

TELEPHONES
COVENTRY 20221
MERIDEN 331

MOTOR
CYCLES



TELEGRAMS
"TRUSTY" COVENTRY

MERIDEN WORKS
ALLESLEY
COVENTRY
CV5 9AU

TRIUMPH ENGINEERING

OUR REF JRN/MMD/972

COMPANY LIMITED

YOUR REF



The Triumph Corporation,
Towson,
Baltimore,
Maryland, 21204,
U.S.A.

16th October 1969.

For the attention of Mr. Rod Coates,
Service Manager.

Dear Rod,

As you are well aware I have a considerable amount of unanswered correspondence from you which has not been answered due to various commitments in which both the writer and the Department have been involved, and because a number of them have required considerable research to give a realistic answer.

Since Tom Gunn has been with us in the Service Department, and because he now knows his way about Umberslade and the other Divisional Departments, I have charged him with going through your back correspondence and "finding the answers" which he has now ably completed.

We therefore start with the earliest outstanding problem, that of the torque chart. Just recently we have succeeded in pushing the torque chart figures through the Design Department and now have a complete authorised chart for publication and use on all our 4 Ranges of models. A copy of this is included with this correspondence. Tom wishes to point out that we have stuck to the lower Triumph engineering torque figures for the 500 and 650 c.c. cylinder heads. The cylinder base nuts for the 500 and 650 c.c. models are at the 25 lb. torque Tricor has always recommended and you will also note that the 250 and 500 c.c. connecting rod nut torque is 27 lbs. ft., and for the 650 c.c. the connecting rod nut torque is 22 lbs. ft. This difference is attributed to the difference in threads of the two nuts. CEI for the 500, UNF for the 650. This also takes into consideration the material change on the 650 c.c. con rod nut. Additionally there are no significantly different figures than those you have used or recommended over the past couple of years. We consider that the torque figures on this chart will be applicable across the board for the last 5 to 10 years, but you will have to use your own discretion in this matter.

Letter N-109, Oil Leaks T150 Model.

Regarding the fibre washers under the oil check valve plug we notice in your letter N-148 that you have developed your own aluminium washer for this usage. We assume therefore that this matter is closed.

Cont.....

However, we will pursue the elimination of all fibre washers with Umberslade Design Department.

Regarding the T150 oil filter housing cap and oil filter elements. The latest word we have on these items would be on the Minutes of Service Meeting No. 64. Before completing this letter we are going to check with the appropriate people at Umberslade and let you know the latest word on these two items. There should be no shortage whatsoever now on the T150 oil filter itself as we now have adequate stocks coming through satisfactorily from Messrs. Copper & Asbestos.

If the .048" solid copper head gasket is adopted on the 750 c.c. engine then this will necessitate increased length push rod, rocker adjusting screws and a new push rod top seal part No. E11190. This new "O" ring is .030" thick and would be used in addition to the existing two ring seals. We are pressing hard on Design to discontinue the project of the .048 solid copper head gasket and utilise the Klingerite "thousand" gasket which would eliminate all these additional variations, but our success has not been confirmed to date.

Letter N-110.

Referring to the lubrication charts regarding all our engines, the latest word we have is that a multi viscosity 20-50 rate oil is to be used in all engines. This weight oil would be used in the engine, primary and forks. The only place a different weight oil is used would be in the gearbox where we now recommend SAE 90 oil.

Regarding early cylinder wear problems, we quote directly from Tom Gunn's report on your recent memo to Mr. Miller regarding this problem.

"The two suspected causes of early cylinder wear problem are:-

- a) The BSA foundry barrels, one of our two suppliers have a lower phosphorus content than the Birco foundry barrels used on 650's. There has never been an early wear problem exhibited on Birco barrels to our knowledge. Therefore as of 1st February 1969 we no longer use BSA foundry 650 barrels on Production.
- b) When the change was made to Hepworth & Grandage manufactured pistons in 1967 the radial piston ring loading was increased by 50% due to a change in ring material."

Specifically it is suspected that the lower phosphorus content (.1%) of these BSA barrels has a contributory effect on cylinder wear characteristics. The Birco barrels have a .2 to .3% phosphorus content and appear to exhibit better wear characteristics. Birco barrels can be identified by an insignia on the front or rear of the cylinder base flange with just a letter and symbol on it. In addition the Triumph casting part number is stamped in the same area as the Birco insignia in $\frac{3}{8}$ to $\frac{7}{16}$ " high letters. The BSA foundry barrels have an insignia consisting of a letter, symbol and number (1 digit). This latter identification indicates date of manufacture.

In addition there is a small BSAF stamped lightly on the cylinder base flange. The BSA foundry Triumph casting part number is about $\frac{1}{4}$ " high. The ring change material that occurred in 1967 was from HG10 specification to HG22C cast iron. Investigations are now determining whether the better quality rings (HG22C material) are responsible for the early barrel wear symptoms.

Cont.....

Regarding the subject of loose cylinder head bolts. We are now making strong efforts to have this problem attended to after the engines have been run on the rolling road. Specifically we have asked that the gas tanks be left off the motorcycles until after the rolling road run and that all our cylinder heads be retorqued after the engines have sufficiently cooled. This matter is receiving top priority and it is hoped that we can soon assure you that this is being done with our production motorcycles.

Regarding the front fork springs on the T150, we have found the following. The first 750 c.c. motorcycles were built using the Yellow/Green H1892 front springs. On the 24th February 1969, engine No. BC 01954, a heavier front spring was installed on all 750's from that date. As the engine number fluctuated somewhat, the BC 01954 engine number is not an absolute figure but is an indication of the change point. You will find that the new springs were put on in a random manner way back to engine No. 1500. The heavier spring installed at this point was the H3651 Purple/White coded spring. ~~While~~ This spring has ^{H1892} ~~the same~~ ^{lower} spring rate, ~~it~~ is a longer spring and therefore in effect it is installed at a greater load at its fitted length than the standard spring. The Purple/White spring load at fitted length is approximately $41\frac{1}{2}$ lbs., whereas the Yellow/Green spring gives a comparative load of $26\frac{1}{2}$ lbs. We have found the Purple/White heavier spring is much preferred on the 750 c.c. motorcycle. Whilst O.K. initially, the Yellow/Green springs quickly settles to a less than proper load. In addition the heavier spring helps with the general problem of grounding on corners.

P/W H 3651 - $26\frac{1}{2}$ LB/IN 10.5" FREE LENGTH H 1892 $\frac{1}{6}$ 32.5 LB/IN
Letter N-111. 9.75" FREE LENGTH

We note you have found a cure for hand assembled racing engines, but nevertheless have passed the contents of your letter, coupled with Jomo's Service Report 1170 to Vic Gray, Quality Manager for attention at the overall production level.

Letter N-114.

The current situation regarding valve guides is summed up on the Minutes of Service Meeting No. 65. It is our belief that the "B" and "C" Range valve stem to guide clearance has been tightened to 750 c.c. standards.

Gear interchangeability is still in the works, reference the Minutes of Service Meeting No. 65, as also the gas tank mounting bracket problem is summed up.

Regarding push rod cover tube seal failures on the 500 and 650 c.c. models. This problem has now been considerably aided by a number of parts improvements. The number one improvement of course was the fitting of the Black heat resistant top sealing ring part No. E11283. This ring was fitted to 650 c.c. engines as of engine No. JD 25768. Also as of this engine number the chamfered tappet guide block was introduced. In addition to these, modified push rod tubes will soon be introduced on Production. These new tubes will have a longer length above the top seal ring and will have 6 holes in them instead of the castellated design now in use. This ring top will prevent the problems associated with the castellated design of the tabs bending in and fouling the push rods.

Cont.....

The strengthened top area will also provide a stiffer "O" ring support than the castellated design. The E9349 650 c.c. push rod tubes are $\frac{1}{4}$ " longer and the E9512 500 c.c. push rod tubes are $\frac{1}{8}$ " longer.

It is to be noted that the sliding push rod tube seal design does not demand any axial seal compression in order to be effective. Oil sealing is done strictly by radial compression of the "O" ring seal. There is a top seal diametral compression of .023" to .032" called for on the drawings. This amounts to .0115" to .016" radial compression per side.

Just recently the Service problem has forced into issue a service fix for 1968/1969 existing push rod tube leakage problems. This we have covered under separate letter to you followed by a Telex correcting a part number in our letter and the Trident Replacement Parts Catalogue. In the meantime we are pressing on getting the improved push rod cover tube arrangement in production also and trying to lick this problem once and for all.

The 650 c.c. connecting rod torque values have been reduced due to a material change in the nut. Whereas before there was some "give" in both the nut and bolt, now with the better material nut there is only some give in the bolt, therefore the lower torque value. We would give a word of warning that if you try to apply the original torque value to the new nut and bolt assembly, you may well succeed in breaking the bolts.

There has now been a formal request from Engineering to Amal to eliminate the wire screen over the main jet on all future concentric carburetters. We would recommend that you inform your dealers to remove the carburetter float bowl and remove this main jet screen on initial set-up. At the same time this will give them the opportunity to clean out the float bowl and tighten the main jet holder. There still has been no progress from Amal on a screw-on float bowl or plug in the bottom of the float bowl for easy cleaning, but we are not letting the matter rest here as far as Service is concerned.

The new numbers you saw for the oil pressure release valve assembly E9992 and E9512 were to be for a new one piece valve assembly. While this valve was specified it has never been built yet, therefore we have reverted back to the original two piece relief valve assembly. However we must warn you that Production is applying Loctite between the body and the cap to make it a "semi" one piece assembly, to overcome leaks and possible distortion when attempting to tighten the release valve home into the crankcase using the wrench on the cap hexagon only.

Letter N-118

As you are aware from the Service Meeting Minutes, the mainshaft high gear seal with 2 spacer washers will not be used at all. The captive "O" ring sprocket nut will be introduced at the recommencement of 1970 production. The new nylon lined clutch cables D2445 are now available for the 750 c.c. models. Will you please reconfirm your orders of this cable with us if you have not already done so.

Letter N-123.

We are still awaiting samples from the Design Department of the proposed new short choke cable for the 750 c.c. model. This would have a choke control down under the seat on one of the existing frame tubes.

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Letter N-129

An investigation of oil pressure switch failures is now being undertaken by Smiths. Our drawings do not show the number of the washer used with this switch. As however this switch is a Smiths number PS5300/1/07 you might be able to make enquiries from Smiths in the States regarding the availability of this washer.

SMITHS 32-634-105

Letter N-130

We have confirmed that a 100% oil pressure check is being made on the TR25W's on the rolling road, and we understand that Mr. Nedham has already Cabled you on the production situation at Small Heath. It appears following first reports that the problem is not likely to endanger big end performance, and at worst there will be no return to the oil tank and the crankcase will fill with oil. Checking of machines on production daily has reduced the overall percentage failures to an actual insignificant situation. For this we are generally thankful.

Letter N-131.

Tom has been having discussions with Jack Williams and some calculations of his own have confirmed that in all probability Raymond Burke Service Bulletin No. 69/2 is correct with regard to high oil pressure on "B" Range. It appears that we have consistently increased the size of the pressure side of the oil pump and have done little to allow for this increase in some of our oil passageways and in the oil pressure relief valve. We will have further words to add to this situation after further investigation.

Letter N-133

Referring to the maintenance notes first, it appears that the timing figures shown there are correct if a dial indicator is used on the valve itself. In other words with the tappets set to .020" for checking purposes you record the timing figure just as the valve starts to lift. This should correspond to the 50 - 64, 67 - 47 shown in the Maintenance Notes. Alternatively as you say and as Tricor prefers, these figures can be taken at the tappet after the tappet has lifted .020".

Turning now to the Workshop Manual, page GD3, the figures shown there appear to be correct for the U.K. domestic way of checking the valve lift, i.e. using a dial indicator on the valve itself. The figures shown on page GD3 for the valve lift correspond to the tappet lift if the valve lift is divided by the rocker arm ratio. These figures then come out approximately to the valve timing specifications shown on page 13 of the Tricor Green Overhaul Manual. Tom believes that the figures shown in the Tricor Overhaul Manual are still correct as of this date whether you are checking the timing by the degree method or by the top dead centre method. These figures as you know pertain to lift at the tappets. For the benefit of our American dealers, Tom is going to discuss with Gerry Uttley a revision to these timing figures so that they show the tappet lift and not the valve lift in future publications.

Referring to Page B30 of the Workshop Manual, you are correct that the valve timing mark on the intake camshaft is shown incorrectly. This intake camshaft gear should as you say have the dot at the root of the gear teeth. This dot should line up with the dash on the intermediate as shown in the Green Tricor Overhaul Manual, page 13.

Cont.....

The marks on the intermediate gear has now been revised, and in fact this revision is the one where Tom quoted in a note to you an engine number for new timing marks. From engine JD 25765 the new intermediate gear shows a dash and a dot for the intake camshaft marks instead of two dashes the same length. The dash will be the bottom mark and this is the mark that must be used for timing purposes on any late model Triumph engine. Tom is taking up with Umberslade the matter of having a dot deleted as we do agree with you that it adds nothing but confusion for our mechanics and dealers. Here again though, Tom points out that both Tricor Overhaul Manuals show the correct method of valve timing.

Copy Letter Coates - Gunn, August 26th.

This refers to Service Meeting 62 and 63 and Service Report 1237. Lucas has taken the policy that they will not alter the inside edge of the contact breaker cam. They claim that there is too much end tolerance possible in our production and that the cam needs its entire present length to account for all possible tolerance situations. They claim, and rightly, that it is Triumph that must put this situation correct and design their timing cover so that the hole in the timing cover for the contact assembly will be concentric with the axis of the exhaust cam.

Referring to the welded on front brake anchor lug. It is true that there is some distortion on the bottom member now occurring. It seems that we shall have to live with this however until the welding technique is perfected and a better way is found to control the present distortion. We have already written to you pointing out that the design condition for 1970 as illustrated in the Replacement Parts Catalogue has not been introduced onto Production, and in fact we are currently running with a welded condition of last years bottom outer member assembly as far as the brake anchor plate lug is concerned.

Regarding the 3 cylinder crankshaft balance. It has been found that there were dimensional changes performed on the 750 crankshaft in the middle of the 1968 year. These changes while maintaining the proper crankshaft balance appear to have affected the balance factor down to about 18%. This of course substantially changes the engine and frame vibration characteristics from the original 30% balance factor. Therefore we do not only have the question of whether the original 30% balance factor was the best one but in addition we have the problem on all late model production 750 bikes since approximately May or June 1968 having a lower than designed balance factor. The entire subject of 3 cylinder engine vibration is undergoing considerable investigation at this time. Attached to this letter will be a sketch showing how to identify the "18%" balance factor crankshafts. At this point there is no official answer to this problem, but we have the Experimental Department, Production, Proof Test and Umberslade working furiously to provide a practical service solution. Meanwhile machines at the factory due for despatch are frozen.

Letter N-135.

Regarding the T100 spit and die problem. At last this problem is receiving some attention from Engineering at Umberslade. Mr. Jack Williams concurs with Tom's opinion that this fault is exclusively due to the change in combustion chamber shape, piston shape, and valve size that occurred in the '67/'68 season.

Cont.....

He is now studying this situation to see what easily and cheaply can be done to alleviate the spit and die problem. At present we are trying knocking the corners off the top of the pistons to create more combustion room around the spark plugs. There is little hope that we will be able to revert to the '66 combustion chamber piston shape which both Mr. Williams and Tom feel is vastly superior to the present design.

Incidentally we assume you realise that for 1968 and 1970 dealers can no longer turn the ignition cam 180° round in order to advance the idle ignition timing. This is due to the fact that Lucas no longer puts a 5° hole in the ignition cam base plate, a subject on which we wrote you recently.

Letter N-140.

Both yourselves and Johnson Motors seems surprised that we at Triumph were capable of producing carburetter wall charts! Glad you appreciated them and we have forwarded copies as requested. They are 3/6d each nett U.K. retail.

We are shortly printing the final version of the Trident electrical wall chart, which has been held up due to the projected "Bonnevillisation" exercise which may affect the pictorial representation but may not possibly affect the actual wiring as indicated. This we do not know so rather than waste efforts and time we are resuming printing of the original wall charts and will send samples to you as soon as they are received.

To clarify the rich condition that may occur with some Amal carburetters it appears that the tapered seat in the main jet holder was machined too deeply. Therefore the main jet only engages on the hexagonal corner and allows an extremely rich running condition. We know of no accurate way to diagnose the symptom except by the extremely rich running condition itself. If there is any doubt about this, the dealer should be urged to replace both the main jet and the main jet holder with a new and correct part.

Letter N-142.

We definitely agree with your findings that the 3 cylinder engine runs considerably better with the $3\frac{1}{2}$ slides. We also feel that the BSA B group advance springs are a definite improvement on this model. In addition of course low speed running is somewhat improved when the engine has the correct valve timing.

Letter N-143.

We were intested to examine the 500 mile service check reports enclosed with the above letter. These appeared to give a far more accurate picture of our quality and service problems than the warranty claim forms that are analysed on the computer print-outs. Tom has been working on the Umberslade people with this in mind and has indicated this fact to Mike Nedham.

Comment on Letter from Pat to Rod written September 12th 1969.

At this present time there is 100% checking being made on Production for the depth of the groove cut in the bottom of the "B" and "C" Range push rod cover tubes.

Cont.....

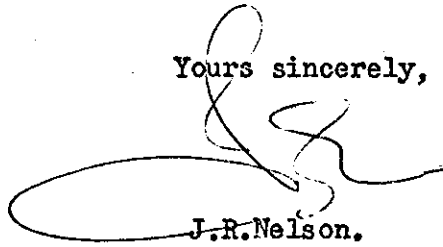
Letter N-148.

In answer to your question at the bottom of the page the copper head gasket cannot be used with the standard push rod cover tube seals as previously mentioned. With the copper gasket you must use in addition the new .030" thick washer part No. E11190.

This brings us virtually up to letter N-149 which we will leave for our next and tie up the other outstanding items which remain unanswered for you.

We hope the foregoing will clarify many of those items which seem to have remained unanswered for you, but both Tom and I can assure you that once you have digested the contents so far, you will be as up-to-date on the situation as we are.

Yours sincerely,



J.R. Nelson.
Service Manager.

c.c. Jomo.
R. Burke Motors.

