FUJI IMVAC™

Operator's Manual for BT-50SB

SPECIFICATIONS

Displacement:	2.84 cu in [46.5cc]
Horsepower:	5.2 hp @ 9,000 rpm
Ignition Style:	CDI Automatic Timing Module
RPM:	1,200 – 9,000 rpm
Fuel:	Gas/2-cycle engine oil
Weight w/muffler:	4.8 lb [2.2kg]

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.

SAFETY TIPS AND WARNINGS

- Always use a balanced spinner and a balanced prop. An unbalanced spinner and prop combination will cause high levels of vibration and may cause the propeller shaft to break.
- Always use a lightweight spinner on your engine. Lightweight spinners are considered to be those with a cone wall of 1mm or less. Heavy spinners could cause the propeller shaft to break.
- Securely tighten the spinner and prop on the engine to prevent it from being thrown off the engine while running.
- Never use a prop that has hit the ground. Even though it may look good from the outside, it may be cracked on the inside which may cause it to disintegrate while in use. Do not use a nicked, cracked or split propeller.
- Keep foreign objects away from the propeller. Make sure that nothing can be "sucked in" by the propeller. Never start the engine on loose gravel or sand.
- Keep onlookers away from the running engine, especially small children.
- Do not attempt to stop the engine by throwing anything into the path of the propeller.
- Make sure the fuel line is well-secured to the engine and to the fuel tank so that it won't come off in flight.

- Do not use silicone fuel line because it will be attacked by the fuel. Use vinyl or neoprene rubber fuel line.
- Always secure the fuel line away from the cylinder head. The engine's heat can damage the fuel line.
- Never touch the engine after a run. The engine will be hot and it may burn you.
- Before transporting your model, remove all the fuel from the fuel tank and fuel lines.
- Always use high quality oil intended for 2-cycle engines.
- Use only low-octane, alcohol-free gasoline. The carburetor diaphragm will gradually deteriorate if you use gasoline with alcohol. You will need to replace the diaphragm in about 80 hours of operation if you use gasoline with alcohol.
- Muffler pressure to the fuel tank is not required.
- Do not install your throttle servo or kill switch servo inside the engine compartment. Doing so could cause radio interference. Install all electronic radio devices at least 12" [305mm] away from the engine. The throttle pushrod should be non-metallic.
- In case the engine is not to be used for more than a month, drain the fuel tank and remove any fuel from inside the carburetor. Do this by running the engine at idle until it quits by running out of fuel. Keeping gasoline inside the carburetor over an extended period of time will damage the diaphragm valve and clog passages inside the carburetor.
- Because the carburetor is more complicated than those used in glow engines, keep the fuel clean by using a fuel filter. Use a filter intended to be used with gasoline engines. Metal filters intended for glow engines are too coarse and will not screen out finer particles. Always filter your fuel by using an appropriate filter before putting it into the airplane's fuel tank.
- If you intend to run this engine on an engine stand, or on any other rigid mount, use rubber mounts. The crankcase and other parts of the engine may crack if you do not provide some kind of vibration absorption mechanism. A rubber mount is not necessary if the engine is mounted on a model airplane.
- Do not operate the engine in a closed room or where ventilation is not adequate.
- Gasoline is extremely flammable. Keep it away from an open flame, excessive heat or sources of sparks. Do not smoke near the engine or the fuel tank.
- This engine was designed for use in a model aircraft. Do not attempt to use it for any other purpose.
- Always install a kill switch that can be operated both manually and with the RC transmitter.

AUTOMATIC IGNITION TIMING MODULE

The BT-50SB engine ignition system is a combination of an electronic system and a mechanical system. The working principle for the Automatic Timing Module is that it gradually advances the ignition timing as the ignition pulse increases with increasing engine rpm. The mixture is ignited when the piston is near top dead center for idling and the timing is gradually advanced as the rpm increase.

PREPARING THE ENGINE

1. Check to see that all screws and bolts are tight. Check carefully for any cracks, broken or missing parts. Tighten or replace before proceeding.

2. Install the prop shaft on the flywheel.
3. Install the spark plug in the cylinder head.

SPARK PLUG

The recommended spark plug is a Champion RCJ-6Y. To avoid improper operation or possible engine damage, do not use any other type of spark plug. The plug gap should be 0.016" to 0.024" [0.4mm to 0.6mm]. If the plug gap is incorrect, adjust it with a spark plug gapping tool, wash it with gasoline and allow it to dry completely before you reinstall the plug in the engine.

PROPELLER

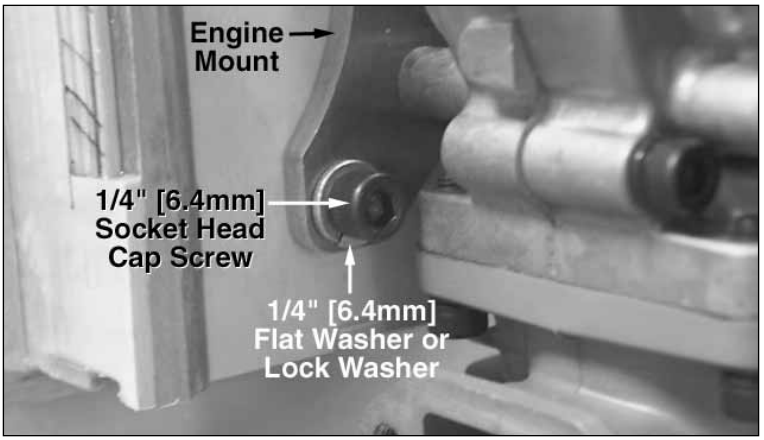
Always use a well-balanced, high-quality propeller.

The recommended propellers are:
18" x 10", 18" x 12", 20" x 8", or 20" x 10" High Performance Wood Prop
20" x 10" or 21" x 10" Carbon Prop

During our tests, our Fuji-Imvac BT-50SB turned a Bolly 20" x 10" carbon prop at 7,600 rpm. The engine was new with 90 minutes of breaking in. The test conditions were: Temperature 50°F [10°C], Humidity 40%, elevation at sea level. Performance may vary depending on atmospheric conditions.

INSTALLING THE FUJI-IMVAC BT-50SB ON YOUR AIRPLANE

Note: The Fuji-Imvac BT-50SB must be installed on a 1/2" [12mm] lite ply firewall or on a 3/8" [9.5mm] birch ply firewall. The firewall must be securely glued to the airplane. Use triangle stock and pin the firewall with hardwood dowels to reinforce the firewall glue joints. Never install the Fuji-Imvac BT-50SB onto a firewall thinner than specified because it may fail due to the power of the engine.



1. Use the supplied template (on the back cover of this manual) to drill the engine mounting bolt holes and the necessary clearance hole on the firewall.

2. Install the engine on the firewall using four 1/4" x 1-1/4" [6.4mm x 32mm] socket head cap screws, four 1/4" [6.4mm] flat or lock washers and four 1/4" [6.4mm] blind nuts. Use some threadlocking compound, such as Great Planes® Pro™ Threadlocker (GPMR6060), on the screws.
3. Install the fuel tank in the airframe. Use only gasoline-safe fuel lines. One line should go to the carburetor and the other is to be used as a vent. You can fill the tank by using the carburetor line as the fill line if you have access to it or install a third line to be used as the fill line.
4. Install a kill switch such as the Great Planes Gas Engine Ignition Switch Harness (GPMG2150). Install the kill switch servo at least 12" [305mm] away from the engine.
5. Install the throttle servo at least 12" [305mm] away from the engine. Make sure that you get the carburetor's full range of rotation with your servo travel.
6. Cut all necessary clearance and cooling holes in the cowl.
7. Make sure the cowl is secured to the airplane and that the spinner to cowl clearance is at least 1/8" [3.2mm].

BEFORE OPERATION

1. Prepare only the amount of gasoline needed. Aged gasoline could damage the engine and cause it to overheat.
2. If the engine was just run, make sure you allow enough time for it to cool down before you run it again. Also, wipe any residue the engine may have thrown on the airplane on the previous flight.
3. Check to see that there are no foreign objects in the path of the propeller. Secure any loose articles of clothing so they cannot be drawn into the propeller.
4. Go through the safety tips and warnings at the beginning of this manual to ensure a successful and safe engine run.
5. Fuel the airplane with the adequate gasoline mix.

BREAK IN THE ENGINE

- To break in your Fuji-Imvac BT-50SB you need to run the engine for about one hour with a fuel mixture that contains a 25:1 (4% oil) fuel/oil ratio.
- Do not adjust the high-speed needle on the carburetor to break in the engine. If you do so, carbon will accumulate in the spark plug and that will make ignition difficult.
- Do not run at full power for extended periods of time while breaking in your engine.
- Make sure that the engine has adequate cooling. While breaking in, the engine may run at slightly higher temperatures.
- If you wish to do so, you can break in your Fuji-Imvac BT-50SB while flying your airplane. Just make sure you observe all recommendations above.

RUNNING THE BT-50SB ON YOUR AIRPLANE.

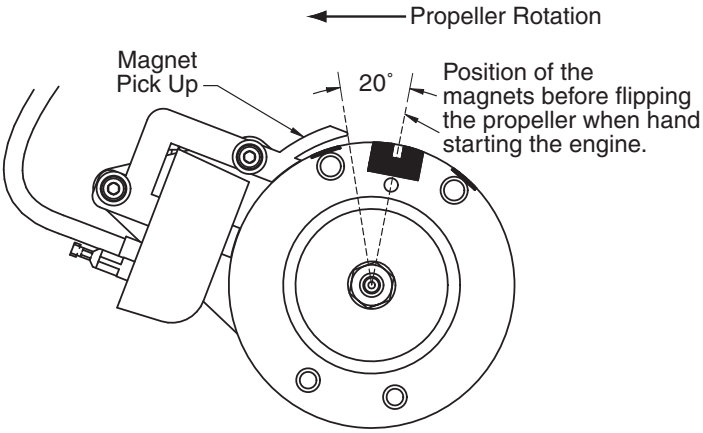
- Once the engine is broken in, use 40:1 (2.5%) fuel/oil mix.

STARTING PROCEDURES

There are four recommended ways to start the Fuji-Imvac BT-50SB:

A. Manual Starting:

Note: Use a thick glove to protect your hand while hand starting the Fuji-Imvac BT-50SB.



1. The propeller should be installed on the prop spacer so that it is comfortable for you to flip it through compression. You also need to position it in a way that when you flip the propeller, the magnets are 20° clockwise from the magnet pick up. Use the sketch for reference.
2. Have someone help you hold the airplane while you start the engine.
3. Make sure the ignition is OFF, close the choke on the carburetor and open the throttle slightly from the idle position.
4. Rotate the propeller slowly about 10 to 20 times (more in winter) until fuel begins to be drawn into the carburetor. Another way to prime the engine is to rotate the prop clockwise from bottom dead center to top dead center (compression) and then counterclockwise back to bottom dead center repeatedly.
5. Switch the ignition to ON.
6. Flip the propeller clockwise several times briskly.
7. After you hear some initial firing sounds, move the choke lever to the OPEN position.
8. Set the throttle to a high idle. Set the prop so that the magnets are 20° clockwise from the magnet pick up when viewed from the front.
9. Flip the prop through compression rapidly. If this is done properly, the engine will start between the first and the eighth flip of the prop. During our testing, starting took an average of 3-4 flips.
10. After starting, let the engine idle for two to three minutes. Open and close the throttle slowly until the engine runs smoothly at idle and at full throttle. Acceleration should also be smooth.
11. If your engine does not start, repeat the procedure.

B. Electric Starter Use:

1. Make sure you use a good quality, lightweight aluminum spinner.
2. Have someone help you hold the airplane while you start it.
3. Make sure the ignition is OFF, close the choke plate on the carburetor and open the throttle slightly from the idle position.
4. Use your electric starter to turn the engine over for several seconds.
5. Switch the ignition to ON and open the choke.
6. Set the throttle to high idle and use your electric starter to turn over the engine until it starts.
7. After starting, let the engine idle for two to three minutes. Open and close the throttle slowly until the engine runs smoothly at idle and at full throttle. Acceleration should also be smooth.
8. If your engine does not start, repeat the procedure.

C. Spring Starting:

1. Have someone help you hold the airplane while you start it.
2. With the ignition OFF, close the choke plate on the carburetor and open the throttle slightly from the idle position.
3. Rotate the propeller slowly about 10 to 20 times (more in winter) until fuel begins to be drawn into the carburetor. Another way to prime the engine is to rotate the prop clockwise from bottom dead center to top dead center (compression) and then counterclockwise back to bottom dead center repeatedly.
4. Turn the ignition switch to the ON position.
5. Hold the propeller, turn it 360° clockwise (one full turn) and let it go (move hand quickly away from the propeller arc).
6. After you hear some initial firing sounds, move the choke to the OPEN position.
7. Repeat Step 5 until your engine starts.

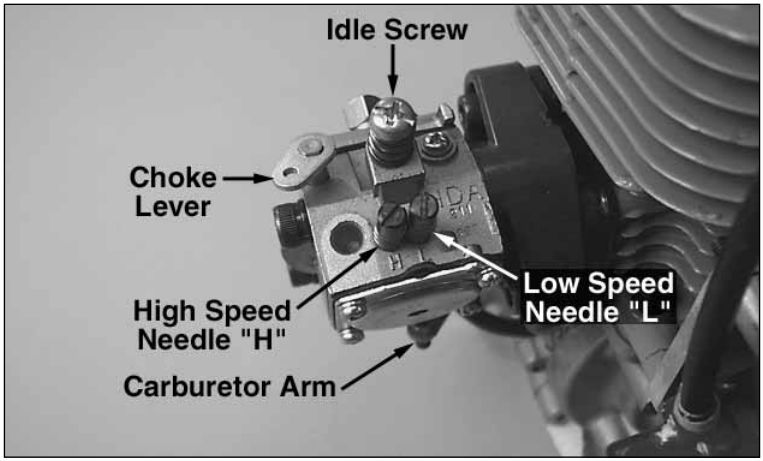
D. Onboard Electric Starter Use:

Follow the instructions supplied with the onboard electric starter.

ENGINE ADJUSTMENTS

Notes:

- Always make high and low speed needle adjustments with the engine shut off. Also make sure the ignition is OFF.
- Adjust the needle marked “H” for high speed rpm. Adjust the needle marked “L” for low speed rpm.



A. Normal high- and low-speed needle settings:

It is not necessary to change the needle settings if the engine runs smoothly. Normally only the “H” needle will need adjustment from time to time and only by a small amount.

H: Open the needle 3/4 of a turn from the closed position (±1/4 of a turn in winter).

L: Open the needle 1-3/8 turns from the closed position (±1/4 of a turn in winter).

Only adjust the high- and low-speed needle within the above range.

B. Idle adjustment:

Note: Do not confuse the idle screw with the low-speed needle “L”. The idle screw physically adjusts how much the carburetor valve can close. The low speed needle “L” adjusts the gasoline to air mixture when the engine is running at low rpm. If your engine appears to work correctly except that the low rpm are not as low as you want them to be, then adjust the idle screw. If your engine behaves erratically at low rpm, then adjust the low-speed needle “L”. When adjusting, turn the screw about 1/8 of a turn each time. A dirty plug will make it difficult to adjust the idle rpm. Follow the recommended procedures if any of the following happens:

Problem:

1. The engine hesitates when accelerated rapidly.

2. The rpm increases at idling.

3. The engine stops when the throttle is moved from high to low.

Solution:

Your low-speed needle “L” is too lean. Open it up about 1/8 turn and try again.

Problem:

The idle is not steady.

Solution:

Your low-speed needle “L” valve is too rich. Close it 1/8 turn and try again.

C. High-Speed Adjustment:

The high-speed rpm and transition performance is adjusted with the high-speed "H" needle valve. When adjusting, turn the screw about 1/8 of a turn each time. The position of the "H" needle will vary according to air temperature and field elevation. If your engine is running smoothly then do not adjust this needle valve. Follow the recommended procedures if any of the following happens:

Problem:

1. Engine stops at full throttle.
2. Engine hesitates when accelerated rapidly.
3. The engine will not come up to full rpm at full throttle.

Solution:

Your high-speed needle valve "H" is too lean. Open it up 1/8 turn and try again.

Problem:

1. Your engine does not reach full rpm.
2. Carbon build-ups appear consistently on your spark plug.

Solution:

Your high-speed needle valve "H" is too rich. Close it 1/8 turn and try again.

3-Year Limited Warranty For USA and Canada

Fuji-Imvac warrants this product to be free from defects in materials and workmanship for a period of three (3) years from the date of purchase. During that period, Fuji-Imvac 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 (spark plug, prop, etc.) or any use of the engine for which it is not specifically intended will automatically void the warranty of the engine. If there is damage resulting from these causes within the stated warranty period, Fuji-Imvac 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.

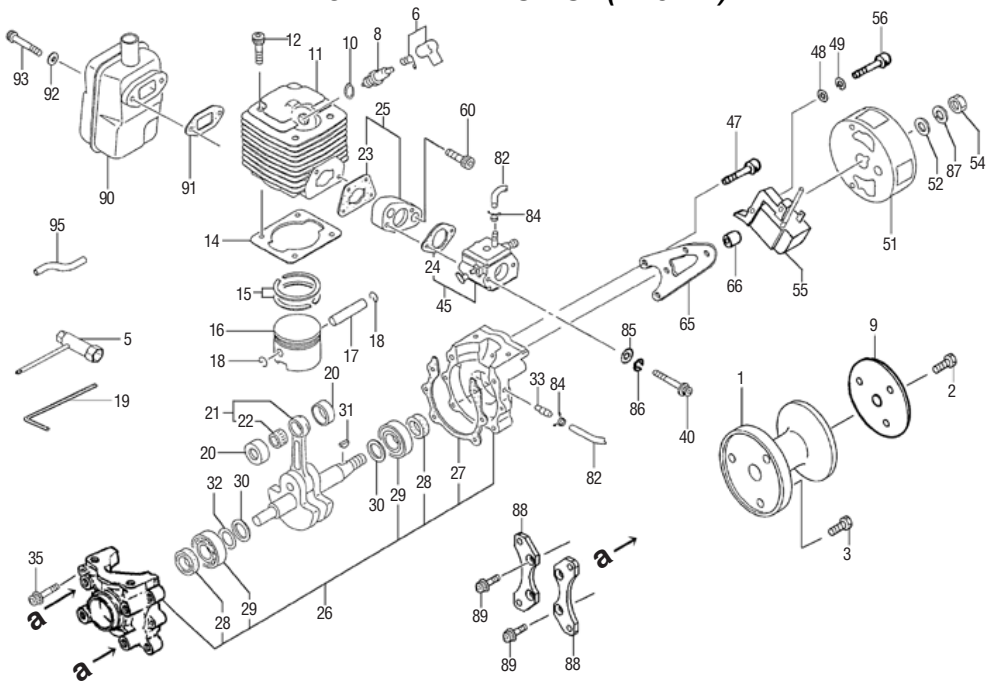
For service on your Fuji-Imvac engine, either in or out of warranty, send it postpaid and insured to:

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

Along with your engine 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.

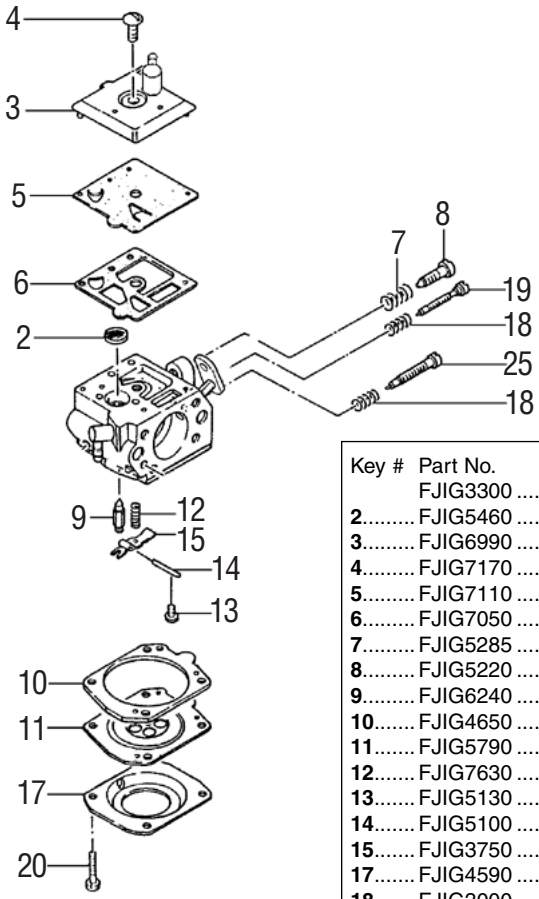
Outside USA and Canada, contact local importer for warranty information.

REPLACEMENT PARTS LIST (ENGINE)



Key #	Part No.	Description	Key #	Part No.	Description
1	FJIG6750	Propeller Flange A	**32**	FJIG4170	Crankshaft Shim .15
2	FJIG8085	Propeller Fixing Bolt	**32**	FJIG4200	Crankshaft Shim .20
3	FJIG8310	Hex Hole Bolt 5x25/WS	**32**	FJIG4230	Crankshaft Shim .30
5	FJIG3720	Box Wrench 17x19mm	**33**	FJIG6900	Pulse Fitting
6	FJIG7500	Spark Plug Cap Assembly	**35**	FJIG8320	Hex Hole Bolt 5x25/S
8	FJIG7470	Spark Plug RCJ-6Y	**40**	FJIG8100	Flange Hex Hole Bolt 5x50
9	FJIG6840	Propeller Flange B	**45**	FJIG3300	Carburetor Set
10	FJIG8610	Special Washer 0.5mm	**47**	FJIG8200	Hex Hole Bolt 4x12/S
11	FJIG4410	Cylinder	**48**	FJIG8740	Washer 4mm
12	FJIG8290	Hex Hole Bolt 5x18/S	**49**	FJIG8640	Spring Washer 4mm
14	FJIG4320	Cylinder Gasket	**51**	FJIG5370	Magnetor Rotor
15	FJIG6630	Piston Ring	**52**	FJIG8770	Washer 7mm
16	FJIG6390	Piston	**54**	FJIG4740	Flywheel Nut
17	FJIG6470	Piston Pin	**55**	FJIG5310	Ignition Coil
18	FJIG6540	Piston Pin C-Clip	**56**	FJIG8240	Hex Hole Bolt 4x35
19	FJIG4918	Hex Wrench 3mm	**60**	FJIG8270	Hex Hole Bolt 5x15/W
20	FJIG6570	Piston Pin Collar	**65**	FJIG3450	Coil Fixing Plate
21	FJIG4050	Crankshaft Complete	**66**	FJIG3600	Collar B 4.5x10x17mm
22	FJIG6180	Needle Bearing 2x8.8mm	**82**	FJIG4800	Fuel Pipe 3x5x110mm
23	FJIG5410	Inlet Manifold Gasket	**84**	FJIG3390	Clip 5.5mm
24	FJIG3150	Carburetor Gasket	**85**	FJIG8645	Small Washer 5mm
25	FJIG3211	Insulator Set	**86**	FJIG8650	Spring Washer 5mm
26	FJIG3870	Crankcase Assembly	**87**	FJIG8652	Spring Washer 7mm
27	FJIG3960	Crankcase Gasket	**88**	FJIG4660	Engine Mount
28	FJIG6270	Oil Seal	**89**	FJIG7171	Hex Hole Screw 5x15mm
29	FJIG3090	Ball Bearing 35mm	**90**	FJIG6035	Muffler
30	FJIG4260	Crankshaft Washer 15.2x22	**91**	FJIG5910	Muffler Gasket
31	FJIG7690	Woodruff Key 3x13x5mm	**92**	FJIG8765	Washer 6mm
32	FJIG4110	Crankshaft Shim .05	**93**	FJIG8400	Hex Hole Button Screw 6x65
32	FJIG4140	Crankshaft Shim .10	**95**	FJIG4830	Fuel Pipe 3x5x280mm

REPLACEMENT PARTS LIST (CARBURETOR)

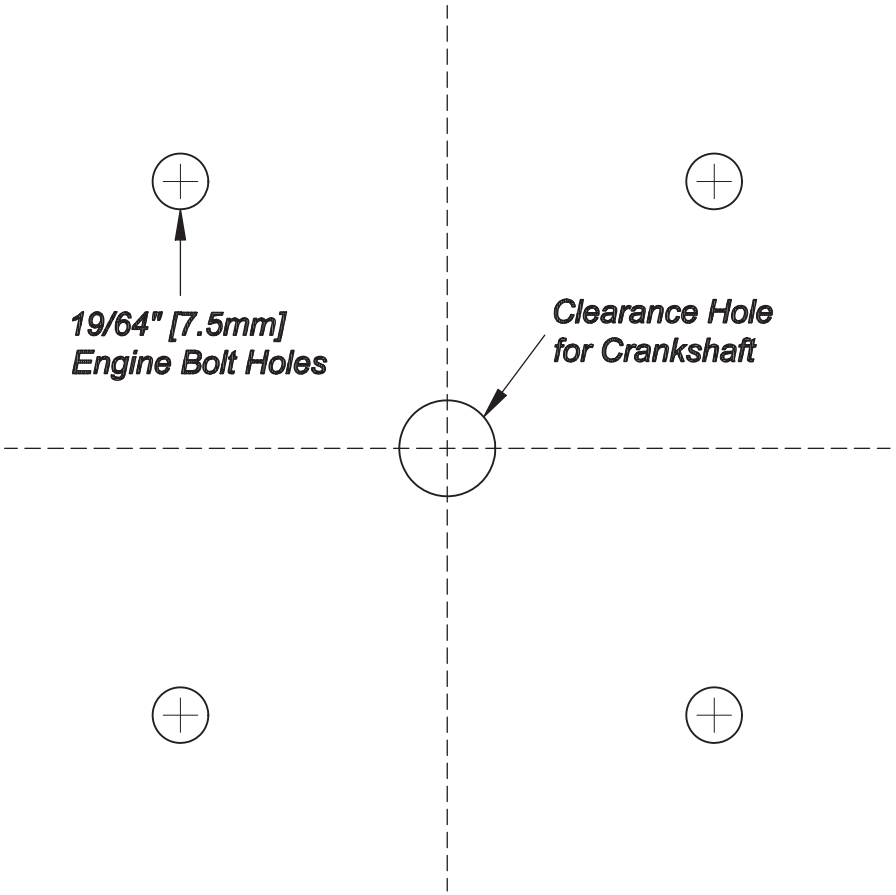


Key #	Part No.	Description
	FJIG3300	Carburetor
2	FJIG5460	Inlet Screen
3	FJIG6990	Pump Body Complete
4	FJIG7170	Set Screw
5	FJIG7110	Pump Gasket
6	FJIG7050	Pump Diaphragm
7	FJIG5285	Idle Adjust Spring
8	FJIG5220	Idle Adjust Screw
9	FJIG6240	Needle Valve
10	FJIG4650	Diaphragm Gasket
11	FJIG5790	Metering Diaphragm
12	FJIG7630	Valve Spring
13	FJIG5130	Hinge Pin Set Screw
14	FJIG5100	Hinge Pin
15	FJIG3750	Control Lever
17	FJIG4590	Diaphragm Cover
18	FJIG3000	Adjust Spring
19	FJIG5670	Low Adjust Screw
20	FJIG7200	Set Screw
25	FJIG5010	High Adjust Screw

OPTIONAL ACCESSORIES

FJIG1050..... Spring Starter
FJIG1150..... Onboard Starter
FJIG4682..... Rubber Engine Mount Set
FJIG6752..... Prop Flange Long
FJIG6754..... Prop Flange Short
FJIG8062..... Spinner Bolt

Engine Mount Template for Fuji-Imvac BT-50SB Engine



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