

be known in the U.K. at the moment but its recent acceptance by the RAC MSA for 100 National & Super, and its promotion by the importers Red Dragon, is certainly going to change all that.

The story started at the end of the 1970s when R & E Folghera, hence the name REFO, made their first CIK engine application. Situated in the German speaking part of northern Switzerland at Gebenstorf near Zurich, the motor caused quite a stir with its availability in various combinations of multiple ports and passages.

Despite being a modest sized factory in a village community, the Folghera engineering firm is famous for its development work for major motorcycle firms such as Yamaha. The company prepared and maintained the World Championship winning side-car outfit of Rolf Biland.

REFO make their position clear from the outset — they are not interested in high volume production. Motors are produced by a small team of Folghera, Alex Bollhalder and another skilled engineer, and each is hand finished with all work on the barrel completed prior to Nikasil treatment of the bore.

All engines are fully tuned with the aim being that they can be raced without any further work. Not only do they insist that there is no comparison between their 'full tuning' and the 'factory selected' description by some other firms, but they are also proud of their design's individuality — it is no copy of a Rotax.

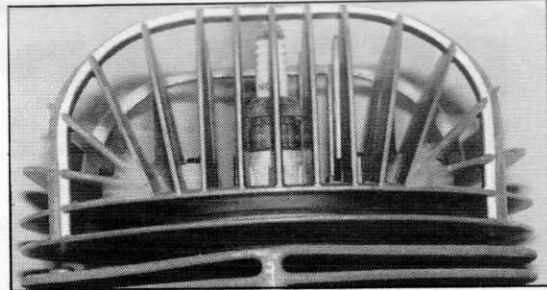
The models are identified by a letter indicating the homologation date, A for 1980, B 1983, C 1986 and D 1989, and a number to show the number of transfer ports. We examined the D5, the one approved by the RAC MSA.

REFO D5

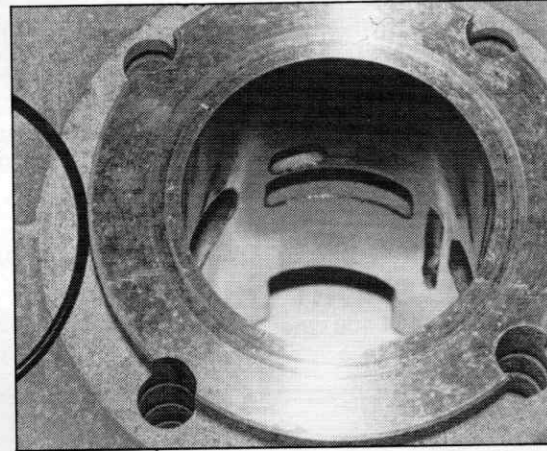
For most kart enthusiasts the Swiss kart industry can be summed up as comprising the efforts of two families. There are the Vokingers with their major trading and manufacturing concern of Swiss Hutless, and Mr Aebi, producer of those jewel-like IBEA slide carburettors.

Over the years there have been several attempts to make kart motors in Switzerland but somehow they never seem to have got beyond a small production run for homologation purposes except, that is, for the REFO. The latter may scarcely

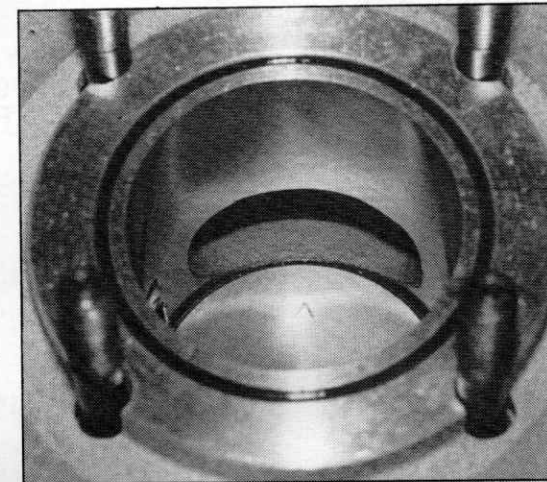
Head fins are linked by two straps.



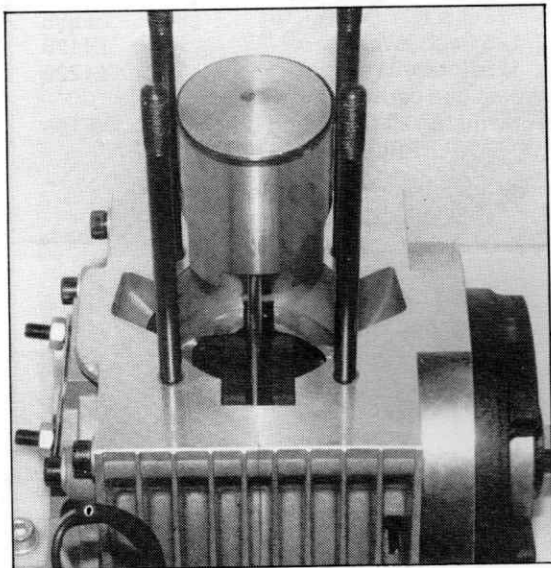
Supplementary exhaust ports sit above the transfers. Not booster transfer slots.



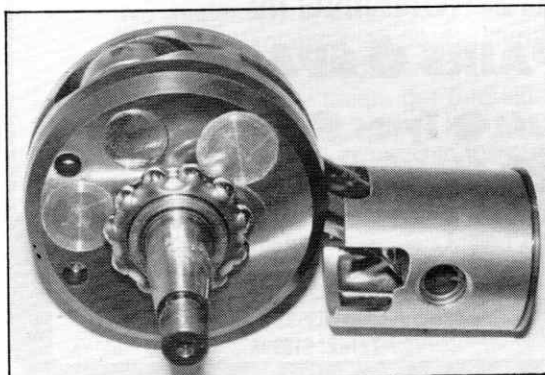
Main exhaust port and head sealing 'O' ring in position.



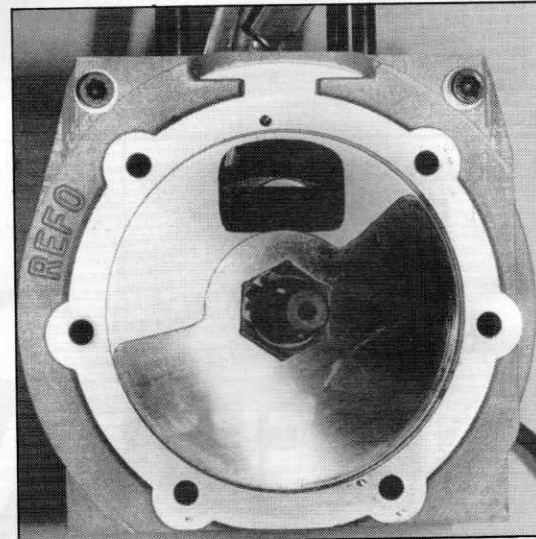
Massive top deck to the crankcase.



Crankshaft is by Hoekle and piston by Mahle.



Rotary valve has a hexagon drive.



It is a classic long stroke motor, the 54mm stroke and 48.5mm bore giving a capacity of 99.76cc. Due to the Nikasil bore surface, the factory claim no cylinder wear of note and state that barrels could last for 5 to 10 years. In addition there is controlled expansion with minimum distortion, and the cooler running enables greater power for longer periods.

The piston, made by Mahle, is of a single ring type with an unusual skirt design. The clearance between piston and Nikasil bore is just 0.06mm and running is said to take only one kilometre. The

piston to head clearance is 1mm and the combustion chamber volume is 9.6cc.

The list of famous names continues with the crankshaft, which is made by Hoeckle, the high priests of crankshafts, and it supports a special REFO connecting rod with an IKO Thomson 15 roller big end bearing. The main bearings are special three part L20s from Japan.

Kedrick Davies of Red Dragon took a REFO along to Paul Carr and Andy Cox for dyno testing, first using an IAME stepped exhaust pipe then a REFO system, all at 79.5cm length, with the following results:

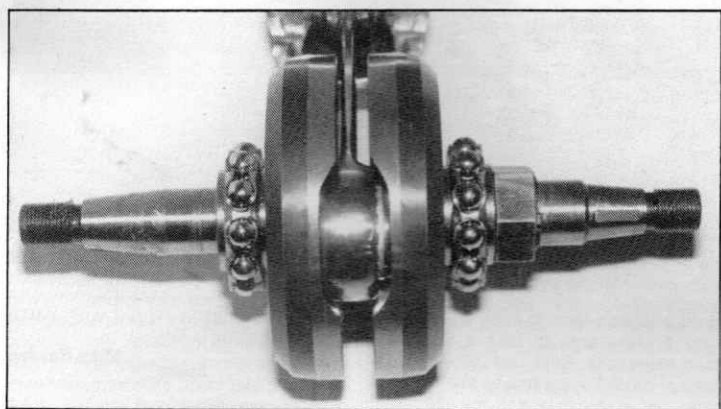
| RPM | REFO IAME STEPPED PIPE | | REFO EXHAUST PIPE | |
|-------|------------------------|-------|-------------------|-------|
| | POWER N/M | HP | POWER N/M | HP |
| 8000 | 95.1 | 13.34 | 95.2 | 13.35 |
| 9000 | 100.6 | 15.80 | 114.2 | 17.94 |
| 10000 | 119.5 | 20.96 | 122.6 | 21.50 |
| 11000 | 119.4 | 23.12 | 125.8 | 24.35 |
| 12000 | 107.2 | 22.56 | 115.1 | 24.22 |
| 13000 | 89.0 | 20.23 | 96.5 | 21.93 |
| 14000 | 72.5 | 17.80 | 74.9 | 18.39 |
| 15000 | 58.2 | 15.35 | 55.0 | 14.50 |
| 16000 | 42.0 | 11.78 | — | — |

8 hours, small end thrust washers when a new piston is fitted, big end bearings every 2 to 3 hours, rotary valve after 3 hours, main bearings after 7 to 8 hours, and piston after 3 hours.

Now as to the cost of all this quality and precision. Complete with Motoplat ignition and big bore exhaust bend the motor retails at £795. The special REFO exhaust pipe is £55, piston and ring £27.50, rod with pin and big end bearing £85, barrel re-plating £50, new barrel £240. VAT is extra to all these prices.

So how do we finally sum up the REFO? Due to the personality of Mr Folghera and the Swiss location of the company, this is a very conservative product. Rather than make exaggerated promises, the business of producing a competitive product has been tackled in a careful and methodical manner. They buy the very finest of specialised components so that every motor that leaves their doors benefits from a top specification and hand finished tuning.

They are one of the first firms to try and remove the stage of the third party tuner from the equation. In effect, all their motors are the equivalent of a factory team engine. There is an initial financial cost but theoretically the ongoing expenditure is reduced to maintenance alone. This Swiss style of doing business is sure to make a lot of sense to many racing in the competitive National and Super classes.

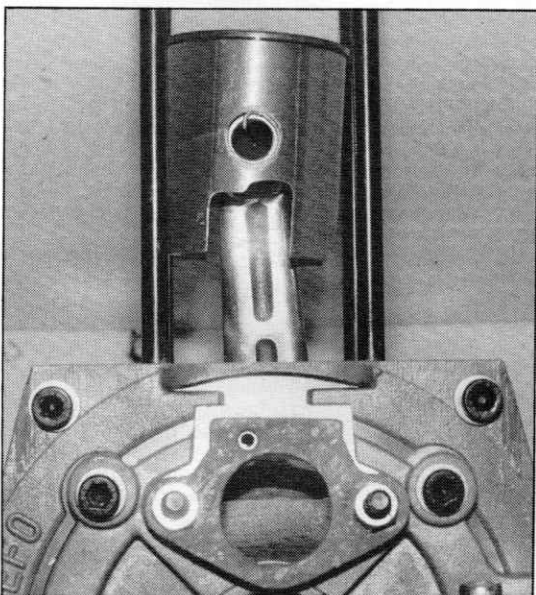


Con rod big end eye is not slotted.

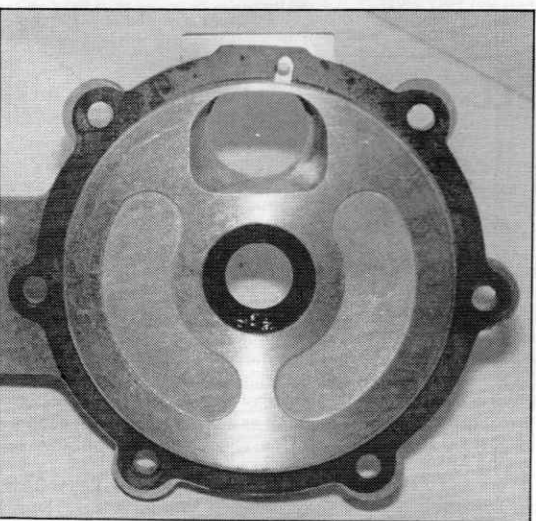
To help new owners this advice is given. Ignition timing normally 2.5mm btdc and 2.25mm btdc on very fast circuits. The coil should be rubber mounted and fitted with an earthing strap. Recommended spark plug for dry conditions either Bosch W08CS or NGK B10EG. In the wet Bosch W02CS, NGK B9EG or Autolite AG2415.

Carburettor no larger than 27mm. Piston clearance 0.06mm when new and maximum 0.09mm. Piston rings to have molybdenum plating with installed end gap of 0.3mm minimum. Petrol/oil mixture using Shell Super M at no less than 7% oil content. Oil seals to be Teflon coated FPJ with two lips.

Replacement times: Con-rod after 7 to



Special rod and unusual shape to piston skirt.



Inside of rotary valve cover has banana shaped reliefs to reduce friction.

SHERINGTON

SHENINGTON K.R.C.
Entries to Sonya Game, 16 Graham Road, Bicester, Oxon. Membership to Jill Wood, 18 Willow Road, Gt. Horwood, Milton Keynes MK17 0QH.

210 CHALLENGE ROUND 7

A fresh but dry day greeted 16 drivers at Sherington for the 7th and final round of the 1990 210 Challenge.

Heat 1. Simon Bateman led the pack away followed by Brian Johnson, Bob Rawden, Peter Higgins and Norman Allen but by the second lap Martin James had moved to 4th and Allen and Keith Edwards also passed Higgins. While Johnson began pressing hard for the lead Rawden dropped from the leading order promoting everyone behind him. Lap 6 and the two front runners, side by side, touched, sending Bateman into the air only to land and continue on his winning way to the flag ahead of Johnson, James, Edwards, Rawden and Chris Flitney 7th from a rear grid start.

Heat 2. As the lights changed it was Keith Edwards' turn to lead Brian Johnson with Simon Bateman, Martin James and Bob Rawden behind, but not for long as on lap 3 both Johnson and Bateman had dropped Edwards to 3rd, soon to be 5th, then 6th. Rawden took over 3rd place from James and Peter Higgins claimed 5th but with no other changes Brian Johnson took a fine heat win.

Final. Simon Bateman had pole, Brian Johnson and Martin James sharing the front row. From the start it was Bateman

chased by Bob Rawden from row 2, James, Johnson, Peter Higgins and Chris Flitney. James quickly took 2nd place and Stuart Warsop and Ernie Winn both passed Flitney who rolled to a halt on the third tour. Rawden lost his 3rd place to Johnson on lap 4 and with no other changes among the top six Simon Bateman took his 13th victory out of 14 starts. Graham Payne, driving conservatively, finished 12th and became the 1990 210 Challenge Champion.

So the series, attracting 25 members from around the county to race over 7 rounds at 4 different circuits between April and October, came to a close. A total of 97 entered all the rounds — an average grid of nearly 14 at each meeting, so demonstrating the competitiveness of the 210 Challenge.

I hope you all enjoyed the series and will support me by being a member and a competitor in the 1991 210 Challenge which is currently being planned. Provisionally it will run over 7 rounds at 4 circuits, Sherington, Little Rissington, Fulbeck and Kimbolton. It is hoped to start in early April and finish in October and dates have been submitted to the relevant clubs which, when they are confirmed, will be published. The number of rounds to count will change in 1991 to the best 5 out of 7, with attendance points from all rounds to be added. The points system will remain unchanged.

Graham Payne

Result

- 1 Simon Bateman — Dino/Villiers
- 2 Martin James — Dino/Villiers
- 3 Brian Johnson — F1/Villiers
- 4 Bob Rawden — Zip/Villiers
- 5 Peter Higgins — Barlott/Villiers
- 6 Ernie Winn — Invader/Villiers

Phil Davis Heat Trophy Positions: Simon Bateman 35 points, Graham Payne 16, John Kettle 9, Brian Johnson 8, Martin James 7, Ernie Winn 6.

Championship Position

| | Rd 1 | 2 | 3 | 4 | 5 | 6 | 7 | Ttl |
|------------------|------|----|----|----|----|----|----|-----|
| 1 Graham Payne | 37 | 37 | 37 | 35 | 31 | 35 | 24 | 236 |
| 2 Simon Bateman | 5 | 33 | 33 | 37 | 37 | 37 | 37 | 219 |
| 3 John Kettle | 30 | 31 | 29 | 32 | 33 | 32 | 5 | 192 |
| 4 Martin James | 24 | 35 | 31 | 5 | 0 | 33 | 35 | 163 |
| 5 Steve Warcroft | 27 | 5 | 28 | 25 | 0 | 30 | 27 | 142 |
| 6 Peter Higgins | 26 | 0 | 32 | 31 | 5 | 5 | 31 | 130 |