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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2025-3998; Project Identifier AD-2025-00432-E; Amendment 39-23500; AD 2026-21-11]

RIN 2120-AA64

Airworthiness Directives; General Electric Company Engines

AGENCY:

Federal Aviation Administration (FAA), DOT.

ACTION:

Final rule.

SUMMARY:

The FAA is adopting a new airworthiness directive (AD) for certain General Electric Company (GE) Model CF34-8C1, CF34-8C5, CF34-8C5A1, CF34-8C5A2, CF34-8C5B1, CF34-8E2, CF34-8E2A1, CF34-8E5, CF34-8E5A1, CF34-8E5A2, CF34-8E5A2HA, CF34-8E6, and CF34-8E6A1 engines. This AD was prompted by reports of in-flight "Engine Degraded" messages from the engine indicating and crew alerting system (EICAS) due to corrosion of the variable geometry (VG) system actuator. This AD requires removing certain electronic engine control (EEC) full authority digital electronic control (FADEC) software versions from service and installing an updated EEC FADEC software that is eligible for installation. The FAA is issuing this AD to address the unsafe condition on these products.

DATES:

This AD is effective November 27, 2026.

ADDRESSES:

AD Docket: You may examine the AD docket at *regulations.gov* under Docket No. FAA-2025-3998; 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, any comments received, and other information. The address for Docket Operations 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:

Daiyun Fang, Aviation Safety Engineer, FAA, 2200 South 216th Street, Des Moines, WA 98198; phone: (206) 910-0063; email: *daiyun.fang@faa.gov*.

SUPPLEMENTARY INFORMATION:

Background

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to certain GE Model CF34-8C1, CF34-8C5, CF34-8C5A1, CF34-8C5A2, CF34-8C5B1, CF34-8E2, CF34-8E2A1, CF34-8E5, CF34-8E5A1, CF34-8E5A2, CF34-8E5A2HA, CF34-8E6, and CF34-8E6A1 engines. The NPRM was published in the **Federal Register** on November 18, 2025 (90 FR 51590). The NPRM was prompted by three separate events involving airplanes with Model GE CF34-8C5 engines installed in which "Engine Degraded" messages were received from the EICAS during flight. A subsequent investigation by the manufacturer revealed that these engines had been operated infrequently over the two-year period prior to these events and stored in close proximity to a saltwater coastline. The investigation further revealed the VG actuation lever arms were stuck due to corrosion between the high-pressure compressor case and vane bushings, which increased the VG actuation loads and slowed the VG response. As a result of this increase, the VG command and actual positions exceeded acceptable disagreement parameters, triggering an EICAS "Engine Degraded" message. In response to the "Engine Degraded" message, the manufacturer and FAA determined that certain versions of the EEC FADEC software installed on GE Model CF34-8E and CF34-8C engines can potentially reduce the engine to idle and lock the throttle until the engine is shut down and restarted. In the NPRM, the FAA proposed to require removal of certain EEC FADEC software versions from service and installation of updated EEC FADEC software that is eligible for installation. The FAA is issuing this AD to address the unsafe condition on these products.

Discussion of Final Airworthiness Directive

Comments

The FAA received comments from three commenters. The commenters were the Airline Pilots Association, International (ALPA), the Citizens Rulemaking Alliance, and Horizon Air. The following presents the comments received on the NPRM and the FAA's response to each comment.

Support for the NPRM

ALPA expressed support for the NPRM.

Request To Justify Forgoing Notice and Comment or Issue an NPRM

The Citizens Rulemaking Alliance requested that the FAA place a detailed analysis in the AD docket explaining why prior notice and comment were impracticable for each requirement and why the

selected compliance times necessitated immediate issuance. Alternatively, the commenter requested that the FAA either convert this action to an interim final rule limited to actions necessary to mitigate any immediate risk and simultaneously issue an NPRM to solicit comment for 30 to 60 days on non-emergency actions. The commenter asserted the FAA has not adequately justified use of the good cause exception to bypass notice and comment and the 30-day delayed effective date and must, at a minimum, provide an explanation why a brief comment period was impracticable.

The FAA notes the comment was submitted in response to an NPRM for which the FAA provided a 45-day comment period. This final rule is effective 35 days after its publication in the **Federal Register** . Therefore, the FAA did not change this AD as a result of this comment.

Request To Comply With the Paperwork Reduction Act (PRA)

The Citizens Rulemaking Alliance requested that the FAA clarify whether the proposed AD requires reporting. If reporting is required, the commenter requested that the FAA revise the proposed AD to comply with the PRA or suspend the reporting requirement until PRA requirements are satisfied.

The FAA notes that this AD does not require reporting. If an AD were to require reporting, the preamble of the AD would include a paragraph titled “Paperwork Reduction Act” that would provide the applicable OMB control number, required PRA statements, and the estimated time to collect the required information (burden). Any costs associated with the reporting requirement would be included in the Costs of Compliance section in the preamble of the AD. Therefore, the FAA did not change this AD as a result of this comment.

Request To Make Incorporation by Reference (IBR) Materials Reasonably Available

The Citizens Rulemaking Alliance stated that the FAA's current practices for IBR frequently fail to meet the legal and regulatory standards for reasonable availability. The commenter called on the FAA to guarantee that all IBR materials are easily and freely accessible to the public and affected parties for both commenting and compliance purposes. The commenter requested that the IBR materials be identified in the proposed AD along with a detailed summary and a statement confirming the reasonable availability of the materials. Further, the commenter requested that the required IBR materials be placed in the AD docket or that the FAA ensure free online access for the duration of the comment period and applicability of the AD.

The FAA notes that this AD does not incorporate by reference any material. All required actions and compliance times are contained within the regulatory text of this AD. Additionally, paragraph (j) of this AD specifies that there is no IBR material in this AD. Therefore, the FAA did not change this AD as a result of this comment.

Request To Provide Additional Cost Information

The Citizens Rulemaking Alliance requested that the FAA clarify its cost estimate for determining the proposed AD is not significant under Executive Order 12866. The commenter stated the FAA should publish the number of affected U.S. products and costs per product (labor rate, labor hours, parts, downtime, and number of affected engines/aircraft). The commenter requested that any safety benefit

quantification or break-even analysis that might have been performed along with the other cost information be placed in the AD docket and comments invited.

In the Costs of Compliance section of the proposed AD, the FAA disclosed the number of affected engines installed on airplanes on the U.S. registry, estimated number of work hours and parts cost provided by the manufacturer, and the aggregate costs. Additionally, the FAA considered the impact that this AD will have on affected operators and determined this AD will not trigger any downtime costs because the requirements of this AD can be performed during regularly scheduled maintenance. Since the FAA has assessed and disclosed the total known costs of the AD requirements in the Costs of Compliance section of the NPRM, and the commenter did not provide additional cost data for the FAA to consider in its cost analysis, it is not necessary to provide additional information in the AD docket. Based upon the analysis provided throughout the proposed AD and in the previous comment response, the FAA certifies that this AD is not a "significant regulatory action" under Executive Order 12866. Therefore, the FAA did not change this AD as a result of this comment.

Request To Consider Impact on Small Entities

The Citizens Rulemaking Alliance requested that the FAA either provide the factual basis for its Regulatory Flexibility Act (RFA) certification that the AD will not have a significant economic impact on a substantial number of small entities or prepare a detailed initial regulatory flexibility analysis that quantifies direct and indirect costs (including parts and downtime) and assesses significant alternatives (longer compliance times for low-utilization small operators, tiered inspection intervals, on-condition monitoring, streamlined alternative method of compliance pathways) for small entities.

The FAA has considered the AD's impact on small businesses and provides the following factual basis for its RFA certification.

Final Regulatory Flexibility Analysis

The Regulatory Flexibility Act of 1980, Public Law 96-354, 94 Stat. 1164 (5 U.S.C. 601-612), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (Pub. L. 104-121, 110 Stat. 857, Mar. 29, 1996) and the Small Business Jobs Act of 2010 (Pub. L. 111-240, 124 Stat. 2504, Sept. 27, 2010), requires Federal agencies to consider the effects of the regulatory action on small business and other small entities and to minimize any significant economic impact. The term "small entities" comprises small businesses and not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000.

Small Entities to Which This AD Applies

The FAA used the definition of small entities in the RFA for this analysis. The RFA defines small entities as small businesses, small governmental jurisdictions, or small organizations. In 5 U.S.C. 601(3), the RFA defines "small business" to have the same meaning as "small business concern" under section 3 of the Small Business Act. The Small Business Act authorizes the Small Business Administration (SBA) to define "small business" by issuing regulations.

The SBA has established size standards for various types of economic activities, or industries, under the North American Industry Classification System (NAICS). These size standards generally define

small businesses based on the number of employees or annual receipts. The following table provides the SBA size standards for all industries with at least one entity impacted by this AD.[1] Note that the SBA definition of a small business applies to the parent company and all affiliates as a single entity.

Description of Small Entity Standards

NAICS code	Description	Size standard
325180	Other Basic Inorganic Chemical Manufacturing	1,000 employees.
336411	Aircraft Manufacturing	1,500 employees.
481111	Scheduled Passenger Air Transportation	1,500 employees.
481219	Other Nonscheduled Air Transportation	$22,000,000.
488119	Other Airport Operations	$35,000,000.
532490	Other Commercial and Industrial Machinery and Equipment Rental and Leasing	$35,000,000.
551112	Offices of Other Holding Companies	$40,000,000.
711211	Sports Teams and Clubs	$41,500,000.
713940	Fitness and Recreational Sports Centers	$15,500,000.

To identify small entities, the FAA first identified the primary NAICS of the entity or parent company, and then used data from different sources (*e.g.,* company annual reports, Bureau of Transportation Statistics) to determine whether the entity meets the applicable size standard. The FAA provides the estimated number of small entities affected by this AD:

Number and Percent of Entities That Are Small 1

NAICS code	Category	Number of entities	Affected engines	Number of small entities	Percent of small entities	Engines for small entities
325180	Other Basic Inorganic Chemical Manufacturing	1	4	1	100	4

1 Entities whose NAICS code was not identified as well as entities that are not considered "small" under the RFA are not included in this table.

NAICS code	Category	Number of entities	Affected engines	Number of small entities	Percent of small entities	Engines for small entities
336411	Aircraft Manufacturing	2	8	0	0	0
481111	Scheduled Passenger Air Transportation	10	3,270	2	20	132
481219	Other Nonscheduled Air Transportation	1	2	1	100	2
488119	Other Airport Operations	1	4	1	100	4
532490	Other Commercial and Industrial Machinery and Equipment Rental and Leasing	1	34	0	0	0
551112	Offices of Other Holding Companies	1	20	0	0	0
711211	Sports Teams and Clubs	1	4	1	100	4
713940	Fitness and Recreational Sports Centers	1	8	0	0	0

1 Entities whose NAICS code was not identified as well as entities that are not considered "small" under the RFA are not included in this table.

Projected Reporting, Recordkeeping, and Other Compliance Requirements

As described in the Cost of Compliance section of this final rule, it will cost $1,340 to remove and install affected versions of software with updated versions for each affected engine. For the purpose of this analysis, each aircraft is assumed to have two engines, bringing the cost per aircraft to $2,680 to remove and install the software. This is described here as the "low case". In addition, 70 engines will require a memory upgrade, which costs $49,680, in addition to the $1,340 to remove and install software, for a total of $51,020. This is described as the "high case". The costs faced by each entity are given in the following table. Three of the six identified small entities face impacts greater than 2 percent of their annual revenues.

Impacts on Small Entities

NAICS code	NAICS description	Average revenues	Low case		High case	
			Average cost	Percent of revenue 1	Average cost	Percent of revenue 1
325180	Other Basic Inorganic Chemical Manufacturing	$6,780,000	$5,360	0.08	$104,720	1.54
481111	Scheduled Passenger Air Transportation	42,005,000	88,440	0.17	1,727,880	3.30
481219	Other Nonscheduled Air Transportation	348,870	2,680	0.77	52,360	15.01
488119	Other Airport Operations	3,900,000	5,360	0.14	104,720	2.69
711211	Sports Teams and Clubs	21,270,000	5,360	0.03	104,720	0.49

1 Value obtained by, for each NAICS Code, dividing each firm's cost by that firm's annual revenue, and averaging the result. This estimate is more precise than dividing the average cost among all entities by the average revenue of all entities within a NAICS Code.

Significant Alternatives Considered

The FAA evaluated the alternative of not promulgating this AD but ultimately deemed that this alternative would create a significant safety hazard. This AD was prompted by reports of in-flight “Engine Degraded” messages from the EICAS due to corrosion of the VG system actuator. This AD requires removing certain EEC FADEC software versions from service and installing updated EEC FADEC software that is eligible for installation. The FAA is issuing this AD to address the unsafe condition on these products.

Request To Include Service Material

Horizon Air requested that the FAA revise paragraph (j) of the proposed AD to include reference to GE CF34-8E Service Bulletin (SB) 73-0044, dated July 4, 2025 (GE SB 73-0044, dated July 4, 2025), to provide additional guidance for updating the EEC FADEC software. Horizon Air stated that previously published FAA ADs requiring EEC FADEC software updates included reference to the manufacturer's service bulletin that contains accomplishment instructions for the replacement of the FADEC software version with a version eligible for installation. Horizon Air also noted that GE SB 73-0044, dated July 4, 2025, contains a statement from GE authorizing the FAA to incorporate the document by reference in an AD.

The FAA disagrees with the request to add guidance documentation to paragraph (j) of this AD because the instructions provided in GE SB 73-0044, dated July 4, 2025, are not required to comply with this AD. The FAA did not change this AD as a result of this comment.

Conclusion

The FAA reviewed the relevant data, considered any comments received, and determined that air safety requires adopting this AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, replacement of the RFA certification with a final regulatory flexibility analysis, and a change in the Costs of Compliance section (from 3,040 engines to 3,364 engines and corresponding cost changes), this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

Costs of Compliance

The FAA estimates that this AD affects 3,364 engines installed on airplanes of U.S. registry. The FAA estimates that 70 of these affected engines will also require an additional memory upgrade of the EEC FADEC software from a three memory sector configuration to a seven memory sector configuration.

Estimated Costs

Action	Labor cost 1	Parts cost	Cost per product	Cost on U.S. operators
Remove and install EEC FADEC software	8 work-hours × $85 per hour = $680	$660	$1,340	$4,507,760
Upgrade EEC FADEC software to seven sectors (70 engines)	8 work-hours × $85 per hour = $680	49,000	49,680	3,477,600

1 The FAA estimated operators will incur $85 in costs per labor hour, which is the weighted average fiscal year (FY) 2026 fully loaded wage of an aircraft mechanic ($69.85) working 60 percent of the labor hours and a general and operations manager ($108.15) working 40 percent of the labor hours. The FAA estimated these wages by taking the average of the FY 2024 Bureau of Labor Statistics (BLS) air transportation industry average wage for aircraft mechanics and general and operations managers (See: Occupational Employment and Wage Statistics Query System, BLS (May 2024), data.bls.gov/oes/); multiplying each wage by a fringe benefit factor of 1.42 (See: Employer Cost for Employee Compensation—December 2024, BLS (2024), bls.gov/news.release/archives/ecec_03142025.pdf); and adjusting these 2024 wages to 2026 dollars using an implicit Gross Domestic Product (GDP) Price Deflator of 2.8 percent (See: Gross Domestic Product: Implicit Price Deflator, FRED (2026) fred.stlouisfed.org/series/GDPDEF).

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.

The FAA is 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.

Regulatory Findings

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, and

(2) Will not affect intrastate aviation in Alaska.

List of Subjects in 14 CFR Part 39

- Air transportation
- Aircraft
- Aviation safety
- Incorporation by reference
- Safety

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 adding the following new airworthiness directive:

2026-21-11 General Electric Company: Amendment 39-23500; Docket No. FAA-2025-3998; Project Identifier AD-2025-00432-E.

(a) Effective Date

This airworthiness directive (AD) is effective November 27, 2026.

(b) Affected ADs

None.

(c) Applicability

This AD applies to the General Electric Company (GE) Model engines identified in paragraphs (c)(1) and (2) of this AD.

(1) CF34-8C1, CF34-8C5, CF34-8C5A1, CF34-8C5A2, and CF34-8C5B1 engines with an electronic engine control (EEC) full authority digital electronic control (FADEC) part number (P/N) 4120T00P29, 4120T00P30, 4120T00P37, 4120T00P38, 4120T00P45, 4120T00P46, 4120T00P53, 4120T00P54, 4120T00P57, or 4120T00P58 installed.

(2) CF34-8E2, CF34-8E2A1, CF34-8E5, CF34-8E5A1, CF34-8E5A2, CF34-8E5A2HA, CF34-8E6, and CF34-8E6A1 engines with an EEC FADEC P/N 4120T00P42 (VIN 111E9320G43), P/N 4120T00P44 (VIN 111E9320G45), P/N 4120T00P48 (VIN 111E9320G49), P/N 4120T00P50 (VIN 111E9320G51), or P/N 4120T00P60 (VIN 111E9320G61) installed.

(d) Subject

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section.

(e) Unsafe Condition

This AD was prompted by an “Engine Degraded” message received in-flight from the engine indicating and crew alerting system, due to corrosion of the variable geometry system actuator. The FAA is issuing this AD to prevent EEC FADEC software from automatically locking the engine at idle until it is restarted. The unsafe condition, if not addressed, could result in failure of one or more engines, loss of engine thrust control, and consequent reduced control of the airplane.

(f) Compliance

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

(g) Definitions

For the purpose of this AD:

(1) “Group 1 engines” are GE Model CF34-8C1, CF34-8C5, CF34-8C5A1, CF34-8C5A2, and CF34-8C5B1 engines.

(2) “Group 2 engines” are GE Model CF34-8E2, CF34-8E2A1, CF34-8E5, CF34-8E5A1, CF34-8E5A2, CF34-8E5A2HA, CF34-8E6, and CF34-8E6A1 engines.

(3) An “EEC FADEC software version that is eligible for installation” on Group 1 engines is any software version that is V6.60 or later approved version.

(4) An “EEC FADEC software version that is eligible for installation” on Group 2 engines is any

software version that is V5.70 or later approved version.

(h) Required Actions

(1) For Group 1 engines, within 12 months after the effective date of this AD, replace any EEC FADEC software version that is V6.50 or earlier with an EEC FADEC software version that is eligible for installation.

(2) For Group 2 engines, within 12 months after the effective date of this AD, replace any EEC FADEC software version that is V5.60 or earlier with an EEC FADEC software version that is eligible for installation.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, AIR-520, Continued Operational Safety 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 AIR-520, Continued Operational Safety Branch, send it to the attention of the person identified in paragraph (j) of this AD and email to: *AMOC@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.

(j) Additional Information

For more information about this AD, contact Daiyun Fang, Aviation Safety Engineer, FAA, 2200 South 216th Street, Des Moines, WA 98198; phone: (206) 910-0063; email: *daiyun.fang@faa.gov*.

(k) Material Incorporated by Reference

None.

Issued on October 19, 2026.

Brian Knaup,

Acting Deputy Director, Integrated Certificate Management Division, Aircraft Certification Service.

Footnotes

1. FAA was unable to obtain data to identify the NAICS code of four entities.

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