CPC RACING PERFORMANCE HANDBOOK
Lay down 1300cc

CPC Racing Engines are custom high quality cast cylinders with billet heads built to the highest standards of the snowmobile industry. Our twin 1300cc engines can be tuned to over 225 horsepower. As with any high quality engine, a little common sense and good maintenance will keep it running at peek performance for along time.

This handbook has been written as a generic guild. It contains valuable information that will help you tune your engine as well as save you money and time in avoiding potential problems. I would like to address some areas of importance. They are all important and do not appear in any special order.

1. **Assembly** Before assembling the rings on to the piston, it is important that you check piston ring end gap. Proper ring end gap on all CPC engines should be at least .016. Ring end gap is accomplished by installing the ring into the cylinder and then turning the piston upside down and squaring the ring in the bore of the cylinder. Then take a feeler gauge and measure the distance between the ring ends. If the measurement is less than .016 you will need to file the ring. Be careful not to over file the end gap as this will reduce performance and hurt the compression! The best way of doing this is to clamp a file into a vice and take the ring in your hand and wiggle or stroke it back and forth while applying pressure to the rings on each side with the file sandwiched between. **Running the engine on too tight of ring end gap will cause engine failure and will damage the nikasil coating on the cylinder and will not be covered on warranty! It is the mechanics responsibility to check and adjust the clearance if needed however most rings will not need to be filed.**

NOTE: Power Valve cable adjustment is critical to the operation and performance of your engine. If the APV cables are out of adjustment you will experience lower power levels as well as a loss of RPM's. Before engine assembly, the stock power valves must be modified. Modified power valves are NOT included in the cost of this kit. You can exchange your power valves for modified ones but most mechanics will modify their own in order to save money. Using a die grinder and a belt sander, the power valves can be modified very easy. Before grinding on the valve you must clean the power valve and then reassemble the power valve into the new 1300cc cylinder and then by using a black or colored marker or by using dye com bluing, mark the amount of valve that needs to be ground off. Remove the valve and grind off excess material until you achieve a .020 to .030 clearance from the edge of the cylinder to the power valve. Reinstall the power valve assembly often to make sure that you grind in a smooth radius which matches the original angles. Make sure that you don't remove too much or too little off of the power valve. **It is the mechanic who is assembling the engine responsibility to make sure that the power valves fit correctly. If the power valve is not correctly modified, it can come in contact with the piston and damage the piston and cylinder. If you are not confident in making the modification, please send your power valves in to CPC and we will modify them correctly. Before assembling the cylinder to the engine, pre-assemble the power valve assembly and install into the cylinder. Then take a straight edge ruler and make sure you have a minimum of .020 to .030 clearance between the power valve and the straight line of**

the cylinder bore. If needed the mechanic can remove the power valves and grind on it with a die grinder to make sure there is enough clearance.

Before assembling the engine, wash both cylinders with hot soapy water, then blow dry them with compressed air.

The following instructions are provided to help you to avoid streaking and scuffing of nikasil plated cylinders. After installing new pistons onto the connecting rod and before sliding the piston into the cylinder we mandatorily recommend using <u>STP Brand Oil Treatment</u> to lubricate the piston. STP is used as an assembly lube to insure that the piston, rings and cylinder have adequate lubrication to avoid scuffing. It is important that the STP be applied in the piston ring land. STP is very sticky and will not run off like 2-Stroke oil. Also you must pour approximately 2 ounces of 2- cycle oil into each crankcase cavity. (Underneath the piston, before installing cylinder.) The oil in the crankcase cavity will allow additional oiling during the first few minutes of startup which is the most critical time of break-in. **It is very important to use Arctic Cat part # 0636-069 high-temp silicon sealant on both sides of the stock base gasket. Only a small film (about .010 to .015 thick) of sealant is needed on the base gasket. Coating the base gasket will prevent antifreeze from entering the crankcase due to metal expansion caused by extremely cold and hot engine cycles.**

NOTE: <u>When installing the pistons, make sure that the anti-rotation pins on the piston are opposite of the exhaust port. With the new lay-down engine design where the reed cage and exhaust port are on the same side of the engine; it is possible to be confused which side is the rear and which side is the front of the engine. If pistons are installed backwards, the ring end gap will snag on the export and damage the cylinder and piston</u>!

NOTE: All cylinder bolts should be torqued to 35 to 40 ft/lbs. All head bolts should be torqued to 20 ft/lbs.

After the engine is assembled, it is mandatory that you pre-mix a full tank of gas at a 100:1 mixture along with your oil injection and continue to do so as long as you use our engine kit.

2. **Break-In** How you break-in your new CPC engine will determine if your engine will be fast or slow. Proper break-in procedure also requires 30 minutes of break-in time at an idle. Do not rev the engine over 2000 RPM's during the first 30 minutes of idle time. In order to avoid overheating of the engine, you should run the engine three to five minutes at a time and then allow a ten minute cool down time.

Make sure that oil injection lines are purged of any air bubbles before start-up. Also the use of high quality synthetic oils greatly increases the success of a proper break-in. Quality synthetic oils include Arctic Cat APV synthetic, Redline or Amsoil racing oil. After the 30 minutes of idle break-in time we suggest that you vary the running RPM's. Do not hold the throttle at a steady position for more than 15 seconds at a time. Revving the engine up and down with short bursts of full throttle acceleration will improve break-in. If these instructions are not adhered to strictly, streaking and scuffing will appear immediately, causing poor performance and ruining the nikasil in the cylinder. We recommend that you have patience during the jetting and clutching tuning stages of your new CPC engines. Take a day or two of dialing the engine in before competition racing or long rides. Do not make any hard pulls up steep mountain or Dyno pulls at Wide Open Throttle (WOT) for more than 3 to 5 seconds for the 1st tank of fuel. Do not run WOT for more than 6 to 10 seconds the 2nd tank of fuel and 12 to 15 seconds WOT for third tank of fuel. Do not make any hard pulls over 30 seconds long until after 4 full tanks of fuel or piston seizure will result!

3. **Compression** Before running any CPC Racing engine, the correct squish and compression should be decided upon before you can choose the correct fuel. Compression, squish and the quality of fuel are dependent upon one another. If you change compression, then the octane requirements also increase. All CPC Racing engines come in either a low compression or a high compression versions. The compression can be changed by simply changing the head insert. Each insert is marked with an **H** for high or an **L** for low compression inserts. We recommend L inserts only for pump gas (91 to 93 octane depending on elevation). We also manufacture an insert called ultra high compression (**UHC**) used strictly for racing on pure race fuel.

The squish must be checked before the engine is run. This test is performed by taking 1/8 inch solder in your hand and bending an arch in the wire at the same time pushing it down the right side of the spark plug hole in line (parallel) with the piston pin. The solder must reach the edge of the cylinder wall. Next pull the engine over three or four times while holding the solder at the spark plug location so the solder won't slip to the side. This test will require two people, one to hold the solder and the other to pull the engine over. Perform the same procedure on the same cylinder, but this time of the left side of the same piston. This allows you to recheck your measurement. The squish is measured by either using a veneer calipers or micrometer. Your measurement is the average of the two tests. Repeat the process and check the other cylinder. Squish should be between .070 and .075.

At CPC we calculate compression by the volume of the head, **not** by taking compression tests with your compression gauge measured in pounds per square inch (psi). The reason for this is simple; if you take a given engine with a set head volume and you run a compression test on it, you will get different readings at different altitudes. For example, a given engine will vary in compression about 3.5 % per 1000 feet in altitude. At sea level you might register 140 psi. The same engine if tested at 4000 feet may measure approximately 120 psi using a compensation factor of 14% (3.5 times 4=14% then calculate 100%minus 14% = 86% times 140 psi = 120.4 psi). Also each compression gauge registers a different value. We have four different gauges in our shop and every one of them will register a different psi reading on the same engine from 5 to 20 psi. You can use a compression gauge as a comparison tool or barometer to make comparisons as well as a tool to trouble shoot and check for problems especially if you use the **same** gauge each time. At CPC we use a compression gauge to make comparisons. We also use mathematical formulas to determine compression ratios.

So let me get to the point; you should use your gauge as a tool for comparison and not let the gauge reading over rule common sense and proven compression ratios. As compression ratios increase, so does the need for higher octane. Octane numerical ratings are a guild for how many anti-detonation abilities that the fuels possess. Higher octane fuel burns slower and resists detonation. Sense high octane fuel burns slower, it has a cooling effect which allows you to run higher compression and more ignition timing to produce more horsepower. If you increase your compression, you will also need to increase your octane. Engines that are run at low elevations need higher octane fuel than high elevation engines **if** they are run at the same compression ratio. This is due to the fact that the air is denser at low elevation. Sense denser air is trapped in the engine; you have an increase in compression even though you didn't increase the compression ratio. Engines that have less squish require higher octane fuel than engines with larger squish. Also larger bore engines require more squish than smaller bore engines. And larger bore race engines need a little more advance on the ignition timing than smaller bore race engines. This is due to the fact that the flame front has a longer distance to travel on bigger bore engines. Engines that run more advance on ignition timing need higher octane fuel requirements. Generally speaking, larger bore engines require higher octane fuel than smaller bore engines. The real question is how high of octane fuel is required for your CPC Racing engine? The answer is, it depends on elevation, timing, squish, engine bore size and compression. Sense each CPC Racing engine is built specifically for each customer needs, then engine octane requirements will vary from customer to customer.

Octane Requirements On 102.5mm Bore CPC Racing Lay down Engines using a 2 degree timing key.

Elevation	**0' to 4,000'**	**4,000' to 7,000'**	**7,000' to 10,000'**
High Compression Head Insert	**100+ Min.Octane**	**94+ Min.Octane**	**92 + Min.Octane**
Low Compression Head Insert	**93 Min.Octane**	**91 + Min.Octane**	**91 + Min.Octane**

***** 100 Octane can be substituted by using 50 % 110 Octane Racing Fuel with 50% Premium unleaded fuel.

For those of you who will be trail riding CPC Racing engines, we recommend that you use at least 1 gallons of race fuel with 9 gallons of premium unleaded for the above 92 Octane requirements. Aviation fuel (AV Gas) can be substituted for race fuel but still must be blended to achieve octane requirements that the specific engine requires. Be aware that many gas stations dispense low octane fuel out of its pumps marked premium. It makes no sense to purchase a very expensive engine and ruin it by running junk fuel. If you can't afford the fuel, then you shouldn't be running our engines!

4. **Oil Requirements** There are many good oils out in the market place. CPC recommends the use of quality synthetic oils. Oil brands such as Arctic Cat APV Synthetic, or Amsoil are ideal and can be purchased at CPC. Synthetic oils provide a 2 to 3 % gain in horsepower and torque over petroleum lubrications. CPC recommends the 40:1 fuel/oil mixture on all engines which have the oil pump disconnected. If you are using the oil injection as a source of lubrication, then we recommend mixing oil with the fuel at a 100:1 for additional protection and lubrication with each tank **even after break-in!**

5. **Cooling Information** The ideal running water temperature for most snowmobiles is between 125 and 140 degrees F measured as the water exits from the engine. Remember that on all lay-down motors, the water exits out the bottom of the engine. Water temperature can be measured by installing an aluminum coupler in the rubber hose between the hose that exits out the engine below the recoil starter and the bottom right hand heat exchanger inlet with the water probe screwed into the coupler. CPC has undergone an extensive study on the relationship of water

temperature and horsepower output. **FACT #1**: Any CPC Racing performance engine than runs over 155 degrees F. will lose horsepower and will be hard to jet or tune. Further more it tells me that your cooling system is inadequate for the snow conditions of that day. Our findings indicate that engines that are run at water temperatures as high as 180 degrees will lose up to 15% horsepower! **FACT#2**: Any snowmobile engine that is consistently run at temperatures over 150 + will experience shorter engine life! This means premature piston failure such as piston skirt collapse and anti-rotation pins falling out of pistons. Sense CPC Racing engines produce 20 to 30% more horsepower than stock engine, the bi-product of power is heat. Most heat exchangers are inadequate to handle the increased heat that is produced by larger, more powerful engines. And worse yet, some customers want to remove heat exchanger's to make their snowmobiles lighter. The results are slow death to your engine. CPC requires every engine to have a water temp gauge to monitor water temperature. **Solution**: #1. Make sure that you have adequate quantity of heat exchanger. #2. Make sure that heat exchanger's are placed where the maximum amount of snow dust will hit them. If the rear exchanger's are too far forward in the tunnel, over heating will be present. Also the most effective heat exchanger is the one in the rear by the snow flap. Make sure it hangs down from the top of the tunnel above the snow flap. Increasing the volume and size of this heat exchanger will have the most effect on cooling. #3. Using a water wetter agent such as Redline Water Wetter will also cool your engine down aproximately10 plus degrees. **FACT #3**: **If you ignore this section and fail to measure your water temperature, expect major problems!**

CPC engines should be run with a thermostat. Water temperature should reach at least 100 degrees F before running engine. Removing thermostat in heavy powder conditions can lower water temperature below 115 and cause a cold seizure due to engine cylinder not being allowed to expand so you have proper cylinder to piston tolerance. Managing water temperature is the most critical element next to proper jetting in a CPC Racing engine. Because we use such large bores in our engines, there is a lot more thermal expansion and contraction in our engines. If you have too low of water temperature, then the cylinder contracts and the cylinder to piston clearances are reduced and can cause a cold seizure. If the water temperature is too high, then the piston will over heat and loose the heat treat properties (piston will be annealed) and the anti-rotation pins will loosen and fall out causing the ring to snag on the ports and destroy your engine. If snow conditions are marginal, you have three choices: **First,** ignore this section and ruin your engine or **second**, park your sled until snow conditions change for the better or **third** you can modify the stock cooling system by increasing capacity to prevent problems in marginal snow conditions. Remember on all lay down motors, the cooler water from the heat exchanger enters the engine at the head location and hot water exits out the bottom half of the engine. This is opposite of what Arctic Cat engines have used in the past. When we monitor water temperature, we are interested in how hot the water gets as it exits out the engine. Hopefully that explains why we place the probe in the hose between the engine and the RH heat exchanger.

6. **Timing Recommendations** Power gains can be picked up generally by advancing the timing. We do not recommend checking the timing until after the engine is broke in. Running the engine at high RPM before the engine is broke in will result in streaking the nikasil cylinders (see break in page 1). We have experienced good power gains by increasing timing 2 to 4 degrees over stock ignition. Increasing the timing can be beneficial on large bore engines due to the fact that you have a large flame front on larger pistons. Increasing ignition timing builds additional heat into your engine. Heat is energy, and energy is horsepower. Additional timing can bring additional horsepower out of your engine; too much timing can add detonation,

causing burn downs. Additional timing also means that you need to be using higher octane fuel. Just as higher compression engines require higher octane, increasing your ignition timing also requires using higher octane fuel. The higher cylinder pressures caused by advancing the timing are similar to increasing compression, therefore the need of better quality fuel. Before doing so it is important to have your snowmobile jetted as close as possible. Timing can effect your jetting and affect the readings on your EGT gauges. As ignition timing increases, your EGT gauges will show **<u>lower</u>** readings. This is due to the fact that the fuel is now burning more completely within the combustion chamber. This heat is being transferred to the piston rather than out the exhaust port and into the pipe where it is measured by an exhaust probe. Even though your EGT gauges are showing a lower reading, the fact remains that the fuel mixture will be burning leaner because of additional heat produced by the advanced timing. You now must read piston wash to determine proper jetting and comparing the piston wash to your EGT readings. You now can see that if you are on the ragged edge of jetting, and then advance your timing, the end result will normally end in detonation or piston seizure!

After timing has been advanced by installing an advanced timing key. It is critical that you do not cruise at 1/4 to ½ throttle positions (5000 to 6000 rpm) for over 10 seconds at these throttle settings as the timing curve is at its maximum advance. Long durations of cruising at high advance timing will cause detonation and or piston seizure. If you are going to use your CPC Racing engine for transportation and many miles of cruising, you must vary throttle positions from part throttle to full throttle and vise versa, up and down to avoid excessive durations of high advanced timing caused by the timing curve which is pre-programmed in the CDI box. When you install a 2 degree or a 4 degree key, you must remember that you advanced the timing from idle all the way to full max RPM's across the board including part throttle RPM areas. Too much timing can cause detonation and not enough timing (especially at max RPM) will not allow the engine to reach full potential and produce max horsepower. The ideal thing would be for someone to custom program a CDI box ignition timing curve with low advance at part throttle and increased timing at high RPM. Since the factory has control of programming the CDI and does not allow after market companies to modify timing curves, the best we can do is install a advanced timing key to improve the high RPM's operation and caution owners to avoid long period of cruising at part throttle to avoid detonation.

7. **Exhaust Gas Temperature (EGT'S) And Jetting** CPC recommends the use of Redline or Koso brand digital EGT gauges on all CPC Racing engines.

CPC recommends that the EGT probe be placed at 7 inches from the exhaust side of the piston skirt to the center line on the probe (approximately 5 inches from the exhaust gasket) on twin exhaust pipes. We recommend probe location on all single pipe exhaust systems be placed in the "Y" pipe at 100mm from the exhaust side of the piston skirt **A perfectly jetted engine will have a 3/8 inch wash on the piston.** Piston wash is the lack (No carbon) of carbon around the outside parameter of the piston. For trail use on CPC Racing engines it is highly recommended that you have about a 3/8 to 1/2 inch of piston wash. This gives you a small margin of safety to prevent piston seizure. Anything less than this and you can expect piston seizure. Failure to take time to jet your engine will be a costly mistake. **<u>Jetting is your responsibility even with EFI engines</u>!**

After you have about two hours of test time on your engine, then pull your spark plugs and by using a cylinder bore light, inspect the carbon deposits on top of the crown of each piston. This inspection is called reading the “Wash”. As air/fuel mixture comes up the transfer ports, this mixture has a tendency to **wash** the carbon off the top of the piston if it is too rich. If the fuel mixture is too lean then the heat of the engine will bake carbon deposits on to the top of each piston. By reading the “wash” expert tuners can determine if the air/fuel mixture is too lean or too rich. Adjustments on jetting should be made according to what air/fuel mixture makes your engine run right and this is determined by reading the wash. If your EGT’s readings say that your engine is running too lean, but the wash on your piston says it is too rich, then always use the reading of the wash to determine what the jetting should be. Remember that the EGT’s are just a tool to monitor and aid you in your tuning. Don’t be so paranoid about reading the EGT’s that you fail to truly tune your engine. Reading the wash on the piston is best accomplished by lowering the piston down to bottom dead center, and with a cylinder bore light inspect the outer edge of the piston by looking down the spark plug hole. On lay down style engines it is recommended that you remove the exhaust pipes. On simi dome pistons, there should be about 3/8 to 1/2 of an inch of wash (no carbon) on the top of the piston at the area of the piston in front of each transfer port (see Figure #1). If carbon is burnt to the edge of the piston in this area, then the jetting is on the lean side. On EFI engines you will need to adjust the fuel management system to increase fuel delivery. If you find that there is no carbon attached to the outer edge of the piston for over an inch, then the jetting is too rich.

Figure 1. Full radius dome pistons. Left, too rich; center, perfect; right, too lean.

As a general rule we suggest the following temperature readings. These readings are only starting points. 1/4 throttle position to be at 800 to 900 degrees F. ½ throttle position to be at 1000 to 1050 degrees F. 3/4 throttle position to be at 1100 degrees F. Full throttle position to be at 1100 to 1125 with 2 degrees of extra timing on the lay down engines. Using a 4 degree key at Wide Open Throttle (WOT) you will need to lower the temp approximately 100 degrees F. i.e. 1000 to 1050 F. Remember that on high compression engines that use a lot of advance timing, they create more heat due to the fact that the fuel is burned in the combustion chamber more efficiently. Also the heat is absorbed into the piston, rings, and cylinder rather than heat being sent out the exhaust port. This heat is energy, which is torque and horsepower. Therefore you will see lower EGT’S on your gauge even though your engine is jetted leaner. **The bottom line is that you need to compare EGT readings along with piston wash to determine the correct jetting (3/8 to1/2 inch piston wash).** See Photo Figure 1.

8. **Clutching**. Clutching, gearing and jetting are the big three tuning areas to focus on when prepping a CPC Racing Engine. There isn't enough space here to go over all theories on clutching, but there is additional help. I have recently authored a book on clutching that has over 100 photos and 100 + pages of information for $19.95.

When you are assembling your CPC engine and you install the drive clutch, do not tighten with an air impact wrench. The clutch bolt should not be over torqued. Correct torque is 50 to 55 ft. lbs of torque. Over tightening can cause deformation of clutch taper and make it extremely difficult to remove the clutch. Over tightening can cause premature clutch bolt breakage. The use of the impact can cause crankshaft deflection run out. Excessive crankshaft deflection will cause clutch bolt breakage as well as create extra friction. The end result is a slow engine.

9. **Power Valves**. CPC engines that use Arctic Power Valves (APV) must be adjusted and maintained properly for maximum performance. This section will cover both areas. The APV system adjusts the size of the exhaust ports to produce maximum horsepower and torque on the top end while providing excellent low end power and increased fuel economy on the low end of the RPM band. The system operates like this: at low RPM's the exhaust valves are held in the low position by the return spring. When the engine reaches higher RPM's, the CDI will send a signal to the servo motor instructing the motor to pull the exhaust valves open via a cable to a high position. This system requires periodic cleaning and cable adjustment. Cleaning is recommended every 1000 miles or every 50 hours of use. Cleaning is accomplished by using an aerosol carb cleaner and a plastic or wooden scraper to remove any carbon on the valve or the valve cavity. The use of high quality synthetic oil will minimize cleaning due to lower carbon build-up.

Cable adjustment is critical to the operation and performance of your engine. If the APV cables are out of adjustment you will experience lower power levels as well as lower RPM's Make sure the power valves are installed correctly. **If the Power valves were not cut correctly for your particular cylinder the piston may come in contact with the exhaust valve and damage to the piston and cylinder will result! This will not be covered under warranty! It is the mechanic who is assembling the engine responsibility to make sure that the power valves fit correctly. Before assembling the cylinder onto the engine, take a straight edge ruler and make sure you have a minimum of .080 (2.0mm) clearance between the power valve and the straight line of the cylinder bore. This is best accomplished by removing the power valves and grinding on them with a die grinder or a belt sander to make sure there is enough clearance.**

To adjust or inspect proper cable adjustment, proceed

#1. Remove the two bolts securing the servo motor plastic cover.

#2. Using a small screwdriver, remove the cable retaining clip.

#3. Rotate the servo actuator counterclockwise to loosen the cable, then pull the cable housing out of the holder.

#4. Pull the cable up and out of the cable housing holder, then slide each cable drum to the left and out of the servo actuator.

#5. While holding the cable housing firmly, pull the cable out as far out as it will go, the release. Repeat this three to four times to insure that the valve is free and not hung-up.

#6. While holding the cable housing, lightly pull on one cable end to remove any slack. Measure the amount of exposed cable from the outer cable housing to the end of the cable. When measuring the cables, keep them as close to their installed position as possible. Proper cable adjustment on the 2007 to 2010 twin lay down engines should be about **34.5 mm plus or minus 1 mm** when measuring from the inside of the lead ball to the end of the outer cable housing. If the cables are not equal or are out of adjustment, then loosen the jam nut on the cable, then using the adjuster nuts in the center of the cable, lengthen or shorten the outer housing as needed, then tighten jam nuts. Generally we suggest that you start on the short side when adjusting.

10. **Batteryless EFI System & Fuel Management System**. All EFI model snowmobiles with a CPC performance engine kit will require some method of manipulating the EFI system to add more fuel. All EFI models regardless of elevation and temperature will require more fuel for the CPC Racing Engines to survive. There are a few things that you will need to know to assist you in making adjustments as well as understanding how the system works. First, let's take a minute to understand how the stock batteryless EFI system works.

The *stock* EFI system is run by an electrical control unit (ECU) which calculates input from five sensors:

1. Intake air temperature sensor
2. Water temperature sensor
3. Throttle position sensor
4. Ignition timing sensor
5. Barometric pressure sensor

All of these senors provide the ECU with information so the correct fuel mixture and ignition timing can be at optimum for correct operation on a *stock* engine.

But everything has changed since we big bored the engine. The factory ECU still thinks that it is a stock 1000cc system and the ignition timing and fuel delivery are what the factory pre-programmed into the ECU. By using an aftermarket EFI control box, you must try to piggy back the stock EFI system and change the air/fuel requirements in order to have a safely jetted engine.

CPC has been working hard in order to provide our customers a way to manipulate the stock EFI system in order to provide the necessary fuel the engine needs to survive with our engine performance kits. If the fuel system is too rich then you will experience poor performance. If the fuel system is too lean, then you will experience burn downs (piston seizure). There is a fine line between rich and lean fuel needs and riders/racers needs. For example; drag racers are looking for lean fuel mixtures to achieve maximum hp and trail riders are looking for safe jetting for hassle free pump gas trail riding. Since we walk the tight rope of trying to get the perfect fuel mixture for each owner of the CPC Racing engine packages; we decided that the best way to handle your fuel mixture needs was to let each owner be responsible for his calibration. On the 1300cc twin engine we recommend the use of a Boondocker EFI control box. Start out rich and take fuel away as needed in order to get a safe EGT values and clean operating engine. (See section #7). **The following settings are only starting points.**

Boondocker EFI Settings @ 9000 feet@

RPM’s	Low	Medium	High	Trim
3000	3	3	3	0
5000	-6	-6	-6	-2
6500	0	0	0	-2
7200	4	10	11	-2
7500	9	22	22	-2
7800	10	20	20	-2

Clutching
Use 12 grams higher weight that stock engine
Use yellow/green drive clutch spring
Use CPC Act Diamond drive conversion kit with a 42/38 helix and orange spring

Running RPM’s on a SLP single pipe is 7500 to 7550 RPM
Running RPM’s on a CPC twin pipes is 7700 RPM

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