

A GUIDE ON HOW TO GET AN UNWILLING SOLEX ENGINE TO RUN

(Based on the original document compiled by Cris LePage & Jim Clift, April, 2002.)

IMPORTANT!

Read this guide to work out how to get an unwilling Solex engine to run or possibly run better. In all cases, caution should be exercised when handling petrol or other flammable liquids. If working around moving engine parts, keep hands, fingers and clothing away so as not to become tangled and injured. If you don't know what you are doing, consider joining one of the many clubs found on the Internet before proceeding further! Many have a forum where questions can be asked and some very good advice received.

Note: This guide does not cover the Solex engine fitted with electronic ignition.

Further detailed information can also be found in the '**Guide to adjusting and disassembling the engine**' manual. (Ref. 3810 EN/1)

Whilst this guide was written specifically for the Cyclomoteur 3800 engine, many of the sections are applicable to the older engines.

The authors do not assume any responsibility whatsoever for any injuries or damage to components caused whilst following this guide.

GENERAL SOLEX TROUBLE SHOOTING AND TUNE-UP PROCEDURES

It takes 3 things for a Solex engine to run:

- Spark
 - Fuel
 - Compression

If the engine doesn't run, one of these three things is either missing or not good enough.

(If the engine has all three of these things, **IT MUST RUN**. It does not have a choice!)

The three most common reasons why Solexes don't run are:

1. Fouled or non-sparking plug.
2. Dirty fuel (inside the tank, filters, pipes, carburettor and/or main jet).
3. Dirty, worn or mis-adjusted ignition points.

The dirty fuel is the most common reason.

BASIC TROUBLE SHOOTING (Follow these steps to get it to run)

The first thing to check on a Solex that won't run is to see if there is a spark at the spark plug.

Remove the air cleaner from the top of the cylinder head. Next, remove the old spark plug and attach a **NEW** (not another second-hand or used!) spark plug to the high-tension lead. Ground the plug base (the threaded part) firmly against the engine. Then spin the flywheel clockwise rapidly by hand. (It may help to do this at night or in a darkened garage to make it easier to see the spark.) A good spark should be a dark blue/purple colour. If the colour is noted to be orange/yellowish, the spark plug is defective!

If there is no spark, clean the ignition points (see '**IGNITION**' paragraph)

If there is a spark, squirt a small amount of fuel mixture* (less than a teaspoonful) into the spark plug hole, install the plug and try to start the bike in the normal fashion. If it starts and runs for 5 seconds and then dies, then check for fuel flow to the carburettor (see '**FUEL FLOW to the CARBURETTOR**' paragraph).

***IMPORTANT NOTE:** Under no circumstances should starting the engine be attempted using any form of commercially available starting fluid or any other combustible liquid. These fluids have no lubrication properties, they burn at extremely high temperatures and severe damage to the Solex engine will result.

If there is fuel flow to the carburettor, a spark at the plug, and it still won't run, then clean the carburettor. (See '**ADDITIONAL NOTES on the CARBURETTOR**' paragraph)

If all those have been done and it still doesn't run, go to the part that says: '**WHAT ELSE IS THERE?**'

FUEL FLOW to the CARBURETTOR

With a *cold* engine, remove the plastic return tube going from the carburettor to the fuel tank. Push or pedal the Solex for a short distance, stop and look to see if there is now fuel weeping from the carburettor return spout. If fuel is present, then reattach the plastic return tube, wipe any spilt fuel off the Solex and note that the fuel pump is operational with no blockage in the tank fuel filter. At this point, remove the carburettor filter mesh (white plastic tube in the top of the carburettor) and inspect it for a clogged condition. In addition, remove the brass main jet on the back of the carburettor (unscrew counterclockwise using a 9 mm A/F wrench). After the jet is removed, apply air pressure to its threaded end and observe if there is any blockage. (Note: *NEVER* push a wire or needle through the calibrated orifice!) After cleaning the jet, reinstall and there should now be proper fuel delivery to the engine.

If there was no fuel spilt at the carburettor return spout, remove the fuel tank. Clean the tank, filter, fuel lines and fuel pump. The tank's filter, the fuel pump's diaphragm and plastic seat or clogged fuel lines may have to be replaced depending upon the situation. If this is the case, consult the '**Guide to adjusting and disassembling the engine**' manual for more detailed instructions.

ADDITIONAL NOTES on the CARBURETTOR

Keeping the carburettor clean is very important! It cannot be overstressed: it not only looks better, but is also safer and makes diagnosis easier. Use a commercial aerosol cleaner to remove gunk from the outside surfaces, and, if removing the carburettor, clean out all openings to purge dirt from its inside as well. Visit a local auto accessory / parts dealer for this type of cleaner.

Follow the directions on the can and observe all the safety recommendations. Because the Solex is designed to deliver outstanding fuel mileage and economy, all fuel system components are in miniature: orifices are very small and will not tolerate dirt-contaminated fuel. By using a plastic fuel tank on later models, Solex eliminated contamination from rust and paint chips (often found on earlier models), but it's up to the owner to keep the fuel storage container clean and the fuel fresh! Do not store large amounts of fuel for the Solex. Only pre-mix small amounts at a time (one gallon / 5 litres or less) and store it safely in a cool, dry environment. Make sure to follow all local and national regulations concerning the safe storage of motor fuels and use only approved containers.

IGNITION

Most Solex engines have 'contact breaker points' ignition - which can get dirty, become worn and need adjusting occasionally. They can be found by looking through holes in the flywheel, (under the plastic cover on left hand side of the engine) after removing the thin 14 mm A/F nut, cover and rubber gasket.

To clean and adjust the ignition points, remove the flywheel using a special Solex flywheel puller that makes use of the three M6-threaded holes (consult the '**Guide to adjusting and disassembling the engine**' manual for detailed instructions). *NEVER* use a claw style puller or attempt to pry off the flywheel using lever tools like screwdrivers! After the flywheel is off, a 5" x 7" (12 x 17 cm) white index card, and carburettor cleaner or rubbing alcohol is required. Then, cut a few 1/4" (6mm) wide strips of index card. Take one of these strips and wet it in cleaner/alcohol. Insert the strip between the ignition points and let it sit for a few seconds. Remove the strip and insert its opposite dry end. Carefully pull the strip from the points. If the strip is discolored on both ends, repeat the procedure until the strip(s) are clean (i.e. the points are now uncontaminated).

It is important to use sharp scissors when cutting index card strips. Tearing these strips will produce paper filaments that will remain between the ignition point contacts.

Next, on the right-hand side of the stator, look for two nuts securing wires (top one is for the ignition coil [spark roll] and bottom one is for condenser lead). Loosen the top nut, slide the ignition coil lead



out and position it temporarily out of the way. Attach a 2' - 3' (20 – 30 cm) long wire test lead (use a light gauge insulated wire for this purpose) to this terminal and tighten the nut. (Both ends must be bare.) Pass the other end of the test lead through one of the 3 openings in the flywheel and then carefully place the flywheel back onto the crankshaft making sure the flywheel key is aligned with the keyway in the shaft. Rotate the flywheel clockwise so that the indented mark is in position under the "Rupture" mark on the stator. Attach an Ohmmeter to the free end of the test lead and to the engine case (Ohmmeters typically have two leads, one black and one red for this purpose. It does not matter which one goes to the test lead or case) thus creating a "circuit" with the ignition contact points being the switch in the circuit. When the points are closed, the Ohmmeter will indicate low resistance (typically 1 ~ 2 ohms, with a clean set of points) and when the points are open, it will indicate an open circuit or infinite resistance. Rotate the flywheel counter-clockwise past when the above-mentioned marks align and then clockwise noting where the points start to open. (As the flywheel is rotated clockwise, the points will [should!] open where the marks align).

Adjust the points by loosening the two outer lock screws which secure the points stationary anvil, and rotating the centre adjusting screw / cam to reposition the anvil. After adjusting, rotate the flywheel clockwise and re-check the settings. Once confirmed, gently tighten the two lock screws and double-check the settings. (Note: If the two lock screws are pushed too hard when tightening, the points backup plate will bend.) Remove the flywheel and the test lead. Refit the ignition coil wire back under the top nut and retighten. Refit the flywheel and tighten nut as per the instructions in the '**Guide to adjusting and disassembling the engine**' manual. The engine is now "statically" timed and should run much better with a correctly timed ignition system!

With all this said, the ignition points should never be filed to remove pitting, rust, scale, etc., except in an emergency. If the points are in poor condition, replace them with a new set as soon as possible to prevent future failures.

WHAT ELSE IS THERE?

- Fuel flow to the carburettor has been checked. ✓
- The carburettor has been cleaned *THOROUGHLY*. ✓
- The ignition points have been cleaned and set. ✓
- There is a fat blue spark at a brand-new plug. ✓

But the Solex still won't run or it runs *POORLY* - Why?

Here are some further common reasons:

- The silencer (muffler) is clogged with carbon.
- The cylinder exhaust port is clogged with carbon.
- The rings or cylinder are worn out or damaged and don't have enough compression.
- The air filter (going into the carburettor) is too dirty to flow air very well.
- The head gasket is leaking.

SILENCER (MUFFLER) CLOGGED with CARBON

A Solex with a clogged silencer will usually start and run - but will not run very fast.

The (header) pipe where it attaches to the manifold exhaust pipe may get slightly congested, but it can be cleaned by scraping out the carbon with a suitable tool. Turn the pipe upside down and tip out loosened carbon. It is not recommended to heat the exhaust pipe to remove carbon, rather, purchase a new exhaust from one of the many Solex parts suppliers found on the internet.

CYLINDER EXHAUST PORT CLOGGED with CARBON

Same as a clogged silencer - it will run but not very fast.

To check this, remove the manifold pipe / carburettor and look into the exhaust port (on the cylinder). The use of a flashlight may be required to see up into the cylinder exhaust port. It should be possible to rotate the ignition flywheel by hand whilst looking into the port and clearly see the piston going up

and down. The top of the port lines up with the cooling fin on the outside of the cylinder. The piston tip to this point in the port should be visible. If it isn't, remove the head and cylinder and thoroughly scrape out the exhaust port with a suitable tool. Scratches inside the port won't hurt anything, but try not to scratch the cylinder bore where the piston rides up and down. A "crescent moon" shaped dark spot at the top of the port in the cylinder is a sure sign of carbon build up. Tap it with the decarbonising tool, and when dislodged from the port, it will show how big the opening should have been!

Before replacing the silencer, check the tightness of the two manifold bolts and the aluminum nut at the bottom of the carburettor.

When a Solex engine is "carboned up", two things happen: low end torque is reduced (thus reducing power) and additional heat is generated. To help reduce carbon build up, use high quality premix engine oil at 40:1. In addition, do not let the engine idle for long periods as this increases carbon build up and heat damage to the piston and rings.

WORN OUT RINGS, CYLINDER and PISTON (Test for compression)

A Solex engine, by design, does not require much compression to run. The engine is rated at 8.2:1 compression, but this is uncorrected and is actually closer to 6.4:1. The advantage to a lower compression is less heat generated while running, lower octane fuel can be used and it takes less horsepower to overcome the compression while running which in turn increases engine torque on the lower end of r.p.m. range. Increasing compression moves the torque band to where it is not practical for Solex running.

Bearing this in mind, test for compression by simply rotating the engine over by hand, with the spark plug in place. Engine compression should be evident (i.e. resistance as the piston moves upward). If no resistance is felt, look at where the cylinder head mounts to the cylinder and see if there is oil oozing from this area (indicating a loose cylinder head / blown head gasket). The head will have to come off for service. Remove the cylinder head as per instructions in the '**Guide to adjusting and disassembling the engine**'. Inspect the head gasket for dark scorched areas radiating from the cylinder to the outside, or to a bolt hole. This will indicate the leak, if present. Check for scuffing and scoring to the cylinder wall. If the cylinder is damaged, consult the internet / manual for replacement parts. **Important:** If the cylinder has been removed, (and because it has ports) it is advisable to arrange the piston rings such that the gaps are neither lined up nor in the same alignment as the cylinder barrel ports.

If the head was loose, de-carbon (decoke) the piston top and cylinder head. Tip: When cleaning up a piston (still in situ) lower it slightly, smear some light grease on the cylinder wall, move back to T.D.C. (highest position) and then scrape the carbon. Once the piston is clean, lower it and wipe off the grease. (Any carbon that would have fallen down between the piston and cylinder has been trapped in the grease and easily cleaned up.) Install the head using a new compression gasket. Tighten cylinder head bolts as per the instructions in the '**Guide to adjusting and disassembling the engine**' manual.

AIR FILTER

Engines are designed to run with air filters to keep dirt out so that the piston and rings and cylinder will last a long time. If the air filter gets clogged with dirt or too much oil, it will richen up the air/fuel ratio and slow it down, maybe foul the spark plug and possibly cause the engine to "four-stroke".

Foam air filters should be cleaned in petrol and allowed to dry. Then, be *LIGHTLY* oiled (just use a *little* oil and try to spread it around). Pleated cloth types (used in older Solexes) can be cleaned in the same way.

Running with no air filter will cause premature wear on all moving engine parts. If the engine runs a lot faster with no air filter (and you have already tried cleaning the filter) then it should be replaced with a new one.

ENGINE TUNING

This is the simple part. Keep the filters clean and the timing set to factory specifications. De-carbon the engine at recommended intervals and use high quality fuel and oil. There is no practical way to increase engine performance without reducing economy, reliability and durability.

GENERAL SOLEX INFORMATION

FUEL, OIL and TWO-STROKES

All Solexes use two-stroke engines requiring oil to be premixed with petrol

OIL

Modern two-stroke oils can usually be pre-mixed between 2.6 fl.oz. (50:1) and 4 fl.oz. (32:1) of oil per gallon of petrol. Buy only two-stroke oil designed for this purpose. Semi-Synthetic two-stroke oils help reduce the build-up of carbon in combustion related areas. Fully Synthetic two-stroke oil is NOT recommended.

PETROL

Use 87 octane "regular" petrol. The use of "high octane" petrol is not required nor desired, as it burns slower and reduces performance. Match the petrol to the application! Also, if at all possible, avoid using petrol containing Ethanol. Ethanol is damaging to 2-stroke engines in general, and is especially damaging to the plastic and rubber pieces of the Solex fuel system.

PETROL ADDITIVES

There is no need to use additives. Mix fuel and oil in small quantities. Always shake the storage container before pouring fuel into the Solex tank.

SPARK PLUGS

Run the specified spark plug detailed out in the table below. **Gap setting: 0.5 mm or 0.020"**

Bosch	W7AC
Champion	L86C
Cyklon	43
Flashpoint	FP 5CR
NGK	B6HS
Marchal	V36A

SPARK PLUG FOULING

A spark plug should never foul if the above instructions have been followed. If spark plugs have to be replaced regularly, check what is being done to contribute to this problem. If the Solex has a particularly high mileage or an unknown history, the engine may need a top end overhaul.

PARTS FALLING OFF

Keep an eye on the Solex. Become familiar with its appearance and operation. Watch for loosening fasteners, and, if concerned, apply a 'Loctite' (or similar) brand adhesive to fasteners that persistently come loose. Check all fasteners weekly.

CONCLUSION

The Solex is the end result of brilliant engineering and design. Solex bikes have sold in the millions since 1946. Never-the-less, as with any mechanical device, problems can arise and should be dealt with as required. Become very familiar with the Solex and look for problems before they arise. If going on a long trip, tighten all fasteners and clean the Solex so that all the parts can be touched and anything out of order will be found. Carry a spare inner tube, tyre pump and proper tools for fixing flat tyres.

Giving the Solex a little attention now and then will greatly decrease the eventuality of a problem when it is least expected. The Solex will reflect the quality of care given it!

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