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

MODEL 7R
1949 - 1952

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INSTRUCTIONS AND TECHNICAL DATA
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The Model 7R A. J. S. is fitted with a single-cylinder chain-driven O. H. C. engine, designed for use in International Races run under F. I. M. Regulations:

ENGINE

Bore 74 m. m. Stroke 81 m. m. Displacement 348 c. c.
Standard compression ratio 9. 5 to 1.

CARBURETTOR

Amal 10 T. T. type. $1\frac{1}{8}$" bore. V3U Choke.
No. 109 needle jet. No. 340 main jet (See note)
(Set at Sea level in dry atmosphere)

NOTE:
Where a jet of different size is fitted, tests have shown that it is suited to the particular engine concerned under these conditions.

SPARKING PLUG - KLG. 689

MAGNETO - BTH type M. D. 1. or Lucas NTT. 1.

VALVE TIMING - Inlet Opens 61° B. T. D. C. Closes 71° A. B. D. C.
Exhaust Opens 74° B. B. D. C. Closes 44° A. T. D. C.

VALVE ROCKER CLEARANCE - For timing and tuning Inlet .005" Exhaust .014"

OIL - Castor base racing oil.

FUEL CONSUMPTION - Approximately 40 m. p. g. on average circuit at Racing speeds.

ENGINE R. P. M. - Motor to be raced as near to 7000 r. p. m. as possible R. P. M. should not exceed 7400.

PRIMARY CHAIN LUBRICATION - Oil is fed from bottom of oil tank through a jetted on-off tap. Standard Amal jets of from 80 to 110 are suitable according to temperature conditions, the smaller sizes being used in hot weather or on small circuits with low gear ratios. The flow of oil should be controlled to 15-20 drops per minute after the motor has been thoroughly warmed up.

FRAME - The Frame and suspension system has been specially developed for racing.

FRONT AND REAR SPRING UNITS are filled with Mineral Oil as follows:
Front Forks - 250cc's ($8\frac{3}{4}$ fluid ozs) oil each leg.
Rear suspension 85cc's (3 fluid ozs) (max.) oil each leg.
Recommended Brands: Castrolite, Single Shell, Mobiloil "Arctic" Essolube 20, Motorine 'E'

TYRE PRESSURES
Front Dunlop ribbed racing tyre 21" x 3. 00" = 21-lbs
Rear Dunlop studded racing tyre 20" x 3. 25" = 21-lbs

GEAR RATIOS
Standard gear ratios 5. 24, 5. 95, 7. 07, 10. 14
Standard sprockets 21-tooth engine 55 tooth rear wheel
44-tooth clutch 22 tooth gear box.

continued . .

ALTERNATIVE GEAR RATIOS

Engine Sprocket	Rear Wheel Sprocket	Top Gear
22	56	5.08
21	54	5.14
22	57	5.18
21	55	5.24
21	56	5.33
20	54	5.40
21	57	5.43
20	55	5.50
20	56	5.60
19	54	5.68

GEAR BOX RATIOS

Top	Third	Second	Bottom
1 to 1	1.136 to 1	1.35 to 1	1.936 to 1

6,750 r.p.m. with top gear of 5.24 represents 100 m.p.h.

GEAR BOX

Correct amount of lubricant 1 pint Summer Grade Mineral Oil.

WEIGHT AND TANK CAPACITIES

Approximate weight (tanks empty) 298-lbs. or 135 kilos.
Fuel tank capacity .. 4.75 galls or 21.5 litres.
Oil tank not to have more than .. 1 gall. or 4.5 litres.

COMPRESSION RATIOS

FUEL	Comp: ratio	Piston Part No.	Main Jet.	Needle Jet.	Magneto Timing B.T.D.C.
72 Octane	8.45 - 1	014081	320-350	109	40°
80 Octane	9.5 - 1	016832	320-350	109	40°
50/50 Petrol Benzol	10.75 - 1	014526	320-350	109	37°
90% Methanol-10% Benzol	13.0 - 1	016417	750-850	118-120	35°

(These pistons are also suitable for '49 and '50 type engines)

BRAKES

These are special A.J.S. double leading shoe brakes adjusted and ground before assembly to machine. Link rods between two brake levers on each hub are not to be adjusted except when relining brakes.

Important:

The leading ends of the brake liners must be kept well "backed off" and this relief must be maintained at $1\frac{1}{2}$" at all times. The rider must bear in mind that as the liners wear, so the relief becomes less.

The A.J.S. double-leading shoe brakes are exceedingly powerful and light in operation and care should be taken before employing the full braking which is available. The rider is strongly advised to learn the 'feel' of the brakes before taking part in serious racing.

(MODEL 7/R 1949-1952)

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The following notes will ensure quick and safe adjustments and replacements to be made and are intended only to cover items of unusual design calling for a special sequence of operations not immediately obvious on inspection:

(1) REMOVAL OF CYLINDER HEAD FOR GRINDING IN VALVES, ETC.,
Remove domed cap on camshaft chaincase. Do this slowly and carefully to ensure retention of camshaft oil feed bush in domed cap.
Remove chaincover. Remove two nuts at end of camshaft and then washer carrying driving peg for camshaft sprocket taking care to mark timing. This can best be done by marking the sprocket hub through the holes in the sprocket each side of one from which peg is withdrawn and by marking this hole only on the sprocket. The correct setting can then be selected on re-assembly by lining up the markings.
Remove engine steady plates from top of cam box and all bolts holding cam box to cylinder head, leaving four extended head bolts in the middle until last.

(When re-assembling fit these first, using pressure to squeeze rubber ring between cam box and chaincase to allow bolts to screw into cylinder head by hand. It is important that these bolts shall assemble freely to avoid damage to threads in cylinder head)

Remove cam box while sliding chain sprocket off hub and as soon as sprocket is clear, fit support tool provided in tool list to hold sprocket in position.

Use long box spanner provided to loosen four nuts holding cylinder head after removing carburettor control wires and slides from carburettor and disconnecting exhaust pipe by slackening clips to frame and megaphone and undoing cylinder head nut using special pen spanner provided.

(2) ADJUSTMENT OF CAMSHAFT CHAIN TENSION BEFORE FIXING CAM BOX FINALLY:
When cylinder head has been replaced, slide cam box into position without shims and slip sprocket on to camshaft. Check thickness of shims required to tighten chain until $\frac{1}{4}$" dia. bolt will just slip between chain tensioner blade and the long coil spring which forces blade against chain.

If it is necessary to add more packing to the shims already provided, there is a laminated shim supplied in tool kit. By carefully scraping all edges of this shim to remove slight burr that may be there, it is possible to insert a sharp knife between the laminations and peel off carefully, using knife as a wedge, shims of .004", .006", .008", etc., thickness, and if necessary a single lamination of .002" thick which will not be useable again can be removed to correct an error in thickness should this have been made when splitting the shim.

It is important that combined thickness of shims used on inlet and exhaust sides are the same or joint will not be solid or oil tight.

continued ..

MAINTENANCE - MODEL 7R - Continued:

(3) SETTING VALVE CLEARANCE AFTER OPERATIONS AND BEFORE TIGHTENING FOUR CENTRE CAM BOX BOLTS.

Remove long narrow caps, held by 6 screws each, from cam box to permit entry of feelers between rockers and cams.

NOTE - It is only possible to adjust clearance when extended head cam box bolts are loose.

Loosen nut clamping edge of rocker spindle and rotate spindle by means of tommy bar across slots provided in end of spindle. This adjusts rocker clearance Tighten clamping nut when clearance is correct, tighten cam box bolts and replace covers.

(4) A damper is fitted to camshaft chain tension blade and consists of a rectangular steel block slotted to receive the edge of the blade and sliding in a slot in the chaincase casting. It is controlled by a cranked spring blade which retains it in the slot. Adjustment of the damping is by altering pressure of the spring blade which is controlled by screwing the upper retaining screw, which is slotted crosswise in or out. Chain tensioner blade should take up slack in chain easily but not violently when released.

(5) Before removing cylinder barrel from crankcase loosen two crankcase clamping bolts at base of cylinder also upper magneto clamping strap nut and afterwards the top rear crankcase bolt which also retains the strap. Cylinder will then slide out freely.

(6) A very slight smear of graphite paste is desirable before assembling exhaust pipe nut, sparking plug and four centre cam box bolts. A liberal quantity should be used on splines and cam face of engine shaft shock absorber when assembling.

(7) Apply grease gun to nipple on engine shaft shock absorber each time machine is run.

(8) Should oil accumulate in crankcase after motor has been standing remove camshaft chaincover. This will expose the oil pumps, the upper of which is the delivery pump. Remove this and see that ball valve is clean and seating properly before replacing.

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A. J. S. M O T O R C Y C L E S

1 9 5 3

M O D E L 7R

INSTRUCTIONS AND TECHNICAL DATA

The 1953 Model 7R has been designed for use in International Road Races and conforms to the current F.I.M. Regulations in every respect:

ENGINE
Single cylinder with chain-driven O.H.C.
Bore 74 m.m. Stroke 81 m.m. Capacity 349 c.c.
Standard compression ratio 10:1.

VALVE TIMING
Inlet opens 49° B.T.D.C. Closes 71° A.B.D.C.
Exhaust opens 70°B.B.D.C. Closes 47° A.T.D.C.

VALVE ROCKER CLEARANCE
For Timing and Racing - Inlet .012" Exhaust .016"

IGNITION TIMING
40° B.T.D.C. fully advanced.

CARBURETTOR
Type G.P. Choke 1-5/32" Throttle Slide 7.
Main Jet 230. Needle Jet 109. (Set at Sea level in dry atmosphere)
NOTE: Where a jet of different size is fitted, tests have shown that it is best suited to the particular engine for maximum power output.

FUEL CONSUMPTION
35 to 40 m.p.h. under I.O.M. conditions.

SPARKING PLUGS
K.L.G. Type FE.300/4.

OIL
Castor base racing oil.

MAGNETO
Lucas Type N.T.T.I.

ENGINE SPEED
Maximum power is developed at 7,200 - 7,400 R.P.M.
Under no circumstances should 7,800 R.P.M. be exceeded.

CHAIN LUBRICATION
Oil is contained in the frame top tube which is filled through a small nozzle located at the steering head on the L.H. side. Lubrication is controlled by a tap on the R.H. side adjacent to the seat nose and then via a Y piece and a 65 Jet to the primary chain and a 35 Jet to the rear chain. Mineral oil of S.A.E.30 grade is recommended. Under very hot climatic conditions smaller jets may prove necessary and under cold conditions an increase in size may prove desirable. Care must be exercised to ensure that the jets are not interchanged.

FRAME
The welded duplex cradle frame and patented Teledraulic suspension system has been specially designed and developed for racing and attention to the forks and rear suspension units as follows will provide the best results:

continued ..

MODEL 7R:

FRAME - Continued:

Forks ..... 200 c.c. (7 fluid ozs) in each leg.
Rear Units .. 90 c.c. (3.17 fluid ozs) per unit.

GEAR BOX LUBRICATION
Approximately 1 pint. S.A.E.50 Mineral Oil.

TYRE PRESSURES
Front 19" x 2.75" - 22 lbs.
Rear 19" x 3.25" - 21 lbs.

GEAR BOX INTERNAL RATIOS
1:1, 1.09:1, 1.35:1, and 1.87:1.

STANDARD SPROCKETS
Engine 22, Clutch 42, Gear Box 21, Rear Wheel 55.

STANDARD GEAR RATIOS
Top 5:1. Third 5.45:1. Second 6.75:1. First 9.35:1.

TOP GEAR R.P.M. AT 100 M.P.H.
6,620 R.P.M.

WEIGHT (Dry)
294-lbs. 134 kilos.

TANK CAPACITIES
Petrol 5.3 galls. 24 Litres.
Oil ... 1 gallon . 4.5 Litres.

BRAKES
The front brake is of the double leading shoe type and the rear is operated by a conventional single cam. The front brake link rods should be adjusted only after re-lining.

Important:
The leading ends of the brake liners must be kept well 'backed off' and this relief must be maintained at all times. The rider must bear in mind that as the liners wear, so the relief becomes less.

The A.J.S. Racing type brakes are exceedingly powerful and light in operation and care should be taken before employing the full braking which is available. The rider is strongly advised to learn the 'feel' of the brakes before taking part in serious racing.

June, 1953.

ALTERNATIVE SPROCKETS AND GEAR RATIOS

MODEL 7R

The following is a list of the gear ratios that can be obtained with the alternative Sprockets that are available:

ENGINE SPROCKET	REAR SPROCKET	GEAR RATIO	R.P.M. AT 100 M.P.H.
20-T	54-T	5.4	7,150
20-T	55-T	5.5	7,280
20-T	56-T	5.6	7,420
20-T	57-T	5.7	7,550
20-T	58-T	5.8	7,680
21-T	54-T	5.14	6,810
21-T	55-T	5.24	6,940
21-T	56-T	5.33	7,060
21-T	57-T	5.43	7,190
21-T	58-T	5.52	7,310
22-T	54-T	4.9	6,500
22-T	55-T	5.0	6,620
22-T	56-T	5.09	6,740
22-T	57-T	5.18	6,860
22-T	58-T	5.27	6,980

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	21¾ 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 negaphone 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 conveniently 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° 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 136, e.g. the diameter of the orifice of the jet is 136" .Any change will adversely effect other settings so that no alteration is in this respect recommended.

THE IGNITION POINT IS CRITICAL. THE OPTIMUM SETTING IS 34° 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° IT SHOULD BE CHECKED AND IF NECESSARY RESET AFTER ENSURING THATTHE THE CONTACT BREAKER POINTS GAP IS SET AT 012° 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 ¼" BEFORE t.d.c. THUS IN FINDING TRUE t.d.c. THE DEGREE PLATE IS ADJUSTED UNTIL 0° IS OPPOSITE A POINTER ATTACHED TO THE CRANK-CASE AT EXACTLY HALF THE TOTAL CRANK ANGLE PERMITTED BY THE PROTRUDING ROD.

VALVE TIMING

When 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 means 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° 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° (crankshaft angle) either way can be obtained on the vernier incorporated in the sprocket hub assembly.

10) If the 4.6° provided by the vernier is too much proceed as follows.
Since the sprocket has 12 vernier holes and 17 chain teeth a small change occurs in the angular position of the sprocket relative to the hub when the [illegible]

(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 accurately 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 for uphill 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.

1964 MODEL. 7 R

GEAR RATIOS AND CORRESPONDING R.P.M AT SPEEDS SHOWN WHEN.
REAR WHEEL IS FITTED WITH 3.50= 19,, RACING TYRE CLUTCH.
SPROCKET 42T. GEARBOX SPROCKET 22T.

ENGINE. SPROCKET.	REAR WHEEL. S PROCKET.	TOP GEAR . RATIOS.	R P M. AT MPH. 100.	105.	110.	115.	120.	125.
23.	54.	4. 48.	5900.	6200.	6500.	6800.	7090.	7390.
23.	55	4.56.	6620.	6310.	6610.	6910.	7220.	7520=
23.	56	4.65.	6150.	6450.	6760.	7070.	7380.	7680.
23 .	57.	4.73.	6250.	6550.	6860.	7170.	4480.	7800.
23.	58.	4.81.	6350.	6670.	6990.	7300.	7610.	7940.
"22.	54.	4.69.	6180.	6490	6800	7100.	7410.	7740.
22.	55.	4.77.	6300.	6600.	6920.	7240.	755o.	7860.
22.	56.	4.86	6410.	6740.	7050.	7380.	770.0.	8020.
22.	57.	4.95.	6520.	6850.	7180.	7500.	7840.	8150.
22.	58.	5.03	6640.	6960.	7300.	7640.	7960.	
21.	54.	4.91.	6490.	6810.	7150.	7460.	7790.	8100.
21.	55.	5.00.	6590.	6910.	7250.	7570.	7900.=	
21.	56.	5.09.	6700.	7040.	7380.	7700.	8040. =	
21.	57.	518.	6820.	7160.	7500.	7850.	8190.=	
21.	58.	5.26.	6940.	7290.	7640.	7990		
20.	54.	5.15.	67		7460.	7800.	8150.	
20.	55.	5.25.	6920.		7600.	7950.	=.	
20.	56.	5.35.	7050.		7750.	8100.	=.	
20.	57....	5.44	7180.		7900			
20.	58	5.54.	7300.	7650	8010.			

THE IGNITION POINT IS [illegible]. THE OPTIMUM SETTING IS 34° 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° IT SHOULD BE CHECKED AND IF NECESSARY RESET AFTER ENSURING THATTHE THE CONTACT BREAKER POINTS GAP IS SET AT .012" 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 SIN 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 LE THE END TOUCHES THE PISTON ABOUT ¼" BEFORE t.d.c. THUS IN PLATE IS ADJUSTED UNTIL 0° IS OPPOSITE A POINTER ATTACHED TO HALF THE TOTAL CRANK ANGLE PERMITTED BY THE PROTRUDING ROD .

VALVE TIMING

When intending to remove the cylinder head ,it is importan the original valve timing can be re-obtained. the best proce

1) After removing the timing case lid ,undo the two nut

2) Before removing the vernier peg ,mark the hole that sprocket and the hub . the mark on the hardened sp made with indelible pencil ,but the mark on the hub

3) Make sure that the sprocket cannot get out of positi this is best done by wiring the sprocket firmly to

4) The chain will defect laterally sufficiently (witho the sprocket (in position on the chain) to be take

5) The 12 screws holding the rocker box and the four l giving access to the cylinder bolts.

6) If the original timing has been lost .fix a Dial I a bracket to the cam box and align the indicator s valve.

7) Mount a degree plate on the crankshaft ,together w attachment point.

8) Obtain precise T.D.C. (use tool made from an old s

9) Set tappets to normal running clearances (inlet.(then with the vernier peg removed, turn degree pl in normal running direction. this is to enable f carry the camshaft round until it is resisted by (this is the approximate point at which exhaust now continue to turn in the same direction until the piston is approximately 79° B.B.D.C., (1959 insert the vernier hole peg in the appropriate h nuts and check (Take reading when indicator sho if not correct an adjustment of 4.6° (crankshaft angle) either way can be obtained on the vernier incorporated in the sprocket hub assembly.

10) If the 4.6° provided by the vernier is too much proceed as follows. Since the sprocket has 12 vernier holes and 17 chain teeth a small change occurs in the angular position of the sprocket relative to the hub when the [illegible]

TOP OF PAGE SHOULD READ

NOTES ON IGNITION SETTING AND VALVE TIMING.

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.

SORRY