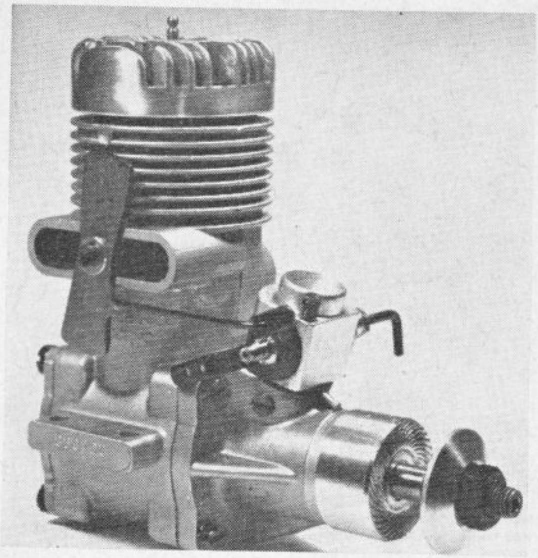


Peter Chinn's RADIO MOTOR COMMENTARY

On test, the combination of high torque under heavy loads and an above average peak b.h.p., gave the Super Tigre G.60F an excellent performance on a wide variety of props.

Super-Tigre G.60F R/C

The Super-Tigre G.60F R/C is one of several Super-Tigre engines which, based on the G.60 series castings and covering the .60 to .71 cu. in. displacement group, are the biggest and heaviest engines offered to date by the Italian Micromeccanica Saturno factory.

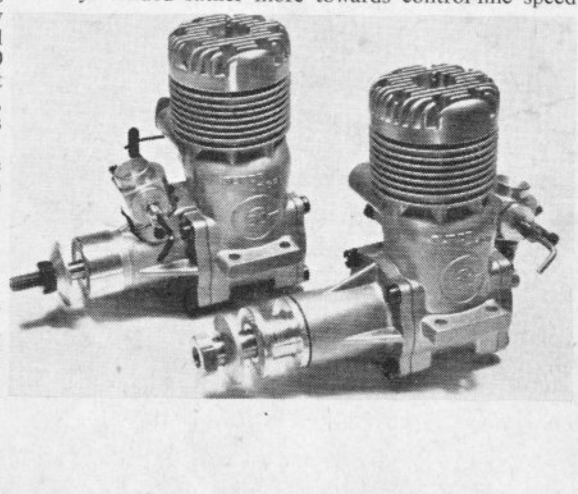
The original 1966 model, from which the G.60 series has evolved, was, in essence, a control-line speed type motor having the familiar racing engine features of twin ball-bearings, disc-valve induction and solidly proportioned castings, together with the well-known Super-Tigre racing pattern cylinder porting and, a new departure, an aluminium piston with a lapped Meehanite band instead of rings. An R/C version was also announced. This had orthodox porting, an aluminium piston with baffle and two rings, a modified cylinder-head, a different shaft and prop driver assembly, plus, of course, the obvious changes necessary for an R/C engine such as the throttle type carburettor and a different backplate. Both these models (but with a number of modifications) continue in production. Other models include the G.65 Racing C/L engine (for the U.S. market) and the G.71 R/C which, like the G.60 R/C, is also now made in a shaft-valve (G.71F R/C) version.

We have recently had one of the latest G.60F models on test. Compared with the original 1966 rear-induction G.60 R/C, it is 1¾ oz. lighter and has appreciably less overhang, both front and rear, reducing overall length by more than an inch to 4.4 in. The G.60F is, of course, still considerably heavier and more bulky than the older ST.60 series engine of the same cylinder capacity, but our test model produced quite a bit more power; sufficient, in fact, to give it a slightly better power/weight ratio than was achieved in the last test we made of an ST.60.

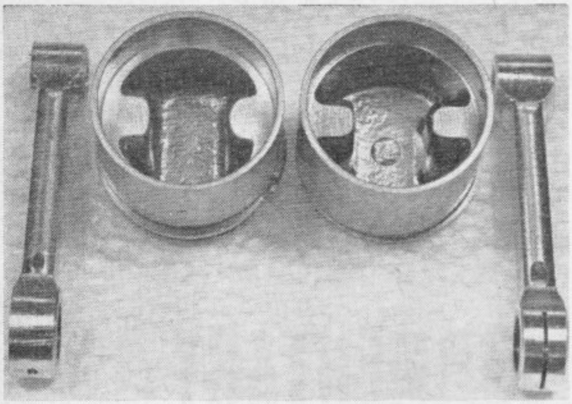
Most noticeable was the very much greater torque developed by the G.60F. Running without a silencer, the G.60F actually recorded the highest maximum torque figure we have obtained to date for a production 10 c.c. R/C engine. This was reflected in the engine's ability to turn very big props at useful speeds; for example, a 14 x 6 PAW Trucut beech prop at 7,900 r.p.m. and a 14 x 6 Top-Flite at 8,550 r.p.m. These figures (using, of course, our standard R/C test fuel) were slightly better than we obtained for the Series III Merco 61. However, the recommended Super-Tigre S.71 type silencer absorbed more power than the Merco's new 'Peak Power' silencer, so that, when 'silenced' the G.60F lost its advantage. Nevertheless, even with its silencer, the Super-Tigre remained a potent engine, as the following extract from our notes indicates. These figures were obtained after the engine had accumulated just over one hour of running time, using the Super-Tigre bar-type plug supplied, and on 5 per cent nitromethane fuel:

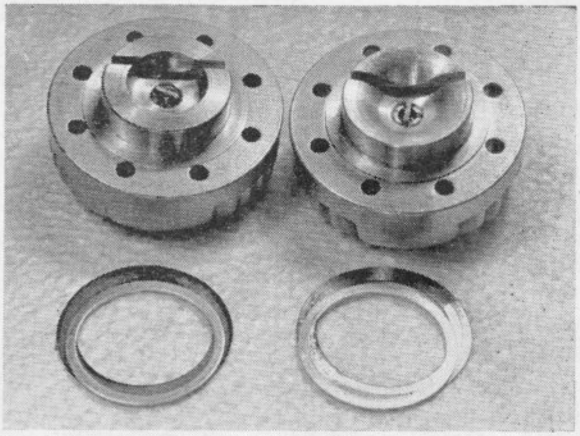
9,600 r.p.m. on 13 x 5½ Top-Flite wood
10,400 r.p.m. on 12 x 6 Power-Prop wood
9,600 r.p.m. on 11 x 8 Top-Flite wood
10,000 r.p.m. on 11 x 7¾ Bartels glass-fibre
10,400 r.p.m. on 11 x 7½ Rev-Up wood
10,600 r.p.m. on 11 x 7 Rev-Up wood
10,900 r.p.m. on 11 x 6 Top-Flite wood
12,000 r.p.m. on 11 x 5 Top-Flite wood

The carburettor fitted to our test model was a standard barrel throttle type without airbleed and, when closed to a low speed setting, tended to run too lean at all times. Super-Tigres are finely built engines and most of them are at the top of their respective classes as regards power, but R/C throttles have not been among their stronger points – possibly because the factory's major interest has always tended rather more towards control-line speed



The current G.60F (left) compared with the original 1966 model rear-induction engine from which it was developed. The shaft valve model is an inch shorter in overall length and weighs 1¾ oz. less.





type motors. Numerous different Super-Tigre R/C carburettors have been fitted over the past few years and we understand that another new one is in the offing, which could be the answer. An alternative is the Kavan carb and this is, of course, favoured by very many Super-Tigre 60 owners.

Apart from this, the G.60F handled very well. Once run in, it started quickly and ran smoothly and evenly. In spite of its high performance, it remained easy to hand start, even when very much under-propped.

In addition to the obvious difference of shaft-valve induction and the resultant changes in the front housing and backplate unit, compared with the original G.60 R/C (described in these columns just two years ago) the G.60F incorporates several modifications. Some of these are to be found on the latest version of the rear induction engine also.

The cylinder head, for example, which formerly used a wide, sharply defined squish band on an almost hemispherical combustion chamber, is now softened to a bell shape. It is interesting to note that, in this respect, it somewhat resembles the combustion chamber shape of the HP 61 described last month except that, as the Super-Tigre does not have a deflectorless piston, the new G.60 head is still slotted for piston baffle clearance.

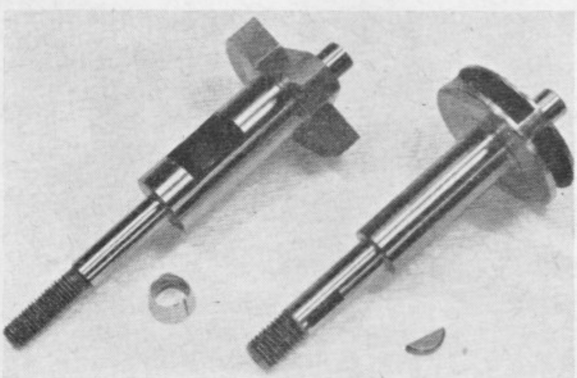
A slightly lighter piston with one, instead of two, compression rings, is used and the connecting-rod is also a little different with slits instead of holes for lubrication. The crankshaft now has the crankweb balance- in the orthodox manner. This replaces the full disc web with peripheral slots which was used on the original G.60 R/C without the aluminium sealing rim employed on the C/L racing version.

Top left are the original G.60 R/C piston and conrod. Latest type piston is lighter and has a single ring. Conrod is also modified. Above: the new style cylinder head (right) as fitted to the latest G.60 R/C and G.60F R/C engines, compared with the 1966-67 type. Above right: standard barrel throttle carburettor fitted to G.60F. Extra needle-valve and intake shown below are optional and call for independent fuel supply, preferably from separate tank.

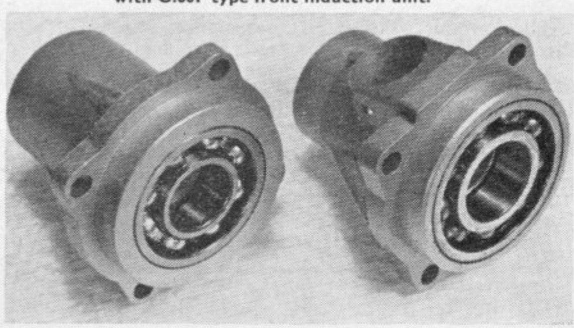
The shaft, having to accommodate an induction passage in the G.60F, has a much larger diameter main journal (15 mm. instead of 12 mm.) than the disc-valve G.60. It runs in a larger ball bearing at the rear, but a smaller one at the front where the shaft is reduced to 7 mm. dia. The prop driver, reverting to the cup type of the ST series instead of the bobbin pattern common to the racing G.60, is mounted on a split taper collet instead of using a Woodruff key.

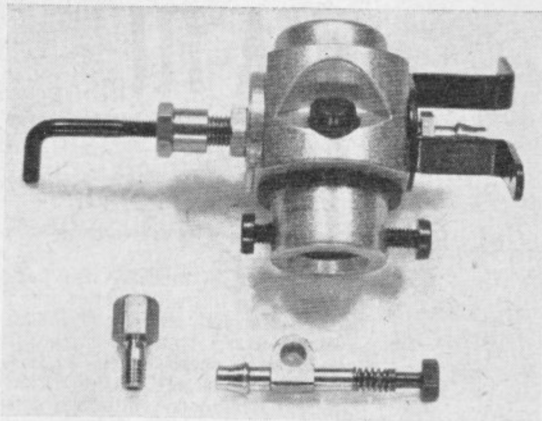
The G.60 engines are noticeably taller in overall height than most .60 class R/C engines, which might suggest a higher stroke/bore ratio. In fact, the G.60 has the 24 x 22 mm. bore and stroke combination common to nearly all foreign 10 c.c. motors and the extra height is largely due to the manufacturer's adoption, in this design, of a much longer connecting-rod than is usual. The idea here is to cut down connecting-rod angularity and thereby reduce piston side-thrust on the cylinder wall.

In standard trim, as supplied, the G.60F weighs just under 16½ oz. This is increased to a little over 19 oz. when the pivoted plate type exhaust restrictor is replaced by the S.71 silencer. The silencer is effective and is easily taken apart for cleaning. Details of its design can be found in the July and August 1967 issues of *R.C.M.&E.*



Left: G.60F crankshaft (far left) and original G.60 R/C shaft. Note different methods of keying prop driver to shaft. Below: standard G.60 front housing and bearing assmbly (left) compared with G.60F type front induction unit.





Kaneko Fuel Pump

The Japanese KNK company are best known for their model power boat kits, large high performance model marine engines (up to 50 c.c. with optional electric starting) and many interesting items of hardware. The company is run by Mr. Y. Kaneko, a dyed-in-the-wool model enthusiast whose achievements include, for example, a set of components for the construction of a 5 c.c. engined radio-controlled jeep, complete with fan and radiator cooling system, clutch, gearbox, differential back-axle, springs and, of course, steering gear and throttle.

A recent addition to the KNK accessory range is the diaphragm type fuel pump illustrated here. The system is intended primarily for model boats but may have possibilities for aircraft also since with it, fuel tank position, or fuel head through manoeuvres, are rendered much less critical.

The device is a diaphragm *pump*, not merely a diaphragm type fuel metering unit like the Jim Walker Fuel Regulator remembered by C/L stunt enthusiasts of yesteryear. With the KNK pump, the fuel tank is not pressurised. The pump, in fact, draws fuel from the tank in the same way as the ordinary diaphragm fuel pump on a car, but is not mechanically or electrically driven. Instead, the diaphragm is operated by pressure *fluctuation* within the crankcase.

The pump unit has a machined aluminium body 32 mm. in diameter and 11.5 mm. deep. On one side there is a single brass inlet nipple for connection to the tube from the tank. On the other side there are two more nipples: one for connection to the fuel delivery line to the carburettor and the other for connection to the pressure pipe from the engine crankcase.

The pump body is machined in two halves. These are held together with screws with the diaphragm clamped between them. The fuel inlet (from the tank) and the pressure connection (from the crankcase) are opposite each other on the inlet and outlet sides of the pump. A shallow concave chamber of about 15 mm. dia. is machined in the inner face of each side of the pump body to allow diaphragm movement. On the inlet side, the pump body is internally drilled to connect the pumping chamber with the outlet nipple, having first gone through a small secondary chamber incorporating a diaphragm operated non-return valve.

An essential part of the system is the special fuel tank pick-up. This incorporates a ball-type non-return valve and a gauze and felt filter. The engine crankcase must, of course be tapped direct (i.e. a rotary-valve timed pressure outlet must not be used) since the system depends on the use of both negative and positive crankcase pressures.

The pump can be installed in any convenient position between the fuel tank and engine. In a boat, a suitable position is in the top of the tank.

Let us envisage, for the purpose of explaining its *modus operandi*, the pump installed horizontally with the tank-to-pump connection at the bottom and the two pump-to-engine connections at the top. As the engine's piston rises and a negative pressure is created in the crankcase, suction draws the pump diaphragm upward which, in turn, results in a pressure drop on the lower side of the diaphragm causing fuel to be drawn into the fuel delivery tube from the tank. Each successive suction stroke lifts the fuel higher until it reaches the pump chamber.

Of course, the reciprocal positive pressure created by the downward stroke of the piston forces the pump diaphragm downward but, as the non-return valve in the pickup filter prevents fuel from escaping back into the tank, it moves, instead, through the drilled passages communicating with the outlet tube to the carburettor. Likewise, on the suction stroke, fuel cannot be drawn back from the carburettor because of the additional diaphragm type non-return valve incorporated in the outlet side of the system.

The KNK pump unit has overall dimensions of approximately 1.24 in. x 1.26 in. dia. and weighs $1\frac{1}{8}$ oz. The tank filter and non-return valve unit measures 0.85 in. x 0.65 in. dia. and weighs 3/10 oz.

Below: The KNK fuel pump unit. Diaphragm pump, left, is operated by fluctuating crankcase pressure (crankcase nipple at left). Special fuel-tank pick-up unit is essential part of system. Below right: parts of the KNK fuel pick-up. Unit incorporates a non-return valve and gauze and felt filter.