

**98-17-11 Textron Lycoming and Teledyne Continental Motors: Amendment 39-10713.
Docket 98-ANE-27-AD.**

{As corrected at 63 FR 55918 - Ed.}

{New-98-10}

Textron Lycoming (LYC) O-235, O-235-C1, O-235-C2C, O-235-L2C, O-235-N2C, O-290, O-290-D2, O-320, O-320-A, O-320-A1A, O-320-A2B, O-320-B2B, O-320-B2C, O-320-D2J, O-320-D3G, O-320-E2A, O-320-E2D, O-320-E2G, O-320-E3D, O-320-H2AD, O-360, O-360-A1A, O-360-A1D, O-360-A3A, O-360-A4A, O-360-A4K, O-360-B1B, IO-360-F1A6, AEIO-320-E1B, HIO-360-C1A, IO-320, IO-320-B1A, IO-360, IO-360-A1A, IO-360-A1B6, IO-360-B1E, IO-360-C, IO-360-C1C, IO-360-C1C6, IO-360-C1D6, IO-360-D, O-540-A1B5, O-540-A1D5, O-540-R2AD, IO-540, IO-540-C4B5, IO-540-S1A5, TIO-540-A2, LIO-320-C1A, LIO-360-C1E6, and IO-720 reciprocating engines; and Teledyne Continental Motors (TCM) A-65, A65-3, A65-8, A75, A75-8, C75-12, C85, C85-8, C85-12, C90-8FJ, C90-12, O-200, O-200-A, O-300, O-300-D, IO-360-C, E-185-4, E-225-8, O-470, O-470-K, O-470-L, O-470-R, O-470-11, IO-470, IO-470-N, IO-470-S, IO-520, IO-520-D, GTSIO-520, and TSIO-520-VB reciprocating engines, with installed crankshafts repaired by Nelson Balancing Service, Bedford, Massachusetts, Repair Station Certificate No. NB7R820J, between February 1, 1995, and December 31, 1997, inclusive, as listed (by work order (W/O)) in Table 1 of this AD.

Table 1

Engine and model	W/O	Date	Engine Ser. No.
LYC:			
AEIO-320-E1B	1134	2/17/96	L-5653-55A
HIO-360-C1A	1155	2/7/96	L-12126-51A
IO-320	1141	1/17/96	
IO-320-B1A	1525	11/14/97	
IO-360	1314	12/17/96	
IO-360	IN6137	8/7/97	
IO-360-A1A	1230	6/10/96	L-474-51
IO-360-A1A	1289	10/23/96	L-4085-5174
IO-360-A1A	1415b	5/23/97	RL-3920-51A
IO-360-A1B6	1463	7/31/97	
IO-360-B1E	1312	12/12/96	L-4453-51A
IO-360-C	1146	1/23/96	R-51448-9-C
IO-360-C1C	1336	2/10/97	
IO-360-C1C	1518	12/9/97	
IO-360-C1C6	1530	11/25/97	
IO-360-C1C6	1537	12/9/97	L-19294-51A
IO-360-C1D6	1286	4/28/97	
IO-360-D	1540	12/2/97	
IO-360-F1A6	1176	3/7/96	L-27423-36A
IO-540	1014	2/8/95	
IO-540	1056	6/13/95	
IO-540	1302	12/5/96	
IO-540-C4B5	1313	12/17/96	L-19547-48
IO-540-S1A5	1513	10/27/97	L-19597-48A
IVO-435-G1A	1271	10/1/96	

LIO-320-C1A	1158	2/8/96	
LIO-360-C1E6	1280	10/7/96	
LIO-360-C1E6	1281	10/9/96	
O-235	1013	2/21/95	
O-235	1051	6/2/95	
O-235	1054	6/9/95	
O-235	1057	6/14/95	L-9041-15
O-235	1058	6/29/95	
O-235	1060	6/30/95	
O-235	1069	8/10/95	
O-235	1110	2/20/96	
O-235	1145	1/23/96	
O-235	1151	1/25/96	
O-235	1160	2/9/96	RL-24636-15
O-235	1305	12/5/96	L-22542-15
O-235	1329	2/11/97	
O-235	1332	2/11/97	
O-235	1481	9/2/97	
O-235-C1	1089	10/8/95	L-6475-15
O-235-C1	1188	4/2/96	L-7143-15
O-235-C1	1335	3/12/97	L-5569-15
O-235-C1	1367	3/24/97	
O-235-C2C	1019	2/24/95	L-12284-15
O-235-C2C	1040	5/8/95	
O-235-C2C	1105	12/1/95	L-12273-15
O-235-L2C	1030	4/6/95	L-14545-15
O-235-L2C	1036	4/24/95	
O-235-L2C	1037	4/24/95	L-23012-15
O-235-L2C	1050	6/2/95	L-15542-15
O-235-L2C	1062	7/5/95	L-18306-15
O-235-L2C	1067	8/8/95	
O-235-L2C	1070	8/10/95	L-16005-15
O-235-L2C	1095	11/14/95	RL-023227-15
O-235-L2C	1101	11/4/95	L-15300-15
O-235-L2C	1102	11/15/95	L-20183-15
O-235-L2C	1162	2/14/96	L-16114-15
O-235-L2C	1179	3/11/96	L-21215-15
O-235-L2C	1219	5/16/96	L-21215-15
O-235-L2C	1251	8/22/96	
O-235-L2C	1285	10/19/96	
O-235-L2C	1365	3/24/97	
O-235-L2C	1400	4/28/97	
O-235-L2C	1414	8/5/97	
O-235-L2C	1417	12/5/97	
O-235-L2C	1433	6/26/97	L-17074-15
O-235-L2C	1435	6/9/97	
O-235-L2C	1504	10/31/97	
O-235-L2C	1508	11/18/97	
O-235-L2C	1524	11/12/97	
O-235-L2C	1536	11/24/97	
O-235-L2C	2010	11/19/97	
O-235-N2C	1511	10/29/97	L-23857-15
O-290	1257	9/4/96	
O-290	1326	3/26/97	
O-290-D2	1082	9/26/95	L-6019-21
O-320	1018	2/22/95	
O-320	1024	3/17/95	

O-320	1038	5/3/95	L-39272-27A
O-320	1045	5/24/95	
O-320	1084	9/28/95	
O-320	1116	1/8/96	
O-320	1125	1/8/96	
O-320	1169	2/28/96	
O-320	1175	3/7/96	
O-320	1184	3/28/96	
O-320	1189	8/27/96	
O-320	1202	4/30/96	
O-320	1212	5/10/96	
O-320	1283	10/17/96	
O-320	1316	12/21/96	
O-320	1340	2/25/97	L-24367
O-320	1347	2/18/97	
O-320	1360	3/10/97	
O-320	1361	3/10/97	
O-320	1436	5/29/97	
O-320	1468	8/14/97	
O-320	1474	8/22/97	L-13130-39A
O-320	1477	9/13/97	
O-320	1477	9/13/97	
O-320	1507	11/18/97	
O-320	1519	11/21/97	
O-320	1546	12/7/97	
O-320	1171	3/1/96	
O-320-A	1192	4/13/96	
O-320-A	1194	4/13/96	
O-320-A	1196	4/13/96	
O-320-A1A	1244	8/13/96	L-5270-27
O-320-A2B	1081	9/22/95	
O-320-A2B	1461	9/9/97	L-12626-27
O-320-B2B	1452	7/10/97	L-2977-39
O-320-B2C	1315	12/17/96	
O-320-D2J	1172	3/4/96	L-13039-39A
O-320-D2J	1173	3/7/96	L-123412-39A
O-320-D2J	1253	9/4/96	
O-320-D2J	1534	11/25/97	
O-320-D2J	1539	12/3/97	
O-320-D3G	1077	9/17/95	
O-320-D3G	1114	1/8/96	L-10983-39A
O-320-D3G	1354	2/25/97	
O-320-D3G	1370	3/26/97	H45247
O-320-D3G	1544	12/3/97	
O-320-E2A	1103	11/10/95	L-26363-27A
O-320-E2A	1191	4/13/96	L-19377-27A
O-320-E2A	1317	12/21/96	L-15219-27A
O-320-E2A	1439	6/9/97	L-38003-55A
O-320-E2D	1068	8/10/95	L-35528-27A
O-320-E2D	1078	9/17/95	
O-320-E2D	1177	3/9/96	L-44732-27A
O-320-E2D	1181	3/14/96	
O-320-E2D	1241	8/9/96	L-42691-27A
O-320-E2D	1245	8/13/96	L-40483-27A
O-320-E2D	1260	9/9/96	L-15300-15
O-320-E2D	1343	2/17/97	
O-320-E2D	1346	3/2/97	L-44320-27A

O-320-E2D	1385	4/16/97	
O-320-E2D	1458	7/18/97	
O-320-E2D	1533	11/25/97	
O-320-E2D	1549	12/12/97	
O-320-E2G	1338	3/10/97	L-38264-27A
O-320-E3D	1034	4/18/95	L-29668-27A
O-320-E3D	1074	8/24/95	L-29495-27A
O-320-E3D	1431	6/9/97	L-33770-27A
O-320-E3D	1444	6/13/97	
O-320-E3D	1500	10/7/97	L-33841-27A
O-320-H2AD	1322	1/22/97	L-1530-78T
O-360	1025	3/17/95	
O-360	1157	2/7/96	
O-360	1199	4/18/96	
O-360	1362	3/10/97	
O-360	1386	4/17/97	
O-360	1394	5/6/97	
O-360	1528	11/19/97	
O-360-A1A	1170	2/28/96	L-20677-36A
O-360-A1A	1214	5/14/96	L-20190-36A
O-360-A1A	1239	8/5/96	
O-360-A1D	1411	5/5/97	
O-360-A3A	1531	11/25/97	
O-360-A4A	1270	9/27/96	L-14008-36A
O-360-A4A	1464	7/30/97	L-24796-36A
O-360-A4A	1486	9/6/97	
O-360-A4A	1529	11/25/97	
O-360-A4K	1166	2/22/96	L-26455-36A
O-360-B1B	1262	9/9/96	L-5261-51A
O-540-A1B5	1129	12/29/95	
O-540-A1B5	1132	1/9/96	L-1165-40
O-540-A1D5	1462	7/28/97	L-5661-40
IO-720	1510	10/26/97	
TIO-540-A2	1064	7/13/95	
TIO-540-A2	1111	1/10/96	
TIO-540-R2AD	1106	11/27/95	L-5949-61A

TCM:

A-65	1152	1/25/96	
A-65	1154	2/7/96	7187
A-65	1183	2/22/96	
A-65	1185	3/28/96	
A-65	1233	6/23/96	
A-65	1290	10/29/96	
A-65	1296	11/14/96	4933868
A-65	1299	11/19/96	
A-65	1325	3/26/97	
A-65	1326	3/26/97	
A-65	1376	4/29/97	
A-65	1438	6/17/97	5890178
A-65-3	1243	8/13/96	324993
A-65-8	1541	12/2/97	
A-65-8	1276	10/5/96	5762568
A75	1156	2/7/96	5321868
A75	1255	9/3/96	
A75	1256	9/4/96	
A75-8	1275	10/5/96	5162868

C75-12F	1293	11/4/96	3316-6-12
C85	1088	10/4/95	
C85	1092	10/18/95	
C-85	1198	4/17/96	29652-7-8
C-85	1297	11/14/96	
C-85	1352	3/10/97	
C-85	1381	4/28/97	
C-85	1391	4/19/97	
C-85	1392	4/19/97	
C-85	1484	9/4/97	28487-6-12
C-85-8FJ	1139	1/17/96	29845-7-8
C-85-8FJ	1420	5/12/97	29465-7-8
C-85-12	1031	4/6/95	
C85-12	1182	3/18/96	21596-6-12
C-85-12	1217	5/15/96	
C85-12	1265	9/12/96	14657
C-85-12	1298	11/14/96	23610-6-12
C-90-8F	1471	9/6/97	42838-1-8
C-90-12	1279	10/7/96	44747-6-12
E-185-4	1124	1/16/96	25700D-1-9
E-225-8	1505	10/28/97	35477-D-9-8-P
GTSIO-520	1208	5/7/96	210114-70H
IO-360-C	1126	12/28/95	F-51439-9-C
IO-470	1028	3/23/95	87329-R
IO-470-N	1421	5/13/97	95271-1-N
IO-470-S	1331	3/11/97	102412-2-S-I
IO-520	1174	3/4/96	
IO-520-D	1167	2/22/96	
O-200	1033	4/18/95	
O-200	1043	5/12/95	
O-200	1049	6/2/95	
O-200	1076	9/11/95	214668-27A
O-200	1104	11/21/95	213830-71A
O-200	1131	1/5/96	
O-200	1142	1/18/96	265349-R
O-200	1147	1/23/96	
O-200	1190	4/13/96	
O-200	1193	4/13/96	
O-200	1195	4/13/96	
O-200	1197	4/17/96	
O-200	1213	5/13/96	
O-200	1261	9/9/96	
O-200	1303	12/5/96	
O-200	1321	2/7/97	28115
O-200	1324	2/6/97	
O-200	1344	3/2/97	
O-200	1393	5/5/97	
O-200	1413	5/7/97	61001-5-4
O-200	1430	5/23/97	
O-200	1437	6/17/97	255759A-48
O-200	1488	9/7/97	
O-200	1506	11/18/97	
O-200	1522	11/11/97	
O-200-A	1052	6/21/95	254150-A-48
O-200-A	1085	9/29/95	
O-200-A	1120	12/29/95	253971
O-200-A	1161	2/9/96	24R-469

O-200-A	1215	5/15/96	
O-200-A	1240	8/5/96	69589-8-A
O-200-A	1254	9/3/96	6105-71-A-R
O-200-A	1264	9/12/96	
O-200-A	1356	3/10/97	
O-300	1027	3/20/95	
O-300	1042	5/12/95	34012-D-6-D
O-300	1083	9/26/95	
O-300	1096	10/23/95	464481
O-300	1137	1/17/96	
O-300	1259	9/4/96	
O-300	1387	4/22/97	
O-300	1397	4/26/97	5928-9A
O-300	1403	4/28/97	
O-300	1423	6/9/97	3834D8Z
O-300	1555	1/13/98	
O-300-A	1446	6/27/97	
O-300-D	1022	3/17/95	35110-D-6-D
O-300-D	1079	9/17/95	24276-D-0-D
O-300-D	1487	9/6/97	
O-300-D	1543	12/3/97	
O-470	1046	6/1/95	
O-470	1383	4/4/97	
O-470-11	1017	2/22/95	
O-470-11	1491	10/19/97	
O-470-11	1492	10/19/97	
O-470-11	1493	10/19/97	
O-470-11	1494	10/19/97	
O-470-F	1236	7/25/96	76956-4-F
O-470-K	1087	10/3/95	47172-6-K
O-470-L	1128	1/10/96	68681-8-L
O-470-L	1359	5/19/97	68245-8-L
O-470-L	1399	4/28/97	
O-470-R	1016	2/10/95	133087-6-R
O-470-R	1086	10/3/95	
O-470-R	1165	2/22/96	
O-470-R	1178	3/10/96	
O-470-R	1201	6/2/96	83164-1-R
O-470-R	1319	1/6/97	459408
TSIO-520-VB	1055	6/9/95	

Note 1: Blank spaces indicate unknown data. Where the engine serial number is blank in this table, it is either unknown or the crankshaft may not be installed in an engine.

Note 2: This airworthiness directive (AD) applies to each engine identified in the preceding applicability provision, regardless of whether it has been modified, altered, or repaired in the area subject to the requirements of this AD. For engines that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must request approval for an alternative method of compliance in accordance with paragraph (c) of this AD. The request should include an assessment of the effect of the modification, alteration, or repair on the unsafe condition addressed by this AD; and, if the unsafe condition has not been eliminated, the request should include specific proposed actions to address it.

Compliance: Required as indicated, unless accomplished previously.

To prevent crankshaft failure due to cracking, which could result in an inflight engine failure and possible forced landing, accomplish the following:

(a) Within 10 hours time in service after the effective date of this AD, determine if this AD applies, as follows:

(1) Determine if any repair was conducted on the engine that required crankshaft removal during the February 1, 1995, to December 31, 1997, time frame; if the engine was not disassembled for crankshaft removal and repair in this time frame, no further action is required.

(2) If the engine and crankshaft was repaired during this time frame, determine from the maintenance records (engine log book), and Table 1 of this AD if the crankshaft was repaired by Nelson Balancing Service, Repair Station Certificate No. NB7R820J, Bedford, Massachusetts. The maintenance records should contain the Return to Service (Yellow) tag for the crankshaft that will identify the company performing the repair. Also the work order number contained in Table 1 of this AD was etched on the crankshaft propeller flange, adjacent to the closest connecting rod journal. Because some etched numbers will be difficult to see, if necessary, use a 10X magnifying glass with an appropriate light source to view the work order number. In addition, the propeller spinner, if installed, will have to be removed in order to see this number.

(3) A person with a private pilot or higher rated certificate may make the determination of applicability of this AD provided the propeller spinner does not have to be removed.

(4) If it cannot be determined who repaired the crankshaft, compliance with this AD is required.

(5) If the engine and crankshaft were not repaired during the time frame specified in (a)(1), or if it is determined that the crankshaft was not repaired by Nelson Balancing Service, no further action is required.

(b) Within 10 hours time in service after the effective date of this AD, accomplish the following:

(1) Perform a visual inspection as defined in paragraph (b)(2) of this AD, magnetic particle inspection, and a dimensional check of the crankshaft journals, or remove from service affected crankshafts and replace with serviceable parts.

(2) For the purpose of this AD, a visual inspection of the crankshaft is defined as the inspection of all surfaces of the crankshaft for cracks which include heat check cracking of the nitrided bearing surfaces, cracking in the main or aft fillet of the main bearing journal and crankpin journal, including checking the bearing surfaces for scoring, galling, corrosion, or pitting.

Note 3: Further guidance on all inspection and acceptance criteria is contained in applicable TCM or LYC Overhaul or Maintenance Manuals, or other FAA-approved data.

(3) Replace any crankshaft that fails the visual inspection, magnetic particle inspection, or the dimensional check with a serviceable crankshaft, unless the crankshaft can be reworked to bring it in compliance with:

(i) All the overhaul requirements of the appropriate TCM or LYC Overhaul/Maintenance Manuals; or

(ii) All of the FAA-approved requirements for any repair station which currently has

approval for limits other than those in the appropriate TCM or LYC Overhaul/Maintenance Manuals.

(4) For the purpose of this AD, a serviceable crankshaft is one which meets the requirements of paragraph (b)(3)(i) or (b)(3)(ii) of this AD.

Note 4: Crankshafts removed from TCM engine models IO-360, IO-520, and TSIO-520 series engines are also subject to compliance with AD 97-26-17.

(c) An alternative method of compliance or adjustment of the compliance time that provides an acceptable level of safety may be used if approved by the Manager, New York (LYC) or Atlanta (TCM) Aircraft Certification Offices. Operators shall submit their requests through an appropriate FAA Airworthiness Inspector, who may add comments and then send it to the Manager, New York or Atlanta Aircraft Certification Offices.

Note 5: Information concerning the existence of approved alternative methods of compliance with this airworthiness directive, if any, may be obtained from the Atlanta Aircraft Certification or New York Aircraft Certification Office, as applicable.

(d) Special flight permits may be issued in accordance with sections 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the aircraft to a location where the requirements of this AD can be accomplished.

(e) This amendment becomes effective on October 19, 1998.