

- 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, ESD5525E and ESD5330 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.

 <p>GOVERNORS AMERICA CORP. Engine Governing Systems</p>	<p>Document: Product Information Version: 3 Status: repl. prev. versions Author: bs Date: 04-04-15 Approved: ro Date: 04-04-15 File: PC</p>	<p>ATB Series Integral Throttle Body Actuators</p> <p>PTI2080, Rev.A</p>	 <p>HUGLI HUEGLI TECH LTD SWITZERLAND Tel.: +41-62-916 50 30 Fax. +41-62-916 50 35 www.huegli-tech.com</p>
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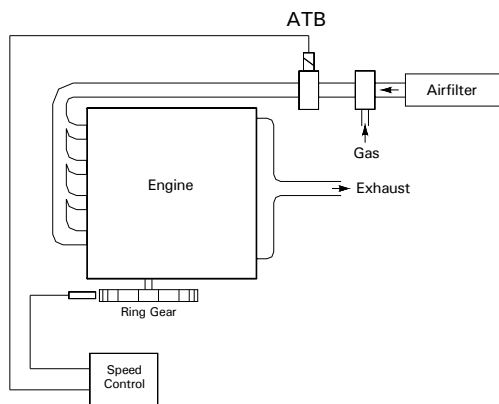
Installation

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

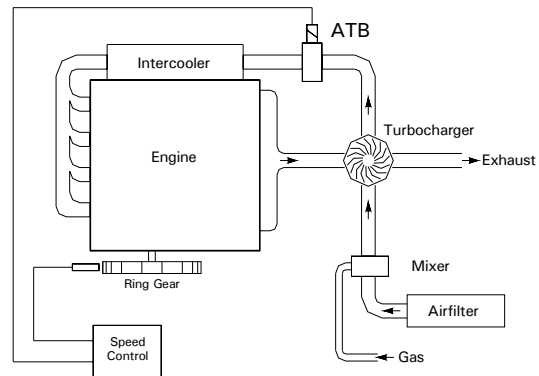
are designed to provide an exact fit to the various manifolds and mixers available. The Selection Chart on page 4 shows the flexibility of design.

Possible arrangements of the ATB

Naturally Aspirated Engines



Turbocharged-Intercooled Engines



Note:

In turbocharged intercooled engines, the ATB may be installed after the turbocharger. The hot air gas mixture will increase the operating temperature of the ATB. In such applications it is

recommended to use an ATB with finned cooling sink.

When uncertain, please consult GAC or your nearest GAC distributor for correct version.

Wiring



All throttle body actuators are pre-wired for either 12 or 24 VDC systems. Use the included wiring harness CH-112 (loose wires 1.8m) 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.

Optional 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.

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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°

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 values 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 Ω
- Red to White (24 VDC)8 Ω
- Red to Actuator Housing < 5 MΩ
- White to Actuator Housing..... < 5 MΩ

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

ATB - xxxTx - a - y - vv

Actuator Throttle Body _____

Bore Ø mm
45
55
65
75
85
95

Throttle Housing Size
2 (medium bore)
3 (large bore)

Electric Actuator Model
T2
T3

a = Electrical Options	
N	Standard version
N1	With finned heat sink for high temperature
F	With position feed back sensor

y = Mechanical Options	
blank	Standard
2	Corrosive Environment

vv = Operating Voltage	
12	12 VDC
24	24 VDC

Examples for Ordering:

ATB-552T2-F-2-12



or

ATB-652T2-N-24 (no mechanical options)

Optional Connectors and Cables:

EC-1300 Mating Connector for Actuator
CH-1220-Lxx Cable 2x1 mm² with mating connector (xx = length in m)

EC-1800 Mating Connector for Feedback Sensor
CH-1209AB-Lxx Cable 3x mm², shielded, with mating connector (xx = length in m)

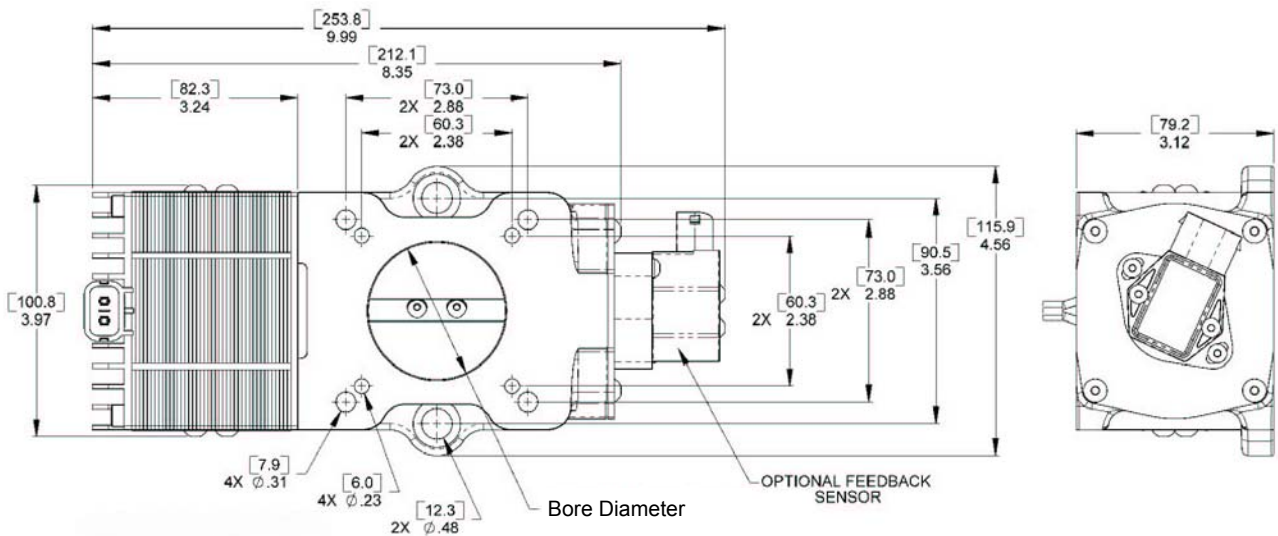
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Dimensions

Throttle Housing Size 2 (Medium Bore) Diameters 45, 55, 65 mm, Voltage 12 or 24 VDC

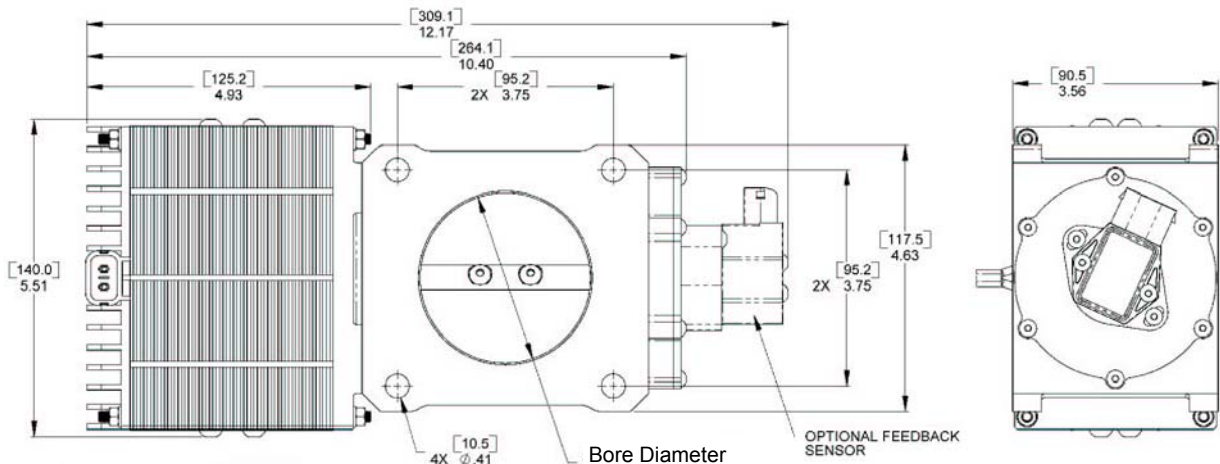
Bore diameter	ATB without Position Sensor	ATB with Position Sensor
45 mm	ATB-452T2-N-vv	ATB-452T2-F-vv
55 mm	ATB-552T2-N-vv	ATB-552T2-F-vv
65 mm	ATB-652T2-N-vv	ATB-652T2-F-vv
65 mm	ATB-652T3-N-vv *)	ATB-652T3-F-vv *)

*) with el. actuator of size T3

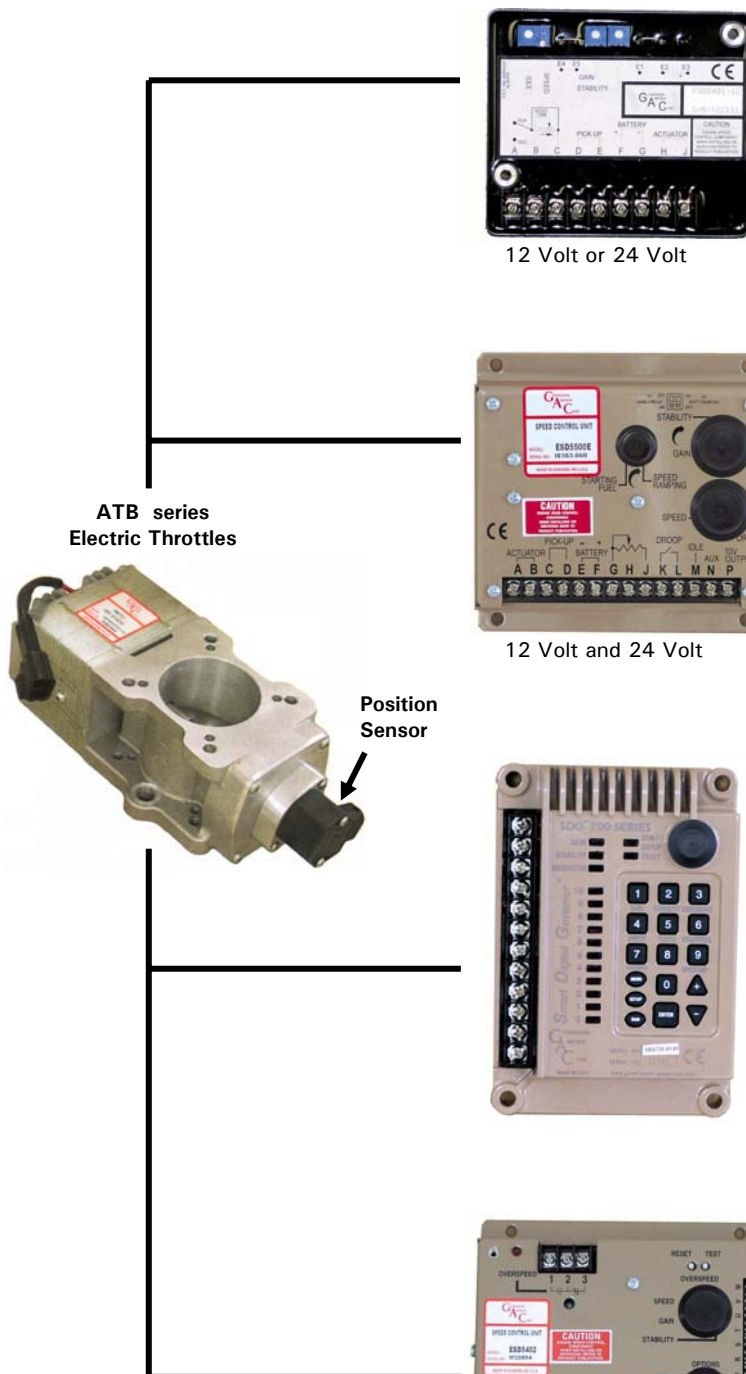


Throttle Housing Size 3 (Large Bore) Diameters 65, 75, 85, 95 mm, Voltage 12 or 24 VDC

Bore diameter	ATB without Position Sensor	ATB with Position Sensor
65 mm	ATB-653T3-N-vv	ATB-653T3-F-vv
75 mm	ATB-753T3-N-vv	ATB-753T3-F-vv
85 mm	ATB-853T3-N-vv	ATB-853T3-F-vv
95 mm	ATB-953T3-N-vv	ATB-953T3-F-vv



Selection of suitable GAC Control Units for ATB series Electric Throttles



12 Volt or 24 Volt

ESD 2401 – Economic Control

- For single, isochronous operation
- Measures actuator current for enhanced control
- Low cost – Precise speed control
- Extremely rugged, hard potted packaging
- Easy installation and adjustment



12 Volt and 24 Volt

ESD 5525E – Universal Control

- For single and parallel operation
- Isochronous and Droop speed regulation
- Fixed and All speed control. Adjustable Idle Speed
- Internal overspeed shut off with integral 10 Amp relay.
- Inputs for Autosynchroniser, load sharing, sped ramp. etc.
- Starting smoke limitation, soft ramping
- Resonant frequency suppression (soft coupling)



SDG 735-01-01

- Microprozessor based design
- Password protected for greater security
- No tool required for adjusting
- SMARTTOUCH® 16 character keypad for easy set-up / programming (No computer required)
- LED bar graph for set-up and troubleshooting
- Non-volatile E² memory
- Overspeed protection
- Engine crank control



24 Volt

ESD 5403 Series – Position Sensor Control

- Incorporates all ESD 5525 E functions
- Works with ATB ...F versions for closed Loop position control
- Adjustable speed ramping