Ignition-Engined Model Racing Car

Operating manual with maintenance instructions and detailed diagrams showing components and their locations

Racing Model Cars

CONGRATULATIONS!

We compliment you on your choice and are sure that this hobby and this new model racing car will give you many hours of real enjoyment.
Day after day you will discover an exciting new way to spend your free time which is not only fun but which also requires a great deal of serious application and skill.
Discover for yourself the special skills and experience that only this hobby can teach you.
At first you will enjoy yourself by opening up the throttle on a tarmac surface but gradually you will make your own modifications to the car to make it "your own personal version" and then you will want to compete against friends on a properly set-out model racing track.
Given time and practice this hobby will give you great satisfaction, and why not - you might well end up in the winner's circle.

Rossano Compagnucci
Compagnucci Racing Model Cars Dept.

Introduction

Your Compagnucci model car is designed to give you maximum enjoyment and is capable of being updated in the future.
Starting with the basic electric powered model car you can add, from time to time, Compagnucci upgrade kits in order to bring your car up to the highest levels of competitiveness using a Spark ignition petrol (gasoline) or methanol Compagnucci engine with forced air cooling or a methanol-fuelled 3.5 cc glow engine from another manufacturer. 4 Wheel Drive with two differentials and an automatic 2-speed gear box.
All the racing car bodies can be used with either electric or internal combustion engines; the only changes necessary being the replacement of the supports and wheels in some cases.
All the options for the cars can be made without the need to make modifications to parts but merely by replacing certain parts where strictly necessary. This is done with the help of detailed, clear and well illustrated instructions.
Only Compagnucci model racing cars are completely modular thanks to the concept of the load-bearing monocoque chassis. This has been given a special configuration - designed to guarantee maximum rigidity and protection against impact. This gives two great advantages: superb road-holding and strong protection of the advanced internal mechanisms and components.
Both the chassis and other components of the car which are subject to mechanical stresses are made of a special composite resin which is both shockproof and heat resistant (carbon fibre reinforcement can be supplied as an optional extra).
The spoilers of the F1 model are truly aerodynamic and have an efficient airfoil shape in order to achieve maximum adhesion of the model racing car to the track as it moves forward at speeds starting at 15 km.p.h. (10 m.p.h.).
The overall suspension system of the car was designed by a group of technicians who normally work on real racing cars!
We are referring to a technical office which has actively cooperated with Alfa Romeo, Ferrari and Motori Moderni Company experimental departments.
This is why Compagnucci model racing cars have an almost perfectly balanced suspension system which allows even beginners to race their car on a track without spending time on adjustments which, more often than not, are quite pointless.
There is a great deal more to say about our model racing cars but we prefer you to discover their many exciting features yourselves.
If you were looking for an inexpensive and safe way to start off in this hobby, you have now found it.
Thanks to our industrial production our prices are the most competitive on the market, in particular for spare parts.
Now it is up to you to get as much enjoyment as you can from your new model racing car. Good luck ... and watch out for the edge of the track!

❑ Warnings

1)Before using your car read this manual carefully and abide by the instructions and recommendations that it contains. In particular you should read the following chapters carefully:
- Mini Pack batteries, battery charger, run down batteries - page 18
- Radio control unit - page 16
- Warning - page 21.

2) Do not run the engine in a closed or poorly ventilated environment as the exhaust gases contain carbon monoxide which causes poisoning if present *even* in small quantities in the air you breathe.
3) The car should not be used by children and should be operated in places suitably equipped for it and free of persons and objects. In any event when making use of it, young persons are advised to do so under the guidance of an adult person.
4) Beware, when the model is running as it can reach speeds which constitute a danger to people in the event of collision.
5) Your model car's fuel tank should always be completely empty when you transport it!

This is indispensable in order to maintain both the car and the ignition engine in a perfect state of efficiency and also to maintain the validity of the Guarantee, as well as peoples safety..

❑ Guarantee

1) The guarantee is valid for a period of 6 months from the date of purchase of the car for all defects of materials or workmanship, should there be any.

   The detective parts of either the model or the engine shall be replaced or repaired free of charge provided that, they have not been mishandled by any unauthorized person. The examination of defects and their causes is the exclusive province of the manufacturer and should there be any labour or transport costs, these shall be charged to the client.

2) The guarantee ceases to be valid in the event that:
   - parts that are not original have been used in the car or the engine;
   - the engine has been used for other purposes, i.e. not used in the car;
   - the instructions regarding the use and maintenance of the ignition engine and the car have not been respected.

   Parts broken as a result of accidents that occur outside the track or as a result of collisions are excluded from the guarantee.

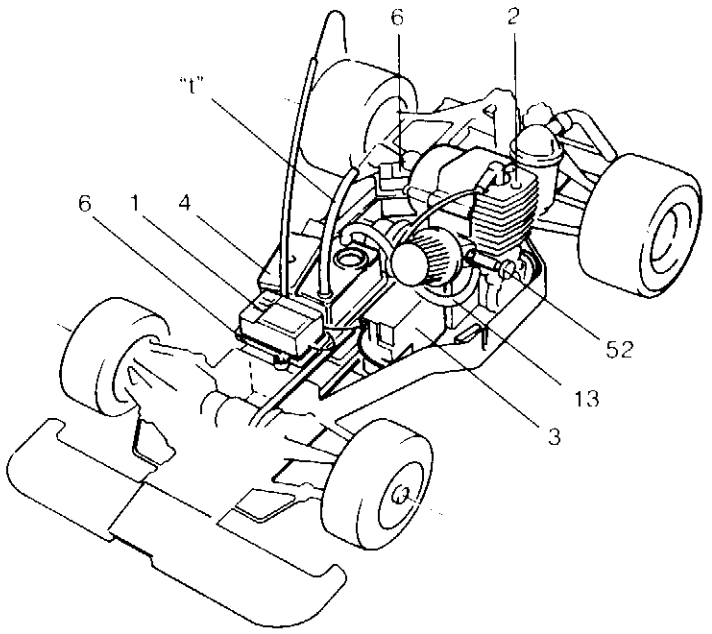


Fig. 1

❑ General

The model racing car is supplied pre-assembled in an elegant practical carrying bag and is supplied complete with the following items:(see Fig. 1)

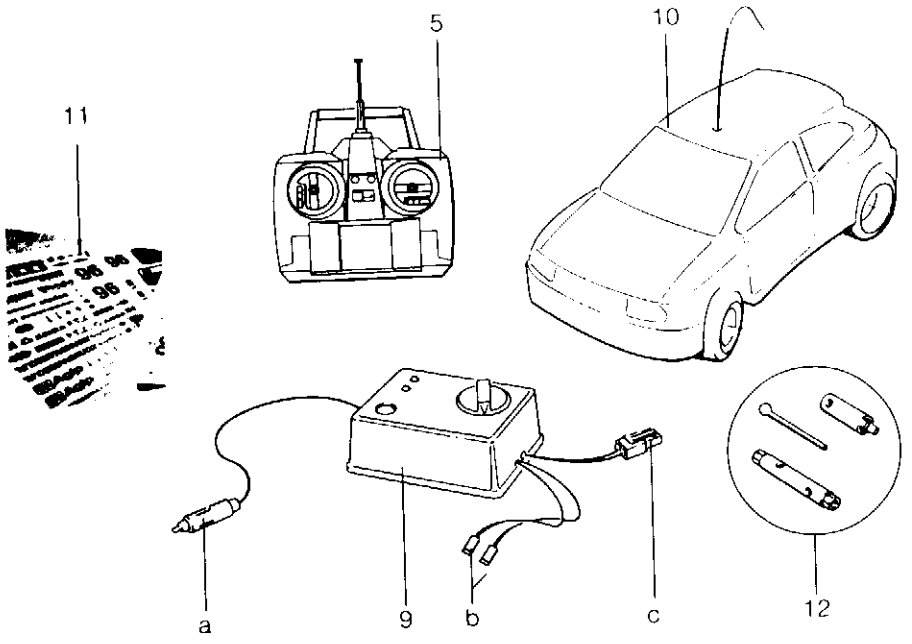
Radio control receiver (1);
- Engine with spark plug (2);
- Electronic spark ignition control unit (3);
- Two rechargeable NiCd batteries (Mini Pack) (4) of 4.8V d.c. and 850 mAh each, one to supply current to the electronic spark ignition control unit and the other for the radio control receiver and servos;
- A two channel AM radio transmitter with interchangeable crystals (5);
- 2 servos (6)
- NiCd battery charger (9):
  - 12 V input from car cigar lighter (a);
  - Output - two 4.8 V d.c. connectors (b) for two 4.8 V batteries (Mini Pack) and one 7.2 V d.c. connector (c) for the Compagnucci portable starter.
- 1 Complete car body (10);

1 set of stickers (11)
- 1 set of spanners (12)

CarTechnical Data

- CE **Approval Seal** (Electromagnetic Compatibility - EMC - in conformity with the followings Standard: CISPR12 (1990), 89/336/CEE, 92/31/CEE, 93/68/CEE)

Radio controlled model car with 4 wheel drive
- Timing-belt driven transmission
- Front and rear self-blocking differential
- Independent suspension on all four wheels
- Adjustable shock absorbers
- Monocoque loadbearing chassis
- Single cylinder 2 stroke spark ignition engine, Mac 6 Series, with forced air cooling. It is fueled by petrol (gasoline) with spark ignition using a spark plug and electronic spark ignition control unit with 4.8 V d.c. input.



EngineTechnical Data

The engine is a single cylinder two stroke type:

MAC 6 **CE Approval Seal** (Electromagnetic Compatibility - EMC - in conformity with the followings Standard: CISPR12 (1990), 89/336/CEE, 92/31/CEE, 93/68/CEE)

Bore	20 mm
Stroke	20 mm
Swept volume	6.28 cc.
Compression ratio	13: 1
Maximum horsepower	1.3 HP at 17.500 rpm

Cooling	- forced air by means of a fan with a power take-off from the crankshaft via a timing pulley and timing belt.
Ignition	- by means of an electronic Spark Ignition system which uses a4.8 volt d.c. input.
Fuel	- mixture of normal or unleaded petrol (gasoline) and 5% lubricant (6% during running-in)
Air Filter	- dry filter
Cylinder Head	- light alloy
Cylinder	- light alloy with a steel liner
Crankshaft	- tempered and ground nickel chrome steel
Connecting rod	- high resistance aluminium alloy with bronze bearings
Piston	light alloy ringed piston
Rotation	- anticlockwise viewed from the front

ATTENTION
These pages replace pages
and THE EXPLODED VIEW SHOWING SPA
for the model car Fig. 25

a) Preliminary checks, warnings and recommendations

❑ Checks

Proceed as follows:

- check that the frequency of your radio does not interfere with another on the same frequency in order to avoid unpleasant consequences. Read the instructions on page 16 regarding radio control carefully.
- remove the body shell and place the model racing car on a flat surface to check that the suspension works by pressing the car down with your hand. If all is well the shock absorbers should return the car to its original height from the ground without any jerks or jamming.

  place the model car on wire support "Z", Compagnucci (Code 000027), Fig. 2, and check that the 4 wheels turn freely when rotated backwards,
- check that no electric wires or the antenna can get caught in the moving transmission bolts.
- check the electrical connections, etc.

● *for petrol (gasoline) engines or those with methyl alcohol with spark ignition, fig. 3*

that the 4.8 V dc mini-pack battery (4) is charged and connected by means of the connectors (6) and (7) to the electronic spark control unit (11) and by means of the connector (5) to the receiver (2)

that the sensor (12) is connected by means of the connectors (8) and (9) to the electronic spark control unit (11);

- that the high voltage cable (10) is connected by means of the pipette "p" to the spark plug (57).

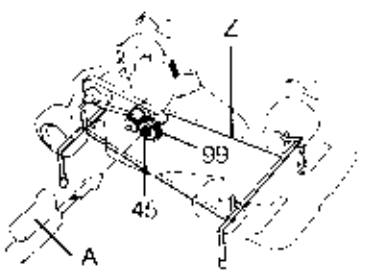


Fig. 2

● *For engines with methyl alcohol with "glow" spark plug*

- the spark plug is not burnt out and that the 1.2 V dc battery supplying it is charged turn on the radio control unit Fig. 19 on page 16, and check that the servos "S" work correctly by operating the "Steering" Pos. 4 and "Gas" Pos. 6 control sticks, that the "Gas" stick is in the centre and not backwards to prevent the brake being put on.

❑ Warnings

- Read the "Mini Pack Battery etc." chapter on Page 18 Figs. 20 and 21 and the "Important" chapter on page 21

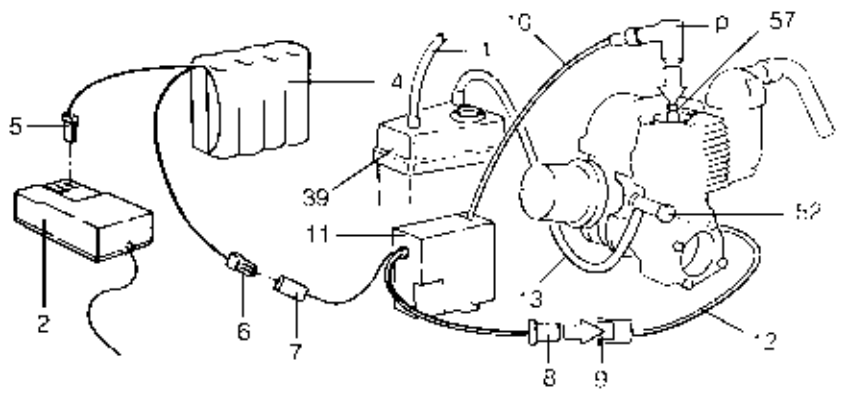


Fig. 3

❑ Recommendations

To dismantle the spark plug with a spare ignition engine you must first slide out pipette "p". This operation must be carried out by sliding it out along the plug axis as shown in Fig. 6a to avoid deforming the pipette and jeopardising good contact to earth. This would make electric sparks which cause radio interference making it impossible to drive the model car.

Before using the engine, carry out a short running in period as described below under point **"d"**. *This operation is indispensable for correct operation and long engine life.*

b) Fuelling (always to be carried out when the engine is not running)

For petrol (gasoline) engines: fill the fuel tank with 6% mixture (60 cc of Castrol TTS Premix oil or equivalent and 940 cc of petrol (gasoline).
For methyl alcohol engines: fill the fuel tank with 16% mixture (160 cc Carbulin, Sintoil, Klotz oil or similar and 840 cc of methyl alcohol).

c) Starting

Do not touch the carburettor needle (52) already preset open at 5½ turns about for petrol (gasoline) engines or the needle (53) for alcohol engines, already preset open at 1½ turns about, or the screw (47).

- Blow into the small air-intake tube "t" of the tank to fill the small tube (13). Fig. 3, then start the engine - either new or one which has been stopped for some time - using the Compagnucci starter "A" (Code 00033) inserted over the nut (45). Figs. 2 and 17, or using a Standard starter in the same way or a portable electric drill with a special key supplied with the car mounted on it (Code CXX00006).
  To facilitate engine starting - either new or one which has been stopped for some time, it is advisable to carry out the following operation:
  slide out the pipette "p" in the way indicated above under the **"Recommendations"** point, and remove the spark plug, making the engine turn with a starter when the mixture comes out in vaporised form from the hole in the plug: it means that it has reached the combustion chamber, lubricating the cylinder at the same time;
- remount the plug and start the engine, using the same starter.

Before running the car, slightly enrich the carburettor (Fig. 4).

d) Running-in

With the model car still positioned on the Compagnucci wire support "2" (code CXX00002), start the engine as described under point "c" "Starting" and keep it idling, if necessary adjusting it by working on the screw (47) Fig. 4.
With small bursts of acceleration, use up a full tank of 6% mixture for petrol (gasoline) engines and 16% for methyl alcohol engines (see point "b" "Fuelling").
Fill the tank again with 5% mixture for petrol (gasoline) engines and 16% for methyl alcohol engines, as already described, gradually accelerating until you reach maximum revs, avoiding any violent accelerations.
When this condition is reached - if necessary, tune the carburettor by making small turns of the needle (52-petrol (gasoline) or (53 alcohol), as shown in Fig. 4:

- clockwise (closing) if the fuel supply is too rich or "fat";
- anticlockwise (opening) if the fuel supply is too poor or "thin" until a satisfactory condition is reached, the engine runs smoothly passing from idling to maximum revs.

After running-in and the initial starts as described above (engine still hot), starting can be carried out either by turning the rear wheels with a strong, sharp, repeated flick (Fig. 5) or by pushing the car forwards (Fig. 6).

e) Stopping the engine

Remove the body shell and proceed as follows.

- If the engine stops because it has run out of fuel, we can be sure that the carburettor remains "clean", without any trace of mixture on the needle which, with the engine stopped for some time, can make the following starting difficult,
- if the engine is still running and you want to stop it, slide out the small tube "13" which connected the carburettor to the tank (39). Fig. 3, from the side of the latter. In this way the engine will stop, using up the mixture remaining in the small tube "13", thereby "cleaning" the carburettor and avoiding the problem described previously above. Then remount the small tube "13" on the tank.
- In the case of an engine with spark ignition, cut off the power supply to the electronic spark ignition control unit (1) and to the receiver (2), disconnecting the connectors (5 and 6) which connect them to the battery (4).

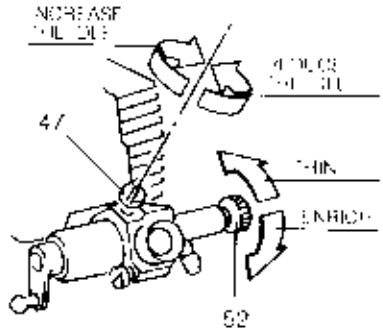


Fig. 4

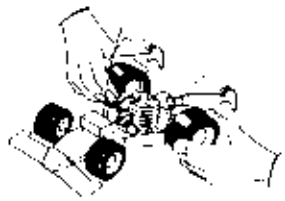


Fig. 5

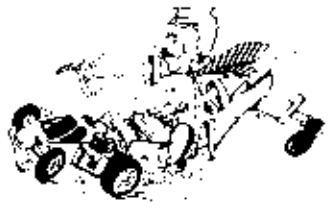


Fig. 6

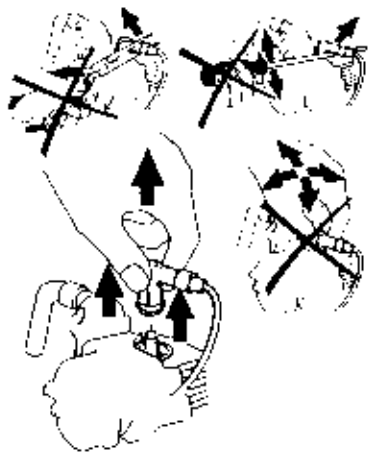


Fig. 6a

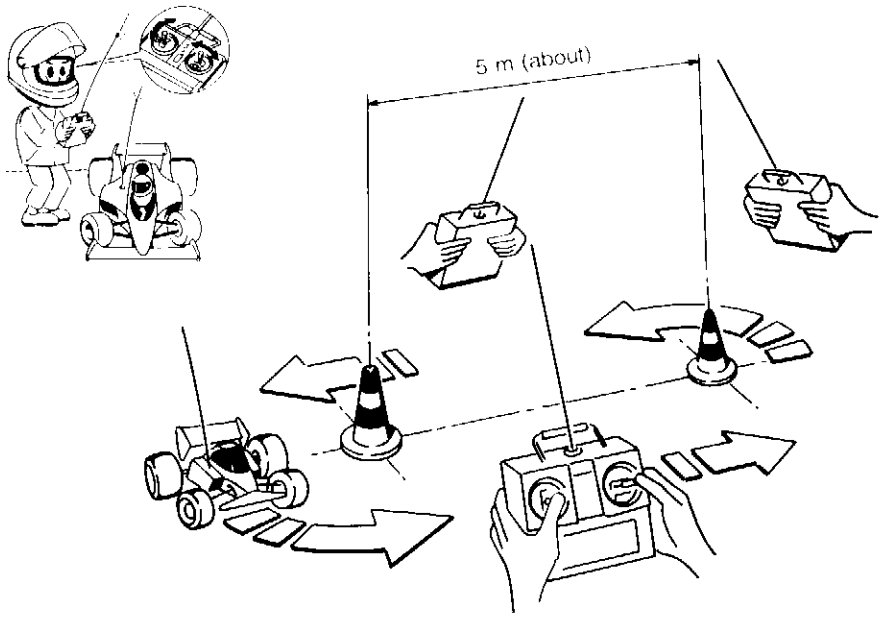


Fig. 7

Driving Advice

- The Compagnucci model racing car, thanks to its dimensions and the near perfect suspension system, is easy and safe to drive even for beginners. The ignition engine, designed for these models, ensures smooth driving at low speeds and allows ample leeway for driving error, thus enabling beginners to learn quickly methods of fast driving.
  Nonetheless, it is always best to follow a precise practice sequence that teaches fast driving in the best and quickest way.
  Figs. 7, 8, 9 and 10 show some race circuits for you to try and the direction to follow as shown by the arrows.
- You should start off by attempting to drive within precise limits in order to train your eye to measure distances.

The first circuit - figs. (7) and (8) - is very simple and consists of alternating straight sections of road with curves following the same direction in rapid succession and you should drive round the curves following the signs very closely (skittles, plastic bottles or just marks on the track).
Once you can do this exercise almost automatically, move your driving position 90° compared to your previous position (but always face the track, of course). You will then appreciate that before doing this, the movements of the model racing car and that of the two control sticks did not change, but once you change the position from which you view the circuit it will seem to you that you have to start learning afresh. This is just an impression that you will have to get used to, every time you run your model racing car on a new circuit.
Once you become used to this new location and can carry out the maneuvers almost automatically, move your driving position another 90° until you learn the circuit from all four angles.

Repeat all of the above with the car in reverse.

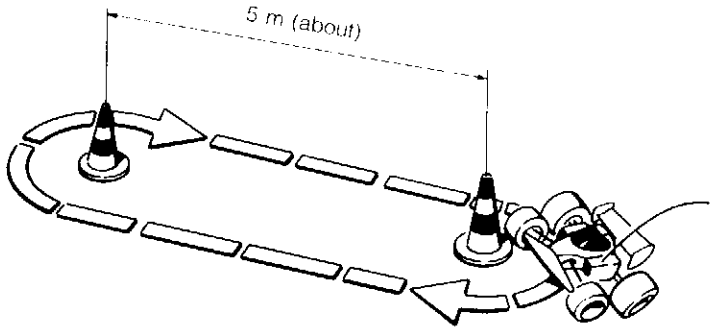


Fig. 8

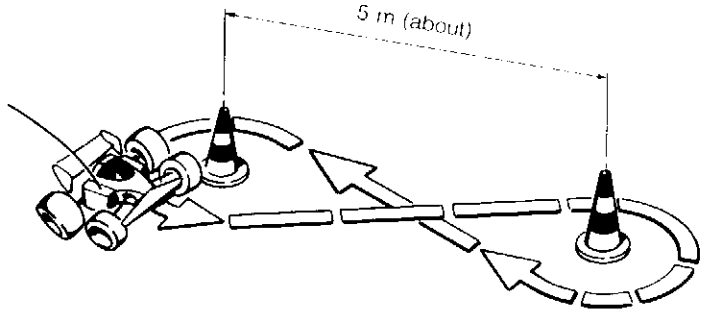


Fig. 9

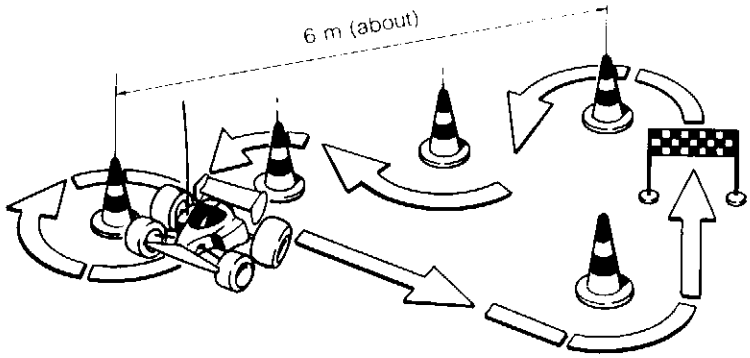


Fig. 10

After this, always using the same method, you can pass on to circuit 9 and then, later as you move ahead to circuit 10, you will steadily improve your driving ability and can compete in races with friends ...
... now that you have perfected your driving skills, you are ready to take part in real competitions.

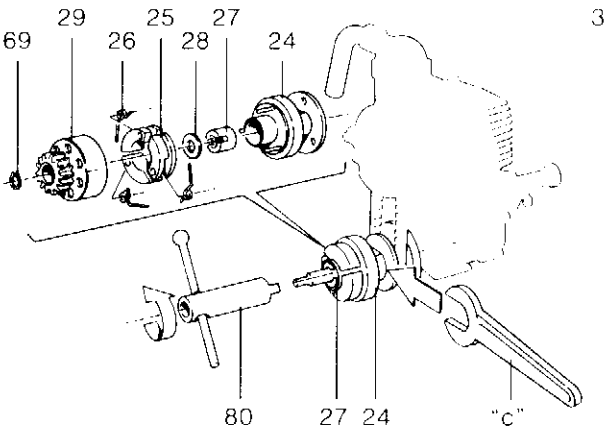


Fig. 11

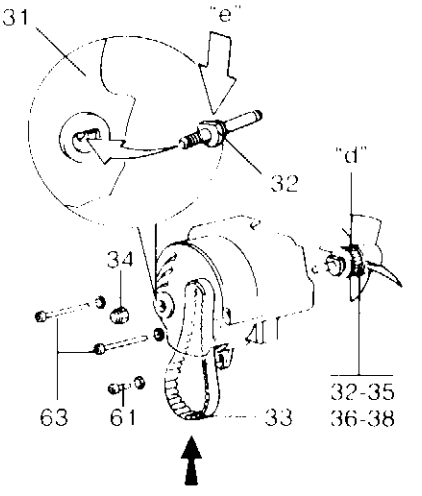


Fig. 12

❑ Engine maintenance

General overhaul

In the event that the engine is dismantled for a complete overhaul or for the replacement of a component, wash the parts with a diluent and lubricate them with a thin film of Castrol ITS, or a similar oil, prior to reassembling the motor.

Changing the clutch shoes (Fig. 11)

- remove the spring washer (69) and slide off the clutch drum (29) with the shim (28);
- remove the worn clutch shoes retaining their counter springs (26) for use again if still in good condition, otherwise replace them;
  insert the counter springs (26) in their locations in the new clutch shoes (25) in the positions shown in Fig. 11, and fix the clutch shoes on to their respective pins;
- open and then close the clutch shoes a few times in order to check that the tension of the springs is about equal on each of the three clutch shoes;
- replace the shim (28) then the clutch drum (29) and the spring washer (69).

Complete clutch, clutch-drum and flywheel change (Fig. 11)

- Remove the spring washer (69)and slide off the clutch drum (29) with the shim (28);
  using the special spanner supplied (80), undo the nut (27) holding the flywheel (24) firmly with a 13 mm open end wrench.
- extract the flywheel (24) and replace it with a new one complete with shoes and counter springs.
- refit the nut and tighten it, without forcing it, with the special spanner (80) and the 13 mm open end wrench.
  put back the shim (28), as well as a new clutch drum if the drumgear wheel is very worn, otherwise replace the original drum together with the spring washer (69)
- rotate the clutch drum in a clockwise direction to check that it moves freely

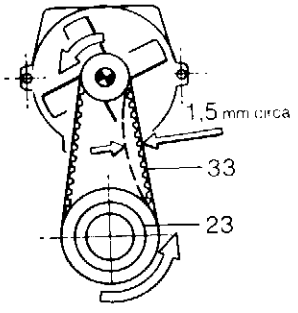


Fig. 13

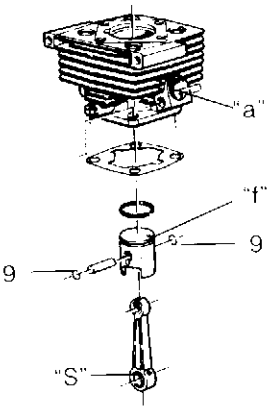


Fig. 14

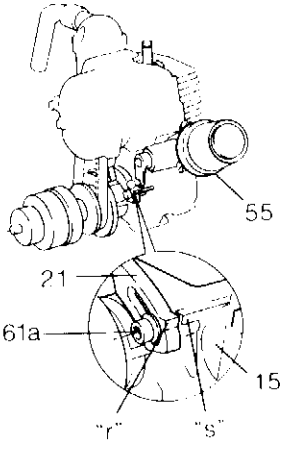


Fig. 15

Replacement of the cooling fan belt (Figs. 12 & 13)

- Remove the screws (63) and (61) and then the fan/fan belt cowling unit and dismantle the fan shaft/fan (32 - 38) after undoing the nut (34) (Fig. 12).
- remove the worn fan belt and substitute it with a new one which should be inserted from the bottom of the cowling (31).
- reassemble the fan/fan belt cowling unit taking care to position the timing belt on the fan's timing pulley (d) and insert the threaded portion of the fan shaft (32) - in accordance with the diagram "e" - which fits into its location inside the fan cowling (31). Then tighten the nut (34) firmly.
- replace the fan and cowling unit on to the engine after having "keyed" the timing belt onto the geared timing pulley (23) (Fig. 13). First insert the screw (61) without tightening it completely and then attach the screws (63) in the same way.
- tighten the timing belt by moving the cowling unit, but not too much. Leave it so that the sides of the timing belt can flex by about 1.5 mm (Fig. 13). Then tighten the screws (61 & 63).

Replacing the piston, connecting rod and piston ring (Fig. 14)

When replacing either the piston, or the connecting rod or the piston ring, pay attention to the following:

- after reassembly, the piston pin retainer-dips (9) must be well home in their seatings;
- when replacing the connecting rod in the piston the most shiny and chamfered surface (S) needs to be located (in relation to the stop-pin (f) of the piston ring) in the position shown in the diagram.
- when replacing the piston/connecting rod in the cylinder, the stop-pin (f) must be on the same side as the induction port (a).

Timing interval adjustment (Fig. 15)

If for any reason, the sensor mount (21) is removed, take care when replacing it, that its marker "r" coincides with the marker "s" on the crankcase (15) and be sure to tighten the two screws (61), which had been loosened previously.

Air Filter (55) (Fig. 15)

You are advised to change the filter after every four hours of running.

Lay-up

It is important, prior to storing the motor for a period of lay up, to give it an overall external cleaning and then put 4 or 5 drops of Castrol TTS (or its equivalent) into the ignition plug hole.

The crankshaft should be rotated a few times taking care to leave the piston at bottom dead centre. The plug should then be replaced.

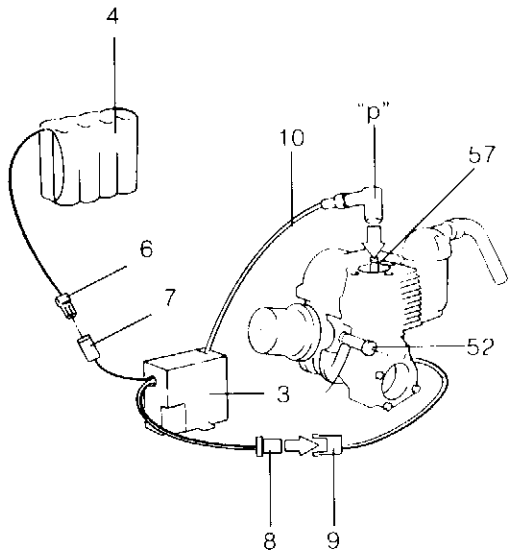


Fig. 16

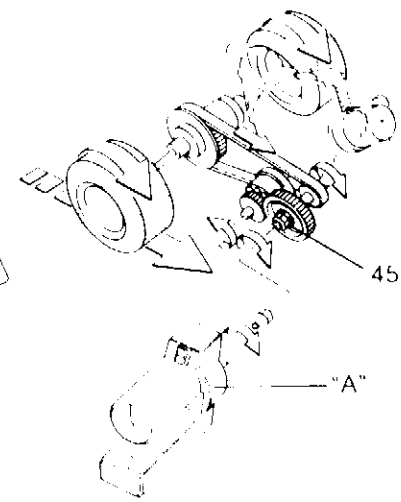


Fig. 17

The engine does not start or does not continue to run (Figs. 16 & 17)

This may be due to:

1) A wet plug (flooded engine)

In this event:

- disconnect the Electronic spark ignition control unit (3) from the Mini Pack (4), remove the high tension lead connector "p" and remove the spark plug (57); then blow strongly on the plug's electrodes to dry them.

Then proceed as follows:

- close the carburettor needle (52) completely by turning it in a clockwise direction without forcing it **but count the number of turns as you do this**, using the mark on the edge of the needle;
- turn the crankshaft by placing the starter (A) on the nut (45) (Fig. 17) or by grasping the rear wheels with your hands and revolving them sharply in a forward direction two or three times until the engine has emptied itself of the excess fuel;
- replace the plug and tighten it without forcing it;
- replace the connector (p) on the spark plug, pushing it down firmly;
- open the carburettor needle (52) **the same number of turns that you made to close it** (see above) and start the motor again in accordance with the paragraph "Starting" (page 8).

2) Lack of current

This may be due to imperfect electrical connections (6, 7, 8, 9 and 10) or the Mini Pack batteries which supplies the Electronic spark ignition control unit may be run down (this should be checked). These rechargeable batteries, if properly charged, should have a duration of about 1 hour (see Mini Pack battery on page 18). The life of the receiver battery should be the same (connector 6a).

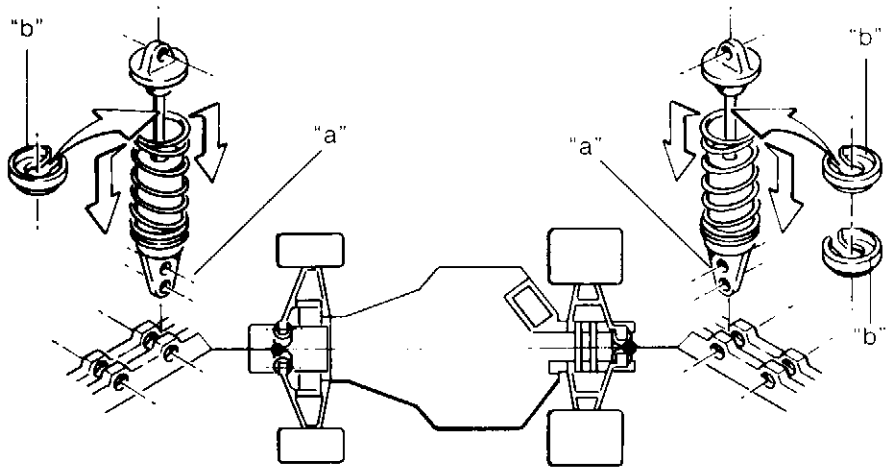


Fig. 18

❑ Car maintenance

For the maintenance of the car it will be sufficient to follow the instructions given in the following table indicating the type of checks necessary and when to carry them out:

Type of check	After	4 tankfuls	10 tankfuls	20 tankfuls	40 tankfuls
Check on wear of belts and geared wheels/pulleys			•	•	
Replacement of belts and geared wheels/pulley					•
Check on wheels (any wear)		•	–	•	•
Check on tightness of engine mounting bolts		•	•	•	•
Check on tightness of chassis bolts		•		•	•
Check on cleanliness of tank and its filter		•	–	•	•

Suspension setting (Fig.18)

The setting of the suspension can be adjusted as follows:
- by moving the point where the shock-absorbers are fixed (a) on the car's chassis;
- by varying the number of shims (b) mounted on the shock-absorbers themselves.

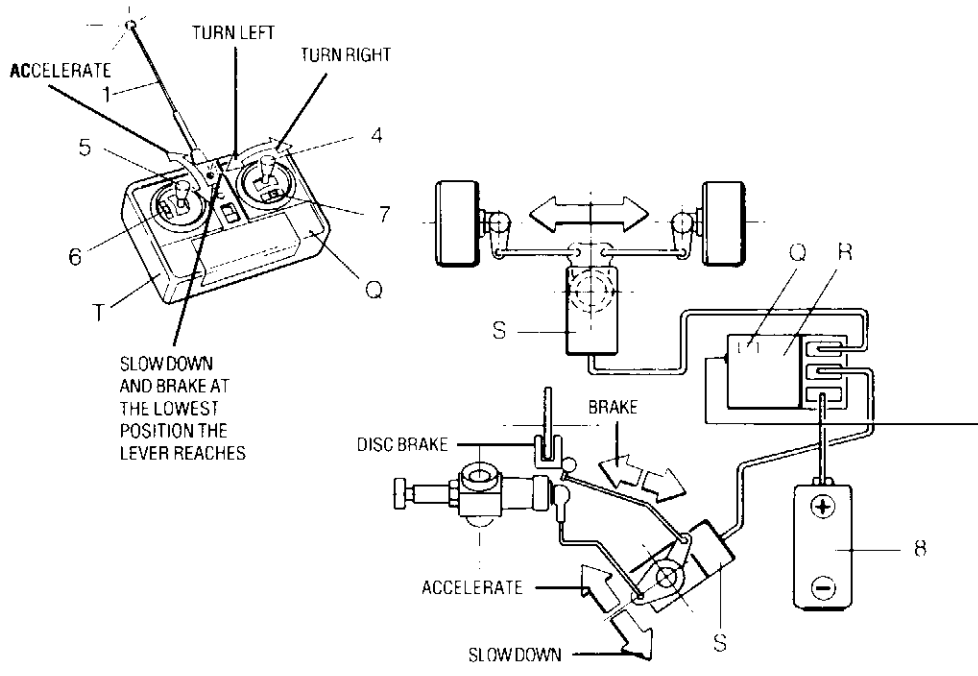


Fig. 19

❑ Radio Control unit (Fig. 19)

Introduction

Technical data (see also the Manual enclosed with the radio control transmitter included in the kit))

- Proportional Radio control with 2 channels and interchangeable crystals, consisting of:
  - Radio transmitter (T)
  - Radio receiver (R)
  - Two servos (S)

N.B. The crystals used in the transmitter and the receiver are identified, on their outside, by a number or a colour code which tells you their operating frequency. They are interchangeable with other crystals (from the same radio manufacturer), thus permitting the driver to change the operating frequency in order to avoid interference from other model racing car radios using the same frequency.

Operation

To operate the transmitter, install eight 1.5 volt alkaline batteries (UM-1 type) in the transmitter's battery compartment, taking particular care that the polarity is correct. Then close the battery compartment and extend the antenna (1).
Turn on the transmitter switch and if the batteries have been installed correctly and are new, you will notice that the power indicator is at maximum, meaning that the transmitter and its antenna has full power.
If the power indicator level decreases, check that the batteries are properly installed with the correct polarity. If necessary replace them with fresh batteries.
A set of batteries gives approximately one and a half hour's consecutive operation of the radio transmitter. The batteries should be replaced as soon as the power indicator signals that the batteries are running down.
The transmitter has two control sticks. The one on the right (4) is for steering whilst the one on the left (5) controls engine speed and the brake.

Each control stick has a small sliding knob, called a "trim" (6) and (7). The trim centralises the control function so if the car, when moving slowly tends to turn towards the right or to the left without the steering control stick having been touched, the trimmer should be adjusted to neutralise this turning tendency (the model car goes strait on).
Use the same procedure for the engine speed control. With the control stick in neutral the wheels should not turn.
The radio receiver also has two channels and its crystal is interchangeable. This *receiver* does not need to be adjusted, but you need to pay attention to it.
For optimum reception of commands from the transmitter, always check that the *receiver's* antenna wire remains undamaged.

"Reverse" function

The "Reverse" function permits you to change the sense of rotation of the servos. This is done by means of a switch on the face of the transmitter. Position "N" (Normal) or "R" (Reverse).

Recommendations when switching the radio on and off

The radio control system supplied with Compagnucci racing model cars is safe and reliable even when radio frequencies are crowded by other users. However it is wise to follow a number of simple but precise rules so as to avoid losing control of the model racing car.

Sequence of operations when switching "ON" the radio control
- extend the transmitter's antenna (1) to its full length
- switch "ON" the transmitter (T)
- switch "ON" the receiver system by connecting it to the Mini Pack (8) in the car.

Sequence of operations when switching "OFF" the radio control
- disconnect the Mini Pack (8) from the receiver.
- switch "OFF" the transmitter (T)
- retract the transmitter's antenna (1) completely

Important! Never switch on the transmitter before extending its antenna at least partially, otherwise the internal amplification circuit could be damaged with the result that the transmitter does not transmit a good signal.

Maintenance

In the event of that there is a malfunction of the radio system, never attempt to make even temporary repairs yourself but ask for help from a qualified servicing centre or directly from ourselves.

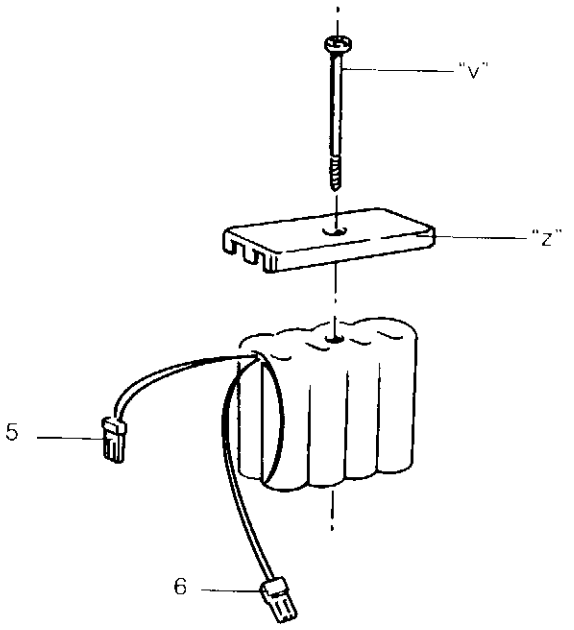


Fig. 20

❑ Mini Pack batteries, battery charger, run down batteries (Figs. 20 & 21)

Warning!

The Mini Pack batteries (Fig. 20) installed in the car have not been charged and therefore, before you attempt to start the engine, they need to be charged with the battery charger supplied (Fig. 21) as described in paragraph 1.1 below.

1 - Mini Pack batteries (Fig. 20)

Technical details.

- The Mini Pack is composed of two rechargeable NiCd batteries each consisting of four 1,2 V d.c. elements connected up in series, with two separate 4.8 volt 850 mAh connectors (5 & 6): one to supply current to the radio control receiver and servos; and the other to the electronic spark ignition control unit.

1.1 - Charging the Mini Pack batteries

Warning!

All battery charging, starting with the initial charge, must take place with the battery removed from the car. To remove it, undo the screw (v), remove the cover (z) and extract it after disconnecting the connectors (5 & 6) from the radio receiver and the electronic spark ignition control unit.

Using the battery charger supplied with the car, details of which are contained in paragraph 2 below, proceed as follows:

- Insert the plug (a) (Fig. 21) into a car's cigar lighter socket.
- Connect each of the of two Mini Pack connectors (5 & 6) to the battery charger's connectors (b).
- Regulate the timer (c) at 30 minutes in order to start charging and carry out **two 30 minute** charging cycles.

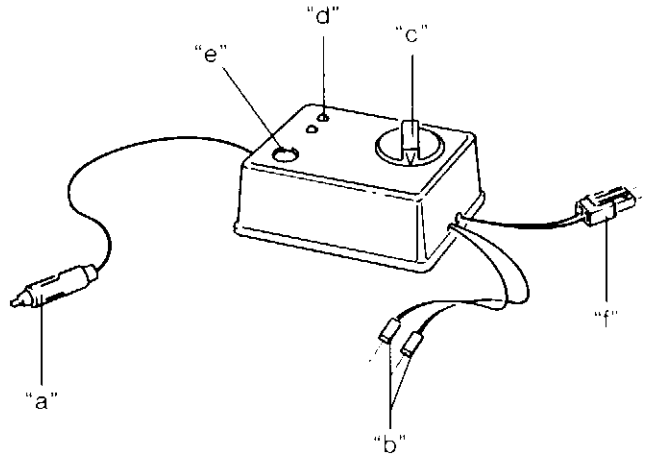


Fig. 21

If during charging, the LED indicator (d) does not stay lit, check the fuse (e). If properly charged, the batteries will operate for approximately one hour.
If during the charging of the batteries, their outside temperature reaches a level that gives you the impression that it could almost burn your hand, stop the charging operation immediately.
When charging has been completed, replace the Mini Pack in the compartment with the cover (z) and tighten up the screw (v).

1.2 - How to check when the Mini Pack is run down

Whilst the car is operating, the batteries' power output is constant.
When the controls (steering and acceleration) no longer answer and the engine starts missing, the time has come to stop the car immediately and to disconnect the Mini Pack, which is now run down, in order to recharge it.
If the Mini Pack's insulation becomes worn, repair it with insulating tape

Battery charger (Fig. 21)

Technical Data

- CE Approval Seal
- Input 12 V d.c. (a)
- Output - two 4.8 V d.c. connectors (b) (for charging the Mini Pack), one 7.2 V d.c. connector (f) (for charging the battery of the (optional) Compagnucci portable starter).
- Charging time:
  - for the two 4.8 V batteries (Mini Pack): **two 30 minute cycles;**
  - for the 7.2 V battery : **one 30 minute cycle**
- Fuse 10 A (e)

REPLACE THE SPARK PLUG (57) WITH A GLOW PLUG (82) FOR GLOW IGNITION **ONLY**

SUBSTITUTE THE CARBURETTOR NEEDLE (52) WITH THE NEEDLE (53) FOR BOTH SPARK AND GLOW IGNITION WHEN USING METHANOL

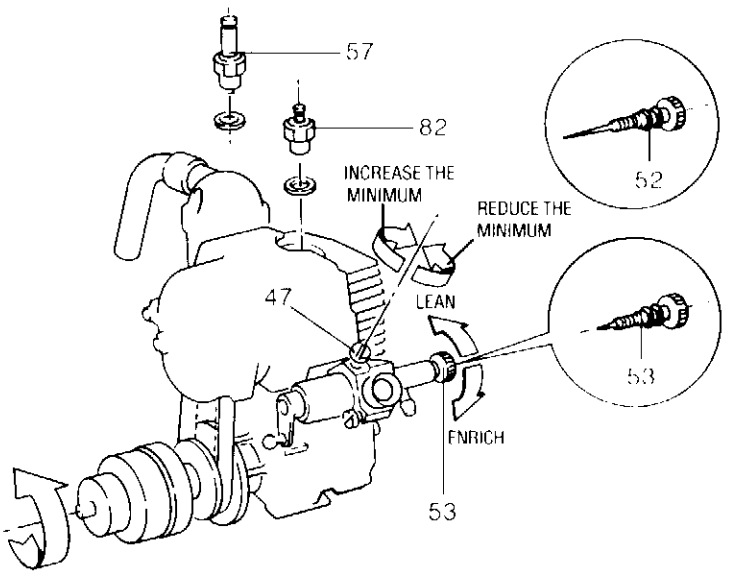


Fig. 22

❑ Fuelling the engine with methanol using either spark or glow ignition (Fig. 22)

MAC engines have special operating characteristics and they can operate with both spark ignition and glow ignition using methanol/lubricant mixture as follows: Spark ignition using methanol/lubricant mixture gives enhanced performance compared with petrol/lubricant mixture. When using the methanol mixture with spark ignition, the only change necessary is to replace the carburettor needle for petrol (52) with a carburettor needle for methanol (53) (optional on request).
Glow ignition (using methanol/lubricant mixture) also has enhanced performance. With glow ignition, in addition to replacing the (52) carburettor needle, it is also necessary to replace the spark plug (57) with a no. 5 glow plug (82).

Starting

To start the engine and for running-in, follow the instructions "Starting" on page 8 and "Running-in" on page 9 **except that**:

a) for **both** spark and glow ignition, fill the tank with a methanol - 16% lubricant mixture - Carbulin, Sintoil, Klotz or similar oils - (a litre of mixture will contain 160 cc of lubricating oil and 840 cc of methanol). The engine must be stopped during tank filling;
b) for **both** spark and glow ignition ensure that the carburettor needle (53) is open about one and a half turns;
c) In the case of **glow ignition**, connect a suitable battery (1.2 V d.c.) directly to the glow plug having disconnected the Electronic spark control unit;

Stopping the engine

To stop the engine with glow ignition, remove the bodywork and place the palm of your hand or a pad of cloth over the air filter intake or close the carburettor needle (53) completely. In the case of Spark ignition, proceed in accordance with the relevant section on page 9.

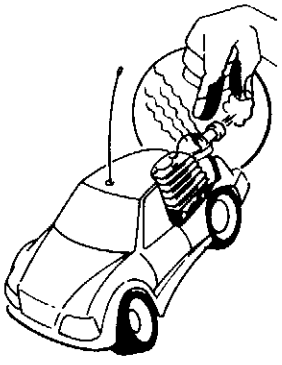


Fig. 23

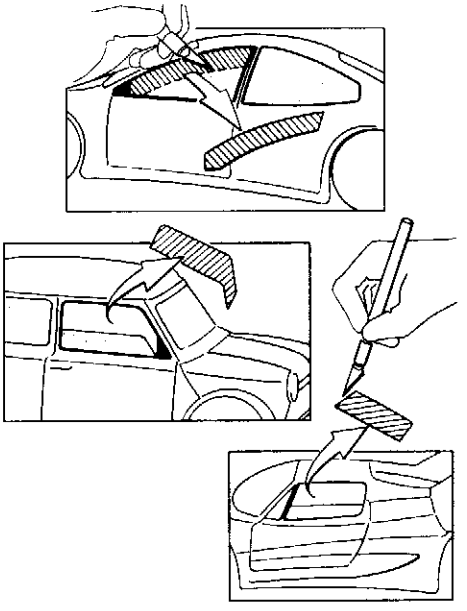


Fig. 24

The engine does not start or does not continue to run - glow ignition (for spark ignition see page 14 - combined with page 20).

This may be due to:

- A wet plug (flooded engine).
  In this event proceed as follows:
  - simply unscrew the glow plug (82) and blow on the plug's element to dry it;
  - close the carburettor needle (83) by screwing it down fully in a clockwise direction without forcing it;
  - turn the engine over either by applying the starter on the nut (45) or by grasping the rear wheels with your hands and revolving them sharply in a forward direction two or three times until the engine has emptied itself of the excess fuel;
  - replace the plug and tighten it without forcing it;
  - open the carburettor needle (53) 1,5 turns and start the motor again in accordance with the paragraph "Starting" on page 20.
- Lack of current
  This may be due to:
  - a burnt-out "glow" plug (replace it);
  - the battery which lights the plug may be run down (recharge it).

❑ Warning (Fig. 23)

When the engine is running and immediately after it stops, the exhaust muffler reaches a very high temperature.
Be careful not to touch it to avoid the risk of bad burns!

❑ Advice regarding the application of stickers and regarding engine cooling

- In order to apply stickers to the car's body you should soak them in soapy water in order to make it easy to slide the stickers into the desired location. This treatment does not weaken the adhesive effect of the glue on the stickers.
- To help cooling, proceed as shown in fig. 24.