Adjusting the carburettor on a Hyundai chainsaw.

All Hyundai chainsaws use Walbro carburettors, so the tuning principles are the same.

Carburettor adjustment is critical on chain saws and other two-stroke engines. An engine that is running too rich will cause a saw to smoke, have insufficient power, result in additional carbon build up and may damage the engine. An engine that is running too lean will also produce insufficient power and is more likely to damage the engine from piston/bore seizure. The correct carburettor adjustment will allow the saw to produce maximum power, extend the life of the engine, reduce emissions, idle smoothly, rev up quickly and give long trouble free service.

An over rich carburettor adjustment is when the proportion of fuel in the combustible air/fuel mixture is so high that the fuel does not burn well. The burn does not produce much heat, so the power stroke is weak. The partially burned mixture is expelled into the exhaust and exits the saw as smoke. An over rich condition causes carbon build-up and will block the spark arrestor and cylinder exhaust ports if run for a long period of time. Outside of carburettor adjustments this can also be caused by having too much oil mixed with the fuel, a blocked air filter and/or old stale petrol. Unleaded petrol can go off in as little as two weeks, so make sure you always use fresh unleaded petrol and 40:1 2-stroke Semi-synthetic oil.

A lean carburettor adjustment is when the proportion of fuel in the combustible air/fuel mixture is so low that there is not enough fuel to burn. This also makes a weak power stroke and causes the saw to have insufficient power. In addition to low power, a lean condition causes the cylinder temperature to rise, which often leads to seizure. A lean condition also allows for excessive RPM which can cause big end bearing and con-rod failure. Other causes for a lean running condition include lack of oil in the petrol-oil mix, and when the fuel tank runs empty. Always stop a saw before the tank runs completely dry. Be sure to use 40:1 petrol:oil mixture ratio recommended for your Hyundai chainsaw.

Hyundai Chain Saw Engines Have Three Carburettor Adjusting Screws:

(You will need a special tool for the Low and High speed adjustment and a Phillips screw driver for the idle adjuster- see images at end of article).

1. Idle Speed/Throttle Stop – This is the adjustment that controls how much the throttle valve (butterfly) stays open when the throttle trigger is released. If this adjustment is set too low, the engine will die when the throttle trigger is released. The throttle valve (butterfly) simply cuts off the supply of combustible air/fuel and the engine stops. If this adjustment is set too high, the high idle speed will cause the centrifugal clutch to engage and the chain will run. This is a dangerous condition and should be avoided. It also causes excessive wear to the clutch.

2. Low Speed Fuel Adjustment (marked L, this is the low speed jet). This is the adjustment that controls the amount of fuel in the combustible air/fuel mixture at idle speed. An adjustment that is set too rich will cause the engine to ‘oil up’ and die at idle speed. A mixture that is too lean will starve the engine and cause it to race or surge. An extremely lean adjustment will also cause the engine to die, too.

3. High Speed Fuel Adjustment (marked H, this is the high speed jet). This is the adjustment that controls the amount of fuel in the combustible air/fuel mixture at cutting speed. It would not be accurate to say that this is the most important setting, because all of these adjustments need to be accurate for a saw to perform at its best, but this is the adjustment that determines how the saw runs in the cut. An adjustment that is set too rich will not allow the saw to reach the RPM level required to reach+ maximum power. Throttle response may also be sluggish and the engine would smoke and perform poorly. A mixture that is too lean will allow the engine to reach an RPM level where bearing failure and cylinder seizure are likely. It will also lack power during cutting and tend to run very hot.

The preceding information briefly explains rich and lean running conditions. It also identifies the three adjustment screws and their functions.

Carburettor Adjustment Procedure

The following procedure should be followed to ensure proper carburettor adjustment:

• (1) Check the air filter and clean it if necessary. Adjusting the carburettor with the air filter partially clogged is like adjusting the carburettor with the choke partially on. If you adjust your saw with a dirty air filter, the saw will run too lean when the filter is cleaned.

• (2) Check the muffler and exhaust port for carbon build up. Carbon clogging the exhaust port or spark arrestor screen can cause a saw to run as if the carburettor requires adjustment. Changing the carburettor settings with a blocked muffler may result in the saw running to lean when the carbon build up is cleaned out. Make sure the spark plug is not carboned up.

• (3) If carburettor adjustment is required due to a new or rebuilt carburettor, it is best to start with the fuel adjustment settings one turn out. This is accomplished by gently screwing the adjusting screws onto their seats and then turning anti-clockwise one turn each. Care must be taken when screwing them onto their seats because the seats may be easily damaged if the adjustment screws are screwed in too tight. These seats are delicate and if they are damaged, the carburettor may have to be replaced.

• (4) Check the fuel level. The tank should be over half full. If the carburettor is adjusted when the fuel tank is nearly empty, the carburettor may be adjusted too rich when the fuel tank is filled.

• (5) Start the engine and warm it up. If the saw will idle let it run for a few minutes. If it will not maintain idle without stalling warm it up by repeatedly squeezing the throttle, do not run the throttle to wide open. Carburettor adjustments made on a cold engine will be too rich when it reaches normal operating temperature.

• (6) Begin by setting the idle speed (screw A). Try to set the speed at about 2700 RPM. If you don’t have a tachometer, try to set the speed so the saw idles as high as possible without engaging the clutch. Never set the idle so the chain runs when the throttle is released. If the saw will not idle, go to the next step.

• (7) Set the low speed fuel adjustment. Slowly turn in (clockwise) the screw (L) until the engine surges or starves for fuel. Make a mental note of the position of the screwdriver. Now slowly turn the adjustment screw out (anti-clockwise) and the engine should run better. Keep turning the screw until the engine starts to splutter and oil up. Make a note of the position of the screwdriver and

compare it to the position of the lean adjustment. Now slowly turn in (clockwise) the screw to a position where it idles the best. It should be about midway between the rich and lean settings.

• (8) Go back to step (6) and reset the idle speed. Chances are that the RPM setting has changed since you optimized the fuel mixture adjustment.

• (9) Set the high speed fuel adjustment. Hold the trigger wide open and adjust the high speed screw (H) anti-clockwise until the engine starts to 4-stroke or slightly mis-fire. Take a note of adjuster position. This is running too rich.

Then we adjust the carburettor lean (clockwise) causing it to sound smoother and then it will start to starve of fuel, creating little power and a LOT of heat. As we back it off from lean to rich again, the sound becomes slightly rougher. This slightly rough sound (or 4-stroking sound, as it's sometimes referred to) is where you want it to be. We like to say, as "close" to the smooth as you can get it, but still just slightly into the rough.

Setting the adjustment slightly rich will reduce 'no-load' max rpm, but will allow the correct 'full-load' air/fuel/oil mixture and thus reduce the possibility of damage to the engine.

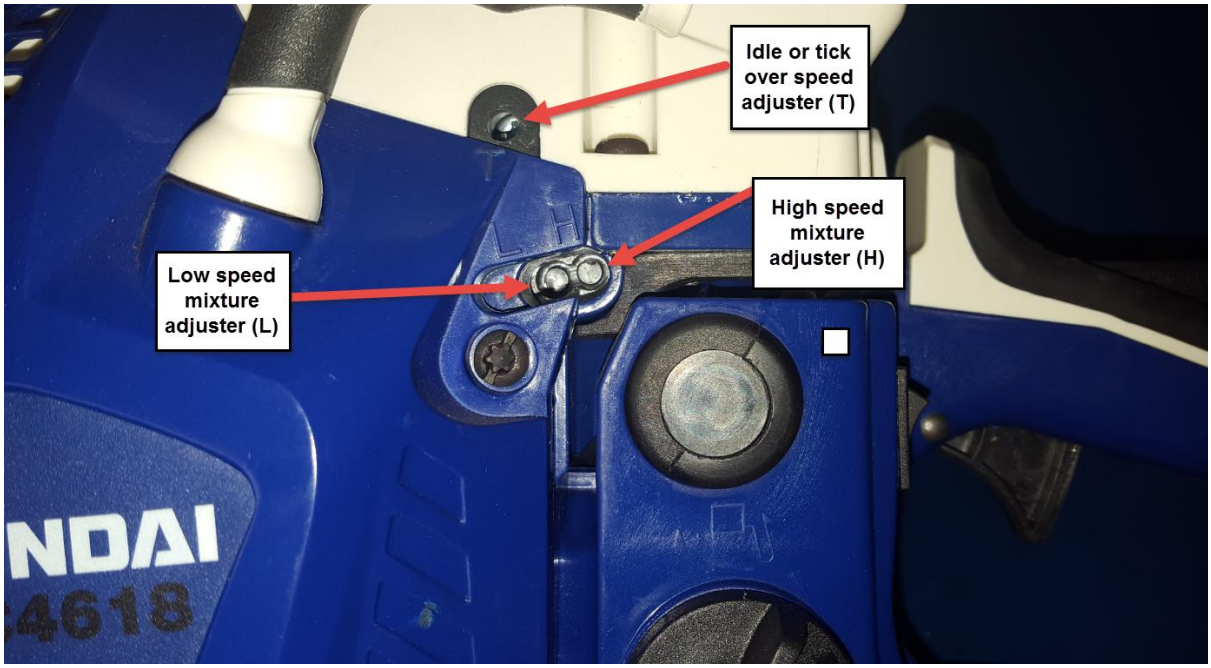
• Check that your low speed adjustment still works as well as before you adjusted the high speed jet. Changing adjustments on one jet will often affect the other slightly. If the acceleration is not as rapid as before go back to step 7.

• Set the final idle speed (Step 6). This time turn the idle speed screw ant-clockwise to the lowest rpm where the saw will idle smoothly without seeming as if the engine will stall.

• Your saw is now correctly adjusted and ready for work.

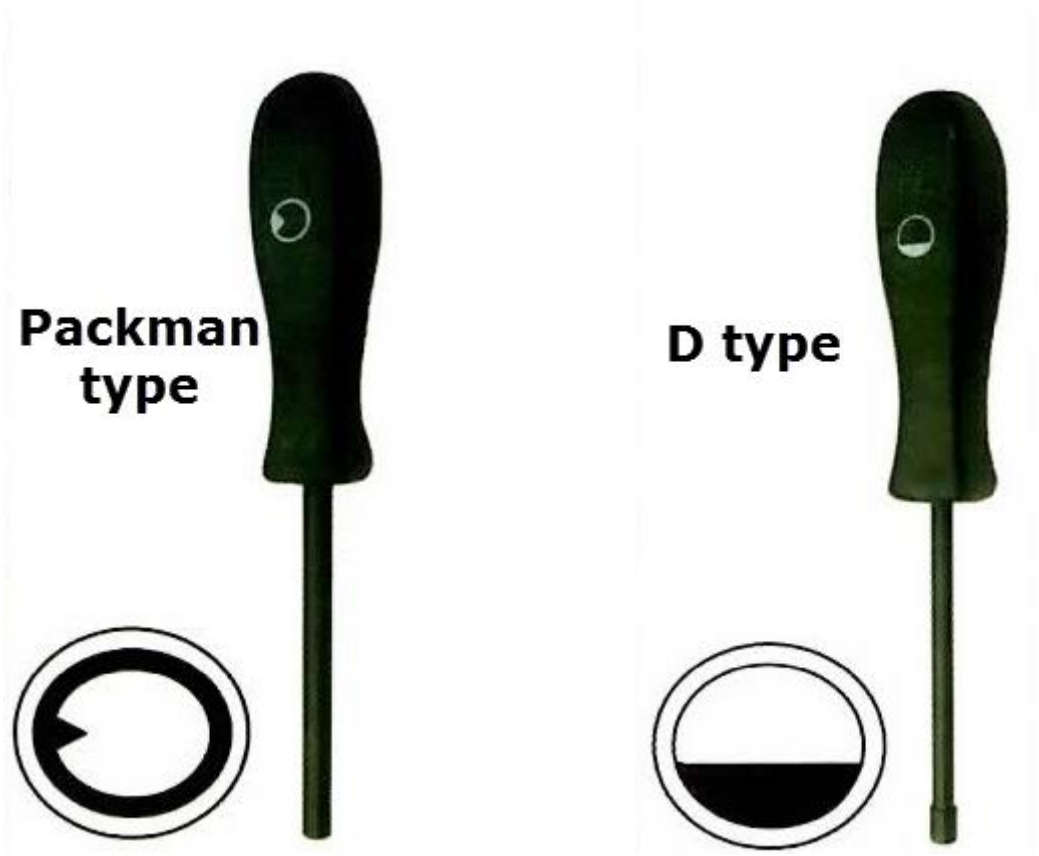
Why can't Carburettors be set when they are new & then leave them alone?

Some people wonder why their saw can't be adjusted when it's new and then not need any other tuning. Unfortunately chainsaws can't be set at the factory and stay correctly adjusted for life. The reason is that altitude, fuel specification, fuel age, humidity, wearing engine components on the chainsaw and a host of other factors cause carburettors to need periodic adjustment.



2-stroke carburettor adjusting tools

Below ‘Packman’ type (left) as used on Hyundai chainsaws and ‘D’ type (right) as used on other Hyundai 2-stroke engines.



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