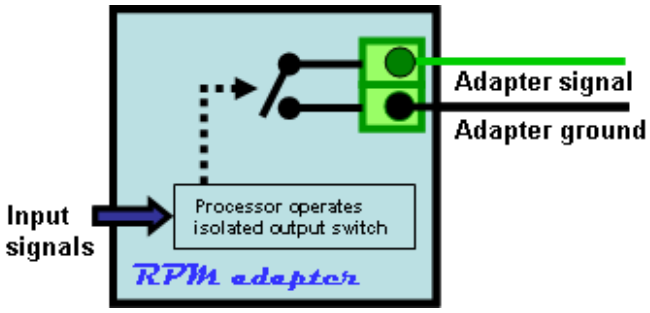
RPM Adapter



The DTec 'RPM adapter' is designed to turn signals from many different sources into compatible signals for connecting to digital devices, such as DYNertia's 'RPM Adapter' input (DYNertia3 uses this input to provide an optional second RPM source).

Some of the sources 'RPM Adapter' can be connected to-

- Ignition leads, by simply wrapping a sensing wire around the lead or using a clamp type 'pick up'
- Ignition coil, switched terminals on inductive or CDI systems ('primary' coil voltage or CDI's 'kill' switch)
- VR sensors (also known as 'inductive' sensors) that generate an AC voltage (like most ABS wheel speed sensors)
- 'Drive' signals to ignition modules/igniters or many 'coil on plug' systems that use an inbuilt transistor. Even many digital sensor signals e.g. cam sensors.
- Injector switching wires
- It can even process 'odd fire' inputs like on many V-twins (unevenly firing intervals) by ignoring every 2nd pulse

There is a Hi voltage input (up to 600V) and a Low voltage input (up to 120V). The low voltage input provides good sensitivity for VR sensors and digital coil drive signals, the Hi voltage is designed for direct connection to the coils switching circuit (coil primary, not secondary spark plug voltage!)

The unit's output terminals are basically an electronic switch (transistor) that pulse closed upon an input signal. This internal 'switching' circuit is fully isolated (optical isolation) from the inputs and power supply; this gives protection to DYNertia3 or any other device using it as a signal source.

'RPM adapter' is microprocessor controlled and even has adjustable output pulse times, filtering and a self test mode. The self test mode operates by generating a series of output pulses for approximately 2 seconds after power is applied. The duration of the pulses and the space between them is determined by the filter settings (discussed later)

Inputs have been designed to be as rugged as possible to allow for a 'try and see' approach. When probing an unknown system use the Hi voltage input first and watch DYNertia's tacho display for a suitable reading. Just do not allow spark plug firing voltage to enter the unit, this is potentially tens of thousands of volts and will cause damage.

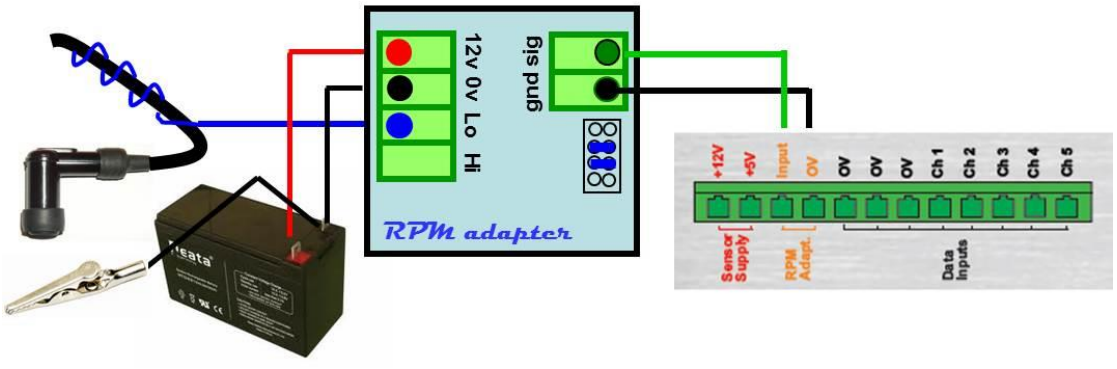
RPM Adapter (suitable for DYNertia3)

NOTE: To open the case, gently squeeze the lid in the middle from both sides and lift.
Wire access is via cut out panels in each end and only small diameter signal wires are required.

Connecting 'RPM adapter' to DYNertia3's "RPM Adapt." input –

'RPM Adapter' input terminal on DYNertia3 is for a secondary rpm input (main rpm input is via provided sensor) and requires switching (pulsing) to ground so DYNertia3 can determine the rpm.

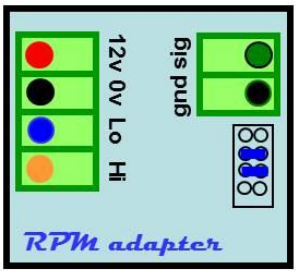
It **cannot** be directly connected to an ignition system due to the high voltages involved. This 'RPM adapter' must be used to turn any high voltages or analogue voltages from a VR sensor (like an ABS wheel speed sensor) into suitable pulses for DYNertia3.



NOTE: As shown, you can use a separate power supply source for 'RPM adapter' unit if required to avoid interference issues by keeping 'RPM adapter' completely isolated from other equipment! Ground for engine is optional (see below).

Basic overview of the terminals on the 'RPM adapter' –

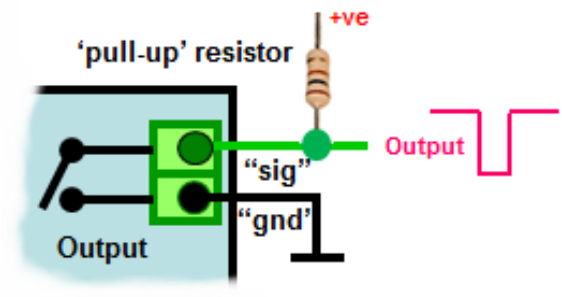
Input terminals. These supply the power for the adapters electronics and are also the connections for the input signals. The Hi voltage input is for coil switch circuits that exceed 120V and also provides extra filtering from electrical noise. This 'Hi' input should be tried first if you are unsure of the wire you are connecting to (it will still trigger from quite low input voltages)



Output terminals. These are bridged together to create a switch that stays closed for the time set by the 'mode setting'. They are fully isolated from the rest of the circuitry for protection and freedom of use.

Filter setting. Bridging these terminals as shown in the table below adjusts the filter times and allows for 'Odd fire' engines. Leave in default setting unless required.

NOTE: It's usually not required for the engine to be grounded when using the Lo input. The induced voltage is enough to trigger the RPM adapter (i.e. the Lo terminal goes to the plug lead sensing wire and engine is not connected to 0V). This can be experimented with by trying with the 0V terminal connected to the engine or not to determine the most stable RPM signal.



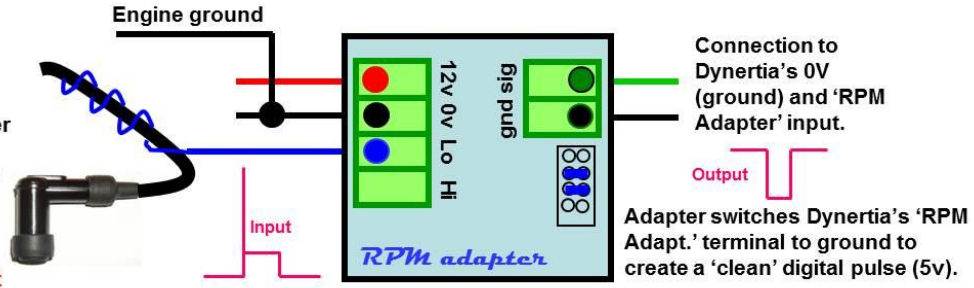
RPM adapter does not send out a voltage pulse, it is a switching device. If not connected to DYNertia3 you must connect a ground and a 'pull-up' resistor as shown, then you can measure a pulse output on the "sig" terminal as the switch opens and closes. The switching current should be limited to < 40mA, we suggest a 10K ohm pull-up resistor.

RPM Adapter (suitable for DYNertia3)

Connections to suit spark plug wire sensing

Adjusting the sensing wires length along the spark plug lead can increase the sensitivity if not reliably triggering.

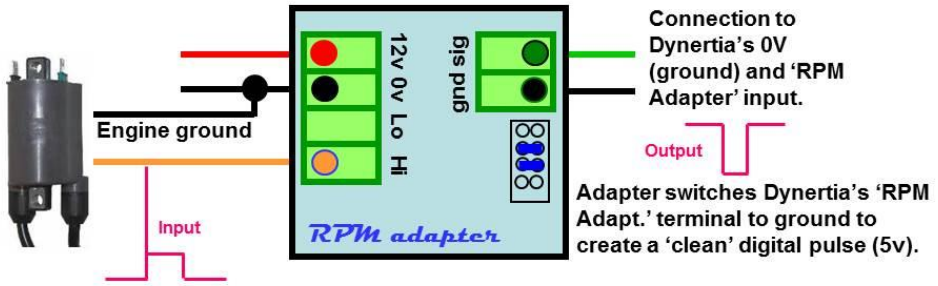
The Lo voltage input of the adapter can often just be laid in parallel along a spark plug wire lead to receive a pulse. The adapters ground (0V) is connected to the engine case ground (sometimes it's better without this ground!). Connect the Lo voltage input to a wire that is firmly coiled around the spark plug lead. It should closely contact the lead and not move around. About if it is too short it may not give a reliable input signal. Be careful not to let the wire receive a 'shock' from the high voltage to the plug as this will cause serious damage to the adapter!



NOTE: If you are using an inductive clamp (e.g. from a timing light) you will find that only one wire will generally need connecting to the Lo terminal i.e. the coil in the clamp is left with one end not connected.

Connections to suit coil 'switching' signals

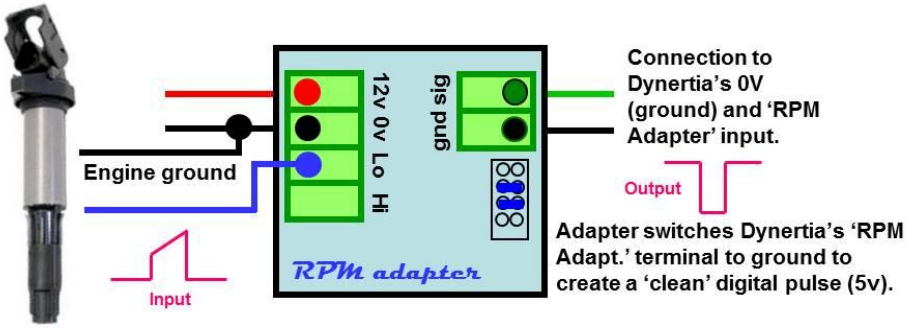
The Hi voltage input of the adapter can be connected to the switching side of the coil (coil primary, often labeled "-"). This terminal has a high voltage (400v) present when the coil fires. CDI and magneto systems can often be connected to at the 'kill switch', as this is often the coil switching wire (it's grounded to stop the engine in these systems). Connect the adapters ground (0v) to the vehicles ground and the Hi voltage input to the coils switched wire!



NOTE: CDI's 'kill' switch is often overlooked as a good stable RPM source on many systems.

Connections to suit coil 'drive' signals

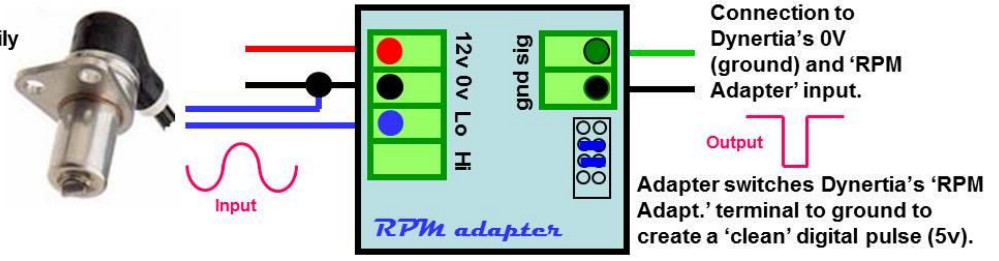
Many ignition systems that use a 'coil on plug' have a small signal from the ECU to fire the coils built in electronics. There are also many systems that use an external transistor ('igniter' or 'module') that also use this principle. The adapter can get an rpm signal from this 'trigger' wire. Connect the adapters ground (0v) to the vehicles ground and the Lo voltage input to the coils trigger wire!



Connections to suit 'VR' (inductive) sensors

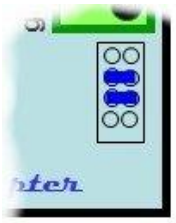
We suggest an inexpensive ABS wheel speed sensor be used and triggered by a rotating engine component (e.g. a bolt head) as this may prove much more convenient than connecting to the wide variety of ignition systems in use.

VR sensors (Variable Reluctance, also known as 'inductive' sensors) are readily available, they are used commonly for ABS wheel speed sensors and crank angle sensors. They generate an AC voltage as an iron object moves past. Connect one wire to the adapters ground (0v) and the other to the Lo voltage input!



Filter settings (default is normally all that's required) –

The 8 pin terminal is provided to allow the filter times to be altered and for the adapter to enter 'odd fire' mode if required. To alter settings disconnect the power, move the 'bridge' connector and re-connect the power.

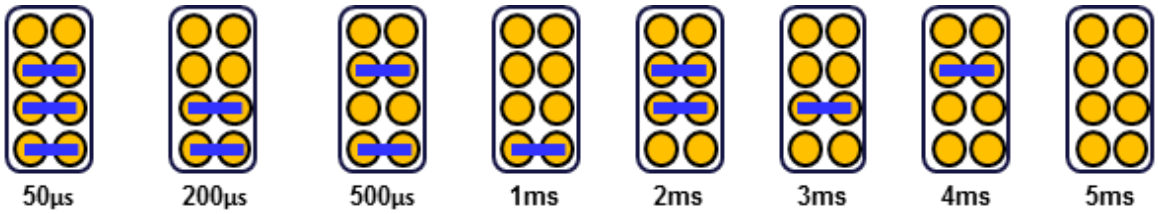


Shown here is the default setting that produces a 2ms (millisecond, 2/1000 second) output pulse when an input is received.

'RPM adapter' has a microprocessor controlled filter circuit to eliminate 'false' triggering from many noisy electrical sources such as found in the ignition system. When an input signal is received the output is triggered for a certain time period, there is also an additional 'stand off' time period added that prevents re-triggering too soon. The 'Stand off' time matches the pulse output time e.g. if a 2ms pulse is sent out there will be a further 2ms delay (therefore 4ms in total before re-triggering).

Setting too long a filter time will reduce the maximum rpm that can be detected. It is suggested to set the filter time as high as practical without limiting your max RPM. The default of 2ms allows 15,000 pulses per minute to be input!

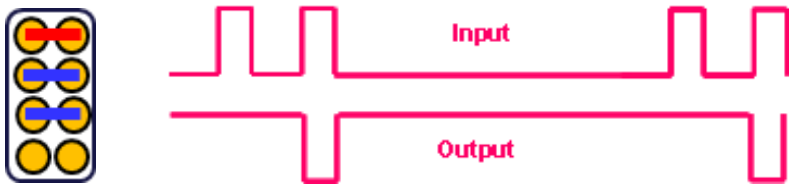
The table below shows the output pulse time periods selected by different mode settings:



If the output causes the tacho to occasionally jump hi then increasing this time delay may help. First try altering the sensing wires length along the spark plug lead; if applicable (you can try coiling around it more times or folding it along the lead to increase the amount of wire parallel to the lead).

'Odd fire' mode-

For odd fire applications such as many V-twins, you can bridge the top 2 pins (shown here in red) and this will tell the adapter to intelligently process the inputs and produce only 1 output despite there being 2 unevenly spaced inputs.



This mode will produce an output that is half of the input frequency so this may need considering when calibrating the tacho settings (i.e. double the 'pulse per rev' hardware setting in the Dynertia3 software).

Odd fire mode can also be used for some CDI coil switching inputs (e.g. if connected to the 'kill' switch wire). There are certain design CDI magneto's that will generate 2 pulses and these are too far apart to filter with a long time delay (as max rpm would be reduced excessively). Odd fire mode may allow this input to work acceptably if it is not possible to get a signal from the spark plug lead.