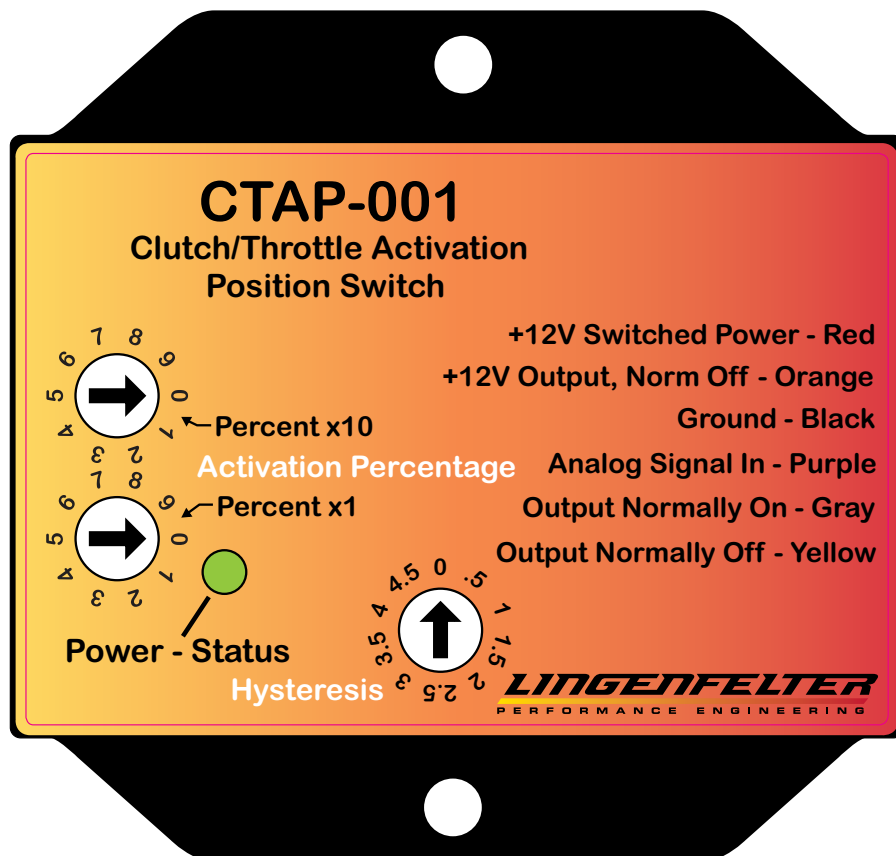


CTAP-001 Clutch/Throttle Position Activation Switch Installation Instructions



PN: L460190108

Parts List

LPE CTAP-001 Clutch and Throttle Activation Position Switch Kit (PN: L460190108)

#	Description	Part number
1	CTAP-001 Clutch and Throttle Activation Position Switch	CTAP-001
2	Self-tapping screws	AV16037
2	Hook and loop tape, per inch	06483
1	Connector, AMP Mate-N-Lock, Male, one position	14803510
1	Connector, AMP Mate-N-Lock Pin, 20-14 AWG	60620-1
6	Instructions	N/A

Tools & Materials Required

- Phillips head screwdriver
- Wire crimping tool
- Flashlight
- ZIP ties

Optional Items

#	Description	Part number
1	LPE Technician's Screwdriver	L950050000
1	Plug & play LS3, LS2, LS7, LSA throttle body TPS harness w. signal wire output & connector	CE105454
1	Plug & play CPP sensor harness for '08+ Corvette, '10+ Camaro & '09+ CTS-V	L480370108



Specifications:

- Available output types:
 - Normally OFF +12vdc
 - Normally ON ground
 - Normally OFF ground
- Analog 0-5 volt input that can accept a Throttle Position Sensor (TPS), Clutch Pedal Position (CPP) sensor, Accelerator Pedal Position (APP) sensor, or most any other rising or falling 0-5 volt signal.
- CTAP-001 switch settings can be adjusted in 1% increments from 0% to 99%.
- Adjustable hysteresis settings of 0%, 0.5%, 1%, 1.5%, 2%, 2.5%, 3%, 3.5%, 4%, and 4.5%
- Custom molded high temperature glass filled Nylon 6 enclosure.
- Fully encapsulated (potted) construction for increased durability.
- Outputs rated for up to 0.75 amps each.
 - The CTAP-001 outputs should control a relay for higher current level applications.
- All three outputs (+12v activation normally OFF, GROUND activation normally ON and OFF) can be used simultaneously.
- 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 18.0 volts.
- Input signal impedance: 100k ohms.
- Current draw: 0.1 amp plus current draw of device being controlled (when active).
- One year warranty (from date of purchase).

Description:

The CTAP-001 Clutch and Throttle Position Activation Switch Module provides window switch activation based on most common 0-5 volt sensor signals. The CTAP-001 is designed to connect to 0 to 5 volt DC sensors including most throttle position sensors (TPS), accelerator pedal position (APP) sensors, clutch pedal position (CPP) sensors, brake pedal position sensors and manifold air pressure (MAP) sensors. The CTAP-001 will accept either a rising or falling voltage signal.

The primary uses for the CTAP-001 are:

- Control the activation of nitrous systems based on throttle position
- Control the activation of a 2-step based on clutch pedal position

In nitrous applications the CTAP is normally used to disable the nitrous below a specified throttle angle. The CTAP allows you do to this on most EFI engines without having to add a wide open throttle (WOT) switch. This is especially helpful on electronic throttle equipped vehicles where no mechanical throttle linkage exists to connect a microswitch to. The TPS based enable is normally used in conjunction with an RPM based enable/disable strategy using a Window Switch or a programmable nitrous controller with built in RPM limit capabilities.

For 2-step applications, the CTAP is used to enable the operation of the 2-step based on clutch pedal position in newer vehicles that have a clutch pedal position sensor. Vehicles such as the 2010-2015 Camaro, 2008-2013 Corvette and the 2009-2015 Cadillac CTS-V are equipped with a clutch pedal position (CPP) sensor. Unlike the clutch pedal switches found on many earlier vehicles, the CPP sensor behaves much like a throttle position sensor. This means that it does not provide an open or closed type contact that can be used to directly enable or disable a 2-step, relay or other device. The CTAP takes the variable voltage signal from the CPP sensor and provides a programmable switched output that can then be used to enable and disable a 2-step or other device. This also gives the added benefit of making it very easy to adjust where in the pedal travel the 2-step activates.

Note the CTAP is usually not needed with the LPE NCC-001 and NCC-002 nitrous controllers since these devices can accept a throttle and/or clutch pedal position sensor signal directly.

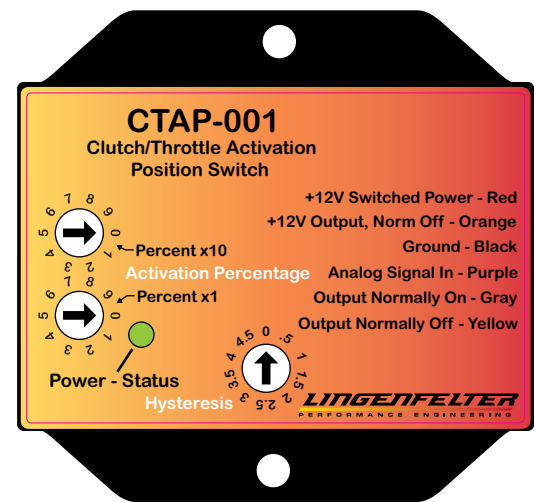
WARNING: The CTAP-001 can not be connected to the throttle position sensor on the new GM direct injection V8 and V6 engines or other engines that use a digital throttle position signal. This includes the 2014-2016 C7 Corvette (LT1 or LT4) and the 2014-2016 4.3L, 5.3L and 6.2L Sierra and Silverado trucks. On these vehicles the throttle position signal is no longer a 0-5 volt signal but is a digital serial data signal. Contact LPE for alternative methods of obtaining a TPS signal on these vehicles.

Table A - Wiring (also labeled on module):

Wire color	Label	Notes
Red	+12 Vdc	Connects to a switched and fused +12 volt DC source.
Orange	Normally Off +12 Vdc Output	This is the normally open (OFF) +12 Vdc activation wire. This wire will close the +12 Vdc path when the switch is activated. This connects to the +12 Vdc side of the device you plan to control.
Black	Ground	Connects to a vehicle ground.
Purple	Analog Input	This connects to the analog signal output wire of a Clutch Pedal Position sensor, Throttle Position Sensor, Accelerator Pedal Position sensor, or other rising or falling 0-5 volts signal sensors.
Gray	Normally On Ground Output	This is the normally closed (on) ground 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.
Yellow	Normally Off Ground Output	This is the normally open (off) ground activation wire. This wire connects to ground when switch is activated. This connects to the ground side of the device you plan to activate.

Settings:

- Controlled by three ten position switches on the front face and a programming button inside the back cover of the CTAP-001
- Two ten position switches for selecting the activation percentage
 - Percent x10
 - Percent x1
- One ten position switch for selecting the activation hysteresis
 - Hysteresis values of 0%, 0.5%, 1%, 1.5%, 2%, 2.5%, 3%, 3.5%, 4%, and 4.5%
 - Hysteresis example: If the activation percentage switches are set to 90% and the hysteresis switch is set to 4%, the CTAP should switch the outputs when the signal reaches 90% of the pedal/throttle travel and then switch back when the signal falls below 86% of the pedal/throttle travel.
 - It is recommended to use at least a small percentage of hysteresis as it is possible for the CTAP to continually switch the outputs on and off if the pedal/throttle position is held at the user-defined activation percentage point with no hysteresis.
- When all three switches are set to zero, the CTAP-001 is in programming mode.
- One programming button inside the rear cover of the CTAP-001
 - While in programming mode, press this button to calibrate the input signal voltages.



Status LED Operation:

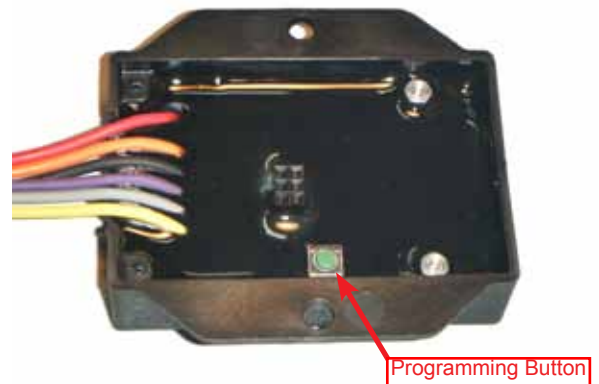
- Blinking GREEN when CTAP-001 is in programming mode (all three switches are set to zero)
- Blinking GREEN+RED after the programming button has been pressed and the CTAP-001 is observing the analog input voltages. The LED will continue blinking GREEN+RED until two sweeps (from closed throttle/released clutch to Wide Open Throttle/depressed clutch) of at least 1.5 volts are taken. Once this parameter is met, the LED will change to one of the following colors:
 - In programming mode, a solid GREEN LED signifies that the programming of the analog voltage range was successful.
 - Blinking RED when an error occurs, which can be fixed by reprogramming the module. The following conditions must be met for the programming to be successful:
 - The span between the closed throttle/released clutch signal and the Wide Open Throttle (WOT)/depressed clutch voltages must be at least 1.5 volts.
 - The difference between the first WOT/depressed signal voltage and the second WOT/depressed signal voltage must be less than or equal to 0.1 volts.
- Solid GREEN LED when the CTAP-001 is powered up in normal operating mode and remains solid GREEN until the input exceeds the user-defined percentage set point.
- Solid RED once the user-defined percentage set point has been exceeded, which means that the outputs are active--remains solid RED until the input falls below the user-defined set point (and hysteresis, if set to some percentage besides zero)

General Installation of the CTAP-001

- Disconnect the negative battery terminal.
- Connect black ground wire of CTAP to a suitable vehicle ground.
- Connect the red +12v power wire to a **switched and fused** +12 volt DC source.
- Connect the purple analog signal input wire from the CTAP to the output signal wire from the sensor that will be used to activate the CTAP, such as the Clutch Pedal Position (CPP) sensor, Throttle Position Sensor (TPS), Accelerator Pedal Position (APP) Sensor, or other sensor that uses a 0-5 volt output signal.
- If you will be using the Normally Off (open) ground activation output, connect the yellow wire to the ground side of the device you plan to activate.
- If you will be using the Normally On (closed) ground activation output, connect the gray wire to the ground side of the device you plan to activate.
- If you will be using the Normally Off (open) +12 Vdc activation output, connect the orange wire to the +12 Vdc side of the device you plan to activate.
- If the device you will be controlling draws more than 0.75 amps, make sure to control the device through a relay.
- Refer to the Programming instructions on page 5 to calibrate the CTAP-001 for the sensor signal that will be used to activate it.
- With the device powered down, set the activation percentage (and the hysteresis if desired)
- Secure the CTAP-001 using the supplied hook and loop tape or using the supplied self taping screws.

Programming the CTAP-001

1. To put the CTAP-001 in programming mode, set all three switches to zero and power up the module. The LED on the CTAP-001 should now be blinking GREEN.
2. Using a Phillips head screwdriver, remove the back cover on the CTAP-001 to access the green programming button.
3. *With the vehicle keyed on, the engine off, and your foot off of the pedal, press the green programming button on the back of the CTAP-001. The CTAP-001 will now take the current closed throttle voltage or released clutch voltage, depending on which sensor you connected the CTAP-001's purple analog input wire to. The LED on the CTAP-001 will blink RED+GREEN at this time.
4. Fully depress and then fully release the pedal that the CTAP-001 is connected to (throttle or clutch) two times. The CTAP-001 will find the average of the two depressed voltages and then compare the average to the released voltage to determine whether the calibration is valid. If the LED turns solid GREEN, the calibration was successful and is programmed into memory. If the LED begins to blink RED, the calibration was unsuccessful for one of the following reasons:
 - The span between the closed throttle/released clutch signal and the wide open throttle (WOT)/depressed clutch voltages must be at least 1.5 volts.
 - The difference between the first WOT/depressed voltage and the second WOT/depressed voltage must be less than or equal to 0.1 volts.
5. If an error occurs, simply power down the CTAP-001 and re-program the pedal position voltages.
6. If the programming of the CTAP-001 was successful, the LED will be solid GREEN until the input voltage exceeds the user-defined set point. When the input voltage exceeds the user-defined set point, the LED will turn solid RED, indicating that the outputs are active.



***THE VEHICLE MUST BE KEYED ON BEFORE YOU PRESS THE PROGRAMMING BUTTON.**

Notes and Warnings:

- **Changes to the Clutch/Throttle activation percentage settings must be done with the ignition off.**
 - The switch positions are only read on power up of the CTAP.
- **Make sure that the CTAP and all connected wires will not interfere with the operation of the pedals (gas, brake, and clutch).**
- Do NOT mount the CTAP-001 directly on top of the engine or near the exhaust manifolds due to heat concerns.
- Do NOT mount the CTAP-001 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 CTAP-001). Failure to do so may result in erratic operation of electronic devices including the CTAP-001.
- It is important to note that the throttle on an electronic throttle body is usually not fully closed with the vehicle keyed on and the engine off. Because of this, the 0%-99% setting on the CTAP may not match the 0%-99% value displayed on the scan tool.
- **While every effort has been made by LPE to test the CTAP-001 on a variety of vehicles, we can not guarantee that this module will work with every electronic throttle currently in use. If this module causes the ECM to set a code or causes any other engine operation issues, disconnect and discontinue the use of this module IMMEDIATELY.**

Throttle versus pedal position signal:

- Electronic throttle equipped vehicles have a position sensor on the accelerator pedal (referred to in these instructions as the Accelerator Pedal Position (APP) sensor) and also have a position sensor on the throttle blade at the engine itself (referred to in these instructions as the Throttle Position Sensor (TPS)).
- When using the CTAP as a wide open throttle (WOT) switch in order to provide a safety shut-off for nitrous oxide injection and other similar systems, we generally recommend that you connect to the throttle (TPS) in order to get the signal. The reason for this is that under some conditions the engine control module (ECM) may close the throttle even though you have the accelerator pedal fully depressed. This can occur during a gear change, if an over-rev condition occurs or if traction control is activated. If this happens and you are using the accelerator pedal sensor signal, the nitrous will not turn off even though the throttle is actually closed.
- When connecting to the throttle position signal on the 2005-2013 Corvette, 2010-2015 Camaro SS, 2012-2015 ZL1 Camaro, 2006-2007 CTS-V, 2009-2015 CTS-V, 2005-2006 GTO, 2007 and newer full size trucks and most other GM Gen IV V8 engine equipped vehicles, LPE offers a plug and play harness that already has a wire tapped into the TPS signal so that you do not have to cut into your stock wiring harness. This harness is LPE part # CE105454.
- On some engines, primarily newer 4 cylinder and 6 cylinder engines, the throttle may not open fully at low RPM even though the accelerator pedal is fully depressed. In these applications you may have to use the accelerator pedal position signal or accept activation not occurring until the RPM reaches a certain level.

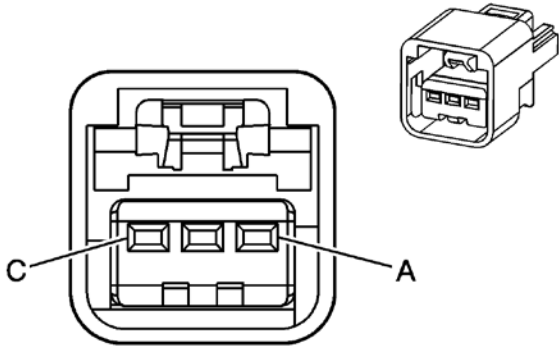
Installation on 2008-2015 Corvette, 2010-2015 Camaro SS, or 2009-2015 CTS-V clutch position sensor:

- The clutch pedal position sensor on the 2008-2016 Corvette, 2010-2015 Camaro, and 2009-2015 CTS-V is found in the clutch pedal assembly in the footwell of the driver side of the vehicle.
- See pages 6-7 for images showing the location of the clutch position sensor in the clutch pedal assembly and for the connector wiring information.
- The purple analog input wire from the CTAP-001 needs to tie into the sensor signal wire on pin B of the clutch pedal position sensor connector (dark blue on the Corvette, yellow on the Camaro, and light green or tan on the CTS-V).
- You can also install the LPE Plug and Play Harness (PN: L480370108), which is specifically designed for the 2008-2016 Corvette, 2010-2016 Camaro, and the 2009-2015 CTS-V. This harness allows you to acquire the clutch position signal voltage without modifying any of the vehicle's existing wiring.

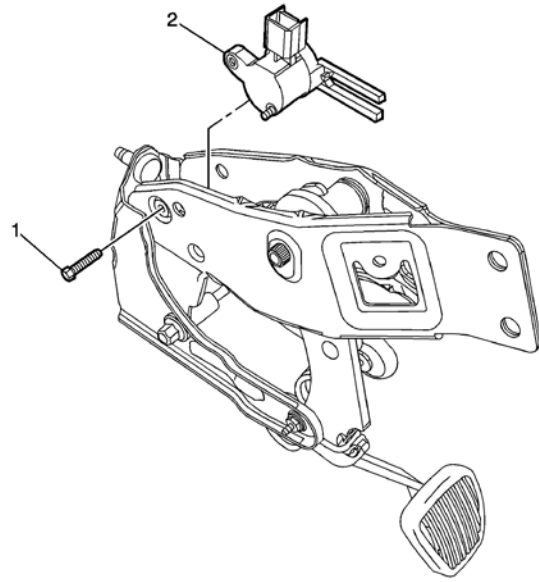
LNC-2000, LNC-2001 and LNC-003 related installation notes:

- For connecting the CTAP-001 to the LNC-2000, LNC-2001 or LNC-003, either a 12v or a ground activation method can be used. All of the wiring diagrams supplied with the LNC-2000, LNC-2001 and LNC-003 show using a 12v activation trigger.
 - This is done because 12v activation problems are usually easier to trace and diagnose than ground activation problems. If a wire has missing insulation and touches to ground you may not be able to easily tell. If a 12v wire shorts to ground it will usually blow a fuse or some other similar indicator of a problem.
- If activating the LNC with the CTAP-001 via 12v activation, connect the orange +12v normally off activation output wire from the CTAP-001 to the yellow +12v activation input wire on the LNC.
- If activating the LNC with the CTAP-001 via ground activation, connect the yellow normally off ground activation wire from the CTAP-001 to the green ground activation wire on the LNC.
- Do not use both methods at the same time on the LNC. You must use one or the other, not both.
- The CTAP-001 outputs not being used for the LNC can be used to activate other devices since all CTAP-001 outputs can be used at the same time.
- Once you have connected the CTAP-001 to the position sensor signal wire, mount the CTAP-001 in a location that will not impact the travel of any of the pedals.

2010-2015 Camaro clutch position sensor connector end view

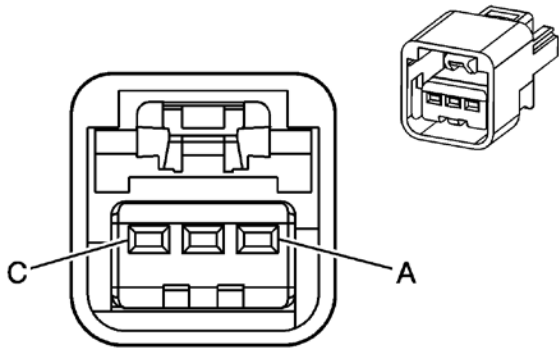


2010-2015 Camaro clutch position sensor location

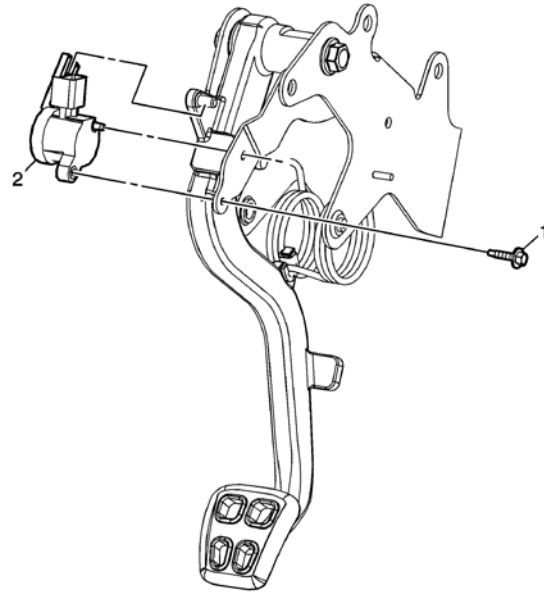


2010-2015 Camaro B25B Clutch Pedal Position Sensor (MV5 or M10)			
Pin	Wire	Circuit	Function
A	0.35 TN	6109	5-Volt Reference 1 (MV5) 5-Volt Reference 2 (M10)
B	0.35 YE	6111	Clutch Pedal Position Sensor Signal
C	0.35 WH	6110	Low Reference

**2008-2016 Corvette and 2009-2015 CTS-V
clutch position sensor connector end view**



**2008-2016 Corvette and 2009-2015 CTS-V
clutch position sensor location**



2008-2013 Corvette Clutch Pedal Position (CPP) Sensor (MM6/MZ6/MN6)			
Pin	Wire	Circuit	Function
A	0.35 D-GN/WH	6294	Low Reference
B	0.35 D-BU	6306	Clutch Pedal Position Sensor Signal
C	0.35 D-GN	6293	5-Volt Reference
2014-2016 Corvette Clutch Pedal Position (CPP) Sensor (MEK/MEL/MEP)			
Pin	Wire	Circuit	Function
A	BK/GY	6110	Clutch Apply Sensor Low Reference
B	YE	6111	Clutch Apply Sensor Signal
C	GY/RD	6109	Clutch Apply Sensor Voltage Reference
2009-2011 CTS-V Clutch Pedal Position (CPP) Sensor (MV7/MG9)			
Pin	Wire	Circuit	Function
A	0.35 GY/BN	7345	Low Reference
B	0.35 L-GN	6338	Clutch Pedal Position Sensor Signal
C	0.35 D-BU/YE	7346	5-Volt Reference
2012-2015 CTS-V Clutch Pedal Position (CPP) Sensor (MV7/MG9)			
Pin	Wire	Circuit	Function
A	0.35 OG/D-GN	7360	Low Reference
B	0.35 TN	6338	Clutch Pedal Position Sensor Signal
C	0.35 D-BU/WH	7361	5-Volt Reference

NOTICES:

It is the responsibility of the purchaser to follow all guidelines and safety procedures supplied with this product and any other manufacturer's product used with this product.

Lingenfelter Performance Engineering assumes no responsibility for damages resulting from accident, improper installation, misuse, abuse, improper operation, lack of reasonable care, or all previously stated reasons due to incompatibility with other manufacturer's products.

Lingenfelter Performance Engineering assumes no responsibility or liability for damages incurred from the use of products manufactured or sold by Lingenfelter Performance Engineering on vehicles used for competition racing.

It is the purchaser's responsibility to check the state and local laws and sanctioning body requirements pertaining to the use of this product for racing applications. Lingenfelter Performance Engineering does not recommend nor condone the use of its products for illegal street racing.

Limited Warranty:

Lingenfelter Performance Engineering warrants the Lingenfelter CTAP-001 Clutch and Throttle Activation Position Switch to be free from defects in material and workmanship under normal use and if properly installed for a period of one year from date of purchase. If the module is found to be defective as mentioned above, it will be replaced or repaired if returned prepaid along with proof of date of purchase. This shall constitute the sole remedy of the purchaser and the sole liability of Lingenfelter Performance Engineering. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall Lingenfelter Performance Engineering be liable for special or consequential damages.

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