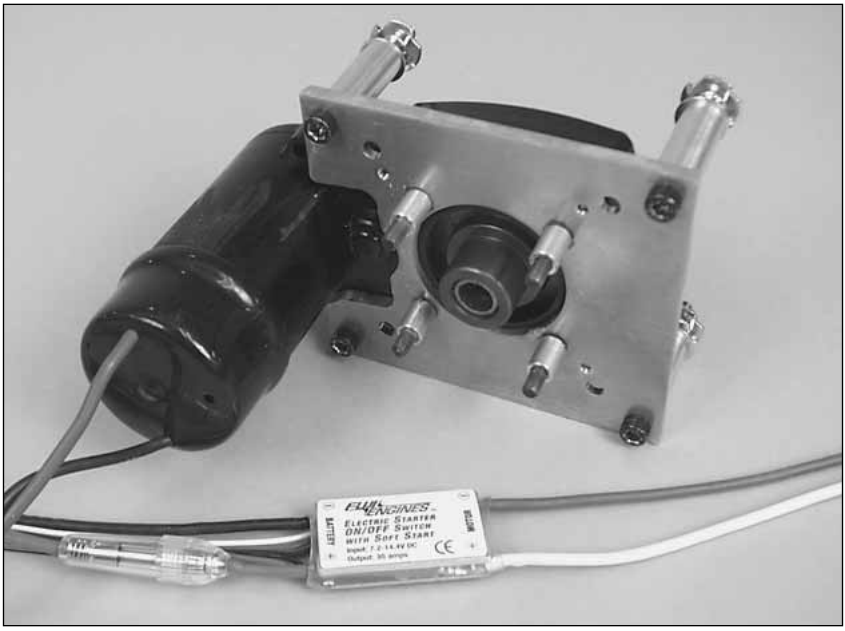
Instructions for the Fuji-Imvac Electric Starter BT-86



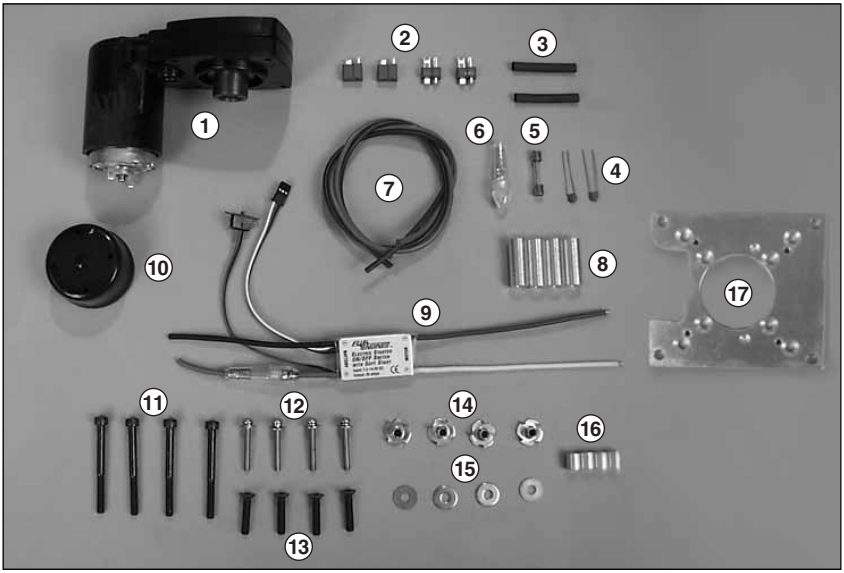
Manufactured by FUJI-IMVAC INC.
YOKOHAMA, 235-0005 JAPAN
Worldwide Distributor (except Japan): Hobbico®, Inc.
Champaign, IL 61826 USA
www.fuji-imvac.com

Fuji-Imvac is not related to the original Fuji Engines sold by Mecoa.

INTRODUCTION

These instructions explain the installation of the Fuji-Imvac Electric Starter BT-86 on a Fuji-Imvac BT64A engine and on a Fuji-Imvac BT-86 Twin.

FUJI-IMVAC BT-86 ELECTRIC STARTER PARTS LIST



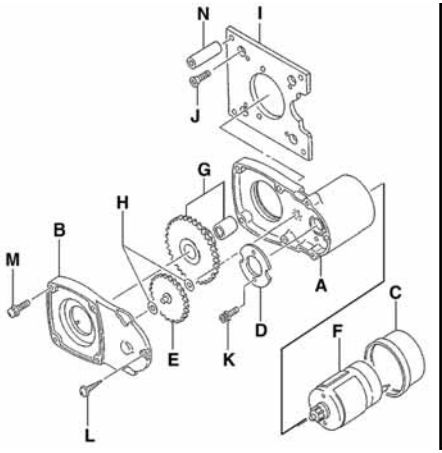
1. Electric starter case with motor
2. Deans connectors
3. Shrink tubing for Deans connectors
4. Capacitors
5. 30A fuse
6. Fuse holder
7. Electrical wire
8. Aluminum firewall spacers
9. Electronic soft start module
10. Rubber cap
11. Firewall mounting socket head cap screws
12. Engine mounting bolts
13. Electric starter mounting bolts
14. Firewall blind nuts
15. Firewall washers
16. Engine mounting spacers
17. Electric starter mounting plate

PARTS AND TOOLS REQUIRED FOR THE INSTALLATION THE BT-86 ELECTRIC STARTER

- 10 cell, 1900mAh battery for the Fuji-Imvac BT-86 Electric Starter (GPMP0743)
- 30-min epoxy (GPMR6043)
- Thin CA (GPMR6001)
- Electric noise suppressant (see note below)
- Phillips screwdriver (HCAR1090)
- Electric drill with 1/4" [6.4mm] drill bit
- Solder iron and soldering supplies (HCAR0776)
- Great Planes® Pro™ Threadlocker (GPMR6060)
- Metric allen wrenches (HCAR0521)
- Electrical tape
- Heat Gun
- Flexible pushrod

REPLACEMENT PARTS

To order replacement parts for the Fuji-Imvac BT-86 Electric Starter, use the following order numbers. Replacement parts are available only as listed. Replacement parts are not available from Product Support, but can be purchased from hobby shops or mail order/Internet order firms. If you need assistance locating a dealer to purchase parts, visit www.greatplanes.com and click on "Where to Buy." If this electric starter is missing parts, contact Product Support (see back cover).



(A) FJIG1201	Starter Gear Case A
(B) FJIG1202	Starter Gear Case B
(C) FJIG1203	Starter Motor Cover
(D) FJIG1204	Starter Motor Spacer
(E) FJIG1205	Starter Gear 2.3 to 1
(F) FJIG1206	Starter Motor
(G) FJIG1207	Starter Gear Assembly
(H) FJIG1208	0.5 Gear Shift Collar
(I) FJIG4720	Starter Mounting Plate
(J) FJIG7171	5x15 Beveled Head Phillips Screws
(K) FJIG7172	4x10 Set Screw
(L) FJIG7173	4.5x12 Beveled Screw
(M) FJIG7174	4x30 Phillips Head Screw With Washers
(N) FJIG3650	Starter Collar A

IMPORTANT NOTES

1. The electric starter depicted in this manual has a Battery Eliminator Circuit (BEC). The BEC circuit is rated at 1 Amp. **Do not use this circuit to power the receiver of your airplane.** The BEC cannot handle more than three regular sized servos. If you do so the BEC will fail with possible catastrophic consequences for your airplane. **Turn off** the micro switch on the electronic soft start module to disconnect the BEC circuit.

2. In order to avoid interference from the gas engine, you must use an electric noise suppressant on the electric starter's wiring that comes back from the electric motor. Radio Shack® offers two types of electrical noise suppressants. The simplest noise suppressant is called "Snap Together Ferrite Choke" and its part number is 273-105. The other type Radio Shack offers is the "10 Amp Noise Filter". Its part number is 27-051.

3. The starter's remote On/Off switch should always be assigned to a **spring-loaded switch** on your transmitter. It is important that you do this for safety reasons. It must be in a spring loaded switch so that it will always be in the "Off" position when the transmitter is turned on and the starter motor will always stop spinning when you release the switch after the engine is started.

4. Always include a "kill switch" in your gas engine installation. A Great Planes Ignition Switch Harness (GPMG2150) is recommended.

5. It is strongly recommended that you use a PCM receiver to control your airplane. PCM receivers can handle vibrations and the type of electronic interference a gas engine produces much better than FM receivers can.

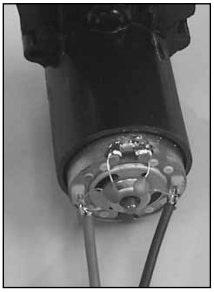
6. The minimum firewall size recommended for the installation of the Fuji-Imvac BT-86 electric starter is 3/8" [9.5mm] birch ply. Lite ply firewalls need to be twice as thick as birch ply firewalls and larger washers (such as fence washers) substituting the washers provided in the kit should be used.

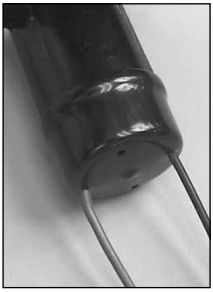
7. The Fuji-Imvac BT-86 electric starter requires a 10-cell 1900mAh battery. This battery will start both the Fuji-Imvac BT-64A and the Fuji-Imvac BT-86 Twin at least 30 times on a full charge without any problems.

INSTALLATION OF THE BT-86 ELECTRIC STARTER ON THE BT-64A

Electrical Installation

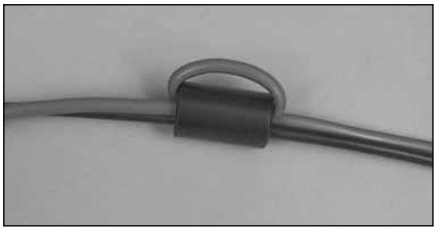
1. Locate the electric starter motor and the two 14-gauge black and red wires. Solder the wires to the motor, making sure that the red wire is connected to the motor tab with the red dot.

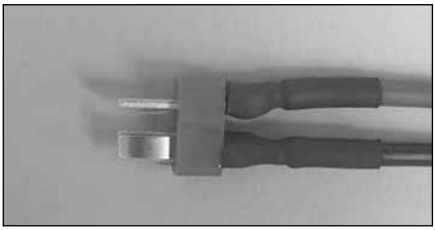




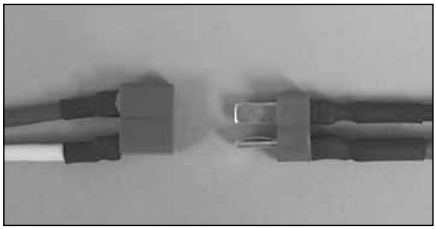
2. Locate the two motor capacitors. Lightly sand a spot on the side wall of the motor. Solder the capacitors as shown above. Each capacitor should have one leg soldered to one motor tab and the other to the motor side wall. Locate the motor's rubber cap. Insert the motor wires through the holes in the cap and slip the cap over the motor to protect it from dirt. Apply a couple of drops of thin CA to the cap to tack glue it to the electric starter's case or tape it in place.

3. Install a noise suppressant on the electric motor wiring, preferably some place on the wire where you can secure the suppressant to the fuselage. If you are using a Snap Together Ferrite Choke type of noise suppressant, install it as shown above. If you are using some other type of noise suppressant, follow the manufacturer's instructions to install it.

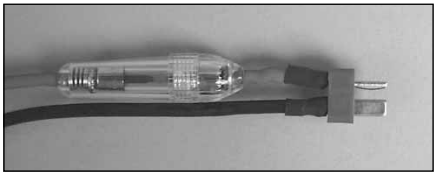




4. Find one of the male Deans connectors. Cut each one of the supplied heat shrink tubing in four pieces. Slip one piece of heat shrink tubing on each wire. Solder the connector to the ends of the wire. Slip the heat shrink tubing over the exposed solder joints and use a heat gun to shrink them. Check the above image for the connector polarity.



5. Find one female Deans connector. Slip one piece of heat shrink tubing on each wire. Solder the connector to the end of the On/Off soft start module. This connector will plug into the one installed in the previous step. Make sure that the pins are installed into the connector such that the white wire from the On/Off soft start switch goes with the red wire from the starter motor and that the blue wire from the On/Off soft start switch goes with the black wire from the starter motor. Slip the heat shrink tubing over the exposed solder joints and use a heat gun to shrink them.

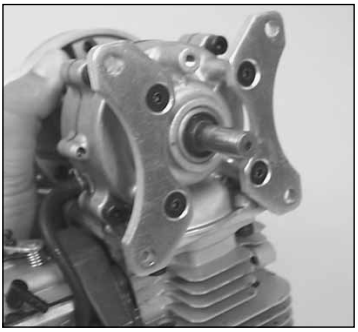


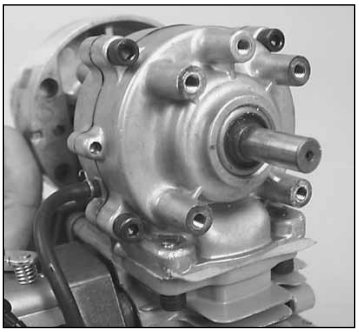
6. Find another male Deans connector and solder it to the “battery” side of the On/Off soft start module using the same procedure as above. Use two pieces of heat shrink tubing to cover the exposed wire. Check the image above for the polarity.

7. The left over male Deans connector is for you to install on the battery you will use to power the electric starter system. Make sure the polarity on your battery matches the polarity of the electric starter system. Use the last two pieces of heat shrink tubing to protect the exposed solder as done above.

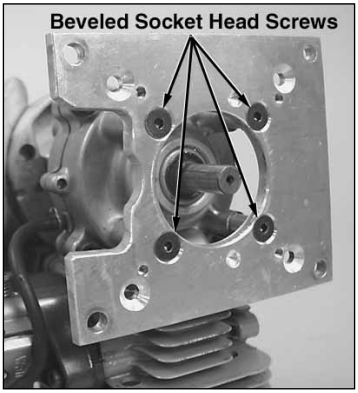
Installing the Electric Starter on the BT-64A Engine

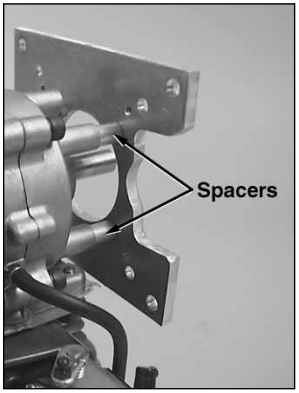
1. Remove the engine mounting plate from the engine.



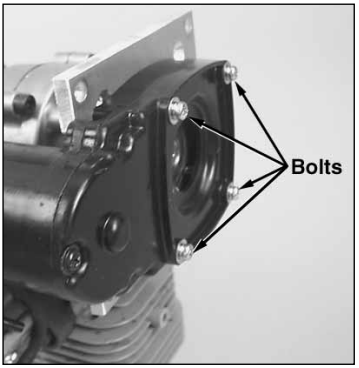


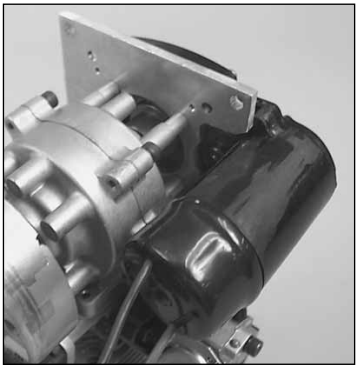
2. Locate the electric starter mounting plate, four beveled socket head screws and four short (9 x 10mm) spacers. Install the plate onto the engine with the spacers between the engine and the mounting plate. The opening in the plate must be facing the carburetor’s side of the engine. **Note:** It is important that you use threadlocking compound on the engine mounting screws.





3. Locate the electric starter assembly and four 4 x 32mm Phillips head bolts with washers. Install the electric starter onto the electric starter mounting plate as shown above using the four bolts. Use threadlocking compound on these bolts.



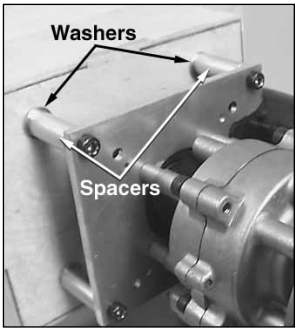


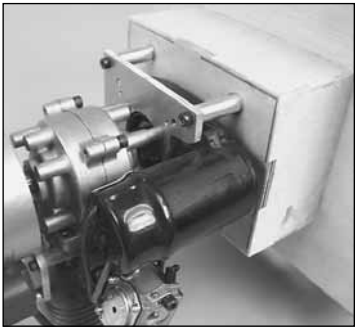
Installing the BT-64A Engine to the Airplane

1. Locate the electric starter template and center it on your firewall. Use tape to hold it in place. Drill the 1/4" [6.4mm] mounting holes at the places indicated by the template. Please note that the engine shaft centerline is not the same as the engine mount template centerline.

2. Use one of the supplied bolts, a washer and a spacer to install the supplied blind nuts in the back of the firewall as shown above. Use a small dab of epoxy on the blind nuts to make sure they stay on when you take the mounting bolts off.

3. Install the engine in place using the spacers, bolts and washers supplied. Make sure the engine is centered in the firewall and that the mounting bolts are tight. Use threadlocking compound on the engine mounting bolts.





4. Route the starter's wiring to the inside of your airplane. Connect the soft start module to the electric starter and to the receiver. Also, connect it to the starter's battery.

5. Connect the throttle pushrod to the carburetor's arm to the throttle servo.

6. Securely install your starter battery inside your airplane. Make sure you have full access to the battery.

7. The electric starter is now installed on your airplane.

INSTALLATION OF THE ELECTRIC STARTER ON THE BT-86 TWIN

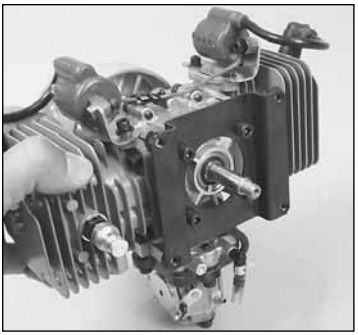
Electrical Installation

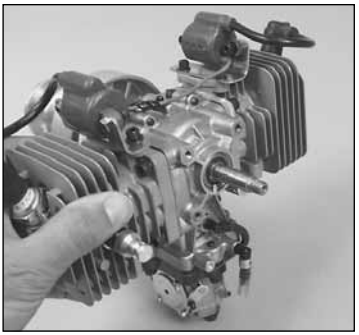
The electrical installation of the Fuji-Imvac BT-86 Electric Starter on the Fuji-Imvac BT-86 Twin engine is identical to that of the Fuji-Imvac BT-86 Electric Starter on the Fuji-Imvac BT-64A engine.

Installing the Electric Starter on the Engine

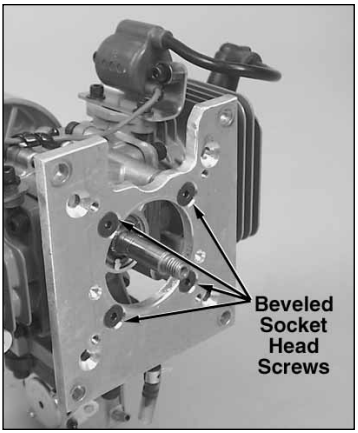
1. Remove the two mufflers from the engine. This makes the installation of the Electric Starter easier.

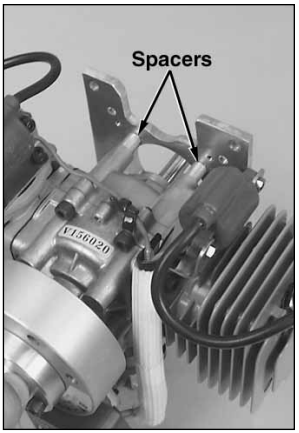
2. Remove the engine mounting plate from the engine.



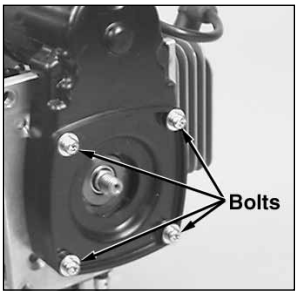


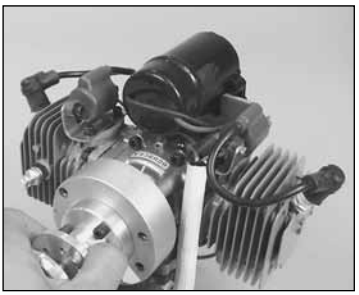
3. Locate the electric starter mounting plate, four beveled socket head screws and four short (9 x 10mm) spacers. Install the plate onto the engine with the spacers between the engine and the mounting plate. The cut-out in the plate must be facing the carburetor's side of the engine. **Note:** It is important that you use threadlocking compound on the engine mounting screws.





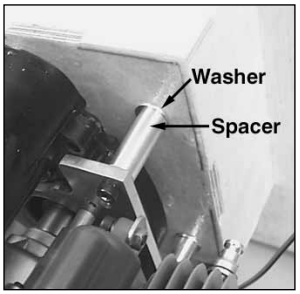
4. Locate the electric starter assembly and four 4 x 32mm Phillips head bolts with washers. Install the electric starter onto the electric starter mounting plate as shown above using the four bolts. Use threadlocking compound on these bolts.





Installing the BT-86 Engine to the Airplane

The Fuji-Imvac BT-86 Twin engine with the electric starter installs on the firewall the same way as the Fuji-Imvac BT-64A does. Please follow the instructions for the Fuji-Imvac BT-64A to install the engine onto the airplane. Remember to reinstall the mufflers onto the engine once the engine is installed on the airplane.



PROCEDURE TO START A GAS ENGINE WITH THE FUJI-IMVAC ELECTRIC STARTER

Note: *When starting the Fuji-Imvac BT-86 Twin engine with the Fuji-Imvac BT-86 Electric Starter, at least one of the decompression valves must be used, preferably both. If no decompression valve is used, the current through the soft start module will blow the fuse and you will have to replace it.*

Caution: *For safety purposes, your airplane must always be properly restrained when starting your engine.*

1. Fuel your airplane.
2. Turn your transmitter and receiver on.
3. Connect the starter's battery to the soft start module.
4. Make sure that nothing is in the way of the propeller. Stay clear from the propeller.
5. Turn the kill switch to the "Off" position.
6. Choke the engine's carburetor.
7. Set the carburetor to full throttle.
8. Flip the starter's switch on for 4 to 5 seconds to prime the engine.
9. Set the carburetor slightly above idle.
10. Turn the kill switch to the "On" position.
11. Again, clear the prop. Make sure that nothing can be "sucked in" the propeller when the engine starts.
12. Flip the starter's switch on for 4 to 5 seconds.

If the engine does not start, wait for 10 seconds and then repeat step 12 five to six times. If the engine still does not start, repeat steps 5 to 12.

After your flight is completed, make sure you disconnect the starter's battery before you turn off your transmitter and receiver.

If you have any questions, or if this electric starter is missing parts, contact Great Planes Product Support:

Great Planes Product Support
3002 N. Apollo Drive, Suite 1, Champaign, IL 61822
(217) 398-8970, Ext 2
productsupport@greatplanes.com

90-Day Limited Warranty For USA and Canada

• Fuji-Imvac Engines warrants this product to be free from defects in materials and workmanship for a period of 90 days from the date of purchase. During that period, Fuji-Imvac Engines will, at its option repair or replace without service charge any product deemed defective due to those causes. You will be required to provide proof of purchase date (receipt or invoice).
• This warranty does not cover damage caused by crash, abuse, misuse, alteration or accident. Damage caused by customer disassembly, tampering, use of substandard fuel, use of incorrect accessories or any use of the starter for which it is not specifically intended will automatically void the warranty of the starter. If there is damage resulting from these causes within the stated warranty period, Fuji-Imvac Engines will, at its option, repair or replace it for a service charge not greater than 50% of the current retail list price. Be sure to include your daytime telephone number and e-mail address in case we need to contact you about your repair.
• Under no circumstances will the purchaser be entitled to consequential or incidental damages. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.
• If you attempt to disassemble or repair this unit yourself, it may void the warranty.
• For service on your Fuji-Imvac Engines product, either in or out of warranty, send it post paid and insured to:

Hobby Services
3002 N. Apollo Drive, Suite 1
Champaign, IL 61822 U.S.A.
(217) 398-0007
www.hobbyservices.com

Along with your starter and proof of purchase date, please include a complete written explanation detailing the problem(s). State your name and address clearly. For repairs not covered under warranty, you must specify whether you wish the charges to be billed COD or if you wish to be notified of the charges so you can send a check.

Outside USA and Canada, contact local importer for warranty information.