MODEL HT — TRIALS

MOTOR CYCLE

GENERAL MAINTENANCE

PUBLISHED 1956

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NOTES ON THE MAINTENANCE OF THE ARIEL MODEL HT TRIALS MOTOR CYCLE

GENERAL REMARKS

Fundamentally the Model HT is a single purpose machine designed and developed for the sporting Trials rider and first listed, after extensive testing in the major Trials of 1955, in the 1956 range. Although the HT as new could probably be ridden immediately in the severest of Trials, a certain amount of road work beforehand is advisable in order to bed down such things as chains, sprockets, wheel bearings, clutch plates, etc.

As is well known the life of a Competition machine for a given mileage is hard in comparison with that of a roadster, consequently after finishing a Trial the quicker the machine is washed down and the working surfaces re-oiled the better for both pocket and peace of mind.

The following notes refer to items of specification peculiar to this Model and ‘should be used in conjunction with the Model VH Instruction Book issued with this machine.

ENGINE

This is basically the same as the Model VH except that it is fitted with an aluminium cylinder barrel with a nickel-iron liner and a piston giving a compression ratio of 5.6 to 1. The same ramp type cam is used and the method of tappet adjustment is as set out in the VH Instruction Book. The liveliness of the “Red Hunter” engine due to the robust construction is inherent, but in time should any falling-off in power become apparent it will probably be due to the valve seats becoming pitted and valves failing to seat efficiently. Test the compression by standing on the kick-starter pedal; with perfect seating your weight should be held for an appreciable time, if not the valves will need regrinding. Bad compression and low compression are vastly different things, and poor compression can cause bad starting, a sluggish performance, high petrol consumption and, more important, can spoil the perfect carburation so necessary to the Competition rider.

Valve Timing:

Inlet Valve Opens	….	26° Before T.D.C.
Inlet Valve Closes	….	77° After T.D.C.
Exhaust Valve Opens	….	70° Before T.D.C.
Exhaust Valve Closes	….	33° After T.D.C.

Valve Tappet Clearances (with engine cold):

Inlet Vale	….	.006 in.
Exhaust Vale	….	.008 in.

MAGNETO

The racing magneto fitted is a "Wader" type, fully waterproofed. The control lever operates so that the cable is slack when the cam ring is sprung to full advance. There should be ⅛ in. backlash in the cable casing. To avoid condensation a breather tube is embodied in the contact breaker cover, and to be sure water does not enter at this point a length of rubber tube should be taken up under the saddle where the open end is high and dry. Remember when clipping this rubber tube to the frame it must not be too tight or it may become flattened. Should any variation be noticed to the normally easy cable operation it is advisable to remove the contact breaker and cam ring and check if the ring is dry and sticking. The ring must be clean and polished and reassembled with the slightest smear of light oil on the ring and felt wick. The magneto timing is ½ in. before T.D.C. on full advance.

CARBURETTER

This is the Amal Monobloc type 376/11T, with settings: .106T Needle Jet, No. 3 Throttle Valve, No. 200 Main Jet; Needle position —centre.

BREATHERS

The breather pipe from the back of the timing cover is fitted with a non-return ball valve. It is easily submerged, even in shallow splashes, but the valve has been found efficient and trouble-free. No valve is fitted to the breather pipe, which comes from the crankcase face on the nearside, and a rubber tube is fitted from the end of this pipe to a point under the saddle.

FRAME AND FORKS

The frame is a lugless design of large diameter straight tubes butted and arc welded, with the exception of the rear down stays which are curved and

bolted up. The steering head angle is set at 27° from vertical, and this, in conjunction with special fork brackets and a 21 in. front wheel, results in quick and positive action of the type necessary for competition work.

The swinging arm uses the same "'rubberbloc" bushes as standard models, but the bearing bolt is inserted from the offside and screws into the bearing housing on the nearside.

The head races each have twenty ¼ in. balls which are packed with heavy grease when new. Should slack develop, adjust as follows: Remove the domed nut from the top of the column which will reveal three grooves machined across the adjusting sleeve. Slacken off the pinch bolt in the top bracket, insert a suitable tool (flat strip alloy is good) and turn clockwise to take up slack.

The telescopic fork requires oil of the same grade as used in the standard fork (S.A.E. 30); the quantity is one third of a pint in each leg. The only parts of the frame requiring lubricant are at the brake pedal spindle and the saddle pivot bolt.

HYDRAULIC DAMPER UNITS

The type fitted is series number AT6/7/1110. The rubber bushes are pinched endways with ⅜ in. bolts.

Measured from the cnnbith of these bolts, the distances at various points are as follows:

Maximum length fully extended with wheel clear of ground—12 in. Minimum length fully compressed under highest load—8¾ in. Thirdly, there is an "'optimum" point where the centres of the gearbox mainshaft, swinging arm pivot and rear wheel hub form a straight line and the rear chain is at its tightest point—10 in.

GEARBOX

The gearbox is a special version of the GB47 type. The shell casting has slight alterations to allow clearances and adjustment in the closepacked short frame. The gears have intermediate ratios of 1.57, 2.44 and 3.2. The final driving sprocket is 19-tooth and the rear wheel 47-tooth. The clutch sprocket is the normal 44-tooth and, as the engine sprocket for the standard HT is 18-tooth, it will be seen that the final ratios are 6.04, 9.48, 14.7 and 19.32. A further range of sprockets between 17-tooth and 24-tooth are available from

the Service Department and a table gives the final ratios for any selected size of sprocket:

Engine Sprocket	Top Gear	Third Gear	Second Gear	Bottom Gear
17	6.40	10.05	15.62	20.47
18	6.04	9.48	14.73	19.32
19	5.73	8.99	13.98	18.33
20	5.44	8.54	13.27	17.00
21	5.18	8.13	12.64	16.58
22	4.94	7.76	12.05	15.81
23	4.73	7.43	11.54	15.14
24	4.53	7.11	11.05	14.50

CLUTCH

Two plates with “Klingerite” inserts are fitted, three plain plates and extra strong springs completing the assembly. Over-tensioning of the clutch springs is unnecessary and can be a factor leading to drag. So long as the end of the spring box centre stud slightly protrudes through the sleeve nut, and the top of the sleeve nut is flush with the edge of the spring box, all is correct.

The clutch withdrawal mechanism is enclosed inside the gearbox end cover and the filler-inspection cap must first be removed to see the clutch cable end.

The withdrawal operation is carried out with a double-faced cam plate with a spring-loaded centre bearing, each plate being separated by three steel balls floating in depressions at points equidistant from the pivot. The rear cam is splined to the inner cover and can move endways to depress the clutch push rod. The outer cam plate cannot move endways, but forms a lever to take the cable nipple and is free to turn on its pivot. This turning action causes the balls to climb the depressions in the cam, which in turn gives thrust to the push rod.

It is imperative that the adjustment of the clutch operating cable is carried out precisely as follows and in proper sequence:

(1) Remove clutch dome and gearbox inspection cap.

(2) Remove clutch cable nipple from cam lever with a small screwdriver and a wire hook.

(3) Slacken the ½ in. locknut on the adjusting screw in the centre of the aluminium clutch end plate. See that the threads on the adjusting screw and in the locknut are clean and easy.

(4) Place a screwdriver in the slot of the adjusting screw, turn first in an anticlockwise direction to make sure it is free, and then clockwise until the end is felt to butt against the end of the push rod.

(5) Note the position of the screwdriver slot in the adjusting screw; then run up the locknut until it is finger tight against the aluminium end plate.

(6) Hold the locknut steady; turn the adjusting screw one third of a turn in an anticlockwise direction and lock it tightly in that position.

Note. As the locknut is hexagon, one third of a turn is equal to either two flats or two points on the outer periphery of the nut.

Before refitting clutch nipple check as follows:

Place a finger down the inspection cover hole and on to the cam lever. It should be possible to move the cam lever anticlockwise against the pressure of a light spring for ⅛ in. before coming up hard against the stop.

Refit the clutch cable nipple in the cam lever; the cable should then be adjusted at the gearbox end to give one sixteenth of an inch backlash when the cable is pulled.

The use of a screwdriver to lift the cam lever against the pressure of the clutch is likely to cause damage to the soft aluminium threads in which the inspection cap screws. Protection is easily given if the screwdriver shank is covered with a short length of rubber tubing, or it can be bound with insulation or medical tape.

GEARBOX LUBRICATION

Although ordinary S.A.E. 50 engine oil is satisfactory, it is strongly recommended that for strenuous work an oil of the type used for highly stressed hypoid gears is used. This oil, S.A.E. 90, has been fully tested by our Works riders with excellent results. A drain plug is situated at the bottom of the box and a small plug on the outer cover behind the kickstarter spindle forms the level plug. Capacity to this level is nine tenths of a pint from dry.

Between the gearbox final driving sprocket and the oil bath chain case are two felt discs which prevent the ingress of water and mud to the primary drive. The revolving face is greased when new, but an occasional soaking with an oilcan whilst still in situ will keep them soft, supple and full bodied.

OIL TANK

Capacity of the tank when filled to half the depth of the filter gauze is 3} pints. This is ample and allows plenty of cool oil for circulation, yet has the additional merit of allowing the rider to make frequent complete flushings without undue expense.

It is advisable to flush out the entire lubrication system after each serious Trial and refill with one of the recommended grades listed in the "Owner's Guide".

Note also in the "Guide" the description and location of the Ariel Flywheel Oil Purifier, together with general instructions for changing the oil and cleansing filters.

AIR CLEANER

Just as there are no hard and fast rules for oil changing, neither can there be for air filter cleaning. The filter is a straightforward and simple article and the rider should immediately become familiar with its construction. The element is designed to run wet, i.e. the gauze is covered with oil, so that dust from the atmosphere passing through will cling to the oil. When the element is fully loaded so that it can collect no more dust, anything further will be fed into the engine to the detriment of the working parts. The conditions met with in Trials are varied; should the going be very dusty the element might need recharging even after a single Trial. Use engine oil S.A.E. 30 for the gauze element.

PETROL TANK

The light alloy tank has a capacity of just under two gallons from dry to brim. The filler cap opens by pressing on the built-in catch and is closed by pressure with the palm of the hand.

The petrol tap is a positive action straight through type with no reserve, thereby ensuring that non-stop sections are taken non-stop. A small filter tube is mounted on the end inside the tank, and can be withdrawn complete with the tap. The tap is of large bore and the flow is quick—if any variation is noticed the filter should be examined immediately as foreign bodies or water can impede the flow. Restriction is apparent by the petrol flowing out in a "flutter" on one side instead of in a round-bored stream.

The "tricycle" tank mountings are of a special soft rubber and when the fixing nuts are fully tightened the tank is thoroughly insulated from all vibration and can be rocked by hand to a small extent. There are no threads to screw into the alloy, instead, the two front rubbers are pushed into

welded-in tubes and the action of compressing the ends causes the diameter of the rubbers to increase and grip tightly in the tubes. The single rear fixing nut is on a stud which screws into the frame, and on removing the nuts and petrol pipe the tank can be lifted straight up and off. When tightening, the three Simmonds nuts should all be flush with the bolt heads.

FOOTRESTS

The footrests on the HT are made from spring steel, and on no account should any attempt be made to re-shape them by brute force, or by applying heat which will either crack them or draw their temper.

CHAINS

The primary drive is exactly the same as the standard VH. The rear chain, however, is exposed, and even if well oiled at the start of a Trial will most certainly look dry at the finish. The noise of a chain that has dried off is not everything to go by, for each link has a bearing which may still be floating in grease or oil, the noise being due to the hammering of dry rollers on dry sprockets. Many first class riders carry a nozzled tin of cycle oil to apply at such times, and a few minutes effort can often work wonders. Information is given separately regarding the periodical soakings in warm grease, but the periods should be much shorter with the Trials machine.

CONTROLS AND CABLES

The controls are best dealt with by the application of thin cycle oil directly on such parts as pivots and rollers and the exposed ends of wires, and this should be done before every Trial. Any chafing of cable covering so that the steel casing is exposed will lead to the ingress of water at that point and the inner wire will soon rust and seize. If noticed in time such points can be oiled, wiped and bound with insulation tape, but if left too late a new cable will be needed. The custom at one time of taping spare cables to operating cables for a quick change is not now considered worth while. Left idle they deteriorate through exposure, and when needed are often found useless. If spare cables must be carried, put them in a waterproof bag in the toolbox.

The flexible drive to the speedometer is taken from the rear hub. Whenever the wheels are out and the cable disconnected, a grease gun should be applied to the gear at the nipple provided, until excess is seen at the screwed end. The inner driving shaft should be drawn out of the casing and, if it needs it, greased as it slides back into the casing. A turn of the shaft under pressure will mate up the squared end into the speedometer head. Do not

grease the drive and cable whilst connected—excess can be pumped into the speedometer head and render it useless.

BRAKES

With so many Brake Tests in Trials you will find in the HT everything you could wish for so long as they are kept in correct working condition. The front brake lever on the handlebar and the foot pedal both return instantly after operation. Should either fail to return with the customary snap, then is the time to find out why.

Rear. Remove wheel, nearside nut and collars and take off the brake plate complete. The shoes may be muddy, but before removing see that one shoe is marked, also one side of the fulcrum post, with a punch mark so that they can be replaced exactly as they came off. If the fabric is wet remove and dry off. Remove lever and spring and draw out the cam spindle. This may be dry and partially seized, if so it will need polishing with emery cloth and greasing before refitting. Check that the adjuster and plungers are clean and greased, and that there is no excess of grease exuding from the wheel bearings. The brake shoes when dry should be cleaned with a stiff wire brush, lightly greased at each end, and refitted exactly as they came out.

Do not use the centre nipple for greasing the hub—instead, pack each race separately with high melting point grease.

Refit wheel without forgetting to apply a spot of oil to the brake rod roller and threads.

Front. Should the operation become stiff, remove the wheel and take off the brake plate. The full width front hub is provided with a grease nipple for lubricating the cam spindle, consequently, if you have given it an occasional pump with the gun it is unlikely to cause trouble. All friction points should be cleaned and working parts greased, whilst both bearings should be packed with H.M.P. grease. Before refitting front wheel see that the spindle is clean and lightly greased. A wedge should be tapped into the fork end slot on the nearside to help the spindle to slide in easily. After spindle is in, draw it right home with the nut. Allow the eye of the nearside fork lug to find its proper position on the spindle, tap out the wedge and tighten the clamping bolt. Pull the spindle nut up tight last of all.

TYRES

For long it has been the policy of manufacturers of motor cycles to issue with their machines a booklet dealing with the care and maintenance of the tyres. The “Old Hand” probably knows it all—on the other hand there are

many with but a vague idea why motor cycles sold purely for competitive purposes are invariably fitted with security bolts. Briefly, for racing purposes (and many Special Tests in Trials come into that category) the abnormal stresses due to acceleration and braking can cause the tyre to creep on the rim, taking with it the _ inner tube. The tyre valve, being a fixture in the rim, cannot go with it and is pulled out bodily to the annoyance, and maybe peril, of the rider. The bolt in the front wheel of the HT is there purely to take braking strains, while the two in the rear not only take braking, but also have to cope with the much higher strains due to driving torque. If a tyre with a white spot is fitted to the HT front wheel the spot must come by the bolt; when fitted to the rear the spot must come midway between the two bolts.

It is well known that to find maximum traction in trials very low pressures are customary, and in most Open events you will find the “maestro” using a degree of under-inflation which can only be described as chronic. Whether you can afford to follow this line is entirely a matter for you to decide—if you cannot, then some definite policy should be adhered to in order to get the maximum effective life from the covers. ;

The continual scrubbing action of the tyres on normal metalled roads can quickly wear the sharp edges from the studs if under-inflated. Therefore, should long distances be travelled to the start, or from the finish, of a Trial, the pressures should be as those of a normal roadster.

In rocky country pressures should be appreciably higher than over courses renowned for mud. It is always easier to let a pound or two out than to put it back. Should rocks be taken fast enough to leave a mark in the rim, check up as soon as possible, for there may be a concussion burst inside which can quickly chafe through the tube.

The value of the milled ring on the tyre valve is problematical. Should the threads become burred or clogged it can become an adjectival nuisance. To discard it and replace with a full length rubber sleeve not only does a better job, but, additionally, any creep taking place in the tyre will immediately be indicated by tilting of the valve.

THE COMPLETE MACHINE

For your guidance, should it be necessary to dismantle the complete machine, the methods used are quite different from those of the standard VH. The engine, gearbox and primary drive are all built into the rear engine plates as a complete unit.

The frame is then put over the unit and additional fitments are then connected up.