

## **TST Adjustable POWERMAX™ R45 Remote Installation Instructions**



Installation of the **POWERMAX™ R45 Remote** is very simple and requires commonly available tools. Velcro™ is supplied with the remote so that it can be fixed mounted in any easy to view and reach location. **TST** installs these remotes on the lip of the instrument panel to the left of the heating/air conditioning control knob. The remote may be tucked away out of sight in the ashtray or about any location as long as the remote cord will reach the plug-in connector on the **POWERMAX™** main computer.

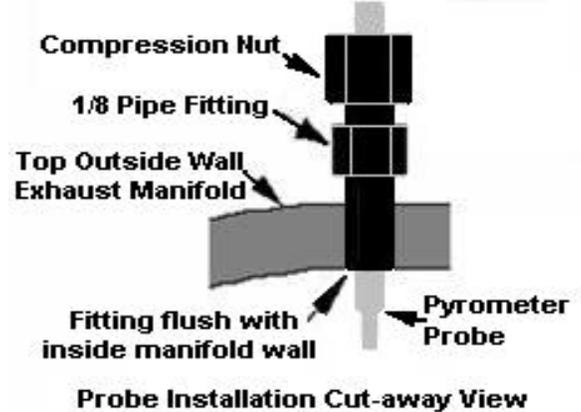
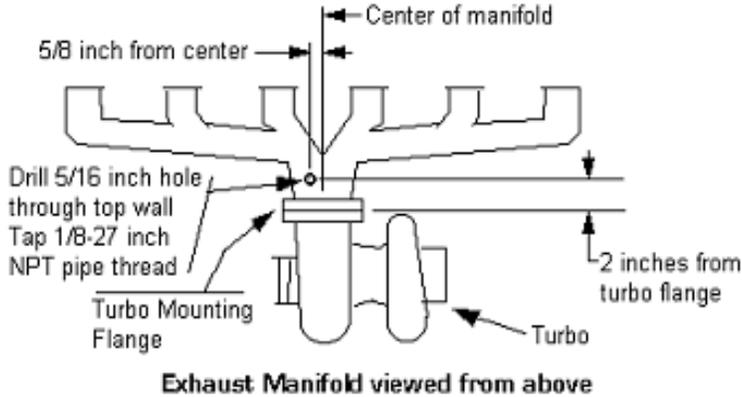
Once the desired location for the remote is determined, route the power cord so that it can be plugged into the phone-like connector on the back of the **POWERMAX™** main computer. Take care to avoid pinching the power cord against sharp metal edges under the dash. Avoid interference with throttle pedal, brake pedal, clutch, and parking brake linkages.

A thermocouple must be installed in the exhaust manifold for the **POWERMAX™ R45**

**Remote** to work properly. The following tools/items will be required to install the thermocouple probe: Electrical tape

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|-----------------------------------|------------------------------------|--|
| Medium #2 phillips screwdriver    | 5/16 inch or 8 mm wrench or socket | 3/8 inch or 10 mm open end wrench                |
| 1/2 inch or 13 mm open end wrench | Center punch and hammer            | Electric or air drill capable of 5/16 inch bit   |
| 5/16 inch drill bit               | Small mechanic magnet              | 1/8 inch tapered NPT pipe tap and holder for tap |

1. Locate the point to install the thermocouple probe. The best place is to locate the probe in the exhaust manifold about two inches before the turbo flange gasket surface toward the engine. The exhaust manifold is a split passage design with 3 cylinders feeding each passage and a vertical internal web separating the two passages in the center thus the manifold is solid in the center. Locate a point two inches from the turbo mounting flange centered on the exhaust manifold, then move forward or rearward on the manifold 5/8 inch and center punch for drilling. Drill 5/16 inch diameter hole straight down through one wall. Tap threads using 1/8-27 inch tapered pipe tap. Tap depth is important. The bottom of the thermocouple 1/8 pipe fitting should be flush with the inside of the exhaust flow path. Tap a few turns and try the fitting, then tap further until fitting bottom is flush with manifold wall.



- Use a small mechanics magnet that will pass through the tapped hole to the bottom wall of the manifold to retrieve drill and tap shavings. Clean shavings from magnet and search for more shavings until the magnet comes back clean.
- Install thermocouple 1/8 pipe fitting in hole and tighten with a 1/2 inch or 13 mm open end wrench. Using a 3/8 inch or 10 mm open end wrench insure the thermocouple is securely attached to the pipe fitting.
- Remove the terminal locknuts from the red and yellow wires of the thermocouple and attach the matching color to the end of the long thermocouple wire that has the red wire longer than the yellow wire. Slide the shrink-wrap tubing over the exposed terminals so they cannot short out against other metal under hood components.
- Route the lead wire toward the firewall taking precaution to keep it away from hot and moving parts. Route the wire next to the main wiring harness that runs along the top of the firewall over the top of the brake booster, and then through the firewall piercing a large rubber grommet in the firewall beside the brake booster canister. NOTE: Do **NOT** cut or splice the thermocouple lead wire as it is special wire that provides correct reading to the gauge. Simply coil any excess wire out of the way. If the thermocouple wire is too short, call factory for longer leads.
- From under the dash, retrieve the thermocouple long lead wire and attach the ring terminal ends to the appropriate ring terminals on the **POWERMAX™** wiring harness. Using the supplied screws and nuts, attach the **red** wire to the **negative** terminal and the **yellow** wire to the **positive** terminal.
- Cover the exposed wires, screws, and nuts with electrical tape.

Operation of the R45 remote is very simple. The **POWERMAX™** main computer should be installed first and tested to insure it is operating properly. Once the main computer is operating correctly, plug the remote power cord into the phone connector of the main computer. The switch on the main computer must be in the "on" position for the remote to show a power level. The temperature readout and the boost reading should work with the **POWERMAX™** turned on or off.

The R45 remote has three digital L.E.D. (light emitting diodes) that show exhaust temperature(EGT), boost(TURBO BOOST) pressure, and power level (if the **POWERMAX™** is switched on). A green fuel L.E.D. glows brighter as the **POWERMAX™** adds more fuel. If the switch on the **POWERMAX™** main computer is "off", the digital L.E.D. will be off (unlit). With key on and the main computer switched "on", the power level single digit L.E.D. indicates the power level setting with "0" being stock power and "9" being the highest power level. Use the green up arrow switch to move up one level at a time or the green down arrow switch to move down one level per push of the switch, the switch must be released between each level change. Levels "1" through "9" equally split the power increase. Power levels may be changed with the engine off or running at any speed/load.

It is recommended that the maximum exhaust temperature “Hi” be set at 1250 if the thermocouple probe is installed in the exhaust manifold. If the probe is installed after the turbo then the “Hi” temp should be set below 900. To set the “Hi” temperature, click the gray center button until the boost readout reads “Hi”. Use the up or down green arrows to move to the desired temperature then push and hold down the center gray button until the word save “SAU” appears. (Note: On older remotes if you press the gray button again, “Bnd” will show, this is user adjustable only on some older remotes). Press the gray button again and you are back to the main screen. When over temperature occurs, all decimal points flash on the temperature display to indicate the **POWERMAX™** computer is reducing added fueling to reduce temperature. If the boost pressure decimal points are flashing, the **POWERMAX™** computer is cutting stock power in an effort to maintain the proper temperature. If oversized injectors have been added the **POWERMAX™** may not be able to cut stock fueling enough to maintain a safe temperature.

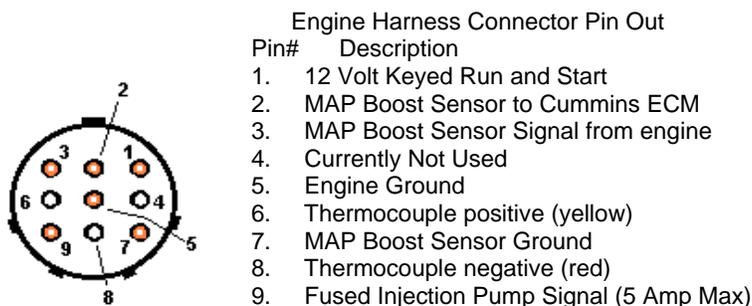
If the **R45 Remote** is unplugged from the main computer, the computer continues to operate at the last level used for power, temperature, and band. For example, if level “0” is indicated and the remote is then unplugged, the **POWERMAX™** main computer will not add any power. If level “5” is indicated and the remote is unplugged, the **POWERMAX™** main computer will stay at level “5”. If temperature was set at 1200 F then it remains at 1200 F.

#### TROUBLESHOOTING

Symptom	Check
R45 reads “2Hot”	Exhaust temperature above 1700 F or wire disconnected
Power cuts off early	“Hi” temp set too low. On older remotes, Band too small.
Remote will not change power level	Connection at injection pump is bad Fuse is blown in the <b>POWERMAX™</b> wiring harness
No yellow (boost) light on remote	Check Map in connection on Map harness
Red (power) light only at <b>POWERMAX™</b>	MAP voltage output too high (above 2 volts). No 12 volt key/crank is available.
No remote display	No 12 volt key/crank is available. No MAP sensor ground
No remote display of Power Level	<b>POWERMAX™</b> computer switched off at main computer
Green (fuel) light extremely bright Blowing 5 Amp fuse constantly	No MAP sensor ground No MAP sensor ground Loose Scotchlock™ connection at injection pump
Remote flickering very dim with <b>POWERMAX™</b> computer “off”	No or poor engine ground connection
Truck stumbles or runs rough while accelerating	Check for loose connection at injection pump wire Check lift pump pressure, must be 3psi or higher

Check all Scotchlock™ and grabbers very carefully. They often look like they're making contact, but are not. The best thing to do is disconnect all connections with Scotchlock™ or grabbers and use a Posi-Tap or solder the wires together.

Check the fuse. When you check the fuse it may look good but still be blown, so either check it with an ohm meter or replace it with a new one. Replace it with a 5 amp fuse.



The female side of the pin connector has terminals 1-9 engraved on the connector. Do not start truck while the **POWERMAX™** is not connected. With the key tuned to the run position, engine NOT running, check the following, with the **POWERMAX™** wiring harness unplugged in cab of truck, with a digital volt/ohm meter.

Using Pin# 5 as ground, Pin# 1 should measure battery voltage 11 to 14 volts DC. If no voltage, check the 12 volt Scotchlock™ connection between the **POWERMAX™** wiring harness and the vehicle harness underhood.

Using Pin# 5 as ground, Pin# 9 should measure battery voltage 11 to 14 volts DC. If no voltage, check the Scotchlock™ connection at the injection pump, and the fuse in the **POWERMAX™** main wiring harness.

Using Pin# 8 as ground, Pin# 6 should measure less than .0085 volts or 8.5 milli volts if temperature is below 400 F.

Using Pin# 7 as the ground, Pin# 3 should measure 1.05 volts DC on 2001 vehicles and 0.5 volts DC on 1998-2000 vehicles.