NORTON COMMANDO TORQUE SETTINGS

The torque values below come from the Norton Workshop manuals, information on the Old Britts website, a table provided in an Andover Norton The Source newsletter, recommendations from members of the Access Norton Forum (https://www.accessnorton.com) and personal experience.

The cylinder and head graphics are courtesy Grant Tiller (https://granttiller.com/).

I list what I use – if it conflicts with the workshop manuals or others, I explain. No, I don't use a torque wrench on everything listed, but I have experimented and know how tight I'm getting things.

Foot Pounds	Inch Pounds	Foot Pounds	Inch Pounds
1	12	11	132
2	24	12	144
3	36	13	156
4	48	14	168
5	60	15	180
6	72	16	192
7	84	17	204
8	96	18	216
9	108	19	228
10	120	20	240

NOTES:

- Lubrication makes bolts easier to turn and therefore lower torque should be used.
- Unless otherwise noted, all values here for standard steel on standard steel threads are for clean and dry threads. This includes Zinc and Cadmium plated.
- Anytime you are threading a stainless-steel nut on to a stainless-steel bolt, it is good practice to put a dab of anti-seize on the threads. Stainless tends to work harden and "weld" itself together.
- Plain steel, plated steel or stainless-steel screws in aluminum casings require great care if fine thread. 5 ft-lb. with anti-seize is fine with course threads but is probably too much with fine threads like those used for the gearbox. I always use anti-seize on stainless into aluminum but only 4ft-lb (48 in-lb.) for fine threads.
- If using the various ARP fasteners sold by Colorado Norton Works or others, the torque values are all stock values. At one-point cNw specified high values for some kits, but no longer.

GENERAL:

There is a table in the MK3 Workshop Manual called "General Guidance Table – Torque Recommendations" that supplies much more info. The plating, thread pitch, hardness, lubrication, and other factors matter. These values for plated, unlubricated UNF fasteners are from that table:

- 1/4" Bolt 8 ft-lb.
- 5/16" Bolt 15 ft-lb.
- 3/8" Bolt 25 ft-lb.
- 7/16" Bolt 40 ft-lb.
- 1/2" Bolt 60 ft-lb.
- 9/16" Bolt 80 ft-lb.

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ENGINE:

- Crankcase top front nut (1/4” stud) 72 in-lb.)
- Crankcase top rear nut (3/8” stud) 25 ft-lb.
- Crankcase bottom screws (1/4” x 20 x 1-1/4 – I use stainless steel socket cap screws, anti-seize, and 72 in-lb.
- Crankcase front short bolt/nut (5/16”) 15 ft-lb.
- Front ISO to Crankcase Mounting Bolts (3.8 in., 4-1/8 in., 2 bolts, 06.3213) 25 ft-lb.
- Cradle to Crankcase Mounting Bolts (3.8 in., 4-1/4 in., 2 bolts, 06.3212) 25 ft-lb.
- Cradle to Crankcase Mounting Bolt (5/16 in., 4-1/4 in., 1 bolt, 06.3212) 15 ft-lb.
- Cylinder head rear nut (3/8 in., 1 nut) 30 ft-lb. See tightening order below (#2)
- Cylinder head sleeve nuts (3/8 in., 2 nuts) 30 ft-lb. See tightening order below (#’s 7,8)
- Cylinder head center bolt (3/8 in., 1 bolt) 30 ft-lb. See tightening order below (#1)
- Cylinder head outside bolts (3/8 in., 4 bolts) 30 ft-lb. See tightening order below (#’s 3,4,5,6)
- Cylinder head nuts (5/16 in., 2 nuts) 20 ft-lb. See tightening order below (#’s 9,10)
- 750 Cylinder base nuts (3/8 in., 6 nuts) 25 ft-lb. See tightening order below
- 750 Cylinder base nuts (5/16 in, 3 nuts) 20 ft-lb. See tightening order below
- 850 Cylinder base nuts (3/8 in, 1 nut) 25 ft-lb. See tightening order below
- 850 Cylinder base nuts (5/16 in, 4 nuts) 20 ft-lb. See tightening order below
- 850 Cylinder barrel Allen bolts (4 bolts, 06-3085, through cylinder) 30 ft-lb.
- Crankshaft nuts
    - Pre-MK3 (2 long and 4 short studs, 12 nuts, 5/16”) 25 ft-lb.
    - Pre-MK3 (4 bolts and 2 studs, 8 nuts, 5/16”) 25 ft-lb. Note: the set 06.7094 that Andover Norton sell is for 72-74 and contains studs and nuts rather than bolts and nuts.
    - MK3 (14 nuts, 3/8”) 30 ft-lb. The MK3 workshop manual says to use Loctite.
- Connecting rod nuts (4 nuts, 06-7827) 25 ft-lb. Note: I’ve seen lots of different recommendations on the Internet for these, but every workshop manual agrees with me. It’s fine to reuse the bolts, new nuts must be used every time, the threads must be clean and dry, do not use Loctite, do not peen the nuts.
- Rocker spindle cover plate bolts (8 bolts) 8 ft-lb.
- Spark plug 15 ft-lb.
- Drain Plug (06-4188) 10 ft-lb. If using the version with magnet from Andover Norton it is very important to not overtighten!

Note: See Timing Case and Primary Case below for more engine related items.

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Cylinder Head Tightening Order:

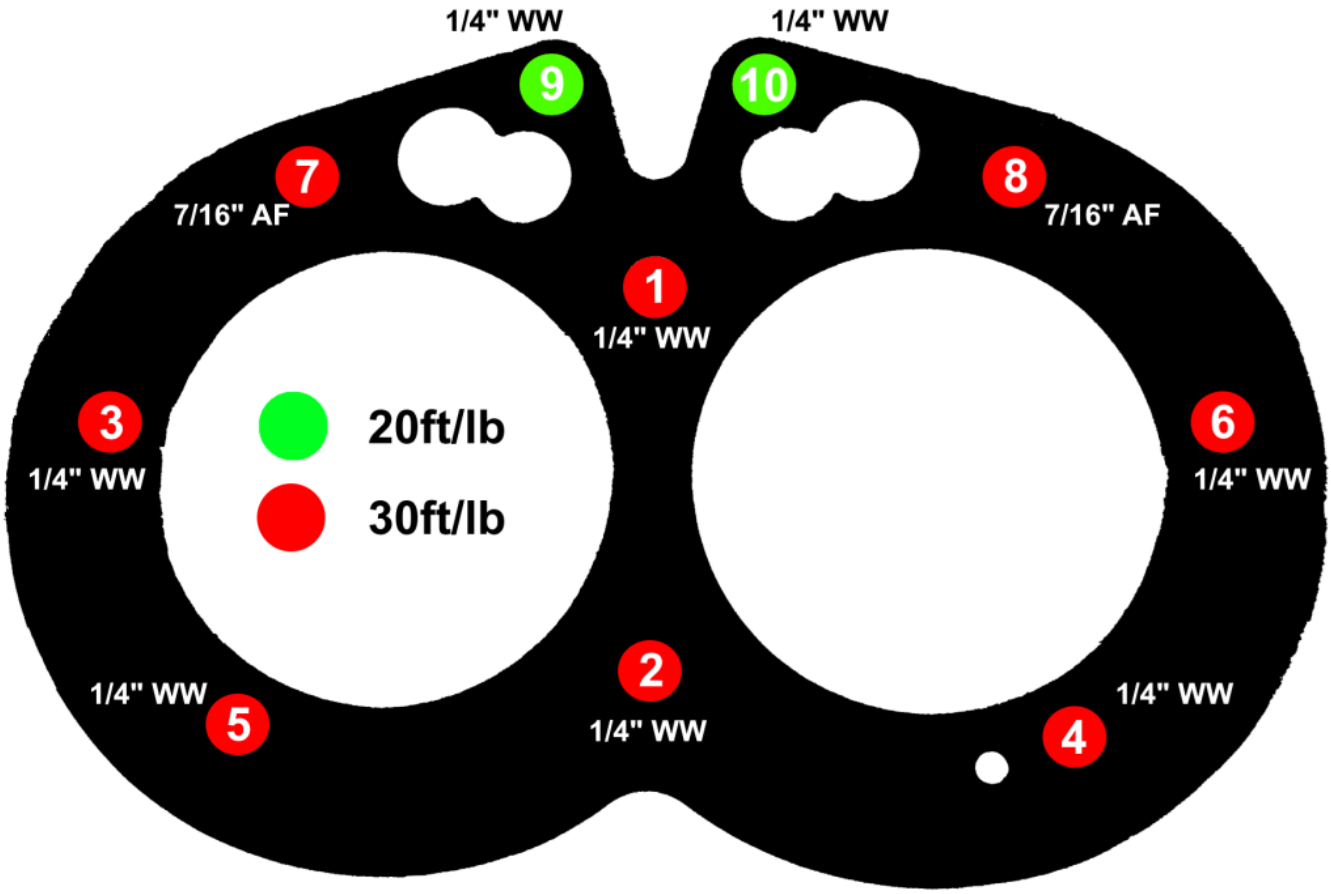
The graphic shows the tightening order (numbers), torque (colors), and wrench sizes. I Start at 10 ft-lb and follow the sequence, then 15 ft-lb, and follow the sequence, and then the final torque and follow the sequence.

Note 1: Norton Service Bulletin N3/68 states that for the 750 Commando the 3/8" bolt/stud torque should be increased to 35 ft-lb and the 5/16" bolts should be increased to 25 ft-lb. However, the 850 workshop manuals still say 30 ft-lb and 20 ft-lb.

Note 2: Here and in the next several pages, WW = Whitworth wrench of the size indicated. It does not indicate the thread pattern – British threads generally go by the diameter of the bolt and not the head size. Most British threads in a Norton are BSC/CEI or BSF, not BSW (Whitworth). AF = Across flats. In other words, 7/16" AF simply means a 7/16" (SAE) wrench which is usually a UNF or UNC thread. In this case the wrench to use is a SAE 7/16" but the studs are BSC/CEI.

Note 3: 750s originally had sleeve nuts (the ones in the front that secure the head from underneath) that were hex shaped for their full length – part NM.24260. The later bikes used sleeve nuts that were round except that the end is 7/16" AF. The older ones are difficult to work with so it's best to replace them with the new type – part 06.3192. The two 7/16" AF are ¼" WW (5/16" BS) if you have the older type.

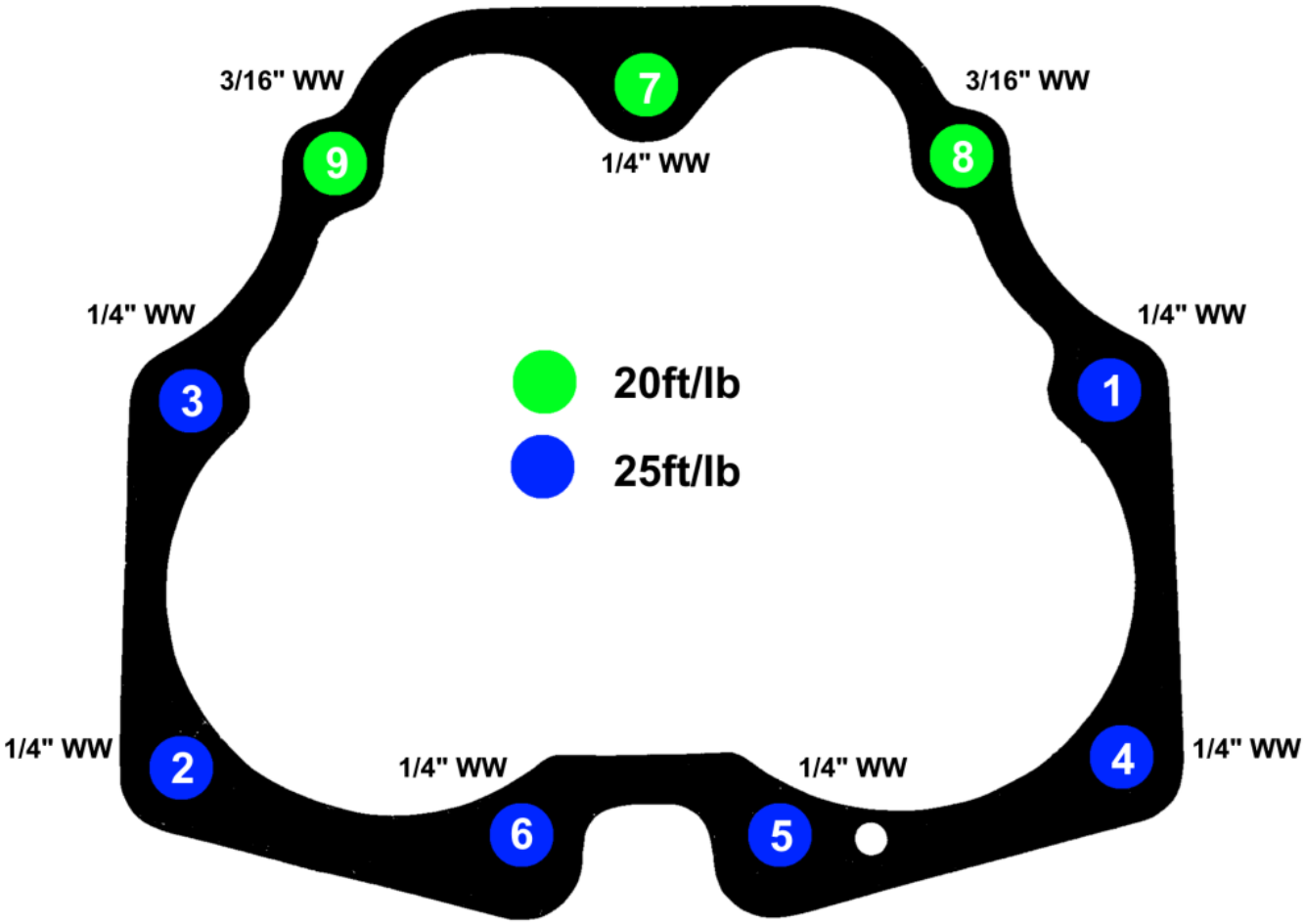
Note 4: Be careful of the three studs in the head and very careful if you replace them. They easily pull out. For more info, see: Norton Commando Head Stud Study of Failed Threads - GME (gregmarsh.com)



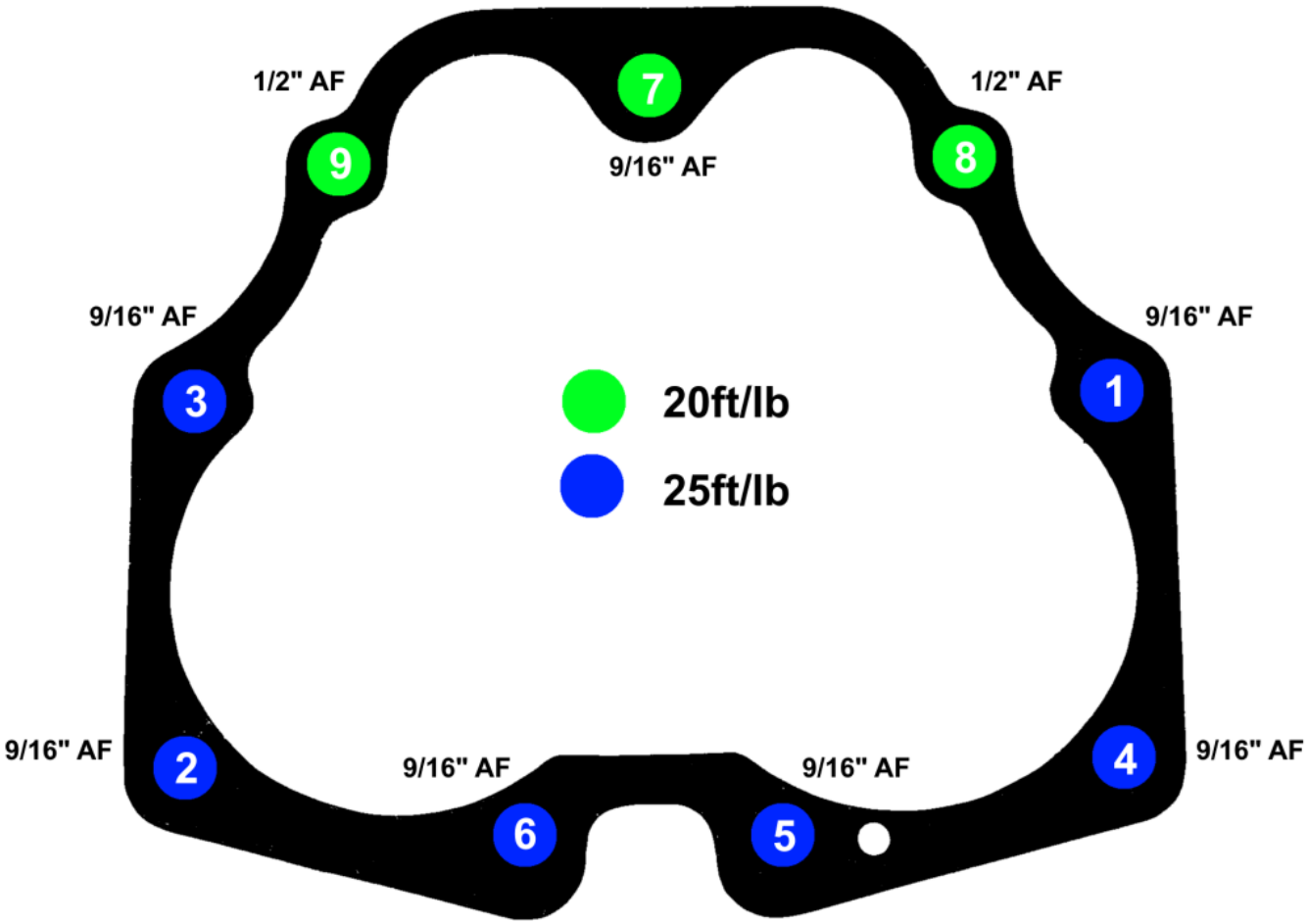
Cylinder Tightening Order:

The three graphics below show the tightening order (numbers), torque (colors), and wrench sizes for the cylinder base nuts for the 750s and the cylinder base nuts and through Allen bolts for the 850s. I start at 10 ft-lb and follow the sequence, then 15 ft-lb, and follow the sequence, and then the final torque and follow the sequence.

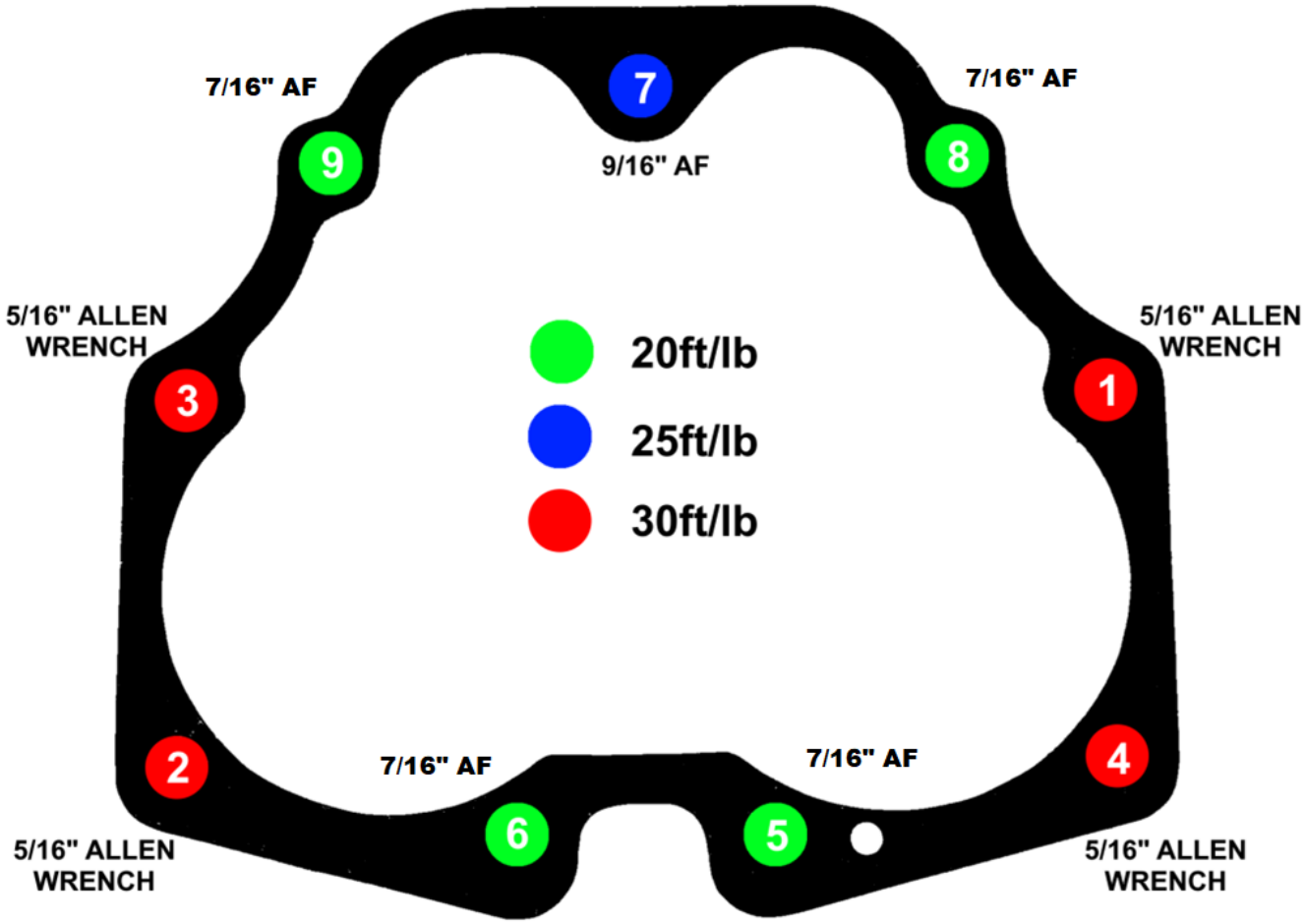
Cylinder Base 750 Tightening Order, Torque, and Wrench Size Prior to 1972:



Cylinder Base 750 Tightening Order, Torque, and Wrench Size 1972/3 with standard cylinders. If using the 850-style 750 cylinders, use the 850 settings on the next page:



Cylinder Base 850 Tightening Order, Torque, and Wrench Size:



TIMING CASE:

- Cam chain tensioner nuts (2 nuts, 06-2692) 15 ft-lb. (This could be too much 10-12 ft-lb sounds better, and the "star" washers make it seem like you will never get there)
- Oil pump stud nuts (no washers, 2 nuts, 06-7592)
    - 70-73 Workshop (065246): 15 ft-lb.
    - MK3 Workshop (00-4224): 10-12 ft-lb.
    - Andover Norton: 15 ft-lb.

    If Heli-Coils are present 15 ft-lb. is probably fine, if not, then it's too much.

- Oil pump worm gear nut (13-1303, on oil pump shaft) 25 ft-lb.
- Oil pump worm gear/nut (06-7889, LH thread, on end of crankshaft) I have found no authoritative source. Th workshop manuals simply say "tighten." Since the crankshaft is "turning into it," it probably can't loosen. I use 15 ft-lb.
- Camshaft sprocket nut (06-7774) This is not specified by any authoritative source I can find. I spoke with a car engine builder with about 40 years' experience, and he said that with chilled cast iron cams, that they use 15 ft-lb and a small dot of red Loctite. It is documented that with the PW3 cam 15 ft-lb is correct. I use Hepolite cams which are chilled cast iron, and I use 40 ft-lb and clean threads. Since the cam is "turning into the nut," it's likely that it won't come loose at much lower torque.
- Oil pressure release valve (2 nuts) 25 ft-lb.
- Timing cover screws (12 screws, 1 – 06-2685; 7 - 2686; 4 – 06-2687) 5 - 6 ft-lb (60 - 72 in-lb.) The graphic below shows the tightening order (numbers) and relative screw lengths. I start at 20 in-lb. and follow the sequence, then 40 in-lb., and follow the sequence, and then the final torque and follow the sequence.

Note: The lengths in the diagram are for pre-MK3 engines. MK3 engines still use 12 screws (06-5533) but they are all 1-1/4" long. If you prefer the slotted screws, you could use 12 of 06-2685 (1-1/4" long) or 12 of 06-2686 (1-1/8" long)

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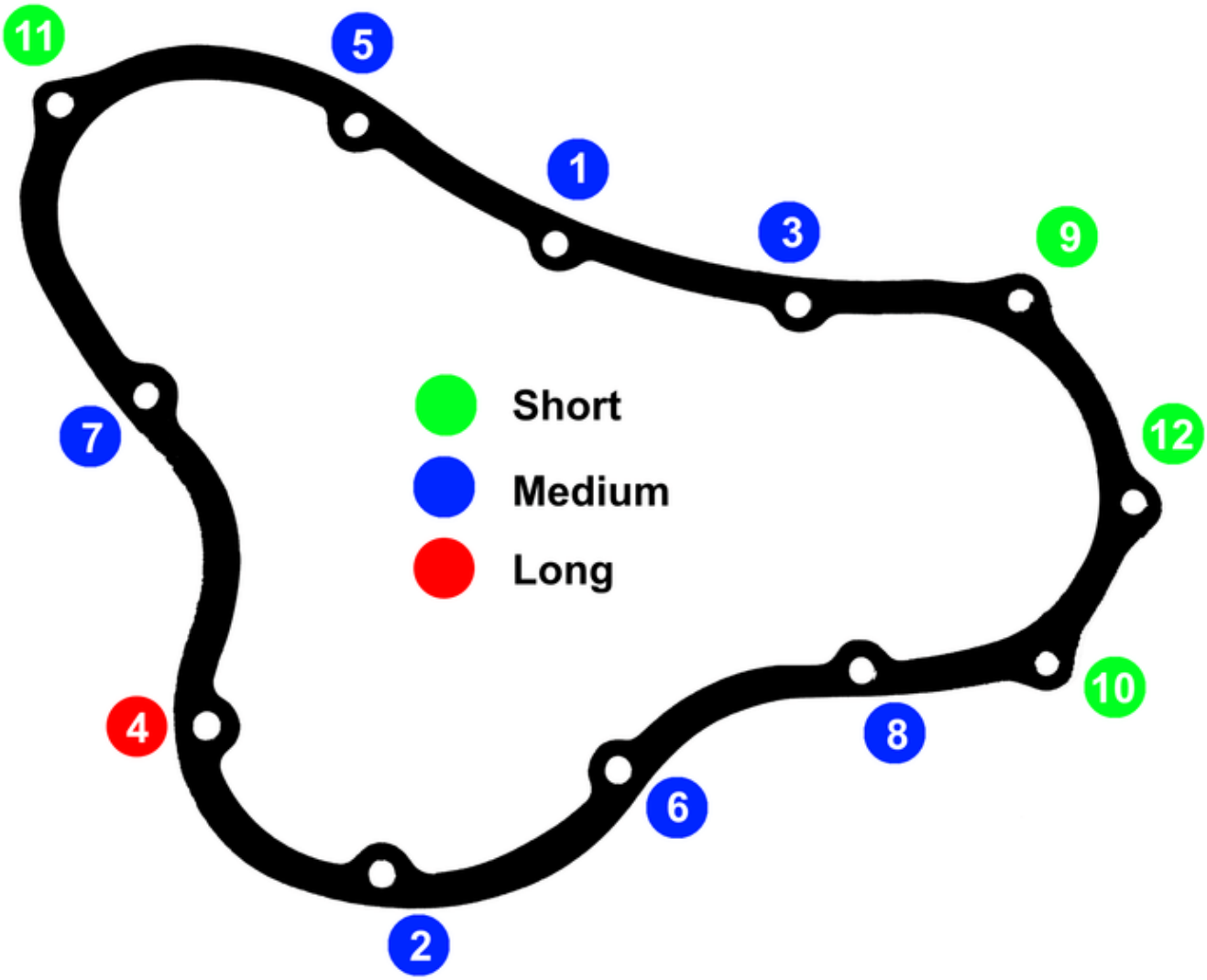

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PRIMARY CHAINCASE:

- Pre-MK3 Chaincase Attachment Nut (one nut, 06-0367) 25 ft-lb. You will find that 25 ft-lb many places. I think it is way too much. With a spotlessly clean O-Ring and inner and outer cover mating surfaces, I tighten until I have an even scant 1/16" gap all the way around.
- Alternator mounting stud nuts (3 nuts, 06-2692) 15 ft-lb.
- Inner Chaincase fixing bolts (3 bolts, 06-2669) 5 - 6 ft-lb (60 - 72 in-lb.)
- Rotor nut, Crankshaft (1 nut, 06-0387) 70 ft-lb. If installing the Colorado Norton Works e-start, see the cNw notes below.
- Alternator mounting stud nuts (3 nuts) 15 ft-lb.
- Clutch to main shaft nut (1 nut, 04-0373) 50 ft-lb.) The factory torque setting for this nut is 70 ft-lb.
    - According to Old Britts and others, this torque setting runs the risk of breaking the clutch locating circlip (06-0752), they say to blue thread locker on this nut and torque to 40 ft-lb and if you want to use 70 ft-lb. you should use a new circlip each time this nut is removed.
    - Andover Norton says 50 ft-lb.
    - I do use a new circlip and 850-type tab washer (06.3459) each time, no thread locker, and 50 ft-lb.
        - If using the tab washer, it is imperative that you also use a 06.3447 washer between the tab washer and nut.
        - If you don't want to use the tab washer and plain washer, then use the lock washer used on earlier bikes (04.0374).
    - If installing the Colorado Norton Works e-start, see the cNw notes below.
- MK3 Chain case outer screws (10 screws, 06-5533) 6 - 8 ft-lb (72 - 96 in-lb.)
    - If using Stainless Steel Socket Cap Screws, then use Nickel Anti-seize and 6 ft-lb.
    - Zinc coated screws do not require anti-seize and can be torqued to 8 ft-lb, but if anti-seize or anything is used on the threads then again use 6 ft-lb.
    - If using the JS Motorsport Primary Cover gasket, I think the torque values are the same but ask Jim, and then tell me!
- MK3 Long starter screw (1 screw, 06-5532) 8 ft-lb.
- MK3 Short starter screws (2 screws, 06-4729) 8 ft-lb.

cNw e-start notes:

- cNw supplies "Belleville" (spring washers) for both the clutch and rotor and they require different handling.
    - For the clutch, they say: "*Do not over tighten. Do not use torque setting as indicated in the original Norton shop manual since this may destroy the circlip on the back of the main shaft. Just tighten until spring washer is flat and nut is secure.*" I have tested and the torque with clean dry threads is between 40 ft-lb and 45 ft-lb.
    - For the rotor nut, they say: "*Put some Blue (medium) thread locker on the threads and make sure the large spring washer is in place. Torque nut to 60-70 ft/lbs.*"

      Any sort of lubrication on threads makes the clamping force higher at any given torque than with clean dry threads. This includes grease, oil, anti-seize, and thread locker! Since the standard is 70 ft-lb with clean dry threads, I consider 60-70 ft-lb too much with thread locker. I don't use thread locker and since I do use their "Belleville" washer, 60 ft-lb is enough in my opinion.
- "Belleville" washers are domed and the high part goes against the nut.

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GEARBOX:

- The inner cover nuts (7 nuts, 00-0004) 12 ft-lb. Tighten in a crisscross pattern to 4 ft-lb, then to 8 ft-lb and finally to 12 ft-lb
- Outer cover screws (5 screws, 00-0482) 50 in-lb.) These are fine threads. Use anti-seize, tighten to 30 in-lb. in a crisscross pattern and then to 50 in-lb.
- Timing-side main shaft nut (1 nut, 04-0023) 40 - 50 ft-lb.
- Final drive sprocket nut (Countershaft) (1 nut, 04-0070, LH Thread) 80 ft-lb. This can be hard to do unless you have the correct very deep socket. I get it as tight as I can and call it good. *Caution: Fine threads and the sleeve gear has splines, so the thread engagement is small. It is easy to overtighten and damage the sleeve gear threads. If the keeper doesn't line up, try a different rotation – don't try to tighten enough to get it line up!*
- Top gearbox fixing bolt, pre-MK3 (06-2563) 55 ft-lb.
- Top gearbox fixing bolt, MK3 (06-4697) 55 ft-lb.
- Bottom gearbox fixing nuts (2 nuts 14.0305) 55 ft-lb. The stud is part 06-0597
- Kick start pinch bolt (1 bolt, 06-0599) 25 ft-lb.
- Gearshift pinch bolt (1 bolts, 04-0105) 15 ft-lb.
- Drain plug (04.0138 or 04.0138M) 10 ft-lb. If using the version with magnet from Andover Norton it is very important to not overtighten!

FRONT FORKS / WHEEL:

Note: The first 5 bullets below specify the tightening order for the front end. At each step it is important to be sure the forks are 100% parallel to each other. If you have short gaiters, this is easy with a piece of plate glass across the forks. With full gaiters, it must be done on the sliders, which is more difficult and is usually best done by sighting across them.

- Fork top bolts (tighten first, 2 bolts, 06-0345) 30 - 40 ft-lb. This makes sure the fork tubes are all the way up.
- Steering head stem nut (tighten second, 1 nut, 0700101) 25 - 30 ft-lb. This makes sure the bottom yoke is all the way up. At this point, the fork ears are locked into place.
- Spindle (axle) nut (tighten third, 1 nut, 06-0361) 60 ft-lb. This makes sure the forks are parallel to each other.
- Yoke pinch bolts (tighten fourth, 2 Allen bolts, 06-1911) 30 ft-lb. Note
- Spindle (axle) pinch bolt/nut (tighten last) 10 - 15 ft-lb.
- ---------
- Fork damper tube anchor bolt (1 bolt each fork) 10 ft-lb.
- Nut mudguard bridge stud (2 each fork) 8 ft-lb. I remove the studs and use 1/4"-20 button head screws.
- Disc to hub nuts (5 nuts) 20 ft-lb.
- Front mudguard stays bolts (bottom, 4 bolts) 10 ft-lb.

Note If the forks become unaligned at this point, you could have a bent bottom yoke. To figure that out, loosen the first four bullets and "nip up". Loosen and retighten the bottom yoke pinch bolts to 30 ft-lb. If the forks are now aligned, you're good and start back at the first bullet. If not, then your bottom yoke is bent.

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Front CALIPER:

- Front caliper to fork bolts (2 bolts\nuts, 0700291) 25 - 30 ft-lb.
- End plug (original caliper, 1 plug, 06-2185) 25 ft-lb. It would take a special/weird tool to set this torque. Since there is a rubber seal, I just get it tight using the tool from Andover Norton which probably gets it to 25 ft-lb or more.

REAR WHEEL:

- The MK3 workshop manual says 80 ft-lb. for the dummy axle and rear wheel spindle, the earlier workshop manuals simply say, “tighten fully”.
    - Rear wheel nut (dummy spindle, 1 nut) 80 ft-lb. Note: You must apply the rear brake while tightening this so the brake backing plate is centralized in the brake hub. Andover Norton and Old Britts say 80 ft-lb. I say that is way more than needed. I make it tight with a standard ratchet - maybe 40-45 ft-lb.
    - Rear wheel spindle (one bolt) 80 ft-lb. Andover Norton and Old Britts say 80 ft-lb. I say that it is way more than needed and will damage the speedometer drive. I make it tight with a standard ratchet - maybe 40-45 ft-lb.
    - Don Pender’s stainless steel one-piece rear axle 40-45 ft-lb. Since this is stainless steel, anti-seize must is required to prevent galling. Note: you must apply the rear brake while tightening this so the brake backing plate is centered on the brake hub.
- Brake Drum Sleeve Nut (three nuts, 06-0323) 40 ft-lb. Note: Only used on older, non-cush hubs.
- Wheel adjuster nuts (2 nuts) 8 ft-lb.
- Speedo cable to speedo Gear Box (06-7904) 15 ft-lb.
- Swing arm pivot pin bolt (one bolt) 10 ft-lb.
- Rear mudguard nut (top, 2 nuts) 8 ft-lb.
- Rear mudguard nut 5/16 (1 nut) 15 ft-lb.
- Rear mudguard nut 1.4 (bottom, 2 nuts) 8 ft-lb.
- Tail lamp pillar nut (2 nuts) 24 in-lb.
- Lift handle-clip nut 1/4 (1 nut) 8 ft-lb.

ISOLASTICS:

- Front bolt nut (1 nut) 30 ft-lb. (Bolt 06-0423, Nut 06-0438 1/2” UNF)
- Front supporting plate nuts (2 bolts) 25 ft-lb. (Bolts 06-3213, Nuts 14-0303 3/8” UNF)
- Rear cradle to engine nut (1 bolt, bottom) 20 ft-lb.
- Rear cradle to engine plate nuts (2 bolts, upper) 30 ft-lb.
- Engine steady to head screw (3 screws) 12 ft-lb.
- Engine steady stud nut (2 studs) 12 ft-lb.

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OIL TANK AND FITTINGS:

- Oil tank mounting bolt (1 bolt, 06-0652) 4 ft-lb.
- Oil junction block bolt (1 bolt, 03-0448) 8 ft-lb.
- Rubber mounting bolt nuts (2 bolts, 4 nuts, 03-3057) 4 ft-lb.
- Oil filter mounting bolts (2 bolts, 14-0114) 8 ft-lb.
- Rocker feed banjo bolts (3 bolts, 06-7696) 15 ft-lb.
- Oil Tank Filter Bolt (1 filter bolt, 06-1159) Since this uses two soft aluminum washers, I tighten to 10 ft-lb and watch it to see if it leaks, if so, I tighten slightly until it doesn't. If over tightened, it will certainly leak!
- Drain plug (06-0668) 10 ft-lb. If using the version with magnet from Andover Norton it is very important to not overtighten!

FOOTRESTS:

- Rear side plate mounting nut (2 each plate) 25 ft-lb.
- Footpeg nuts (1 each footpeg) 40 ft-lb.
- Footrest mounting flange nuts (3 on left 2 on right) 8 ft-lb.
- Footrest mounting bolt (1 on right) 15 ft-lb.
- Passenger footrest bolt\nut (1 each) 25 ft-lb.
- Passenger pivot bolt (1 each rest) 8 ft-lb.
- Mounting rubber nuts (2 each rubber) 10 ft-lb.

MISCELLANEOUS:

- Side stand nut (1972 - later, one nut) 50 - 60 ft-lb. Since the bolt goes in from the bottom and is thin headed and since you can't get a torque wrench on the nut with the primary installed, just make it very tight. Next time you have the inner and outer primary off, you can do it with a torque wrench if you like!
- Center stand nuts (1 nut each side) 45 ft-lb.
- Coil mounting bracket nuts (2 nuts) 10 in-lb.
- Kick start pinch bolt (1 bolt/nut) 25 ft-lb.
- Balance pipe bolt, exhaust (2 bolts/nuts) 7 ft-lb.
- Carburetor stud nut (4 nuts) 8 ft-lb.
- Carburetor fixing screws (4 screws) 8 ft-lb.
- Shock mounting nuts (2 each shock) 25 ft-lb.
- Chain guard nut (2 nuts) 8 ft-lb.
- Front brake lever pivot bolt (1 bolt) 25 ft-lb.
- Front hydraulic hose nut (1 nut) 15 ft-lb.
- Muffler clamp pinch bolt (1 bolt) 9 ft-lb.
- Zener diode nut (one nut) 24 in-lb.
- Coil clip bolts (2 each coil) 10 in-lb.
- Coil mounting bracket bolts (4 bolts) 8 ft-lb.
- Reflector nut 20 in-lb.
- Screw, condenser pack (2 screws) 24 in-lb.
- Nut, condenser pack (2 nuts) 24 in-lb.
- Horn nut (2 nuts) 8 ft-lb.
- Head lamp bolt (2 bolts) 15 ft-lb.

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