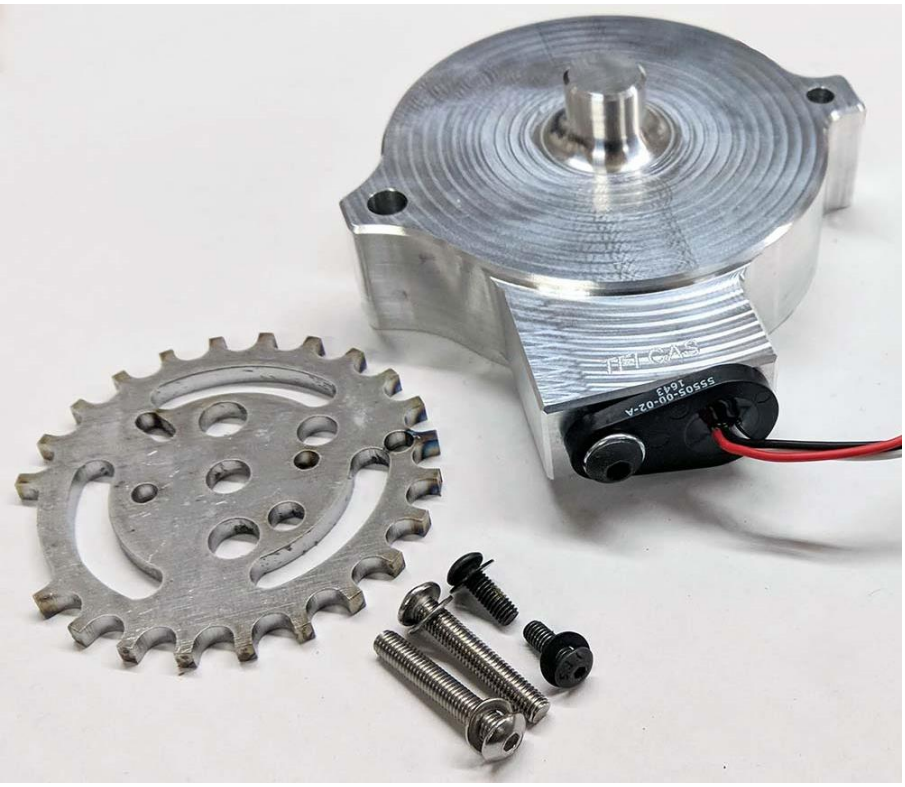
Ford 24-2 CAS Retrofit Kit



This kit is designed to work with Ford TFI distributors and Megasquirt and Microsquirt based ECU's. It should also work with other standalone ECU's that can use a missing tooth wheel driven at cam speed and a Hall Effect sensor.

It eliminates the Ford TFI, PIP, reluctor wheel, and upper & lower distributor cap and replaces it with a modern hall effect sensor, laser cut 24-2 trigger wheel, and billet aluminum cap/sensor holder. It works with both Ford TFI and MSD TFI distributors.

The kit allows you to run modern coils whether they are mounted in a coil on plug configuration or a standard waste spark multi-post style coil. Not only does this eliminate the Ford parts that are often prone to failure, it also increases trigger wheel resolution to allow for sequential injection and more precise timing control. It also increases clearance for roots style superchargers in V8 applications and custom intake manifolds in 4 cylinder applications.

Mechanical Installation:

Begin by loosely bolting the cap adapter on the distributor using the “long” screws (*Figure 1*), and make a clear mark along the side of the distributor housing in line with the sensor centerline (*Figure 2*). This will be used to phase the CAS wheel with cylinder #1. Remove the cap adapter, and extend this mark so it is clearly visible from the top.

Figure 1: Assembly

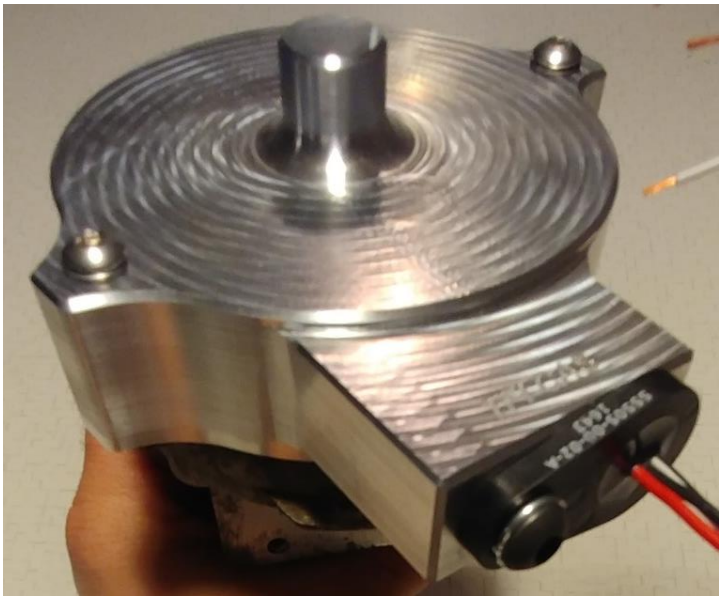
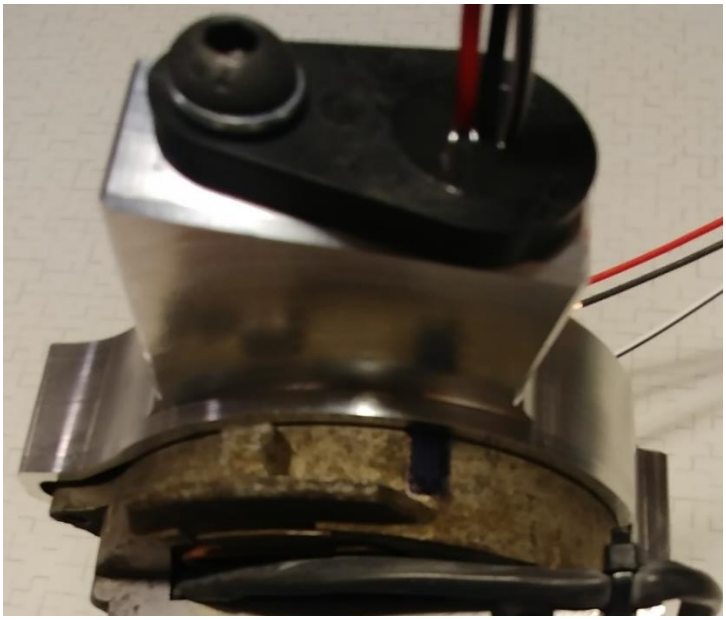


Figure 2: Marking Distributor Body for Sensor Alignment

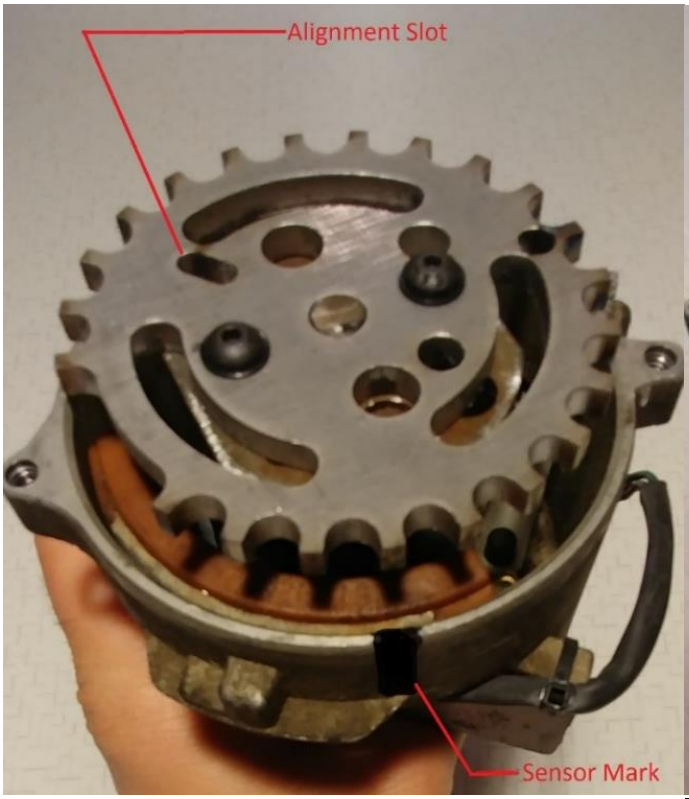


Remove the distributor rotor and PIP rotor wheel. The TFI and PIP is no longer used, but can be left in place if desired. Using the supplied “short” screws, install the new 24-2 CAS wheel in place of the PIP rotor wheel. The screws supplied with the kit have a locking compound on the threads to prevent loosening. Install the wheel

with the milled counterbore facing down. Ensure the alignment tab protruding from the distributor plate is aligned with the alignment slot in the CAS wheel to match your distributor rotation (see Figure 3).

Figure 3: Proper Phasing at TDC #1

Clockwise Rotation (2.3L):



Counter-Clockwise Rotation (SBF/BBF):

While there is no “official” torque spec, take care not to overtighten these screws. Carefully inspect interface between CAS and the plate it is bolted to, ensuring it is sitting flat.

Rotate the engine to TDC for cylinder #1 (if unsure/not marked remove #1 spark plug to verify the engine is on the compression stroke/is not 180 degrees out). Install the CAS/distributor in the block with the wheel in the position shown in Figure 3. Use your mark to line the 4th tooth after the missing tooth with the sensor centerline. In MS2 and MS3 code variants, the tooth after the missing tooth is known as “Tooth #1”. Our goal is for “Tooth #1” to pass the sensor approximately 90 degrees prior to cylinder #1 TDC. There are 30 crank degrees per tooth. If installed as per the image, tooth #1 should be set to 90 degrees.

Once aligned, lock the distributor into position and bolt the cap adapter on using the supplied “long” screws and washers. Do not overtighten as these are not large screws.

Wiring:

The supplied sensor is a Hall effect gear tooth style sensor. When a ferrous metal target is in front of the sensor barrel the signal wire will be grounded. The output is pulled up to 12v via an internal resistor so when the target is not present the output will equal 12v.

PiMPx/PiMPxs/PiMPshift with CAS/Coil On Plug Expansion Harness:

If you have purchased our optional plug and play CAS/Coil expansion harness, ignore this section of the instructions as the wiring is already set up for you, just plug the CAS into the 6 pin crank/cam connector. Ensure the "Dist in" jumper is removed.

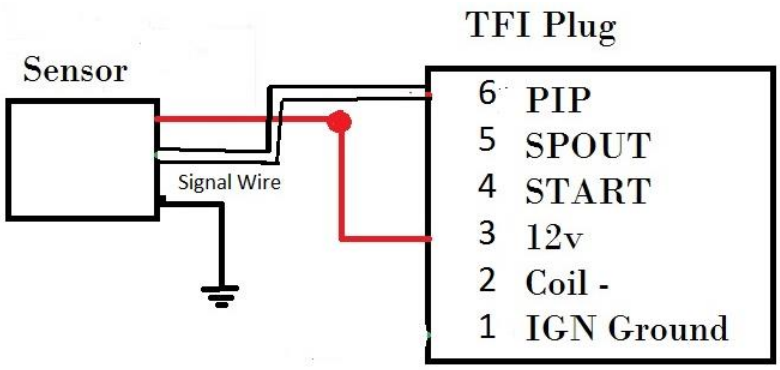
PiMPx/PiMPxs/PiMPshift using internal Expansion Connector:

Alternately if it is preferred to use the ECU's internal expansion plug but you're doing your own wiring using our expansion flying lead harness or expansion connector with individual wires, "VR1" can be used. If VR1 is used, connect as described below in the Microsquirt/MS3Pro section below. Ensure the "Dist in" jumper is removed.

PiMPx/PiMPxs/PiMPshift with TFI harness using EEC Connector:

If using factory style TFI wiring with a PiMPx/PiMPxs/PiMPxshift, the sensor signal wire may be connected directly to the PIP plug present at the TFI connector, and the sensor may be powered directly off the TFI connector. Ensure the "Dist In" jumper is installed as if it were a standard TFI.

Figure 4: PiMPx/PiMPxs/PiMPxshift with Factory TFI Wiring



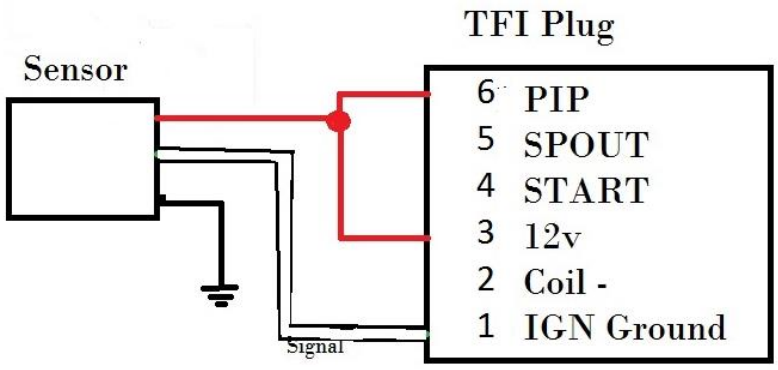
Original PiMP or V2 Microsquirt:

If using an original PiMP or V2 Microsquirt, the "Opto" ignition input circuit will be used and this circuit will be reversed relative to the "standard" TFI installation. If using existing TFI wiring, this wiring must be verified with a voltmeter prior to electrical installation. To do so verify there is good continuity from the "ground" wire present at the TFI plug to EEC pin 16. Also verify there is not continuity to ground at EEC pin 16 with the TFI module and ECU unplugged.

EEC Pin 16 (connects to PiMP/Microsquirt Opto -) will become our signal input wire, **it is critical it is not grounded**. Connect the sensor signal wire to the wire previously connected to TFI pin 1. Ground the sensor

ground wire to the engine or distributor body. Connect the sensor power wire to the wire previously connected to TFI pin 3. In addition to the sensor connections, the old TFI PIP (goes to EEC pin 56, connects to Microsquirt Opto In +) must now be powered. The most convenient place to do this is to "T" it into the splice powering the new sensor (Figure 5). You may de-pin the TFI connector and connect to the necessary wires, or cut the wires and connect to them.

Figure 5: Microsquirt Based Original PiMP Connection with Factory TFI Wiring



V3.0 Microsquirt, MS3 Pro, EFI Source Goldbox:

If using a v3.0 Microsquirt, MS3 Pro, EFI Source Goldbox, or "full size" Megasquirt (whether v3.0 or v3.57), it is recommended the VR input circuit be used. Connect sensor power to 12v, sensor ground to ground, and the signal wire to the VR + wire. The supplied sensor is pulled up to 12v, and will output a 12v square wave. Leave the VR - wire of MS3 Pro or Microsquirt floating/disconnected. With "full size" Megasquirts, it will be necessary to turn the "zero crossing" trim pot 2-5 turns. Turn 2 turns for V3.57, and 5 turns for v3.0.

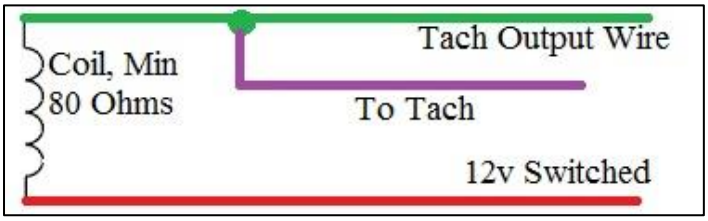
Coils:

There are too many coil options to cover within this document. LS coils and IGN1A coils are two common choices. We sell the IGN1A coils and coil harnesses for those who want to use them.

Tach:

PiMP, PiMPx/PiMPxs/PiMPxshift, Microsquirt, MS3 Pro, Goldbox, and MS3 all have intrinsic tach outputs. These are pulled up to 12v, and many tachs will function simply by connecting the wiring formerly connected to Ignition coil (-) to the tach output wire (and enabling this function in software). It is recommended this is tried first. Some tachometers actually require an inductive "spike" from a coil to function. If this is the case for your tach, the coil of a relay or an inductor can be used for this "coil substitute". See Figure 6 for tach circuit diagram.

Figure 6: Tach Adapter Wiring



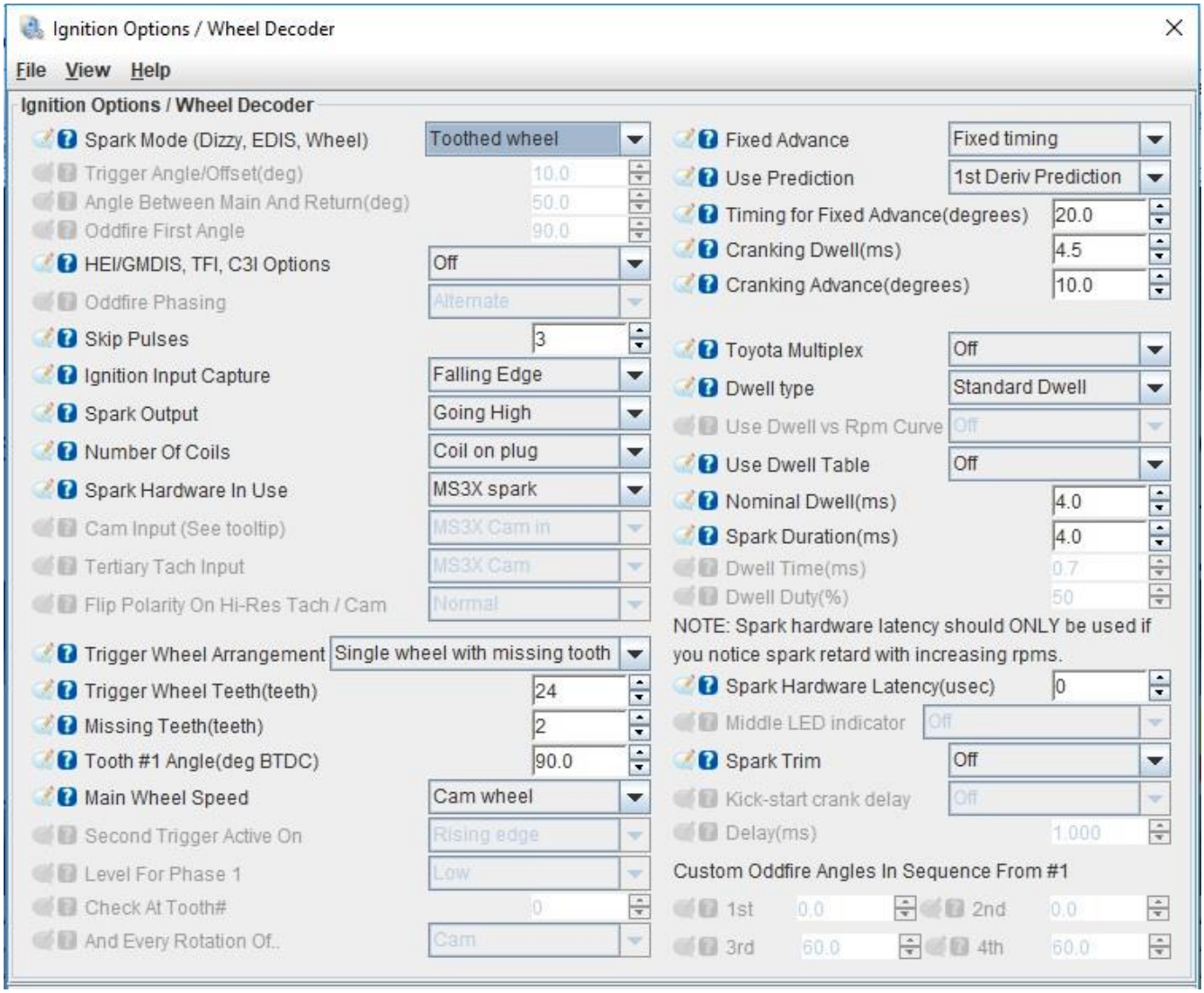
TunerStudio Settings:

Open your project and navigate to (*Ignition Settings > Ignition Options/Wheel Decoder*). For LS Coils or IGN1A coils configure to match settings shown in image below.

For other coil types you'll need to set dwell type, dwell duty %, cranking dwell and nominal dwell to match your coils. You'll also need to set number of coils to match your setup.

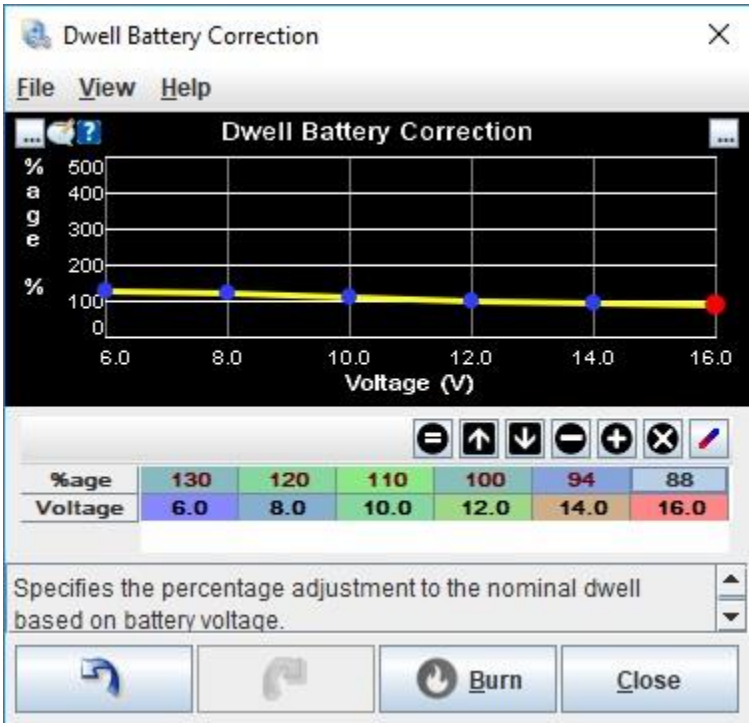
Make sure "Spark Output In Use" matches your ECU type. If you don't have this information then consult with us on the support forum. For "Nominal Dwell" with IGN1A coils, start at 4.0 and turn it up until you have no misfires.

CAS & LS Coil or IGN1A Coil Settings:



LS Coils need to use the Dwell Battery Correction table below. Other coils should be fine with the base tune table. So navigate to (Ignition Settings > Dwell Battery Correction) and match the settings shown below:

LS Coil Dwell Battery Correction:



Initial Startup:

If installed per the image in Figure 3, spark timing should be close enough to start and run. After initial start up, confirm timing with a timing light. Adjust the CAS as you would a distributor to set timing.

If timing is within 5 degrees, you may adjust by changing “Tooth #1 Angle” in TunerStudio instead of mechanically moving the distributor body. A smaller tooth #1 angle will advance the timing while a larger angle will retard the timing.