

SERVICE BULLETIN**SB00-2B**

Compliance Will Enhance Safety

Supersedes SB00-2A
TECHNICAL PORTIONS
FAA APPROVED**SUBJECT:** IO-346 Replacement Cylinder Assembly Kit**PURPOSE:** To notify owners, operators, maintenance facilities and distributors of new cylinder.**COMPLIANCE:** At next cylinder replacement or engine overhaul.**MODELS****AFFECTED:** IO-346**I. Scope**

By this original bulletin, Continental Motors, Inc. (CM) announced the availability of a new cylinder kit for the IO-346 engine model. Kit EQ6657¹, includes four (4) cylinders and all components necessary for installation of the new cylinders. Figure 4, "EQ6657 Kit (detail)", on page 4, provides cylinder and component illustration followed by a complete parts list shown in Table 2 on page 5.

II. Installation Procedure

CAUTION: This cylinder kit (EQ6657) must be installed as a complete unit. Do not utilize any component parts or cylinder assemblies contained within this kit on earlier cylinders or cylinder components.

NOTE: Prior to installation perform a complete dimensional inspection of the cylinder, pistons, and piston rings. Dimensional fits and limits are provided in Table 3, "Cylinder Dimensions," on page 6.

Refer to the IO-346 Overhaul Manual, Form X30027, for cylinder removal and installation instructions. Additionally, the following installation instructions must be followed:

CAUTION: Do not attempt to restore damaged threads. Cylinder deck studs and through bolts have rolled threads.

1. Visually inspect cylinder deck stud threads and through bolt threads for mechanical damage. Replace any cylinder deck stud or through bolt that exhibits any mechanical damage.
2. Verify that cadmium plating is present on cylinder deck stud threads, through bolt threads, and flanged nut threads. Absence of cadmium plating requires replacement of the stud, through bolt or nut. Cylinder deck stud nuts and through bolt nuts must be replaced at engine overhaul, reference the latest revision of M-0, Standard Practice Maintenance Manual.
3. Lubricate cylinder deck stud threads and through bolt threads with clean 50 weight engine oil prior to assembly.

1. To order cylinder kit EQ6657 contact a CM Distributor.

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4. Install piston rings, piston, and cylinder in accordance with the instruction provided in the IO-346 Engine Overhaul Manual, Form X30027.
5. Install cylinder deck stud nuts and through bolt nuts.
6. Initially torque the 7/16-20 cylinder deck stud nuts to 245–255 inch lbs. in the numerical sequence shown in Figure 1, “Initial Cylinder Installation Torquing”.
7. Torque the 7/16-20 cylinder deck stud nuts and the 1/2-20 through bolt nuts to 490–510 inch lbs. in the sequence shown in Figure 2, “Intermediate Cylinder Installation Torquing”.
8. Torque the 1/2-20 through bolt nuts to their final torque specified in Table 1 in the sequence shown in Figure 3, “Final Cylinder Installation Torquing”, on page 3.
9. Install inter-cylinder baffles, induction system, exhaust system and peripheral baffles in accordance with the engine overhaul manual Form X30027 and the aircraft manufacturer’s maintenance manual.
10. Perform a complete ground run up in accordance with the aircraft manufacturer’s instruction.
11. Inspect the engine and nacelle for evidence of fuel and oil leaks. Correct any discrepancies noted before releasing aircraft and engine for test flight. Make a logbook entry.
12. Perform a test flight in accordance with the latest revision of the latest revision of M-0, Standard Practice Maintenance Manual.

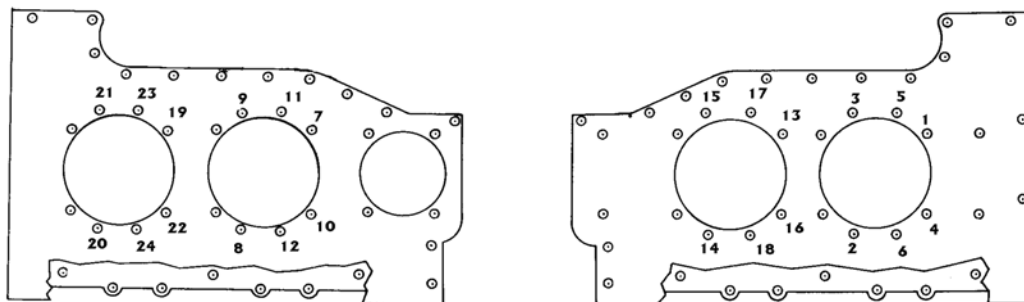


Figure 1. Initial Cylinder Installation Torquing

Torque cylinder deck stud nuts: 245 to 255 inch lbs. in the numerical sequence shown.

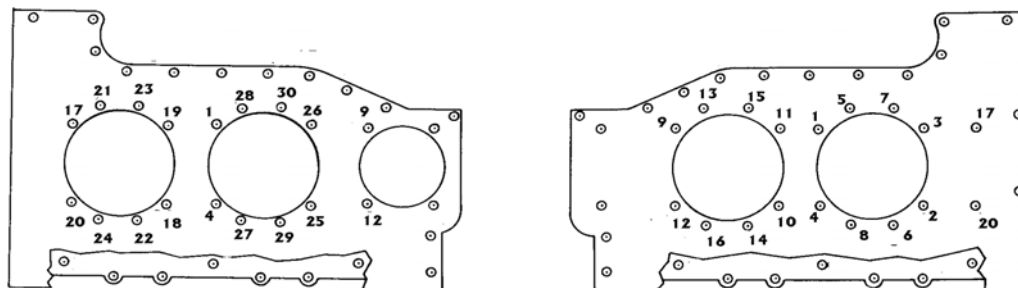


Figure 2. Intermediate Cylinder Installation Torquing

Torque cylinder deck stud nuts and through bolt nuts: 490 to 510 inch lbs. in the numerical sequence shown. Through bolt nuts number 1, 4, 9, 12, 17 and 20 must be torqued simultaneously from both sides of engine.

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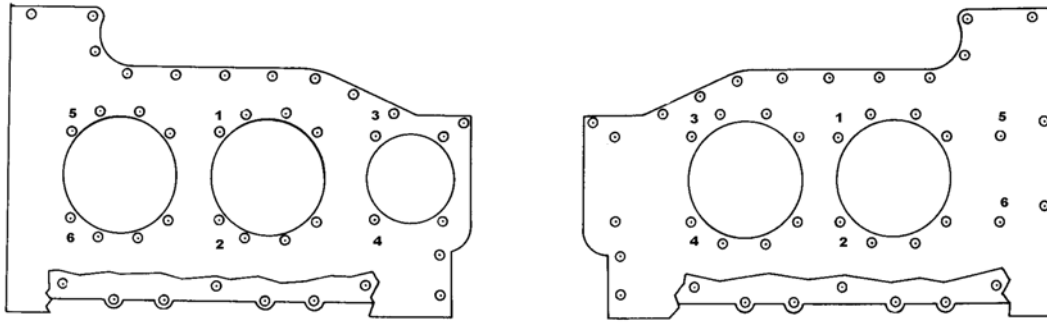


Figure 3. Final Cylinder Installation Torquing

Torque cylinder through bolt nuts to the appropriate value specified in Table 2.

CAUTION: Do not install “O” ring seals on any through bolt unless CM Service Bulletin M77-9, “Thru Bolt Change”, has been complied with.

Final through bolt torque values are determined by matched through bolt and nut application:

Table 1. Final Torque Values

Size	Fasteners		Torque Value	
	Nut	Through Bolt	IN / LB	FT / LB
.44-20	Nut, cylinder deck stud	N/A	490–510	40.8–42.5
.50-20	Nut, 6 point flanged, 1/2-20, P/N 538969.	Use with P/N 539050-10.75 through bolt. Originally installed through bolt and nut. ¹	640–660	53.3–55.0
.50-20	Nut, 6 point flanged, 1/2-20, P/N 634505. (supersedes P/N 538969).	Use with P/N 641930-10.75 through bolt. (supersedes P/N 539050-10.57 ²)	690–710	57.5–59.2
.50-20	Nut, 12 point flanged, 1/2-20, P/N 652541. (supersedes P/N 634505).	Use with P/N 641931-10.75 through bolt. (supersedes P/N 641930-10.75 ³)	790–810	65.8–67.5

1. P/N 539050-10.75 through bolt has a smooth machined dowel section.
2. P/N 641930-10.75 through bolt has “O” ring grooves machined in center dowel section only.
3. P/N 641931-10.75 through bolt has “O” ring grooves machined in center dowel section and machined identification grooves at either or both ends of the bolt.

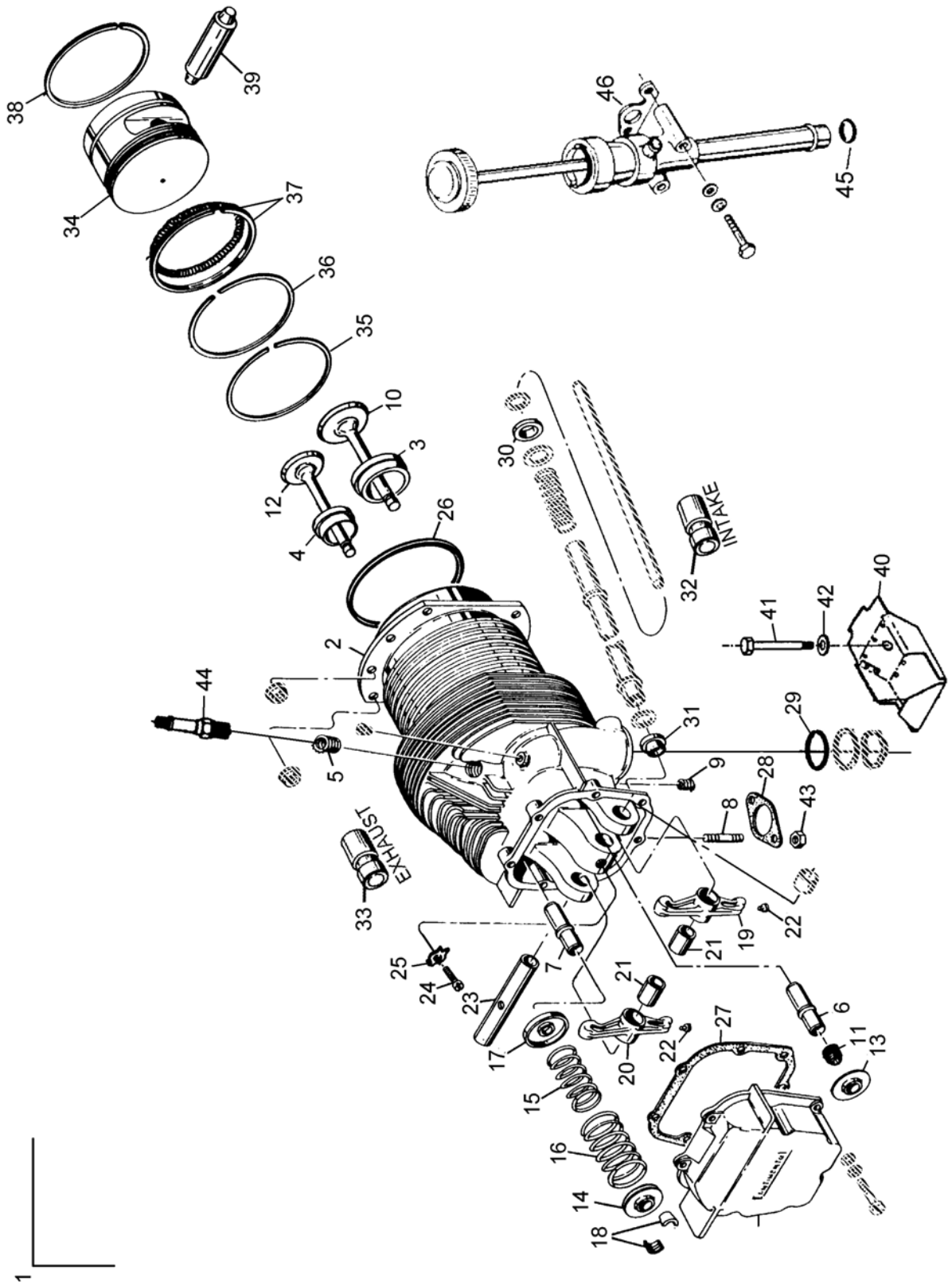


Figure 4. EQ6657 Kit (detail)

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Table 2. EQ6657 Kit, Cylinder Top Overhaul Parts List

FIGURE & INDEX	PART NUMBER	DESCRIPTION	QUANTITY
1	EQ6657	Kit – Cylinder Top Overhaul	1
N/A	658176A1	Cylinder & Valve Assy. (superseded 654974A1)	4
2	658176	Cylinder Assy., Mach (Ref. Only)	1
3	630591	Insert, Intake Valve Seat	1
4	654567	Insert, Exhaust Valve Seat	1
5	520112-3	Insert, Helicoil, Spark-plug	2
6	655166	Guide, Intake Valve	1
7	636242	Guide, Exhaust Valve	1
8	643804-1	Stud, Ring Locked	2
9	MS122121	Insert, Helicoil 0.25-20	2
10	655868	Valve, Intake	1
11	646985	Seal, Valve Guide, Intake	1
12	655771	Valve, Exhaust	1
13	35971	Retainer, Valve Spring Outer	1
14	652112	Retainer, Rotocoil, Exhaust Valve	1
15	654442	Spring, Valve Inner	2
16	654441	Spring, Valve Outer	2
17	625393	Seat, Valve Spring	2
18	24802	Key, Valve Spring	4
19	646088	Rocker Assy., Intake Valve	4
20	646086	Rocker Assy., Exhaust Valve	4
21	530367	Bushing, Intake & Exhaust.Valve Rocker	1
22	21007	Screw, Drive #2	1
23	653824	Shaft, Valve Rocker	4
24	654589	Screw, Shaft Retainer	4
N/A	646564A3	Gasket Kit, Single Cylinder	4
25	501868	Washer, Tab, 33 Dia. ID	1
26	641066	Seal, "O" Ring.103x4.99x5.19	1
27	655703	Gasket, Rocker Cover	1
28	652459	Gasket, Exhaust. Flange	1
29	646103	Seal, Intake Manifold	1
30	534610	Packing, Push Rod Housing to C/C	2
31	536410	Packing, Push Rod Housing to Cyl.	2
32	658088	Lifter Assy., Intake, Hydraulic	4
33	658077	Lifter Assy., Exhaust, Hydraulic	4
34	657989	Piston, 5.25 Dia C.R.7.5:1	4
N/A	654716	Ring Set (Single Cyl.)	4
35	648005	Ring, Piston-#1	1
36	654719	Ring, Piston-#2	1
37	654717	Ring Assy.-#3 (P/ 654718 Expander and 649250-1 Ring)	1
38	648008	Ring, Piston-#4	1
39	630046	Pin & Plug Assy., Piston	4
40	643230	Baffle Assy.	2
41	641106	Bolt, Special 8.50 Lg.	2
42	AN960-10I	Washer, Flat #10 Thd.	2
43	22022	Nut, Exhaust	8
44	655908 ¹	Spark Plug, (URHB32E)	8
45	MS9021-210	O-ring	1
46	649965	Gasket, Breather/Oil Filler Neck	1

1. EQ6657 kit is supplied with P/N 655908 (URHB32E) long reach spark plugs for cylinder P/N 654974A1 and 658176A1.

Table 3. Cylinder Dimensions

DESCRIPTION	New Min.	New Max.
CYLINDER AND HEAD ASSEMBLY		
Cylinder bore, standard size Diameter: ¹	SID97-4	SID97-4
Cylinder bore out-of-round:	SID97-4	SID97-4
Cylinder bore Maximum Allowable Oversize:	.015	
Cylinder bore surface roughness (new cylinder with phosphated cylinder bore)	30 Ra – 60 Ra	
Cylinder bore cross hatch (wet honing) Angle off Horizontal: ²	22° – 32°	
Microfinish (measured in direction of piston travel after honing, no phosphate).....R _a : ³	30 Ra - 50 Ra	
Intake valve seat insert in cylinder head Diameter:	.0090 T	.0120 T
Exhaust valve seat insert in cylinder head Diameter:	.0070 T	.0100 T
Intake valve guide in cylinder head Diameter:	.0010 T	.0025 T
Exhaust valve guide in cylinder head Diameter:	.0010 T	.0025 T
Intake valve in guide Diameter:	.0010 L	.0042 L
Exhaust valve in guide Diameter:	.0035 L	.0062 L
Intake valve face (to stem axis) Angle:	59°-45' to 60°-15'	
Exhaust valve face (to stem axis) Angle:	45°-00' to 45°-30'	
Intake valve stem Diameter:	.4335	.4340
Exhaust valve stem Diameter:	.4333	.4340
ROCKER ARMS AND SHAFTS		
Rocker shaft Diameter:	.7172	.7180
Rocker boss (inside) Finish Diameter:	.7182	.7192
Rocker shaft in rocker boss Diameter:	.0002 L	.0020 L
Rocker shaft in rocker arm bushing Diameter:	.0012 L	.0030 L
Rocker arm in support bosses Side Clearance:	.0015 L	.0020 L
Rocker arm foot-to-valve stem tip (lifter deflated), Int. and Exh. Clearance:	.060	.200
Rocker arm to valve spring retainer Clearance:	.020	
Rocker shaft retainer screw Torque:	45 in. lbs	55 in. lbs
PISTONS, RINGS AND PINS		
Piston skirt in cylinder (Maganese-Phosphate) perpendicular to pin bore Diameter:	SID97-4	SID97-4
Top piston ring in groove Side Clearance:	.0015	.008
Second piston ring in groove Side Clearance:	.0015	.008
Third piston ring in groove Side Clearance:	.0035	.0055
Fourth piston ring in groove Side Clearance:	.006	.008
Top ring gap at 1.00 ± 0.50 inches from open end of barrel Gap: ¹	SID97-4	SID97-4
Second ring gap at 1.00 ± 0.50 inches from open end of barrel Gap: ¹	SID97-4	SID97-4
Third ring gap at 1.00 ± 0.50 inches from open end of barrel Gap: ¹	SID97-4	SID97-4
Fourth ring gap at 1.00 ± 0.50 inches from open end of barrel Gap: ¹	SID97-4	SID97-4
Piston pin in piston: Diameter:	.0001	.0007
Piston pin Diameter:	1.1243	1.1245

1. See the latest revision of M-0, Standard Practice Maintenance Manual.
2. Hone turn around areas up to 0.5 inch from the bottom of the cylinder skirt and the cylinder head barrel stop are exempt from the cross hatch angle requirement.
3. Whenever cylinder barrels are honed, measure barrel surface finish using Hommel Tester T500 P/N 191800 prior to returning cylinder to service. Tester and software may be purchased from Hommel America, New Britain, Ct.