HEADQUARTERS, ARMY AIR FORCES
WASHINGTON 25, D. C.

TECHNICAL ORDER
NO. 02-55AC-34

30 November 1944

ENGINES AND MAINTENANCE PARTS

PACKARD—REVISION OF IGNITION TIMING AND IGNITION SYSTEM OPERATION—V-1650-3 AND -7

NOTE As prescribed in T. O. No. 00-20A, appropriate reference to this Technical Order will be entered on AAF Form 60-B for the engines affected. The work directed herein will be accomplished as soon as practicable by service activities with the aid of base maintenance facilities and by depots at time of engine overhaul. Commanding Officers will be responsible for bringing paragraph 2.b. of this Technical Order to the attention of all pilots cleared for operation of aircraft powered with the subject type engines as well as those undergoing transition flying training as contemplated in AAF Regulation 50-16.

1. a. To prevent detonation when operating at high power output, the exhaust magneto will be retimed to the engine in order to produce a synchronized spark at 45 degrees before top center.

b. To increase the operating time between breaker point adjustments, the tolerances outlined in paragraph 2.c. will be observed. It has been found that these magnetos will perform satisfactorily with a breaker point clearance as high as .018 inch, therefore, breaker points will not be reset until the gap is in excess of .018 inch.

2. a. REVISION OF MAGNETO-TO-ENGINE TIMING.

(1) Rotate crankshaft in the direction of normal operation until the "A6" piston is traveling upward on the compression stroke, stopping when the stamped marking "A6IMA" (or the 45-degree mark which is stamped on later models) on the crankshaft flange is in register with the pointer as observed through the inspection plug hole located at propeller end of lower crankcase. (See figure 1.)

NOTE Some timing flanges have a scribed line for both the "A6IMA" and the "A6EMA" marks, other flanges have but one scribed line for both the "A6IMA" and "A6EMA" marks while later flanges are marked with scribed lines indicating 40 degrees, 45 degrees, and 50 degrees before top center (BTC).

(2) Remove the left magneto (exhaust) in accordance with the following procedure:

(a) Drain aftercooler system and remove header tank to aftercooler pipe assembly.

(b) Disconnect aftercooler bleeder line at aftercooler pump end; detach bleeder line clip from wiring harness; and remove wiring harness connection retaining cap screw which holds bleeder line bracket to connection cover.

(c) Disconnect bleeder line at aftercooler and remove line from engine.

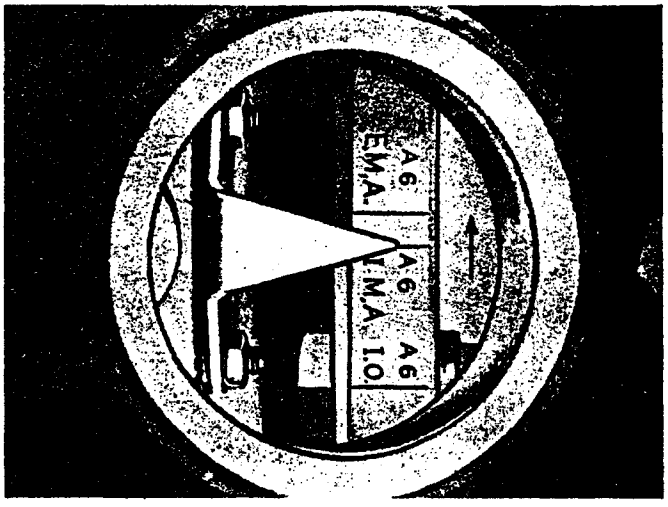

Figure 1 - Timing Flange
Set to Time "A" and "B" Magnetos

(d) Remove aftercooler oil line clip from wiring harness.

(e) Loosen exhaust wiring harness by detaching two brackets from coolant inlet pipe and one bracket from cylinder block at No. 2 cylinder and remove retaining nut on clip under aftercooler.

(f) Remove the three remaining cap screws from connection cover and withdraw distributor cap.

(g) Detach control link from bell-crank lever. Remove link from magneto and unscrew the ground connection retaining nut.

(h) Remove nuts from the three mounting studs and withdraw magneto.

(3) Timing and installation procedure for SF12RAP-3 magneto (C-6).

(a) Check breaker point gap and if less than .011 inch or more than .018 inch, reset to .012 inch using flight tool kit wrench AT8002.

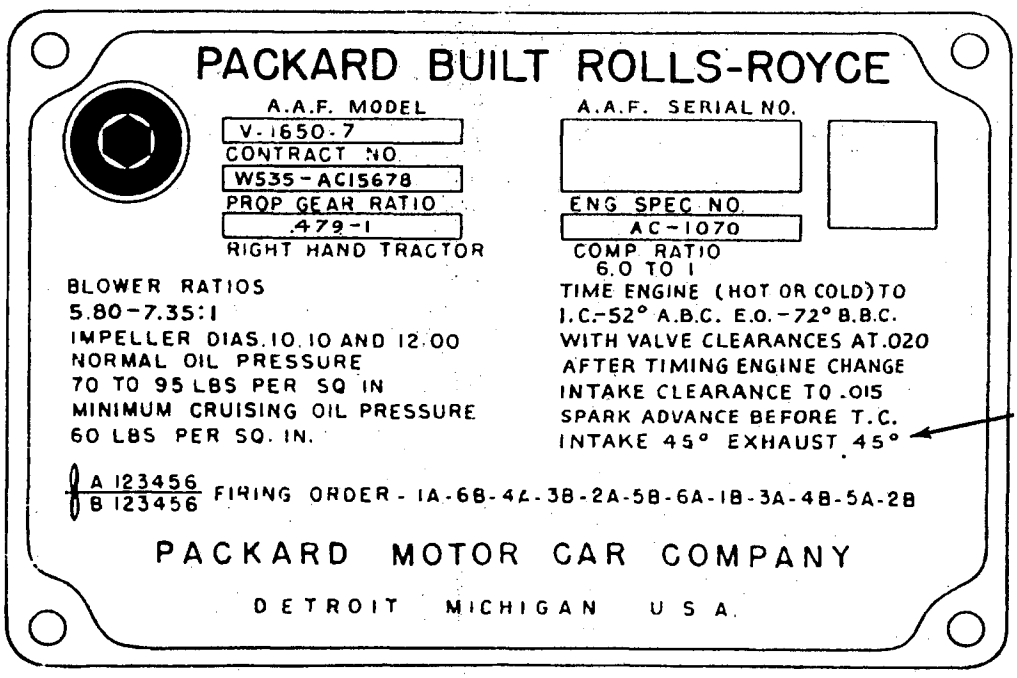

Figure 2 - Typical Data Plate

(b) Take off the distributor block by removing the two screws and two bolts, then turn distributor rotor until the large distributor finger electrode is in position to fire "A6" cylinder (AE6 wire).

(c) Turn rotor shaft slowly in clockwise direction (viewed from driving end) until breaker points are just opening, indicated by an Abbott timing light, type A-100, or equivalent. Lock the rotor in this position with special locating tool or mark position on distributor gear with a scriber.

(d) With the magneto rotor located or otherwise held in position where the breaker points are just opening with breaker housing in full advanced position, slide magneto on the mounting studs and engage the vernier coupling shaft. If coupling shaft cannot be readily engaged without turning the rotor shaft, carefully remove the coupling shaft, revolve it one spline and then check to see if engagement can be made without turning rotor shaft. It may be necessary to try each of the 12 splines on the coupling shaft before coupling shaft and magneto coupling are in register.

(4) Timing and installation procedure for SF12RAP-4 magneto (Northeast).

(a) Check breaker point gap and if less than .011 inch, or more than .018 inch, reset to .012 inch.

(b) Connect an Abbott timing light, type A-100, to the breaker points and turn rotor shaft in direction of normal rotation until mark on the distributor rotor gear at "L" is visible through the peep hole on the upper side of the magneto.

(c) Continue turning rotor shaft until breaker points open as indicated by timing light. Lock in this position with the clutch of the lock tool AT9622. Check mark on distributor gear and if aligned with moulded index line on coil housing the magneto is now correctly pretimed.

NOTE The following instruction pertaining to the vernier coupling shafts will facilitate the timing of the magneto to the engine. The procedure eliminates the necessity of an initial engagement of the magneto with the magneto drive and subsequent adjustments in order to obtain the exact timing position of the vernier coupling which is comparatively inaccessible when mounted in the airplane.

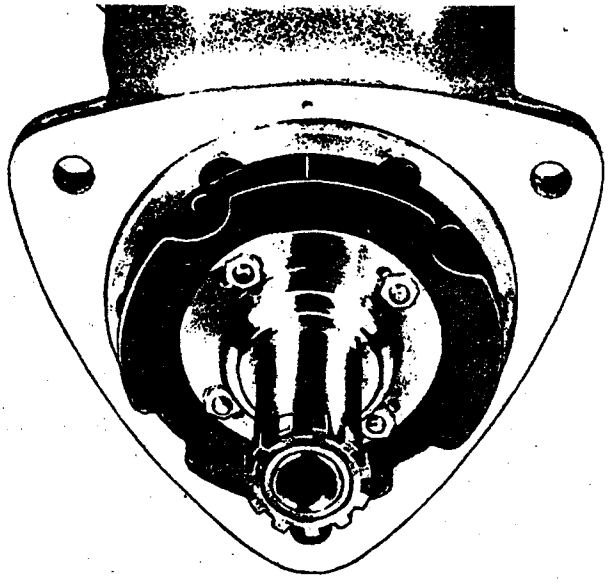

Figure 3 - Draw Pencil Line on Coupling in Register With Prick Punch Mark on Mounting Flange

(d) Scribe a mark on the flange exactly midway between the stud holes, if not previously marked. Lightly stone area to remove possible burrs. (See figure 3.)

(e) Place the vernier coupling shaft on the magneto drive coupling and pencil mark the flanged end of the coupling in register with the center mark as shown in figure 3.

(f) Remove coupling shaft and with large end toward you, continue the mark over the edge and down the face of the flange. Observe the relation between this mark and the edge of the adjacent spline.

(g) Examine the mounting flange on the wheel case; an etched line will be found on this face midway between the upper mounting flange. If not distinct, measure between studs and remark. Insert the vernier coupling shaft into the magneto drive in the wheel case of the engine.

(h) Check the relation between the etched mark on the wheel case and the spline of the coupling shaft immediately below the mark. If this relationship is not the same as that between the pencil mark placed on the coupling and its adjacent spline, disengage the coupling shaft and turn one spline at a time until the correct relationship is obtained. A piece of string with a loop over the lower mounting stud and the upper end held taut and in register with the etched line on the wheel case will assist in obtaining the alignment. (See figure 4.)

(i) Install gasket and magneto on mounting studs. If all of the foregoing steps have been carefully followed, the magneto coupling should engage the vernier shaft without any movement of the magneto rotor.

(5) Tighten mounting stud nuts. Check timing of both magnetos for synchronization by turning engine crankshaft backwards about one-fourth of a revolution, then turn crankshaft slowly in direction of normal rotation until breaker points of both magnetos are just opening as determined by timing light or feeler gage. Observe timing mark at crankcase inspection port and if mark is in register with pointer or within 1/16 inch either way of being in register, the timing is correct, if not, remove magneto and retime to the above procedure until desired timing is obtained. (See figure 1.)

(6) The engine data plate will be corrected to indicate the correct spark advance before top center. Use a small flat punch to obliterate the numerals "50" located to the right of the word "Exhaust." Restamp in the same location the numerals "45." (See figure 2.)

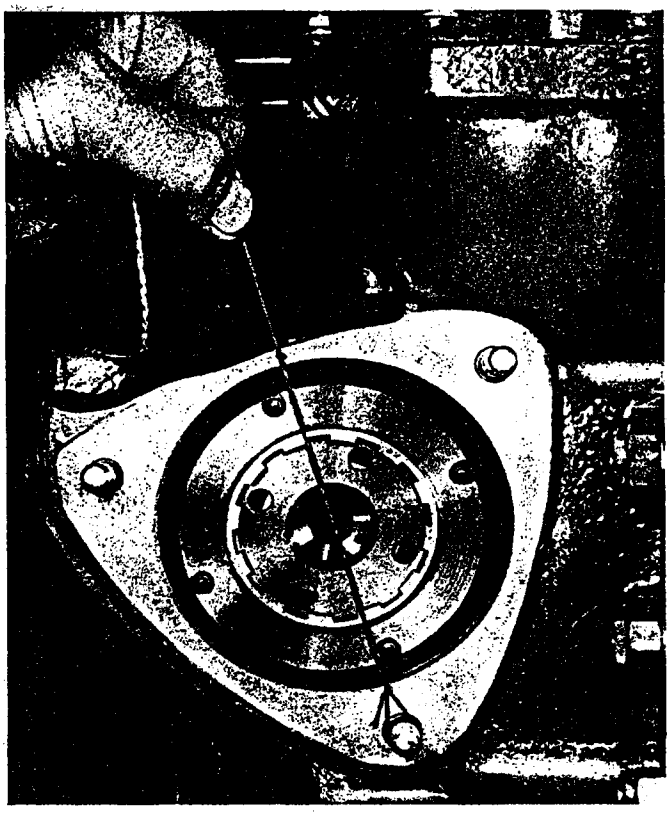

Figure 4 - String Stretched Across Center Point of Coupling Acts as a Pointer to Align Spline

b. REVISION OF IGNITION SYSTEM CHECK TOLERANCES.

(1) Maximum single ignition rpm drop for V-1650-3 and -7 engines operating at 2300 rpm is as follows:

(a) Right magneto (intake) - 100 rpm.

(b) Left magneto (exhaust) - 130 rpm.

c. REVISION OF BREAKER POINT CLEARANCE.

(1) The maximum allowable service tolerance on breaker point clearance has been changed from .014 to .018 inch. Breaker points having clearance within .011 to .018 inch will not require readjustment during service inspection.

(2) Breaker points with clearance in excess of .018 inch will be readjusted to .012 inch plus .002 inch or minus .001 inch. When new breaker points are installed they will also be adjusted to this clearance.

By Command of General ARNOLD:

Prepared by Engine Section,
Maintenance Div, Hq, ATSC.

BENNETT E. MEYERS
Major General, U.S.A.
Deputy Director
Air Technical Service Command

★ SUPPLEMENT TO BASIC TECHNICAL ORDER ★

5 January 1945

ENGINES AND MAINTENANCE PARTS

PACKARD—REVISION OF IGNITION TIMING AND IGNITION SYSTEM OPERATION—V-1650-3 AND -7

NOTE This Technical Order supplements T. O. No. 02-55AC-34, dated 30 November 1944, to make corrections as indicated herein. A SUITABLE REFERENCE TO THIS SUPPLEMENT WILL BE MADE ON PAGE 1 OF THE BASIC TECHNICAL ORDER, AND THE AFFECTED PARAGRAPHS INDICATED ACCORDINGLY.

1. Paragraph 2.a.(3)(a) of T. O. No. 02-55AC-34, dated 30 November 1944, is hereby amended to read as follows:

2. a. (3) * * * * * * *

(a) Adjust the breaker points to a clearance of .012 inch prior to the installation of the exhaust magneto. The breaker point clearance of the intake magneto should also be adjusted to the same figure.

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2. Paragraphs 2.a.(4)(a) and (b) of T. O. No. 02-55AC-34, dated 30 November 1944, are hereby amended to read as follows:

2. a. (4) * * * * * * *

(a) Adjust the breaker points to a clearance of .012 inch prior to the installation of the exhaust magneto. The breaker point clearance of the intake magneto should also be adjusted to the same figure.

(b) Connect an Abbot timing light, type A-100, to the breaker points, and turn rotor shaft in direction of normal rotation until the mark "R" on the distributor rotor gear is visible through the peep hole on the upper side of the magneto. The mark "L" will be visible through the peep hole when timing intake magnetos.

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By Command of General ARNOLD:

Prepared by
Engine Section,
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B. E. MEYERS
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