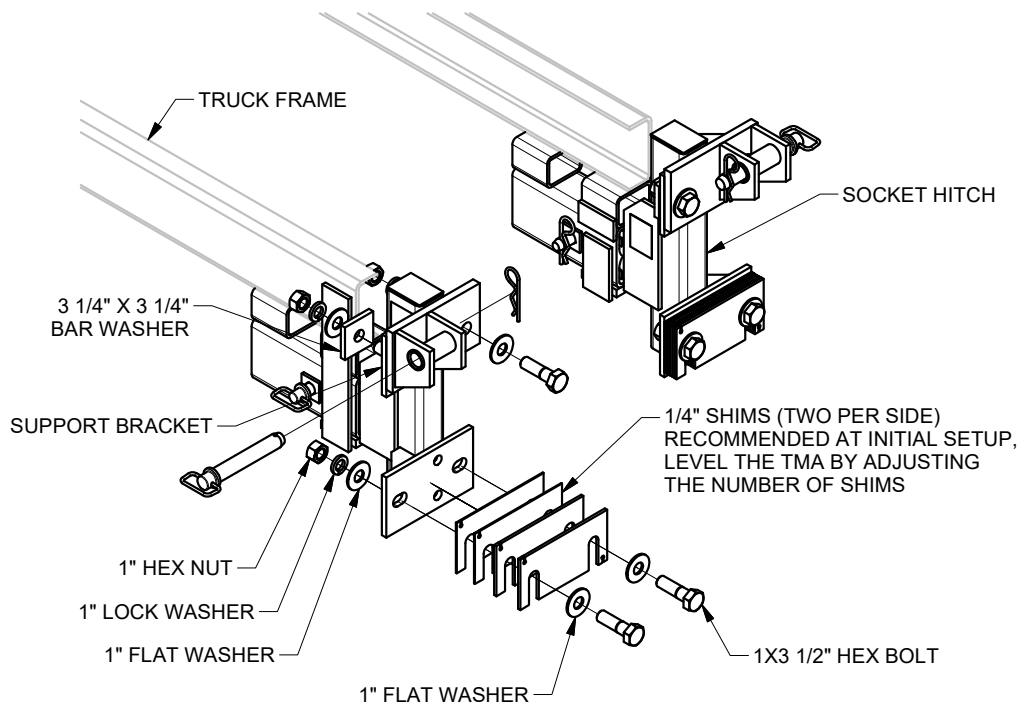
4. Socket Hitch Assembly

Insert the Socket Hitches and pin them into place using the 1" x 6 3/4" Hitch Pins and Retainer Pins shipped with the system.



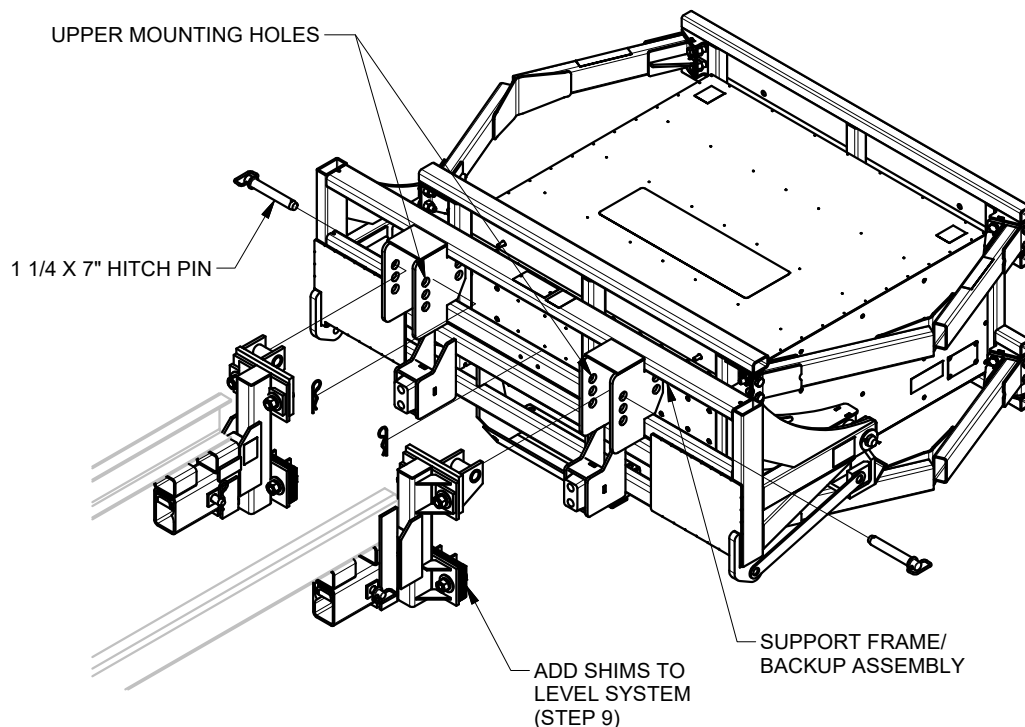
5. Mount the Support Brackets to Socket Receivers

Mount the Support Brackets to the Socket Hitches as shown below. Shims are used to level the system. It is recommended that two (2) 1/4" shims per side be used initially. This may be adjusted once the system is assembled.



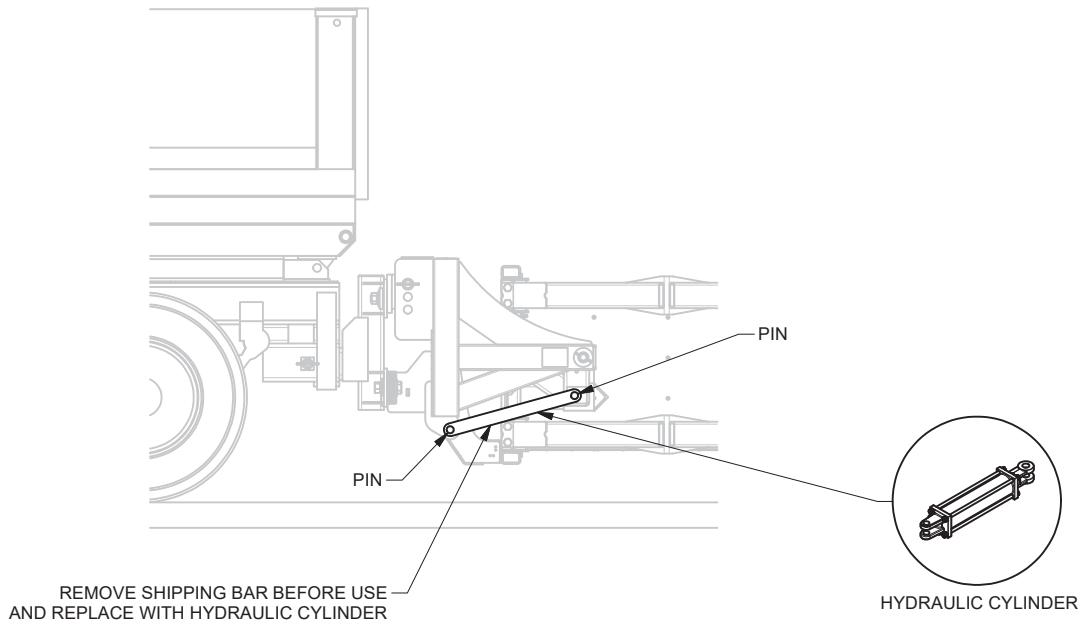
6. Attach the Support Frame / Backup to the Attachment Assembly

Move the system to the truck and pin the Support Frame/Backup Assembly to the Support Brackets (see below). The system is to be assembled as a whole unit. Use forklift slings to support the system. Use the upper set of mounting holes for the attachment.



7. Remove Shipping Bars (Hydraulic System Sold Separately)

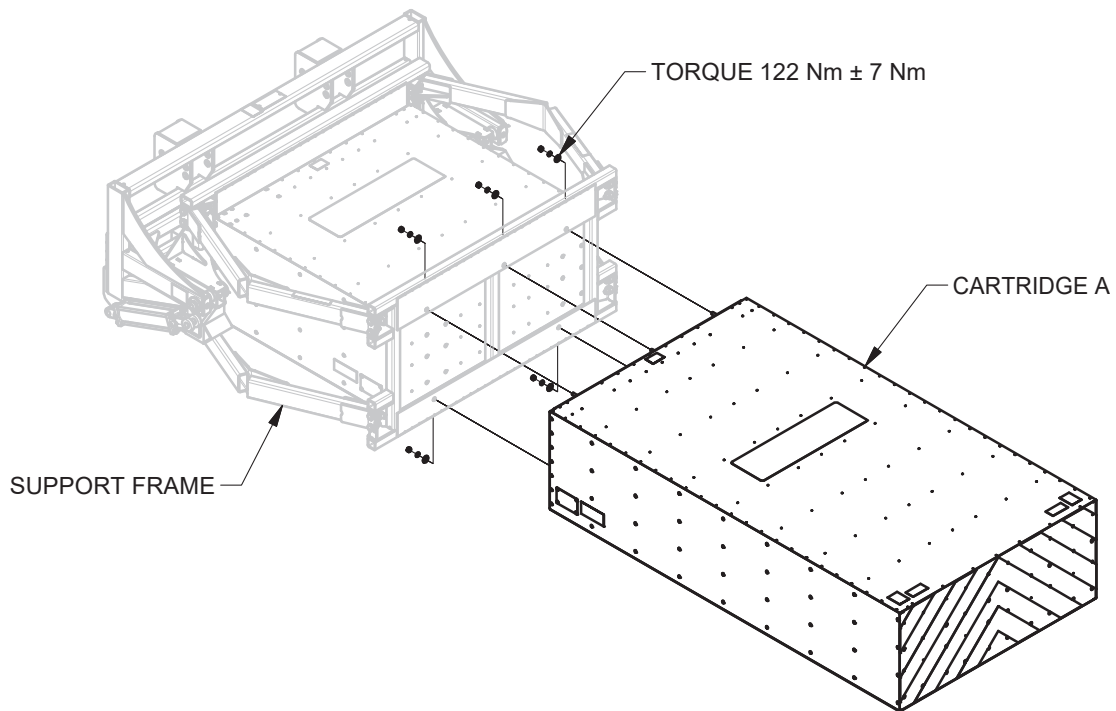
Install Hydraulic Cylinders while removing shipping bars. Remove the pins holding the shipping bar and replace with desired Hydraulic Cylinder. Repeat on opposite side.



Remove pins, remove shipping bar, and replace with hydraulic cylinder on both sides..

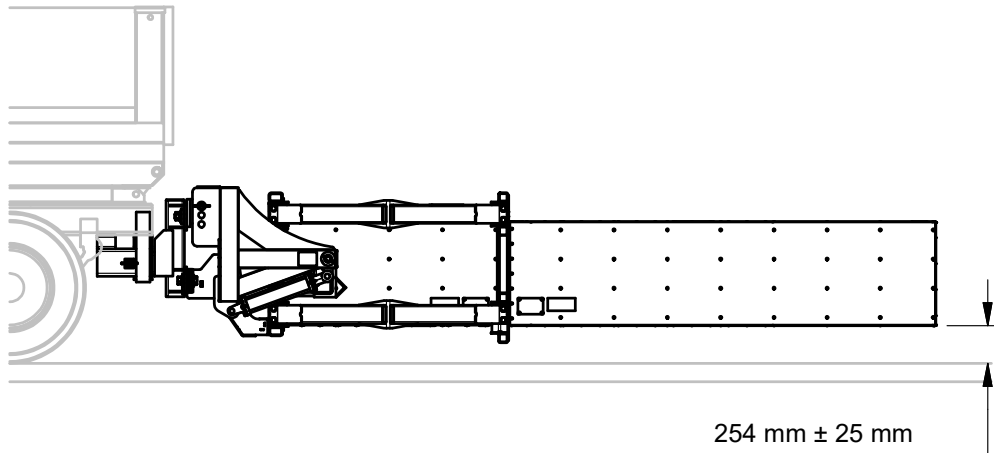
8. Bolt Cartridge A to Support Frame

Bolt Cartridge A to Support Frame using supplied hardware and torque to $122 \text{ Nm} \pm 7 \text{ Nm}$.



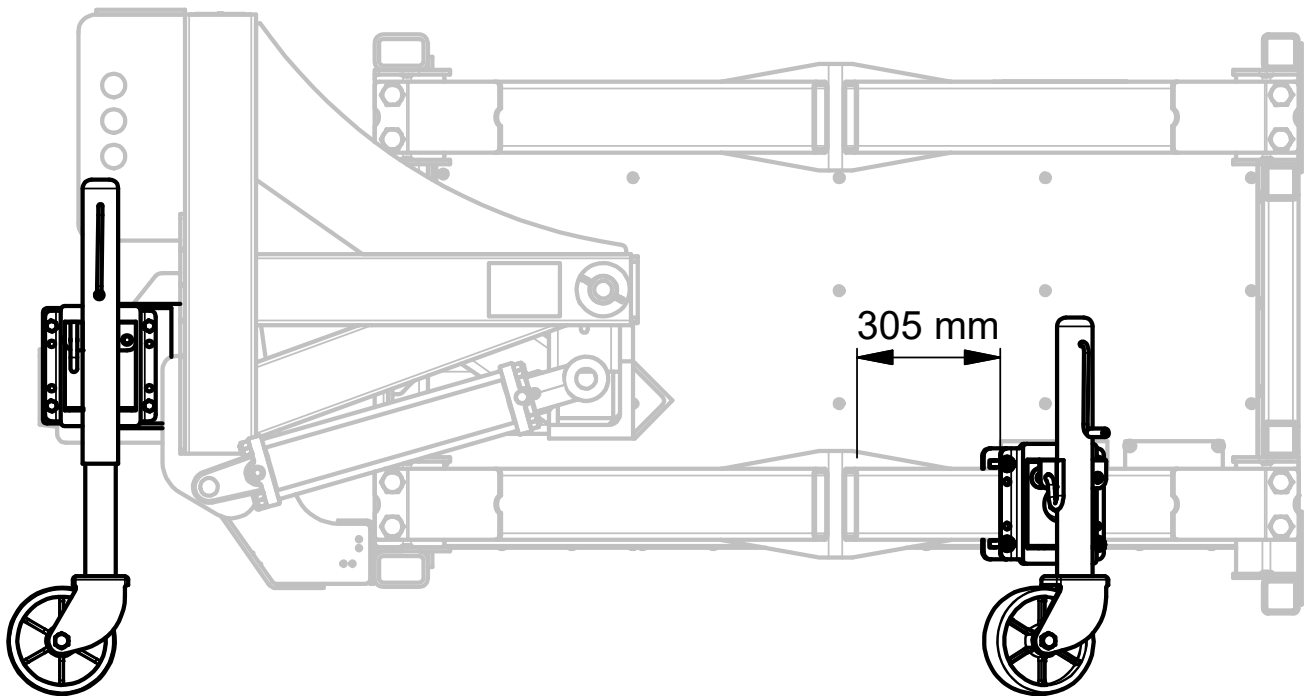
9. Adjust the height of the System Frame.

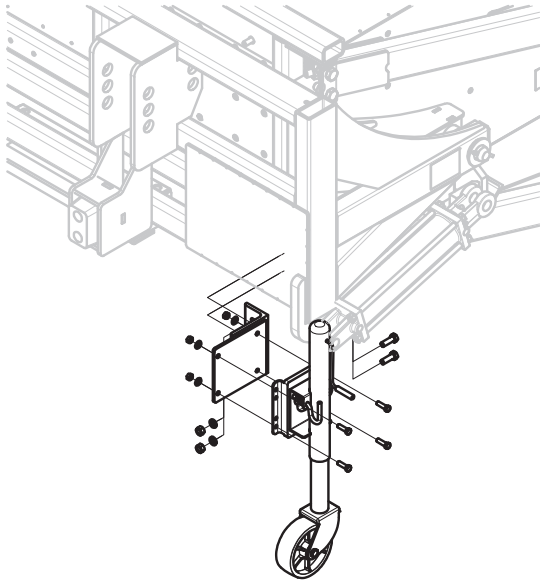
Verify that the system frame is $254 \text{ mm} \pm 25 \text{ mm}$ from the ground at the rear of the system. It may be necessary to add shims to the Socket Hitch in order to achieve $254 \text{ mm} \pm 25 \text{ mm}$ at the rear of the system.



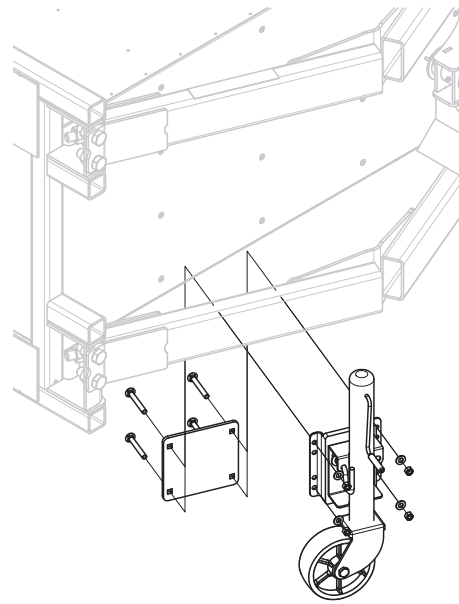
10. Install and Store the Jacks (Optional)

The Jacks are optional to facilitate the attachment and removal of the GUARD EN™ from the truck. Jacks must be removed when system is deployed.





Front Jack
Attachment



Rear Jack
Attachment



Unbolt, remove, and store Jacks when the TMA is in service.

11. Final Check of the System

Double check the height of the system.

Check hydraulics and check for any interference when raising and lowering the system.

Check lights.

Operation Instructions (Hydraulic System Sold Separately)

The GUARD EN™ TMA must be equipped with a Hydraulic System (Valtir Hydraulic System sold separately) that can be used to tilt the TMA up from its horizontal position. The “tilting” feature may be used to prevent possible scraping of the rear end of the system as the truck travels in and out of the sloped driveways. The operator simply activates the “up” button to tilt the TMA up. When he removes his finger from the button, the TMA will hydraulically lock. To lower the TMA, the operator simply activates the “Down” button. The Buzzer will continue to buzz until the TMA is either all the way up or down.

The complete vertical “up” position allows the TMA equipped truck to be more easily driven and parked in congested areas. The driver must verify clearance before lowering the TMA from the vertical (up) position.

The system can only perform as an attenuator when the system is in the down position.

When raising or lowering the TMA from outside the cab, the operator is to stand on the non-traffic side of the truck. Always stay clear of moving parts. Never stand behind or below a lowering TMA, or allow others to be positioned there.

Raise and Lower the System



Make sure the top of the system is clear of all objects before proceeding. Under no circumstances should anyone be allowed behind or in the path of the system when it is being raised or lowered.

When operating from the cab, always be aware of objects behind or below the TMA.

Raising the System

To tilt the system up: Press and hold the “Raise” side of the Switch until the system reaches the 90-degree position. The hydraulics automatically lock the system when the Switch is released.

Lowering the System

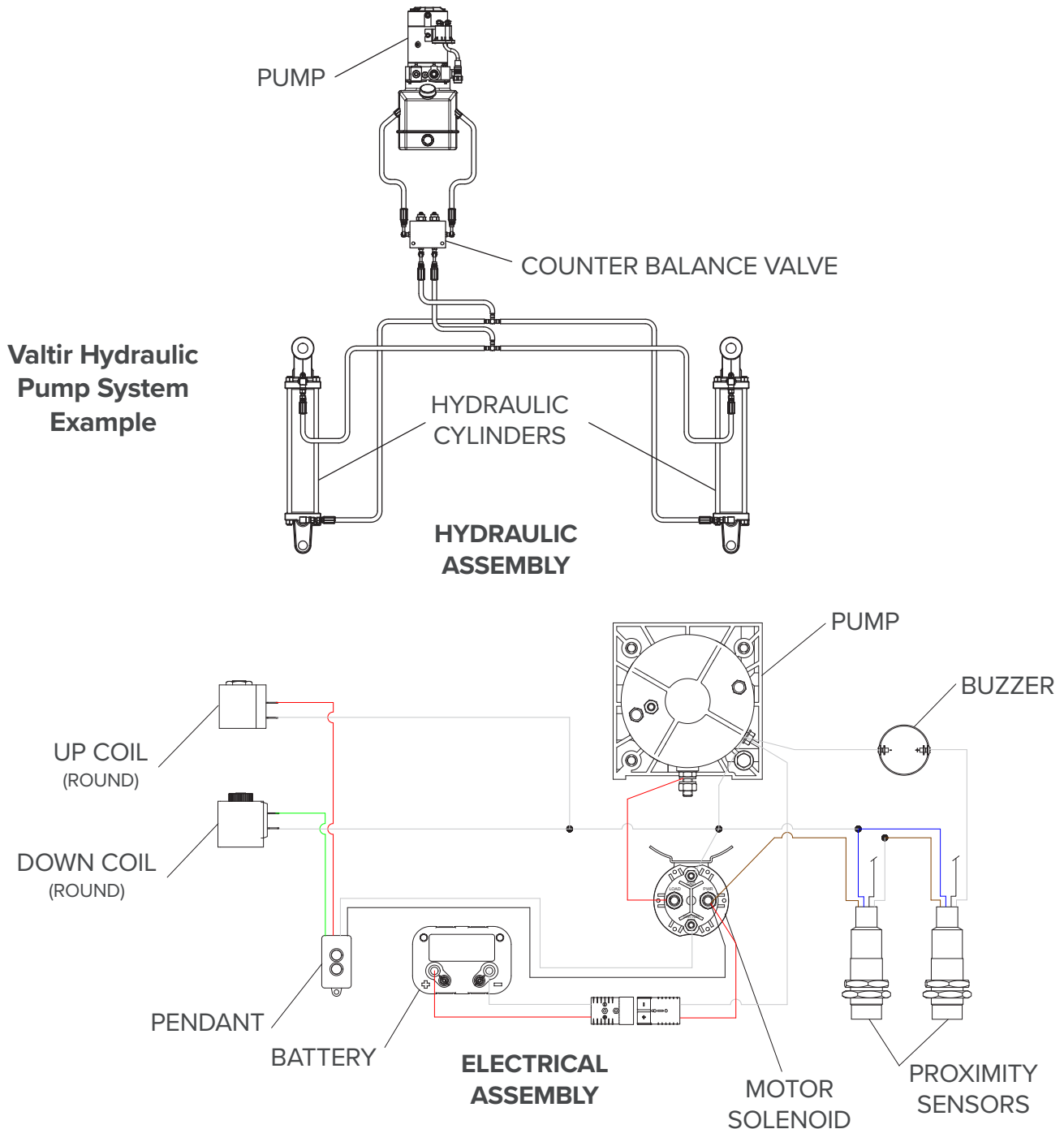
When lowering the system, press and hold the “Lower” side of the Switch.

Optional Valtir Hydraulic System Operation

The optional Valtir Hydraulic System is a Hydraulic Locking system to allow the TMA to be locked in any position. The system works via Counter Balance Valves. These Valves are mechanically operated. When the TMA system is raised or lowered, these Valves are opened from pump pressure, allowing the hydraulic fluid to flow. At all other times, these Valves are closed, locking the TMA in place.

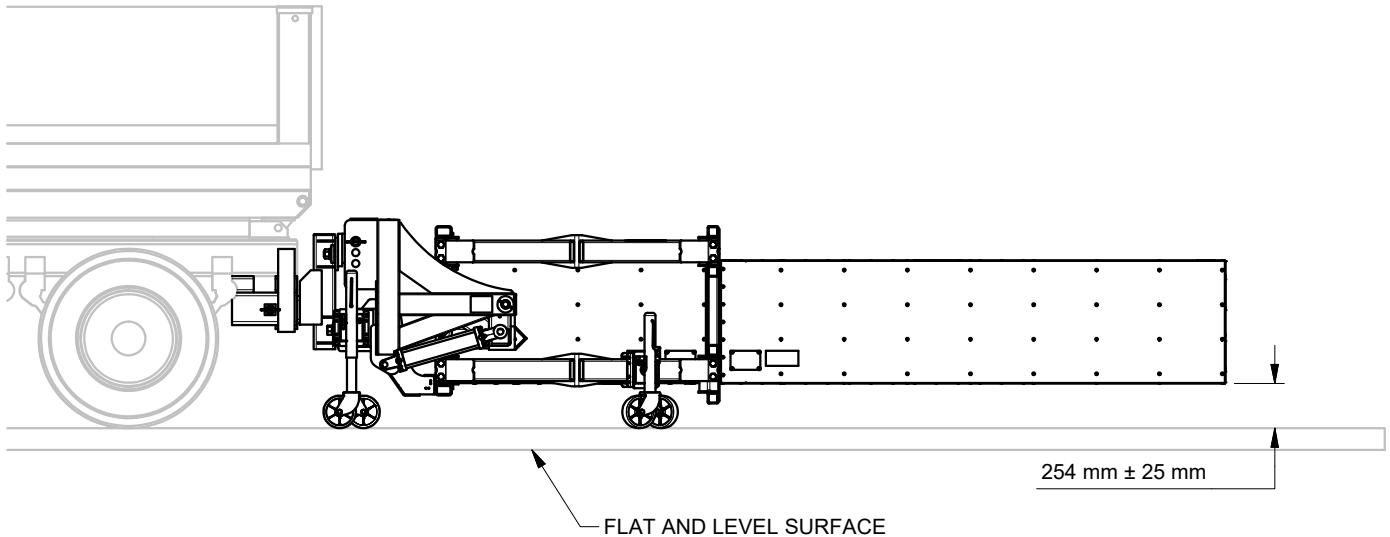


Never use the TMA as an attenuator in any orientation that is not fully down. This can be dangerous because an errant vehicle may not properly engage the TMA. The system can only perform as an attenuator when the system is in the fully lowered position. The TMA has a buzzer which sounds when the TMA is not fully raised or lowered. Failure to follow this warning may result in damage, injury, or death.



Maintenance

Before performing any maintenance on the Guard EN™, thoroughly read and understand the Maintenance Section and the Safety Section of this manual.



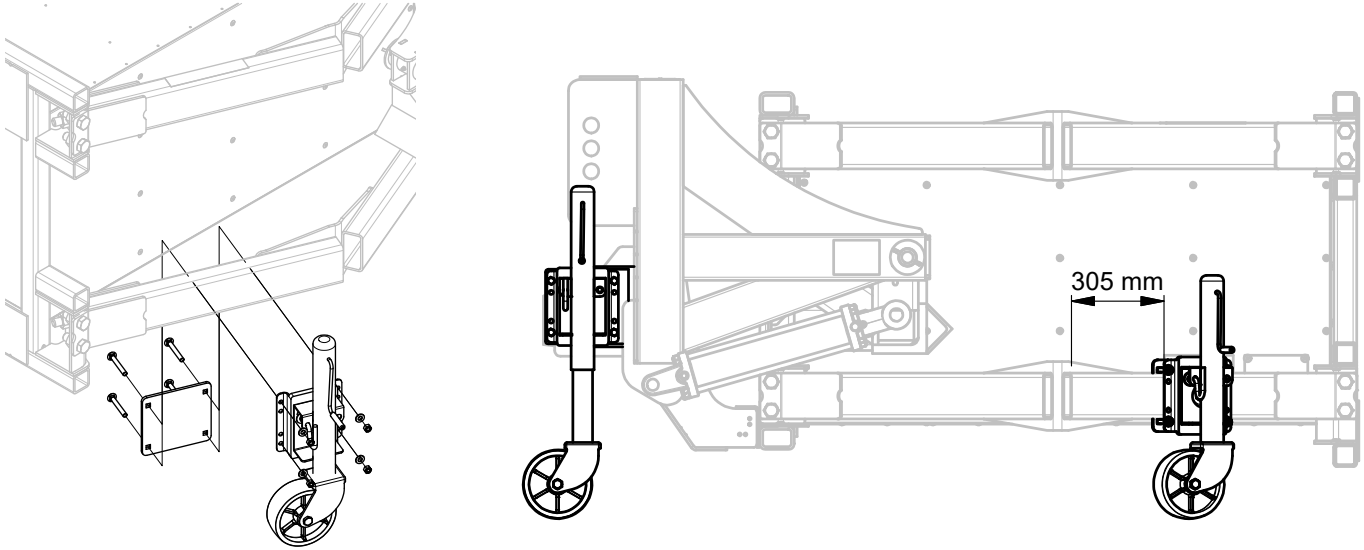
Routine Maintenance

- | | |
|--|---|
| 1. Height - The height of the system is important to its impact performance. Check regularly and adjust as necessary (see above). | As Required |
| 2. Fasteners - Check the tightness of the fasteners. Refer to the Drawing Package for all fastener locations. Check all bolts attaching the Cartridges to the support structure. | Monthly |
| 3. Clean System - Clean the system frame, Cartridges, and Impact Face from dirt and salt. Always check lubrication after cleaning. | Monthly & each use when salt and/or snow are present |
| 4. Pivot Pins - Prior to each use, ensure all Pins are held in position with a Retaining Pin as required. | Monthly |
| 5. Hydraulic Cylinders, Hoses and Fittings (optional) - Inspect all Hydraulic Pins and connections for leaks. | Monthly |
| 6. Jacks (optional) - Inspect Jack wheel condition. | Monthly |
| 7. Light Bulbs - Replace the light bulbs as required. | As Required |
| 8. Hydraulic Pump - Clean the Hydraulic Pump. | Monthly |
| 9. Hydraulic Cylinders - Clean as required. | Monthly |
| 10. Lubrications - Lubricate optional Jacks and Hydraulic Cylinders connection pins. | Monthly |
| 11. Grease Pins - Grease Pivot Pins. | 6 Months |

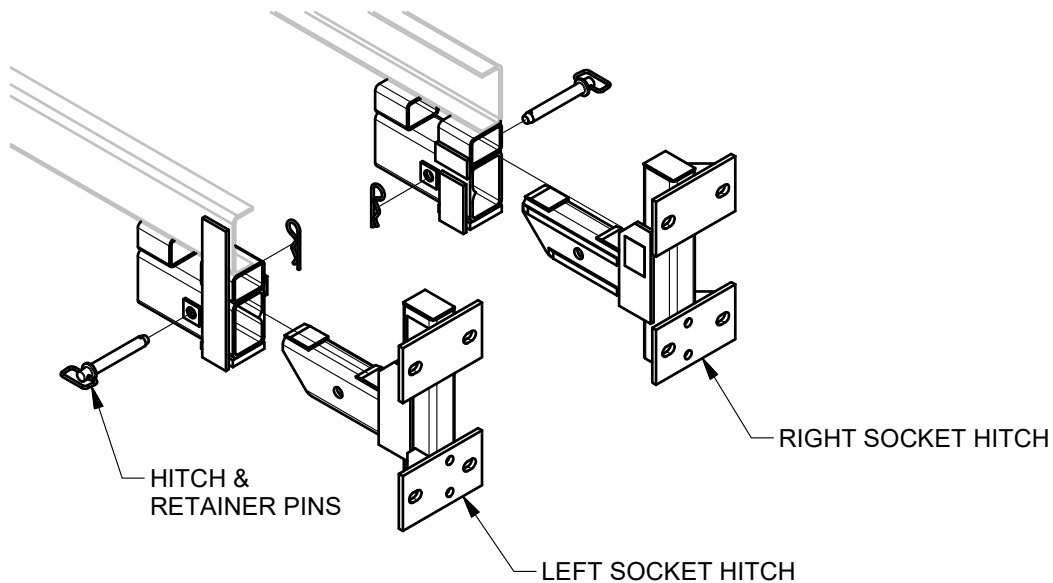
Detaching and Attaching the System

Detaching the System from the Truck

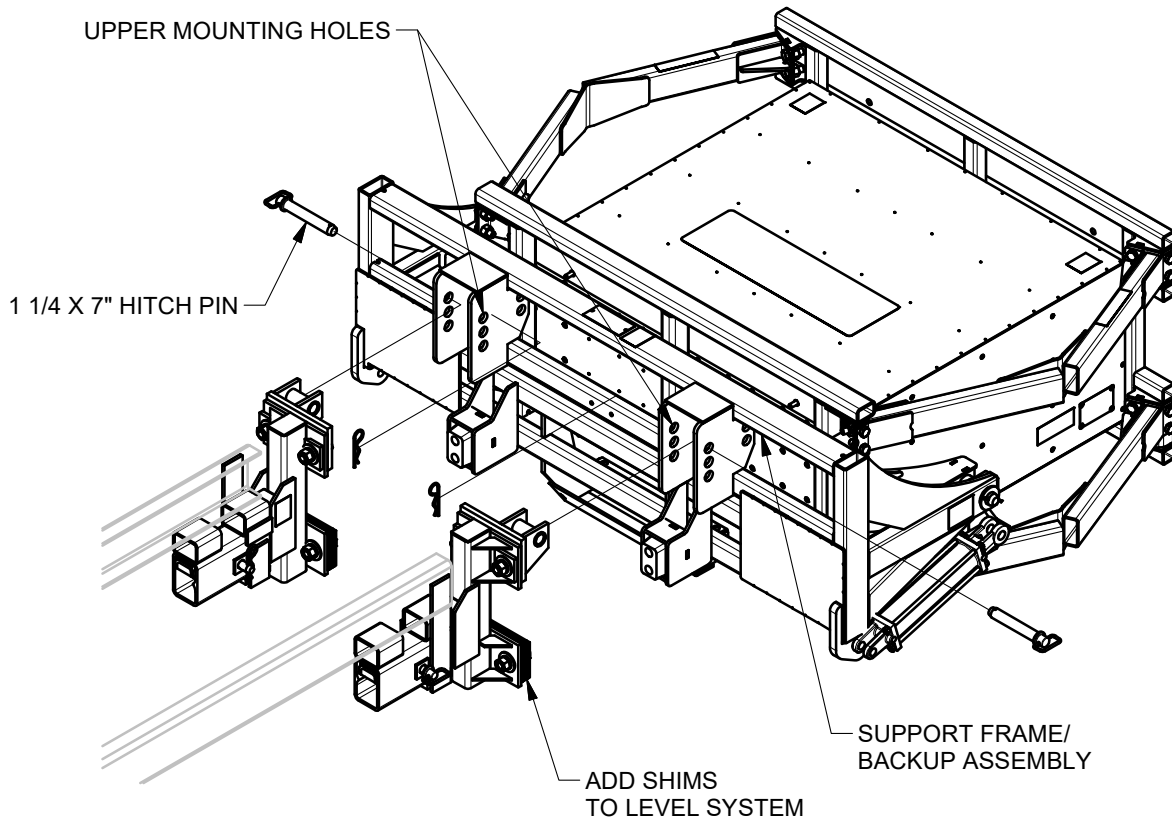
1. Ensure the GUARD EN™ and the truck are on level ground.
2. Attach Jacks as shown below using the provided fasteners.



3. Extend the Jacks until the weight of the system is supported.
4. Remove the Socket Hitches from the Underride Socket Receivers by removing both 1 x 6 3/4" hitch pins (see below).



If the alignment is off, making removal difficult, it may be necessary to adjust the Jacks or temporarily disengage the GUARD EN™ from the Socket Hitches. This can be done by removing the two (2) 1 1/4 x 7" Hitch Pins and Retainer Pins (see below). Loosen the hardware to ease interference and then re-tighten.



5. Roll the GUARD EN™ away from the truck.

Attaching the GUARD EN™ to the TRUCK

1. Roll the GUARD EN™ to the truck.
2. Insert the Socket Hitches into the Underride Socket Receivers and pin them into place using 1 x 6 3/4" pin and retainer pin. If alignment is off, making the assembly difficult, it may be necessary to adjust Jacks or temporarily uncouple the Socket Hitches from the GUARD EN™. Ensure the retainer pins are inserted correctly and cannot fall out.
3. Retract the Jacks completely and remove them from the GUARD EN™.
4. Store Jacks for future maintenance or repair.
5. Verify rear system is 254 mm ± 25 mm above ground level.

Repair Instructions

Minor Damage (Skin Damage Only) Work should be done by service professional.

- Damage to the rear-most 2.13 m of the cartridge top and bottom skins or to the rear-most 3' [914 mm] of the side covers.
- An affected area smaller than 610 mm wide by 571 mm long by 152 mm deep may be repaired by applying aluminum reinforcement to cover the damaged area.
- Use 0.8 mm thick aluminum on top and bottom skins and 1.6 mm thick aluminum on side covers. Riveting is the recommended fastening method for attaching reinforcements.
- Damage to the front of the cartridge, because this is the area that supports the cantilevered weight of the system, cannot be repaired. If this area of the cartridge has not been crushed, extra rivets may be added as needed.

Major Damage (Internal / Frame Damage)

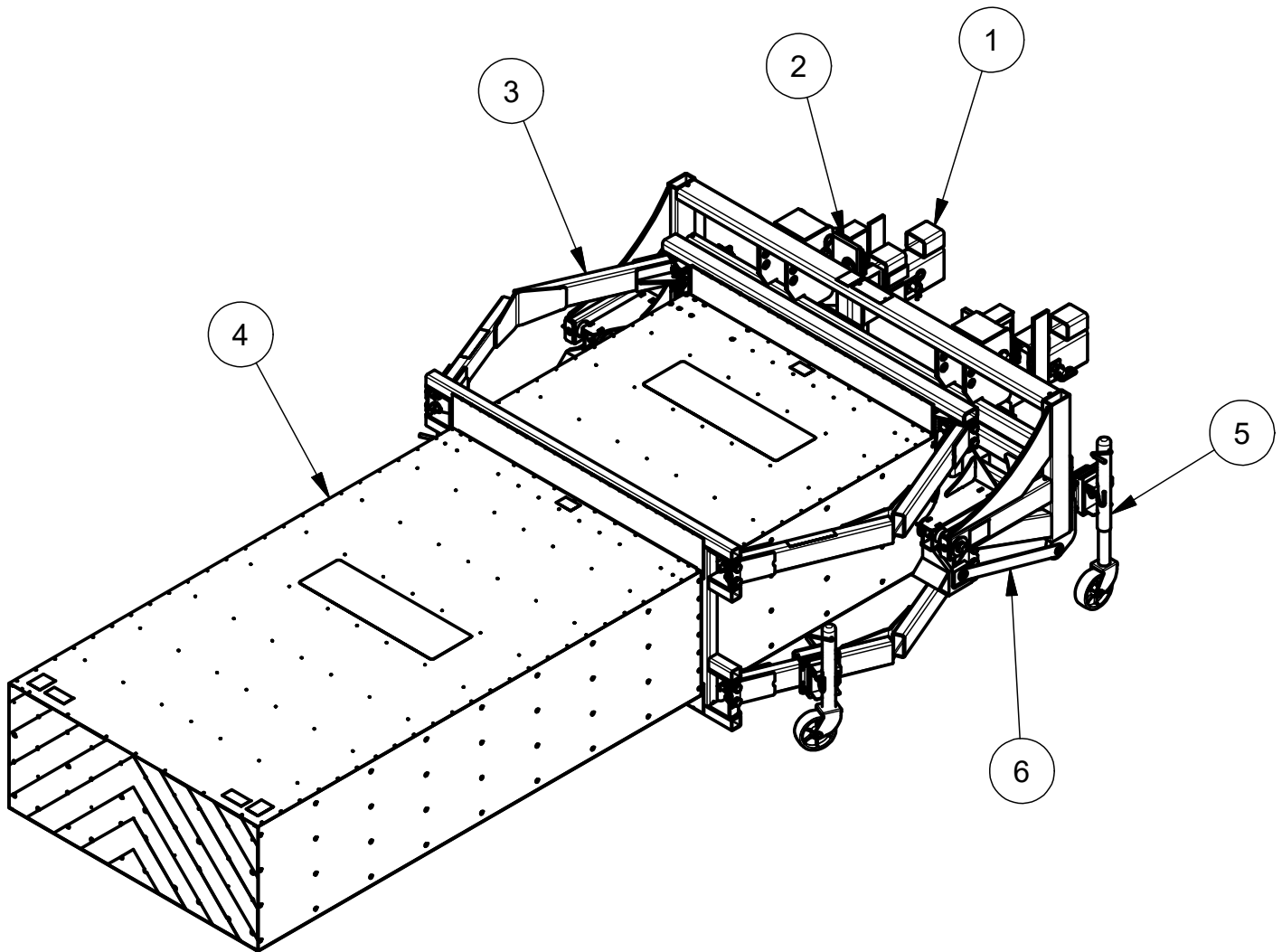
- Damage to larger areas, or any crushed area in the front 305 mm of the cartridge is considered major. Damage to the front 1.22 m of the side covers or ripples along the length of any covers is also considered major. Such damage could significantly affect the total energy absorbing ability of the cartridge. Cartridge replacement is required as repairs for major damage are not recommended.



Customer Service personnel are available to assist in evaluating damaged TMA cartridges. Photos of the damaged area taken at different angles with measurements should be submitted for evaluation.

Parts List

System Assembly

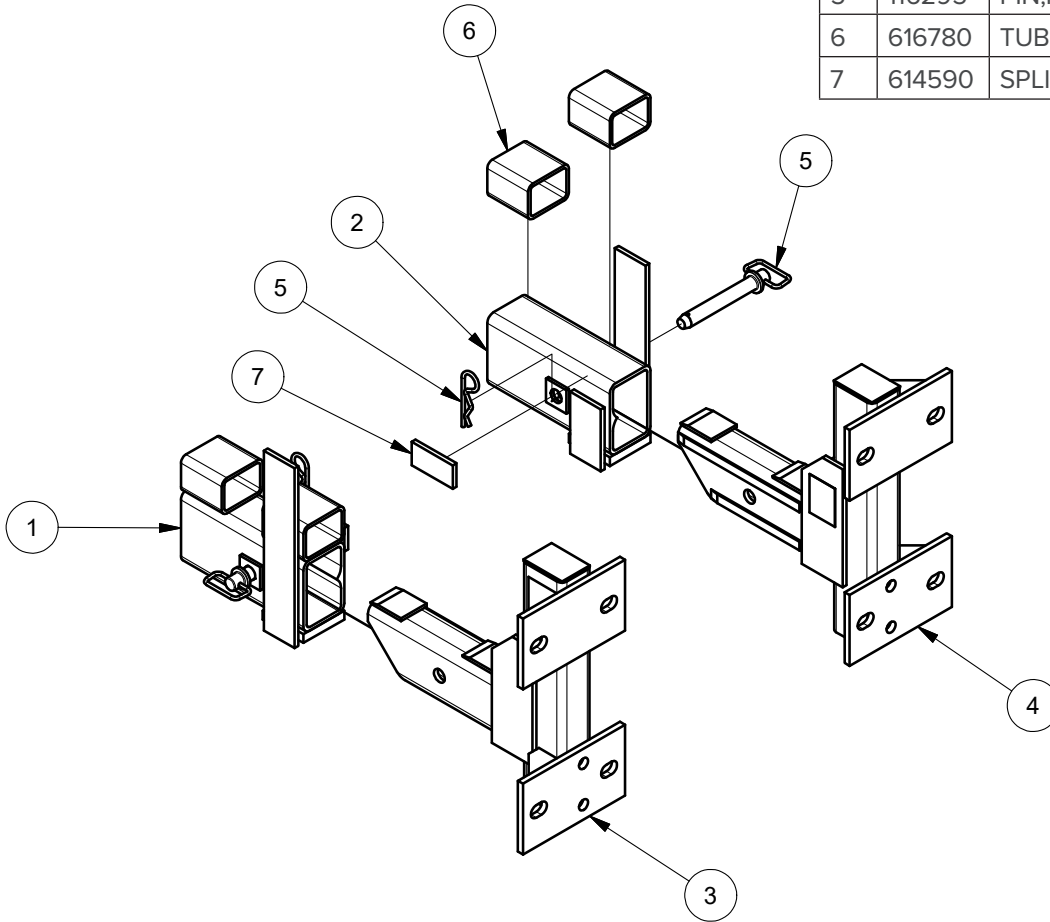


1	SEE OPTIONS	UNDERRIDE ASSY,RECEIVER,TMA
2	604382	ATTACHMENT ASSY,TMA
3	628689	FRAME ASSY,GUARD EN,W/DECALS
4	628698	CARTRIDGE A,GUARD EN,YLW/BLK,W/DECALS
5	628860	JACKS ASSY
6	628870	HYDRAULIC SHIPPING BAR ASSY

1. Socket Hitch (See Options)

Standard Underride Assy: 616797

1	614467	SOCKET RECEIVER,UNDERRIDE,L
2	614472	SOCKET RECEIVER,UNDERRIDE,R
3	611413	MOUNT,SUPPORT,L,W/DECAL
4	611415	MOUNT,SUPPORT,R,W/DECAL
5	116295	PIN,HITCH,1X6 3/4 W/SNAP
6	616780	TUBE,SPACER,PT
7	614590	SPLICE,SPACER

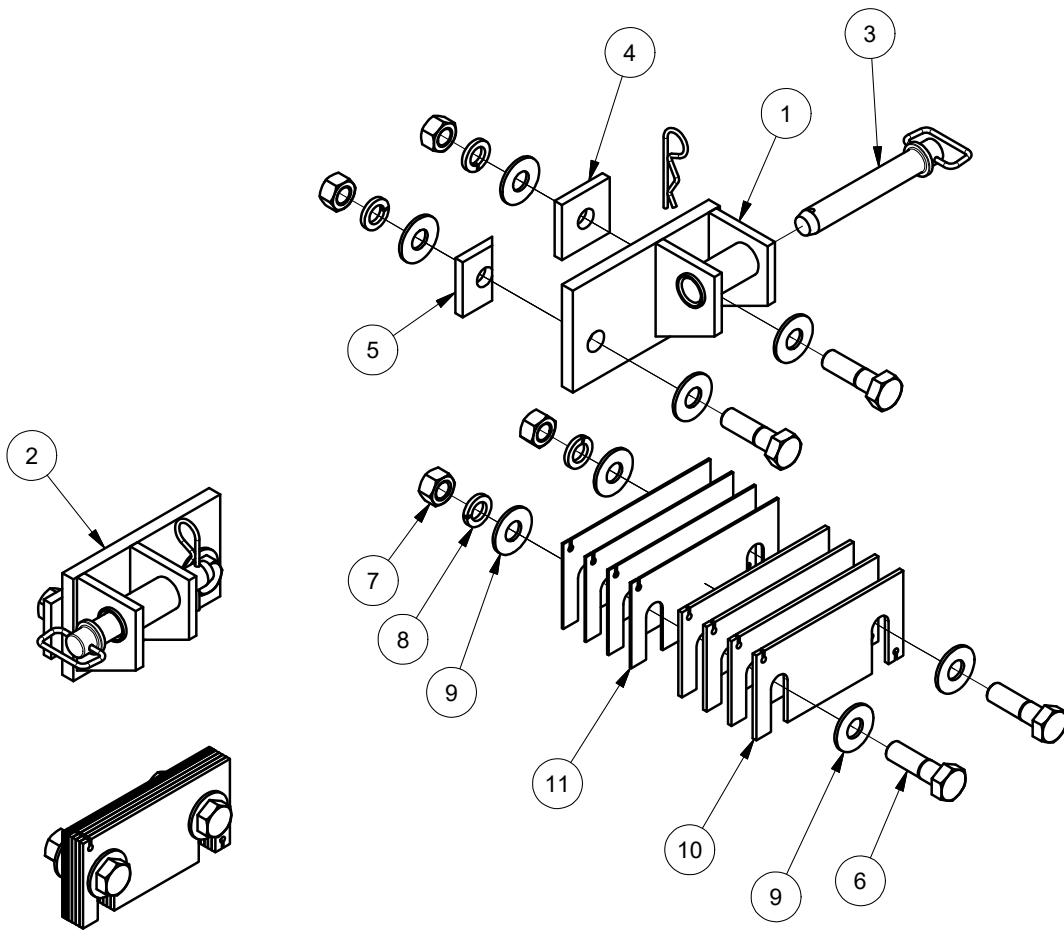


Optional Extensions/Finishes

616797	SOCKET HITCH RECEIVER
627813	LESS PAINT/PRIMER
616792	4" MOUNTS
616793	7" MOUNTS
616794	9" MOUNTS
616796	QUICK MOUNT
616798	GALVANIZED
619069	GALVANIZED, 4" MOUNTS
619070	GALVANIZED, 7" MOUNTS
619071	GALVANIZED, 9" MOUNTS
616800	LOW FRAME
616801	LOW AND NARROW

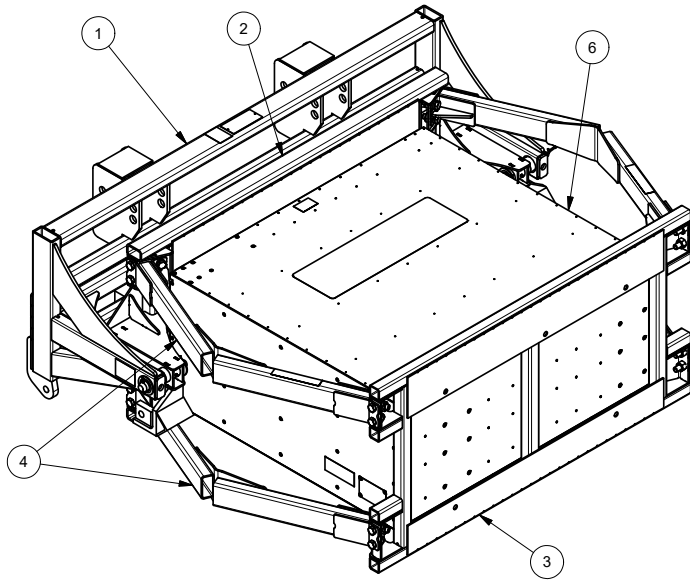
619042	GALVANIZED, EXT MOUNTS
619066	GALVANIZED, EXT 4" MOUNTS
619067	GALVANIZED, EXT 7" MOUNTS
619068	GALVANIZED, EXT 9" MOUNTS
616789	EXT MOUNTS
616788	EXT 4" MOUNTS
616790	EXT 7" MOUNTS
616791	EXT 9" MOUNTS
616799	4" CLEAR SPACE
627849	4" CLEAR SPACE, 4" MOUNTS
627850	4" CLEAR SPACE, 7" MOUNTS
616795	4" CLEAR SPACE, 9" MOUNTS

2. Attachment Assembly - 604382



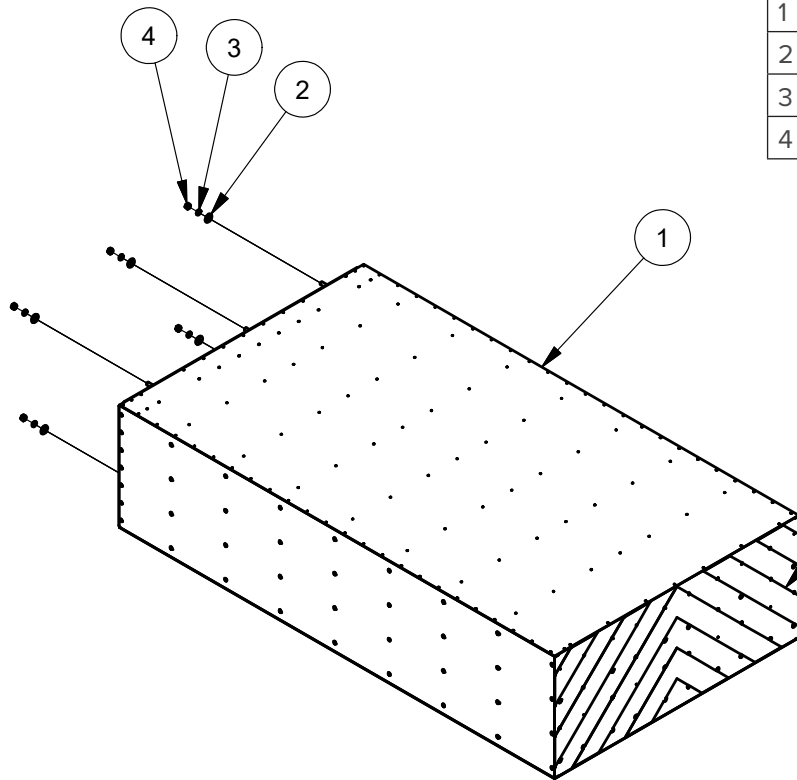
1	605584	BRACKET,SUPPORT,RIGHT,TMA8291,B
2	605581	BRACKET,SUPPORT,LEFT,TMA 9180,B
3	116293	PIN,HITCH,1 1/4X7 P,W/HAIRPIN COTTER
4	608321	FLT ST 1/2X3 1/4X3 1/4,W/HOLE
5	608311	FLT ST 1/2X2 1/2X3 1/4,W/HOLE
6	113532	BOLT,HX,1X3 1/2,G8,P
7	115932	NUT,HX,1,G8,P
8	118080	WASHER,LOCK,1,G
9	003900	1" ROUND WASHER F844
10	614059	SHIM,1/4X5X10
11	614063	SHIM,12 GA X5X10

3. Frame Assembly - 628689



1	628680	FRAME,BACKUP,SUPPORT,TILT,GUARD EN
2	628681	FRAME,TILT,GUARD EN
3	628682	MIDFRAME,GUARD EN
4	628683	ARM WELDMENT,GUARD EN
5	116249	PIN,AXLE,1 1/2X9,P
6	628684	CARTRIDGE B,GUARD EN,W/DECALS
7	118000	WASHER,FLAT,1 1/2 SAE,P
8	116270	PIN,COTTER,1/4X2 1/2,S
9	614493	SPACER 1/2X3X4 1/2,W/HOLES
10	113412	BOLT,CR,1/2X3,G5,P
11	113554	BOLT,HX,3/4X2,G5,P
12	118090	WASHER,LOCK,3/4,P
13	115956	NUT,HX,3/4,P
14	118458	BUMPER,POLYURETHANE
15	118083	WASHER,LOCK,1/2,P
16	115067	GREASE FITTING,1/4-28 STR
17	118008	WASHER,FLAT,1/2ID X 3/8OD,P
18	115942	NUT,HX,1/2,P,G8

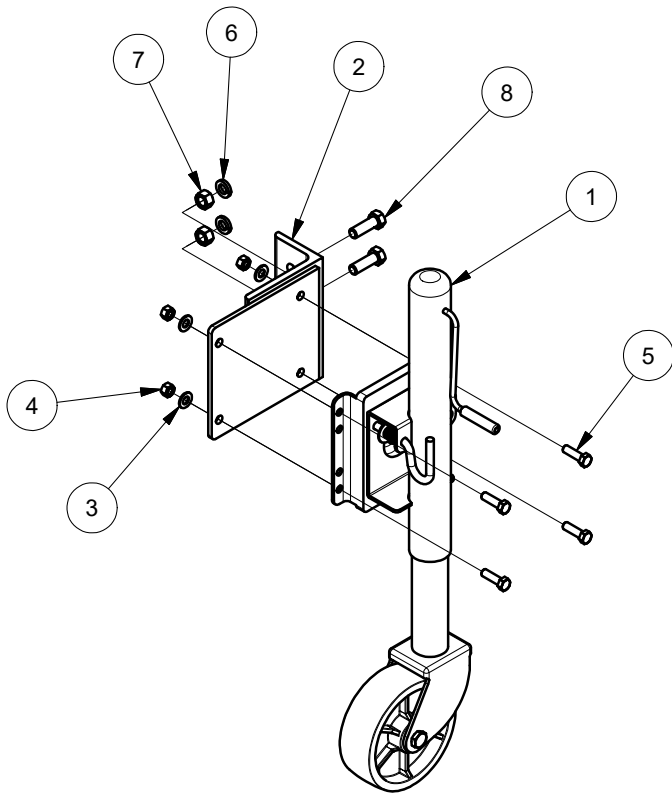
4. Cartridge A Assembly - 628698



1	628687	CARTRIDGE,REAR,GUARD EN
2	118008	WASHER,FLAT,1/2 ID X 1 3/8OD,P
3	118083	WASHER,LOCK,1/,P
4	115942	NUT,HEX,1/2,G8,P

STRIPING SOLD SEPARATELY
PLEASE CONTACT CUSTOMER
SERVICE FOR STRIPING OPTIONS

5. Jacks - 628860

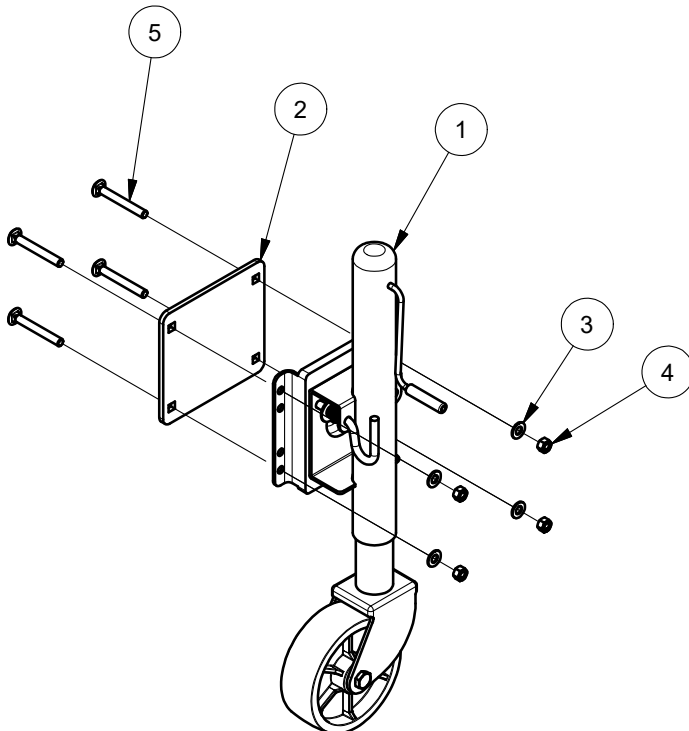


Front

Left: 628861

Right: 628862

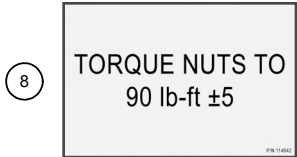
1	118744	JACK,SWIVEL,SD WND,1500LB
2	628865	FRONT JACK MOUNT,GUARD EN
3	118030	WASHER,FLAT,3/8 ID X13/16
4	115963	NUT,HX,3/8,P
5	113590	BOLT,HX,3/8X1 1/4,G5,P
6	118083	WASHER,LOCK,1/2,P
7	115941	NUT,HX,1/2,P
8	113460	BOLT,HX,1/2X1 1/2,G5,P



Rear : 628863

1	118744	JACK,SWIVEL,SD WND,1500LB
2	628864	FLT 1/4X6 5/8,W/HOLES
3	118030	WASHER,FLAT,3/8 ID X13/16
4	115963	NUT,HX,3/8,P
5	119723	BOLT,CR,3/8X3,G2,P

Decals



1	119603	DECAL,REMOVE
2	119644	DECAL,CEN/TS 16786 TESTED,GUARD EN
3	119353	DECAL,VALTIR LOGO
4	119601	DECAL,CARTRIDGE A,GUARD EN
5	119642	DECAL,CARTRIDGE B,GUARD EN
6	114668	DECAL,WARNING,HANDS/FEET
7	119357	DECAL,VALTIR REPLACE PTS
8	114642	DECAL,TORQUE 90 FT/LBS
9	114459	DECAL,CAUTION,'STAY CLEAR



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