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# TRAFFIC SAFETY CORPORATION

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In-Roadway Warning Light System  
AC Powered SC-TS1250AC15A Crosswalk System Controller  
Installation and Owner's Manual



**TRAFFIC  
SAFETY** CORP.  
*[www.xwalk.com](http://www.xwalk.com)*

TSC Technical Support  
T: 916.394.9884

11/26/2025

Rev. B



## Technical Support Center Reference Information

System Controller Part Number \_\_\_\_\_

Controller Serial Number \_\_\_\_\_

Fixture Model Number \_\_\_\_\_

Number of Fixtures \_\_\_\_\_

Date of Shipment \_\_\_\_\_

**Retain this installation and user manual as a permanent record of your system purchase and as a reference in the event that warranty Service is required.**

## Register Your System

TSC has provided a convenient and efficient way to register your new system on-line at [www.xwalk.com/registration](http://www.xwalk.com/registration). Registration is required within 1-Year of the date of shipment to qualify the system for TSC's 5-Year Limited System Warranty.

By registering your system with TSC, you will be recorded as the owner of the system. Your registration with TSC:

Will serve as confirmation of your system purchase and qualify your system for TSC's 5 Year Limited System Warranty.

Provide us with information required for quick servicing or your requests.

Help us notify you of enhancements or modifications to your system.



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## Introduction

Traffic Safety Corporation's In-Roadway Warning Lighting System is one of the most durable and reliable lighting systems ever developed. To ensure the integrity of the system over its lifetime the system must be properly installed. Failure to install the system properly will negatively impact the performance of the system, shorten its life and may void the manufacturer's warranty.

The proper installation and operation of your system is our top priority. For that reason this installation manual has been designed to guide you through each of the major steps of the in-pavement and electrical installation of the system. We recommend that a copy of the manual be given to both the design engineer and the installer of your system, well in advance of the actual installation.

The major steps covered in this manual include:

### **A. In-pavement Installation**

1. Proper Placement of Fixtures
2. Drainage System Requirements and Design
3. Base Can Installation

### **B. Electrical Installation**

1. Fixture Cabling and Connection
2. Activation and Pre-warning Device Cabling
3. System Controller Connection

Please call if you have any questions or concerns about the installation requirements, system set-up or operation. Suggestions for improving our installation manual are welcomed. The TSC Technical Support Center can be reached at 1-916-394-9884.

## **Section 1 – General Information**

### **A. Warranty Requirements**

TSC offers a 5-Year Limited System Warranty on its In-Roadway Warning Lighting System, the industry's longest warranty. In order to qualify for the warranty the following requirements need to be met:

1. System must be installed properly. Failure to install the system properly may affect the integrity of the system and shorten its life.
2. Use only the TSC supplied components shipped with your system. This is a matched component system and the use of any other components may affect system performance or damage the system.
3. Do not replace High Bright LED Arrays in the field. The long-life High Bright LED arrays are replaceable only in the factory. Factory replacement includes overall fixture inspection, replacement of the LED array(s), replacement of the gaskets and/or O-Rings, validation of seal and LED burn-in.
4. The TSC system must be registered with TSC using the on-line system in order to activate TSC's 5-Year Limited System Warranty.

### **B. Installation Precautions and Recommendations (TS-600/TS-520/TS-500/TS-400 Fixtures)**

1. Verify that the drainage system is working properly by pouring water into the drain hole of each base can before pouring concrete, and checking that the underlying drainage is absorbing the water. This should be done after the core drilling or trenching, but before the fixture is installed and the concrete is poured. The water absorption test is done prior to pouring concrete so that, if the drainage system is not performing properly, it can be repaired without having to remove and then re-pour the concrete.
2. Verify that the base cans have been installed level with the road surface and are positioned so that when the fixtures are installed, they will point parallel to the direction of traffic flow
3. Base cans are shipped with a protective plywood cover, TSC's Part# BA-PLCVR-3/4. The cover is used to protect the flange ring and keep debris out of the base can during installation, whenever the fixtures need to be removed for routine maintenance, during road resurfacing or during fixture shipment. After installation, the plywood covers should be marked, "DO NOT DISCARD", and stored in a safe location until needed.

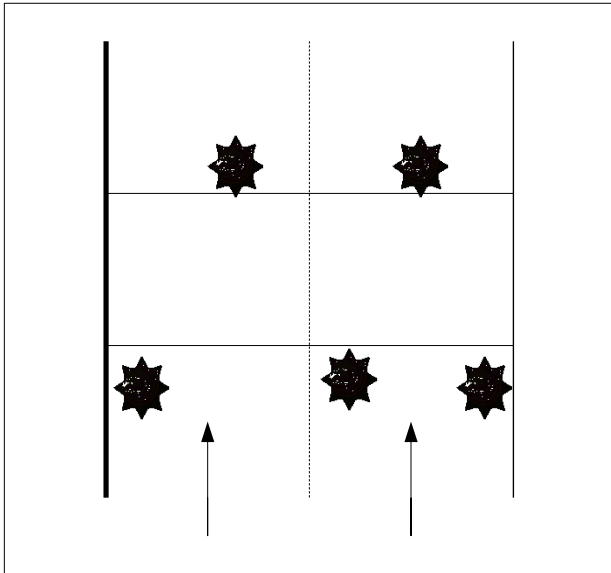
### **C. Technical Support Center Information:**

If You Have Any Questions or Concerns Call TSC Technical Support Center Before Proceeding: Open M-F, 7:30 AM to 4 PM PST @ 1-916-394-9884.

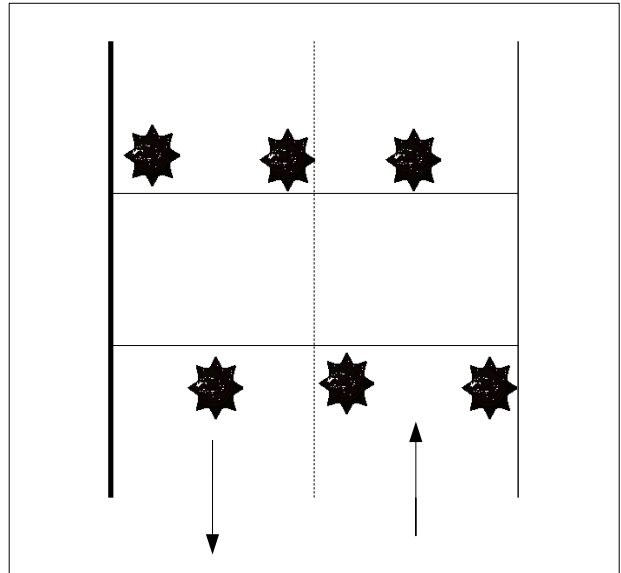
## Section 2 – In-Pavement Fixture Installation (TS-600/TS-520/TS-500/TS-400 Fixtures)

### A. Proper Placement of TS-600/TS-520/TS-500/TS-400 Fixtures

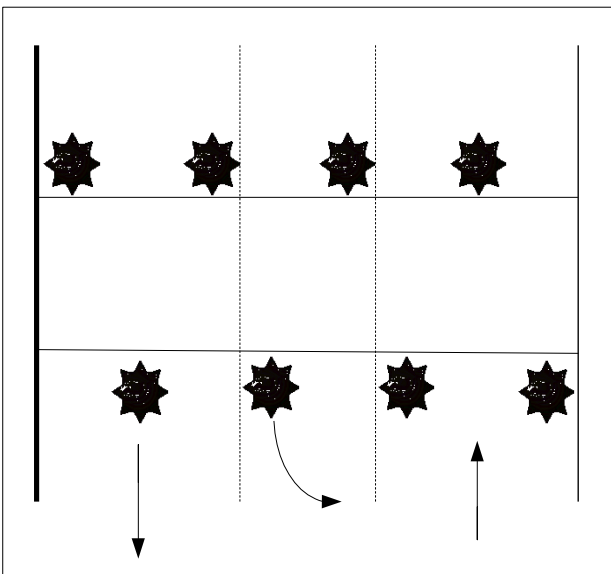
Refer to the design engineer's drawings for recommended placement of fixtures. Orient the base cans so that the fixtures will point parallel to the direction of on-coming traffic. Many possible fixture configurations are possible depending on the type of road that the crosswalk is being installed across. Typical layouts for the more common installations are shown below:



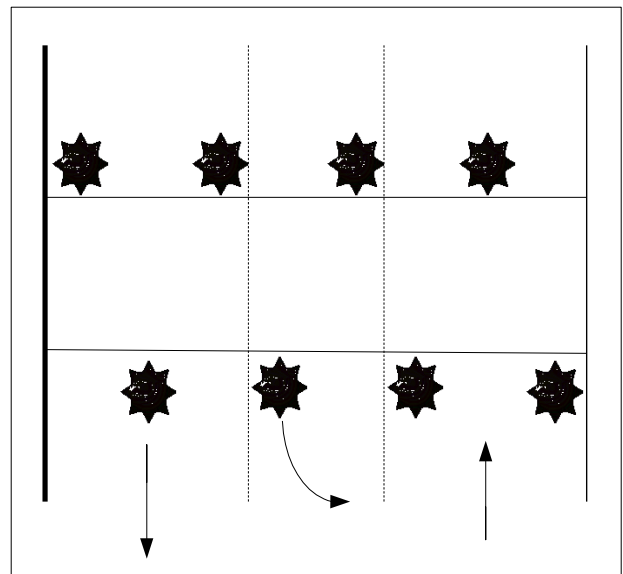
**Two Lane, One Way**



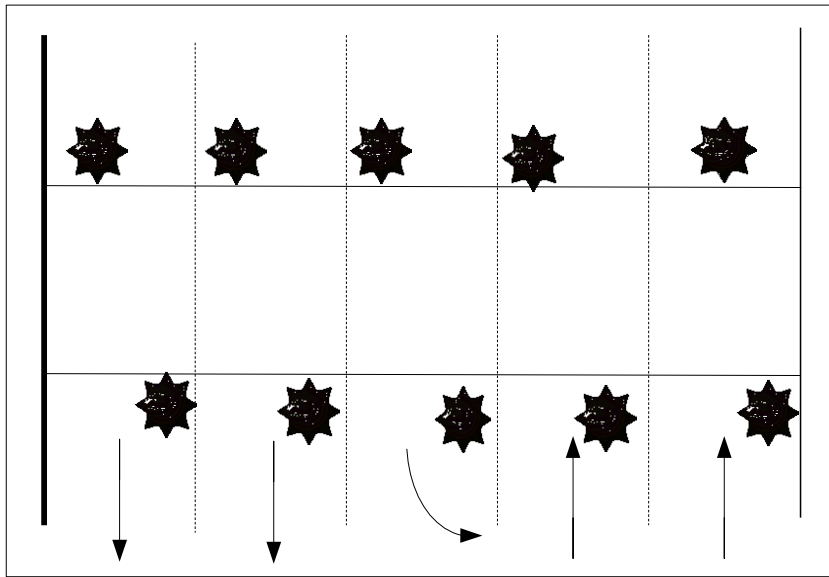
**Two Lane, Two Way**



**Two Lane with Turn Lane**



**Four Lane, Two Way**



**Four Lane, Two Way with Turn Lane**



**Typical Fixture Layout for Two Lane Road**

## B. Drainage System Requirements

The truism that water and electricity don't mix holds for In-Roadway Lighting Systems. Roadway pavement is subject to many sources of moisture, the most serious of which is ground water. The TSC In-roadway lighting system is designed to prevent water and water vapor from making contact with electrical conductors, contacts and connections. Fixtures used in the TSC system employ seals that prevent moisture from entering the light fixture. The connectors used are waterproof and provide connection between the fixture, and control system without fear of electrical shorting to ground. However, water within the base cans, left for long periods of time, may create problems. Standing water in the base can is especially undesirable in colder climates because of damage that can be done when water freezes and expands. To prevent problems caused by standing water in the base cans a proper drainage system must be designed and prior to the electrical installation of the fixtures and pouring of concrete. Failure to install a proper drainage system may result in damage to the system components.

## C. Drainage System Design

A number of drainage system designs may be used to provide proper drainage for the TSC In-roadway warning light system. Two types of drainage systems are typically used in the installation of the system:

- Modified French Drain – This drain typically consists of a 1 1/2 inch diameter PVC pipe discharging into a drain rock section, which is installed directly under the drain hole of the base can. See Figures 1 and 2 that are located on pages 7 and 9 respectively.
- Piped Drain - This drain provides positive drainage from each base can through a pipe system that carries any water that gets into the system off the edge of the street where it will drain into an open ditch, storm drain system, or other drainage facilities that are available. See Figure 3 located on page 11. If no existing drains are available, then an excavation can be made at the outside of the street section and this excavation filled with drain rock. This will serve as a retention area for water produced in the system and an area to allow for percolation of this water into the surrounding ground.

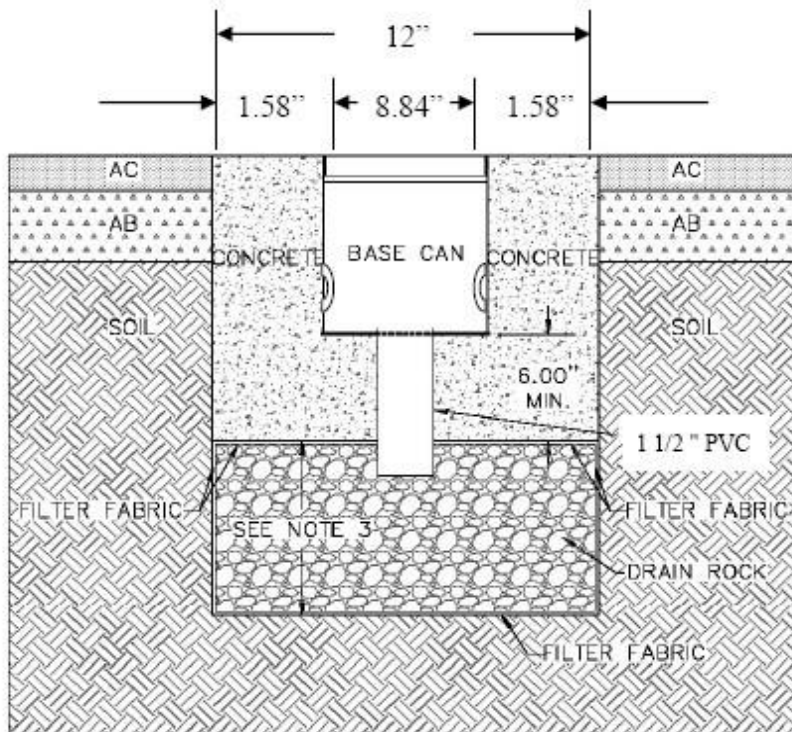
Because local codes, soil conditions and weather conditions are unique to each location TSC will not specify a drainage system for a specific installation. The typical installations described in the following pages are provided as general guidelines and may not apply at your site location. Refer to the Design Engineer's drawing for the drainage system specified for your specific installation. If one has not been prepared, ask the Design Engineer to prepare one before proceeding with the installation. If you, or the design engineer, have any questions about the need for a drainage system, we urge you to contact the TSC Technical Support Center at 1-916-394-9884.

## D. Base Can Installation – Core Drill and Saw Cut (Figure 1)

1. Remove the plywood base covers from the base can, mark them “Do Not Discard”, and store them in a safe location.
2. Begin the core drilling (typically 12 to 14 inch diameter and the depth will vary per terrain and/or suggestion of the civil engineer/contractor) and saw cut process. Holes should be drilled at fixture locations. Saw cuts should then be made to allow room for the fixture power cables (typically 3½” deep x ½” wide). Saw cuts are made parallel to the direction of the pedestrian travel and in line with the centers of the conduit holes.
3. In this installation, the base can fixture cable conduit holes will not be used with conduit. However, the fixture cables will pass from the edge of the saw cut into these holes. The cables will be held in place and the holes sealed with a sealing compound such as *Dollie Duct Seal* compound, or equivalent.
4. Prepare the drainage system specified by the design engineer. With this type of installation it is impractical to install a piped drain system. It is recommended that the modified French drain system be utilized. Refer to figure 1 on page 7.
5. Install the base can drain fittings provided into each base can drain hole. Run 1½ inch size pipe, Schedule 40 PVC, into the fittings of the base can. Pipe length should be cut so that the pipe, when positioned over the drain, extends approximately 3 to 4 inches into the drain rock.
6. Suspend the base cans so they are level with the surface of the pavement and supported so that they are rigid and won’t move during the concrete pour. Base cans should be oriented so that the fixture optics will be aligned parallel with the traffic lane. Use of mounting jigs is recommended for proper alignment of base cans. Consult the design plans for the preferred method of base can suspension for your installation.
7. Test the drainage system by pouring water into the base can at each fixture location before concrete is poured. Pour enough water to verify that the underlying ground is absorbing the water. If the base can is not draining properly, modifications to the drainage system will be necessary. In this case consult with your design engineer before proceeding. Once you’re satisfied that the drain is working properly, move on to the next step.
8. Install the fixture cables. Run fixture power cables to each base can, one black wire, one white wire for non-dimming fixtures. Run one black wire, one white wire and one green wire for dimming fixtures. If grounding is required by local code, run an additional grounding wire to each base can. The ground wire can be attached to the base can using the ground strap provided at the bottom inside of each base can.

9. Make sure that the filter fabric is in place above the drain rock to prevent slurry from clogging up the drain. Then encase the base cans and drainage system in concrete. It is recommended that at least 6 inches of concrete be used below the base. Fill saw cuts with Traffic Loop Sealant, or equivalent.
10. After the concrete has hardened, remove the mounting jigs, clean out base cans, and replace protective plywood covers until fixtures are ready for installation.

**Figure 1: Base Can Installation – Core Drill and Saw Cut**



**Notes:**

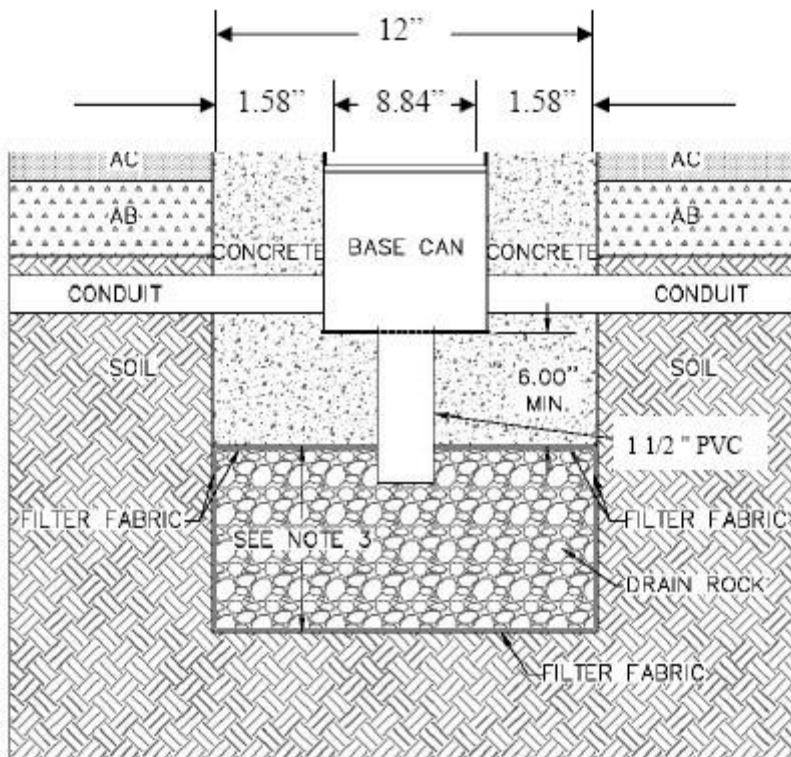
1. Drain rock shall be graded from 1 inch to ¼ inch.
2. Drain rock shall be encased in a filter fabric material to avoid soil infiltration into the drain rock.
3. Recommended depth of drain rock unit varies dependent upon the type of existing soils.
  - a. Where existing soils are granular and permeable the depth of the drain rock unit can be limited to 1 foot.
  - b. Where existing soils are fine graded and have low permeability the depth of the drain rock unit should be increased to 3 feet or greater to provide a reservoir for short term retention. Refer to engineering plans for the requirements specified by the project engineer.
4. Concrete shall be 3/8 inch maximum aggregate mix, use a minimum of seven sacks of cement per cubic yard of concrete and poured from a height of approximately 5 inches above the can. Concrete should only be poured from one side. Vibrate or rod concrete to completely fill the area below and on all sides of the base can. When concrete is visible on the side opposite to the side that concrete is being poured from, pouring can commence from alternate locations.
5. Abbreviations: Asphalt Concrete (AC), Aggregate Base (AB).

## E. Base Can Installation – Trench and Fill – Option 1 (Figure 2)

1. Remove the plywood base covers from the base can, mark them “Do Not Discard”, and store them in a safe location.
2. Begin trenching process. After trenching is completed along fixture locations, prepare the drainage system as specified by the design engineer. Refer to figure 2 on page 9.
3. Install the base can drain fittings provided into each base can drain hole. Run 1 1/2 inch size pipe, Schedule 40 PVC, into the fittings of the base can. Pipe length should be cut so that the pipe, when positioned over the drain, extends approximately 3 to 4 inches into the drain rock.
4. Suspend the base cans so they are level with the surface of the pavement and supported so that they are rigid and won't move during the concrete pour. Base cans should be oriented so that the fixture optics will be aligned parallel with the traffic lane. Use of mounting jigs is recommended for proper alignment of base cans. Consult the design plans for the preferred method of base can suspension for your installation.
5. Test the drainage system by pouring water into the supported base can at each fixture location. Pour enough water to verify that the underlying ground is absorbing the water. If the base can is not draining properly, modifications to the drainage system will be necessary. In this case consult with your design engineer before proceeding. Once you're satisfied, move on to the next step.
6. Install fixture cable conduit. Run 1 inch pipe size, Schedule 40 PVC, between each base can. PVC conduit should fit snugly into the grommets located at each base can conduit hole. Complete installation by running conduit from the last base can in the system to the system controller, as specified by the design engineer.
7. Install the fixture cables. Run fixture power cables through the conduit into each base can, one black wire and one white wire for non-dimming fixtures. Run one black, one white and one green wire for dimming fixtures. If grounding is required by local code, run an additional wire through the conduit to each base can. The ground wire can be attached to the base can using the ground strap provided at the bottom inside of each base can.
8. Make sure that the filter fabric is in place above the drain rock to prevent slurry from clogging up the drain. Then encase the base cans and drainage system in concrete. It is recommended that at least 6 inches of concrete be used below the base.
9. Backfill the trench with specified material, compact and cover per the designer's specifications, taking care not to damage conduit or drainage system. Remove mounting jig, clean out base can and replace protective plywood covers until fixtures are ready for installation.

10. After the concrete has hardened. Remove the mounting jigs, clean out base cans, and replace the protective plywood cover until fixtures are ready for installation.

**Figure 2: Base Can Installation – Trench and Fill (Option 1)**



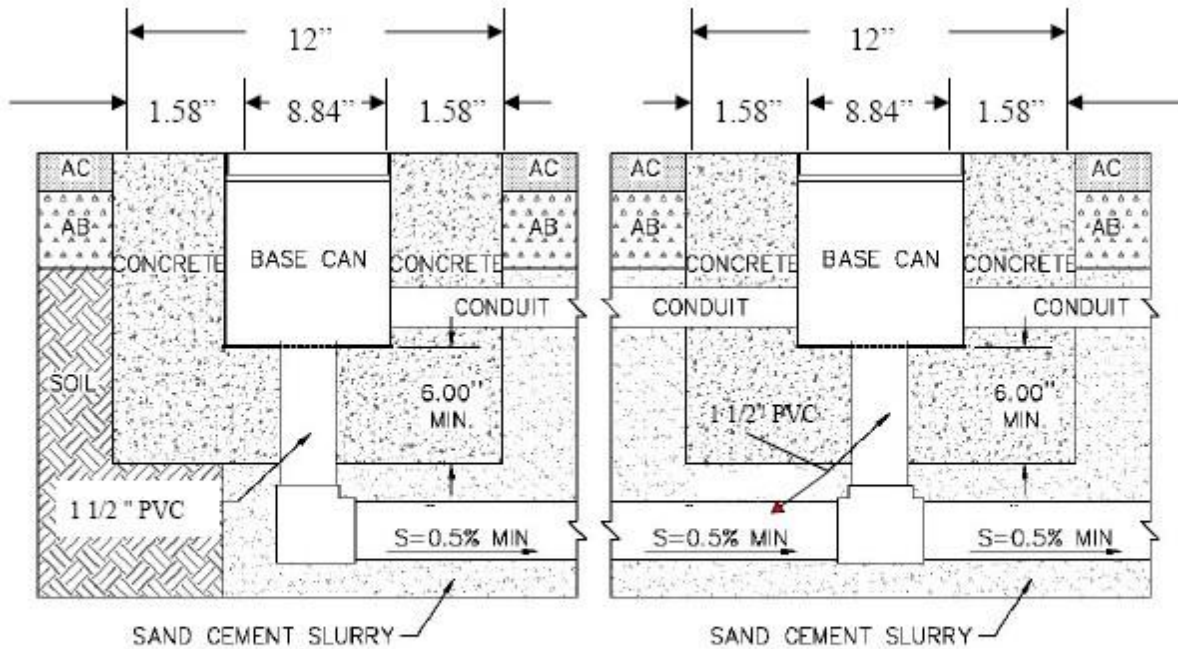
### Notes:

1. Drain rock shall be graded from 1 inch to ¼ inch.
2. Drain rock shall be encased in a filter fabric material to avoid soil infiltration into the drain rock.
3. Recommended depth of drain rock unit varies dependent upon the type of existing soils.
4. Where existing soils are granular and permeable the depth of the drain rock unit can be limited to 1 foot.
  - a. Where existing soils are fine graded and have low permeability the depth of the drain rock unit should be increased to 3 feet or greater to provide a reservoir for short term retention. Refer to engineering plans for the requirements specified by the project engineer.
  - b. Concrete shall be 3/8 inch maximum aggregate mix, use a minimum of seven sacks of cement per cubic yard of concrete and poured from a height of approximately 5 inches above the can. Concrete should only be poured from one side. Vibrate or rod concrete to completely fill the area below and on all sides of the base can. When concrete is visible on the side opposite to the side that concrete is being poured from, pouring can commence from alternate locations.
5. Abbreviations: Asphalt Concrete (AC), Aggregate Base (AB)
6. **Note: Drawing not to scale.**

## F. Base Can Installation – Trench and Fill – Option 2 (Figure 3)

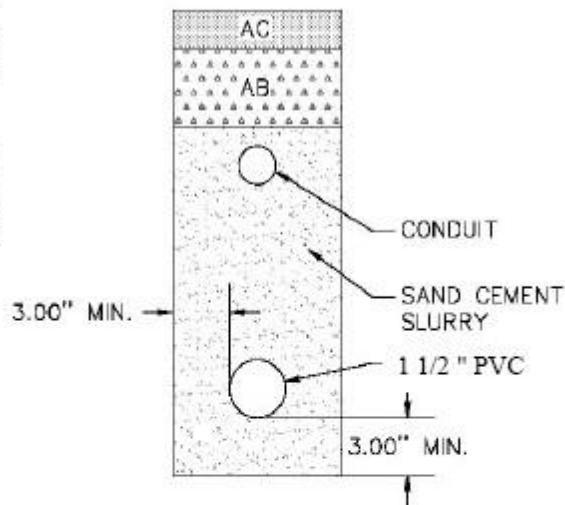
1. Remove the plywood base covers from the base can, mark them “Do Not Discard”, and store them in a safe location.
2. Begin trenching process. After trenching is completed along fixture locations, prepare the drainage system as specified by the design engineer. Refer to Figure 3 on page 11.
3. Install the base can drain fittings provided into each base can drain hole. Suspend the base cans so that they are level with the surface of the pavement and aligned parallel with the traffic lane. Use of mounting jigs is recommended for proper alignment of base cans. Consult the design plans for the preferred method of base can suspension for your installation, making sure that they are rigid and won't move during the concrete pour.
4. Install drain conduit. Run 1 1/2 ", *Schedule 40 PVC*, from each base can fitting into the proper coupling (right angle bend, T-adapter, etc.). Connect all couplings together using the proper length PVC pipe. Run the end of the drain conduit into the drainage system, ditch, or leaching pit. The drainage conduit pipe should have a slight negative slope.
5. Test the drainage system by pouring water into the supported base can at each fixture location. Pour enough water to verify that the drainage system is absorbing the water. If the base can is not draining properly, modifications to the drainage system will be necessary. In this case consult with your design engineer before proceeding. Once satisfied, move on to the next step.
6. Install fixture cable conduit. Run 1 inch pipe size, *Schedule 40 PVC*, between each base can. PVC conduit should fit snugly into the grommets located at each base can conduit hole. Complete installation by running conduit from the last base can in the system to the system controller, as specified by the design engineer.
7. Install the fixture cables. Run fixture power cables through the conduit into each base can, one black wire and one white wire for non-dimming fixtures. Run one black wire, one white wire and one green wire for dimming fixtures. If grounding is required by local code, run an additional wire through the conduit to each base can. The ground wire can be attached to the base can using the ground strap provided at the bottom inside of each base can.
8. Encase the base cans and drainage system in concrete. It is recommended that at least 6 inches of concrete be used below the base. After the concrete has hardened, remove the mounting jigs, clean out base cans, and replace the protective plywood covers until fixtures are ready for installation.
9. Backfill the trench with specified material, compact and cover per the designer's specifications, taking care not to damage conduit or drainage system.

Figure 3: Base Can Installation – Trench and Fill (Option 2)



**Notes:**

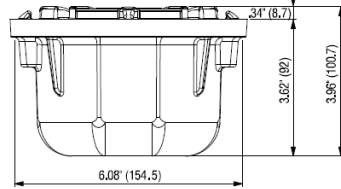
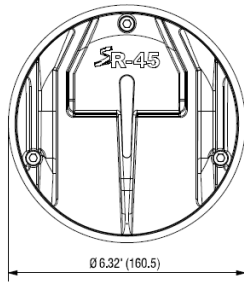
1. The 1 1/2 inch PVC drain conduit is used to discharge water into the existing drainage system, existing ditches or if necessary a leaching pit.
2. The leaching pit can consist of a 36 inch diameter drilled hole carried to a depth of 6 to 10 feet and filled with drain rock.
3. Abbreviations: Asphalt Concrete (AC), Aggregate Base (AB), Slope (S).
4. Drainage slopes of 1% are typical.
5. Drawing not to scale.



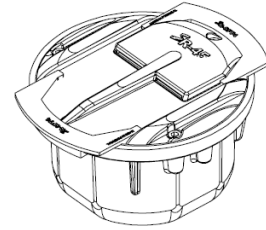
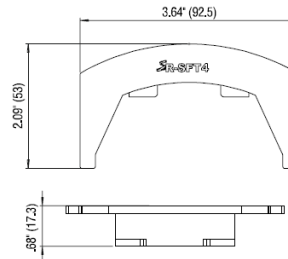
6. Concrete shall be 3/8 inch maximum aggregate mix, use a minimum of seven sacks of cement per cubic yard of concrete and poured from a height of approximately 5 inches above the can. Concrete should only be poured from one side. Vibrate or rod concrete to completely fill the area below and on all sides of the base can. When concrete is visible on the side opposite the side that concrete is being from, pouring can commence from alternate locations.

## Section 3 – In-Pavement Fixture Installation (TS-SR-45 and TS-SR-48 Fixtures)

Dimensions (mm)



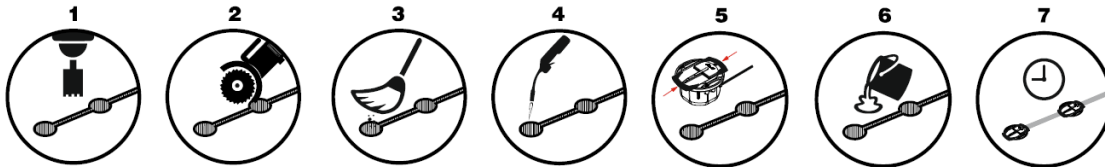
SR-SFT4 Installation Accessory (mm)



### Installation Procedure



Personal protective equipment must be worn during installation process.



1. After deciding the location where the stud will be installed, drill a hole having a minimum diameter of 6.5" (165mm) and 3.94" (100mm) deep.
2. Using a disk cutter, open a connection between the holes with .59" (15mm) width and 2.36" (60mm) depth.
3. Brush any debris or dust from the hole resulting from drilling.
4. Dry the hole with a blowtorch to remove any moisture that may compromise the adhesion and effectiveness of the grout.
5. Add a SR-SFT4 installation accessory to each stud. The accessory will help to align and keep the road stud in place during the grout drying time. This accessory will be removed at the end of the installation.
6. Pour  $\pm 5.5$  lb. ( $\pm 2.5$  kg) of ULTRAFLOW 4000/8 grout in the hole and insert the stud checking that the LEDs are facing the correct direction. Remove any excess grout.
7. The grout drying time may change depending on weather conditions. Consult the grout data sheet for more information. After the grout has dried, the top part of the SR-SFT4 accessory should be broken and removed.

Changing or not completing the described installation process can result in suspension of warranty.

## Section 4 – Electrical System Installation

### A. Fixture Cabling

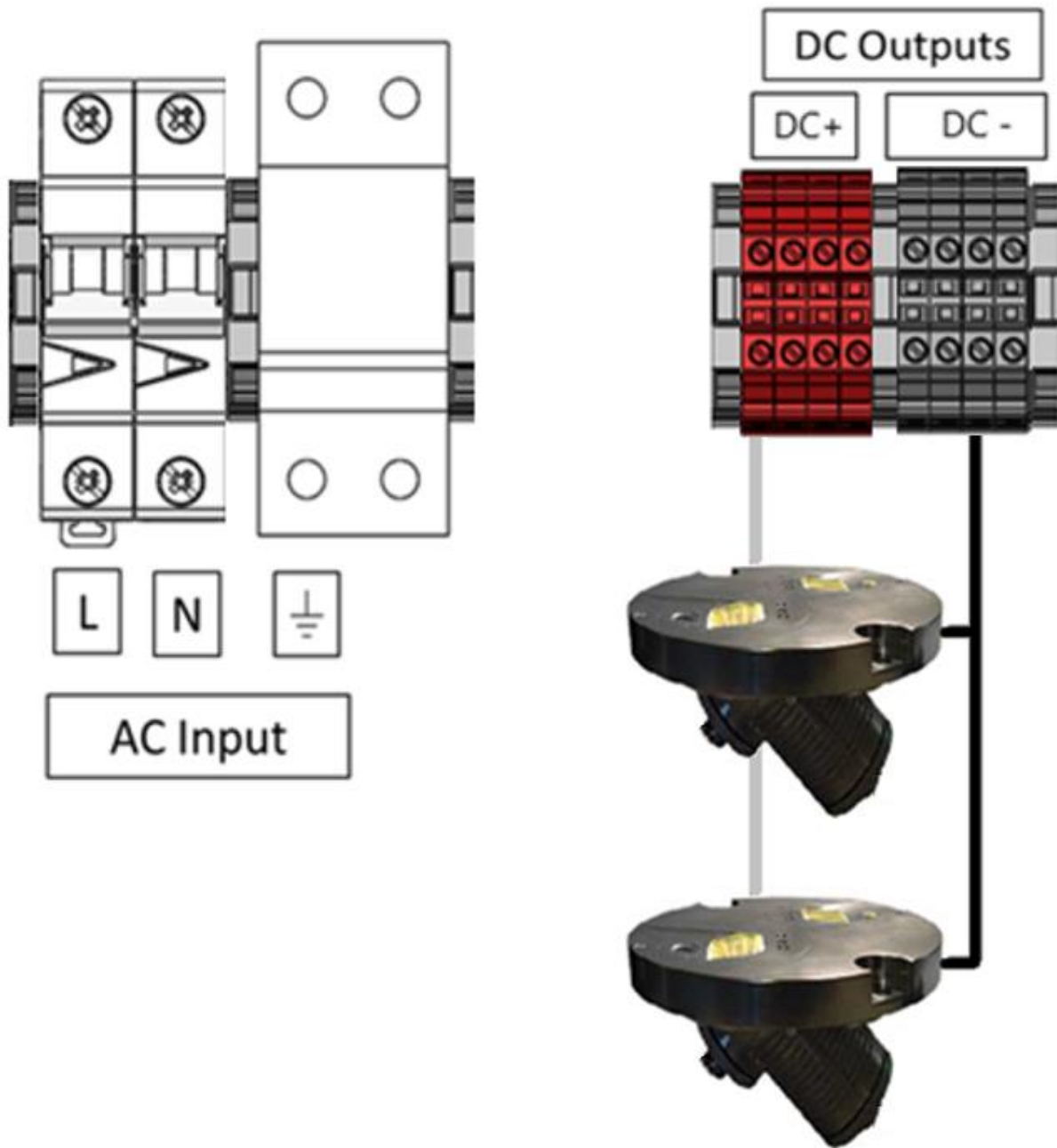
The system +12 VDC cables may be installed directly into saw cut 2½ inch minimum (typically 3½ inch) depth x 1/2 inch wide, instead of running the cable through conduit. Cable should be stacked into the saw cut, held down to the bottom using a backing rod and sealed using Bondo P606 or equivalent sealing compound. If using conduit pull cable through conduit. Ensure that all wiring conforms to NEC, State, Local and other applicable codes.

#### 1) Fixtures

##### **MODEL: TS-600/TS-520/TS-500/TS-400 Fixtures**

Using AWG wire of appropriate type to meet local codes, pull one White (+12 VDC) and one Black (DC-) power wire to each fixture (parallel circuit). If local code requires grounding, pull an additional green wire to each fixture.

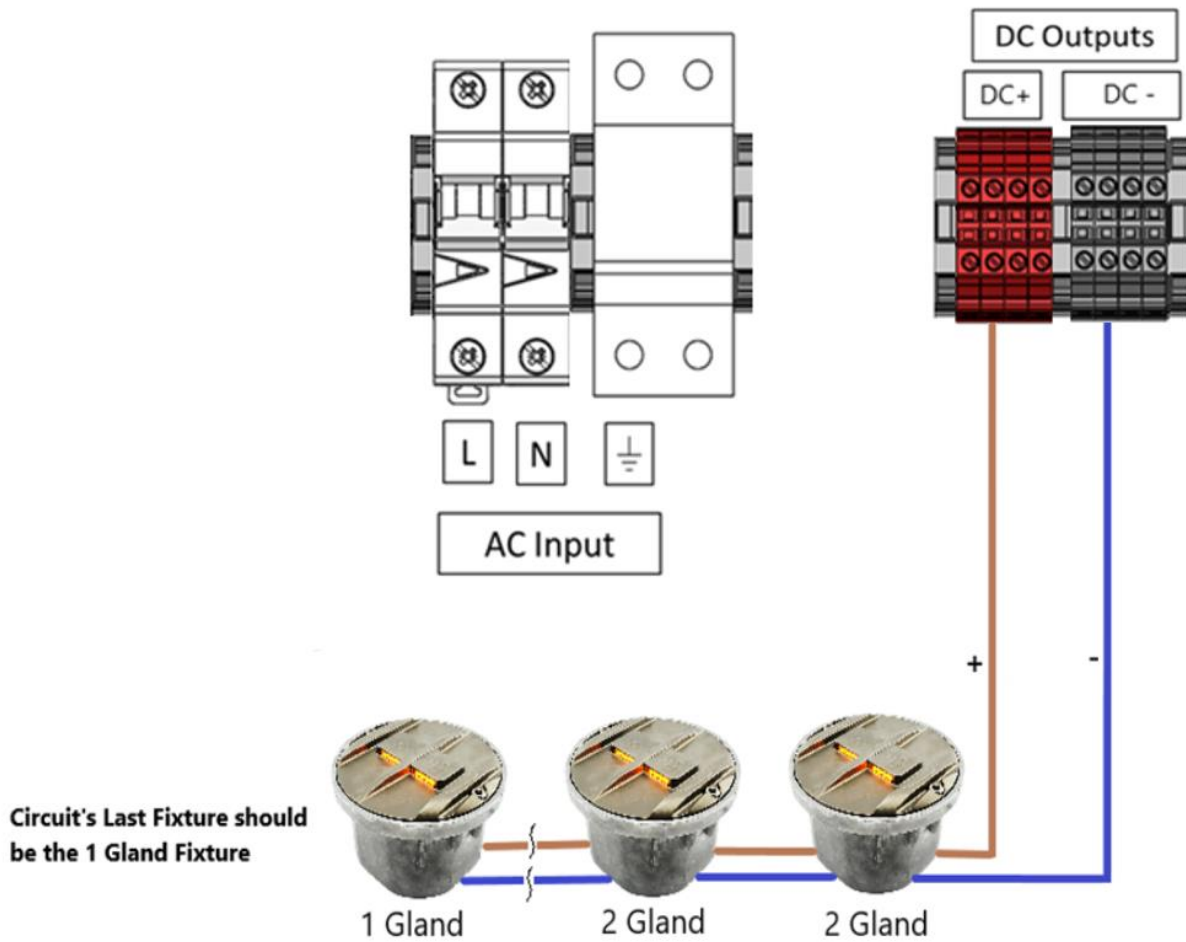
Make a parallel circuit with 3M or similar waterproof connectors. At each fixture, using TSC's Part #CO-1051907021 pigtail connect the BLACK lead to the BLACK #10 AWG wire and connect the WHITE pigtail lead to the WHITE #10 AWG wire. The use of drip-loops is recommended.



Wiring Diagram TS-600 Fixtures only

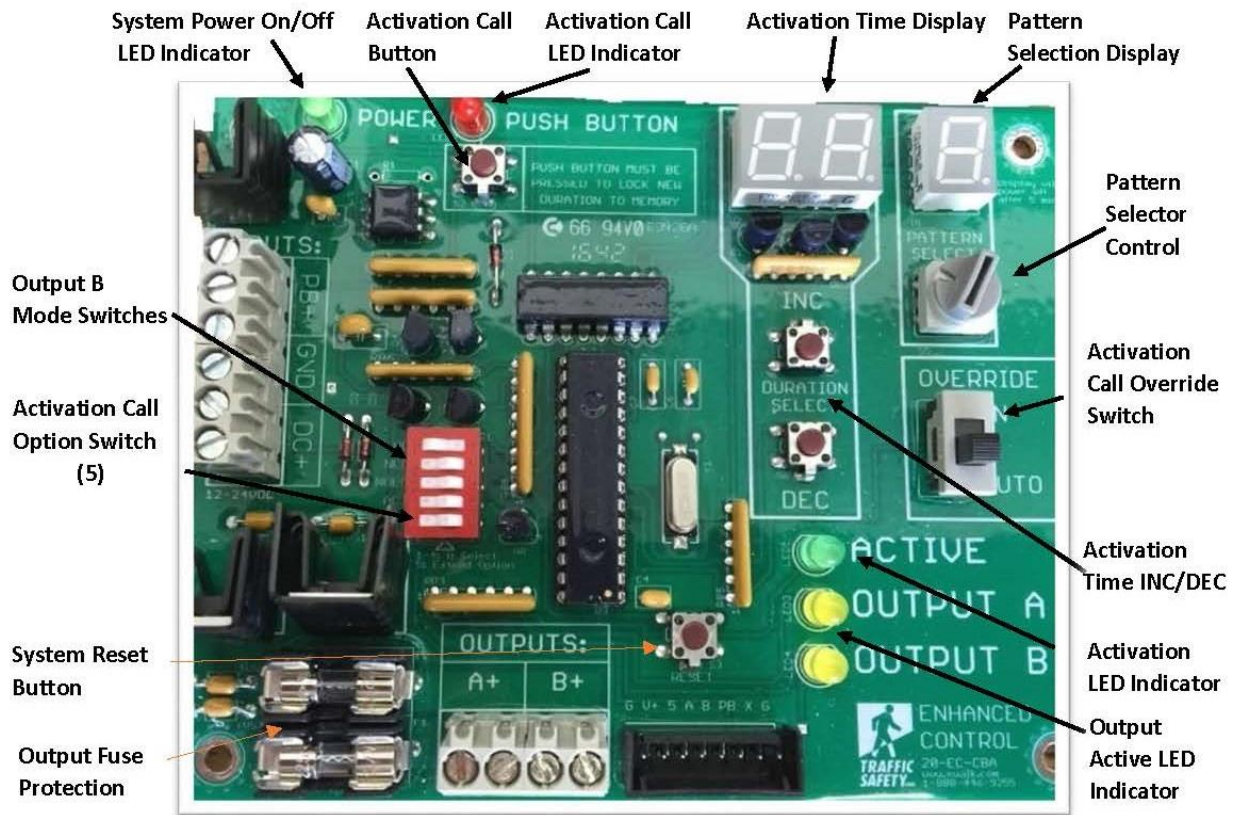
**MODEL: TS-SR4(X)-XX-2G and TS-SR4(X)-XX-1G Fixtures**

Use AWG wire of appropriate type and size to meet local codes, from controller's **DC Outputs connectors**, **DC+ connector (Red)** connect to the Brown (+12 VDC) wire to the circuit's first fixture and first cable gland. Connect from controller's **DC- connector (Black)** to the Blue (DC-) wire to the circuit's first fixture and first cable gland, the second cable gland will continue with the power distribution (+ and -) to the next fixture in the circuit. Repeat this process for all fixtures with 2 cable glands. See diagram below. Note: Brown and Blue wires should never make contact with each other to avoid any short circuits. The last fixture in the circuit should be a 1 Gland fixture to end the circuit. Make all wire connections/splicing in waterproof junction boxes.



## B. System Controller Description

If your system shipped with a controller other than the TS1250, refer to its installation manual; otherwise use the installation instructions for the TS1250 Controller provided in this section. Refer to TSC wiring diagram provided with system. A description of the system, directions for installation and set-up are provided below. Troubleshooting guidelines are described in Appendix A.



**Enhanced Control Board**

1. Pattern Selector – Flash pattern is selected by ten position pattern selector switch.
  - a. Position 0: 50 FPM Solid Flash Pattern (standard MUTCD flash pattern)
  - b. Position 1: 60 FPM Solid Flash Pattern (standard MUTCD flash pattern)
  - c. Position 2 – 8: Enhanced Flash Patterns (solid flash period is broken into a series of pulses)
  - d. Position 9: Rotates through each enhanced flash pattern, changing pattern each activation period.
2. Pattern Selection Display
  - a. Displays selected pattern option number (1 – 9).
3. Activation Time INC/DEC
  - a. Used to set activation time period. Activation time may be increased or decreased in one second increments over a range of one second to ninety-nine seconds.

4. Activation Time Display
  - a. Displays, digitally, the activation time in seconds over the range from one to ninety-nine seconds.
  - b. Pattern and time displays will dim after 5 minutes of inactivity to conserve power.

5. Output B Mode Switches **(OUTPUT B NOT APPLICABLE TO THIS CONTROLLER)**

Output B pattern output is selected by the top four slide switches.

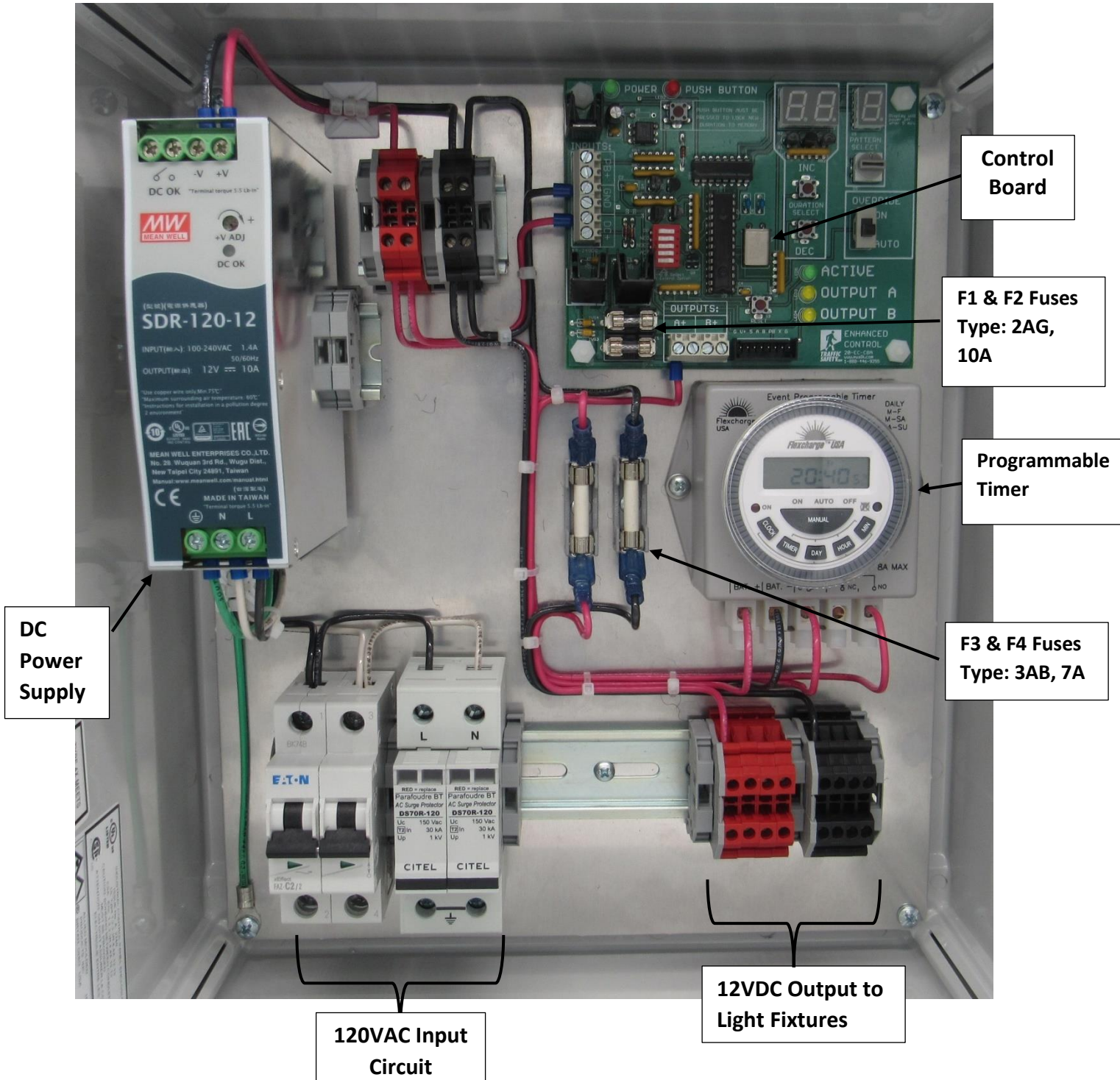
Note: C = CLOSED, O = OPEN

- a. Switch 1 (1=C, 2=O, 3=O, 4=O): Same flash period and pattern as Output A.
- b. Switch 2 (1=O, 2=C, 3=O, 4=O): Same flash period as Output A, but pattern is solid.
- c. Switch 3 (1=O, 2=O, 3=C, 4=O): Same flash period as Output A, but complementary duty cycle.  
Pattern is not enhanced (solid pattern).
- d. Switch 4 (1=O, 2=O, 3=O, 4=C): Output B always active while output A is flashing.
- e. Switch 1-4 (1=O, 2=O, 3=O, 4=O): Output B always inactive.

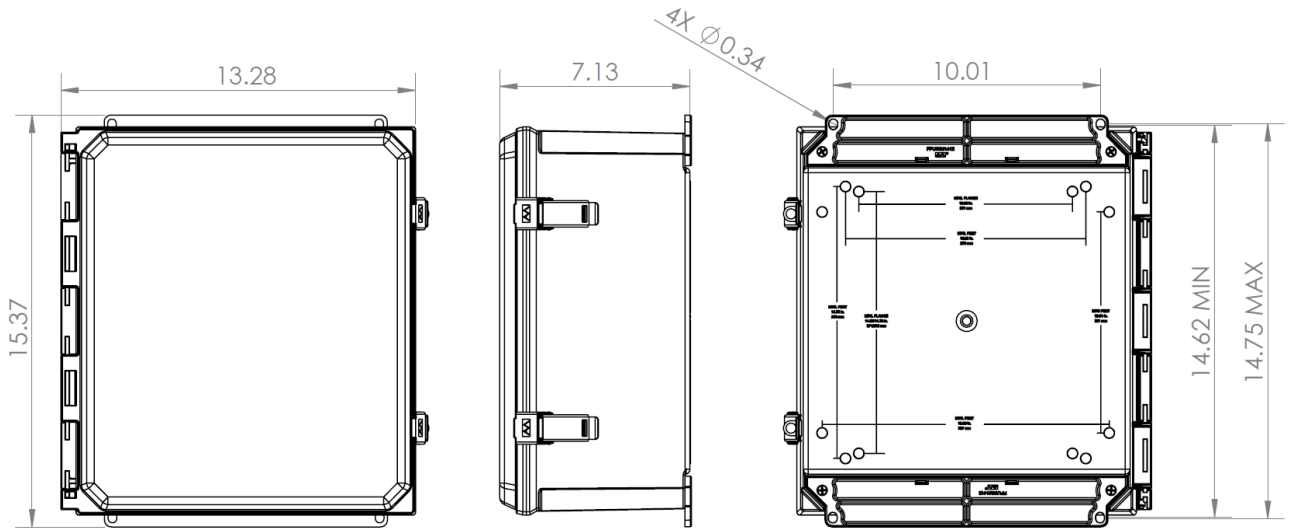
**Caution/Attention: Only one slide may be positioned in the CLOSED position at any given time. Having more than one switch positioned in the CLOSED position will result in improper system operation.**

6. Activation Call Option Switch
  - a. Activation call option is selected by the bottom slide switch, Switch #5. When closed, allows activation period to be reset by activation call. When open, ignores activation calls during the activation period (does not reset and begin the activation cycle).
- 7. Activation Call Override Switch**
  - a. Set the switch to the ON position, allows continuous flashing (activation calls are not required to activate system).
8. System Power On/Off LED Indicator
  - a. LED on when power is applied to the system.
9. Activation Call Button (Test Button)
  - a. Sends activation call to initiate activation flash periods.
10. Activation Call LED Indicator
  - a. Flashes when activation call is sent from activation call button.
11. Activation LED Indicator
  - a. On during activation period.
12. Output Active LED Indicators
  - a. Indicate the flash pattern being sent to Output A and Output B.
13. System Reset
  - a. Resets the control board.

### C. System Controller Installation

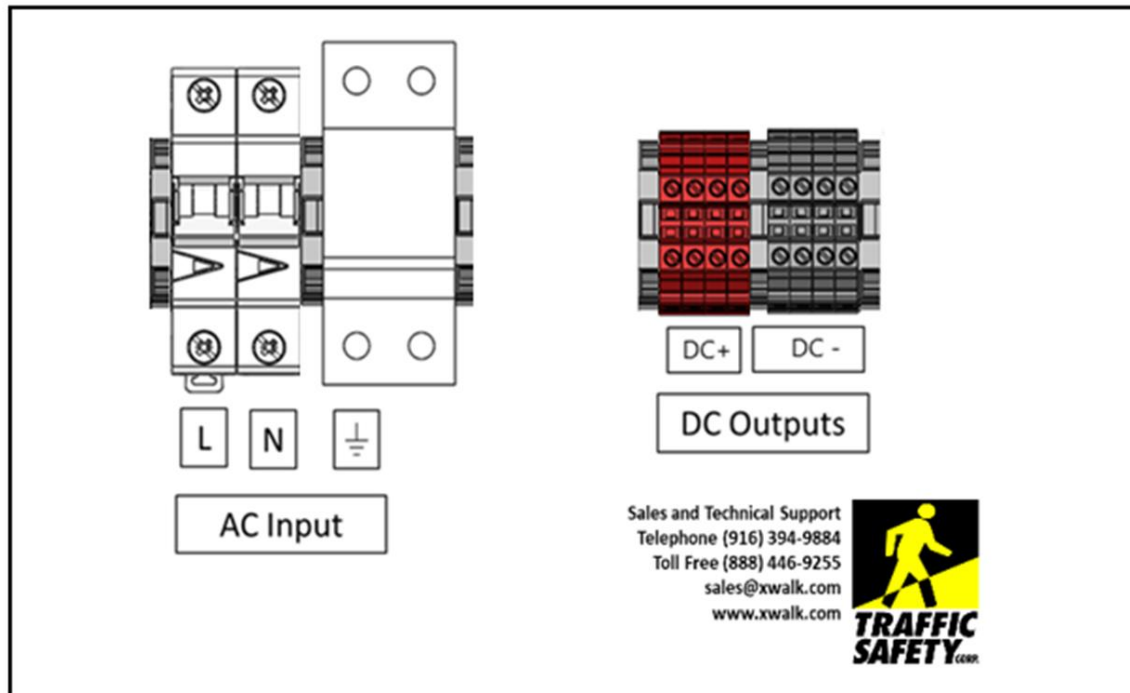


1. Mount control system in its proper location, as specified in the design plans. Enclosure Internal Dimensions: 14 x 12 x 6 in. Please see diagram below for enclosure's overall dimensions and mounting hole layout.
2. It is recommended to place two holes in the bottom of the enclosure for 1 inch conduit fittings, one for incoming power and one for the output. The recommended hole locations are shown below. Fittings must be UL Listed and of suitable type and rating to maintain water tightness of the enclosure.



**Enclosure Overall Dimensions**

**Mounting Hole Layout**



3. Make sure that the devices provided are rated for the output voltage level of the control system.

**Caution/Attention:** Devices are specifically matched to the output voltage level of the control system. Use of any other type or quantity of fixtures may damage the control system, fixtures or both.

4. Set the circuit breaker to OFF position.

**Caution/Attention:** Always ensure the system circuit breaker is in the OFF position before servicing the system wiring.

5. Connect the AC green ground wire to AC Input Ground, as required by local code.

6. To provide maximum protection from surges, ensure that the system ground is tested and provides less than 25 ohms to ground resistance.

7. Connect the 120VAC source wiring to the Input circuit breaker. Connect the Line to the left side of the breaker marked "L". Connect the Neutral or Line 2 to the right side of the breaker marked "N".

8. Before connecting output circuit (light fixtures) to controller, set the circuit breaker to the ON position and power up the TS1250. Verify that control board powers up and all indicators appear normal. Press the Push Button on the control board to check for proper system response. If all is well, set the circuit breaker to the OFF position and proceed to the next step.

8. Connect the fixtures in a parallel circuit wiring to the VDC Outputs connectors. Light Fixture's Brown Wire (DC+) to RED Connector (+DC) and Light Fixture's Blue Wire (DC-) to BLACK Connector (-DC). See pages 13-15 for more details. Note the following:

a. On 12VDC Output models, 84 watt, 7A is the maximum output.

10. Before continuing, perform a check on the DC loads:

a. Ensure that DC loads are not connected to the 120 VAC input terminals.

b. Set the circuit breaker to the ON position and test the operation of the DC loads before continuing.

c. Set the circuit breaker to the OFF position.

**Caution/Attention:** Ensure DC load circuits are connected to DC output terminals and AC input power to AC input terminals. DC loads connected to AC terminals will damage the load device and wiring.

11. Ensure all wiring conforms to local code.
12. Set the circuit breaker to ON position and test system operation.
13. On the **Control Board**, make sure the **Override Switch** is set to the **ON** position
14. Program the programmable timer to desired activation times.
15. Refer to Appendix A-F for trouble shooting guidelines.

## D. Programming the Programmable Timer

### SETTING TIME:

Set the clock to your local time and the day of the week.

- 1) Press and hold the **CLOCK** button.
- 2) Set the day of the Week by pressing the **DAY** key until the correct day appears.
- 3) Set the **HOUR** by pressing the **HOUR** key until proper hour appears. (24 hour time)
- 4) Set **MINUTE** by pressing the **MIN** key until the proper minute appears

When the time and day is set, release the **CLOCK** key

### PROGRAMMING:

It is not necessary to use all 8 event pairs but you will need to set both one ON time and one OFF time for each event.

- 1) Pressing the **TIMER** key will enter the Program mode. Pressing the **TIMER** key will scroll through the events. Stop on the event you want to set. There are 8 events and an ON and OFF time for each event. Only set the events you need. All others can remain blank.
- 2) Press **DAY** key to select the day or group of days. Press the HOUR key to set the hour and the **MIN** key to set the minute. To clear the event, press the DAY key then press and hold the **TIMER** key until the setting clears. Always set an **OFF** time for each **ON** time. It is possible to have one **OFF** event for several **ON** events. For example, if you have a light that comes on at different times each day but is to be **OFF** at the same time every day. One **OFF** event is all that is needed as long as it covers all of the **ON** days.

When the programming is complete, press the **CLOCK** key.

The **MANUAL** key will select **ON**, **AUTO**, and **OFF**. For Automatic operation it must be set to **AUTO**. You can manually turn the load **ON** and **OFF** by selecting **ON** or **OFF**. Watch the \_\_\_ cursor along the bottom edge of the display window and stop it over the function you want. All programming and time can be reset to New settings by pushing the **RESET** button with a pencil or pen. **Use caution, all programming will be lost when this button is pushed.**

## **Section 5 – Maintenance**

### **A. Fixtures**

Fixtures are made from corrosion resistant anodized aluminum or corrosion resistant stainless steel that can withstand salt and other chemicals. Fixtures are rated to withstand static loads up to 44,000 lbs. without sustaining permanent deformation or cracking of materials. Leads and gaskets are rated to withstand up to 300 degrees F. Under normal conditions no maintenance is required except to periodically check the integrity of the drainage system, periodic cleaning of the lenses and occasional factory replacement of the LED lamp.

### **B. Base Cans**

Traffic Safety fixtures are designed for minimum field maintenance. If properly installed, fixtures should not require any maintenance. Fixtures subjected to standing water in the base cans for long periods of time will eventually take in water, resulting in an electrical short and damage to the fixture. Furthermore, standing water in the base can that is subject to cold temperatures may damage the base can, fixture and, or connectors due to repeated expansion and contraction of the water as it freezes and melts. As part of a maintenance program, fixtures should be checked every six months to ensure the integrity of the drainage system. Any standing water should be removed immediately.

### **C. Lenses**

The TS400, TS500 and TS600 series fixtures all feature a self-cleaning lens design. If the fixtures are installed properly cleaning will not be required for long periods of time. If needed, lens cleaning can be done periodically using pressure or hand washing.

### **D. LED Lamp Replacement**

The long lasting LED arrays have an estimated ten year average life expectancy. In order to keep the fixture warranty in effect all LED lamp replacements are serviced at the TSC facility. At our facility we complete a comprehensive inspection and evaluation of the fixture; replace the LED unit(s), replace the sealing components, gaskets and, or O-Rings; verify the seal and burn-in the LED unit(s). A process is in place to make the lamp replacement easy for our customers. Once a request is received, a refurbished replacement fixture is immediately sent out with a return tag. When the customer's fixture is received it will be evaluated. If repairs are covered by the warranty the customer will receive a full credit for the fixture. If repairs are not covered by the warranty or the fixture is out of warranty, the customer will be credited for the return minus the cost of the replacement service.

## Appendix A – TS1250 Troubleshooting Guidelines

The TS1250 controller includes several indicators and controls to assist the installer in the troubleshooting process. Recommended equipment required for trouble shooting:

Narrow slotted screwdriver  
AC/DC multi-meter

When performing maintenance on the TS1250 be aware of the following safety considerations:

All measurements suggested should be made on terminals with wires in place. Do not remove any wires.

Exposing the DC side of the circuit to AC voltage can damage the controller as well as attached devices.

The Circuit breaker should be in the OFF position when making any wiring changes.

These troubleshooting steps are intended to be performed in sequence. When a problem is detected, verify all troubleshooting steps starting from Step 1.

Symptom	Problem	Check
System not functional 1. No indicator LEDs are lit 2. System does not respond to any inputs.	NO AC power to control board	1. Check Circuit Breaker is in ON position 2. Check Input AC voltage level 3. Check AC voltage level at input to power supply 4. Check that all terminal block screws are tight and wires are secured.
	Power Supply not functioning	1. Check AC voltage level at input to power supply 2. Check to see that DC power LED is ON. a. If ON but dim, immediately disable AC power to system and check for shorts. 3. Check DC output voltage (should be 12 VDC) a. If low voltage is read, system may be shorted or overloaded. Disconnect all output loads and recheck voltage level. b. Power Supply may be damaged. Replace power supply.

<p>Control board not functional:</p> <ol style="list-style-type: none"> <li>1. Power LED on control board not lit.</li> <li>2. No response to any inputs</li> </ol>	<p>Control board <b>not functioning</b></p>	<ol style="list-style-type: none"> <li>1. Check that red and black wires into control board are secure. Measure voltage between DC and GND input terminals.</li> <li>2. Push reset button, display should activate.</li> <li>3. Inspect board visually for visible damage.</li> <li>4. Replace control board.</li> </ol>
<p>System does not activate.</p> <ol style="list-style-type: none"> <li>1. Activation device does not initiate output.</li> </ol>	<p>Inoperable activation device or control board</p>	<ol style="list-style-type: none"> <li>1. Check all wiring connections to activation device.</li> <li>2. Check that “Push Button” indicator lights when activation device is triggered: <ol style="list-style-type: none"> <li>a. If indicator lights, but system does not activate, replace control board.</li> <li>b. In indicator does not light, check activation device connections. Note: PB1 is DC+ when measured to ground.</li> </ol> </li> </ol>
	<p>Control board not functioning</p>	<ol style="list-style-type: none"> <li>1. With load disconnected and override switch set to ON, test output voltage on the control board of each output (A+ and B+) with respect to GND. If: <ol style="list-style-type: none"> <li>a) Output is stuck OFF, measure on left side of output fuse for voltage, to verify fuse is not faulty.</li> <li>b) Output is stuck ON. Verify Output B dip switches are set correctly.</li> <li>c) Otherwise, output circuit on control board is inoperable. Replace control board.</li> </ol> </li> </ol>

## **Appendix B – TS1250 Component Replacement List**

12VDC Power Supply  
Enhanced Control Card  
7 Amp Fuse, 3 AB Type  
10 Amp Fuse, 2 AG Type

## **Appendix C – Fixture Cabling Test**

Note: The "Fixture Cabling Test" must be performed before (1) Any of the fixture plugs are plugged into fixture socket(s); and (2) The cabling coming from the fixture sockets is connected to the controller output connector terminals.

After the fixture socket pigtails are spliced onto the cabling inside of each base can, and the cabling coming from the fixture sockets is routed to the controller location, perform the following steps:

1. Connect one side of an ohm meter to the white wire located at the base of the controller enclosure. This connection will remain in place until the test is completed. The wire used for this connection must be long enough to reach all of the fixture locations (base cans).
2. Starting from the base can located closest to the controller, connect the other probe of the ohm meter to the contact point of the fixture socket with the largest inside diameter. A low resistance reading indicates a correctly wired fixture socket. If a high resistance reading is indicated (meg-ohms) the wiring in the fixture socket is incorrect and needs to be reversed, or the wiring between the fixture socket and controller location is open. To determine which the case is, connect the ohm meter probe to the contact point of the fixture socket with the smallest inside diameter. A low reading confirms that the socket wiring needs to be reversed. In this case reverse the wiring connections in the socket at the pigtail splice point. A high reading indicates that the wiring is open between the controller and the fixture socket. In this case the cabling between the two points (Controller and base can or between the last base can and the current base can) may not be properly connected, or the cable between these two points may be defective. Before replacing the cable the fixture socket pigtail splice should be visually examined for continuity.
3. Repeat step 2 for each base can in the system, moving from the closest base cans to the one located furthest from the controller.

## **Appendix D – Limited System and Product Warranties**

### **1- Year Limited Product Warranty**

For all products manufactured by TSC, but not purchased as part of a complete system, TSC provides a 1-year limited product warranty which warrants them to be free of material defects for a period of one year from the date of shipment. Warranty Limitations TSC makes no warranties, express or implied, other than those stated herein. For example, TSC does not warranty the workmanship of the installer, damage caused by acts of nature, vandalism, improper installation, improper maintenance or abuse. Note: The warranty period of fixtures covered under the 5-year system warranty is reduced to two years when fixtures are subjected to abrasive materials or chemicals. TSC is not an engineering firm and makes no expressed or implied warranty as to the applicability of its products or systems in any specific situation, applications or location: such decisions are the responsibility of the owner, designer engineer and/or others. Therefore, as to all goods sold by TSC, TSC hereby disclaims any implied warranty of merchantability or implied warranty of fitness for a particular purpose and Buyer agrees that TSC shall not be liable for any special, indirect, incidental, consequential or liquidated damages of any kind whether the Buyer's or any other claim is based upon contract, tort or any other legal theory.

### **5-Year Limited System Warranty**

TSC supplies fully integrated and factory tested in-roadway warning lighting systems. TSC's systems are backed by a 5-year limited system warranty on all core components of the system purchased from and integrated by TSC. Core components are defined as the system controller, fixtures, base cans, fixture connectors, LED signs, and activation devices that are set forth in the TSC Price Book. The warranty excludes any components not purchased from TSC including, but not limited to, signs, beacons, lamps, batteries, solar panels, and activations devices. To avoid invalidating the TSC 5-year limited system warranty all components of the system connected to the system controller must be listed on the Submittal Form and approved by TSC for connection to the system controller. Adding components not listed on the Submittal Form voids the 5-year system warranty and the 1-year product warranty on the system controller. System components that are integrated in to the system, but not purchased from TSC, are excluded from the 5-year system warranty and 1-year product warranty. Core components covered by the system warranty are warranted to be free of material defect for a period of five years from the date of shipment.

**Appendix E – Core Drill and Saw Cut Installation Pictures**



**Fixture Layout**



**Core Drill**



**Saw Cut**



**Drainage**



**Mounting Jig Setup**



**Base Can Alignment**



**Base Can in Concrete**

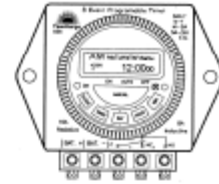


**Plywood Protective Cover**



**Fixtures Placed In Base Cans**

## Appendix F – Programmable Timmer



### *Flexcharge™* USA PROGRAMMABLE TIMER

7 Day, 8 Event Pairs, 16 Amp Resistive, 8 Amp Inductive, 12 Volt

#### OVERVIEW

Now you can have full control of lights, pumps, cameras, etc. with the accuracy of a Quartz clock. Perfect for signs, yard lights, etc. The light can be turned ON and OFF at specific times of day and many times a day if needed. When used in conjunction with the Flexcharge NC12L12 or Night Watchman Dusk to Dawn controls, you can delay the evening turn ON until it is dark but still have an exact turn OFF time. This will automatically compensate for changing sunset times. An internal replaceable Lithium battery will retain your programming in the event of a system power failure. The basic system is capable of controlling loads up to 16 amps at 12 volts and can easily drive an external relay to load capacities up to 100 amps.

#### INSTRUCTIONS

Follow the wiring diagram to connect the wires to your 12 volt system. The timer must operate from 12 volts AC or DC but the switch will control any voltage up to 250V. The BAT+ and BAT- terminals must be connected to a 12 volt source to switch the load ON and OFF. **You must supply power to the Common ( C ) terminal for the load to obtain power.** This can be any voltage up to 250 volts to meet your load requirements. For example if your load is to operate from the same power source as the timer clock, connect the ( C ) terminal to the battery positive terminal.

#### SETTING TIME

Set the clock to your local time and the day of the week.

- 1) Press and hold the **CLOCK** button.
- 2) Set the day of the Week by pressing the **DAY** key until the correct day appears.
- 3) Set the **HOUR** by pressing the **HOUR** key until proper hour appears. (24 hour time)
- 4) Set **MINUTE** by pressing the **MIN** key until the proper minute appears

When the time and day is set, release the **CLOCK** key

**PROGRAMMING:** It is not necessary to use all 8 event pairs but you will need to set both one *ON* time and one *OFF* time for each event.

1) Pressing the **TIMER** key will enter the Program mode. Pressing the **TIMER** key will scroll through the events. Stop on the event you want to set. There are 8 events and an *ON* and *OFF* time for each event. Only set the events you need. All others can remain blank.

2) Press **DAY** key to select the day or group of days. Press the **HOUR** key to set the hour and the **MIN** key to set the minute. To clear the event, press the **DAY** key then press and hold the **TIMER** key until the setting clears. Always set an *OFF* time for each *ON* time. It is possible to have one *OFF* event for several *ON* events. For example, if you have a light that comes on at different times each day but is to be *OFF* at the same time every day. One *OFF* event is all that is needed as long as it covers all of the *ON* days.

When the programming is complete, press the **CLOCK** key.

The **MANUAL** key will select *ON*, *AUTO*, and *OFF*. For Automatic operation it must be set to *AUTO*. You can manually turn the load *ON* and *OFF* by selecting *ON* or *OFF*. Watch the \_\_\_ cursor along the bottom edge of the display window and stop it over the function you want.

All programming and time can be reset to *New* settings by pushing the **RESET** button with a pencil or pen. Use caution, all programming will be lost when this button is pushed

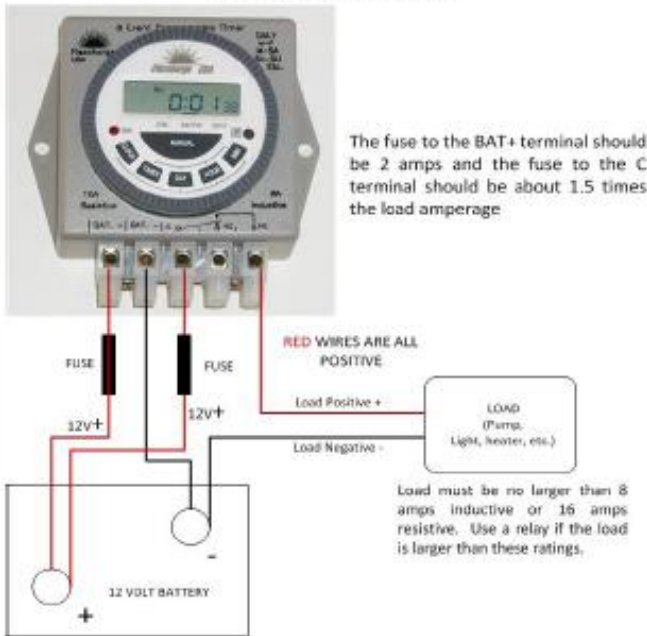
Units manufactured after 10/01/00. After several years the battery may need replacement. contact the manufacture or your dealer for further instructions.

[www.flexcharge.com](http://www.flexcharge.com)



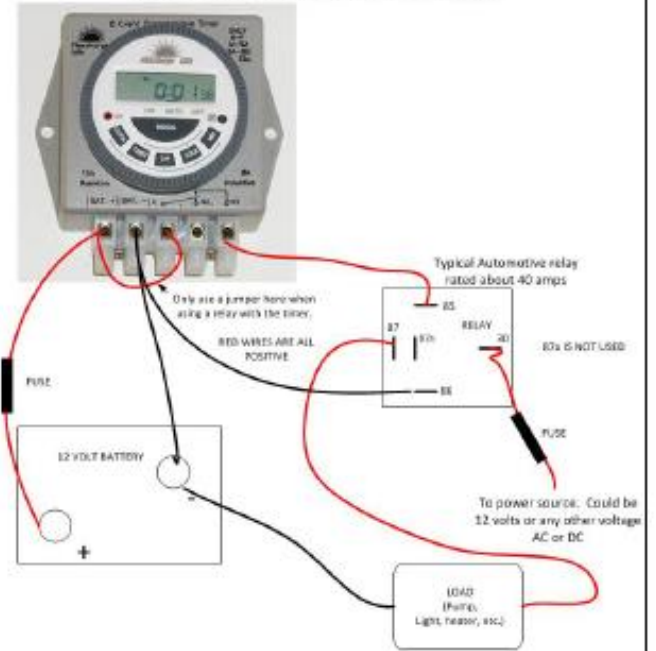
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**Typical wiring for a 12 volt load using the normally open (NO) terminal.**



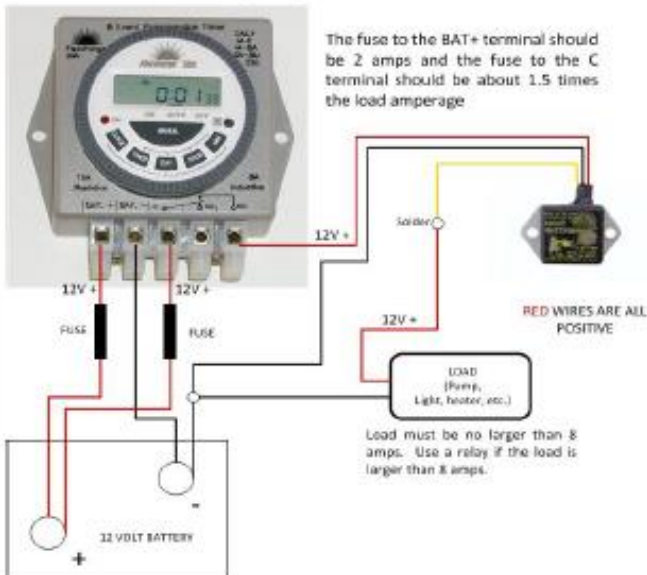
© Flexcharge

**USING AN EXTERNAL RELAY ON THE FLEXCHARGE TIMER FOR HIGHER AMPERAGE OR OTHER VOLTAGE LOADS**



© Flexcharge

**Using the Flexcharge Night Watchman with the Flexcharge Programmable Timer.**



Adding the Night Watchman to the system will give you a dusk to dawn ON / OFF function and the timer will allow you to have an off time during the night to save energy if the load is not needed for part of the night.  
 Program the timer to come on about 1 hour before sunset. Set an off time during the night when the load does not need to be on. Set another on time when you want the load to come back on during the night. Set an off time about an hour after sun rise.

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