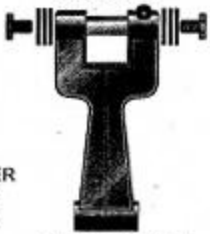
THUNDER SHIFT KIT

PATENTED

Gets the power to the ground !!

Fully adjustable clutch weights for precision tuning at low end, midrange and top end!!

Fits: Arctic Cat, Polaris, Comet and Yamaha YXR clutches.



Fits: Ski-Doo. TRA clutches.

TRA arm not included

No other weight matches the THUNDER SHIFT KIT in quality, performance and value. Save valuable time and money while increasing performance.

DIAL-A-JET

PATENTED

Dial-A-Jet is a completely adjustable external jetting system that delivers pre-atomized (vaporized) fuel maximizing horsepower of the engine at any temperature or altitude. It improves throttle response and fuel mileage and works well with stock or modified engines. ***Easy to install kits are available for all makes and models. Dually Kits also available.***

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http://www.cloudnet.com/~tpi

Produced by Shane Zeppelin Designs, Litchfield, MN

$3.95 U.S.

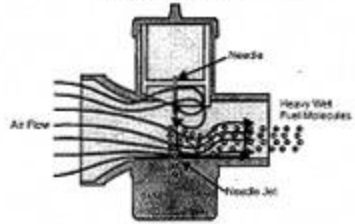
U.F.O.™

PAT. PEND.

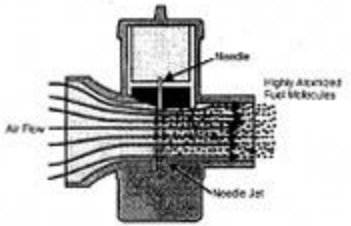
Ultimate Flow Optimizer

INSTRUCTION MANUAL

For installing and tuning U.F.O.s in Mikuni Round Slide Carburetors sizes 32mm - 44mm



Standard Round Slide Carb



Round Slide Carb With UFO

The U.F.O. is a simple, trouble free, aerodynamic piece that fits Mikuni roundslide carburetors from 32mm through 44mm. The U.F.O. makes a normal round slide carburetor out perform the more expensive flat slide carburetor by eliminating turbulence and increasing air flow and velocity, creating a highly atomized fuel charge.

- ***Superior fuel atomization***
- ***More horsepower with less fuel***
- ***Broader power band***
- ***Explosive throttle response***
- ***Improved fuel economy***
- ***Cleaner emissions***
- ***Cooler running engine***
- ***Less sensitive to temperature, altitude and jetting changes***

⚠ WARNING ⚠

READ BEFORE INSTALLATION

Personal injury and damage to property can result from the improper installation of any product, including the U.F.O. Kit. Read instructions thoroughly prior to installation. When working with combustible liquids such as gasoline, always have a fire extinguisher available.

Always use safety glasses when drilling and tapping.

U.F.O. Performance

Any performance product requires a certain amount of tuning in order to achieve maximum performance. The UFO is no exception.

The necessary work and expertise needed to install different products varies. Instructions (where provided) are given to assist in installation only and are not a substitute for mechanical expertise in setting up racing snowmobiles or other vehicles. References to performance gains, reliability, ease of installation and tuning are based on our experiences as well as some of our customers. This is NOT a guarantee of similar performance in every installation. While we sell proven products, it is up to the individual to make the most of the products in their application.

If you do not have the necessary skills to install the U.F.O.s and tune your carburetors or clutching, have a qualified dealer or repair shop install them for you and make necessary adjustments.

U.F.O.™ PAT. PEND.

Installation

1. Remove carburetor slides in accordance with the factory service manual for your brand. Remove all components from your carburetor slide valve. Note the number stamped on your slide (2.0, 2.5, 3.0, 3.5, etc.). You will usually need to install a UFO the next size higher numerically. Example: A 2.5 would be increased to 3.0.

DO NOT purchase a new slide. It is an easy job to modify your existing slide.

YOU MUST remove the excess metal from your slide to match the UFO size. Use a metal file, rotary grinder or belt sander. The difference from one size to the next is .032. See page 12, fig. 3.

2. Insert the six hole locator disc (Drill Guide) on the bottom side of your carburetor slide. Align the notch in the disc with the full length guide groove in the carburetor slide. See Fig. 1.

Note: When drilling, it is recommended that you use a drill press to ensure accuracy.

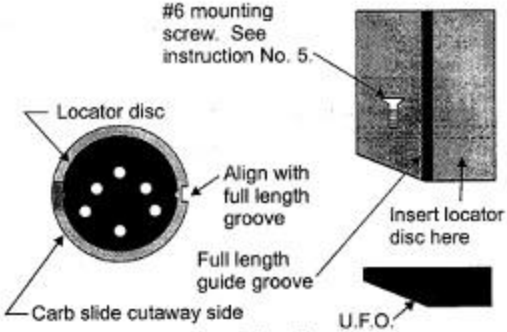


Fig. 1

3. Select the hole position that aligns best with your carburetor slide and aligns with the U.F.O. on the underside of the slide. There are six screw boss locations in the UFO. If any boss is in the way of your cable, simply drill it out or remove it with a rotary grinding tool.

Installation

4. Carefully mark and center punch the hole you select.

5. Drill the selected position with a 9/64 drill bit all the way through the bottom of the carburetor slide. Next use a 9/32 drill bit to countersink the hole you just drilled. Countersink, just deep enough for the head of the #6 screw to sit flush with the floor of the slide.

6. Select a U.F.O. that is or one size larger than the number stamped on your carburetor slide. Example: If you have a 2.5 cutaway, select the 3.0. See section on slide cutaway fig. 3, page 12. If you havea 3.5 slide, it is usually not necessary to run a larger cutaway.

7. After completing the U.F.O. installation, reinstall your carb slides per your factory manual.

8. For severe use or extra security, you may install an extra screw, although we have never had a screw let go.

9. The final safety check on the U.F.O. is the carburetor needle itself, which never leaves the center of the U.F.O., making it impossible to disconnect and cause damage.

Make sure the slides travel the full stroke up and down with no hesitation or binding.

U.F.O.™ PAT. PEND.

Tuning the U.F.O.

Prior to installing the U.F.O., your carburetors must be properly jetted for your altitude and temperature. Float levels must be set correctly and carburetors must be synchronized. Most machines come from the factory jetted several sizes too rich. Ask your local dealer or high performance shop for the correct jet size. We will use this "new jet size" for our baseline. NOT THE STOCK JET SIZE THAT CAME FROM THE FACTORY. Now that you have a properly jetted machine, we can start with your U.F.O.

U.F.O.s WORK ON ALL ENGINES resulting in a performance increase regardless of engine size or brand.

The Pilot Jet, Slide Cutaway, Needle E-Clip, Air Screw and Main Jet need to be adjusted according to directions.

PILOT JET

The major tuning change we have seen when installing the UFOs is in the pilot jet circuit. The pilot jets need to be reduced by approximately 50% (example: If stock pilot is a #50, then reduce to a #25 - this will usually put you close to the correct size +/- one size). Pilot jets are in increments of 5 (half sizes are available in increments of 2.5).

Approximately 4 to 6 pilot jet sizes (in increments of 5) equal one (1) main jet size in increments of 10. Providing you are jetted very tightly on your main jet circuit, say 1175° F to 1250° F, you will want to increase your main jet one size if you have dropped 4 to 6 pilot jet sizes.

Note: V-Force and Boysen Reeds or more aggressive cut rotary valves usually require an extra full size pilot jet reduction (increment of 5).

When reducing the pilot jet size, you are correcting for the excess fuel being drawn in by the UFO from between the needle and nozzle as well as the pilot jet.

U.F.O.™ PAT. PEND.

Tuning

PILOT JET Continued

The pilot jet never quits feeding fuel. Even at full throttle the pilot jet has influence. Every 4 to 6 pilot jet sizes (in increments of 5) will be equivalent to approximately one main jet size in increments of 10. This means if you were jetted right on the edge with your main jet and you went from a 50 pilot jet down to a 25 pilot jet, you would increase your main jet by 10. For example, 250 would be increased to 260.

AIR SCREW

Select the setting that runs the best. The exact setting will depend on pilot jet size and cutaway. Turning the air screw in richens the mixture, turning it out leans the mixture. Usually stock setting to 1/2 turn further out works best.

SET IDLE SPEED

Bump up your idle speed to 1300 to 1500 RPM.

SLIDE CUTAWAY

The cutaway has its major influence at 1/4 throttle (see Fig.2, Page 8). This has a major effect on low end tuning and works in conjunction with the pilot jet and air screw. The next size larger cutaway is usually required when installing UFOs. Example: 2.0 cutaway would be increased to a 2.5. See Fig. 2, page 8 and Fig. 3, page 12 for circuit and slide cutaway explanations.

MAIN JET

UFOs do not affect the main jet circuit unless you have reduced your pilot jet 4 to 6 sizes or more. Test your machine with the stock main jets first. If further jetting is required, consult the jetting section (Page 8).

Tuning

NEEDLE CLIP POSITION (Jet Needle)

Start with your needle 2 e-clips richer. Providing your machine takes the throttle crisply and cleanly through midrange, leave the needle position alone. If your sled does not take the throttle quickly and cleanly, try 1 e-clip leaner (move e-clip up to lean needle setting, move e-clip down to richen needle setting). You should not run your needle on the leanest position. This limits the cooling during deceleration. Whenever you are at the extreme richest or leanest position with your needle clip position, it's time to change the needle jet nozzle.

Anytime you are running more than 4 or 5 **main jet** sizes below the original equipment main jet from the factory, you should watch for a lean midrange condition. 4 to 6 **pilot jet** size reduction will also lean midrange. You can usually correct the lean condition with a needle e-clip adjustment. If you cannot get enough adjustment from your needle e-clip adjustment, you will need to change your needle jet nozzle.

NEEDLE JET (Nozzle)

This is the brass tube your needle fits into. UFO installation seldom requires a needle jet change.

Going down in size on the needle jet decreases the fuel flow constantly through the whole metering range of the needle. Changing the needle itself can change the amount of fuel flow at certain points in the range. If you only want to make it slightly richer or leaner throughout the range (1/4 to 3/4 throttle), a change of needle jet (nozzle) would be appropriate.

NOTE: 4 to 6 sizes or more reduction in pilot size may require one size LARGER needle jet tube if your model of sled in known to be somewhat lean in midrange prior to the installation of UFOs.

Jetting Help

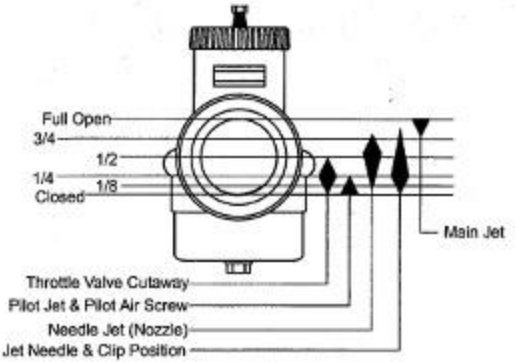


Fig. 2

We always suggest that any modifications be performed cautiously and conservatively. Go down slowly in jet size per our instructions. Here are some hints and suggestions that will help you jet your snowmobile:

1. First and most obvious, take it to a shop or friend that you feel most confident with. We recommend you read Aaen's book on carburetor tuning.

2. A surefire way to achieve maximum performance is to purchase a set of EGTs (Exhaust Gas Temperature) gauges.

Testing and Jetting:
Select a safe and proper testing area free of objects or debris with ample acceleration and shut down area. Tuning procedure: Select a main jet for optimum wide-open performance. Start engine and allow time for a complete warm-up.

Run the snowmobile on a flat, hard-packed surface at full throttle. If the engine fails to pull full RPM or labors at full throttle, the main jet is too large (rich). Install the next lower available jet size and repeat full throttle test. Continue to change jetting one size at a time until engine runs efficiently at full open throttle. Check the condition of spark plugs after each run to determine mixture. See page 10.

U.F.O.™ PAT. PEND.

Jetting Help

If the main jet is slightly lean, the engine will run better when cool and lose power as it heats up. If the main jet is slightly rich, the engine will miss and lose power rapidly under loaded conditions. The main jet is the first fuel system to pick up dirt and foreign matter. Keep your gas clean and watch for sudden heating and/or momentary full throttle seizing.

Remember that changes in main jet tuning will have an effect on the state-of-tune of the needle jet system and adjustments may have to be made to the needle position after changes in main jetting.

Your sled should run like it does when the temperature drops. Listen for the crisp cracking sound. The lazy mellow sound is too rich. The ability to identify a rich or lean mixture is the most important tuning tool.

LEAN CONDITION

When the fuel mixture is too lean, the following conditions may be present:

- *The improper condition improves when the choke is engaged.
- *The spark plug is pale and/or the electrode burns away.
- *The RPM of the engine fluctuates under constant throttle.
- *A lack of power is evident.
- *The metal-to-metal (ping) sound of a tight piston or detonation may be noted.

RICH CONDITION

When the fuel mixture is too rich, the following conditions may be present:

- *The exhaust sound is dull or muted and recurrent.
- *The improper condition becomes worse when the choke is engaged.
- *The improper condition gets worse as the engine heats up.
- *Exhaust is heavy and more visible as the throttle is advanced
- *Spark plug fouling is experienced.
- *Engine misses or "four-cycles" under loaded conditions.
- *A strong fuel smell is noted in the air.

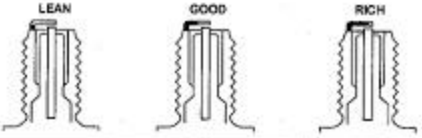
Plug Reading

Proper fuel mixture can be easily determined by reading the spark plug electrode strap.

If "ES" series plugs are used...

To determine correct main jet size, run the machine over a safe driving course at full throttle for a distance of one mile. While holding the throttle lever in the ¾ to full throttle position, hit the safety kill button. When the machine comes to a stop, release the throttle lever and remove the plugs. Observe electrode color. If the entire electrode is black, mixture is too rich. Select the next smaller main jet size and repeat test.

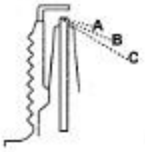
When the main jet size is correct, the outer electrode will be a cardboard box brown color to coffee with cream color or a light tan.



"EV" series plugs with the fine wire electrode.

To determine correct main jet size, first install the "EV" style spark plugs. Run the machine over a safe driving course at full throttle for a distance of one mile. While holding the throttle lever in the ¾ to full throttle position, hit the safety kill button. When the machine comes to a stop, release the throttle lever and remove the plugs. Observe electrode color. If the entire electrode is black, mixture is too rich. Select the next smaller main jet size and repeat test.

When the main jet size is correct, the center electrode will have a silver crown appearance, which starts at the top and tapers down 1/3 of the electrode side. If it goes past 1/3 of the electrode length, the mixture is too lean and you must increase the main jet size or engine damage will occur.



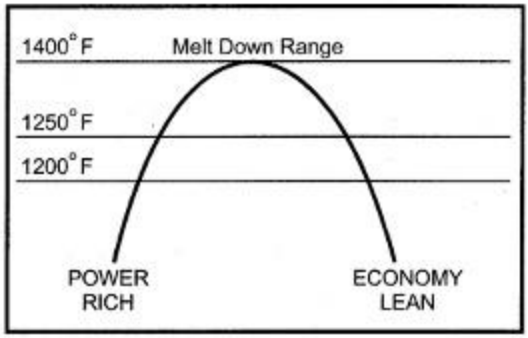
A - would indicate a rich condition.
B - would indicate a correct main jet.
C - would be a lean condition.
Anything below "B" would be lean with "C" being near burn sown point. The crown will be a metallic color.

U.F.O.™ PAT. PEND.

EGTs

Acceptable Exhaust Temperature Ranges

Each engine produces its own exhaust thermal signature. The size of the carburetors, timing of the ignition, diameter and shape of the exhaust pipes, quality of the fuel and location of the EGT sensors all affect the temperature observed. **For proper placement of exhaust gas temperature sensors, consult the manufacturer of the exhaust system.** After installing UFOs you will notice that the temperature is more stable at all locations. In general, if all cylinder temperatures are within 50 degrees F of each other, and the readings are 150 to 200 degrees F below the maximum temperature obtained on the power side of the bell curve (see below), you are operating safely and at top efficiency.



With the help of EGTs you can lean the carburetor for maximum power and efficiency.

WARNING:
DO NOT ATTEMPT THIS WITHOUT EGTs.