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Adjusting Fuel/Air Ratio on a tii

[Your goal is to match up the injection pump arm (fuel) to the throttle butterfly (air) to get the correct fuel to air ratio.]

I. Introduction

Years ago I developed a very good method for adjusting the correct fuel/air ratio on a tii. If you own a tii save this article — put it in your glove box, tape it to your mechanic's chest, just don't throw it away. This information is not available in any manual and it will solve almost all of your running problems that are mixture related. I can't count the times we have had customers come to us with their tiis, after having been told that they need to replace the mechanical injection pump. In virtually every case these cars were restored to correct running order by using the following method. We have never needed to replace a Kugel fisher injection pump and I've seen many tiis with well over 150,000 miles. The pump is virtually trouble free and is a jewel of engineering.

II. Your Goal

What you are trying to do is to synchronize the injection pump arm (fuel) to the throttle butterfly (air) to get the correct fuel to air ratio.

III. Preliminaries

To get the pump arm and the throttle butterfly to match up, there can be no play or slop in the linkage at the ball and socket joints, and the throttle shaft bushing can not be worn out. I've seen manuals that make a big deal about exact linkage arm length, it's not that big of a deal, just get it in the ball park. Before you start adjusting the fuel/air ratio you should make sure your timing is set correctly. (See Captain Says)

IV. Understanding the Adjustment Mechanism

- Just above the throttle butterfly, next to the cold start injector you will see a cover plate (about 78mm/3" dia.) held on by 2/5mm bolts with 8mm heads.
- Unscrew the two bolts and remove the cover plate.
- With the engine *not* running operate the accelerator linkage up by the back firewall. You will observe that the half-moon cam will push up against an intermediate arm with an adjustment screw and it moves the throttle butterfly arm.
- At rest the half-moon cam should be close to aligned with the edge of the pin hole below it. (See illustration)
- Air adjustment: If you study the illustrations you will see that the butterfly adjustment screw moves the butterfly's position and therefore changes the air delivery.
- Fuel adjustment: The cam sets up the fuel delivery because it is indirectly linked to the injection pump arm. A shaft (about 100mm/4") connects the cam to an adjustable arm located between the curved intake pipe on #2 cylinder. The cam's position, to increase or decrease fuel delivery, can be changed by loosening up the 6mm bolt (10mm head) and changing the position of the arm.
- Idle adjustment (fuel/air): You will notice that the idle is adjusted by moving the cam and butterfly at once via an

adjustment screw that pushes against the cam.

V. Adjustment (*Synchronizing the injection pump to the butterfly*)

The first thing we want to do is to find the correct running range for the butterfly at idle 1000rpms and at 3000rpms.

- Start the engine up and hold it at a steady 3000rpms.
- Turn the adjustment screw, located in the intermediate arm, clockwise (opening up the butterfly) until you hear the idle 'zing' up (this may not happen, instead the idle might die off), at this point the system is running too lean.
- Now, back off the screw (counter-clockwise) closing the butterfly. You will hear the engine run smooth for about 3/4 to 1 turn and then die off, at this point the engine is running too rich.

[Note: finding the rich point is normally quite easy, but finding the lean point can sometimes be a little tricky.]

- Having found the rich point, turn the screw in (clockwise) about 1/3 to 1/2 turn. This should be the setting you are looking for. Make a mental note of where the adjustment screw is and remember its position.
- Bring the car down to an idle of 1000rpms and repeat the above procedure.
- After finding your correct idle setting, see if it matches fairly closely (less than 1/4 turn) to your 3000rpm setting. If you have a match you are almost

done and you just have to set the idle.

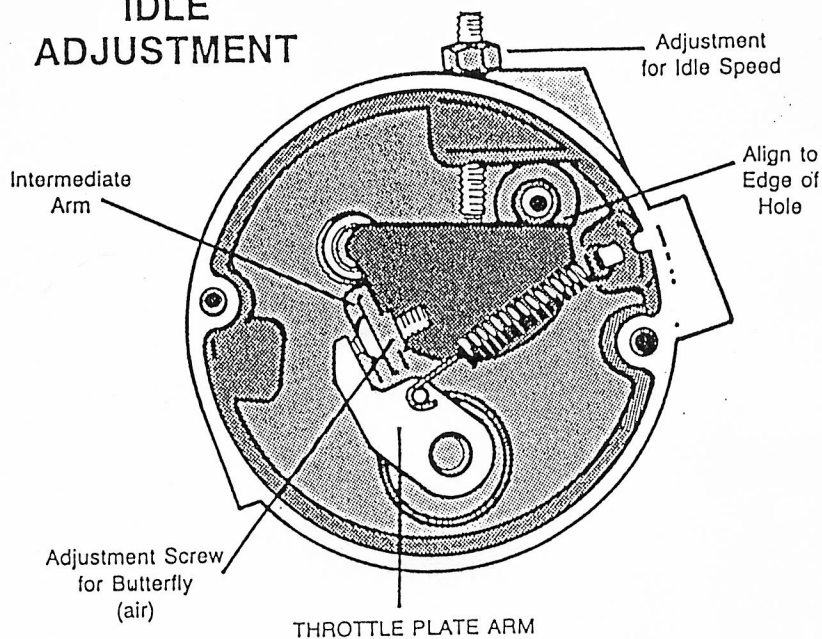
VI. If you didn't get a match up.

- If you fail to get a match you will have to change the position of the cam (fuel adjustment) by loosening up the nut and bolt that hold the cam arm into position and moving the cam.
- Adjust the cam until you produce a fairly close match (less than 1/4 turn).

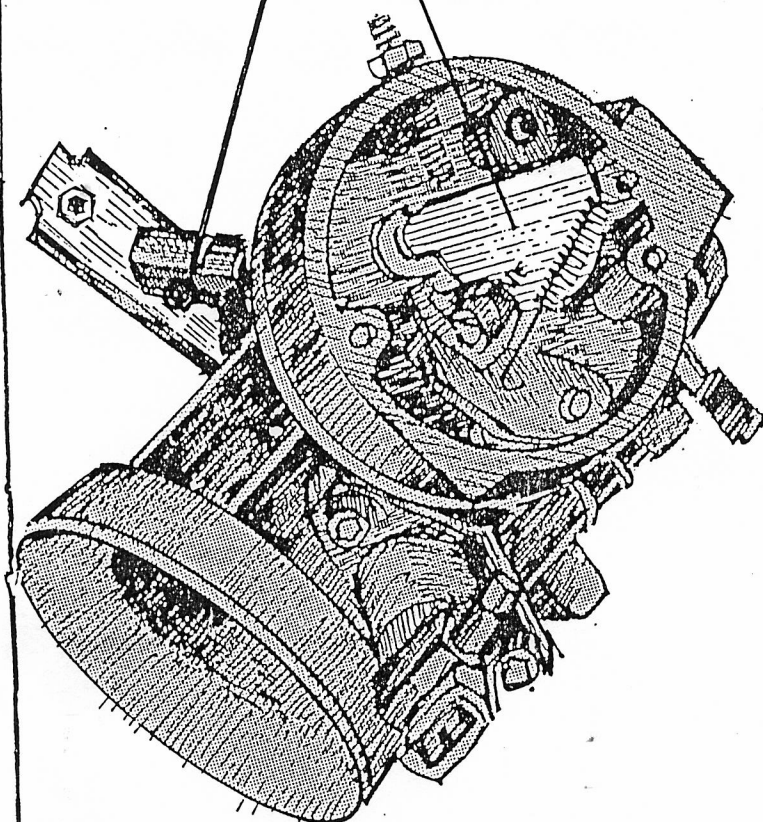
VII. Adjust idle (fuel/air)

The idle adjustment can be done externally by adjusting the 6mm screw that pushes against the cam. Simply loosen the locking nut with a 10mm wrench and adjust the idle screw and lock down the setting.

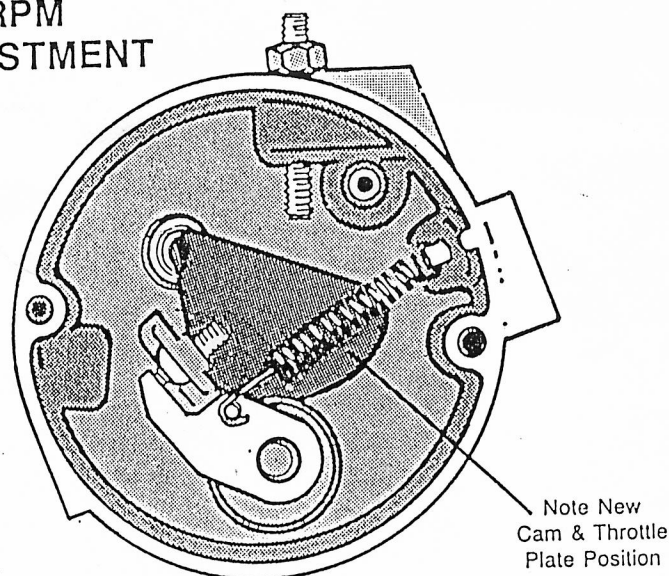
IDLE ADJUSTMENT



Adjustment Screw on Lever — Controls Cam Position (i.e. injection pump fuel delivery)



3-3500 RPM ADJUSTMENT



CAPTAIN SAYS

I should also warn you that a fair number of early tiis (1972-1973) that we've worked on will like to start advancing at idle because the centrifugal advance springs have lost their original tension. When this happens, idle rpm will change from one point to another. For example, if you set the idle at 1000 rpms and then rev up the engine, when the engine comes down it may settle in at 1200 rpms and if you rev it up again the idle may change to 900 rpms.

To fix this problem, you will need to bend the tabs back that hold the centrifugal advance springs (to stiffen the springs) or pull the distributor apart and clip a couple of coils off the springs or replace the distributor.