

SERVICE BULLETIN

Compliance Will Enhance Safety

Supersedes SB96-7C
TECHNICAL PORTIONS
FAA APPROVED**SUBJECT:** Torque Limits**PURPOSE:** To provide torque specifications for fasteners utilized on all CMI aviation gasoline (AvGas) engines.**COMPLIANCE:** During all maintenance, repair, or overhaul events.**MODELS****AFFECTED:** All CMI aviation gasoline (AvGas) engines.**I. General Information**

The torque specifications included in Service Document (SB96-7D) must be used for their specific application. If an application is not listed under Section V, “Component Specific Torque Specifications” (see Table 2, through Table 4), use the general torque specifications listed under Section VI, “General Torque Specifications” (see Table 5 through Table 8). Refer to the appropriate manufacturer’s overhaul instructions for aircraft or engine accessory torque specifications.

WARNING**USE ONLY CLEAN 50 WEIGHT AVIATION ENGINE OIL APPLIED ON SURFACES LISTED, UNLESS OTHERWISE SPECIFIED.**

Do not apply any form of sealant to the crankcase cylinder deck, cylinder deck chamfer, cylinder mounting flange, cylinder base O-ring, cylinder fastener threads, or crankcase main bearing bosses. The use of RTV, silicone, Gasket Maker or any other sealant on the areas listed above during engine assembly will cause a loss of cylinder deck stud or through-bolt torque. Subsequent loss of cylinder attachment load, loss of main bearing crush and/or fretting of the crankcase parting surfaces will occur. The result will be cylinder separation from the crankcase, main bearing movement, oil starvation, and catastrophic engine failure.

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II. Torque Guidelines

WARNING

Proper torquing practices cannot be over emphasized. Torque procedures are provided to achieve correct preloading of fasteners. If the fasteners are not properly plated, the fastener threads are not clean and free of deformation or are not properly lubricated, the correct fastener preload will not be achieved even though the given torque value is reached. For this reason, it is critical that all fasteners be inspected for proper plating, thread form, and correctly lubricated prior to torquing. Failure to verify a fastener's serviceability or to correctly lubricate the fastener prior to assembly and torquing will result in the fastener not being properly preloaded and subsequent failure of the fastener may occur.

- Before torquing the hardware, verify the hardware size is correct.
- The accuracy of any torque indicating wrench depends on a smooth application of force and current calibration traceable to the National Institute of Standards and Technology, verifiable by the calibration data label affixed to the tool.
- If cotter pin holes must be aligned, set the torque wrench at the low limit and tighten the nut to the first hole beyond this torque; do not exceed the maximum specified torque limit. This torquing procedure must be followed for all applications requiring cotter pin hole alignment.
- If a nut slot cannot be aligned with a cotter pin hole within the specified limits, substitute another serviceable nut to attain alignment.
- If the cotter pin hole in a stud lies beyond the stud nut slots after the nut has been torqued, verify if the issued hardware is correct for the installation and the stud is correctly installed to the proper height.
- Check studs for necking damage (over stretch/misshapen deformity) due to excessively applied torque.
- Check the part for reduced thickness resulting from wear or incorrect part.
- Where applicable, special instructions/details are provided in footnotes following each table.
- The notation (AR) refers to “As Required” in all torque specification tables.

III. Cylinder Torque Procedures

Proper cylinder installation requires a multiple step torquing process. Lubricating, preloading torque, and achieving final torque values (not to exceed torque limits). Refer to the applicable Maintenance and/or Overhaul Manual for the proper torquing sequence.

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IV. Supersedures

1. Through bolt nuts P/N's 634505 and 649496 have been superseded by nut P/N 652541. At engine overhaul, all P/N 634505 and 649496 flanged through bolt nuts must be replaced with P/N 652541 (flanged 12 point nut).

NOTE: If replacing P/N 634505 or 649496 (less that a complete set, prior to engine overhaul), torque the replacement nut P/N 652541 to the required value of the original fasteners (P/N 634505 or 649496).

- a. Nut P/N 634505 is a flanged 6 point (hex) nut requiring a torque value of 690-710 inch lbs.
 - b. Nut P/N 649496 is a flanged 6 point (hex) nut requiring a torque value of 790-810 inch lbs.
 - c. Nut P/N 652541 is a flanged 12-point nut requiring a torque value of 790-810 inch lbs.
2. Connecting Rods
 - a. Nut, Connecting Rod (nut P/N 626140 w/bolt P/N 35972) is superseded by Nut, Connecting Rod (Spiralock nut P/N 654487 w/bolt P/N 655960).
 - b. Nut, Connecting Rod (nuts 24804 or 626140 w/bolt P/N 530213) and Nut, Connecting Rod (Spiralock nut P/N 654487 w/bolt P/N 654693) are superseded by Nut, Connecting Rod (Spiralock nut P/N 654487 w/bolt P/N 655959).

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V. Component Specific Torque Specifications

Table 2. Component Specific Torque Specifications

Size	Fastener	Torque Value		Models Affected (Non-standard, see General Torque Specification)
		In-Lbs	Ft-Lbs	
CRANKCASE				
.25-28	Nut, Crankcase Flange	100-125	8.3-10.4	A, C, & E Series, O-200, O-300, O-470 (AR), IO-240 & IOF-240
.25-28	Nut, Engine Mount Leg Bushing	90-100	7.5-8.3	C-125, C-145 & O-300
.25-28	Nut, Tie Bolt Prop Shaft Cages	90-110	7.5-9.2	GO-300
.31-18	Bolt, Oil Sump Flange	155-175	12.9-14.6	IO-346, O-470, IO-470, TSIO-470, GTSIO-520, IO-520, L/TSIO-520, IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOL-550
.31-24	Nut, Crankcase Flange	180-220	15.0-18.3	IO-346, O-470, IO-470, TSIO-470, GTSIO-520, IO-520, L/TSIO-520, IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOL-550
.31-24	Nut, Crankcase Backbone	240-280	20.0-20.3	(AR) Stainless Steel Hardware Only
.31-24	Nut, Crankcase Through Bolts	180-220	15.0-18.3	O-470 (AR), & E Series
.31-24	Nut, Magneto to Crankcase	100-120	8.3-10.0	All Models (AR)
.31-24	Nut, Magneto Gearshaft Support to Crankcase, ConeLok	190-210	15-8-17.5	IO-360 & L/TSIO-360
.31-24	Nut, Self-Locking, Fuel Pump Cover	155-175	12.9-14.6	O-200-A, B & D; O-300-A & D
.38-24	Bolt, Crankcase Through Bolts, Front Main Only	275-325	22.9-27.1	GO-300
.38-24	Nut, Crankcase Through Bolts, Front	370-390	30.8-32.5	O-470 & E Series
.38-24	Nut, Crankcase Through Bolts, Upper Rear	275-325	22.9-27.1	All 470, 520 & 550
.38-24	Nut, Crankcase Through Studs	275-325	22.9-27.1	A Series, C-75, C-85, C-90 & O-200
.38-24	Nut, Crankcase Tie Bolts	370-390	30.8-32.5	All (AR) EXCEPT IO-240, IOF-240 & 360
.38-24	Nut, Crankcase Tie Bolts	275-325	22.9-27.1	All IO-240, IOF-240, & 360
.38-24	Nut, Cylinder to Crankcase Stud	410-430	34.2-35.8	A, C, & E Series, O-200, O-300, GO-300 & O-470
.38-24	Nut, Cylinder to Crankcase Studs	440-460	36.7-38.3	All IO-240, IOF-240, & 360
.38-24	Nut, Mounting Bracket to Crankcase	275-325	22.9-27.1	All Models (AR)
.44-20	Nut, Crankcase Tie-Bolts-Nose & Below Camshaft	440-460	36.6-38.3	All Models (AR)
.44-20	Nut, Cylinder to Crankcase Studs	490-510	40.8-42.5	All Models EXCEPT TSIOL-550
.44-20	Nut, Cylinder to Crankcase Studs	590-610	49.2-50.8	TSIOL-550
.44-20	Nut, Cylinder to Crankcase Through Studs	400-450	33.3-37.5	A Series, C-75, C-85 & C-90

Table 2. Component Specific Torque Specifications

Size	Fastener	Torque Value		Models Affected (Non-standard, see General Torque Specification)
		In-Lbs	Ft-Lbs	
.44-20	Nut, Front & Rear Crankcase Bearing Through Studs	490-510	40.8-42.5	O-200
.44-20	Nut, Through Bolt at Cadmium Plated Washer	440-460	36.6-38.3	All Models (AR)
.44-20	Nut, Through Bolt at Cylinder Flange	490-510	40.8-42.5	All (AR) EXCEPT IO-240, IOF-240, & 360
.44-20	Nut, Through Bolt at Cylinder Flange	590-610	49.2-50.8	All IO-240, IOF-240, & 360
.44-20	Nut, Through Bolt at Front Mount Belt-Driven Alternator	490-510	40.8-42.5	All Models (AR)
.44-20	Nut, Tie Bolts at Nose and Prop Shaft Cages	340-360	28.3-30.0	GO-300
.50-20	Nut, Crankcase Through Bolt at Cadmium Plated Washer	615-635	51.2-52.9	IO-346, O-470, IO-470, TSIO-470, GTSIO-520, IO-520, L/TSIO-520, IO-550, IOF-550, TSIO-550, & TSIOF-550
.50-20	Nut, Crankcase Through Bolt at Cylinder Flange, P/N 634505 (6 point/0.33" tall)	690-710	57.5-59.2	All IO-346, All 470, All 520 & All 550 EXCEPT TSIOL-550
.50-20	Nut, Crankcase Through Bolt at Cylinder Flange, P/N 652541 (12 point)	790-810	65.8-67.5	All IO-346, All 470, All 520 & All 550 EXCEPT TSIOL-550
.50-20	Nut, Crankcase Through Bolt at Cylinder Flange, P/N 649496 (6 point/0.43" tall)	790-810	65.8-67.5	TSIOL-550
.50-20	Nut, Crankcase-Nose Tie Bolts	640-660	53.5-55.0	All Models (AR)
.50-20	Nut, Through Bolt at Cadmium Plated Washer	690-710	57.5-59.2	TSIOL-550
.62-18	Plug, (using crush washer)	190-210	15.8-17.5	All Models (AR)
GEARS				
.25-28	Bolt, Gear to Camshaft	140-160	11.7-13.3	A, C & E Series, O-200, O-300, O-470, IO-240, & IOF-240
.25-28	Bolt, Gear to Crankshaft (P/N 22532) ¹	140-160	11.7-13.3	A, & C Series, O-200, O-300, GO-300, IO-240 & IOF-240
.25-28	Bolt, Gear to Crankshaft (P/N 534904) ¹	170-175	14.2-14.6	E Series, O-470 Numerical, O-470-A & E
.31-24	Bolt, Gear to Camshaft	240-260	20.0-21.7	E Series, IO-360, L/TSIO-360, IO-346, O-470, IO-470, TSIO-470, GTSIO-520, IO-520, L/TSIO-520, IO-550, IOF-550, TSIO-550, TSIOF-550, & TSIOL-550
.31-24	Bolt, Gear to Crankshaft (Lower Hardness Identified with Green Dykem) ¹	240-260	20.0-21.7	E Series, IO-360, L/TSIO-360, IO-346
.31-24	Bolt, Gear to Crankshaft (Bolt Hardness RC 38-42) ¹	380-420	31.7-35.0	O-470, IO-470, TSIO-470, IO-520, L/TSIO-520, IO-550, IOF-550, TSIO-550, TSIOF-550, & TSIOL-550

Table 2. Component Specific Torque Specifications

Size	Fastener	Torque Value		Models Affected (Non-standard, see General Torque Specification)
		In-Lbs	Ft-Lbs	
.31-24	Bolt, Face Gear to Camshaft	140-150	11.7-12.5	IO-346, GTSIO-520, IO-520, TSIO-520 (AR), IO-550, IOF-550, TSIO-550, & TSIOL-550
.31-24	Nut, Generator or Alternator Gear	175-200	14.6-16.7	A, C & E Series, O-200, O-300, GO-300, IO-360, & L/TSIO-360
.31-24	Nut, Generator Gear (531231) w/washer (401507)	175-195	14.6-16.3	E Series
.38-24	Bolt, Vacuum & Fuel Pump Gear to Camshaft	275-325	22.9-27.1	IO-240 & IOF-240
.38-24	Nut, Slick Mag Gear to Magneto Shaft	120-180	10.0-15.0	O-200 & O-300
CONNECTING RODS				
.38-24	Nut, Connecting Rod (nuts 24804 or 626140 w/bolt P/N 530213) ^{2, 3, 4}	400-475	33.3-39.6	A & C Series, O-200, O-240, IO-240, IOF-240, O-300, GO-300, IO-360 & L/TSIO-360
.38-24	Nut, Connecting Rod (Spiralock nut P/N 654487 w/bolt P/N 655960)	400-475	33.3-39.6	E-Series O-470, IO-470, with 654796 Connecting Rod
.38-24	Nut, Connecting Rod (nut P/N 626140 w/bolt P/N 35972) ^{2, 3, 5}	400-475	33.3-39.6	E-185, E-205, E-225, IO-346, O-470 Numbered and Lettered Engines IO-470, TSIO-470, with 628751 Connecting Rod
.38-24	Nut, Connecting Rod (Spiralock nut P/N 654487 w/bolt P/N 654693) ⁵	490-510	40.8-42.5	O-200, O-240, IO-240, IOF-240, O-300, IO-360, L/TSIO-360, O-470, IO-470, TSIO-470
.38-24	Nut, Connecting Rod (Spiralock nut P/N 654487 w/bolt P/N 655959)	490-510	40.8-42.5	O-200, O-240, IO-240, IOF-240, O-300, IO-360, L/TSIO-360, O-470, IO-470, TSIO-470
.44-20	Nut, Connecting Rod (Spiralock nut P/N 643215 w/bolt P/N 643112)	550-600	45.8-50.0	O-470, IO-470, IO-520, L/TSIO-520-AE & CE, IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOL-550
.44-20	Nut, Connecting Rod (Spiralock nut P/N 654490 w/bolts P/N 643112 or P/N 655958)	690-710	57.5-59.2	O-470, IO-470, GTSIO-520, IO-520, L/TSIO-520, IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOL-550
.44-28	Nut, Connecting Rod (rod P/N 646476 w/bolts P/N 629340 and nut 628109) ²	475-525	39.6-43.8	IO-346, O-470, IO-470, TSIO-470, IO-520 & TSIO-520 (EXCEPT L/TSIO-520-AE & CE)
.44-28	Nut, Connecting Rod (rod P/N 646474 w/bolts P/N 631794 and nut 631554) ²	550-575	45.8-47.9	GTSIO-520
MISCELLANEOUS FUEL INJECTION				
#8-32	Screw, Aneroid Body Hold Down (AN500-8-14)	17.5-22.5	1.5-1.9	All Fuel Injected Model (AR)
#8-32	Screw, Manifold Cover Hold Down (AN503-8-12)	22-26	1.8-2.2	All Fuel Injected Model (AR)
.125-27	Fitting, Cover, Fuel Pump, Vapor Separator	60-80	5.0-6.7	All Fuel Injected Model (AR)

Table 2. Component Specific Torque Specifications

Size	Fastener	Torque Value		Models Affected (Non-standard, see General Torque Specification)
		In-Lbs	Ft-Lbs	
.125-27	Nozzle, Fuel Injector (w/anti-seize compound)	55-65	4.6-5.4	All Fuel Injected Model (AR)
.19-24	Through Bolt, Fuel Pump	29-31	2.4-2.6	All Fuel Injected Model (AR)
.25-28	Ejector, Cover, Fuel Pump, Vapor Separator	90-100	7.5-8.3	All Fuel Injected Model (AR)
.25-48	Jam Nut, Aneroid Stem Adjustment	25-30	2.1-2.5	All Fuel Injected Model (AR)
.31-24	Nozzle, Fuel Injector (w/anti-seize compound)	55-65	4.6-5.4	All Fuel Injected Model (AR)
.31-24	Nut, Throttle and Mixture Control Levers to Shaft	100-120	8.3-10.0	All Fuel Injected Model (AR)
.31-32	Nut, Fuel Injection Line	40-45	3.3-3.7	All Fuel Injected Model (AR)
.38-24	Nut, Fuel Injection Line	55-60	4.6-5.0	All Fuel Injected Model (AR)
.50-24	Nut, Air Reference Sleeve "B" Nut to Air Reference Line ⁶	--	--	All Turbocharged Models
.62-18	Metering Unit Plug & Screen Assembly (w/new gasket)	120-130	10.0-10.8	All Fuel Injected Model (AR)

Table 2. Component Specific Torque Specifications

Size	Fastener	Torque Value		Models Affected (Non-standard, see General Torque Specification)
		In-Lbs	Ft-Lbs	
MISCELLANEOUS LUBRICATION SYSTEM FASTENERS				
.25-20	Bolt, Oil Cooler to Adapter	100-110	8.3-9.2	IO-360, L/TSIO-360, O-470, IO-470, TSIO-470, IO-520, TSIO-520 (AR), IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOL-550
.25-20	Bolt, Oil Pump Cover to Crankcase	75-85	6.3-7.1	All Models (AR)
.25-28	Nut, Collar Assembly - Governor Oil Transfer	75-85	6.3-7.1	O-470, IO-470, TSIO-470, IO-520, TSIO-520 (AR), IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOL-550
.375-18	Oil Cooler Cross Fitting ⁷	185 min.	15.4 min.	TSIO-550-C, K, N; TSIOF-550-D, K
.38-24	Tachometer, Shaft to Oil Pump Drive Gear	280-300	23.3-25.0	IO-360-D, L/TSIO-360
.62-18	Plug, Bypass Valve	190-210	15.8-17.5	O-200-D
.62-18	Plug, Oil Cooler (w/crush washer)	190-210	15.8-17.5	All Models (AR)
.62-18	Plug, Oil Suction Tube (w/crush washer)	190-210	15.8-17.5	All Models (AR)
.62-18	Plug, Oil Sump Drain	190-210	15.8-17.5	All Models (AR)
.62-18	Oil Filter Cartridge	180-216	15.0-18.0	All Models (AR)
.75-16	Oil Filter, Disposable	192-216	16.0-18.0	All Models (AR)
.75-16	Plug, Oil Sump Drain	190-210	15.8-17.5	IO-470-M & IO-520-E
.88-16	Cap, Oil Relief Valve	190-210	15.8-17.5	O-200, IO-240, IOF-240, O-300 & L/TSIO-360
.88-16	Plug, Oil Bypass	240-260	20.0-21.7	O-470, IO-470, TSIO-470, IO-520, TSIO-520, GTSIO-520, IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOL-550
1.00-14	Vernatherm, Oil Temperature Control Valve ⁸	190-210	15.8-17.5	All Models (AR)
1.00-18	Screen Assembly, Scavenge Oil	200-210	16.7-17.5	O-300 (AR), IO-360 (AR), L/TSIO-360 (AR)
1.12-18	Housing, Oil Pressure Relief Valve (New Gasket)	240-260	20.0-21.7	IO-346, O-470, IO-470, TSIO-470, IO-520, TSIO-520, GTSIO-520, IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOL-550
1.25-18	Plug, Special Vernatherm	310-320	20.8-29.2	All Models (AR)
1.25-18	Vernatherm, Oil Temperature Control Valve	410-420	34.2-35.0	All Models (AR)
1.375-16 LH	Housing, Tachometer Drive	250-350	20.8-29.2	All Models (AR)
1.75-16	Oil Filter Adapter Lock Nut	500-520	41.6-43.3	O-300 (AR), IO-360 (AR) & L/TSIO-360 (AR)
1.75-16	Oil Filter Screen (w/new crush gasket. Install gasket w/parting line against screen face.)	500-520	41.6-43.3	All Models (AR)

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Size	Fastener	Torque Value		Models Affected (Non-standard, see General Torque Specification)
		In-Lbs	Ft-Lbs	
MISCELLANEOUS CYLINDER HARDWARE				
.071 (18mm)	Spark Plug ⁹	300-360	25.0-30.0	All Models (AR)
.125-27	Connector, Cylinder Drain	60-80	5.0-6.7	All Models (AR)
.19-32	Screw, Cylinder Baffle to Baffle Support ¹⁰	--	--	All Models (AR)
.19-32	Screw, Cylinder Baffle to Baffle Base	36-50	3.0-4.2	All Models (AR)
.25-20	Bolt, Rocker Shaft Hold Down	85-110	7.1-9.2	O-470-2, 4, 13, 13A & O-470-B (AR)
.25-20	Bolt, Through Bolted Rocker Shaft	90-100	7.5-8.3	O-470, IO-470, TSIO-470, IO-520, TSIO-520 (EXCEPT BE), IO-550 (EXCEPT G, N, P & R), IOF-550 (EXCEPT N, P & R) & TSIOL-550
.25-20	Screw, Rocker Box Cover (tighten two lower screws first)	55-65	4.6-5.4	IO-240, IOF-240, IO-360 & L/TSIO-360
.25-20	Screw, Rocker Cover	55-65	4.6-5.4	All Models (EXCEPT 240 & 360)
.25-20	Screw, Intake Flange	85-110	7.1-9.2	All Models (AR)
.25-20	Set Screw, Rocker Shaft, Locking	45-55	3.8-4.6	O-200, O-300
.25-28	Nut, Rocker Shaft Hold Down	110-120	9.2-10.0	IO-240, IOF-240 & All 360
.25-28	Nut, Exhaust (self locking)	120-130	10.0-10.8	All Models (AR)
.25-28	Nut, Exhaust Manifold Flange (spiral gasket)	100-110	8.3-9.2	All Models (AR)
.31-18	Bolt, Rocker Shaft Hold Down ¹¹	190-210	15.8-17.5	GTSIO-520, TSIO-520-BE, IO-550-G, N, P & R, IOF-550-N, P & R, TSIO-550 & TSIOF-550
.31-24	Bolt, Rocker Shaft Hold Down ¹²	85-110	7.1-9.2	O-470, IO-470, TSIO-470, IO-520, TSIO-520 (EXCEPT BE), IO-550 (EXCEPT G, N, P & R), IOF-550 (EXCEPT N, P & R) & TSIOL-550
.31-24	Nut, Exhaust Manifold Flange (spiral gasket)	200-210	16.7-17.5	All Models (AR)
.31-24	Nut, Induction Tube Flange	50-70	4.2-5.8	IO-240, IOF-240 & All 360
.44-20	Plug, Cylinder Drain (w/O-ring)	50-70	4.2-5.8	TSIOL-550
MISCELLANEOUS FASTENERS				
.19-32	Nut, Carburetor Air Intake Box Control Lever	9-10	0.75-0.83	O-200-D
.25-62	Clamp, Hose, Oil Gauge Rod	12-16	0.3-1.3	IO-360 & L/TSIO-360 (AR)
.25-62	Clamp, Hose, Magneto Pressurization	10-14	0.8-1.17	All Models with Pressurized Magnetos
.25-28	Nut, Exhaust Coupling, "V" band clamp ¹³	42	3.5	TSIO-520-L, LB & WB
.31-18	Bracket, Turbocharger	220-250	18.3-20.8	GTSIO-520-F, K
.31-18	Bolt, Alternator Mounting	150-180	12.5-15.0	IO-346, All 520 & All 550

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Size	Fastener	Torque Value		Models Affected (Non-standard, see General Torque Specification)
		In-Lbs	Ft-Lbs	
.38-16	Bolt, Turbocharger to Bracket	310-350	25.8-29.2	TSIO-520-L1, LB, UB, WB
.38-24	Nut, Slick Mag Impulse Coupling to Magneto Shaft	128-180	10.0-15.0	All Model using Slick Impulse Coupled Magnetos
.38-24	Nut, Starter to Adapter	200-220	16.7-18.3	O-300 (AR), GO-300 (AR), IO-346, All 470, 520 & 550
.44-20	Nut, Alternator Sheave to Starter Shaft	600-720	50-60	TSIO-520-B
.56-18	Nut, Starter Shaft Gear ¹⁴	450-500	37.5-41.6	IO-520, IO-550, IOF-550, TSIO-550, TSIOF-550
.56-18	Nut, Starter Jaw, Crankshaft	575-625	47.9-52.1	O-470-Numeral
.56-18	Nut, Generator Pulley Drive	450-500	37.5-41.7	IO-346, ALL 470, IO-520, TSIO-520, IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOF-550
.56-24	Screw, Shoulder, Air Conditioning Idler Sheave	800-850	66.6-70.8	TSIO-520-BE, TSIO-550, TSIOF-550
.62-32	Nut, Alternator Hub Assembly	300-450	25.0-37.5	IO-346, IO-520(AR), TSIO-520 (AR), GTSIO-520 (AR), IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOF-550
.66-20	Nut, Alternator or Generator Pulley	450-500	37.5-41.7	O-470, IO-470, IO-520 (AR), TSIO-520 (AR), TIARA (AR), IO-550, IOF-550, TSIO-550, TSIOF-550 & TSIOF-550
.75-16	Nut, Starter Shaft Gear, Viscous Damper	---	180-220	GTSIO-520
.88-18	Adapter, Tachometer Reduction Gear	120-180	10.0-15.0	IO-240, IOF-240 & All 360

- Heat crankshaft gear to 300° F; install gear on crankshaft immediately for shrink fit. Ensure the gear seats tightly against the end of the crankshaft by tapping lightly with a brass hammer.
- Torque to low limit. If cotter pin will not align with holes, increase torque gradually, up to high limit only. If cotter pin holes will not align within torque range, replace the nut and repeat. In no case shall nuts be tightened below the minimum or above the maximum torque limit. Refer to the most current revision of CMI Service Document SIL93-15 for special cotter pin installation instructions in 360 series engine connecting rods.
- A) P/N 530184 connecting rod (identified by forging number 530186), P/N A35159 (identified by forging 5561) and P/N A35160 (also identified by forging number 5561) must be assembled with P/N 530213 bolt, P/N 24804 or 626140 nut and P/N 639292 cotter pin.
B) Assemble P/N A36121 connecting rods utilizing the P/N 632041 forging with the part numbers indicated in current technical data.
Assemble P/N A36121 connecting rod assemblies utilizing the P/N 40742 forging with P/N 35972 connecting rod bolt, P/N 24804 nut and P/N MS24665-132 cotter pin.
- Bolt P/N superseded by 655960. Do not mix with obsolete parts.
- Bolt P/N superseded by 655959. Do not mix with obsolete parts.
- Snug nut finger tight to set seal between nut and male connector, then tighten additional 3/4 to 1 turn.
- Install fitting hand-tight. Wrench tighten the cross fitting to the appropriate clocking of fitting within 1-3 turns from the finger tight position. Minimum torque of 185 in/lbs must be achieved upon clocking position of fitting. The fitting is not to be loosened in order to achieve proper alignment (clocking).
- Apply Loctite Pipe Sealant 592.
- Lubricate spark plug threads with spark plug manufacturer's recommended lubricant.
- Install baffle screw until seated against flat washer; then, tighten an additional 2-6 turns. Baffle to be snug but not distorted. Verify minimum one (1) thread protrudes past nut plate on lower cylinder baffle.
- Do not realign hex cap screw to mate with tab washer.
- Must be reworked to through bolt rocker shaft configuration according to most current revision of CMI Service Document M92-6.
- Strike outer periphery of coupling band lightly to distribute load. Tighten to 50-60 in/lb. for P/N 641284 clamp and 60-70 in/lb. for P/N 653832 clamp.
- Align and adjust compressor belt tension according to most current revision of CMI Service Document M89-6.

Table 3. Specific Torque for Non-Lubricated Hardware

Size	Fastener	Torque Value		Models Affected
		In-lbs	Ft-lbs	
---	Clamp, Hose	25-35	2.0-2.9	All Models (AR)
#8-32	Screw, Throttle Lever	17.5-22.5	1.5-1.9	All Models (AR)
#10-32	Nut, Magneto Ground Terminal	15-17	1.25-1.41	CMI S-20/200, S-1200 Magnetos
#10-32	Nut, Magneto Ground Terminal	13-15	1.08-1.25	Slick Magnetos
#10-32	Screw, Ignition Harness Cable Outlet Plate	12-15	1.0-1.25	CMI S-20/200 Magnetos
Various	Nut, Ignition Harness Cable Outlet Plate	18-22	1.5-1.8	CMI S-1200 Magnetos
Various	Screw, Ignition Harness Cable Outlet Plate	18-28	1.5-2.33	Slick Magnetos
.125-27	Fuel Injector Nozzle to Cylinder ¹	55-65	4.6-5.4	All Fuel Injection Models
.31-24	Nut, Cable Attach	55-60	4.6-5.0	All w/Energizer Starter
.31-32	B-Nut, Fuel Injection Line to Fuel Injector Nozzle	40-45	3.3-3.8	All Models (AR)
.375-24	B-Nut, Fuel Injection Line to Fuel Manifold Valve	55-60	4.6-5.0	All Non-FADEC Fuel Injected
.56-24	Sensor, Magneto (Tachometer)	35-40	2.9-3.3	All Models (AR)
.625-24	B-Nut, Ignition Lead to Spark Plug	90-95	7.5-7.91	All Non-FADEC
.68-24	Sensor, Magneto (Tachometer)	35-40	2.9-3.3	All Models (AR)
.75-20	B-Nut, Ignition Lead to Spark Plug	110-120	9.2-10.0	All Non-FADEC
1.12-18	Oil Pressure Relief Valve Housing	240-260	20.0-21.7	All Models (AR)

1. Apply CMI P/N 646943 Anti-Seize Lubricant

Table 4. FADEC Components (Non-Lubricated Hardware)

Size	Fastener	Torque Value		Models Affected
		In-lbs	Ft-lbs	
#4	Screw, ECU 50-Pin Connector	10-15	0.83-1.25	All FADEC
#4	Screw, Speed Sensor 25-Pin Connector	10-15	0.83-1.25	All FADEC
#10	Bolt, Ground Strap	25-35	2.02.9	All FADEC
.125-27	Adapter Fitting, Manifold Air Temperature	60-80	5.0-6.6	All FADEC
.25-18 NPT	Sensor, Fuel Pressure	130-150	10.83-12.5	All FADEC
.25-18 NPT	Sensor, Manifold Pressure	130-150	10.83-12.5	All FADEC
.25-24	Bolt, ECU Mount	60-70	5.0-5.83	All FADEC
.25-62	Clamp, Exhaust Gas Temperature Sensor	30-35	2.5-2.9	All FADEC
.31-32	Nut, Fuel Injection Solenoid Retaining	24-28	2.0-2.3	All FADEC
.375-24	Bayonet Adapter, Cylinder Head Temp. Sensor	55-65	4.58-5.41	All FADEC
.375-24	Fuel Injection Line to Fuel Distribution Block	55-60	4.6-5.0	All FADEC
.437-24	Compression Fitting, Manifold Air Temp. Ferrule	145-155	12-12.9	All FADEC
.75-20	B-Nut, Ignition Harness to Spark Tower	110-120	9.1-10.0	All FADEC
.75-20	Jam Nut, ECU Spark Tower	110-120	9.1-10.0	All FADEC

VI. General Torque Specifications

Table 5. General Torque Specification

Bolts, Nuts, Screws		
Size	Torque	
	In. lbs.	Ft. lbs.
#2-56	1.4-2.6	N/A
#4-40	2.9-5.5	N/A
#6-32	5.3-10.1	N/A
#8-32	17.5-22.5	1.5-1.9
#10-32	36-50	3.0-4.2
#10-24	21-25	1.7-2.0
.250-20	75-85	6.3-7.1
.250-28	90-100	7.5-8.3
.3125-18	155-175	12.9-14.6
.3125-24	180-220	15.0-18.3
.375-16	220-260	18.3-21.7
.375-24	275-325	22.9-27.1
.44-20	400-450	33.3-37.5
.50-20	550-600	45.8-50.0
Driving Studs		
.250-20	50-70	4.2-5.8
.3125-18	100-150	8.3-12.5
.375-16	200-275	16.7-22.9
.44-14	300-425	25.0-35.4
Pipe Plugs		
.062-27	30-40	2.5-3.3
.125-27	60-80	5.0-6.7
.250-18	130-150	10.8-12.5
.375-18	185-215	15.4-18.0
.500-14	255-285	21.3-23.8
.750-14	310-350	25.8-29.2

Table 6. Hydraulic Line Torque Specification

Hose Size	Hose End Fitting Material	Torque (In-lbs.)	Models
.44-20	Nut-Self-Locking #4 hose	115-165	TSIO-520-L, LB, WB
.56-18	Nut-Self-Locking #6 hose	185-335	TSIO-520-L, LB, WB
.75-16	Nut-Self-Locking #8 hose	360-570	TSIO-520-L, LB, WB

NOTE: Fitting torques in Table 7 are for reference only. For all tapered (NPT/NPTF) fittings that must be oriented to a specific angle (clocked) for mating with another fitting or hose, screw the fitting into the port finger-tight. Wrench tighten additional 2-3 turns until the fitting is oriented at the desired angle. Do not loosen the fitting to achieve proper alignment.

Table 7. Straight Thread Fitting Torque Specification

Size	Fitting Size	Torque (In-lbs)
.31-24	Brass / Aluminum	15-30
.31-24	Steel	15-50
.38-24	Brass / Aluminum	40-65
.38-24	Steel	50-90
.44-20	Brass / Aluminum	60-80
.44-20	Steel	70-120
.44-24	Steel	60-80
.56-18	Brass / Aluminum	75-125
.56-18	Steel	90-150
.75-16	Brass / Aluminum	150-250
.75-16	Steel	135-250
.88-14	Brass / Aluminum	200-350
.88-14	Steel	300-400

Table 8. Hose Fitting ("B" Nut) Torque Specification

Hose Size	Hose End Fitting Material	Torque (In-lbs)
-2 (.31-24)	Brass/Aluminum Fitting	50-80
-2 (.31-24)	Steel Fitting	75-120
-3 (.38-24)	Brass/Aluminum Fitting	70-105
-3 (.38-24)	Steel Fitting	95-140
-4 (.4375-20)	Brass/Aluminum Fitting	100-140
-4 (.4375-20)	Steel Fitting	135-190
-5 (.500-20)	Brass/Aluminum Fitting	130-180
-5 (.500-20)	Steel Fitting	170-240
-6 (.5625-18)	Brass/Aluminum Fitting	150-195
-6 (.5625-18)	Steel Fitting	215-280
-8 (.750-16)	Brass/Aluminum Fitting	270-350
-8 (.750-16)	Steel Fitting	470-550
-10 (.875-14)	Brass/Aluminum Fitting	360-430
-10 (.875-14)	Steel Fitting	620-745
-12 (1.063-12)	Brass/Aluminum Fitting	460-550
-12 (1.063-12)	Steel Fitting	855-1055

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