CAS Ltd.

Swanton, Vermont

USA

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REFERRING TO: SPK-01 SOLID STATE SHOWER OF SPARKS FOR M9F MAGNETOS

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PURPOSE: SOLID STATE REPLACEMENT FOR THE RUSSIAN KP4716 HIGH VOLTAGE STARTING SYSTEM

MODELS AFFECTED: AIRCRAFT WITH M-14P SERIES ENGINES EQUIPPED WITH M9F MAGNETOS

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I. SAFETY PRECAUTIONS

During the installation use caution and be sure not to apply power to the system until the installation is complete. The unit generates high voltages that can cause damage to personnel. Be sure that the power lead to the control unit is disconnected during installation.

The unit will provide a spark with the magnetos in the OFF position. Use extreme caution during testing of the system. REMAIN clear of the propeller at all times. The engine may have some fuel air vapors in the cylinders and the spark can cause it to kick over as soon as the SPK-01 is activated. We highly recommend removing all of the front spark plugs during installation and initial testing to prevent accidental starting of the engine.

II. INTRODUCTION

The SPK-01 is an electronic device that can be used to replace the original Russian KP4716 high voltage starting system. Its purpose is to supply a high voltage spark current to the M9F magneto during engine starting. It can be used in new installations of M14P series engines that utilize the M9F magnetos. It should not be confused with the starting vibrator system that is used with the M9-35 magnetos. It will operate equally well with 12 volt or 24 volt electrical systems. It should be powered only during the starting phase of operations and not be continuously powered.

System Description:

The SPK-01 starting system consists of two units, the control box and the ignition coil. The control box (see photo 1) is activated during engine starting. It generates a high frequency square wave that is fed to the coil unit (see Photo 2). The coil then generates a high voltage (in excess of 20,000 volts) continuous spark. This is fed to the starting input on the distributor cap of the left magneto. The M9F magneto has a special hole for the high voltage lead. This high voltage is then fed through a separate ring on the rotor and then to the trailing finger of the rotor in the magneto. The trailing finger is retarded about 24 degrees from the primary rotor finger. Thus the high voltage spark is fed to each cylinder at about top dead center to assist starting. After the engine is running the normal magneto supplies the spark at about 24 degrees before top dead center using the advanced finger on the rotor.

The SPK-01 is not designed for continuous operation and the control unit may be damaged if it is run continuously for more than one minute. It should be activated only during starting. It works equally well for both air start or electric start engines.

Photo 1: SPK-01 Control Box

Photo 2: SPK-01 Coil Unit and Harness

III. INSTALLATION

SYSTEM LAYOUT

MOUNT THE CONTROL BOX

Choose a place to mount the control box. It should be mounted in a location that allows easy wiring to the coil and the starting switch. It should be mounted on a flat metal surface to allow for heat transfer from the control box to a larger metal surface. Secure it with screws. Most installations are on the engine side of the firewall.

MOUNT THE COIL UNIT

Choose a place near the left magneto to mount the coil. Be sure that the high tension cable of the coil unit has enough length to reach the left magneto cover with enough slack to easily remove the cover for future maintenance operations. Mount the coil unit using the mounting hole on the coil unit.

ELECTRIAL WIRING

Connect the start lead to the starting switch. This lead should supply system voltage to the control box only when the master switch is on and the start button is depressed. Do not connect this wire until the final testing stage.

Install a ground lead to a suitable ground point on the airframe.

PREPARE AND CONNECT THE HIGH TENSION LEAD

1. Remove the left magneto metal cover by removing the four screws on the forward side of the magneto and releasing the three hold down screws.

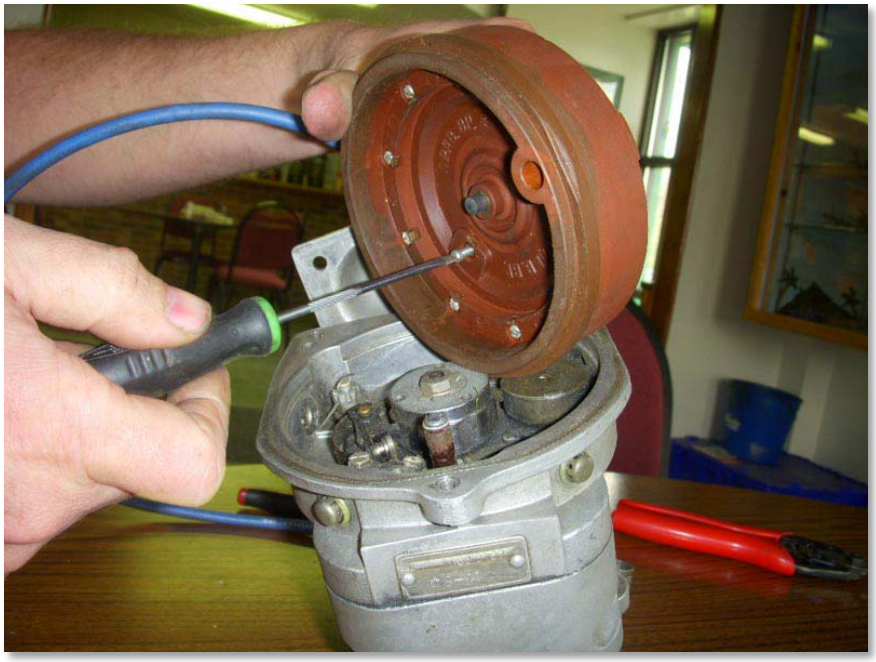
2. Route the high-tension wire between the coil unit and the left magneto as illustrated below. Leave some extra slack to permit later removal of the rotor cap for servicing and timing.

3. Install washer and nut. Tighten the nut.

4. Remove distributor cap and lift straight up; use caution to not bend cigarette.

5. Loosen the Shower of Sparks screw with flathead screwdriver.

6. Insert wire fully into magneto cap and tighten screw. Pointed end of screw will penetrate to the inner wire.



7. Carefully realign and replace magneto cap and cover.

IV. EQUIPMENT LIST

- SPK-01 control box
- coil unit with connector and leads

V. WIRING DIAGRAM