

# TECH TIPS

The upper ends of the guides were modified by Bray to accept the Perfect Circle seals. This will require about 15 minutes lathework per guide. Bray removes the upper shoulder from the top of the guide, and then cuts a series of shallow retaining grooves into the guide's surface. In this way, the Perfect Circle seals can enjoy a tight, long-lasting fit on the guide.

In terms of porting, Bray indicates that much of his work involves matching adjacent surfaces and diameters, unshrouding the valves in the combustion chamber, and bending the valve seats and head together. All this is quite important because the stock Ducati ports are rather poorly finished. The exhaust ports appear to be particularly restrictive. And while there isn't enough surrounding metal to remove from the ports for maximum flow, there are many areas to be ground and smoothed.

The intake ports also have their own problems. The front cylinder's intake tract has several different diameters from the manifold down to the valve. It is Bray's feeling that these transitions have deleterious effect on flow through the port, so he makes these transitional areas as free-flowing as possible. The carburetor side of the intake manifold is about 30mm diameter stock. Bray opens this up to about 34mm. Also there existed in our cylinder heads a serious misalignment between the rubber manifold spacer and the cylinder head. It seems that the intake port was cast about three -mm off center. This too was smoothed out.

Generally the internal combustion engine's exhaust valve receives the worst beating of all the parts. This is because of its wide fluctuation of operating temperatures throughout its cycle. Heat is its enemy, and there are but two ways to get rid of it: through the valve guide and through the valve seat. The Ducati valve seats were widened slightly to where they measure about 3/32 inches. This is done at no sacrifice in performance and aids reliability in that it maximizes heat transfer from the valve.

There are many proponents of polishing port surfaces to a mirror finish, but Bray isn't one of them. And for reasons we totally agree with. You see a mirror finish looks pretty but there is serious doubts as to whether this type port will flow any better than one still having an as-cast texture. The mirror-finished port allows vapor flow direct contact with port wall. This results in two things happening to the charge: 1) friction occurs between the charge and the wall, slowing the charges speed down the port. This particularly noticeable at curves in the port and areas where the charge must change shape and/or direction. 2) Contact between the charge and the highly polished port surface can allow fuel particles to come out of suspension, kind of like laundry on a clothesline becoming damp when the fog rolls in. The tiny moisture droplets come out of suspension in the air. This precipitation is certainly unwanted in an intake port, where power producing fuel is lost. 3) In some cases, polishing can form a heat barrier. This is due to molecular compression of the surface metal brought about by the physical act of polishing.

So, final finishing of the port surfaces involves grinding with an #80 stone, followed by a #120 stone grind and then a final glass bead blast finish.

The results of the Bray head modifications are dramatic. To say that the Ducati goes faster

seems absurdly simple, but throttle response at all engine speeds is greatly enhanced. But top end performance is where the motorcycle is so dramatically different. The Stock Ducati 750 Sport begins to hang its tongue out at around 7000 rpm and due to its special valve springs, it is safe way past that point. We can't say exactly at what rpm the valves will now float because, frankly, we haven't tried to induce float. And nor do we intend to.

Of course, the top end oil control problem has been rectified. How long it will stay under control, we can't say; time can only answer that. But the differences between the stock guides and seals and those now fitted in the head are dramatic, both in terms of design and choice of materials. Also, there is the matter of Bray's craftsmanship. You see, as we tore into this project, we saw a few discomfiting signs of lackadaisical workmanship during the motorcycle's initial assembly. By contrast, Bray's painstaking diligence through all facets of this project was most assuring.

The motorcycle was good before, and now it's better. We expect it to stay that way for a long time

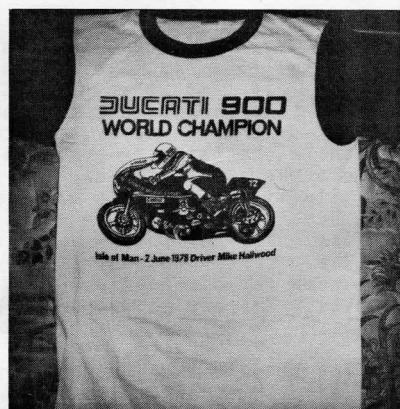
## DUCATI ELECTRICAL SYSTEMS

Bikes to be Covered in this Piece: 250 Monza, 250GT, 250 MK I, and 350 Sebring.

The Ducati electrical systems have long been a curiosity to me, but independent efforts to analytically determine their methods of operation convinced me that the systems were sufficiently complex to warrant outside help. As Ducati tinkerers are wont to do, I sought help from a person with a strong electronics background. My mentor does not have a dog which can chew through a steel-belted radial tire, but he speaks with authority nevertheless.

The particular subject of this article is the six-pole battery-alternator system found on the 250 Monza, 250 GT, 250 MK I, and 350 Sebring.

The six-pole rotor magnet is the heart of the system core themselves, which provides paths of low magnetic reluctance to magnetic flux. In



## ISLE OF MAN T-SHIRT

This beautiful shirt was created to commemorate Mike Hailwoods tremendous comeback win on the fabulous Ducati racer. The shirt is on white 50/50 material, with red collar and sleeves. Printed on both sides in green, red and black. The drawing is very detailed. An absolutely beautiful shirt. \$6.95 plus \$1.25 shpg. Overseas shipping is \$2.50 for Air Mail service.