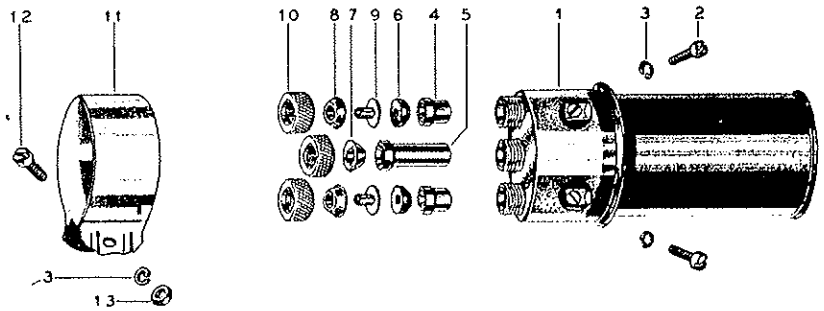
BENDIX

SERVICE PARTS LIST

12 VOLT BATTERY IGNITION COIL
PART NO. 10-16144-1



Exploded Parts View

SERVICE PARTS LIST

Ref. No.	Part No.	No. Req.	Description
1	10-16144	1	**COIL—Stripped—12 Volt**
2	10-3661	2	**SCREW** (*Cable Connection*)
3	10-3132		**WASHER—Lock** (2, *Cable Connection Screw*) (1, *Radio Shield Sleeve Screw*)
4	10-9227	2	**BUSHING—Insulating** (*Primary Cable Terminal*)
5	10-5785	1	**TERMINAL—High Tension Cable**
6	10-2674	2	**GLAND** (*Primary Cable Terminal Bushing*)
7	10-2617	1	**GLAND** (*High Tension Cable Terminal*)
8	10-7030	2	**FERRULE** (*Primary Cable Terminal, Outer*)
9	10-7029	2	**FERRULE** (*Primary Cable Terminal, Inner*)
10	10-3657	3	**NUT—Knurled** (*Primary and High Tension Cable Terminals*)
11	10-9248	1	**SLEEVE—Coil Radio Shield**
12	10-9660	1	**SCREW** (*Radio Shield Sleeve*)
13	10-694	1	**NUT** (*Radio Shield Sleeve Screw*)

NOTE: 10-16144-1 Coil does not include Mounting Bracket or Clamp.

BENDIX AIRCRAFT BATTERY IGNITION
Type WL-7a

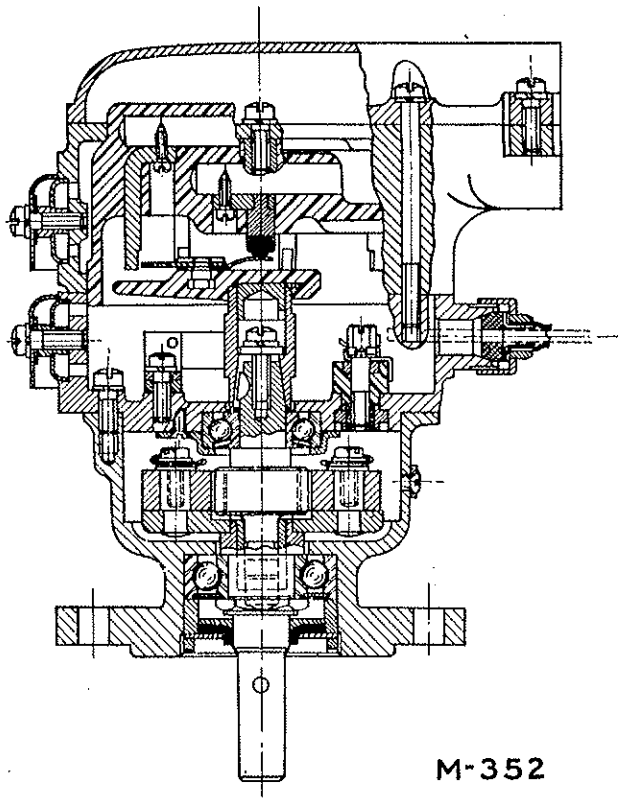


Fig. 1
Sectional View of WL-7a Timer Distributor

Description

The Bendix type WL-7a battery timer-distributor operates in conjunction with a high tension ignition coil and derives its energy from the storage battery of the airplane. The battery timer supplies ignition for the front spark plugs of the engine only. Ignition for the rear plugs is supplied by a magneto.

The type WL-7a timer-distributor incorporates an automatic, centrifugally-operated spark advance mechanism which has a range of 15° as measured on the timer driveshaft. Since the timer is driven at half the speed of the engine, this is the equivalent of a 30° spark advance on the engine crankshaft. Since the engine is timed to fire fully advanced at 30° before top center, the timer will provide a fully retarded spark, which is delivered at the top center position of the piston for the prevention of kick-backs at starting. Then as the engine is speeded up the automatic advance feature functions to provide the full running advance of 30°.

Installing and Timing to the Engine

Turn the engine in the normal operating rotation to the full advance firing position on the compression stroke as instructed by the engine manufacturer's manual.

Remove the radio shield and distributor head from the timer. Grasp the distributor finger and turn it at least one full revolution in the normal operating direction until the breaker contacts of the timer are just opening and the high tension segment on the finger is in a position where it will line up with the No. 1 cylinder electrode in the distributor head. It will be noted in doing this that the distributor finger can be turned a fraction of a revolution before the drive shaft of the timer begins to turn. This interval represents the range of the automatic advance mechanism which is normally in a retarded position when the unit is stationary, but which is shifted to full advance by turning the finger in the manner just described. Be sure all play or backlash is removed from the mechanism by holding the driveshaft lightly if necessary. Should the finger be turned beyond the No. 1 firing position, do not turn the finger backward to correct it. Make another complete revolution to be certain that the firing position (points just opening) is reached by turning the finger in the normal direction of rotation. Then gently release the finger without moving the driveshaft of the unit. This procedure will leave the driveshaft set in the full advance No. 1 firing position as required for correct timing to the engine.

Install the timer on the engine in this relation and run the mounting nuts down sufficient to hold the timer in place, but not enough to prevent turning the timer as necessary for the final adjustment. Then again turn the finger as before to place the unit in full advance, and while holding the finger in this position rotate the entire timer unit through the angle provided by the elongated screw holes in the mounting flange to the position where the contact points are just on the instant of opening. It is recommended that a timing light be connected across the points as a means of determining the opening position. The use of cellophane or shims between the points is not recommended because such practice is likely to result in the introduction of foreign material between the point surfaces, causing unsatisfactory operation of the breaker.

If sufficient adjustment of the timing is not afforded by the elongated mounting screw holes, additional range can be obtained by loosening the three screws (M, Fig. 2) and rotating the upper part of the housing as necessary. Remember that the advance mechanism must be kept in the full advance position for all adjustments. When the correct adjustment has been obtained, tighten and lock the mounting screws.

Care in Operation

Inspection of Breaker Felts. Approximately every 100 hours remove each distributor head and examine the lubricating felt attached to the cam follower. If it is dry, apply two drops of medium bodied lubricating oil on it. Never allow oil to reach the breaker contact points as this would cause pitting of the points and consequently interference with engine operation.

Inspection of Breaker Contacts. When examining the breaker felts, check the adjustment of the contact points as follows:

Turn the engine crankshaft so that the clearance between the contact points is a maximum. This clearance as measured with a feeler gauge should be from .014" to .018". If adjustment for clearance is necessary, loosen the two screws A and B (Fig. 2) which hold the contact point assembly C in place. Move this contact point assembly to the right or left until the desired clearance (.016") is obtained after which the screws A and B

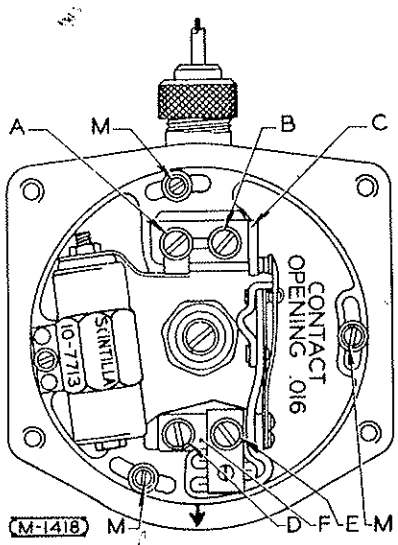
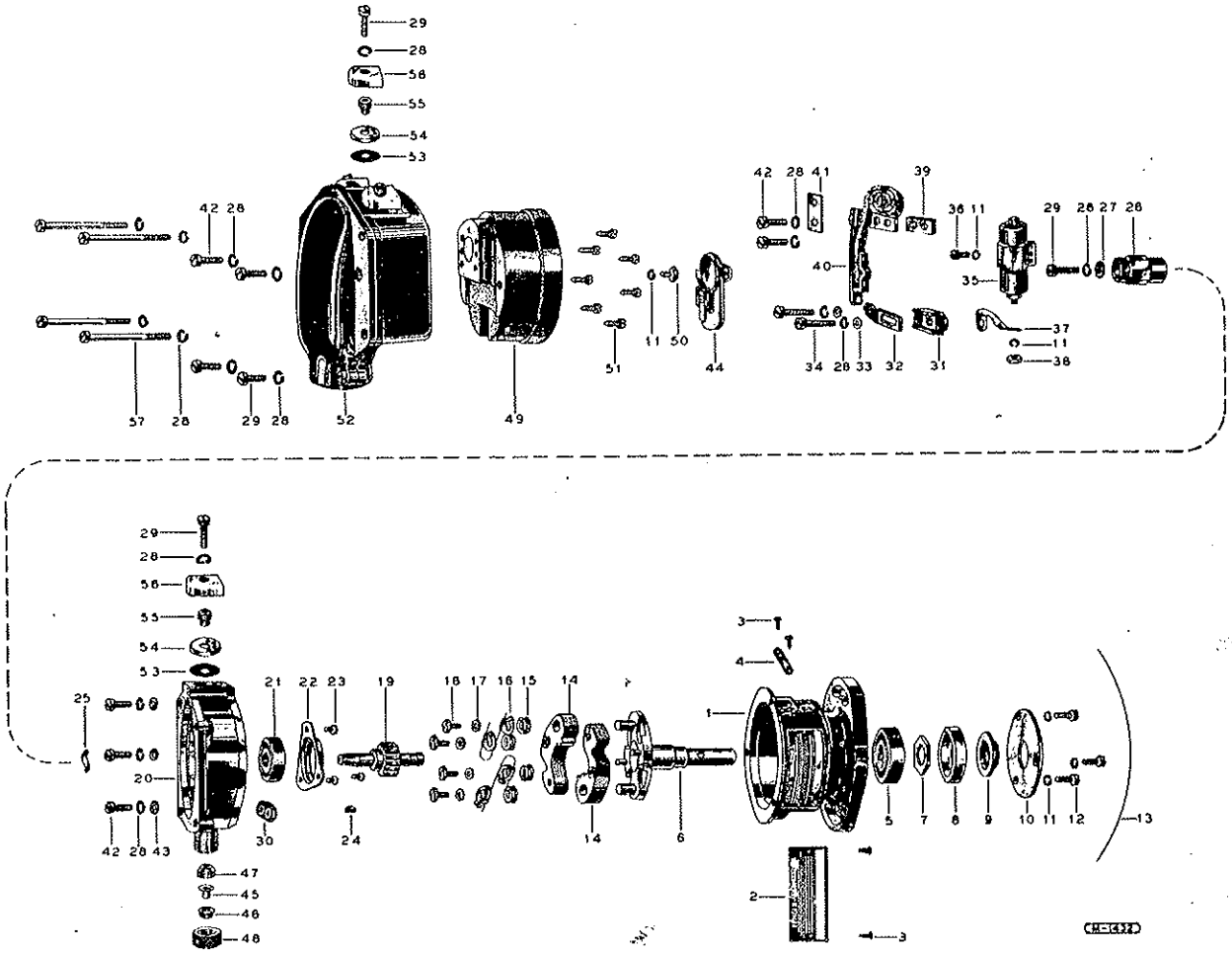


Fig. 2
Breaker View

are re-tightened. Vertical alignment of the contact points is obtained by loosening the two screws D and E and moving the movable contact point assembly F to the position desired.

After the proper clearance has been obtained, turn the engine crankshaft until the piston of No. 1 cylinder reaches its full advance firing position on its compression stroke. Loosen the three screws M and, while holding finger in the full advance position, move the breaker housing assembly until the contact points just begin to open. At this position, the distributor finger should be opposite the No. 1 electrode of the distributor head. Re-tighten the screws M after adjustment is made. If necessary, additional advance range can be obtained by loosening the two mounting flange hold-down bolts and rotating the whole unit through the range provided in the slots of the mounting flange.

Inspection of Distributor Finger and Distributor Head. At the above inspection periods, examine the carbon brush in the distributor head and the contact spring on the distributor finger for excessive weaf. The distributor finger can be removed with an upward pressure applied with the hand. Do NOT use a screw driver for prying off distributor finger.



Exploded Parts View of the Type WL-7a Battery Timer

SERVICE PARTS LIST

Ref. No.	Part No.	Qty.	Description
			SECTION I
1	**	1	**HOUSING—Timer**
2	2-782Z	1	**PLATE—Identification**
3	10-17712		**DRIVE SCREW** (2, *Identification Plate*) †(2, *Rotation Direction Plate* 10-16389)
4	†10-16389	1	**PLATE—Rotation Direction** (*Housings having non-threaded holes for Rotation Direction Plate Drive Screw*)
*	†10-1108	1	**PLATE—Rotation Direction** (*Housings having threaded holes for Rotation Direction Plate Screws*)
*	†10-9859	2	**SCREW** (*Rotation Direction Plate* 10-1108)
5	10-604Z	1	**BEARING—Ball** (*Drive End*)
6	10-5908Y	1	**SHAFT—Drive**
7	10-7596	1	**NUT—Drive Shaft**
8	10-5414	1	**RETAINER—Inner** (*Oil Seal*)
9	10-5413Y	1	**OIL SEAL—Drive Shaft**
10	10-16633	1	**RETAINER—Outer** (*Oil Seal*) (*On and after Serial No.* 1101)
*	10-5412	1	**RETAINER—Outer** (*Oil Seal*) (*Up to and including Serial No.* 1100)
*	10-7597	1	**NUT—Retaining** (*Oil Seal*) (*Up to and including Serial No.* 1100)
11	10-7501	6	**WASHER—Lock** (3, *Oil Seal Retainer Screw, on and after Serial No.* 1101) (1, *Condenser Screw*) (1, *Condenser Terminal*) (1, *Carbon Brush*)

*Not illustrated
**See Section II for Part No.
†Not required for use on timer housings having cast arrows

Ref. No.	Part No.	No. Req.	Description
12	10-16637	3	SCREW—Oil Seal Retainer (*On and after Serial No.* 1101)
13	10-30939	AR	WIRE—Safety (*Oil Seal Outer Retainer Screw*) (*On and after Serial No.* 1101)
14	**	2	FLYWEIGHT—15° Advance Range
15	**	AR	WASHER—Shim (*Flyweight Screw*)
16	**	2	SPRING—Flyweight Tension
17	**	4	WASHER (*Flyweight Spring Screw*)
18	10-9860	4	SCREW—Flyweight
19	10-8329	1	SHAFT—Cam
20	10-13270Y	1	HOUSING—Breaker
21	10-2936	1	BEARING—Ball (*Breaker End*)
22	10-5917	1	RETAINER (*Cam Shaft Bearing*)
23	10-5003	3	SCREW—Cam Shaft Bearing Retainer
24	2-181	1	KEY—Woodruff (*Cam*)
25	10-5924	1	WASHER—Spring (*Cam*)
26	**	1	CAM—Breaker
27	10-9621	1	WASHER—Plain (*Cam Screw*)
28	10-3132	19	WASHER—Lock (1, *Cam Screw*) (2, *Contact and Cam Follower Screw*) (2, *Adjustable Contact Screw*) (3, *Breaker Housing Screw*) (2, *Distributor Head Screw*) (2, *Shield Clamping Screw*) (3, *Ventilator Screw*) (4, *Shield Fastening Screw*)
29	10-3661	6	SCREW (1, *Cam*) (3, *Ventilator Shield Assembly*) (2, *Shield Clamping*)
30	10-5788	1	BLOCK—Insulating (*Adjustable Contact Assembly*)
31	10-3316	1	INSULATOR—Adjustable Contact Assembly
32	10-3320	1	ADJUSTABLE CONTACT ASSEMBLY
33	10-3317	2	WASHER—Plain (*Adjustable Contact Screw*)
34	10-18185	2	SCREW—Adjustable Contact Assembly
35	10-7713-3	1	CONDENSER
36	10-12540	1	SCREW—Condenser
37	10-7102	1	CONNECTOR (*Condenser to Breaker*)
38	10-7727	1	NUT—Condenser Terminal
39	10-7101	1	BLOCK—Locating (*Contact and Cam Follower, Not Used in Breaker Housings incorporating raised boss for Contact and Cam Follower Assembly*)
40	10-33483	1	CONTACT AND CAM FOLLOWER ASSEMBLY
41	10-3464-3	1	PLATE—Retaining (*Contact and Cam Follower Assembly Felt*)
42	10-4018	7	SCREW (2, *Contact and Cam Follower Assembly*) (3, *Breaker Housing*) (2, *Distributor Head*)
43	10-4023	3	WASHER—Plain (*Breaker Housing Screw*)
44	10-33636	1	FINGER—Distributor
45	10-7029	1	FERRULE—Inner (*Ground Cable*)
46	10-7030	1	FERRULE—Outer (*Ground Cable*)
47	10-2674	1	GROMMET—Rubber (*Ground Cable*)
48	10-3657	1	NUT—Ground Cable Outlet
49	10-9862Y	1	HEAD—Distributor
50	10-22529	1	CARBON BRUSH—Distributor Head (*Distributor Heads incorporating removable Carbon Brush*)
*	10-7627	1	CARBON BRUSH—Distributor Head (*Distributor Heads incorporating spun-in Carbon Brush*)
51	2-185	8	SCREW—Cable Piercing
52	10-9854Y	1	SHIELD ASSEMBLY—Radio
53	10-9354	3	SCREEN—Ventilator
54	10-7441	3	RETAINER—Ventilator Screen
55	10-7573	3	SPACER—Ventilator Shield
56	10-7572	3	SHIELD—Ventilator
57	10-3368	4	SCREW—Radio Shield

*Not illustrated.
**See Section II for Part No.

SECTION II

Parts Special for WL-7a Timer, Spec. No. 10-13810-2

Ref. No.	Part No.	No. Req.	Description
1	10-16631Y	1	HOUSING—Timer
14	10-23295	2	FLYWEIGHT—15° Advance Range—Clw.
15	10-7305	AR	WASHER—Shim (*Flyweight Screw*)
16	10-12719	2	SPRING—Flyweight Tension
17	10-9858	4	WASHER—Plain (*Flyweight Spring Screw*)
26	10-13811	1	CAM—Breaker—Clw.

Parts Special for WL-7a Timer, Spec. No. 10-52021-1

Ref. No.	Part No.	No. Req.	Description
1	10-52022	1	HOUSING—Timer
14	10-23296	2	FLYWEIGHT—15° Advance Range—Anti-clw.
16	10-52074	1	SPRING—Flyweight Tension
	10-52076	1	SPRING—Flyweight Tension
*	10-7022	1	RETAINER—Flyweight Tension Spring 10-52074
17	10-17920	4	WASHER—Special (*Flyweight Spring Screw*)
26	10-13709	1	CAM—Breaker—Anti-Clw.

*Not illustrated

United States of America
Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SE00809WI

This certificate issued to Butterfly Aviation, Inc.
602 East Renner Field Road
P.O. Box 736
Goodland, KS 67735

*certifies that the change in the type design for the following product with the limitations and conditions thereof as specified hereon meets the airworthiness requirements of Part * of the * Regulations.*

Original Product - Type Certificate Number : See Attached Approved Model List (AML)

Make : SE00809WI for list of approved engine models and

Model : applicable airworthiness regulations.

Description of Type Design Change:
Installation of a modified, alternate source of supply, engine ignition coil assembly and condenser in accordance with the data as listed on Approved Model List (AML), No. SE00809WI, dated August 2, 1999, or later FAA approved revision.

Limitations and Conditions:
Approval of this change in type design applies to the above model engine(s) only. This approval should not be extended to engine(s) of this model on which other previously approved modifications are incorporated unless it is determined that the relationship between this change and any other previously approved modifications, including changes in type design, will introduce no adverse effect upon the airworthiness of that engine. A copy of this Certificate and FAA Approved Model List (AML) No. SE00809WI must be maintained as part of the permanent records of the modified engine.

This change in type design applies only to ignition coil assemblies and condensers which are modified, 100% functionally tested and inspected by the holder of this certificate at the above identified location.

Compatibility of this design change with previously approved modifications must be determined by the installer

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

This certificate and the supporting data which is the basis for approval shall remain in effect until

Date of application : February 22, 1999

Date of issuance : August 2, 1999

Date reissued :

Date amended :

surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration

By direction of the Administrator

C. D. Riddle
(*Signature*)
Charles D. Riddle
Program Manager
Wichita Aircraft Certification Office
(*Title*)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

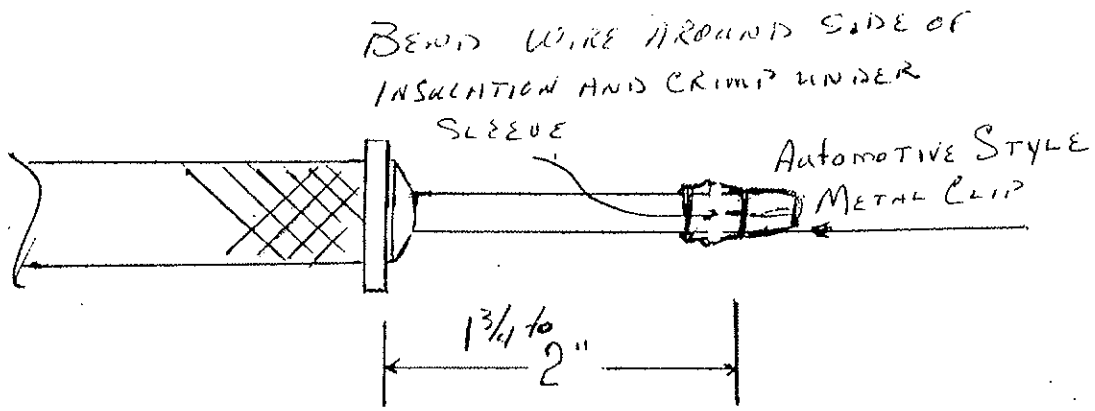
BUTTERFLY IGNITION COIL & CONDENSER

REMOVAL OF BENDIX COIL P/N 10-16144, INSTALLATION OF BA10-16144 COIL

PLEASE READ ALL INSTRUCTIONS BEFORE STARTING INSTALLATION

1. Remove cover band from top portion of coil.
2. Unscrew center ferrule nut and remove high tension lead from coil.
3. Loosen screws inside of coil top that hold timer and battery wires and unscrew the ferrule nuts and remove the wires from coil.
4. Remove clamp bolts that hold coil in bracket and remove coil.
5. Install original rubber mounting material and additional material as necessary and install coil in bracket. When replacing a coil other than a 10-16144, the enclosed bracket may be useful.
6. Install end 640905-1 connector on wire ends and install timer (-) and battery (+) wires in coil, using the installation tool provided, through top of coil. Tighten ferrule nuts. Tool can also be used to remove wires from coil should that become necessary.
7. **REMOVE INSULATOR (CIGARETTE) FROM COIL WIRE AND ADJUST LENGTH TO APPROX 2 IN. LONG AND INSTALL AUTOMOTIVE STYLE METAL CLIP. INSERT WIRE INTO COIL (METAL END MUST INSERT INTO AND MAKE CONTACT WITH METAL CUP IN COIL), AND TIGHTEN FERRULE NUT.**
8. **REMOVE TOP FROM BATTERY TIMER BY REMOVING FOUR CORNER SCREWS. SLIDE TOP TO ONE SIDE AND REPLACE CONDENSER WITH BA10-7713 CONDENSER.**
9. Use a light film of silicone sealer between distributor parting surfaces on assembly as it will help keep moisture out.
10. Complete 337 and log book entry. Weight change negligible.

NOTE: If removing the large 6 volt coil there is a dropping resistor in the circuit, it is usually located behind the firewall in the upper right corner. Remove the battery ignition wires from it and route them out to the new coil. The BA10-16144 coil is designed to operate on 12 volts.



FAA APPROVED MODEL LIST (AML) NO. SEOO809WI
FOR
IGNITION COIL ASSEMBLY AND CONDENSER INSTALLATION
BUTTERFLY AVIATION, INC.

Original Issue Date: August 2, 1999
Revision Date: Sept. 12, 2005

Item	Engine Make	Engine Model	Original Type Cert. No.	Cergification Basis for Alteration	FAA Approved Drawing List No.	Revision Level & Date	AFM Supl. No. & Date	Approved Mdl. List Amdment & Date
1	Jacobs Service Company	R-755A2 R-755B2	E-237	CAR 13, Effective August 1, 1941 as ammended by 13-1 & 13-2	Drawing List: BA10-16144/UC15X BA10-16144/27270	Revision Dated: Feb. 20, 1999 Sept. 12,2005	N/A	N/A
2	Jacobs Aircraft Engine Company	L-4MB (R-755-9)	E-121	Type Certificate No. 121	Drawing List: BA10-16144/UC15X BA10-16144/27270	Revision Dated: Feb. 20, 1999 Sept. 12,2005	N/A	N/A
3	Jacobs Service Company	R-755-S	E-1SW-6	Type Certificate No. E-1SW-6	Drawing List: BA10-16144/UC15X BA10-16144/27270	Revision Dated: Feb. 20, 1999 Sept. 12,2005	N/A	September 25, 2002
4	Jacobs Aircraft Engine Company	L-6MB R-915-5,-7	E-195	Type Certificate No. No. 195	Drawing List: BA10-16144/UC15X BA10-16144/27270	Revision Dated: Feb. 20, 1999 Sept. 12, 2005	N/A	N/A
5	Teledyne Continental Motors	W670-23	E-162	Aeronautical Bulletin 7-A, Car 13 Effective 8/1/41 Type Cert. No. 162	Drawing List: BA10-16144/UC15X BA10-16144/27270	Revision Dated: Feb. 20, 1999 Sept. 12, 2005	N/A	N/A