WHEEL SPEED SENSOR ADAPTER FOR MUSTANG / F-150

REVISION **2.0.0**

DEVICE OVERVIEW

The **Wheel Speed Sensor Adapter for Mustang / F-150** provides a high-performance, plug-and-play solution for integrating 2011+ Ford Mustang and F-150 wheel speed sensors with boost controllers, nitrous systems, or standalone ECUs.

WARNING: This product is designed exclusively for racing applications operated in controlled environments. Use on public roadways is prohibited.

APPLICATIONS

- 2011+ Ford Mustang
- 2011+ Ford F-150

ELECTRICAL SPECIFICATIONS

Maximum Supply Voltage: 18 V

Output Signal:

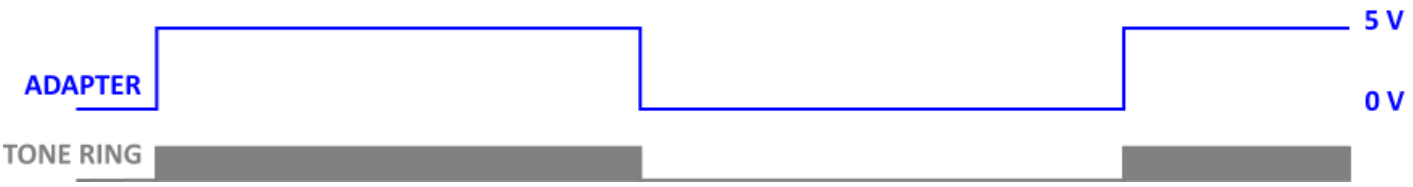
- 0–5 V square wave with built-in 1 kΩ pull-up resistor
- 0–12 V square wave with user-supplied 2.2–10 kΩ external pull-up resistor
- Open-drain output for devices with existing pull-up resistors

WIRING

COLOR	DESCRIPTION	SIGNAL TYPE	CONNECTION DETAILS
RED	Switched 12 V	Power Input	Connect to switched and fused 12–18 V power source.
BLACK	Chassis Ground	Ground Input	Connect to chassis ground.
GREEN	Speed Output	Digital Output	Connect to speed input on Cortex EBC or other control device.
PURPLE	N/A	N/A	Used for production calibration only.

OUTPUT – SWITCHING PROTOCOL SENSORS (2011–2023 MUSTANG, 2011–2014 F-150)

The wheel speed adapter will output 5 V when a tooth is in front of the sensor, and 0 V when a valley is in front of the sensor.



Pulse Count	50 pulses per wheel revolution
Pulses Per Mile	30,000–40,000 (depends on tire size)
Duty Cycle	50%
Pulse Width	Varies with wheel speed

OUTPUT – AK PROTOCOL SENSORS (2024+ MUSTANG, 2015+ F-150)

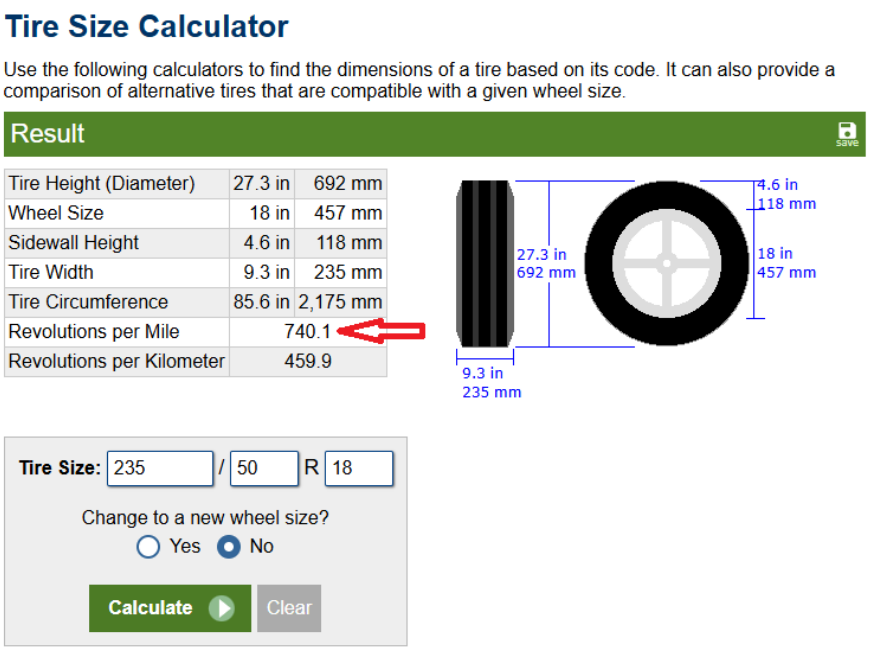
The wheel speed adapter will output a 50-microsecond speed pulse each time the sensor gap changes due to the teeth and valleys of the tone ring moving past the sensor.



Pulse Count	108 pulses per wheel revolution
Pulses Per Mile	60,000–80,000 (depends on tire size)
Duty Cycle	Varies with wheel speed
Pulse Width	50 µs

WHEEL SPEED CALIBRATION

To calculate the pulses per mile for your specific tire size, first determine the number of revolutions required for your tire to travel one mile using the tire size calculator at https://www.calculator.net/tire-size-calculator.html. For example, the standard 2015+ Mustang GT tire size of 235/50R18 requires **740.1** revolutions to travel one mile.



Once you have determined the revolutions per mile for your tire size, calculate the pulses per mile using the following equations:

2011–2023 Mustang	$Pulses\ Per\ Mile = (Revolutions\ Per\ Mile) \times 50$
2011–2014 F-150	$Pulses\ Per\ Mile = (Revolutions\ Per\ Mile) \times 50$
2015+ F-150	$Pulses\ Per\ Mile = (Revolutions\ Per\ Mile) \times 108$
2024+ Mustang	$Pulses\ Per\ Mile = (Revolutions\ Per\ Mile) \times 100$

For example, using the 235/50R18 Mustang tire: $Pulses\ Per\ Mile = 740.1 \times 50 = \mathbf{37,005}$

CONVERTING OUTPUT TO 0–12 V AMPLITUDE

Converting the adapter output from 0–5 V to 0–12 V amplitude requires the removal of a jumper and the installation of an external 2.2–10 kΩ resistor. The location of the pull-up jumper is shown in the image below. Removing this jumper will disable the internal pull-up resistor to 5 V for the output.



After disabling the internal pull-up resistor, an external pull-up resistor must be installed between the signal wire and switched 12 V power, as shown in the diagram below.

