

- Low-Cost, Maintenance Free, Compact Design
- Various Bore Sizes Available (25 - 85mm)
- Precise, Real-Time Engine Speed Control
- Flexible Design for Engine, Manifold & Fuel Mixer Considerations
- Adaptable to Corrosive Environmental Conditions
- Rapid Response to Transient Load Conditions
- Optional Throttle Position Feedback Sensor
- Mounts in Any Position, No Mechanical Linkage, No Mounting Brackets
- Idle Adjustment Screw
- Optional High Temp & Sealed Versions for Turbo-charged Engines

### INTRODUCTION

The **ATB Series** integral throttle body electric actuator is designed to control the air or an air/fuel mixture to a gaseous-fueled engine. They are typically used to control an engine by working in tandem with a conventional fuel mixer. The design baseline for the **ATB Series** incorporates fast response and proven reliability to allow for efficient and more precise control. The **ATB Series** actuator directly drives the throttle plate. Internal return springs provide for a normally closed valve for fail-safe operation. This ensures that the throttle plate returns to the minimum fuel position when the actuator becomes de-energized. **ATB Series** actuators are also designed to accept system battery voltages of either 12 or 24 VDC and are available with a throttle position feedback sensor.

### DESCRIPTION

**ATB Series** actuators are proportional electromagnetic devices designed for precise, efficient metering of airflow to a gaseous-fueled engine. When coupled with a **GAC** speed control unit and **GAC** speed sensor, a basic closed-loop governor system is established. Operation of this closed-loop governor system is as follows: The magnetic speed sensor, mounted strategically on the engine, will generate real-time electrical pulses, which are directly proportional to engine RPM. The electronic speed control unit monitors these pulses and compares them to a preset engine speed setting. If these pulses differ from the preset engine speed setting, the speed control unit will initiate a calculated response. This response is an increase or decrease in current flow to the actuator, which in turn changes the throttle plate's positioning. As the throttle plate's position changes, the amount of air and fuel is increased/decreased as necessary to cause the engine speed to return to the preset engine speed setting. The throttle plate's shaft rotation is proportional to the amount of actuator current and is counterbalanced by the internal return springs.

The **ATB Series** design uses steel, precision grade, lubricated bearings to provide low friction support to the throttle shaft. Therefore, no maintenance is necessary. **GAC** also offers high temperature



**TI Series for bore sizes  
25, 30, 35 and 40mm**



**T2 Series for bore sizes  
45, 55 and 65mm**



**T3 Series for bore sizes  
75 and 85 mm**

versions suitable for operation on the downstream side of the turbo. The results are a rapid, proportional response to actuator positional changes and outstanding reliability consistent with **GAC** expectations.

**GAC** offers a full line of speed controls both analog & digital for use with the **ATB Series**, all of which are field proven and 100% tested. The **ESD5403** control should be used for all **ATB Series** throttle bodies with feedback. For more information on these controls visit the **GAC** website or call us at **Governors America Corp.**

## 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** are designed to provide an exact fit to the various manifolds and mixers available. The Selection Chart on page 3 allows for proper sizing of the **ATB** to the engine.

### IDLE ADJUSTMENT

An adjustable Idle Stop setscrew is provided to set a fixed fuel opening if desired. Using the appropriate Hex wrench, you must completely remove the first 'locking' setscrew. This will give you access to the inner Idle setscrew for adjustment using the same Hex wrench. Turning the wrench clockwise will increase the fixed

throttle opening. Typically, the engine speed should be set by unplugging the actuator or by turning off the governor power once the engine is running and then setting the engine speed to the desired setting. Adjustment is complete once you have replaced the locking setscrew. The locking setscrew should only be tightened to snug plus a ¼ turn.

### 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 reduce EMI effects on the control system. For applications where EMI is still a concern, shielded cable for the actuator is recommended.

## 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.

**Table 1.**

Measure the resistance from:	
<b>T1 Coil Resistance</b>	
Red to White (12 VDC) .....	2.2 Ω
Red to White (24 VDC) .....	8.6 Ω
<b>T2 Coil Resistance</b>	
RedtoWhite(12VDC) .....	1.4Ω
RedtoWhite(24VDC) .....	5.3Ω
<b>T3 Coil Resistance</b>	
RedtoWhite(12VDC) .....	0.9Ω
Red to White (24 VDC) .....	3.3 Ω
<b>T1 &amp; T2 &amp; T3</b>	
RedtoActuatorHousing .....	>5MegaΩ
White to Actuator Housing .....	>5MegaΩ

## SPECIFICATIONS

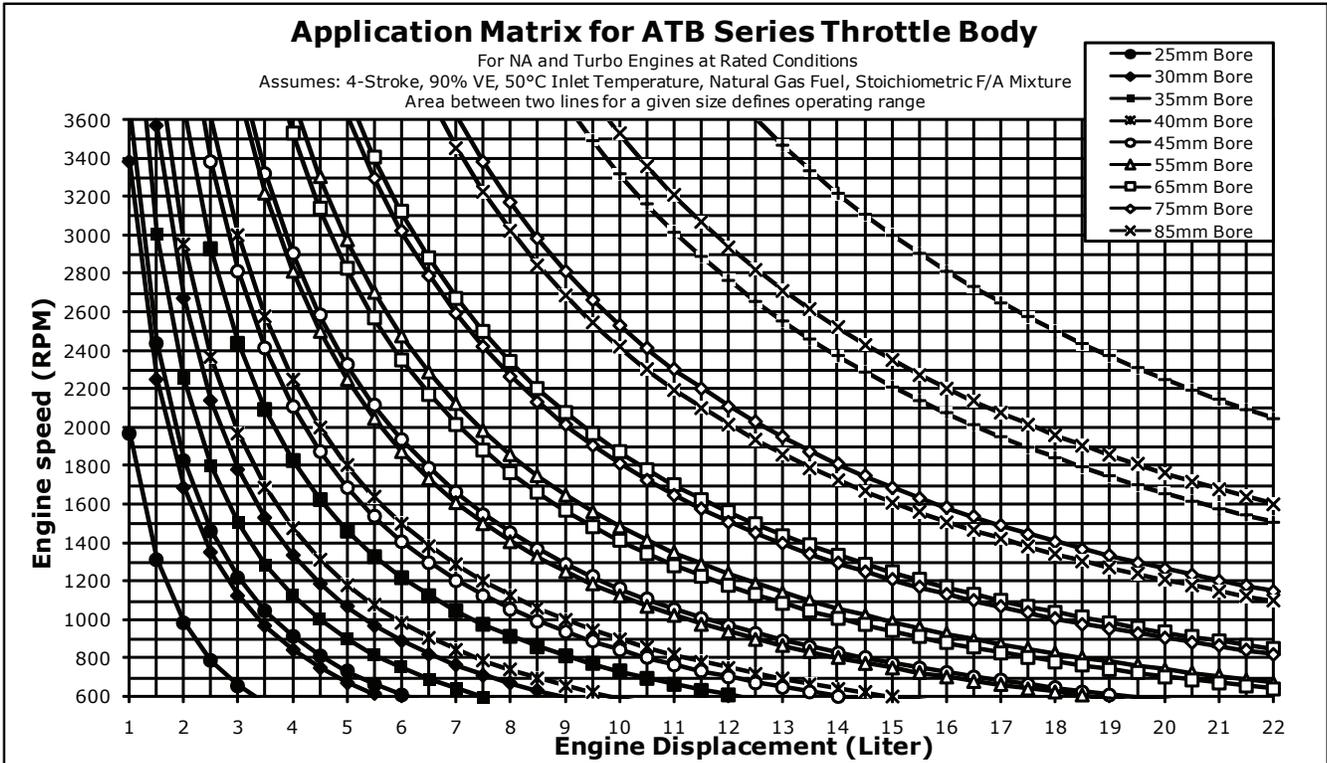
<b>PERFORMANCE</b>	
Maximum Throttle Plate Rotation .....	65° +/- 1 degree
<b>POWER INPUT FOR T1</b>	
Operating Voltage .....	12or24VDC
Normal Operating Current .....	3 Amps @ 12 VDC
	1.5Amps @24VDC
Maximum Current – Continuously Rated .....	6 Amps @ 12VDC
	3 Amps @ 24 VDC
<b>POWER INPUT FOR T2</b>	
Operating Voltage .....	12or24VDC
Normal Operating Current .....	2 Amps @ 12 VDC
	1Amps @24VDC
Maximum Current – Continuously Rated .....	6 Amps @ 12 VDC
	3 Amps @ 24 VDC
<b>POWER INPUT FOR T3</b>	
Operating Voltage .....	12 or24VDC
Normal Operating Current .....	3 Amps @ 12 VDC
	1.5Amps @24VDC
Maximum Current – Continuously Rated .....	12 Amps @ 12 VDC
	6 Amps @ 24 VDC
<b>ENVIRONMENTAL</b>	
Operating & Storage Temperature Range .....	-40° to +200° F (-40° to + 95° C)
High Temperature Version Temperature Range .....	-40° to +400° F (-40° to +205° C)
Relative Humidity .....	SAE J1455
Salt Spray .....	ASTMB117-97
All Surface Finishes .....	Fungus & Corrosion Resistant
<b>RELIABILITY</b>	
Vibration .....	+/- 4g, 25 to 100 Hz
Shock .....	.20g, 11 msec.
Testing .....	100% Functionally Tested
Rated Life .....	>40 million cycles
<b>AGENCY COMPLIANCE</b>	
CSA Certified .....	Class 1, Division 2, Group A, B, C, & D, T3 (pending)
CE Compliant .....	stationary industrial markets only (pending)

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Caution: None of GAC products are flight certified controls including this item.

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## ATB Series SELECTION CHART



### ATB Order Information

ATB bbhdd a yy - vv

ATB	bbhdd			a	yy	vv
MODEL NAME	bb BORE SIZE	h HOUSING	dd DRIVER	ELECTRICAL OPTIONS	MECHANICAL OPTIONS	OPERATING VOLTAGE
actuator throttle body	25	1	T1	N = Standard	Leave Blank = Standard	12 for 12 VDC
	30	1	T1		1* = High Temp 400°F (205°C)	
	35	1	T1		2 = Mechanical Throttle Position Indicator	
	40	1	T1		3 = Corrosive Environment	
	45	2	T2+	F = Feedback	4 = Sealed	24 for 24 VDC
	55	2	T2+			
	65	2	T2+			
	75	3	T3**			
85	3	T3**				

\*High temperature option includes 400° F ( 205° C) rated bearings, seals, grease, magnet wire and heat sink.

\*\*Sealed option standard.

+ Feedback versions sealed.

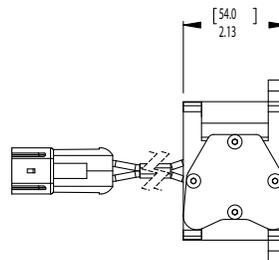
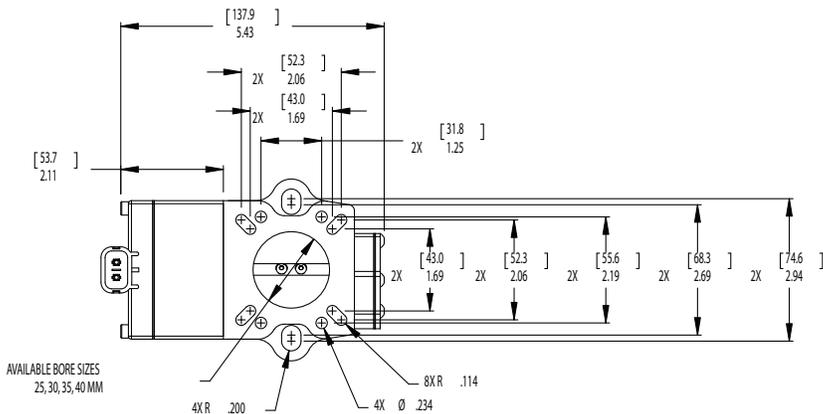
Examples of Ordering	
<b>ATB552T2F-12</b>	55mm, T2 Type Throttle Body Actuator, w Feedback, Standard Mechanical Option, 12 Volts
<b>ATB753T3N1-24</b>	75mm, T3 Type Throttle Body Actuator, Standard Electrical Option, High Temperature Version, 24 Volts

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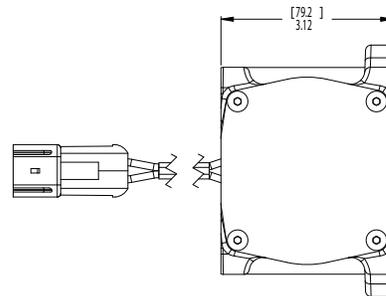
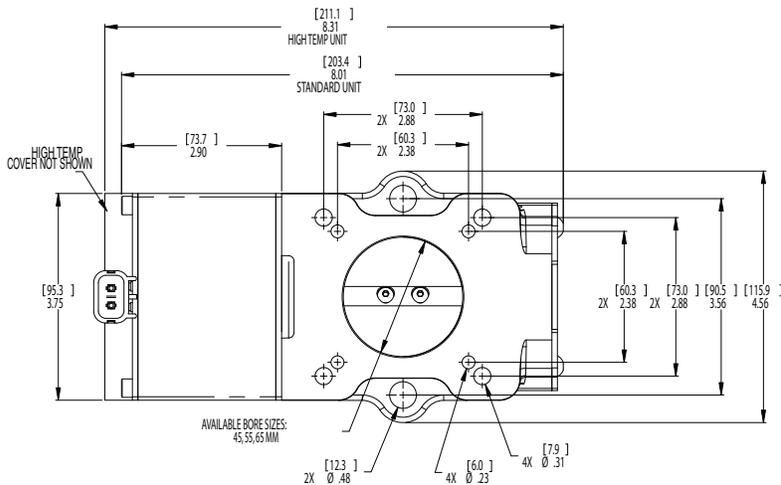
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# DIMENSIONS

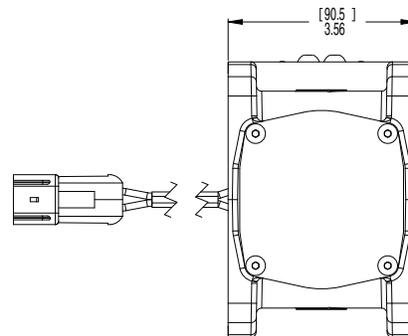
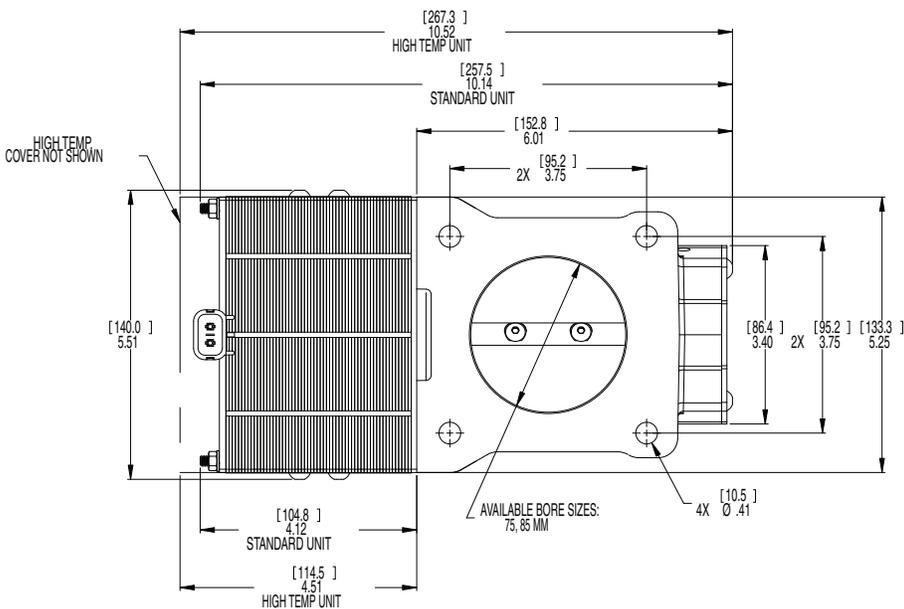
**For bore sizes 25, 30, 35 and 40mm**



**For bore sizes 45, 55 and 65mm**



**For bore sizes 75 and 85mm**



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