



# In-Roadway Warning Light Systems



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# 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



# 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.



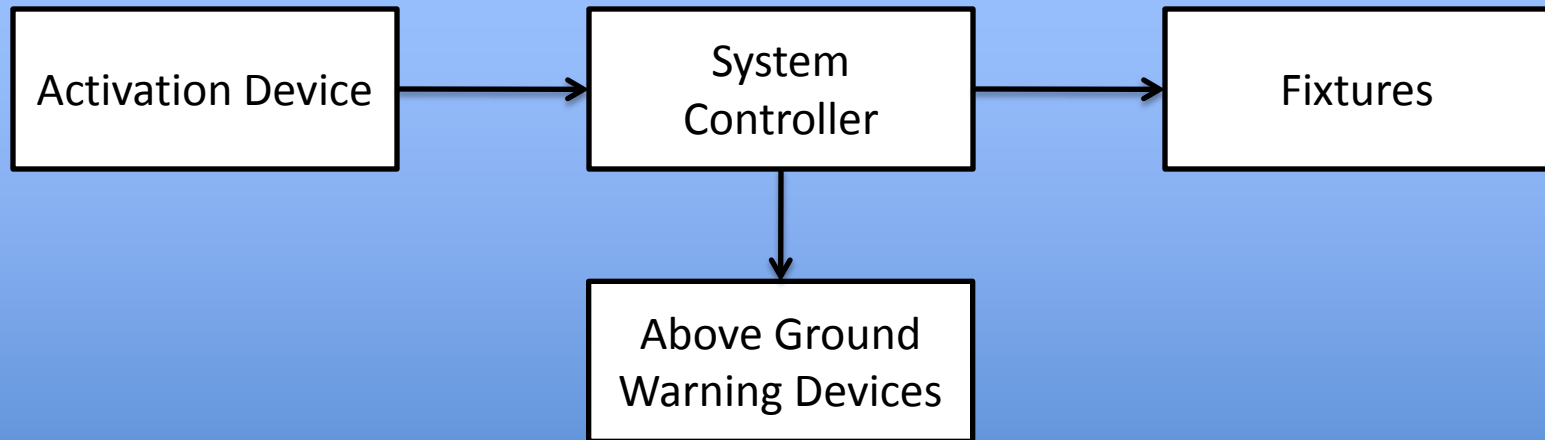
## **Solar Powered TS1000**

- 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



# Introduction to In-Roadway Warning Light Systems





# Introduction to In-Roadway Warning Light Systems



# Evaluating In-Roadway Warning Light Systems

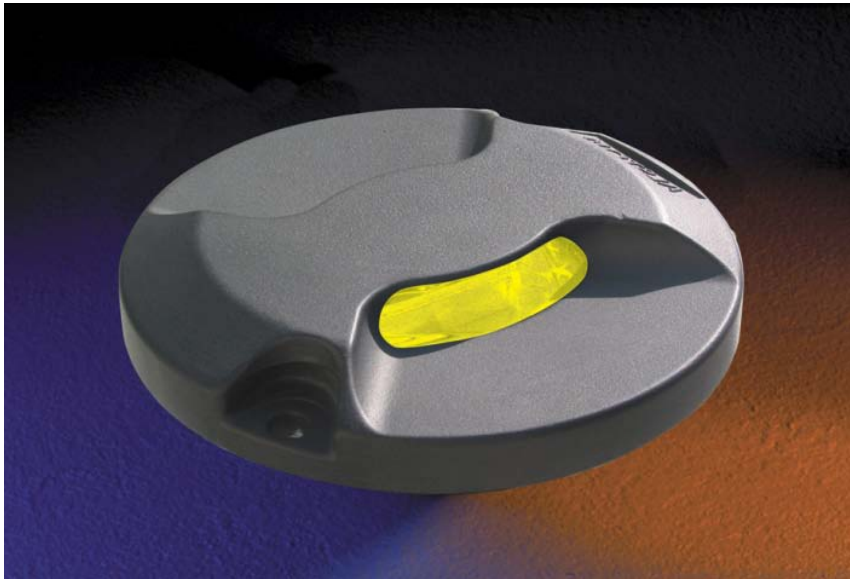
- **By the Effectiveness of the System**
  - Improves Driver's Awareness that the Crosswalk is in Use
  - Improves Pedestrian Visibility at Night
- **By the Quality of the System**
  - Reliability
  - Maintenance Requirements
  - Durability

# TS600 Light Fixture



- Flush Profile
- High-Visibility
- Bi-directional Optics
- Anodized Aluminum
- Hardened Glass
- Reliable LEDs & Electronics
- Self-cleaning

# TS400 and TS500 Light Fixtures

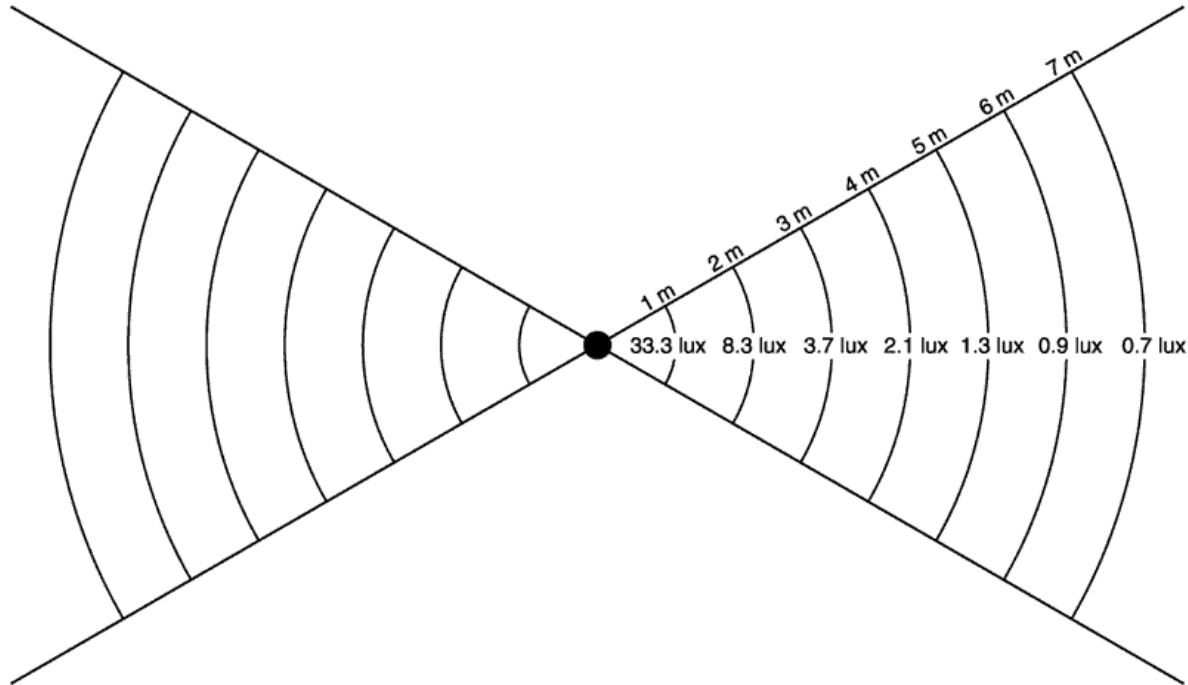


- Low Profile
- High-Visibility
- Bi-directional Optics
- Selectable Beam Widths

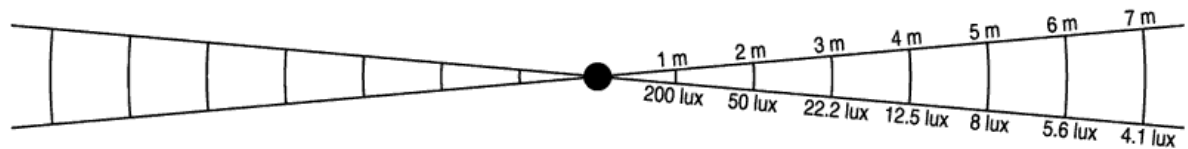
- Anodized Aluminum / Stainless Steel
- Hardened Glass
- Reliable LEDs & Electronics
- Self-cleaning

# TS400 and TS500 Beam Optics

## 60° Wide Beam Light Illumination Pattern

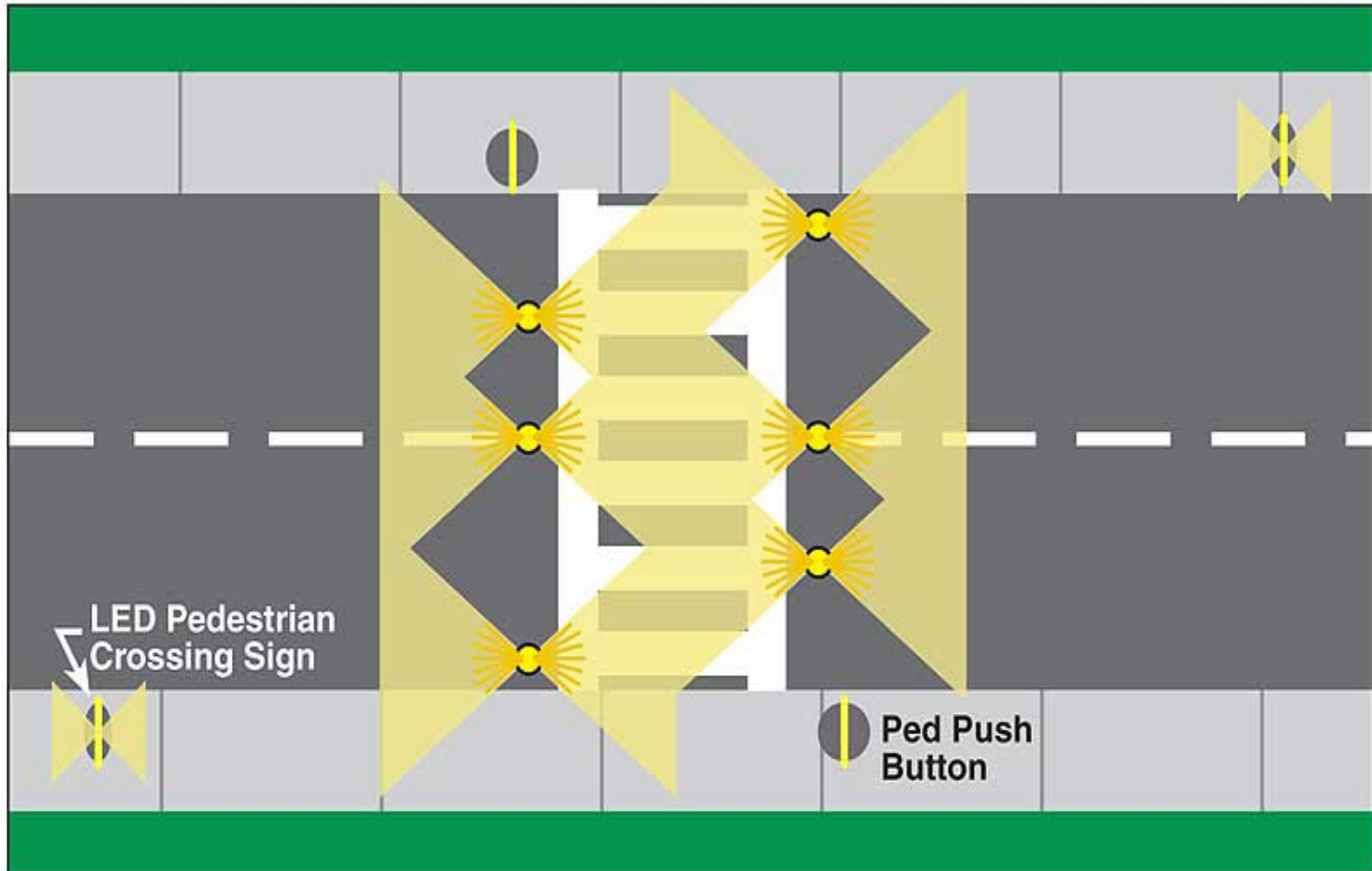


## 10° Narrow Beam Light Illumination Pattern



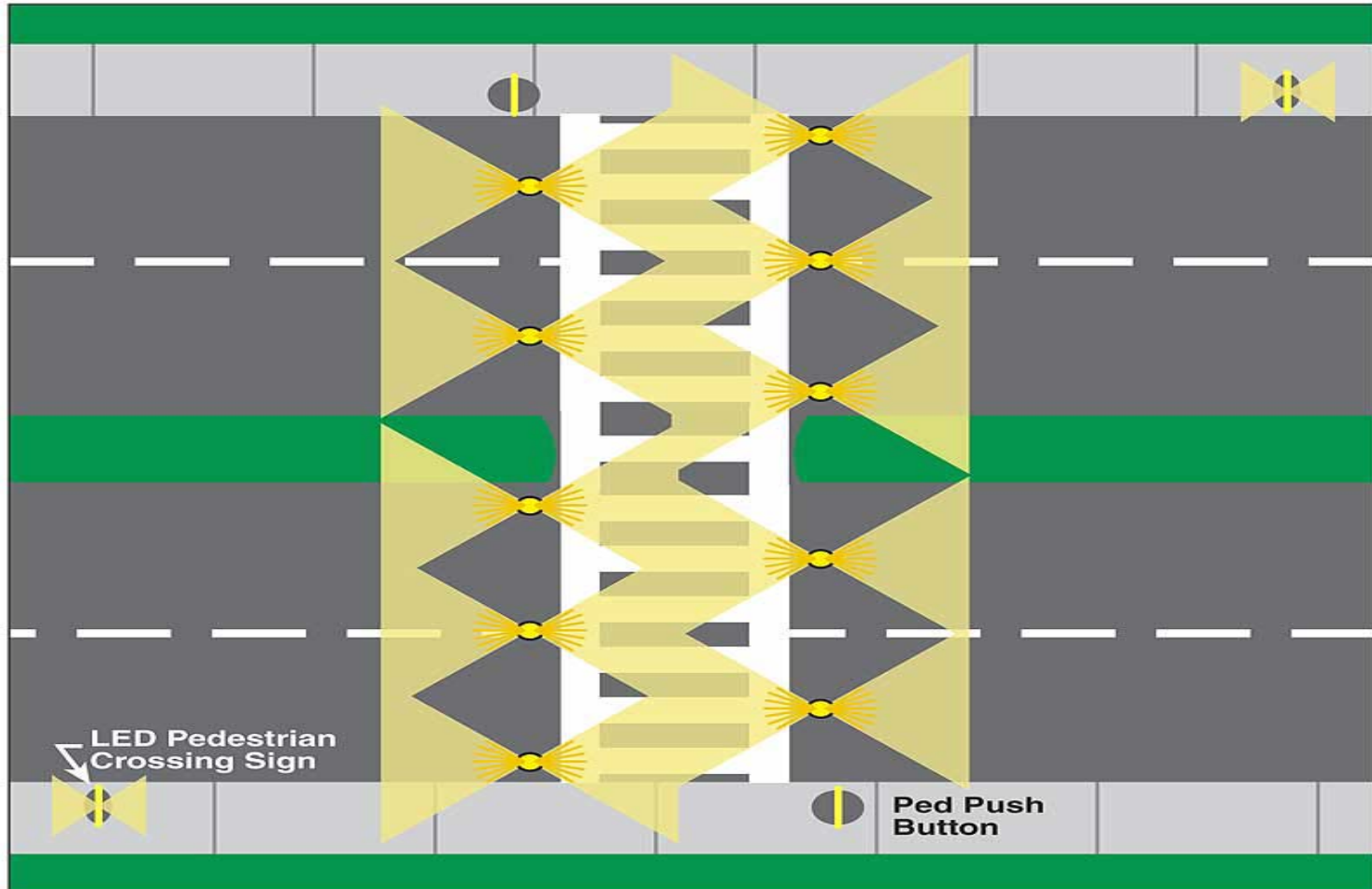
# Installation Layouts

## Two Lane Crosswalk



# Installation Layouts

## Four Lane Crosswalk





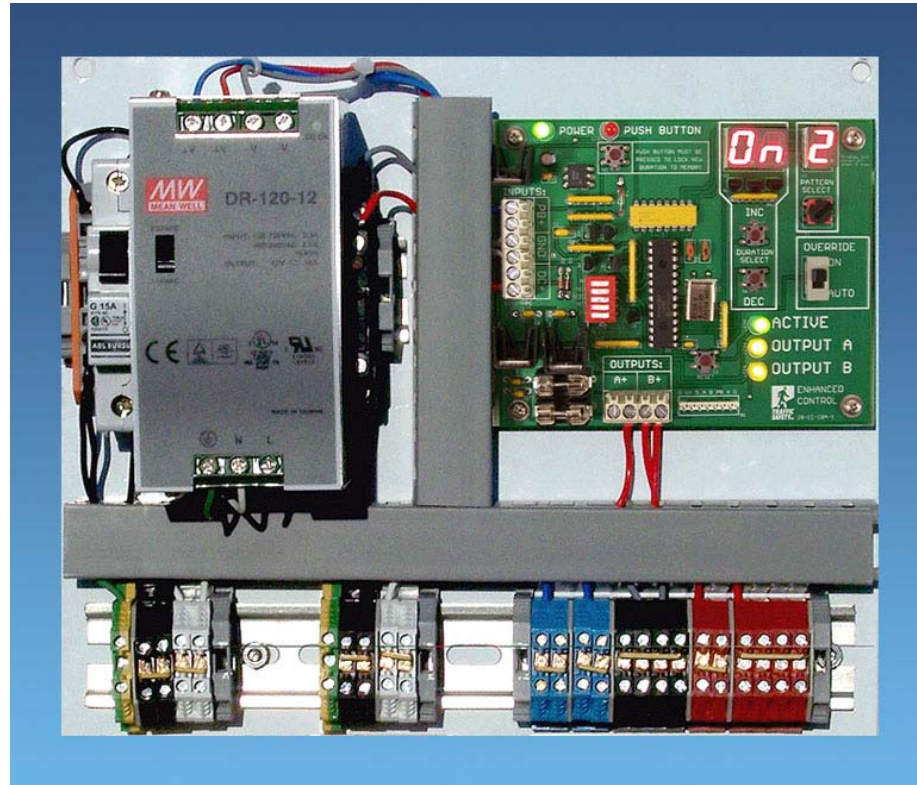
# BA-725-10 Fixture Base Can



- Galvanized Steel Construction

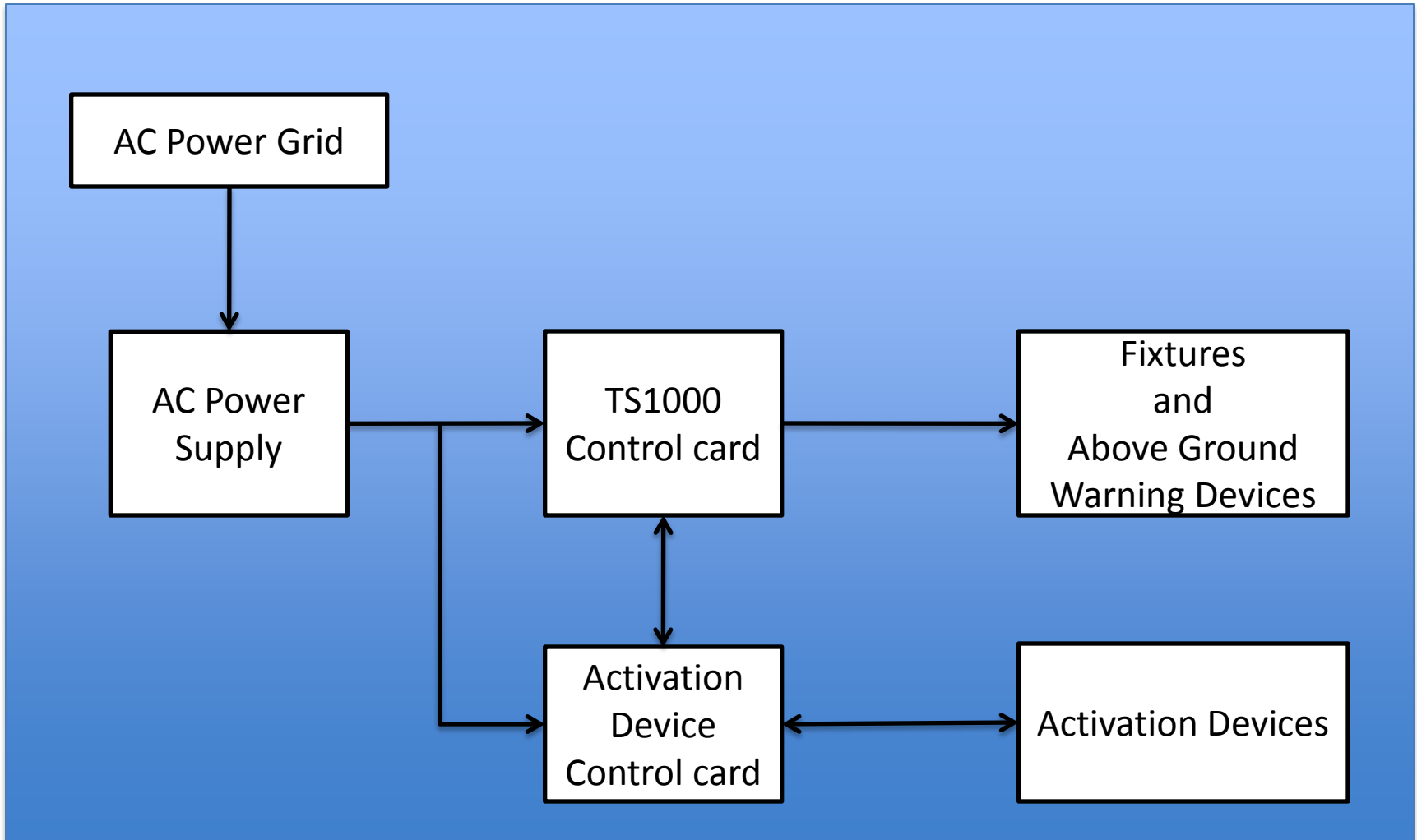


# TS1000 Crosswalk System Controller

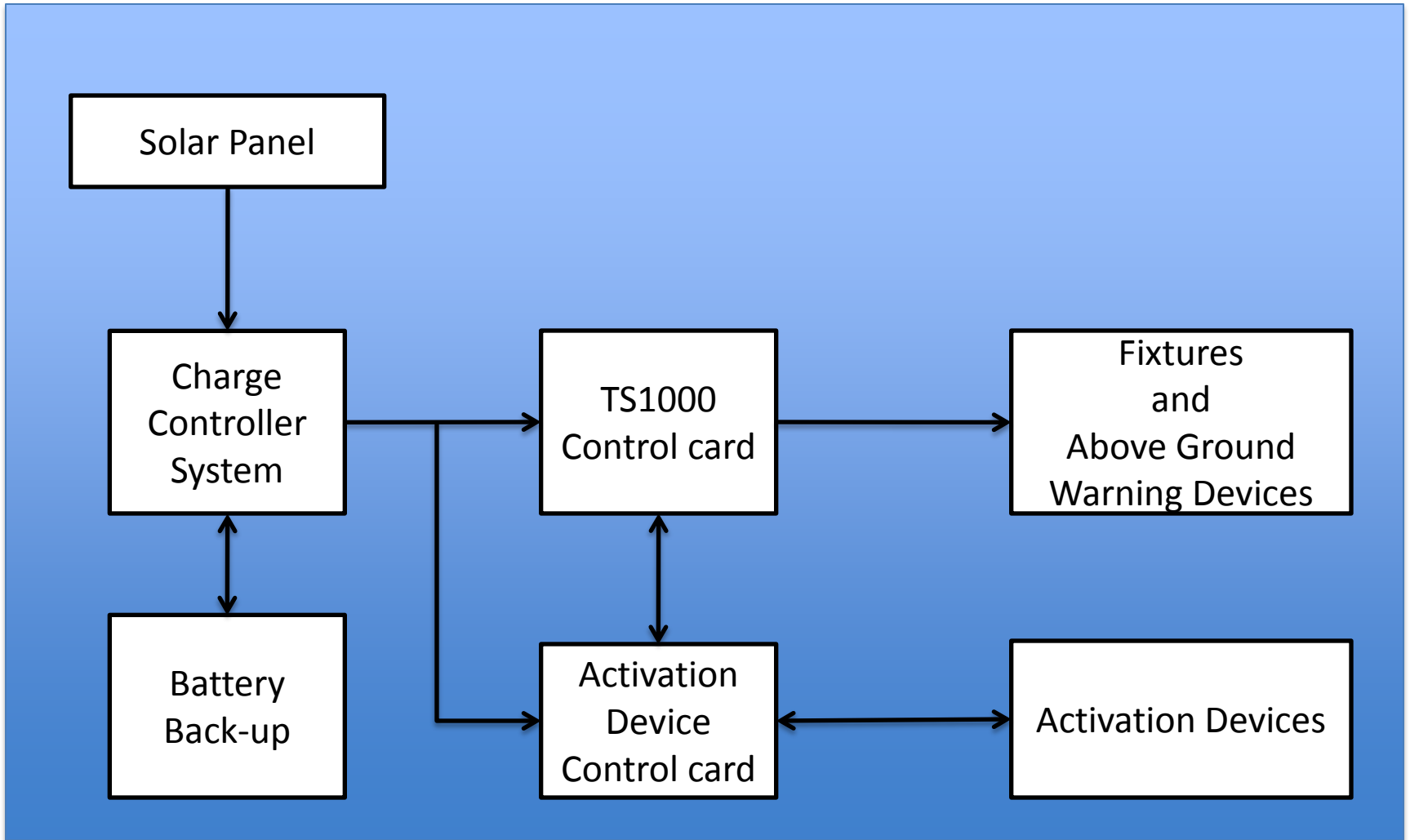


- Generates Standard and Enhanced Flash Patterns
- Auto Flash-pattern Sequencing
- Dual Channel DC Outputs and Dual Channel AC Outputs

# AC Powered System



# Solar Powered System



# 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.

# System Installation Basics

**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.
  - White fixture conductor (+12 Volts DC) to red street cabling (connects to output terminal block of system controller).
  - 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

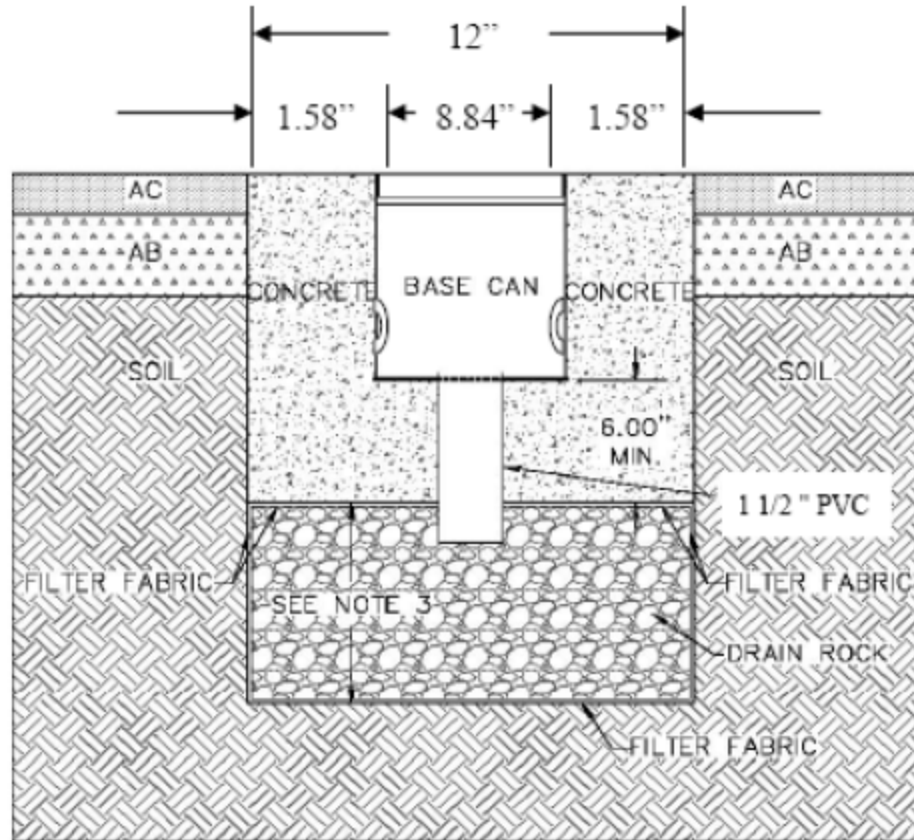


**Fixture Layout**



**Core Drill**

# Core Drill and Saw Cut Installation



# Core Drill and Saw Cut Installation



**Saw Cut**



**Drainage**

# Core Drill and Saw Cut Installation



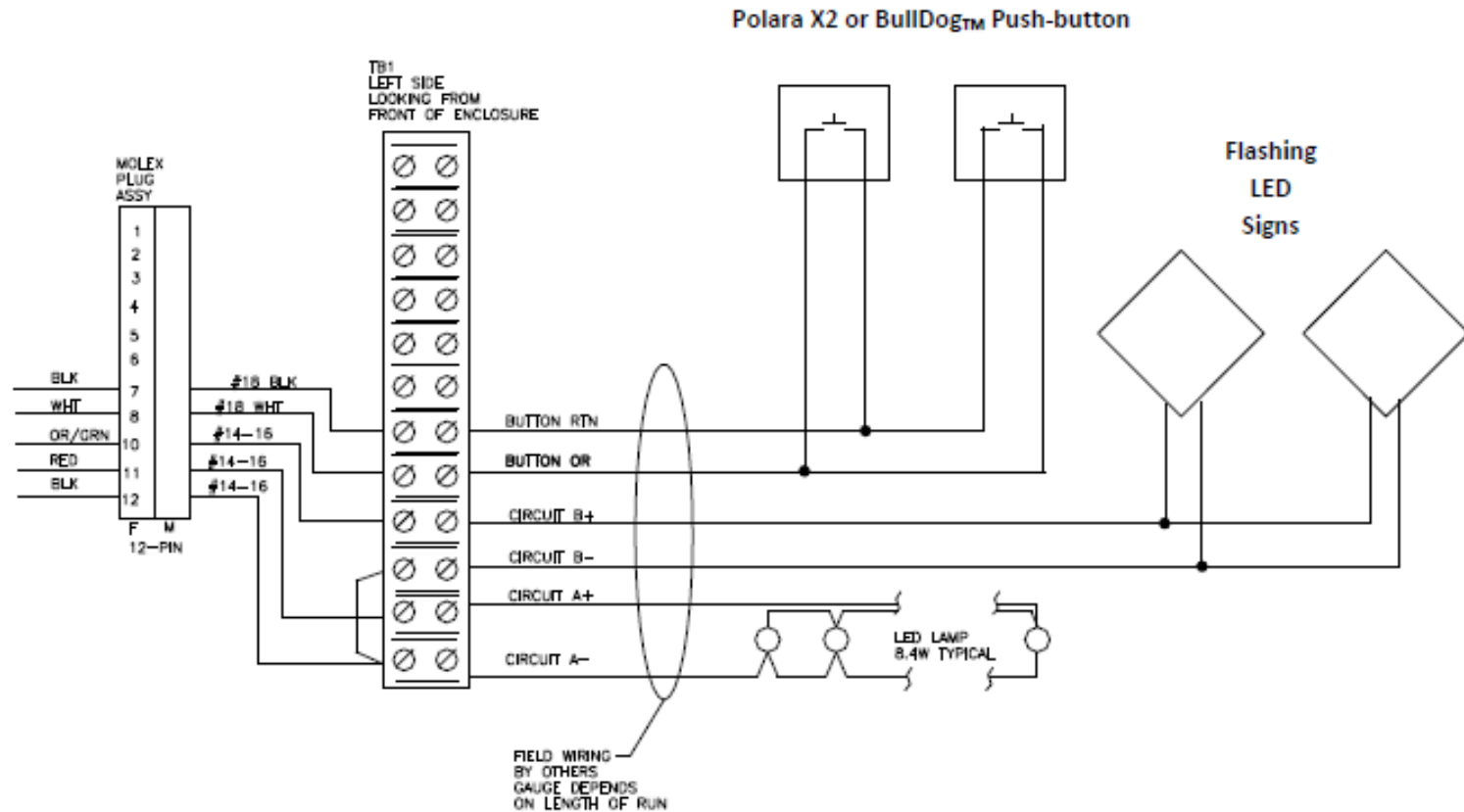
**Mounting Rig Setup**



**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.

# Site Preparation



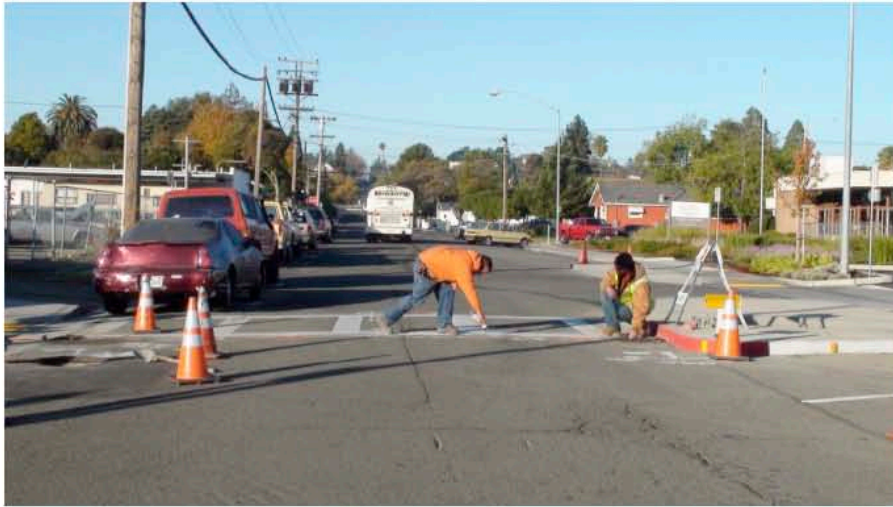
4. L-Bolts and electrical conduit are installed and a concrete foundation is poured at each pole base location.



5. Site prepared and ready for trenching to begin.



# Trenching Operation



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.

# Trenching Operation



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.

# Trenching Operation



10. The final phase of the trenching is completed with the use of a trench shovel.

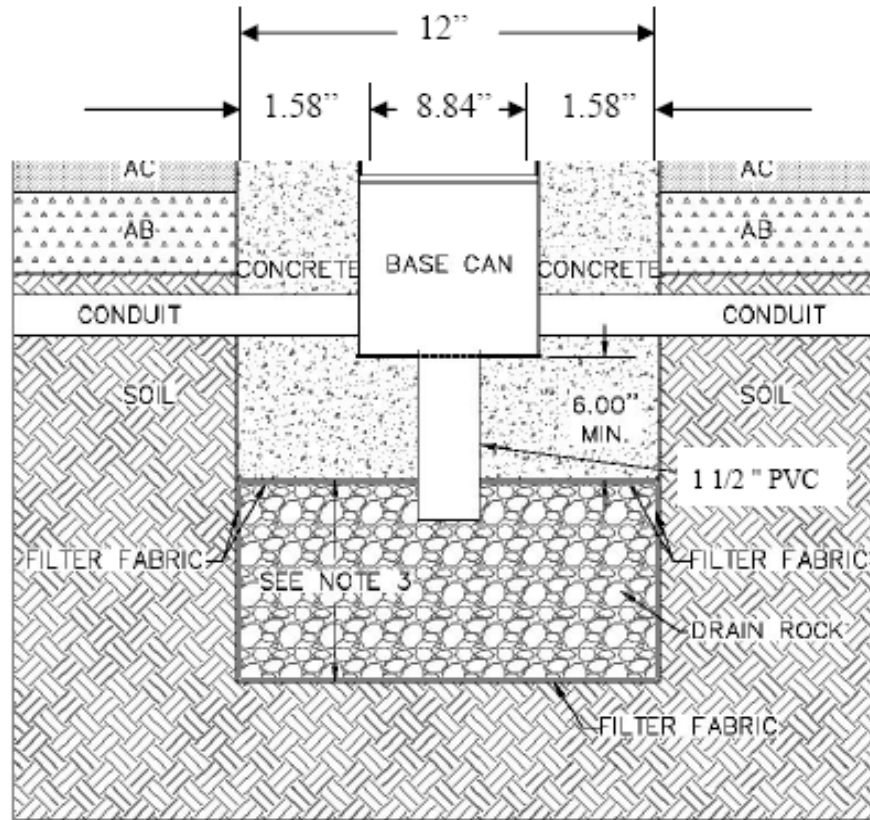


11. Trench is now completed and ready for Installing the Base Cans and Conduit.



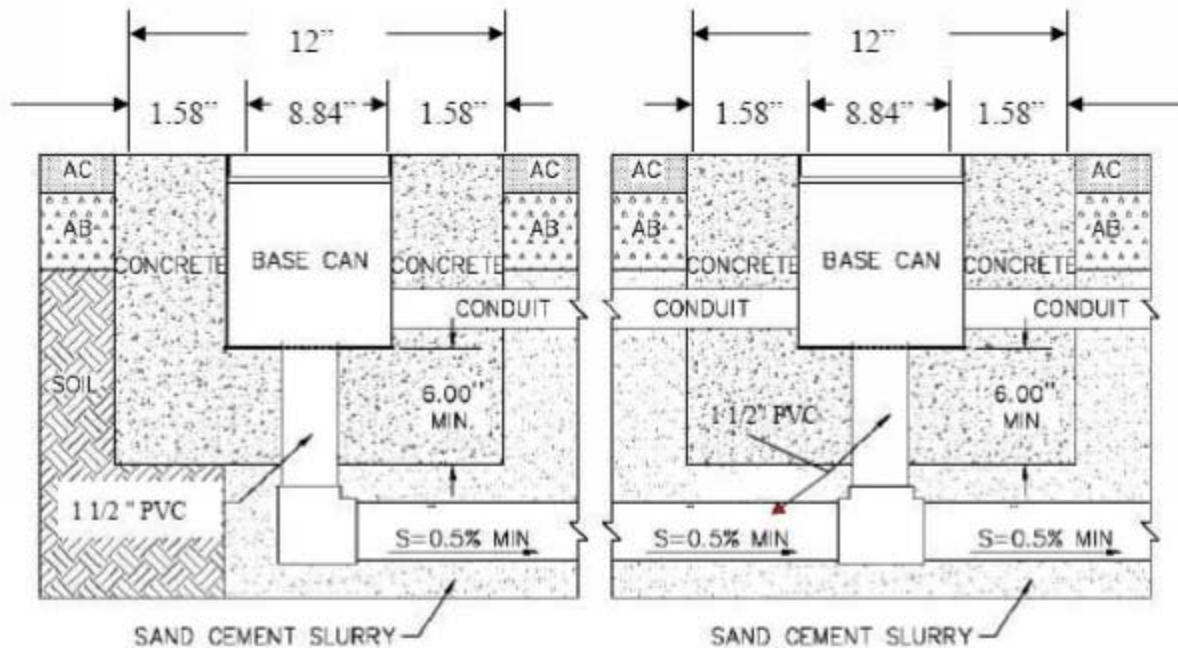
# Trench and Fill Installation

Base Can Installation – Trench and Fill (Option 1)



# Trench and Fill Installation

Base Can Installation – Trench and Fill (Option 2)



# Base Can and Drainage System Installation



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.

# Base Can and Drainage System 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.



# Base Can and Drainage System Installation



16. Base cans are then attached to drain conduit using the PVC fittings.



17. Base cans are then lowered into the trench.

# Base Can and Electrical Conduit Installation



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.

# Fill Operation



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

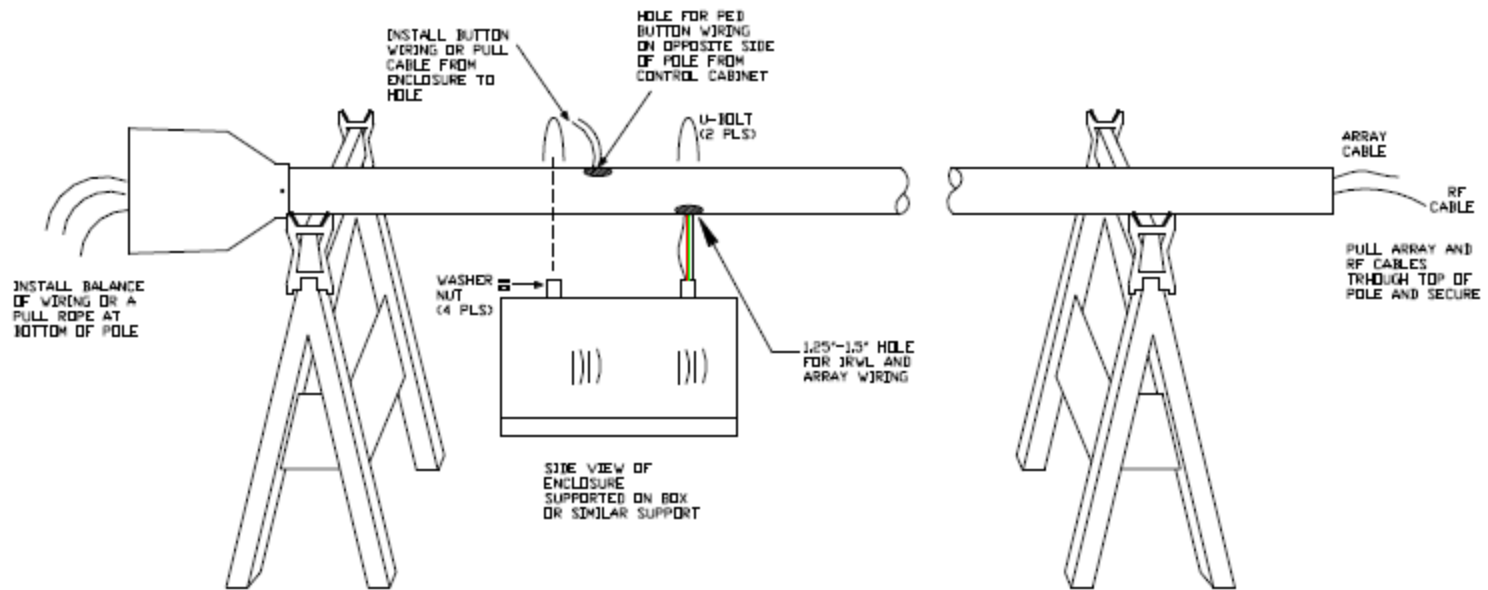


24. The treads of the L-Bolts are cleaned in preparation for mounting the pole base.



25. Pole base shown with access door positioned towards the side walk.

# Pole Assembly Preparation



# 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



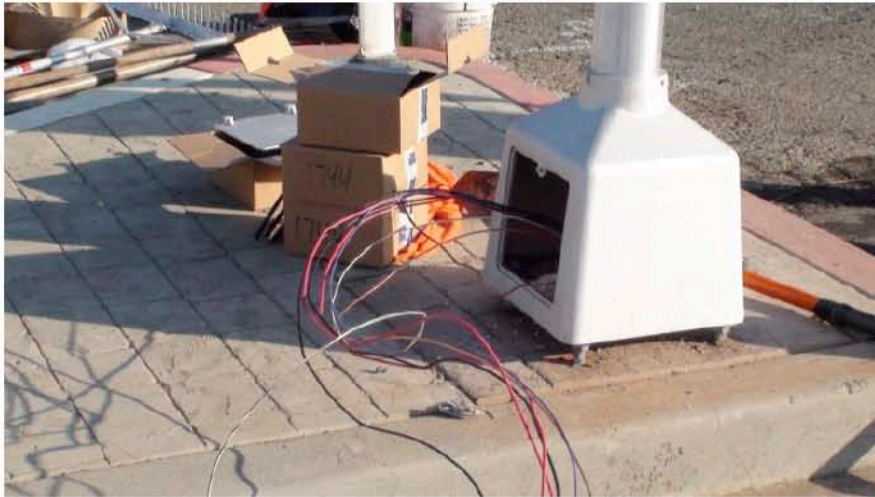
34. Cabling is attached to the terminals at the back of the pushbutton, and the pushbutton attached to the pole.



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

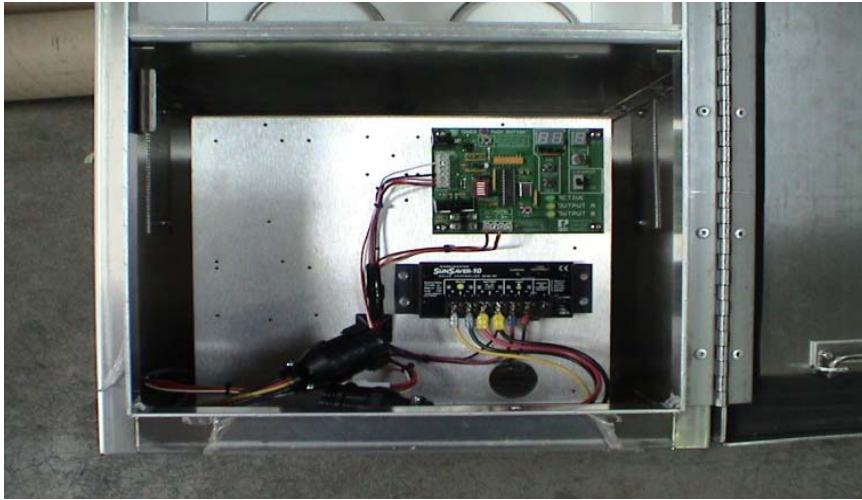


40. In-Pavement installation completed and ready for fixtures to be plugged into their connectors.



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.

# Final System Set-up and Testing



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.



# Completed Installation



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.



**TRAFFIC  
SAFETY** CORP.



# Under Vehicle Security and Safety Inspection Systems



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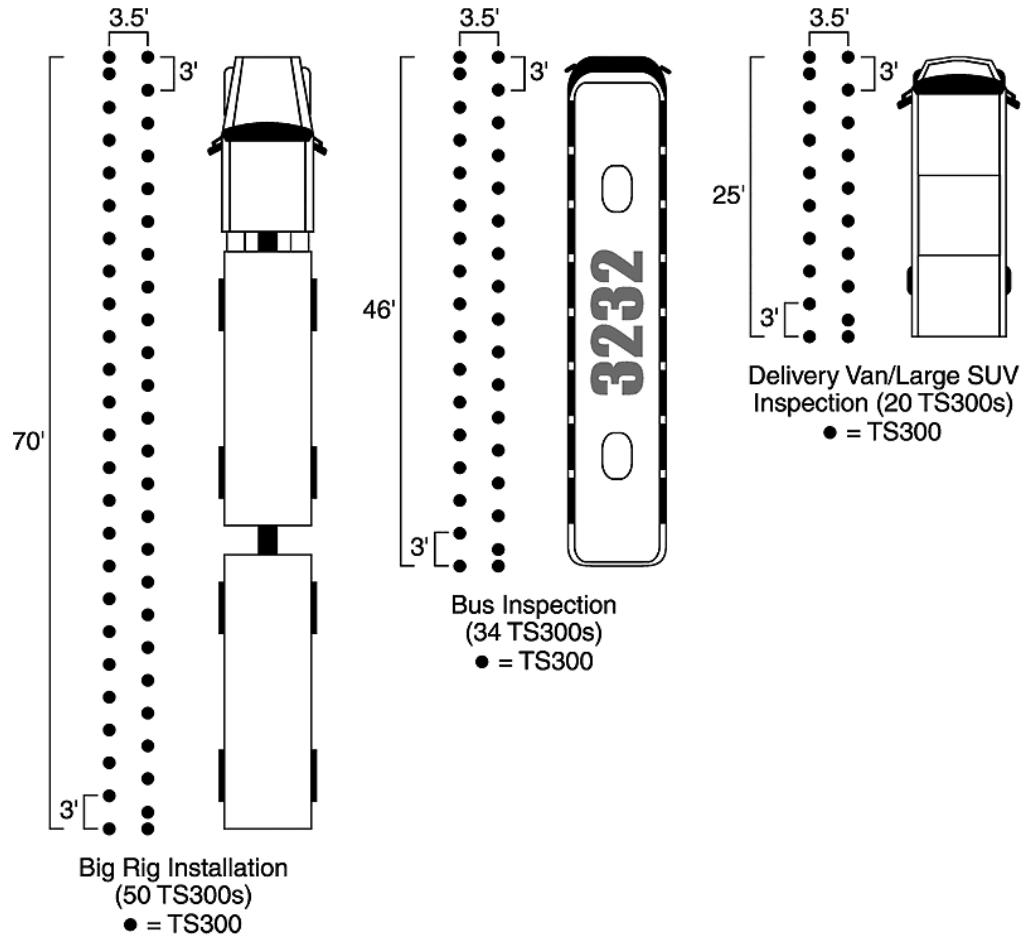
# Under Vehicle Security and Safety Inspection Systems



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



# TS300 Fixture Layout



# 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)

Quantity	Product	Part Number	Description
20	Fixture	FI-TS300-50/52	Clear, 50W halogen, 120 VAC
20	Connector	CO-012022	Female Connector
20	Base Can	BA-725-10-2	Base can: 8.625" x 10" deep
1	Inspection Mirror	MI-TS300MIRROR	Hand-held Inspection Mirror

## 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.

Quantity	Product	Part Number	Description
20	Fixture	FI-TS300-LP	Clear, LED, 120 VAC
20	Connector	CO-1051903021	Female Connector
20	Base Can	BA-725-10-2	Base can: 8.625" x 10" deep
1	Inspection Mirror	MI-TS300MIRROR	Hand-held Inspection Mirror

# 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).

Quantity	Product	Part Number	Description
20	Fixture	FI-TS300-LVD	Clear, LED, 12 VDC
20	Connector	CO-012022	Female Connector
20	Base Can	BA-725-10-2	Base can: 8.625" x 10" deep
1	Inspection Mirror	MI-TS300MIRROR	Hand-held Inspection Mirror
1	System Controller	SC-TS3000	Dimming System Controller

## 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.

Quantity	Product	Part Number	Description
20	Fixture	FI-TS300-LV	Clear, LED, 12 VDC
20	Connector	CO-1051903021	Female Connector
20	Base Can	BA-725-10-2	Base can: 8.625" x 10" deep
1	Inspection Mirror	MI-TS300MIRROR	Hand-held Inspection Mirror
1	System Controller	SC-TS2000	Low Voltage System Controller