

Pinzgauer 710/712 Independent Throttle Body EFI Project

Design Objectives:

- 1) Improved startup/drivability
- 2) Altitude fuel mix compensation
- 3) Complete engine control of both fuel and ignition
- 4) Possible closed loop feed-back
- 5) Use OEM system that is both sized correctly and available for low cost
- 6) Hands-on learning experience of modern engine management techniques

Previous EFI limitations:

Single throttle body designs require extremely sophisticated plenum designs that are difficult to attain proper air flow modeling with the physical restrictions of the Pinzgauer motor envelope.

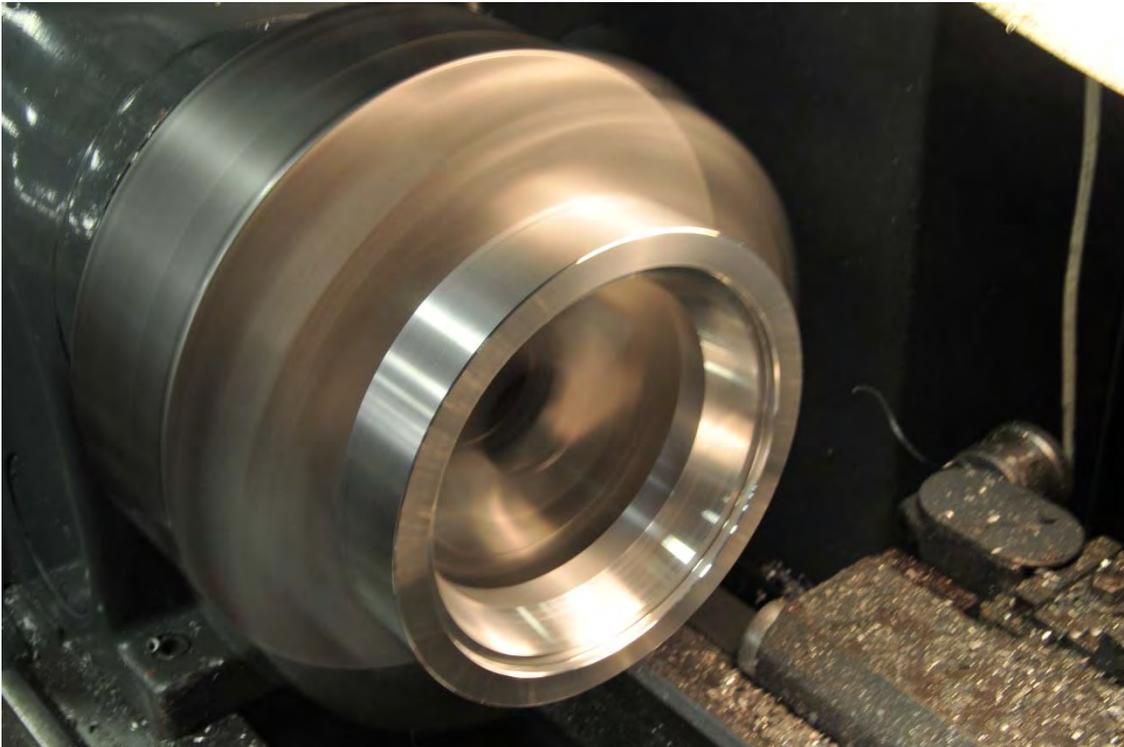
Most use expensive branded stand-alone ECU systems.

Design Approach:

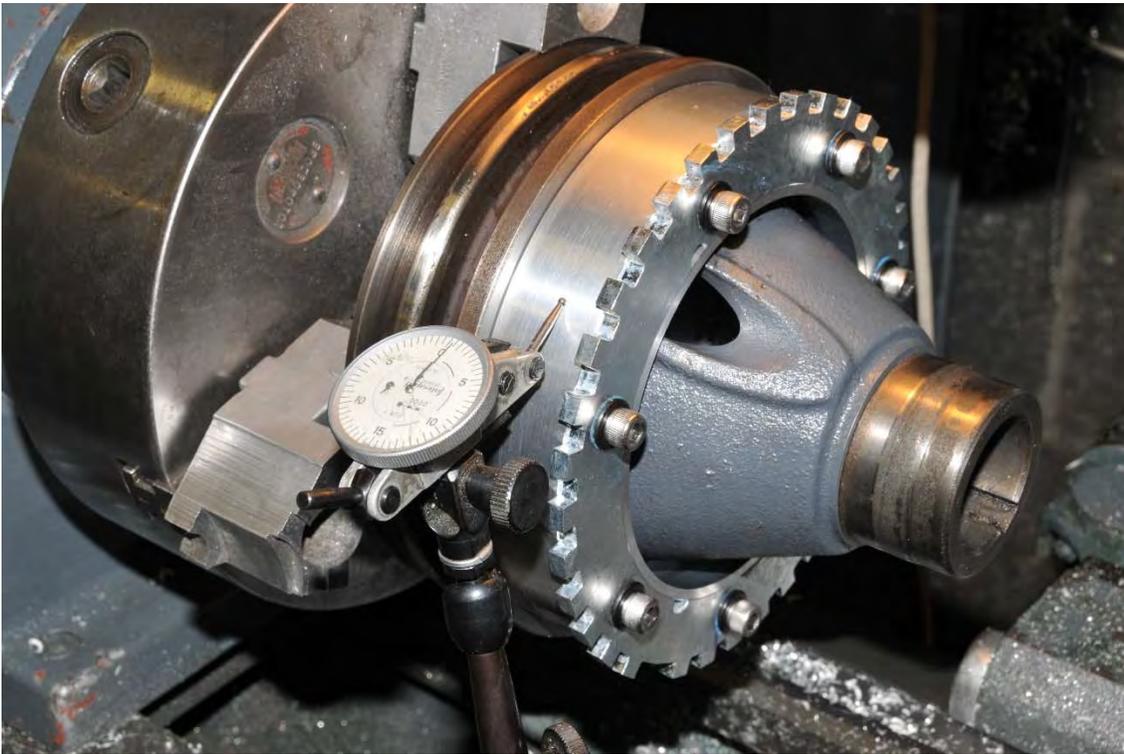
Use an available OEM throttle body assembly sized for the Pinzgauers' volumetric efficiency. The stock carburetors use a 36mm diameter throttle openings so I found a modern motorcycle throttle body assembly of the same size that contains all the injectors, MAP, TPS sensors and ICV already. The primary injector size is 275cc, perfect for the Pinz. Fabricated parts include intake manifold, crank trigger bracket, 36-1missing tooth crank ring, throttle bracket and intake plenum.

As with the over-drive project, the use of captioned photos tells the story more effectively:

Turning the crank adaptor to mount the missing tooth ring



Mounted ring checking run-out (less than .001 TIR)



Machining bung holes in each header pipe to run four narrow-band O2 sensors



Welding on bungs



Finished header



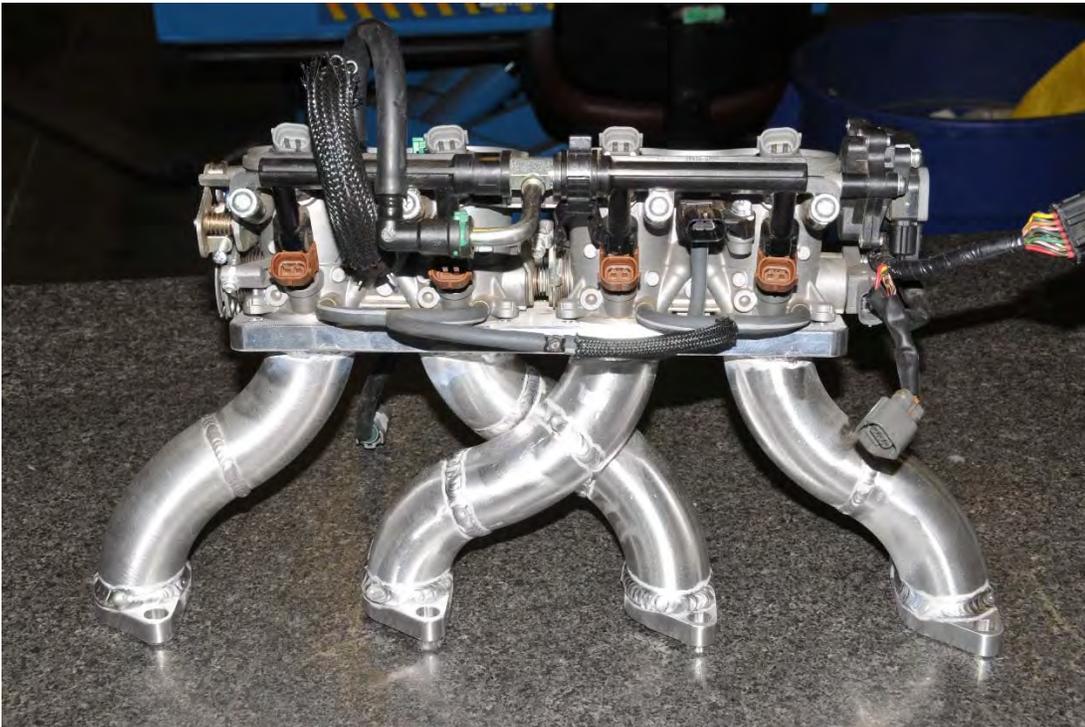
Intake manifold and fixture design



Fabricating intake manifold in special fixture



Completed manifold with ITB assembly fitted



Modifying the air shroud opening to accommodate the manifold



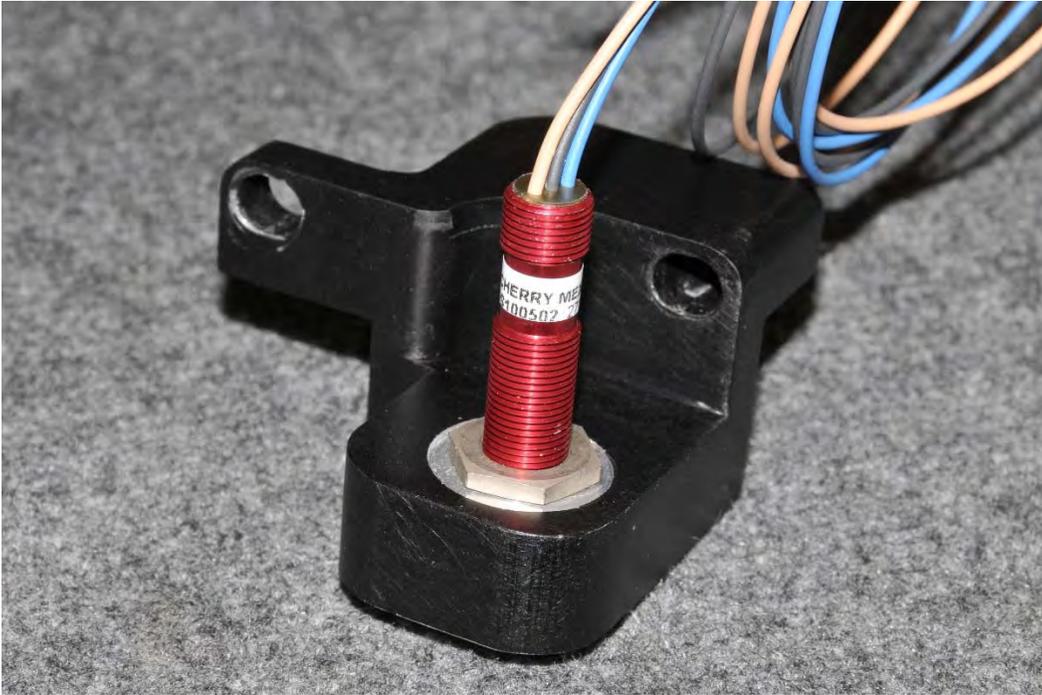
Manifold after Type 3 hard-black anodizing



Top view of ITB. Nice complete OEM set-up for less than \$150 complete!!



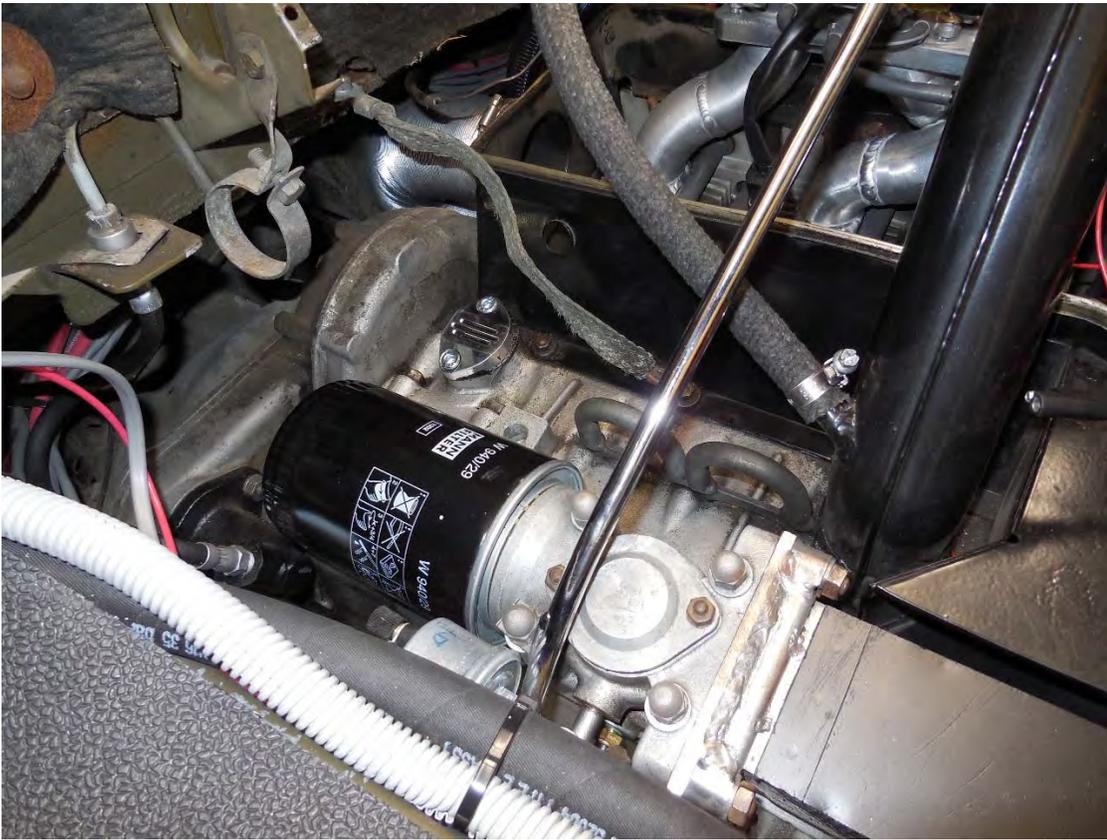
Crank sensor bracket with sensor. This must be extremely robust to avoid missed sync under all conditions (water, mud, etc.)



Fabricate and install Torlon bushings to tighten up gas pedal linkage (needed to get full rotational travel)



Remove and block off stock fuel pump



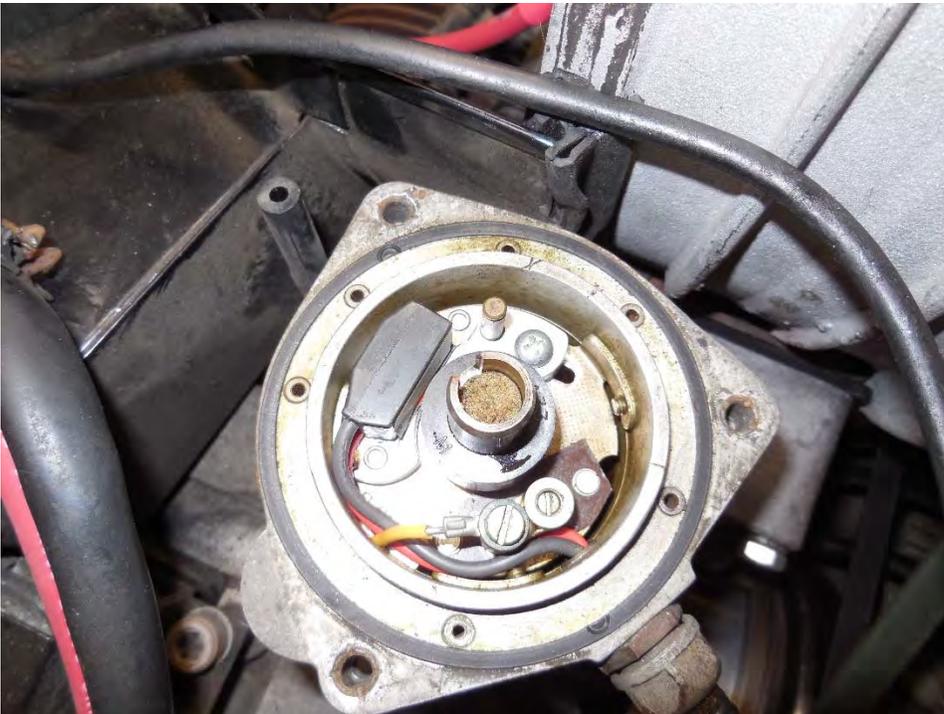
Mounting Bosch electric fuel pump (drill and tapped bell housing M8) Completely protected location



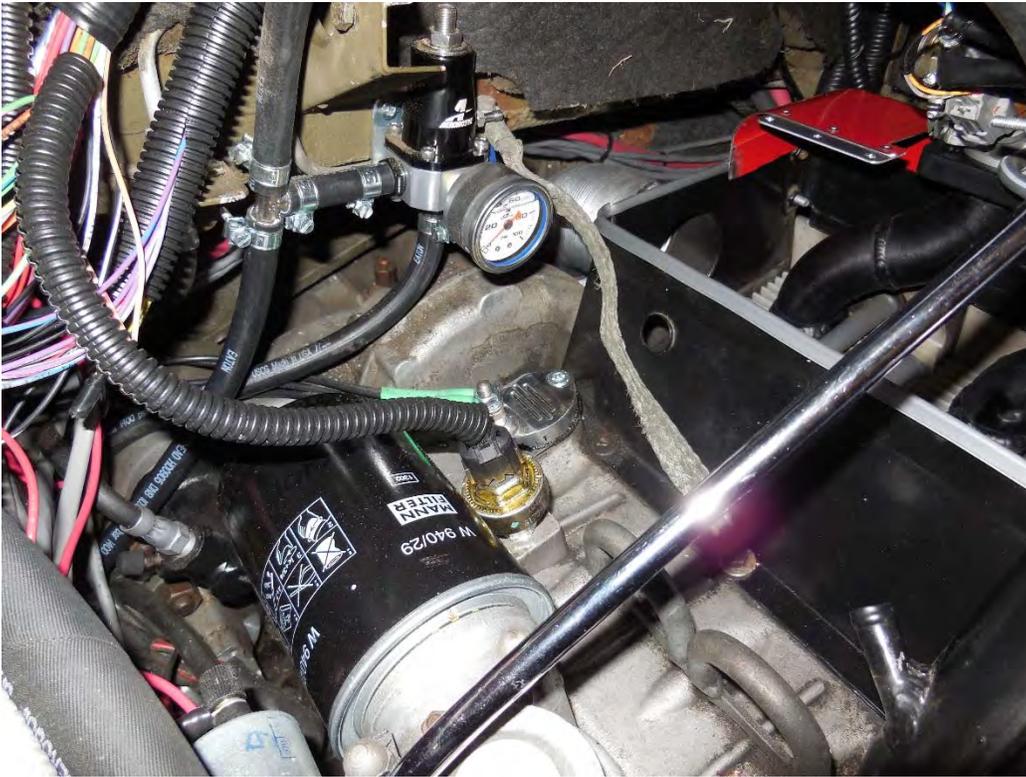
Mounting ECU behind driver's seat



Dis-assemble distributor and lock mechanical advance in-place. Remove 3 magnets from magnet ring of Pertronix (the black plastic ring is actually 2 pieces. Separate and remove 3 of 4 magnets) This becomes the cam timing sensor for fully sequential ignition. Adjust to sense magnet just after crank sensor sees missing tooth so ECU knows where TDC is.



Mount Aermotive fuel regulator and gauge. Plumb to manifold line for auto pressure compensation



Notice knock sensor mounted to engine block

New ambulance dual port fuel pick-up mounted to a flushed and sealed fuel tank



Mounting temp sensor in oil pan



Comparing each cylinders' air/fuel ratio with O2 sensors. Equal length intake runners insure equal response and AF ratio

