



Notification of a Proposal to issue an Airworthiness Directive

PAD No.: 20-184

Issued: 24 November 2020

Note: This Proposed Airworthiness Directive (PAD) is issued by EASA, acting in accordance with Regulation (EU) 2018/1139 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 129 of that Regulation.

In accordance with the EASA Continuing Airworthiness Procedures, the Executive Director is proposing the issuance of an EASA Airworthiness Directive (AD), applicable to the aeronautical product(s) identified below.

All interested persons may send their comments, referencing the PAD Number above, to the e-mail address specified in the 'Remarks' section, prior to the consultation date indicated.

Design Approval Holder's Name:	Type/Model designation(s):
THE BOEING COMPANY	737-8 and 737-9 aeroplanes

Effective Date: [TBD - planned: same date as AD issue date]

TCDS Number(s): EASA.IM.A.120

Foreign AD: Federal Aviation Administration (FAA) [AD 2020-24-02](#) dated 20 November 2020, which is not adopted by EASA.

Supersedure: This PAD proposes to supersede EASA AD 2019-0051R1 dated 25 March 2019.

ATA 22 – Auto Flight – Flight Control Computer Software – Installation / Test

ATA 27 – Flight Controls – Horizontal Stabilizer Trim Wire Bundle Routing – Modification / Stall Warning System Stick Shaker Circuit Breaker Buttons (Coloured Caps) – Installation

ATA 31 – Instruments – Operational Program Software – Updates

ATA 34 – Navigation – Angle of Attack Sensors – Test

– Airplane Flight Manual – Limitations / Operating Procedures – Amendment

– Master Minimum Equipment List – Amendment

– Operational Readiness Flight / Pilot Training / Flight Simulation Training Devices

Manufacturer(s):

The Boeing Company

Applicability:

Model 737-8 and 737-9 (commercially known as 'MAX') aeroplanes, all manufacturer serial numbers (MSN).



Definitions:

For the purpose of this AD, the following definitions apply:

Ferry flight: Any non-passenger, non-commercial flight conducted after the effective date of this AD, operating with a permit-to-fly issued under Annex I (Part 21) of Regulation (EU) 748/2012, and under flight conditions approved by EASA.

Affected FCC OPS: Flight Control Computer (FCC) Operational Program Software (OPS) P12.1.1, or earlier FCC OPS.

Affected MDS DPC OPS: MAX Display System (MDS) Display Processing Computer (DPC) OPS, Blockpoint (BP) 1.5, or earlier MDS DPC OPS.

Serviceable FCC OPS: FCC OPS P12.1.2, Part Number (P/N) 2274-COL-AC2-26, or later FCC OPS and corresponding P/N.

Serviceable MDS DPC OPS: MDS DPC OPS, BP 1.5.1, P/N COL49-0078-0006, or later MDS DPC OPS/BP and corresponding P/N.

The applicable SB: Boeing Alert Requirements Bulletin (RB) 737-22A1342 RB, for the FCC OPS P12.1.2 introduction; Service Bulletin (SB) 737-27-1320, for the stall warning system stick shaker circuit breakers button (coloured cap) installation; Special Attention SB 737-31-1860 (at any revision), for the MDS OPS update; Special Attention SB 737-27-1318 Revision 2, for the horizontal stabilizer trim wiring wire bundle routing modification; Special Attention SB 737-00-1028, for the angle-of-attack (AOA) sensor system test and operational readiness flight; as applicable.

Groups: Group 1 aeroplanes are those MSN identified by line number in Boeing Special Attention SB 737-31-1860 original issue, dated 12 June 2020. Refer to Boeing Document D6-19567 Part 3 for the line number and the corresponding MSN.

Group 2 aeroplanes are all other MSN.

Reason:

Prompted by two fatal accidents with Boeing 737-8 aeroplanes, EASA issued Emergency AD 2019-0051-E (later revised) to suspend all flight operations of the two affected models. EASA AD 2019-0051R1 allowed non-passenger, non-commercial ferry flights and defined the conditions for such ferry flights.

The results of safety investigations conducted by the authorities of the States where these events occurred, as well as EASA's own safety review, have confirmed that, with affected FCC OPS and MDS DPC OPS installed, a single erroneous high AOA sensor input to the FCC on an affected aeroplane during manual flight with flaps up may prompt the Manoeuvring Characteristics Augmentation System (MCAS) to input incremental nose down trim. In this scenario, the flight crew may be unable to respond appropriately by applying opposing nose-up stabilizer trim, returning the aeroplane to a trimmed state, and by actuating the stab trim cut-out switches.

This condition, if not corrected, could lead to a stabilizer position that cannot be fully countered with elevator input, possibly resulting in loss of control of the aeroplane.



Prompted by those findings, Boeing developed new OPS for FCC and MDS DPC and issued the applicable SB to provide instructions for OPS in-service installation. Boeing also updated the Airplane Flight Manual (AFM) to introduce new flight crew procedures and limitations, and the applicable flight crew training programme(s), introducing new training to ensure pilot understanding of the MCAS functions, the consequences of introducing the serviceable OPS, and the new 'Airspeed unreliable' procedure.

EASA conducted a comprehensive review of the measures proposed by Boeing, including flight testing, and considers that these measures adequately address the above described unsafe condition.

For the reasons described above, this PAD proposes to supersede EASA AD 2019-0051R1, cancelling the 'suspension of flight operations' requirements of that AD. The affected Boeing 737-8 and 737-9 aeroplanes can be returned to service, provided that the required actions proposed in this PAD have been accomplished. To achieve that, this PAD proposes to require that serviceable FCC OPS and serviceable MDS DPC OPS are installed, certain modifications are embodied, including wiring changes, a sensor test is accomplished, and buttons (coloured caps) are installed on the stall warning system's circuit breakers. This PAD also proposes to require certain changes to the AFM to introduce the new flight crew procedures and limitations, including a prohibition to perform Required Navigation Performance - Authorization Required (RNP AR) approaches, in order to eliminate the identified risk after single failure of an AOA sensor during some RNP AR approaches. This PAD also proposes to require amendment of the EASA-approved Boeing 737 MAX B-737-8/-9 Master Minimum Equipment List (MMEL) Supplement for certain items. Following all these actions, this PAD proposes the accomplishment of an operational readiness flight. Finally, this PAD proposes to prohibit (re)installation of affected FCC OPS and affected MDS DPC OPS, as defined in this PAD.

EASA participated in a Joint Operational Evaluation Board (JOEB) meeting convened by the FAA, also including Agência Nacional de Aviação Civil (ANAC) of Brazil and Transport Canada Civil Aviation (TCCA). This JOEB evaluated the procedural changes and the pilot training proposed by Boeing for the 737-8/-9 (MAX). The JOEB validated Boeing's proposed training changes, and Boeing embodied them in the Operational Suitability Data for Flight Crew (OSD FC) as part of the EASA Boeing 737 validated type certificate, together with other changes. In particular, and in addition to initial type rating training, differences training from the Boeing 737-600 through 737-900ER series (NG) to the MAX has been improved with the addition of training elements, including new training areas of special emphasis (TASE). In order to support the new training elements, changes which are necessary for Flight Simulation Training Devices (FSTD) are described in the form of dedicated Simulator Data Bulletins (SDB), issued by Boeing Simulator Support. In order to ensure safe operation of the MAX upon return to service, this PAD proposes to require that "return to service" (RTS) training, including ground and flight training in a suitable full flight simulator (FFS), is performed prior to pilots operating the MAX. The RTS training content is documented in a specific Appendix to the B737 OSD FC. Parts of the RTS training can also be done on a Boeing 737 NG FFS, being equivalent to the Boeing 737 MAX FFS for specific manoeuvres, as has been demonstrated during the JOEB process.

EASA has also issued Preliminary Safety Directive (PSD) 20-185, which intends to require holders of an EASA third country operator (TCO) authorisation to implement either all requirements of this EASA AD, or all requirements of FAA AD 2020-24-02, supplemented by the crew training



requirements specified in the FAA [Flight Standardization Board \(FSB\) Report for Boeing 737, Revision 17, Appendix 7 \(Boeing 737 MAX Special Training for Flight Crews\)](#) and the limitation on RNP AR approaches (see Figure 3 of Appendix 1 of this AD), to allow return to service (as related to their TCO authorised operations) of their Boeing 737-8 and 737-9 aeroplanes, when operated under an EASA TCO authorisation into, within or out of the territory to which the EU treaties apply.

Required Action(s) and Compliance Time(s):

Required as indicated, unless accomplished previously:

Installation/Test of FCC OPS:

- (1) For Group 1 aeroplanes: Before next flight after the effective date of this AD, install serviceable FCC OPS, as defined in this AD, and accomplish a software installation test in accordance with the instructions of the applicable SB. During the installation test, if the serviceable FCC OPS P/N is not shown as being installed on FCC A and FCC B (see Note 1 of this AD), before further flight, accomplish applicable corrective action(s) until the serviceable FCC OPS P/N is installed on FCC A and FCC B. Later-approved FCC OPS versions are only those Boeing software versions that are approved as a replacement for the affected FCC OPS, and are approved as part of the type design after the effective date of this AD.

Note 1: The flight control system for 737 MAX aeroplanes includes two FCC units (FCC A and FCC B) which process inputs from the pilots and aeroplane sensors to move the control surfaces. Guidance for doing the installation, and verify installation, of FCC OPS software can be found in the Boeing 737-7/8/8200/9/10 Aircraft Maintenance Manual (AMM), Section 22-11-33.

This paragraph corresponds to paragraph (g) of FAA AD 2020-24-02.

Stall Warning System Stick Shaker Circuit Breakers – Button (Coloured Cap) Installation:

- (2) For Group 1 and Group 2 aeroplanes: Before next flight after the effective date of this AD, install a button (coloured cap) on each stick shaker circuit breaker, on panels P6-1 and P18-2, in accordance with the instructions of the applicable SB.

This paragraph **does not correspond to any paragraph** of FAA AD 2020-24-02.

AFM Amendment(s):

- (3) For Group 1 aeroplanes: Before next flight after the effective date of this AD, amend the applicable AFM, Boeing Document D631A002-EASA, by including the changes as specified in Appendix 1 of this AD. This can be accomplished by inserting a copy of Figures 1 through 11 of Appendix 1 into the applicable AFM.

Revising the applicable AFM by introducing a later approved AFM revision is an acceptable method to comply with this requirement, provided it is determined that the changes as specified in Appendix 1 of this AD are part of that AFM revision.

In addition, before next flight after the effective date of this AD, remove the AFM information previously required by FAA AD 2018-23-51 (which will be superseded by the Final Rule AD for FAA AD 2020-24-02) from the Certificate Limitations and Operating Procedures chapters of the applicable AFM.



This paragraph corresponds to, **but is different from**, paragraph (h) of FAA AD 2020-24-02.

MMEL Provisions for Inoperative Flight Control System Functions:

- (4) For Group 1 and Group 2 aeroplanes: From the effective date of this AD, in the event that the aeroplane functions associated with the flight control system as modified by this AD are inoperative, that aeroplane may be operated (dispatched) only if the provisions specified in Figure 12 of Appendix 1 of this AD are incorporated into the EASA-approved Boeing 737 MAX B-737-8/-9 MMEL, based on which the operator's approved minimum equipment list (MEL) is amended. This can be accomplished by inserting a copy of Figure 12 of Appendix 1 into the applicable operator MEL.

Revising the EASA-approved Boeing 737 MAX B-737-8/-9 MMEL by introducing a later EASA-approved MMEL revision is an acceptable method to comply with this requirement, provided it is determined that the changes as specified in Figure 12 of Appendix 1 of this AD are part of that MMEL revision.

This paragraph corresponds to, **but is different from**, paragraph (i) of FAA AD 2020-24-02.

Installation/Verification of MDS Software, Removal of INOP Markers:

- (5) For Group 1 aeroplanes: Before next flight after the effective date of this AD, accomplish all applicable actions identified as "RC" (required for compliance) in, and in accordance with the instructions of, the applicable SB.

This paragraph corresponds to paragraph (j) of FAA AD 2020-24-02.

Horizontal Stabilizer Trim Wire Bundle Routing Change

- (6) For Group 1 aeroplanes: Before next flight after the effective date of this AD, accomplish all applicable actions identified as "RC" in, and in accordance with the instructions of, the applicable SB.

This paragraph corresponds to paragraph (k) of FAA AD 2020-24-02.

AOA Sensor System Test

- (7) For Group 1 aeroplanes: Before next flight after the effective date of this AD, accomplish all applicable actions identified as "RC" for the "AOA Sensor System Test" as specified in, and in accordance with the instructions of, the applicable SB.

This paragraph corresponds to paragraph (l) of FAA AD 2020-24-02.

Operational Readiness Flight

- (8) For Group 1 aeroplanes: Before next flight after accomplishment of the actions required by paragraphs (1) through (7) of this AD, accomplish all applicable actions identified as "RC" for the "Operational Readiness Flight" as specified in, and in accordance with, the instructions of the applicable SB. The EASA approved flight conditions, as specified in Appendix 2 of this AD, form the basis on which a Permit to Fly can be issued in accordance with Annex I (Part 21) of Regulation (EU) 748/2012 to accomplish the operational readiness flight required by this paragraph.



No additional EASA flight conditions approval is required.

Before next flight after the operational readiness flight, any mechanical irregularities that occurred during the operational readiness flight must be resolved in accordance with the operator's approved maintenance program.

This paragraph corresponds to, **but is different from**, paragraph (m) of FAA AD 2020-24-02.

Credit:

- (9) Modification of an aeroplane, accomplished before the effective date of this AD in accordance with the instructions of Boeing Special Attention SB 737-27-1318 at original issue, dated 10 June 2020, or Revision 1 dated 24 June 2020, is an acceptable method to comply with the requirements of paragraph (7) of this AD for that aeroplane, provided the 14 Installation Deviation Records (IDRs) identified in paragraph 1.D., "Description," of Boeing Special Attention SB 737-27-1318, Revision 2, dated 10 November 2020, have been incorporated on the aeroplane. Accomplishment of FAA-approved Boeing IDRs not identified in paragraph 1.D., "Description," of Boeing Special Attention SB 737-27-1318 Revision 2, before the effective date of this AD, is acceptable for compliance with the corresponding "RC" steps specified in Special Attention SB 737-27-1318, Revision 1, dated 10 June 2020, provided those IDRs reference Boeing Special Attention SB 737-27-1318, Revision 1, dated 10 June 2020.

This paragraph corresponds to paragraph (o)(2) of FAA AD 2020-24-02.

Paragraphs (10) to (15) of this AD **do not correspond to any requirements** as specified in FAA AD 2020-24-02. Some of these actions are recommended by FAA Safety Alert for Operators (SAFO) [20014](#) and SAFO [20015](#).

Return to Flight Operations:

- (10) For Group 1 aeroplanes: Modification of an aeroplane by accomplishing all actions as required by paragraphs (1) through (8) of this AD, including software installation verifications/tests, implementation of all AFM and MMEL changes, an AOA Sensor System Test, and an operational readiness flight, cancels the suspension of flight operations as previously required by EASA AD 2019-0051R1 for that aeroplane.

For Group 2 aeroplanes: Installation of buttons (coloured cap) on the circuit breakers of the Stall Warning System Stick Shaker on an aeroplane, as required by paragraph (2) of this AD, cancels the suspension of flight operations as previously required by EASA AD 2019-0051R1 for that aeroplane.

Pilot Training Requirements:

- (11) From the effective date of this AD, prior to any commercial or non-commercial flight, except ferry-flights, as defined in this AD, ensure that each pilot has performed the training as specified in paragraph (11.1) or (11.2) of this AD, as applicable.

(11.1) For a pilot who already holds a type rating for any Boeing Model 737-600 through 737-900ER (inclusive), with privileges to operate a model 737-8 or -9 (MAX) aeroplane: RTS



training outlined in Appendix 3 to the Operational Suitability Data – Flight Crew (OSD-FC) B737, Boeing document D626A014 Revision D, which contains elements constituting the training module to support the RTS of the Boeing 737-8 and -9 (MAX).

- (11.2) For all other pilots: An initial type rating course for the Boeing 737-8/-9 (MAX), or differences (conversion from another model) training to the Boeing 737-8/-9 (MAX), as applicable, which includes the mandatory elements of the OSD FC B737, Boeing document D626A014 Revision D.

Full Flight Simulators (FFS) used for Pilot Training:

- (12) From the effective date of this AD, ensure that FSTD used to deliver training to pilots, as required by paragraph (11) of this AD, are capable to support the applicable OSD FC TASE and the RTS Appendix, as applicable. Concurrently, liaise with the FSTD Operator to verify that the requirements of paragraphs (13) and (14) of this AD are complied with.
- (13) From the effective date of this AD, ensure that on each Boeing 737 MAX FFS, used to deliver training to pilots as required by paragraph (12) of this AD, the instructions of the applicable Boeing SDBs related to the B737 MAX RTS are embodied. To this extent, the actions specified in paragraphs (13.1) and (13.2) are applicable.
- (13.1) FSTD / FFS Binary Simulation Load must incorporate revision 3.23.4_3, or later, as described in Boeing SDB-737-001 Revision G, or later revisions, and the FCC software revision P12.1.2 must be active.

Note 2: Regulation (EU) No 1178/2011 ORA.FSTD.110 Modifications requires that the competent authority must be notified of the updated Binary Simulation Load. The FSTD documentation available to the user (qualification certificate and/or FSTD configuration control documents) must have a clear identification of the Binary Simulation Load installed.

- (13.2) Evaluate the manual stabilizer trim system for proper control forces and travel as described in CS-FSTD(A) initial issue (and issue 2) Appendix 1 to CS FSTD(A).300 Flight Simulation Training Device Standards g.1 and i.1. As described in g.1, system operation should be predicated on and traceable to the system data provided by the aeroplane manufacturer, original equipment manufacturer, or alternative approved data. The instructions of Boeing SDB-737-006 provide an acceptable method for FSTD Operators to validate manual stabilizer trim wheel forces. Whenever the forces are not adequate to meet the training objectives, the FSTD Operator must declare the FFS unsuitable to conduct training on manual stabilizer trim wheel.
- (14) From the effective date of this AD, ensure that on Boeing 737 NG FFS, when used to deliver training to pilots as required by paragraph (11) of this AD, manual stabilizer trim system is evaluated for proper control forces and travel as described in CS-FSTD(A) initial issue (and issue 2) Appendix 1 to CS FSTD(A).300 FSTD Standards g.1 and i.1. As described in g.1, system operation should be predicated on and traceable to the system data provided by the aeroplane manufacturer, original equipment manufacturer, or alternative approved data. For previously qualified FFSs (those that have a qualification basis before CS-FSTD(A) initial issue became applicable), the FSTD operator should refer to the original FFS qualification basis



Primary Reference Document standard (the standard under which the FFS was initially qualified), which contains similar requirements to evaluate control forces and travel. The instructions of Boeing SDB-737-007 provide an acceptable method for FSTD operators to validate manual stabilizer trim wheel forces. Whenever the forces are not adequate to meet the training objectives, the FSTD operator must declare the FFS unsuitable to conduct training on manual stabilizer trim wheel.

Prohibition to Install affected FCC OPS and affected MDS DPC OPS:

(15) For Group 1 and Group 2 aeroplanes: From the effective date of this AD, do not install on any aeroplane affected FCC OPS or affected MDS DPC OPS, as defined in this AD.

Ref. Publications:

Boeing Special Attention SB 737-00-1028 original issue dated 20 July 2020.

Boeing Alert Requirements Bulletin 737-22A1342 RB dated 17 November 2020.

Boeing Special Attention SB 737-27-1318 original issue dated 10 June 2020, or Revision 1 dated 24 June 2020, and Revision 2 dated 10 November 2020.

Boeing SB 737-27-1320 original issue dated 14 October 2020.

Boeing Special Attention SB 737-31-1860 original issue dated 12 June 2020, or Revision 1 dated 02 July 2020.

Boeing SDB-737-001 Revision G dated 09 November 2020.

Boeing SDB-737-006 original issue dated 03 June 2019.

Boeing SDB-737-007 original issue dated 13 June 2019.

EASA-approved Boeing 737 MAX B-737-8/-9 MMEL, Boeing document D639A001-02, Revision 2 [to be published].

The use of later approved revisions of the above-mentioned documents is acceptable for compliance with the requirements of this AD.

Remarks:

1. This Proposed AD will be closed for consultation on 22 December 2020.
2. Enquiries regarding this PAD should be referred to the EASA Programming and Continued Airworthiness Information Section, Certification Directorate. E-mail: ADs@easa.europa.eu.
3. Information about any failures, malfunctions, defects or other occurrences, which may be similar to the unsafe condition addressed by this PAD, and which may occur, or have occurred on a product, part or appliance not affected by this PAD, can be reported to the [EU aviation safety reporting system](#). This may include reporting on the same or similar components, other than those covered by the design to which this PAD applies, if the same unsafe condition can



exist or may develop on an aircraft with those components installed. Such components may be installed under an FAA Parts Manufacturer Approval (PMA), Supplemental Type Certificate (STC) or other modification.

4. For any question concerning the operational or technical content of the requirements in this PAD, please contact: Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, California 90740-5600, United States of America; Telephone: +1 562-797-1717; Internet: <https://www.myboeingfleet.com>.



Appendix 1 – AFM and MMEL Changes

In the Operating Procedures chapter, revise the General paragraph to include the information in

Figure 1 to paragraph (3) of this AD	
Standard Operating Procedures	(Required by EASA AD 2020-XXXX)
<p>Flight crews should follow company specific Standard Operating Procedures (SOPs) for the handling of Non-Normal Situations. Company SOPs for handling Non-Normal situations must include at least the items mentioned below:</p> <p>As a general overview of how non-normal situations should be conducted, consider maximum use of autoflight system to reduce workload, if available and appropriate. The flight crew should recognize and announce the non-normal situation to be acknowledged by other pilot.</p> <p>Maintain airplane control: The Pilot Flying (PF) is to maintain airplane control and ensure that the flight path is under control. The Pilot Monitoring (PM) is to monitor the flight path.</p> <p>Analyse the situation and apply good CRM: The flight crew shall review all warning lights, caution lights, and other alert lights to identify the non-normal situation. Prioritize alerts and recommend course of action.</p> <p>Take the proper action: Do the NNC memory items based on each crewmember's area of responsibility. Call for and complete the appropriate NNC. Review all warning lights, caution lights, and other alerts; complete other NNCs as required.</p> <p>Evaluate the need to land: Assess status of the airplane. Review options for diversion or continued flight.</p> <p>Definitions:</p> <p>Recall items are minimum immediate action items</p> <p>Reference items are accomplished after Recall items have been accomplished.</p>	

This figure **does not correspond to any requirement** of FAA AD 2020-24-02.

In the Operating Procedures chapter, replace the existing Airspeed Unreliable paragraph with the information in

Figure 2 to paragraph (3) of this AD	
Airspeed Unreliable (E)	(Required by EASA AD 2020-XXXX)
<p>Airspeed Unreliable</p> <p>Airspeed or Mach indications are suspected to be unreliable:</p> <p>Recall:</p> <ul style="list-style-type: none"> • If autopilot is engaged, disengage. • If autothrottle is engaged, disengage. • Set both F/D switches to off. • Set the following gear up pitch attitude and thrust: • Flaps extended: 10° and 80% N1 • Flaps up: 4° and 75% N1 	



Figure 2 to paragraph (3) of this AD**Airspeed Unreliable (E)****(Required by EASA AD 2020-XXXX)**

Reference:

PROBE HEAT switches check on.

The following indications are reliable: attitude, N1, ground speed, and radio altitude.

Notes:

1. Stick shaker, overspeed warning and airspeed low alerts may sound erroneously or simultaneously.
2. The flight path vector and pitch limit indicator may be unreliable on the PFD and HUD (as installed).
3. If the AOA indicator option is installed, the stick shaker indicator may be unreliable. AOA digital readout, analog needle, and approach reference band may be unreliable if the airspeed unreliable condition is caused by erroneous AOA.

Attempt to determine a reliable airspeed indication.

If a reliable airspeed indication can be determined:

Use the reliable airspeed indication for the remainder of the flight. If only the standby airspeed indication is reliable do not use autopilot, autothrottle, or flight directors. If the captain's or first officer's airspeed

indication is reliable, turn on the flight director switch on the reliable side. If needed, engage autopilot on the reliable side. Do not use autothrottle.

Note: Autopilot may not engage or may disengage automatically.

If a reliable airspeed indication cannot initially be determined:

Using performance tables from an approved source, set the pitch attitude and thrust setting for the current airplane configuration and phase of flight. When in trim and stabilized, compare the captain, first officer, and standby airspeed indicators with the airspeed shown in the table. An airspeed indication that differs by more than 20 knots or 0.03 Mach from the airspeed shown in the table should be considered unreliable. If only the standby airspeed indication is reliable, do not use autopilot, autothrottle, or flight directors. If the captain's or first officer's airspeed indication is reliable, turn on the flight director switch on the reliable side, and autopilot if needed. Do not use autothrottle.

Note: Autopilot may not engage or may disengage automatically.

If a reliable airspeed indication cannot be determined using performance tables from an approved source:

Using the performance tables from an approved source, set pitch attitude and thrust setting for the airplane configuration and phase of flight as needed. Reference an approved source for landing distances.

Notes:

1. Maintain visual conditions if possible.
2. Establish landing configuration early.
3. Radio altitude reference is available below 2500 feet.
4. Use electronic and visual glideslope indicators, where available, for approach and landing.

Attempt to determine a reliable altitude indication.



Figure 2 to paragraph (3) of this AD	
Airspeed Unreliable (E)	(Required by EASA AD 2020-XXXX)
<p>Use the most reliable altitude indication for the remainder of the flight. If the captain's or first officer's altitude indication is reliable:</p> <p>The airplane may not meet RVSM requirements. Set transponder to reliable side and select traffic alerts only mode.</p> <p>If captain's and first officer's altitude indications are both unreliable:</p> <p>Turn off transponder altitude reporting.</p> <p>Note: Airplane does not meet RVSM requirements.</p> <p>A nuisance stick shaker may be deactivated at pilot's discretion. This improves recognition of a stall warning on the opposite side.</p> <p>Note: Elevator Feel Shift may be active, resulting in increased control column forces.</p> <p>If deactivating stick shaker is needed: Only the active stick shaker should be deactivated. Deactivate erroneous stick shaker.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. When the circuit breaker is pulled, increased control column forces due to Elevator Feel Shift activation are removed. 2. The stick shaker on the opposite side is not deactivated. <p>If deactivating stick shaker is not needed; end of procedure except deferred items.</p> <p>In addition to the normal descent, approach and landing checklists, complete the following deferred items:</p> <p>For approach, only set the BARO minimums on the reliable PFD. Remove the BARO minimums from the unreliable PFD.</p> <p>Note: If BARO minimums are set only on the First Officer's PFD, DH/MDA aural callouts are not provided. In the event of a go-around, do the normal go-around procedure except refer to the Flight with Unreliable Airspeed go-around table to determine the go-around pitch setting.</p> <p>In the event of a go-around if either the Captain's or First Officer's airspeed indication is reliable, when TO/GA is pushed, the flight director pitch bar may be removed. Selection of an AFDS pitch mode change, such as LVL CHG, restores the flight director pitch bar.</p> <p>In the event of a go-around and the standby airspeed indication is the only reliable airspeed, do not use TO/GA.</p>	

This figure corresponds to, **but is different from**, the requirements of Figure 2 to paragraph (h)(3) of FAA AD 2020-24-02.

This AFM change (Figure 2 above) is approved by the EASA under Major Change 0010059715.



In the Certificate Limitations chapter, revise the Required Navigation Performance paragraph to include the information in

Figure 3 to paragraph (3) of this AD	
Required Navigation Performance - Authorization Required	(Required by EASA AD 2020-XXXX)
Conducting RNP AR operation is prohibited.	

This figure **does not correspond to any requirement** of FAA AD 2020-24-02.

In the Operating Procedures chapter, replace the existing Runaway Stabilizer paragraph with the information in

Figure 4 to paragraph (3) of this AD	
Runaway Stabilizer (E)	(Required by EASA AD 2020-XXXX)
If uncommanded stabilizer movement occurs continuously or in a manner not appropriate for flight conditions:	
Recall:	
Firmly hold control column. Disengage autopilot if engaged. Disengage autothrottle if engaged. Use the control column and thrust levers to control airplane pitch attitude and airspeed. Use main electric stabilizer trim to reduce control column forces.	
If the runaway stops after autopilot is disengaged, do not re-engage autopilot or autothrottle; end of procedure.	
If the runaway continues after autopilot is disengaged, place both STAB TRIM cutout switches to CUTOFF.	
If the runaway continues, grasp and hold stabilizer trim wheel.	
Reference:	
Trim the stabilizer manually.	
Notes:	
1. A two-pilot effort may be used to correct an out of trim condition.	
2. Reducing airspeed reduces airloads on the stabilizer which can reduce the effort needed to manually trim. Anticipate trim requirements. Do not re-engage autopilot or autothrottle.	
In addition to the normal descent, approach and landing checklists, complete the following deferred item:	
Establish landing configuration and in-trim condition early on final approach.	

This figure corresponds to the requirements of Figure 3 to paragraph (h)(4) of FAA AD 2020-24-02.



In the Operating Procedures chapter, replace the existing Stabilizer Trim paragraph with the information in

Figure 5 to paragraph (3) of this AD	
Stabilizer Trim Inoperative	(Required by EASA AD 2020-XXXX)
<p>Loss of electric trim through the main electric stabilizer trim switches, or when directed by the Stabilizer Out of Trim procedure.</p> <p>Place both STAB TRIM cutout switches to CUTOOUT. The autopilot is not available. Trim stabilizer manually. A two-pilot effort may be used and will not cause system damage.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Reducing airspeed reduces airloads on the stabilizer which can reduce the effort needed to manually trim. 2. If the failure could be due to ice accumulation, descend to a warmer temperature and attempt again to trim manually. <p>If the stabilizer can be trimmed manually, anticipate trim requirements. If the stabilizer cannot be trimmed manually, expect higher than normal elevator forces during approach and landing. The thrust reduction at flare will cause a nose down pitch.</p> <p>Plan a flaps 15 landing. Set Vref 15+10 knots.</p> <p>Note: The maximum wind additive should not exceed 5 knots. Check the non-normal landing distance tables in an approved source.</p> <p>In addition to the normal descent, approach and landing checklists, complete the following deferred items: Review the normal go-around procedure. During a go-around, advance thrust to go-around smoothly and slowly to avoid excessive pitch-up.</p> <p>Establish landing configuration early on final approach.</p>	

This figure corresponds to the requirements of Figure 4 to paragraph (h)(5) of FAA AD 2020-24-02.

In the Operating Procedures chapter, add the information in

Figure 6 to paragraph (3) of this AD	
Speed Trim Fail	(Required by EASA AD 2020-XXXX)
<p>The Speed Trim function and MCAS function are inoperative.</p> <p>Continue normal operation.</p> <p>Note: The Speed Trim System will not provide stabilizer trim inputs when deviating from a trimmed airspeed.</p>	

This figure corresponds to the requirements of Figure 5 of paragraph (h)(6) of FAA AD 2020-24-02.



In the Operating Procedures chapter, add the information in

Figure 7 to paragraph (3) of this AD	
Stabilizer out of Trim	(Required by EASA AD 2020-XXXX)
<p>The STAB OUT OF TRIM light illuminates for the following conditions:</p> <p>On the ground: A partial failure of a Flight Control Computer.</p> <p>In-flight: the autopilot does not set the stabilizer trim correctly.</p> <p>If on ground, do not take off. End of procedure.</p> <p>In flight, during large changes in trim requirements, the STAB OUT OF TRIM light may illuminate momentarily. If the stabilizer is trimming, continue normal operation; end of procedure.</p> <p>In flight, if the stabilizer is not trimming, hold control column firmly. Disengage autopilot. Disengage autothrottle if engaged. Use main electric stabilizer trim as needed.</p> <p>If the stabilizer responds to electric trim inputs, do not re-engage the autopilot or autothrottle; end of procedure.</p> <p>If the stabilizer does not respond to electric trim inputs, accomplish the Stabilizer Trim Inoperative procedure.</p>	

This figure corresponds to the requirements of Figure 6 of paragraph (h)(7) of FAA AD 2020-24-02.

In the Operating Procedures chapter, add the information in

Figure 8 to paragraph (3) of this AD	
AOA Disagree	(Required by EASA AD 2020-XXXX)
<p>When AOA DISAGREE appears on the PFD, this indicates the left and right angle of attack vanes disagree. Accomplish the Airspeed Unreliable procedure.</p>	

This figure corresponds to the requirements of Figure 7 of paragraph (h)(8) of FAA AD 2020-24-02.

In the Operating Procedures chapter, add the information in

Figure 9 to paragraph (3) of this AD	
ALT Disagree	(Required by EASA AD 2020-XXXX)
<p>The ALT DISAGREE alert is displayed on the captain's and first officer's altitude tape on the PFD when the indications disagree.</p> <p>If the IAS DISAGREE alert is also shown on the speed tape of the PFD, accomplish the Airspeed Unreliable procedure.</p> <p>If the IAS DISAGREE is not shown, check all altimeters are set to correct barometric setting.</p> <p>If the ALT DISAGREE alert remains, do not use the flight path vector, and if a reliable altitude is determined, use the transponder for the reliable side.</p>	



Figure 9 to paragraph (3) of this AD	
ALT Disagree	(Required by EASA AD 2020-XXXX)
<p>If a reliable altitude is not determined, set the transponder to not transmit altitude.</p> <p>In addition to the normal descent, approach and landing checklists, complete the following deferred items:</p> <p>For approach, only set the BARO minimums on the reliable PFD. Remove the BARO minimums from the unreliable PFD.</p> <p>Note: If BARO minimums are set only on the First Officer's PFD, DH/MDA aural callouts are not provided.</p> <p>Establish landing configuration early.</p> <p>Radio altitude reference is available below 2 500 ft.</p> <p>Use electronic and visual glideslope indicators where available for approach and landing.</p>	

This figure corresponds to the requirements of Figure 8 of paragraph (h)(9) of
FAA AD 2020-24-02.

In the Operating Procedures chapter, add the information in

Figure 10 to paragraph (3) of this AD	
IAS Disagree	(Required by EASA AD 2020-XXXX)
<p>When IAS DISAGREE appears on the PFD, this indicates the captain's and first officer's airspeed indicators disagree. Accomplish the Airspeed Unreliable procedure.</p>	

This figure corresponds to the requirements of Figure 9 of paragraph (h)(10) of
FAA AD 2020-24-02.

In the Certificate Limitations and Operating Procedures chapters, add the information in

Figure 11 to paragraph (3) of this AD							
Autopilot Single Channel Operation / Malfunction	(Required by EASA AD 2020-XXXX)						
<p>Limitations</p> <p>For single channel operation during approach, the autopilot shall not remain engaged below the Minimum Use Height (MUH).</p> <p>The following table defines the MUH for single channel operation as function of aircraft model:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Aircraft Model</th> <th style="text-align: center;">MUH (feet AGL)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">737-8</td> <td style="text-align: center;">111</td> </tr> <tr> <td style="text-align: center;">737-9</td> <td style="text-align: center;">130</td> </tr> </tbody> </table>		Aircraft Model	MUH (feet AGL)	737-8	111	737-9	130
Aircraft Model	MUH (feet AGL)						
737-8	111						
737-9	130						
<p>Operating Procedures - Demonstrated Altitude Loss</p> <p>The demonstrated altitude loss due to a simulated hard-over single channel autopilot malfunction is:</p> <p>Level Flight:</p> <p>Flaps up when recovery was initiated 3 seconds after the recognition point:</p>							



Figure 11 to paragraph (3) of this AD											
Autopilot Single Channel Operation / Malfunction	(Required by EASA AD 2020-XXXX)										
<table border="1"> <thead> <tr> <th>Aircraft Model</th> <th>Demonstrated Loss (feet)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">737-8</td> <td style="text-align: center;">259</td> </tr> <tr> <td style="text-align: center;">737-9</td> <td style="text-align: center;">230</td> </tr> </tbody> </table>	Aircraft Model	Demonstrated Loss (feet)	737-8	259	737-9	230					
Aircraft Model	Demonstrated Loss (feet)										
737-8	259										
737-9	230										
<p>Approach:</p> <p>(a) Within 1 second time delay between recognition point and initial recovery:</p> <table border="1"> <thead> <tr> <th>Aircraft Model</th> <th>Demonstrated Loss (feet)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">737-8</td> <td style="text-align: center;">31</td> </tr> <tr> <td style="text-align: center;">737-9</td> <td style="text-align: center;">35</td> </tr> </tbody> </table> <p>(b) When a recovery was initiated without delay:</p> <table border="1"> <thead> <tr> <th>Aircraft Model</th> <th>Demonstrated Loss (feet)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">737-8/-9</td> <td style="text-align: center;">8</td> </tr> </tbody> </table>		Aircraft Model	Demonstrated Loss (feet)	737-8	31	737-9	35	Aircraft Model	Demonstrated Loss (feet)	737-8/-9	8
Aircraft Model	Demonstrated Loss (feet)										
737-8	31										
737-9	35										
Aircraft Model	Demonstrated Loss (feet)										
737-8/-9	8										

This figure **does not correspond to any requirement** of FAA AD 2020-24-02.

In the EASA-approved MMEL, add the information in

Figure 12 to paragraph (4) of this AD	
ATA 22 - Autoflight	
(1)	Autopilot Systems 2.22-10-01.1 Deleted MMEL dispatch option. Dispatch is not permitted with both autopilot systems inoperative.
(2)	Autopilot Disengage Aural Warning System 2.22-10-02.1 Deleted MMEL item. The autopilot disengage aural warning system must be operative for dispatch.
(3)	STAB OUT OF TRIM Light 2.22-10-03.1 Deleted MMEL item. The STAB OUT OF TRIM light must be operative for dispatch.
(4)	Speed Trim Function 2.22-11-01.1 Deleted MMEL item. The speed trim function must be operative for dispatch.
(5)	SPEED TRIM FAIL Light 2.22-11-02.1 Deleted MMEL item. The SPEED TRIM FAIL light must be operative for dispatch.
(6)	Mode Control Panel Switches 2.22-11-05.1 Deleted MMEL dispatch option.



Figure 12 to paragraph (4) of this AD

- Dispatch is not permitted with both A/P ENGAGE Command (CMD) Switches (A and B) inoperative.
- (7) **Mode Control Panel Switch Lights**
2.22-11-06.1 Deleted MMEL dispatch option.
Dispatch is not permitted with both A/P ENGAGE Command (CMD) switch lights inoperative.
- (8) **Autoflight Status Annunciator**
2.22-11-08.1 Added MMEL requirement for (O) procedure.
2.22-11-08.1 Added proviso.
2.22-11-08.1 Deleted MMEL dispatch option.
Dispatch is not permitted with both autopilot (A/P) disengage lights inoperative. Dispatch may be made with one A/P disengage light inoperative, provided the autopilot disengage aural warning is verified to operate normally before each flight.
- (9) **Control Wheel Autopilot Disengage Switches**
2.22-11-10.1 Added MMEL requirement for (O) procedure.
2.22-11-10.1 Added proviso.
2.22-11-10.1 Deleted MMEL dispatch option.
Dispatch is not permitted with both Control Wheel Autopilot Disengage Switches inoperative. Dispatch may be made with one control wheel autopilot disengage switch inoperative provided the following conditions are met.
- Mode Control Panel autopilot DISENGAGE bar is verified to operate normally before each departure.
 - Autopilot is not used below 1,500 feet AGL, and
 - Approach minimums do not require use of autopilot.
- ATA 27 - Flight Controls**
- (10) **Control Wheel Trim Switch Systems**
2.27-41-01.1 Deleted MMEL item.
Both control wheel trim switch systems must be operative for dispatch.

This figure corresponds to, **but is different from**, the requirements of Figure 10 of paragraph (i) of FAA AD 2020-24-02.

Note to Figure 12: The MEL provisions specified in figure 12 to paragraph (4) of this AD correspond to the changes introduced in EASA-approved Boeing 737 MAX B-737-8/-9 MMEL, Boeing document D639A001-02, Revision 2 [to be published].



Appendix 2



European Union Aviation Safety Agency

EASA Form 18B - Approved Flight Conditions for a Permit to Fly – EASA AD [insert number]

3. Aircraft manufacturer/type Boeing 737-8, -9 “MAX”	4. Serial number(s) MSN: 42825 42826 42827 42828 42829 42830 42831 42832 42833 42834 42835 42836 43296 43320 43347 43555 43556 43557 43562 44353 44354 44355 44356 44357 44358 44588 44589 44590 44591 44592 44593 44594 44595 44596 44597 44598 44599 44600 44601 44648 44649 60133 62743 63970 63971 63972 63973 64067 64068 64069 64295 64296 64605 64606 64607 64937 64992 64993
5. Purpose (i.a.w. 21.A.701(a)) Flying an aeroplane for troubleshooting purposes or to check the functioning of one or more systems, parts or appliances after maintenance.	
Initial duration for Permit to Fly: From: 1 Jan 2021 Until: 31 Dec 2021	
6. Aircraft configuration	
These Flight Conditions are approved only for the purpose of carrying out the 'operational readiness flight' required by paragraph (9) of EASA AD [insert number]. The holder of the Permit to Fly issued on the basis of these Flight Conditions shall ensure that, except for compliance with that AD and these flight conditions, the configuration of the aeroplane is compliant with the requirements of Annex I (Part-M) of Commission Regulation (EU) No 1321/2014.	
7. Substantiations	
<p>The implementation of actions required by EASA AD [insert number] ensures the correction of the unsafe conditions identified in EASA Emergency AD 2019-0051-E dated 12 March 2019.</p> <p>These Flight Conditions are required as EASA AD [insert number] mandates an operational readiness flight to be completed before an affected aeroplane can be safely returned to service. However, until this operational readiness flight is completed, the AD cannot be recorded as being complied with and until that time, the aeroplane's Airworthiness Review Certificate (ARC) remains invalid. Therefore, these Flight Conditions enable the issuance of a Permit to Fly, under which the operational readiness flight can be safely performed in absence of a valid ARC.</p> <p>EASA has determined and is satisfied that an aeroplane meeting the configuration as specified in Field 6 can perform the intended operational readiness flight safely under the defined conditions and restrictions as specified in Field 8.</p> <p>Note: A flight conducted in accordance with these flight conditions meets the criteria of a “Level B” maintenance check flight, as defined in SPO.SPEC.MCF.100 - Levels of maintenance check flight (Commission Regulation (EU) No 965/2012, Annex VIII, Subpart E, Section 5 refers).</p>	
8. Conditions/Restrictions	
<p>The operational readiness flight must be conducted in accordance with the following conditions or restrictions:</p> <ul style="list-style-type: none"> - The flight shall be conducted in accordance with the Accomplishment Instructions of Boeing Special Attention SB 737-00-1028 dated 20 July 2020. The use of Appendix A of the SB is optional. - The flight shall be a non-passenger, non-commercial flight. - These Flight Conditions are valid for one (1) operational readiness flight only. <p>The approval of these flight conditions remains valid, provided the aeroplane remains in the configuration as specified in Field 6, and compliance with all applicable airworthiness directives, including EASA AD [insert number], is ensured.</p>	
9. Statement	
<p>These flight conditions have been established and justified in accordance with 21.A.708.</p> <p>The aeroplane as defined in Field 6 above has no features and characteristics making it unsafe for the intended operation under the conditions and restrictions as specified in Field 8.</p>	

