

The 1935-40 Standard and W.D.-Type 16H and "BIG FOUR" NORTON

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Part I—Engine Overhaul Data for Popular 490 c.c. and 633 c.c. Side-valve Models

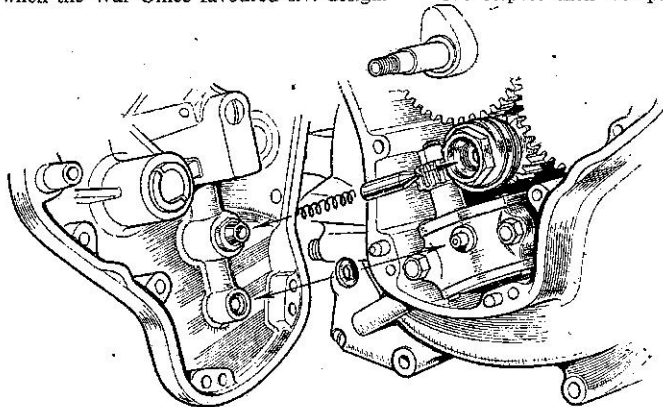
PRE-WAR Norton side-valve models in 490 c.c. and 633 c.c. capacities are still held in high esteem, for they have played a big part in the history of motorcycling in this country. Elders amongst us will acknowledge that the two models have, in fact, enjoyed what must be record continuity; younger enthusiasts, perchance, encountered one or other of these motorcycles during war service, for Norton Motors, Ltd., executed large W.D. contracts at a time when the War Office favoured s.v. design.

anyway, if the unit is to come right down.

It is immaterial whether or not the sparking plug is removed at this stage; certainly the carburetter must be detached and tied up out of harm's way, and extraneous cables, such as that operating the valve-lifter, disconnected.

The Top End

The iron fins of the cylinder head do not chip so readily as the modern alloy ones do, but respect their comparative fragility and



When dismantling the crankcase parts, care is necessary not to lose the fibre joint washer between the oil pump delivery nipple and distribution channel in the outer panel. Also shown is the pressure valve controlling flow of lubricant to the big end.

The 16H saw service in the desert, and afterwards large numbers, still bearing yellow paint and Arabic symbols, found owners in this country and abroad. The civilian counterpart of the 16H, although not all of us realize the fact, is radically different in several small but vital items. It has carried on a long Bracebridge Street tradition of simplicity and reliability.

Superseded by the modern 596 c.c. "Big Four," the older 633 c.c. model, in W.D. and standard trim, is still a favourite with sidecar owners, particularly those whose requirements are supplied by the second-hand market.

In this article the writer aims at describing practical work on the engines of both capacities and of both types—engines made for use in peace and war. All the power units are similar, none is complicated and none requires the application of special Norton-made tools.

Dismantling Routine

It is not essential to remove the tank; any of the engines can be stripped down with the tank in situ, but for a major overhaul, freedom of movement and accessibility are improved if it is taken off. There is no need to drain it first; the two taps can be turned off and the feed-pipes disconnected. May I repeat previous advice and suggest that, before getting to work on the engine, you slacken the engine mainshaft driving sprocket, making use of the locking effect of the transmission to secure the sprocket while the nut is turned. That process entails dismantling the primary chaincase—essential,

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USEFUL DATA

(All Models Unless Otherwise Stated)

Valve Timing: Inlet opens B.T.D.C. 27° to 30°.
Exhaust closes A.T.D.C. 27° to 30°.
(Set to .002 in. tappet clearance).

Ignition Timing: 35° to 38° in. B.T.D.C. with ignition control fully advanced.

Tappet Clearance (cold): Inlet .004 in.
Exhaust .006 in.

Piston-ring Gap: Compression rings 0.15 in.
Scraper .008 in.

Piston/Bore Clearances:
Top land: .029 to .027 in.
Second land: .0155 to .0135 in.
Third land: .0155 to .0135 in.
Top skirt: .0075 to .0065 in.
Bottom skirt: .035 to .045 in.

Cylinder Bore: 16H "Big 4"
79 mm. 82 mm.
Rebore to plus .020 in. or .040 in. when wear exceeds .008 in. on standard or rebored dimensions.

Small-end Bush: .875—.0005 in. (Ream after fitting).

Valves: Head diameter 1.625 in.
Stem diameter .343 in.

Compression Ratio: 16H "Big 4"
4.9:1 4.8:1

Camwheel side float: .004 in.

Cam follower side float: .006 in.

Carburetter Settings:
16H—Amal type 276AE/1BE with 170 main jet.
"Big 4"—Amal type 276/011 with 170 main jet.

Magdyno: Lucas type AG4, M.O.1-4 pattern with E3 HM 10 dynamo.

Magdyno Chain Drive: 3/8 in. pitch: .155 in. 42 pitches.

Contact-breaker Gap: .012 in.

use a well-fitting box spanner to slacken the nine cylinder-head nuts. Originally, copper cylinder-head gaskets were fitted. Army workshops may have substituted a C. and A. type and, if this is the case, a new gasket is a good investment.

Up to 1938 the valve springs and tappets were shielded by a quickly detachable plate. Subsequently, all the side-valve engines had a tappet chest integral with the cylinder casting, and an oil-tight cover plate. In these post-1938 engines there is a nut and stud inside the tappet chest and the nut must be slackened before the cylinder can be lifted. The stud is hollow and acts as an oil jet, blowing lubricant from the timing chest to the tappets and springs.

A "U"-type Terry spring compressor facilitates valve removal. Standard valve-spring length now is 2 3/4 in. and springs must be replaced if the coils have closed up more than a total of 1/4 to 5/16 in.

"Big Four" owners should note that W.D. and standard barrels, pistons and heads differ, despite almost identical appearance. The overall barrel lengths of the two types—W.D. and standard—vary. Common to the whole of the side-valve range, however, is the use of wire circlips (remember that when one has been prised out it should be discarded and a new one fitted) for gudgeon pins and connecting rods. Valve seats are inclined at 45 degrees and must be recut if pocketed. The cutter should have a pilot section of 11/32 in. dia.

Pressing in a new bush effectively renovates the small-end; ream to 3/8 in. when fitted and drill oil holes to line up with those in the top of the connecting rod.

W.D. instructional literature suggests a very generous piston-ring gap of .030-in.; this can safely be reduced, say to .015 in. or .018 in. for the compression rings, and .008 for the scraper. Piston/cylinder-wall clearances are set out in the table of useful data. Wear in excess of .008 in. on standard justifies a rebore.

Probably a new cylinder-base washer will be necessary. When cutting it take great pains to see that it is identical with the standard washer, and that the hole for the oil feed to the cylinder wall has not been overlooked.

The Crankcase Components

Removal of the outer Magdyno drive cover, held by three cheese-headed screws, the chain, and the Magdyno is necessary before the crankcases can be separated. Half slacken the driven and driving sprocket nuts, and exert a gentle leverage, simultaneously tapping the face of each nut. This should jar the sprockets off the spindle tapers. The cam-wheel sprocket is keyed but the Magdyno sprocket is not.

It is worth mentioning that the chain line of the W.D. 16H model is not the same as that of the other models. This difference is due to the type of Magdyno base-plate used.

Seven cheese-headed and two counter-sunk screws secure the timing panel; as it is withdrawn, care should be taken, or the two timing pinions will come away also. If this does, in fact, happen and the pinions are

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