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DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D. C.

Revision: 4
Date: 02/28/95

M A S T E R M I N I M U M E Q U I P M E N T L I S T

W I N G A I R C R A F T M O D E L D - 1

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FEDERAL AVIATION ADMINISTRATION
MASTER MINIMUM EQUIPMENT LIST
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Log of Revisions

REV. NO.	DATE	PAGE NUMBERS	INITIALS
ORIGI NAL	07/22/88		
1	04/24/89	All Pages	
2	06/27/89	HIGHLIGHTS OF REV. , DEFINITIONS	
2	06/27/89	PREAMBLE	
3	07/21/92	HIGHLIGHTS OF REV. , DEFINITIONS	
3	07/21/92	GUIDELINES	
3	07/21/92	21-1, 23-1, 25-1, 31-1, 32-1	
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3	07/21/92	61-1	
4	02/28/95	HIGHLIGHTS OF REV. , DEFINITIONS	
4	02/28/95	GUIDELINES	
4	02/28/95	21-1, 22-1, 23-1, 25-1, 26-1	
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Control Page

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	VI	6	01/31/95
	VII	6	01/31/95
	VIII	6	01/31/95
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Preamble	XIII	2	06/14/89
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Highlights of Change

The asterisk symbol (*) has been deleted from column 4. See placarding policy in Definitions section.

ATA 23, item 3, Cockpit Voice Recorder revised to indicate it as optional equipment.

ATA 23, item 4, Boom Microphones added.

Relief for Passenger Address System added per Global Change 13 as item 5.

Relief added for ATA 26, item 1, Portable Fire Extinguishers in accordance with Global Change 19.

Relief added for ATA 31, item 3, Flight Data Recorder.

ATA 33, relief for Flight Compartment and Instrument Lighting Systems revised per Global Change 21.

Standard relief added for Cabin Lighting Systems.

Relief added for ATA 34, item 2, Navigation Equipment, GPS.

Relief for ATC Transponders and Automatic Altitude Reporting Systems revised per Global Change 20.

Relief added for GPWS.

Relief for TCAD revised to indicate it as optional equipment.

Relief added for TCAD.

Definitions

1. System Definitions.

System numbers are based on the Air Transport Association (ATA) Specification Number 100 and items are numbered sequentially.

- a. "Item" (Column 1) means the equipment, system, component, or function listed in the "Item" column.
- b. "Number Installed" (Column 2) is the number (quantity) of items normally installed in the aircraft. This number represents the aircraft configuration considered in developing this MMEL. Should the number be a variable (e.g., passenger cabin items) a number is not required.
- c. "Number Required for Dispatch" (Column 3) is the minimum number (quantity) of items required for operation provided the conditions specified in Column 4 are met.

NOTE: Where the MMEL shows a variable number required for dispatch, the MEL must reflect the actual number required for dispatch or an alternate means of configuration control approved by the Administrator.

- d. "Remarks or Exceptions" (Column 4) in this column includes a statement either prohibiting or permitting operation with a specific number of items inoperative, provisos (conditions and limitations) for such operation, and appropriate notes.
- e. A vertical bar (change bar) in the margin indicates a change, addition or deletion in the adjacent text for the current revision of that page only. The change bar is dropped at the next revision of that page.

2. "Airplane/Rotorcraft Flight Manual" (AFM/RFM) is the document required for type certification and approved by the responsible FAA Aircraft Certification Office. The FAA approved AFM/RFM for the specific aircraft is listed on the applicable Type

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Certi fi cate Data Sheet.

3. "As required by FAR" means that the listed item is subject to certain provisions (restrictive or permissive) expressed in the Federal Aviation Regulations operating rules. The number of items required by the FAR must be operative. When the listed item is not required by FAR it may be inoperative for time specified by repair category.

4. Each inoperative item must be placarded to inform and remind the crewmembers and maintenance personnel of the equipment condition.

NOTE: To the extent practical, placards should be located adjacent to the control or indicator for the item affected; however, unless otherwise specified, placard wording and location will be determined by the operator.

5. "-" symbol in Column 2 and/or Column 3 indicates a variable number (quantity) of the item installed.

6. "Deleted" in the remarks column after a sequence item indicates that the item was previously listed but is now required to be operative if installed in the aircraft.

7. "ER" refers to extended range operations of a two-engine airplane which has a type design approval for ER operations and complies with the provisions of Advisory Circular 120-42A.

8. "Federal Aviation Regulations" (FAR) means the applicable portions of the Federal Aviation Act and Federal Aviation Regulations.

9. "Flight Day" means a 24 hour period (from midnight to midnight) either Universal Coordinated Time (UCT) or local time, as established by the operator, during which at least one flight is initiated for the affected aircraft.

10. "Icing Conditions" means an atmospheric environment that may cause ice to form on the aircraft or in the engine(s).

11. Alphabetical symbol in Column 4 indicates a proviso (condition or limitation) that must be complied with for

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operation with the listed item inoperative.

12. "Inoperative" means a system and/or component malfunction to the extent that it does not accomplish its intended purpose and/or is not consistently functioning normally within its approved operating limit(s) or tolerance(s).

13. "Notes:" in Column 4 provides additional information for crewmember or maintenance consideration. Notes are used to identify applicable material which is intended to assist with compliance, but do not relieve the operator of the responsibility for compliance with all applicable requirements. Notes are not a part of the provisions.

14. Inoperative components of an inoperative system: Inoperative items which are components of a system which is inoperative are usually considered components directly associated with and having no other function than to support that system. (Warning/caution systems associated with the inoperative system must be operative unless relief is specifically authorized per the MMEL).

15. "(M)" symbol indicates a requirement for a specific maintenance procedure which must be accomplished prior to operation with the listed item inoperative. Normally these procedures are accomplished by maintenance personnel; however, other personnel may be qualified and authorized to perform certain functions. Procedures requiring specialized knowledge or skill, or requiring the use of tools or test equipment should be accomplished by maintenance personnel. The satisfactory accomplishment of all maintenance procedures, regardless of who performs them, is the responsibility of the operator. Appropriate procedures are required to be published as part of the operator's manual or MEL.

16. "(O)" symbol indicates a requirement for a specific operations procedure which must be accomplished in planning for and/or operating with the listed item inoperative. Normally these procedures are accomplished by the flight crew; however, other personnel may be qualified and authorized to perform certain functions. The satisfactory accomplishment of all procedures, regardless of who performs them, is the responsibility of the operator. Appropriate procedures are

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required to be published as a part of the operator's manual or MEL.

NOTE: The (M) and (O) symbols are required in the operator's MEL unless otherwise authorized by the Administrator.

17. "Deactivated" and "Secured" means that the specified component must be put into an acceptable condition for safe flight. An acceptable method of securing or deactivating will be established by the operator.

18. "Visual Flight Rules" (VFR) is as defined in FAR Part 91. This precludes a pilot from filing an Instrument Flight Rules (IFR) flight plan.

19. "Visual Meteorological Conditions" (VMC) means the atmospheric environment is such that would allow a flight to proceed under the visual flight rules applicable to the flight. This does not preclude operating under Instrument Flight Rules.

20. "Visible Moisture" means an atmospheric environment containing water in any form that can be seen in natural or artificial light; for example, clouds, fog, rain, sleet, hail, or snow.

21. "Passenger Convenience Items" means those items related to passenger convenience, comfort or entertainment such as, but not limited to, galley equipment, movie equipment, ash trays, stereo equipment, overhead reading lamps, etc.

22. Repair Intervals: All users of an MEL approved under FAR 121, 125, 129 and 135 must effect repairs of inoperative systems or components, deferred in accordance with the MEL, at or prior to the repair times established by the following letter designators:

Category A. Items in this category shall be repaired within the time interval specified in the remarks column of the operator's approved MEL.

Category B. Items in this category shall be repaired within three (3) consecutive calendar days (72 hours), excluding the day the malfunction was recorded in the aircraft maintenance

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record/logbook. For example, if it were recorded at 10 a.m. on January 26th, the three day interval would begin at midnight the 26th and end at midnight the 29th.

Category C. Items in this category shall be repaired within ten (10) consecutive calendar days (240 hours), excluding the day the malfunction was recorded in the aircraft maintenance record/logbook. For example, if it were recorded at 10 a.m. on January 26th, the 10 day interval would begin at midnight the 26th and end at midnight February 5th.

Category D. Items in this category shall be repaired within one hundred and twenty (120) consecutive calendar days (2880

hours), excluding the day the malfunction was recorded in the aircraft maintenance log and/or record.

The letter designators are inserted adjacent to Column 2.

23. Electronic fault alerting system - General

New generation aircraft display system fault indications to the flight crew by use of computerized display systems. Each aircraft manufacturer has incorporated individual design philosophies in determining the data that would be represented. The following are customized definitions (specific to each manufacturer) to help determine the level of messages affecting the aircraft's dispatch status. When preparing the MEL document, operators are to select the proper Definition No. 23 for their aircraft, if appropriate.

a. BOEING (B-757/767, B-747-400, B-777)

Boeing airplanes equipped with Engine Indicating and Crew Alerting Systems (EICAS), provide different priority levels of system messages (WARNING, CAUTION, ADVISORY, STATUS and MAINTENANCE). Any messages that affects airplane dispatch status will be displayed at a STATUS message level or higher. The absence of an EICAS STATUS or higher level (WARNING, CAUTION, ADVISORY) indicates that the system/component is operating within its approved operating limits or tolerances.

System conditions that result only in a maintenance level message, i.e. no correlation with a higher level EICAS message,

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do not affect dispatch and do not require action other than as addressed within an operators standard maintenance program.

b. DOUGLAS (MD-11)

Some Douglas aircraft are equipped with an alerting function which is a subsystem within the Electronic Instrument System (EIS). The alerting function provides various levels of system condition alerts (WARNING, CAUTION, ADVISORY, MAINTENANCE and STATUS).

Alerts that affect aircraft dispatch will include WARNING, CAUTION, STATUS or MAINTENANCE level. MAINTENANCE alerts are displayed on the status page of the EIS display panel under the maintenance heading.

A MAINTENANCE alert on the EIS indicates the presence of a system fault which can be identified by the Central Fault Display System (CFDS) interrogation. The systems are designed to be fault tolerant, however, for any MAINTENANCE alert, the

MEL must be verified for dispatch purposes.

c. AIRBUS (A-300-600, A-310, A-320/319/321, A-330, A-340

Airbus aircraft equipped with Electronic Centralized Aircraft Monitoring (ECAM) provide different levels of system condition messages (WARNING, CAUTION, STATUS, and ADVISORY). A-320/319/321, A-330, and A-340 also provide MAINTENANCE status messages.

Any message that affects airplane dispatchability will normally be at the WARNING, CAUTION or STATUS level. MAINTENANCE messages (A-320/319/321, A-330, and A-340 only) are also indicated on ECAM Status Page below the white Maintenance Label.

A MAINTENANCE status (Class II) message on ECAM indicates the presence of a system fault which can be identified by CFDS (A-320/319/321) or CMS (A-330/A-340) interrogation. The systems are designed to be fault tolerant, however for any MAINTENANCE status (Class II) message, the A-320/319/321 MEL must be verified for dispatch capability. For the A-330 and A-340, MAINTENANCE status messages do not affect dispatch.

d. FOKKER (FK-100)

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Fokker aircraft are equipped with Multi Function Display System (MFDS) which provides electronic message referring to the different priority levels of system information (WARNING (red), CAUTION (amber), AWARENESS (cyan) AND STATUS (white)). Any messages that affects aircraft dispatch will be at the WARNING, CAUTION or AWARENESS level. In these cases the MEL must be verified for dispatch capability and maintenance may be required.

System conditions that only require maintenance are not presented on the flight deck. These maintenance indications/messages may be presented on the Maintenance & Test Panel (MAP) or the Centralized Fault Display Unit (CFDU) and by dedicated Built In Test Evaluation (BITE) of systems.

24. "Administrative control item" means an item listed by the operator in the MEL for tracking and informational purposes. It may be added to an operator's MEL by approval of the Principal Operations Inspector provided no relief is granted, or provided conditions and limitations are contained in an approved document (i.e. Structural Repair Manual, airworthiness directive, etc.). If relief other than that granted by an approved document is sought for an administrative control item, a request must be submitted to the Administrator. If the request results in review and approval by the FOEB, the item becomes an MMEL item rather than an administrative control item.

25. "****" symbol in Column 1 indicates an item which is not required by regulation but which may have been installed on some models of aircraft covered by this MMEL. This item may be included on the operator's MEL after the approving office has determined that the item has been installed on one or more of the operator's aircraft. The symbol, however, shall not be carried forward into the operator's MEL. It should be noted that neither this policy nor the use of this symbol provide authority to install or remove an item from an aircraft.

26. "Excess Items" means those items that have been installed that are redundant to the requirements of the FARs.

27. "Day of Discovery" is the calendar day an equipment/instrument malfunction was recorded in the aircraft

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maintenance log and or record. This day is excluded from the calendar days or flight days specified in the MMEL for the repair of an inoperative item of equipment. This provision is applicable to all MMEL items, i.e., categories "A, B, C, and D."

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Preamble
(Effective 6/14/89)

The following is applicable for authorized certificate holders operating under Federal Aviation Regulations (FAR) Parts 121, 125, 129, 135: The FAR require that all equipment installed on an aircraft in compliance with the Airworthiness Standards and the Operating Rules must be operative. However, the Rules also permit the publication of a Minimum Equipment List (MEL) where compliance with certain equipment requirements is not necessary in the interests of safety under all operating conditions. Experience has shown that with the various levels of redundancy designed into aircraft, operation of every system or installed component may not be necessary when the remaining operative equipment can provide an acceptable level of safety. A Master Minimum Equipment List (MMEL) is developed by the FAA, with participation by the aviation industry, to improve aircraft utilization and thereby provide more convenient and economic air transportation for the public. The FAA approved MMEL includes those items of equipment related to airworthiness and operating regulations and other items of equipment which the Administrator finds may be inoperative and yet maintain an acceptable level of safety by appropriate conditions and limitations; it does not contain obviously required items such as wings, flaps, and rudders. The MMEL is the basis for development of individual operator MELs which take into consideration the operator's particular aircraft equipment configuration and operational conditions. Operator MELs, for administrative control, may include items not contained in the MMEL; however, relief for administrative control items must be approved by the Administrator. An operator's MEL may differ in format from the MMEL, but cannot be less restrictive than the MMEL. The individual operator's MEL, when approved and authorized, permits operation of the aircraft with inoperative equipment.

Equipment not required by the operation being conducted and equipment in excess of FAR requirements are included in the MEL with appropriate conditions and limitations. The MEL must not deviate from the Aircraft Flight Manual Limitations, Emergency Procedures or with Airworthiness Directives. It is important to remember that all equipment related to the airworthiness and the operating regulations of the aircraft not listed on the MMEL must be operative.

Guidelines for (O) & (M) Procedures

The FOEB has identified a need for certain procedures to provide an adequate level of safety while providing relief for the following items. These procedures must be established by the operator. The following guidelines are to help establish these required procedures.

- 21-1 (M) Maintenance procedure to assure no fuel leak or mechanical/electrical fault will cause a fire or additional damage.
- 21-2 (O) Operations procedure to record lapsed time on the heater.
- 22-1 (M) Maintenance procedure to assure no electrical or mechanical fault exists that will have an adverse effect on any flight control function.
- 31-2 (O) Operations procedure to record flight time.
- 32-1 (O) Operations procedure to prevent aircraft movement when stopped or parked.
- 34-11-1(M) Procedure to deactivate and secure the system.
- 34-11-2(O) Procedure to ensure TA and RA display is visible to the non-flying pilot, and audio functions are operative on flying pilot side.
- 34-11-3(O) Procedure to ensure non-flying pilot monitors pilot's display
 - (O) Procedure to ensure TA ONLY mode is selected, and all TA functions/elements are operative.
- 34-11-4(O) Procedure to ensure all RA display/functions are operative.
- 37-1 (M) Maintenance procedure to assure no mechanical problem exists, as a result of pump failure, that could have an adverse effect on engine operations.

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- | | | | | | |
|----|--------------------|---|---|---|-----|
| 1. | Combusti on Heater | C | 1 | 0 | (M) |
| 2. | Heater Hour Meter | C | 1 | 0 | (O) |

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22	AUTO FLI GHT			

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1.	Autopilot	C	1	0	(M)As required by FAR.
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SYSTEM & SEQUENCE NUMBERS	ITEM	1.	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
23	COMMUNICATIONS				
1.	Communications	C	-	-	As required by FAR.

Equipment (VHF, HF, UHF)					
2. Cockpit Speaker	C	1	0		May be inoperative provided two operative headsets are available to the flight crew.
3. Cockpit Voice Recorder ***	D	1	0		
4. Boom Microphones	D	-	0		
5. Passenger Address System					
1) Passenger Configuration	B	1	0		(0)May be inoperative provided alternate, normal and emergency procedures, and/or operating restrictions are established and used.
2) Cargo Configuration	D	1	0		

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SYSTEM & SEQUENCE NUMBERS	ITEM	1.	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
25	EQUIPMENT/FURNISHINGS				
1.	Shoulder Harness	B	2	1	Right side may be inoperative for single pilot operations provided the seat remains unoccupied.

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2.	ELT	C	1	0	As required by FAR.
					OR
		C	1	0	May be inoperative for published scheduled flights in air carrier service.
3.	Passenger Convenience Item(s)	-	-	0	Passenger convenience items, as expressed in the MMEL, are those related to passenger convenience, comfort or entertainment such as but not limited to, galley equipment, movie equipment, ash trays, stereo equipment, overhead reading lamps, etc. Items addressed elsewhere in this document shall not be included. (M) and (O) procedures may be required and included in the air carrier's appropriate document.

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SYSTEM & SEQUENCE NUMBERS	1. ITEM	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
26	FIRE PROTECTION			
1.	Portable Fire Extinguishers	D -	-	Any in excess of those required by FAR may be inoperative or missing provided: a) The inoperative fire

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extinguisher is tagged inoperative, removed from the installed location, and placed out of sight so it can not be mistaken for a functional unit, and

b) Required distribution is maintained.

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SYSTEM & SEQUENCE NUMBERS	ITEM	1.	2. NUMBER INSTALLED		4. REMARKS OR EXCEPTIONS
			3.	NUMBER REQUIRED FOR DISPATCH	
30	ICE AND RAIN PROTECTION				
1.	Pitot Heat	B	1	0	Must be operative for IFR passenger carrying and for flight in known or forecast icing conditions.

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SYSTEM & SEQUENCE NUMBERS	ITEM	1.	2. NUMBER INSTALLED		4. REMARKS OR EXCEPTIONS
			3.	NUMBER REQUIRED FOR DISPATCH	
31	INDICATING/RECORDING SYSTEMS				
1.	Clock with sweep second hand, or electric digital clock	C	1	0	May be inoperative for VFR flight.
2.	Flight Hour Recorder	C	1	0	(0)
3.	Flight Data	D	-	0	

*** Recorder

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32	LANDING GEAR							
1.	Parking Brake	C	1	0	(0)			

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33	LIGHTS			
1.	Cockpit and Instrument Lighting System	C -	-	Individual lights may be inoperative provided the remaining lights are: <ul style="list-style-type: none"> a) Sufficient to clearly illuminate all required instruments, controls, and other devices for which it is provided, b) Positioned so that direct rays are shielded from flight crewmembers eyes, and c) Lighting configuration and

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2.	Anti collision Light System	B	1	0	intensity is acceptable to the flight crew. May be inoperative provided: a) Airplane is not operated at night. OR b) Strobes are installed and operate normally.
		B	1	0	NOTE: The strobe light system must be approved and certificated as an Anti-Collision Light System if used in place of a rotating beacon.
3.	Strobe Light System ***	C	1	0	May be inoperative: a) For day operations, OR b) For night operations

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SYSTEM & SEQUENCE NUMBERS	1. ITEM	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS	
33	LIGHTS				
4.	Position Lights	C	3	0	May be inoperative for day operations.
5.	Cabin Light Systems	C	-	-	May be inoperative provided lighting configuration is acceptable to the flight crew.

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SYSTEM & SEQUENCE NUMBERS	ITEM	1. NUMBER INSTALLED		3. NUMBER REQUIRED FOR DISPATCH		4. REMARKS OR EXCEPTIONS
34	NAVIGATION					
1.	ATC Transponders and Automatic Altitude Reporting Systems	D	-	-	-	Any in excess of those required by FAR may be inoperative.
2.	Navigation Equipment (VOR, ILS, Loran, Omega/VLF, INS, Doppler, RNAV, GPS)	C	-	-	-	As required by FAR.
3.	Marker Beacon	C	1	0	0	May be inoperative provided approach procedure does not require its use.
4.	Altitude Encoder					Combined with ATC Transponders, Revision 4.

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5.	DME	C	1	0	As required by FAR.
6.	ADF	C	-	0	As required by FAR.
7.	RMI	C	-	0	
8.	Radar Altimeter	C	1	0	NOTE: May affect GPWS.
9.	Vertical Speed Indicator	B	1	0	Must be operative on left side for IFR passenger carrying operations.
10.	Avionics Fan	C	1	0	May be inoperative providing RNAV is not used.

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SYSTEM & SEQUENCE NUMBERS	ITEM	1.	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
34 NAVIGATION					
11. Traffic Alert Collision Avoidance System(TCAS) ***					
1) TCAS System	D	-	0		(M) May be inoperative provided the system is deactivated and secured.
2) Combined Traffic Alert (TA) and Resolution Advisory (RA) *** Dual Displays	C	2	1		(O) May be inoperative on the non-flying pilot side provided: a) TA and RA elements and audio functions are operative on flying pilot side, and b) TA and RA display indications are visible to the non-flying pilot.
3) Resolution Advisory (RA) Display System(s)	C	2	1		(O) One may be inoperative on non-flying pilot side.

	C	-	0	(0) May be inoperative provided: a) All Traffic Alert (TA) display elements and voice command audio functions are operative, and b) TA only mode is selected by the crew.
4) TA Display System(s)	C	-	0	(0) May be inoperative provided all installed RA display and audio functions are operative.

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SYSTEM & SEQUENCE NUMBERS	ITEM	1.	2. NUMBER INSTALLED		4. REMARKS OR EXCEPTIONS
			3.	NUMBER REQUIRED FOR DISPATCH	
34	NAVIGATION				
12.	Magnetic Compass	B	1	0	May be inoperative provided any combination of three gyro or INS (IRU) stabilized compass systems are operative. OR
		B	1	0	May be inoperative provided: a) Any combination of two gyro or INS stabilized compass systems are operative, and b) Aircraft is operated with dual independent navigation capability and under positive radar control by ATC on the en route portion of the flight. OR
		B	1	0	May be inoperative for flights that are entirely within areas of

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magnetic unreliability provided at least two stabilized directional gyro systems are installed, operative, and used in conjunction with approved free gyro navigation techniques.

13. ***	Ground Proximity Warning System	D	-	0
14. ***	Traffic Collision Avoidance Device (TCAD)	D	-	0

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SYSTEM & SEQUENCE NUMBERS	ITEM	1.	2. NUMBER INSTALLED		4. REMARKS OR EXCEPTIONS
			3.	NUMBER REQUIRED FOR DISPATCH	
37	VACUUM/PRESSURE				
1.	Vacuum Pumps	C	2	1	(M)One may be inoperative for day VFR flights.
2.	Vacuum Gauge	C	1	0	May be inoperative for day VFR flight provided the source failure indicators are operative.

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SYSTEM & SEQUENCE NUMBERS	ITEM	1. NUMBER INSTALLED		3. NUMBER REQUIRED FOR DISPATCH		4. REMARKS OR EXCEPTIONS
61	PROPELLERS					
1.	Propeller Synchrophaser	C	1	0		

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