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SERVICE INSTRUCTION

DATE: May 26, 2009

Service Instruction No. 1154M
(Supersedes Service Instruction No. 1154L)
Engineering Aspects are
FAA Approved

SUBJECT: FAA Approved Starters, Generators, Alternators, Regulators and Relays

MODELS AFFECTED: Lycoming engines as herein specified.

TIME OF COMPLIANCE: As required for replacement.

The following is a list of FAA approved starters, generators, alternators, regulators and relays for Lycoming engines. Current and interchangeable part numbers are listed as an aid in ordering replacement items.

NOTE

Delco-Remy starters, generators, alternators, and related regulators and relays are no longer available from Lycoming. Lycoming will, however, continue to supply mounting brackets and attaching parts for the life of units now in use.

**TABLE 1 – STARTERS
(NO LONGER AVAILABLE FROM LYCOMING)**

Vendor	ENGINE SERIES	PART NUMBER		DESCRIPTION			
		Lycoming	Vendor No.	Type	Voltage	Pinion Pitch	Weight (Lbs.)
Delco-Remy	235,290,320	69953	1109669	Direct Drive	24V.	10/12	18.0
	720	72279	1113471	Gearred	12V.	10/12	18.0
Kelly Aerospace Power Systems, Inc.**	235	LW-15483	MHB-4015	Direct Drive	24V.	10/12	18.0
	235,290,320	76210	MZ-4204	Direct Drive	12V.	10/12	18.0
	235,290,320,340,360,540	76211	MZ-4206	Gearred	12V.	12/14	18.0
		LW-14207	MZ-4218	Gearred		12/14	18.0
	320,340,360,540	76212	MHB-4001	Gearred	24V.	12/14	18.0
		LW-14208	MHB-4010	Gearred		12/14	18.0
	LIO-320,LO-360,LIO-360	LW-10556*	MZ-4216	Gearred	12V.	12/14	18.0
		360	76213	MZ-4205		Gearred	12V.
	LW-14209		MZ-4217	Gearred	12/14	18.0	
	LW-15573		MZ-4221	Gearred	12/14	18.0	
	LW-18989		MZ-4226	Gearred	12/14	18.0	
	360	76214	MHB-4003	Gearred	24V.	12/14	18.0
		LW-14210	MHB-4012	Gearred		12/14	18.0
		LW-14447	MHB-EO-26102	Gearred		12/14	18.0
TVO-435, VO-435	LW-15574	MHB-4019	Gearred	24V.	12/14	18.0	
	LW-12023	MHB-4008	Gearred		12/14	18.0	
VO-435-B1A	75787	MZ-4208	Gearred	12V.	16 Pitch	18.0	

* Reverse rotation

** Formerly Electrosystems, Inc.



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Lycoming Engines, a division of AVCO Corporation, a wholly owned subsidiary of Textron Inc.

**TABLE 1 – STARTERS (CONT.)
(NO LONGER AVAILABLE FROM LYCOMING)**

Vendor	ENGINE SERIES	PART NUMBER		DESCRIPTION			
		Lycoming	Vendor No.	Type	Voltage	Pinion Pitch	Weight (Lbs.)
Kelly Aerospace Power Systems, Inc.**	540	LW-11936	MHB-4007	Geared	24V.	12/14	18.0
		LW-14213	MHB-4013	Geared		12/14	
	LTIO-540	LW-12159*	MHB-4009	Geared	24V.	12/14	18.0
	TIO-541-A	75699	MZ-4207	Geared	12V.	12/14	18.0
		LW-14211	MZ-4219	Geared		12/14	
		LW-15575	MZ-4223	Geared		12/14	
	TIO-541-E	75700	MHB-4002	Geared	24V.	12/14	18.0
		LW-14212	MHB-4011	Geared		12/14	
		LW-15576	MHB-4017	Geared		12/14	
	TIGO-541	78791	MHB-4005	Geared	24V.	12/14	18.0
720	77879	MHJ-4004	Geared	24V.	10/12	18.0	
	LW-12787	MHJ-4005	Geared		10/12		
Lamar	LIO-320,LO-360, LIO-360, LTIO-540	31A22552*	PM1201	Geared	12V.	12/14	11.5
Lycoming	235,320,360,540	31A21198	-----	Geared	12V.	12/14	8.0
		31A21210	-----	Geared		10/12	8.0
		31B21064	-----	Geared	24V.	12/14	12.0
		31B21211	-----	Geared		10/12	12.0

* Reverse rotation
** Formerly Electrosystems Inc.

**TABLE 2 – STARTERS■
(AVAILABLE FROM LYCOMING)**

Note that this section does not imply approval for the aircraft installation, and additional information may be required from the specific starter manufacturer and the aircraft manufacturer in which the starter is being installed. (Example: the starter may not be a direct replacement for an original equipment starter. Some airframes equipped with air conditioning may have brackets that will prevent installation. Other airframes may have engines with oil coolers mounted on the front baffles, which may require some modification of the baffling, wiring, and/or prop governor cable brackets. On Lycoming IO-360-A series engines there may be additional interference with the fuel injector servo.)

Vendor	ENGINE SERIES	PART NUMBER		DESCRIPTION			
		Lycoming	Vendor No.	Type	Voltage	Pinion Pitch	Weight (Lbs.)
Kelly Aerospace Power systems, Inc.**	235	LW-16207	MMU-4001	Direct Drive	24V.	10/12	18.0
		31B22475	MMU-6001	Direct Drive		10/12	8.0
		31B26042	ERB-8012	Geared		10/12	9.5
	235,290,320	31A22473	MZ-6204	Direct Drive	12V.	10/12	8.0
	235,290,320,340,360,540	LW-15571	MZ-4222	Geared	12V.	12/14	18.0
	235,290,320,340,360,390, 540,580	31A22470	MZ-6222	Geared	12V.	12/14	8.0
	235,320	31B26043	ERZ-8012	Geared	12V.	10/12	9.5
	235,320,360,540	31B26041	ERZ-8011	Geared	12V.	12/14	9.5
	320	LW-16460	MZ-4224	Geared	12V.	12/14	18.0
		31A22471	MZ-6224	Geared		12/14	8.0

■ Starters to be ordered by using Lycoming part numbers.
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**TABLE 2 – STARTERS■ (CONT.)
(AVAILABLE FROM LYCOMING)**

Vendor	ENGINE SERIES	PART NUMBER		DESCRIPTION			
		Lycoming	Vendor No.	Type	Voltage	Pinion Pitch	Weight (Lbs.)
Kelly Aerospace Power Systems, Inc.**	320,340,360,540	LW-15572	MHB-4016	Geared	24V.	12/14	18.0
		31B22476	MHB-6018	Geared		12/14	8.0
	320,340,360,540,580	31B22474	MHB-6016	Geared	24V.	12/14	8.0
	320, 360-540-580	31B26040	ERB-8011	Geared	24V.	12/14	9.5
	LIO-320,LO-360,LIO-360	LW-14215*	MZ-4220	Geared	12V.	12/14	18.0
		31A22472*	MZ-6220	Geared		12/14	8.0
	360	LW-18047	MZ-4225	Geared	12V.	12/14	18.0
		LW-18990	MHB-4020	Geared	24V.	12/14	18.0
	540	LW-15577	MHB-4018	Geared	24V.	12/14	18.0
	LTIO-540	LW-14214*	MHB-4014	Geared	24V.	12/14	18.0
31B22477*		MHB-6014	Geared	12/14		8.0	
720	31B22462	MHB-4016A	Geared	24V.	10/12	18.0	
Lamar	235,320	31A22361	PM1203	Geared	12V.	10/12	11.5
		31B22362	PM2403	Geared	24V.	10/12	11.5
	320,360,540	31A22206	PM1201	Geared	12V.	12/14	11.5
		31B22207	PM2401	Geared	24V.	12/14	11.5
LIO-320, LO-360-LIO-360 LTIO-540	31B22553*	PM1201	Geared	24V.	12/14	11.5	
Sky Tec	235,320,340,360,540, TIO-541	31B23592	149NL	Geared	12V/24V.	12/14	9.40
		31B26554	149NL/EC	Geared	24V.	10/12	9.40
	235,320,360,540	31A22100	149-12PM	Geared	12V.	12/14	8.25
		31A22102	122-12PM	Geared	12V.	10/12	8.25
		31A22106	122-12LS	Geared	12V.	10/12	8.25
		31A22112	122-12HT	Geared	12V.	10/12	8.50
		31B22103	122-24PM	Geared	24V.	10/12	8.25
		31B22107	122-24LS	Geared	24V.	10/12	8.25
		31B22113	122-24HT	Geared	24V.	10/12	8.50
		31B23590	122NL	Geared	12V/24V.	10/12	9.40
	235,320,360,390,540,580	31B26552	122NL/EC	Geared	24V.	10/12	9.40
		31A22104	149-12LS	Geared	12V.	12/14	8.25
		31A22110	149-12HT	Geared	12V.	12/14	8.50
		31B22101	149-24PM	Geared	24V.	12/14	8.25
		31B22105	149-24LS	Geared	24V.	12/14	8.25
	LIO-320,360,LHIO-360, LO-360, LTIO-540	31B22111	149-24HT	Geared	24V.	12/14	8.50
		31B23593*	149NLR	Geared	12V/24V.	12/14	9.40
	360	31B26555*	149NLR/EC	Geared	24V.	10/12	9.40
		31A22114*	149-12HTL	Geared	12V.	12/14	8.50
		31B22115*	149-24HTL	Geared	24V.	12/14	8.50
		31B22116	149-24HT/EC	Geared	24V.	12/14	8.50
		31B22117	122-24HT/EC	Geared	24V.	10/12	8.50

■ Starters to be ordered by using Lycoming part numbers.

* Reverse rotation.

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GENERATORS■

Vendor	ENGINE SERIES	PART NUMBER		DESCRIPTION
		Lycoming	Vendor No.	
Delco-Remy	235, 290, 320, 340, 360	68767	1101900	12V.-35A.
	235, 290, 320, 340, 360, 540	68764	1101899	12V.-20A.
	235, 290, 320, 540	71744	1101915	12V.-50A.
	320, 360, 540	71980	1105052	24V.-40A.
	320, 360, 540, 720	72695	1105055	24V.-50A.
	LIO-320	LW-11429*	1101923	12V.-50A.

■ Generators no longer available from Lycoming.
* Reverse rotation.

**TABLE 1 – ALTERNATORS
(NO LONGER AVAILABLE FROM LYCOMING)**

ENGINE SERIES	Lycoming Basic Alternator P/N	Vendor P/N*	Lycoming Alternator Assy. P/N	Vendor Alternator Assy. P/N	Description
235,320,360,540	78308	ALE-8406	-----	-----	12V.-40A.
	78401●	ALE-6406	-----	-----	
	LW-14300	ALE-8420	-----	-----	
	LW-14302●	ALE-6420	-----	-----	
235,320,360,540	78407	ALY-8403	-----	-----	12V.-60A.
	78409●	ALY-6403	-----	-----	
	LW-14308	ALY-8420	LW-12832**	ALY-8520 "G"	
		ALY-8520	-----	-----	
LW-14310●	ALY-6420	LW-12834**	ALY-6520 "G"		
235,320,360,540	LW-14336	ALU-8521LS♣	32B19550♦	-----	12V.-70A.
235,320,360,540,720	78312	ALT-8404	-----	-----	24V.-50A.
	LW-14319	ALT-8421	-----	-----	
	LW-14321	ALT-8421LS	32C19551♦	-----	
235,320,360,540,720	LW-14316	ALX-8421	-----	-----	12V.-70A.
235,320,360,540,720	LW-14324	ALU-8421	LW-12845**	ALU-8521 "G"	24V.-70A.
	LW-14326	ALU-8521LS	32C19553♦	-----	
	LW-14327	ALU-8521LS♣	32C19554♦	-----	
235,360,540	LW-14310●	ALY-6420LS	LW-14373♦	-----	12V.-60A.
320	LW-10372	ALY-8405	-----	-----	12V.-60A.
	LW-14312	ALY-8526	LW-12839**	ALY-8426 "G"	
	LW-14335	ALY-8526LS	LW-14375♦	ALY-8526 "G"	
320,360,540	78403	ALZ-8401	-----	-----	12V.-50A.
	78405●	EO-20041-LB	-----	-----	
	LW-14304	ALZ-8423	-----	-----	
	LW-14306●	-----	-----	-----	
320,360,540,(Kits,05K21702-01, 05K21702-02,05K21702-03, 05K21702-04, 05K21702-05)	32C21420	ES-4019LS	32C21703♦	-----	28V.-130A.

* Seven digit numbers are Delco-Remy. Letter prefix numbers are Kelly Aerospace Power Systems, Inc.
** Assembly includes ground strap.
♦ Assembly includes Lycoming supplied pulley.
● Less blast tube.
♣ Thermocoupled.

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**TABLE 1 – ALTERNATORS (CONT.)
(NO LONGER AVAILABLE FROM LYCOMING)**

ENGINE SERIES	Lycoming Basic Alternator P/N	Vendor P/N*	Lycoming Alternator Assy. P/N	Vendor Alternator Assy. P/N	Description
320,360,540,720	74319	1100717	74880	-----	12V.-70A.
	78310	ALX-8403	-----	-----	
	LW-14316	ALX-8421	LW-12840**	ALX-8421 "G"	
320,360,540,720	78314	ALU-8403	-----	-----	24V.-70A.
320,360,540,720	32C21447	ES-4011LS♣	32C21448♦	-----	28V.-90A.
360 Steel Pulley	LW-10511	ALY-8403LS	LW-10513♦	-----	12V.-60A.
360	LW-14310●	ALY-6420	LW-15404	-----	
360	74319	1100717	76165	-----	12V.-70A.
	78412	ALX-8403LS	-----	-----	
	LW-14336	ALX-8521LS♣	32B19560♦	-----	
360 Steel Pulley	LW-14321	ALT-8421LS	LW-14358♦	-----	24V.-50A.
360 (Kit, LW-13479)	LW-10966	ALV-8402L	-----	-----	24V.-100A.
360 (Kit, LW-13479)	LW-18885	ALV-8511	LW-18905*	-----	
360 (Kit, 05K22739), HIO-360-D1A	32C22737	ES-4019LS	32C23585	-----	24V.-130A.
360,540	79036	ALU-8403LS	-----	-----	24V.-70A.
360,540	32C22029	ES-4019LS♣	32C22030♦	-----	28V.-130A.
360,540,720	LW-10544●	ALV-6403LS	LW-10979●♦	-----	24V.-100A.
	LW-18888●	ALV-8512	LW-18904●♦	-----	
VO-435	LW-12882	ALV-9405L	-----	-----	24V.-100A.
	LW-18874	ALV-9511L	-----	-----	
VO-435,TVO-435, GO-480	LW-11648‡	ALU-9404L	-----	-----	24V.-70A.
	LW-14222‡	ALU-9422L	LW-12851**	ALU-9422L "G"	
GO-480,VO-435	78411‡	ALX-9404L	LW-12819**	ALX-9404L "G"	12V.-70A.
	LW-14220‡	ALX-9422L	LW-12843**	ALX-9422L "G"	
540	LW-10009●	ALY-6406	-----	-----	12V.-60A.
540	LW-12277	ALT-8404	-----	-----	24V.-50A.
	LW-14322	ALT-8421	-----	-----	
540	LW-14327	ALU-8521LS♣	32C19562♦	-----	24V.-70A.
		ALU-8521LS♣	32C19565♦	-----	
540	LW-10966	ALV-8402L	LW-14817	-----	24V.-100A.
	LW-18885	ALV-8511	LW-18906*	-----	
540	32C21447	ES-4011LS♣	32C23288♣	-----	28V.-90A.
540,720	LW-10966	ALV-8402L	LW-10967	-----	24V.-100A.
	LW-18885	ALV-8511	LW-18900*	-----	
IGO-540	LW-11884	ALV-9406L	-----	-----	24V.-100A.
	LW-18871	ALV-9412L	-----	-----	
TIO-541	74884	1100749	75273	-----	12V.-70A.
TIGO-541	LW-10256	ALV-9401LS	-----	-----	24V.-100A.
	LW-18873	ALV-9510L	-----	-----	
720	78414	ALT-8404LS	LW-13352♦	-----	24V.-50A.
720 Grooved Pulley	LW-14321	ALT-8421LS	LW-14361♦	-----	

* Seven digit numbers are Delco-Remy. Letter prefix numbers are Kelly Aerospace Power Systems, Inc.

** Assembly includes ground strap.

♦ Assembly includes Lycoming supplied pulley.

● Less blast tube.

♣ Thermocoupled.

‡ Flanged.

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**TABLE 2 – ALTERNATORS ■
(AVAILABLE FROM LYCOMING)**

ENGINE SERIES	Lycoming Basic Alternator P/N	Vendor P/N*	Lycoming Alternator Assy. P/N	Vendor Alternator Assy. P/N	Description
235,320,360,540	LW-14313	ALY-8520LS	LW-14371♦	-----	12V.-60A.
235,320,360,540	32B23992	AL12-P70	-----	-----	12V.-70A.
235,320,360,540,720	LW-14318	ALX-8521LS	32B19549♦	-----	12V.-70A.
235,320,360,540,720	LW-14326	ALU-8521LS	32C19553♦	-----	24V.-70A.
320,360,(Kit,05K21701),540,720	32C20114	ES-4011LS	32C21681♦	-----	28V.-90A.
320,360,540	32B19569●	ALX-8521-LS1	LW-14338♦	-----	12V.-70A.
320,360,540	32C19570●	ALU-8521-LS	LW-14339♦	-----	24V.-70A.
360 Steel Pulley	LW-14313	ALY-8520LS	LW-12837**♦	ALY-8520 "G"	12V.-60A.
			LW-14351♦	ALY-8520	
360	LW-14333	ALY-6520LS	32B19555	-----	12V.-60A.
360	LW-14318	ALX-8521LS	LW-12842**	ALX-8521 "G"	12V.-70A.
			LW-14353♦	ALX-8521	
			32B19561♦	-----	
360	LW-14326	ALU-8521LS	LW-12849**♦	ALU-8521 "G"	24V.-70A.
			LW-12850**♦	ALU-8521 "G"	
			LW-14357♦	ALU-8521	
360	32C21997	ALU-8532LS	-----	-----	24V.-75A.
360,540	LW-14329	ALU-6521LS	LW-14367♦	-----	24V.-70A.
540	LW-14315●	ALY-6527	LW-12836**	ALY-6527 "G"	12V.-60A.
540	LW-14326	ALU-8521LS	LW-12847**♦	ALU-8521 "G"	24V.-70A.
			LW-14354♦	-----	
			LW-14363♦	-----	
			32C19556♦	-----	
			32C19558♦	-----	
540	32C21355	ES-4018LS	32C19563♦	-----	24V.-70A.
			32C19564♦	-----	
			32C21356♦	-----	
			32C21673♦	-----	
540	32C20114	ES-4011LS	32C22786♦	-----	28V.-90A.
			32C22375♦	-----	
540 (Pack, 05J19403)	LW-14329●	ALU-6521LS	LW-14369♦	-----	24V.-70A.
540 (Pack, 05J22487)	32C22491	ES-4011-1LS	32C22492♦	-----	24V.-90A.
540 (Kit, 05K22787)			32C22951♦	-----	
540 Lt.	32C22515	ALU-6539LS	32C22527♦	-----	24V.-75A.
540 Rt.			32C22528♦	-----	
540,720 Grooved Pulley	LW-14326	ALU-8521LS	LW-14356♦	ALU-8521	24V.-70A.
TIO-540-AE2A			32C19562♦	-----	24V.-70A.
TIO,LTIO-540-U2A	LW-14329●	ALU-6521LS	LW-14365♦	-----	24V.-70A.

- Alternator to be ordered by using Lycoming part numbers.
- * Seven digit numbers are Delco-Remy. Letter prefix numbers are Kelly Aerospace Power Systems, Inc.
- ** Assembly includes ground strap.
- ♦ Assembly includes Lycoming supplied pulley.
- Less blast tube.

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VOLTAGE REGULATORS■

Vendor	ENGINE SERIES	PART NUMBER		DESCRIPTION
		Lycoming	Vendor No.	
Bendix	GO-435, GO-480	68263	1589-1-E	24V.-50A.
Delco Remy	235, 290, 320, 340, 360, 540	72205	1119226	12V.-20A.*
		62833	1118704	12V.-35A.*
		68872	1118799	24V.-25A.*
		71745	1119224	24V.-50A.*
	320, 340, 360, 540	68626	1119145	12V.-35A.**
		72077	1119246	12V.-50A.**
	320, 360, 540	68810	1119139	12V.-20A.**
	320, 360, 540	71350	1118976	24V.-25A.**
		71979	1119237	24V.-40A.**
		72311	1119273	24V.-40A.*
		73340	-----	24V.-50A.*
320, 360, VO-435, 540, TIO-541, 720	74291	9000590	12V.♦	
320, 360, 540, 720	74292	9000951	24V.♦	
360, 540, 720	72696	1119656	24V.♦	
Lear Siegler	360	LW-12364	51565	24V.
Prestolite	235, 320, 360, 540, 720	LW-12749	FVR-4002‡	12V.**♦
	235, 320, 360, GO-480, 540, 720	LW-10185	VSF-7203	12V.♦
	235, 320, 360, 540, VO-435, 720	LW-12747	FVR-4004	12V.♦
		LW-15895	FVR-4224	12V.♦♦
	235, 320, 360, VO-435, TVO-435, 540, IGO-540, TIGO-541, 720	77347	VSF-7402	24V.♦
	235, 320, 360, 540, VO-435	LW-10179	VSF-7403	24V.♦
		LW-12748	FVR-4005●	24V.♦
	320, 360, 540	LW-12750	FVR-4003‡	24V.**♦
	Optional twin engine installations.	LW-11139	EO-20803	12V.**♦
Optional twin engine installations.	LW-11140	EO-20713	24V.**♦	
Wico	235, 320, 360, 540, VO-435, 720	LW-11357	X-17990●	12V.♦

■ Voltage Regulators no longer available from Lycoming.
 * Non-paralleling.
 ** Paralleling.
 ♦ Transistor.
 ● Single engine, internally grounded field alternator installations only.
 ‡ Twin engine, internally grounded field alternator installations only.

RELAYS■

Vendor	ENGINE SERIES	PART NUMBER		DESCRIPTION
		Lycoming	Vendor No.	
Delco-Remy	290, 320, 340, 360, 540	68628	1116887	12 Volt
	320, 360, 540, 720	71349	1116902	24 Volt
		74804	1115832	
	320, 360, VO-435, 540, 720	74461	1115831	12 Volt
Prestolite	235, 320, 360, VO-435, GO-480, 540	78059	FOC-4002A	12 Volt
	320, 360, TVO-435, 540, IGO-540, TIGO-541, 720	78060	FOC-4003A	24 Volt

■ Relays no longer available from Lycoming.

NOTE: Revision "M" revises tables for Starters and Alternators.

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1154
MO	DAY	YEAR	MO	DAY	YEAR			
07	29	96	05	26	09	7 of 7	M	