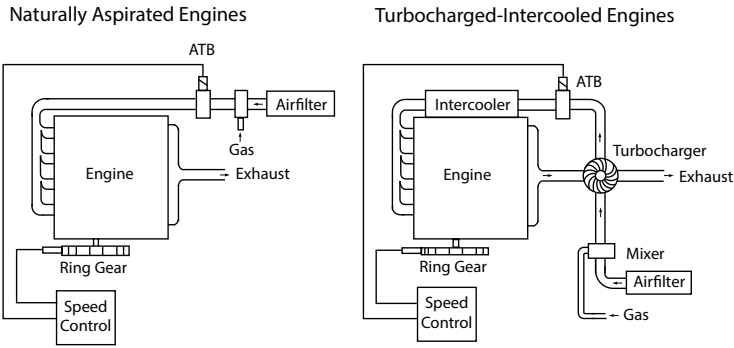


ATB Series Integral Throttle Body Actuators

1 INTRODUCTION

The ATB Series integral throttle body electric actuators are designed to control the air or air/fuel mixture to a gas or gaseous-fueled engine. They are typically used to control an engine by working in tandem with a conventional fuel mixer. Examples of the installation locations are shown here:



2 NOMENCLATURE

SUFFIX	DEFINITION
1 4	High Temperature & Sealed
2	Mechanical Position indicator, Sealed (Only available with non-high-temp version, T2 units only)
F	Feedback Position Sensor, Sealed
N	Normal (Comes with no Feedback Position Sensor), Sealed

Examples:

PART NO.	SYMBOL(S)	DEFINITION
ATB452T2N-12	N	Does not come with Feedback Position Sensor. Sealed to 5.0 Bar.
ATB452T2N2-12	N,2	Does not come with Feedback Position Sensor, but has a mechanical position indicator. Sealed to 5.0 Bar
ATB753T3F14-24	F,1,4	Comes with Feedback Position Sensor, is high temperature rated, and is sealed to 5.0 Bar internally.

WARNING Gaseous Fuel Controlling Product. All ATB's are Approved to 5.0 BAR. Improper Use May Cause a Hazardous Condition. No Smoking or Open Flame. Avoid Spark of Static Hazard.

3 SPECIFICATIONS

PERFORMANCE	
Maximum Throttle Plate Rotation	65° ±1°
Response	10 - 90% < 35 msec
POWER INPUT for T1 - 25mm to 40mm Bore Size	
Operating Voltage	12 or 24 VDC
Normal Operating Current	3.0 A at 12 VDC 1.5 A at 24 VDC
Maximum Current	6.0 A at 12 VDC 3.0 A at 24 VDC
Coil Resistance (Red to White 12VDC) (Red to White 24VDC)	2.2 ohms 8.6 ohms
Red to Housing	> 5 M ohms
POWER INPUT for T2 - 45mm to 65mm Bore Size	
Operating Voltage	12 or 24 VDC
Normal Operating Current	6.0 A at 12 VDC 3.0 A at 24 VDC
Maximum Current	9.0 A at 12 VDC 4.5 A at 24 VDC
Coil Resistance (Red to White 12VDC) (Red to White 24VDC)	1.4 ohms 5.3 ohms
Red to Housing	> 5 M ohms
POWER INPUT for T3 - 75mm Bore Size	
Operating Voltage	12 or 24 VDC
Normal Operating Current	3.0 A at 12 VDC 1.5 A at 24 VDC
Maximum Current	12.0 A at 12 VDC 6.0 A at 24 VDC
POWER INPUT for T4 - 75mm to 95mm Bore Size	
Operating Voltage	24 VDC
Normal Operating Current	6.5 A at 24 VDC
Maximum Current	10.0 A at 24 VDC
Coil Resistance (A - D 24VDC)	2.5 ohms
A to Housing	> 5 M ohms

ENVIRONMENT	
Normal Ambient Operating Temperature Range	-40°F to +200°F (-40°C to +95°C)
High Temperature Version Ambient Operating Temperature Range	-40°F to +250°F (-40°C to +125°C)
Relative Humidity	SAEJ1455
Salt Spray	ASTMB117-97
All Surface Finished	Fungus & Corrosion Resistant
Maximum Pressure, All Units Are Sealed	5.0 Bar
RELIABILITY	
Vibration	±4G, 25 to 100 Hz
Shock	20G, 11 msec
Testing	100% Functionality Tested
Rated Life	>40 Million Cycles
AGENCY COMPLIANCE	
CE Compliant	Stationary Industrial Markets Only
PHYSICAL	
Dimensions	See Section 4
Weight (T1)	3.0 lbs (1.36 kg)
(T2)	6.0 lbs (2.72 kg)
(T3)	17.6 lbs. (7.89 kg)
(T4)	15.0 lbs (6.80 kg)
WIRING HARNESS	
T1/T2/T3 (Packard) Cable Harness	CH1215
T4 (MIL) Cable Harness Mating Connector	CH1203, CH1210, or CH1212 EC1000 (Straight) or EC1010 (90°) MIL
FEEDBACK SENSOR WIRING	
T2/T3	CH1515 (Harness) & EC1515 (Mating Connector)
T1/T4	CH1243 (Harness) & EC1523 (Mating Connector)

Industrial Engine Applications / 4 Cycle / Natural Gas / Stoichiometric FA Mixture

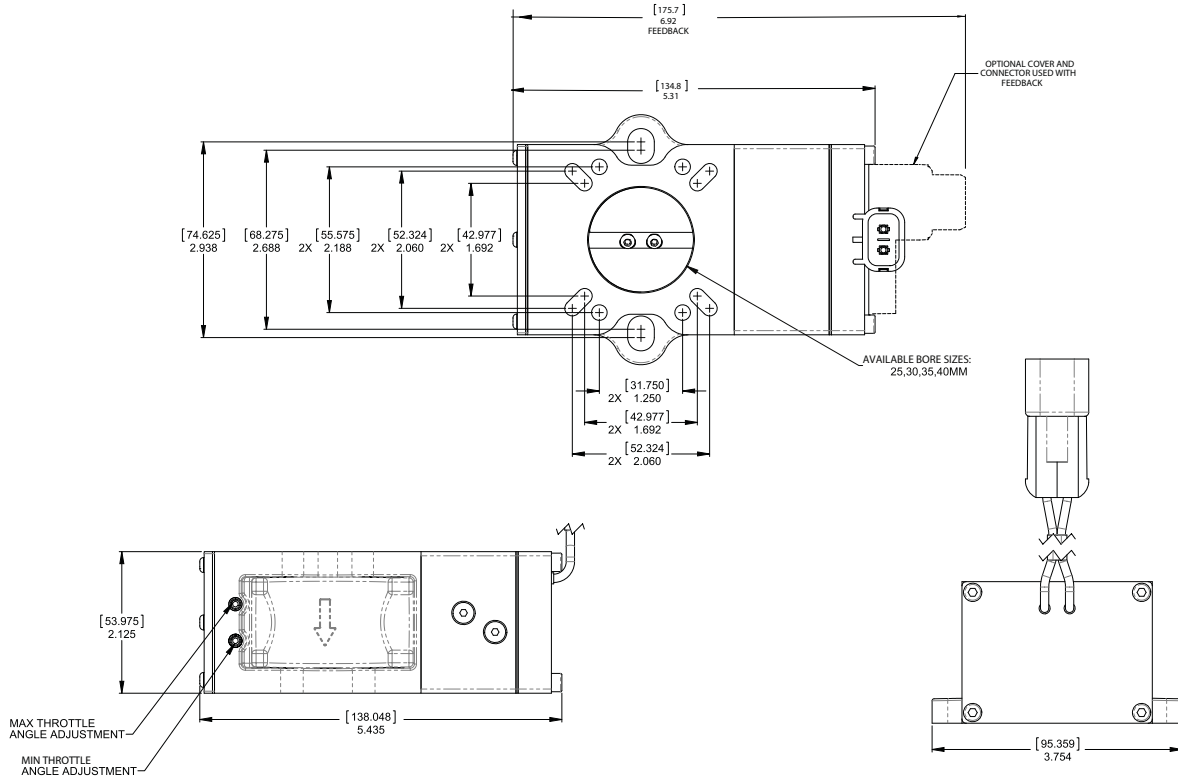
RPM	Engine Size in Liters														ATB sizing in MM inside diameter																			
	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	11	12	13	14	15	16	17	18	19	20	21	22			
600					25	25	25	25	30	30	30	30	30	30	35	35	35	35	35	40	40	40	40	40	45	45	45	55	55	55	55	55	55	55
800				25	25	25	30	30	30	30	35	35	35	35	35	40	40	40	40	45	45	55	55	55	55	55	55	55	55	65	65	65	65	
1000			25	25	30	30	30	30	35	35	35	35	40	40	40	40	45	45	45	55	55	55	55	55	55	65	65	65	65	65	65	65	75	
1200		25	25	30	30	30	30	35	35	40	40	40	40	45	45	45	55	55	55	55	55	65	65	65	65	65	75	75	75	75	75	75	75	
1400		25	30	30	35	35	35	35	40	40	40	40	45	45	45	55	55	55	55	55	65	65	65	65	75	75	75	75	85	85	85	85	85	
1500		25	30	30	35	35	35	40	40	40	40	45	45	55	55	55	55	55	55	65	65	65	65	65	75	75	75	75	85	85	85	85	85	
1600		25	30	35	35	35	40	40	40	45	45	45	45	55	55	55	55	55	65	65	65	75	75	75	75	75	85	85	85	85	85	85	85	
1800		25	30	35	40	40	40	40	40	45	45	45	45	55	55	55	55	65	65	65	65	75	75	75	75	75	85	85	85	85	85	85	85	
2000		25	35	35	40	40	40	45	45	45	45	55	55	55	65	65	65	65	65	75	75	75	75	85	85	85	85	85	85	85	85	85	85	
2200	25	30	35	40	40	40	45	45	45	55	55	55	55	65	65	65	65	65	75	75	75	85	85	85	85	85	95	95	95	95	95	95	110	
2400	25	30	35	40	45	45	45	55	55	55	55	55	55	65	65	65	75	75	75	75	85	85	85	85	85	95	95	95	95	95	110	110	110	
2600	25	30	35	40	45	45	55	55	55	55	55	55	65	65	65	75	75	75	75	85	85	85	95	95	95	95	95	95	110	110	110	110	110	
2800	30	30	40	45	45	45	55	55	55	55	65	65	65	65	75	75	75	75	85	85	85	95	95	95	95	110	110	110	110	110	110	110	110	
3000	30	30	40	45	45	55	55	55	65	65	65	65	75	75	75	75	75	85	85	85	95	95	95	95	110	110	110	110	110	110	110	110	110	
3200	30	30	40	45	55	55	55	65	65	65	65	65	75	75	75	85	85	85	85	95	95	110	110	110	110	110	110	110	110	110	110	110	110	
3400	30	30	40	45	55	55	55	65	65	65	65	65	75	75	75	85	85	85	85	95	95	95	95	110	110	110	110	110	110	110	110	110	110	
3600	30	30	45	55	55	55	65	65	65	65	65	75	75	75	85	85	85	85	85	95	95	95	110	110	110	110	110	110	110	110	110	110	110	

RPM	23	24	24	25	25	26	26	27	27	28	28	29	29	30	30
600	55	55	55	55	65	65	65	65	65	65	65	65	65	75	75
800	65	75	75	75	75	75	75	75	75	75	75	75	75	85	85
1000	75	75	75	85	85	85	85	85	85	85	85	85	85	85	85
1200	85	85	85	95	95	95	95	95	95	95	95	95	95	95	95
1400	95	95	95	95	95	95	95	95	95	110	110	110	110	110	110
1500	95	95	95	95	110	110	110	110	110	110	110	110	110	110	110
1600	95	95	95	95	110	110	110	110	110	110	110	110	110	110	110
1800	110	110	110	110	110	110	110	110	110	110	110	110	110	120	120
2000	110	110	110	110	110	120	120	120	120	120	120	120	120		
2200	110	110	120	120	120	120									
2400	120	120	120	120	120										

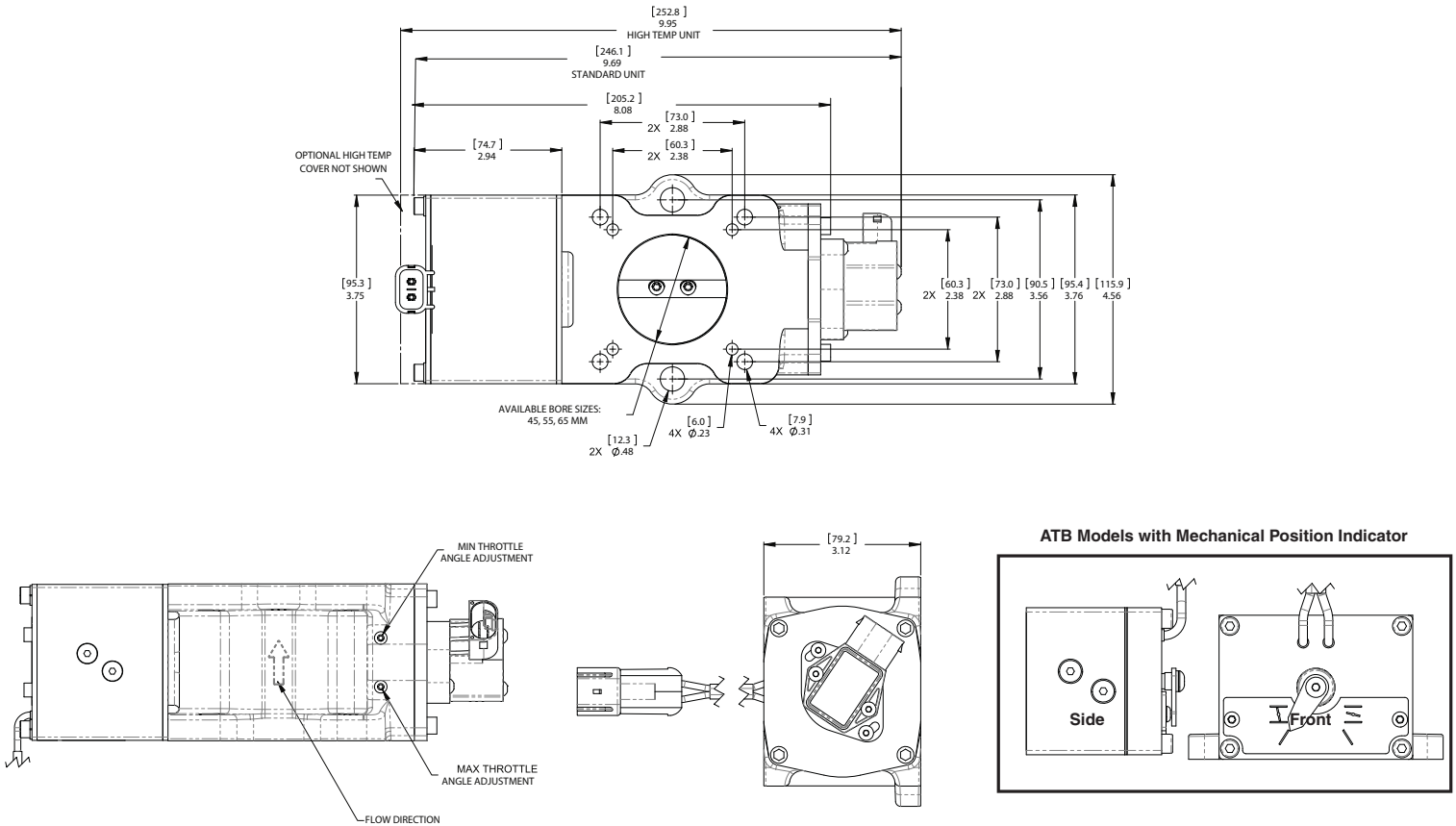
NOTE These charts are for reference use only and we were derived from averaging maximum velocity method and capacity index method at 75% butterfly travel position. Final sizing may differ depending on application

AVAILABLE BORE SIZES BY FAMILY	
BORE DIAMETERS	FAMILY
25, 30, 35, 40	T1
45, 55, 65	T2
75, 85, 95, 110, 120	T4

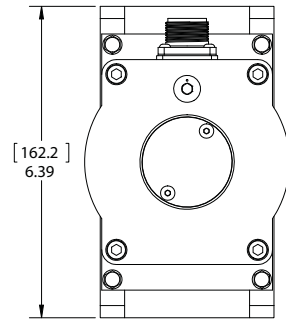
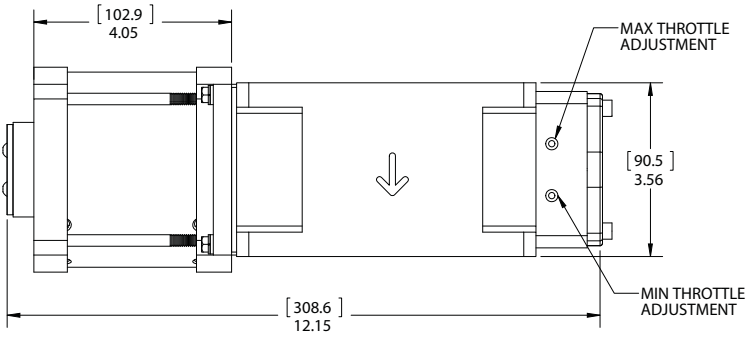
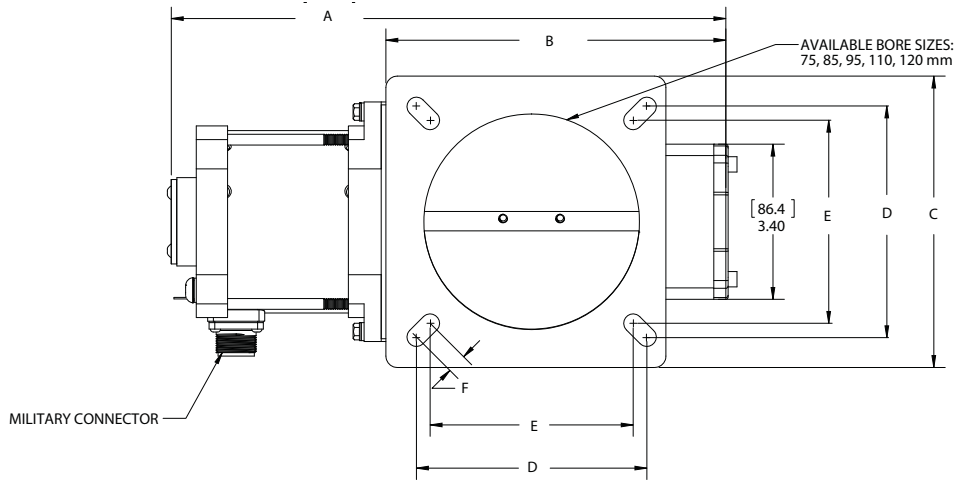
T1 Series



T2 Series



T4 Series



DIMENSION	BORE SIZE	
	75/95	110/120
A	[288.3] 11.35	[308.6] 12.15
B	[166.7] 6.56	[189.2] 7.45
C	[133.4] 5.25	[162.2] 6.39
D	[95.2] 3.75	[128.3] 5.05
E	N/A	[113.0] 4.45
F	[10.5] Ø 0.41	[10.8] Ø 0.42

NOTE All ATBs with 75, 85 and 95 mm bore sizes, have mounting holes (diameter of each mounting hole is Dimension F and the distance between them is Dimension D). ATBs with 110 and 120 mm bore sizes, have slots instead.

6 INSTALLATION

The actuator is mounted rigidly between the engine's intake manifold and the gas mixer. The preferred mounting orientation for the ATB Series is with the throttle shaft parallel to the engine crank shaft. Normal vibration from the engine will not affect the operation of the actuator. The ATB Series is designed to provide an exact fit to the various manifolds and mixers available. Section 5 OUTLINE DRAWINGS on the other side of this document shows proper sizing of the ATB to the engine for envelope concerns.

NOTE The arrow on the side of the ATB represents the direction of flow.

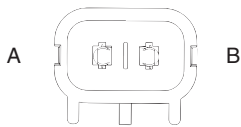
CAUTION A Gaseous Fuel Shut-Off Valve, Independent of the Throttle Body Actuator, Should Be Provided to Prevent Loss of Engine Control or Propagation of a Hazardous Flammable Condition Which May Cause Personal Injury or Equipment Damage.

WARNING An overspeed shutdown device, independent of the governor system, should be provided to prevent loss of engine control, which may cause personal injury.

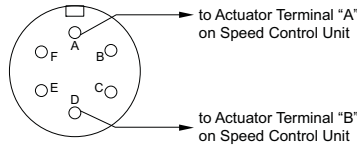
7 WIRING

All throttle body actuators are pre-wired for either 12 or 24 VDC systems. Use the included wiring harness to connect the actuator to the speed control unit's output terminals. Prior to connecting the actuator cable, twist it so that there is about one complete twist per inch along the entire length of the cable. This will substantially re-duce EMI effects on the control system. For applications where EMI is still a concern, shielded cable for the actuator is recommended.

Packard Connector (T1, T2 & T3)



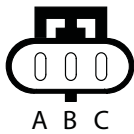
MIL Connector (ATB T4)



POSITION FEEDBACK SENSOR

Mating Connector EC1523

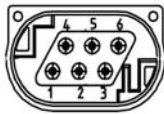
(ATB T1 & T4)



HARNESS	
PIN	SIGNAL
A	+5V
B	GND
C	OUT

Mating Connector EC1515

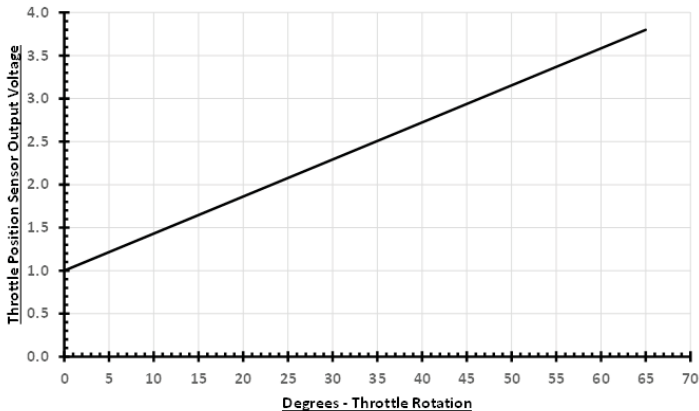
(ATB T2 & T3)



HARNESS	
PIN	SIGNAL
1	+5V
2	GND
4	OUT

NOTE The Position Feedback Sensor is installed and preset at no fuel (0%) at 1.0V output. Max opening (100%) at 65° is 3.8V.

Throttle Body Position Feedback Sensor Output



8 THROTTLE ADJUSTMENT

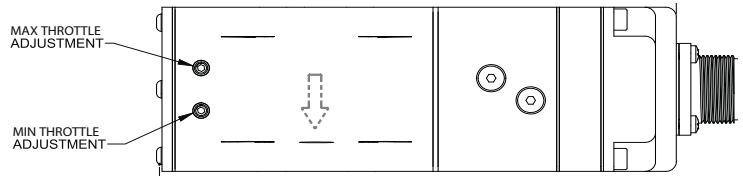
NOTE Typically, the engine speed should be set by un-plugging the actuator power to the governor or by turning off the governor power once the engine is running and then setting the engine speed to the desired setting.

An adjustable Idle Stop set screw (Min Throttle Adjustment) is provided to set a fixed fuel opening if desired. Below represents where to generally find the adjustment screws on each ATB model. For a more detailed view, see Section 8 for Min and Max Throttle Adjustment screw locations.

Idle Stop Adjustment

- Using a 2.5mm Hex wrench, you must completely remove the first 'locking' setscrew. This will give you access to the inner idle setscrew.
- Using the same Hex wrench, turning the wrench clockwise will increase the fixed throttle opening.
- Adjustment is complete once you have replaced the locking setscrew. Apply Locite 518 or equivalent. The locking setscrew should only be tightened to snug plus 1/4 turn

NOTE Max throttle Stop is preset to 65 degrees from factory.



9 TROUBLESHOOTING

If the governor system fails to operate, the following test can be performed. Shut engine down, disconnect the actuator cable and measure the resistance at the actuator connector. Next, check resistance from each wire to the actuator housing and compare readings to values shown in **Table 1**. If the resistance values differ from values shown, the actuator is defective. This test is only to ensure that there is no obstruction, wire breakage or metal-on-metal contact inside the throttle body.

Make sure to reconnect the actuator cable. Next, energize the actuator to full fuel (follow steps in the speed control publication). The throttle plate should move fully open. Next, rotate the throttle plate to determine if the plate moves smoothly without binding or sticking.

Measure the resistance from: **TABLE 1**

T1 Coil Resistance	(±10%)
Red to White (12 VDC)	2.2 Ω
Red to White (24 VDC)	8.6 Ω
T2 Coil Resistance	(±10%)
Red to White (12 VDC)	1.4 Ω
Red to White (24 VDC)	5.3 Ω
T3 Coil Resistance	(±10%)
Red to White (12 VDC)	0.9 Ω
Red to White (24 VDC)	3.3 Ω
T4 Coil Resistance	(±10%)
A-D (24 VDC)	2.5 Ω
T1, T2, & T4	(±10%)
Red (or A) to Actuator Housing	> 5 M Ω