Gauge Wiring For The '90-97 Miata

Thank you for purchasing the Track Dog Racing Gauges. There are many options as to which gauges you selected, but the wiring and the installation will be similar. Minor modifications such as clearances may be required to your dash area where the gauge panel will insert depending on the combination of your gauges.

The radio will be reinstalled into the lower section of the console. This will allow the gauges to be mounted higher for a better viewing. TDR offers a complete prewired kit option for those who would prefer simpler installation and includes color specific wiring, plugs and connectors and labels to simplify the wiring. The photo below shows typical kit components, but may not resemble your kit. The TDR kit also includes connectors, radio tool and tie-wraps. You may require more with your particular installation.

Here is a list of item and tools you may require for your installation depending on your gauge configuration.

Radio removal tool	Phillips screwdriver
Wire cutters and strippers	Soldering gun
3/16" shrink tubing	Extra wire for sensors, 20-22 gauge
Tee connection for water	Wiring connectors
Electrical tape	Tie-wraps
Dremel tool or other cutting device if needed	Vampire connections

REMOVE THE CONSOLE

1. Empty the console before proceeding. Remove the shift knob by turning counterclockwise. All year models 1990 to 1997 consoles are similar.

2. Remove the three Phillips screws in the console box and the cup holder as shown in Photos 1-B and 1-C.

3. Remove the two Phillip screws on each side of the console as show in Photo 1-D.

Photo 1-A: Remove the shift knob

Photo 1-B: Remove the Phillip screws from console

Photo 1-C: Remove the Phillip screw from cup holder

Photo 1-D: Remove the Phillip screws from each side of the console

4. Lift the console up at the front first and then away from the gas filler and trunk release switches at the rear as shown in Photos 1-E and 1-F.

5. Disconnect electrical connections as shown in Photo 1-G and place the console off to the side.

Photo 1-E: Lift the console upwards over the shift knob

Photo 1-F: Pull the console forward to clear the levers

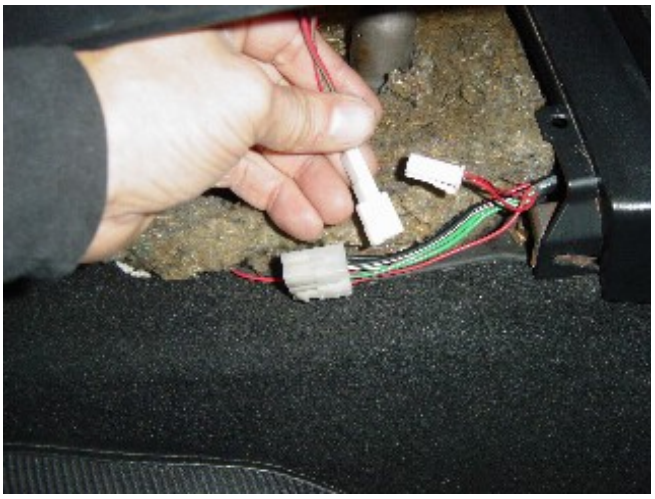

Photo 1-G: Unplug all electrical connections

REMOVE THE RADIO

6. Remove the two covers on the side of the radio using a small screwdriver as shown in Photo 2-A.
7. In order to remove the radio you will require a radio removal tool (included with the prewired kit). Put the shifter in 4th gear to provide more clearance during radio removal. Insert the tool into the two holes on the sides of the radio until they bottom out as shown in Photo 2-B.

8. Press the bars in and towards the side and then press outwards to release the spring clips and pull the radio out as shown in Photo 2-C.

9. Disconnect the wiring connectors and antenna plug. Set aside until the gauges are installed

Photo 2-A: Remove the radio covers on each side with a small screwdriver

Photo 2-B: Insert the radio removal tool on each side through the exposed holes


Photo 2-C: Push removal tools toward the outside


Photo 2-D: Remove wiring and slide radio out

REMOVE THE BEZEL

10. Remove the two Phillip screws at the bottom of the bezel as shown in Photo 3-A.

11. Using a small flat-head screwdriver gentle press out the vent rings as shown in Photo 3-B, it won't take too much effort. There are two Phillip screws up at the top inside the vent holes. Don't drop them.

Photo 3-A: Remove the lower Phillips screw on the lower left side

Photo 3-B: Remove the vent ring with a small screwdriver

Photo 3-C: Remove the Phillips screw at the top of the air vent on the right side

Photo 3-D: Remove the Phillips screw at the top of the air vent on the left side

12. Remove both of the Phillip screws as shown in Photos 3-C and 3-D.

13. The bezel can be removed now, there are a couple of spring clips holding it in as well. Start by pulling at the bottom as shown in Photo 3-E.

14. Unplug the headlight/warning switch wiring connector from the bezel as shown in Photo 3-F.


Photo 3-E: Remove the radio wiring

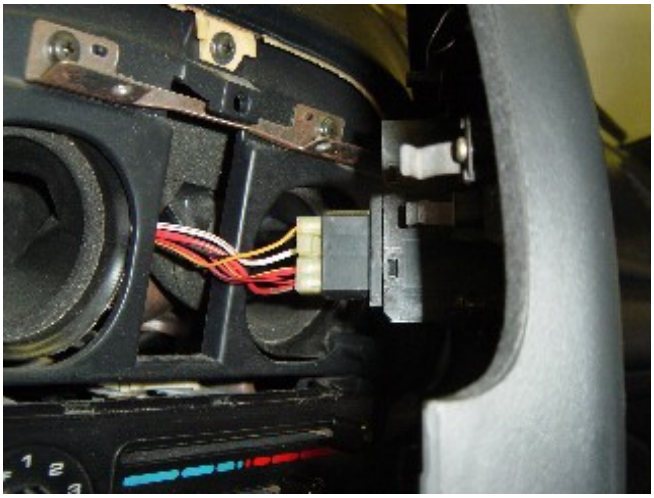
Photo 3-F: Remove the radio wiring

INSTALLING THE GAUGES AND RADIO

15. Remove the two Phillip screws on each side of the storage bin and remove as shown in Photo 4-A.

16. Insert the radio into the lower section of the bezel. Press the radio in until the clips are secure as shown in Photo 4-B.

17. Place the gauge panel in the bezel and insert the gauges as shown in Photo 4-C.

18. The gauge mounting brackets require modification so they can hold the gauge panel to the bezel. Modify as required on both sides and middle if necessary, depending on your gauge configuration.

Photo 4-A: Remove the Phillip screws from the storage bin and remove

Photo 4-B: Insert the radio into the lower section of the bezel until the clips are secure in the bezel

Photo 4-C: Insert one or more of the outside gauges

Photo 4-D: Modify the gauge mounting bracket to hold the gauge panel to the bezel

19. The gauge mounting bracket, depending on the manufacturer you use will be made of steel or plastic. Photos 4-D through 4-F show the Westach gauge installation.

20. If you purchased the TDR Gauge Kit then the gauges come prewired to the gauge panel. Because the gauge mounting bracket holds the gauge panel to the bezel you must remove or loosen the mounting brackets before inserting into the bezel.

21. Reattach the mounting brackets with the nut supplied. Don't over tighten as you could damage the gauge. If you remove a wire, refer back to Photo 4-G for placement.

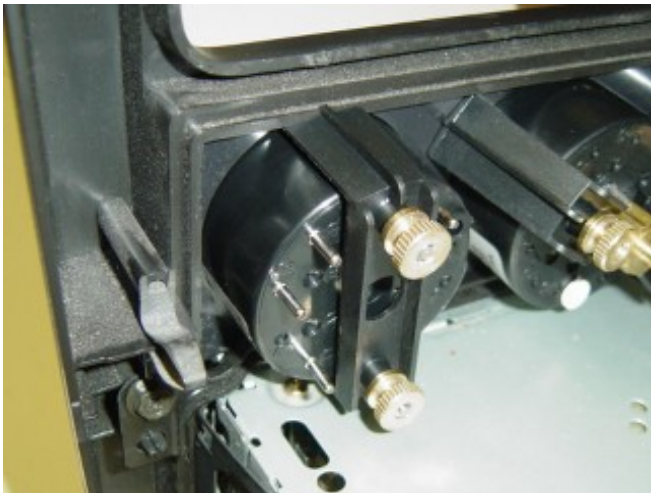

Photo 4-E: Gauge mounting bracket should press against the bezel to hold the gauge panel secure

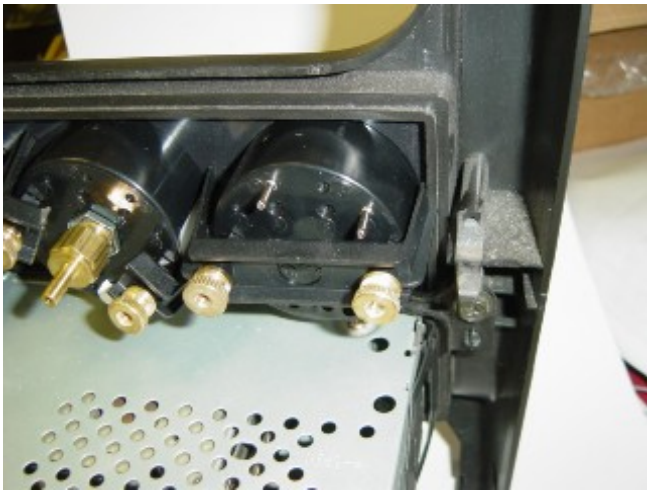

Photo 4-F: Similar mounting of the gauges on the opposite side

Photo 4-G: If you received the prewired gauge kit this would be a similar installation

Photo 4-H: After the gauge panel is secure, remove the radio from the bezel

22. Remove the radio from the bezel as shown in Photo 4-H. With the radio removed wiring is simplified during installation.

PULLING THE CABLES AND VACUUM HOSE

23. Feed the Sensor cables through the radio opening leaving the connecter out about 6 in. and under the driver's side dash area as shown in Photo 5-A. Run the wires safely under the dash making sure they will not interfere with your feet. Use supplied tie-wraps to secure when complete.

24. Cut a small slit in the firewall wiring boot next to the brake booster as shown in Photo 5-B.

Photo 5-A: Feed the sensor wires through the radio opening and toward the firewall

Photo 5-B: Using a knife, cut a slit in the firewall wiring boot

Photo 5-C: Bend a coat hanger and push into the cut

Photo 5-D: Pull the Sensor cables about 12" through the coat hanger loop

25. Bend a coat hanger 180 deg. to make a loop as shown in Photo 5-C and push it through the wiring boot about 4 inches.

26. Before you bring the cables though the firewall, make sure the Sensor cables are in the right place where they will not interfere with your feet. Put the Sensor cables in the coat hanger loop with about 12 in. of extra cable and pull though the firewall wiring boot as shown in Photo 5-D.

27. If you already have a vacuum hose being used for the JR Powercard or FM Voodoo fuel management unit then you can "T" into the existing vacuum tube. If not pull the vacuum tube in the same method as the sensor cables as shown in Photo 5-F.

Photo 5-E: Pull the coat hanger out along with the Sensor cables

Photo 5-F: Sensor cables and vacuum hose pulled through the firewall wiring boot

WIRING POWER TO THE GAUGES

28. Power source for the gauges will come from the cigarette lighter power leads. Remove the knee panel under the steering column using a Phillips screwdriver.

29. Reach behind the cigarette lighter and pull the connector plug off. Pull the connector toward the steering column where you will have access to the wires as shown in Photo 6-A.

30. The Power wires are the BLUE wire for the 12V Positive and the BLACK wire for the 12V Negative. Pull some of the electrical tape away from the wiring to access the wires.

31. The TDR Gauge Kit uses the RED wire for the 12V Positive, the BLACK wire for the 12V Negative.

32. Cut the wires and solder in the gauge power wires as shown in Photo 6-B. Attach the shrink tubing supplied over the soldered connections. Use a cigarette lighter to shrink the tubing.

Photo 6-A: Pull the cigarette lighter connector to the side for access for wiring

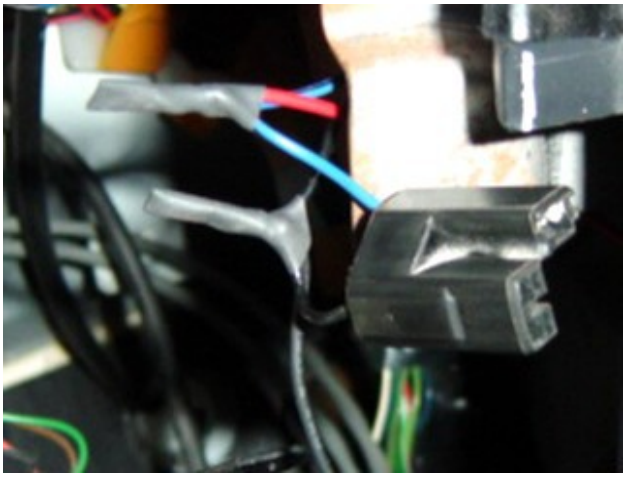

Photo 6-B: The power wires are the BLUE wire 12V Positive and the BLACK wire 12V Negative

33. The Lighting power source will come from attaching to the hazard warning light connector; polarity is not required. Locate the RED with BLACK TRACER and the SOLID RED wires on the connector as shown in Photo 6-C, there are side by side.

34. Pull the Lighting wires behind the A/C panel on the right side as shown in Photo 6-E.

35. Cut off any unnecessary length of the YELLOW wires from TDR Gauge Kit before soldering. Again there is no polarity in the light wiring.

Photo 6-C: Headlight/Warning connector

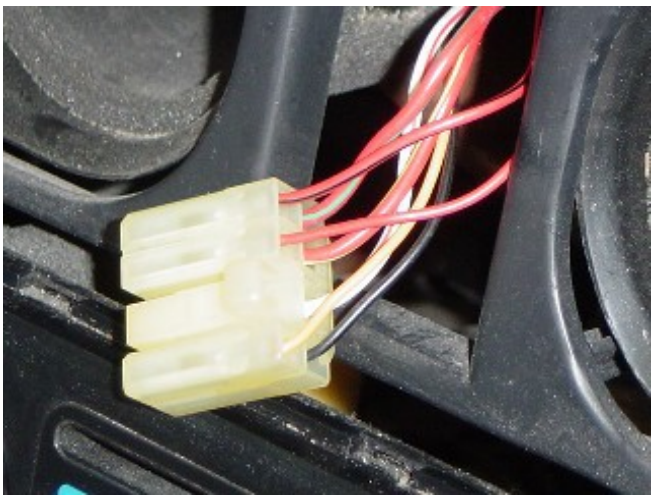

Photo 6-D: From the front view showing the two Light power wires

36. Cut off any unnecessary length of the YELLOW wires from TDR Gauge Kit before soldering. Cut the wires and solder in the gauge Lighting wires as shown in Photo 6-F. Attach the shrink tubing supplied over the soldered connections. Use a cigarette lighter to shrink the tubing.

Photo 6-E: Lighting wire pulled behind A/C panel on the right side

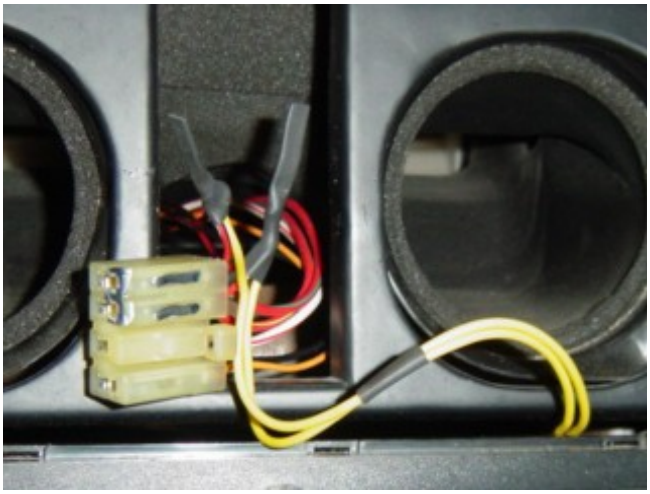

Photo 6-F: Lighting wire soldered to the connector

WIRING THE O2 SENSOR

37. The O2 Sensor wire has to be traced back to the ECU that is mounted on the panel behind the passenger seat as shown in Photo 7-D.

38. The TDR Gauge Kit uses a BLUE wire for the O2 sensor. Trace the BLUE wire toward the firewall.

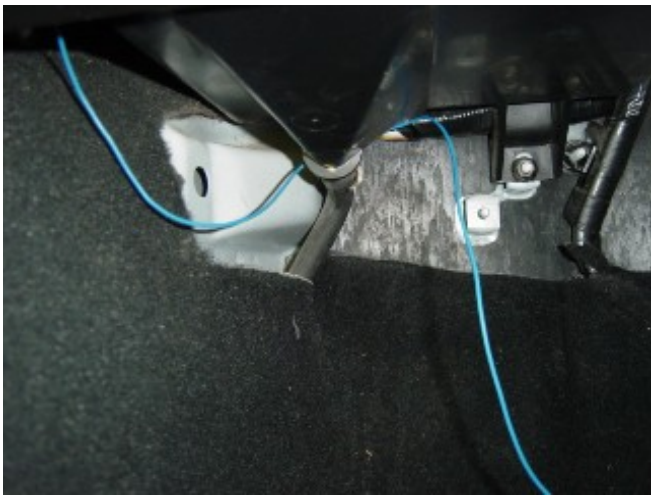

Photo 7-A: O2 Sensor wire traced though the floor board and under the carpet

Photo 7-B: O2 Sensor wire traced through the side sill after removing the side sill cover

39. Remove the side sill using a Phillips screwdriver and lay off to the side. Run the BLUE wire down the side sill toward the ECU as shown in Photo 7-B.

40. Pull the carpet back exposing the ECU. Use masking tape or some other means to hold the carpet out of the way of the ECU as shown in Photo 7-D.

41. There are either two or three terminal blocks on the depending on the year model, refer to Photo 7-E for different year ECU wiring options. The pictures shown in Photos 7-C and 7-D are from a '96-97 Miata. To remove the terminal block from the ECU, squeeze in the middle to release the latching mechanism.
42. The O2 sensor uses the RED with a GREEN TRACER on terminal 3-C for the '96-97 model shown in Photo 7-C. This wire however looks more like a blue tracer than a green tracer, but view the ECU wiring configuration included in Photo 7-E to determine orientation.

43. Cut off any unnecessary length of the BLUE wire before soldering. Attach the shrink tubing supplied over the soldered connections. Use a cigarette lighter to shrink the tubing.

Photo 7-C: O2 Sensor terminal block uses a RED with GREEN TRACER that is second from the end

Photo 7-D: ECU on the back wall behind the seat

DUAL FAN COOLING OPTION

44. You might want to consider wiring your fans together as well for added cooling efficiency. Apply a jumper wire between the two wires designated on the terminal connectors in blue in Photo 7-E. With the jumper connected, both fans operate together when cooling is required. Normally the passenger fan operates the A/C and or is activated when the temperature reaches a second set point level in the ECU. This connection parallels the two fan relay coil wires so the relays will continue to carry the full fan load. The '90-93 model can not be jumped with this method.

90-93 ECU WIRING

Oxygen Sensor Terminal 2N Red with Blue Tracer

1U R/B	1S L/O	1Q LG/B	1O G	1M *	1K LG/Y	1I *	1G BR/Y	1E Y/B	1C V	1A L/R
1V BR/W	1T *	1R B/G	1P L/Y	1N R	1L *	1J L/B	1H BR	1F W/Y	1D W/G	1B W/R

2Y *	2W L/O	2U Y	2S *	2Q L/W	2O R	2M R/B	2K LG/R	2I B/W	2G Y/L	2E W	2C B/LG	2A B
2Z LG	2X Y/R	2V Y/B	2T *	2R *	2P R/G	2N R/L	2L LG/W	2J *	2H R/W	2F *	2D B/LG	2B B

94-95 ECU WIRING

Oxygen Sensor Terminal 2N Red with Blue Tracer
Dual Fan Jumper Terminals 1L Black with Green Tracer and 2S Blue with White Tracer

1U R/B	1S L/O	1Q LG/B	1O G/B	1M G/R	1K B/LG	1I L/W	1G BR/Y	1E Y/B	1C V	1A L/R
1V BR/W	1T Y/R	1R Y	1P L/Y	1N R	1L B/G	1J L/B	1H BR	1F *	1D W/G	1B W/R

2Y G/W	2W L/O	2U Y	2S L/W	2Q L/W	2O R/W	2M R/B	2K LG/W	2I B/W	2G Y/L	2E W	2C B/LG	2A B
2Z G	2X Y/R	2V Y/B	2T LG	2R Y/G	2P R/B	2N R/L	2L L/R	2J LG/R	2H LG/Y	2F B/R	2D B/L	2B B

96-97 ECU WIRING

Oxygen Sensor Terminal 3C Red with Green Tracer
Dual Fan Jumper Terminals 1A Black with Green Tracer and 1B Blue with White Tracer

1U LG	1S *	1Q G/B	1O B/LG	1M G/R	1K LG/B	1I LG/Y	1G L/B	1E Y/B	1C V	1A B/G
1V *	1T G/L	1R G	1P L/O	1N *	1L BR/W	1J R/W	1H R/B	1F *	1D W/B	1B L/W

3O B/L	3M R/W	3K R/B	3I LG/W	3G L/W	3E *	3C R/G	3A *
3P L/Y	3N B/Y	3L R	3J LG/R	3H BR/B	3F R/B	3D R/L	3B R/W

4Y L/W	4W G/W	4U Y	4S *	4Q L/O	4O Y	4M *	4K *	4I L/R	4G Y/L	4E Y/B	4C B	4A B/LG
4Z *	4X G	4V Y/B	4T Y/R	4R BR	4P Y/W	4N BR/Y	4L B/W	4J Y/G	4H Y/W	4F W	4D B	4B W/R

WIRING COLOR CHART

COLOR	CODE	COLOR	CODE
Blue	L	Orange	O
Black	B	Pink	P
Brown	BR	Red	R
Dark Blue	DL	Purple	PU
Dark Green	DG	Sky Blue	SB
Green	G	Tan	T
Gray	GY	White	W
Light Blue	LB	Yellow	Y
Light Green	LG	Violet	V
Natural	N		

Photo 7-E: ECU wiring for different year models

INSTALLING THE BEZEL AND CONSOLE

45. Reverse the installation of the bezel and console. Install the bezel by snapping it back in.

46. The radio can be installed into the bezel prior to reinstalling, but make sure the wiring will not be an issue. The radio should easily push back in, if not check wiring interference and reinstall.

47. Install the two radio end covers and then secure the bezel and console. Take caution when reinstalling the two screws back into the air outlets as they are easily dropped.

Photo 8-A: Install bezel and place wiring up front for radio installation

Photo 8-B: Take caution when installing these two screws, as they are a little difficult to start

INSTALLING THE SENSORS

48. For air, water and oil sensors use the extension wire supplied with the TDR kit. Use the supplied tie-wraps to help attach the cable. Attach the sensor connector plug by soldering the wires and using the shrink tubing supplied. The sensors do not have polarity.

49. If you ordered the water sensor kit the temperature sensor attaches to the supplied tee fitting. The tee fitting uses 5/16" barb fittings for the water lines and pipe clamps to secure the hoses. The sensor is shipped loose in case you want to mount the sensor in another manor. Use either Teflon tape or pipe compound on the threads. The preferred water line runs from the bottom of the radiator thermostat housing over to the throttle body as shown in Photo 9-B.

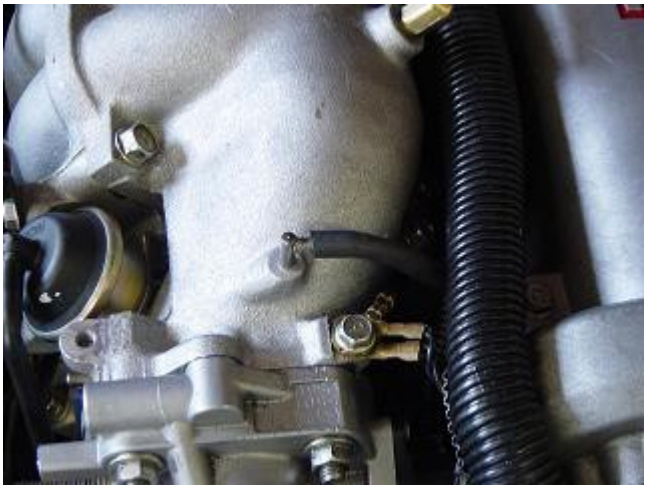

Photo 9-A: Vacuum fitting can be anywhere on the engine, but best nearest the throttle body opening

Photo 9-B: Water temperature comes from the Tee provided into the 5/16" hose

Photo 9-C: Air temperature sensor can be installed using a 1/8" NPT taped hole in the intercooler pipe

Photo 9-D: Oil temperature can be from a remote oil filter kit or by replacing the plug in the oil pump

50. The air temperature sensor uses a different type of open cell sensor that is 1" long from the 1/8" NPT fitting for faster temperature response. Do not use this style in a liquid application, as it will damage the sensor. Most pipes supplied with turbos and superchargers have a thick enough wall to thread in a 1/8" NPT thread for the sensor. You will require a drill bit and a 1/8" NPT tap for this application. Thread Locker works well as a sealer on the treads when you screw in the sensor as shown in Photo 9-C.

CAUTION: An NPT thread is a taper thread; do not thread all the way to the end of the tap. Tap about 2/3 of the tap length and then test the sensor in the hole. You want the sensor fitting to begin to get tighter after about 2-3 turns. On all of the sensors do not twist the wiring as you tighten down the fitting or wire breakage may occur.

51. Oil temperature sensing is limited to either a remote oil filter kit that has a spare fitting or using the oil pump clean out plug as shown in Photo 9-D. The alternator has to be removed for this application. You will need an Allen wrench to remove the plug and then thread in the new oil temperature sensor.

Below are some common readings you should see on your gauges that may be useful to you for a guideline.

Air/Fuel Ratio	Around 14.7 at idle and cruising, around 12 or greater at full throttle
Vacuum/Boost	Normally 15-18 vacuum at idle with increasing boost thereafter
Oil Temperature	Slightly higher than water temperature in normal driving. Temperatures around 250-275F in hard driving
Water Temperature	Normal around 180-200F. Temperatures around 225-230F during hard driving
Air Temperatures	Non-intercooled 180-210F considered high and you should resist hard acceleration; could cause detonation. Air to air intercooled ambient and up.

We hope you will be pleased with our products. If at any time you need assistance please feel free to contact us by phone or email us at ***support@trackdogracing.com***.

The Track Dog Racing Team