



112-581 LS 105mm Throttle Body (w/ cable drive & taper)
112-583 LS 105mm Throttle Body (w/ cable drive - without taper)
112-585 LS 95mm Throttle Body (w/ cable drive & taper)
112-589 LS 90mm Throttle Body (w/ cable drive & taper)

Intake Applications:

P/N	Bore size	Low RPM Taper	Application	Intake application		
112-581	105mm	Yes	Street/Race	Holley 105mm Hi-Ram		
				Fast™ LSXR & LSXRT		
				MSD® Atomic AirForce		
				Most other 102 through 105mm LS intakes using 4 bolt TBs		
112-583	105mm	No	Race	Holley 105mm Hi-Ram		
				Fast™ LSXR & LSXRT		
				MSD® Atomic AirForce		
				Most other 102 through 105mm LS intakes using 4 bolt TBs		
112-585	95mm	Yes	Street/Race	Stock LS2		
				Stock LS3		
				Stock LS7		
				Holley LS Mid-Rise		
112-589	90mm			Yes	Street/Race	Holley 95mm Hi-Ram
						Fast™ LSX
						Edelbrock Pro-Flo XT using 4 bolt TBs
						Most other 90 through 95mm LS intakes using 4 bolt TBs

NOTE: Holley's LS throttle bodies work with intakes that are ported and non-ported. For intakes that do not have the same opening as these throttle bodies, and full porting is not desired, simple chamfering of the leading edge of the intake opening will improve air flow.

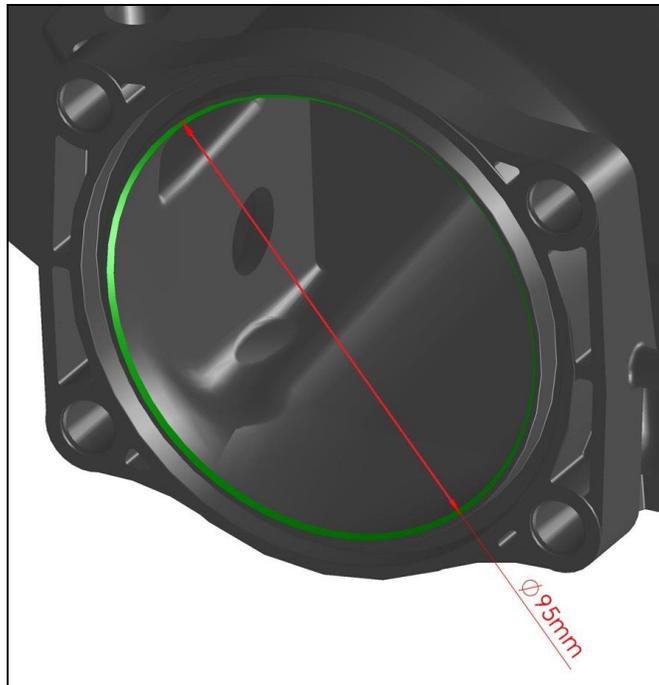


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1.0 TAPERED VS. NON-TAPERED DESIGNS:

Tapered models offer more pedal to throttle travel at low RPMs to improve drivability on street and similar applications. Models without tapers are maximized for "RACE ONLY" applications.

2.0 ACCESSORIES - CABLE BRACKETS:

- 20-147 Cable Bracket for 90 & 95mm Throttle Bodies and Factory or FAST® style intakes
- 20-148 Cable Bracket for 105mm Throttle Bodies and Factory or FAST® style intakes
- 20-149 Cable Bracket for 90mm, 95mm, and 105mm Throttle Bodies and Holley Hi-Ram intakes

3.0 THROTTLE BODY ASSEMBLY:

1. Install the IAC (not supplied) onto the Holley throttle body.

Required Idle Air Control (IAC) valve motor
Application: '98-'02 5.7L Chevrolet Camaro
Standard Motor Prod. # AC234
GM # 17113598

2. Make certain the o-ring is correctly placed on the IAC. Holley suggests putting lubricant on the o-ring, such as Vasoline®.
3. Install with plug, oriented as shown in **Figure 1**, using the (2) supplied M4 X 10mm button head screws.

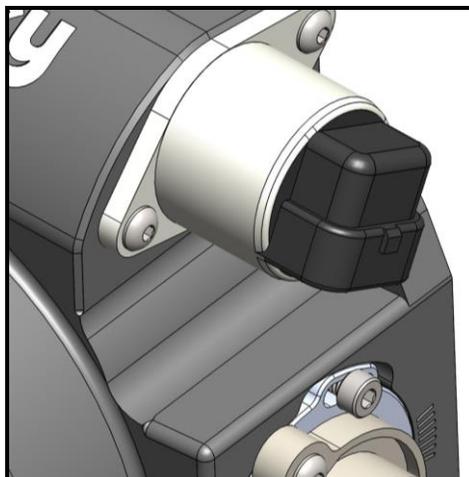


Figure 1

4. Torque the M4 bolts to 18 in./lbs. Use thread locking compound 262 or equivalent.
5. Install the TPS (not supplied) onto the Holley throttle body.

Required Throttle Position Sensor (TPS)
Application: '98-'02 5.7L Chevrolet Camaro
Standard Motor Prod. # TH149
GM # 17123852

6. Make certain the o-ring is correctly placed on the TPS.
7. Align the "D" shaped socket in the TPS to the throttle body shaft and lightly press the TPS toward the CLOCKER ring's face.
8. Rotate the TPS slightly counter-clockwise to engage the locator pin into the slot on the CLOCKER ring.
9. Press inward to seat the TPS to the ring's face.
10. Use the (2) supplied M4 X 14mm S. S. button head screws.
11. Torque the M4 bolts to 18 in./lbs. Use thread locking compound 262 or equivalent.

WARNING! If it is required that the TPS be removed from the throttle body, care will need to be taken as the shaft is tight in the sensor's bore. Slowly and evenly work the sensor off the shaft. After removal, inspect the sensor for damage before reusing.

IMPORTANT! Rotate the cable arm completely open and back to closed to confirm the sensor does not stop rotation before the throttle body cable arm hits its hard stops.

4.0 PCV PASSAGE VALVE SETTING (OPEN/CLOSED):

1. See **Figure 2**.
2. Before installation, determine your PCV requirements.

NOTE: Most applications have a PCV tube that connects to the throttle body.

3. If you have a Turbo or Centrifugal style supercharger, the PCV connection is not typically used and this passage will need to be closed. Rotating the valve screw clockwise until tight will close the passage for these applications.
4. If you will be using the PCV as with most applications, the passage is open from the factory.
5. If there is a need for repositioning to the factory open setting, rotate counter-clockwise pushing in until a click is felt. Then rotate 1 ½ turns clockwise to ensure enough thread engagement.

5.0 INSTALLATION:

1. Disconnect the negative battery cable.
2. Remove the air intake lid and air intake duct.
3. Unplug the Mass Air Flow (MAF) sensor and intake air temp sensors (if applicable).
4. Disconnect the Throttle Position Sensor (TPS) and Idle Air Control (IAC) valve motor.
5. If there are coolant lines connected to the original throttle body, use a barbed coupler and clamps to join the lines together.
6. Remove the original throttle body bolts and throttle body.
7. Install the throttle cable bracket (not supplied) and the Holley throttle body.
8. In most cases, the intake will have an o-ring seal (**Figure 3**). Use this seal between the intake and throttle body when possible. A standard gasket has been provided for use if:
 - The intake has been custom ported to fully utilize the throttle body bore *and* as a result the o-ring cannot be used
 - Holley throttle cable bracket 20-147 or 20-148 is used (**Figure 4**).
 - The mating intake does not have an o-ring feature and is designed for use with a flat gasket.

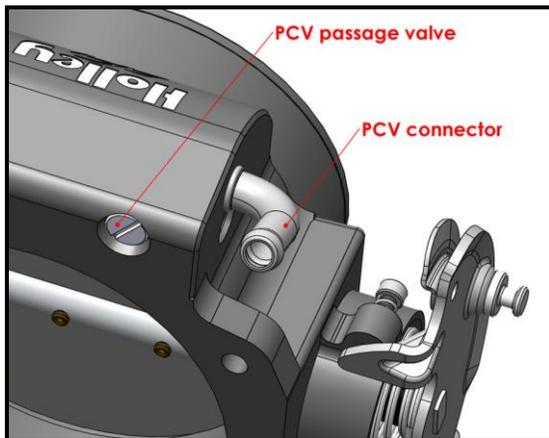


Figure 2

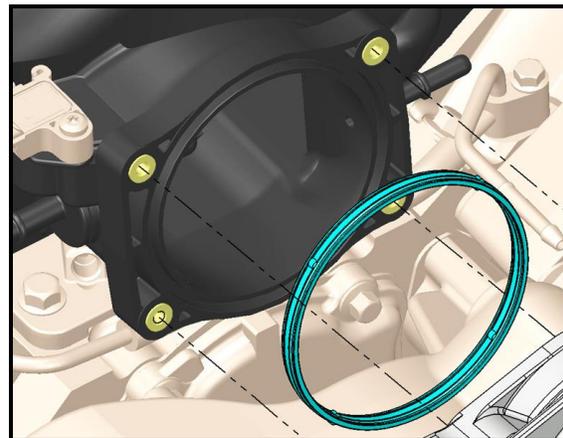


Figure 3

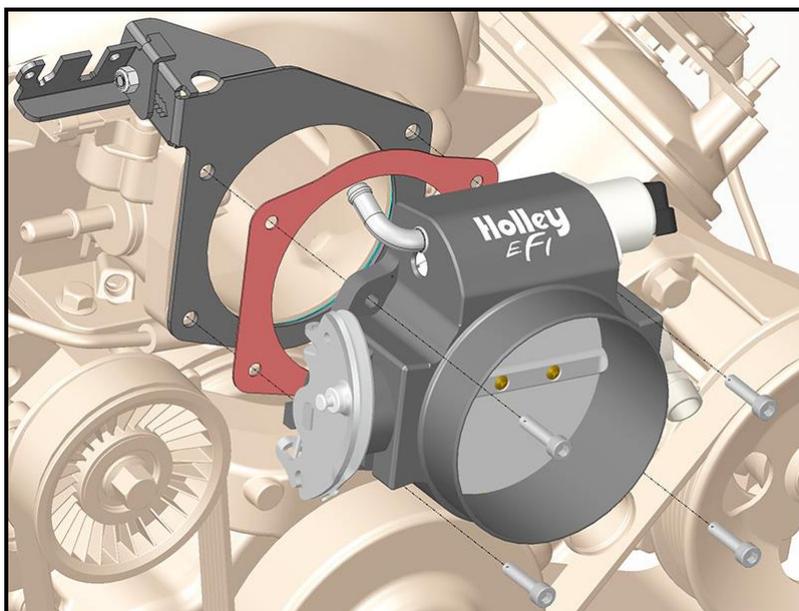


Figure 4

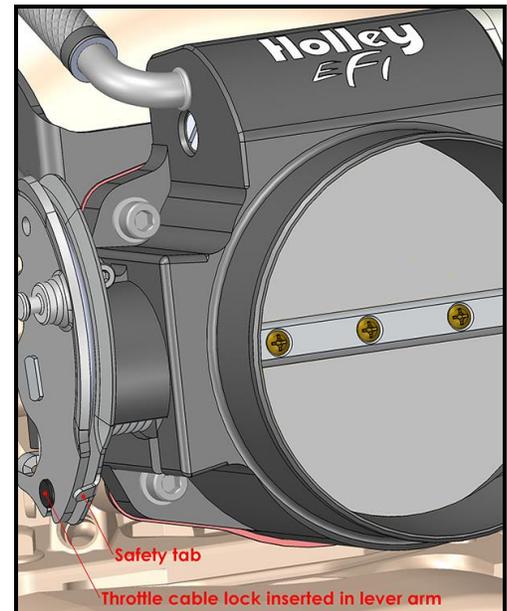


Figure 5

9. Mount the throttle body to the intake manifold using the supplied (4) M6x1 -25mm screws and (4) washers. Torque these bolts to 10 Nm (89 in./lbs.).
10. This throttle body works with throttle cables from '98-'02 5.7L Camaro and Firebird (GM Part # 12565560). There is also an allowance for a cruise control cable from the same applications (numerous GM Part #s).
11. Install the throttle cable and cruise control cable (if applicable).
12. After inserting the throttle cable lock into the lever arm, bend closed the safety tab (**Figure 5**).
13. Confirm the cable arm to cable bracket alignment and correct, if needed.
14. Check the cruise control cable to ensure the throttle is not sticking or binding with movement.
15. Install the PCV hose to the throttle body (if applicable).
16. Plug the harness to the TPS and IAC connectors.
17. Reinstall the air intake duct and air intake lid assembly.

NOTE: Most duct couplers have a degree of stretch and can be worked over larger throttle body inlets. If a larger coupler is required, reference the below chart for the throttle body you purchased. Couplers can be sourced from www.hiprospeed.com or several other suppliers.

P/N	Throttle Body	Throttle Body Inlet O.D.
112-581	LS 105mm Throttle Body (w/cable drive & taper)	4 1/4"
112-583	LS 105mm Throttle Body (w/cable drive - without taper)	4 3/8"
112-585	LS 95mm Throttle Body (w/cable drive & taper)	4"
112-589	LS 90mm Throttle Body (w/cable drive & taper)	3 7/8"

WARNING! Use care when installing the coupler to the throttle body. If the coupler has to be stretched and worked onto the throttle body inlet it is recommended that mechanics gloved be used in case hands slip.

18. Reconnect the battery.
19. Check throttle movement at pedal and adjust as needed.

WARNING! Any sticking, binding, or other interference in the throttle linkage could result in uncontrolled engine speed. This could result in engine damage or personal injury.

6.0 ON-ENGINE ADJUSTMENTS:

1. Start the engine and observe idle.
 - If idle is high, confirm the throttle cable is adjusted to allow the lever arm to rest on the blade idle screw (**Figure 8**) and the cable is not holding the blade open.
 - If idle is acceptable, bring the engine to running temperature and check the idle again.
 - If idle is not desirable, turn the key to the off position for 30 seconds. This allows the ECU to learn the IAC's new position. Restart engine and reevaluate idle.

IMPORTANT! The ECU takes time to learn after engine components have been changed. It is recommended that the vehicle be driven for one to two hours to allow the computer to adjust to this throttle body before moving to the following adjustments. Making adjustments before the computer has gone through a learn cycle can yield inconclusive and inconsistent results.

2. If idle is low or rough, adjust the bleed screw (**Figure 6**) counter-clockwise. This will increase idle RPM.

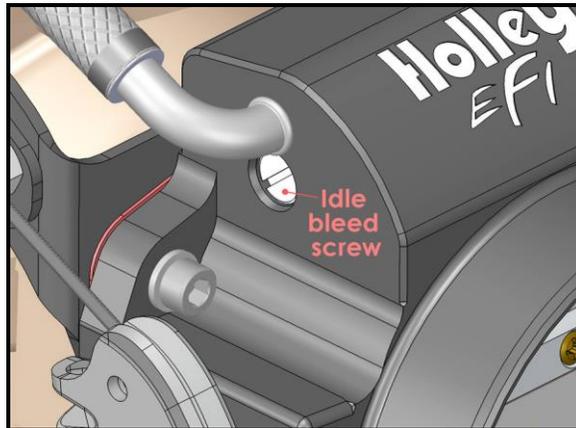


Figure 6

7.0 BLEED SCREW:

The idle bleed is an adjustable passage around the throttle blade to increase idle, if needed. The bleed screw allows idle adjustment without effecting blade position and TPS output voltages at idle.

7.1 Bleed Screw Adjustment (Simple):

1. Start with the bleed screw rotated fully clockwise. This is closed and the factory setting.
2. With the engine warm to running temperature and idling, rotate the bleed screw counter-clockwise to increase idle.
3. Set to preference. Maximum adjustment is when the screw head is flush with the face of the throttle body.
4. If the bleed screw is at maximum and the preferred idle is still not obtained, throttle blade adjustment may be required (see 8.0 Throttle Blade Idle Adjustment section).

7.2 Bleed Screw Adjustment (Advanced):

1. Start with bleed screw rotated fully clockwise. This is closed and the factory setting.
2. Remove the air intake duct and press the supplied blue plug into the IAC passage (**Figure 7**).
3. While the plug is in place, it is recommended the throttle blade not be opened to ensure the plug is not pulled into the intake.
4. Reattach the air duct, start the engine, and adjust the bleed screw counter-clockwise to increase idle.
5. Adjust to the lowest idle the engine will maintain. This will center the range of the IAC so the ECU can correctly control idle. Maximum adjustment is when the screw head is flush with the face of the throttle body.

6. **Remove the blue plug after the bleed screw has been adjusted and before driving.** If the bleed screw is at maximum and the preferred idle is still not obtained, throttle blade adjustment may be required (see 8.0 Throttle Blade Idle Adjustment section).

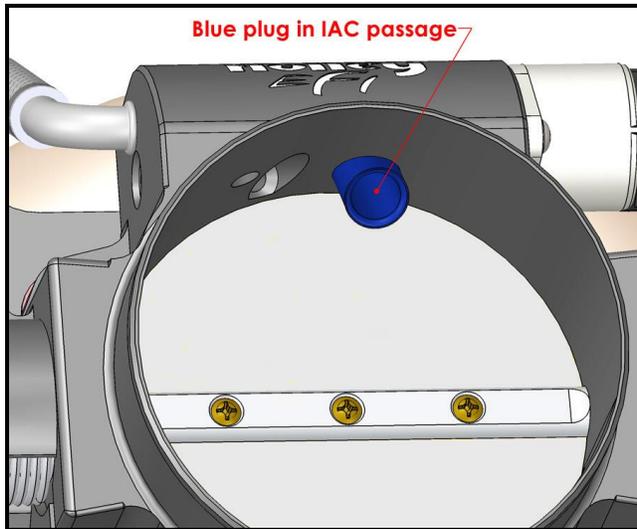


Figure 7

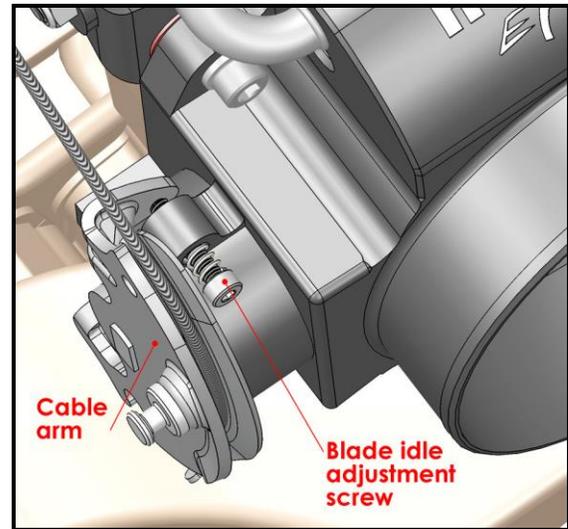


Figure 8

8.0 THROTTLE BLADE IDLE ADJUSTMENT:

1. If idle is still low after bleed screw adjustment, the blade adjustment screw can be adjusted to further increase idle. This will move the TPS output voltage up and potentially out of the range the ECU expects at idle (see 9.0 TPS Clocking Adjustment section).
2. Turn the blade idle adjustment screw (**Figure 8**) clockwise in small increments to increase idle as needed.

IMPORTANT!

If the blade idle adjustment screw is turned counter-clockwise to decrease idle, make certain the blade does not stick both with the engine cold and at running temperature. When closed, the cable arm tab should rest on the blade screw, not with the blade binding in the bore.

9.0 TPS CLOCKING ADJUSTMENT:

NOTE: If using a **Holley EFI** ECU, adjustment will not be required as the ECU will compensate for most TPS voltage output issues. Simply perform a TPS autotest after installing the throttle body and after any adjustments of the blade idle adjustment screw. If using a factory ECU, adjustment may be required in *some* cases.

Factory ECUs expect TPS idle voltage to be between 0.8 and 0.2 volts. If the output is outside this range, idle issues and engine trouble codes can result.

Reasons that may cause improper TPS idle voltage:
• Sensor variations (plus/minus 0.1 Volts)
• Throttle shaft rotation from increasing idle
• Vehicle wiring and connection resistance
• Other application variations

Holley has added the TPS CLOCKER (**Figure 9**) to correct these situations. This feature allows the TPS to be rotated back into the ECU's required idle voltage. The CLOCKER utilizes the full rotational range of the typical TPS and gives a resulting idle adjustment of about 1 volt total (+/- 0.5 volts). In some cases, the TPS may need to be adjusted at Wide Open Throttle (WOT). The ECU needs to see less than 5 volts at WOT.

IMPORTANT! After each time the CLOCKER is adjusted and before the engine is started, rotate the throttle arm and be sure that the arm tab contacts the throttle body's WOT hard stop and the blade idle adjustment screw *before* there is contact with the internal stops in the TPS. Tighten both of the CLOCKER ring screws before starting the engine. Torque M4 bolts to 18 in./lbs. and use thread locking compound 262 or equivalent after final setting.

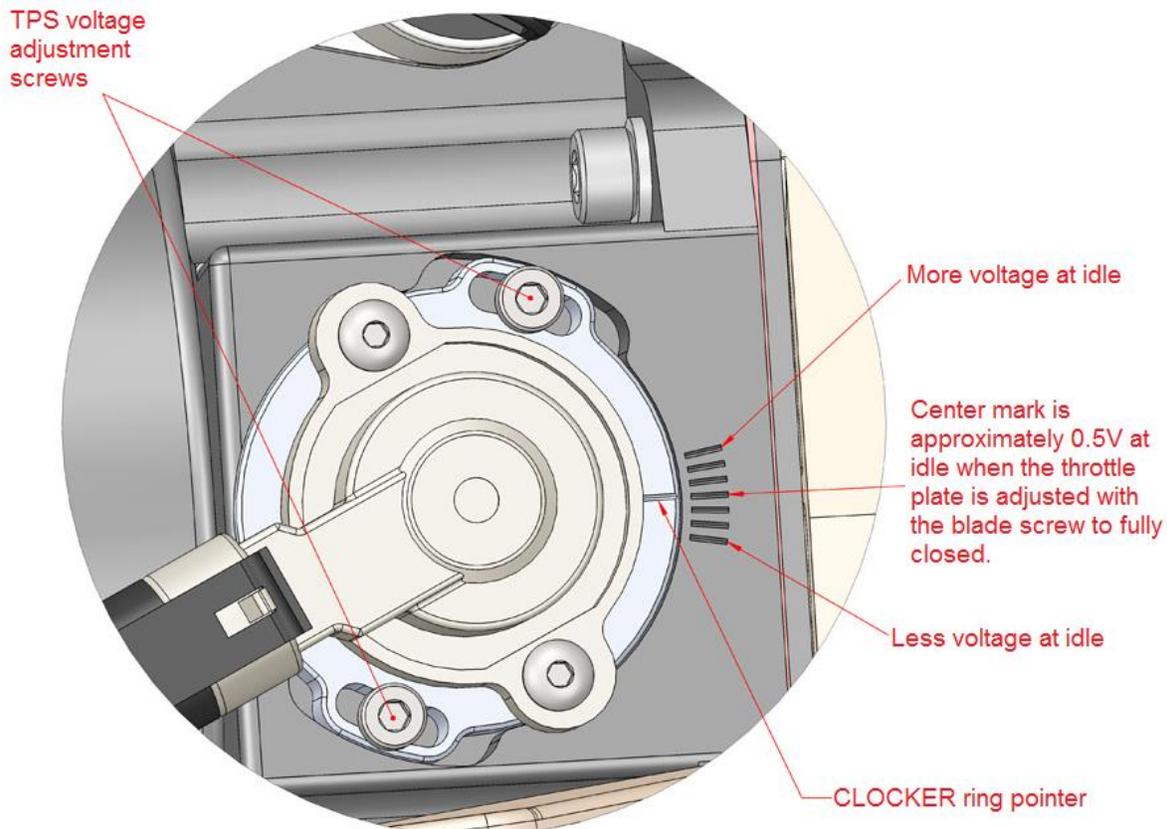


Figure 9

9.1 General Adjustment:

As a rule of thumb, if the throttle blade is adjusted at the blade adjustment screw, rotate the TPS the same amount in the same direction the plate is rotated. This will keep the output voltage the same at idle.

9.1.1 Voltage Setting With Multi-Meter:

If adjustment is required, readings can be taken to confirm TPS voltages are correct. Do the following with the key in the run position but without the engine started.

9.1.1A Polarity:

First determine the polarity of the ECU's 5 volt output (wires A and B). Unplug the harness plug from the TPS. Using a digital multi-meter set to DC voltage, place the red probe on the connector A and the black probe on the connector B (**Figure 10**). Typically B is the negative wire, but if the meter shows (-) negative voltage, switch the red and black meter probes. The black probe will then be on the negative connector.

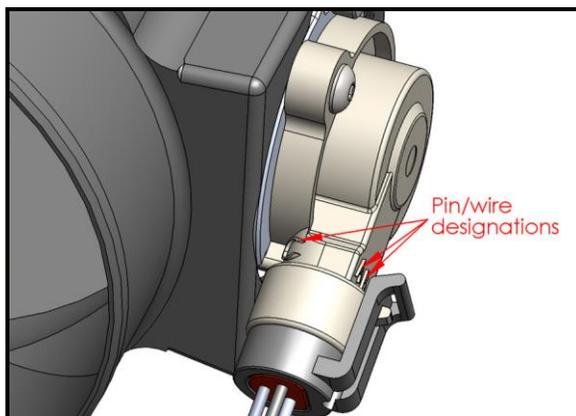


Figure 10

<u>Pin/wire</u>	<u>Typical polarity configuration</u>	<u>Reversed polarity configuration</u>
A	5 Volts (+) positive from ECU	(-) Ground
B	(-) Ground	5 Volts (+) positive from ECU to TPS
C	Output signal from TPS	Output signal from TPS

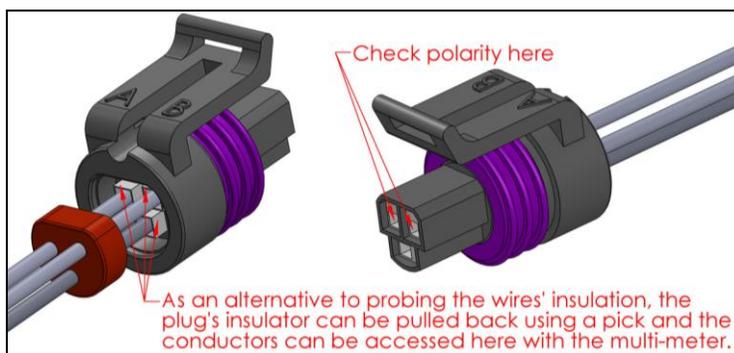


Figure 11

9.1.1B Voltage:

Reinsert the harness plug into the TPS. Push the meter's black probe through the insulation of (-neg) ground wire determined previously to contact the conductor inside. Push the red meter probe into wire C and contact the conductor. Note the voltage with the throttle body closed as well as rotated open to WOT. Adjust the TPS to around 0.5 volts at idle and confirm the voltage is in range at WOT. If the WOT voltage is out of range, the TPS can be adjusted to bring it back in range, but the idle voltage must stay inside its required range.

<u>Reference voltage range</u>	<u>Throttle position</u>
0.2 to 0.8 volts required	Idle
4.5 to 5.0 volts preferred	Wide open throttle

9.1.2 TPS Setting Using A Scan Tool:

A scan tool can be used to check both polarity and voltages. Many auto part stores have scan tools available for loan. Throttle position will be measured in (%) percentage.

9.1.2A Polarity:

If (%) percentage increases with increased throttle, then the TPS harness has typical polarity. If (%) percentage decreases with increased throttle, then polarity is configured reversed.

9.1.2B Voltage:

After all idle adjustments have been completed; rotate the TPS clockwise to show approximately 10%. Then slowly rotate the TPS counter-clockwise until it shows 0%. If the TPS is rotated past 0%, repeat this process.

GENERAL NOTE: In some cases with performance engine combinations, the ECU may need to be tuned after adding the throttle body.

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