MISHIMOTO

ENGINEERING REPORT

2017+ Honda Civic SI Performance Air Intake | SKU: MMAI-CIV-17SI

By Ye Liu, *Mishimoto Product Engineer*

REPORT AT A GLANCE

- **Goal:** To create a high-quality intake for the 2017 Civic SI.
- **Results:** Performance gain at higher RPM range. Improved intake sound compared to the stock system. Safe to run on stock vehicle without a tune. High-flow conical air filter provides increased airflow to the engine. Enclosed airbox blocks radiating engine bay heat.
- **Conclusion:** Dyno testing showed consistent horsepower and torque gains at a higher RPM range with max gains of 4.26 hp and 4.33 ft-lb over the stock intake system.

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DESIGN OBJECTIVES

The design requirements assigned to this project are as follows:

- Design to create performance gain while maintaining safe air/fuel ratio without custom tuning
- Durable design that will last the life time of the vehicle
- Easy bolt-on installation without any permanent modification done to the vehicle
- High-quality intake tone
- Compatible with larger aftermarket intercooler pipe

MATERIAL SELECTION

Steel heat shield, aluminum CNC-machined mass airflow (MAF) sensor adapter and housing, steel wire-reinforced silicone hose.

DESIGN AND FITMENT

Our design process started with taking the stock intake apart, thoroughly investigating the system, and searching for room for improvement. The stock intake system consists of a short rubber hose, an enclosed airbox, and a sound resonator that connects to the bottom of the airbox with a rubber grommet and is bolted onto the lower frame. Fresh air comes through the front grille and then makes its way over the top radiator support. The stock intake does not have ducting to guide ram air directly into the airbox. Instead, there is a "scoop" on the top half of the airbox facing the front of the vehicle, capturing the fresh air. An experiment was carried out to investigate exactly which location has the most air feed, and how we can take advantage of this "over the top" air. Mishimoto engineers first removed all the panels from underneath the vehicle. Then, with the vehicle on a lift, we set up a powerful blower, feeding air directly at the front grille. With the hood closed and the engine bay accessible from underneath, we could feel around and determine the fresh air entry location on top of the radiator cover. This experiment showed that the width of the stock airbox scoop only covers a third of the fresh air stream width. The rest can escape from the airbox and into the hot engine bay, thus being wasted. We improved this in the Mishimoto intake design by incorporating a much wider inlet port to utilize most of the fresh air supply.

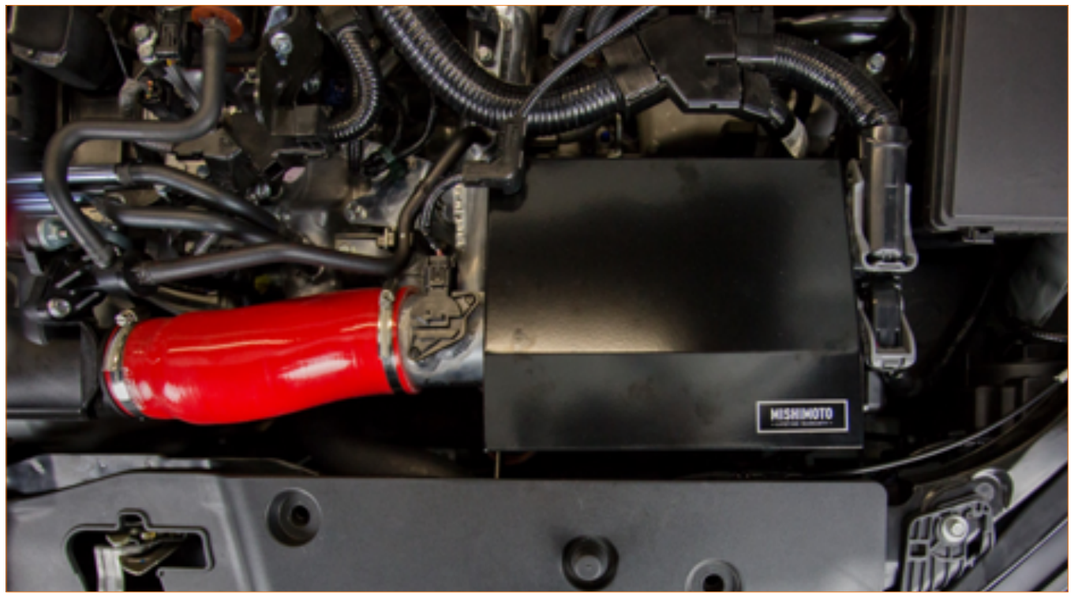

FIGURE 1: *Mishimoto intake prototype.*

FIGURE 2: *The Mishimoto intercooler piping showed power and torque gains when compared to the stock piping.*

The Mishimoto airbox was mounted on all the stock hardware, with an extra rubber isolator that bolted to the front upper frame for complete vibration isolation and allowing engine movement. A short ram silicone hose was created to maximize internal volume and remove restriction caused by the corrugated part on the stock rubber hose.

The most important part of the Mishimoto intake R&D is the MAF housing design. By calibrating the sensor location and housing's inside diameter, we achieved a good balance between performance gain and safe air/fuel ratio on a stock tune. In this step, several MAF housing designs were created and tested until we found the perfect configuration.

SOUND TESTING

Intake sound is one of the most important features of a performance intake. The Mishimoto performance intake lends a loud, throaty, and aggressive intake tone that is pleasing to the ear, and pronounces the sound of turbo spool. More information on the R&D process for this performance intake can be found on the Mishimoto engineering blog:

MISHIMOTO ENGINEERING BLOG

PERFORMANCE TESTING

Performance testing was carried out on our in-house Dynapack™ dynamometer. Testing day temperature was 76˚F and humidity 39%. All dyno runs were conducted in 4th gear and dyno mode. The Mishimoto intake created consistent power gains with almost identical air/fuel ratios compared to stock. The dyno results, both performance gains and air/fuel ratios, can be found in Figures 4 and 5. The results shown are average data curves of multiple dyno runs. We do not take the highest or lowest dyno runs to prove artificial gains. Flow bench testing also showed (Figure 6) that the Mishimoto intake is 37% less restrictive than the stock intake. What this means is that the engine will "breath" much easier with the Mishimoto intake, and that there is considerable potential for more power when the vehicle is custom tuned.

FIGURE 3: *Engineering vehicle getting ready for the dyno.*

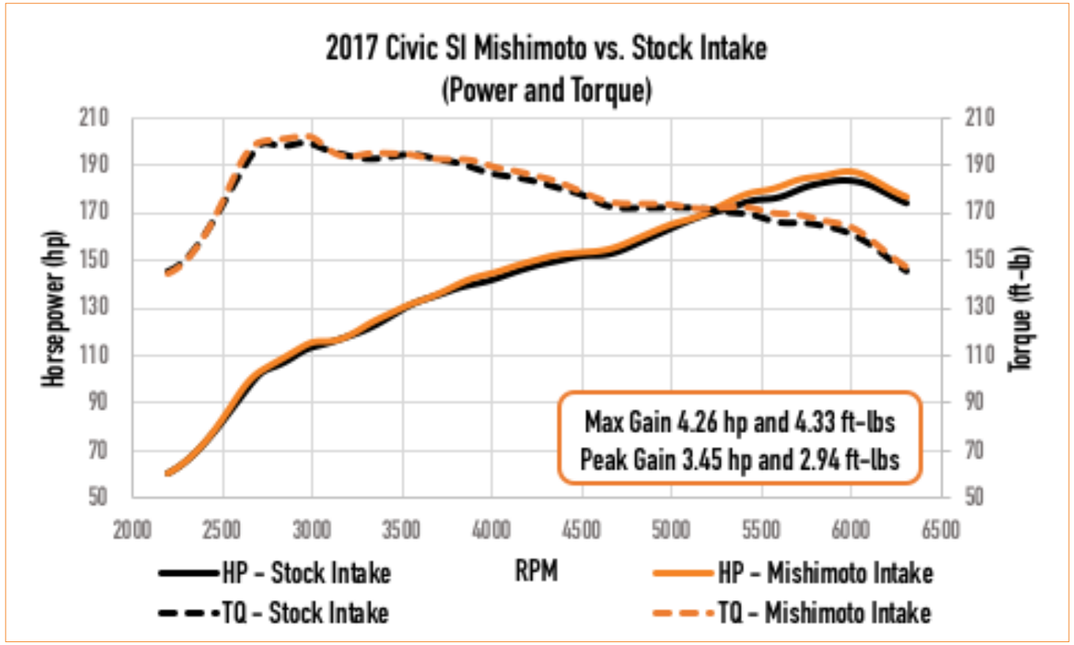

FIGURE 4: *Dyno result (power and torque).*

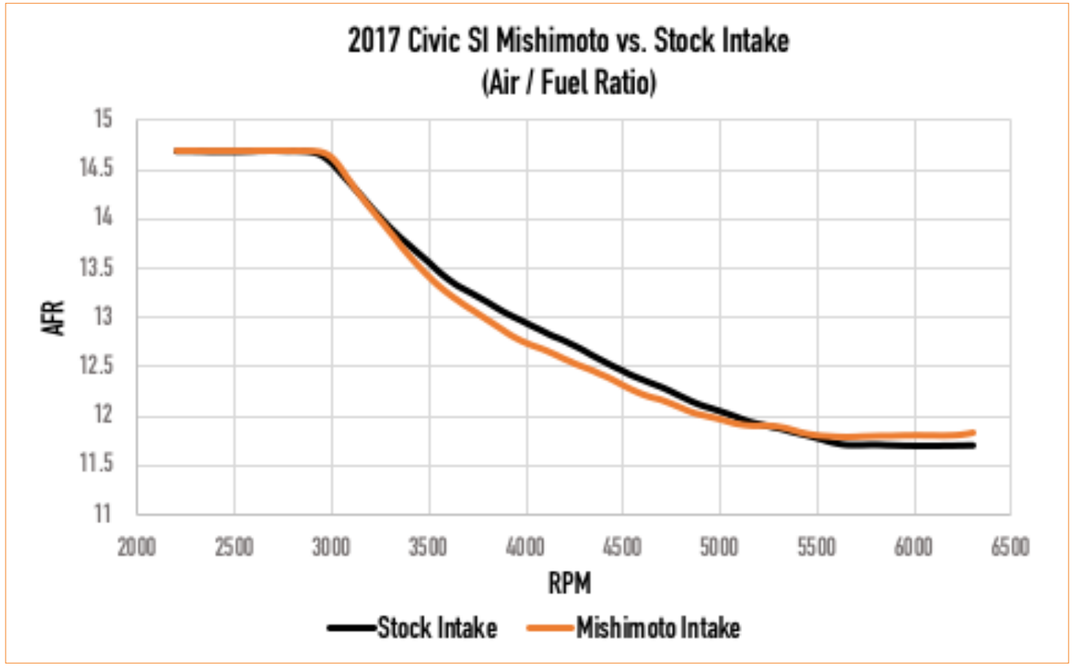

FIGURE 5: *Dyno results (AFR).*

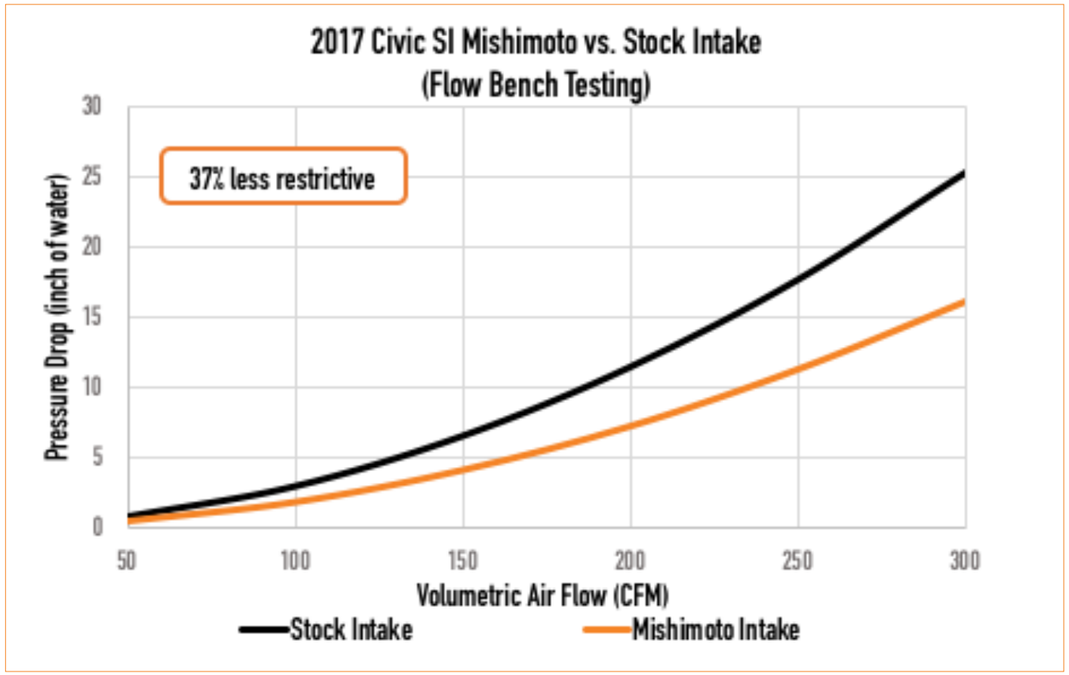

FIGURE 6: *Flow bench results.*

INSTALLATION NOTES

The Mishimoto performance air intake is an excellent bolt-on upgrade for the 2017 Civic SI and can be installed on a stock vehicle without any permanent modification or custom tuning. The intake is also compatible with the Mishimoto intercooler pipes.

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