Approved Model List For

ETX900-TSO Battery Installation
EarthX

STC No. SA01005DE

Revision: D
Dated: March 17, 2023

FAA APPROVED MODEL LIST
ETX900-TSO Battery Installation Airworthiness Approval

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1. Revision Log

Revision	Pages	Description	FAA Approval	Date
IR	ALL	Initial Release	See previous revision for signature	Original Issue April 8, 2021
A	ALL	Cessna Adds models 182E, 182F, 182G, 182H, 182J, 182K, 182L, 182M, 182Q Piper Adds models PA-28-140, PA-28-150, PA-28-151, PA-28-160, PA-28-161, PA-28-180, PA-28-181, PA-28-201T, PA-28-235, PA-28-236, PA-28R-180, PA-28R-200, PA-28R-201, PA-28R-201T, PA-28RT-201, PA-28RT-201T, PA-28S-160, PA-28S-180.	See previous revision for signature	May 4,2022
B	4 ALL	Corrections to AML approved models listed in Section 4. Added Cessna 182N and revised Model 182Q to include serial numbers up to 18265965 only. Corrected page numbering.	See previous revision for signature	August 1, 2022
C	4 6	Added Mooney M20 Series Models to Approved Model List in Section 4. Minor grammatical corrections to Appendix A Issue Paper.	See previous revision for signature	September 29, 2022
D	Page 4 Sect 4	Adds Aviat A-1 series models	Manager, Denver ACO Branch Federal Aviation Administration Compliance and Airworthiness Division Aircraft Certification Service Date: _____	March 17, 2023

2. Introduction

This document is the Federal Aviation Administration (FAA) Approved Model List (AML) for Supplemental Type Certificate (STC) Number SA01005DE, for installing the EarthX Inc. ETX900-TSO Battery into eligible aircraft.

Revisions to the AML must be coordinated between the STC holder and the responsible ACO Branch and require FAA approval. This AML is only applicable to the aircraft listed in paragraph 4.

2.1 Prerequisites

For a serial number of an approved model (see paragraph 4) to be eligible for this STC installation, certain equipment must be installed (See paragraph 2.2, limitation 1)

2.2 Limitations

Limitations - ALL models:

Limitation Number	Limitations for ALL models
1	To prevent battery overcharging, Over Voltage Protection (OVP) means/ equipment in the battery charging system is required.
2	The installer must determine if this design change is compatible with previously approved modifications.
3	The modified airplane must be maintained in accordance with the Instructions for Continued Airworthiness (ICA) document.
4	A copy of this certificate must be maintained as part of the permanent records for the modified aircraft.
5	If the holder agrees to permit another person to use this certificate, the holder shall give the other person written evidence of that permission.
6	Installation limited to 14 DC volts electrical systems.

Limitations - Model Specific:

None

3. Certification Basis

The certification basis for each qualified model listed in paragraph 4 is as specified in its Type Certificate Datasheet (TCDS) and as modified by this STC's type design at the amendment levels noted in the appendix A.

4. Approved Model List

Item	Aircraft Make	Aircraft Model	TC Data Sheet	Certification Basis	Master Document List/Date	Instructions for Continued Airworthiness	Model Limitations	Notes	Initial Approval / Amendment Date
1	Cessna	182P	3A13	CAR part 3 with amendments as noted in Appendix A, Table 1.	EarthX Doc. No. D18120 Rev. B, dated April 8, 2021 or later FAA approved revision.	EarthX Doc. No. 180426 Rev. B, dated July 31, 2020 or later FAA approved revision.	See paragraph 2 for Limitations for all models and any Model Specific Limitations	None	Initial Approval April 8, 2021
2	Cessna	182E, 182F, 182G, 182H, 182J, 182K, 182L, 182M, 182N, 182Q to Serial Number 18265965.	3A13	CAR part 3 with amendments as noted in Appendix A, Table 1.	EarthX Doc. No. D18120 Rev. C, dated February 15, 2022 or later FAA approved revision.	EarthX Doc. No. 180426 Rev. C, dated September 11, 2021 or later FAA approved revision.	See paragraph 2 for Limitations for all models and any Model Specific Limitations	(1)	May 5, 2022/ August 1, 2022
3	Piper	PA-28-140, PA-28-150, PA-28-151, PA-28-160, PA-28-161, PA-28-180, PA-28-181, PA-28-201T, PA-28-235, PA-28-236, PA-28R-180, PA-28R-200, PA-28R-201, PA-28R-201T, PA-28RT-201, PA-28RT-201T, PA-28S-160, PA-28S-180.	2A13	CAR part 3 with amendments as noted in Appendix C, Table 1.	EarthX Doc. No. D18120 Rev. D, dated March 17, 2022 or later FAA approved revision.	EarthX Doc. No. 180426 Rev. C, dated September 11, 2021 or later FAA approved revision.	See paragraph 2 for Limitations for all Models and any Model Specific Limitations	(1)	May 5, 2022
4	Mooney	M20 Series Models: M20E (SN 24-470 and on), M20F (SN: All), M20J (SN 0001-02999), M20K (SN: 0001-0999)	2A3	CAR part 3 with amendments as noted in Appendix A, Table 1.	EarthX Doc. No. D18120 Rev. E2, dated September 9, 2022 or later FAA approved revision.	EarthX Doc. No. 180426 Rev. C, dated September 11, 2021 or later FAA approved revision.	See paragraph 2 for Limitations for all Models and any Model Specific Limitations	(1)	September 29, 2022
5	Aviat	A-1 Series Models: A-1, A-1A, A-1B, A-1C-180, A-1C-200	A22NM	CAR part 3 with amendments as noted in Appendix A, Table 1.	EarthX Doc. No. D18120 Rev. F, dated September 18, 2022 or later FAA approved revision.	EarthX Doc. No. 180426 Rev. C, dated September 11, 2021 or later FAA approved revision.	See paragraph 2 for Limitations for all Models and any Model Specific Limitations	(1)	March 17, 2023

NOTE(S):

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(1) **All models added have been substantiated per a specific Model Evaluation Summary (MES) report that substantiates model additions. This is per the STC's Model Qualification Process (MPQ) document D18114**

Appendix A: STC Certification Basis

All models shown in paragraph 4 fall within the STC's certification basis shown below

Based on §§ 21.115 and 21.101, and the FAA policy for significant changes in FAA Order 8110.48, the certification basis is as follows:

a. As determined by the Type Certificate Data Sheet (TCDS) for the aircraft for parts **not changed or not affected** by this STC.
b. Regulations at the amendment levels listed in Table 1 below for parts **changed or affected** by the STC since the reference date of application, March 31, 2021.
c. Means of Compliance Issue Paper, SE-1, dated January 9, 2020 approved and closed on January 28, 2020, Installation of Rechargeable Lithium Batteries and Battery Systems on Aircraft is applicable to this modification.

Table 1: Certification Basis Including Amendments and Special Conditions

Regulations	Amdt.
CAR 3	
3.381(a)	3-0
3.382	3-0
14 CFR part 23	
§ 23.301(a)(b)(c)	23-48
§ 23.303	23-0
§ 23.305(a)(b)	23-45
§ 23.307(a)	23-0
§ 23.561(e)	23-34
§ 23.601	23-0
§ 23.603(a)(b)	23-23
§ 23.605(a)	23-23
§ 23.607(b)	23-48
§ 23.609(a)(b)	23-0
§ 23.611	23-48
§ 23.613(a)(b)(c)(d)	23-45
§ 23.619	23-7
§ 23.625(a)(b)(c)	23-7
§ 23.853(a)	23-62
§ 23.863	23-34
§ 23.867(b)(1)	23-62
§ 23.1301	23-62
§ 23.1309(a)(c)(d)	23-62
§ 23.1322(b)(e)	23-43
§ 23.1351(a)(1)(2)(i)(b)(1)(i)(ii)(2)(3)	23-49
§ 23.1357	23-43
§ 23.1359(c)	23-49
§ 23.1365(a)(c)(d)(e)	23-49
§ 23.1367	23-0

FAA APPROVED MODEL LIST
ETX900-TSO Battery Installation Airworthiness Approval

STC NO. SA01005DE

Regulations	Amdt.
§ 23.1431(b)	23-62
§ 23.1529	23-26
§ 23.1541(a)(2)(b)	23-21
§ 23.2010	23-64
§ 23.2525	23-64
Special Conditions per IP Below	-

Issue Paper (IP) SE-1, date 1/9/2020 approved and closed on January, 28-20:

NOTE: For details on the IP Special Conditions below and MOC to the special conditions, review the Issue Paper outlined above

Special Conditions:

(1) Maintain Safe Cell Temperature.
(2) Prevent explosion or fire.
(3) Prevent the occurrence of self-sustaining, uncontrolled increases in temperature or pressure.
(4) Not emit explosive or toxic gases in hazardous quantities within the airplane either in normal operation or as a result of any failure.
(5) Comply with the requirements of §23.863.
(6) Escaped corrosive fluids or gases shall not damage surrounding structure or any adjacent systems, equipment, electrical wiring, or the airplane in such a way as to cause a major or more severe condition.
(7) The maximum amount of heat resulting from a short circuit of the battery or internal cell, or any other failure, shall not have a hazardous effect on the aircraft structure or essential systems.
(8) Rechargeable lithium battery installations must have a system to automatically control the charging rate of the battery to prevent battery overheating and overcharging and either:
   i. A battery temperature sensing and over temperature warning system with a means for automatically disconnecting the battery from its charging source in the event of an over temperature condition, OR
   ii. A battery failure sensing and warning system with a means for automatically disconnecting the battery from its charging source in the event of a battery failure.
(9) Any rechargeable lithium battery installation, the function of which is required for safe operation of the aircraft, must incorporate a monitoring and warning feature that will provide an indication to the appropriate flight crew members whenever the safe of charge of the batteries has fallen below levels considered acceptable for dispatch of the aircraft.
(10) The instructions for Continued Airworthiness (ICA) required by §23.1529 must contain maintenance requirements to assure that the battery has been sufficiently charged at appropriate intervals specified by the battery manufacturer and the equipment manufacturer that contain the rechargeable lithium battery or rechargeable lithium battery system. The lithium rechargeable batteries and lithium rechargeable battery system must not degrade below a specified ampere-hour levels sufficient to power aircraft systems. The ICA must also contain procedures for the maintenance of replacement batteries to prevent the installation of batteries that have degraded charge retention ability or other damage due to prolonged storage at a low state of change. Replacement batteries must be of the same manufacturer and part number as approved by the FAA.
(11) To show compliance to the proposed special conditions herein, paragraphs (1) through (10):
   i. RTCA documents, "Minimum Operation Performance Standards for Rechargeable Lithium Battery Systems", DO-311A, may be used for non-commuter category airplane installations.
   ii. RTCA document, Certification Test Guidance for Small and Medium Rechargeable Lithium Batteries and Battery Systems, DO-347, may be used for commuter category airplane installations.