

MOTORCYCLE SERVICE NEWS

NUMBER
215

PAGE
1 of 3

YAMAHA INTERNATIONAL CORPORATION
MONTEBELLO, CALIFORNIA

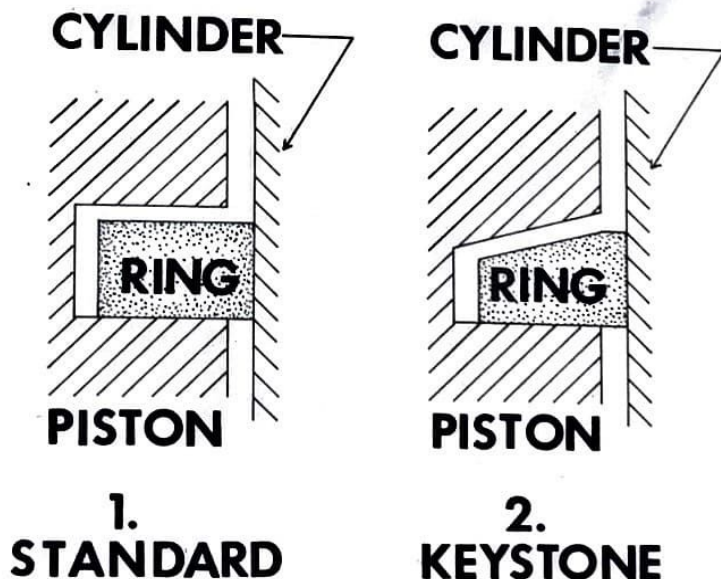
DATE 3/28/69

ALL (1969) KEYSTONE RINGS

For effective use of combustion pressures there must be a good seal between the crown of the piston and the cylinder wall. It is not practical, however, to attempt to secure a perfect seal. With this in mind, importance is placed on effective sealing and prevention of piston ring sticking. The Keystone piston and piston ring were designed to improve performance in the above areas.

Piston ring sticking is generally caused by gum deposits which are produced through a breakdown of the fuel and oil from the heat of the combustion process. This gum residue will deposit itself in the ring lands and rings. The subsequent blow-by of burnt gases, and the imperfect combustion caused by blow-by, tends to speed up the accumulation of these gum deposits.

In order to prevent the rings sticking and to provide more effective sealing of the combustion pressures Yamaha has employed the Keystone piston and ring (Fig. 1 & 2) in its engines.



The design of the Keystone ring is such that combustion gas pressures force the ring down and out almost simultaneously. This forces the ring tightly against the cylinder wall preventing blow-by (Fig. 3). On the other hand, in the case of the plain ring, (Fig. 1), combustion pressure first acts on the top of the ring, forcing it down, and then passes between the ring and piston to force the ring against the cylinder wall. This action is considerably slower than that of the Keystone type ring and will allow more blow-by.

MOTORCYCLE SERVICE NEWS

NUMBER
215

PAGE
2 of 3

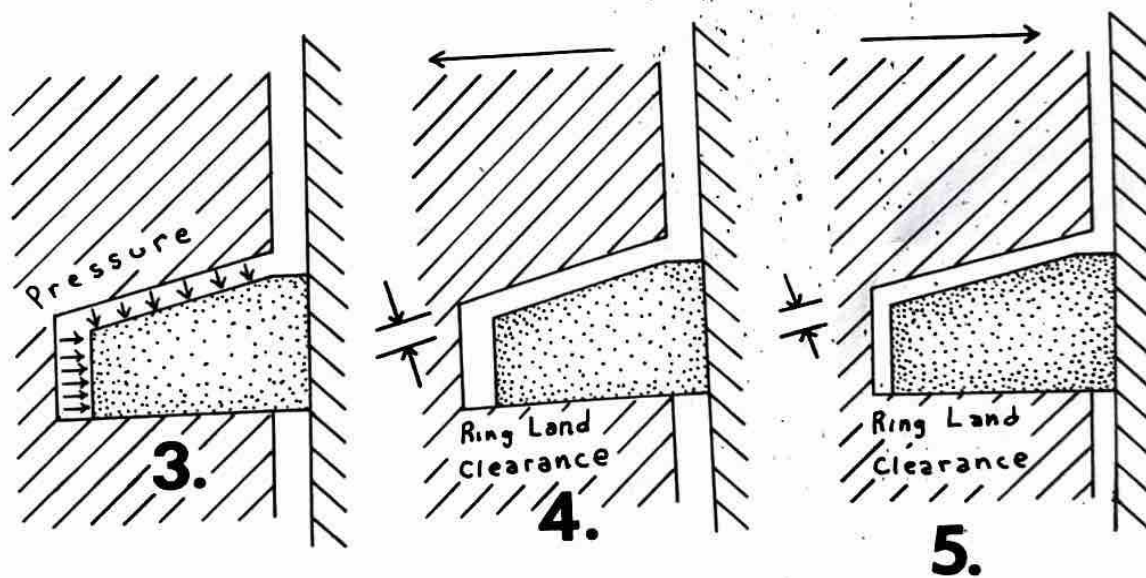
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KEYSTONE RINGS -continued

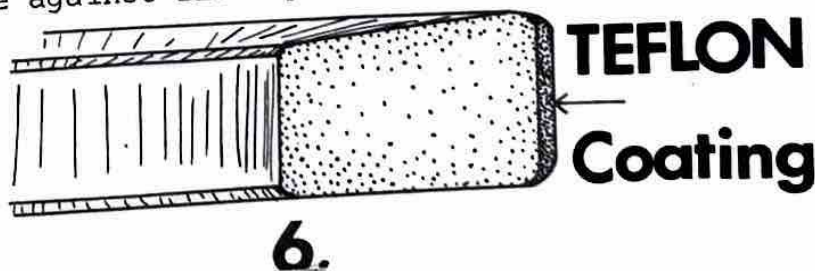
With blow-by, heat cannot be dissipated from the piston ring to the cylinder wall and, as was mentioned earlier, excessive combustion heat will cause the oil film to break down creating additional gum deposits. The Keystone ring allows for much better heat transference than the standard type ring.

The most important advantage of the Keystone type ring is that the piston ring land clearance changes as the piston moves up and down. Figures 4 and 5 show variations in the clearance resulting from the floating action of the piston in the cylinder.



This variation in ring land clearance produces a "scrubbing" effect that reduces the accumulation of gum deposits and thus prevents the ring from sticking in the land.

Lastly, the outer surface of the ring is coated with Teflon (Fig. 6). The Teflon coating serves as an effective aid during ring "seating". In addition, the Teflon coating will follow microscopic irregularities in the cylinder bore more faithfully than previous materials thus providing additional resistance against blow-by.



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NUMBER
215

PAGE
3 of 3

KEYSTONE RINGS--continued

TECHNICAL NOTES ON KEYSTONE RINGS:

The keystone ring can be handled in the same manner as conventional rings as far as servicing is concerned. However, the Keystone piston is not interchangeable with standard rings. It is for this reason that Keystone pistons and rings must be used as a set.

IDENTIFICATION:

The keystone ring can be identified from the conventional by its unique cross-sectional shape. The conventional ring has a rectangular cross-section whereas the Keystone ring employs a 7° slope on top (see drawings #1 and #2).

In addition, Keystone pistons and rings are marked on top with an identifying code. The pistons have a "K" stamped next to the undersize code opposite the directional arrow. The rings are stamped with a "1N" or "1T" next to the gap to indicate the top ring, and a "2N" or "2T" to indicate the bottom ring. In addition, the oversize is stamped on the opposite end, again, on top.

INSTALLATION:

RINGS AND PISTONS MUST BE INSTALLED AS A SET. INSTALLATION PROCEDURES (RING GAP, PISTON CLEARANCE) ARE THE SAME AS FOR STANDARD RINGS AND PISTONS.

WHEN INSTALLING FIVE-PORT PISTONS IN THREE PORT BARRELS MAKE SURE THE RING GAPS DO NOT PROTRUDE INTO A TRANSFER OR INTAKE PORT.

MISCELLANEOUS INFORMATION:

Keystone pistons and rings will eventually be standard parts for all models. At this time, they are original equipment on the following models:

MODEL	IBM PREFIX
L5T	166
G5T	180
R3C	235 (from engine no. 3196)
DS6C	246 (uses 248 piston & ring)
AT1	248
CT1	251
AS2C	245 (uses 183 piston & ring)

ORDERING: SEE MOTORCYCLE PARTS NEWS BULLETIN NUMBER 247.