ENGINE GOVERNING SYSTEMS

ATB SERIES

Integral Throttle Body Actuators

- Low-Cost, Compact Design.
- Precise, Real-Time Engine Speed Control.
- Flexibility of Design for Engine, Manifold and Fuel Mixer Considerations.
- Adaptability to Corrosive Environmental Conditions.
- Rapid Response to Transient Load Conditions.
- Optional Throttle Position Feedback Sensor.

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, multi-voltage usage, and proven reliability to allow for efficient and more precise control. The ATB SERIES actuator directly drives the throttle plate. Two internal return springs provide for a normally closed valve for fail-safe operation. This insures 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 radial ball bearings to provide low friction support to the throttle shaft. Therefore, no maintenance is necessary. The results are a rapid, proportional response to actuator positional changes and outstanding reliability consistent with GAC expectations.

GAC offers five different electronic speed controls for use with the ATB SERIES, all of which are field proven and 100% tested. The ESD2401, ESD5500E, ESD5525E and ESD5526E are compatible with all 12V and 24V ATB SERIES throttle bodies. The ESD5403 control is recommended for all ATB SERIES throttle bodies with feedback. For more information on these controls visit the GAC website or call us at Governors America Corporation.

INSTALLATION

The actuator is mounted rigidly between the engine's intake manifold and the gas mixer. 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 shows the flexibility of design.

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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 Adjustment 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.

WARNING

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

SPECIFICATIONS

Performance

Maximum Throttle Plate Rotation ……. 65° ± 1 degree

Power Input

Operating Voltage ……. 12 or 24 VDC
Normal Operating Current ……..….. 2 Amps @ 12 VDC
…… 1 Amps @ 24 VDC
Maximum Current – Continuously Rated ……..…….. 6 Amps @ 12 VDC
……...…3 Amps @ 24 VDC

Environmental

Operating & Storage Temperature Range …… -40° to +200° F (-40° to + 95° C)
Relative Humidity ……. SAE J1455
Salt Spray ……ASTM B 117-97
All Surface Finishes……Fungus and Corrosion Resistant

Reliability

Vibration …….. 25 to 100 Hz, +/- 4g
Shock……20g, 11 msec.
Testing …… 100 % Functionally Tested
Rated Life……>40 million cycles

TROUBLESHOOTING

Please Note

These tests are to check for proper operation of the actuator **only**. If the actuator passes these tests, the problem is more than likely elsewhere in the system. Refer to the speed control unit technical publication, troubleshooting section or contact GAC or an authorized service agent.

If the governor system fails to operate, the following test can be performed. Shut engine down, disconnect the actuator cable and measure the resistance through the wires while rotating the throttle plate. Next, check resistance from each wire to actuator housing again while rotating the throttle plate (See table below). The resistance will fluctuate when you manually rotate the plate, but the reading should settle back to a fixed value based on the table below. This test is only to insure that there is no obstruction, wire breakage or metal-on-metal contact inside the throttle body.

Measure the resistance from:

Red to White (12 VDC) ……2 Ohms
Red to White (24 VDC) ……8 Ohms
Red to Actuator Housing ……< 5 Mega ohms
White to Actuator Housing…… < 5 Mega ohms

Make sure to reconnect the actuator cable

Next, energize the actuator to full fuel (follow steps in the speed control publication) and manually move the actuator throttle plate to the de-energized position. You should feel no binding or sticking of the throttle plate.

ATB Selection Chart

Use the following chart to determine which ATB is suitable for you're application.

GAC Model Number	*Engine Displacement*
ATB452T2	4.2L to 5.7L
ATB552T2	5.7L to 8.1L
ATB652T2	8.1L to 12.0L
ATB753T3	12.0L to 22.0L

ORDER INFORMATION

ATB xxxxx a y - vv

Actuator
Throttle
Body

Bore Size (mm)	**Model #**
45	**452T2**
55	**552T2**
65	**652T2**
75	**753T3**

a = Electrical Options

N – Standard
F - Feedback

y = Mechanical Options

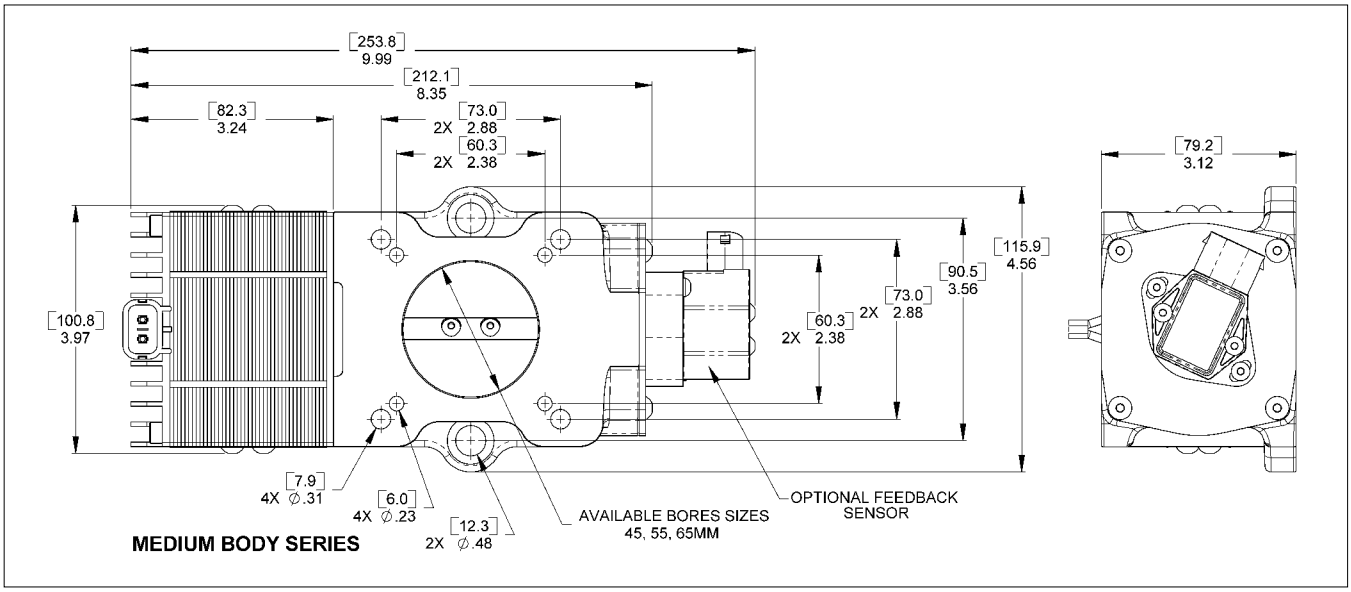
Leave Blank – Standard
2 – Corrosive Environment

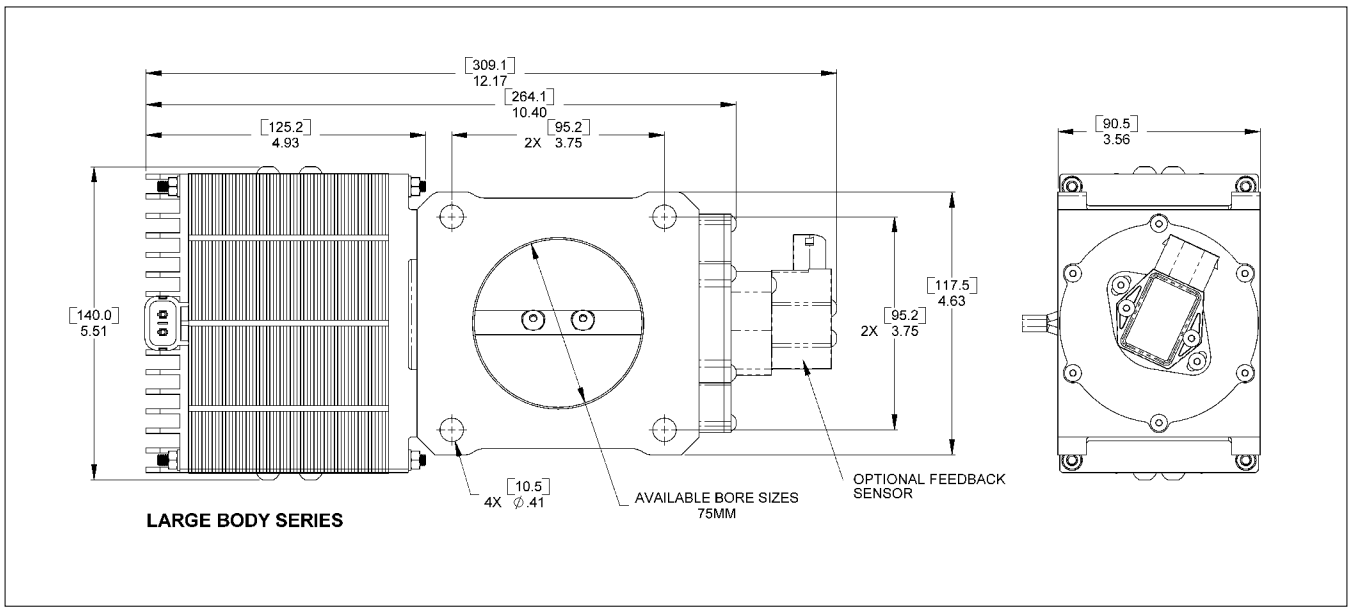
vv = Operating Voltage

12 – Wired for 12 volt operation
24 – Wired for 24 volt operation

Examples of Ordering

ATB552T2F2-12
or
ATB652T2N-24 (No Mechanical Options)





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