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ipd Fuel Ratio Control, by TS⁴

1. Installation

   A. Install the modified Bosch fuel control unit in the original location, then connect the large cable harness, slide on the cover, and clamp the cable in place.

   B. Install the remote control box in a convenient location, and route the two-wire cable down to the Bosch fuel control unit. You may trim the cable shorter if needed, or lengthen it by splicing if desired (carefully!). If you do "adjust" the length of the cable, it is suggested you "tin" (apply a solder covering) the end of each wire to avoid the hazard of stray wire strands touching the case.

   C. Remove the small component attached to the two external binding posts on the control unit (you might want to keep it -- by taping it to the box, for example). This little component is called a "resistor", and when connected across the binding posts as it was, it makes the Bosch unit "think" there is a remote box attached to it, set to "Normal". If you lose it and need to replace it, the value you need is 9.1K (9,100) ohms.

   D. Now attach the wires, one to each binding post (it does not matter which wire goes to which post), by loosening each post cap, inserting a wire into the small hole in the metal center shaft, and closing the cap down until it holds the wire securely in the hole. Use your hand only: more than finger tight can break the binding post.

2. Operation

   The remote box allows adjustment from -10% of normal mixture up to +30% of normal mixture, assuming a proper fuel pressure setting. Simply turn the dial to the position desired. PLEASE BE CAREFUL! TOO LEAN A MIXTURE CAN SEVERELY DAMAGE YOUR ENGINE!

   If one of the wires becomes broken or disconnected, the control unit will act as if the remote box is set to +30%. If you cannot find the problem quickly, replacing the small shipping resistor you saved (did you?) will allow a "Normal" fuel mixture until you can get service.

3. Theory

   The Bosch control unit is designed so that no injector can be on more than 50% of the time. Because of that, there is a saturation limit that will be reached at some RPM level, where the time available for each injector to fire is not sufficient to deliver the fuel desired. If the desired operation of the engine requires greater enrichment than is possible because of saturation, the fuel pressure must be increased to compensate. Using the table to the right, you can see that as fuel pressure ("XX psi") is increased, the dial setting ("DIAL") required to obtain a given percentage of enrichment is lower, resulting in a higher saturation RPM limit ("RPM"). Choose carefully if you decide it is necessary to increase fuel pressure, and test the results carefully with appropriate performance tests.

DIAL	RPM	26 psi	28 psi	30 psi	32 psi	36 psi
-10%	8670	-17%	-10%	-4%	+3%	+15%
-5%	8210	-12%	-5%	+2%	+8%	+21%
Norm	7800	-7%	Norm	+7%	+14%	+28%
+5%	7430	-2%	+5%	+12%	+19%	+34%
+10%	7090	+2%	+10%	+17%	+25%	+40%
+15%	6780	+7%	+15%	+23%	+31%	+47%
+20%	6500	+11%	+20%	+28%	+36%	+53%
+25%	6240	+16%	+25%	+34%	+42%	+60%
+30%	6000	+20%	+30%	+39%	+48%	+66%

4. Warranty

   This fuel control box was modified as **supplied to us by you** -- that is, old and used. As such TS⁴ warrants the **modifications** made to your fuel controller for one year, exclusive of consequential damage or loss of use, and subject to state and federal law. If your unit fails because of the age of the original components, we will attempt to effect repair, but cannot guarantee the continued performance of the original components in the Bosch unit. No liability is assumed by the manufacturer, except for the repair of either the remote control box or the modifications in the fuel control unit, should either or both be found defective. *ipd* did not participate in the manufacture of this device and therefore does not participate in this guarantee, although the original design is owned by them.

FINAL WORDS: This mixture ratio control modification has been added to the fuel control unit to assist the user in engine experimentation only. The manufacturer claims no responsibility for the results of using this control. In particular, the user is responsible for compliance to any applicable pollution control regulations, as well the protection of his engine from damage by running with too lean a fuel mixture.