

Feedback Sensor ATB Upgrade Kit

+1 413 233 1888www.governors-america.com

1 INTRODUCTION

ATBs without sensors can be updated with one of the following installation kits. These upgrade kits that add throttle position feedback sensors to existing ATB assemblies as described. Upgrades must be made by skilled personnel and should not be attempted by a novice installer. Kits are available for the T1, T2, and T4 ATBs.

АТВ	GAC Part Number
T1 ATB	KT555
T2 ATB	KT552
T4 ATB	KT556



2 KT555 - T1 SENSOR UPGRADE

T1 Series ATB's uses upgrade kit KT555 wich includes all the hardware and the sensor as well as its and its mating connector. Additional items needed for this installation include Loctite 603, Loctite 222 Loctite 5999, torque wrenches and other tools as detailed in this procedure. Installation requires a clean area and power for testing.

FIGURE 1: KT555 Installation



KT555 T1 SENSOR INSTALLATION PROCEDURE

Referencing the KT555 T1 sensor kit Figure 1 and Figure 2, complete the following installation.

- 1. Remove and retain the eight M3 button head torx cap screws. Remove the cover plate from the ATB assembly. Remove and discard the gasket and Loctite 5999 found on the cover if present.
- 2. Prior to removing the springs (8) and spring return plate (7), set the minimum throttle adjustment to 0% fuel by setting the min throttle adjustment set screw so that the shaft is allowed to rotate to the 0% fuel position (valve closed). Hold the shaft/butterfly valve at 0% fuel while screwing the minimum fuel adjustment screw. The screw should barely make contact with the edge of the spring return plate.





FIGURE 2: Spring Return Plate Removal and Update

- 3. Remove the two extension springs (8) from the pins on the spring return plate (7).
- 4. Loosen the two set screws (9) and pull the spring return plate off of the actuator shaft.
- 5. Push the new spring return plate assembly (D) from KT555 onto the actuator shaft and rotate it counterclockwise so the flat edge of the plate makes contact with the minimum adjustment screw. Then rotate the shaft /butterfly valve to the 0% fuel position.
- 6. Torque the two M4 set screws, coated with Loctite 603, to 18-20 in-lb [2.0 2.25 N⋅m].
- 7. Connect the two extension springs (8) to the spring pins and apply a small amount of Lithium grease on the end of each spring hook.
- 8. Install the spring cavity cover (A) using the eight M3 button head torx cap screws removed from Step 1. Be sure to add Loctite 222 to the screw threads and Loctite 5999 on the sealing surface of spring cavity cover (A).
- 9. Place the o-ring seal (E) into the seal groove of the spring cavity cover.
- 10. Supply 5.0 V DC to the sensor and measure the output voltage while manually rotating the sensor blade to read 1.0 V DC, prior to installing.
- 11. Install sensor (B) onto the cover positioning the radial location of the sensor blade to engage the slot in the end of the plate assembly spring return (D) when fully seated. Insert two sensor retaining M4 button head cap screws using Loctite 222.
- 12. Rotate the feedback sensor, with the throttle body in the no fuel position (0%) to set 1.0 V DC output.
- 13. Coat the two retaining screws (G) with Loctite 222 and torque to 12 15 in-lb [1.35 1.7 N·m].



FIGURE 3: Completed Installation





3 KT552 - T2 SENSOR UPGRADE

T2 Series ATB's uses upgrade kit KT552 which includes all the hardware and the sensor as well as its and its mating connector. Additional items needed for this installation include Loctite 603, Loctite 222, Loctite 5999, torque wrenches, and other tools as detailed in this procedure. This is an extensive upgrade and requires a clean area and power for testing.

FIGURE 4: KT552 Kit



KT552 T2 SENSOR INSTALLATION PROCEDURE

Using kit Figure 4 and Figures 5 – 8, carefully install the new sensor.

1. From the existing ATB T2, remove cover plate, gasket, and hardware (13), (14), (12).



FIGURE 5: Existing ATB Components

2. Set the Min Throttle Adjustment to 0% fuel. To do so, back the Min Throttle Adjustment screw out (17) located under the locking set screw (21) so the shaft rotates to the 0% fuel position (valve closed). Hold the shaft/butterfly valve at 0% fuel while screwing the minimum fuel adjustment screw into the ATB so that the end of it barely touches the edge of the spring adjusting plate (8). The Min Throttle Adjustment



spring Max/Min Retained with Two Max Jornm Set Screw

contacts the flat edge of the spring adjusting plate (8).

FIGURE 6: Removing Adjustment Plate

- 3. Remove the extension springs (11), spring adjusting plate (8) and max/min adjusting plate (6) by removing the retaining set screws (7).
- 4. Clean and inspect the extension springs (11), screws, and spring adjusting plate (8) and hardware 3 M4 socket head cap screw (10) three M4 lock washers (9) and three M4 flat washers (20) for reuse. Retain wave washer (19).
- 5. Using the KT552 hardware, install the new max/min spring plate assembly with feedback sensor (A) onto the actuator shaft. Rotate it toward the min throttle adjustment screw so the flat edge of the plate makes contact with the screw. Rotate the shaft/butterfly valve to the 0% fuel position (closed).



- 6. Position the spring plate assembly so the wave washer's preload height is 0.02 [0.50 mm] from full compression.
- Apply Loctite 603 to the M4x.7x5 mm max/min spring plate assembly retaining set screws (B), torque to 18 - 20 in-lb [2.0 - 2.25 N⋅m].



FIGURE 7: Combined ATB and Sensor Installation Components



- 8. Reinstall the spring adjusting plate (8) with three M4x.7x10 mm socket head cap screws (10), Lock washers (9) and flat washers (29).
- 9. Connect the two saved extension springs (11) with one end on the adjusting plate post (8), the other on the max/min spring plate post (6) so the spring force loads the throttle plate in the closed direction.
- 10. Apply a small amount of general purpose Lithium grease to the hook ends of each spring.
- Rotate the spring adjusting plate (8) so the throttle plate lifts-off at 16-18 oz-in [0.127 0.141 N·m]. Torque the three adjusting plate retaining screws (10) to 18 20 in-lb [2.0 2.25 N·m].



- 12. Lubricate the housing o-ring seal (C) with an all purpose Lithium grease and place it on the o-ring.
- 13. Mount the ATB sensor cover plate (D) onto the housing, install four M5 socket head cap screws (E), coat the threads with Loctite 222 and torque to 33-35 in-lb [3.72 3.95 N⋅m]
- 14. Coat o-ring seal (F) with Lithium grease and insert onto the adapter plate (G).



FIGURE 8: Sensor Installation Details

- 15. Insert the AB adapter plate (G) into the cover plate (D) and insert two M4 button head retaining screws (H), threads coated with Loctite 222. Do not tighten.
- 16. Install the o-ring (L) onto the feedback sensor (M) firmly pressing the seal onto the black base around the spindle. Lubricate the entire seal with Lithium grease.
- 17. Press the 5/32 x 1/2" dowel pin (I), coated with Loctite 603, into the sensor adapter plate (J) until it is flush with the bottom of the plate.
- 18. Insert the M4x.7x8mm set screw (K) into the sensor adapter plate (J), coat the threads with Loctite 222.
- 19. Place the sensor adapter plate (J) onto the feedback sensor (M) with the adapter plate oriented so the set screw is seated on the flat, and o-ring is seated on black base. Torque to 20 25 in-lb [2.25 2.8 N⋅m].
- 20. Insert the sensor and adapter plate assembly into AB adapter plate (G) positioning the dowel pin so it engages the spring loaded coupling on the max/min plate assembly (A).
- 21. Coat the threads of two M4x.7x35mm button head cap screws (N) with Loctite 222 and torque to 20 25 in-lb [2.25 2.8 N⋅m].
- 22. Supply the feedback sensor with 5.0 V DC. Monitor the output voltage and manually rotate the position feedback sensor with the throttle body in the no fuel position (0%) set to1.0V output. Maximum output, at 65° throttle body rotation (100%) should be approximately 3.8 V DC.
- 23. Torque the two sensor retaining screws (H) to 20 25 in-lb [2.25 2.8 N·m].



4 KT556 - T4 SENSOR UPGRADE

T4 Series ATB's are configured to accept feedback sensor part number SN288. Upgrade kit KT556 includes the SN288 sensor and its mating connector EC1523.

FIGURE 10: Sensor Cover Removal

FIGURE 9: KT556 Kit Contents



KT556 T4 SENSOR INSTALLATION PROCEDURE

Using Figures 9 and 10 as reference, complete the following installation steps:

- 1. Remove and retain the two screws (1) holding the feedback sensor cover plate (2). Remove and discard the sensor plate (2), gasket (3), and hardware (5,6).
- 2. Supply the sensor with 5.0 V DC. Monitor the output voltage and manually rotate the sensor blade until the output voltage reads 1.0 V DC.
- 3. Insert the new sensor (A) so its blade engages the slot in the end of the actuator shaft, with the throttle plate in the no fuel position (0%). Apply Loctite 222 to the two screws (1) and insert them. Do not tighten.
- 4. Rotate the feedback sensor, with the throttle body in the no fuel position (0%) to set a 1.0 V output.
- 5. Torque the two sensor retaining screws (1) to 12 15 in-lb [1.35 1.7 N·m].