Scorpion Trailer Attenuator Installation, Maintenance, and Repair Manual

10002-TL3-12TA

10002-TL2-12TA

TrafFix Devices Inc.

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PN 13192 Rev A 04/02/09
Safety Instructions
Scorpion Trailer Attenuator (TA)

A. Before attempting to install or operate the Scorpion 10002 TA this manual should be read and understood. Those areas with warnings or cautions should be carefully followed.

B. Before operation on the roadway, check all fasteners between the TARS, Strut and Cartridge areas for tightness and excessive wear.

C. Check lug nuts for proper torque values to 75 ft-lbs.

D. Check that the single crank jack is fully retracted and up in the locked pinned position before transport.

E. Inspect all lights for proper function.

F. For correct TA operation in the use mode, the entire TA should be 12” ± 1” [30.48cm ± 2.54] cm above the ground and horizontal to the roadway.

G. The responsible agency for the truck should check that the following specifications are met. The truck should have a minimum weight of 10,000 lbs. to provide correct performance. It should be equipped with proper operator safety equipment such as seat belts and headrest, etc. If ballast is needed, it should be properly anchored to the truck frame to prevent movement during an impact.

H. Before disconnecting the TA from the truck, make sure the TA rear wheels are chocked to prevent rolling when removed from truck.

Special Warnings

1. After a vehicle impact with the TA, do not drive the truck with the damaged TA. Remove the TA at the pintle hook and have the TA transported back to the maintenance yard.

2. Check the TA model to make sure that the posted speed matches the TA rating.
General Maintenance

<table>
<thead>
<tr>
<th>Item to Service</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>1. Check all fasteners between the TARS, Strut and Cartridge areas for tightness and excessive wear</td>
<td>Check before driving</td>
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<tr>
<td>2. Check for levelness and that the height 12” (\pm 1) [30.48cm (\pm 2.54)] clearance with the truck ballasted to 20k.</td>
<td>Check before driving</td>
</tr>
<tr>
<td>3. Check (\frac{1}{4})” bolts that attach all four modular energy absorbers for tightness</td>
<td>Check before driving</td>
</tr>
<tr>
<td>4. Grease jack, caster, and wheel bearings</td>
<td>As required</td>
</tr>
<tr>
<td>5. Replace light bulbs</td>
<td>As required</td>
</tr>
</tbody>
</table>

After Impact Removal & Repairs

1. Have an insurance inspector inspect the damage prior to performing any work.

2. Disassemble system and mark for replacement, all bent and damaged parts.

3. Write down all part numbers for those items that need replacing – only TrafFix replacement parts can be used for warranty validity.

4. After receiving replacement parts verify that the new part fit against the older parts and proceed to assemble per the installation manual.
Limitations and Warnings

The Scorpion 10002 (Trailer Mounted Attenuator), TL-2, has been tested and evaluated per the recommendations of the National Cooperative Highway Research Program (NCHRP) Report 350. It is capable of decelerating and stopping light and heavy weight vehicles (820 kg. and 2000 kg.) in accordance with the criteria of tests 2-50 and 2-51 for TL-2 certification (70 kph). Reference FHWA letter HSSD/CC-65D for additional information.

Also, the Scorpion 10002 (Trailer Mounted Attenuator), TL-3, is capable of decelerating and stopping light and heavy weight vehicles (820 kg. and 2000 kg.) in accordance with the criteria of tests 3-50, 3-51, and optional tests 3-52 and 3-53 for TL-3 certification (100 kph.). Reference FHWA letter HSSD/CC-65C for additional information.

To achieve acceptable impact performance, it is recommended that the Scorpion 10002 be attached to a host vehicle with a minimum weight of approximately 10,000 lbs (4535 kg). The entire TA must be mounted level with the ground and the bottom of the TA must be 12” ± 1” (305 mm. ± 25 mm.) above the ground.

Impacts that exceed the design capabilities described in this manual (vehicle weight, speed, and impact angle) may not result in acceptable crash performance as described in NCHRP 350 relative to structural adequacy, occupant risk and vehicle trajectory factors.

Operator’s Deployment Instructions

1. For deployment of TMA in stationary applications, truck drive/operator must ensure truck is parked with emergency brake on and the transmission is engaged in gear or park.
2. For night operation, truck drive/operator must check and ensure that the side and rear light marker lights are switched on via the truck light switch.
TRAFFIX DEVICES TRAILER ATTENUATOR
ATTACHES DIRECTLY TO THE PINTLE HOOK
AND REQUIRES LITTLE OR NO ADDITIONAL
INSTALLATION OR TRUCK MODIFICATION BEYOND
THE FACTORY INSTALLED FRAME PLATE.

PRE-IMPACT CONDITION
POSITION DURING NORMAL
OPERATIONAL USE

TELESCOPING ANTI-ROTATION SYSTEM (TARS)

POST-IMPACT CONDITION
POSITION AFTER IMPACT EVENT
HAS OCCURRED

TELESCOPING ANTI-ROTATION SYSTEM (TARS)
STOPS UP AGAINST THE FRAME PLATE
PREVENTING ANGULAR ROTATION DURING THE IMPACT
FULL MOUNTING PLATE PREPARATIONS FOR THE TRAFFIX DEVICES SCORPION TRAILER ATTENUATOR W/ TELESCOPING ANTI-ROTATION SYSTEM (TARS)

PLEASE REFERENCE FHWA ACCEPTANCE LETTER HSSD/CC-65B AND CC-65C FOR PROPER HOST VEHICLE WEIGHT

LUNETTE EYE
6" [15.24] TOTAL VERTICAL HEIGHT ADJUSTABILITY

TARS IMPACT ZONE LEFT

20 TON PINTLE HOOK POSITION 28" FROM THE GROUND TO THE CENTER OF THE LUNETTE EYE

TARS IMPACT ZONE RIGHT

GROUND LEVEL


FULL MOUNTING PLATE PREPARATIONS FOR THE TRAFFIX DEVICES SCORPION TRAILER ATTENUATOR W/ TELESCOPING ANTI-ROTATION SYSTEM (TARS)

PLEASE REFERENCE FHWA ACCEPTANCE LETTER HSSD/CC-65B AND CC-65C FOR PROPER HOST VEHICLE WEIGHT

LUNETTE EYE
6" [15.24] TOTAL VERTICAL HEIGHT ADJUSTABILITY

TARS IMPACT ZONE LEFT

20 TON PINTLE HOOK POSITION 28" FROM THE GROUND TO THE CENTER OF THE LUNETTE EYE

TARS IMPACT ZONE RIGHT

GROUND LEVEL

1/2" OR THICKER FRAME PLATE W/ PINTLE HOOK 34" [86.36] WIDTH

ADDITIONAL SUPPORT PLATE MUST BE ADDED WHEN FRAME PLATE DOES NOT DROP LOW ENOUGH FOR TARS IMPACT ZONE

GROUND LEVEL

10" [25.40]

12" [30.48]

TRAFFIX DEVICES SCORPION TRAILER ATTENUATOR W/ TELESCOPING ANTI-ROTATION SYSTEM (TARS)
PLEASE REFER TO FHWA ACCEPTANCE LETTER HSSD/CC-65B AND CC-65C FOR PROPER HOST VEHICLE WEIGHT

ADDITIONAL SUPPORT PLATE FOR TARS IMPACT ZONE

HEIGHT OF ADDITIONAL PLATE WILL VARY DEPENDING ON HEIGHT OF FRAME

ADDITIONAL SUPPORT PLATE FOR TARS IMPACT ZONE ALIGNMENT 1/2" THK X 6" A-36 STEEL [1.27] X [15.24]

ADDITIONAL SUPPORT PLATE FOR TARS IMPACT ZONE ALIGNMENT 1/2" THICK X 6" A-36 STEEL [1.27] X [15.24]

TARS IMPACT ZONE

TARS IMPACT ZONE

GUSSET SUPPORT TUBE

DRAWN BY: Mary Dralle DATE: 6-28-07
CHECKED BY: APPROVED BY:
FULL MOUNTING PLATE PREPARATIONS FOR THE TRAFFIX DEVICES SCORPION TRAILER ATTENUATOR WITH THE TELESCOPING ANTI-ROTATION SYSTEM (TARS)
PLEASE REFERENCE FHWA ACCEPTANCE LETTER HSSD/C C - 65B AND C C - 65C FOR PROPER HOST VEHICLE WEIGHT
FRAME UNDER RIDE SUPPORT TUBES CAN BE USED TO CREATE SUPPORT FOR TARS IMPACT ZONE

FRAME PLATE WIDTH FITS WITHIN THE STANDARD 34" [86.36]
FRAME WIDTH DIMENSION

TARS UNDER RIDE SUPPORT TUBES FOR THE TRAFFIX DEVICES SCORPION TRAILER ATTENUATOR W/THE TELESCOPING ANTI-ROTATION SYSTEM (TARS)

PLEASE REFERENCE FHWA ACCCEPTANCE LETTERS HSSD/CC-65B AND CC-65C FOR PROPER HOST VEHICLE WEIGHT
TRAFFIX DEVICES SCORPION TRAILER ATTENUATOR W/TELESCOPING ANTI-ROTATION SYSTEM (TARS)
PLEASE REFERENCED FHWA ACCEPTANCE LETTER HSSD/CC-65B AND CC-65C FOR PROPER HOST VEHICLE WEIGHT

FRAME UNDER RIDE SUPPORT TUBES

TARS IMPACT ZONE RIGHT

TARS IMPACT ZONE LEFT

20 TON PINTLE HOOK POSITION TO THE CENTER OF THE LUNETTE EYE

LUNETTE EYE
6" [15.24] TO TAL VERTICAL HEIGH TADJ. USTABILIT Y

6" [15.24] TOTAL VERTICAL HEIGHT ADJUSTABILITY
2" [5.08] UP AND 3"[7.62] DOWN FROM FACTORY POSITION
TRAFFIX DEVICES
SCORPION TRAILER ATTENUATOR

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<td>TIRE AND WHEEL</td>
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<td>27</td>
<td>13295</td>
<td>LICENSE PLATE HOLDER W/LIGHT</td>
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NOTES: UNLESS OTHERWISE SPECIFIED.
BRAKE WIRING SCHEMATIC

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN INCHES.

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www.trafficxdevices.com

TA BRAKE WIRING DIAGRAM

NOTES: UNLESS OTHERWISE SPECIFIED.

ITEM DESCRIPTION PN
3 BRAKE SWITCH ENGAER 13154
13 JUNCTION BOX 10518
28 BRAKE AWAY PLUG 13275
29 BRAKE AWAY BOX CABLE 13273
30 BRAKE STRUT WIRING 13276
31 CARTRIDGE/RIGHT WHEEL/LEFT WHEEL CONNECTOR 13274

LEFT WHEEL CONNECTOR

CARTRIDGE WIRING

BRAKE AWAY BOX PLUG

BRAKE AWAY BOX CABLE

JUNCTION BOX

BRAKE AWAY CONTROL BOX

BRAKE AWAY CABLE

RIGHT WHEEL CONNECTOR

STRUT WIRING
TA CRANK WHEEL INSTALLATION

CRANK JACK WHEEL
P/N 13130

CRANK JACK WHEEL LOCK PIN

TA TONGUE INSTALLATION

TARS TONGUE TO STRUT INSTALLATION

3/4"-10 X 2" HEX BOLTS
3/4" ID X 2" OD WASHER
UNDER BOLT HEAD
INBOARD BOLT DIRECTION
HEAD TOWARDS REAR OF TA

3/4"-10 X 2" HEX BOLT
3/4" ID X 1-1/2" OD WASHERS
UNDER BOLT HEAD
OUTBOARD BOLT DIRECTION
HEAD TOWARDS TRUCK

3/4"-10 NUTS
3/4" ID X 1-1/2" OD WASHER
UNDER OUTBOARD NUT

CRANK JACK WHEEL
P/N 13130

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<tr>
<td>12009</td>
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<tr>
<td>12009</td>
<td>3/4&quot; ID X 2&quot; OD Washers</td>
<td>8</td>
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3/4"-10 X 2-1/2" HEX BOLT
3/4" ID X 2" OD WASHER
UNDER BOLT HEAD
OUTBOARD BOLT DIRECTION
HEAD TOWARDS TRUCK

1/4"-20 X 1-1/4" BOLTS
1/4" GRD 8 WASHER
1/4" ID X 1-1/4" OD WASHER

3/4"-10 X 2-1/2" HEX BOLT
3/4" ID X 1-1/2" OD WASHERS
UNDER BOLT HEAD
INBOARD BOLT DIRECTION
HEAD TOWARDS REAR OF TA

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<td>12042</td>
<td>1/4&quot; Grd 8 Washer</td>
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1/4"-20 X 1-1/4" BOLTS
1/4" GRD 8 WASHER
1/4" ID X 1-1/4" OD WASHER
Assembly of Scorpion Trailer Attenuator (TA) (TL-3)

1. Note that the **Warning Top Heavy** means that caution should be used in moving the pallets. Use fork extenders on forklift and keep all personnel away while moving. **Note: Components are heavy and cumbersome. It may take several people to properly set up the Scorpion TA.**

2. Unpack the pallet by removing the shrink-wrap and cutting the steel bands (Refer to Drawing 911). **Caution:** *It is possible that when the steel banding is cut the TA cartridge and strut may fall a few inches. Keep personnel away from the TA when the steel bands are cut. Keep a few feet away from pallet when pallet is pulled free of the cartridge because it will drop a few inches.*

Remove Module Box A, B, and C, the fenders, and the wheels/tires from the Cartridge Section before it is taken off the pallet. Place TARS Tongue, Cartridge and Strut Sections in the horizontal position on a level work surface (Refer to Drawing 912 for full view).

![Figure 1](image1.png)

3. Position automotive roller jacks or other supports under both sides of the cartridge section. The supports should be about midway between front and back and about 12” high.

4. Repeat with Strut section. Refer to Drawing 925 for full view

5. Locate the TARS Tongue Section, the Crank Jack Wheel, and the Crank Jack Wheel Lock Pin from the Accessories box, and the Heavy Duty Single Post Jack wheel. Install the wheel as follows:

   A. Lift the TARS.

   B. Insert the wheel into the jack.

   C. Secure with Crank Jack Wheel Lock Pin.

   (Refer to Drawing 924 for full view)

![Figure 2](image2.png)
6. Remove the following parts from the Strut:

- Bolts, ¾"-10x2", PN12006
- Washers, ¾” x 2” OD, Large dia, PN12069
- OD Washers, ¾” x 1½”, Small dia, PN12009
- Nylon Nuts, ¾"-10, PN12008

Roll the strut into position in front of the TARS Tongue and bolt as follows:
- Starting with the outboard hole on the top of the vertical bracket of the strut, thread the bolt, head towards truck, through a small diameter washer, the hole in the TARS, and then the hole in the strut. Once the bolt is through, secure with another small diameter washer and the Nylock nut. Repeat on the bottom and the other side.
- On the inboard hole on the top of the vertical bracket of the strut, thread the bolt, head towards rear of TA, through a large diameter washer, the hole in the TARS, and then the hole in the strut. Once the bolt is through, secure with another large diameter washer and the Nylock nut. Repeat on the bottom and the other side.

(Refer to Drawing 924 for full view)
7. Remove the following parts from the Cartridge:

Bolts, ¾”-10x2 ½”, PN 12007  
Washers, ¾”x 2” OD, Large dia, PN 12069  
Washers, ¾”x 1½” OD Small dia, PN 12009  
Nylon Nuts, ¾”-10, PN 12008

Roll the strut into position in front of the cartridge and bolt as follows:
- Starting with the outboard hole on the top of the vertical bracket of the cartridge, thread the bolt, head towards rear of TA, through a small diameter washer, the hole in the cartridge, and then the hole in the strut. Once the bolt is through, secure with another small diameter washer and the Nylock nut. Repeat on the bottom and the other side.
- On the inboard hole on the top of the vertical bracket of the cartridge, thread the bolt, head towards truck, through a large diameter washer, the hole in the strut, and then the hole in the cartridge. Once the bolt is through, secure with another large diameter washer and the Nylock nut. Repeat on the bottom and the other side.

(Refer to Drawing 924 for full view)
8. Install Module Box C, within the cartridge section, to the top and bottom angles on the backside of the strut. Use one \( \frac{3}{4}'' \times 1\frac{1}{4}'' \) Fender Washers and \( \frac{3}{4}'' \) Grd 8 Washers with each \( \frac{3}{4}'' \times 20 \times 1\frac{1}{4}'' \) Allen bolt and back the small washer with one larger washer before installing. Torque the Allen bolt until the large washers just start to dish inward.

(Refer to Drawing 925 for full view)

9. Install Module Box B to the top and bottom angles within the cartridge section at the rear. Use one \( \frac{3}{4}'' \times 1\frac{1}{4}'' \) Fender Washers and \( \frac{3}{4}'' \) Grd 8 Washers one small washer with each \( \frac{3}{4}'' \times 20 \times 1\frac{1}{4}'' \) Allen bolt and back the small washer with one larger washer before installing. Torque the Allen bolt until the large washers just start to dish inward.

10. Install Module Box A to the top and bottom angles on the backside of the rear diaphragm. Use one \( \frac{3}{4}'' \times 1\frac{1}{4}'' \) Fender Washers and \( \frac{3}{4}'' \) Grd 8 Washers one small washer with each \( \frac{3}{4}'' \times 20 \times 1\frac{1}{4}'' \) Allen bolt and back the small washer with one larger washer before installing. Torque the Allen bolt until the large washers just start to dish inward. Make sure to position the ICC bar light to the top of the rear panel on the box.
11. Remove the nuts from the studs on each of the axle. Install the fenders and wheel/tire. Secure with nuts. Repeat for remaining side.

(Refer to Drawing 926 for full view)

![Diagram of vehicle with labeled parts and nut/washer specifications]

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Figure 6

12. Plug the main power cable from the strut (left side) into the electrical connector box on the cartridge. Snap the wire retainers in place on the electrical connector box and wire tie the retainers together

13. The rear ICC bar light has two wires extending from it with plugs. Connect the plugs into the electrical wire plugs at the light.

14. Connect the 7-pin electrical connector and verify that all the lights function correctly.

(Refer to Wiring Schematic)

15. Hook up to appropriate host vehicle and road test the Scorpion TA.

16. Check all bolts for tightness after the road test and refer to the maintenance section of the manual to set up regular maintenance.
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LIGHT WIRING DIAGRAM

NOTES: UNLESS OTHERWISE SPECIFIED.
1. Units: Inches [M]
NOTES: UNLESS OTHERWISE SPECIFIED
Assembly of Scorpion Trailer Attenuator (TA) (TL-2)

1. Note that the Warning Top Heavy means that caution should be used in moving the pallet. Use fork extenders on forklift and keep all personnel away while moving. **Note: Components are heavy and cumbersome. It may take several people to properly set up the Scorpion TA.**

2. Unpack the pallet by removing the shrink-wrap and cutting the steel bands. **Caution: It is possible that when the steel banding is cut the TA may fall a few inches. Keep personnel away from the TA when the steel bands are cut. Keep a few feet away from pallet when pallet is pulled free of the cartridge because it will drop a few inches.**

Remove Module Box A, B, and C, the fenders, and the wheels/tires from the Cartridge Section before it is taken off the pallet. Place TARS Tongue and Cartridge Sections in the horizontal position on a level work surface (Refer to Drawing 10002-TL2-12TA for full view).

3. Position automotive roller jacks or other supports under both sides of the cartridge section. The supports should be about midway between front and back and about 12” high.

4. Locate the TARS Tongue Section, the Crank Jack Wheel, and the Crank Jack Wheel Lock Pin from the Accessories box, and the Heavy Duty Single Post Jack wheel. Install the wheel as follows:
   
   A. Lift the TARS.
   
   B. Insert the wheel into the jack.
   
   C. Secure with Crank Jack Wheel Lock Pin.

   (Refer to Drawing 978 for full view)
6. Remove the following parts from the Cartridge:

- Bolts, ¾”-10x2”, PN12006
- Washers, ¾” x 2” OD. **Large** dia, PN12069
- OD Washers, ¾” x 1½”, **Small** dia, PN12009
- Nylon Nuts, ¾”-10, PN12008

Roll the cartridge into position in front of the TARS Tongue and bolt as follows:
- Starting with the outboard hole on the top of the vertical bracket of the cartridge, thread the bolt, head towards truck, through a **small** diameter washer, the hole in the TARS, and then the hole in the cartridge. Once the bolt is through, secure with another **small** diameter washer and the Nylock nut. Repeat on the bottom and the other side.
- On the inboard hole on the top of the vertical bracket of the cartridge, thread the bolt, head towards rear of TA, through a **large** diameter washer, the hole in the TARS, and then the hole in the cartridge. Once the bolt is through, secure with another **large** diameter washer and the Nylock nut. Repeat on the bottom and the other side.

(Refer to Drawing 978 for full view)
7. Install Module Box C, within the cartridge section, to the top and bottom angles on the front of the cartridge. Use one ¼” x 1-¼” Fender Washers and ¼” Grd 8 Washers with each ¼”-20 x 1-1/4” Allen bolt and back the small washer with one larger washer before installing. Torque the Allen bolt until the large washers just start to dish inward.

(Refer to Drawing 979 for full view)

8. Install Module Box B to the top and bottom angles within the cartridge section at the rear. Use one ¼” x 1-¼” Fender Washers and ¼” Grd 8 Washers with each ¼”-20 x 1-1/4” Allen bolt and back the small washer with one larger washer before installing. Torque the Allen bolt until the large washers just start to dish inward.

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<tr>
<td>12042</td>
<td>1/4&quot; Grd 8 Washer</td>
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Figure 4

9. Install Module Box A to the top and bottom angles on the backside of the rear diaphragm. Use one ¼” x 1-¼” Fender Washers and ¼” Grd 8 Washers with each ¼”-20 x 1-1/4” Allen bolt and back the small washer with one larger washer before installing. Torque the Allen bolt until the large washers just start to dish inward. Make sure to position the ICC bar light to the top of the rear panel on the box.
10. Remove the nuts from the studs on each of the axle. Install the fenders and wheel/tire. Secure with nuts. Repeat for remaining side.

(Refer to Drawing 979 for full view)

Figure 5

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<tr>
<td>12042</td>
<td>1/4&quot; Grd 8 Washer</td>
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11. Plug the main power cable from the cartridge (left side) into the electrical connector box. Snap the wire retainers in place on the electrical connector box and wire tie the retainers together

12. The rear ICC bar light has two wires extending from it with plugs. Connect the plugs into the electrical wire plugs at the light.

13. Connect the 7-pin electrical connector and verify that all the lights function correctly.

(Refer to Wiring Schematic)

14. Hook up to appropriate host vehicle and road test the Scorpion TA.

15. Check all bolts for tightness after the road test and refer to the maintenance section of the manual to set up regular maintenance.
TA Limited Warranty

TrafFix Devices warrants to the purchaser that the Scorpion Trailer Mounted Attenuator (TA) is free from any defects in materials and workmanship. If this product proves to be defective in material or workmanship during the period of this warranty, TrafFix Devices will repair or replace, at its option, the defective product free of charge. The period of this warranty is the one year period beginning from the date the purchaser puts the unit into service or one year from the date of purchase.

To obtain warranty service, the purchaser or distributor must first fill out a warranty authorization form and fax same to TrafFix Devices to have our technical services department evaluate the problem and recommend repair procedures. TrafFix Devices will then issue a signed warranty work approval form to authorize the distributor or customer to repair or replace any items, which TrafFix deems to have been defective. All replacement parts claimed to be defective will be invoiced at the time of shipment, and upon receipt and evaluation a credit memo will be issued.

This warranty does not extend to any failure of the Scorpion TA caused by misuse, abuse or material alteration of this product, or any negligence in connection with the installation, service, or use of this product. For the correct installation, service, or use of this product refer to the installation manual, the operator’s deployment instructions, and the operator’s checklist.

Warranty Authorization Form

1. Company Name _____________________
2. Address ______________________________________________________________
3. Phone, Fax Number, and E-Mail ___________________________________________
4. Name of Customer __________________________
5. Date ___________________
6. Serial number of TA near controller outlet: ______________________
7. Repair parts are listed in Illustration 906 and on the corresponding parts list which section of the installation manual.
8. List part numbers of replacement or repair items:
   ____________________ ____________________ ____________________ __________________
   ____________________ ____________________ ____________________ __________________
9. Describe the problem and reason for failure: ____________________________________________
   _______________ ______________________ ______________________ _____________________
   _______________ ______________________ ______________________ _____________________
10. Fax this form and e-mail any pictures. Then phone TrafFix Devices technical services.
    Phone: (949) 361-5663       Fax: (949) 361-9205       E-mail: info@traffixdevices.com