

Team 3: Development of an Intake Alignment Device

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Project Scope

To develop a device to optimize the process of aligning the intake manifold to the engine block on a nitro methane TOP fuel dragster so that they are flush and parallel to each other in order to save rebuild time.

Background

- NHRA allots only 20 minutes to rebuild the entire engine, while the Cummins team takes 30 seconds to align the engine.
- Top Fuel engines require the intake manifold and the engine block to be flush and parallel to each other.
- If both components are not flush and parallel pressure difference can cause catastrophic failure.

Current Project Design

- Prototype with 4 digital indicators to ensure all bolts are to the same height.
- 4 RGB LEDs, one for each indicator to tell the user which bolt is unlevel.
- Switch, to zero all indicators at once along with power on/off switch.
- Test rig for prototype that resembles mock manifold and mock engine block along with spacers to change manifold elevation.

Project Constraints

- Fast and easy to use interface
- Accurate to 0.005"
- Standalone device

Test Rig

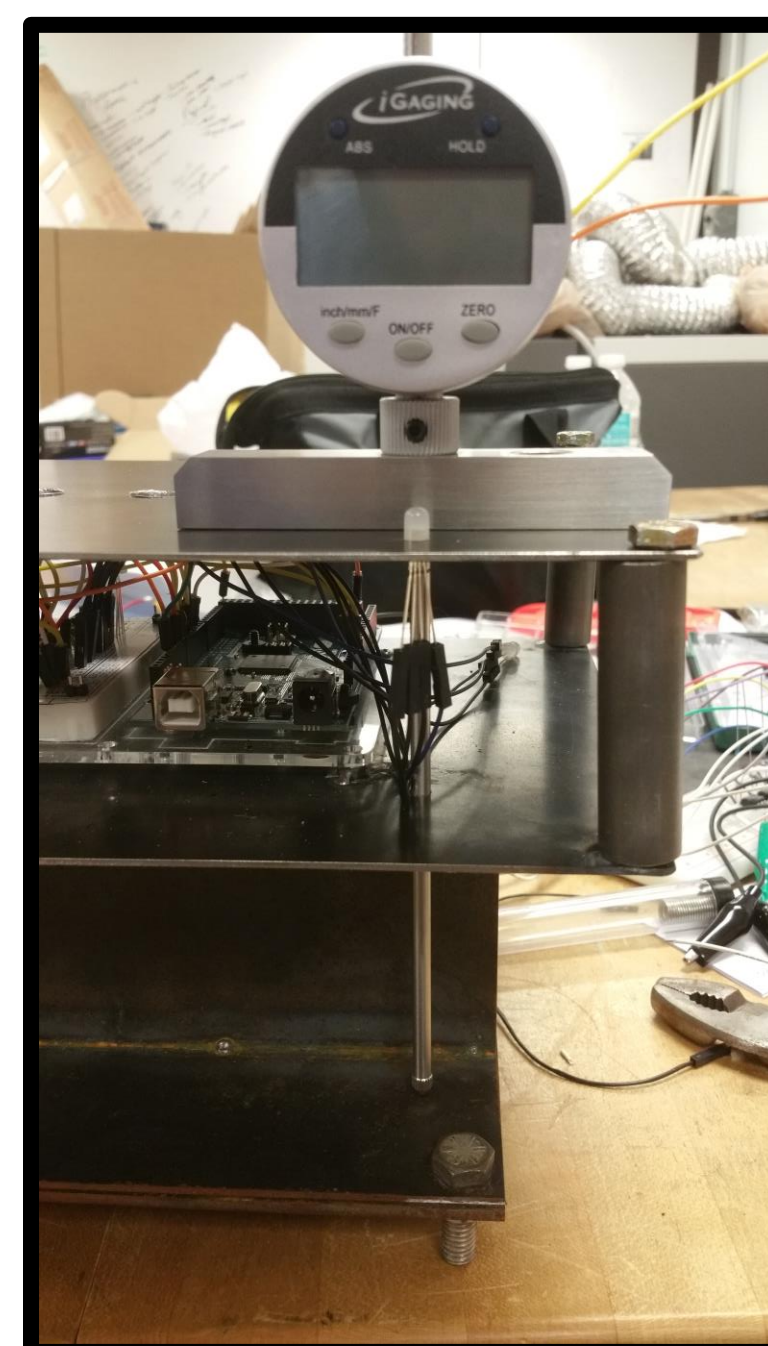


Not flush and parallel between engine block and intake manifold



Flush and parallel between engine block and intake manifold

Prototype



Single indicator on prototype



Prototype on top of test rig

Summary

- Fast accurate prototype that ensures the intake manifold and the engine block are flush and parallel
- Test mock engine for proof of concept that changes the elevation of the intake manifold.
- Accurate to 0.001"

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