



TYPE-CERTIFICATE DATA SHEET

No. IM.E.097

for

Lycoming IO-390 series engines

Type Certificate Holder

Lycoming Engines

An Operating Division of AVCO Corporation

652 Oliver Street

Williamsport, Pennsylvania, 17701, USA

For Models:

IO-390-A1A6

IO-390-A3A6

IO-390-A1B6

IO-390-A3B6

AEIO-390-A1A6

AEIO-390-A3A6

AEIO-390-A1B6

AEIO-390-A3B6

IO-390-C1A6

IO-390-C3A6

IO-390-C1B6

IO-390-C3B6

HIO-390-A1A

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TABLE OF CONTENTS

I. General	4
1. Type/ Model	4
2. Type Certificate Holder	4
3. Manufacturer	4
4. Date of Application	4
5. EASA Type Certification Date	4
II. Certification Basis	5
1. State of Design Authority Certification Basis	5
2. Reference Date for determining the applicable airworthiness requirements	5
3. EASA Certification Basis	5
3.1. Airworthiness Standards	5
3.2. Special Conditions (SC)	5
3.3. Equivalent Safety Findings	5
3.4. Deviations	5
3.5. Environmental Protection	5
III. Technical Characteristics	5
1. Type Design Definition	5
2. Description	6
3. Equipment	6
4. Dimensions	6
5. Dry Weight	6
6. Ratings	7
7. Control System	7
8. Fluids (Fuel, Oil, Coolant, Additives)	7
9. Aircraft Accessory Drives	8
IV. Operating Limitations	8
1. Temperature Limits	8
2. Speed Limits	8
3. Pressure Limits	9
3.1 Fuel Pressure	9
3.2 Oil Pressure	9
V. Operating and Service Instructions	9
VI. Notes	10
SECTION: ADMINISTRATIVE	11
I. Acronyms and Abbreviations	11
II. Type Certificate Holder Record	11
III. Change Record	11



I. General

1. Type/ Model

IO-390 Series/IO-390-A1A6, -A3A6, -A1B6, -A3B6
 AEIO- 390- A1A6, -A3A6, -A1B6, -A3B6
 IO-390-C1A6, -C3A6, -C1B6, -C3B6
 HIO-390-A1A

2. Type Certificate Holder

Lycoming Engines
 An Operating Division of AVCO Corporation
 652 Oliver Street
 Williamsport, Pennsylvania, 17701, USA

3. Manufacturer

Lycoming Engines

4. Date of Application

IO-390-A1A6	IO-390-A3A6	IO-390-A1B6	IO-390-A3B6	AEIO-390-A1A6
20 Nov 2013	20 Nov 2013	20 Nov 2013	20 Nov 2013	20 Nov 2013
AEIO-390-A3A6	AEIO-390-A1B6	AEIO-390-A3B6	IO-390-C1A6	IO-390-C3A6
20 Nov 2013	20 Nov 2013	20 Nov 2013	02 June 2017	02 June 2017
IO-390-C1B6	IO-390-C3B6	HIO-390-A1A		
02 June 2017	02 June 2017	02 June 2017		

5. EASA Type Certification Date

IO-390-A1A6	IO-390-A3A6	IO-390-A1B6	IO-390-A3B6	AEIO-390-A1A6
01 September 2016	01 September 2016	01 September 2016	01 September 2016	01 September 2016
AEIO-390-A3A6	AEIO-390-A1B6	AEIO-390-A3B6	IO-390-C1A6	IO-390-C3A6
01 September 2016	01 September 2016	01 September 2016	20 October 2017	20 October 2017
IO-390-C1B6	IO-390-C3B6	HIO-390-A1A		
20 October 2017	20 October 2017	04 May 2018		



II. Certification Basis

1. State of Design Authority Certification Basis

See FAA TCDS E00006NY

2. Reference Date for determining the applicable airworthiness requirements

11 April 2008 (same as FAA certification reference date)

3. EASA Certification Basis

3.1. Airworthiness Standards

CS-E Amendment 1 dated 03 December 2007 (for IO/AEIO-390-A1A6, -A3A6, -A1B6, -A3B6)

CS-E Amendment 4 dated 12 March 2015 (for IO-390-C1A6, -C3A6, -C1B6, -C3B6, HIO-390-A1A)

3.2. Special Conditions (SC)

SC Piston Engines intended for Use in Rotorcraft (for HIO-390-A1A)

3.3. Equivalent Safety Findings

CS-E 130 (g) Fireproofness of engine attachment points

3.4. Deviations

none

3.5. Environmental Protection

none (not required for piston engines)

III. Technical Characteristics

1. Type Design Definition

IO-390-A series: Engine Parts Catalogue IO-390 No. PC-IO-390-A and Installation Drawing No. O4C63610 (IO-390-A1A6, -A3A6) resp. O4C63612 (IO-390-A1B6, -A3B6).

AEIO-390 series: Engine Parts Catalogue AEIO-390 No. PC-AEIO-390-A and Installation Drawing No. O4C63621 (AEIO-390-A1A6, -A3A6) resp. O4C63622 (AEIO-390-A1B6, -A3B6).

IO-390-C series: Engine Parts Catalogue IO-390 No. PC-IO-390-C and Installation Drawing No. 04J63637 (IO-390-C1A6, -C3A6) resp. 04J63634 (IO-390-C1B6, -C3B6).

HIO-390-A1A: Engine Parts Catalogue HIO-390-A1A No. PC-HIO-390-A1A and Installation Drawing No. O4C63627



2. Description

The Lycoming IO-390 engine is a fuel injected, naturally aspirated, horizontally opposed, four cylinder, four stroke, spark ignited, aircooled, wet sump engine incorporating provisions for front and rear mounted accessories. The AEIO-390 incorporates modifications on the oil system to enable aerobatic operation.

Displacement: 6.375 dm³ (389 cu. in.)
Bore x stroke: 135.1 mm x 111.1 mm (5.319 in. x 4.375 in.)
Compression ratio: 8.9 : 1
Gear ratio: N/A

3. Equipment

See latest revision of Lycoming Service Instruction No. 1042 and 1154

4. Dimensions

	All models(AE)IO-390-A series	IO-390-C series	HIO-390-A1A
Overall Length	780 mm (30.70 in.)	827 mm (32.56 in.)	827 mm (32.56 in.)
Overall Height	492 mm (19.35 in.)	536 mm (21.11 in.)	508 mm (20.00 in.)
Width	870 mm (34.25 in.)	873 mm (34.37 in.)	876 mm (34.50 in.)

5. Dry Weight

IO-390-A1A6, -A3A6, -A1B6, -A3B6	AEIO-390	IO-390-C1A6, -C3A6,	IO-390-C1B6, -C3B6	HIO-390-A1A
139 kg (307 lbs)	142 kg (312 lbs)	135 kg (298 lbs)	136 kg (300 lbs)	134 kg (296 lbs)

(weight without starter and alternator)



6. Ratings

Rating		IO-390-A1A6, -A3A6, -A1B6, -A3B6 AEIO-390-A1A6, -A3A6, -A1B6, -A3B6	IO-390-C1A6, -C3A6, -C1B6, -C3B6	HIO-390-A1A
Power, kW (HP)	Take-off and Maximum Continuous, full throttle at sea level pressure altitude	157 (210) at 2700 rpm	157.1 (210.7)* at 2700 rpm	-
	Take-off, 96.5 kPa (28.5 in. Hg) at sea level pressure altitude	-	-	153.5 (205.8)** at 2800 rpm
	Maximum Continuous, full throttle at sea level pressure altitude	-	-	153.5 (205.8)** at 2700 rpm

Note: The performance values specified are defined under the conditions of ICAO and ARDC standard atmosphere. For the tolerance on these values, see the latest revision of the Lycoming Detail Engine Specification for each model.

* Engine Power variation of -2% (157.1 kW/210.7 HP) to +5% (168.3 kW/225.7 HP) is applicable to IO-390-C Series engine models.

** Engine Power variation of -2% (153.5 kW/205.8 HP) to +5% (164.4 kW/220.5 HP) is applicable to HIO-390-A1A engine model.

7. Control System

The Lycoming IO/AEIO/HIO-390 engine models are equipped with a mechanical fuel injection system and a two magneto ignition system.

8. Fluids (Fuel, Oil, Coolant, Additives)

Fuel: See latest revision of Lycoming Service Instruction No. 1070

Oil: See latest revision of Lycoming Service Instruction No. 1014



9. Aircraft Accessory Drives

Designation	Rotation direction facing drive pad	Speed ratio to crankshaft	Max. Torque Nm (in. lbs)		Max. Overhang moment Nm (in. lbs)
			Continuous	static	
Tachometer ^x	CW	0.5:1	0.79 (7)	5.65 (50)	0.56 (5)
Prop. Governor	CW	0.866:1 (A1A6, A3A6, C1A6, C3A6) 0.895:1 (A1B6, A3B6, C1B6, C3B6)	14.12 (125)	135.58 (1200)	4.52 (40))
Starter [*]	CCW	13.556:1		50.84 (450)	16.95 (150)
Alternator [*]	CW	3.20:1	6.78 (60)	13.56 (120)	19.77 (175)
Fuel Pump	Plunger	0.5:1	--	-	1.13 (10)
Accessory 1 ^x	CCW	1.3:1	7.91 (70)	50.84 (450)	2.82 (25)
Accessory 2 ^x (A1B6, A3B6, C1B6, C3B6, HIO-390-A1A only)	CW	1.3:1	11.30 (100)	90.39 (800)	4.52 (40)
Optional dual drives mounting on Accessory drive pad (A1A6, A3A6 only) for:					
Accessory and Accessory	CCW	1.3:1	7.91 (70)	50.84 (450)	0.68 (6)
	CCW	1.3:1	Total	Total	1.13 (10)
Or:					
Accessory and Propeller Governor	CCW	1.3:1	7.91 (70)	50.84 (450)	0.68 (6)
	CCW	1.3:1	Total	Total	1.13 (10)

"C" - Clockwise, "CCW" - Counter-Clockwise, "Total" - refers to total torque of dual drives

* These accessories are optional, see latest revision of SI 1154 for approved alternates.

^x These drives are optional and accessory pads may be cast over.

IV. Operating Limitations

1. Temperature Limits

Cylinder head (well type thermocouple): 241 °C (465 °F)
Oil inlet: 113 °C (235 °F) for all models except HIO-390-A1A
118 °C (245 °F) for HIO-390-A1A

2. Speed Limits

Max. Overspeed (3 seconds, Momentary overspeed): 2970 rpm



3. Pressure Limits

3.1 Fuel Pressure

Inlet to fuel pump,	minimum:	-13.8 kPa (-2.0 psig)
	maximum:	41.3 kPa (35.0 psig)
	maximum with Injector Idle Cutoff:	379.2 kPa (55.0 psig)
Inlet to fuel injector, minimum idle:		-
	minimum:	96.5 kPa (14.0 psig)
	maximum:	310.3 kPa (45.0 psig)

3.2 Oil Pressure

Minimum (idle):	172 kPa (25 psig)
Normal:	379...655 kPa (55...95 psig)
Maximum (starting, warm-up, taxi, take off):	793 kPa (115 psig)

V. Operating and Service Instructions

Manuals

	IO-390-A series	AEIO-390 series	IO-390-C series
Operation and Installation Manual	60297-34	60297-42	IOM-IO-390-C Series

	HIO-390-A1A		
Operation and Installation Manual	IOM-HIO-390-A1A		

Instructions for Continued Airworthiness

	IO-390-A series	AEIO-390 series	IO-390-C series
Maintenance Manual	LMO-IO-390-A	LMO-AEIO-390-A	MM-IO-390-C Series
Overhaul Manual	LMO-IO-390-A	LMO-AEIO-390-A	OHM-IO-390-C Series
Parts Catalogue	PC-IO-390-A	PC-AEIO-390-A	PC-IO-390-C
Service Bulletins and Service Letters	As issued	As issued	As issued

	HIO-390-A1A		
Maintenance Manual	MM-HIO-390-A1A		
Overhaul Manual	OHM-HIO-390-A1A		
Parts Catalogue	PC-HIO-390-A1A		
Service Bulletins and Service Letters	As issued		

Note: See latest revision of Lycoming Service Letter No. L114 for document revisions and supersedures.



VI. Notes

Note 1: The EASA approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is published in the applicable "Maintenance Manual" document, chapter 4 "Airworthiness Limitations".

Note 2: These engines (except HIO-390-H1A) are eligible for pusher and tractor operation. The HIO-390-A1A is eligible for use on rotorcraft.



SECTION: ADMINISTRATIVE

I. Acronyms and Abbreviations

n/a

II. Type Certificate Holder Record

n/a

III. Change Record

Issue	Date	Changes	TC issue
Issue 01	01 September 2016	Initial Issue	Initial issue 01 September 2016
Issue 02	20 October 2017	Models IO-390-C1A6, -C3A6, -C1B6, -C3B6 added	20 October 2017
Issue 03	04 May 2018	Model HIO-390-A1A added	04 May 2018

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