SERVICE BULLETIN

DATE: June 14, 2017 NO: SB 225R9

SUPERSEDES: S.B. 225R8 dated 3/22/2013

SUBJECT: ANEROIDS

When turbocharged diesel engines are accelerated, the turbocharger speed lags behind engine speed. The injection pump however, will normally deliver full load fuel quantities during acceleration resulting in unburned fuel and excessive smoke until full turbocharger speed and boost pressure are attained. To address this condition, Stanadyne offers a device called an aneroid as an option on its DB Series injection pumps.

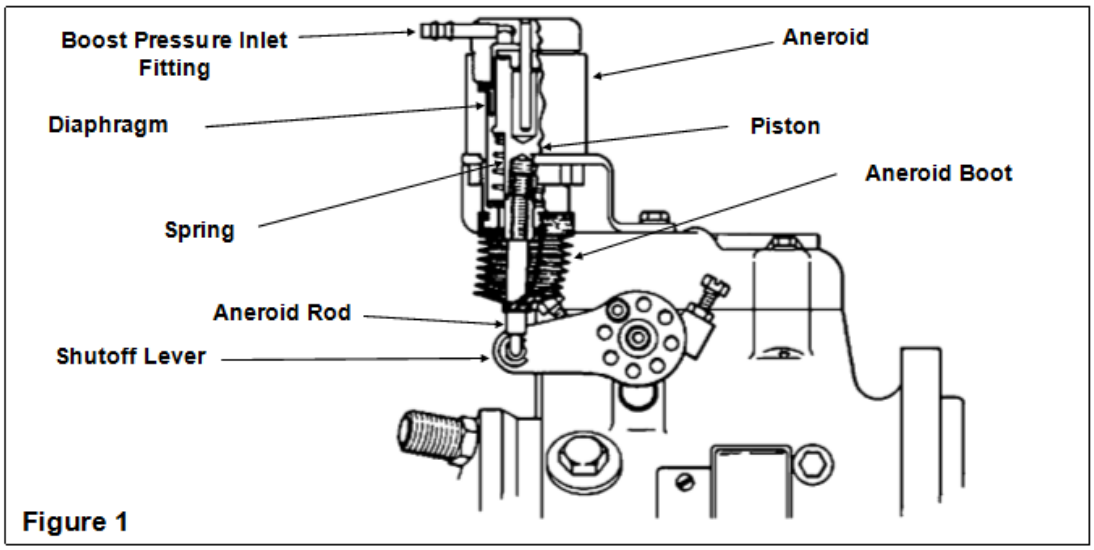

Figure 1

The aneroid consists of a spring loaded diaphragm connected to a rod which actuates the pump's shutoff lever (Reference Figure 1). Engine intake manifold pressure (boost pressure) is fed to the aneroid. When the pressure is low the aneroid moves the shut-off lever to a reduced fuel position, which restricts metering valve travel and limits fuel delivery. When manifold pressure increases, it overcomes the spring force and moves the shutoff cam out of contact with the metering valve linkage assembly allowing the pump to deliver full fuel. Reference Figure 2 on the next page.

Checking Aneroid Operation

Aneroid operation may be checked without removing it from the pump or disturbing adjustments. The aneroid should be inspected for correct operating pressure settings and shut-off lever travel (Reference the individual pump specification and the adjustment section of this bulletin). Also, inspect the aneroid for leakage and for binding during operation. Connect a filtered, regulated and measurable air pressure source to the boost pressure inlet fitting. *Note: Operating pressures are very low. An accurate gauge with a range of 0-30 p.s.i. (0–207 kPa), calibrated in 0.5 p.s.i. (3.5 kPa) increments is recommended.* Refer to the individual pump specification for the operating pressure and shutoff lever travel settings for each application. If service or adjustments is necessary, refer to the appropriate section of this bulletin.

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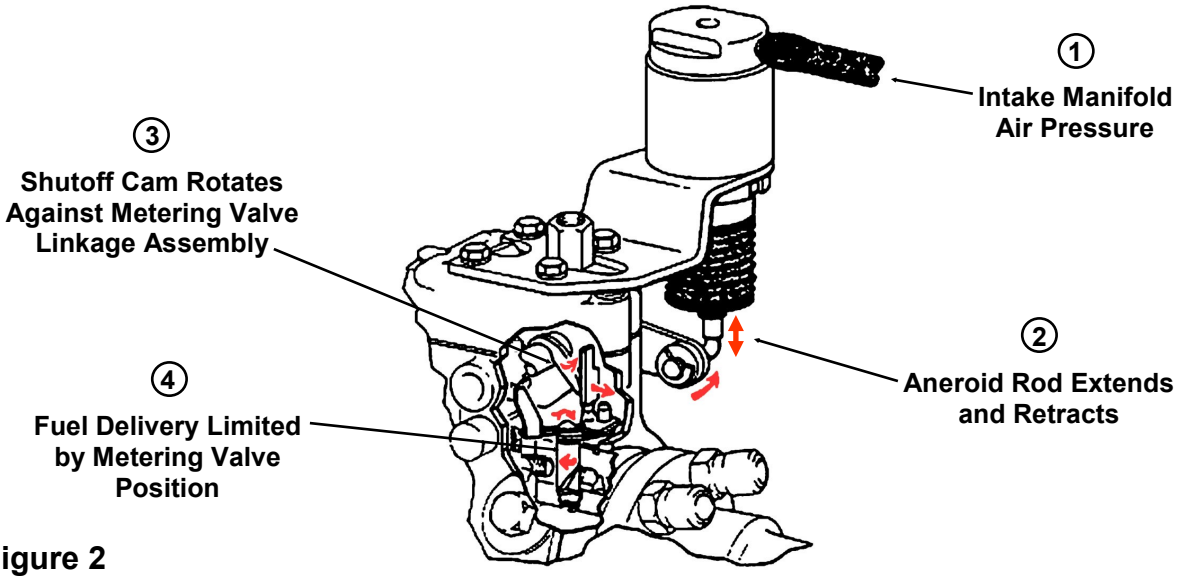


Figure 2

Service and Replacement

The aneroid is now a serviceable unit. If the aneroid is not functioning correctly, you can replace it as an assembly or repair it as outlined within this bulletin. Aneroid assemblies are now provided with the 19776 aneroid rod and a 16809 or 41079 aneroid boot as illustrated in Figure 4.

Since the introduction of the complete assemblies, the aneroid has undergone some internal design changes and the addition of a lock nut to the aneroid rod on some assemblies (Reference Figures 3 and 4). The updated aneroid assemblies supersede all previous aneroid assemblies as listed in the following able. Always refer to the individual pump specification to determine which aneroid to use.

Aneroid Assemblies	
Current	Supersedes
34995	18232, 34660
35222	18423, 34661
35223	33594, 34662
35224	33594, 34663
40586	—

NOTE: The boost pressure inlet fittings (P/N's 31104 and 40587) are available for service replacement, as shown in Figures 3 and 4.

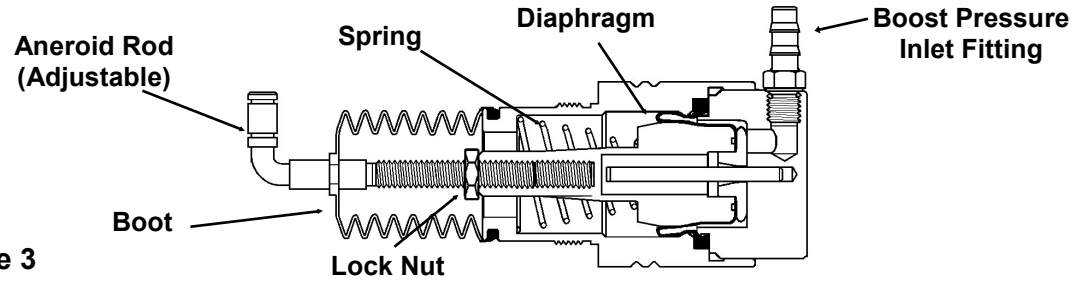


Figure 3

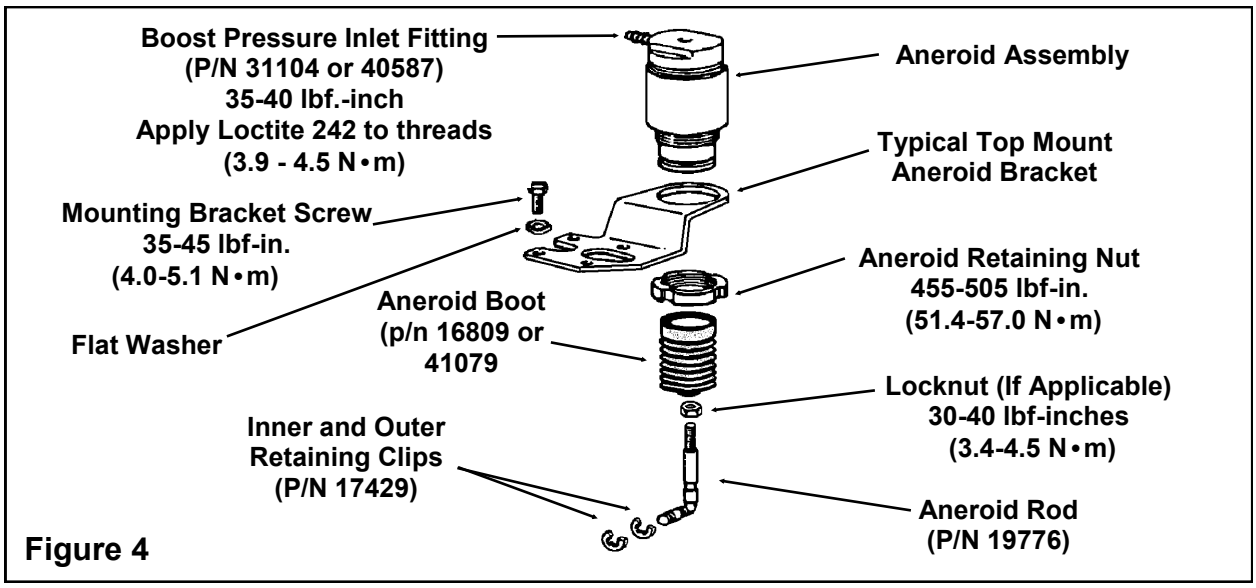


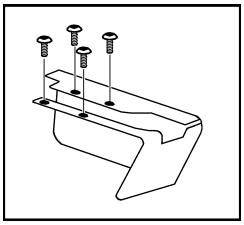
Figure 4

Removal and Installation Without Aneroid/Bracket Service

Always remove the aneroid and bracket from the pump as an assembly. If the aneroid or bracket do not require replacement, they should not be disassembled.

Caution: Do not submerge the aneroid assembly in oil or solvents. Doing so may wash away the dry lubricant used on the internal diaphragm.

For the following procedures reference Figure 4.



1. If the pump is equipped with an aneroid tamper resistant shield (p/n 33081), remove it and discard it.
2. Remove the outer aneroid retaining clip from the aneroid rod using a small screwdriver of equivalent.
3. Disengage the aneroid rod from the shut-off lever.
4. Remove the aneroid bracket mounting fasteners & remove the bracket and aneroid assembly.

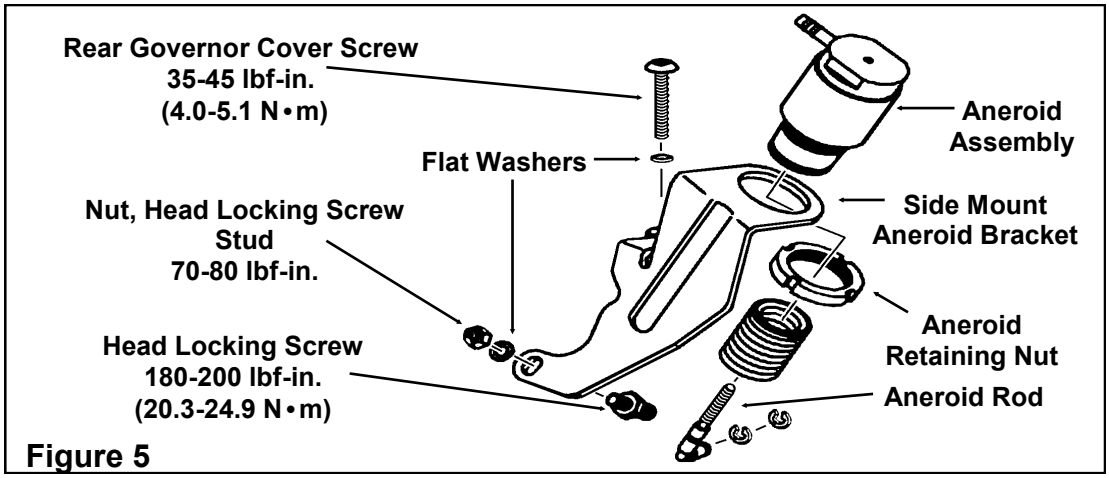


Figure 5

5. Pump repairs may now be performed. If the aneroid bracket or aneroid needs replacement or service, skip to the next section of this bulletin before re-assembly of the aneroid and bracket to the pump.
6. Install the aneroid and mounting bracket assembly on the pump. For a top mounting bracket (Figure 4), tighten the screws to 35-45 lbf-in. (4.0-5.1 N•m). For a side mounted bracket like (Figure 5), tighten the rear governor cover screw to 35-45 lbf-in. (4.0-5.1 N•m) and tighten the nut on the head locking screw stud to 70-80 lbf-in. (7.9-9.0 N•m).

7. Do not attach the aneroid rod to the pump shutoff lever at this time. Pump calibration should be performed with the aneroid rod disconnected and the shutoff lever held in the “Run” position. Aneroid adjustments should be performed following pump calibration, as outlined in the Adjustment Section of this bulletin.

***Note**: There are several different styles of aneroid brackets in use. Figure 4 shows a typical top mounted aneroid bracket and Figure 5 shows a typical side mounted aneroid bracket.*

Aneroid/Bracket Disassembly with Aneroid/Bracket Service

While the aneroid and its bracket should normally be left assembled, should either component require replacement or service, dis-assembly and re-assembly may be performed as follows:

1. Clamp the aneroid bracket in a vise. If the aneroid or bracket needs replacement, proceed to step 2. If the aneroid needs servicing, skip to step 3.
2. Remove the aneroid body retaining nut using the P/N 18031 Aneroid Retaining Nut Wrench and remove the aneroid from the bracket then skip to step 10.
3. Separate the boot from the aneroid body and then remove the operating rod from the aneroid piston. If equipped, the lock nut must be loosened prior to removing the aneroid rod from the aneroid piston. Wrench flats have been added to the aneroid piston to prevent the piston from rotating.
4. Remove the aneroid cap from the aneroid assembly using a 1-1/4” open end wrench.
5. The aneroid diaphragm and piston assembly will be attached to the aneroid cap as shown in Fig. 6. The aneroid diaphragm and piston assembly can now be removed from the aneroid cap.
6. The spring and two shims can be removed from the aneroid body and inspected for re-use. If the spring and shims are not re-usable, then the aneroid assembly must be replaced.
7. The new diaphragm and piston assembly, P/N 42883, can now be installed onto the aneroid cap. Do not submerge or rinse off the diaphragm and piston assembly with any solvent or oil as this will remove the dry lubricant from the diaphragm.
8. Install the shims and spring onto the diaphragm and piston assembly as shown in Figure 7.
9. Apply a continuous bead of Loctite 242 thread locker all the way around threads of the aneroid cap and install the cap onto the aneroid body. The aneroid cap should be torqued to 50-60 lbf-in. (4.0-5.1 N•m), then skip to step 12.
10. To re-assemble, secure the bracket in a vise and install the aneroid body into the bracket. Position the aneroid inlet fitting according to the position indicated on the pump specification.
11. Assemble the aneroid retaining nut to the aneroid body and tighten to 455-505 lbf-in. or (51.4-57.0 N·m) using service tool 18031.
12. Attach the boot to the aneroid rod and thread the rod (with the lock nut installed on the aneroid rod, if equipped) into the aneroid piston. Lightly bottom the aneroid rod in the piston and then back it out approximately three (3) turns, leaving the lock nut loose until the final aneroid adjustments are made. Install the aneroid and bracket assembly as outlined in the installation section of this bulletin.

Fig. 6

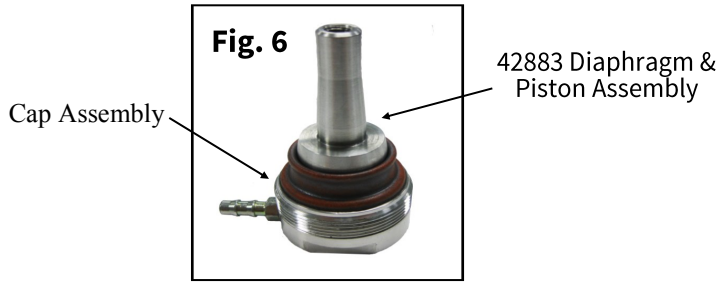


Figure 7

Adjustments

Aneroid adjustments include setting: 1) the amount of fuel reduced during low boost pressure conditions, 2) shut-off lever travel, and 3) activation pressures (shut-off lever lift-off and full travel). Adjustments should be performed in the following order, unless otherwise stated on the latest edition of the service specification.

Note: All adjustments are made with the aneroid and bracket installed on the pump and the throttle lever in the full fuel (W.O.T.) position.

1. Set the forward shutoff lever adjusting screw (Figures 8 & 11) to obtain the fuel delivery stated on the individual pump specification. This will establish the maximum amount of fuel delivered when the aneroid is retracted in the minimum or no boost position.
2. Install the Aneroid Travel Setting tool (P/N 42485) as shown in Figures 9 and 10. Be sure to set the ruler so that it is aligned with the center of the aneroid rod (inset picture Figure 9).
3. Set the rear shutoff adjusting screw (Figure 8 & 11) to obtain the amount of shut-off lever travel (Fig. 11) stated on the pump specification by measuring the aneroid rod travel against the ruler.

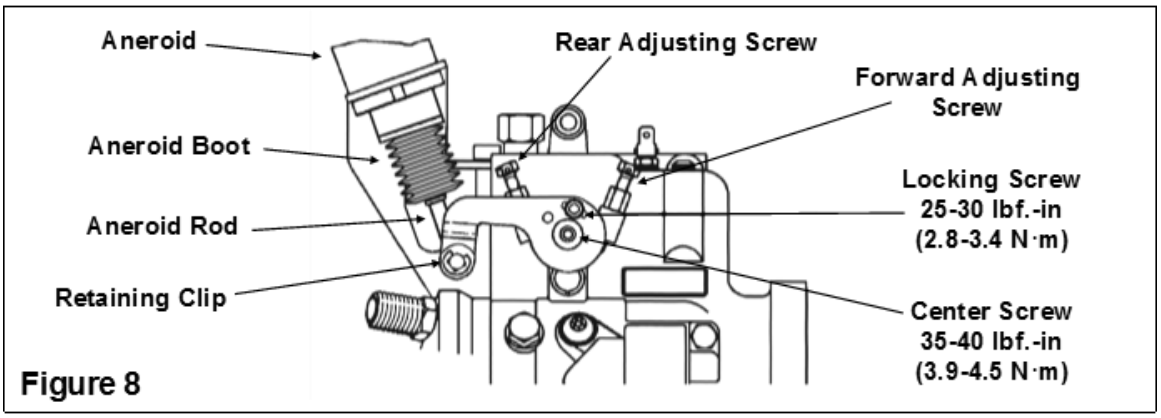


Figure 8

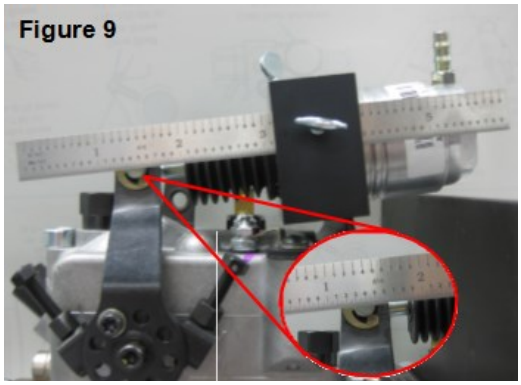


Figure 9


Figure 10

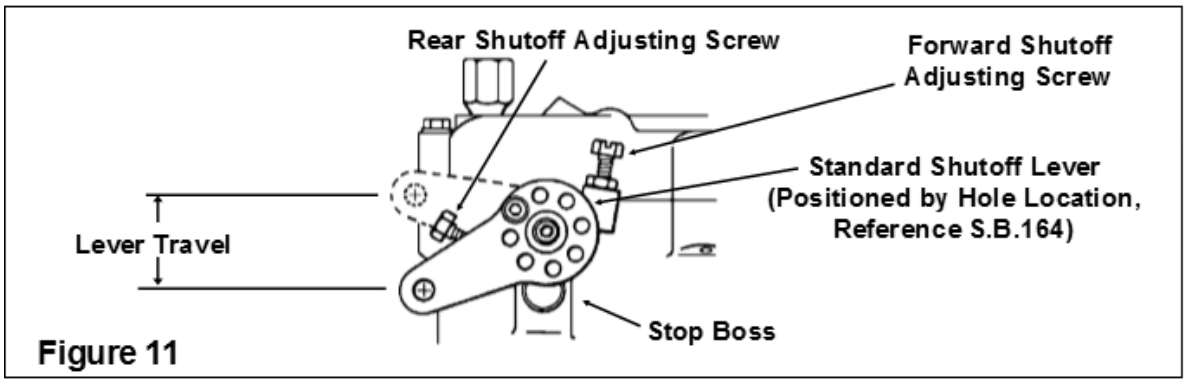


Figure 11

4. Install the boot to aneroid body. Ensure that the aneroid rod is backed out approximately three (3) turns from the fully bottomed position in the aneroid piston. Install the inner retaining clip on the aneroid rod (Figure 4) and connect the rod to the pump shutoff lever.
5. Connect the regulated air pressure source to the aneroid inlet. Cycle the pressure between 0– 7 p.s.i. (0 – 48.3 kPa), a minimum of three (3) times and check for smooth motion.
6. Loosen, but do not remove, the center screw and the locking screw.
7. Hold the forward adjusting screw against the stop boss on the housing. Cycle the air pressure between 0 - 4 p.s.i. (0 – 27.6 kPa) to confirm that the shutoff lever rotates freely.
8. While holding the forward adjusting screw against the stop boss, set the air pressure to the mean (middle) of the lift-off pressure given on the pump specification.
9. Tighten the center screw to 35-40 lbf.-inches (3.9-4.5 N·m) then tighten the locking screw to 25-30 lbf.-inches (2.8-3.4 N·m).
10. Set air supply to 0 p.s.i. (0 kPa) and install a small piece of shim stock (approximately .004 inch (.102 mm) thick) between the forward adjusting screw and the stop boss on the housing. Reference Figure 11).
11. Slowly increase the air pressure to determine at what pressure the forward adjusting screw lifts off the stop boss. Movement can be detected when the shim stock falls or slips free from under the forward adjusting screw. Proceed as follows according to the shut-off lever type in use.

A. If the shutoff lever is the adjustable type, as shown in Figure 8, and the lift off pressure is not within the specified pressure range then repeat steps 5-10 until lift off is within specification.

B. If the shutoff lever is the standard type (lever positioned by hole location, as shown in Figure 11) adjust the lift off as follows. Slowly increase the air pressure to determine at what pressure the forward adjusting screw lifts off the stop boss. Movement can be detected when the shim stock falls or slips free from under the forward adjusting screw.

If the air pressure required to obtain shut-off lever lift-off exceeds the pressure indicated on the pump specification, then disengage the rod from the shutoff lever and turn the rod out one turn (lengthen).

If the lever travel requires less pressure than indicated, turn the rod in one turn (shorten). Repeat this step until the lift-off pressure is achieved at the pressure stated on the pump specification.

Once the aneroid rod length is set, if equipped with a lock nut, apply one drop of Loctite 242 to the aneroid rod/lock nut thread interface. Tighten the lock nut to 30-40 lbf-inches (3.4-4.5 N•m), while preventing rotation of the piston assembly. The aneroid rod must fit freely into the lever assembly without twisting the internal diaphragm as shown in Figure 3 on page 2. Finally, install the outer retaining clip and recheck the response and the repeatability of the pressure settings.

Pump Models with both Aneroid and ST-125 Woodward Governor

For pumps equipped with both the ST-125 Woodward Electronic Governor (Figure 13)and aneroid assembly , reference Service Bulletin 509 for service.

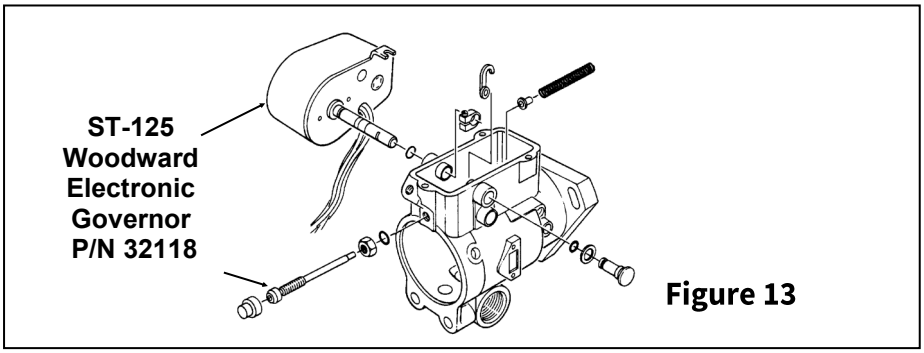


Figure 13

Revision	Date	Changes
5	03/00	Added information about new aneroid part numbers, adjustable shutoff levers, use with Woodward Governors, and aneroid tamper resistant shield.
6	02/01	Added aneroid supersession information and inlet boost pressure fitting part number. Modified adjustment procedures
7	12/09	Added information regarding the addition of a lock nut on some aneroids and a new barbed fitting.
8	3/13	Add information regarding diaphragm replacement and instructions for use of new tool P/N 42485 for setting aneroid travel.
9	06/17	Updated to current format. Added boot 41079 for aneroid assembly p/n 40586.

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