LINGENFELTER

PERFORMANCE ENGINEERING

Installation Instructions for Lingenfelter RPM-002 Digital RPM Controlled Switch

PN: L460040000

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Parts List

#	Part number	Description
1	RPM-002	LPE Digital RPM Controlled Switch
1		hook & loop tape
2	AV16037	self-tapping screw
1	L920010000	LPE decal
1		instructions

Optional Items

- LED (for shift or indicator light)
  - Red LED (12 volt, 30 cm wire) L450030000
  - Green LED (12 volt, 30 cm wire) L450040000
- Sealed 40 amp heavy duty relay kit L450100000
- MPH activated switch L460050000

Specifications:

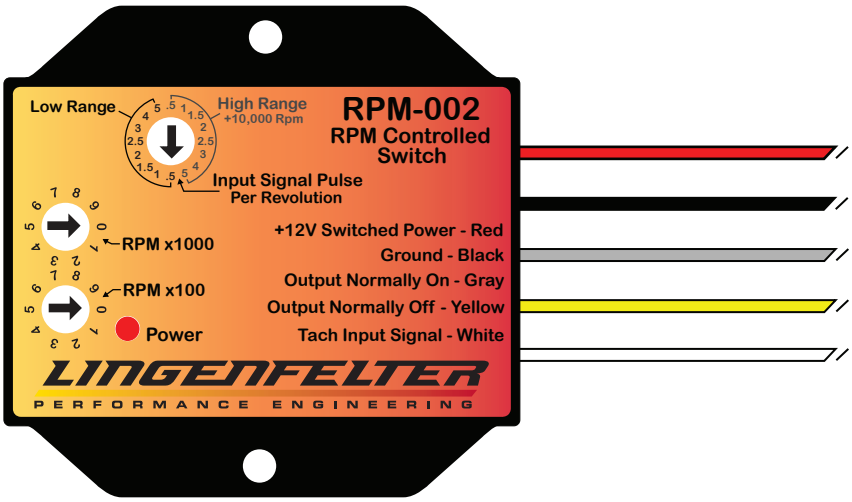
- The Lingenfelter Performance Engineering RPM-002 RPM Controlled Switch incorporates a precision 32-bit timer to realize microsecond precision over a very wide operating RPM range. Most common tachometer pulse frequencies are supported with no additional components required.
- The RPM-002 can perform as a standard RPM activated switch or it can provide “Window” switch type capability, switching at one RPM level and then switching back at a second RPM level.
- RPM switch settings can be adjusted in 100 RPM increments from 500 to 19900 RPM.
- Accepts both traditional 12 volt tachometer signals and also accepts 5 volt reference engine speed signals found on many newer cars, trucks and motorcycles.
- Now features a custom molded high temperature glass filled Nylon 6 enclosure with direct access to the controller settings without requiring removal of a cover or access panel.
- Fully encapsulated (potted) construction for increased durability.
- Outputs rated for up to 2.0 amps.
  - The RPM switch should control a relay for higher current level applications.
- Both the normally on and the normally off outputs can be used simultaneously.
- When operated in standard RPM activated switch mode, the RPM-002 can be a shift light controller. As a shift light controller, the RPM-002 should be able to trigger most common 12 volt shift lights. For shift lights that draw more than 2.0 amps, a relay would need to control the light.
- Outputs have a self protect feature and will turn OFF in case of a direct short or over current condition.
- Operating voltage range: 9.0 to 16.0 volts.
- Input signal type: +12 volt DC square wave or coil negative terminal and +5 volt DC reference signal applications.
- Input signal impedance: 10k ohms.
- Current draw: 0.1 amp plus current draw of device being controlled (when active).
- 90 day warranty (from date of purchase).

Table A - Wiring (also labeled on module):

Wire color	Label	Notes
White	Tach	This is the RPM input wire. This connects to your RPM signal wire.
Yellow	Normally Off	This is the normally open (off) activation wire. This wire connects to ground when switch is activated. This connects to the ground side of the device you plan to activate.
Gray	Normally On	This is the normally closed (on) activation wire. This wire will open the ground path when the switch is activated. This connects to the ground side of the device you plan to control.
Black	Ground	Connects to a vehicle ground.
Red	+12 Vdc	Connects to a switched +12 volt DC source.

Settings:

- Controlled by one sixteen position switch and two ten position switches
  - Single sixteen position switch for selecting pulse per revolution count (Input Signal Pulse Per Revolution switch)
    - First half of the range is the Low Range (9,900 & below)
    - Second half of the range is for the High Range (10,000+ RPM)
  - Two ten position switches for selecting RPM (one above the other)
    - RPM x1000
    - RPM x100



Red LED:

- Comes on solid on start-up
- When active RPM is reached, LED will blink at 18 Hz (fast)
- Blinks at 2 Hz rate (slow) if RPM set below 500 RPM at start-up with outputs disabled
- Blink once per second for 30 seconds when ready to enter or exit Window Switch Mode

Notes:

- **Changes to the RPM switch point settings must be done with the ignition off.**
  - The switch positions are only read on start up.
- The RPM Controlled Switch will not work at RPM levels below 500 RPM.
- The minimum difference between the high and the low mode when in Window Switch mode is 500 RPM.
- The RPM must drop 100 RPM below the RPM activation & deactivations settings to turn the circuit back on or off (ie a 100 RPM hysteresis exists).
- **Do NOT** submerge the module in liquid or directly wash the unit with liquid of any type! The switches on the RPM-002 are sealed but are NOT rated for high pressure washing, use caution if power washing near the RPM-002 module.

Installation:

- Disconnect the negative battery terminal.
- Connect black wire of RPM switch to a suitable vehicle ground.
- Connect the red wire to a **switched and fused** +12 volt DC source.
- Connect the white wire to the RPM signal source. This can be the tachometer output lead of the vehicle, the switched side of the ignition coil (negative side) or the 5 volt RPM reference signal.
    - **See Table B on page 6 for information on some of the common vehicle ECM/PCM tachometer signal wiring information.**
- If you will be using the Normally Off (open) output, such as to control a shift light, connect the yellow wire to the ground side of the device you plan to activate.
- If you will be using the Normally On (closed) output, connect the gray wire to the ground side of the device you plan to activate.
- If the device you will be controlling draws more than 2 amps, make sure to control the device through a relay.
- Secure the device using the supplied hook and loop tape or using the supplied self taping screws.
    - Do NOT mount the RPM-002 directly on top of the engine or near the exhaust manifolds due to heat concerns.
    - Do NOT mount the RPM-002 in the line of site of high temperature objects such as exhaust manifolds, turbine housings etc. If needed, put a heat shield in between the heat source and the module to protect the plastic case.
    - Do NOT install within 6” of nitrous solenoids or other devices with strong magnetic fields.
    - Do NOT install near the spark plugs or the spark plug wires (or other potential strong sources of electrical noise).
    - LPE recommends the use of resistor type spark plugs and RFI (radio frequency interference) and EMI (electromagnetic interference) suppression spark plug wires on all EFI engines and any vehicle that has electronic control modules on board (including the RPM-002). Failure to do so may result in erratic operation of electronic devices including the RPM-002.
- Set the desired RPM switch activation point using the two ten position rotary switches for the 1000 RPM increment (X000) and the 100 RPM increment (0X00), as labeled on page 2. See Tables C & D on page 7 for the RPM switch settings.
- Set the Input Signal Pulse Per Revolution switch to the correct setting for your vehicle application. See Table E on page 7 for the settings.
- Reconnect the negative battery terminal.

Example settings:

GM LS1/LS6/LS2 V8 engines (connect white Tachometer Input Signal to PCM/ECM TACH output)

- 1800 RPM switch point example
    - Sixteen position Input Signal Pulse Per Revolution switch set to Low Range and 2 pulses per revolution
    - RPM programming switch for thousands of RPM (X000) on position 1
    - RPM programming switch for hundreds of RPM (0X00) on position 8

2007-2008 GM CK trucks (Escalade, Denali, Tahoe, Yukon etc.) that do not have a tachometer output wire (connect white Tachometer Input Signal to any one of the 4 coil trigger wires on the coil harness to either bank of cylinders)

- 1800 RPM switch point example
    - Sixteen position Input Signal Pulse Per Revolution switch set to Low Range and 0.5 pulses per revolution
    - RPM programming switch for thousands of RPM (X000) on position 1
    - RPM programming switch for hundreds of RPM (0X00) on position 8
    - NOTE - when connecting to the coil wire it is critical that the RPM-002 be powered up when ever the ignition is powered up. If you need to put a disable switch into the circuit make sure you disable the output from the RPM-002 and keep the RPM-002 powered when the ignition is on. If not you will likely cause a check engine light.

Most GM V8 electronic fuel injection (EFI) engine applications including L98, LT1 and LT4 engines (connect white Tachometer Input Signal to ECM/PCM TACH output)

- 7200 RPM switch point example
  - Sixteen position Input Signal Pulse Per Revolution switch set to Low Range and 4 pulses per revolution
  - RPM programming switch for thousands of RPM (X000) on position 7
  - RPM programming switch for hundreds of RPM (0X00) on position 2

Most traditional single coil V8 engine applications (connect white Tachometer Input Signal wire to the coil negative terminal)

- 7200 RPM switch point example
  - Sixteen position Input Signal Pulse Per Revolution switch set to Low Range and 4 pulses per revolution
  - RPM programming switch for thousands of RPM (X000) on position 7
  - RPM programming switch for hundreds of RPM (0X00) on position 2

Most modern sportbike motorcycles including all years of the Suzuki GSXR-1300 Hayabusa, all years of the Kawasaki ZX-14 and 2002 and newer Suzuki GSXR-1000 (connect white Tachometer Input Signal to one of the coil negative terminals)

- 14,500 RPM switch point example
  - Sixteen position Input Signal Pulse Per Revolution switch set to High Range and 0.5 pulses per revolution
  - RPM programming switch for thousands of RPM (X000) on position 4
  - RPM programming switch for hundreds of RPM (0X00) on position 5

Installation notes:

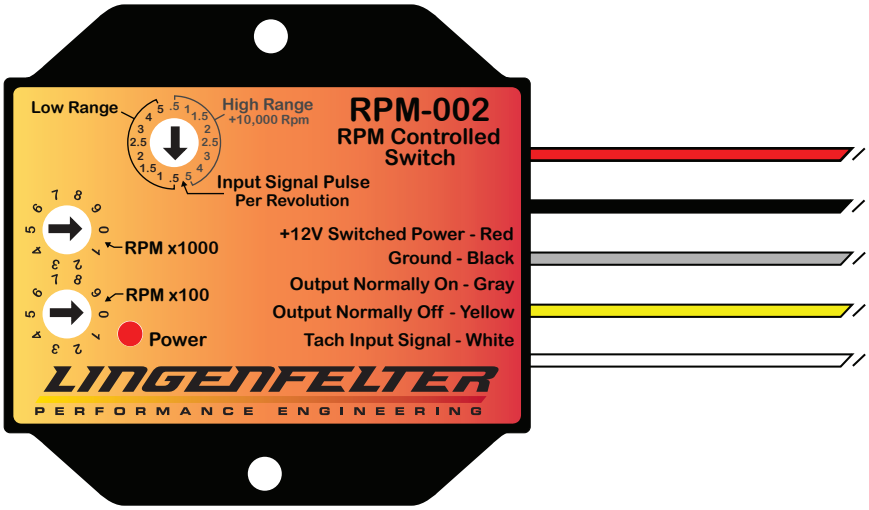
- On most engines the Tachometer Input Signal wire can be connected to one coil negative terminal or wire (may have 1, 2 or 4 individual coils - just connect to one of these). Start at 0.5 pulse/revolution. If the RPM reads double, switch to 1 pulse per revolution.
- If connecting to an older vehicle (including motorcycles with analog ignitions and solid core spark plug wires), interference may occur. If this happens modern noise suppression spark plug wires and spark plugs MUST be used.
- If connecting to an MSD or other multi-strike ignition system you will need to connect to the tachometer output terminal on the ignition system. Refer to the user manual of your ignition system for output location and pulse frequency.
- On odd fire engines such as Harley Davidson engines connect to one coil and use the single cylinder (0.5 pulse per revolution) mode setting.

For additional product installation information and technical support, contact LPE or your LPE products distributor. You can also find technical support and usage discussions regarding this product and many other LPE products in our Internet forums:

http://www.lingenfelter.com/LPEforumfiles

Window switch mode programming instructions:

To Enter/Exit RPM Window Mode:
1 – With power off, set the two switches to 0 and the Input Signal Pulse Per Revolution to Low Range 0.5 pulse per mile (as shown in the image below)



2 – Turn Power on to RPM-002 switch.
3 – Red LED will blink once per second for 30 seconds.

A – If RPM-002 is in Window Mode already the Red LED will go out and remain out until power is removed. When the Red LED goes out the RPM-002 is returned to Normal RPM Switch mode. Set to the desired RPM and Pulse Frequency/RPM Range and turn power back on.

B – When entering RPM Window Mode of operation the Red LED will begin to blink 5 times per second. Do NOT move the Pulse Frequency/RPM Range Select Switch before setting the RPM switches.

1 – Set the RPM Programming switches to the desired low RPM setting.
IMPORTANT – Low RPM must be in the range 400 to 9,900 RPM.
2 – Once you have set the Desired Low RPM set the Pulse Frequency/RPM Range Select Switch to a non-zero position.
3 – At this point the Low RPM setting will be checked for a valid setting. If the Low RPM is below 400 RPM or Above 9,900 RPM the Red LED will blink alternating between Fast and Slow to indicate an Error.
4 – If the Low RPM setting is valid the RPM-002 will now enter Window Mode and the Low RPM setting will be saved along with the new operating mode.
5 – The Red LED will now blink a pattern to show the Low RPM setting. Example – LED will blink twice, wait 1 second then blink eight times to indicate a setting of 2,800RPM.
6 – Turn power off.
7 – Set the Pulse Frequency/RPM Range Select switch to position needed for your application.
8 – Set the RPM Programming Switches to the desired High RPM setting.
IMPORTANT – High RPM setting must be greater than Low RPM setting.
9 – Turn power ON, The Red LED will blink the current Low RPM setting and then come on steady and the RPM-002 is ready for Window Mode operation.

IMPORTANT – If power is removed while in the process of changing operating modes the new settings may become corrupt. On power up the RPM-002 will check for valid settings and will default back to Normal Operating mode if an error has occurred.

To set a new Low RPM, follow instructions to switch back to Normal mode, and then back to Window Mode and set Low RPM as outlined above.

Normal Mode Power Up – The Red LED will come on steady at power up.

Normal Mode Error – If the RPM is set for less than 500 the Red LED will blink five times per second until the RPM-002 is powered down and a valid RPM is set.

Normal Mode Operation – When in Normal Mode when the set RPM is reached the Outputs will be active.

Window Mode Power Up – The Red LED will blink the Low RPM setting to indicate Window Mode is active and to verify the Low RPM setting.

Window Mode Error – If the Low RPM setting is great than or equal to the High RPM setting the red LED will blink ten times per second. Either set a new correct Low RPM or adjust the High RPM to a value greater than the Low RPM setting.

Window Mode Operation – When in Window Mode the Outputs will be Active when the RPM is Equal to or Above the Low RPM setting and the RPM is Below or Equal to the High RPM setting.

Table B

Common vehicle ECM/PCM tachometer signal wiring information					
Vehicle	**Year(s)**	**ECM/PCM location**	**Pin**	**Wire color**	**Circuit #**
Camaro & Firebird	1996-1997	Connector C1 (Red)	13	White	121
Camaro & Firebird	1998	Connector C2 (Blue)	35	White	121
Camaro & Firebird	1999-2002	Connector C2 (Red)	10	White	121
Corvette	1996	Connector C1 (Red)	13	White	121
Corvette	1997-1998	Connector C2 (Blue)	35	White	121
Corvette	1999-2003	Connector C2 (Red)	10	White	121
Corvette	2004	Connector C2 (Green)	10	White	121
Corvette	2005	Connector C1 (Blue)	48	White	121
Corvette	2006-2007	Connector C1 (Black)	48	White	121

Table C

RPM in thousands (X000)		
0 to 9 equal to 0 to 9000 RPM (in LOW) or 10000 to 19000 (in HIGH)		
Switch setting	RPM	
	LOW mode	HIGH mode
0	0	10000
1	1000	11000
2	2000	12000
3	3000	13000
4	4000	14000
5	5000	15000
6	6000	16000
7	7000	17000
8	8000	18000
9	9000	19000

Table D

RPM in hundreds (0X00)	
0 to 9 equal to 0 to 900 RPM (in LOW or HIGH)	
Switch setting	RPM
0	0
1	100
2	200
3	300
4	400
5	500
6	600
7	700
8	800
9	900

Table E

	Pulse/rev	Common Application(s)
Low Range RPM mode	0.5	Typical 1 cylinder engines & individual coil ignitions such as '99+ V8 Mustang, Suzuki Hayabusa, Kawasaki ZX-14
	1	Typical 2 cylinder engines & wasted spark coil packs such Viper/SRT10 coil
	1.5	Typical 3 cylinder engines
	2	Typical 4 cylinder engines + LS1, LS2 etc.TACH signal
	2.5	Typical 5 cylinder engines
	3	Typical 6 cylinder engines
	4	Typical 8 cylinder engines
	5	Typical 10 cylinder engines
High range RPM mode	0.5	Typical 1 cylinder engines & individual coil ignitions such as '99+ V8 Mustang, Suzuki Hayabusa, Kawasaki ZX-14
	1	Typical 2 cylinder engines & wasted spark coil packs such Viper/SRT10 coil
	1.5	Typical 3 cylinder engines
	2	Typical 4 cylinder engines + LS1, LS2 etc. TACH signal
	2.5	Typical 5 cylinder engines
	3	Typical 6 cylinder engines
	4	Typical 8 cylinder engines
	5	Typical 10 cylinder engines

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