



GRP ENGINE LINE  
**USER AND  
MAINTENANCE  
MANUAL**



**US  
VERSION**



**GRP** *engines*

# ENGINE USER AND MAINTENANCE MANUAL

We wish to thank you for choosing our engines and we assure you that the greatest care has been given to planning, production and assembly in order to ensure your total satisfaction with this product and any future purchases. We are always available to answer any questions you may have.

Before attempting to start the engine, it is extremely important that you read and comply with the "GENERAL SAFETY INSTRUCTIONS AND WARNINGS" contained in this User and Maintenance Manual.

Furthermore, we ask you to study carefully the complete contents of this User and Maintenance Manual so that you are acquainted with all the functions, procedures and technical features of your new engine.

Keep this User and Maintenance Manual in a safe and convenient place so you can consult it at all times. All the parts of this Manual can be printed freely so you have a copy on hand whenever needed.

## CONTENTS:

GENERAL SAFETY INSTRUCTIONS AND WARNINGS	3
BEFORE STARTING THE ENGINE	4
ADJUSTING THE CARBURETOR	5
CHOICE OF GLOW PLUG	6
GLOW PLUG LINE	7 - 8
ENGINE STARTING	9
ENGINE BREAK IN	10
ENGINE FINAL TUNING	11
USER NOTES	12
ENGINE CLEANING AND MAINTENANCE	13
ENGINE TOOLING SYSTEM	14 - 15
TROUBLESHOOTING - 1 - 2	16 - 17
ENGINE TUNED .21 Buggy - GENERAL INFORMATION	18 - 23
ENGINE TUNED .28 Truggy - GENERAL INFORMATION	24 - 29
FLS EXHAUST LINE	30
AIR FILTER LINE	31
ARTICLE LIST	32 - 33
WARRANTY CONDITIONS	34 - 35

# GENERAL SAFETY INSTRUCTIONS AND WARNINGS

Never consider your engine a "toy", but a true and proper internal combustion engine of the latest generation, with a power that could injure yourself or others if not used with due caution. Responsibility for any damages caused by incorrect use will be due to the owner of the engine who must use the greatest professional care. If another person uses your engine in any way, you must ensure they have a copy of this User and Maintenance Manual.

The following **WARNINGS** apply to **ALL MODEL COMBUSTION ENGINES** and are grouped under two headings according to the damage or danger that could occur due to abuse or negligence.

## **WARNINGS**

These indicate dangers that could cause serious injuries (even fatal in extreme cases).

## **NOTES**

These indicate less evident, general hazards that could however cause damage or injury.

## **WARNINGS**

Never start or use the engine in a closed space. These small engines, just like those in full size vehicles, emit lethal carbon monoxide. Therefore use your engine only in the open air.

The fuel used for model engines is poisonous. Make sure it never comes into contact with eyes or mouth. Always keep the fuel in a clearly marked container and out of reach of children.

This fuel used in model engines is also highly inflammable. Keep it away from any open flame, excessive heat, sparks or anything else that could set it alight. Never smoke or allow others to smoke nearby.

Model engines generate high temperatures. Never touch any part of the engine until it has cooled down. Direct contact with the exhaust pipe, cooling head or manifold in particular will cause severe burns.

## **NOTES**

This engine is designed to be used on model vehicles. It cannot be used on any other type of model or for any other purpose.

Mount the engine securely on your model following the manufacturer's instructions and using appropriate screwdrivers and wrenches.

Install an efficient exhaust and make sure it remains so. Frequent and close exposure to a noisy exhaust (especially in case of powerful high-speed engines) can damage your hearing and the noise can be bothersome to other people even at a distance.

Carefully check that the cables for lighting the glow plug and/or the battery cables for starting the model do not come into contact with any engine's rotating parts. Check also that the throttle servo is correctly connected and assembled.

To stop the engine, close the throttle using your transmitter, then manually close the suction on the carburetor air filter, or press the fuel supply pipe. **NEVER TRY TO STOP THE ENGINE BY SLOWING DOWN THE FLYWHEEL WITH YOUR FINGERS OR OTHER OBJECTS.**

Immediately after stopping the engine, when the glow plug is still hot, the engine could restart **WITHOUT** the glow plug starter being connected, due only to the rotation of the engine parts.

For their own safety, keep all spectators (adults and children), at a distance of at least 15 feet when you prepare to start your model-engine.

## **BEFORE STARTING THE ENGINE**

In order to install the engine on your model vehicle and to make it work, you will need the following optional parts, tools and various items:

### **OPTIONAL PARTS**

**GLOW PLUG**, the engine is supplied with the best type, but it may be necessary to use another type according to the climate or the track conditions. For further information refer to the table describing use of plugs on pages 7 and 8.

**AIR FILTER**, single or double layer foam, specific to the model vehicle must be fitted. See the GRP special production of Air Filters on page 31.

**EXHAUST MANIFOLD** specific for each model vehicle, as shown in the spare parts list, there are short, medium and long versions. We advise buying one of each type to cover all types of tracks. See the GRP special production of Manifold on page 30.

**EXHAUST PIPE** special homologated type for every kind of model racing vehicle (Lowercase, see the spare parts list for precise article codes). Each engine guarantees maximum performance when using only the exhaust pipe recommended by the manufacturer. See the GRP special production of Pipe on page 30.

### **TOOLS**

**HEXAGONAL SCREWDRIVERS** sizes 1.5 mm, 2 mm, 2.5 mm, 3 mm.

**STRAIGHT SCREWDRIVER** medium size.

**ALLEN WRENCH** size 8 mm, for the glow plug. (Recommended with long cross handle).

### **VARIOUS ITEMS**

**BLENDED FUEL** specifically for model racing cars, containing 10% - 30% nitromethane and 8% - 10% oil.

Initially we recommend using a mix containing less nitromethane (20%), and more oil (10%).

Later, after break-in, you can use more nitromethane (30%), and less oil (8%).

Loxi recommends:

**LOSFO320** Nitrotane Race Gallon 20%

**LOSFO420** Nitrotane Race Quart 20%

**LOSFO330** Nitrotane Race Gallon 30%

**LOSFO430** Nitrotane Race Quart 30%

The ideal then is to use the same sort of fuel, but if you wish to change the brand or mix, we recommend repeating the break-in phase as if the engine were new.

The quality of the fuel influences greatly the engine's performance and life. Fuel containing a high percentage of nitromethane generates more power but reduces the life of the engine components.

**FUEL FILTER** specific must be installed along the fuel tube between fuel tank and carburetor to prevent dirt from entering the carburetor.

**GLOW PLUG DRIVER** specific for all model vehicle engines.

**STARTING BOX** specific to each type of model vehicle, for starting the engine. (Normally the manufacturer's own model).

**FUEL FILLER** plastic with long metal tube for filling the tank.

**SILICONE FUEL TUBE** 5 mm, heat-resistant, for connection between the fuel tank and the carburetor.

## ADJUSTING THE CARBURETOR

The carburetor requires 3 adjustment checks:

**A. HIGH SPEED NEEDLE** to adjust the quantity of fuel when the carburetor throttle is fully open. (Medium/High Rpm)

Turn clockwise (–) to reduce the quantity of fuel, for leaner carburation.

Turn counter-clockwise (+) to increase the quantity of fuel, for richer carburation.

**B. LOW SPEED NEEDLE** to adjust the quantity of fuel to give the best acceleration from a static position. (Low Rpm)

Turn clockwise (–) to reduce the quantity of fuel, for leaner carburation.

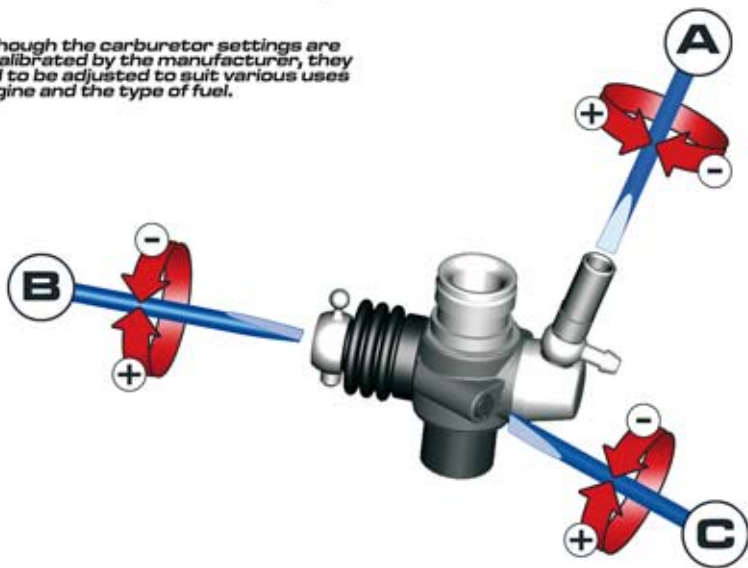
Turn counter-clockwise (+) to increase the quantity of fuel, for richer carburation.

**C. IDLE ADJUSTING SCREW** to adjust the engine's idle or slow running speed when the throttle is closed.

Turn clockwise (+) to increase the minimum rpm.

Turn counter-clockwise (–) to reduce the rpm.

**Note:** although the carburetor settings are already calibrated by the manufacturer, they may need to be adjusted to suit various uses of the engine and the type of fuel.





# CHOICE OF GLOW PLUG

## CHOICE OF GLOW PLUG

The choice of the correct plug and the compatibility between glow plug and fuel can greatly influence engine performance, so you must choose the correct glow plug after a brief test. In the following pages, you will find the types of glow plugs available for this specific engine, please refer to the table below to assist you in making your choice:

Air temperature	Plug for .21 and bigger engines
0° - 15° C - (32° - 59° F)	C5
15° - 30° C - (59° - 86° F)	C6
25° - 40° C - (86° - 104° F)	C7

Carefully install the glow plug using the appropriate wrench; the glow plug must turn easily until completely inserted then tighten securely.

## USE OF GLOW PLUG

The engine starts when the glow plug's wire is incandescent due to the connection with a 1.5-volt battery.

When the battery is disconnected, the heat retained in the engine combustion chamber is sufficient to keep the glow plug's wire alight, thus keeping the engine running.

## GLOW PLUG LIFE

In case of these high-performance model-racing engines, glow plugs should be considered as consumable components.

The high technology used in production, and the top quality of the materials used ensure that our glow plugs have a longer life than others on the market.

The life of a glow plug can be lengthened and maximum engine performance guaranteed by a correct use, for example:

- Choosing the right glow plug.
- Using good quality fuel.
- Never leave the glow plug starter attached to the glow plug for too long when warming up the engine or when it is running.
- Never use the engine with a too lean carburation.

## REPLACING THE GLOW PLUG

Naturally, apart from when the glow plug is burnt out, it may be necessary to replace it because it is not giving maximum performance, such as when:

- The glow plug's wire is deformed
- Dirt is stuck to the glow plug's wire or the glow plug body is corroded
- The surface of the glow plug's wire has become rough and white
- The engine tends to cut out when at minimum
- Ignition becomes difficult

Note: when a glow plug burns out, part of the wire could fall into the engine and cause damage the next time it is started. To prevent this risk, we recommend that you always check the engine and clean all parts such as piston and head after a glow plug burns out.

## GRP - GLOW PLUG LINE



GRP has designed with much care a special line of glow plugs, for its own engines. Glow plugs are a very important component for good engine function and maximum performance. It often happens that problems or breakages that happen on an engine are attributable to a defective glow plug or the latter produced with very low-quality material, which causes a much higher damage to the end-user than the actual cost of a quality glow plug.

To avoid this kind of problem GRP has produced its own glow plug line, for each engine, and for all racing situation. In our complete line you will find 3 versions: **STANDARD**, **TURBO** and **PLUS**. All glow plugs are packed in a plastic box of 1 or 5 pieces.

### INTERNAL WIRE

The internal wire of GRP glow plug is made using a special Platinum alloy, studied by GRP, which guarantees maximum resistance and very long lasting, up to 5 times longer than normal glow plugs.

### EXTERNAL BODY

The external body of GRP glow plug is made fully with a special stainless steel to guarantee maximum resistance of its thread and maximum resistance to electrostatic corrosion.

### INTERNAL INSULATOR

The internal insulating package is made with special material and a particular design, which guarantees maximum insulation at all conditions between the external body and the central pin, where the wire is welded.

### CENTRAL PIN

Even the central pin of GRP glow plug is made fully with a special stainless steel to guarantee maximum insulation to electrostatic corrosion, and to the very high temperatures the wire reaches.



### STANDARD

Our standard version is a glow plug, which carries all special GRP characteristics, and it comes with its own copper washer and it is used in all SPORT line engines. It is available in four different degrees of temperature:

4 - Hot	LOSRO114
5 - Medium	LOSRO115
6 - Cold	LOSRO116
7 - Very Cold	LOSRO117

The use of various types depends on the type of engine used and on the weather and racing conditions. It can be used in combination with any other engine on the market that uses a standard connection and not a conical one.

### TURBO

Our turbo version is a glow plug, which carries all special GRP characteristics, and the most used indeed since it is mounted in all TUNED line engines. It is available in four different degrees of temperature:

4 - Hot	LOSRO104
5 - Medium	LOSRO105
6 - Cold	LOSRO106
7 - Very Cold	LOSRO107

The use of various types depends on the type of engine used and on the weather and racing conditions. It can be used in combination with any other engine on the market, providing that its cone-shaped end is matching.

### PLUS

Our plus version is a patent pending glow plug worldwide by GRP, which has a special design of the sparking internal part, where the wire is more exposed in the combustion chamber of the engine, guaranteeing:

- Better sparking
- Better combustion
- Less likely for an engine to die down

This glow plug was studied for the use in very hard conditions, when it rains and it is very cold, and it is then very easy for an engine to die down. It is available in three different degrees of temperature:

5 - Medium	LOSRO125
6 - Cold	LOSRO126
7 - Very Cold	LOSRO127

The use of various types depends on the type of engine used and on the weather and racing conditions.





## **ENGINE STARTING**

Before starting the engine, it is necessary to install the following accessories correctly and with great care.

### **GLOW PLUG**

Carefully insert the supplied glow plug into cavity of the engine head, making sure the threads match before tightening it firmly.  
(The supplied glow plug is already fitted to the engine, but we recommend the above procedure every time you have to remove it. Turbo glow plugs do not have gaskets.)

### **EXHAUST MANIFOLD**

Fit the silicone gasket to the special grooves on the exhaust pipe. Do not use any metal tools as this could damage the gasket.  
Smear the gasket with oil and insert the manifold into the pipe, turning it gently into position with the 4-hole flange. Fit the 4 springs to hold the manifold to the exhaust pipe.

### **EXHAUST FLS PIPE**

Mount the silicone gasket on the special grooves on the exhaust pipe. Do not use any metal tools as this could damage the gasket.  
Smear the FLS O-Ring gasket with a small amount of oil, and insert the exhaust pipe in the manifold, turning it gently.  
The exhaust pipe must be fastened to the chassis using a flexible metal wire that will absorb vibrations to prevent any damage to the exhaust pipe.

### **CARBURETOR**

The engine is supplied with its carburetor installed but not firmly fastened in the standard position. Loosen the fastening screws and place the carburetor in the ideal position for your model vehicle.  
Press the carburetor towards the engine while tightening the securing screw.  
Tighten the screw firmly taking care not to damage the carburetor body.  
Now fit the air filter described previously.

### **CLUTCH BLOCK**

Fit the flywheel and clutch assembly and adjust the clutch in accordance with the model manufacturer's instructions.

### **COMPLETE ENGINE**

**MAKE SURE THAT THE SURFACES OF THE MOUNTED ENGINES ARE ALL ON THE SAME LEVEL AND ON THE SAME PLANE.**  
Incorrect installation can cause distortion of the casing, bearings, etc. at high temperature, resulting in a considerable loss of performance.

We recommend using the correct screws, according to the type of model, and to check that the screw holes are perfectly centered.  
Check also that the engine casing does not touch the base of the model's chassis.

## ENGINE BREAK IN

Now you have completed the engine with all its parts and mounted it on your model, continue as follows.

### ENGINE BREAK IN

To guarantee long life and top performance, each engine needs to be broken in, bearing in mind that the more careful the break in, the longer the engine will give its best performance. Break in must be done carefully with the engine installed on the model, in the following way:

- Fill up the tank with fuel.
- Remove the glow plug temporarily to check that, when connected to the battery, the wire heats up and becomes incandescent (Orange/yellow). Put the plug back into the engine.
- Switch on the transmitter and receiver and set the throttle slightly open from the idle position.
- Place the model on the starter box and rotate so that the fuel flows from the tank to the carburetor. If the engine is not rotating due to the piston being tight, do not force the starter box, but release the engine, using a screwdriver on the flywheel.
- When you see through the transparent silicone tube that the fuel is reaching the carburetor, connect the glow plug starter to heat the wire and start the engine. **PLEASE NOTE:** it is extremely important not to accelerate the engine for a long period of time when the car model is not in contact with the ground (ie. model resting on the starter box) because it would quickly overheat, causing serious damages.
- When you start the engine, leave it running a few minutes with rich carburation, with the glow plug starter connected and with the wheels turning freely off the ground. Under these conditions, the oily carburation perfectly lubricates all the engine's internal parts. To know whether the carburation is sufficiently rich, abundant smoke should be emitted from the exhaust pipe. Repeat the operation until all the fuel in the tank has been used up.
- Disconnect the glow plug starter and try to run the car on the track. If the carburation is too rich, slowly increase the speed to keep the engine running as long as possible. If it stops because carburation is too rich, turn the high speed needle clockwise by a third of a turn and try again.
- If the engine continues to run even when carburation is very rich, continue to use the model until you have consumed at least 3 fuel tanks. Then close the high speed needle by a further third of a turn and consume another 2 fuel tanks. Repeat the procedure until you have consumed at least 6 tanks of fuel. However the exhaust pipe should continue emitting abundant smoke.
- To stop the engine, close the throttle completely using the throttle lever on the transmitter, then press your thumb on the carburetor air filter, or pinch the fuel pipe to the carburetor. Never try to stop the engine by slowing down the flywheel with your fingers or other objects.

**NOTE:** whenever any major components of the engine are replaced, such as piston, sleeve, crankshaft, bearings, etc., or if you change fuel, the complete break in procedure must be repeated.

### WARNING!

Never touch rotating parts, the engine or the exhaust pipe after stopping the engine because engine or exhaust pipe is very hot and any contact could cause severe burns.

## ENGINE FINAL TUNING

Final tuning of the carburetion must be done only after completing the break in, and according to the following procedure:

- Run the model (with the carburetor completely open) on the longest possible straight, to observe the speed. Close the high speed needle by a third of a turn and repeat the run, noting down the improvement in performance.
- Continue with more runs, closing gradually the high speed needle, with the intention of reaching the straight run at the highest speed. Always remember that if the needle is closed too much (carburetion too lean), the engine overheats and loses speed with a visible reduction of exhaust smoke. In this case, slow down immediately, stop the model and open the high speed needle by one-quarter of a turn.
- With the engine running, and the wheels of the model raised above the ground, close the throttle and leave it idling for at least 5 seconds, then fully reopen the throttle. If at this point the engine discharges an excessive amount of smoke and the engine does not accelerate smoothly and rapidly, the minimum carburetion is probably too rich. In this case, turn the idle speed needle clockwise by half of a turn.  
If during the rapid acceleration phase the engine suddenly "coughs", the minimum carburetion is too lean. You can correct this by opening the idle speed needle by half of a turn.

**NOTE:** the carburetor needles must be adjusted gradually and not more than a third of a turn, always checking accurately the effect of any tiny adjustment on the throttle. Make the adjustment patiently, under racing conditions, until the engine responds rapidly and promptly to the throttle control.

### **WARNING!**

Adjustments of the carburetor by means of the Low and High speed needles cannot be made accurately when the wheels of the model are raised off the ground since this does not reproduce the real conditions of use, and an operation of this kind could damage the engine by overheating.

When you reach the optimum carburetion, a slight trail of smoke will be visible during high-speed runs and the engine revolutions per minute increase smoothly during acceleration.

Remember that, if carburetion is too lean, the engine will overheat and will not give maximum performance. If prolonged this may cause severe damage to the engine components.

As for all engines, we recommend setting a slightly richer carburetion than the optimal point, as a safety measure.

If the engine, with the carburetor completely closed, remains at a too-high-off throttle speed, turn anti-clockwise the minimum screw to reduce the opening of the carburetor throttle.

Never over rev the engine (it can reach 50,000 rpm), which would cause a serious damage to the crankshaft and conrod.



# ENGINE CLEANING AND MAINTENANCE

Remember that the performance and life of your engine depend directly on its care and maintenance, as described below.

## AIR FILTER

Very often it happens that the driver does not pay due attention to the importance of the air filter, which although it is a very low cost part, it may seriously damage your engine, or compromise your engine performance. It is very important to replace your air filter often, without washing it or recycling it for several times. The new GRP air filter line is sold at a very low price to help a frequent replacement by the driver, and avoid any engine deterioration. See the GRP special production of Air Filters on page 31.

## FUEL FILTER

Tiny dirty particles, present in all fuels, can accumulate and partially obstruct the flow of the fuel, causing an incorrect and unreliable carburation, with the consequent reduction of performance. We recommend installing a good filter between the tank and the carburetor. Always remember to clean the filters regularly to remove any dirt that has accumulated inside.

## CARBURETOR

For the carburetor to function correctly, the small holes through which the fuel passes must be kept clean. At regular intervals, disassemble the carburetor and clean each needle and adjustment screw. Carefully check the O-rings on the various pins, making sure they are not damaged or broken. We recommend changing the O-rings regularly even if they are not damaged or broken. After cleaning, reassemble the carburetor placing the needles in the positions they occupied previously. Small errors are possible in positioning, so we recommend checking the carburation when the engine is restarted.

## TANK

After each run, empty the fuel tank completely then restart the engine to burn up completely the fuel still present in the silicone tube. This ensures that the remaining fuel does not deposit any residue of oil on the tank floor, which would create problems when the engine is used later.

## ENGINE

When the engine stops because it has used up all the fuel in the tank, remove the air filter and inject a few drops of standard oil into the carburetor, and start the engine using the starting box for the 4-5 seconds to distribute the oil over all internal parts. This procedure reduces the risk of internal corrosion until the engine is next started. To clean the exterior, we recommend using methanol or kerosene. Do not use solvents that could damage the silicone fuel tube.

## CHECKING AND MAINTENANCE

Remember that performance of the engine, even when correctly used, will normally tend to diminish after a certain period of time due to the wear on mechanical parts. Therefore it is necessary to carry out maintenance and promptly replace any worn parts to ensure the efficient operation of the engine.

## REPLACEMENT OF PARTS

We recommend replacing the relative parts when you come across the following problems:

Engine noise becomes metallic and it overheats more than usual.

Replace the front and back bearings, using the special tools we produce for this specific operation. (See pages 14 and 15)

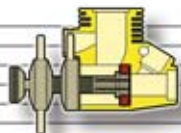
Power and acceleration performance are drastically reduced.

Replace the Cylinder/Piston/Conrod block, and in this case it is better to replace also the bearings described above. (See pages 14 and 15)

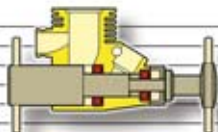
Minimum rpm is unstable and the engine tends to cut out.

Replace the Sleeve/Piston/Conrod block as described above. It may also be necessary to replace the crankshaft, if a careful check detects visible scoring in the suction area. Check also that the tolerance between the crankshaft pin and relative hole on the conrod is no more than 0.002 in (0.06 mm). (See pages 14 and 15)

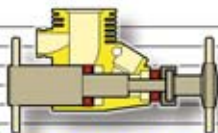




**REMOVAL  
REAR BEARING**



**REMOVAL  
FRONT BEARING**



**FRONT & REAR BEARING  
INSTALLATION**

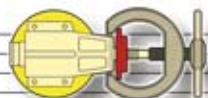
## GRP - ENGINE TOOLING SYSTEM



**SLEEVE REMOVER  
PULLER**



**ENGINE TOOLING SYSTEM KIT Engine .21 .28  
Code LGSRC050**



**FLYWHEEL PULLER**

# **TROUBLE SHOOTING - 1**

## **Symptom: THE ENGINE DOES NOT START**

The tank is empty and the fuel cannot reach the carburetor.  
*Fill up the tank with fuel, and repeat the starting procedure.*

The glow plug is burnt out or the glow plug igniter battery is dead.  
*Replace the glow plug or recharge the glow plug igniter battery.*

The fuel filter, air filter or exhaust pipe is clogged.  
*Clean the fuel filter or the air filter, or unclog the exhaust pipe.*

Too much fuel has been pulled into the engine and the engine is flooded.  
*Remove the glow plug and let the engine run, on the starter box, to evacuate the excess fuel.*

The fuel pipe is disconnected, or broken or perforated.  
*Connect the fuel pipe to the carburetor, or check the pipe and replace it if it is broken.*

Carburetor needles not positioned correctly.  
*Return the needles in their original position, as supplied initially by the manufacturer.*

The carburetor is not connected correctly to the throttle servo control.  
*Position the servo control centrally and reconnect the carburetor or adjust on transmitter.*

The engine's starting box turns in the wrong direction.  
*Check the direction of rotation of the starting box and invert the electrical connections if necessary.*

## **Symptom: THE ENGINE STARTS THEN DIES QUICKLY**

Insufficient fuel in the tank.  
*Fill up the tank with fuel.*

The glow plug is fouled.  
*Replace the glow plug.*

The engine is hot from previous use.  
*Wait until the engine has cooled down.*

The Clutch is dragging.  
*The clutch bell should spin freely when the engine is not running. Consult the model manufacturer's instructions*

Fuel filter or air filter clogged, exhaust pipe clogged.  
*Clean the fuel filter or the air filter, or unclog the exhaust pipe.*

The glow plug igniter disconnected immediately.  
*Leave the igniter connected to the glow plug until the engine is running smoothly.*

Foam forms on the fuel in the tank.  
*Tank mountings must be flexible to absorb the vibrations of the chassis.*

## **TROUBLE SHOOTING - 2**

### **Symptom: THE ENGINE DOES NOT MAINTAIN A STABLE MINIMUM IDLE**

Type of glow plug not suitable for climatic conditions.

Use the type of plug suggested in the manufacturer's instructions.

Type of fuel not suitable.

Use a type of fuel with a proper percentage of nitromethane.

The exhaust pipe and manifold are not fastened correctly.

Install the exhaust pipe and manifold securely, following the manufacturer's instructions.

### **Symptom: THE ENGINE DOES NOT REACH MAXIMUM RPM**

Insufficient break in period, or not done correctly.

Adjust the full speed needle after warming up the engine, or repeat the break in procedure.

The exhaust pipe and manifold are not fastened correctly.

Install the exhaust pipe and manifold securely, following the manufacturer's instructions.

The fuel pipe is disconnected, broken or perforated.

Connect the fuel pipe to the carburetor, or check the pipe and replace it if it is broken.

### **Symptom: THE ENGINE DOES NOT RESPOND READILY TO ACCELERATION**

The glow plug has been fouled.

Replace the glow plug.

Combustion is not correct, probably too much oil.

Gradually close the high and low speed needles in clockwise direction.

The transmitter's exponential electronic control is not set correctly.

Check the settings on your transmitter.

### **Symptom: THE ENGINE RETURNS TO IDLE VERY SLOWLY**

The low-speed needle is not adjusted correctly.

Turn the idle adjustment screw counter-clockwise.

The carburetor is not secured correctly.

Check the securing screw on the carburetor and tighten it if necessary.

## TUNED .21 Buggy - TECHNICAL DATA

Model Car		<b>1:8 Buggy</b>
Engine Code		<b>LOS2000</b>
Displacement	cm <sup>3</sup>	<b>3.49</b>
Rotation max.	rpm	<b>43.000</b>
Stroke	mm	<b>16.79</b>
Bore	mm	<b>16.27</b>
Ports	n	<b>5</b>
Sleeve		<b>ABC</b>
Crankshaft Diam.	mm	<b>14</b>
Glow Plug Type		<b>Turbo</b>
Carburetor Diam.	mm	<b>8.0 (Variable)</b>
Carb. Material		<b>Aluminium</b>
Weight	gr	<b>355</b>





## TUNED .21 Buggy - CONSTRUCTION DETAILS

The functions of these model engines are quite different from other combustion engines. Compression is not obtained by a piston ring, but by the fact that both the piston and cylinder are slightly conical and this allows the perfect closure of the combustion chamber when the piston is at its maximum upper stroke. When the engine is cold, the piston is tightly locked within the cylinder and for this reason it is difficult to turn the engine manually, but this is absolutely normal since the ideal contact between piston and cylinder is obtained when both reach the normal temperature for operating the engine.

### CONROD

It is produced with a special advanced technological material, which has allowed the exclusion of a bushing on piston side. This gives a greater lightness, leading to a higher acceleration and rotational rate. Moreover, this material has a specific heat resistance at high temperatures of use guaranteeing a minimal deformation.

### SLEEVE/PISTON

The piston has a particular design and it is made directly from a "cnc" production, using a special aluminium alloy, which guarantees a very high dimensional stability at high temperatures, a very high wear resistance and it gives easy running and lower friction. The sleeve is made with a special ABC alloy, but the main technical and mechanical characteristics are gained after special internal treatments, which guarantee a very high hardness and considerable wear-resistance. All external surfaces are tried to assure the highest dimensional quality.

### CRANKSHAFT - APS

It is designed with a special profile through which we can obtain the perfect balancing of the piece, without having to balance it up with weights, which generally creates heterogeneous deformations at temperatures of use.

**APS - ABRASION PROTECTION SYSTEM** is an exclusive treatment studied after many tests that can be applied on different components. These pieces are wear resistant and they guarantee a reduction of loss of friction and therefore power.

### CRANKCASE

It has been studied with the most developed and advanced software of mechanical simulation, to simulate all deformations at high temperatures of use. Therefore, we managed to create a very stiff structure, mainly in the area of cylinder/exhaust and carburetor joint/intake. The manifold joint is fixed with 4 identical springs, which are perfectly fitted between the cooling fins.

The special aluminium alloy used for the press fusion process, combined with the patent system for port production are extremely important.

### REAR COVER - APS

It is made with special aluminium alloy and then undergoes an APS treatment. It is resistant to abrasion, due to conrod rotation.

**APS - ABRASION PROTECTION SYSTEM.**

### CARBURETOR - TCS

It is made from a single piece of an aluminium alloy, through a press fusion process. All O-rings are made with a special material to guarantee the highest elasticity and resistance to fuel. All carburetors are supplied with a TCS bushing. **TEMPERATURE CONTROL SYSTEM** is a technical concept for the separation of direct contact of the carburetor body with the crankcase, to control the temperature of the carburetor itself. An insulating bushing made with a very special mineral material interrupts the heating passage to the carburetor body, guaranteeing a better regulation of the carburetor performance.

## **TUNED .21 Buggy - STANDARD ACCESSORIES**

### **STANDARD FEATURES ON EACH ENGINE - LOSR2000**

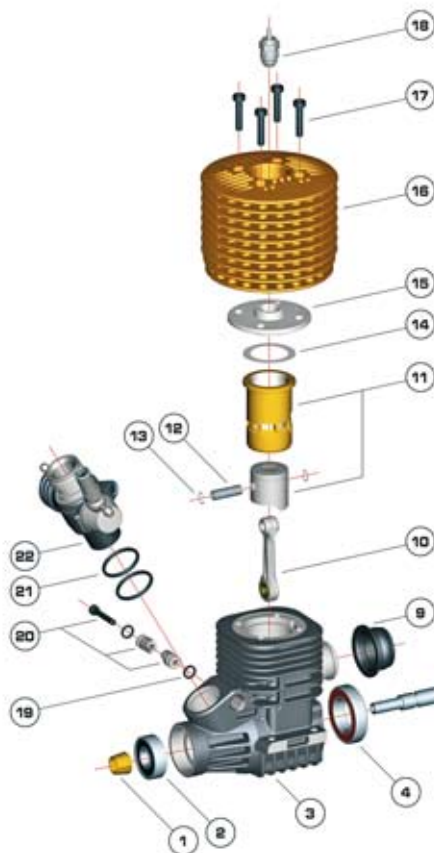
*This is a 1/8-Buggy high-powered engine with 3.5cc capacity for competition. It is supplied with a "C - Turbo" glow plug, which improves engine performance considerably in terms of both power and regular functions, while reducing fuel consumption.*

*The air reducers on the carburetor can be exchanged, thus adapting the engine functions to various types of tracks and different driving styles. The 8.0 mm reducer is part of standard supply, but spare parts include all sizes from 5.0 mm to 9.0 mm.*

*Each single engine comes with a security cap on the exhaust, entrance of carburetor, fuel intake and on the crankshaft. It is sold in a plastic box, complete with standard accessories included with each engine kit:*

- Turbo glow plug C6 (Mounted directly on engine, LOSR0106).
- 0.1 mm Head gasket (2 pieces LOSR2036).
- Exhaust gasket (1 piece LOSR2053).
- Manifold fastening spring (4 pieces LOSR2052).
- 8.0 mm carburetor air reducer (Mounted directly on engine, LOSR2069).
- Engine protection cover (Mounted directly on engine).
- Decal logo on engine
- Use and Maintenance Manual (1 piece code GRP108MAN02)

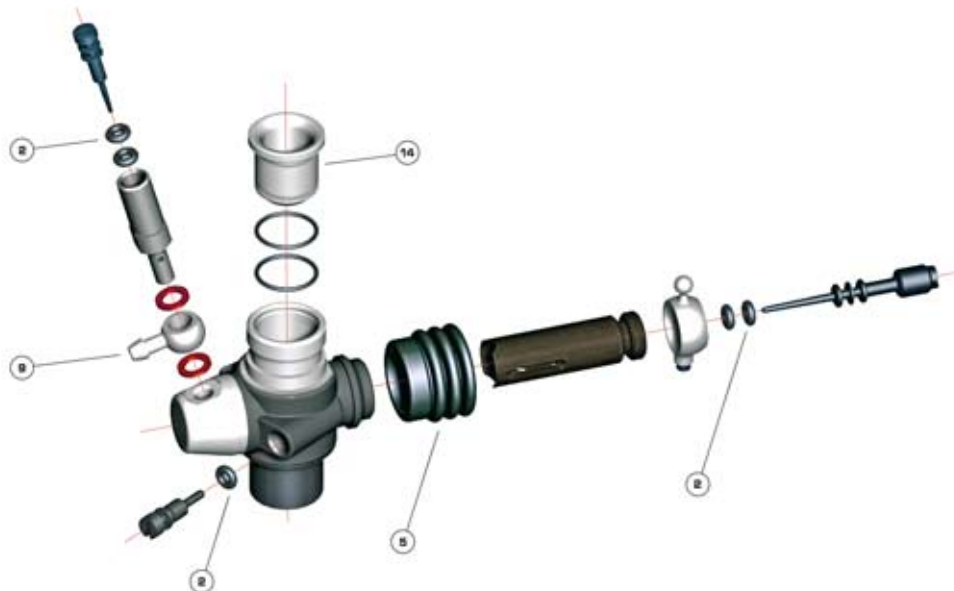
# TUNED .21 Buggy - ENGINE - EXPLODED VIEW



1	LOSA9376	Flywheel Collet
2	LOSR2040	Front Ball Bearing: .21, .28
3	LOSR2026	Crankcase: .21
4	LOSR2041	Rear Ball Bearing: .21, .28
5	LOSR2042	Crankshaft: .21, .28
6	LOSR2030	Backplate O-Ring: .21, .28
7	LOSR2029	Backplate: .21, .28
8	LOSR2031	Backplate Screw Set (4): .21, .28
9	LOSR2053	Shaped Exhaust Gasket Kit (2): .21, .28
10	LOSR2043	Conrod: .21, .28
11	LOSR2044	Piston/Sleeve 5P-ABC: .21 Buggy
12	LOSR2046	Piston Pin: .21, .28
13	LOSR2047	Piston Pin Clip Set (3): .21, .28
14	LOSR2036	Head Button Copper Gasket, 0.10: .21
14b	LOSR2037	Head Button Copper Gasket, 0.20: .21
15	LOSR2035	Head Button, Turbo: .21
16	LOSR2032	Cooling Head: .21 Buggy
17	LOSR2034	Cooling Head Screw Kit (4): .21, .28
18	LOSR0104	Turbo Glow Plug #4
18a	LOSR0105	Turbo Glow Plug #5
18b	LOSR0106	Turbo Glow Plug #6
18c	LOSR0107	Turbo Glow Plug #7
19	LOSR2025	Carb O-Ring Kit (5): .21, .28
20	LOSR2024	Carburetor Retainer: .21, .28
21	LOSR2028	O-Ring Crankcase Kit (2): .21, .28
22	LOSR2020	Carburetor: .21 Buggy, .28 Truggy

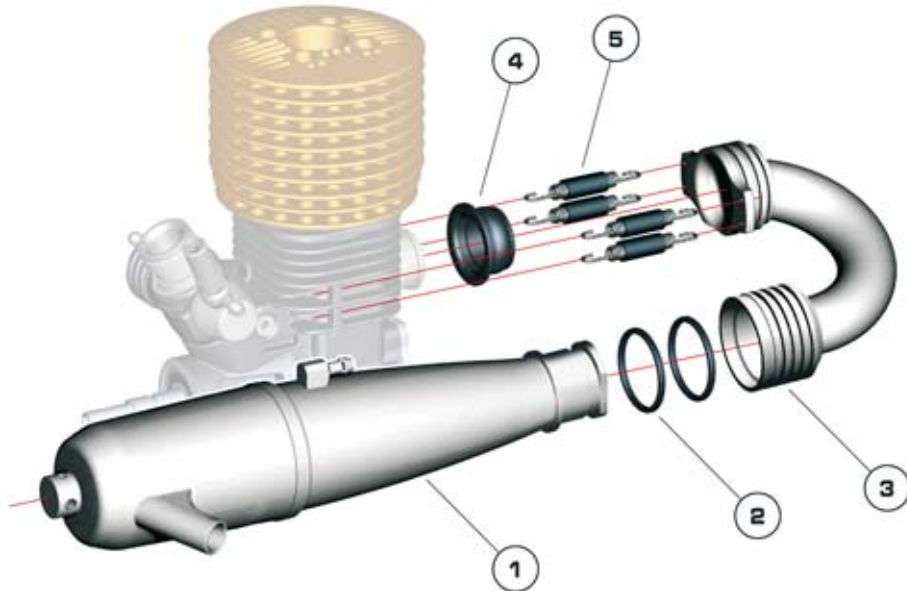
# TUNED .21 Buggy - CARBURETOR - EXPLODED VIEW

2	LOSR2021	Needle O-Ring Kit (5): .21, .28
5	LOSR2022	Dust Protector, Rubber: .21, .28
9	LOSR2023	Fuel Intake Nipple
14	LOSR2067	Carburetor Air Restrictor Set, 5.0, 5.5, 6.0
14a	LOSR2068	Carburetor Air Restrictor Set, 6.5, 7.0, 7.5
14b	LOSR2069	Carburetor Air Restrictor Set, 8.0, 8.5, 9.0



## TUNED .21 Buggy - EXHAUST - EXPLODED VIEW

1	LOSR2049	Efra 2053 Tuned Pipe: .21, .28
2	LOSR2051	O-Ring Pipe Gasket FLS Kit (2)
3	LOSR2050	Manifold, Short: .21, .28
4	LOSR2053	Shaped Exhaust Gasket Kit (2): .21, .28
5	LOSR2052	Manifold Spring Kit (4): .21, .28





## TUNED .28 Truggy - TECHNICAL DATA

Model Car		<b>1:8 Truggy</b>
Engine Code		<b>LOS2010</b>
Displacement	cm3	<b>4.60</b>
Rotation max.	rpm	<b>43.000</b>
Stroke	mm	<b>16.80</b>
Bore	mm	<b>18.60</b>
Ports	n	<b>5</b>
Sleeve		<b>ABC</b>
Crankshaft Diam.	mm	<b>14</b>
Glow Plug Type		<b>Turbo</b>
Carburetor Diam.	mm	<b>8.0 (Variable)</b>
Carb. Material		<b>Aluminium</b>
Weight	gr	<b>355</b>



## TUNED .28 Truggy - CONSTRUCTION DETAILS

The functions of these model engines are quite different from other combustion engines. Compression is not obtained by a piston ring, but by the fact that both the piston and cylinder are slightly conical and this allows the perfect closure of the combustion chamber when the piston is at its maximum upper stroke. When the engine is cold, the piston is tightly locked within the cylinder and for this reason it is difficult to turn the engine manually, but this is absolutely normal since the ideal contact between the piston and cylinder is obtained when both reach the normal temperature for operating the engine.

### CONROD

It is produced with a special advanced technological material, which has allowed the exclusion of a bushing on piston side. This gives a greater lightness, leading to a higher acceleration and rotational rate. Moreover, this material has a specific heat resistance at high temperatures of use guaranteeing a minimal deformation.

### SLEEVE/PISTON

The piston has a particular design and it is made directly from a "cnc" production, using a special aluminium alloy, which guarantees a very high dimensional stability at high temperatures, a very high wear resistance and it gives easy running and lower friction. The sleeve is made with a special ABC alloy, but the main technical and mechanical characteristics are gained after special internal treatments, which guarantee a very high hardness and considerable wear-resistance. All external surfaces are tried to assure the highest dimensional quality.

### CRANKSHAFT - APS

It is designed with a special profile through which we can obtain the perfect balancing of the piece, without having to balance it up with weights, which generally creates heterogeneous deformations at temperatures of use.

**APS - ABRASION PROTECTION SYSTEM** is an exclusive treatment studied after many tests that can be applied on different components. These pieces are wear resistant and they guarantee a reduction of loss of friction and therefore power.

### CRANKCASE

It has been studied with the most developed and advanced software of mechanical simulation, to simulate all deformations at high temperatures of use. Therefore, we managed to create a very stiff structure, mainly in the area of cylinder/exhaust and carburetor joint/intake. The manifold joint is fixed with 4 identical springs, which are perfectly fitted between the cooling fins.

The special aluminium alloy used for the press fusion process, combined with the patent system for port production are extremely important.

### REAR COVER - APS

It is made with special aluminium alloy and then undergoes an APS treatment. It is resistant to abrasion, due to conrod rotation.

**APS - ABRASION PROTECTION SYSTEM.**

### CARBURETOR - TCS

It is made from a single piece of an aluminium alloy, through a press fusion process. All O-rings are made with a special material to guarantee the highest elasticity and resistance to fuel. All carburetors are supplied with a TCS bushing. **TEMPERATURE CONTROL SYSTEM** is a technical concept for the separation of direct contact of the carburetor body with the crankcase, to control the temperature of the carburetor itself. An insulating bushing made with a very special mineral material interrupts the heating passage to the carburetor body, guaranteeing a better regulation of the carburetor performance.

## **TUNED .28 Truggy - STANDARD ACCESSORIES**

### **STANDARD FEATURES ON EACH ENGINE - LOSR2010**

*This is a 1/8-Truggy high-powered engine with 4.6cc capacity for competition. It is supplied with a "C- Turbo" glow plug, which improves engine performance considerably in terms of both power and regular functions, while reducing fuel consumption.*

*The air reducers on the carburetor can be exchanged, thus adapting the engine functions to various types of tracks and different driving styles. The 8.0 mm reducer is part of standard supply, but spare parts include all sizes from 5.0 mm to 9.0 mm.*

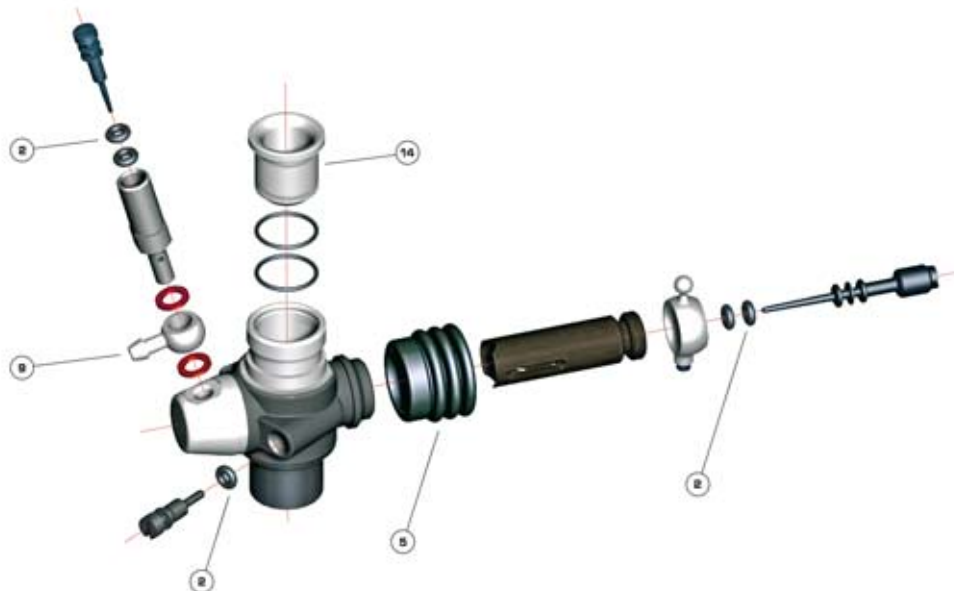
*Each single engine comes with a security cap on the exhaust, entrance of carburetor, fuel intake and on the crankshaft. It is sold in a plastic box, complete with standard accessories included with each engine kit:*

- Turbo glow plug C6 (Mounted directly on engine, LOSR0106).
- 0.1 mm Head gasket (2 pieces LOSR2038).
- Exhaust gasket (1 piece LOSR2053).
- Manifold fastening spring (4 pieces LOSR2052).
- 8.0 mm carburetor air reducer (Mounted directly on engine, LOSR2069).
- Engine protection cover (Mounted directly on engine).
- Decal logo on engine
- Use and Maintenance Manual (1 piece code GRP108MAN02)



# TUNED .28 Truggy - CARBURETOR - EXPLODED VIEW

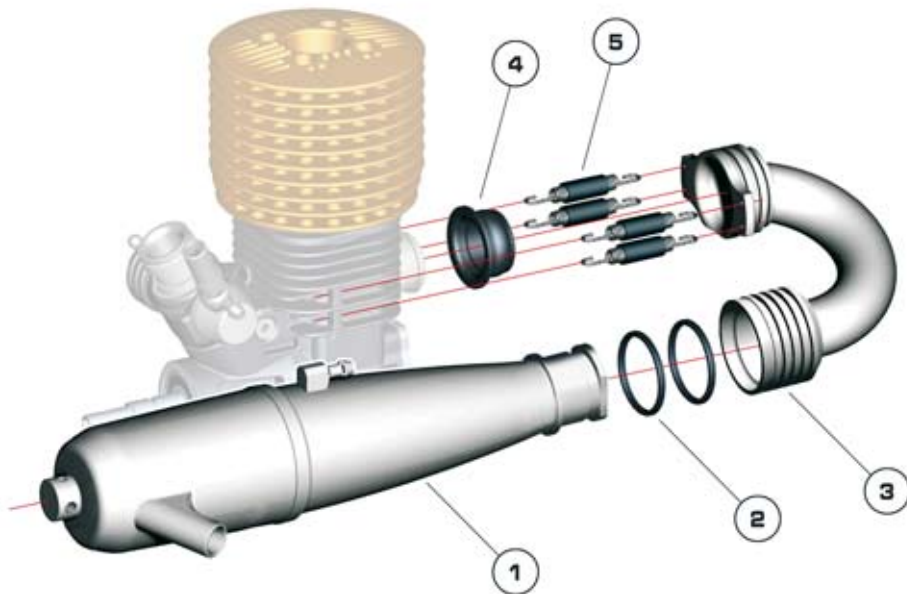
2	LOSR2021	Needle O-Ring Kit (5): .21, .28
5	LOSR2022	Dust Protector, Rubber: .21, .28
9	LOSR2023	Fuel Intake Nipple
14	LOSR2067	Carburetor Air Restrictor Set, 5.0, 5.5, 6.0
14a	LOSR2068	Carburetor Air Restrictor Set, 6.5, 7.0, 7.5
14b	LOSR2069	Carburetor Air Restrictor Set, 8.0, 8.5, 9.0





## TUNED .28 Truggy - EXHAUST - EXPLODED VIEW

1	LOSR2049	Efra 2053 Tuned Pipe: .21, .28
2	LOSR2051	O-Ring Pipe Gasket FLS Kit (2)
3	LOSR2050	Manifold, Short: .21, .28
4	LOSR2053	Shaped Exhaust Gasket Kit (2): .21, .28
5	LOSR2052	Manifold Spring Kit (4): .21, .28





## NEW FLS SYSTEM

All pipes and manifolds of this new line, come with the new "FLS" quick block system, patented worldwide by GRP, which guarantees the following advantages:

- Quick link and release without any springs.
- Maximum safety even in case of a hard crash or bump.
- Maximum hold of exhaust gas, through the usage of big O-rings.
- O-Ring made with a special material resistant to abrasion and high temperature.
- Consumption reduction, to be more precise, the connection between manifold and pipe.
- Anti-vibration link to best absorb any vibration.
- Reduction of encumbrance measures in the link area.

After much research, GRP has produced a new, special line of pipes and manifolds. The main novelty consists of a new fast link initialled FLS, created and patented worldwide by GRP. This system eliminates the usage of holding springs and shaped gaskets. It guarantees apart from a quick fastening, a 100% sure hold too. We have introduced many other novelties, such as special material, its CNC machining exhaust pipe and its internal design and other particular features as described below.



## GRP FLS Exhaust Line .21

Article Code	LOBR2048	LOBR2050
Engine Line	.21BU .25TR	.21BU .25TR
Description and Homologation	Elm 2053	SHORT

## GRP - AIR FILTER LINE

*GRP has studied and produced a complete line of air filters for its own engines. Very often it happens that the driver does not pay due attention to the importance of air filters, which although it is a very low cost part, it may seriously damage your engine, or compromise anyway your engine performance.*



### BUGGY Air Filter

Article Code	<b>LOS2051</b>
Engine Line Use	<b>.21 BUGGY .28 TRUGGY</b>
Filters quantity - Pcs	<b>12</b>
Oil quantity - N x Cl	<b>2 x 20</b>
Oil Type	<b>Special Oil</b>

# ARTICLE LIST - 1



All GRP engines, accessories and spare parts are packed and sold in appropriate colored see-through plastic boxes. This type of packaging ensures the maximum guarantee that the product does not get damaged during transportation to the hobby shop.

Each item is checked off by an item number, a description and a barcode for its complete identification.

GRP guarantees the absolute product authenticity only for item, which come in their original sealed packaging. Moreover, our product guarantee on engines is acknowledged only if our engine is used with its original GRP spare parts.

Indicated below is the type of use for each GRP article.

Article Code	Article Description	Article Engine Destination	
		21BU TUNED	28TR TUNED
LOSR2000	GRP Engine, Tuned 01 .21 Buggy	0	
LOSR2010	GRP Engine, Tuned 01 .28 Truggy		0
LOSR2020	Carburetor: .21 Buggy, .28 Truggy	0	0
LOSR2021	Needle O-Ring Kit (5): .21, .28	0	0
LOSR2022	Dust Protector, Rubber: .21, .28	0	0
LOSR2023	Fuel Intake Nipple	0	0
LOSR2024	Carburetor Retainer: .21, .28	0	0
LOSR2025	Carb O-Ring Kit (5): .21, .28	0	0
LOSR2026	Crankcase: .21	0	
LOSR2027	Crankcase: .28		0
LOSR2028	O-Ring Crankcase Kit (2): .21, .28	0	0
LOSR2029	Backplate: .21, .28	0	0
LOSR2030	Backplate O-Ring: .21, .28	0	0
LOSR2031	Backplate Screw Set (4): .21, .28	0	0
LOSR2032	Cooling Head: .21 Buggy	0	
LOSR2033	Cooling Head: .28 Truggy		0
LOSR2034	Cooling Head Screw Kit (4): .21, .28	0	0

## ARTICLE LIST - 2

### Article Engine Destination

21BU  
28TR

[illegible]



# WARRANTY CONDITIONS - 1

## **Warranty Period:**

**Exclusive Warranty-** Horizon Hobby, Inc., (Horizon) warrants that the Products purchased (the "Product") will be free from defects in materials and workmanship at the date of purchase by the Purchaser.

## **Limited Warranty**

(a) This warranty is limited to the original Purchaser ("Purchaser") and is not transferable. **REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER.** This warranty covers only those Products purchased from an authorized Horizon dealer. Third party transactions are not covered by this warranty. Proof of purchase is required for warranty claims. Further, Horizon reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.

(b) **Limitations- HORIZON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.**

(c) **Purchaser Remedy-** Horizon's sole obligation hereunder shall be that Horizon will, at its option, (i) repair or (ii) replace, any Product determined by Horizon to be defective. In the event of a defect, these are the Purchaser's exclusive remedies. Horizon reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the sole discretion of Horizon. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Horizon. Return of any goods by Purchaser must be approved in writing by Horizon before shipment.

## **Damage Limits:**

**HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.** Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability.

If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase.

**Law:** These Terms are governed by Illinois law (without regard to conflict of law principals).

## **Safety Precautions:**

This is a sophisticated hobby Product and not a toy. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the Product or other property. This Product is not intended for use by children without direct adult supervision. The Product manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or injury.

## **WARRANTY CONDITIONS - 2**

### **Questions, Assistance, and Repairs:**

Your local hobby store and/or place of purchase cannot provide warranty support or repair. Once assembly, setup or use of the Product has been started, you must contact Horizon directly. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance. For questions or assistance, please direct your email to [productsupport@horizonhobby.com](mailto:productsupport@horizonhobby.com), or call 877.504.0233 toll free to speak to a service technician.

### **Inspection or Repairs**

If this Product needs to be inspected or repaired, please call for a Return Merchandise Authorization (RMA). Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon is not responsible for merchandise until it arrives and is accepted at our facility. A Service Repair Request is available at [www.horizonhobby.com](http://www.horizonhobby.com) on the "Support" tab. If you do not have internet access, please include a letter with your complete name, street address, email address and phone number where you can be reached during business days, your RMA number, a list of the included items, method of payment for any non-warranty expenses and a brief summary of the problem. Your original sales receipt must also be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

### **Warranty Inspection and Repairs**

To receive warranty service, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be repaired or replaced free of charge. Repair or replacement decisions are at the sole discretion of Horizon Hobby.

### **Non-Warranty Repairs**

Should your repair not be covered by warranty the repair will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for repair you are agreeing to payment of the repair without notification. Repair estimates are available upon request. You must include this request with your repair. Non-warranty repair estimates will be billed a minimum of 1/2 hour of labor. In addition you will be billed for return freight. Please advise us of your preferred method of payment. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. If you choose to pay by credit card, please include your credit card number and expiration date. Any repair left unpaid or unclaimed after 90 days will be considered abandoned and will be disposed of accordingly. Please note: non-warranty repair is only available on electronics and model engines.

Electronics and engines requiring inspection or repair should be shipped to the following address:

**Horizon Service Center**  
4105 Fieldstone Road  
Champaign, Illinois 61822

All other Products requiring warranty inspection or repair should be shipped to the following address:

**Horizon Product Support**  
4105 Fieldstone Road  
Champaign, Illinois 61822

Please call 877-504-0233 with any questions or concerns regarding this product or warranty.



**GANDINI RACING  
PRODUCTION srl**

Via Michelangelo, 3  
46040 Guidizzolo Mantova Italy  
Email. [info@grpgandini.com](mailto:info@grpgandini.com) - [www.grpgandini.com](http://www.grpgandini.com)



**Losi, a division of Horizon Hobby, Inc.**  
**4105 Fieldstone Road**  
**Champaign, IL. USA 61822**  
**[WWW.LOSI.COM](http://WWW.LOSI.COM)**