Installation Manual for Traction Control System

TCS: DriverMod for:

- 1991-92 Dodge Spirit R/T Turbo III (w/ABS)
- 1992-93 Dodge Daytona IROC R/T Turbo III (w/ABS)

Contents

Introduction

The purpose of this document is to provide detailed information regarding the installation of the ND Performance - Traction Control System. The installation of the system is very straight forward and typically not very difficult. This document includes detailed step-by-step instructions and includes many pictures to help clarify. Average installation time is around 3 hours at a normal pace.

It should be noted that this version of TCS was specifically designed for the Dodge Spirit R/T and Daytona IROC R/T 2.2L Turbo III cars equipped with ABS. It can also be installed in vehicles that have had an engine swap, so long as an 88-93 period VR-type (variable reluctance) ABS sensor is installed in one of the rear wheels. Likewise, a non-ABS equipped R/T and also add the rear ABS sensor. This manual will not go into detail on the installation of this sensor, as it assumes that the base car is a.) a SBEC controlled Turbo III car, and b.) has factory ABS installed. TCS will not operate without all required components hooked up and operational!

This system should be installed by professional. In our experience the vast majority of problems associated with aftermarket automotive electronics systems are due to improper installation. Improper installation can lead to a system that is unsafe, unusable, intermittent, and improper installation can even damage the Traction Control System or the vehicle electronics. ND Performance will not warranty this product or any damage that is caused to your vehicle due to improper installation (See warranty and disclaimer documentation). If you do not feel comfortable installing this system on your vehicle we strongly urge that you take your vehicle to a certified professional for installation.

There are two particular ways that the Traction Control System can be wired into the vehicle. The first method is to solder and shrink wrap / tape all wiring into the vehicle's wiring. Soldering provides the most solid wire to wire connection. However once the TCS wiring harness is soldered into the vehicle, removal of the system is difficult and cannot be performed quickly. The alternative method to use is to crimp terminals and "t-taps" to install all wiring into the vehicle's wiring. This method does not provide as solid of a connection into the vehicles wiring system as the soldering method. However, the use of the crimp terminals allows for quick installation and also quick removal of the system in the case that the vehicle needs to be returned to a factory configuration. Our testing shows that a system **properly** installed using the crimp terminals can be almost as reliable as the soldering method. One of the major issues that we find with people improperly installing crimp terminals is the use of bad crimping tools. See the "Tools Needed for Installation" section of this document for a link to a good set of low cost crimpers. To conclude, if you want the most solid wire to wire connection, have soldering experience, and removal time/effort of the TCS is unimportant, we suggest soldering the TCS wiring harness during installation. However, installation can be easily and reliably performed using the provided crimp terminals and t-taps.

All information needed for the installation should be contained within this detailed document, however if you have any questions please feel free to contact us at neil@ndperformance.com

TCS Packing List

- ➢ Traction Control Unit
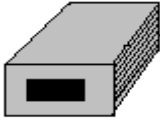
- ➢ Wiring Harness
- ➢ TCS Tuner CD (For Microsoft Windows)
- ➢ Installation Hardware Kit:

    - ▪ (5) Blue "T-Tap" connectors

    - ▪ (4) Male quick disconnect crimp terminals
    - ▪ (4) Female quick disconnect crimp terminals

- ➢ (1) Promotional decal.

If you are missing any of the components, please email us at neil@ndperformance.com

Tools Needed for Installation

- Soldering Iron (and solder) or Decent Set of Crimpers.
  - If using crimpers avoid the cheap universal crimpers available at places like Radio Shack. These crimpers are very thin and easily bend, and thus create a crimp that is unusable and a poor install. A good set of crimpers for this job can be found at your local Sears and only cost around eight dollars. They are:
   - Companion 8 in. Crimp-On Staking Tool Sears item #00973647000 Mfr. Model #73647

- Drill
  - Only one bit size slightly larger than the width of a single wire 18-gauge wire is needed. I typically use a 5/32" bit, however many sizes will work.
- Wire strippers
- Pliers (Alligator not needle nose)
- Electrical Tape
- Serrated knife/blade
- Wire coat hanger (Stock radio antenna for you creative guys out there)
- Long flathead screwdriver
- Vehicle Jack
- Socket set and ratchet.

How to Properly Solder

This section of the document simply describes how to properly solder and protect wire to wire connections. It includes how to properly solder a "T" connection, as well as how to solder a standard wire to wire connection (i.e. butt connect).

Soldering Standard Butt Connection

1. Strip approximately 1/2" of insulation from each wire to be connected. Cut approximately 1" of heat shrink tubing as well.

2. Place one wire through the heat shrink tubing (not included) and twist the stranded copper wire together so that joint is linear.

3. Use a soldering iron (with a small amount of solder on it) to heat the <u>wire</u> for a few seconds, and then simultaneously apply solder to the twisted copper and soldering iron, coating the entire junction with solder. Do not add an excessive amount of solder.

4. Finally move the heat shrink tubing over the soldered junction and heat the tubing with a heat gun or lighter.
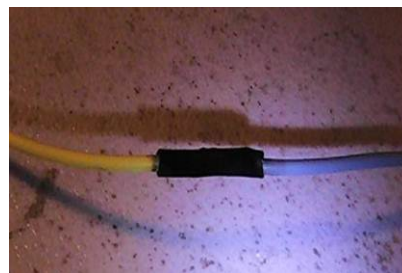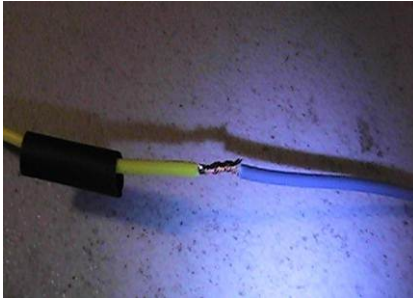
Soldering "T" Connection

1. With the new wire that is to be teed in (i.e. the wire coming from the TCS harness) strip approximately 1/2" to 1" of insulation from the wire. With the existing wire that is going to be tapped (i.e. the wire in the vehicle) remove the insulation from a 1/4" to 1/2" section so that only the copper is exposed but the wire is still intact.

2. Wrap the new wire around the existing wire, so that the new wire is parallel to the existing wire.

3. Use a soldering iron (with a small amount of solder on it) to heat the <u>wire</u> for a few seconds, and then simultaneously apply solder to the twisted copper and soldering iron, coating the entire junction with solder. Do not add an excessive amount of solder.

4. Finally using electrical tape cleanly wrap up the soldered junction.
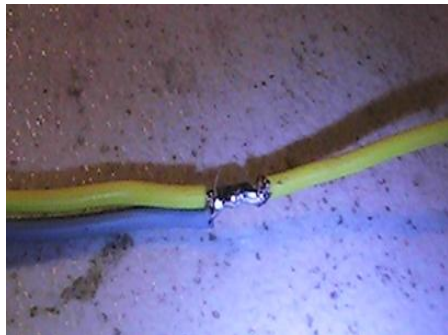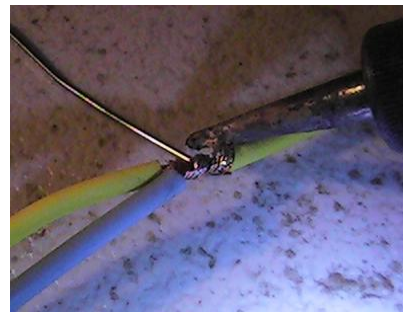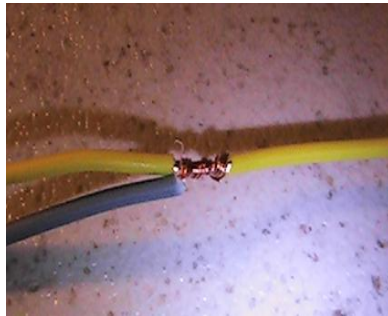
How to Properly Crimp

This section of the document simply describes how to properly crimp all connections used in this installation document. It includes how to properly use the provided t-taps, as well as how to properly crimp the provided quick disconnect terminals (for butt connections).

Crimping the Provided Disconnect Terminals

1. Strip approximately 3/8" of insulation from wire

2. Place the terminal over the bare copper wire, and push wire in until the wire insulation contacts the metal jacket inside of the terminal.

3. Place the terminal jacket in the crimper tool as shown in the pictures below. While holding the wire in the terminal jacket firmly squeeze the handles of the crimp tool, to crimp the terminal on to the wire. A crimp mark should be easily visible (see pictures) when crimp is performed correctly. Holding the terminal, pull on the wire slightly to ensure that the crimp is solid.

4. If equipped with your kit, use a heat gun or lighter to apply heat to the translucent pink/red heat shrink on the terminal. This shrink wrap will shrink completely on to the wire and provide protection against moisture and corrosion.
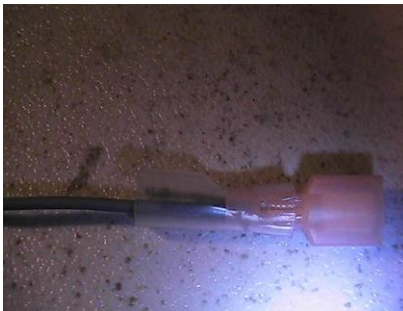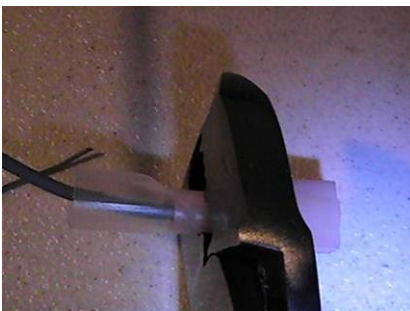
How to Use the Provided T-Taps for "T" Connection

1. Open the t-tap by pulling on the large plastic flap.

2. Place the existing wire to be tapped inside of the of the t-taps opening you created in step 1. Close the t-tap by pushing the large plastic flap to its original position.

3. Place the new wire that you want to tap in into the other side of the t-tap. Push this wire all the way through until it hits the plastic end of the t-tap.

4. Ensuring that both wires are lined up in the t-tap, use large pliers to push the metal piece firmly down into the t-tap. When you are complete, the top of the metal will be flush with the plastic.

5. Take the large plastic flap of the t-tap and lock it in place over the top of the t-tap thus sealing the wires inside the t-tap.
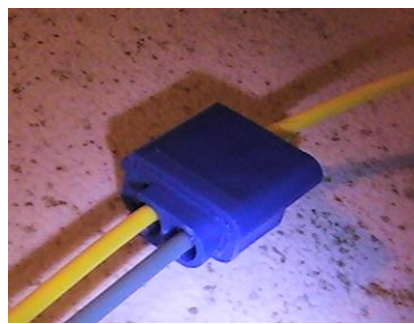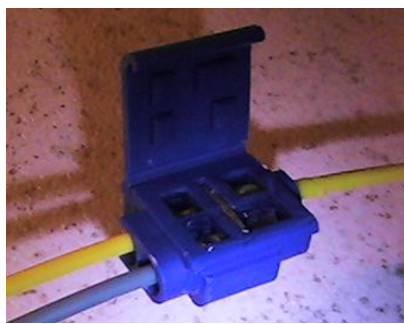
	COLOR	FUNCTION	CONNECTS TO:
	Black	Ground	Ground point under dash
	Red	+12v Input	ASD Circuit
	Dark Blue	Ignition Output #1	Coil Channel #1
	Dark Green	Ignition Output #2	Coil Channel #2
	Light Blue	Ignition Input #1	Ignition Channel #1 (from SBEC)
	Light Green	Ignition Input #2	Ignition Channel #2 (from SBEC)
	Violet	Rear ABS Sensor Input	Rear Sensor Signal (at ABS Controller)
	Orange	VSS Input	Vehicle Speed Sensor Signal
	Yellow / White	Clutch Switch Input	Clutch Switch (under dash)
	Green / Black	Throttle Position Sensor Input	TPS Input (at SBEC)

Table 1. Wire colors and wire functions

CAV	WIRE CODE	IGNITION SYSTEM CIRCUITS	SHEET
1	K1 20DG/RD ✶	MAP SENSOR SIGNAL	24
2	K2 20TN/BK ✶	TEMPERATURE SENSOR SIGNAL	28
3	A14 16RD/WT ✶	DIRECT BATTERY FEED	27
4	K4 18BK/LB ✶	SIGNAL GROUND	24
5	Z11 16BK/WT ✶	SIGNAL GROUND	28
6	K6 20VT/WT ✶	MAP SENSOR SIGNAL	24
7	K7 18OR	8 VOLT OUTPUT	24
8	—	—	—
9	A21 14DB	ASD RELAY	27
10	—	—	—
11	Z12 16BK/TN ✶	POWER GROUND	27
12	Z12 16BK/TN ✶	POWER GROUND	27
13	K14 18LB/BR ✶	INJECTOR	25
14	K13 18YL/WT ✶	INJECTOR	25
15	K12 18TN	INJECTOR	25
16	K11 18WT/DB ✶	INJECTOR	25
17	K17 18DB/YL ✶	IGNITION COIL	28
18	—	—	—
19	K19 18BK/GY ✶	IGNITION COIL	27
20	K20 18DG	ALTERNATOR	26
21	K21 18BK/RD ✶	CHARGE TEMPERATURE SENSOR	26
22	K22 18OR/DB ✶	THROTTLE POSITION SENSOR	28
23	V37 18RD/LG ✶	SPD CNTRL MODE SELECT SWITCH	25,67
24	K24 18GY/BK ✶	CRANKSHAFT POSITION SENSOR	27
25	D21 20PK	SCI (TRANSMIT)	28
26	D1 20VT/BR ✶	CCD BUSS (+)	25
27	C20 18BR	A/C CLUTCH INPUT	25,29
28	—	—	—
29	K29 18WT/PK ✶	BRAKE SWITCH SIGNAL	25,67
30	T41 20BR/YL ✶	PARK/NEUTRAL SWITCH SIGNAL	28
31	C27 20DB/PK ✶	RADIATOR FAN RELAY	25,29
32	G3 20BK/PK ✶	CHECK ENGINE WARNING LAMP	28
33	V36 20TN/RD ✶	SPEED CONTROL (VACUUM)	25,67
34	C13 20DB/OR ✶	A/C CLUTCH RELAY SIGNAL	25
35	—	—	—
36	K36 20LG/BK	WASTE GATE SOLENOID	24
37	—	—	—
38	—	—	—
39	K39 18GY/RD ✶	AUTOMATIC IDLE SPEED MOTOR(AIS-3)	28
40	K40 18BR/WT ✶	AUTOMATIC IDLE SPEED MOTOR(AIS-1)	28
41	K41 18BK/DG ✶	OXYGEN SENSOR SIGNAL	25
42	K42 18BK/LG ✶	DETONATION SENSOR	27
43	G21 20GY/LB ✶	TACHOMETER SIGNAL	28
44	K44 18TN/YL ✶	CAMSHAFT POSITION SENSOR	24
45	D20 20LG	SCI (RECEIVE)	28
46	D2 20WT/BK ✶	CCD BUSS —	25
47	G7 20WT/OR ✶	DISTANCE SENSOR SIGNAL	28
48	—	—	—
49	—	—	—
50	—	—	—
51	K51 20DB/YL ✶	AUTO SHUTDOWN SIGNAL	28
52	K52 20PK/BK ✶	PURGE SOLENOID SIGNAL	24
53	V35 20LG/RD ✶	SPEED CONTROL (VENT)	25,67
54	—	—	—
55	K55 20LB	BARO READ SOLENOID	24
56	—	—	—
57	A142 16DG/OR ✶	ALTERNATOR FEED	26
58	—	—	—
59	K59 18VT/BK ✶	AUTOMATIC IDLE SPEED MOTOR(AIS-4)	28
60	K60 18YL/BK ✶	AUTOMATIC IDLE SPEED MOTOR(AIS-3)	28

CONNECTOR
VIEWED FROM TERMINAL
END OF CONNECTOR

BLACK

SINGLE BOARD ENGINE
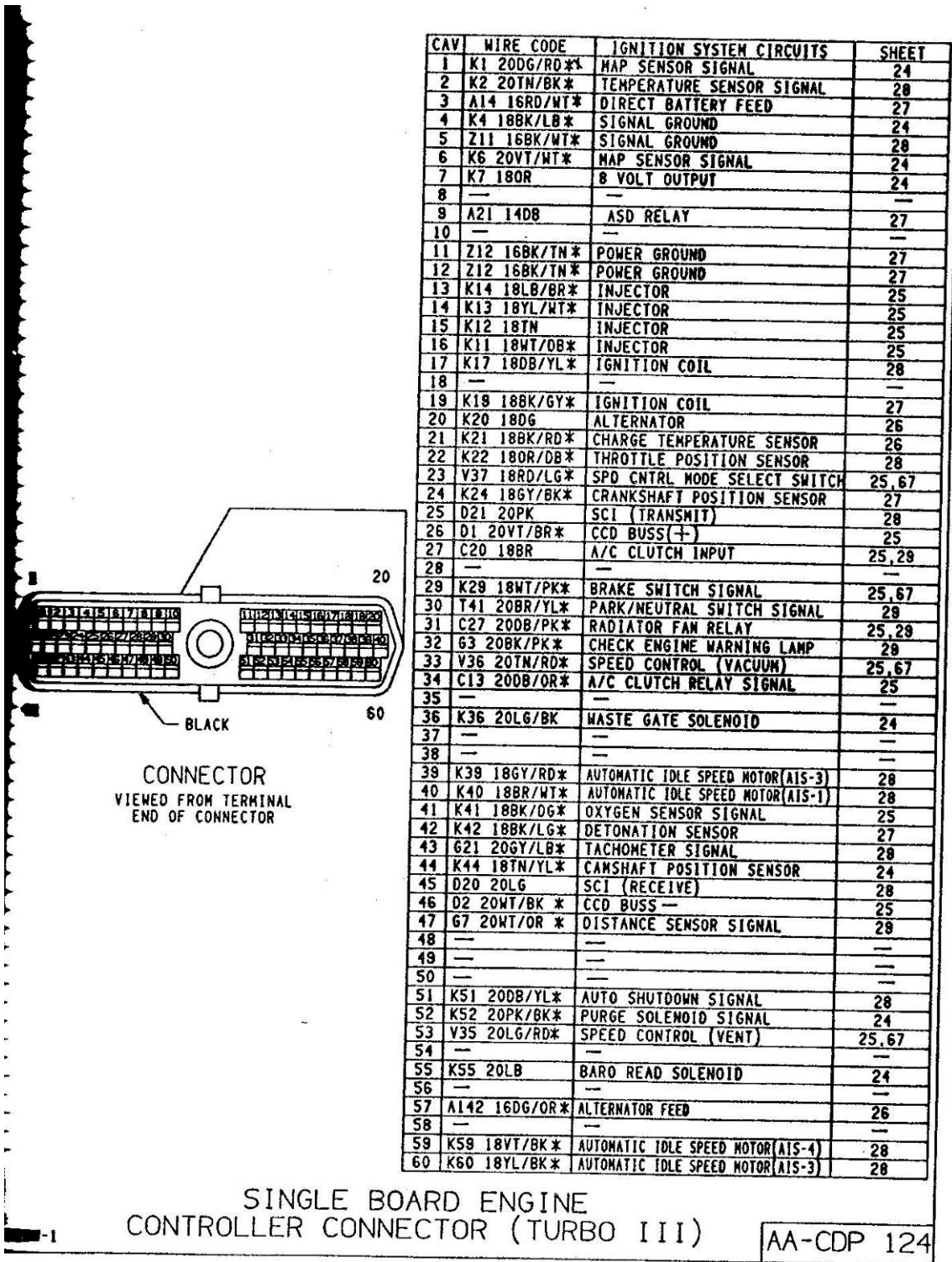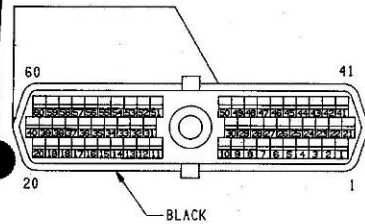CONTROLLER CONNECTOR (TURBO III)

AA-CDP 124

Figure 1. 1991 Turbo III SBEC Connector Pinout Diagram (92/93 similar)

WIRING DIAGRAMS 8W - 325

CAV	WIRE CODE	IGNITION SYSTEM CIRCUITS	SHEET
1	B1 18YL/DB *	RIGHT REAR WHEEL SENSOR	50
2	B2 18YL	RIGHT REAR WHEEL SENSOR	50
3	B3 18LG/DB*	LEFT REAR SHEEL SENSOR	50
4	B4 18LG	LEFT REAR SHEEL SENSOR	50
5	Z1 16BK	ABS GROUND	51
6	B6 18WT/DB*	RIGHT FRONT WHEEL SENSOR	50
7	B7 18WT	RIGHT FRONT WHEEL SENSOR	50
8	B8 18RD/DB *	LEFT FRONT WHEEL SENSOR	50
9	B9 18RD	LEFT FRONT WHEEL SENSOR	50
10	—	—	—
11	D11 20WT/VT*	DIAGNOSTIC CONNECTOR	52
12	D12 20OR	DIAGNOSTIC CONNECTOR	52
13	L50 18WT/TN*	STOP LAMP	52
14	—	—	—
15	G19 18LG/OR*	ABS WARNING LAMP RELAY	51
16	B116 18GY	ABS PUMP MOTOR RELAY	49
17	—	—	—
18	—	—	—
19	—	—	—
20	B120 14BR/WT*	ABS SYSTEM HYDRAULIC MODULATOR	49
21	—	—	—
22	—	—	—
23	—	—	—
24	—	—	—
25	—	—	—
26	—	—	—
27	—	—	—
28	—	—	—
29	—	—	—
30	—	—	—
31	—	—	—
32	—	—	—
33	—	—	—
34	—	—	—
35	—	—	—
36	—	—	—
37	—	—	—
38	—	—	—
39	—	—	—
40	—	—	—
41	B47 14RD/LB*	ABS SYSTEM RELAY	51
42	B142 18BR/YL*	ABS SYSTEM HYDRAULIC MODULATOR	49
43	B143 18DG/YL*	ABS SYSTEM HYDRAULIC MODULATOR	49
44	—	—	—
45	B145 16WT/DG*	ABS SYSTEM HYDRAULIC MODULATOR	49
46	B146 18BR/LB*	ABS SYSTEM HYDRAULIC MODULATOR	49
47	B47 14RD/LB*	ABS SYSTEM RELAY	51
48	B148 18DG/LB*	ABS SYSTEM HYDRAULIC MODULATOR	49
49	B149 16WT/LG*	ABS SYSTEM HYDRAULIC MODULATOR	49
50	—	—	—
51	—	—	—
52	—	—	—
53	—	—	—
54	—	—	—
55	—	—	—
56	—	—	—
57	B57 18BR/BK*	ABS SYSTEM RELAY	51
58	—	—	—
59	—	—	—
60	A21 14DB	IGNITION SWITCH	52

60   41
20   1
BLACK

ANTI-LOCK BRAKE SYSTEM CONTROLLER CONNECTOR

AA-CDP 130

828W-1

Figure 2. 1991 Spirit R/T ABS Controller Connector Pinout Diagram (92/93 similar)

Detailed Installation

1. Actual mounting instructions will be a somewhat generalized, as this version of TCS will be used in more than one model of car. However, the concepts and certainly the wiring connections are the same.

2. Disconnect and remove the battery and the upper airbox/hose assembly.

3. Connect the two main wiring harnesses to the TCS box. Then connect the USB -> Serial cable to the DB9 connector on the TCS box, followed by the 2.5mm Map Switcher cable. Take great care to not bend the Map Switcher cable connector, as it can be easily broken. Route this cable to a point where you will mount the Map Switcher. For now, leave it aside, and we will return to it later.

4. The TCS box will be mounted under the passenger seat, and the wiring will be routed from under the seat. All of the wiring will go UNDER the seat rail, and the into the center console area. The USB cable will simply lie on the floor at this point. When not in use, it will tuck up under the seat. At this point, it would be best to disassemble the center console, but if you are careful, you may not need to. From there, the wiring will route along all of the car's original wiring, under the steering column, and then make a turn up to the firewall.

5. Next you will hook up the clutch up switch. This switch enables the starter, and it will function to tell TCS when you step on the clutch pedal. This wire is located in a green connector located within all of the wiring to the left of the steering column. It is tricky to find, and it is even harder to photograph. Once you find it, you will "T" the YELLOW/WHITE wire to the YELLOW wire in this connector. Use the pics below for reference.
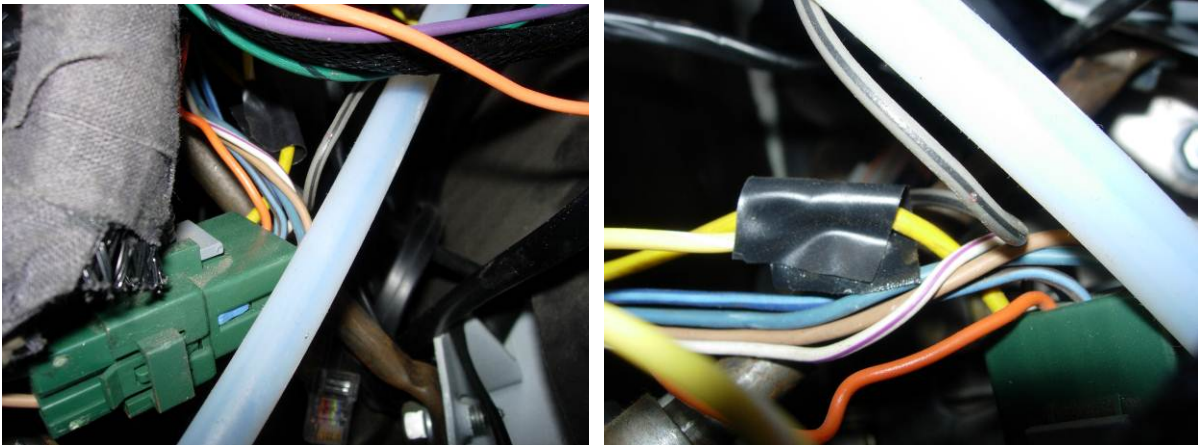

6. Next will be the main grounds for the TCS. These will be two black wires and one brwn wires, all with pre-crimped eyelets. Remove the right side nut securing the steering column, and place the eyelets for all three grounds over the stud, and replace the nut, tightening properly.


7. There is a large rubber grommet that runs through the firewall that is located in the driver side rear corner of the engine bay. From the inside of the car this grommet can be found approximately eight inches above and to the left of the pedals. Locate this grommet.

8. Cut/Poke a small hole through the grommet to allow the TCS harness to fit through. This can be done with a small serrated knife/blade. When placing the hole in the harness sure not to place the hole too close to the center of the grommet where the existing vehicle wiring harness is located.

9. Use a coat hanger (or other stiff metal rod), and from the under the hood push it through the hole that you created in the rubber grommet against the firewall on the driver's side corner. Once the coat hanger (or antenna) is through the grommet push it far enough so that you can see it end inside the cabin by the pedal assembly.
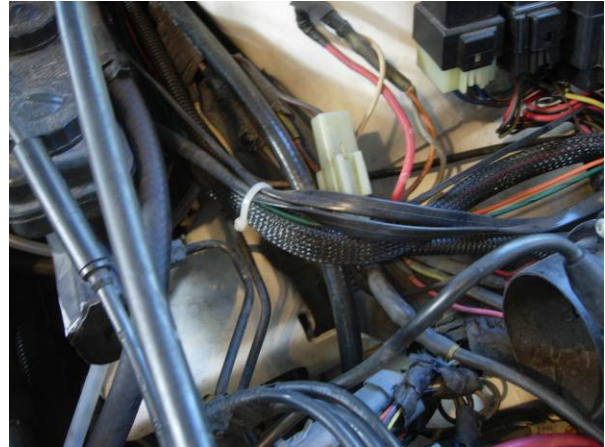

10. Tape the remaining wires **firmly** to the coat hanger (or antenna). Slowly pull the coat hanger (or antenna) back through the firewall grommet by pulling on the coat hanger (or antenna) from under the hood. Once the harness has been passed through the firewall grommet release the harness from the coat hanger (or antenna) by removing the tape. Be sure all the wires have come through the grommet. The result should look similar to the pictures above.

11. Run the TCS harness wires (except for the violet wire) towards the SBEC.

12. Remove the SBEC main connector (8mm screw will remain captive in the connector).

13. Remove the SBEC wire cover by prying (gently) on the four tabs retaining it.

14. Remove the tape that is covering the sheathing over the wiring harness where it enters the connector.

15. "T" (or tap) the **RED** wire from the TCS harness into the **DARK BLUE** wire going to SBEC Pin 9. Shown below is the using the provided t-tap (see "How to properly crimp" section). If you are soldering directly see the "How to properly solder" section.
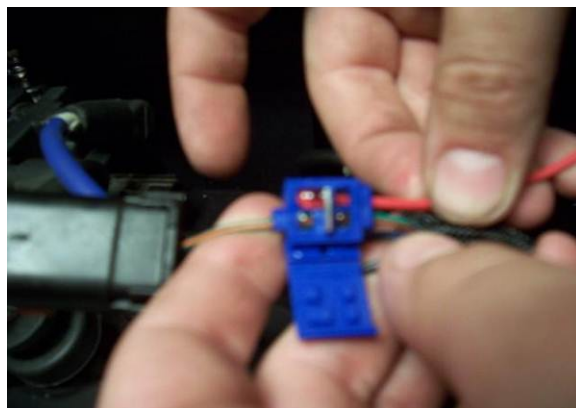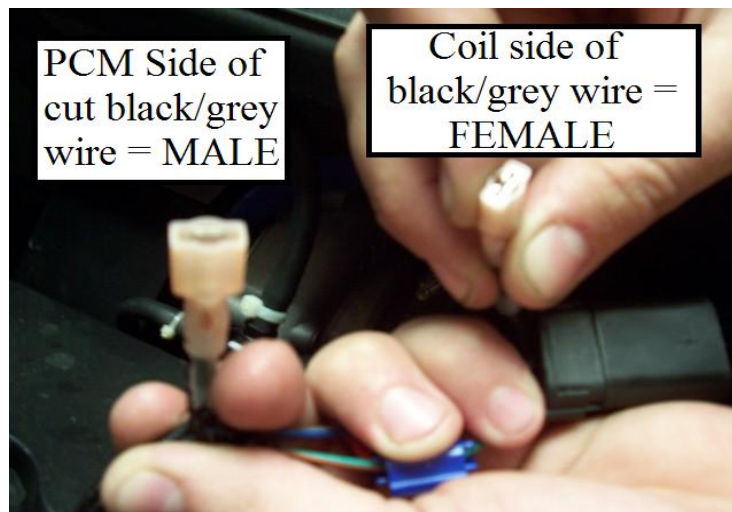

16. Next crimp the following connectors onto the wires on the TCS harness. You can skip this step if

you are soldering directly:

- ➢ **LIGHT GREEN** : <u>Male</u> terminal
- ➢ **DARK GREEN** : *Female* terminal
- ➢ **LIGHT BLUE** : *Female* terminal
- ➢ **DARK BLUE** : <u>Male</u> terminal
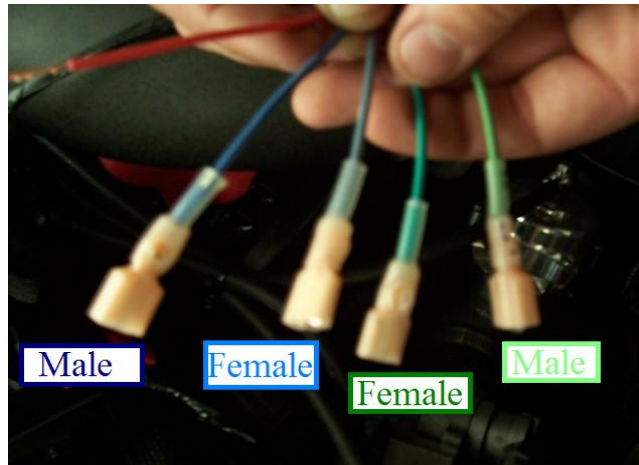
17. Cut the **BLACK/GREY** wire (SBEC Pin 19) approximately 2 inches from the SBEC connector.

18. Next crimp the following connectors onto the wire ends you just cut. You can skip this step if you are soldering directly.

- ➢ On the coil side of the **BLACK/GREY** wire crimp on a *Female* terminal
- ➢ On the SBEC (PCM) side of the **BLACK/GREY** wire crimp on a <u>Male</u> terminal

19. Connect the **LIGHT BLUE** wire from the TCS harness to the SBEC Side of the cut **BLACK/GREY** wire from the vehicle harness. Connect the **DARK BLUE** wire from the TCS harness to the coil side of the cut **BLACK/GREY** wire. If soldering, then follow the "How to

properly solder" section to make the connections. If using crimp terminals then simply push the terminals into each other to make the connections.

20. Cut the **DARK BLUE/**<mark>**YELLOW**</mark> wire on the vehicle harness approximately 2 inches from the SBEC connector.

21. Next crimp the following connectors onto the wire ends you just cut. You can skip this step if you are soldering directly:

    ➢ On the coil side of the **DARK BLUE/**<mark>**YELLOW**</mark> wire crimp on a *Male* terminal

    ➢ On the PCM (SBEC) side of the **DARK BLUE/**<mark>**YELLOW**</mark> wire crimp on a *Female* terminal

22. Connect the <mark>**LIGHT GREEN**</mark> wire from the TCS harness to the PCM Side of the cut **DARK BLUE/**<mark>**YELLOW**</mark> wire from the vehicle harness. Connect the **DARK GREEN** wire from the TCS harness to the coil side of the cut **DARK BLUE/**<mark>**YELLOW**</mark> wire. If soldering, then follow the "How to properly solder" section to make the connections. If using crimp terminals then simply push the terminals into each other to make the connections.
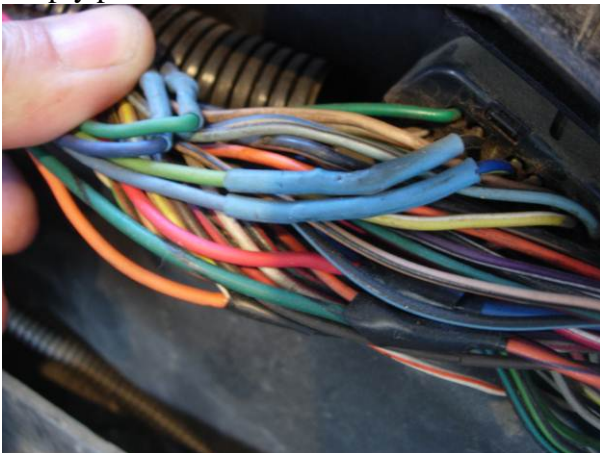
23. Route the **ORANGE** wire up to the **WHITE**/**ORANGE** wire (SBEC Pin 47). Tap the **ORANGE** wire into the **WHITE**/**ORANGE** wire. Use a crimp T-tap or solder.

24. Take the **DARK GREEN**/**BLACK** wire from the TCS and tap it into the **ORANGE**/**DARK BLUE** (SBEC Pin 22). Use a crimp T-Tap or solder the wire.

25. At this point, you are done connecting to the SBEC wiring. Neatly tuck the wires into the connector, tape if necessary, and put the connector cover back in place.
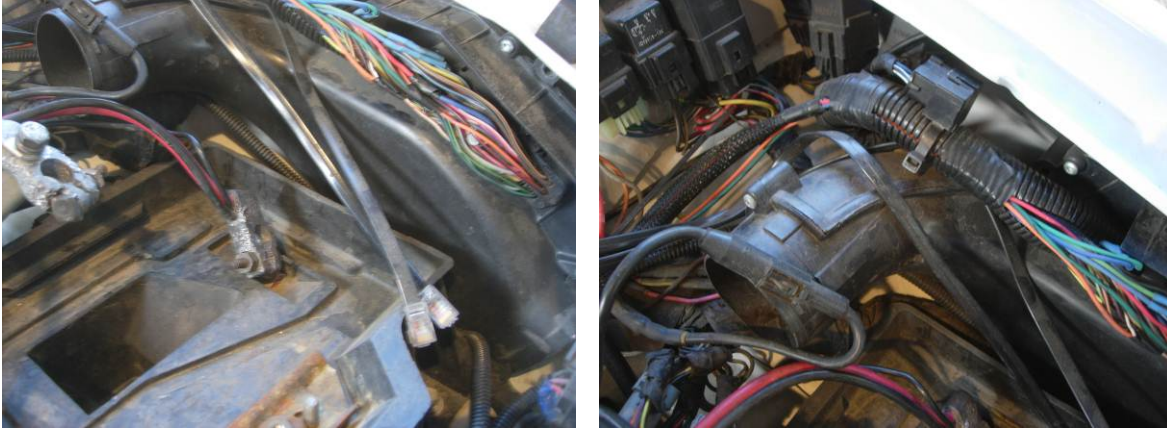
26. Reconnect the SBEC connector.

27. Route the **PURPLE** wire from the TCS Harness along the firewall, and around to the ABS controller. On some vehicles, this wire may need to be extended to reach. If so, use 18 gauge wire, appropriate for automotive use. (See pics below).

28. Remove the ABS controller connector (8mm screw will remain captive in connector).

29. Remove cover from connector by gently prying up the four retaining tabs.

30. Locate and tap the **PURPLE** TCS wire into the **YELLOW** wire in ABS Connector Pin 2. Use the crimp T-Tap connector or solder.

31. Replace connector cover, and reconnect connector to the ABS controller.

32. Inside the vehicle, locate a suitable location for the Map Switcher, and route its cable to it. Secure the Map Switcher with double-sided tape or Velcro, if desired. Connect the 2.5mm cable to it.

33. Be sure all of the wiring is neat, and will not interfere with the pedals, steering, or any other items in the car.

34. Replace and reconnect the battery.

35. Put the airbox back together.

36. Startup the vehicle, drive and enjoy. All units have been burned-in, bench tested, and are ready for immediate use. TCS is automatically operational with a launch limiter set at 4500, and a generic (medium aggressiveness) TCS map. For more information on TCS operation please see the operation manual/notes on the ND Performane website (http://www.ndperformance.com/) for the most recent information and software.
   If the vehicle does not start or operate properly we suggest double checking all of your connections (and this install document in its entirety), and if the problem persists contact ND Performance immediately.