CONTINENTAL AIRCRAFT ENGINE

MAINTENANCE MANUAL

STANDARD PRACTICE FOR SPARK IGNITED ENGINES

Technical Portions Accepted by the Federal Aviation Administration

Publication M-0

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CHANGE 6

SEP 2018

Supersedure Notice

This manual incorporates maintenance and service information contained in Continental Motors Service Documents common to the horizontally opposed, spark ignition, AvGas aircraft engines conforming to Type Certificate held by Continental Motors. This document is supplemental to the Instructions for Continued Airworthiness provided in the manuals listed in Section 1-1.1. Instructions contained in the Service Documents listed in Section 1-2.4 are superseded by instructions in this manual upon release, except for those Mandatory Service Bulletins (MSBs) and Critical Service Bulletins (CSBs).

Effective Changes for this Manual

0 .....15 April 2016	4.....31 Jul 2017		
1 ..... 30 May 2016	5.....26 Jan 2018		
2 .....30 Sep 2016	6..... 30 Sep 2018		
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List of Effective Pages

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C (blank)	1	2-5 thru 2-6	0	6-3	2	6-33 thru 6-48	0
i	6	2-7 thru 2-8	1	6-4 thru 6-5	3	6-49	5
ii	0	2-9 thru 2-12	0	6-6	1	6-50	4
iii thru xviii	1	2-13	3	6-7	0	6-50.1 thru 6-50.2	4
1-1 thru 1-3	6	2-14 thru 2-24	0	6-8 thru 6-10	5	6-51	0
1-4 thru 1-6	0	3-1 thru 3-2	0	6-11 thru 6-15	0	6-52	3
1-7 thru 1-8	6	3-3	3	6-16 thru 6-17	2	6-53 thru 6-66	0
1-9	0	3-4	0	6-18	4	6-67	1
1-10	0	3-5	4	6-19 thru 6-22	0	6-68 thru 6-69	0
1-11	6	3-6	5	6-23	2	6-70	5
1-12	5	3-7 thru 3-8	3	6-24 thru 6-25	5	6-71 thru 6-74	0
1-13 thru 1-14	0	3-9	5	6-26	0	6-75	5
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6-96	1	6-157	0	10-19 thru 10-21	0	B-1	1
6-97	0	6-158	3	10-22	1	B-2 thru B-5	0
6-98 thru 6-100	3	6-159	6	10-23 thru 10-24	0	B-6 thru B-12	6
6-101	1	6-159.1 added	6	10-25	1	B-13 thru B-16	0
6-102	0	6-159.2 added	6	10-26 thru 10-30	0	C-1 thru C-4	0
6-103	1	6-160 thru 6-164	0	10-31 thru 10-34	6	C-5	6
6-103.1 added	5	6-165	3	10-34.1	4	C-6	4
6-103.2 added	5	6-166 thru 6-171	0	10-34-2	5	C-7	5
6-104 thru 6-115	0	6-172	1	10-35 Blank added	4	C-8 thru C-9	1
6-116	1	6-173 thru 6-174	0	10-36	4	C-10 thru C-15	0
6-117 thru 6-132	0	7-1 thru 7-2	0	10-37	0	C-16	5
6-133 thru 6-135	1	7-3 thru 7-5	4	10-38	3	C-17 thru C-18	0
6-136	0	7-6 thru 7-7	0	10-39 thru 10-40	1	C-19	1
6-137 thru 6-138	1	7-8	1	10-41 thru 10-62	0	C-20 thru C-23	0
6-139	0	7-9	0	10-63	5	C-24	4
6-140	1	7-10	1	10-64 thru 10-69	0	C-25 thru C-26	0
6-141	0	7-11 thru 7-17	0	10-70	3		
6-142	3	7-18	3	10-71 thru 10-93	0		
6-143 thru 6-145	0	7-19 thru 7-23	0	10-94 thru 10-95	3		
6-146	3	7-24	1	10-96 thru 10-97	0		
6-146.1 added	3	7-25 thru 7-30	0	10-98	6		
6-146.2 added	3	8-1 thru 8-15	0	10-99	0		
6-146.3	5	8-16	2	10-100 thru 10-101	3		
6-146.4	5	8-17 thru 8-26	0	10-102 thru 10-103	0		
6-146.5	5	9-1	1	10-104 thru 10-106	4		
6-146.6	5	9-2 thru 9-6	0	10-107 thru 10-108	0		
6-146.7 added	5	10-1 thru 10-2	0	11-1 thru 11-8	0		
6-146.8 added	5	10-3	1	12-1	1		
6-147	3	10-4 thru 10-8	0	12-2	0		
6-148 thru 6-149	5	10-9	2	12-3	6		
6-150 thru 6-151	0	10-10 thru 10-12	5	12-4 thru 12-7	0		
6-152	2	10-13	2	12-8 thru 12-10	1		
6-153 thru 6-154	1	10-14	3	12-11 thru 12-12	0		

3-3.1.2. Six Cylinder Engine Crankcase Threading

WARNING

Do not apply <u>any</u> form of sealant to the crankcase cylinder deck, chamfer, cylinder mounting flange, cylinder base O-ring, or cylinder fastener threads. The use of RTV, silicone, Gasket Maker or <u>any</u> 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, main bearing movement, oil starvation and catastrophic engine failure. USE ONLY CLEAN 50 WEIGHT AVIATION ENGINE OIL ON SURFACES LISTED.

1. Use full strength, non-thinned P/N 654663 (gasket sealant). Shake or mix well before using.

   CAUTION: Apply gasket sealant and threading (a continuous, single piece) only as illustrated.

2. Apply P/N 654663 (gasket sealant) to 2-4-6 case half according to the manufacturer's instructions only in areas where threading is indicated. When applying, use short light brush strokes until an even thin coat is obtained. The gasket sealant should be viscous enough that most of the brush marks disappear; if not, discard the old gasket sealant and reapply with new gasket sealant.

   NOTE: Allow the gasket sealant to air dry to a tacky condition before applying silk threading.

3. Apply a thin translucent coat of P/N 646942 (gasket maker), not to exceed 0.010 inch thick, to the 1-3-5 case half. Apply gasket maker in all areas that will mate against areas where gasket sealant was applied on the matching 2-4-6 case half (except the through bolt bosses).

4. Apply and position P/N 641543 (a continuous, single piece of grade "D" silk thread) on the 2-4-6 case half as specified (see Figure 3-6 through Figure 3-9). Ensure the free ends of the thread will be covered by gasket material (except at the nose oil seal).

5. Assemble crankcase halves; install and torque all crankcase hardware in proper sequence in accordance with the applicable overhaul manual as soon as possible.

   NOTE: Take care to prevent displacement or damage to the crankshaft oil seal and silk thread. Ensure thrust washer halves and bearing halves remain in place.

6. After crankcase torque, follow the instructions in Section 10-10 to install the nose oil seal.

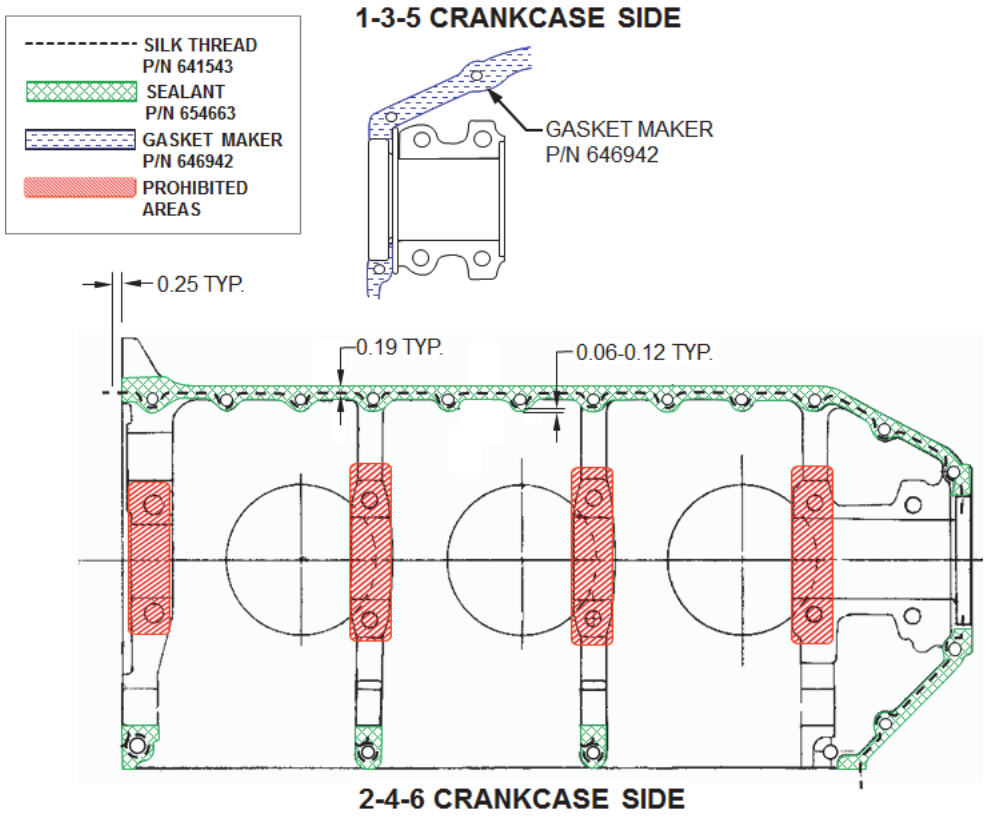

Figure 3-5. Crankcase Threading Diagram - O300

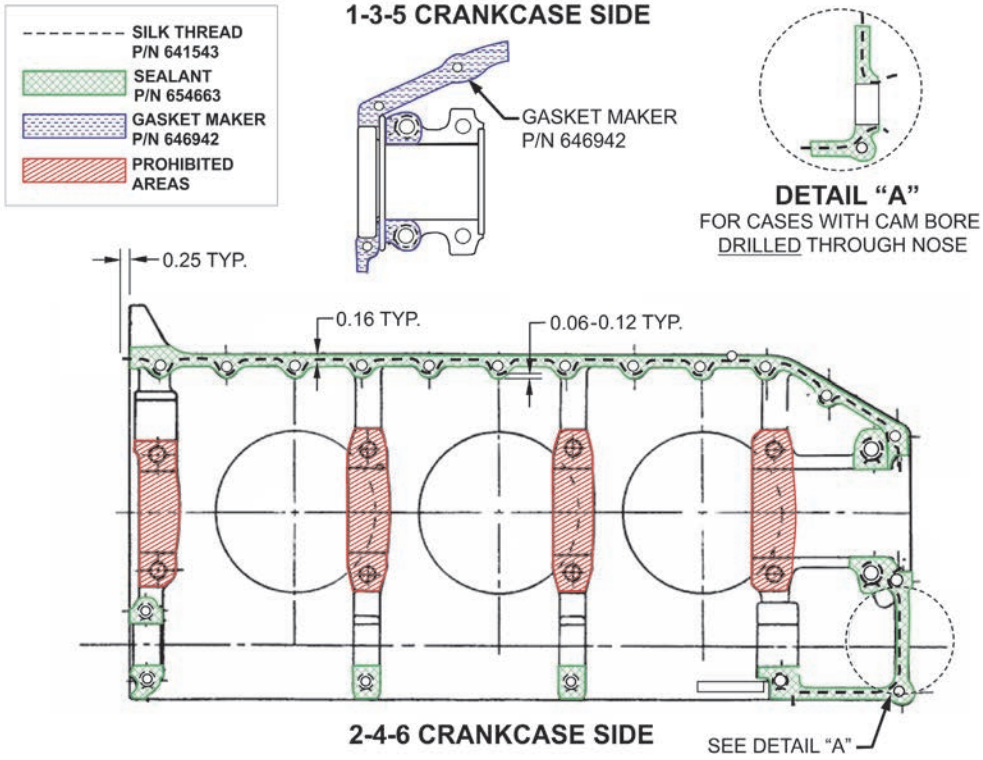

Figure 3-6. Crankcase Threading Diagram - IO360, L/TSIO360

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iii thru xviii	1	2-13	3	6-7	0	6-50.1 thru 6-50.2	4
1-1 thru 1-3	6	2-14 thru 2-24	0	6-8 thru 6-10	5	6-51	0
1-4 thru 1-6	0	3-1 thru 3-2	0	6-11 thru 6-15	0	6-52	3
1-7 thru 1-8	6	3-3	3	6-16 thru 6-17	2	6-53 thru 6-66	0
1-9	0	3-4	0	6-18	4	6-67	1
1-10	0	3-5	4	6-19 thru 6-22	0	6-68 thru 6-69	0
1-11	6	3-6	5	6-23	2	6-70	5
1-12	5	3-7 thru 3-8	3	6-24 thru 6-25	5	6-71 thru 6-74	0
1-13 thru 1-14	0	3-9	5	6-26	0	6-75	5
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6-96	1	6-157	0	10-19 thru 10-21	0	B-1	1
6-97	0	6-158	3	10-22	1	B-2 thru B-5	0
6-98 thru 6-100	3	6-159	6	10-23 thru 10-24	0	B-6 thru B-12	6
6-101	1	6-159.1 added	6	10-25	1	B-13 thru B-16	0
6-102	0	6-159.2 added	6	10-26 thru 10-30	0	C-1 thru C-4	0
6-103	1	6-160 thru 6-164	0	10-31 thru 10-34	6	C-5	6
6-103.1 added	5	6-165	3	10-34.1	4	C-6	4
6-103.2 added	5	6-166 thru 6-171	0	10-34-2	5	C-7	5
6-104 thru 6-115	0	6-172	1	10-35 Blank added	4	C-8 thru C-9	1
6-116	1	6-173 thru 6-174	0	10-36	4	C-10 thru C-15	0
6-117 thru 6-132	0	7-1 thru 7-2	0	10-37	0	C-16	5
6-133 thru 6-135	1	7-3 thru 7-5	4	10-38	3	C-17 thru C-18	0
6-136	0	7-6 thru 7-7	0	10-39 thru 10-40	1	C-19	1
6-137 thru 6-138	1	7-8	1	10-41 thru 10-62	0	C-20 thru C-23	0
6-139	0	7-9	0	10-63	5	C-24	4
6-140	1	7-10	1	10-64 thru 10-69	0	C-25 thru C-26	0
6-141	0	7-11 thru 7-17	0	10-70	3		
6-142	3	7-18	3	10-71 thru 10-93	0		
6-143 thru 6-145	0	7-19 thru 7-23	0	10-94 thru 10-95	3		
6-146	3	7-24	1	10-96 thru 10-97	0		
6-146.1 added	3	7-25 thru 7-30	0	10-98	6		
6-146.2 added	3	8-1 thru 8-15	0	10-99	0		
6-146.3	5	8-16	2	10-100 thru 10-101	3		
6-146.4	5	8-17 thru 8-26	0	10-102 thru 10-103	0		
6-146.5	5	9-1	1	10-104 thru 10-106	4		
6-146.6	5	9-2 thru 9-6	0	10-107 thru 10-108	0		
6-146.7 added	5	10-1 thru 10-2	0	11-1 thru 11-8	0		
6-146.8 added	5	10-3	1	12-1	1		
6-147	3	10-4 thru 10-8	0	12-2	0		
6-148 thru 6-149	5	10-9	2	12-3	6		
6-150 thru 6-151	0	10-10 thru 10-12	5	12-4 thru 12-7	0		
6-152	2	10-13	2	12-8 thru 12-10	1		
6-153 thru 6-154	1	10-14	3	12-11 thru 12-12	0		

Table B-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), XX-240, XX-360
.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, XX-470, XX-520 & XX-550
.31-24	Nut, Crankcase Flange	180-220	15.0-18.3	IO-346, XX-470, XX-520 & XX-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	XX-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 XX-470, XX-520 & XX-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 XX-240 & XX-360
.38-24	Nut, Crankcase Tie Bolts	275-325	22.9-27.1	All XX-240 & XX-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 XX-240 & XX-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	36.7-38.3	All Models (AR)
.44-20	Nut, Cylinder to Crankcase Studs (includes 7th stud)	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
.44-20	Nut, Front & Rear Crankcase Bearing Through Studs	490-510	40.8-42.5	O-200

Table B-2. Component Specific Torque Specifications

Size	Fastener	Torque Value		Models Affected (Non-standard, see General Torque Specification)
		In.-Lbs.	Ft.-Lbs.	
.44-20	Nut, Through Bolt at Cadmium Plated Washer	440-460	36.7-38.3	All Models (AR)
.44-20	Nut, Through Bolt at Cylinder Flange	490-510	40.8-42.5	All (AR) EXCEPT XX-240 & XX-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, XX-470, XX-520 & XX-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	53.3-55.0	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, XX-240
.25-28	Bolt, Gear to Crankshaft (P/N 22532)[1]	140-160	11.7-13.3	A, & C Series, O-200, XX-240, O-300 &, GO-300
.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, XX-360, IO-346, XX-470, XX-520 & XX-550
.31-24	Bolt, Gear to Crankshaft (Lower Hardness Identified with Green Dykem)[1]	240-260	20.0-21.7	E Series, XX-360, IO-346
.31-24	Bolt, Gear to Crankshaft (Bolt Hardness RC 38-42) [1]	380-420	31.7-35.0	XX-470, XX-520 & XX-550
.31-24	Bolt, Face Gear to Crankshaft	140-150	11.7-12.5	IO-346, XX-520 (AR), XX-550
.31-24	Nut, Generator or Alternator Gear	175-200	14.6-16.7	A, C & E Series, O-200, IO-240, O-300, GO-300 & XX-360