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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2017-0771; Product Identifier 2016-NM-212-AD; Amendment 39-19449; AD 2018-20-15]

RIN 2120-AA64

Airworthiness Directives; The Boeing Company Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are superseding Airworthiness Directive (AD) 2015-09-07, which applied to all The Boeing Company Model 787 airplanes. AD 2015-09-07 required a repetitive maintenance task for electrical power deactivation. This AD requires installing new software for the generator control unit (GCU). This AD also removes certain airplanes from the applicability. This AD was prompted by the determination that a Model 787 airplane that has been powered continuously for 248 days can lose all alternating current (AC) electrical power due to the GCUs simultaneously going into failsafe mode. We are issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective November 20, 2018.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of November 20, 2018.

The Director of the Federal Register approved the incorporation by reference of certain other publications listed in this AD as of May 1, 2015 (80 FR 24789, May 1, 2015).

ADDRESSES: For service information identified in this final rule, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; internet <https://www.myboeingfleet.com>. You may view this service information at the FAA, Transport Standards Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195. It is also available on the internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2017-0771.

Examining the AD Docket

You may examine the AD docket on the internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2017-0771; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, the regulatory evaluation, any comments received, and other information. The address for Docket Operations (phone: 800-647-5527) is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Joe Salameh, Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3536; email: joe.salameh@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to supersede AD 2015-09-07, Amendment 39-18153 (80 FR 24789, May 1, 2015) (“AD 2015-09-07”). AD 2015-09-07 applied to all The Boeing Company Model 787 airplanes. The NPRM published in the Federal Register on August 15, 2017 (82 FR 38629). The NPRM was prompted by the determination that a Model 787 airplane that has been powered continuously for 248 days can lose all AC electrical power due to the GCUs simultaneously going into failsafe mode. This condition is caused by a software counter internal to the GCUs that will overflow after 248 days of continuous power. The NPRM proposed to require installing the new GCU software developed to address the software counter overflow anomaly. The NPRM also proposed to remove certain airplanes from the applicability. We are issuing this AD to address loss of all AC electrical power, which could result in loss of control of the airplane.

Comments

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the NPRM and the FAA's response to each comment.

Support for the NPRM

The Air Line Pilots Association, International (ALPA) and American Airlines indicated their support for the NPRM.

Request To Update Number of Affected Airplanes

Boeing requested that we update the Costs of Compliance section of the proposed AD to state that “55 airplanes of U.S. registry” are affected. Boeing noted that its records show 55 N-registered airplanes, not 47 as stated in the proposed AD.

We agree with the commenter's request for the reason provided. We have updated the Costs of Compliance section of this AD accordingly.

Request To Revise Warranty Information in Costs of Compliance Section

Boeing requested that we revise the Costs of Compliance section of the proposed AD to state that warranty remedies are not available for Boeing Service Bulletin B787-81205-SB240063-00, Issue

002, dated June 7, 2016. Boeing noted that Boeing Service Bulletin B787-81205-SB240063-00, Issue 002, dated June 7, 2016, states “Boeing warranty remedies are not available for the configuration changes set forth in this service bulletin. Notwithstanding, Boeing will provide the supplier software referenced in this service bulletin at no charge. This offer will expire eight years from the original issue date of this service bulletin.”

We acknowledge the commenter's request and agree to clarify. The warranty information in the Costs of Compliance section of this AD is meant to be informational, and is included when the manufacturer's service information states warranty coverage may be available. We do not control warranty coverage and operators must work with the manufacturer to determine if they are eligible for a warranty. We have revised the warranty information in the Costs of Compliance section of this AD to note that some of the software costs may be covered under warranty.

Request To Clarify Requirements Related to Software Installation

Boeing requested that we clarify or confirm that requiring operators to concurrently install new software as specified in paragraph (i) of the proposed AD will not require operators to request alternative methods of compliance (AMOCs) for installing later-approved software revisions in accordance with future service bulletins. Boeing noted that Boeing Service Bulletin B787-81205-SB420006-00 includes instructions to install several software part numbers that will bring airplanes up to common interface control document (ICD) 9.3 configuration, which is not a safety-related project. Boeing further noted that several other service bulletins call out common ICD 9.3 as a concurrent requirement.

Based on the commenter's request, we have changed paragraphs (h), (i)(1)(i), (i)(1)(ii), and (i)(2) of this AD to allow operators to install later-approved software versions, provided those later-approved versions meet certain conditions. Therefore, operators will not be required to obtain AMOCs to install newer versions of the software required by paragraph (i) of this AD. Similarly, operators will not be required to obtain AMOCs to install newer versions of the software required by paragraph (h) of this AD.

Request To Provide Additional Credit

Boeing and United Airlines (UAL) requested that we provide credit for certain actions done in accordance with Issue 002 of Boeing Service Bulletin B787-81205-SB420006-00. Boeing also requested that we provide credit for certain actions done in accordance with Issue 001 of Boeing Service Bulletin B787-81205-SB420006-00. UAL noted that it had accomplished Boeing Service Bulletin B787-81205-SB420006-00, Issue 002, dated February 13, 2015, on its fleet. UAL added that Boeing Service Bulletin B787-81205-SB420006-00, Issue 003, dated October 15, 2015, was issued to correct software part numbers for certain groups of airplanes, and none of those airplanes are in its fleet. Boeing noted that Issue 002 and Issue 003 of Boeing Service Bulletin B787-81205-SB420006-00 were issued to provide clarification and to provide additional required work for a limited group of airplanes. Boeing suggested that we revise paragraph (j) of the proposed AD to provide credit for the earlier service bulletin revisions for certain airplanes and provide credit for the earlier revisions for certain other airplanes provided that additional work is done on those airplanes.

We agree with the commenters' requests for the reasons provided. We have changed paragraphs (j)(1) and (j)(2) of this AD and added paragraph (j)(3) to this AD to provide credit for actions required by paragraphs (i)(1)(ii) and (i)(2) of this AD for certain airplanes.

Conclusion

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the changes described previously, and minor editorial changes. We have determined that these minor changes:

- Are consistent with the intent that was proposed in the NPRM for addressing the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM.

We also determined that these changes will not increase the economic burden on any operator or increase the scope of this AD.

Related Service Information Under 1 CFR Part 51

We reviewed the following service information.

- Boeing Service Bulletin B787-81205-SB240063-00, Issue 002, dated June 7, 2016, which describes procedures for installing operational program software (OPS) into each of the six GCUs and doing a software check. This service information specifies to concurrently accomplish the following two service bulletins.
- Boeing Service Bulletin B787-81205-SB280018-00, Issue 001, dated April 17, 2014, which describes procedures for installing fuel quantity management program software and doing a software check.
- Boeing Service Bulletin B787-81205-SB420006-00, Issue 003, dated October 15, 2015, which describes procedures for installing common interface control document 9.3 software and doing a software check.
- Boeing Multi Operator Message MOM-MOM-15-0248-01B, dated April 19, 2015; and Boeing Multi Operator Message MOM-MOM-15-0248-01B(R1), dated April 20, 2015. This service information describes procedures for electrical power deactivation of Model 787 airplanes. These documents are distinct due to editorial revisions.

This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section.

Costs of Compliance

We estimate that this AD affects 55 airplanes of U.S. registry. We estimate the following costs to comply with this AD:

Estimated Costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Electrical power deactivation (actions retained from AD 2015-09-07)	1 work-hour × \$85 per hour = \$85 per deactivation cycle	\$0	\$85 per deactivation cycle	\$4,675 per deactivation cycle.
Software installation (new required action)	5 work-hours × \$85 per hour = 425	0	\$425	\$23,375.

Estimated Costs for Concurrent Actions

Action	Labor cost	Parts cost	Cost on U.S. operators
Install fuel quantity management program software	1 work-hour × \$85 per hour = \$85		¹ Up to \$4,675.
Install common interface control document 9.3 software	Up to 15 work-hours × \$85 per hour = \$1,275		¹ Up to \$70,125.

¹ We have received no definitive data that would enable us to provide parts cost estimates for the concurrent actions specified in this AD.

According to the manufacturer, some of the software costs of this AD may be covered under warranty, thereby reducing the cost impact on affected individuals. We do not control warranty coverage for affected individuals. As a result, we have included all available costs in our cost estimate.

Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

This AD is issued in accordance with authority delegated by the Executive Director, Aircraft Certification Service, as authorized by FAA Order 8000.51C. In accordance with that order, issuance of ADs is normally a function of the Compliance and Airworthiness Division, but during this transition period, the Executive Director has delegated the authority to issue ADs applicable to transport category airplanes and associated appliances to the Director of the System Oversight Division.

Regulatory Findings

We have determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a "significant regulatory action" under Executive Order 12866,
- (2) Is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39—AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by removing Airworthiness Directive (AD) 2015-09-07, Amendment 39-18153 (80 FR 24789, May 1, 2015), and adding the following new AD:



FAA
Aviation Safety

AIRWORTHINESS DIRECTIVE

www.faa.gov/aircraft/safety/alerts/
www.gpoaccess.gov/fr/advanced.html

2018-20-15 The Boeing Company: Amendment 39-19449; Docket No. FAA-2017-0771; Product Identifier 2016-NM-212-AD.

(a) Effective Date

This AD is effective November 20, 2018.

(b) Affected ADs

This AD replaces AD 2015-09-07, Amendment 39-18153 (80 FR 24789, May 1, 2015) (“AD 2015-09-07”).

(c) Applicability

This AD applies to The Boeing Company Model 787-8 and 787-9 airplanes, certificated in any category, as identified in Boeing Service Bulletin B787-81205-SB240063-00, Issue 002, dated June 7, 2016.

(d) Subject

Air Transport Association (ATA) of America Code 24, Electrical power.

(e) Unsafe Condition

This AD was prompted by the determination that a Model 787 airplane that has been powered continuously for 248 days can lose all alternating current (AC) electrical power due to the generator control units (GCUs) simultaneously going into failsafe mode. This condition is caused by a software counter internal to the GCUs that will overflow after 248 days of continuous power. We are issuing this AD to address loss of all AC electrical power, which could result in loss of control of the airplane.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Retained Repetitive Maintenance Task: Electrical Power Deactivation With a New Reference to Terminating Action

This paragraph restates the actions required by paragraph (g) of AD 2015-09-07, with a new reference to terminating action. At the latest of the times specified in paragraphs (g)(1), (g)(2), and (g)(3) of this AD, accomplish electrical power deactivation on the airplane, in accordance with step 2) in “DESIRED ACTION” of Boeing Multi Operator Message MOM-MOM-15-0248-01B, dated April 19, 2015; or Boeing Multi Operator Message MOM-MOM-15-0248-01B(R1), dated April 20, 2015. The main and auxiliary power unit (APU) batteries do not need to be disconnected when

performing the electrical power deactivation. Repeat the electrical power deactivation thereafter at intervals not to exceed 120 days until the software installation required by paragraph (h) of this AD is done.

(1) Within 120 days after the last electrical power deactivation in accordance with step 2) in “DESIRED ACTION” of Boeing Multi Operator Message MOM-MOM-15-0248-01B, dated April 19, 2015; or Boeing Multi Operator Message MOM-MOM-15-0248-01B(R1), dated April 20, 2015.

(2) Within 120 days after the date of issuance of the original certificate of airworthiness or the date of issuance of the original export certificate of airworthiness.

(3) Within 7 days after May 1, 2015 (the effective date of AD 2015-09-07).

(h) New Requirement of This AD: Software Installation

Within 12 months after the effective date of this AD: Install new operational program software (OPS), or later-approved version, into each of the six GCUs, do a software check, and do all applicable corrective actions before further flight, in accordance with the Accomplishment Instructions of Boeing Service Bulletin B787-81205-SB240063-00, Issue 002, dated June 7, 2016. Later-approved versions of the software are only those Boeing software versions that are approved as a replacement for the applicable software, and are approved as part of the type design by the FAA or the Boeing Commercial Airplanes Organization Designation Authorization (ODA) after issuance of Boeing Service Bulletin B787-81205-SB240063-00, Issue 002, dated June 7, 2016. If any software check fails, before further flight, do corrective actions, repeat the check, and do applicable corrective actions until the software passes the check. Accomplishment of the actions required by this paragraph on all six GCUs on an airplane terminates the requirements of paragraph (g) of this AD for that airplane.

(i) New Requirement of This AD: Concurrent Actions

(1) For Group 1 airplanes as identified in Boeing Service Bulletin B787-81205-SB240063-00, Issue 002, dated June 7, 2016: Prior to or concurrently with accomplishing the actions required by paragraph (h) of this AD, do the actions specified in paragraph (i)(1)(i) and (i)(1)(ii) of this AD.

(i) Install new fuel quantity management program software, or later-approved version, and do a software check, in accordance with the Accomplishment Instructions of Boeing Service Bulletin B787-81205-SB280018-00, Issue 001, dated April 17, 2014. Later-approved versions of the software are only those Boeing software versions that are approved as a replacement for the applicable software, and are approved as part of the type design by the FAA or the Boeing Commercial Airplanes ODA after issuance of Boeing Service Bulletin B787-81205-SB280018-00, Issue 001, dated April 17, 2014. If any software check fails, before further flight, do corrective actions, repeat the check, and do applicable corrective actions until the software passes the check.

(ii) Install new common interface control document 9.3 software, or later-approved version, and do software checks, in accordance with the Accomplishment Instructions of Boeing Service Bulletin B787-81205-SB420006-00, Issue 003, dated October 15, 2015. Later-approved versions of the software are only those Boeing software versions that are approved as a replacement for the applicable software, and are approved as part of the type design by the FAA or the Boeing Commercial Airplanes ODA after issuance of Boeing Service Bulletin B787-81205-SB420006-00, Issue 003, dated October 15, 2015. If any software check fails, before further flight, do corrective actions, repeat the check, and do applicable corrective actions until the software passes the check.

(2) For Group 2 airplanes as identified in Boeing Service Bulletin B787-81205-SB240063-00, Issue 002, dated June 7, 2016: Prior to or concurrently with accomplishing the actions required by paragraph (h) of this AD, install new common interface control document 9.3 software, or later-approved version, and do software checks, in accordance with the Accomplishment Instructions of Boeing Service Bulletin B787-81205-SB420006-00, Issue 003, dated October 15, 2015. Later-approved versions of the software are only those Boeing software versions that are approved as a

replacement for the applicable software, and are approved as part of the type design by the FAA or the Boeing Commercial Airplanes ODA after issuance of Boeing Service Bulletin B787-81205-SB420006-00, Issue 003, dated October 15, 2015. If any software check fails, before further flight, do corrective actions, repeat the check, and do applicable corrective actions until the software passes the check.

(j) Credit for Previous Actions

(1) This paragraph provides credit for the actions specified in paragraph (h) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin B787-81205-SB240063-00, Issue 001, dated December 22, 2015.

(2) This paragraph provides credit for the actions specified in paragraph (i)(1)(ii) and (i)(2) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin B787-81205-SB420006-00, Issue 001, dated January 22, 2015, provided that the applicable actions specified in Table 13 and Table 14, as applicable, of paragraph 4, "Description," of Boeing Service Bulletin B787-81205-SB420006-00, Issue 003, dated October 15, 2015, are done within 12 months after the effective date of this AD.

(3) This paragraph provides credit for the actions specified in paragraph (i)(1)(ii) and (i)(2) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin B787-81205-SB420006-00, Issue 002, dated February 13, 2015, provided that the applicable actions specified in Table 14 of paragraph 4, "Description," of Boeing Service Bulletin B787-81205-SB420006-00, Issue 003, dated October 15, 2015, are done within 12 months after the effective date of this AD.

(k) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Seattle ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (l)(1) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(3) An AMOC that provides an acceptable level of safety may be used for any repair, modification, or alteration required by this AD if it is approved by the Boeing Commercial Airplanes ODA that has been authorized by the Manager, Seattle ACO Branch, to make those findings. To be approved, the repair method, modification deviation, or alteration deviation must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

(4) AMOCs approved previously for AD 2015-09-07 are approved as AMOCs for the corresponding provisions of paragraph (g) of this AD.

(5) For service information that contains steps that are labeled as Required for Compliance (RC), the provisions of paragraphs (k)(5)(i) and (k)(5)(ii) of this AD apply.

(i) The steps labeled as RC, including substeps under an RC step and any figures identified in an RC step, must be done to comply with the AD. If a step or substep is labeled "RC Exempt," then the RC requirement is removed from that step or substep. An AMOC is required for any deviations to RC steps, including substeps and identified figures.

(ii) Steps not labeled as RC may be deviated from using accepted methods in accordance with the operator's maintenance or inspection program without obtaining approval of an AMOC, provided the RC steps, including substeps and identified figures, can still be done as specified, and the airplane can be put back in an airworthy condition.

(l) Related Information

(1) For more information about this AD, contact Joe Salameh, Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3536; email: joe.salameh@faa.gov.

(2) Service information identified in this AD that is not incorporated by reference is available at the addresses specified in paragraphs (m)(5) and (m)(6) of this AD.

(m) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(3) The following service information was approved for IBR on November 20, 2018.

(i) Boeing Service Bulletin B787-81205-SB240063-00, Issue 002, dated June 7, 2016.

(ii) Boeing Service Bulletin B787-81205-SB280018-00, Issue 001, dated April 17, 2014.

(iii) Boeing Service Bulletin B787-81205-SB420006-00, Issue 003, dated October 15, 2015.

(4) The following service information was approved for IBR on May 1, 2015 (84 FR 24789, May 1, 2015).

(i) Boeing Multi Operator Message MOM-MOM-15-0248-01B, dated April 19, 2015. The date appears only on the first page of this document.

(ii) Boeing Multi Operator Message MOM-MOM-15-0248-01B(R1), dated April 20, 2015. The date appears only on the first page of this document.

(5) For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; internet <https://www.myboeingfleet.com>.

(6) You may view this service information at the FAA, Transport Standards Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195.

(7) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued in Des Moines, Washington, on September 25, 2018.

John P. Piccola,
Acting Director, System Oversight Division,
Aircraft Certification Service.