In-Roadway Warning Light Systems
Traffic Safety Corporation
Sacramento, California
Introduction to Traffic Safety Corp.

• Headquartered in Sacramento, CA
• Founded in 1997
• Our Mission: To Make Communities Safer for Everyone
• Design, Manufacture, Integrate and Distribute AC & Solar Powered In-Roadway Warning Light Systems
• Pioneer in the Traffic Safety Industry
• Concepts Adopted in the 2000 Edition of the MUTCD
• Quality Focused: ISO 9001: 2008 Certified
• Network of Dealers throughout the US & Canada
• Over 500 Installations Across 30 States
Installations Across the United States
Avoid as Many as Four Out of Five Accidents with a Solar Powered In-Roadway Warning Light System

Studies show that the accident rate at uncontrolled, lighted crosswalks is as much as 80% less than at un-controlled, unlighted crosswalks.

Enhance the safety of your pedestrians with a TSC In-Roadway Warning Light System, the most effective and reliable system in the world.

Solar Powered TS1000
➢ Green Compliant
➢ Faster Deployment
➢ Lower Operating Costs
➢ No Remediation Issues
In-Roadway Warning Light System Components

• In-pavement Light Fixture
• Base Can (Fixture Stability, Protection, Drainage)
• System Controller
• Activation Device
• Above Ground Warning Device (Optional)
Introduction to In-Roadway Warning Light Systems

- Activation Device
- System Controller
- Fixtures
- Above Ground Warning Devices
Introduction to In-Roadway Warning Light Systems
Introduction to In-Roadway Warning Light Systems
Evaluating In-Roadway Warning Light Systems

• By the Effectiveness of the System
  – Improves Driver’s Awareness that the Crosswalk is in Use
  – Improves Pedestrian Visibility at Night

• By the Quality of the System
  – Reliability
  – Maintenance Requirements
  – Durability
TS600 Light Fixture

• Flush Profile
• High-Visibility
• Bi-directional Optics
• Anodized Aluminum
• Hardened Glass
• Reliable LEDs & Electronics
• Self-cleaning
TS400 and TS500 Light Fixtures

- Low Profile
- High-Visibility
- Bi-directional Optics
- Selectable Beam Widths

- Anodized Aluminum / Stainless Steel
- Hardened Glass
- Reliable LEDs & Electronics
- Self-cleaning
TS400 and TS500 Beam Optics

60° Wide Beam Light Illumination Pattern

10° Narrow Beam Light Illumination Pattern
Installation Layouts

Two Lane Crosswalk

(LED Pedestrian Crossing Sign)

(Ped Push Button)
Installation Layouts

Four Lane Crosswalk
BA-725-10 Fixture Base Can

- Galvanized Steel Construction
TS1000 Crosswalk System Controller

- Generates Standard and Enhanced Flash Patterns
- Auto Flash-pattern Sequencing
- Dual Channel DC Outputs and Dual Channel AC Outputs
AC Powered System

AC Power Grid

AC Power Supply

TS1000 Control card

Activation Device Control card

Fixtures and Above Ground Warning Devices

Activation Devices
Solar Powered System

- Solar Panel
- Charge Controller System
- Battery Back-up
- TS1000 Control card
- Activation Device Control card
- Fixtures and Above Ground Warning Devices
- Activation Devices
Activation Device
Push Button Station (AC-X2 Series)

- With or without Audio Caution Message and Flashing LEDs
- May be configurable with Multiple languages
- Locator Tone
Activation Device
Pedestrian Crossing Pad (AC-PEDXPAD)

• Reinforced Stainless Steel Frame and UV Treated Pad
• Covers 2 x 3 Foot Area, Scalable for Larger Areas
• Adjustable Sensitivity
Above Ground Warning Device
MUTCD Flashing LED Signs (TS30 Series)

Pedestrian Crossing (W11-2)  School Crossing (S1-1)

• Aluminum Back with 3M-Diamond Grade Sheeting
• High-visibility
• 30”/36” and AC/DC Powered Versions
TSC’s Assurance of Customer Satisfaction

• Tests, Integrates, and Performs a Burn-in of the entire System before Shipping

• Provides Technical Support (Local Support through Dealer Network and Tech Support Center) through all Phases of the System Deployment

• Backs-up the Reliability of the System with a System Warranty:

  5-Year System Warranty

  The Industry’s Longest Warranty
Installation Types

• **In-pavement Installation**
  – Core Drill and Saw Cut
  – Trench and Fill

• **System Power Source**
  – AC Grid Powered
  – Solar Powered
System Configuration and Specification

Traffic Safety Corp. recommends that a complete site inspection be conducted prior to system design and configuration, to ensure that all site variables have been taken into account in the configuration of the system.

• Excessive crowning, steep up/down-hill slopes immediately following the crosswalk area, uneven road surfaces, and curves in the road should be evaluated to determine their affects of the system configuration and performance.

• Conditions affecting drainage, such as road depressions and soil conditions, should be evaluated to determine the correct drainage requirements.

• Shading of solar panel, if a solar powered system is planned, check for potential sources of shadows between 9am and 3 pm. A solar site survey is recommended.

• Based on the site survey, the system can be properly specified and configured for the intended site.
To ensure that the system performs to its design specifications, the system must be installed properly.

- Consult the **engineering plans** before placement of the base cans to assure their proper location.

- When installing the fixture base cans make sure that they are **installed flush** and level with the surface of the road. Use of a mounting jig is required and should be removed only after the concrete has cured.

- Orient the base cans so that when the fixtures are installed they will be **aligned with the flow of traffic**. Base cans may be aligned properly by rotating them until a bolt hole is in line with the flow of traffic.

- Provide **support** at the bottom of base cans. In the case of a trench and fill type installation, a Dobie block may be used to avoid settling while the concrete cures. In the case of a core drill and saw cut type installation using a French Drain, the drain pipe will provide the required support. If a Modified French Drain is employed, a Dobie block beneath the drain pipe may be used to provide the required support. The use of quick drying concrete is recommended around the base can area.
System Installation Basics

Attention to a few basic installation practices makes for a problem free installation.

• Verify that **drainage** system functions as expected before pouring concrete (a gallon of water should be absorbed within 3-5 minutes).

• Pay attention to the **polarity** of the fixture cabling.
  
  o White fixture conductor (+12 Volts DC) to red street cabling (connects to output terminal block of system controller).

  o Black fixture conductor (Return) to black street cabling (connects to DC ground terminal block of system controller).

• When installing a solar powered system make sure that the solar panels are facing **True South**.

• Before connecting the street wiring to the controller terminal block, **check the street wiring** with an ohm meter to make sure that there are no **shorts**.
Installation Overview

Core Drill and Saw Cut
AC Powered Installation

Manteca, CA – June 2008
Core Drill and Saw Cut Installation

Fixture Layout

Core Drill
Core Drill and Saw Cut Installation
Core Drill and Saw Cut Installation

Saw Cut

Drainage
Core Drill and Saw Cut Installation

Mounting Rig Setup

Base Can Alignment
Controller and Street Wiring
Core Drill and Saw Cut Installation

Base Can In Concrete

Plywood Protective Cover
Detailed Installation Overview

Trench & Fill
Solar Powered Installation

City of Vallejo, CA – December 2009
Pre-installation

1. Main system components arrive on one or more pallets.
2. Optional pole kit shipped separately.
3. Crosswalk site before system installation.
4. L-Bolts and electrical conduit are installed and a concrete foundation is poured at each pole base location.

5. Site prepared and ready for trenching to begin.
6. An outline of the trench is first sprayed onto the pavement.

7. A dry cut is then made to cut along the outline of the trench.
8. Next, a jack hammer is used to break-up the existing pavement within the trench.

9. A trench digger is then used to remove pavement pieces and dig the trench.
10. The final phase of the trenching is completed with the use of a trench shovel.

11. Trench is now completed and ready for installing the Base Cans and Conduit.
Trench and Fill Installation

Base Can Installation – Trench and Fill (Option 1)
Trench and Fill Installation

Base Can Installation – Trench and Fill (Option 2)
12. Base cans are fitted with a mounting jig (used to hold base can flush with road surface), and the conduit fittings attached to the bottom of the base can.

13. Drain and electrical conduit is then positioned for installation.
14. Drain conduit (PVC) is then installed between the base cans, and between base cans and the storm drain.

15. Drain conduit is positioned directly below the drain hole of each base can.
16. Base cans are then attached to drain conduit using the PVC fittings.

17. Base cans are then lowered into the trench.
18. Dobie blocks are positioned under the conduit to prevent the base can from sinking after the mounting jig has been removed.

19. Electrical conduit is then installed above the drain conduit and connects with all base cans.
Preparations for the Fill Operation

20. Wood stakes are put in place and attached to the electrical conduit with wire to support the conduit during the pouring of concrete.

21. With all base cans, mounting jigs, drain and electrical conduit, and supports in place the concrete is poured and leveled.
22. Quick dry concrete is generally used around the base cans; Standard concrete mix is used everywhere else.

23. The mounting jig is removed, base can cleaned, and the protective plywood cover bolted onto the base can.
Pole Base Installation

24. The treads of the L-Bolts are cleaned in preparation for mounting the pole base.

25. Pole base shown with access door positioned towards the side walk.
Pole Assembly Preparation
26. Access holes are cut into the pole at various locations to provide access for Electrical cabling between system components.

27. Waterproof Electrical Fittings are attached to the Pole for Flashing LED Sign Cabling.
Solar Panel Assembly

28. Pole mounting hardware is attached to the solar panel.

29. Solar panel is then attached to the pole.
Solar Panel Assembly

30. Using a steel tape, cabling is pulled through the inside of the pole and positioned to electrically connect system components.

31. Waterproof fittings are installed on pole cap and cabling attached to the terminals inside the solar panel J-Box.
Pole and Sign Installation

32. Pole and base are installed onto base foundation (base shown with access door open).

33. Flashing LED signs are installed using saddle brackets and metal straps.
Activation Device Installation and Field Cabling

34. Cabling is attached to the terminals at the back of the pushbutton, and the pushbutton attached to the pole.

35. Infrastructure (street cabling) for fixtures, signs, and pushbuttons are measured and prepared for placement into the electrical conduit.
Field Cabling Operation

36. The process of passing the cabling through the base cans, to the pushbuttons and signs, and to the control system begins at the pole base.

37. All cabling passes through the base cans. Fixtures are wired in parallel using water proof splices (white-to-red and black-to-black).
Trench Fill and Leveling Process

38. After all street cabling has been completed; asphalt is shoveled into the trench and leveled with a rake.

39. An asphalt compactor is used to finish the leveling and smoothing of the asphalt.
Fixture Installation

40. In-Pavement installation completed and ready for fixtures to be plugged into their connectors.

41. The plywood covers are then removed and replaced with fixtures. The fixtures are bolted to the base can. Silicon sealant is then placed into the space between the base can and fixture, providing a water proof seal.
42. Final wiring is then made to the terminal block in the rear of the enclosure; the controller back panel is reinstalled, load and power cables connected, and the system’s operating parameters set-up.

43. The solar powered TS1000 Crosswalk Warning Light System is now ready for testing.
44. View of crosswalk looking towards the main parking area and Solano County building complex.

45. View of crosswalk looking towards the secondary parking area.
Completed Installation and Site Photo

46. View of crosswalk from the driver’s perspective (one way, single lane road).

47. Solano County Justice Building.
Under Vehicle Security and Safety Inspection Systems
Under Vehicle Security and Safety Inspection Systems

- Military Bases
- Government Buildings
- Border Crossings
- Manufacturing Plants
- Vehicle Maintenance Facilities
- Weighing Stations
TS300 Fixture Layout

Big Rig Installation (50 TS300s)
bullet = TS300

Bus Inspection (34 TS300s)
bullet = TS300

Delivery Van/Large SUV Inspection (20 TS300s)
bullet = TS300
TS300 Fixture

- Anodized Aluminum
- Omni-directional Optics
- Self-cleaning Lens Cover
- High Static Load Rating

- High-intensity Halogen Lamp/LED Options
- 120/240 VAC or 15 VDC Voltage Options
- Single/Three Step LED Brightness Control Option
- Packaged Systems Available
# Under Vehicle Inspection Light System Packages (20 Fixture Example)

## Package 1: Halogen (120/240 VAC Operation)
Uses off-the-shelf Halogen lamps (2,000 hour lamp life)

<table>
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<tr>
<th>Quantity</th>
<th>Product</th>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>20</td>
<td>Fixture</td>
<td>FI-TS300-50/52</td>
<td>Clear, 50W halogen, 120 VAC</td>
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<tr>
<td>20</td>
<td>Connector</td>
<td>CO-012022</td>
<td>Female Connector</td>
</tr>
<tr>
<td>20</td>
<td>Base Can</td>
<td>BA-725-10-2</td>
<td>Base can: 8.625&quot; x 10&quot; deep</td>
</tr>
<tr>
<td>1</td>
<td>Inspection Mirror</td>
<td>MI-TS300MIRROR</td>
<td>Hand-held Inspection Mirror</td>
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</table>

## Package 2: LED (120/240 VAC Operation)
Uses LED Light Source with lower power consumption (94%) and longer useful life (25X longer) than Halogen lamps.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Product</th>
<th>Part Number</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>20</td>
<td>Fixture</td>
<td>FI-TS300-LP</td>
<td>Clear, LED, 120 VAC</td>
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<td>Connector</td>
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<td>Inspection Mirror</td>
<td>MI-TS300MIRROR</td>
<td>Hand-held Inspection Mirror</td>
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</tbody>
</table>
# Under Vehicle Inspection Light System Packages (20 Fixture Example)

## Package 3: LED with Dimming Feature (15 VDC Operation)
Uses LED Light Source with lower power consumption (94%) and longer useful life (25X longer) than Halogen lamps. Provides safer, low voltage DC cabling to the fixture, and three step dimming capability (three brightness levels).

<table>
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<th>Quantity</th>
<th>Product</th>
<th>Part Number</th>
<th>Description</th>
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<td>FI-TS300-LVD</td>
<td>Clear, LED, 12 VDC</td>
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<tr>
<td>20</td>
<td>Connector</td>
<td>CO-012022</td>
<td>Female Connector</td>
</tr>
<tr>
<td>20</td>
<td>Base Can</td>
<td>BA-725-10-2</td>
<td>Base can: 8.625&quot; x 10&quot; deep</td>
</tr>
<tr>
<td>1</td>
<td>Inspection Mirror</td>
<td>MI-TS300MIRROR</td>
<td>Hand-held Inspection Mirror</td>
</tr>
<tr>
<td>1</td>
<td>System Controller</td>
<td>SC-TS3000</td>
<td>Dimming System Controller</td>
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</tbody>
</table>

## Package 4: LED (15 VDC Operation)
Uses LED Light Source with lower power consumption (94%) and longer useful life (25X longer) than Halogen lamps. Provides safer, low voltage DC cabling to the fixture.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Product</th>
<th>Part Number</th>
<th>Description</th>
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<tr>
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<td>Clear, LED, 12 VDC</td>
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<td>20</td>
<td>Connector</td>
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<td>Female Connector</td>
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<tr>
<td>20</td>
<td>Base Can</td>
<td>BA-725-10-2</td>
<td>Base can: 8.625&quot; x 10&quot; deep</td>
</tr>
<tr>
<td>1</td>
<td>Inspection Mirror</td>
<td>MI-TS300MIRROR</td>
<td>Hand-held Inspection Mirror</td>
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<tr>
<td>1</td>
<td>System Controller</td>
<td>SC-TS2000</td>
<td>Low Voltage System Controller</td>
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