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# **BACKSTOP – USA** T/A

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**UNIVERSAL LIFE SAFETY PRODUCTS, LLC.**

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**Installation & Repair Instructions for:**

**BACKSTOP FULLY AUTOMATIC TOUCH  
SENSITIVE AND COMBO REVERSE  
BRAKE SAFETY SYSTEMS**

# CAUTION

The Backstop Touch Sensitive Reverse System is designed as an aid to help the driver perform a reverse maneuver.

In no way does it exempt the driver from taking every normal pre-caution while driving in reverse.

Under no circumstances can the Manufacturer (Universal Life Safety Products LLC) or the Distributor be held responsible for accidents or damage provoked by careless maneuvering or the system being out-of-service or failure of the product

## IMPORTANT

**It is recommended that your Backstop Reverse Braking System be checked daily or weekly to ensure that your system is in good working order and responds properly.**

**A simple test would be to have the operator put the vehicle in reverse and while the vehicle is slowly moving backward, have another person **stand alongside the vehicle (not behind it) and flex/push on the rear rubber sensor bumper.****

**The vehicle should stop at the same speed as if the operator had pulled out the emergency brake button.**

**If the system does not respond, as it should, repairs should be initiated immediately.**

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# **UNIVERSAL LIFE SAFETY PRODUCTS, LLC. BACKSTOP-USA, TOUCH SENSITIVE SYSTEM**

## **INTRODUCTION**

This Backstop-USA device is primarily designed to fit onto vehicles that have air or air/hydraulic brakes. It normally operates the rear brakes only.

The system is extremely sensitive and will apply the vehicle brakes automatically when reverse gear is selected and the rubber sensor comes into contact with an obstacle.

The sensors are available in variable lengths to suit customer requirements and this dimension should be specified when placing an order for a Backstop system.

Choice of position for the sensor(s) on the rear of the vehicle is left to the customer.

The perfect mounting position for the sensor would be about 6 inches beyond the vehicles rear end. This would ensure that no part of the vehicle could be damaged due to the short distance traveled after automatic brake application.

The sensor is designed to cope with most forms of impact and has been tested using pneumatic cylinders to simulate crushing caused by an impact for over half a million cycles with no ill effect.

However the sensor should always be checked after relatively severe occurrences to ensure that the system is still functional.

The sensor itself has a hollow air chamber on its prominent edge which is sealed at either end by "Welding" uncured rubber into position after each one has been cut down to size.

It is this air chamber which is the detecting or sensing medium as a compression of the wall of this chamber would obviously cause the pressure inside to increase slightly, this pressure rise caused by an impact on the sensor is transmitted down a 4mm tube to a control/switch unit which houses a very sensitive pressure switch which will trigger when a suitable pressure rise has occurred.

The rubber sensor being basically an "air tube" can be connected with other sensors quite simply, enabling multiple sensor versions to be an ever increasingly popular option. The reason for this is that as well as an I.C.C. bar sensor, 2 upright sensors can be fitted to accommodate loading dock impacts for instance.

A gear lever operated reversing buzzer (light) is essential to make the Backstop system fully automatic and it must be checked regularly for correct functioning.

INTRODUCTION, CONT'D

**THE SYSTEM IS DESIGNED TO ONLY OPERATE IN REVERSE GEAR AT SLOW SPEEDS AND THEREFORE UNDER NO CIRCUMSTANCES SHOULD THE BACKSTOP SYSTEM BE WIRED INTO ANY ELECTRICAL CIRCUIT WHICH COULD BE EITHER ACCIDENTALLY OR DELIBERATELY LEFT SWITCHED ON WHILE THE VEHICLE IS MOVING FORWARD.**

**ANY SYSTEM CONNECTED IN SUCH A WAY IS AUTOMATICALLY INVALIDATING THE WARRANTY OF THE BACKSTOP SYSTEM OR ANY PROBLEM CAUSED BY INCORRECT INSTALLATION.**

**WARNING: FOR TRAILER SYSTEMS ALWAYS WIRE TO SUPPLEMENTARY SOCKET TO I.S.O. STD REVERSE LIGHT TERMINAL.**

## **BACKSTOP MATERIAL LIST**

BSK-96-12, Backstop Reverse Braking System, 12 Volt, Complete w/ 96" Rubber Sensor

Consisting of:

<i>Quantity</i>	<i>Model #</i>	<i>Description</i>
1	BS-CS-7012	Control Switch Module, 12 Volt, on Mounting Plate
1	BS-301	BAS, Electrically Controlled Air Valve 12 Volt, w/ Mounting Bracket
1	BS-526	Push-in Connector 4mm O.D.
1	BS-MTK-16	16 Reflective Mounting Tabs (Kit)
1	BS-ST	8 ft. 4mm Sensor Tube
1	BS-S-096	8ft. Rubber Sensor (Bumper)

### **OPTIONAL ITEMS:**

BS-2WC	2-Way Check Valve
BS-096	96" Aluminum Mounting Plate
BS-MS-90	Under Dash Back-Up Alarm
BS-YS	"Y" Sensor for Multiple Sensors
BS-RV	Air Relay Valve

Note: Special Order Length Rubber Sensors (other than 8 ft.) Need Longer Lead Time.

## BACKSTOP MATERIAL LIST

### LED Light System

BSK-96-12-L, Backstop Reverse Braking System, 12 Volt, Complete w/ 96" Rubber Sensor  
With Red LED Light Strips.

Consisting of:

<i>Quantity</i>	<i>Model #</i>	<i>Description</i>
1	BS-CS-7012	Control Switch Module, 12 Volt, on Mounting Plate
1	BS-301	BAS, Electrically Controlled Air Valve 12 Volt, w/ Mounting Bracket
1	BS-526	Push-in Connector 4mm O.D.
1	BS-LED44	2 Pc. 94 ½" Lengths Red LED Strips
1	BS-ST	8 ft. 4mm Sensor Tube
1	BS-S-096	8ft. Rubber Sensor (Bumper)

#### OPTIONAL ITEMS:

BS-MT1	6 Mounting Strips 31 ½" Long
BS-2WC	2-Way Check Valve
BS-096	96" Aluminum Mounting Plate
BS-MS-90	Under Dash Back-Up Alarm
BS-YS	"Y" Sensor for Multiple Sensors

Note: Special Order Length Rubber Sensors (other than 8 ft.) Need Longer Lead Time.



## **ABBREVIATED SUMMARY**

### **BACKSTOP-USA, INSTALLATION INSTRUCTIONS**

We recommend the use of automatic slack adjusters. If automatic adjusters are not used, brakes should be adjusted and maintained to manufacturer's specs.

We also recommend that all fittings and lines used in fitting BackStop be approved for use with air brakes (Weatherhead 1400 Series or equal).

### **RUBBER SENSOR MOUNTING**

Sensor requires a flat surface at least 4-1/2" wide, typically extending the full width of the vehicle. A clearance hole is required for the 4mm sensor tubing. To secure, drill sensor and support with supplied reflective 16 tabs, 8 on top and 8 on bottom, attaching with three (3) screws each (not supplied).

**STANDARD BACKSTOP SYSTEM:** Mount the rubber sensor so that tubing is protected and supported. Do not bend tubing too much or it will kink. The fitting for the 4mm tubing is very easy to use. Push tubing in all the way into the fitting and check for security by pulling gently on tubing; it should not come out. To release tubing, push on outer ring of the fitting (and hold) and pull the tubing out.

**MULTIPLE SENSORS:** Run 4mm tubing from each rubber sensor to the control module and locate the "Y" fitting as close to the control module as possible.

### **CONTROL MODULE MOUNTING**

**It is highly recommended that the Control Module Unit be mounted in a rear compartment at its highest level (because of flooding) and as close to the rubber sensor push-in-connector as possible.** If trailer has sliding tandem, mount control unit and two-way check valve forward of slider and flexible slider supply and service lines. Make sure slider does not interfere with BackStop control unit or lines.

### **TWO-WAY CHECK VALVE MOUNTING**

Two-way check valve (shuttle type) should be mounted horizontally. If trailer has fixed rear wheels and enough clearance, mount the two-way check valve right onto the relay valve with the use of a nipple.

## **PLUMBING**

Run a feed-line to the “in” side of the BAS Valve. Vehicles with more than one air tank (Emergency Vehicles) should always use the initial tank to draw your air supply from. The “out” side of the BAS Valve is connected to one side of the two-way check valve. Now run a line from the center of two-way check valve to the service side of the relay valve. The BAS Valve (BS-301) must be mounted with the vent port down.

## **ELECTRICAL CONNECTION**

Electrical connection is made to back-up light or dedicated reverse circuit. On a trailer, use the center or # 7 pin of electrical connector and make sure that you have a good ground. Ground terminals should be cadmium, zinc or tin-plated and a crimp type serrated point cutting terminal is preferred. Wiring should be 14 gauge (SAE GPT). All wiring should be installed in suitable conduit or boxes, within the structure of the trailer, or in housings or raceways that provide equal protection. Wiring should be protected from stones, excess dirt, ice, moisture and chafing. The function of the back-up light switch should be tested periodically.

## **TEST CONTROL SOLENOID**

To test the electrical portion of BackStop - operator should engage gearshift “in” and “out” of reverse gear with ignition on - tractor engine off. You can hear solenoid “click” in the control unit.

## **RUBBER SENSOR TEST**

To test the rubber sensor and 4mm tubing connection, place control unit end of the 4mm tubing line into a small glass of water and push in on the rubber sensor. Small air bubbles should appear in glass. **Do not release the rubber sensor until you have removed the tube from the glass, or you will suck water into sensor.**

## **SYSTEM TESTING**

Vehicle should be run to build air supply. When air supply is sufficient have vehicle back up - and exert pressure on the rubber sensor. The vehicle brakes will lock - and stay locked until vehicle shift lever is removed from the reverse position.

## **REVERSE WARNING BUZZER (LIGHT)**

Vehicle should not be operated if buzzer sounds (or light goes on) in any position other than REVERSE.

## FITTING PROCEDURE

### FULL AIR BRAKED RIGID TRUCK SYSTEM

#### “INLET” TYPE CONTROL VALVE

**IT IS RECOMMENDED THAT THIS SECTION BE READ COMPLETELY BEFORE ATTEMPTING TO FIT THE UNIT.**

#### Brake Activating Solenoid Valve - (BAS Valve)

1. Normally the BAS Valve unit is fitted to the vehicle chassis as near as possible to the rear brake lines.

Port 1 = Air Supply In

Port 2 = Air Supply Out

2. Remove the ignition keys of the vehicle and chock the wheels. Also put the vehicle handbrake in the “off” position.

3. Locate the Rear Brake Service Relay Valve, then position the BAS Valve as close as possible to service valve. When a suitable position has been found mount the BAS valve to the vehicle chassis using suitable bolts.

4. When securely fixed, connect the Inlet side of the Backstop solenoid valve (Port No. 1) into the air supply tank or line.

5. Locate the line from the Footbrake Valve to the Rear Brake Service Relay Valve.

6. Remove this line from the Rear Brake Service Relay Valve and in its place using a suitable adapter, fit the Outlet port of the Double Check Valve into the Service Relay Valve.

***Note: The double check valve has two inlet ports and one outlet port. The outlet port is at right angles to the two inlet ports and on the opposite side of the valve to the mounting bracket.***

7. Refit the line from the footbrake into one end of the Double Check Valve and fit the Outlet port of the Backstop Solenoid Valve (Port No. 2) into the opposite end.

Should any difficulty be encountered fitting the Double Check Valve directly into the Rear Brake Service Relay Valve it can be fitted independently on the vehicles chassis. The Outlet Port should then be connected with suitable pipe and fittings into the Rear Brake Service Relay Valve in place of the footbrake line. Re-connect the footbrake line and the Backstop Outlet line.

**NOTE: TO ENSURE THAT THE CORRECT BRAKE LINES ARE CHOSEN, WITH THE FOOTBRAKE LINE DISCONNECTED DEPRESS THE BRAKE PEDAL, IF AIR ESCAPES THE CORRECT LINE HAS BEEN SELECTED, IF NO AIR ESCAPED THE WRONG AIR LINE HAS BEEN DISCONNECTED.**

### **Control Switch Module - Electrical**

1. Ensure that the control switch module and the vehicle have the same 12-volt operating voltage as the inlet type valve.
2. The control switch unit houses the solid-state electronic circuits that controls the Backstop system activation, and the system activated device oscillator.
3. The Control Switch module should be mounted in a rear compartment as close to the Rubber Sensor push-in connector as possible, using 8ft. (or less) of the 4mm tubing.
4. The Control Switch module has 3 connections with an electrical cable coming from each one.

No. 1 is connected direct into the BAS Valve with a 4-foot long two-wire conductor. The **Red (+)** wire is positive and is connected directly to the only wire showing. The **Black (-)** negative wire must be attached with the mounting bolt of the BAS valve for a positive mechanical ground.

No. 2 has a 4 conductor 4 foot long lead colored **Red (+)** and **Black (-)**. This lead must attach to a lead running to the vehicle cab to a system-actuated buzzer. This cable supplies a pulsed (oscillating) electrical supply to the buzzer and indicates correct function of the system. (Green & White Wires are not used). (**Do not tie leads together**).

No. 3 has a 2 conductor 6-foot long lead colored **Red (+)** positive and **Black (-)** negative. This power source cable is for connection to the vehicle electrical system and should run to a dedicated electrical line or to the reverse light circuit itself. **Do Not Attach to a vehicle mounted back-up alarm.**

The **Red (+)** wire should be connected to the (+) reverse light feed to enable activation in reverse gear only and the **Black (-)** wire to a suitable (-) ground or positive return.

### **Sensor Tube**

4mm x 8ft. O.D. tubing is used to connect the rubber sensor to the Control Switch module.

Note that there is a small hole approximately 4 inches from one end of the rubber sensor on its mounting face. This is for insertion of the sensor push-in connector that has a 5mm O.D. metal or plastic stem that pushes into the rubber and a larger diameter fitting which accepts the 4mm O.D. tubing and is a “push in type fitting” . The hole in the rubber sensor must be free of foreign matter. Carefully drill a suitable sized hole to match the position of the fitting on the mounting surface.

Insert one end of the 4mm O.D. sensor tube into the push-in connector and pass the tube through the mounting surface and through any rubber grommets required to protect the tube.

Mount the sensor to its mounting surface ensuring that the 4mm tube does not kink or bend severely. Be very careful not to tighten tie-wraps as to pinch and restrict the 4mm tubing.

### **Rubber Sensor**

This is fitted to the rear of the vehicle either by mounting direct onto existing back steps or I.C.C. bars using self-tapping screws and reflective tabs, or by fixing brackets, to allow the Backstop rubber sensor mounted into suitable box section to be attached to the vehicle.

It requires a flat surface, approx. 4-1/2" inches wide, extending to the overall length of the rubber sensor supplied. The sensors themselves are available in a variety of lengths to suit all applications. Attachment to the mounting surface is made using self tapping screws and backing plates. Position the sensor in place and drill through the sensor lips (upper and lower) into the mounting surface using a 5/32" drill bit. The attachment screws should be located at even intervals to prevent undue stress.

The screws and plates may now be screwed onto the sensor and into the mounting surface.

To prevent kinking of the sensor tube allow a reasonable radius for the tube and ensure that drilled holes through which the pipe has to travel are large enough to include grommets in order to protect the 4mm sensor tube.

Route the sensor tube along the vehicle bodywork attaching it at intervals to existing pipes, cables, or using suitable clips (loom).

Connect the other end of the sensor tube (which should be cut to the correct length) into the "push in fitting" on the Backstop control switch module.

Re-check the complete installation against these instructions and diagrams included in this booklet.

### **Double Check Valve**

This valve simply allows two inlet ports to independently supply one outlet port. This allows the service brakes of the vehicle to be applied either by normal footbrake operation or by Backstop operation. All 3 ports have 3/8" NPTF female threads.

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***Note:** Various sizes of pipefittings will be required to connect the Backstop system into the vehicle brakes.*

## **SEQUENCE OF OPERATION**

1. When reverse gear is selected, an electrical supply passes from the output terminal of the gearbox reverse switch to the Backstop Control Switch Module. The supply puts the control module into the “standby” mode, and the under dash buzzer should sound.
2. On impact on the rear rubber bumper sensor will then:  
  
The inlet supply to the valve will be taken from the supply line to PORT 1 which when activated will introduce pressure via PORT 2 to the service control line via a Double Check valve.
3. Once on, the brakes remain applied until the vehicle gear lever is moved out of reverse. This operation cuts off the electrical supply and the switch module then returns to its “neutral” mode.
4. On “inlet type” valves the pressure now downstream of the valve is exhausted to atmosphere through PORT No. 3 and the incoming air supply PORT 1 is sealed off. This action releases the brakes.

Note: Charge air reservoirs to ensure that all the new pneumatic connections made are airtight.

**Always check after installation that no other circuit other than the automatic reverse gear selection switch actuates the system and reverse lights. This ensures that inadvertent connection to Manual Override Switching could not render the system active while in forward motion.**

**Backstop USA, Universal Life Safety, LLC cannot accept liability if this directive is not followed.**

***Note: If the vehicle has a reversing beeper, care must be taken not to wire the Backstop system into the electrical circuit supplying the reversing beeper, as this may cause problems in service, due to the isolating relay that operates when the vehicles lights are on.***

Strict adherence to the above instructions will ensure efficient operation of the complete system. Check its operation frequently and replace damaged components - it will then give long lasting protection.

Should your Backstop-USA system be damaged in any way, a parts replacement service is available from your local service center or

**UNIVERSAL LIFE SAFETY PRODUCTS, LLC.**

Backstop-USA at  
(609) 971-2756 or (888) 745-2983 (outside NJ)  
Sanford (Sandy) Weinberg (Owner/Pres.)

**KIT COMPONENT DRAWING :**

These are shown in diagram form on page 13.

***IT IS VERY IMPORTANT THAT THE YELLOW COPY OF THE  
“WARRANTY CERTIFICATE” BE FILLED OUT COMPLETELY AND  
SIGNED. THIS WARRANTY CERTIFICATE MUST BE MAILED TO:***

**UNIVERSAL LIFE SAFETY PRODUCTS, LLC.**

**T/A BACKSTOP - USA  
18 Hollywood Blvd. So.  
Forked River, N.J. 08731**

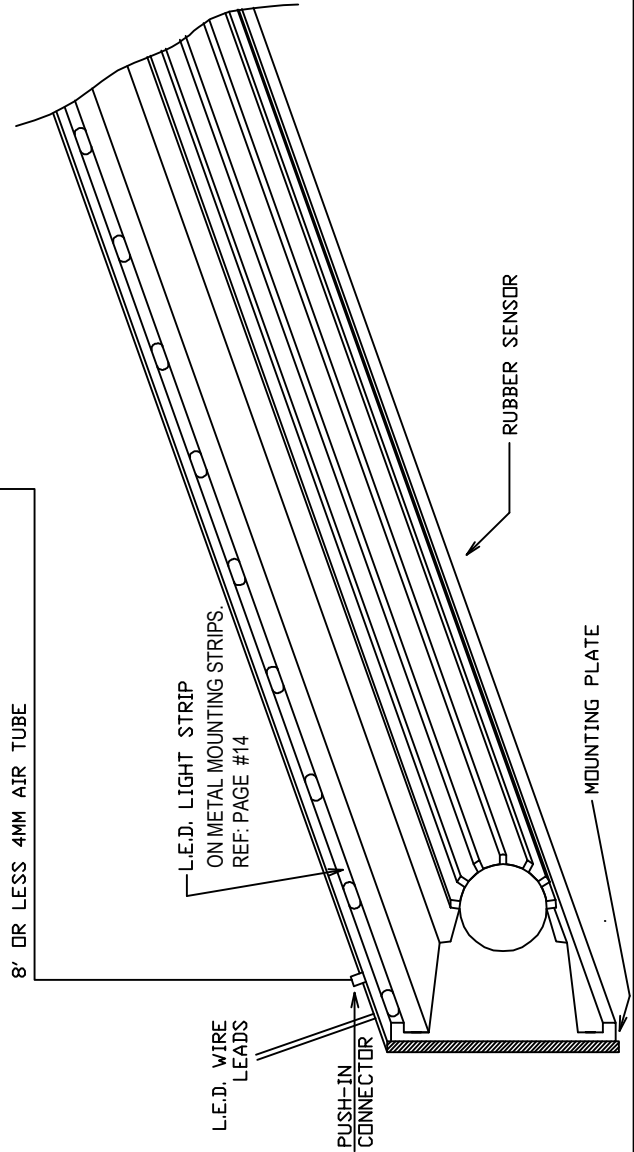
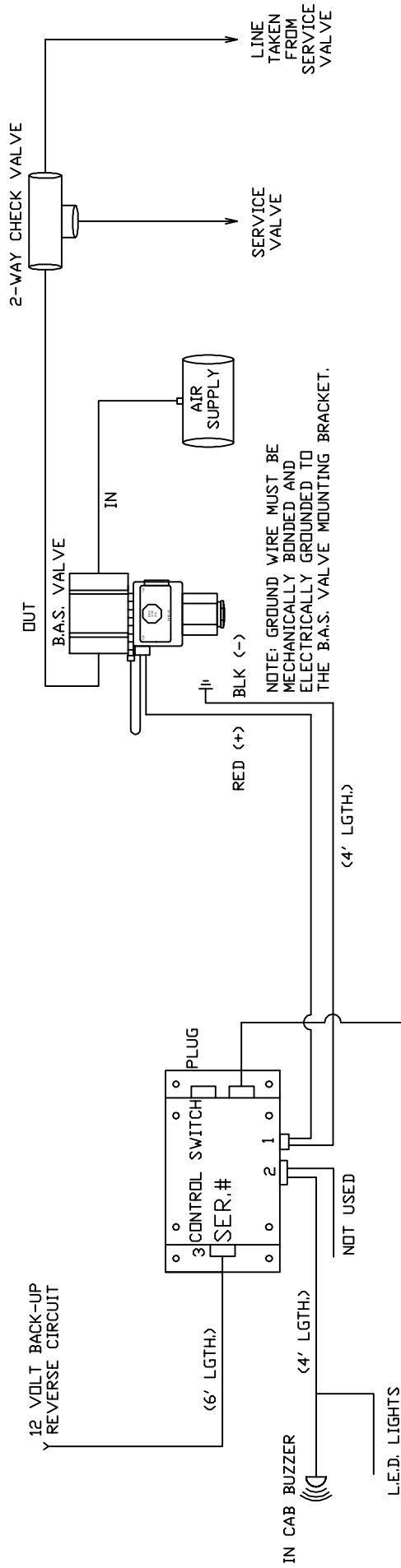
## **FUNCTION CHECK**

- Trailer systems only. (Hitch trailer to tractor and make electrical, pneumatic connections).
- Chock wheels on vehicle.
- Start engine and build up air pressure in vehicle air tank.
- Switch engine OFF but leave ignition ON.
- Select reverse gear, ensuring the handbrake is NOT applied.
- Apply hand pressure to the rear sensor bumper.
- At this point the vehicle brakes should be immediately and automatically applied and should remain ON even when the hand pressure is released.
- If this does not occur, please return and check the plumbing of the fittings for leaks. And double check the instructions.
- To release the brakes, select neutral or a forward gear.
- Once the test has been completed successfully, switch ignition off, ensure handbrake is on, and remove chocks from under wheels.

## **IMPORTANT**

**The function check must be done immediately following initial installation and at least once a week thereafter.**



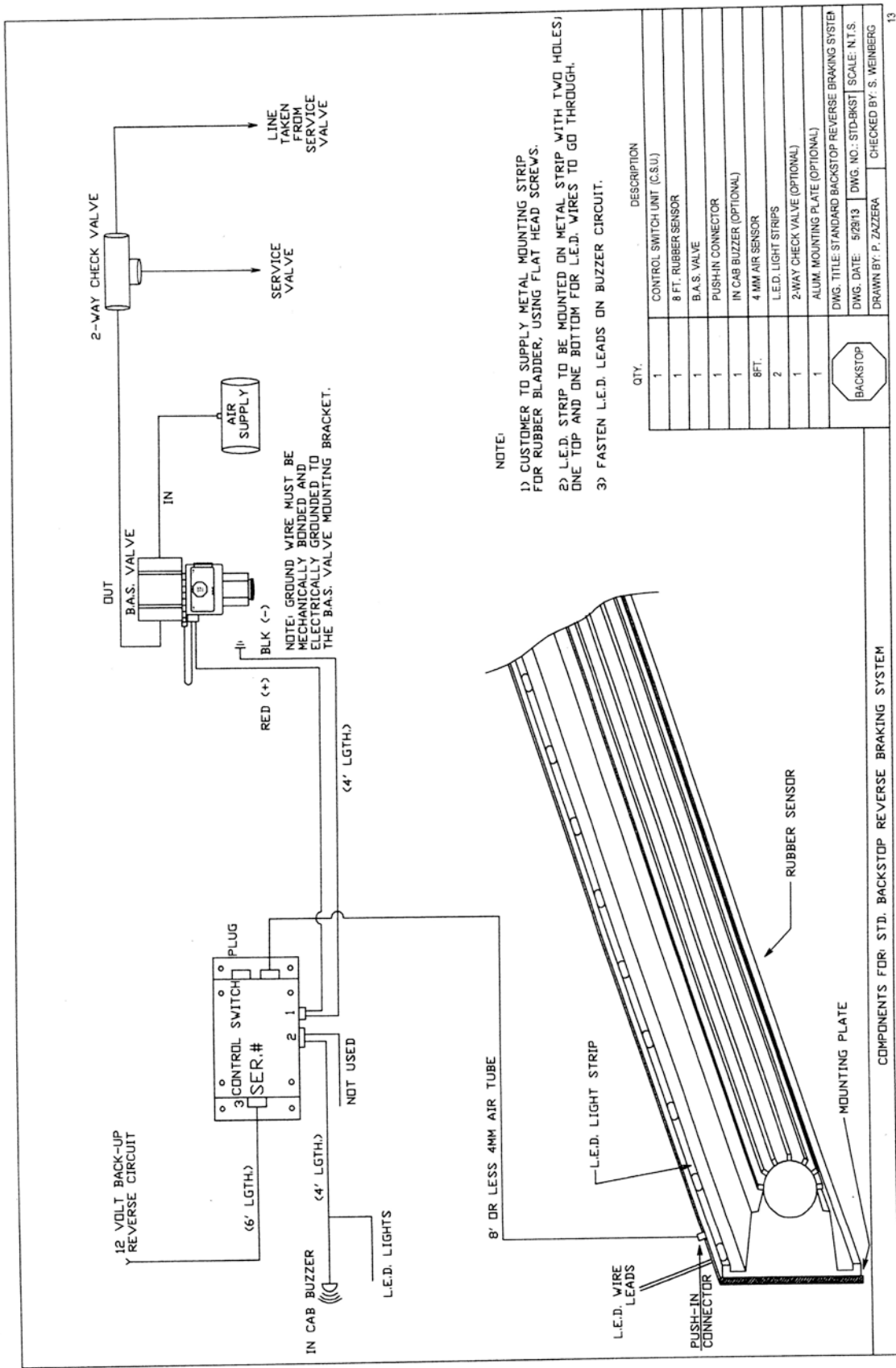


NOTE:

- 1) OPTIONAL METAL MOUNTING STRIPS: #BK-MT1 FOR RUBBER BLADDER, USING FLAT HEAD SCREWS.
- 2) L.E.D. STRIP TO BE MOUNTED ON METAL STRIP WITH TWO HOLES; ONE TOP AND ONE BOTTOM FOR L.E.D. WIRES TO GO THROUGH.
- 3) FASTEN L.E.D. LEADS ON BUZZER CIRCUIT.

QTY.	DESCRIPTION
6	MOUNTING STRIPS FOR LED (OPTIONAL)
1	CONTROL SWITCH UNIT (C.S.U.)
1	8 FT. RUBBER SENSOR
1	B.A.S. VALVE
1	PUSH-IN CONNECTOR
1	IN CAB BUZZER (OPTIONAL)
8FT.	4 MM AIR SENSOR
2	L.E.D. LIGHT STRIPS
1	2-WAY CHECK VALVE (OPTIONAL)
1	ALUM. MOUNTING PLATE (OPTIONAL)
BACKSTOP	
DWG. TITLE: STANDARD BACKSTOP REVERSE BRAKING SYSTEM	
DWG. DATE: 5/29/13	DWG. NO.: STD-BKST
SCALE: N.T.S.	
DRAWN BY: P. ZAZZERA	
CHECKED BY: S. WEINBERG	

COMPONENTS FOR: STD. BACKSTOP REVERSE BRAKING SYSTEM



NOTE:

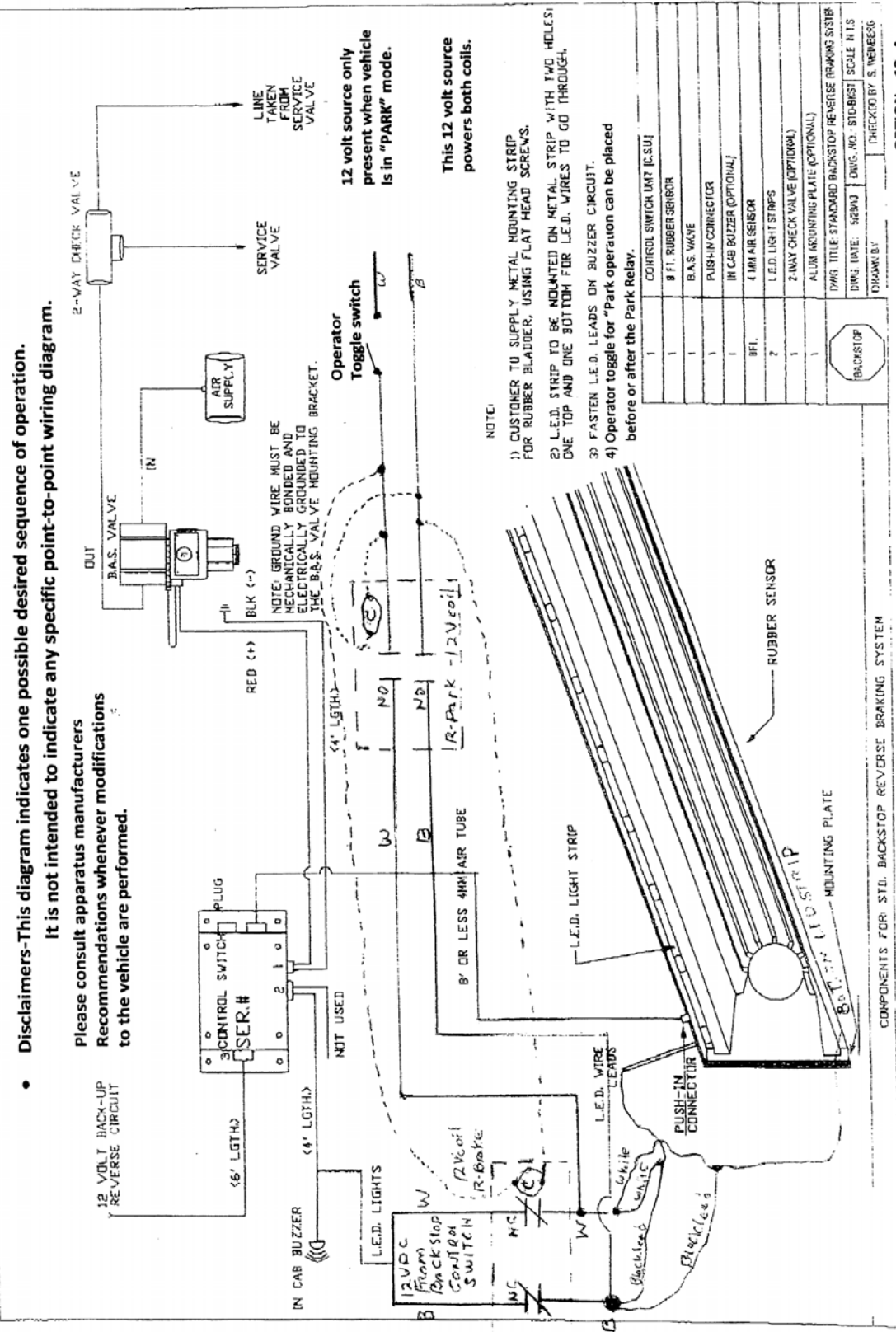
- 1) CUSTOMER TO SUPPLY METAL MOUNTING STRIP FOR RUBBER BLADDER, USING FLAT HEAD SCREWS.
- 2) L.E.D. STRIP TO BE MOUNTED ON METAL STRIP WITH TWO HOLES; ONE TOP AND ONE BOTTOM FOR L.E.D. WIRES TO GO THROUGH.
- 3) FASTEN L.E.D. LEADS ON BUZZER CIRCUIT.

QTY.	DESCRIPTION
1	CONTROL SWITCH UNIT (C.S.U.)
1	8 FT. RUBBER SENSOR
1	B.A.S. VALVE
1	PUSH-IN CONNECTOR
1	IN CAB BUZZER (OPTIONAL)
8FT.	4 MM AIR SENSOR
2	L.E.D. LIGHT STRIPS
1	2-WAY CHECK VALVE (OPTIONAL)
1	ALUM. MOUNTING PLATE (OPTIONAL)
DWS. TITLE: STANDARD BACKSTOP REVERSE BRAKING SYSTEM	
DWS. DATE: 5/28/13   DWS. NO.: STD-BKST   SCALE: N.T.S.	
DRAWN BY: P. ZAZERA   CHECKED BY: S. WEINBERG	

COMPONENTS FOR: STD. BACKSTOP REVERSE BRAKING SYSTEM

# Sequence of operation for LED Strips "ON" with vehicle in "PARK"

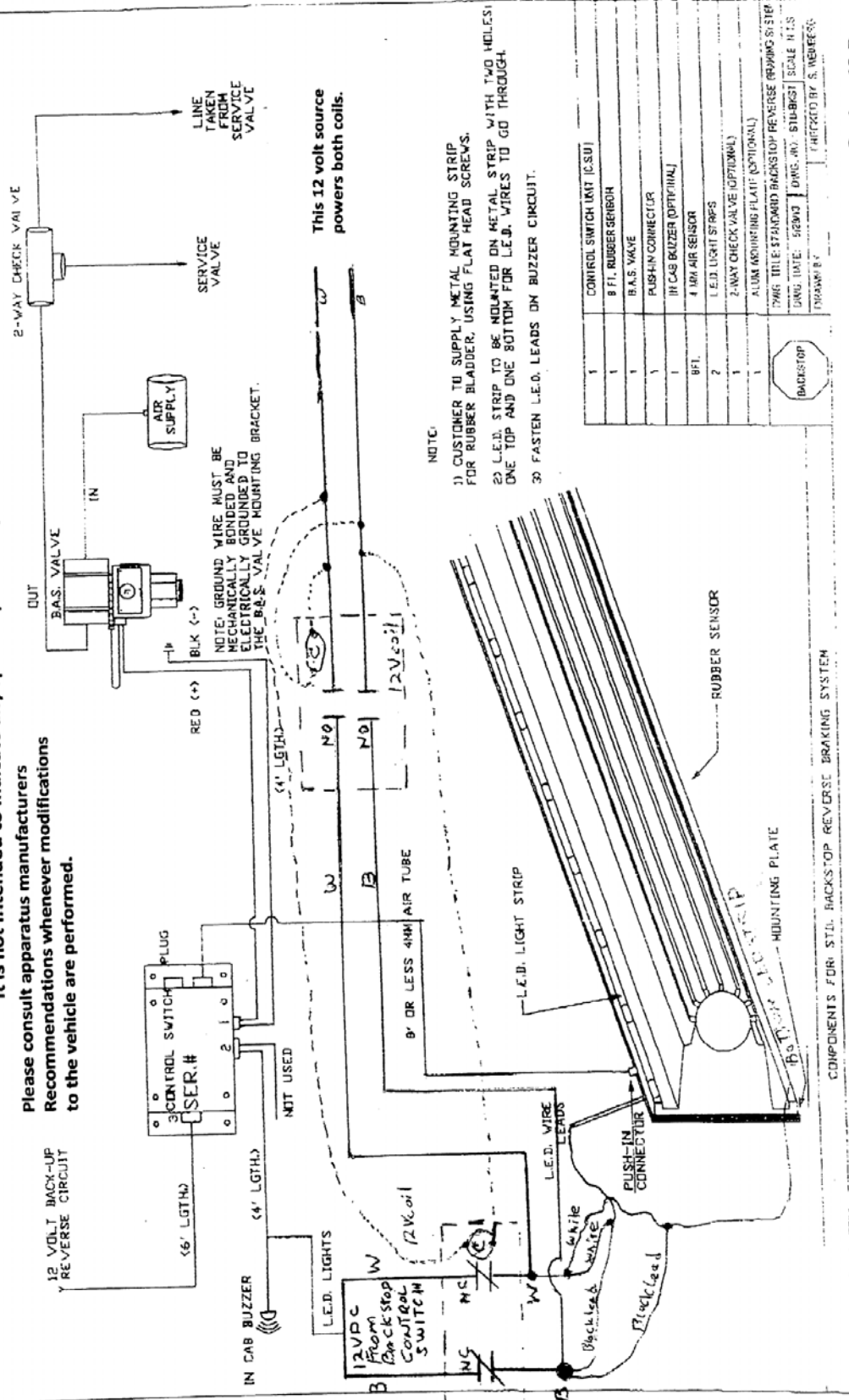
- Disclaimers-This diagram indicates one possible desired sequence of operation. It is not intended to indicate any specific point-to-point wiring diagram.
- Please consult apparatus manufacturers Recommendations whenever modifications to the vehicle are performed.



## Dual operation of LED strips in DRIVE mode also operating as a brake light

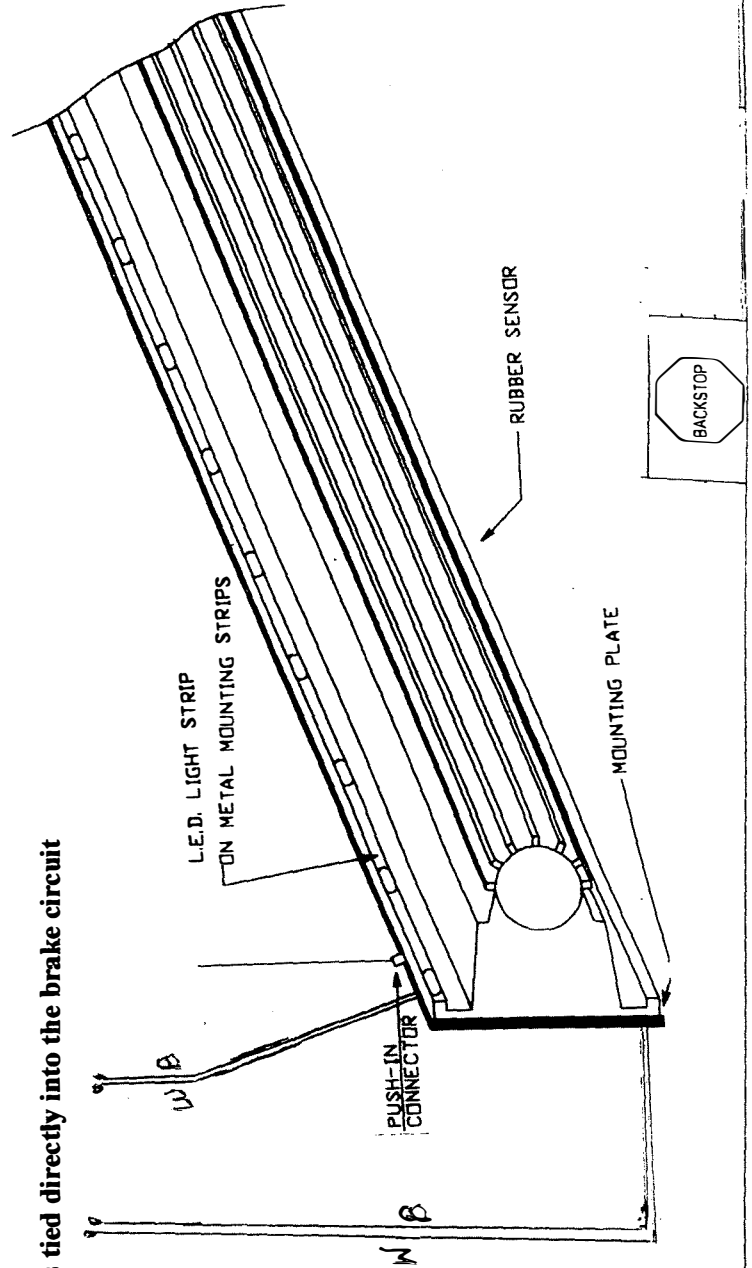
- Disclaimers-This diagram indicates one possible desired sequence of operation. It is not intended to indicate any specific point-to-point wiring diagram.

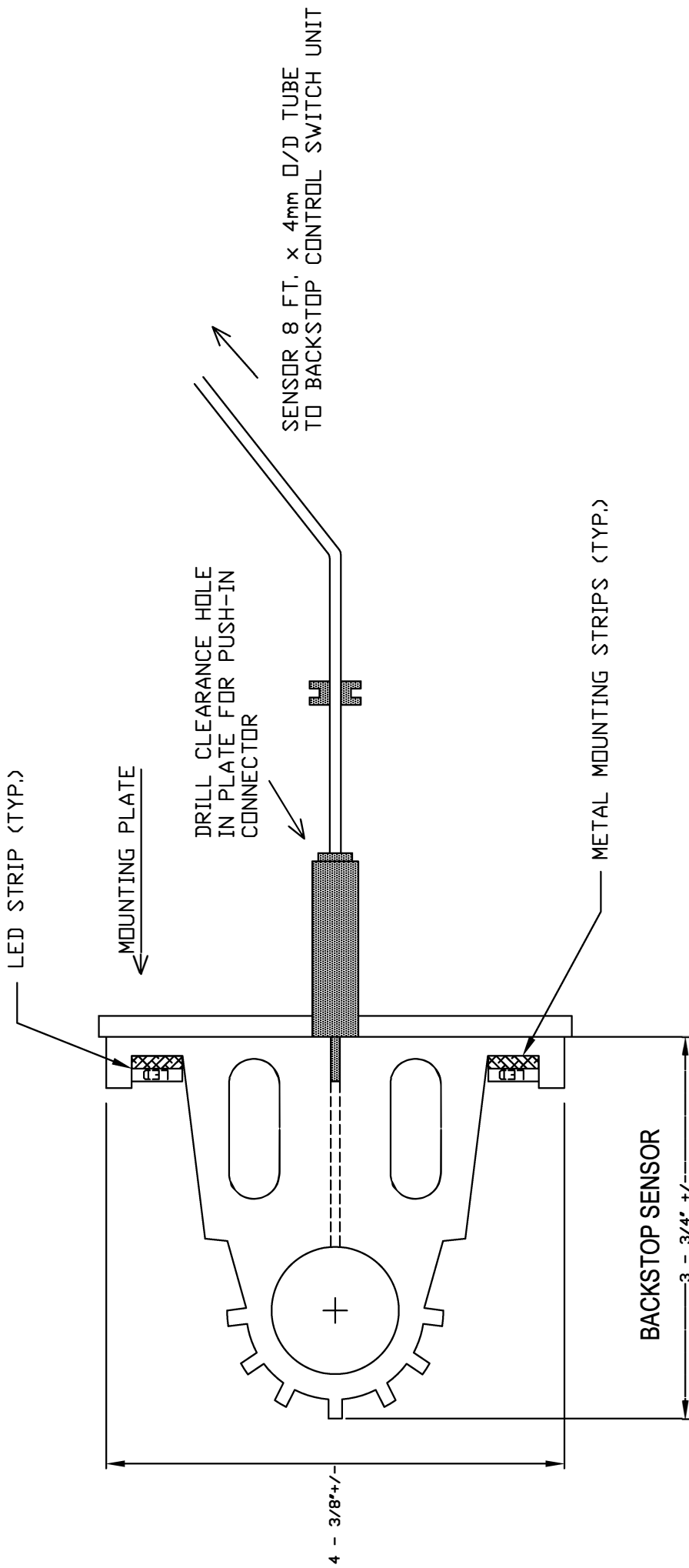
Please consult apparatus manufacturers Recommendations whenever modifications to the vehicle are performed.



Completely eliminating the BACKSTOP LED light strips from the basic system and strictly using the BACKSTOP LED strips as an additional set of brake lights going both forward and in reverse.

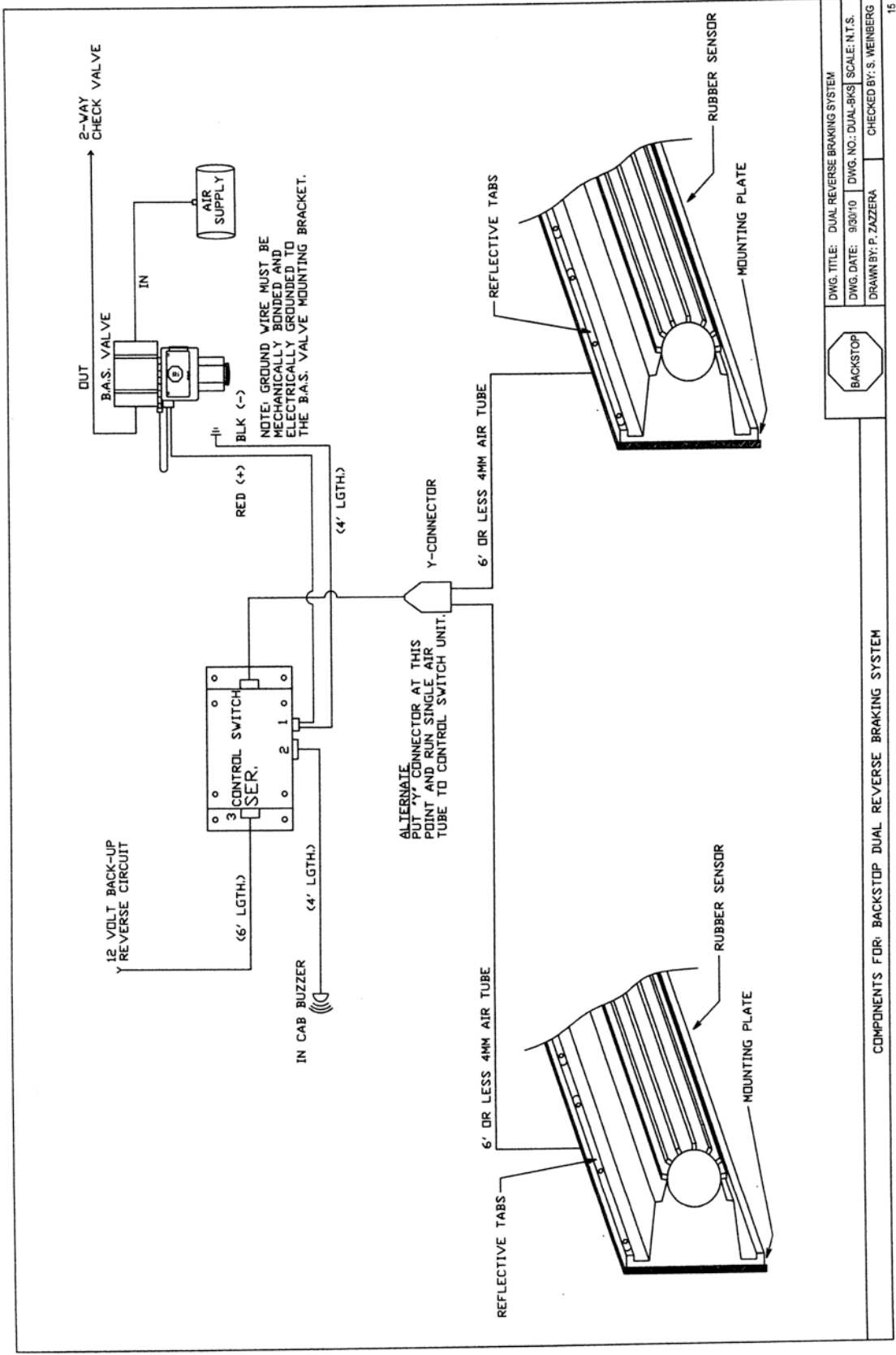
LED wires tied directly into the brake circuit





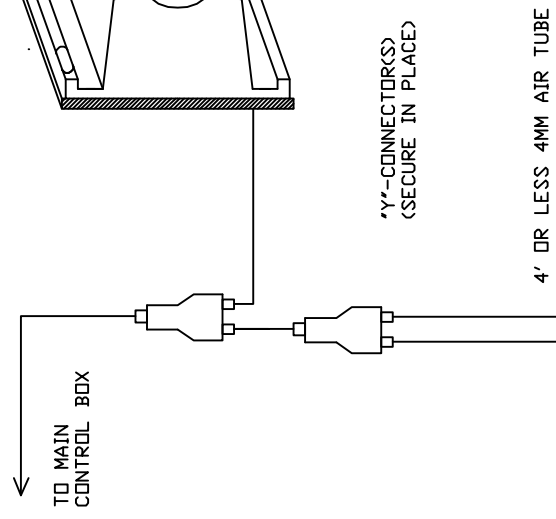
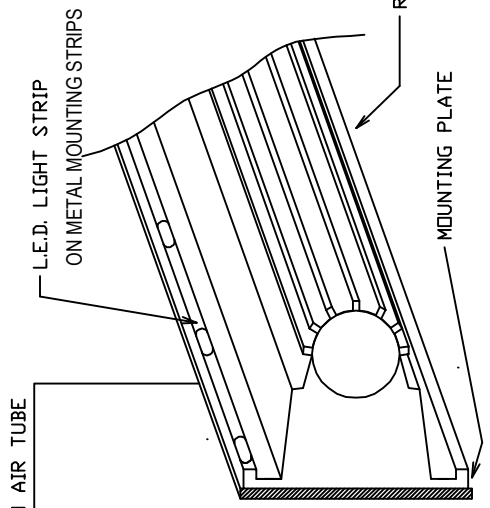
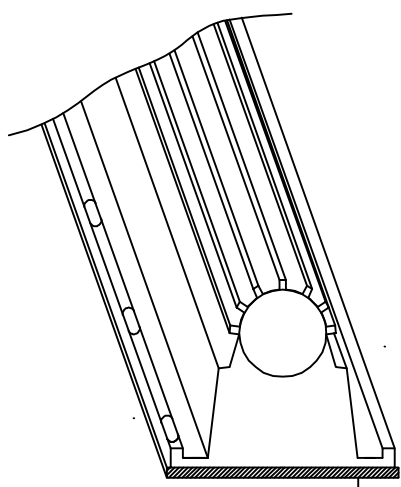
NOTE: END OF RUBBER BLADDER TO CENTER HOLE VARIES BETWEEN 3-7/8" TO 4". 4MM SENSOR TUBE CAN BE INSTALLED TO COME OUT ON DRIVER OR PASSENGER SIDE.

DWG. TITLE: RUBBER CONTACT SENSOR MOUNTING CROSS-SECTION	
DWG. DATE: 8/22/19	DWG. NO.: CROSS-SEC
SCALE: N.T.S.	
DRAWN BY: P. ZAZERA	
CHECKED BY: S. WEINBERG	
REV. NO.: 2	BACKSTOP
RUBBER CONTACT SENSOR MOUNTING CROSS-SECTION	



BACKSTOP	DWG. TITLE: DUAL REVERSE BRAKING SYSTEM
	DWG. DATE: 9/30/10   DWG. NO.: DUAL-BKS   SCALE: N.T.S.
	DRAWN BY: P. ZAZZERA   CHECKED BY: S. WEINBERG

COMPONENTS FOR: BACKSTOP DUAL REVERSE BRAKING SYSTEM



'Y'-CONNECTOR(S)  
(SECURE IN PLACE)

4' OR LESS 4MM AIR TUBE

TO MAIN  
CONTROL BOX

4' OR LESS 4MM AIR TUBE

L.E.D. LIGHT STRIP

RUBBER SENSOR

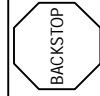
MOUNTING PLATE

L.E.D. LIGHT STRIP  
ON METAL MOUNTING STRIPS

RUBBER SENSOR

MOUNTING PLATE

MOUNT PLATE AND RUBBER SENSOR  
SO BOTH 4mm TUBING ARE IN THE CENTER

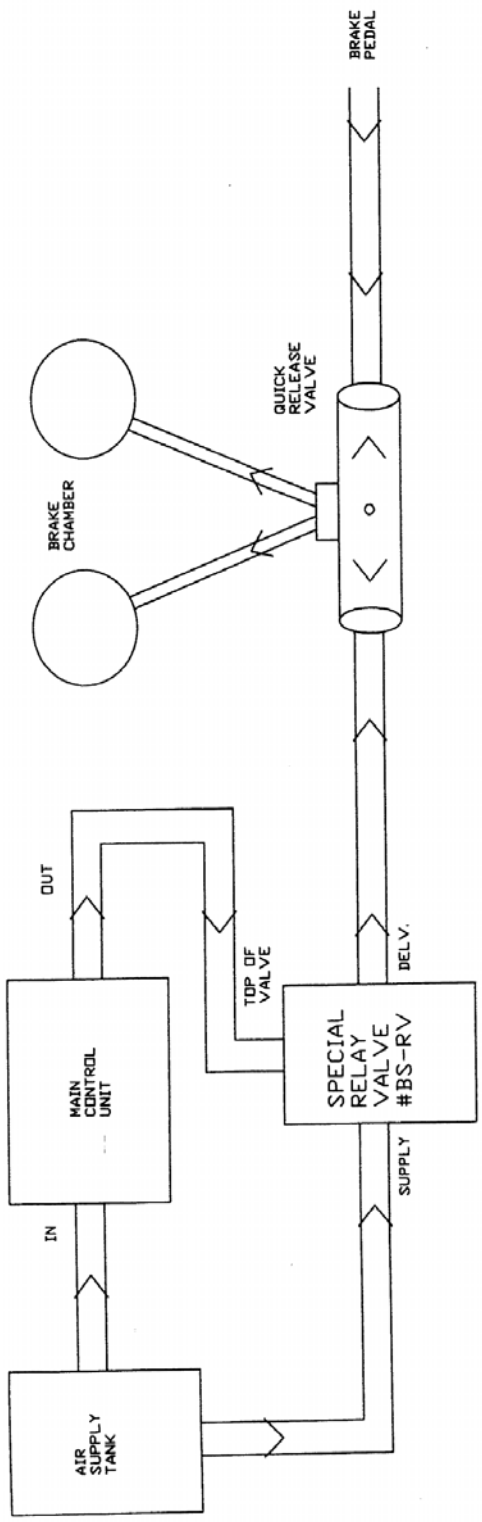


REF. DRAWING PAGE #14

COMPONENTS FOR BACKSTOP TRIPLE REVERSE BRAKING SYSTEM

DWG. TITLE: DUAL AND TRIPLE REVERSE BRAKING SYSTEM	
DWG. DATE: 5/29/13	DWG. NO.: TRIPLE-BK
SCALE: N.T.S.	
DRAWN BY: P. ZAZERA	
CHECKED BY: S. WEINBERG	



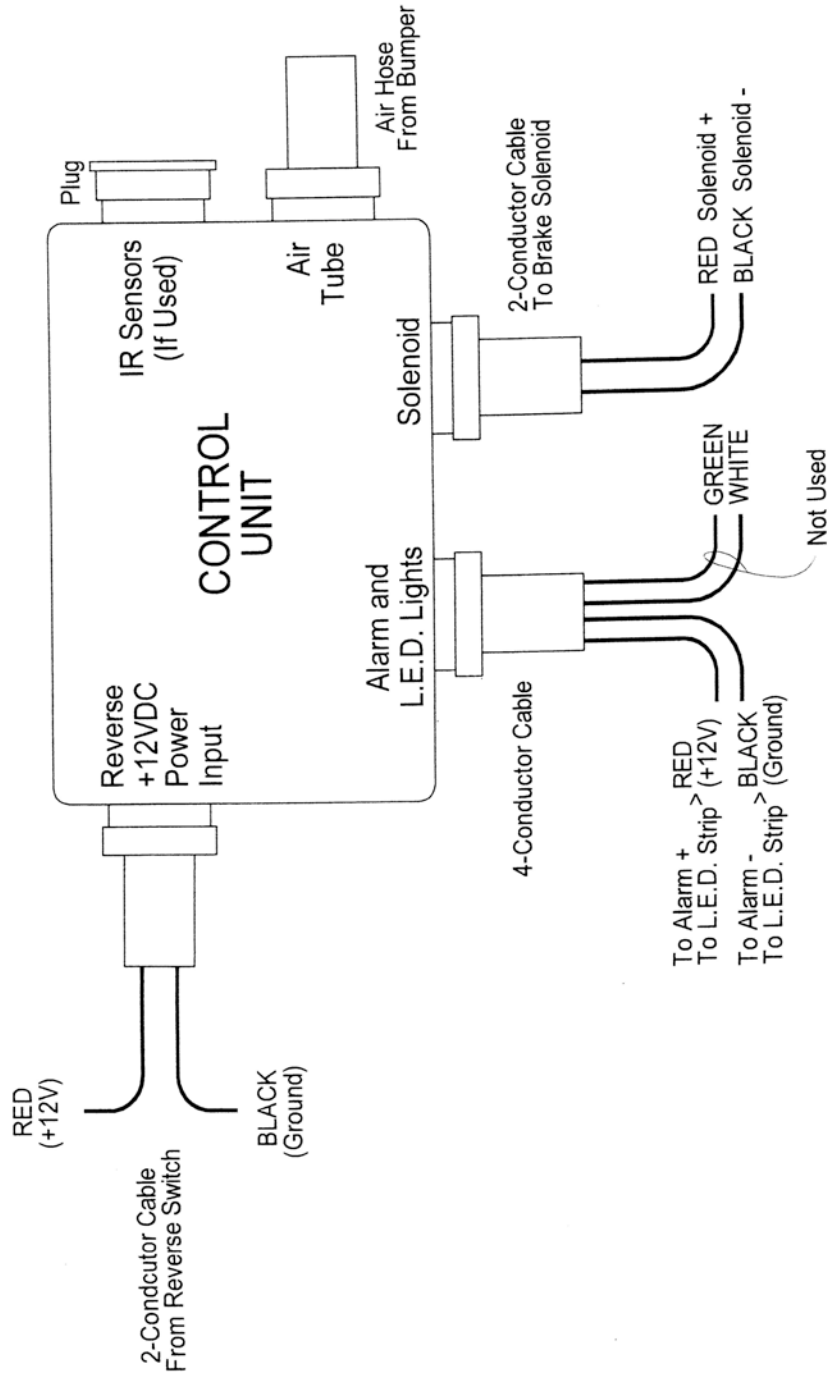


**BACKSTOP\_RELAY\_CIRCUIT**

\*\* RV RELAY VALVE, TO BE USED IN EXTREME CONDITIONS ONLY, CONTACT YOUR DEALER.

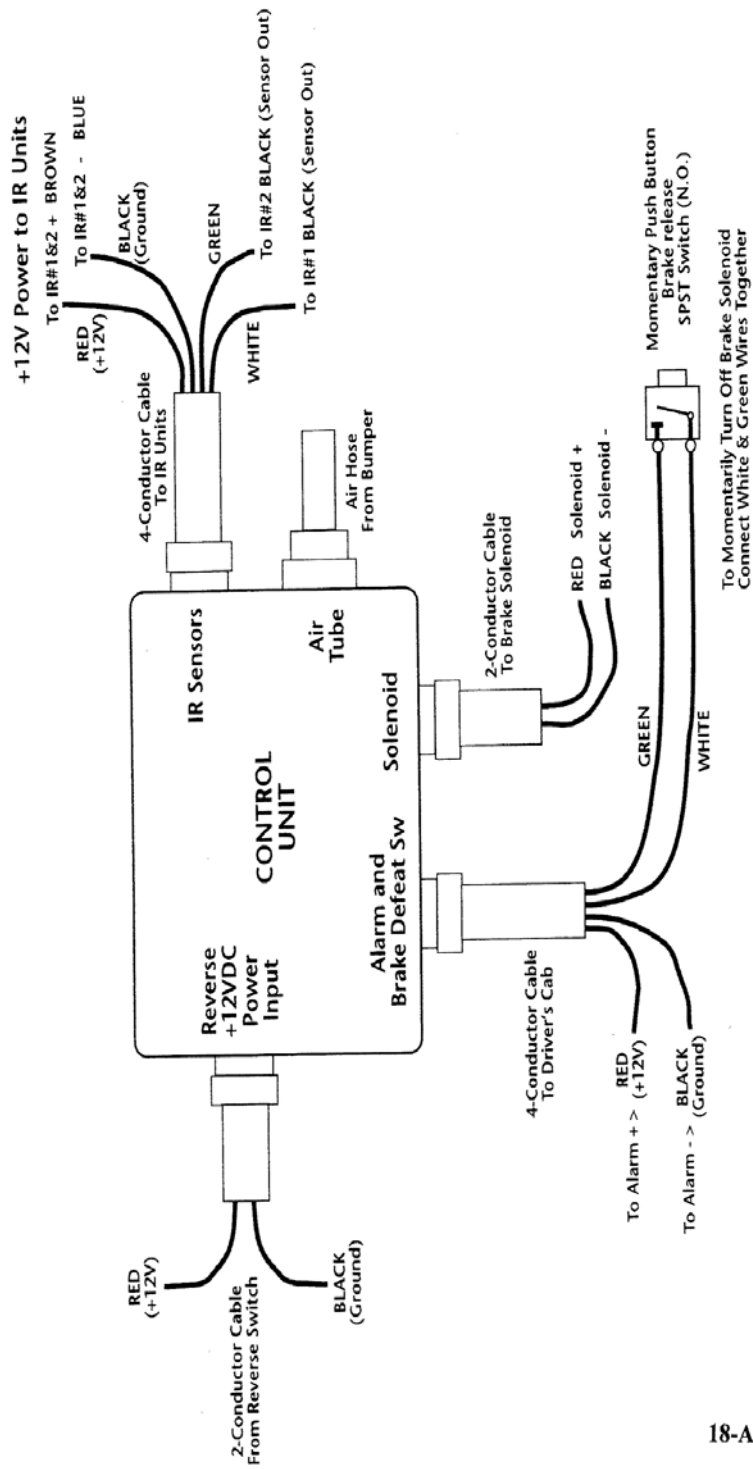
	DWG. TITLE: BACKSTOP RELAY CIRCUIT
	DWG. DATE: 9/30/10   DWG. NO.: RELAY-CR   SCALE: N.T.S.
	DRAWN BY: P. ZAZZERA   CHECKED BY: S. WEINBERG

# Connection Diagram Backstop Combination Control Unit Standard System



	DWG. TITLE: CONNECTION DIAGRAM	DWG. NO.: CONN-DIA	SCALE: N.T.S.
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## Connection Diagram BackStop Combination Control Unit with Air Pressure and Infrared Sensors



**BACKSTOP USA**  
**FAULT FINDING CHART**

Warning - Chock wheels before system testing.

SYMPTOM	CHECK	ACTION
Brakes fail to operate when sensor is depressed with reverse gear engaged, ignition on and handbrake off.	That sufficient brake air pressure is available as indicated by the brake pressure gauge.	Run engine to build up air pressure.
	Reverse Light Switch is passing current when reverse is selected and that current is reaching the Backstop unit.  (This can be easily identified as the Warning Lamp or Buzzer will operate as soon as reverse gear is selected.	Check reversing switch linkage. Replace reversing switch or electrical connection. Replace fuse.
	Electrical circuit between Backstop Control Switch and B.A.S. Valve. Should be hot once the sensor is depressed.	If the control switch unit is working OK then check the function of the B.A.S. Valve. If control switch unit is unserviceable call for return authorization.
	That sensor pressure is reaching the switch unit. To do this, first chock the wheels then:  1. Remove sensor tube at control switch unit by pushing in on ring of connector then holding ring in while pulling tube out.  2. Connect the free end of the sensor tube to a manometer that will read from 1 to 4 inches water gauge. (Water column)  3. Depress the sensor slowly, until the manometer reads 2 inches. Hold the sensor at this deflection and note if reading falls away quickly.	Remove sensor tube at sensor and blow through tube to check if it is blocked. If so then replace. Inspect length of tube for kinks or damage.  If tube is OK inspect sensor for damage and replace if necessary.

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SYMPTOM	CHECK	ACTION
	4. If reading cannot be obtained it indicates a bad leak or a completely blocked sensor tube. A slow loss of pressure is normal.	
Poor sensitivity	For damage to sensor tube or sensor, leading to loss of air or obstruction.	Replace tube or sensor.
	<p>Insert a 4mm tee piece into the sensor tube. To the spare socket fit a manometer that reads from 1 to 4 inches water gauge.</p> <p>Chock the vehicle wheels and:</p> <ol style="list-style-type: none"> <li>1. Brakes OFF.</li> <li>2. Ignition ON.</li> <li>3. Reverse gear engaged.</li> <li>4. Slowly depress sensor and note manometer reading.</li> <li>5. If pressure to operate the Backstop is higher than 3 inches water gauge.</li> </ol>	If control switch unit is unserviceable call for return authorization.
	Condition of vehicle braking system.	Adjust.
	Water contaminating sensor tube.	Disconnect at both ends and blow through with an air line. return authorization.
Brakes apply as soon as reverse gear is applied.	For faulty or damaged Backstop switch unit.	If control switch unit is unserviceable call for return authorization.
	Brake pressure too high.	Check unloader valve of vehicle compressor.

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SYMPTOM	CHECK	ACTION
Reverse light fuse keeps blowing.	For damage to electrical cable to Backstop control switch unit and reverse lights.	Replace as necessary.
	For faulty control switch unit.	If control switch unit is unserviceable call for return authorization.
Backstop warning lamp/buzzer operates when not in reverse gear.	For faulty gearbox reverse light switch.	Replace as necessary.
	For faulty wiring to Backstop system (i.e. short circuits).	Replace as necessary.
	For faulty control switch unit.	If control switch unit is unserviceable call for return authorization.