CAN BUS WHEEL SPEED AND RPM INTERFACE FOR MUSTANG / F-150

Revision 3.0.0

DEVICE OVERVIEW

The **CAN Bus Wheel Speed and RPM Interface for Mustang / F-150** delivers a simple solution for extracting wheel speed, vehicle speed, and RPM signals from 2015–2023 Ford Mustang and 2015–2026 Ford F-150 vehicles. Designed with drag racers in mind, this application-specific CAN bus interface offers multiple speed output modes — including front left wheel speed, front right wheel speed, average rear wheel speed, or PCM-calculated vehicle speed — providing maximum flexibility for gear-based or speed-based control applications.

APPLICATIONS

- 2015–2023 Ford Mustang
- 2015–2026 Ford F-150

- 2024-2026 Ford Mustang
    - RPM and PCM-calculated vehicle speed only. We are still working on a solution for ABS wheel speed for the 2024+ Mustang.

SPEED OUTPUT

Output Modes	Front left wheel speed Front right wheel speed Average rear wheel speed PCM-calculated vehicle speed
Frequency	Wheel speed modes: 1 radian per second = 4 Hz Vehicle speed mode: 1 mile per hour = 4 Hz
Pulses Per Mile	Wheel speed modes: 10,000–20,000 (depends on tire size) Vehicle speed mode: 14,400
Minimum Speed	Wheel speed modes: 0.5 radians per second Vehicle speed mode: 0.5 miles per hour
Signal Type	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

RPM OUTPUT

Frequency	4-pulses per revolution
Minimum Engine Speed	50 RPM
Signal Type	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

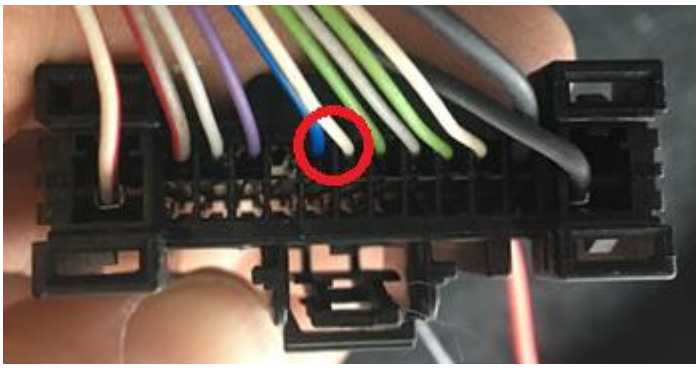
WIRING

	COLOR	DESCRIPTION	SIGNAL TYPE	CONNECTION DETAILS
4-Pin	**RED**	Switched 12 V	Power Input	Connect to switched and fused 12–40 V power source.
4-Pin	**BLACK**	Chassis Ground	Ground Input	Connect to chassis ground.
4-Pin	**WHITE**	CAN Low	Digital I/O	Connect to HS1 CAN- on vehicle wiring harness.
4-Pin	**BLUE**	CAN High	Digital I/O	Connect to HS1 CAN+ on vehicle wiring harness.
2-Pin	**GREEN**	Speed Output	Digital Output	Connect to speed input on Cortex EBC or other control device.
2-Pin	**PINK**	RPM Output	Digital Output	Connect to RPM input on Cortex EBC or other control device.

CONNECTING TO HS1 CAN BUS: 2015–2023 MUSTANG AND 2015–2020 F-150

The HS1 CAN bus on the 2015–2023 Mustang and 2015–2020 F-150 vehicles can be easily accessed at the Data Link Connector (DLC) module, which is below the left side of the dash on the driver side of the vehicle. The OBD2 connector, used for scan tools and tuning cables, is located on the front of the DLC module.

On the back of the DLC module, there is a 24-pin wiring connector. The blue and white HS1 CAN bus wires are located near the center of the row farthest from the connector's retaining clip, as shown in the image to the right (your connector may have more or fewer wires depending on the year and trim level of the vehicle).

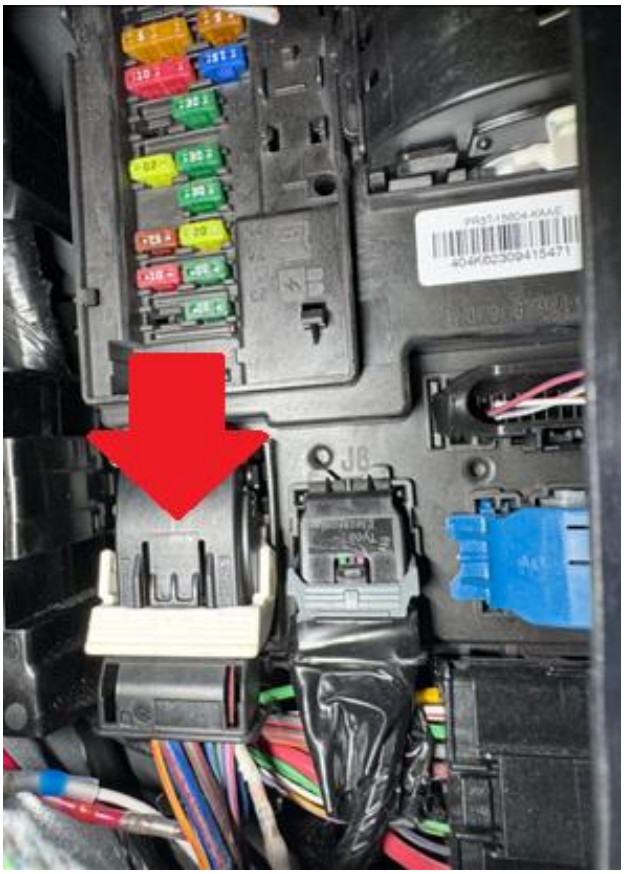


Carefully tap/splice the blue and white wires from the CAN interface into the corresponding blue and white HS1 CAN bus wires on the DLC wiring connector.

NOTE: There may be multiple white wires that connect to the DLC module. The correct white wire will twist around the blue HS1 CAN bus wire as they enter the taped section of the wiring harness.

CONNECTING TO HS1 CAN BUS: 2024–2026 MUSTANG

The HS1 CAN bus on the 2024–2026 Mustang can be accessed at the Body Control Module (BCM), which is integrated into the interior fuse box on the right side of the passenger footwell. The blue and white HS1 CAN bus wires can be found on the large J7 connector on the lower left side of the BCM.



Carefully tap/splice the blue and white wires from the CAN interface into the corresponding blue and white HS1 CAN bus wires on the J7 BCM wiring connector.

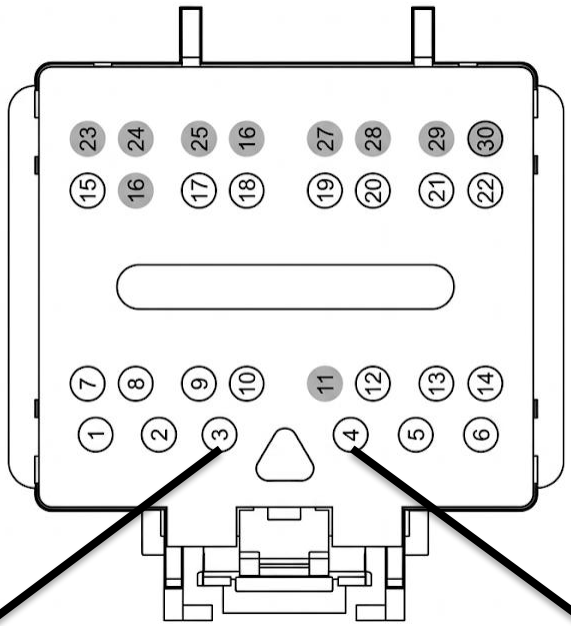
NOTE: There may be multiple blue wires that go to the J7 connector. The correct blue wire will twist around the white HS1 CAN bus wire in the wiring harness.

CONNECTING TO HS1/HS2 CAN BUS: 2021–2026 F-150

The HS1 CAN bus on the 2021–2023 F-150 and HS2 CAN bus on the 2024–2026 F-150 can be easily accessed behind the glove box. Open the glove box, then push in on the tabs on both sidewalls to release the stopper tabs. Allow the glove box to drop down fully. Gently pull the unit toward you to unclip it from the bottom hinges.

With the glove box removed, you will have access to four wiring connectors. The necessary CAN bus wires are located in the front row of wires on the dark gray connector that is next to the brown connector.

Carefully tap/splice the blue and white wires from the CAN interface into Pin 3 (CAN+) and Pin 4 (CAN-) on the dark gray connector, as outlined below.



2021–2023: HS1 CAN+ (**BLUE**)

2024–2026: HS2 CAN+ (**GREEN**/**ORANGE**)

CONNECT TO BLUE ON CAN INTERFACE

2021–2023: HS1 CAN- (**WHITE**)

2024–2026: HS2 CAN- (**GREY**/**BLUE**)

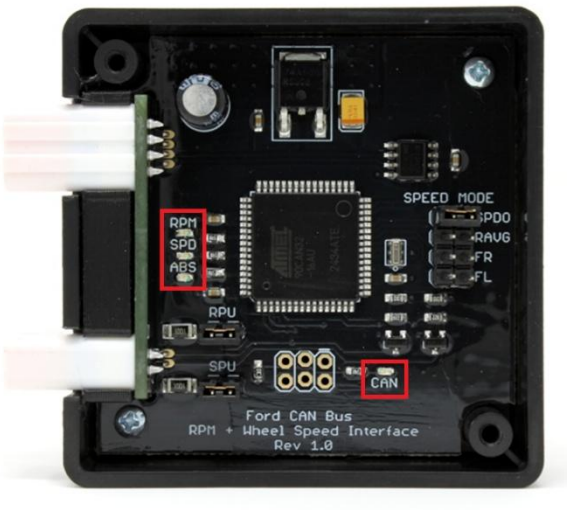
CONNECT TO WHITE ON CAN INTERFACE

Example Installation: 2021–2023 F-150

Example Installation: 2024–2026 F-150

DIAGNOSTIC LEDs

The CAN interface has four built-in diagnostic LEDs to provide visual confirmation of CAN bus activity and message detection. The locations of these LEDs are shown in the image below.



LED	FUNCTION
CAN	LED will flash while the interface searches for data on the CAN bus. When CAN data has been detected, the LED will become solid.
RPM	LED will turn on while RPM information is detected on the CAN bus.
SPD	LED will turn on while PCM-calculated vehicle speed is detected on the CAN bus.
ABS	LED will turn on while ABS wheel speeds are detected on the CAN bus.

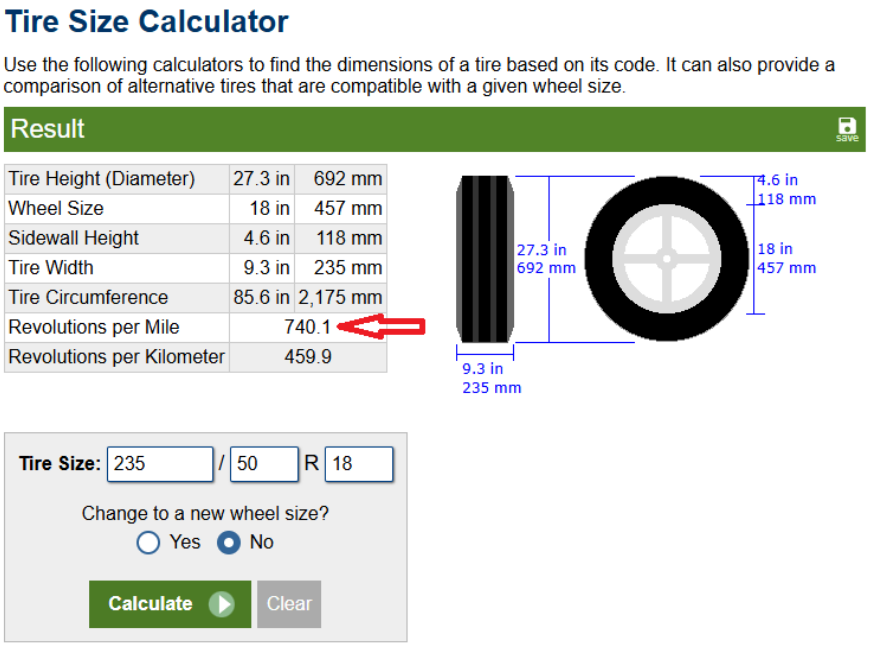
SPEED MODE SELECTION

The type of speed signal output by the CAN interface is determined by the position of the SPEED MODE jumper.

JUMPER POSTION	OUTPUT TYPE	OUTPUT SCALE
SPDO	PCM-calculated vehicle speed (speedometer)	1 mile per hour = 4 Hz (14,400 pulses per mile)
RAVG	Average rear wheel speed	1 radian per second = 4 Hz
FR	Front right wheel speed	1 radian per second = 4 Hz
FL	Front left wheel speed	1 radian per second = 4 Hz

WHEEL SPEED CALIBRATION

The Ford ABS module reports wheel speed in radians per second (RPS), which represents the rotational speed of the wheel. When the interface is configured for a wheel-speed output mode, the output frequency is scaled at 1 RPS = 4 Hz. 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.



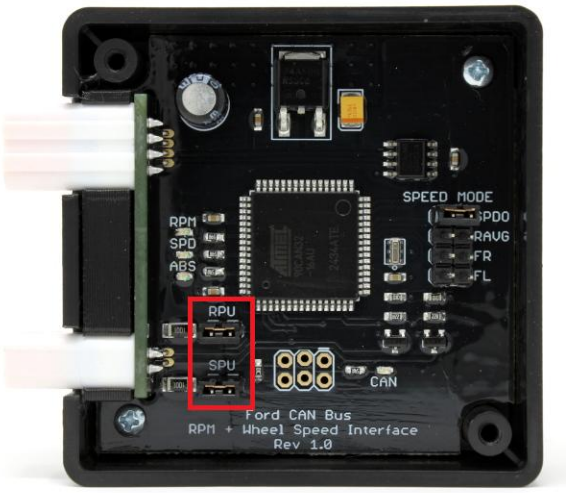
Once you have determined the revolutions per mile for your tire size, calculate the pulses per mile using the following equation:

$$\boldsymbol{Pulses\ Per\ Mile} = (\boldsymbol{Revolutions\ Per\ Mile}) \times \boldsymbol{8\pi} \approx (\boldsymbol{Revolutions\ Per\ Mile}) \times \boldsymbol{25.1327}$$

For example, using the 235/50R18 tire: $Pulses\ Per\ Mile \approx 740.1 \times 25.1327 \approx \mathbf{18,600}$

CONVERTING OUTPUT TO 0–12 V AMPLITUDE

Converting the CAN interface outputs 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 locations of the speed output pull-up (SPU) and RPM output pull-up (RPU) jumpers are shown in the image below. Removing these jumpers will disable the internal pull-up resistor to 5 V for the corresponding 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.