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SERVICE INSTRUCTION

Service Instruction No. 1308E
(Supersedes Service Instruction No. 1308D)
Engineering Aspects are
FAA Approved

SUBJECT: Pressurized Magneto Pressure Test

MODELS AFFECTED: Lycoming TIO-540-A2B, -A2C; (L)TIO-540-F, -J, -V, -R, -U, -W, -AE, -AF, -AG, -AH, -AJ, -AK; TIGO-541; IO-720-B1B and IO-720-B1BD series engines.

TIME OF COMPLIANCE: At intervals not to exceed 100 hours and anytime magneto is removed or replaced.

The Model 11-10090 Air Flow Tester is available for testing the pressurization system of the Bendix 1200, D3000, D3200 and Unison Slick 6200 and 6300 series magnetos used on applicable Lycoming engines.

The airflow tester is used to perform three checks of the magneto pressurization system on certain (L)TIO-540, TIGO-541 and IO-720 series engines as listed below in Table 1. The three checks of the pressurization magneto system and applicable engine models are as follows:

1. Operation Check

    a. The operation of the pressurized magneto system is checked by measuring the pressure at the magneto when the engine manifold pressure is maintained at a specified limit. See page 2, steps A1 thru A4.

2. Magneto Air Leakage

    a. Magneto air leakage is measured by supplying air from the tester to the magneto at a predetermined air pressure and recording leak down time. See page 3, steps B1 thru B7.

3. Relief Valve and System Check

    a. Proper operation of the relief valve is checked by the measurement of the valve and adapter air input to the air output and then by the measurement of the complete magneto pressurization system.

    b. To conduct the check with the airflow tester, see pages 4 thru 6, steps C1 thru C11.

    c. To conduct the check without the airflow tester, see pages 6 thru 7, steps D1 thru D5.

A trouble-shooting guide can be found on page 8.

TABLE 1

Engine Models	Magneto Manufacturer	Operation Check	Magneto Air Leakage Check	Relief Valve and System Check	
				With Air Flow Tester	Without Air Flow Tester
(L)TIO-540-F, -J, -R, -U, -V	*TCM	Yes	Yes	Yes	Yes
(L)TIO-540-F, -J, -R, -U, -V	Unison	No	No	Yes	No
TIO-540-A2B, -A2C	Unison	No	No	Yes	No
TIO-540-AE, -AF, -AH, -AJ, -AK, -W	Unison	No	No	Yes	No
TIGO-541	*TCM	Yes	Yes	Yes	Yes
IO-720-B1B, -B1BD	*TCM	No	Yes	Yes	No

*Formerly Bendix.

A detailed procedure for the complete test of the magneto pressurization system and relief valve is included with the Air Flow Tester Model 11-10090. This unit is available from Kell-Strom Tool Company, Inc., 214 Church Street, Wethersfield, CT 06109.

A. Operation Check (Figure 1):

NOTE

The operation check can only be performed on the (L)TIO-540-F, -J, -R, -U, -V, TIGO-541 series engines, that use TCM (formerly Bendix) magnetos. (See Table 1.)

A1. Remove the magneto hose (magneto to magneto pressure adapter) from elbow P/N MS20822-4 at magneto.

A2. Connect magneto hose to tee of tube assembly P/N 11-10097 and short hose of tube assembly to elbow in magneto.

A3. Connect tube assembly P/N 11-10097 to regulated output fitting of air flow tester. See Figure 1.

NOTE

Observe standard safety precautions when running the engine. Be careful that the tube assembly P/N 11-10097 does not touch the exhaust system.

A4. For the TIGO-541 series, with the engine running, set the governor control for a speed of 2133 (propeller speed) RPM. For all other engines, set the governor control for a speed of 2400 (direct drive) RPM. Open throttle to a manifold pressure of 37 to 38 Hg. inches. The regulated pressure gauge (G1) should read 3 lbs. ± ¼ lb. Failure to obtain the specified pressure indicates improper air flow through the magneto or an incorrect adjustment of the relief valve.

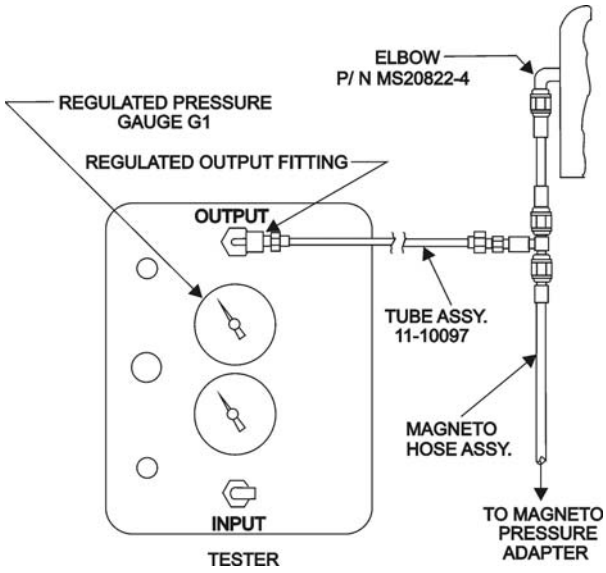

Figure 1. Connections for Operation Check

B. Magneto Air Leakage (Figure 2):

NOTE

The magneto air leakage check can only be performed on (L)TIO-540, TIGO-541, and IO-720 series engines that use TCM (formerly Bendix) magnetos. (See Table 1.)

B1. Disconnect the magneto hose (magneto to magneto pressure adapter) from tee and the tube assembly from tester.

NOTE

For the magneto air leakage check on the IO-720 series engines, connect tube assembly P/N 11-10097 direct and the elbow fitting P/N MS20822-4 at the magneto. Then proceed to step 3.

B2. Install cap on open end of tee. See Figure 2.

B3. Place air valve lever in the open (up) position. Turn pressure regulator fully counterclockwise (minimum pressure).

B4. Connect air source of 100 psi maximum to air input fitting. Turn pressure regulator clockwise to increase pressure on regulated pressure gauge (G1) to 10 psi.

B5. Install tube assembly into regulated output fitting of tester. Pressure on the gauge (G1) will drop momentarily when connection is made, then return to 10 psi setting. If necessary readjust regulator to 10 psi on gauge.

B6. Close air valve (down) position and record the time required for the pressure on gauge (G1) to drop from 10 psi to 1 psi. Time interval must be between 9 and 45 seconds.

B7. If the leak down is less than 9 seconds, check all connections of the test to be sure they are tight. If all connections are tight, check seal at parting of cover, cover screws and around ignition leads at magneto. Replacement of magneto is necessary if everything is tight and the recheck of steps 4 thru 6 is less than 9 seconds. If the leak down is more than 45 seconds, the bleed hole in the plug on bottom of magneto is restricted. Remove the plug and clean hole to .015 inch. Replace plug and repeat steps 4 thru 6.

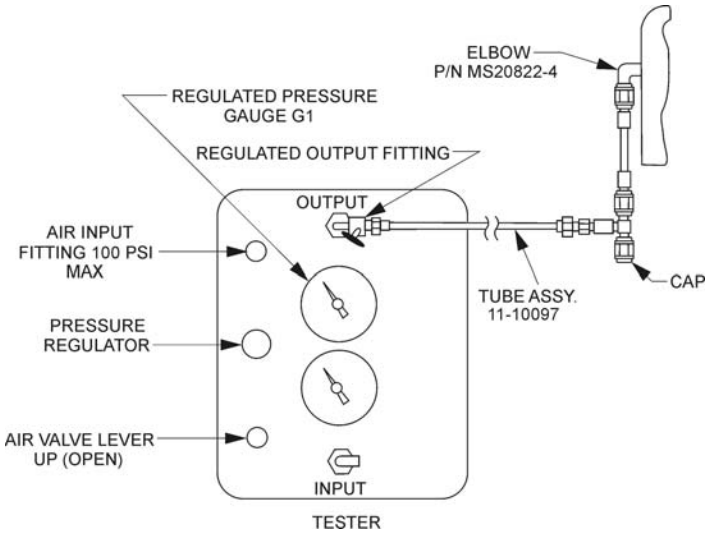

Figure 2. Connections for Magneto Air Flow Check

C. Relief Valve and System Check (Figures 3 and 4):

NOTE

The relief valve and system check can be performed on all (L)TIO-540, TIGO-541, and IO-720 series engines. (See Table 1.)

The relief valve and system check can be performed with either the Model 11-10090 Air Flow Tester or with the setup shown in Figure 4. The parts needed for the setup in Figure 4 are one pressurized regulator and two regulated pressure gauges which will read from one (1) to ten (10) psi. The two gauges must be able to be read in ¼ psi increments.

Relief Valve Check:

C1. Remove the magneto hose (magneto to magneto pressure adapter) from the engine, also remove relief valve P/N LW-13134, LW-13697, LW-14443 or 66N21020 and adapter P/N LW-13227.

NOTE

On adapter assemblies removed from the IO-720-B1B with tee fitting P/N AN825-4, one end of the tee must be capped for this check.

C2. Model 11-10090: Install adapter with relief valve into end of short hose, P/N 11-10120 furnished with tester. The other end of hose is installed in the regulated output fitting.

Figure 4 Setup: Connect the compressed air source, the pressurized regulator, the two regulated pressure gauges, the magneto hose, the adapter P/N LW-13227 and relief valve as shown in Figure 4.

C3. Model 11-10090: Connect magneto hose between outlet fitting of adapter and adapter input of tester as shown in Figure 3.

C4. Model 11-10090: Turn pressure regulator counterclockwise (minimum pressure) and connect the air source to air inlet of tester.

C5. Turn the pressure regulator clockwise until the pressure of Column "A" (See Table 2) is indicated on the regulated pressure gauge (G1). The adapter pressure of Column "B" should be seen on the adapter gauge (G2). Readjust the regulator until the regulator pressure gauge (G1) reads the same as Column "C" of Table 2. The adapter gauge (G2) should remain the same as Column "B". If the relief valve does not maintain the adapter pressure (Column "B") throughout the regulated pressure range of Column "A" and "C", the orifice in the relief valve adapter may be restricted with foreign matter or the relief valve setting is in need of adjustment.

System Check:

C6. Remove the relief valve adapter from the hose assembly. Check the orifice by inserting a No. 55 drill (.052 inch) consequently cleaning out any foreign matter that may be present.

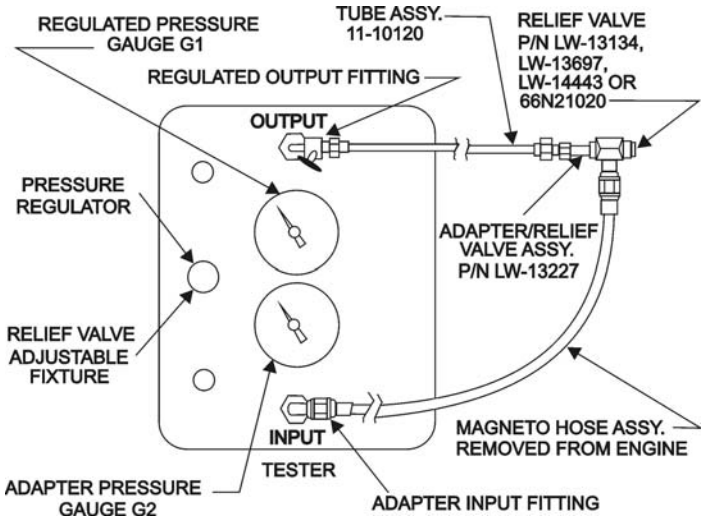

Figure 3. Connections for Relief Valve and System Check

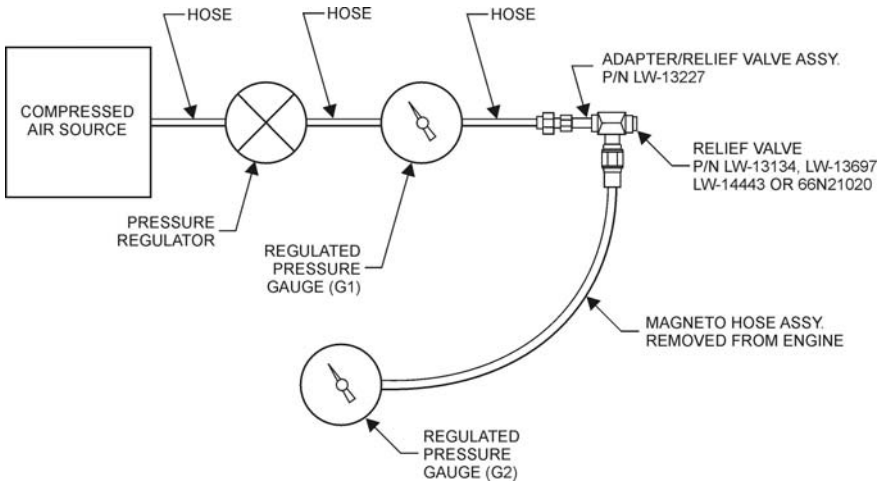

Figure 4. Alternate Connections for Relief Valve and System Check

C7. Reset the relief valve by removing it from the adapter and placing the valve into the relief valve adjusting fixture of tester making sure the small nut of the valve engages the socket in the fixture. Using a standard screwdriver, adjust the spring tension. Turning the screw clockwise will increase the pressure, counterclockwise will decrease the pressure.

C8. Reassemble the relief valve into the adapter and recheck to the pressure in Column "C". Repeat step 7 until the relief valve will maintain the proper adapter pressure throughout the regulated pressure range.

C9. Lockwire the relief valve to the adapter and install in the air inlet housing. Connect magneto hose to adapter.

C10. Recheck the magneto system to the adapter pressure in Column "D".

C11. After the above checks have been made and are acceptable, remove the tester and return all lines back to the original setup.

TABLE 2

ENGINE MODELS	COLUMN "A" REGULATED PRESSURE	COLUMN "B" REGULATED PRESSURE	COLUMN "C" REGULATED PRESSURE	COLUMN "D" ADAPTER PRESSURE		RELIEF VALVE P/N
				*TCM Magneto	Unison Magneto	
(L)TIO-540-F, -J, -R, -U, -V	4 psi	3 psi ± ¼ psi	8 psi	3 psi ± ½ psi	----	LW-13134
(L)TIO-540-F, -J, -R, -U, -V	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
TIO-540-A2B, -A2C	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
(L)TIO-540-U2A	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
(L)TIO-540-J2B	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
TIO-540-AE	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
TIO-540-AF	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
TIO-540-AG	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
TIO-540-AH	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
TIO-540-AJ	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
TIO-540-AK	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
TIO-540-W	6 psi	5 psi ± ¼ psi	10 psi	5 psi ± ½ psi	4 psi ± ½ psi	66N21020
TIGO-541	4 psi	3 psi ± ¼ psi	8 psi	3 psi ± ½ psi	----	LW-13134
IO-720-B1B	6 psi	4-½ psi ± ¼ psi	10 psi	4-½ psi ± ½ psi	----	LW-13697
IO-720-B1BD	8 psi	3 psi ± ¼ psi	12 psi	7 psi ± ½ psi	----	LW-14443

*Formerly Bendix.

D. Alternate Relief Valve and System Check (Figure 5 and 6):

NOTE

This alternate relief valve and system check can only be performed on (L)TIO-540 and TIGO-541 series engines that use TCM (formerly Bendix) magnetos. (See Table 1.)

An alternate method for checking the operation of the pressurized magneto system without an air flow tester is as follows:

D1. Remove the top plug from the magneto.

D2. Install a gage which will read from one (1) to ten (10) psi. Gauge must be able to be read in ¼ psi increments.

D3. (L)TIO-540 series engines:

a. Run engine at 2400 (direct drive) RPM and 37 to 38 inches Hg. manifold pressure.

b. TIGO-541 series engines: Run engine at 2133 (propeller speed) RPM and 37 to 38 inches Hg. manifold pressure.

D4. Run engine at 2400 RPM and 37 to 38 inches Hg. manifold pressure.

D5. The gauge must read 3 psi ± ¼ psi.

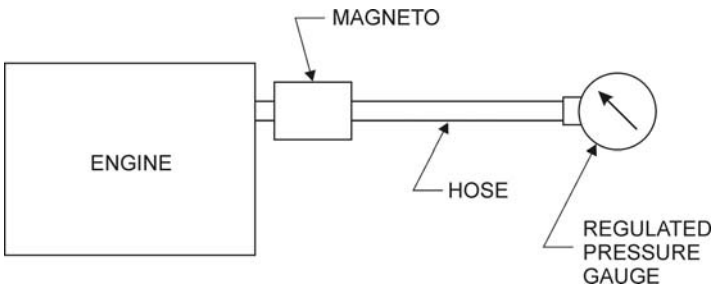

Figure 5. Alternate Relief Valve and System Check for (L)TIO-540 Series Engines

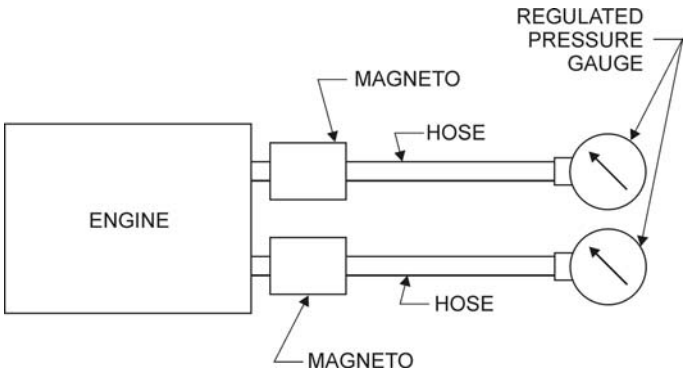

Figure 6. Alternate Relief Valve and System Check for TIGO-541 Series Engines

Troubleshooting

The following is a list of the common troubles which may be encountered with the pressurized magneto. Along with the troubles are the probable causes and remedies.

TROUBLE	PROBABLE CAUSE	REMEDY
1. Magneto pressure more than pressure in Column D	Magneto, bleed hole clogged	Clean bleed hole to .015 inch (38mm drill).
	Relief valve inoperative	Replace relief valve.
2. Magneto pressure less than pressure in Column D	Orifice in pressure relief valve adapter clogged	Clean orifice with No. 55 drill.
	Hoses and fittings loose	Tighten same.
	Leaking pressure at magneto cover or ignition leads	Tighten same, if unable to tighten, replace magneto. Replace grommets.
	Relief valve inoperative	Replace relief valve.
	Leaking pressure at magneto shaft bearing	Replace magneto.

NOTE

After each change that is performed, check the operation of the pressurized magneto. Do not try more than one change at a time.

NOTE: Revision “E” revises text and adds new engine models.