LEO®
ENGINES

OWNER'S INSTRUCTION MANUAL

WARNINGS

Model engine fuel is poisonous. Avoid contact with eyes and mouth.Always store it in a clearly marked container and out of the reach of children.

Model engine fuel is also highly flammable.Keep it away from flame, heat, sparks,or anything else which might ignite it. Do not smoke around.

Never operate your engine in an unventilated space.Model engines, like automobile engines, exhaust toxic carbon-monoxide. Use your engine only in an open area.

Model engines generate considerable heat.Do not touch any part of your engine until it has cooled. Contact with the miffler (silencer).cylinder head or exhaust header pipe,in particular,may resuit in a serious burn.

SAFETY INSTRUCTIONS AND WARNINGS ABOUT YOUR LEO ENGINE

Remember that your engine is not "toy",but a highly efficient internal-combustion machine whose power is capable of harming you,or others,if it is misused.
As owner,you,alone,are responsible for the safe operation of your engine,so act with discretion and care at all times.
Once you must use engine with safety instructions all the time,your LEO engine is acquired by another person,we would respectfully request these instructions are also oassed on to its new owner.

- The advice which follows applies basically ALL MODEL ENGINES and is grouped under two headings according to the degree of damage or danger which might arise through misuse or neglect.

⚠ WARNINGS

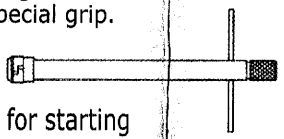
These cover events which might involve serious (in extreme circumstances, even fatal) injury.

⚠ NOTES

Many other possibilities these cover, generally less obvious sources of danger, but which,under certain circumstances, may also cause damage or injury.

LONG SOCKET WRENCH WITH PLUG GRIP

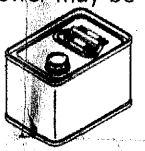
Recommended for easy removal and replacement of the angled and recessed glowplug,the angled and and recessed glowplug,the O.S.Long Socket Wrench incorporporates a special grip.



- Items necessary for starting

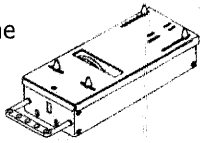
FUEL

Generlly,it is suggested that the user selects a fuel that is commercially available for model two-stroke engines and contains 10-30% nitromethane. As a starting point,we recommend a fuel containing more nitro if necessary. When the brand of fuel is changed, or the nitro content increased,it is advisable to repeat the running-in procedure referred to in the RUNNING-IN paragraphs.Please note that with high-nitro fuels. Although power may be increased for competition purposes glowplug elements do not last as long and engine life will be shortened.



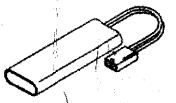
STARTER BOX

For starting the engine



7.2V BATTERIES FOR STARTER BOX

Batteries for starter box. Select according to the starter box used. Be sure to full charge before using.

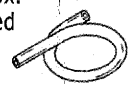


FUEL PUMP

For filling the fuel tank, a simple, polyethylene "squeeze" bottle, with a suitable spout, is required.

SILICONE FUEL LINE

Heatproof silicone tubing of approx. 5mm o.d. and 2mm i.d. is required for the connection between the fuel tank and engine.



INSTALLATION OF THE CARBURETOR

As deliverd, the engine has its carburetor lightly installed in the intake boss. Secure it as follows.

REMINDER!

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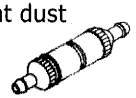
⚠ Model engine fuel is also highly flammable. Keep it away from open flame, excessive heat, sources of sparks, or anything else which might ignite it. Do not smoke around.

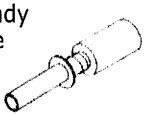
FUEL FILTER

To fit in the fuel line between fuel tank and carburetor to prevent dust coming into the carburetor.

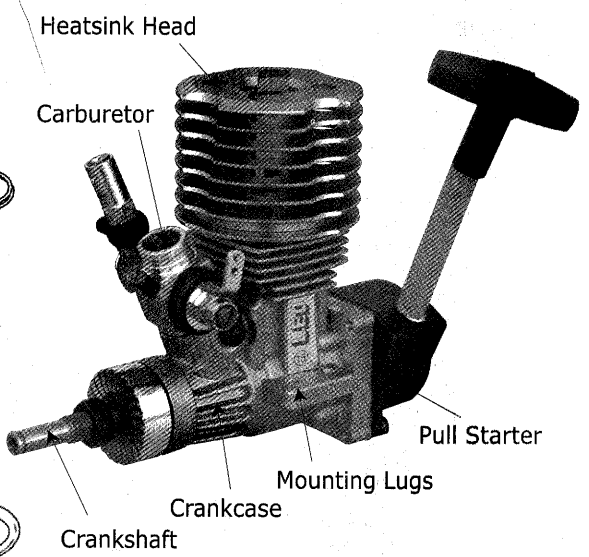


GLOWPLUG IGNITER

Commmercialy available handy glowplug heater in which the glowplug battery nd battery leads are integrated.



BASIC ENGINE PARTS

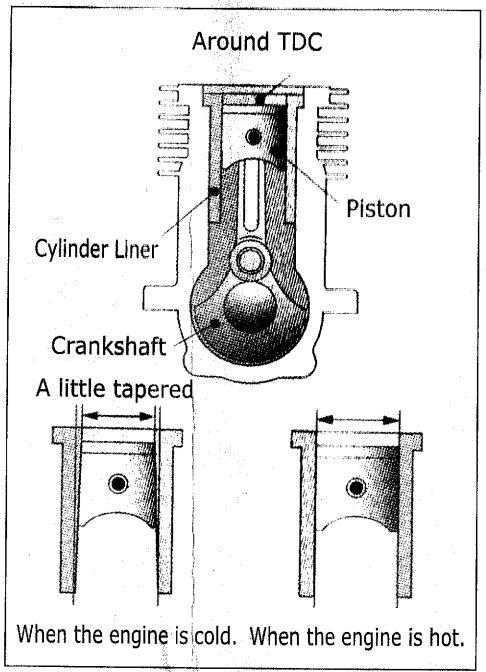


ENGINE INSTALLATION

Make sure that the vehicle's engine mounting surfaces are level and in the same plane. Poor installation may cause distortion of the

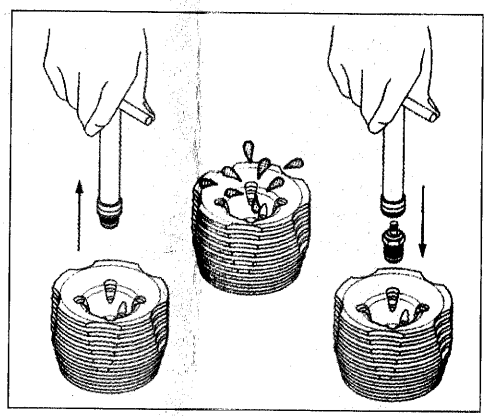
ENGINE CONSTRUCTION

With this engine,the piston will be tight at the top of its stroke (TDC)when the engine is cold. this is normal.
The cylinder bore is a little tapered to achieve a perfect running clearance when they reach their running temperatures.



NOTES WHEN APPLYING AN ELECTRIC STARTER

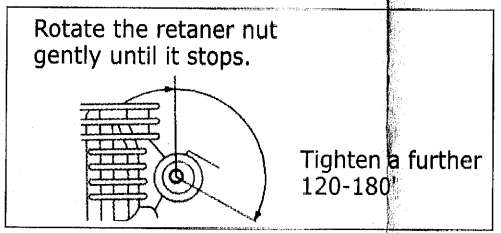
Do not over-prime.This could cause hydraulic lock and damage the engine on application of the electric starter.
If over-primed,remove glowplug, close needle-valveand apply starter to pump out surplus fuel. Cover the head to prevent the pumped out fuel from coming into your eyes.



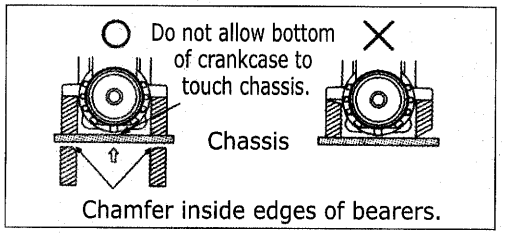
⚠ NOTE

As delivered,the engine has its carburetor lightly fit into its intake.Secure it changingits angle according to the car chassis.

2.Rotate the retainer screw gently until it stops. then tighten a further 120-180'. Do not overtighten the screw as this will damage the carburetor body.



The recommended screws for securing the engine are 3mm or 4-40 steel Allen hexagon socket type.
If existing holes in the engine mount do not align perfectly with engine mounting lugs, enlarge them slightly with a needle-file so that screws are in alignment with the mounting holes.



TROUBLE SHOOTING

Cause	Corrective action
Fuel tank is empty. Fuel not reaching the engine.	Fill the tank with fuel and repeat Priming procedure.
Glowplug element is burnt out. Glowplug battery discharged	Replace glowplug. Recharge or replace the battery.
Clogged fuel filter Air cleaner and silencer inside is dirty.	Clean or replace fuel filter. Replace cleaner element and clean inside silencer.
Over priming	Remove glowplug and pump excess fuel.
Fuel tubing is disconnected. Fuel tubing is kinked, split or has a hole.	Connect fuel tubing securely. Check the tubing carefully and replace if necessary.
Incorrect carburetor settings	Return the metering needle and mixture control valve to basic position.
Incorrect servo linkage	Re-linkage after setting servo at neutral.
Reverse rotating direction of starter box	Mare sure it rotates counter clockwise seen from crankshaft side.

Symptom: Engine fires intermittently but does not run.

Cause	Corrective action
Insufficient fuel the tank.	Fill the tank with fuel.
Deteriorated glowplug	Replace glowplug.
Clogged fuel filter Air cleaner and silencer inside is dirty.	Clean or replace fuel filter. Replace cleaner element and clean inside silencer.
Engine overheated	Wait until engine is cooled.
Incorrect clutch release	Adjust the tension of clutch spring.
Too immediately disconnecting plug battery.	Do not disconnect plug battery and wait until r.p.m. become stable.
Fuel in the tank extremely bubbled	Fit O rings to the tank screws to prevent bubbles.

Symptom: Engine fails to fire.

Symptom
Unstable idling
Cause
Unsuitable glowplug
Unsuitable fuel
Extremely light flywheel
Silencer is disconnected or has play

Corrective action
Use suggested glowplug in the instructions.
Do not use extremely high nitro or low oil fuel.
Add suitable load.
Install silencer securely.

Symptom
Not reaching expected peak r.p.m.
Cause
Insufficient warming up or running-in.
Silencer or manifold is not securely connected or disconnected.
Fuel tubing from tank to is split or broken.

Corrective action
Set the needle only after warming up. Complete running-in.
Replace seal ring. Check the connections and secure them.
Replace the tubing.

Symptom
Poor response
Cause
Deteriorated glowplug
Incorrect carburetor settings
Incorrect setting or transmitter Exponential function.

Corrective action
Replace glowplug.
Readjust low r.p.m. range with metering needle and mixture control valve.
Check the transmitter setting.

Symptom
Poor r.p.m. drop
Cause
Too much throttle opening at Idling.
Incorrect carburetor fitting

Corrective action
Close metering needle to adequate position to lower idling r.p.m.
Fit carburetor securely.

OPERAING INSTRUCTIONS FOR THE LEO 1190 CARBURETTOR

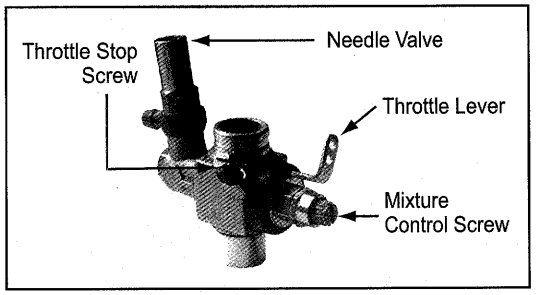
The LEO carburettor has been designed for "off-road" racing car engines. Having a larger throat and incorporating an automatic mixture control device, it releases the full potential of the engine providing positive throttle response and rapid acceleration. It is essential that a muffler pressurized fuel feed system is used.Make sure that the fuel tank cap is closed tightly.

These adjustable controls are provided on the 1190 carburettor (See photo below.)

- The Needle-Valve:For adjusting the mixture strength when the throttle is fully open.
- The Mixture Control Screw:For asjusting the mixture strength at part-throttle and idling speeds,to obtain steady idling and smooth acceleration to mid speeds.
- The Throttle Stop Scrow:For establishing the minimum idling speed.

NEEDLE VALVE

Turn the needle-valve clockwise to close(for leaner mixture).
Turn the needle-valve counter-clockwise to open(for richer mixture).
Turning the needle-valve clockwise reduces the fuel suppy to the engine.
Turning it counter-clockwise increases the fuel supply.
Turn the needle-valve clockwise slowly.The position where the needle-valve stops is the fully closed position.It may be convenient to remember the position of the mark in the needle knob at this time.



MIXTURE CONTROL SCREW

3.After the optimum needle-valve setting has been determined,the mixture control screw should be checked as follows:With the engine running, close the throttle and allow it to idle for about five seconds,then open the throttle fully.at this point If,the engine puffs out a good deal of smoke and does not accelerate smoothly and rapidly,it is probable that the idling mixture is too rich.In this case,turn the mixture control screw clockwise 1/8-1/4 turn (45* to 90*).on the other hand If,the engine tends to speed up momentarily and then cut out abruptly when the throttle is opened,the idling mixture is too lean.In this case,turn the mixture control screw counter-clockwise 1/8-1/4 turn (45* to 90*)

Note:Mixture control screw adjustment should be made in increment of 1/8-1/4 turn (45* to 90*),checking the effect on the throttle response of each small adjustment.

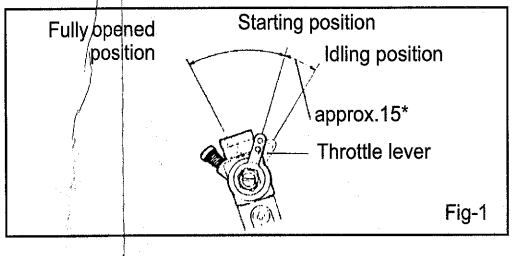


Fig-1

4.Carry out adjustments patiently under actual running conditions.until the engine responds quickly and positively to the throttle control.

Note: Mixture adjustments cannot be made accurately under 'no load' conditions which,in any case,are not advised since such operation carries a risk of damaging the engine through over-revving.

CARBURETTOR CLEANLINESS

The correct functioning of the carburettor depends on its small fuel orifices remaining clear.The minute particles of foreign matter that are present in any fuel can ensily partially obstrust these orifices and upset mixture strength so that rngine performance becomes erratic and unreliable.
It is recommended that fuel is oassed through a filter when the tank is filled and that a good in-line filter is installed between the fuel tank and carburettor and,furthermore,that this fillter is frequently cleaned to remove dirt and lint that accumulates on the fillter screen.

PARTS LIST

NO.	Description	Code NO.
1	Idle Needle Valve	AA1246
2	Idle Ratchet	AA1235
3	Throttle Lever Fixing Nut	AA1243
4	Throttle Lever	AA1249
5	Dust Cover	AA1248
6	Washer	AA1247
7	Rotor	AA1232
8	Rotor Spring	AA2841
9	Nozzle	AA1239
10	"O"Ring	AA2844
11	"O"Ring	AA1139
12	Carb. Body	AA1231
13	"O"Ring	AA1150
14	Nut	AA1240
15	Spring	AA1252
16	Throttle Stop Screw	AA1251
17	Washer	AA1244
18	Needle Valve Holder	AA11360
19	"O"Ring (2.5x1.5)	AA2848
20	Nipple	AA11350
21	High-Speed Needle Valve	AA11350

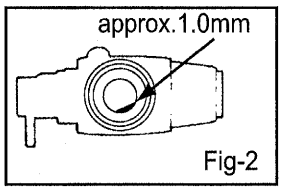
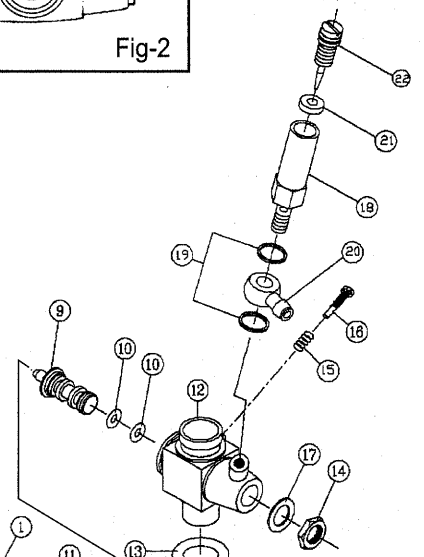


Fig-2



minor adjustment.First,run the engine as received,and re-adjust the mixture control screw only when necessary.

MISADJUSTMENT

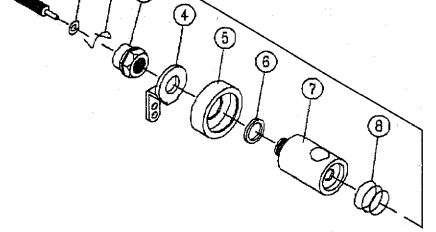
1. Open the throttle slightly from the idling position,and open the needle-valve three turns from the fully closed position,then start the engine. (See Fig. 1)
2. Run the vehicle with the throttle fully open over the longest available straight line course-or around a curve of sufficient radius to permit full-throttle driving,two to three times.Now return the model to the starting point,close the needle-valve 1/8 turn (i.e. 45*)and repeat the run, taking note of the improvement in performance.
   Continue with further runs,gradually reducing the needle-valve setting abd aiming to achieve the best performance. If the needle-valve is closed below the optimun setting,the model will slow down,accompanied by visibly diminished exhaust smoke,in which case, throttle down,stop the needle-valve and reopen the needle-valve 1/8-1/4 turn (i.e. 45* to 49*)

Note: Having established the optimum needle-valve setting,make a note of the number of turns necessary to re-establish this from the closed position.

smoothly during acceleration.
Remember that,if the engine is operated with the fuel/air mixture slightly too lean,it will overheat and run unevenly,As with all engine, it is advisable to set both needle-valve and mixture control screw very slightly on the rich side of the highest rpm setting,as a safety measure.

6. If the engine runs too fast with the throttle closed,the throttle stop screw should be turned counter-clockwise to allow the throttle opening to be reduced.

Note: In the course of making adjustments.it is just possible that the mixture control screw may be inadvertently screwed in or out too far and its original position lost.In this case,reset the controls as follows: First,remove the air cleaner.Then,unscrew the throttle stop screw until the throttle opening is just closed completely.At this point,screw in the mixture control screw slowly clock-wise until it stops.(Do not use force, otherwise the screw tip will damage the jet hole on the opposite side.) Now unscrew the mixture control screw one complete turn.Finally,turn the throttle stop screw one slowly clockwise until the throttle rotor os opened just 1.0mm as shown in Fig.2 and fix this setting by tightening the locknut.



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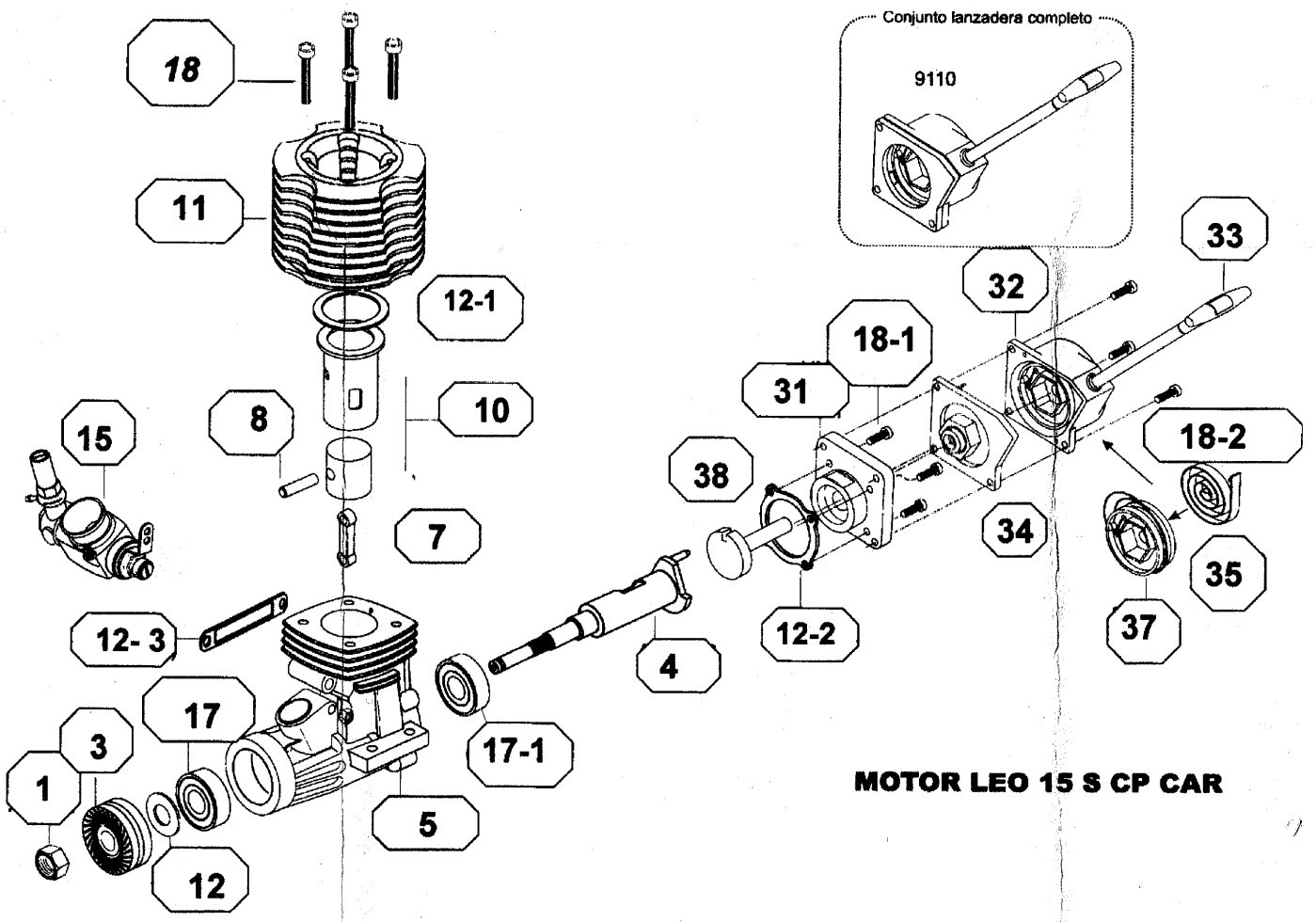

MOTOR LEO 15 S CP CAR