



Connecting Rod Bolt & Nut Set (ARP)

MG T-Series

321-269

Contents of Kit

Qty	Item#	Description
(8)	320-881	Bolt, connecting rod, ARP
(8)	320-882	Nut, flanged, connecting rod, ARP
(1)	322-815	Ultra-Torque Assembly Lube, ARP
(1)	980-402	Supplemental Information Sheet (This document)

This is simply the best con-rod bolt and nut set available for the MG T Series engine today.

About this kit.....

When it came time to rebuild the engine in Al Moss's TC, we looked to Automotive Racing Products Inc. (ARP) for engineering advice. We had copies of the original "Morris Motors Ltd." blueprints for internal engine fasteners, which was a good place to start, but as you can imagine, materials science has come a long way since 1939! Working with T-Series Specialists and ARP, the Moss Product Development Engineers identified several fasteners with room for serious improvement. The OE type pinch bolt at the wrist pin (small end) of the con rod was one; please check out our new pinch bolt & lock washer kit 320-899. More important than that, the connecting rod bolts were also identified as needing an upgrade.



MORRIS MOTORS Ltd. ENGINES BRANCH

MATERIAL SPEC N° EN 1008 SUPPLIED HEAT TREATED

SECTION STRETCH DIMPLE

MOSS MOTORS MANUFACTURING

PART NAME BOLT, CONNECTING ROD		REV A	PART NUMBER 320-881
MATERIAL 8740 ALLOY STEEL	CREATION DATE 2013-04-24	REVISION REVISION A	
FINISH BLACK OXIDE	DRAWN BY JASON DAVIS	REVISION DATE 2013-05-07	
UNITS INCHES	PHONE NUMBER (805) 679-7117	REVISED BY JASON DAVIS	
TOLERANCE XXXXX+0.005 XXXX+0.010	SCALE 1:1	FILE MSC / MG-TD / ROD BOLT /	PAGE 1 OF 1

About the bolts....

For the con rod bolts, ARP selected heat treated 8740 chrome moly steel. From ARP: "8740 chrome moly is seen as a good tough steel, with adequate fatigue properties for most racing applications, but only if the threads are rolled after heat-treatment, as is the standard ARP production practice. Typically, chrome moly is classified as a quench and temper steel that can be heat-treated to deliver tensile strengths between 180,000 and 210,000 psi." Once the material had been selected, new drawings were done by Jason, one of the engineers in our R&D Department. ARP made the bolts and they selected the companion nut. They also supply the special Assembly Lube to help ensure accurate torque readings.

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44 **Importance of the Proper Torque**

45 The connecting rod bolts are in a class by themselves when you consider the stress they are exposed to when
46 the engine is running. ARP explained it well: "...properly preloading a rod bolt is essential for trouble-free
47 performance. If a bolt is installed without sufficient preload (or pre-stretch), every revolution of the crankshaft will
48 cause a separation between the connecting rod and rod cap. This imposes additional stretch in the bolt. The
49 stretch disappears when the load is removed on each revolution, or cycle. Over time, this cycle stretching and
50 relaxing can cause the bolt to fail due to fatigue, just like a paper clip that is bent back and forth by hand. To
51 prevent this condition, the bolt's pre-load must be greater than the load caused by engine operation. A properly
52 installed bolt remains stretched by its preload and isn't exercised by the cyclic loads imposed on the connecting
53 rod. A quality bolt will stay stretched this way for years without failing. The important thing is to prevent the bolt
54 from failing due to fatigue by tightening it to a load greater than the demand of the engine." Connecting rod bolts
55 support the primary tension loads caused by engine operation and must be protected from cyclic stretching.
56 That's why proper tightening of connecting rod bolts is so important. "Protect your bolts – tighten them as
57 recommended."
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59 **Importance of Using ARP Assembly Lube**

60 Anyone that has assembled an engine will remember (hopefully!) coating the threads of the bolts with motor oil,
61 perhaps without understanding exactly what that was supposed to do. Simply put, there is going to be friction
62 between the threaded fastener and the threads of the paired nut or hole; assembled "dry", the torque readings will
63 include some of that friction, and as a result the bolt or nut will not be torqued properly. The aim of torquing all
64 the con rod nuts to the same value is to apply the same clamping force with each bolt. Since the friction varies,
65 the torque recorded will not be correct, and the clamping force will not be uniform. This variance is called "pre-
66 load scatter". To overcome this problem, tightening procedures for bolts/nuts specify that they be torqued in
67 stages, and then loosened and re-torqued several times. The solution? Lubricate the threads with something that
68 eliminates the friction variable and allows you to torque the nuts to their final value once. And if you do back a nut
69 off, you know that when it is re-torqued, the clamping force will be the same as the first time. Suffice it to say that
70 motor oil (and every other lube in your shop) will not work as well as ARP Ultra Torque Assembly Lube. That is
71 why it is provided in this kit, and why we want you to use it.
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73 **So... What is the Proper Torque?**

74 ARP has determined that 32 ft-lbs **with use of ARP Ultra Torque Assembly Lube** is optimal for the
75 connecting rod big end nuts and bolts. Note that this is higher than the 27 ft-lbs given for the factory
76 hardware, and note that the ARP assembly lube included with this nut and bolt set must be used.
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78 **So... What About Stretch?**

79 For those that have the necessary instruments, you may measure the bolt stretch as an alternative to
80 using the torque figures above. ARP has determined that the stretch for these bolts will be 0.0065-
81 0.0070" when properly tightened using the ARP Ultra Torque Assembly Lube.
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88 *Although every effort has been made to ensure the accuracy and clarity of this information, any suggestions that you may have that will*
89 *improve the information (especially detailed installation notes) are welcome. Please use the simple email form on the "Contact Us"*
90 *page on the Moss website: <http://www.mossmotors.com/AboutMoss/ContactUs.aspx> If you prefer, you may call our Technical*
Services Department at 805-681-3411. So many people call us for help that we are often not able to answer the calls as fast as we'd
like, and you may be asked to leave a message. We respond to every call for help as quickly as we can, which is normally within 2
business days, but when the volume of calls and emails is high, it may take longer. We apologize in advance for the inconvenience.



Moss Motors, Ltd.

440 Rutherford Street, Goleta, California 93117
In the US & Canada Toll Free (800) 667-7872 FAX (805) 692-2510 (805) 681-3400

Moss Europe Ltd.

Hampton Farm Industrial Estate, Hampton Road West, Hanworth Middlesex, TW13 6DB
In the UK: 020-8867-2020 FAX: 020-8867-2030