Questo motore si differenzia dai precedenti modello nelle seguenti parti: Biellismo: a dimensioni inalterate è stato sostituito la qualità dei materiali sia della biella che dell’albero motore. I nuovi materiali presentano caratteristiche meccaniche atte a resistere agli forti torsionali. - Cilindro: il cilindro si presenta composto da una nuova lega di alluminio e conserva la canna interna cromata. A differenza del passato, la cromatura viene sottoposta ad un trattamento speciale prima dell’applicazione di retifica finale. - Accensione: l’impianto di accensione è fornito, in alternativa, mediante spinterogeno oppure volano magnete.

Some confusion seems to occur between the different models of B.M. engines so to try and clear this we have prepared the table below giving the relative details of each. Externally all the FC models have a crankcase with cooling fins, all other models do not. Internally all European models have a long and stroke of 48mm x 26mm giving a swept volume of 977cc. Models with an iron liner are rebores to a maximum size of 48.55mm giving a swept volume of 999cc. As the list shows some models have a two-piece crankshaft—where the crankpin is forged as part of the drive side crank half, whilst the others have the three-piece assembly with the separate crankpin. The two-piece crankshaft is more expensive to produce but gives a better inertial moment shape owing to the increased mass on the inlet side crankshaft web. These main differences lie in the connecting rod centres and type of piston used. The early model B.M.s were very similar to the Sprints and Parilla engines but the FC110 introduced in January '52 broke new ground by having a connecting rod with centres of 110mm and the piston having the separate pin condition existed 4mm nearer to the crown. The idea of this was to reduce the smaller acceleration of the rod and piston loading. Both items were made lighter to take advantage of this and to give more acceleration. However trouble was experienced with the piston cracking upwards from the gudgeon pin boss. In contrast the two-piece modified with three reinforcement ribs above the gudgeon pin boss instead of the original one. This increased the weight of the piston slightly and together with other technical problems caused a number of connecting rod failures. The increased length of the connecting rod in the FC110 led meant a small loss in primary compression so to offset this early engines were fitted with small piston that suffers cast into the root of the crankcase. Development, however, showed that these caused obstruction of the gas flow into the engine and the transfer ports were therefore removed. For America's conversion of the FC110 was to fit a 104mm rod with the 1897 piston but this was not homologated for Europe. After a lot of experiments by the factory in 1970 the FC100 and FC106 with a new liner material, new pistons, bolted rods and detail improvements were homologated for 1971/72 and the FC110 discontinued. It is possible by machining both the top and root of the crankcase, also the base of the cylinder, to convert the FC110 to a similar mechanical specification to the current FC100 or FC106. A warning, however, that this work requires great precision and should only be entrusted to a very competent machining shop.

Currently achieved experiments are being carried out on three cylinders of five porting cylinders but so far none have shown a conclusive improvement, some engines are better whilst others are not. If, however, future experiments should prove a conclusive improvement the necessary modifications will be incorporated in production engines.

The port timings in the latest B.M. engines are the result of years of experimenting and experience and as a result are the best compromise for all round performance and reliability. The latter should always remember that before he decides to alter his ports to improve performance; first check that the engine is mechanically as it should be, i.e. the crankshaft is running completely true and is not ripped in the crankcase. The cylinder bore is round and true and has the correct piston skirt clearance. The piston and connecting rod are the right type as overweight and non-standard parts can upset the crankshaft balance factor and thus reduce both performance and reliability.

There are twice before using that file or rotary cutter if you still feel compelled to have a "tapp" try the rotary valves, that's easier and cheaper to replace.

<table>
<thead>
<tr>
<th>Model</th>
<th>Introduced</th>
<th>Currently Available</th>
<th>R.A.C. Class</th>
<th>A.mm</th>
<th>B.mm</th>
<th>C.mm</th>
<th>Assn</th>
<th>Piston Type</th>
<th>Remarks</th>
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<tr>
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<td>Jan. 65</td>
<td>No</td>
<td>Junior</td>
<td>155</td>
<td>100</td>
<td>28</td>
<td>1312</td>
<td>Chrome Cylinder</td>
<td>3 Piece Crank</td>
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<td>22</td>
<td>1966</td>
<td>Iron Liner</td>
<td>2 Piece Crank</td>
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</table>

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B.M. INFORMATION

BY JOHN MILLS  Part 2

In our last issue we published an article by John Mills which threw light on the specification of the various B.M. models produced to date. Unfortunately for some mysterious reason we omitted a drawing from the article rendering the accompanying table useless. We have therefore decided to repeat this and trust all is now clear with the missing illustration. Incidentally the correct bore and stroke of European model B.M.s is 48 m.m. x 64 m.m.

<table>
<thead>
<tr>
<th>Model</th>
<th>Introduced</th>
<th>Currently Available</th>
<th>UK</th>
<th>RAC Class</th>
<th>A.m.m</th>
<th>B.m.m</th>
<th>C.m.m</th>
<th>Asse</th>
<th>Piston Type</th>
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<td>Junior</td>
<td>100 Nat.</td>
<td>155</td>
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</table>

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GO BULTACO AND WIN

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The factory claimed that although the engine comes with a 5 ported barrel, the piston is without the 5th port so that the engine can be run-in before the modification. This may be the true reason but there is no doubt it is useful that their action both saves them work and could provide them with a lot-out if an engine blows up and it can be shown that the piston has been incorrectly ported.

The port timings on the engine we examined are very interesting when related to that normally used. Basically the exhaust period has been extended by having a timing of 83º b.b.d.c. Such a timing would tend to improve top and performance and it may be that...
the small inlet stub diameter is to help compensate for this. The transfer and 3rd ports are set lower than usual at 58° bbdc whilst the 5th ports are higher at 61° bbdc.

Piston

The piston in the engine looks very like that from a Komet but has a 2 m.m. button ring instead of 1.5 m.m. and there is only one reinforcing rib inside it so the piston is lighter. A lightweight gudgeon pin supplied as standard.

The little end is a bush bearing and the connecting rod is the same length as a Komet, i.e. 96 m.m., hence the engine's model number. A 100 m.m. rod length version is also available and is known as the FK 100 in Britain.

The exhaust system is a new one for DM and is much shorter than that normally used by them or Parilla. At 22½ in. instead of the usual 23 in. it appears to be identical to an early Monza unit. The expansion box is 3½ in. diameter and terminates with a ½ in. outlet pipe. The end cone has been covered with a drum after the cone has been drilled with 30 3/16 in. holes. The space between the drum and cone has been tightly packed with a substantial quantity of glass wool and the end then capped off with a cover held by three self-tappers.

The transfer passages and all the bottom throat units are very clean and nicely flowed. The long 5th ports can be seen flanking the 3rd port.

Better dimensions?

It will be most interesting to see what effect on actual track performances the change to Komet dimensions will have. The flow configuration internally appears to have been nicely executed and the quality of matching is excellent. The head-on clash between the two deadly rivals of DM and IAME (Komet, Parilla, Vega and Saeetta) will now take place in real earnest with the struggle being settled at this year's World Championships. A good augury for the motor was the way the actual one we examined won first time out in the hands of Paul Fletcher straight-out-of-the-box. The price of both the FK 96 and FK 100 in three port trim is £110.
B.M. FC100
Stroke 54 mm. Bore 48 mm.
Capacity 97.7 cc.
Max. bore 1.912″ = 48.565 mm.

No model B.M., other than the FC100 is allowed the 5.335″ connecting rod or 15mm piston. The figures in brackets below are for the F100 JB.
Scheda di Omologazione 1975-76-77

Fiche d'Homologation

MOTORE PER KART - CATEGORIA 100 cc INTERNAZIONALE
Motors pour Kart - Categorie

Casa Costruttrice  
Constructeur

BM MOTORI - PIACENZA (Italy)
BM FC/52

Modello  
Modèle

1974

Anno inizio fabbricazione  
Année de début de fabrication

L'omologazione è valida dal  
L'homologation est promenée à compter du

1° GENNAIO 1975

N. pagine che compongono la scheda  4
Nombre de pages comprenant la fiche

Timbro della C.S.A.I.  
Cachet de l'Automobile Sporitique Nationale

Timbro della F.I.A.  
Cachet de la F.I.A.
**TESTA**

forma della camera di scoppio

Materiale: Alluminio

Tollerance generale: Materiale lavorato ± 1 mm.
Tollerance geometria - superficie nera
Garanzia lattice - anche nel perno

Peso: Kg. 2,0

Materiale fumo: ± 1%

Collettori conducca

**CILINDRO**

Materiale: Alluminio con olio in ghisa

44

R = 3
Scheda di Omologazione 1975-76-77
Fiche d'Homologation

MOTORE PER KART - CATEGORIA 100 cc INTERNAZIONALE
Motom pour Kart - Categorie

Casa Costruttrice
Constructeur
BM MOTORI - PIACENZA (Italy)

Modello
Modèle
BM/FCL

Anno inizio lavorazione
Année de début de fabrication
1974

L'omologazione è valida dal
L'homologation est prononcée à compter de
1° GENNAIO 1975

1. Fotografia del motore visto dal lato motore
1. Photographie du moteur, côté moteur
2. Fotografia del motore visto dal lato opposto
2. Photographie du moteur, côté opposé

N. pagine che compongono la scheda, 4.
Nombre de pages comprenant la fiche, 4.

Timbro della C.I.A.
Cachet de l'Autorité Sportive Nationale

Timbro della F.I.A.
Cachet de la F.I.A.
**TESTA**

Forno della camera di scoppio

**VOLUME**: camera scoppio ca. 9.2

**MATERIALE**: Alluminio

**Tolleranze generali**: Materiale lavorato: ± 1 mm.

**Tolleranze medie**: material used

**General tolerances**: machine part

**PESO**: Kg. 1.550

**MATERIALE lussi**: ± 2%

**Material cutoff**

**CILINDRO**

**MATERIALE**: Alluminio con carica in ghisa

**DIMENSIONI**:

- 44
- 25
- R = 7/
Albero motore e biella

Materiali: Acciaio
Peso: Kg 1,000

BIELLA
Scala 1:1

Materiali: Acciaio
Tolleranza 10% in meno
Peso: Grammi 165

98
THE NEW B.M.s

There is nothing quite so melancholy as an Italian who feels that the dice are loaded against him and at the moment there are some very long faces at B.M. Superficially one might imagine that this important Italian kart manufacturer had everything going for him. First started when the principal of the giant Astra concern, Camillo Bertuzzi, heavily involved with General Motors products and manufacturer of earth moving equipment and military tanks, took up 125cc with good box kart racing. Not surprisingly, with such superb resources behind him he quickly became involved in the tuning of his engine and eventually the construction of same.

One of the tycoon’s enthusiasm for the sport developed motors that were originally somewhat fragile but also extremely fast. Their hunger for success became a burning passion which led to such kamikaze efforts as the F100 GS with its infamous hand controlled additional air inlet into the cylinder. When neck-and-neck with another competitor one was forced to pull the lever so admiring extra air to weaken the mixture and get you past the opposition. Not surprisingly few competitors could be trusted with such a control.

Gradually all sorts of rumours started about B.M. — that a large shipment was returned from the U.S.A. to Europe as unsatisfactory and that there were in turn resent to our kartists. Marketing the motors has always appeared unconventional with tales of Swiss business men sometimes handling the sales and even the use of the barrier system with a kart manufacturer swapping his chassis frames for engines. Successes have never been easy to obtain and there are often long periods when B.M. comissariates report that they cannot get a reply from the factory to letters or telegrams.

Winning the World Championship in 1965 with Guido Sale and in 1966 with Tom Nielsen whetted their appetite for the big title and they have always concentrated on prestige event successes rather than steady commercial practice. Their 1974 effort was conducted more like a Formula 1 crusade with the foundations being laid in two of the world’s best drivers — Neepa and Goni, backed up by young Gabbiani. The factory engaged the most revered of tuners, Franco Baroni to work on B.M. development with Augusto Fiordelli continuing as General Manager. Special karts were made using the finest materials to ensure that the best possible use could be made of the excellent performance available. Drivers attempting to buy B.M. karts for their own use quickly found themselves faced with either figures having too many zeros on the end or a blanket of silence if they were well known campaigned of B.M.’s rivals.

Through a series of mishapadventures, of which the majority could be put down to bad luck, B.M. made no showing in the overall results of the World Championship and it was a very crushed and disillusioned team that returned to the home factory at Parma, where the race is being held. Other troubles were looming on the horizon which had started when the American importers of B.M., APPCO, asked them to prepare reed valve models for their market so that the popular U.S.A. reed valve class could be attacked. APPCO paid for the engine parts but the two American controlling bodies must have got the wind of the idea for the class became AMERICAN reed and then it was tightened even further by making it specifically a McCulloch class. Mr. Bovelli senior entered the picture with a proposal for the reed valve
motor to be revived, still under the B.M. name, but with his financiers and possibly a certain undertakings relative to his son (the current World Junior Champion). Contracts were apparently drawn up and signed only for B.M. to change their mind. We hope to enlarge the character of Robbili in a subsequent issue but suffice it to say that he made no attempt to enforce his rights by legal process but simply brought up most of the premises where B.M.'s were being manufactured and hired the majority of their key personnel and set them to work to produce the four models of the Siro motor.

With the three year homologation period rapidly approaching, B.M. with no workshops and few mechanics, were in an acutely difficult position to make the prototypes and the initial 25 engines for inspection of each of the four models they intended to introduce. In the end, Dante Garbini, owner of a large woodworking machinery manufacturing company and father of a rapid junior driver. stepped in the breach and offered the use of his factory. No doubt some stringent tests were made to ensure his son was supplied with top motors for the World Championship.

As the homologation data approached so the Italians entered their annual silly season for major strikes and in the end just managed to get three models ready by the skin of their teeth, the FCL 2C having to be withdrawn. Although the K96/3, FC52 and FCL are all unmistakably B.M. in their external appearance, there are in fact considerable differences in the structural castings and a great divergence in the internal design.

K96/3
With a stroke of 48.6 mm (the same as the FCL) the K96/3 is based on their K96 which two years ago took up the classic stroke dimension pioneered by Komet and now used by DAP, Delta, Upton and Zip. It has a 36 mm connecting rod and the porting incorporates a third transfer passage—the first time it has been adopted by B.M. A very rare feature these days, due to the cost of construction, is the use of a 2 piece crankshaft. The K96 had a 5 ported barrel and 3 piece crankshaft.

FC52
This model has a 52 mm stroke (a new figure for a B.M.) and 48.9 mm bore and has to have a longer con rod of 98 mm. The crankcases look very similar from the outside, having a slight barrel shape. There is a 3 piece crankshaft but combustion chamber, rotary valve and the use of three transfer passages follows K96/3 layout and design. The earlier FC100 had a 54 mm stroke and a two piece crank whilst the FC100/3 had a three piece crank. This is all most confusing because B.M. appear to have changed their numbering system! The /3 in FC100/3 indicated the crankshaft type whereas in the 96/3 it refers to the number of transfer passages.

FCL
This model has a 48.5 mm stroke and 50.7 mm bore and incorporates a Yee reed induction into the bottom of the valve and a booster port apparently fed from the inlet passage on the cylinder side of the rear. There are four reed petals on the valve, there is a 96 mm rod and a three piece crankshaft. Unlike the other two models which have two bolts securing the head to the barrel in addition to four long studs, the FCL only has the latter. The head has a flat top to the finning, which is lower to the front of the engine than at the back whilst the crankcase is also distinctly different having a very wide base supported on short stubby legs.

It is said that Goldstein has spent much time testing B.M. engines and cars in Italy and will spinwheel the factories renewed efforts for 1975. It has also been said that the temperamental Maestro has returned to Belgium unconvinced as to the merits of continuing this relationship—only time will tell whether these solemn faces of the men at Piaccouia will become jubilant at the World Championship.
The international homologation took place in January at Paris and as a result the Italian engine manufacturers arranged the announcement of their new motors, whether intended for racing in Europe or not, at around that time.

Guazzoni

It has been a long time since we had a Guazzoni engine for karting and the new model VR10 appears to be a serious attempt at getting back amongst the competitive engines.

The stroke is 54mm and the bore 48mm, figures pioneered by the first rotary valve kart engine, the Saetta VII, but new to Guazzoni. The barrel appears to be square when viewed from above and instead of parallel head fins, like the Guazzoni VR8 etc., they are splayed radially and look very like those on the Komat K77. Carburation is by Dell'Orto MB22A and MB24 units.

B. M.

The B. M. FC100 appears to be exactly as homologated for Britain with stroke and bore of 54mm and 48mm respectively. Interestingly enough, both the Guazzoni and the B. M. appear to weigh 25 lbs. (11.6kg) which is 1.3 lbs. more than most other Italian engines.
Supplement number 3 to Part One of the

KART ENGINE SPECIFICA

B.M.

To distinguish the B.M. F100 from the B.M. F100 JB and B.M. F100 GS

The difference in barrel shape when seen from above of the B.M. F100 (right) and the models in class I Super (left)
BM F100

Stroke 54 mm, Bore 48 mm. Capacity 97.7 cc.
Max. bore 1.912" = 48.565 mm.
Alternatives allowed—die cast barrel, head, crankcase and valve cover.