DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

E-223
Revision 21
Lycoming Engines

**O-233**-A1,O-235
**O-235**-A, -B, -AP, -BP, -C, -C1, -C1A, -C1B, -C1C, -C2A, -C2B, -C2C, -E1, -E1B, -E2A, -E2B, -F1, -F1B, -F2A, -F2B, -G1, -G1B, -G2A,-G2B, -H2C, -J2A, -J2B, -K2A, -K2B, -K2C, -L2A, -L2C, -M1, -M2C, -M3C, -N2A, -N2C, -P1, -P2A, -P2C, -P3C

April 30, 2013

# TYPE CERTIFICATE DATA SHEET NO. E-223

Engines of models described herein conforming with this data sheet (which is a part of Type Certificate No. E-223) and other approved data on file with the Federal Aviation Administration meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Civil Air Regulations/Federal Aviation Regulations provided they are installed, operated and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

| | |
|---|---|
| Type Certificate Holder | Lycoming Engines<br>An Operating Division of AVCO Corporation<br>Williamsport, Pennsylvania 17701 |
| Type Certificate Holder Record | Avco Lycoming Williamsport Div., AVCO Corporation transferred TC E-223 to Lycoming Engines, An Operating Division of AVCO Corporation on December 17, 2003 |

| Model | O-235-C1,-C1B, -E1,-E1B | O-235-C1C | O-235-C1A | O-235-C2C, -H2C | O-235-L2C, -K2C |
|---|---|---|---|---|---|
| Type | 4HOA Direct Drive | | | | |
| Rating<br>Max. continuous hp., r.p.m.<br>Sea level pressure altitude | 115-2800-S.L. | 108-2600-S.L. | 100-2450-S.L. | 108-2600-S.L. (See Note 11) | 115-2700-S.L. (See Note 12) |
| Takeoff (5 min.) hp., r.p.m. at full throttle | 115-2800 | 115-2800 | 100-2450 | 115-2800 | 118-2800 |
| Fuel (minimum grade aviation gasoline)** | 80/87 | - - | - - | - - | 100/100LL |
| Lubricating Oil (Lubricants should conform to the specifications as listed or later revisions thereto) | Lycoming Spec. No. 301-F and Service Instruction No. 1014 | - - | - - | - - | - - |
| Bore and stroke, inch | 4.375 x 3.875 | - - | - - | - - | - - |
| Displacement, cubic inch | 233 | - - | - - | - - | - - |
| Compression ratio | 6.75:1 | - - | - - | - - | 8.5:11 |
| Weight (dry), lb. | (See NOTE 8) | - - | - - | - - | - - |
| C.G. Location | (See NOTE 8) | - - | - - | - - | - - |
| Propeller shaft end size | Integral flange - SAE Type 2 | - - | - - | Type 1 | - - |
| Crankshaft Dampers | None | - - | - - | - - | - - |
| Carburetor+ | MA-3A or MA-3PA | - - | MA-3A | LVC-3-3A or LVC-3-3PA | - - |
| Ignition, dual | (See NOTE 8) | - - | - - | - - | - - |
| Spark plugs | (See NOTE 7) | - - | - - | - - | - - |
| Ignition, timing °BTC | 25 | - - | 15 | 25 | 20 |
| Oil sump capacity, qt. | 6 | - - | - - | - - | - - |
| Usable oil, qt. | 4 | - - | - - | - - | - - |
| NOTES | 1 thru 5,7,8,10 | - - | - - | 1 thru 5,7,8,10,11 | - - |

| Page No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Rev. No. | 21 | 21 | 18 | 18 | 18 | 18 | 18 |

| Models (Continued) | O-235-C2A, -C2B,-E2A, -E2B | O-235-F1, -F1B,-G1, -G1B | O-235-F2A, -F2B,-G2A, -G2B,-J2A, -J2B | O-235-K2A, -K2B,-L2A, -M1,-M2C, -M3C | O-235-N2A, -N2C,-P1, -P2A,-P2C, -P3C |
|---|---|---|---|---|---|
| Rating | | | | | |
| Max. continuous hp., r.p.m. Sea level pressure altitude | 115-2800-S.L. | 125-2800-S.L. | 125-2800-S.L. | 118-2800-S.L. (See NOTE 12) | 116-2800-S.L. (See NOTE 14) |
| Takeoff (5 min.) hp., r.p.m. at full throttle | 115-2800 | 125-2800 | 125-2800 | 118-2800 | 116-2800 |
| Fuel (minimum grade aviation gasoline)** | 80/87 | 100/100LL | - - | - - | - - |
| Lubricating Oil (Lubricants should conform to the specifications as listed or later revisions thereto) | Lycoming Spec. No. 301-F and Service Instruction No. 1014 | - - | - - | - - | - - |
| Bore and stroke, inch | 4.375 x 3.875 | - - | - - | - - | - - |
| Displacement, cubic inch | 233 | - - | - - | - - | - - |
| Compression ratio | 6.75:1 | 9.7:1 | - - | 8.5:1 | 8.1:1 |
| Weight (dry), lb. | (See NOTE 8) | - - | - - | - - | - - |
| C.G. Location | (See NOTE 8) | - - | - - | - - | - - |
| Propeller shaft end size | Integral flange - SAE Type 1 | Type 2 | Type 1 | Type 1* | Type 1* |
| Crankshaft Dampers | None | - - | - - | - - | - - |
| Carburetor+ | LVC-3-3A or LVC-3-3PA | MA-3A or MA-3PA | LVC-3-3A or LVC-3-3PA | - - | - - |
| Ignition, dual | (See NOTE 8) | - - | - - | - - | - - |
| Spark plugs | (See NOTE 7) | - - | - - | - - | - - |
| Ignition, timing °BTC | 25 | - - | - - | 20 | - - |
| Oil sump capacity, qt. | 6 | - - | - - | - - | - - |
| Usable oil, qt. | 4 | - - | - - | - - | - - |
| NOTES | 1 thru 5,7,8,10 | - - | - - | - - | - - |

*"- -" indicates "same as preceding model"*

* *Models O-235-M1, -M3C, -P1 and -P3C have a type 2 flange*

** *See latest revision of Lycoming Service Instruction No. 1070 for alternate fuel grades*

\+ *See latest revision of Lycoming Service Instruction No. 1523 for alternate carburetors.*

CERTIFICATION BASIS:

| Regulations & Amendments | Model | Date of Application | Date of Type Certificate E-223 Issued/Revised | Canceled (See Note 6) |
|---|---|---|---|---|
| CAR 13 As Amended to May 31, 1938 | O-233-A1 | June 13, 1940 | August 26, 1940 | February 25, 1944 |
| As Amended to November 15, 1940 | O-235 | April 19, 1941 | February 11, 1942 | December 1, 1947 |
| CAR 13 Effective August 1, 1941 | O-235-A | June 15, 1942 | July 3, 1942 & 1947 | December 1, 1947 |
| | O-235-B | May 2, 1944 | July 21, 1944 | December 1, 1947 |
| | O-235-AP | July 17, 1944 | July 21, 1944 | December 1, 1947 |
| | O-235-BP | May 2, 1944 | July 21, 1944 | December 1, 1947 |
| | O-235-C | November 15, 1945 | January 3, 1946 | December 1, 1947 |
| | (O-235-2 SEE NOTE 6) | | | |
| | O-235-C1 | September 11, 1946 | March 20, 1947 | |
| | O-235-C1A | May 28, 1948 | July 7, 1948 | |

| Regulations & Amendments (cont'd) | Model | Date of Application | Date of Type Certificate E-223 Issued/Revised | Canceled (See Note 6) |
|---|---|---|---|---|
| CAR 13 Effective June 15, 1956 | O-235-C1B | October 4, 1960 | October 12, 1960 | |
| As Amended by 13-1, 13-2, & 13-3 | O-235-C1C | January 6, 1976 | January 23, 1976 | |
| | O-235-C2A | May 26, 1965 | July 22, 1965 | |
| | O-235-C2B | October 4, 1966 | November 29, 1966 | |
| | O-235-C2C | February 6, 1968 | February 16, 1968 | |
| | O-235-E1 | October 31, 1968 | June 17, 1969 | |
| | O-235-E1B | October 31, 1968 | June 17, 1969 | |
| | O-235-E2A | October 31, 1968 | June 17, 1969 | |
| | O-235-E2B | October 31, 1968 | June 17, 1969 | |
| | O-235-F1 | February 27, 1979 | March 11, 1971 | |
| | O-235-F1B | February 27, 1970 | March 11, 1971 | |
| | O-235-F2A | February 27, 1970 | March 11, 1971 | |
| | O-235-F2B | February 27, 1970 | March 11, 1971 | |
| | O-235-G1 | May 10, 1971 | May 17, 1971 | |
| | O-235-G1B | May 10, 1971 | May 17, 1971 | |
| | O-235-G2A | May 10, 1971 | May 17, 1971 | |
| | O-235-G2B | May 10, 1971 | May 17, 1971 | |
| | O-235-H2C | December 20, 1972 | January 4, 1973 | |
| | O-235-J2A | February 6, 1973 | February 12, 1973 | |
| | O-235-J2B | December 20, 1972 | January 4, 1973 | |
| | O-235-K2A | April 19, 1974 | June 6, 1974 | |
| | O-235-K2B | April 19, 1974 | June 6, 1974 | |
| | O-235-K2C | June 23, 1978 | June 28, 1978 | |
| | O-235-L2A | April 19, 1974 | June 6, 1974 | |
| | O-235-L2C | June 25, 1975 | July 11, 1975 | |
| | O-235-M1 | September 27, 1978 | October 6, 1978 | |
| | O-235-M2C | October 23, 1981 | November 4, 1981 | |
| | O-235-M3C | October 23, 1981 | November 4, 1981 | |
| | O-235-N2A | December 3, 1981 | January 5, 1982 | |
| | O-235-N2C | December 3, 1981 | January 5, 1982 | |
| | O-235-P1 | April 23, 1982 | May 12, 1982 | |
| | O-235-P2C | April 23, 1982 | May 12, 1982 | |
| | O-235-P3C | April 23, 1982 | May 12, 1982 | |
| | O-235-P2A | April 20, 1983 | April 26, 1983 | |

PRODUCTION BASIS: Production Certificate No. 3

NOTE 1. Maximum Permissible Temperatures:

| | Cylinder Head | | | |
|---|---|---|---|---|
| Models | Spark Plug Washer Thermocouple | Well Type Thermocouple | Cylinder Barrel | Oil Inlet |
| All except 0-223-A1 O-235, O-235-A, -AP O-235-B (O-235-2), -BP -C | 525°F | 500°F | 325°F | 245°F |

NOTE 2. For all models except O-233-A1, O-235, O-235-A, -AP, -B(O-235-2), -BP, -C, allowable fuel pressures at carburetor inlet are:

3.0 p.s.i. desired, 0.5 p.s.i. minimum and 8.0 p.s.i. maximum.

For gravity feed systems, minimum fuel pressure is 7.5 inches of gasoline differential pressure across the fuel inlet fitting for the O-235-K, -L, -M, -N series.

| | | | |
|---|---|---|---|
| Oil Pressure Limits - | (Normal operations) | Minimum 60 p.s.i. | Maximum 90 p.s.i. |
| | (Idling 25 p.s.i.) | | |
| | (Starting & Warm-up) | | Maximum 100 p.s.i. (O-235-N and P series-115 p.s.i. max.) |

NOTE 3. Deleted. (Accessories such as generators, fuel pumps, etc., previously listed in NOTE 3 are satisfactory for continued use with these engines. Accessories of these type are not integral engine accessories and therefore are not evaluated for approval during engine certification testing. The airworthiness of such accessories is substantiated during aircraft-installation system approval. The suitability of the accessory for the engine mounting provisions as described in NOTE 4 of this data sheet must be determined when processing such approval.

NOTE 4. The following accessory drives are available:

| Accessory Drive | -C1A | -C2A, -C2B<br>-C1C, -C2C | -G1, -G1B<br>-G2A, -G2B | -F1, -F1B, -F2A, -F2B, -H2C, -J2A, -J2B, -K2A, -K2B, -L2A, -L2C, -K2C, -M1, -M2C, -M3C, -N2A, -N2C<br>-P1, -P2A, -P2C, -P3C |
|---|---|---|---|---|
| Starter | * | * | * | * |
| Generator | * | * | # | # |
| or Generator | | ** | # | # |
| or Alternator | | ** | * | * |
| Fuel Pump (Plunger) | * | ** | ** | ** |
| Tachometer | * | * | * | * |
| Vacuum Pump | ** | ** | ** | ** |
| Propeller Governor | # | # | ** | *** |

"#" indicates "does not apply" * = Standard, ** = Optional C = Clockwise, CC = Counter-Clockwise

*** = Models O-235-M1, -M2C, -M3C, -P1, -P2A, -P2C, -P3C are equipped with a Propeller Governor Drive, AN20010, Type XX, note torque limitations.

| Accessory Drive | Rotation Facing Drive Pad | Speed Ratio to Crankcase | Maximum Torque (in. -lb.) Cont. | Static | Maximum Overhang Moment (in. -lb.) |
|---|---|---|---|---|---|
| Starter | CC | 13.556:1 | # | 450 | 150 |
| Generator | C | 1.910:1 | 60 | 120 | 175 |
| or Generator | C | 2.50:1 | 60 | 120 | 175 |
| or Alternator | C | 3.25:1 | 60 | 120 | 175 |
| Fuel Pump (Plunger) | # | 0.500:1 | # | # | 10 |
| Tachometer | C | 0.500:1 | 7 | 50 | 5 |
| Vacuum Pump | CC | 1.300:1 | 70 | 450 | 25 |
| Propeller Governor | C | 0.866:1 | 125 | 1200 | 40 |

"#" indicates "does not apply" * = Standard, ** = Optional C = Clockwise, CC = Counter-Clockwise

*** = Models O-235-M1, -M2C, -M3C, -P1, -P2A, -P2C, -P3C are equipped with a Propeller Governor Drive, AN20010, Type XX, note torque limitations.

NOTE 5. The foregoing models incorporate additional different characteristics as follows:

| Models | Characteristics |
|---|---|
| O-235-C1- | Four cylinder, horizontally opposed, air cooled, direct drive. Has provisions for dual pump drives. Eligible for both tractor and pusher type installations. |
| O-235-C1A- | Similar to O-235-C1 except ignition timing, lower r.p.m. and hp. Has optional 2 position or automatic propeller governor drive. |
| O-235-C1B- | Similar to O-235-C1 except has retard breaker magnetos. |
| O-235-C1C- | Similar to O-235-C1 except has Slick magnetos. |
| O-235-C2A- | Similar to O-235-C1 except has a type 1 propeller flange. |
| O-235-C2B- | Similar to O-235-C2A but has S-1200 series magnetos. |
| O-235-C2C- | Similar to O-235-C2B except incorporates Slick magnetos with integral shielded ignition harness. |
| O-235-E1- | Similar to O-235-C1 except crankcase and crankshaft, modified to supply pressurized oil to contant speed propeller; Accessory case changed to accommodate a standard propeller governor drive. |
| O-235-E1B- | Similar to O-235-E1 except for S4LN-200 series retard breaker magnetos. |
| O-235-E2A- | Similar to O-235-E1 except has Type 1 propeller flange. |
| O-235-E2B- | Similar to O-235-E2A except incorporates S-1200 series magnetos. |
| O-235-F1- | Similar to O-235-C1 except for compression ratio, fuel grade and rating. |
| O-235-F1B- | Similar to O-235-F1 except has retard breaker magnetos. |
| O-235-F2A- | Similar to O-235-F1 except has a Type 1 propeller flange. |
| O-235-F2B- | Similar to O-235-F2A but has a S-1200 series magnetos. |
| O-235-G1- | Similar to O-235-F1 except has provisions for using constant speed propeller. |
| O-235-G1B- | Similar to O-235-G1 except has retard breaker magnetos. |
| O-235-G2A- | Similar to O-235-G1 except has a Type 1 propeller flange. |
| O-235-G2B- | Similar to O-235-G2A except has S-1200 series magnetos. |
| O-235-H2C- | Similar to O-235-C2C except has Type 1 dynafocal mounting. |
| O-235-J2B- | Similar to O-235-F2B except has Type 1 dynafocal mounting. |
| O-235-J2A- | Similar to O-235-J2B except for magnetos. |
| O-235-K2A- | Similar to O-235-F2A except ignition timing, lower hp. and reduced compression ratio. |
| O-235-K2B- | Similar to O-235-F2B except ignition timing, lower hp. and reduced compression ratio. |
| O-235-K2C- | Similar to O-235-K2A except has Slick magnetos. |
| O-235-L2A- | Similar to O-235-J2A except ignition timing, lower hp and reduced compression ratio. |

O-235-L2C- Similar to O-235-L2A except has Slick magnetos and lower maximum continuous rating.

O-235-M1- Similar to -L2A except has provision for controllable propeller and has AS-127 Type 2 propeller flange.

O-235-M2C- Similar to O-235-M1 except has Slick 4200 series magnetos and Type 1 propeller flange.

O-235-M3C- Similar to O-235-M1 except has Slick 4200 series magnetos.

O-235-N2A- Similar to O-235-L2A except has reduced compression ratio and reduced power ratings.

O-235-N2C- Similar to O-235-L2C except has reduced compression ratio and reduced power ratings.

O-235-P1- Similar to O-235-M1 except has reduced compression ratio and reduced power ratings.

O-235-P2C- Similar to O-235-M2 except has reduced compression ratio and reduced power ratings.

O-235-P3C- Similar to O-235-M3C except has reduced compression ratio and reduced power ratings.

O-235-P2A- Similar to O-235-P1 except has a Type 1 propeller flange.

NOTE 6. Approval of the following models has expired. No engines of these models manufactured after the date or with serial numbers above those listed below are eligible for use in certificated aircraft. (The early production engines may still be used in certificated aircraft or installed under a supplemental type certificate). Detail specifications for these engines have been deleted from this data sheet. Such information can be obtained by contacting the Manager, Propulsion Branch of the New York Aircraft Certification Office, Federal Aviation Administration.

| Model | Date | Serial No. |
|---|---|---|
| O-233-A1 | 2-25-44 | 106 |
| O-235, O-235-A, -AP, O-235-B, -BP, O-235-C | 12-1-47 | 4524-15 |

O-235-2 Identical to O-235-B. When engines of this model are installed in certificated aircraft, the corresponding commercial model designation should be added to the engine nameplate.

NOTE 7. Spark Plugs: See latest revision of Lycoming Service Instruction No. 1042 for approved equipment.

NOTE 8. Ignition, C.G. and Weights

| | | C.G. Location (dry) including starter and generator | | Off prop. | |
|---|---|---|---|---|---|
| Model | Ignition, dual | Propeller Flange front face, in. | Below prop. shaft C.L., in. | shaft C.L., in. | Weight (dry) lb. |
| O-235-C1 | Bendix S4LN-21, S4LN-20 | 14.75 | 1.13 | 0.20 Left | 246 |
| O-235-C1A | Bendix SF4LN-8, SF4N-8 Bendix SF4LN-21, S4LN-20 | 14.75 | 1.13 | 0.20 Left | 236 |
| O-235-C1B | Bendix S4LN-200, S4LN-204 | 14.75 | 1.13 | 0.20 Left | 245 |
| O-235-C1C | Slick 4251, 4250 | 14.75 | 1.13 | 0.20 Left | 243 |
| O-235-C2A | Bendix S4LN-21, S4LN-20 | 14.75 | 1.13 | 0.20 Left | 246 |
| O-235-C2B | Bendix S4LN-1227, S4LN-1209 | 14.75 | 1.13 | 0.20 Left | 247 |
| O-235-C2C | Slick 4251, 4250 | 14.75 | 1.13 | 0.20 Left | 244 |
| O-235-E1 | Bendix S4LN-21, S4LN-20 | 14.51 | 1.17 | 0.15 Left | 250 |
| O-235-E1B | Bendix S4LN-200, S4LN-204 | 14.51 | 1.17 | 0.15 Left | 249 |
| O-235-E2A | Bendix S4LN-21, S4LN-20 | 14.51 | 1.17 | 0.15 Left | 250 |
| O-235-E2B | Bendix S4LN-1227, S4LN-1209 | 14.51 | 1.17 | 0.15 Left | 251 |
| O-235-F1 | Bendix S4LN-21, S4LN-20 | 14.75 | 1.13 | 0.20 Left | 250 |
| O-235-F1B | Bendix S4LN-200, S4LN-204 | 14.75 | 1.13 | 0.20 Left | 249 |
| O-235-F2A | Bendix S4LN-21, S4LN-20 | 14.75 | 1.13 | 0.20 Left | 250 |
| O-235-F2B | Bendix S4LN-1227, S4LN-1209 | 14.75 | 1.13 | 0.20 Left | 251 |
| O-235-G1 | Bendix S4LN-21, S4LN-20 | 14.51 | 1.17 | 0.15 Left | 253 |
| O-235-G1B | Bendix S4LN-200, S4LN-204 | 14.51 | 1.17 | 0.15 Left | 252 |
| O-235-G2A | Bendix S4LN-21, S4LN-20 | 14.51 | 1.17 | 0.15 Left | 253 |
| O-235-G2B | Bendix S4LN-1227, S4LN-1209 | 14.51 | 1.17 | 0.15 Left | 254 |
| O-235-H2C | Slick 4251, 4250 | 14.75 | 1.13 | 0.20 Left | 243 |
| O-235-J2A | Bendix S4LN-21, S4LN-20 | 14.75 | 1.13 | 0.20 Left | 252 |
| O-235-J2B | Bendix S4LN-1227, S4LN-1209 | 14.75 | 1.13 | 0.20 Left | 253 |
| O-235-K2A | Bendix S4LN-21, S4LN-20 | 14.75 | 1.13 | 0.20 Left | 252 |
| O-235-K2B | Bendix S4LN-1227, S4LN-1209 | 14.75 | 1.13 | 0.20 Left | 253 |
| O-235-K2C | Slick 4252 or 4281 and 4250 | 14.75 | 1.13 | 0.20 Left | 248 |
| O-235-L2A, -N2A | Bendix S4LN-20, -21 or S4LN-204, -21, or two S4LN-21 | 14.75 | 1.13 | 0.20 Left | 252 |
| O-235-L2C, -N2C | Slick 4250, 4252, or 4250, 4281, or two 4252, or two 4281 | 14.75 | 1.13 | 0.20 Left | 249 |
| O-235-M1, -P1 & -P2A | Bendix S4LN-20, -21 or S4LN-204, -21 or two S4LN-21 | 14.51 | 1.17 | 0.15 Left | 255 |
| O-235-M2C, -M3C, -P2C, and -P3C | Slick 4250, 4281 or 4252, Opt. two 4252 or 4281 | 14.51 | 1.17 | 0.15 Left | 252 |

NOTE 9. Deleted 3/21/80.

NOTE 10. Starters, generators and alternators approved for use on these engines are listed in the latest revision of Textron Lycoming Service Instruction No. 1154.

NOTE 11. Models O-235-C2C and O-235-H2C have an alternate rated maximum continuous power rating of 100 hp at 2400 r.p.m.

NOTE 12. Models O-235-L2A, -L2C, O-235-M1, -M2C, and O-235-M3C have alternate ratings of 115 hp at 2700 r.p.m., 112 hp at 2600 r.p.m., 110 hp at 2550 r.p.m., and 105 hp at 2400 r.p.m.

NOTE 13. All models equipped with one impulse coupling magneto, may use two impulse coupling magnetos as optional equipment.

NOTE 14. Models O-235-N2A, -N2C, -P1, -P2A, -P2C, -P3C have alternate ratings of 113 hp at 2700 r.p.m., 110 hp at 2600 r.p.m., 108 hp at 2550 r.p.m. and 103 hp at 2400 r.p.m.

.....END.....