INSTALLATION INSTRUCTIONS FOR

GOODLIN TSS SYSTEM

COVERS MODEL #

GL-RO-2

"TSS CONTROL BOX"

DATE ISSUED 1989

GOODLIN SYSTEMS INC.

TABLE OF CONTENTS

T.S.S. CONTROL BOX SPECIFICATIONS

POWER INPUT: 110 VAC 50-60 Hz 11 watts max

POWER OUTPUT: 24 VAC 50-60 Hz 48 watts max
(for external devices)

RESPONSE TIME: 200-100 milliseconds

ENCLOSURE: SIZE- 8"L x 10"H x 6"D Mounting - External

FEET- .25" Holes at 10.75"H x 6"L Center

TYPE- UL ENVIRONMENTAL TYPE 1, 4, 12 AND 13

NON-METALLIC

PRESENCE MODE: 5-10 minute hold time

LOOP FREQUENCY: Three selectable frequencies.
range of 25-65 kilohertz.

LOOP PROTECTION:

Isolation transformer allows operation with poor quality loops, including a single point a short to ground.

lightning protection: The detector can withstand a 10 microfarad capacitor charged to 1,000 volts to be discharged directly into the loop terminals. The detector can withstand a 10 microfarad capacitor charged to 2,000 volts to be discharged between either loop terminals and earth ground.

The circuit board is conformal coated to provide environmental protection.

OPERATING TEMPERATURE: -40°F TO +170°F

RELAY OUTPUT: 10 amp rated DPDT 8 pin relay

INTRODUCTION

THE INDUCTIVE LOOP VEHICLE DETECTOR (WE CALL IT THE T.S.S TOUCHFREE-SENSING-SWITCH) is based on the principle of metal detection. This is accomplished by a "locating search coil" The search coil is commonly referred to as the "loop". When metal objects enter the electrical field generated by the loop, the detector in the system is activated to show a presence condition. This is when the relay is activated in order to turn on any number of controls or equipment.

Although the control box can work with many types of loops not many of the pavement/floor cut loops can work for all applications. Critical measurment of the vehicle, moving equipment, or difficult pavement/floor conditions make floor cut loops inadequate for use. For this reason a STAND or PAD may be used.

TSS STAND—

An upright 'loop' that has a "cone sensing effect" that can be used for accurate measurments of a vehicle. Made with a break-away base, indication light, 25 feet of leed in cord. Made with PVC material.

MODEL # GL-14

TSS PAD—

A plastic pad that has the 'loop' windings inside it. also has a cone sensing effect, L.E.D. indicator, and 50 feet of lead in cord. Made with Polyethylene material.

MODEL # GL5-SM

FLOOR LOOPS—

Preformed burial loops or a DO IT YOUR SELF CUT IN THE FLOOR LOOP. Floor cut loop kits are available.

CALL FACTORY FOR INFORMATION AND MODEL #'S

NOTE: All lead in cords to STANDS/PADS can be ordered in longer lengths. Larger specialty STAND/PADS are available for Truck, Train, and driveway applications.

DETECTON FIELD THEORY

The detection field is like an invisible set of bubbles or lines crossing from one side of the sensor* to the other. When power is first applied, the detector 'remembers' the way the bubble is formed. The field will only be altered or reshaped by the presence of new metal. The detector will remember and accept this new shape if it (the detector) is reset, thus the sensor can be placed by metal as long as the metal stays where the detector 'remembers' it was. Any new metal entering the field will reshape the 'bubble'. It is this reshaping, or change the detector will see and activate on. Also note that THE CLOSER THE METAL IS TO THE SENSOR, THE LESS IT HAS TO MOVE TO RESHAPE THE FIELD. The amount of metal also has an effect on the amount of change in the field. The more the metal the more the change! When the metal is removed from the field the bubble returns to the original state the detector remembers it was, thus the detector deactivates. IF THE 'BUBBLE' DOES NOT RETURN TO THE ORIGINAL SHAPE, THE DETECTOR WILL NOT DEACTIVATE AND MIGHT BECOME UNSTABLE AFTER A FEW MINUTES (10-15). This is seen by the 'flashing' of the detector (on & off, on & off). Resetting the detector (turning the power off then on) will set the detector back to normal with a new 'bubble' in its memory. If this 'flashing' occurs, it may be a system fault (a bad detector). Most detectors now have an internal check that phases out any detection/activationin a preset amount of time. Example: If a car was set over a loop for more than 30 minutes, the sensor would phase out that car and deactivate with the thought- the car is there to stay, and to get ready for any more (different) metal.

AS YOU CAN SEE, MOST INSTABILITY PROBLEMS ARE CAUSED BY THE MOVEMENT IN THE FIELD BY CLOSE, LARGE METAL PIECES. THE MOST CONCENTRATED PART OF THE FIELD IS ABOUT 4-6 INCHES FROM THE SURFACE OF THE SENSOR.

*-SENSOR is the loop or coil windings that set up the field.

PARTS & NUMBERS

FOR

GOODLIN TSS SYSTEM
GL-RO-2

GL-0001.....TSS DETECTOR

GL-0002.....PLUG ASSEMBLY

GL-0003.....24VAC TRANSFORMER

GL-0004.....DPDT RELAY 24VAC

GL-0005.....RELAY BASE (8 PIN)

GL-0006.....TERMINAL STRIP (8 CONNECTOR)

GL-0008.....TOGGLE SWITCH

GL-0009.....CONTROL BOX ENCLOSURE

GL-0014.....COUNTER 24VDC (OPTIONAL)

GL-0015.....BRIDGE RECTIFIER (FOR COUNTER)

INSTALLMENT PROCEDURES

1-PICK OUT A GOOD TIME FOR INSTALLATION! An evening that has a relatively slow next day is preferred in case of trouble or complications.

2-TEST THE CARWASH FOR PROPER WORKING ORDER! MAKE SURE THE EQUIPMENT WORKS BEFORE WORKING ON IT. This way if something is wrong after you start you can tell it's the Equipment and NOT the INSTALLATION or the NEW SYSTEM.

3-Find a suitable place for the control box. If a STAND or a PAD is used MAKE SURE THE SENSOR CORDS CAN REACH BETWEEN THE SENSOR AND THE CONTROL BOX!

4-Look into the carwash wiring. You will need to find a constant 110v power,(hot and a neutral) and the wires that are now going to the activation switch that is going to be replaced.

5-Install sensor. (FLOOR CUT LOOP, STAND, or PAD)

6-Install control box and wire in power, sensor, and switch legs of equipment being activated with the new TSS SYSTEM.
REFER TO TERMINAL BLOCK WIRING DIAGRAMS

7-TEST THE SYSTEM. see 'START UP PROCEDURES.

8-TEST THE CARWASH FOR PROPER OPERATION.

* THE TSS SYSTEM'S DETECTOR IS FACTORY SET. THIS IS ONLY FOR *
* TROUBLE SHOOTING OR CUSTOMIZATION *

Sensitivity ajustments are as follows-

1) Inductive detector (loop) is by a switch inside the detector.

a) Turn off power and unplug the detection

(cable going to detector pulls off.)

b) Remove detector from it's housing (take out small screws on the casing and the detector should slide out.

c) Ajust sensing switch (location upper left hand corner)

There are two types of sensativity switches, slide and dial.

Slide switch type 3 position (from the top) HIGH, MEDIUM AND LOW

NOTE:Top side is the one without metal

The dial type has a wider selection (you need a small screwdriver to turn the dial) the number is indicated by the arrow on the dial

0,1,2,8,9 are not used

3 = low

4 = med

5 = high (factory setting)

6 = super sensitive (some pad models)

7 = ultra sensitive

6 & 7 might give instability problems depending on conditions of placment, installment and other factors. #5 works best for most applications.

d) Plug detector back in (plug is slotted for correct arangment)

e) slide detector back into position and put in screws

NOTE: YOU MAY WANT TO LEAVE SCREWS OUT UNTIL TESTED

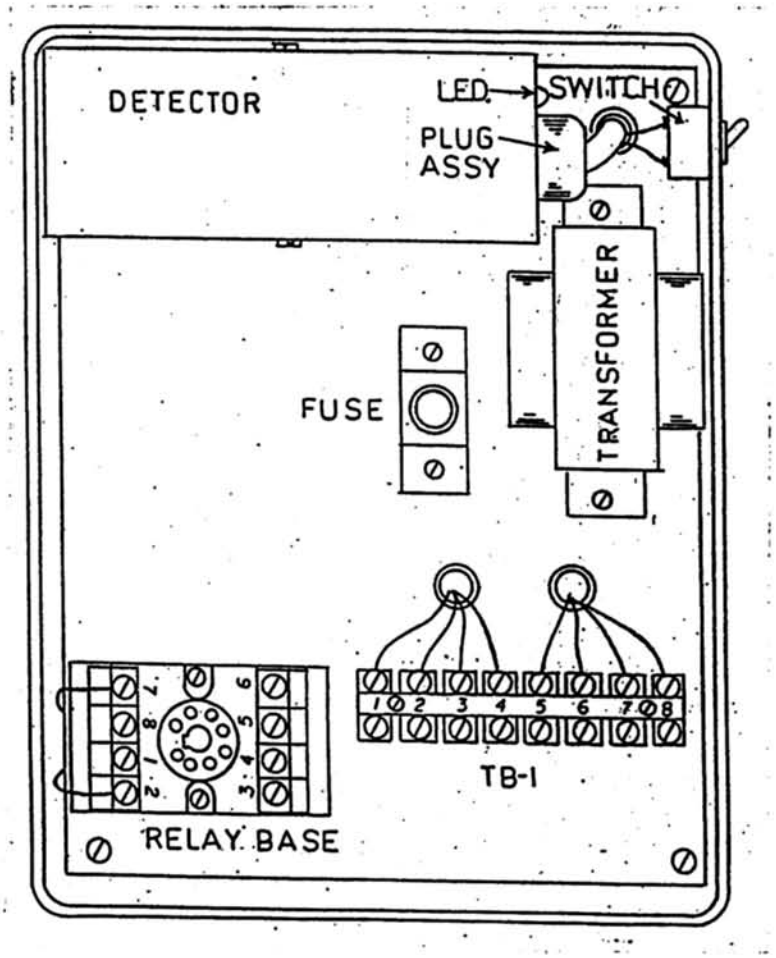
f) Turn on power

g) Test the system (see TEST PROCEDURE)

It is recommended the control box to be installed in the driest location possible. If the control box is to be installed in a wet area, the proper water resistant fittings should be used . As an extra measure you may use silicone around the fitting to insure a water tight seal.

```
                 use silicone
 ---------      /
|         |   /connector
|         |  //
|         |  ]======
|   TSS   |   \
| CONTROL |    \
|   BOX   |     \ use silicone
|         |
|         |
 ---------
```

This will help the internal components stay dry. Even though we use a rustproof fiber box that repells water, direct water (water leaking in the box) can cause damage to the inside components.



A 24VAC 40VA transformer is placed in the control box to operate an indication light option (on tss STAND OR PAD SENSORS) This same transformer can be used to operate a 24vac solenoid valve such as on rinse, flood arches, and other fluid control solenoids. This saves you from running a supply from a different source. (SEE BASIC WIRING DIAGRAMS)

Once the SENSOR is mounted (STAND, PAD, or floor cut loop). and the box is mounted, the electrical connections are made (refer to the terminal sheet), turn on the power to the SYSTEM box. The SYSTEM is ready to use if the light on the TSS detector/sensor turns on, then off. If the light turns on and stays on, then flip the switch on the control box off, then on again. If the light remains on, use the problem chart at the end of this manual The switch on the CONTROL BOX must be on for the TSS SYSTEM to operate. This is the reset switch for the detector

Once set, the SYSTEM will sense any metal entering its field. The metal around the TSS STAND is phased out whenever the SYSTEM is reset (or power is interrupted) On the front of the detector (the blue box in the control box) there is a three position switch. This is used to separate the frequency of one STAND from another in the same area. If you have more then one SYSTEM in your car wash adjacent to one another you may have to move the frequency switches to different settings (example: one on high the other on low) and reset your TSS SYSTEMS. Standare setting is on HIGH.

The TSS STAND has a standard length of cord of 25 feet. The TSS PAD has a standard length of cord of 50 feet, This should give you enough reach to place the control box high and out of the water area. If you require more cord you may request a longer cord to be sent with your TSS STAND or PAD, We have these choices- 50, 75, 100, 125, 150, 175, 200, 225 and 250 foot. Lengthen your cord by splicing on. We recommend using solder to join the wires and heat shrink tubing over the splice (FIG 2). You may also use tape and silicone in place of the heat shrink tubing. Use stranded wire cord AWG #16 or #18. The cord you use must have all 4 wires twisted around each other (example: SO CORD , COMMUNICATIONS CORD). It can't be untwisted such as speaker wire and some types of extention cords.

FIG.2

```
                                        heat shrink tube(push over
                                        solder connection and heat
                                        until tubing is snug)
                                        /
                                       /
                  ====SOLDER=}}}}}}}==
                 =                    =
                = ====SOLDER=}}}}}}}=  =
       ===========                     ==========
_______========== =                    = =========_______
                 = =                  = =
                 = ===}}}}}}}========= =
                 =                    =
                  ===}}}}}}}=========
```

REMEMBER: Water will reduce the sensitivity of the SENSOR if it allows conductivity between wires

You may want to protect the cord by placing it in a pipe (PVC if possible.) where it crosses the floor. This is recommended to protect the cord from being damaged. With the TSS SYSTEM activated the STAND/PAD cord should not be coiled, other wise the SENSOR will not have full sensitivity.

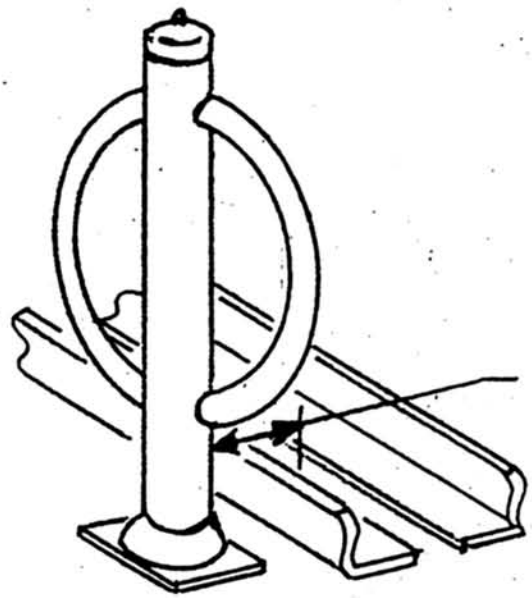
COMPARISON TABLE

	GOODLIN TSS SYSTEM WITH STAND	HANNA LOOP SYSTEM	GROUND LOOP SYSTEM	GOODLIN TSS SYSTEM WITH PAD
1. LIGHT ON SENSOR WHEN ACTIVATED	YES	NO	-----	YES
2. SPECIAL ADJUSTMENTS	NO	YES	YES	NO
3. RESET SWITCH	YES	NO	NO	YES
4. 24V POWERS SUPPLY	YES	YES	NO	YES
5. TWO FUNCTION OPERATION	YES	YES	NO	YES
6. BREAK AWAY BASE	YES	NO	NO BASE	NO BASE
7. SAW CUTTING REQUIRED	NO	NO	YES	NO
8. PLACEMENT BY METAL	YES	?	NO	YES
9. OPTIONS AVAILABLE WITH UNIT	YES	NO	NO	YES
10. MOVABLE	YES	YES	NO	YES
11. WEATHER-PROOF	YES	?	YES	YES
12. SENSING RANGE 25" & OVER	YES	NO	HAS TO BE 6' SQUARE OR BIGGER	YES
13. SERVICE MANUAL	YES	NO	NO	YES
14. METAL ON LOOP STAND	NO	YES	NO	NO
15. PRE-BUILT CONTROL BOX	YES	YES	NO	YES

INSTALLATION INSTRUCTIONS
WITH SENSOR OPTIONS

We recommend the TSS STAND be placed approximately 8"-10" from conveyor's outside rail.

NOTE: measurement FROM INSIDE OF OUTER RAIL.



This enables you to have good clearance for all vehicles. The TSS stand can be placed along the conveyor at any point in the car wash and will not be affected by water, temperature or car wash chemicals. Since there are no moving parts in the stand, there is no maintenance is to be performed as there is with other switching devices.

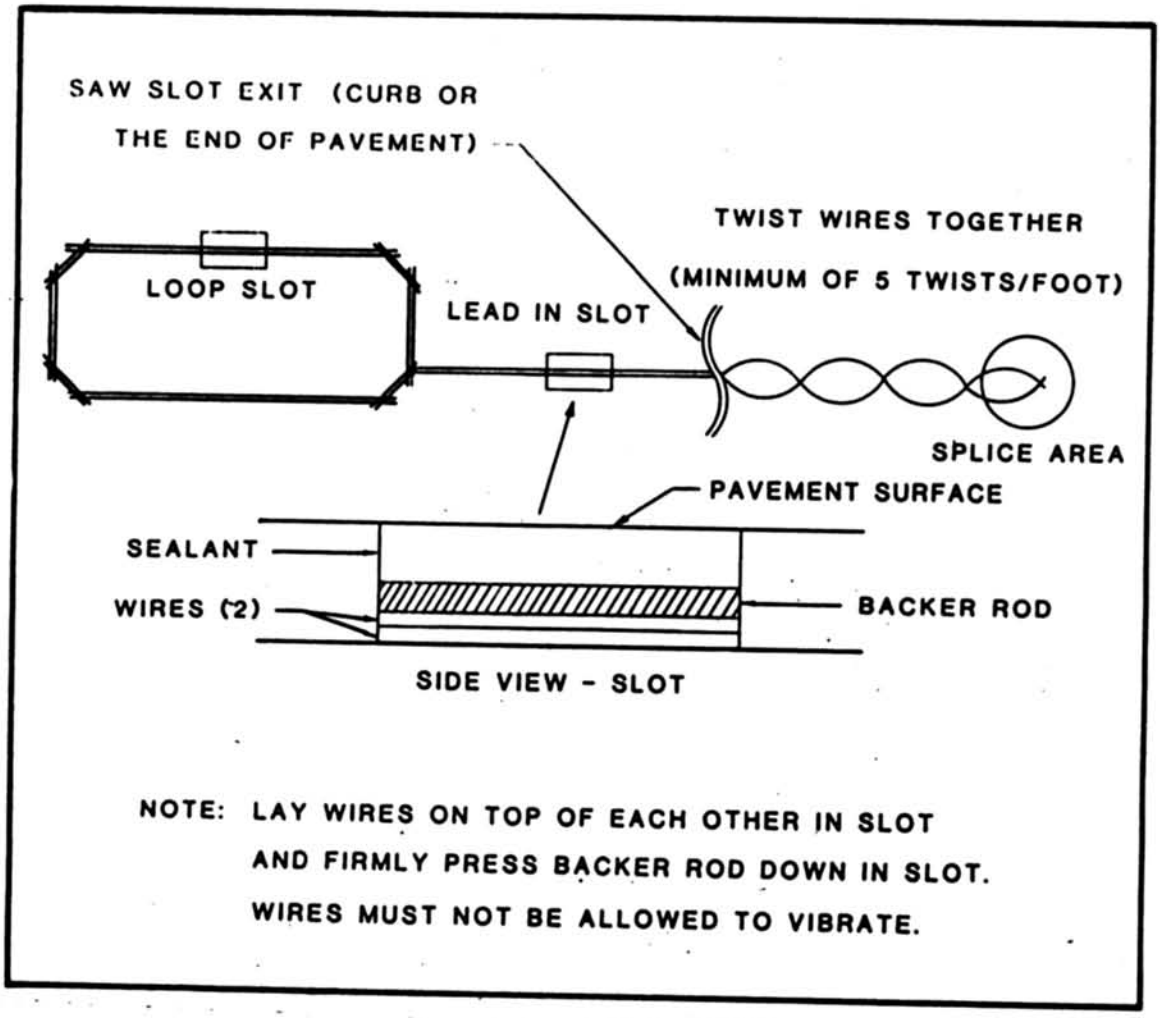
FLOOR CUT LOOP INFORMATION

A floor cut loop is a set of wire winding set into the floor to act as the SENSOR for the DETECTOR. This is usualy used to cover a large area (such as a street exit). Due to the wide sensing range of the floor cut loop, the measurement of a vehicale is vary inacurate. Such as for an entrance system of a car wash (for the wash computer). If acuraccy is important or the floor cut loop can not be put in, the TSS STAND or PAD can be used.

NOTE* Recomendation for car wash loop measurements are 2 feet by 6 feet.

```
=========================
========== CONVEYOR=======

 _
 | |
6| |<-LOOP
 | |
 |_|
  2
```



THE BUDDY SYSTEM OPTION

SEE BUDDY SYSTEM/BUDDY KIT MANUALS FOR INSTALLATION

THE BUDDY SYSTEM is a set of POWERFUL PHOTO ELECTRIC EYES that enable the TSS SYSTEM to measure the cars, if they are running with 12" or less space between them. Normally the TSS SYSTEM can hold the measurement of the car between + - 4 to 6 inches of accuracy. Amazingly, tests on different sets of photo eyes has shown that they have the same accuracy as the TSS SYSTEM! BOTH CAN ONLY BE + - 4 to 6 inches! Not to worry because if you sit down and figure it out, any carwash computer and equipment are only +-6 inches accurate per car length. This distance is hardly worth worrying over, on a busy day most of the equipment runs continuously. THERE ARE ONLY 2 (TWO) REASONS FOR HAVING A BUDDY SYSTEM!

1) Safety Of A Backup System.

2) Breaking One Car Up From Another When They're Closer Than 12" Apart

REQUIREMENTS —

*TSS SYSTEM CONTROL BOX

*TSS STAND

*Clear Floor Space For The Small BUDDY STAND (Opposing Of The TSS STAND). 9"x 9" Space At 9 - 12 Feet Away From Conveyor.

THIS CAN BE ADDED TO EXISTING TSS SYSTEMS IN KIT FORM, OR IT CAN BE ADDED TO SYSTEM WHEN ORDERED (RECOMMENDED)

The BUDDY SYSTEM is not affected by employee traffic, the TSS SYSTEM has to sense metal with the eye activation before the control relay will turn on. The eyes are encased in the stands thus keeping the water/chemicals away from the eyes.

ENTER DISABLE OPTIONAL SYSTEM

REFER TO ENTER DISABLE MANUAL FOR INSTALLATION INSTRUCTIONS

The ENTER DISABLE SYSTEM is an entrance controller that only lets the the entrance system (in this case the TSS) work only when a button is pushed and for ONE CAR ONLY. This is usually put on the ROLLER UP BUTTON. This helps eliminate employee theft by controlling the entrance system.

THE EMPLOYEE CANNOT-

-TRIP OR BYPASS* THE ENTRANCE SYSTEM TO RUN ONE VERY LONG CAR (And collect for the 5 cars that really went in the car wash)

-GET THE DOUBLE CAR COUNT. CAR GOING INTO THE ENTRANCE SYSTEM THEN ROLLING BACK OUT AGAIN. (This problem is a great excuse to pocket a few cars and blame the shortage on rollback)

This ENTER DISABLE SYSTEM is a separate system that comes in its own control box. It can be used with any entrance system. Like most of GOODLIN SYSTEMS it can be fully by-passed in case of failure. (by-pass key switch for security)

INSTALLING A BYPASS SWITCH

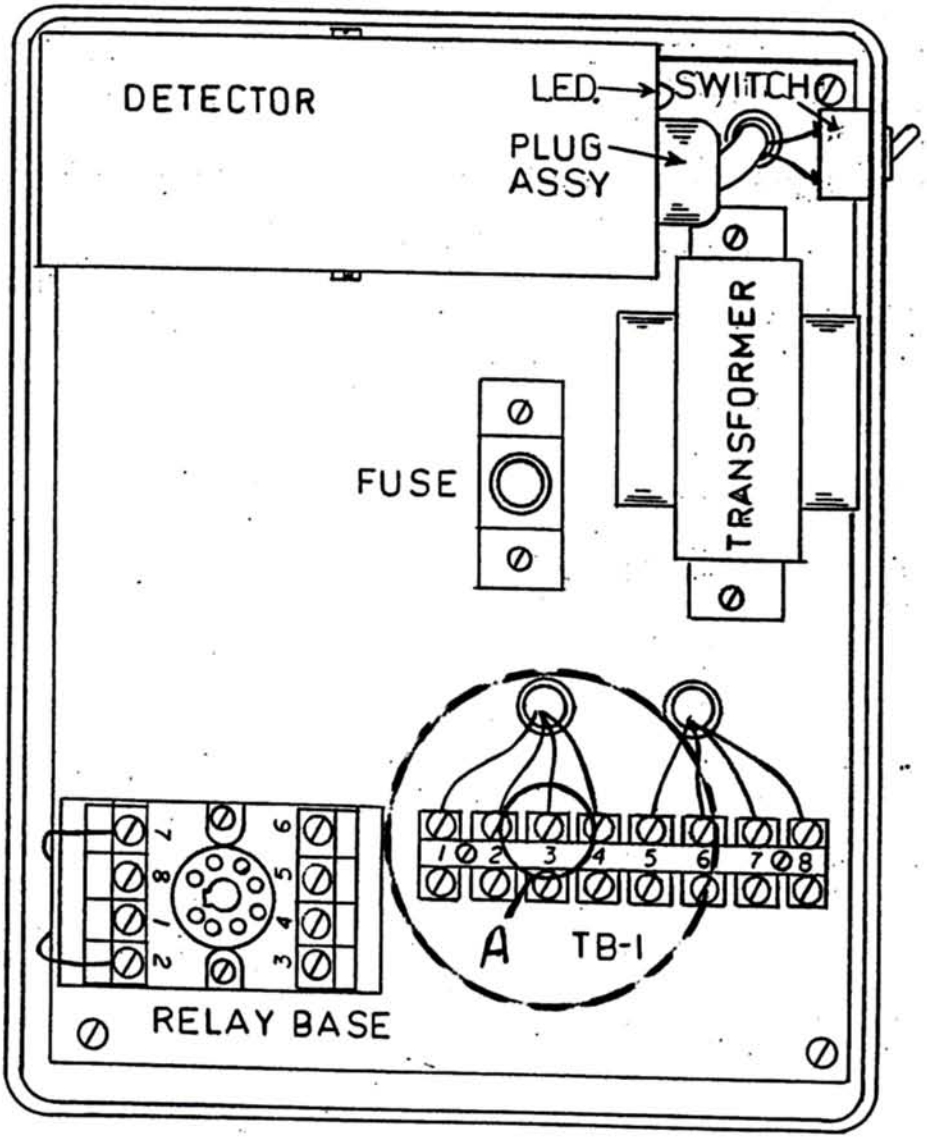
NOTE* THE RESET SWITCH ONLY REMOVES POWER FROM THE DETECTOR NOT THE TRANSFORMER! REMOVE FUSE TO KILL ALL CONTROL POWER TO THE TSS SYSTEM. POWER BEING SWITCHED FROM RELAY MAY HAVE DIFFERENT POWERSOURCE.

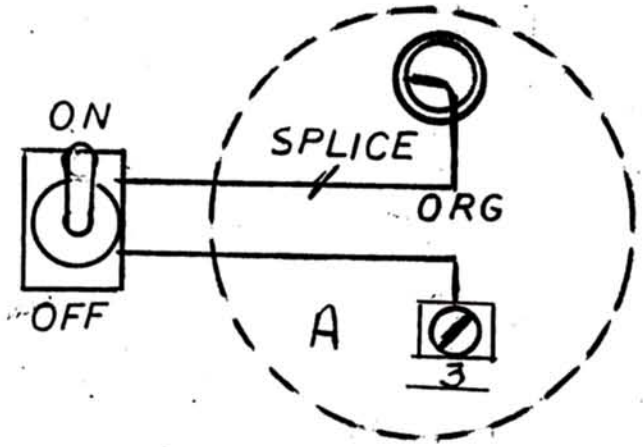
The bypass switch when properly installed enables the operator to enter in cars even if the TSS STAND or DETECTOR is damaged and will not function correctly. The order of operation depends on two switches - the RESET, and the BYPASS.

SYSTEM = TSS CONTROL BOX.

FUNCTION = WHAT THE TSS SYSTEM IS TURNING ON
(EX: COMPUTER ENTRANCE)

RESET	BYPASS	CAUSE AND EFFECT
ON	ON	NORMAL OPERATION - CAR ACTIVATES SYSTEM AND SYSTEM TURNS ON FUNCTION
OFF	ON	FUNCTION ACTIVATION - DETECTOR'S CONTACTS CLOSE WHEN POWER IS OFF. TURNING RESET SWITCH BACK ON WILL RESET DETECTOR AND DEACTIVATE THE FUNCTION. THIS SETTING IS BYPASSING THE TSS SYSTEM.
OFF	OFF	SYSTEM IS OFF. FUNCTION IS OFF. YOU CAN NOW OPERATE THE FUNCTION BY TURNING ON THE BYPASS SWITCH.
ON	OFF	DETECTOR WILL WORK BUT FUNCTION WILL NOT. SYSTEM WILL SEEM OFF AS IF POWER WAS OFF.


DETECTOR
LED
SWITCH
PLUG ASSY
TRANSFORMER
FUSE
RELAY BASE
TB-1
A


ON
OFF
SPLICE
ORG
A
3

ENTER GUARD OPTION

THE ENTER GUARD IS FACTORY INSTALLED WHEN THE TSS SYSTEM IS ORDERED OR AVAILIBLE AS A SEPARATE KIT.

The ENTER GUARD is similar to the ENTER DISABLE in the way that the entrance system has to be 'authorized' by a push button This is for the short entrance car washes that have a problem with car roll in/back. This is its only function and will not stop the entrance from being tampered with.

IF YOU HAVE AN ENTER GUARD KIT REFER TO ITS INSTRUCTION MANUAL

IF THE TSS SYSTEM HAS A FACTORY INSTALLED UNIT THE HOOKUP IS AS FOLLOWS-

1) Splice onto the pre-marked wires of the 'TO AUTHORIZE BUTTON' wires, and wire them into an auxiliary set of contacts off of the ROLLER UP BUTTON. If no ROLLER UP BUTTON IS available you will need to install a 'WASH', 'AUTHORIZE' or 'A' button to authorize the entrance system
2) Follow all other TSS INSTRUCTIONS
3) The 2nd bypass switch is for this function. (stops the ENTER GUARD from controlling the TSS SYSTEM)
4) The time delay setting should be the same time it takes a car from the start of being pushed until midway through the ENTRANCE SENSOR.

TIME DELAYS FOR TSS SYSTEM

* SEE TIME DELAY INSTRUCTIONS FOR WIRING INFORMATION *

*NOTE: If this option is used the ENTER GUARD CANNOT BE ADDED WITHOUT AN EXTRA BOX.

THE TSS TIME DELAY RELAY COMBINES SOLID STATE DIGITAL TIMING CIRCUITS WITH AN ELECTRO-MECHANICAL RELAY FOR CONTROL OF LOADS, IT IS AVAILABLE IN 3 TYPES-

1) TIME DELAY OFF
2) TIME DELAY ON
3) TIME DELAY INTERMATIC

All of the above time delays are DPDT.

If needed, INTERLOCK TIME DELAYS are available in the above forms, ONLY THEY ARE STDP. (ONLY 1 SET OF CONTACTS) INTERLOCK TIME DELAYS HOLD THE TIMING CYCLE WHEN THE CONVEYOR (CAR WASH) IS SHUT DOWN. A set of dry interlocked contacts are needed (with interlocked time delays). EX: AUXILIARY STARTER CONTACTS, RELAY CONTACTS.

THE GOODLIN TSS CONTROL BOX

TESTING AT START UP

1) After the SYSTEM is installed and the power is applied the indicator light on the TSS STAND or PAD should be off. If not using a TSS STAND or PAD the L.E.D. on the detector (inside the control box) can be observed for this test. If it isn't, try the reset switch on the TSS CONTROL box, turn it off then on (it must be on for the system to work). If the light/L.E.D. remains on, check the connections.

2) Using a piece of 12" x 12" sheet metal (aluminum foil is good) start 2 feet away from the SENSOR and slowly move the sheet into the center of the SENSOR -Aproximately within 15" the SYSTEM should activate. At this point the detector's L.E.D. should light up. If the TSS STAND or PAD is used, their light should also light up. The control relay should pull in and the equipment (that the TSS SYSTEM is turning on) should turn on.

NOTE: If using the ENTER GUARD,ENTER DISABLE or BUDDY SYSTEM other switches may need to be activated for THIS system to work.

5) Take the metal away from the sensor.The system lights should turn off, and the control relay should deactivate

4) If all of this tests out, the 'GOODLIN TSS SYSTEM' will be at your service.

TROUBLESHOOTING GUIDE
FOR
GOODLIN TSS SYSTEM

PROBLEM	POSSIBLE CAUSE/CORRECTION
The STAND light doesn't turn on. - The PAD light doesn't turn on. RELAY DOES TURN ON NORMALLY	Open the control box cover and check the power at terminals #3 and #4 on terminal block #1 If there is power present across the terminals when the system is activated- 1) The light is bad 2) The cord is bad Check the cord for breaks, by opening the cover on the system (STAND top cover lifts off) Take off the wire nuts covering splices for the light and test. (24vac when system is activated)
The STAND light stays on. - The PAD light stays on. - The detector's L.E.D. stays on.	Switch the control box reset switch off and on. This should reset the system and the light should go out, if not- 1)Cord is shorted 2)Splices bad (system J-box) 3)Detector is defective 4)SENSOR is defective/went bad 5)Improper wiring.

PROBLEM	POSSIBLE CAUSE/CORRECTION
Relay doesn't work	Check 24vac power at terminals #5 and #6 on terminal block #1. If power is present but relay doesn't turn on, test terminals #3 and #4 on terminal block #1. If no power is present (#5 and #6) then the transformer is bad If power isn't present on #3 and #4, but is on #5 and #6 then the detector is bad If both #5,#6 and #3,#4 have power then the 1) relay is bad 2) bad connection in control box 3) another system* is preventing relay function. * ENTER DISABLE?
The SENSOR doesn't sense. The light doesn't come on. The relay in control box. doesn't pull in.. When DETECTOR is activated	Check power input in (110vac) control box at terminal block #1 terminals #7 and #8. If there is power - Check the detector reset button on the detector (a white square push button fuse holder). Push in let go (this should pop the holder open), push in again to put back in place.

PROBLEM	POSSIBLE CAUSE/CORRECTION
cont..	If problem still persists push in and pull out the front of the reset button. Test the the fuse. If fuse is blown replace with same type fuse. If fuse is not blown and all above tests were ok - 1) bad detector 2) bad plug assembly If fuse was blown and blows when replaced- 1) bad detector 2) shorted plug assembly 3) shorted cable from stand 4) short in controls
TSS SYSTEM check out	Same as GOODLIN TSS SYSTEM test at start up PG. 20

TERMINAL DIAGRAM
FOR
GL-RO-2
TURN THIS PAGE SO THIS SIDE IS TO THE RIGHT

RIGHT SIDE OF BOX

TB #1

8	110vac HOT INPUT
7	110vac NEUTRAL INPUT
6	24vac NEUTRAL OUTPUT
5	24vac HOT OUTPUT
4	24vac NEUTRAL OUTPUT FOR INDICATOR LIGHT
3	24vac HOT OUTPUT FOR INDICATOR LIGHT
2	TO THE SENSOR (LOOP) COILS/WINDINGS
1	TO THE SENSOR (LOOP) COILS/WINDINGS

RELAY
BASE