

TF-2 Tach Signal Filter

Precision DynoTech

- Produces a clean square wave output signal from noisy input signals
- For use with inductive spark plug wire pickups
- Push-pull or open drain output
- Configurable noise rejection settings



Description

The TF-2 Tach Signal Filter has an intended functionality to accept a weak and noisy source signal from an inductive clamp-style pickup and output a clean and amplified square wave output for use with dyno data acquisition systems. Its output is like that of a hall-effect sensor and thus can be used with data systems that accept a hall-effect sensor as an RPM input.

Quick Start Guide

Hook this filter up to your dyno data acquisition unit as if it were a hall-effect sensor, or similar RPM sensor.

The green terminal block is easy to use. Simply use a small flathead screwdriver to open and close the metal jaws inside the connector. First ensure the jaw is open, and if it is not, turn the screw on top counterclockwise. Insert your stripped wire into the appropriate hole and close the jaw by turning the screw clockwise. Ensure that the metal jaw is clamping on bare wire, and not the wire's insulation.

The green terminal may also be removed entirely from the filter. Firmly grab each side with your fingers and pull. *Do not pull directly on any wires going into it; that will damage the terminal.*

1. Use the DC 5v to 12v power from the data unit and connect it to the labeled input '+5-12V'.
2. Connect the labeled OUTPUT from the filter to the RPM Input on your data unit.
3. Lastly, connect the ground from the filter to the ground of the data unit.
4. Set DIP switches 3, 4, and 5 to the appropriate max RPM settings for your specific application.
 - *The Max RPM configured by these switches must be set properly.* Refer to section **“Maximum RPM Settings”** on page 2 for more information.

The “TACH + IN” and “TACH – IN” connections on the green terminal block are optional and can be used when the red and black banana plug inputs are not utilized.

If using the banana plug inputs, ensure that they are fully seated. When the filter is new, they require a solid push to be fully seated.

Settings Overview

The TF-2 has user configurable settings via the external DIP switches. The options are as follows.

Switch #1 – Output Type – Push/Pull or Open Drain

Suggested Setting: **ON (Push/Pull)**

Switch #2 – Edge Trigger – Rising Edge or Falling Edge

Suggested Setting: **OFF (Falling)**

Switches #3, #4 and #5 – Max RPM Setting

The maximum RPM allowed can be set to a variety of values using switches 3, 4, and 5. Any input that would cause an RPM value above the threshold set with these switches will be ignored. Always set this value to be above the anticipated maximum input RPM of the signal source (i.e. the engine).

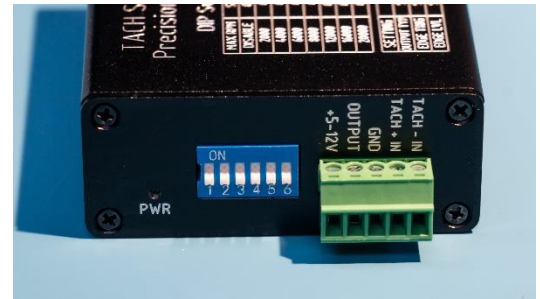
If this value is set too high, input noise may cause a higher than actual RPM output. See page 2 for specific settings of these switches.

Switch #6 – Signal Level Detect

Setting this switch to ON will use a static slicer level, at approximately 300 millivolts. Any signal meeting or exceeding that value will be considered a valid input signal by the device. Any value below 300mV will be ignored.

Setting this switch to OFF will use an automatic slicer level, and is dynamically varied based upon the input signal characteristics.

Suggested Setting: **OFF** (Automatic level detect)



Maximum RPM Settings

Choose a max value that exceeds the maximum value anticipated by your application. Keep in mind that 'RPM' refers to the measured spark signal and may not be the actual RPM of the engine. For instance, if the spark signal used only fires once every 2 rotations of the crankshaft, and your maximum engine rpm will be 7500, then the maximum spark rpm signal will be half of that, 3750. In this example, using a MAX RPM setting of 4000 on the filter would be appropriate.

Some engines may have a wasted spark (such as Predators, Briggs, and similar). This means the engine RPM will equal the spark rpm, as a spark occurs once per revolution.

Furthermore, if you are using the coil wire on a multi-cylinder engine as your signal source, then multiple sparks may fire per revolution. How many will depend on your engine.

Refer to the table on the next page, which is also engraved on the enclosure, to set the appropriate max RPM for your application.

DIP Switch Settings for various MAX RPM values

MAX RPM	Switch #3	Switch #4	Switch #5
NO MAX (Unlimited)	OFF	OFF	OFF
2000	ON	ON	ON
4000	ON	ON	OFF
6000	ON	OFF	ON
8000	ON	OFF	OFF
12000	OFF	ON	ON
16000	OFF	ON	OFF
20000	OFF	OFF	ON

Connections

The TF-2 Tach Signal Filter has two options for input connections. Two banana plug connectors are available for use with standard automotive style inductive clamps for spark plug wires.

A second option for an input signal is provided on the green terminal block, labeled “TACH + IN” and “TACH – IN”. These connections are internally tied to the banana plug terminals and should not be connected if the banana plug terminals are being used.

The power input, output, and ground connections are also located on the green terminal block.

+5 to 12V: Power Input – The Filter requires a minimum voltage of 5 volts DC, and a maximum voltage of 12 volts DC to operate. Connect this to your data acquisition unit, which should supply this DC voltage.

OUTPUT – This is the filtered output from the device and should be connected to the RPM input on the dyno data unit.

Ground – Connect to the ground on the dyno data unit.

Usage

If you are using a clamp style inductive pickup, **it is imperative that the clamp is orientated the correct way.** An arrow is embossed on the plastic clamp itself and should be pointed toward the spark plug. **Having this backwards will cause erratic and inaccurate RPM signals.**

The ‘PWR’ light will illuminate solid red when power is supplied to the filter via your data acquisition unit.

The ‘PWR’ light will flash when digital filtering is occurring, i.e., noise is being rejected. This is not a problem, but rather a simple indicator to see whether any noise is being filtered out.

Troubleshooting

No RPM detected by data unit.

- Check for illuminated red 'PWR' light. If it is not illuminated, check to see if the filter is properly wired to the data unit, and that it is receiving at least 5 volts DC, and a maximum of 12 volts DC.
- If an inductive clamp-style pickup is being used, verify that its orientation is correct. The embossed arrow on the clamp should be pointed toward the spark plug.
- Ensure all input connections are fully seated into the filter.
- Some data units may operate better with DIP Switch #1 set to **OFF**.

Output RPM Signal is noisy or erratic, or incorrect

- Verify that the inductive clamp is orientated properly. The embossed arrow should point toward the spark plug.
- Verify correct MAX RPM value is set using DIP switches 3, 4, and 5. Too low of a max RPM setting will result in an incorrect RPM value (usually reporting half of the actual RPM).
- Keep any wires away from other sources of high voltage noise. If the wire leading from the inductive clamp is near other high voltage wires, such as spark plug wires from other cylinders, it will potentially pick up those signals as well.
- Try changing the setting of Dip Switch 6.

Still Having Trouble?

Send an email to Sean@PrecisionDynoTech.com if you are still having trouble, and we will be happy to help!