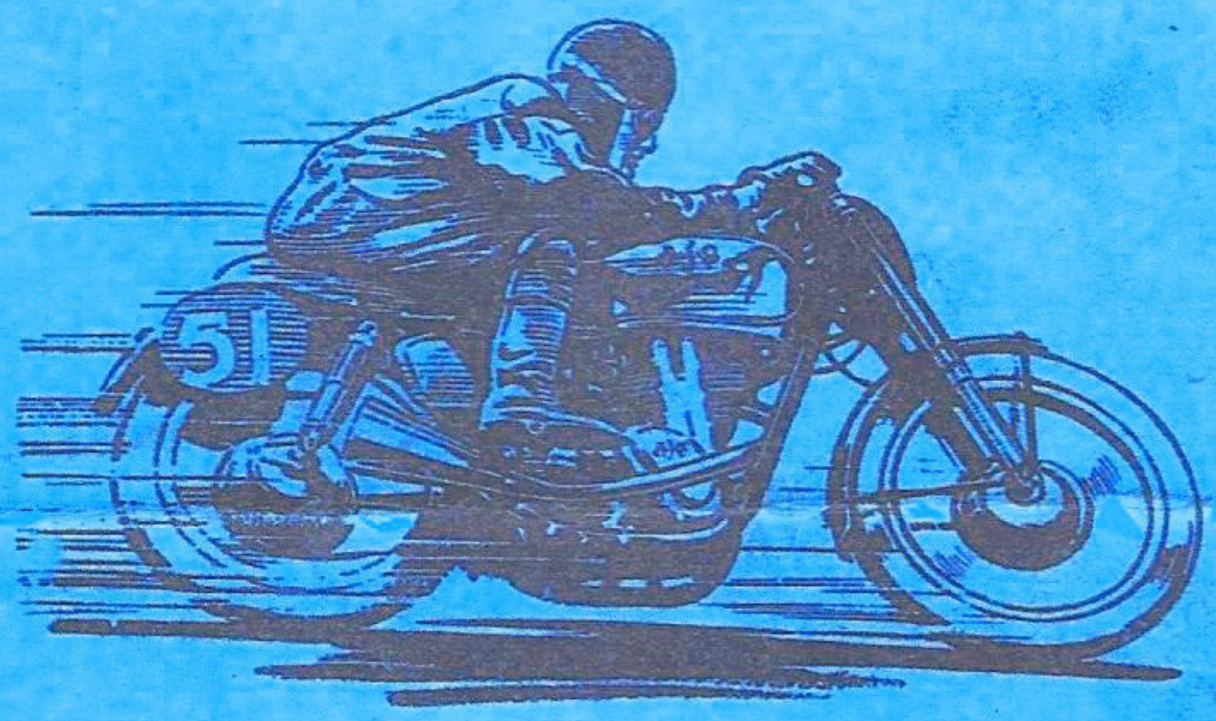
A.J.S



MODEL 7R. 348 C.C. O.H.C.

RACING MODEL INSTRUCTION SHEETS

Motor A.J.S Cycles

PLUMSTEAD ROAD · LONDON · S·E·18

1961 A.J.S. M O D E L 7R.

SPECIFICATION AND TECHNICAL DATA.

ENGINE - SINGLE CYLINDER, chain driven O.H.C.
Bore 75.5 m.m. (2.972") Stroke 78 m.m. (3.070").
Capacity - 349 c.c. (21.35 cu.in).
Compression ratio - 12.0 : 1
Fuel Petrol 10 octane (RM).
Oil Castor base racing oil.
Carburettor Amal 1⅛" type 5 G-P (see note on carburation).
Remote mounted top feed float chamber.
Magneto Lucas racing, type 2 MTT.
Sparking Plug K.L.G type E.258/2.

FRAME - Welded Duplex cradle type.
Front forks Patented Teledraulic.
Oil capacity 200 cc. (.352 pt.) in each leg.
Use oil SAE 5.
Rear suspension units Racing Girling.
Gear Box. A.J.S. racing type 4-speed, 4 plate clutch.
Gear box lubrication 1 pint SAE, 50 mineral oil.
Overall gear ratios (suitable for I.o.M).
Top 4.85:1 Third 5.33:1 Second 6.46:1 Bottom 8.65:1.
Standard sprockets - Engine 22T - Clutch 42T - Gearbox 22T - Rear wheel 56T.
Transmission chains Primary ½" x .305" Secondary ⅝" x .305".
Chain lubrication - Oil contained in frame top tube. Filled through nozzle on left-hand side of steering head.

A tap for general use situated above twin feed block. This must be turned OFF when machine is stopped.

Jet size 20 suitable for SAE 30 mineral oil, is fitted as standard but this may require altering to suit varying temperature conditions.

Front number plate In glass-fibre material incorporating tachometer mounting and transparent face screen.
Racing seat Constructed of glass-fibre, padded with sponge rubber and covered with leather cloth.

Fuel Tank	Light alloy	4¼ gallons	21¼ litres.
Oil Tank	Light alloy	1 - gallon	4.5 litres.
Wheels	Light alloy rims -	front W.M.1	Rear W.M.2.
	Tyres -	front 3.00" x 19"	Rear 3.50" x 19"
Brakes	Front brake -	double leading shoe type.	
	Rear brake -	conventional single cam.	

NOTE:

The front brake link rods must not be adjusted except when relining. After relining and turning the front brake linings, subsequent adjustments must be made only on the cable. The leading ends of the liners should be kept well "backed off" and this relief must be maintained at all times. The rider will realise that as the liners wear, so the relief becomes less.

Total dry weight of machine as delivered 284 lbs.

Throttle Valve.

No 5. throttle valve is fitted as standard but as the optimum one depends partly on the driving technique of the individual rider it is possible that either No4.(less cutaway). or No6 (more cutaway). might give better results in certain cases . Generally however, N will provide the cleanest " opening up" with minimum megaphone effect".

NEEDLE.

The standard fitting is 5.G.P/6.

It should be realized that the needle position influences the selection of the throttle v to some extent . the standard position for the needle is in the middle notch (or third notch from top). but if for example , the needle is raised to the fourth notch from the top , although the mixture strengh will be increased mainly in the speed range corresponding to about " 2/3. full throttle, a small enrichment will be noticable also in the first third of throttle opening . In this case a No 6 throttle valve could provid a compensating effect , It is unlikely that it should be necessary to lower the needle below the third notch in any circumstances and generally a 5G P/6 needle in the third notch should give best results

Pilot Jet.

It is important that the pilot jet should be carefully adjusted The slowest possible, regular 'tickover' should be obtained.- then slightly enrichened by one or two notches on the finger adjuster.

(screw IN to weaken -screw OUT to richen.)

when once set satisfactorily , do not readjust unnecessarily it is desirable to realise that each adjustable point , viz: pilot jet throttle valve and needle have some (though sma effect on the other settings .

MAIN JET.

The standard main jet fitted is 330. However erginas are accepted for rated power out put and specific fuel consumption having main jets varying between 310 and 350. THis is invariably due to changes , in ambient temperature and air density e,g, when the barometer is high and air intake temperature 'low' a 350 main jet gives the best power output conversely a 310 jet might be necessary to restore maximum performance . the range between 310 and 350. covers all normal atmospheric chages.

FUEL LEVEL.

The fuel level should frequently be checked to ensure that the standard setting has not inadvertently been disturbed .When the machine is standing on level ground and upright, the level should be in line with the bottom of the circle inscribed on the air jet cover plug, THis is conveniantly achieved with the aid of a length of transparent tubing attache to the float chamber outlet , An alternative but less accurate method is to remove the air jet plug and lean the machine over at about 10^{0} from the vertical , At this angle petrol should just weep through the air jet.

AIR JET.

Thas jet has the effect of providing some compensation for the varying air and fuel flow characteristics as gas velocity increases with the engine speed. The standard air jet fitted is a 135, e.g. the diameter of the orifice of the jet is 135" .Any change will adversely effect other settings so that no alteration is in this respect recommended.

top of page should read: Notes on ignition setting and valve timing

THE IGNITION POINT IS CRITICAL.. THE OPTIMUM SETTING IS 34^{0} b.t.d.c. WHEN THE CONTACT BREAK POINTS ARE SET AT .012". IF THE CONTACT BREAKER GAP VARIES ,THE IGNITION POINT VARIES . IF IT IS SUSPECTED THAT THE IGNITION ANGLE IS NOT PRECISELY 34^{0} IT SHOULD BE CHECKED AND IF NECESSARY RESET AFTER ENSURING THATTHE THE CONTACT BREAKER POINTS GAP IS SET AT 012^{0} ENSURE THAT PRECISE t.d.c. HAS BEEN OBTAINED BEFORE SETTING . THIS CAN BE FOUND BY MEANS OF A SPECIAL TOOL SCREWED INTO THE SPARKING PLUG HOLE ,THE TOOL CAN EASILY BE MADE UP SINCE IT MERELY COSISTS OF A OLD SPARKING PLUG BODY INTO WHICH A LENGTH OF ROD IS ATTACHED. WHEN THE TOOL IS SCREWED INTO THE SPARKING PLUG HOLE .THE LENGTH OF THIS ROD IS SUCH THAT THE END TOUCHES THE PISTON ABOUT $\frac{1}{4}$" BEFORE t.d.c. THUS IN FINDING TRUE t.d.c. THE DEGREE PLATE IS ADJUSTED UNTIL 0^{0} IS OPPOSITE A POINTER ATTACHED TO THE CRANK-CASE AT EXACTLY HALF THE TOTAL CRANK ANGLE PERMITTED BY THE PROTRUDING ROD .

VALVE TIMING

Whenever intending to remove the cylinder head ,it is important before doing so to ensure that the original valve timing can be re-obtained. the best procedure is as follows.

1) After removing the timing case lid ,undo the two nuts on the end of the camshaft,
2) Before removing the vernier peg ,mark the hole that it occupies on both the sprocket and the hub . the mark on the hardened sprocket is most conveniently made with indelible pencil ,but the mark on the hub may be centre-popped.
3) Make sure that the sprocket cannot get out of position relative to the chain this is best done by wiring the sprocket firmly to thechain ,
4) The chain will defect laterally sufficiently (without straining it) to enable the sprocket (in position on the chain) to be taken off the end of the camshaft.
5) The 12 screws holding the rocker box and the four long bolts are now removed giving access to the cylinder bolts.
6) If the original timing has been lost .Fix a Dial Test indicator ,by mesns of a bracket to the cam box and align the indicator stalk truly in line with the valve.
7) Mount a degree plate on the crankshaft ,together with a pointer to a convenient attachment point.
8) Obtain precise T.D.C. (use tool made from an old sparking plug)
9) Set tappets to normal running clearances (inlet.008"Exhaust. 012").
   then with the vernier peg removed, turn degree plate two or three rotations in normal running direction. this is to enable friction of sprocket hub to carry the camshaft round until it is resisted by the exhaust rocker .
   (this is the approximate point at which exhaust valve lift will commence)
   now continue to turn in the same direction until the pointer indicates the the piston is approximately 79^{0} B.B.D.C., (1959 and later engines)
   insert the vernier hole peg in the appropriate hole and lock up both camshaft nuts and check (Take reading when indicator shows ,0005" 'nip')
   if not correct an adjustment of 4.6^{c} (crankshaft angle) either way can be obtained on the vernier incorporated in the sprocket hub assembly.
10) If the 4.6^{c} provided by the vernier is too much proceed as follows.
    Since the sprocket has 42 vernier holes and 47 chain teeth a small change occurs in the angular position of the sprocket relative to the hub when the [illegible] in order to obtain [illegible]

bottom of page should read:
To the hub when the sprocket is moved in relation to the chain.
Therefore in order to obtain the timing required.
There are 3 more lines which are impossible to read.

(Valve Timing)

Inlet should open	55° - 57°
Inlet should close	76° - 78°
Exhaust should open	76° - 78°
Exhaust should close	42° - 44°

NOTE:- Inlet opening and exhaust closing points should be obtained as sccurately as possible.

Sparking Plug

K. L. G. type E. 258/2 sparking plug is fitted as standard.

POWER RANGE AND GEAR RATIOS

The top gear ratio should be selected which will allow the engine to run generally between 7300 rpm. and 7900 rpm. and 8000 rpm. must be considered as the upper limit for a very short time since at this speed power output tends to fall off. The 'mean' rpm to aim for when selecting the top gear ratio should be 7600 rpm. this giving a margin of 300 rpm above 7600 rpm for downhill and following wind conditions while 300 rpm. below 7600 rpm. still provides nearly maximum power and improved torque foruphill and head wind work in top gear. The best average speed should be obtained by gearing as suggested above.

ATTENTION TO TRANSMISSION PARTS

Adequately lubricated chains and sprockets in good condition and in perfect alignment and adjustment have a very high mechanical efficiency but a rapidly increasing loss in efficiency and a corresponding reduction of effort at the rear wheel takes place when quite small defects in lubrication, alignment and adjustment appear. This point is made in order to emphasize a recommendation that as much care should be given to ensuring a minimum loss of power in transmission as is usually given to obtaining maximum engine power output.

Tyre pressure has an effect on tractive resistance which is not generally appreciated - it is relevant therefore to consider this aspect under the heading of "transmission parts". The highest pressure consistent with riding comfort on wet or dry road surface should always be employed. The tyre manufacturers recommendations should be followed as closely as practicable.

continued

7R ENGINE

FOR SPECIAL ATTENTION WHEN OVERHAULING AND REBUILDING ENGINE OR CYCLE PARTS

1) CYLINDER HEAD/PISTON - Clearance dimensions

At t.d.c. the clearance between the cylinder head sphere and the piston crown "squish" land should be .022" - 027". If checking this dimension proceed as follows.

(a) Place 'Plasticine' around the piston "squish" land. After moving the piston over t.d.c. remove the piston and carefully lift the impacted 'Plasticine' with a thin knife. Measure the thickness as accurately as possible with a micrometer. Since it is not possible to measure 'Plasticine' with absolute accuracy, method (b) is preferable.

(b) Instead of 'Plasticine' use a substance known as "N.H.C. mounting Plastic" - (North Hill Plastics Limited, London N.16) This material sets hard in 20 to 30 minutes, when the set mould may be easily removed from the piston crown and that portion representing the "gap" accurately measured.

Manufacturing tolerance limits have the effect of reducing or increasing the 'nominal' "squish" gap. This may necessitate in the original build, the use of one or more shims under the cylinder barrel. If any shims are fitted it is important to note that these shims must be replaced when the engine is reassembled.

2) VALVE SPRING LOAD ADJUSTMENT

Valve seated load (1961 7R Engines)

The valve seated load should be approximately 104 lb. using Springs Part No. 020328 and 020329. This load value is obtained with springs (i.e. one pair of hairpin springs per valve) having a specific load of 180 lb. per inch deflection. When the initial deflection of a spring of this rating is 0.580" the load will be 104 lb. ± 2 lb.

These conditions may be checked by measuring the distance between the spring prongs and the loop. This is conveniently achieved by making up a simple " 010 tolerance" gauge from a piece of ¼" steel plate. The width of the gauge should be .530" at one end and .540" at the other end. One end or the other of this gauge should be capable of sliding just freely between the upper sides of the spring prongs and the lower sides of the spring loop. If necessary, adjust by means of the shims under the spring seat block to provide the required "gap".

If new springs are to be fitted, it is a precaution to ensure that the prongs do not "butt" when installed. A clearance of approximately .020" between the prong ends is necessary. Also, the spring prongs must not have any tendency to "bind" or "lock" in their respective holes in the spring seat blocks. This is to ensure that, by allowing the springs to take up unconstrained and natural alignment, stress concentration and risk of premature failure is avoided.

continued

7R ENGINE - continued.

3). CAMSHAFT CHAIN ADJUSTMENT.

The camshaft chain is adjusted by means of shims between the rocker box faces. If more than .060" total shim thickness is required it is an indication that the timing chain is worn and should be renewed. Shims in excess of 0.060" are liable to adversely affect the valve and rocker operation geometry.

The chain should be set so that the spring tensioner (aided by finger pressure) deflects the chain from a straight or taut line by between 5/16" and ⅜" measured approximately at mid-distance between the sprocket centres. This slack is necessary to take care of variation of sprocket centres due to thermal effects.

Cylinder Head Nuts and Rocker Box Bolts.

Torque loading spanner settings.

Cylinder head nuts	(012780)	30 lb. ft.
Rocker box bolts	(012871)	18 lb. ft.

GEAR BOX - Internal Ratios.

	Top	Third	Second	Bottom
Standard 7R	1.0 : 1	1.099 : 1	1.331 : 1	1.782 : 1
Gears - number of teeth	23/19	22/20	20/22	17/25

A lower bottom gear ratio of 1.892:1 may be obtained by using a specially formed 16T mainshaft pinion (Part No. 040605) which meshes with the standard 25T layshaft pinion (Part No. 040510).

4). REAR CHAIN ADJUSTMENT.

The rear chain should be adjusted with just perceptible slack when the rear suspensions are at their fully compressed position. This operation is not easy to achieve unless a tool is available for holding the suspension units in their fully compressed position. The tool may be easily made up since it consists merely of two pieces of ¼" wide mild steel plate with suitable slots for engaging above and below the suspension unit spring abutments. Three ¼" steel rods are welded on to position the plates at the appropriate distance apart.

The procedure is to depress the rear of the machine and slip the claws of the tool over the spring abutments of one suspension unit thus holding the position required while adjusting the chain.