

INSTRUCTION MANUAL FOR MANUALLY OPERATED TCG-2000 GANGWAY WITH SAF-T CAGE



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1) INTRODUCTION

a) PLEASE READ THIS FIRST PRIOR TO INSTALLATION OR OPERATION

- i) On behalf of Sam Carbis Solutions Group LLC., thank you for your purchase of our safety equipment. It is our pleasure helping you with all your fall protection and product handling needs. We value our customer relationships and to ensure you get the most out of your equipment, our experienced support team is available for you to contact throughout your equipment service life. While this manual fully covers our product, if you should have any questions or concerns please contact us at 1-800-948-7750 or 1-843-669-6668 for international customers.
- ii) Please carefully read this Installation, Operation, and Maintenance Manual as it is an integral part of your purchased Carbis equipment. It is the Owner's responsibility ensuring all personnel who operate and or maintain the Carbis equipment first receive comprehensive training. It is also the Owner's responsibility for ensuring appropriately documented maintenance and inspection activities are, including any abnormal operating condition and its associated root cause evaluation, followed by corrective actions implemented to eliminate recurrence. Any identified abnormal operating conditions should be cause for discontinuing use until contacting Sam Carbis Solutions LLC for further assistance.
- iii) With aging of equipment and associated service life-limiting variables, such as corrosion, fatigue, wear, etc., remedy these discrepancies as soon as possible during periodic maintenance to preclude operational failure.
- iv) This manual provides guidance to operating and maintenance personnel in the matter of safe operation and recommended practices. However, it is not, and cannot be, a substitute for well-trained personnel. Great reliance must be placed upon the knowledge, background, and experience of the operating and or maintenance personnel with this manual serving as a guide. Willfully or inadvertently disregarding the information contained in this equipment manual automatically voids the warranty.
- v) This product was inspected prior to shipment and meets Carbis' Quality Control Standards. It is important to completely review the information contained in this manual before operating the unit including the following:
 - 1) Upon delivery, inspect the equipment for shipping damage or any loose or missing hardware. All factory installed fastening hardware has been tightened prior to shipment. If loosening any fastening hardware whether factory or field installed, re-tightened accordingly before use.
- vi) It is imperative operating and maintenance personnel prior to using the equipment become familiar with the safety information contained in section **3) SAFETY LANGUAGE**.
- vii) Visually inspect all safety placards, signs, and labels for serviceability, visibility and legibility. Operating personnel must be familiar with the contents of such placards, signs, and decals. See **Section 3) b) for SAFETY LABEL DESCRIPTIONS** for the description of all safety label and signs appearing on the equipment described in this manual.

viii) U.S. Patents 6,814,522; 8,479,884; 8,813,912, 9,567,759; 8,745,799; 9,546,458; 8,656,556; and other patents pending protect the equipment shown in this manual.

b) VEHICLE POSITIONING

i) Carbis designs gangways in a variety of styles, sizes, and materials accommodating specific customer requirements in applications including varying heights and types of vehicles. Subsequently, with each gangway, Carbis provides customer-approved Engineering Drawings and or scope data documenting key dimensional relationships between a particular-type vehicle and the accessing gangway including safety cages as applicable. Prior to operational use refer to the specific customer approved Carbis equipment Final Drawings for familiarization with vehicle dimensional relationships in determining required for proper vehicle positioning.

ii) **⚠ WARNING** Incorrect gangway positioning on top of the vehicle can cause a dangerous condition leading to a potential for damage, serious injury or death. The access equipment when extended protrudes into the standard vehicle clearance envelope. Always leave the gangway in the full upright stored position until the intended underneath positioned vehicle comes to a complete stop and given proper permission to access. Always leave the gangway stored when not in use to prevent damage from traversing vehicles. Keep hands away from moving areas (See FIGURE 1-1 and FIGURE 1-2).

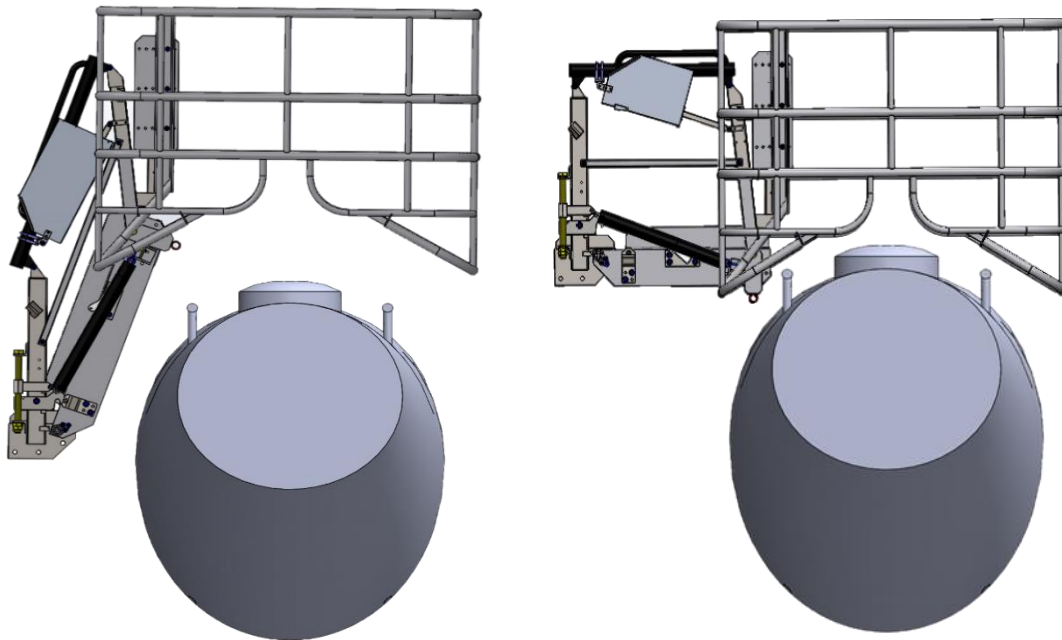


FIGURE 1-1 GANGWAY STORED AND FIGURE 1-2 GANGWAY IN WORKING POSITION

iii) TRUCK POSITIONING

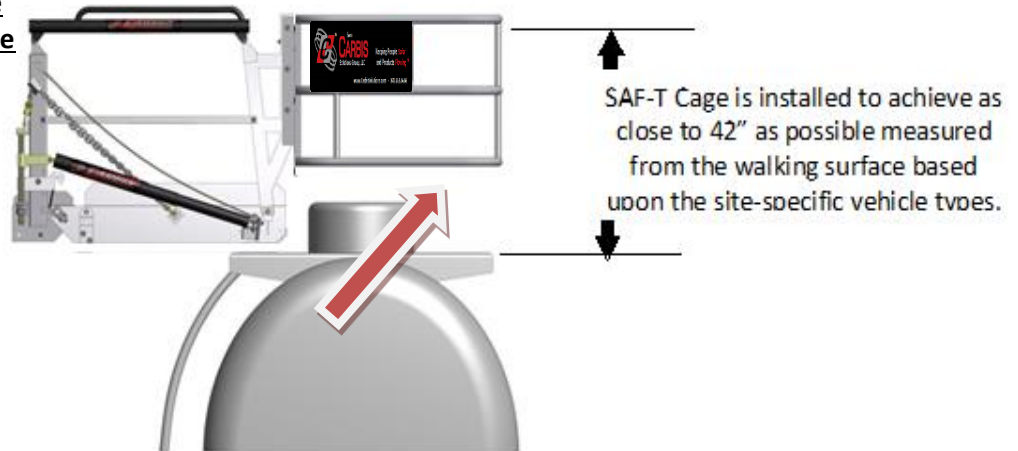
Given the portable nature of a truck, the truck driver's abilities largely determine correct spotting. Therefore, consider using visual spotting aids such as bollards, curbs, painted guidelines, suspended markers

(i.e., tennis balls), etc. enhancing the driver's positioning ability. See **FIGURE 1-3** below for proper vehicle positioning with Carbis' gangways. Tracking gangways allow gangway positioning along the length of the truck.

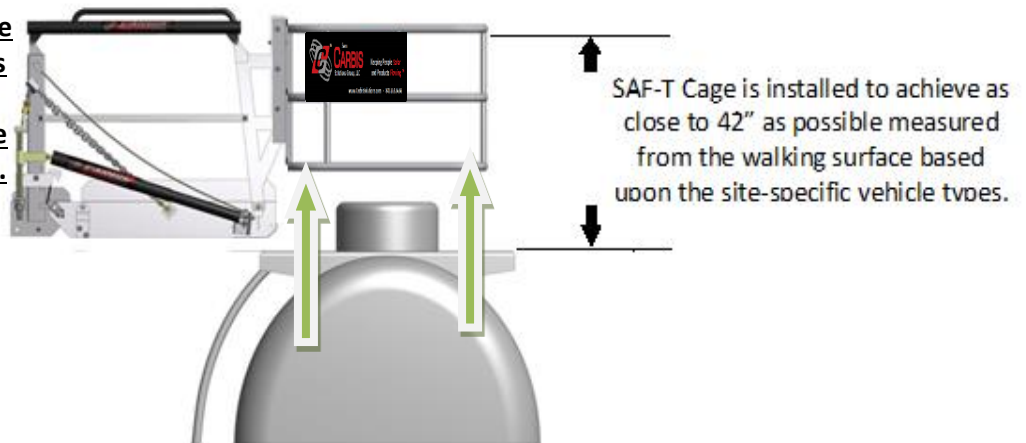
iv) DEVIATIONS

Unexpected vehicle configuration deviations can cause a hazard even when proper positioning has taken place. Training for hazard recognition by all operators is required for fall protection equipment (Ref: OSHA 1910.30).

Vehicle positioned too close to the TCG-2000. This blocks access to the hatch creating incorrect cage spacing and a fall hazard



Vehicle correctly positioned to the TCG-2000. This allows safe access to the hatch with correct cage spacing thus mitigating a fall. (See final drawing for proper location).



Vehicle positioned too far from the TCG-2000. This blocks access to the hatch creating incorrect cage spacing and a fall hazard

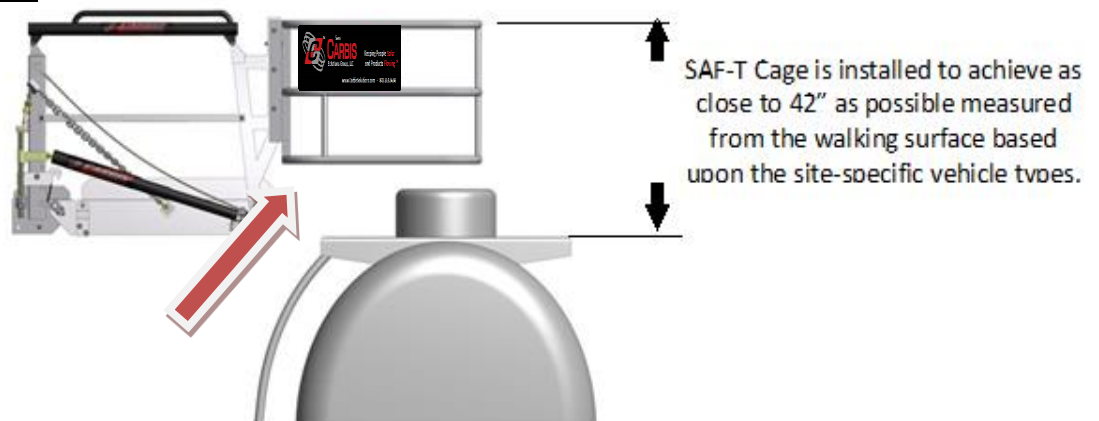


FIGURE 1-3

2) PRODUCT DESCRIPTION:**MANUALLY OPERATED TCG-2000 GANGWAY WITH SAF-T CAGE**

**SEE PROJECT-SPECIFIC DRAWINGS, FIGURES WITHIN THIS SECTION,
AND SECTION 8) SPECIFICATION SHEETS AND DRAWINGS**

⚠ WARNING

Only the person performing the work can operate Carbis equipment. No other personnel are authorized to operate at any time. Failure to adhere to this caution may cause a person to fall risking injury or damage to equipment. All other personnel should maintain a 10-foot/3-meter clearance while Carbis Equipment is in motion.

⚠ CAUTION

Do not operate Carbis Equipment for any other purpose other than its intended design. Do not modify Carbis equipment to perform beyond its factory settings. Failure to do so could cause a malfunction possibly damaging equipment and causing injury. Contact Carbis for service

a) MECHANICAL EQUIPMENT (SEE FIGURE 2-1.)**i) GANGWAY**

The TCG-2000 Series Gangway is a manually operated, spring-assisted, articulating gangway with a foot lock (if installed) for storage, providing safe access to various types of truck bulk trailers and rail hopper cars of different heights for operators to safely perform the work required on the vehicles.

- 1) A galvanized steel base tread that is either fixed mounted directly to a platform, horizontally pivot mounted, or track mounted.
 - a) The TCG-2000 Operated Gangway requires assembly, connections, and startup before use. See section 7) **INSTALLATION AND SET UP** for instructions.
 - b) **The live load capacity for Carbis series TCG-2000 gangways including user, PPE, and any equipment is 500 lbs./227 Kg.**
- 2) The gangway consists of stringers articulating about the base tread with top handrails and midrails pivoting about the base tread uprights. The outboard uprights support the outer end of the top handrails and midrails, supporting safety cages or seatainer treads. Walk surface options are open serrated metal plank, fiberglass, or serrated bar grating, and are so noted on the Final Drawings Gangway material options are designated by the letter in the model number noted on the Final Drawings:
 - a) A – Aluminum
 - b) S – Mill Steel
 - c) P – Primed Steel
 - d) G – Galvanized Steel
- 3) Stringer bottom leading edge mounted bumpers give added protection against vehicle damage.

- 4) **A base tread mounted foot lock (if installed) mounted on the base tread secures the gangway in the upright stored position. The use of slotted chain locks secures the gangway in the stored position.**
The upright stored position is typically 85 degrees above horizontal.
- 5) **⚠️ WARNING For gangways without a foot lock, the use of slotted chain locks must be used to secure the gangway in the stored position in case the gangway drifts down. Failure to secure the gangway could cause the gangway to protrude into the standard vehicle clearance envelope.** Gangways without a foot lock usually store less than 70 degrees storage above horizon.
- 6) Stringer attached adjustable chains supported by base tread upright mounted slotted tube chain locks when secured hold the gangway in any desired position within the normal working range of 15 degrees above to 15 degrees below horizontal. **(See FIGURE 2-1).** *The range may be modified within the limits to accommodate options.*
- 7) The slotted tube design secures the chain throughout the full range of gangway movement from the lowest working position up to the fully raised stored position.
- 8) The chains provide strength and equipment stability allowing access to a variety of trailers or railcars.
NOTE: The chains when correctly slotted into the chain locks secure the gangway when not in use.
- 9) Covered springs mounted between the uprights and the stringers provide tension adjustment to minimize the push/pull force required to articulate the gangway.
- 10) An attached pull-up rope aids the operator to return the gangway to the upright stored position.
- 11) Gangway mounted cages employ additional grab rails mounted perpendicular to the outboard uprights on each side of the gangway compensating for an inboard handrail gap created when lowering the gangway.
- 12) When in the stored position, the gangway's attached serial number on the first tread left-hand side is visible. Note: Always reference this serial number when contacting Sam Carbis Solutions Group with any questions or concerns.
- 13) TCG-2000 gangways can be equipped with an **optional** pivoting outboard upright and cage leveling mechanism (see **FIGURE 2-2**). Mounted on the upper half of each left and right pivoting outboard upright, the cage leveling mechanism consists of back-to-back channels: one on the gangway fixed upright and one on the pivoting upright. Mounted between the channels is a thru threaded rod with a series of back-to-back adjustment nuts and washers on both sides of each channel.

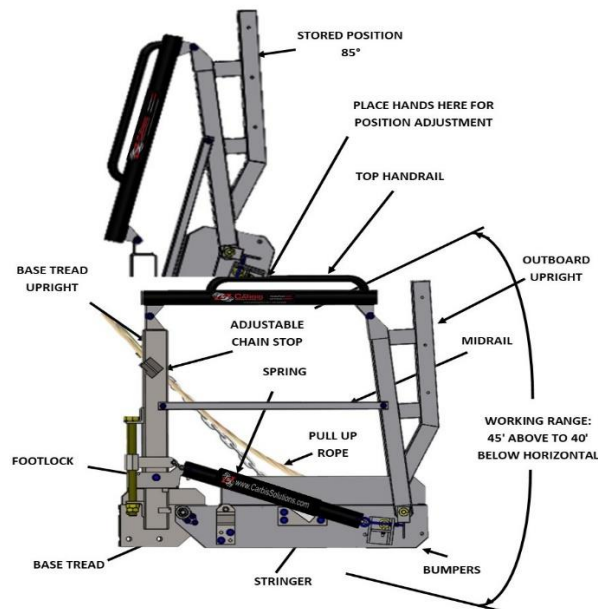


FIGURE 2-1 TCG-2000 GANGWAY GENERAL ARRANGEMENT

ii) GANGWAY FOOT LOCK (IF INSTALLED)

Most Carbis manual sprung gangways employ a single manually functioning foot lock. A single base tread mounted foot lever when depressed activates the foot lock unlocking function. When lowering the gangway, depressing the foot lever while pushing forward on the handrails extends the foot lock spring and releasing the mechanical foot lock for the gangway to extend. The gangway locking function engages when fully raised to the stored position. (See drawings listed at the end of this manual for foot lock configuration).



For gangways without foot locks, the use of slotted chain locks is required to secure the gangway in the stored position to prevent the gangway from drifting down into the standard vehicle envelope.

iii) LIFT RESTRICTING DEVICE (SEE FIGURE 2-2)

(NOTE: Not all TCG-2000 gangways include the Lift Restricting Device)

The Lift Restricting Device (LRD™) design impedes the gangway from inadvertent or premature raising while operating personnel occupy the top of the vehicle. The Lever Arm Release Handle design releases the LRD™ while simultaneously raising the gangway to the stored position as an operator exits the gangway. A protective cover prevents personnel from overriding the LRD™ while on the vehicle. The LRD™ mounts between the inner end of the top rail and the upper half of the outboard upright and consists of the following:

- 1) A linear rail with ratcheting angled teeth mounted on the underside; the rail is pinned on one end to a lug supported on the top rail of the gangway by double U-bolts. The opposite end of the rail slides into an extension tube pinned to a support bolted to the outboard handrail of the gangway.

- 2) Pinned to a lug mounted on the underside of the linear tube is a ratcheting pawl with a pivoting catch engaging a tooth of the linear rail and holding the gangway in place, impeding gangway lift.
- 3) The LRD™ Lever Arm Release Handle design actuates by a pull-up rope supplied with the LRD. The Release Handle mounts on the LRD™ ratcheting pawl. Pulling the pull-up rope pulls the handle towards the platform causes the ratcheting pawl to pivot, releasing the catch from its engagement with the rail gear tooth and raises the gangway to the stored position with the LRD™ pull-up rope.

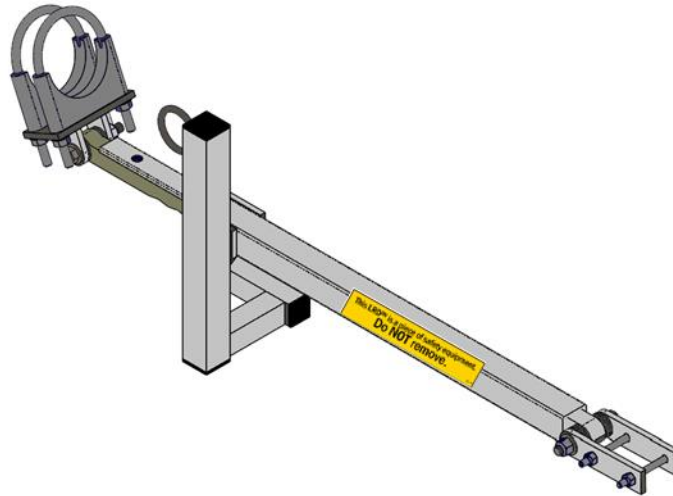


FIGURE 2-2 (4 Step LRD™)

b) MODIFIED GANGWAY

- i) For any modified gangway including the addition of ancillary components not otherwise identified above, see project-specific drawings that reflect the modification or addition.
- ii) **SAF-T CAGE (IF INSTALLED)**
 - 1) The SAF-T Cage is either a monolithic or two-piece cage structure that bolts directly to the outboard upright of the gangway. The cage can bolt in either the high or low position as determined by site-specific needs to maintain the required fall protection criteria (see **FIGURE 2-2**).

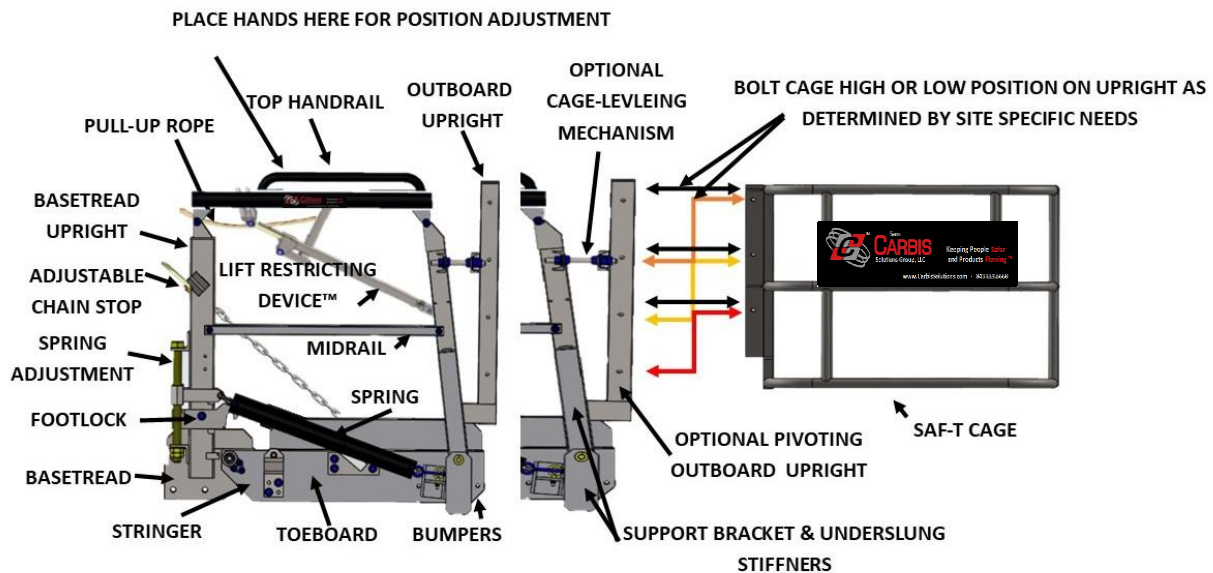


FIGURE 2-3 TCG-2000 GANGWAY WITH OPTIONAL CAGE LEVELING SYSTEM

- 2) **WARNING** For gangways without a cage, post gangway protection is the responsibility of the owner. The employer must provide for prompt rescue of each employee in the event of a fall. The employer must have a rescue plan in the event of a fall occurring and the ability to implement a rescue. See OSHA 1910.140 and ANSI/ASSP Z359.2 for guidelines on fall protection systems.

c) **OPTIONAL TCG TRACK AND CARRIAGE WITH TCG-S910.1 TRACK LOCK MECHANISM (SEE FIGURE 2-4 AND FIGURE 2-5)**

- i) The galvanized steel track and carriage system includes the following features:
- 1) A track assembly integrated to a platform structure or as a separate assembly bolting to the face of a fixed platform structure.
 - 2) A carriage mounted gangway base tread that rolls on the track assembly.
 - 3) A track top section capturing the top rollers with the bottom section supporting the carriage rollers.
 - 4) A removable stop inserted through the top surface end holes preventing the carriage from rolling past the track ends.
 - 5) The main carriage assembly consists of a plate weldment with top and bottom rollers mounted at each end. The top rollers ride on the vertical inside track leg and the bottom rollers ride along the bottom outside face of the carriage mounting plate and are bolted to the backside of the gangway.
 - 6) Carriage Rolling Assemblies consist of shaft-supported rollers mounted on base tread mounting plate.

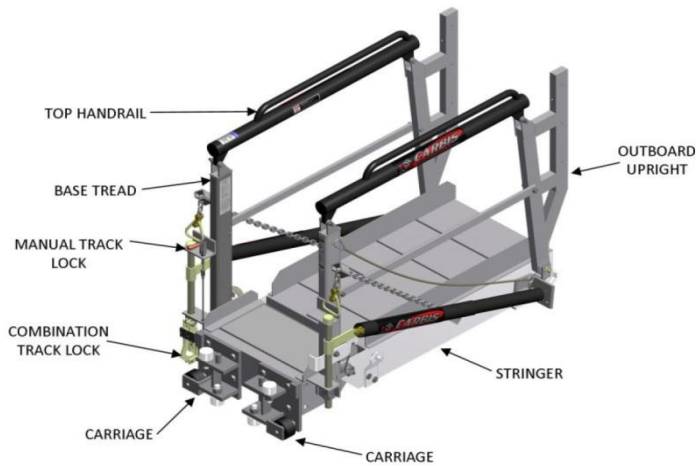


FIGURE 2-4

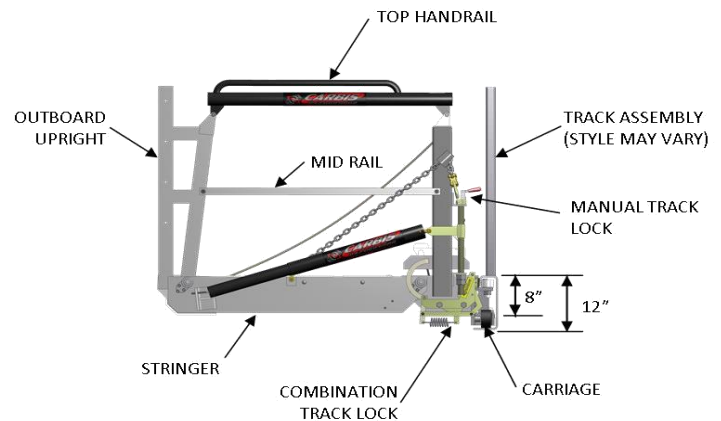


FIGURE 2-5

d) OPTIONAL TCG-S910.1 TRACK LOCK MECHANISM (SEE FIGURE 2-6 AND FIGURE 2-7)

All TCG gangways with the track and carriage option also include the TCG-S910.1 Track Lock Mechanism, a safety device preventing gangway damage from inadvertent rolling along the track when not in the stored position. The mechanism consists of a combination of automatic and manual lock functions as described below.

i) The automatic function of the mechanism consists of the following features:

- 1) A housing assembly with a curved release lever arm on one end and a brake pad pivot arm on the opposite end. Both arms are positioned between and bolted to each arm's upper pivot point housing side plates. A pair of flat bar spacers bolted below the housing between both arms allow the arms to pivot together. As the springs extend or retract an extension spring pinned between each arm's bottom extension changes each arm's top end geometry.
- 2) The assembly bolts through the gangway base tread side plate holes. The top of the curved release lever arm includes a bent leg engaging the gangway stringer top edge as the gangway raises to the stored position.
- 3) As the gangway raises to the stored position, the stringer engages the bent leg of the release lever arm causing the spring to extend. As the spring extends, the brake pad pivot arm pivots disengaging the brake pad from the track. Once the gangway is in the stored position, the brake pad releases from the track allowing the gangway to manually track.
- 4) Whenever the gangway is not in a stored position, the release lever arm disengages from the stringer thereby causing the spring to press against the track brake pad preventing the gangway from tracking.
- 5) The track lock mechanism automatic lock function remains inactive whenever the gangway is stored permitting gangway free roll movement along the length of the track. As an added safety feature, the track lock mechanism manual track lock lever only engages the gangway is in the stored position. When engaged, the manual track lock lever actuates a second brake pad against the track preventing the gangway from inadvertently rolling along the track by any external force such as wind.

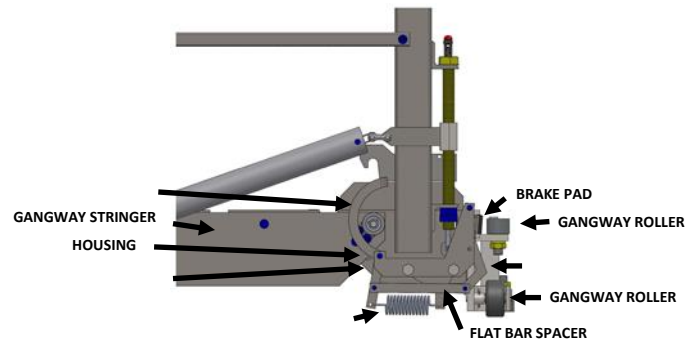
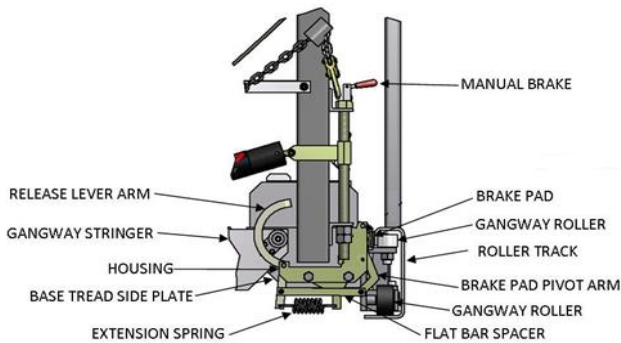


FIGURE 2-6 MANUAL TRACKING AND FIGURE 2-7 AUTO LOCK TRACKING

e) OPTIONAL TCG PIVOT MOUNT (SEE FIGURE 2-8 AND FIGURE 2-9)

- i) The pivot mount system consists of a gangway base tread with a male pivot post mounted on the underside and a tread extension mounted on the platform side of the tread that includes the following features:
 - 1) The male pivot post engages a female pivot-mounting sleeve and rests on a wear pad.
 - 2) The range of pivot rotation is 10 degrees each side of center.
 - 3) Brackets either bolted or welded to a platform and surface mounted or underslung below the platform structure support the female pivot-mounting sleeve.
 - 4) The pivot-mounting system can be retrofitted to an existing pivot support bracket.

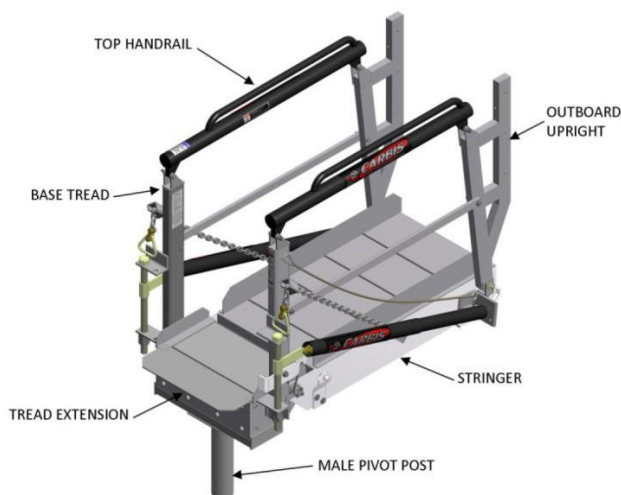


FIGURE 2-8

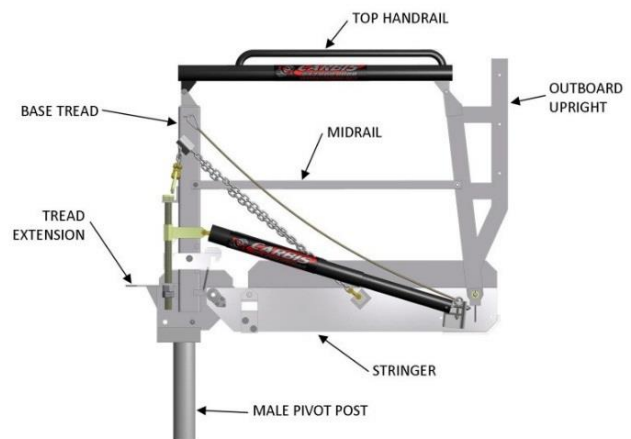





FIGURE 2-9

3) SAFETY LANGUAGE

a) HAZARDS

The following safety notes are grouped by hazard and used throughout this manual. Please carefully read and understand these notes before performing any task contained in this manual.

- i)  **Failure to comply with these DANGER warnings WILL result in serious injury or death.**
- 1) **This equipment CAN conduct electricity.**
 - 2) **Perform required grounding procedures per the owner's safety code.**
 - 3) **Do NOT allow this unit to contact live electrical wires.**
- ii)  **Failure to comply with these warnings COULD result in serious injury or death.**
- 1) Correct vehicle positioning is imperative to ensure proper deployment and function of Carbis equipment. Incorrect vehicle positioning or improper use of this equipment increases the risk of serious injury or death. Carbis equipment is designed to function only as described in this manual and depicted on applicable drawings. **IT IS THE SOLE RESPONSIBILITY OF THE OWNER TO ENSURE PROPER USE OF CARBIS EQUIPMENT. IF ANY QUESTIONS, PLEASE CONTACT CARBIS BEFORE PROCEEDING.**
 - 2) Before accessing Carbis equipment, correctly spot a vehicle per **Figure 1-1** then ensure Carbis equipment is properly deployed, supported, and secured.
 - 3) Operator must ensure nonessential personnel are clear of Carbis equipment during any controlled operation.
 - 4) No personnel including the operator must not occupy Carbis equipment while it is in motion.
 - 5) Do not force Carbis equipment by any means to overcome any seen or unseen obstacle or obstruction. You must use Carbis Equipment within its designated operating limits.
 - 6) Keep hands clear of chains while gangway is in motion.
 - 7) If the equipment will not function as intended, discontinue use and immediately contact maintenance.
 - 8) Never make repairs of damaged or missing parts. Replace missing parts only with Carbis approved suitable parts.
 - 9) Material loaded onto or unloaded from vehicles may present a health hazard. It is the sole responsibility of the owner ensure operating personnel are familiar with any associated material hazards and implement appropriate safety measures to protect personnel against such hazards.
 - 10) If installed, do not tamper with, disable, remove, or override lift restricting device (LRD[™]).
- iii)  **Failure to comply with these cautions COULD result in personnel injury or damage to equipment**
- 1) Carefully read this manual before unpacking and installing Carbis equipment.
 - 2) Only permit personnel in good physical condition and trained in the proper operation of this equipment to operate it.
 - 3) When operating Carbis Equipment personnel should always wear appropriate Personal Protective Equipment (PPE), such as gloves, safety glasses, safety shoes, helmet etc.
 - 4) For chain supported Carbis gangways, both locking chains must be correctly engaged in the chain lock

slots supporting the gangway before accessing. Slack or unequal chain adjustment may result in unanticipated movement and loss of balance when walking or standing on the equipment.

- 5) For operator safety, Carbis recommends the equipment be stored and not used when wind speed gusts exceed 35 mph/56 kph.
 - 6) Except for limit switches (if installed), unit is not to rest on the vehicle at any time.
- iv) **NOTICE** Failure to comply or adhere to these notices COULD result in equipment damage or degradation.
- 1) Qualified maintenance personnel must be familiar with manual instructions as well as all accompanied system schematics and drawings before performing component adjustments.
 - 2) Ensure local safety **LOCKOUT-TAGOUT** procedures are correctly adhered before performing work on Carbis Equipment.

b) SAFETY LABEL DESCRIPTIONS

Please ensure the following safety labels below are eligible and properly affixed on the equipment as described in this manual before use. Contact Carbis when requiring replacement labels

AL-157.1 (Inside right handrail)

SAFETY INSTRUCTIONS

Caution: If vehicle is not correctly positioned underneath the gangway not not deploy the gangway

1. Ensure gangway is in the fully stored position and spot the vehicle in its correct position.
2. For pivot mounted gangways, pivot the gangway to the desired position.
3. With chains inserted in the next to last link, depress the foot lock pedal (located on the right side of the gangway, if applicable), place both hands on the top handrail, and push outward. Keep hands clear of chains during all times when gangway is in motion.
4. With gangway at the desired level, adjust the chains so that both chains equally support the gangway. The chain links **MUST** be engaged in the slots of the chain locks. Fine adjustments may be made by twisting the chain prior to engagement.
5. If gangway is equipped with a walk surface extension, lift and slide handle (located on the right side of gangway) until extension reaches the edge of the vehicle. Secure the extension handle in place in the grating.
6. If equipment does not appear to correctly fit on vehicle or to be correctly deployed, **DO NOT ACCESS**. Always be aware of your surroundings.
7. After performing the required work on the vehicle, retract walk surface extension (if applicable), pivot gangway to center position (if applicable), and use the pullup rope to return the gangway to its stored position. Make sure that the foot lock has fully engaged the foot lock bolt on the side of the gangway (if applicable). Tighten a chain to additionally secure the gangway in the stored position. Gangways not equipped with a foot lock **MUST** use a chain to secure the gangway in the stored position.

Always refer to the Manual

AL-157.1

AL-159.1 (Inside left handrail)

INSPECTION & MAINTENANCE PROCEDURES

1. This gangway should be inspected on a monthly basis as a minimum. A harsh environment and/or heavy use may dictate more frequent inspections.
2. Visually inspect the gangway before each use. Do NOT use if any parts are damaged or missing. Never make repairs to damaged or missing parts. Replace missing parts with approved equal parts.
3. Inspection of springs should include a check of the number of coils wound around the spring clip on each end. A minimum of TWO full coils is required.
4. Walk surfaces should be kept clean and, so far as possible, dry.

SPRING ADJUSTMENT

If the gangway is either dropping or rising in the working range, then spring adjustment is needed.

1. With the gangway in the stored position, raise or lower one spring ear in 1/2" inch increments by turning the head of the bolt on the spring adjuster. Make sure the double jam nuts on the bottom of the bolt do not come loose.
2. Check the operation of the gangway.
3. If multiple adjustments are needed, alternate between the left and right side spring adjuster.

SYMPTOM: Gangway is hard to lift from the working position.
CURE: Raise the ears.

SYMPTOM: Gangway will not stay down in the working position.
CURE: Lower the ears.

See manual at www.carbissolutions.com
Contact Sam Carbis Solutions Group LLC for replacement parts.

AL-159.1

AL-156.1 (Front of right top Handrail)

⚠ WARNING

Chains must be supporting gangway prior to access.

See instruction label.

Keep hands clear while gangway is in motion.




Capacity

500 Lbs

227 Kg

AL-156.1

AL-305-R1 (Inside top front on right Handrail)

 <p>DANGER</p>	<p>This unit CAN conduct electricity. Grounding requirements determined by company safety code.</p> <p>Do not allow this unit to contact live electrical wires.</p> <p>Do not handle live electrical wires while standing on or in contact with this unit.</p> <p>Failure to comply with these warnings WILL result in serious injury or death.</p>
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AL-305-R1

AL-160 (Front of lower left Handrail)

NOTICE

Tighten a chain to additionally secure gangway in stored position. Gangways without a foot lock **MUST** use a chain to store gangway.

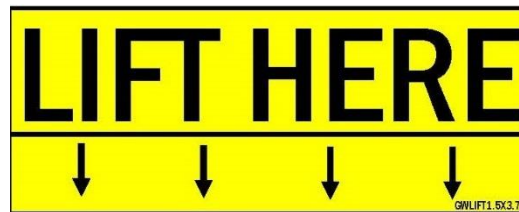
AL-160

AL-162 (right front base tread)

Rope **MUST be used to raise gangway**

AL-162

GWLIFT1.5X3.75 Used for TCG installation (positioned on outside Left and Right of outboard Uprights See Figures 7-1 and 7-2)



AL-163(Affixed to the LRD™ if installed)

**This LRD™ is a piece of safety equipment.
Do **NOT** remove.**

AL-163

- iii) **SAFETY LABELS LOCATION** (See Figure 3-1) for safety label locations on this equipment as described in this manual. For TCGs with adjustable uprights, see Figure 7-2 for lift label placement.

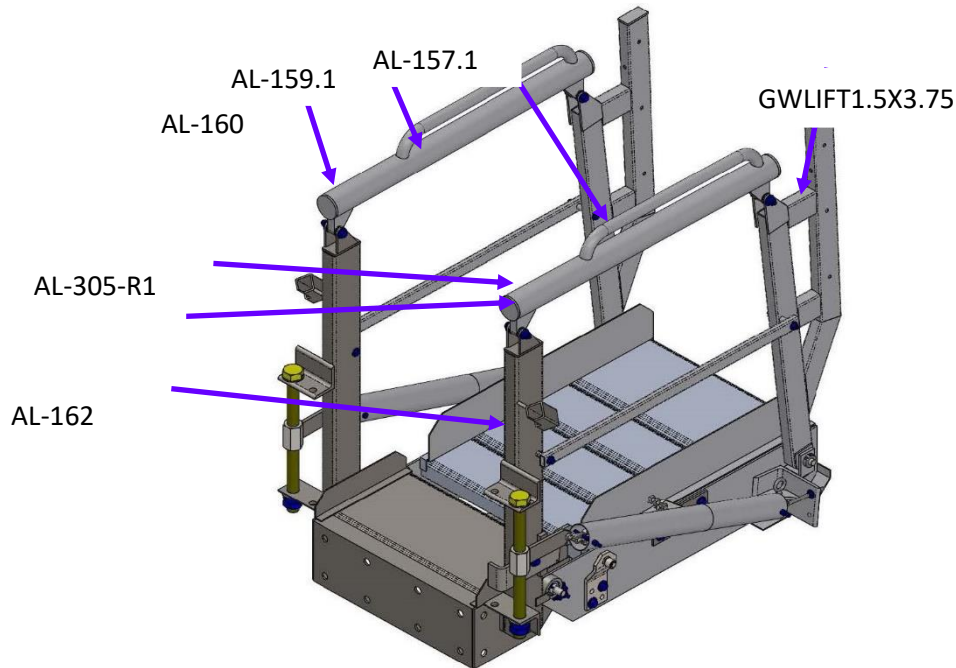


FIGURE 3-1
SAFETY LABEL LOCATIONS

NOTE: Image shown is TCG-2000 with fixed uprights

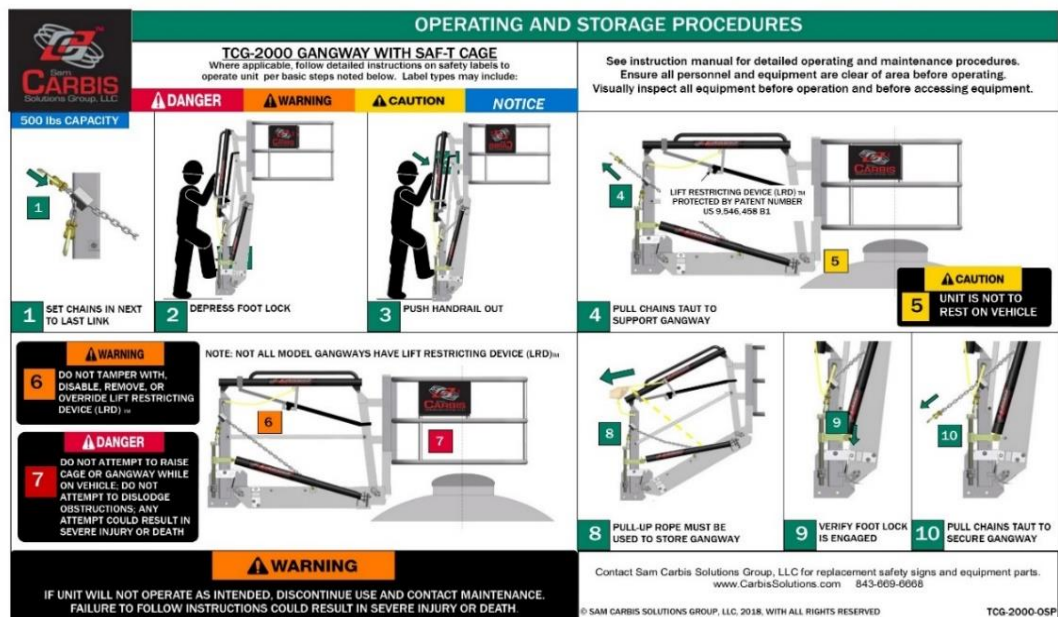


FIGURE 3-2
TCG-2000-OSP WITH SAF-T CAGE (OPERATOR LOCATED OPERATIONAL SIGN)

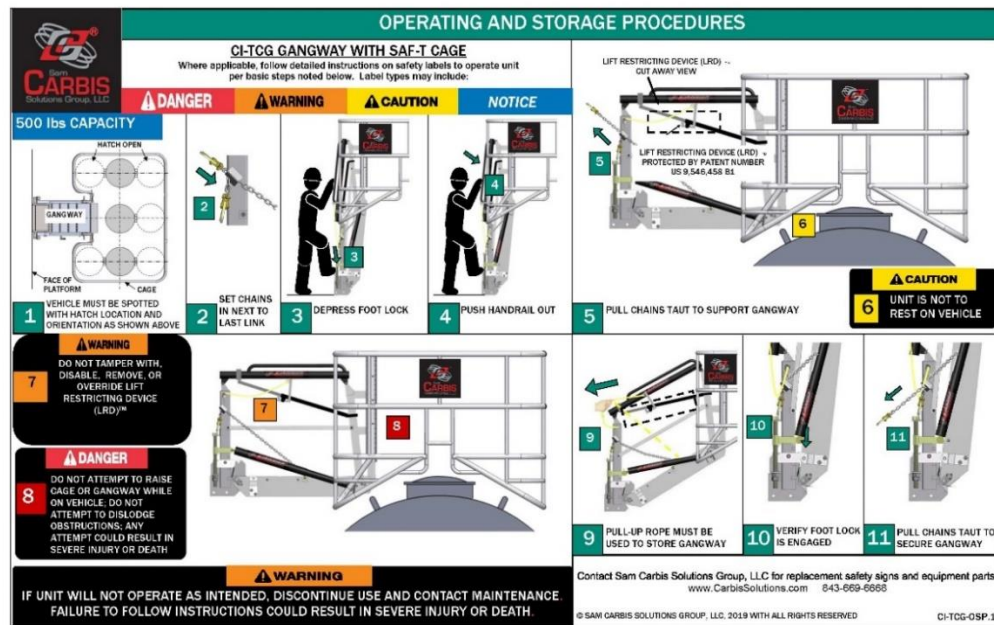


FIGURE 3-2

CI-TCG-OSP FOR OPTIONAL CEMENT INDUSTRY HTQIKCAGE (OPERATOR LOCATED OPERATIONAL SIGN)

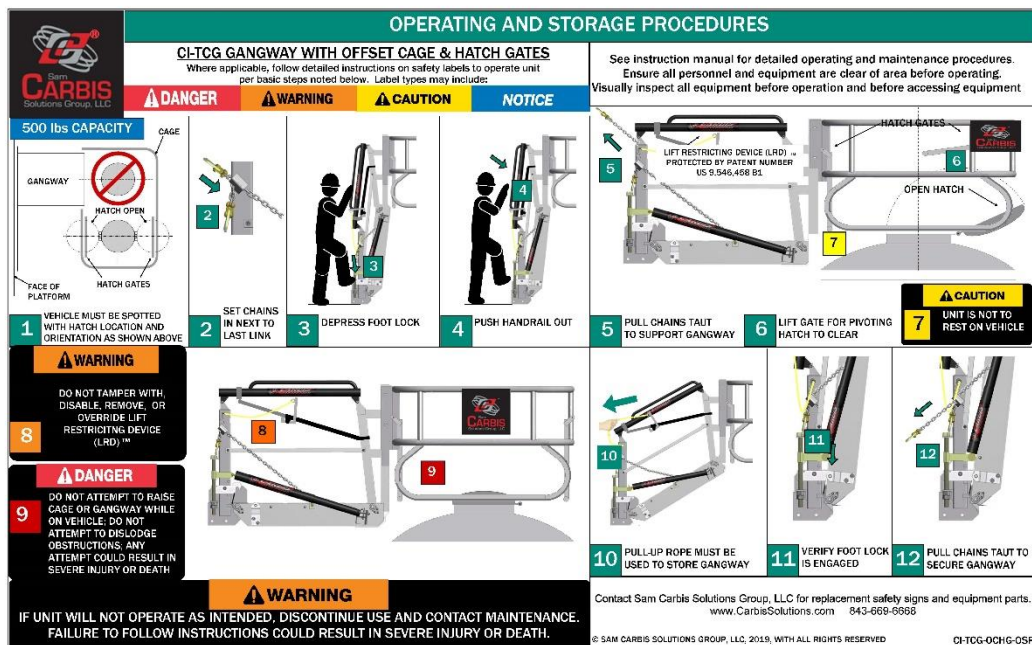


FIGURE 3-3


CI-TCG-OCHG-OSP FOR OPTIONAL CEMENT INDUSTRY (OPERATOR LOCATED OPERATIONAL SIGN)


4) OPERATION

a) PRE-USE INSPECTION

i) For systems including loading arms, see separate instruction manual for operation.

ii)  **DO NOT USE** Carbis Equipment if wind speed gusts exceed 35 mph/56 kph.

- 1) **Gangway live load capacity for Carbis TCG-2000 gangways with PPE, tools and must not exceed 500 lbs./227 kg.**
- 2) Visually inspect the assemblies before use. If discovered damaged or broken components replace before returning to service. If component replacement requires any disassembly, refer to Section **7) INSTALLATION AND SETUP** for restoring the system to operational status.
- 3) Verify all safety placards, signs, and labels are clearly visible, legible, and in good repair. Operating personnel must be familiar with the contents of such placards, signs, and labels. See section **3 SAFETY LANGUAGE b) SAFETY LABEL DESCRIPTIONS** for all safety labels appearing on the equipment described in this manual.
- 4) Before operating the equipment, inspect between the equipment and the vehicle for any obstruction impeding correct movement or creating a tripping hazard. Remove any obstructions before proceeding.
- 5)  **Keep hands clear of the gangway chains while the gangway is in motion. If the gangway is already positioned down over a vehicle, first ensure no personnel have accessed the gangway or vehicle before storing the gangway and cage in the (fully up) stored position with the safety chains correctly secured. Damage to equipment or injury to personnel may occur.**

iii)  **Before spotting any vehicle, the gangway must always be in the full upright stored position before proceeding. Do not extend the gangway and extended cage out into the standard vehicle clearance envelope until the vehicle comes to a full rest stop and proper permission given to access the vehicle. When not in use, the gangway and cage must always be in the stored position to prevent inadvertent damage from traversing vehicles. Keep hands clear of moving areas while gangway is in motion.**

iv) With no vehicle berthed, verify the gangway is in the stored position. Correctly spot the accessed vehicle per **Figure 1-1** noting the work area in front of the gangway. If available, use visual aids to assist in spotting the vehicle Continue to b) if track mount and pivoting installed. Otherwise, proceed to c).

b) TRACK MOUNT AND PIVOTING OPERATIONS (IF INSTALLED)

i) For pivot-mounted gangways, pivot the gangway to the desired position.

ii)  **If discovering a broken or missing TCG-S910.1 Track lock Mechanism Spring, do**

not operate the gangway. If not correctly functioning, do not attempt to repair. Contact Maintenance or Carbis immediately for assistance or replacement parts.

iii) For track-mounted gangways, perform the following sub-steps:

- 1) With the gangway body locked in the upright stored position, release the manual track lock Lever and manually roll the gangway to the desired working position.
- 2) With the gangway properly positioned along the track, open the swing gate and deploy the gangway in section c) for operation. Once the gangway releases from the stored position, the brake lock pad will automatically engage the roller track preventing the gangway from tracking.

iv) **NOTICE** Do not attempt to roll the deployed gangway along the track. Doing so can damage the equipment. If the TCG-S910.1 Track lock Mechanism Spring is broken or missing **do not operate the gangway. If not correctly functioning, do not attempt to repair. Contact Maintenance or Carbis immediately for assistance or replacement parts.**

c) **MANUAL OPERATING SEQUENCE**

- i) **WARNING** If the gangway will not raise or lower, or if the foot lock will not engage when pushed or pulled to the desired position, **immediately discontinue** use and contact Maintenance. Failure to follow instructions or attempt to dislodge obstructions may result in severe injury or death.
- 1) Ensure vehicle correctly spotted per **(Figure 1-1)** above.
 - 2) **WARNING** If vehicle is not properly centered, a gap may be created which can lead to death or serious injury.
 - 3) Set each chain with the next to the last link engaged in the chain lock slot.
 - 4) While depressing the foot lock (if installed), place both hands on the top handrail and push outward.
 - 5) After completely lowering the gangway over the vehicle, equally adjust the chains allowing for stable gangway support before securing the chain links in the chain lock slots.
 - 6) **CAUTION** Other than limit switches (if installed), **The gangway is not to rest on the vehicle.** If, so raise the gangway and reposition the vehicle accordingly then reaccomplishing steps 1-5.
 - 7) **WARNING** If no cage is installed, **Post gangway protection is the responsibility of the owner. The employer must provide for prompt rescue of each employee in the event of a fall. The employer must have a rescue plan in the event of a fall occurring and the ability to implement a rescue. See OSHA 1910.140 and ANSI/ASSP Z359.2 for guidelines on fall protection systems.**
 - 8) Once completing the required work and before exiting the top of the vehicle, ensure the area is clear of all equipment and tools.
 - 9) Ensure no one has inadvertently raised the gangway before using the gangway to exit.
 - 10) **WARNING** Do not attempt to raise gangway and cage while personnel or tools are on the vehicle, gangway or cage; do not attempt to dislodge obstructions. Any attempt could result in severe injury or death.

- 11) After all personnel exited off the vehicle and gangway and on to the platform, turn around facing the gangway and firmly grab the pull-up rope attached to the LRD™ handle (if installed). Firmly pull the rope to disengage the LRD™ and raise the gangway to the stored position.
- 12) It is not necessary to depress the foot lock pedal (if installed) when raising the gangway; however, ensure the foot lock has engaged the bolt of the foot lock mechanism.
- 13) Pull the chains taut to additionally secure the gangway in the stored position. For gangways not equipped with a foot lock, use the chains to secure the gangway in the stored position.
- 14) **⚠ WARNING** **If the gangway does not have a foot lock to securely store it, the use of slotted chain locks must be used to secure the gangway in the stored position in case the gangway drifts down. Failure to secure the gangway could cause the gangway to protrude into the standard vehicle clearance envelope**
- 15) **⚠ WARNING** If the gangway will not raise or lower when pushed or pulled to the desired position, or if the foot lock will not engage (if installed), discontinue use and contact Maintenance immediately. Failure to follow instructions may result in severe injury or death.

ii) For track mounted TCG's, when finished with the operation perform the following:

- 1) With the gangway locked in the upright stored position, push down the manual track lock lever engaging the brake and preventing the gangway from free rolling along the track.

5) TROUBLESHOOTING

a) GENERAL

- i) **⚠ WARNING** **Failure to comply with these warnings CAN result in serious injury, death, or damage to equipment. It is the Owner's responsibility to ensure procedures in this manual are correctly followed.**
 - 1) Ensure maintenance personnel troubleshooting Carbis equipment are completely familiar with the equipment, have thoroughly read this manual, and possess the necessary maintenance skillset to work on this equipment. Contact Carbis if requiring further troubleshooting assistance.
 - 2) Discontinue equipment use until maintenance issues are correctly resolved.

b) SPECIFIC COMPONENT TROUBLESHOOTING

- i) The TCG-2000 gangway components are listed in section 2) **PRODUCTION DESCRIPTION**, Section 4) **OPERATION**, and Section 6) **MAINTENANCE**. Refer to the specific component in these sections when performing required troubleshooting procedures. If troubleshooting exceeds maintenance personnel capabilities or if questions still arise, please contact Carbis for further troubleshooting assistance.

6) MAINTENANCE

a) GENERAL

- i) **⚠ WARNING** Before performing any maintenance on a Carbis system, lock and tag out the equipment according to local safety directives. Ensure the gangway is full upright stored position with the chains fully secured and taut. If required, use a properly rated cargo strap securing under the gangway stringers before beginning maintenance. Do not cargo strap by the cage or handrails. Do not stand or walk under the gangway or cage.
- ii) Carbis designs and builds equipment minimizing periodic maintenance and does not require extensive inspection and maintenance other than noted in this manual. The following are recommended inspection procedures for incorporating into an inspection program. Any parts needing replacement replace with equally rated parts ensuring product integrity. Contact Carbis for guidance and parts information.

b) PERIODIC INSPECTION AND CLEANING

- i) As a minimum, Carbis recommends a monthly inspection of the assemblies. Harsh atmosphere and/or heavy use may dictate more frequent inspection and maintenance.
- ii) **NOTICE** When inspecting the gangway, ensure the equipment is properly “locked out and tagged” per safety regulations. As an added safety precaution when the gangway is fully raised and in the stored position, ensure the chains are pulled taut and the chain links properly engaged in the chain lock slots. Use a properly rated cargo strap to secure, if necessary.
- iii) Thoroughly clean the equipment ensuring walk surfaces are free of material that would otherwise interfere with the safe, slip-resistant feature of the walk surface. The walking-working surfaces should be kept clean and as dry as much as possible preventing inadvertent tripping hazards.
- iv) Carbis does not advocate pressure washer use for cleaning as it could damage bearing and cylinder seals, damage surfaces, and inadvertently remove safety labels. However, if used wear proper PPE and use lower pressures focusing on the walkway area to remove grease, product build up etc. Dictate cleaning frequency by the material build-up on the walk surfaces.
- v) Use proper fall protection equipment prior to conducting periodic maintenance.
- vi) Using a wrench or ratchet socket, check all bolted connections for a secure snug fit. Do not over torque.
- vii) Check all rotating/pivoting connections for proper fit, corrosion, and excessive wear or play. Repair or replace as required.
- viii) Inspect component surface welds including those hidden from view for cracks, distortion, and corrosion. If found discontinue use until addressing items. Contact Carbis for guidance. Never repair damaged parts. Replace damaged and missing parts only with Carbis approved parts.

- ix) If applicable, inspect rolling components and tracks for:
 - 1) Proper installation, security, and freedom of movement.
 - 2) Free of debris that would otherwise impede their rolling function.
 - 3) Free of flat spots and excessive wear. Replace as needed.
- x) Inspect track for excessive wear, cracks, loose or missing hardware. Ensure track securely mounted in ground.

c) GANGWAY OFF EQUIPMENT SPRING MAINTENANCE

i) Off Equipment Spring Maintenance (see Figure 6-1)

- 1) Inspect springs for corrosion and replace if excessive. Spring inspection should also include inspecting and verifying on each end the number of coils wound around the spring clip. A minimum wind of two full coils is required. If less than two full coils lubricate with a light oil and rotate clip with opened ended wrench until achieving a minimum overlap of two full coils.



FIGURE 6-1

d) GANGWAY SPRING ADJUSTMENT AND REPLACEMENT

*** Spring counterbalance system adjustment may be required for adjusting the amount of force necessary for the return of the gangway to the stored position. The springs are factory set for the gangway weight and any purchased options. These could include a seatainer end tread and/or a cage. All purchased options must be installed, and springs adjusted prior to use for the springs to properly function. See Figure 6-2 for TCGs with 4 steps or more or Figure 6-3 for a TCG with 3 Steps for adjustments procedures reference.**

- i) To adjust spring tension or replace a spring, follow the instructions noted below:
- ii) Spring Adjustment

- 1) Prior to adjustment, mark or measure the starting location as reference point. Perform spring adjustments in 1/2" increments while checking the balance by operating the gangway and adjusting the adjustment bolt until achieving a required rope pull of 50 pounds or less.
- 2) With the gangway in the stored position, the foot lock engaged, and using the correct wrench adjust the adjustment bolt by only turning by the bolt head. Do not attempt to loosen the double jam nuts. If the gangway is difficult to raise, using 1/2" increments adjust the spring ear upward. If the gangway will not stay down when lowered, using 1/2" increments adjust the spring ear downward until proper force is achieved.

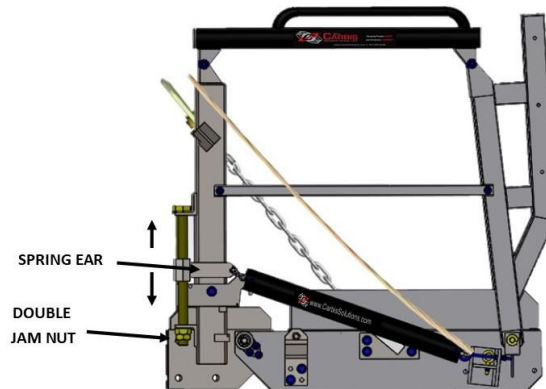


FIGURE 6-2 ADJUST VIEW FOR TCGs HAVING 4 OF MORE STEPS

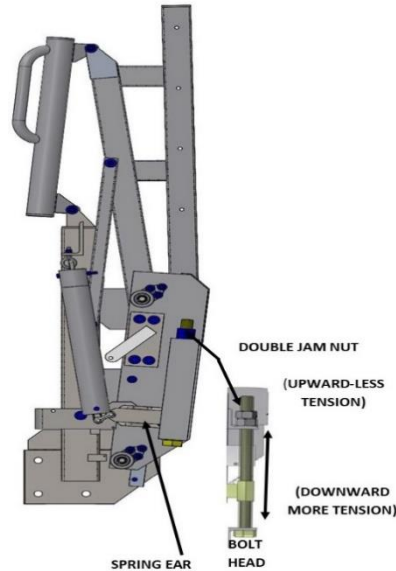


FIGURE 6-3 TCG 3-STEP GANGWAY ADJUSTMENT PERFORMED IN STORED POSITION (CUT AWAY VIEW)

iii) Gangway Spring Replacement:

- 1) If the gangway requires any spring counterbalance system component replaced, **adhere** to the following the procedures below. If any questions or concerns understanding the procedures, discontinue maintenance and contact call Carbis for technical assistance.
- 2) With the gangway in the stored position, using a cargo strap or rope secure the gangway ensuring the gangway does not inadvertently deploy during maintenance.

-
- 3) Using a paint marker, mark the current ear location on the threaded rod.
 - 4) Adjust the spring ear upward until relieving all spring tension.
 - 5) Continue by following the supplied spring counterbalance system replacement instructions.
 - 6) Reconnect hardware as instructed.
 - 7) Adjust the ear to its original position.
 - 8) Untie the gangway and test the unit.
 - 9) If adjustments are required, see iv) Spring Adjustment

iv) Unlocking the Spring Adjustment Nut:

If gangway spring adjustment has not been performed for a long period, under certain environmental conditions, the spring adjustment nuts may seize on the threads. If this condition occurs, to unlock the nut perform the following steps:


- 1) Ensure the gangway is locked in the stored position, foot lock engaged, and the chain taut and engaged in the chain lock slot.
- 2) Mark the current nut location on the long-threaded adjustment bolt.
- 3) Spray a penetrating lubricant catalyst onto the threads of the bolt each side of the nut and let it sit for approximately 20 minutes.
- 4) Using a 2"/50mm wrench, turn the nut ear into the gangway base tread upright securing the nut. After securing the nut, apply enough torque to turn the bolt while the nut remains fixed. **NOTE:** Pneumatic power can be used if available.
- 5) Once the nut freely turns on the bolt threads, adjust the nut thread position to the original mark.

e) FOOT LOCK ADJUSTMENT PROCEDURE (IF INSTALLED)

- i) If the gangway foot lock is misaligned or the locking pin does not properly engage with the foot lock mechanism, follow the procedure below for realigning the locking pin with the foot lock mechanism.
- ii) The following procedure applies to all Carbis manually operated TCG-2000 gangways with a single foot lock:
 - 1) For safety reasons, ensure the system is properly locked and tagged out preventing inadvertent gangway operation during the foot lock adjustment procedure.
 - 2) Ensure the gangway is fully raised and locked in the stored position.
 - 3) Adjust the chain on one side of the gangway sufficiently taut with the chain link engaged in the chain lock slot securing the gangway in the stored position.
 - 4) Loosen the two locking pin assembly bolts.
 - 5) Center the foot lock mechanism locking pin between the pin and the foot lock without the foot lock contacting the pin.
 - 6) With the locking pin centered within the foot lock, tighten the locking pin bolts.
 - 7) For gangways with double foot locks, repeat steps (3), (4), and (5) to adjust the other foot lock.
 - 8) Reposition the chains on each side of the gangway with the next to the last link engaged in the chain lock slot before operating.

- 9) Operate the gangway through at least three cycles verifying the foot lock is properly functioning in both lock and unlock positions.
- 10) If the above procedure does not properly realign the locking pin with the foot lock mechanism, discontinue gangway service and contact Carbis for further instructions

f) TCG S-910.1 TRACK LOCK MECHANISM MANUAL BRAKE ADJUSTMENT PROCEDURES

- i) Manual Brake adjustment is considered an integral part of this instruction manual. The manual brake is a sub-assembly of the TCG S-910.1 Track Lock Mechanism associated with manually tracking gangways.
- ii)  **WARNING** Only qualified maintenance personnel trained in safe and proper maintenance procedures should perform adjustments on Carbis equipment in accordance with the most recent industry practices. Failure to do so could cause personnel injury or damage to equipment.
- iii) Prior to the adjustment of any component, it is imperative that system Lockout/Tagout Procedures be performed per company safety regulations and requirements.
- iv) The manual brake can be adjusted per the procedure below to adequately lock the gangway in place while stored in the upright position. For describing the adjustment procedure, the following components of the manual brake sub-assembly are identified in **FIGURE 6-5** below are noted in the procedure:
 - 1) Lever
 - 2) Lever Clamp
 - 3) 3/4" Nut
 - 4) 5/16" Jam Nut
 - 5) Threaded Rod
- v) Use **FIGURE 6-4** below as a guide while performing the following steps to adjust the manual brake:
 - 1) With the lever in the upright unlocked position, secure the lever clamp in place then loosen the 5/16" jam nut on the threaded rod. Next loosen the 3/4" nut on the lever clamp.
 - 2) With both nuts loosened and the lever in the upright unlocked position, manually turn the lever clamp one complete turn (360 degrees).
 - a) Turning the clamp clockwise tightens the brake engagement increasing the braking strength.
 - b) Turning the clamp counterclockwise loosens the brake engagement decreasing the braking strength.
 - 3) With the lever in the upright unlocked position, secure the lever clamp in place and then tighten the 3/4" nut on the lever clamp. Next tighten the 5/16" jam nut on the threaded rod.
 - 4) Push the lever down to the horizontal locked position and test the brake engagement. If a pull tester tool is available, a properly adjusted manual lock braking mechanism should provide 300 lbs. of push-pull force.
 - 5) If the brake engagement is insufficient or if the lever is still too tight, repeat steps (1) thru (4) to

achieve the desired results.

- vi) For any assistance, replacement parts, comments, or questions, contact Carbis. Please have your model number, serial number, or drawing number available to expedite your request.

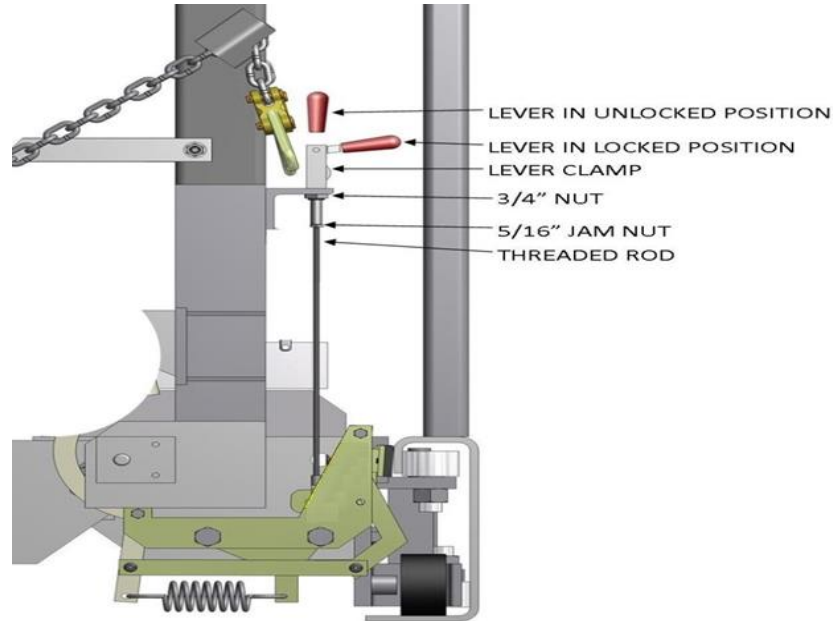


FIGURE 6-4

TCG-S910.1 TRACK LOCK MECHANISM MANUAL BRAKE SUB-ASSEMBLY

7) INSTALLATION AND SET UP

SEE THE FINAL DRAWINGS, ASSEMBLY DRAWINGS, AND POWER SYSTEM DRAWINGS ASSOCIATED WITH THIS MANUAL

a) GENERAL

- i) **NOTICE** **AVOID PROBLEMS WITH STAINLESS STEEL BOLTS.** Keep bolts and nuts free of grime and other contaminants from entering threads. Lubricate stainless steel bolts and nuts prior to tightening. Avoid the use of impact speed wrenches. The impact wrench will introduce heat and cause the bolt to seize.
- ii) **GANGWAY LIFT POINTS** See **FIGURE 7-1** and **FIGURE 7-2.**
 - 1) When lifting the gangway with fixed uprights in **FIGURE 7-1** below, secure the gangway to an external lifting device at the lift points identified by the yellow "LIFT HERE" labels (2 locations) posted on the outboard upright top horizontal cross member outside faces as identified. For adjustable uprights in **FIGURE 7-2**, secure the gangway to an external lifting device at the lift points identified by the yellow "LIFT HERE" labels (4 locations) posted on the outboard upright bolt support channel outside faces as identified.

- iii) **WARNING** Never use the LIFT HERE area as a manual means to raise or lower an installed gangway. Injury to personnel or and damage to equipment can occur. Follow proper procedures for gangway raising and lowering.

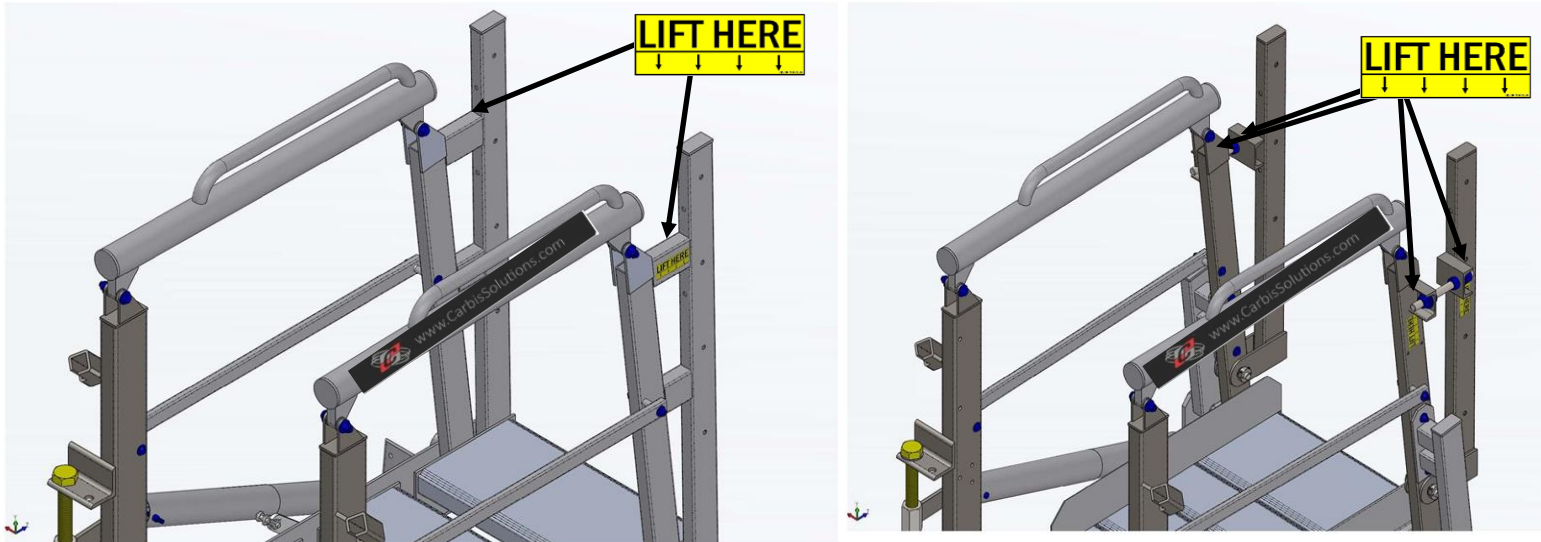


FIGURE 7-1 Labels placed on outside of Fixed Uprights (2 locations) with arrows facing downward and FIGURE 7-2 Labels placed on outside of Adjustable Uprights (4 places) with arrows facing inward

b) SITE PREPARATION

- i) **NOTICE** Any new or existing structural components shall be true and plumb before attaching Sam Carbis Solutions Group, LLC equipment. The structure shall also be enough for supporting all imposed equipment loads. Improper load support can negatively affect equipment operation.
- ii) It is the owner's responsibility to prepare the site prior to installing Carbis equipment. Site preparation includes, but is not limited to, the following:
- 1) Removal and/or relocation of existing obstructions.
 - 2) Field drilling mounting holes as required per mounting hole patterns as shown on the Final Drawings and/or Assembly Package.
 - 3) Adding any new customer-supplied members to existing structures as required by the Carbis Equipment.
 - 4) Any foundation work required by Carbis equipment should be constructed using only the information on the Final Drawings.

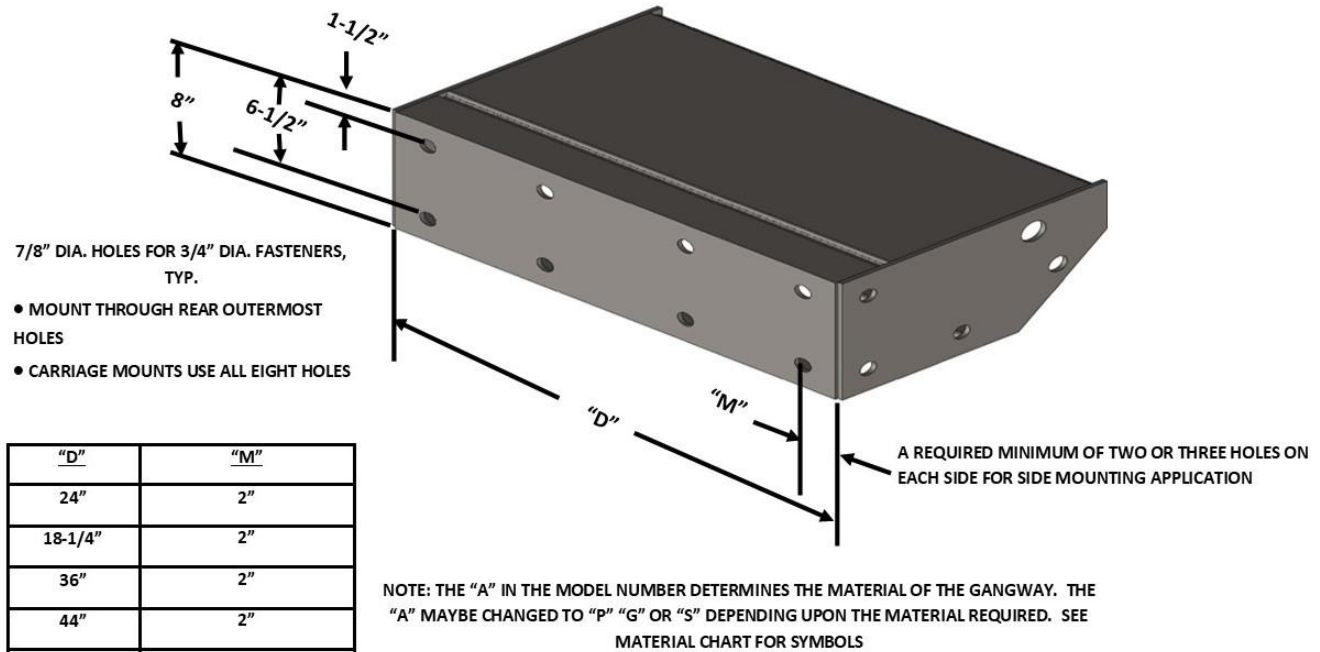
c) PRE- INSTALLATION INSPECTION AND OFF-LOADING

- i) **NOTICE** The gangway assembly ships with the chain links engaged in the chain lock slots securing the gangway in the stored position. Do not disengage the chain links from the chain lock slots until **after** securely installing the gangway base tread.
- 1) Carbis properly packages equipment and components in the best manner possible for safe shipping and practical off-loading purposes.
 - 2) It is the owner's responsibility for ensuring shipment completeness validating the shipped equipment with the identified Parts and the Hardware Component Lists. Check for any shipping damages and missing components and report any discrepancies to Carbis before continuing.
 - 3) It is also the owner's responsibility for providing appropriate off-loading devices to safely handle Carbis equipment and components. When offloading pay strict attention to eccentric loads such as counterweighted components.
 - 4) Some components may ship pre-assembled.

d) ASSEMBLY**i) REQUIRED STRUCTURAL CONNECTION BOLT TENSIONS**

- 1) A325 Bolts - Snug Tight Condition
 - a) Snug tight condition is defined as the tightness when all plies in a joint are in firm contact. Attain snug condition by a few rotations of an impact wrench or the full effort of a man using an ordinary wrench. Carbis' standard bolt installation is snug tight in a bearing type connection. Different requirements will be specifically detailed on the drawings.
 - b) Any bolts less than 1/2" diameter, torque to 60 in.-lbs.
 - 2) Stainless Steel Hardware - Snug Tight Condition
 - a) Snug Tight condition defined same as A325 bolts.
 - b) Keep bolts and nuts free of grime and other contaminants that may get into threads. Lubricate stainless steel bolts and nuts prior to tightening.
 - c) Any bolts less than 1/2" diameter, torque to 60 in.-lbs.
- ii) A qualified contractor with an understanding of Carbis equipment should perform the final assembly and installation of the Carbis equipment in conformity with industry standards, local building code requirements, and in accordance with the most recent industry practices for safe rigging. The procedures outlined in this section describe safe and practical sequences. Any deviation preferred by the contractor must be in conformance with the above- referenced standards, codes, and practices. See Final/Assembly Drawing for Carbis-supplied components and hardware lists. Foundation anchor bolts to be supplied by customer.

e) TCG-2000 GANGWAY MOUNTING SPECIFICATIONS



"D"	"M"
24"	2"
18-1/4"	2"
36"	2"
44"	2"
48"	2"
60"	2"
MATERIAL CHART	
TYPE	MATERIAL
S	MILLED STEEL
R	PRIMED STEEL
G	GALVANIZED STEEL
A	ALUMINUM

FIGURE 7-3

f) GANGWAY MOUNT INSTALLATION

- Carbis will supply the mounting hardware for Carbis supplied gangway mounted platforms. Otherwise use customer-supplied hardware when installing the gangway mount to a platform per the following sequence:
 - Bolt the gangway base tread to the platform structure.
 - Disengage the chains from holding the gangway in the stored position and reposition the chains with the next to the last link engaged in the chain lock slot before beginning operations. (**NOTE:** If cage option is included, do not lower gangway until the cage is installed).

g) PIVOT MOUNT OPTION (SEE FIGURE 7-4)

- Carbis will supply the mounting hardware for Carbis supplied pivot-mounted gangway platforms. Otherwise use customer-supplied hardware when installing the gangway pivot mount to a platform per the following sequence:
 - Attach the pivot mount receiver sleeve support component (face mounted or underslung mounted)

- to the platform structure.
- 2) Install the wear pad on the top of the sleeve opening.
- 3) Insert the base tread pivot post into the sleeve.
- 4) Disengage the chains from holding the gangway in the stored position and reposition to the next to last link engaging in the chain lock slot to before beginning operation.

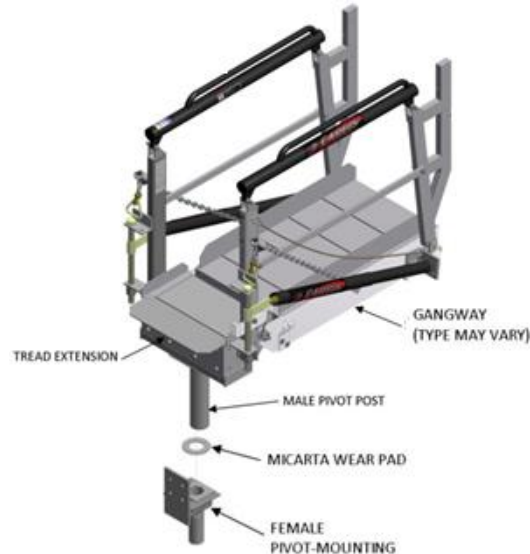


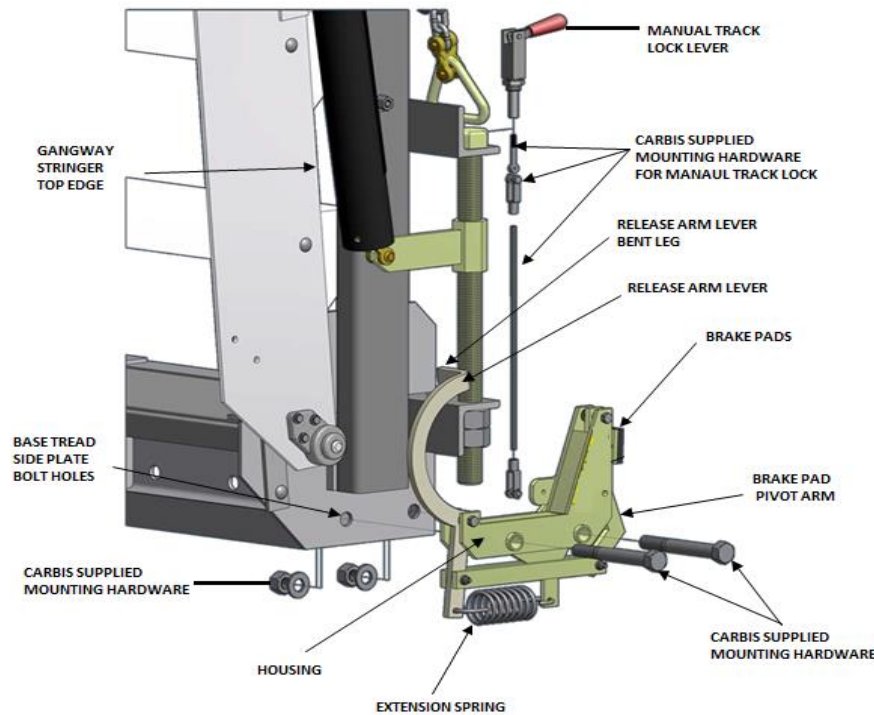
Figure 7-4

h) TRACK AND CARRIAGE OPTION WITH TCG-S910.1 TRACK LOCK MECHANISM

- i) For existing platforms, **always** use Carbis special bolts (199) to mount the tracks to the platform.
- ii) For Carbis-supplied platforms, Carbis will drill the bolt holes and supply the tracks mounting bolts (199).
- iii) Install the track and carriage per the following sequence. For Carbis-supplied platforms with built-in tracks, skip steps (1) and (2):
 - 1) Bolt track section(s) to platform.
 - 2) After all track sections have been installed, tighten track mounting bolts.
 - 3) Insert track stop components at one end of the track run.
 - 4) Slide gangway into the track section.
 - 5) Insert track stop components at opposite end of the track run.
 - 6) With the gangway locked in the upright stored position, push the manual track lock lever down to engage the brake and prevent the gangway from free rolling along the track.
 - 7) Disengage the chains from holding the gangway in the stored position and reposition the chains with the next to the last link engaged in the chain lock slot before beginning operation.
 - 8) For TCG-S910.1 Track Lock Mechanism retrofit on an existing gangway, see next paragraph for installation procedure.

i) TCG-S910.1 TRACK LOCK MECHANISM INSTALLATION

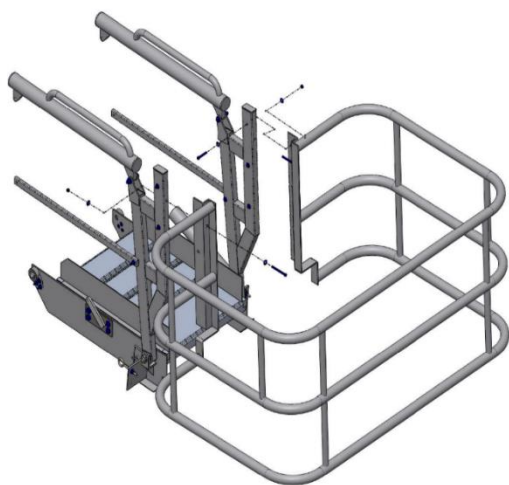
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- i) The following maintenance procedure also applies to both the replacement and retrofit of a TCG-S910.1 Track Lock Mechanism on an existing tracking gangway system.
- ii) Using **FIGURE 7-5** below as a guide, install or replace the TCG-S910.1 Track Lock Mechanism per the following steps:
- 1) Ensure the gangway is locked in the upright stored position.
 - 2) Manually pivot the curved release lever arm engaging the stored gangway stringer top edge. If the lever arm is too tight to manually hold, temporarily tie the arm top bend to the brake pad pivot bolt using string or tape to sufficiently hold the arm in place.
 - 3) Position the Track Lock Assembly so the lever arm bent leg passes over the stored gangway stringer top edge aligning the bolt sleeves with the base tread side plate bolt holes.
 - 4) Using Carbis-supplied hardware, bolt the assembly to the base tread side plate.
 - 5) If the release lever arm was tied or taped, release it allowing the bent leg of the release lever arm to engage the stringer top edge.
 - 6) With the gangway in the raised stored position, ensure the brake pad disengaged the roller track and the gangway rolls freely when manually pushed in either direction.
 - 7) Check the brake pad function by lowering the gangway from the stored position to completely disengage the release lever arm from the gangway stringer. The brake pad should fully engage the roller track preventing the gangway from tracking. Apply enough push/pull pressure on the gangway verifying the gangway remains in stationary in place.
 - 8) From the stored position, raise and lower the gangway several times verifying the TCG S910.1 Track Lock Mechanism operation.
 - 9) Install the manual track lock lever and Carbis-supplied mounting hardware as shown in **FIGURE 7-5** below.
 - 10) Ensure the manual track lock brake correctly engages the track firmly holding the gangway in place.



TCG-S910.1 RACK LOCK MECHANISM FIGURE 7-5

j) CAGE ASSEMBLY OPTION

- i) For gangways with included safety cage options, use Carbis-supplied hardware to install the cage per **FIGURE 7-6** below.
 - 1) Gangway and cage type may vary from that shown; however, the bolting arrangement and configuration are the same. Refer to the Final Drawings and/or Assembly Drawings to determine the site-specific cage position requirement.
 - 2) Assembly Package determines the site-specific cage position requirement. **Ensure fall gaps limits are equal to or less than 19"/48cm.**
 - 3) For gangway with **optional** cage leveling mechanism, inspect the cage for level and adjust the cage leveling mechanism as required per outlined the steps.
 - 4) NOTE: Gangway and cage configuration may vary from that shown in **Figure 7-6**.



HARDWARE LIST				
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	MATERIAL
1	6	BOLTSS.375X2.5	3/8-16 X 2 1/2 HEX C/S 18-8 SS	18-8 STAINLESS STEEL
2	2	BOLTSS.375X4	3/8-16 X 4 HEX C/S 18-8 S.S.	18-8 STAINLESS STEEL
3	8	NUTSS.375	3/8-16 HEX NUTS 18-8 STAINLESS STEEL	18-8 STAINLESS STEEL
4	16	WASHERFTSS.375	3/8 X 1 FLAT WASHER 18-8 S.S.	18-8 STAINLESS STEEL

* QTY'S SHOWN ARE FOR ONE (1) BOX OF CAGE HARDWARE

FIGURE 7-6 (CAGE MAY VARY. SEE DRAWINGS FOR SPECIFIC CAGE)

k) CAGE LEVELING PROCEDURE SEE FIGURE 7-7.

- i) If the safety cage becomes out of level, adjust the cage back to the level position by equally adjusting both left and right uprights: **NOTE: Do NOT make any adjustments to the nuts on the adjustable outboard uprights.**
 - 1) To RAISE the cage:
 - a) Back off NUT 2 on the fixed outboard upright.
 - b) Tighten NUT 1 until the cage becomes level.
 - c) Tighten NUT 2.
 - 2) To LOWER the cage:
 - a) Back off NUT 1 on the fixed outboard upright.
 - b) Tighten NUT 2 until the cage becomes level.
 - c) Tighten NUT 1.

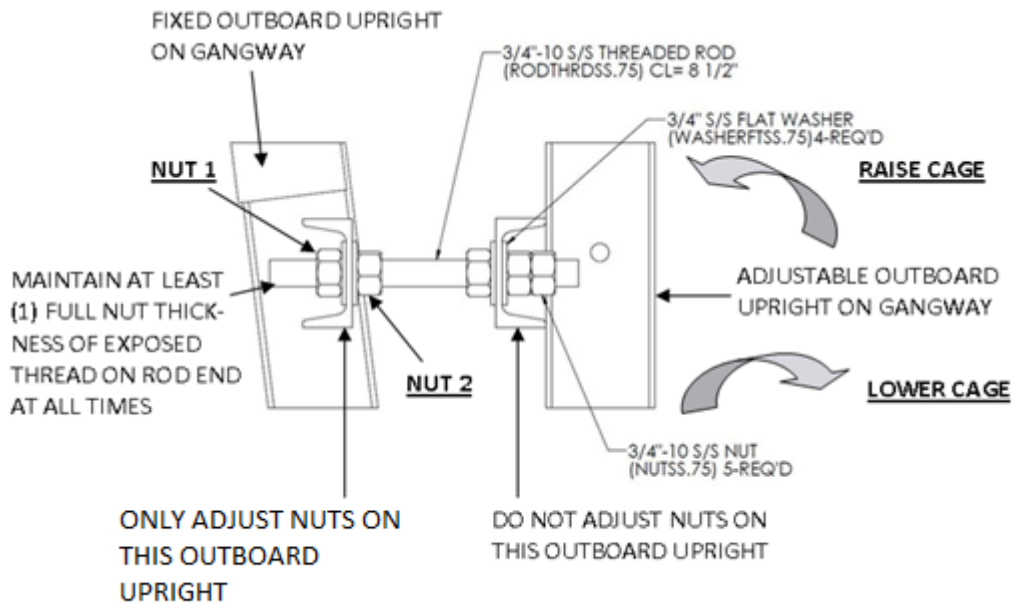


FIGURE 7-7

I) LRD™ INSTALLATION PROCEDURE

- i) The LRD™ assembly is normally factory installed and will not require any additional assembly. However, if installing an LRD™ assembly follow the directions below.
- ii) Per **FIGURE 7-8**, perform the following steps:
 - 1) The supplied LRD™s are installed with the operating arm extending outward of the gangway.
 - 2) Spot the location for two holes by measuring down a distance equal to DIM "A" from the upper end of the 3" X 1-1/2" aluminum gangway post and 1/2" and 2-1/2" from the edge as shown in **FIGURE 7-8**. Drill a 5/16" diameter hole at each location (two holes total) completely through the gangway post.
 - 3) Assemble the extension tube mounting bracket at the location of the drilled holes using the supplied two 1/4" X 2-3/4" long bolts, two washers, and two lock nuts. Tighten until lock nut is fully engaged and snug tight.
 - 4) Measure and mark a location 7" from the handrail pivot bracket platform side as shown in **FIGURE 7-8**. With the LRD™ totally assembled, center the linear rail mounting bracket on the marked location. Install the supplied two U-bolts, spacers, and washers and snug tight.
 - 5) Test Lever Arm Release Handle operation by raising and lowering the gangway. Pull the LRD™ rope disengaging the locking mechanism and raising the gangway.
 - 6) If retrofitting an existing gangway with the LRD™ assembly, the existing lifting rope can be removed. Perform the lifting function using the rope attached to the LRD™ lever arm.

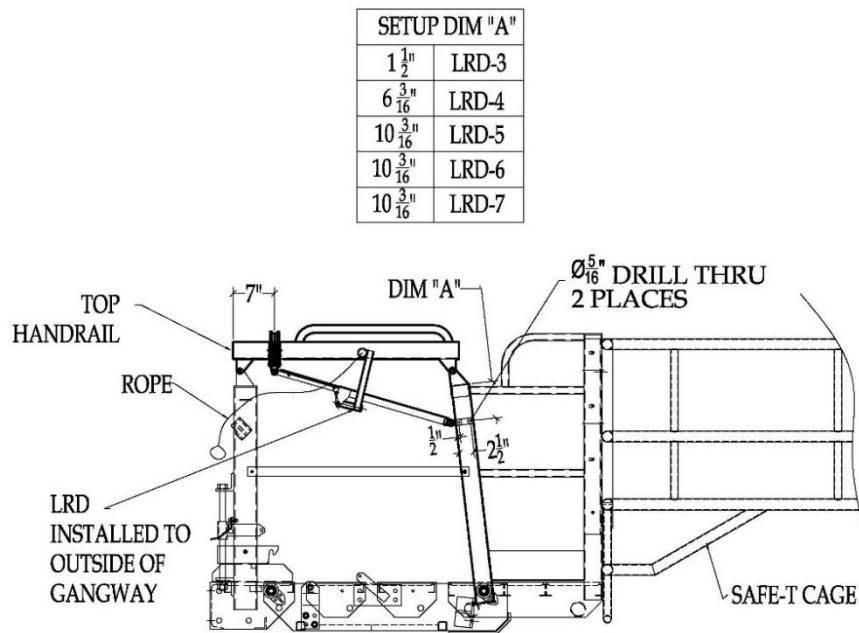


FIGURE 7-8 LRD™ INSTALLATION LOCATION

NOTE: Gangway and cage configuration may vary from that shown.

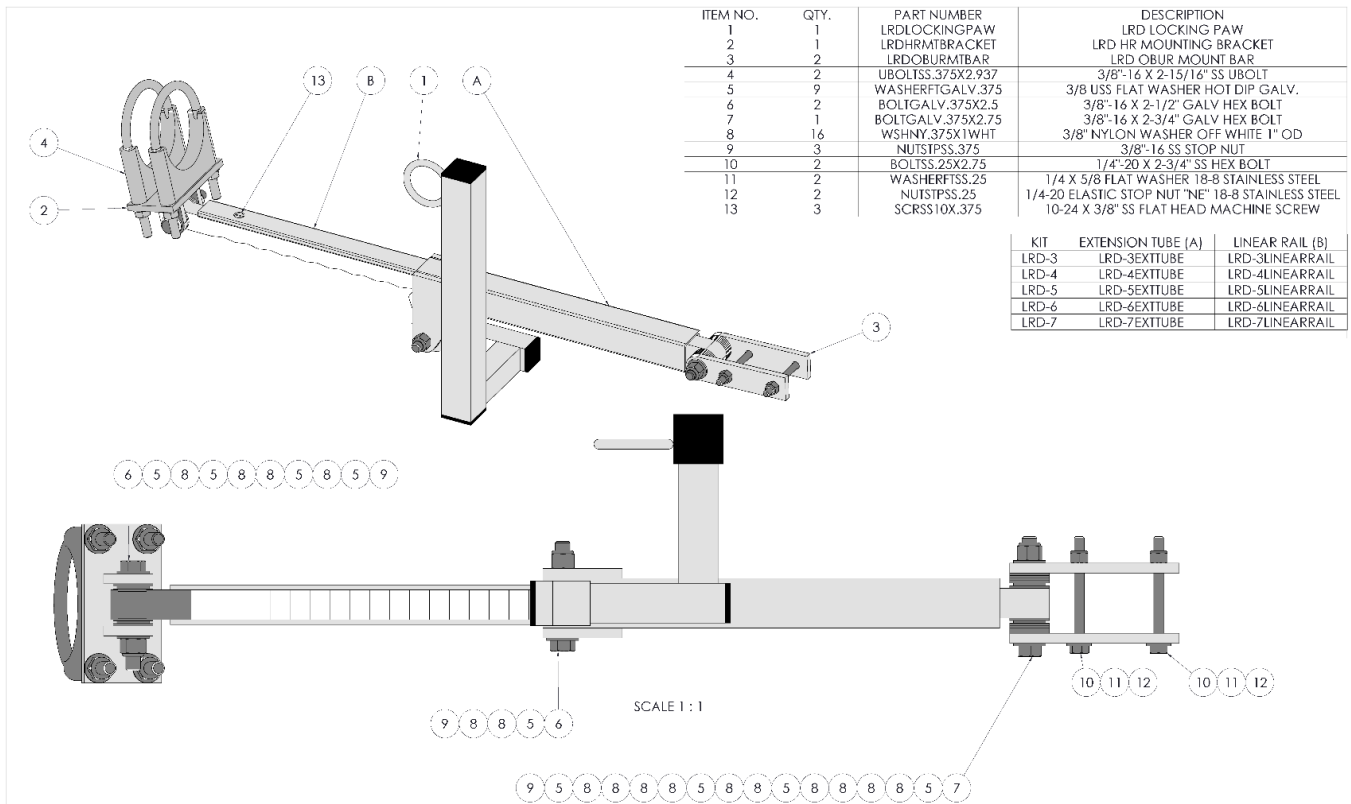
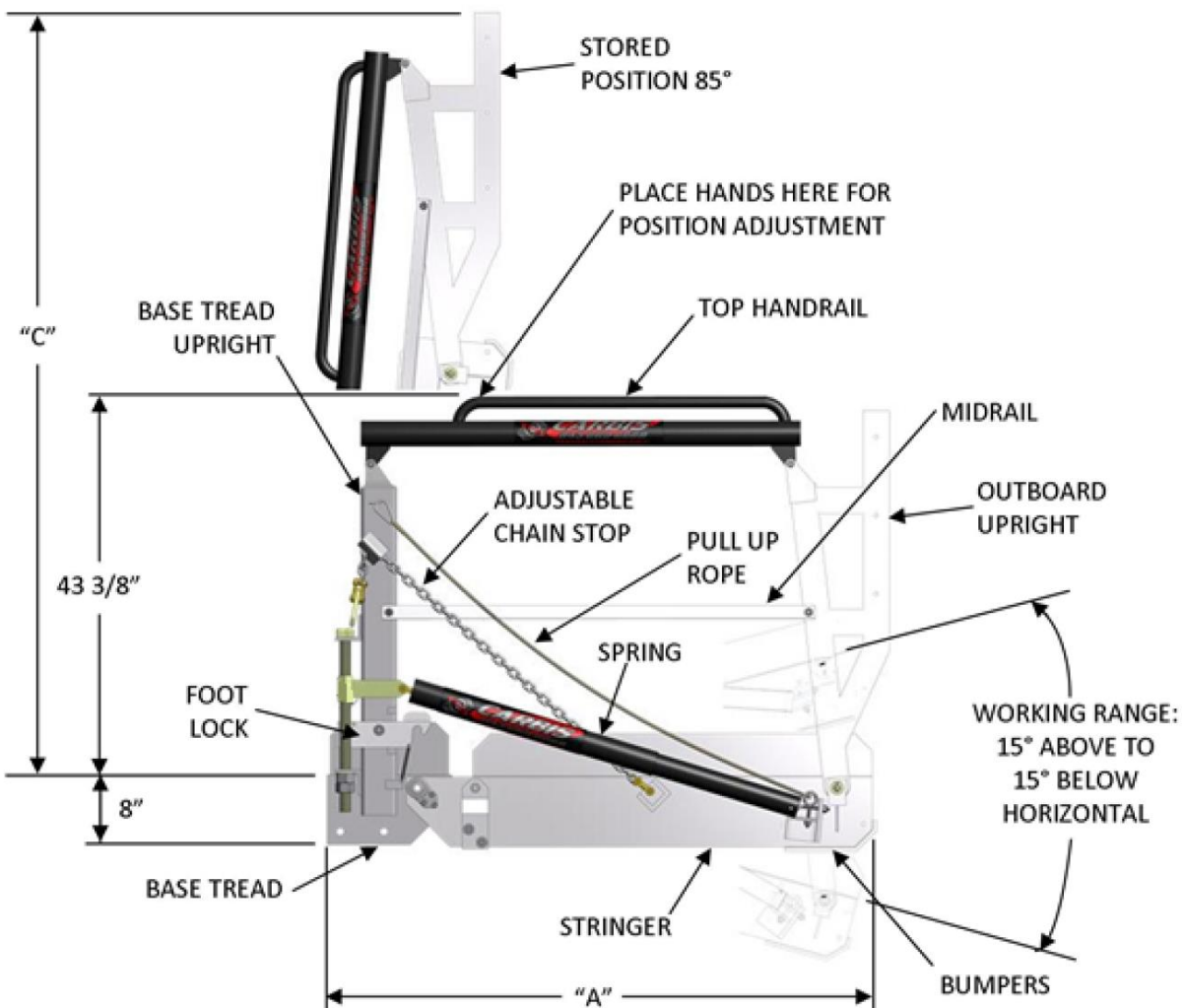
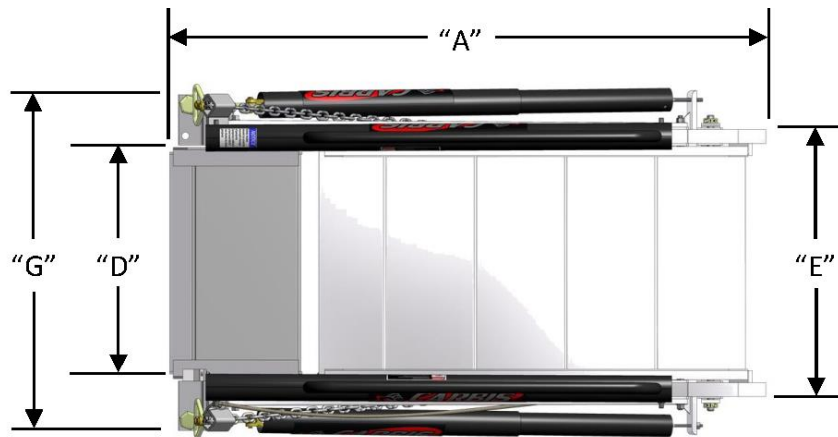


FIGURE 7-9 OPTIONAL LIFT RESTRICTING DEVICE (LRD)™ GENERAL SPECIFICATIONS

8) SPECIFICATION SHEETS AND DRAWINGS

a) MECHANICAL DRAWINGS AND SPECIFICATIONS



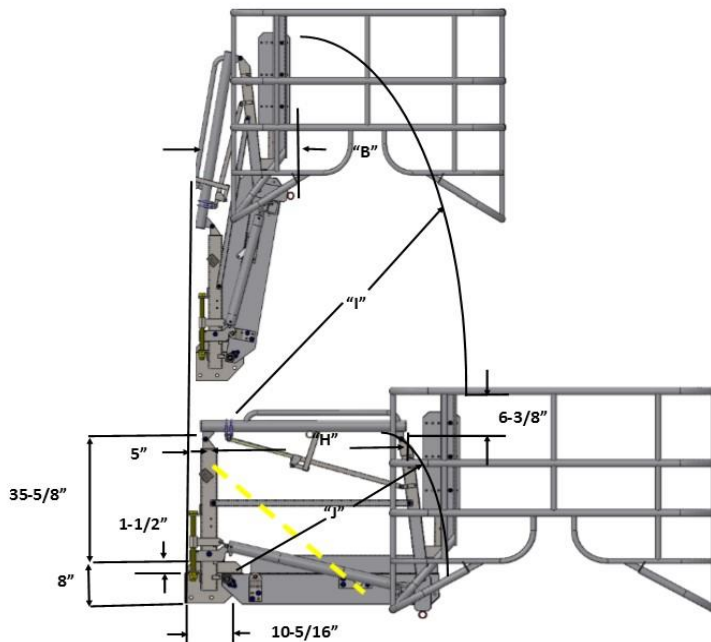
b) TCG-2000 GANGWAY MODEL SPECIFICATIONS

MODEL NO.	"A"	"B"	"C"	"H"	"I"	"J"
TCG-2000-3	"39"	19 7/8"	66"	24"	35 3/8"	28 1/4"
TCG-2000-4	"51"	20 7/8"	78"	36"	47 3/8"	40 1/4"
TCG-2000-5	"63"	22"	90"	48"	59 3/8"	52 1/4"
TCG-2000-6	"75"	23"	102"	60"	71 3/8"	64 1/4"
TCG-2000-7	"87"	24"	114"	72"	83 3/8"	76 1/4"
TCG-2000-8	"99"	25 1/8"	126"	84"	95 3/8"	88 1/4"

- ALL ALUMINUM GANGWAYS WILL HAVE GALVANIZED STEEL BASED TREADS
- AUTOMATIC FOOT LOCK IN 85 DEGREE STORED POSITION
- PADDED LOWER EDGE PREVENTS VEHICLE DAMAGE

"D"	"E"	"G"
24"	29"	"38"
18 1/4"	23-1/4"	32 1/4"
36"	41"	50"
44"	49"	58"
48"	53"	62"
60"	65"	74"

ALL OPTIONAL MOUNTING ANGLES FOR GANGWAYS ARE MADE OF STEEL



LOAD CAPACITY	
FIXED MOUNT:	500LBS/227KG
PIVOT MOUNT:	500LBS/227KG
TRACK MOUNT:	500LBS/227KG

OPTIONS

- **WALKING SURFACE**
OPEN METAL PLANK
FIBERGLASS GRATING
BAR GRATING
- **MATERIAL OPTIONS**
S- MILLED STEEL
P- PRIMED STEEL
G-GALVANIZED STEEL
- **COUNTERBALANCES OPTIONS**
SPRINGS (STANDARD)
HYDRAULIC (OPTIONAL)
PNEUMATIC (OPTIONAL)

NOTE: DEPENDING UPON THE SIZE OF THE GANGWAY AND OPTIONS PURCHASED, STANDARD SPRING COUNTERBALANCE MAY NOT BE AVAILABLE FOR THAT GANGWAY

THE TCG-2000 GANGWAYS MEET OR EXCEED OSHA REGULATIONS AS WE INTERPRET THEM.

FIGURE 8-1 TCG-2000 GANGWAY GENERAL SPECIFICATIONS