

Table of Contents

REF: Electrical System	3
Turn Signals	3
LED Lighting	3
<i>Converting to LED Turn Signals</i>	3
Front Turns	5
<i>The vwclogan Front Turn Signal Mod</i>	5
Alternate Bracket Material	8
Bikes with this mod	10
<i>Front Turns on the Forks</i>	12
Rear Turns	12
<i>Loose Rear Turn Signal - Fixes</i>	12
86-90 LED Turn Signal Schematic	13

[Go To Technical Menu](#)

REF: Electrical System

Turn Signals

Here's a chart of alternative incandescent bulbs that can be used in place of 1157 Run/Turn or Run/Brake bulbs:

**Bulb Selection - #1157 Standard
Dual-Filament Incandescent - S-8 Socket
Taillight&Brake -or- Running&Turn**

Bulb Number	Filament	Volts	Watts	Amps	Cp	Life Exp
1034	Low	14.0	8.26	0.59	3	5000
	High	12.8	23.04	1.80	32	200
1157	Low	14.0	8.26	0.59	3	5000
	High	12.8	26.88	2.10	32	1200
2057	Low	14.0	6.86	0.49	2	5000
	High	12.8	26.88	2.10	32	1200
2357	Low	14.0	8.26	0.59	3	5000
	High	12.8	28.54	2.23	40	400
2397	Low	14.0	6.72	0.48	2	5000
	High	12.8	28.54	0.23	40	400

LED Lighting

LEDs are not only highly shock resistant but they have a very long lifetime and can be made quite bright (and in many different colors). ¹⁾

Converting to LED Turn Signals

Selecting and mounting the LED turn signals can be fairly easy with many aftermarket options. However, they may not simply be straight wired in as the OEM bulbs are. The recommendation is to use a 'load balancer'.

If all you do first is replace the bulbs with LED lights, all is normal except the lights don't blink when you push the turn signal switch.

The root cause is that standard bulbs (app around 20-30 watts and 12-14 volts) draw a couple of amps. Normal electromechanical flashers need an amp or two to flash on and off.

But LEDs draw only a few milliamps, which is not enough to activate the flashers. Hence the edict to use 'load balancers'.

A load balancer is nothing but a dummy load (or more simply called a resistor).

By installing a resistor in parallel with your light, the resistor acts as a dummy load drawing the amps you need in order to make the flasher work.

Choosing a resister:

It's important to understand that each incandescent bulb runs 24w when it flashes. ²⁾

You need a 6-ohm resistor to simulate that equiv load.

Using a resistor rated at 10-watts is definitely going to heat up when you run 24-watts of power through it.

You need a 50-watt resistor because components should be spec'd for twice the rating that they will regularly encounter to provide reliability and safety.

You might get away with cutting corners, sometimes, but it's not a good idea as a policy.

You need one 6-ohm, 50-watt resistor to replace each turn signal bulb (that you either eliminate or replace with LED version or mini-bulbs).

Between 1991 and 2007, the total load that each side of the Turn Signal Module is expecting is $2 \times 24w = 48w$.

That's what it is designed to function with when blinking the TS lights.

The TSM is designed to expect a certain range of amps being drawn by the lights. ³⁾

When a bulb burns out, that changes the amp draw and the TSM blinks fast (instead of not blinking at all as in older models) to notify the rider that there is an issue.

Prior to '91, the turn signal flasher was an automotive type with no intelligence.

From 2007 on, most of the TSMs are smart enough to sense and function with whatever the standard load requires.

(whether incandescent, LED or mini-bulb, without adding load resistors)

If you eliminate or replace (with LEDs) both front & back turn signals on the same side, you can parallel two resistors to obtain a 3-ohm load (equiv to two bulbs).

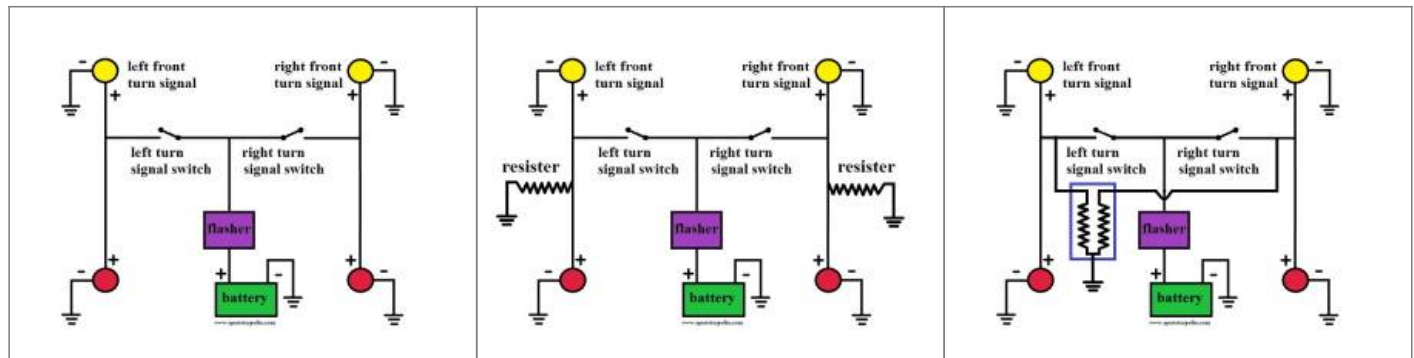
THAT ONLY REQUIRES ONE CONNECTION TO THE TURN SIGNAL LINE for that side of the bike (no terrorizing of the harness is necessary).

Just make one connection, anywhere along the entire TS wiring, for the resistors to replace the bulbs, on that side of the bike.

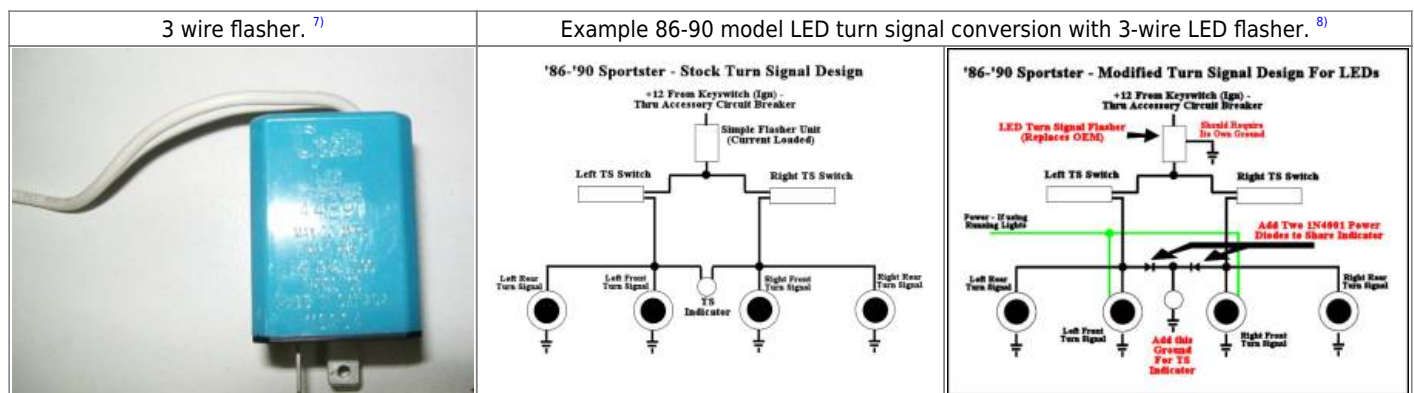
(VIOLET wire on LEFT side and/or BROWN wire on the RIGHT side with resistors often placed somewhere under the seat)

So fundamentally use the right parts, install in a nice clean, protected method of connection (solder, shrink-wrap, etc).

Simplified OEM turns. ⁴⁾	Resister / load balancer inline. ⁵⁾
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The 3-wire flashers have their own ground wire and they should require no load of any sort to function. The addition of two diodes for the indicator bulb in the configuration shown below should guarantee there is no bleed from one circuit to the other. ⁶⁾



Front Turns

The vwclogan Front Turn Signal Mod

2007 XL1200N ⁹⁾

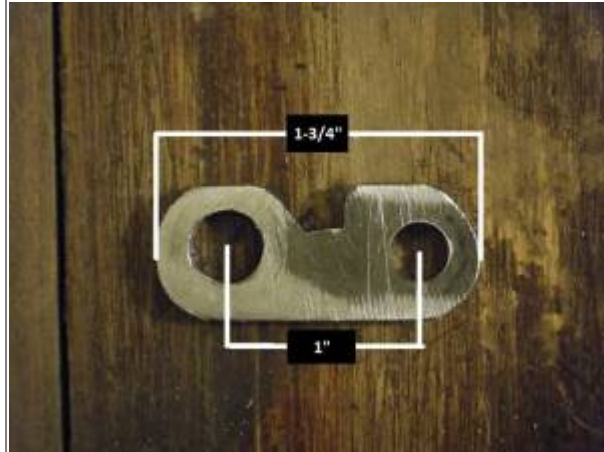
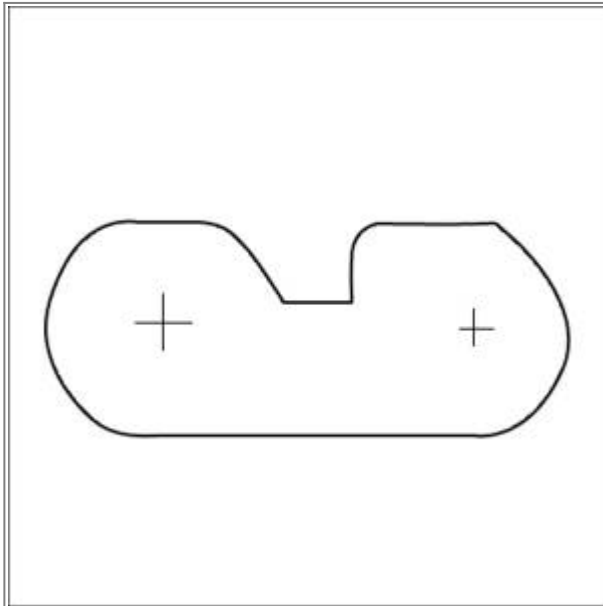
Tools include a hacksaw, file and a drill. ¹⁰⁾

1/4" steel tubing, black 1/4" PVC tubing or a bunch of washers can be used for spacers. ^{11) 12)}



Template for the bracket.
Entire drawing should print out 2" x 2".
(notched to get around a small edge in the tree) ¹³⁾

Holes drilled in 3/4" wide bracket.
Left hole (tree) - 3/8". Right hole (turn) 5/16". ¹⁴⁾



Parts: (2) 5/16"x24x1-1/2" bolt, lockwashers and spacers. ¹⁵⁾



Remove the lower tree bolt on the right side. ¹⁶⁾ Remove the rounded bolt from the signal with an Allen wrench. ¹⁷⁾



Mount the new bracket to the tree. Torque the existing bolt (#45 Torx socket head) to 30-35 ft lbs. ¹⁸⁾ ¹⁹⁾

Add a spacer on a bolt to extend the turn housing. ²⁰⁾



Tighten the turn and zip tie the wires nice and neat. ²¹⁾

Reposition as needed and start on the other side. ²²⁾



After / Before
Stock front turns on a 2007 XL1200N ²³⁾

Alternate Bracket Material

Bracket made from aluminum flat bar ²⁴⁾



These rectangular strips were bought from a hardware store. They are size 3 (CHGO NO 3) and the holes are 1" apart (center to center). You can also find stainless spacers in the correct size. Cut and shape the brackets, over drill one hole on each, paint them. ²⁵⁾



Use the original signal mounts, some flat metal stock and a bolt with the same thread as mirrors. Cut the stock to size and drill the 3/8" holes for the tree mount. ²⁶⁾



Modification for 48's. The only difference is that you need to drill two 3/8" holes in both brackets and angle the brackets from the tree slightly to allow the nut to clear. The 48 turn signal has the wires running through the mounting stud rather than having them come out the back of the housing.

The mounting stud is the perfect length to fit the new 1" spacer and there is ample room to bolt the original nut and lock washer to the new bracket. ²⁷⁾





All thread coupling: In the first pic below, the top 2 fasteners were removed from each side and discarded; (L) 3/8" x 18 pinch bolt and (R) turn signal stud.

The 2-1/4" threaded rod and coupling nut replaces the pinch bolt and provides for more threads in the tree. 3/8" rods can be cut from all-thread or a 5" carriage bolt.

The coupling nuts are 1-3/4" long or can be cut shorter (these were cut to 7/8"). The signal stud is replaced with a 5/16" x 24 bolt with the head ground down just enough to fit inside the coupling nut snugly. It is then cut so there is about 1/2" of threads to screw into the turn signal housing with a jam nut threaded on it.

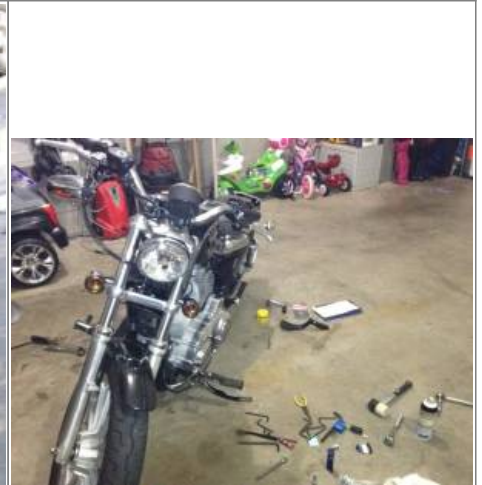
The carriage end of the 5/16" bolt is then inserted into the coupling that has been side drilled and tapped for a #10x32 set screw to hold the signal bolt tight.

The tree can be torqued back properly by use of a crows foot on a socket wrench applied to the coupling. ²⁸⁾



Bikes with this mod

Mounted to lower trees:

2012 883N ²⁹⁾2009 XL1200N ³⁰⁾2007 883L ³¹⁾2012 XL1200X ³²⁾2012 XL1200C ³³⁾2007 XL1200R ³⁴⁾

Mounted to upper trees:



2000 XL1200 ³⁵⁾

Front Turns on the Forks

98 1200C

Turns mounted with electrical conduit clamps. ³⁶⁾

09 883L

Turns mounted with electrical conduit clamps. ³⁷⁾

Rear Turns

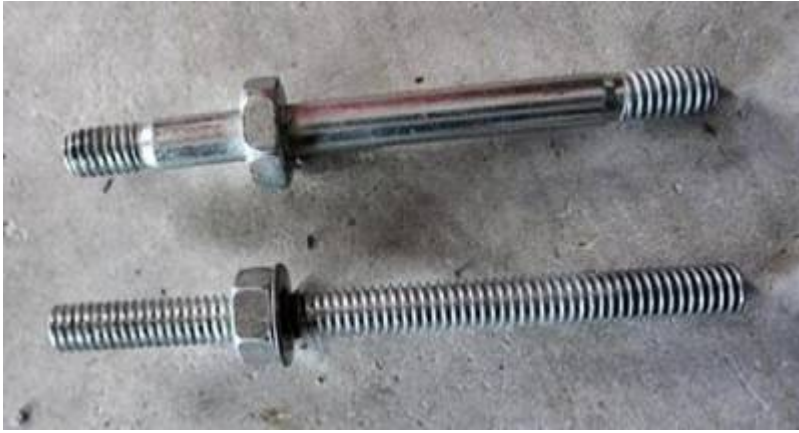
Loose Rear Turn Signal - Fixes

Some times the double-ended stud that mounts the rear turn signal housing to the fender (thru a stand-off spacer) is not long enough to get a good bite on the threads in the housing. That eventually leads to the first few threads stripping out. Even though there are more threads in the housing, the stud will not reach deep enough.

Note that on some of the stock studs, the housing threads on the double-ended stud have a different pitch than the fender mounting threads.

SportyTrace suggested the following: ³⁸⁾

I ended up fabbing up a replacement longer threaded stud that could get deeper into the indicator body to use the good remaining threads. I used all-thread rod. The trick was getting a nut fixed into place on threaded rod and making the stalk the correct length. I ended up purposely messing up the threads at the fixing point and added loctite too. Worked a treat, but was a bit fiddly. Shown below: original stock one on top and home-made replacement beneath.



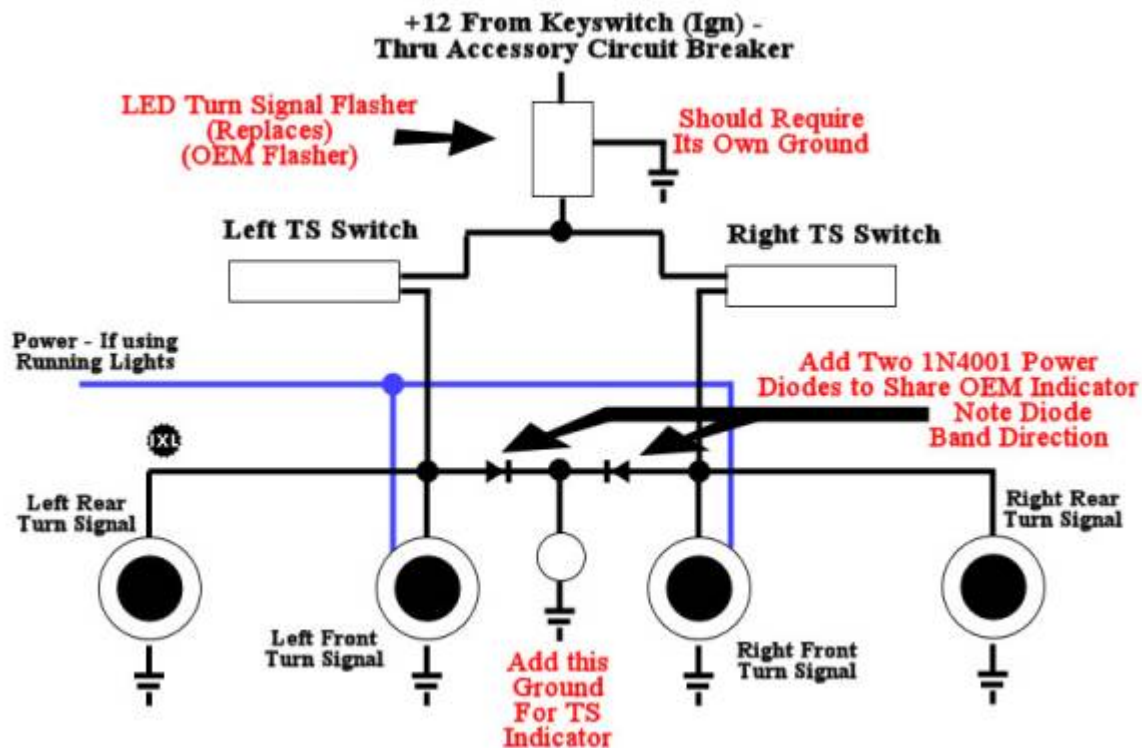
The threads may be repairable using JB Weld (lightly coating the inside of the hole), then rethreading the housing. If all the threads in the housing are stripped, using the above extended stud might reach far enough to use a nut (or speed nut) on the inside of the housing.

86-90 LED Turn Signal Schematic

The stock turn signal blinker is 'load activated', meaning it requires a certain current draw before it functions correctly.

If you change the TS bulbs to LED type, the stock blinker will not work (unless you use load equalizers). But, for these years, it is a simple matter replace the OEM Flasher with an LED-compatible Flasher, then add some diodes and ground wires to make the change. The following electrical diagram illustrates the needed changes.

'86-'90 Sportster - Modified Turn Signal Design For LEDs



Go To Technical Menu

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3)

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