NOT MEASUREMENT SENSITVE

MIL-PRF-63029D(AV)
INTERIM AMENDMENT 1
13 May 1998

PERFORMANCE SPECIFICATION

MANUALS, TECHNICAL: REQUIREMENTS FOR OPERATOR'S MANUALS AND CHECKLISTS FOR AIRCRAFT

This interim amendment is approved for use within the U.S. Army Aviation and Missile Command, with MIL-PRF-63029D(AV), dated 23 August 1996.

The attached insertable replacement pages listed below are replacements for stipulated pages. When the new pages have been entered into the document, insert the interim amendment as the cover sheet to the specification.

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
13	23 August 1996	13	Reprinted without change
14	13 May 1998	14	23 August 1996
23	13 May 1998	23	23 August 1996
24	13 May 1998	24	23 August 1996
25	13 May 1998	25	23 August 1996
26	13 May 1998	26	23 August 1996
27	13 May 1998	27	23 August 1996
28	13 May 1998	28	23 August 1996
29	13 May 1998	29	23 August 1996
30	13 May 1998	30	23 August 1996

Preparing Activity:
Army - AV

(Project Number TMSS-A355)

Chapter 2 - Aircraft and Systems Description and Operation

Chapter 3 - Avionics

Chapter 4 - Mission Equipment

Chapter 5 - Operating Limits and Restrictions

Chapter 6 - Weight/Balance and Loading

Chapter 7 - Performance Data

Chapter 8 - Normal Procedures

Chapter 9 - Emergency Procedures

Appendix A - References

Appendix B - Abbreviations and Terms

Index

3.2.1.1 Size. Operator's TMs shall be prepared for a final trim size of 8 1/2 inches wide by 11 inches in length. The usable area for preparation of the manuals shall be 7-1/4 by 10 inches (including marginal copy). See MIL-STD-38784 for additional information.

3.2.1.2 Page arrangement All text shall be arranged in a double column page. Each column shall be approximately 3-1/2 inches wide with a gutter approximately 1/4 inch wide between the columns. When configuration or equipment differences exist, duplicate pages of the operator's manual may be prepared when authorized by the contracting activity (6.2). The pages shall be numbered identically, with the difference indicated by a designator symbol in the upper right corner of the page. When appropriate, the following statement shall be added verbatim to Chapter 1:

Duplicate pages have been provided. Aircraft applicability is indicated in the upper right corner of the -10 pages affected. Remove and discard pages which are not applicable to the assigned aircraft.

3.2.1.3 Cover. Covers shall be prepared in accordance with Figure 5 (note the distribution statement). A 3/8-inch bleed-to-edge indicator shall be used on both the right edge of the cover and corresponding right-hand pages. Pages in Chapter 9, Emergency Procedures, shall not have bleed-to-edge indicators in the text, but shall have diagonal lines around three edges of the page (Figure 55).

3.2.1.4 Reporting errors. To assist in improving TMs and reporting errors, specific information shall be placed in the TM.

3.2.1.4.1 Errors statement. The following statement shall immediately precede the Table of Contents:

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Write a letter or complete and mail a DA Form 2028-2, Recommended Changes to Publications and Blank Forms, to Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal, AL 35898-5230. You may also report errors or recommend improvements by e-mail directly to ls-lp@ redstone.army.mil. A reply will be furnished to you. Instructions for sending an electronic DA Form 2028 may be found at the back of this manual preceding the hard copy DA Form 2028-2. Types of comments that should be avoided on DA Forms 2028-2 are those that: (1) ask a question instead of giving an answer; (2) are based on minor differences of opinion or wording; (3) point out obvious editorial errors, misspellings, or errors in punctuation, *unless the errors change the intended meaning.*

An overprinted sample of DA Form 2028-2 and three pre-addressed tear out DA Forms 2028-2 shall be included at the back of each manual.

3.2.1.4.2 E-mail. The following instructions shall be placed at the back of the manual immediately in front of the DA Forms 2028-2.

The following format must be used when submitting an electronic DA Form 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: (enter e-mail address)
To: ls-lp@redstone.army.mil

Subject: DA Form 2028

1. **From**:
2. Unit:
3. **Address**:
4. **City**:
5. **St**:

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3.2.3.12.2 AC power supply system. These systems shall include inverters and alternators; indicators, gauges, and controls; AC circuit breaker and junction box diagram; auxiliary power; and ground power.

3.2.3.12.3 Breakers. The location of each circuit breaker panel shall be shown, and on standardized installation, each circuit breaker in the panels shall be identified. The illustration sha1l depict a typical installation of both systems (AC/DC) which may be combined on one illustration. In those instances where a standardized circuit breaker location does not exist, the location of circuit breakers or fuses shall be given. This diagram shall be located near the description of the electrical system.

3.2.3.13 Section XII - Auxiliary power unit. This section shall include a description of the auxiliary power unit, controls, and its interaction with other systems. Starting, stopping, and inflight operating procedures shall be contained in Chapter 8 and emergency procedures in Chapter 9.

3.2.3.14 Section XIII - Lighting. Information shall be provided for, but not limited to, formation, landing, fuselage, cabin, instruments, wheel well, taxi, navigation, and anti-collision lights. Coverage shall concern itself largely with locations, controls, power sources, and a discussion of functions. Illustrations may be used if equipment is not depicted in Chapter 2 or elsewhere.

3.2.3.15 Section XIV - Flight instruments. All flight instruments, indicators, gauges, and miscellaneous instruments and systems shall be described in this section. Miscellaneous instruments and systems shall include such items as master caution systems, rpm high/low warning systems, trainer instrument panel, and clocks. Special problems, such as erroneous readings of the airspeed indicating system resulting from installation error or hovering, shall be included with references to correction charts, when applicable. Complex display systems shall be included under a separate primary heading.

3.2.3.15.1 Illustrations. Line drawings shall be provided for all instruments. Each indicator, gauge, and control shall be shown (Figure 12). Each item shall be indexed or posted and references shall be entered in the text as appropriate. On the drawing, the names or index number of the instruments, whichever is most legible, may be placed in the instrument or indicator outline.

3.2.3.16 Section XV - Servicing, parking, and mooring. Servicing shall include, but not be limited to, flight crew oriented instructions for normal and closed circuit refueling and for replenishment of fuel, oil, hydraulic fluid, other fluids, and air in tires. Servicing shall also include all other such items involved in servicing the aircraft that a crew could be expected to perform while away from military maintenance support. Safety precautions to observe in servicing a particular tank or reservoir, such as grounding and prevention of fire hazards, shall be stated clearly. Servicing instructions shall be supplemented with a diagram showing locations of

regular and alternate servicing points. NO STEP areas on walkways leading to tanks shall be indicated, with necessary precautions. Reference shall be made to graphs or data in other parts of the manual pertinent to servicing, such as tire pressure versus gross takeoff weight.

3.2.3.16.1 Servicing diagram. The servicing diagram shall depict each servicing point, including, but not limited to, tanks, reservoirs, filler caps, receptacles, oxygen bottles, and accumulators and shall be shown as viewed (Figure 13). Illustrations of site gauges and other indicators shall clearly depict proper servicing levels.

3.2.3.16.2 Servicing table. The servicing table shall be in tabular form as shown in Figure 14. Each item of equipment including, but not limited to, engine, transmission, gearboxes, reservoirs (hydraulic, anti-icing), auxiliary power unit, and oxygen systems shall be listed under "System." Under the heading of "Specification," the military specification for the fuel, oil, fluid, or lubricant shall be listed, including references to any notes on temperature ranges, mixing of oil, etc. Fuel capacities shall also be listed to include total, servicing capacity, and usable capacity in U.S. measurements to the nearest tenth of a gallon, and metric equivalents.

3.2.3.16.3 Approved fuels. Include a tabular listing of primary, alternate, and emergency fuels, to include NATO and commercial brand names authorized for use in the aircraft for which this manual applies. Warnings and cautions regarding additives shall be presented in the table. Also, restrictions on the use of any fuels shall be stated. The fuels contained in this listing shall only be those authorized for use by TB 55-9150-200-24 and by the contracting activity (6.2). This information shall not be repeated in the manual.

3.2.3.16.4 Additional servicing instructions. Information shall include a listing of acceptable commercial engine oils as indicated in TB 55-9150-200-24 and as authorized for use in the aircraft (Figure 15).

3.2.3.16.5 Ground handling. List instructions and necessary precautions for ground handling aircraft, including any information needed in extreme cold, heat, humidity, and dust. Provide description and instructions for operating any ground handling equipment involved. Left and right turning limits while towing (with or without external stores) shall be listed. Aircraft ground handling procedures relating to electronics equipment shall be stated when applicable.

3.2.3.16.6 Parking and mooring. Instructions for parking and mooring and the installation and stowage of aircraft covers, control locks, chocks, and tie down devices shall be described and illustrated. Ground handling, parking, and mooring may be shown on a single page illustration.

3.2.4 Chapter 3 - Avionics

3.2.4.1 General. Except for mission avionics, this chapter shall describe the avionics equipment configuration including all its systems and controls and shall provide the proper techniques and procedures to be employed when operating the equipment.

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3.2.4.2 Section I - General. This chapter shall cover avionics equipment configurations installed on a specific aircraft. It shall include a brief description of the avionics equipment, its technical characteristics, capabilities, and locations. Reference shall be made to Chapter 4 for mission avionics.

For each item of avionics equipment contained within Sections II, III, and IV, the TM shall be written in the following format.

a. Description

b. Controls and functions

c. Operation

d. Emergency operation (if applicable)

Additional sections may be added to this chapter by the contracting activity (6.2).

3.2.4.2.1 Description. Avionics equipment shall be described in detail, including controls, indicators, instruments (if applicable), jacks, switches, control panels, etc. Antenna locations shall be shown on appropriate illustrations.

3.2.4.2.2 Controls and functions

a. The location and function of each control, including built-in test capability, contributing to the operation of the avionics equipment shall be listed. A separate paragraph shall be used for each control panel. Reference shall be made to illustrations in Chapter 2 regarding controls and control panels.

b. A tabular listing shall be included with each paragraph listing control panels. The listing shall be divided into two columns, titled "Control" and "Function" or "Control/Indicator" and "Function," whichever is applicable. Each control or indicator shall be listed and its function defined in terms of what the operator of the control will see, hear, or do as a result of the control setting. Terms of simple, immediate, and observable results shall be used. No attempt shall be made to give the operator the exact technical details about what happens when the control is used.

3.2.4.2.3. Operation. A series of paragraphs shall be used to describe the operating details for each item of avionics equipment. Whenever standard operational avionics data exists within the government, such data shall be furnished to the contractor by the contracting activity. Complete operating procedures shall be included as follows:

a. When separate modes of operation are available, i.e., when the equipment may serve two or more systems, each mode shall be described. These shall be listed as modes of operation and each shall be briefly described.

b. Explain the sequence of settings and the position to which the controls should be set to ensure proper results each time the equipment is energized. Instructions shall be provided to prevent the possibility of damage through improper settings or sequence of operations. When appropriate, call attention to operating tolerances. When operation of a unit is related to or dependent on the operation of a similar or independent control unit, this information shall be included in the operating procedure. Only those controls normally used by the operator shall be included. Control adjustments that are the responsibility of maintenance personnel shall not be included.

c. If the configuration provides for a parallel operation from various positions in the aircraft, similar, separate, and complete coverage for each position shall be provided. When the procedure is identical to a position previously covered, it may be covered by a reference to the previous procedure.

3.2.4.2.4 Emergency operations. When applicable, settings and operations of avionics equipment during emergency operations shall be described.

3.2.4.2.5 Power source. A brief description of the power sources for avionics equipment shall be provided, including any special procedures or limitations using, but not limited to, external power and battery power.

3.2.4.3 Section II - Communications. This section shall contain all information for communications equipment installed in the aircraft.

3.2.4.4 Section III - Navigation. This section shall cover all navigation systems and indicators, as applicable. When there is doubt as to whether the system should be covered under communications or navigation, the primary use of the system shall be the deciding factor, and a suitable reference shall be made in the manual to aid the operator in locating the material. The following systems and indicators shall be described.

a. Automatic direction finder (ADF)

b. Gyro compass and magnetic indicators

c. Marker beacon

d. Flight director

e. (VHF) OMNI directional range

f. Tactical Air Navigation (TACAN)

g. Instrument landing system

h. Doppler

i. Inertial navigation system (INS)

j. Autopilot

k. Other

3.2.4.5 Section IV - Transponder and radar. This section shall cover all transponders, collision warning systems, and radar systems and indicators, as applicable.

3.2.5 Chapter 4 - Mission Equipment

3.2.5.1 General. This chapter shall describe all standard mission equipment that may be utilized with the aircraft. Coverage shall include description, controls and function, operating procedures, power sources, and illustrations. Controls, functions, and operating procedures shall be in the same format as Chapter 3.

3.2.5.2 Section I - Mission avionics. This section shall contain unclassified information regarding mission avionics equipment that is not a part of the standard flight communication, navigation, transponder, or radar equipment. It contains electronic equipment such as radio monitoring systems, side looking airborne radar (SLAR), infrared devices, and photographic equipment. Detailed information shall be given regarding the photographic equipment, including, but not limited to, types of cameras, control stations, camera doors, and capabilities of the equipment. Gun camera equipment shall also be covered. Mission avionics equipment that requires extensive explanation of operating procedures shall be covered in this section or in an appendix. An appendix for mission avionics equipment shall be included only if authorized by the contracting activity (6.2). Classified information on mission avionics equipment shall be covered in a separate classified supplement to the manual.

3.2.5.3 Section II - Armament. This section shall describe gunnery, rocket, tow target, control, and computer equipment and their interrelations when installed. Armor protection shall be discussed along with the individual item which is being protected. When the equipment and their description are extensive, armament equipment may be covered as separate sections. The TM shall also cover precautions and safety considerations.

3.2.5.3.1 Armament control system. This part of the manual shall contain the operating instructions for the armament control system. Also, information such as presentation on the scope or sight, when applicable, shall be included. Warm-up time and preflight, inflight, before

landing, and after landing checks shall be listed. Checklist format and style shall be in accordance with paragraph 3.2.10.2.4.

3.2.5.3.2 Gunnery equipment. Information shall be included on all guns and turrets, including quantity of ammunition which can be carried for each gun. The manual, when describing remote controlled turrets, shall include, but not be limited to, the station from which the turret is operated, method of gaining control of the turret, and method of transferring control. All gunnery controls shall be covered, including gun sight and gun heater.

3.2.5.3.3 Rocket equipment. Information shall be provided regarding the firing procedures, description and capability, controls, and types and number of rockets that can be carried. Typical combinations of rockets and firing order shall be covered. Special precautions, if any, shall be listed.

3.2.5.3.4 Missiles. Information shall be provided regarding the firing procedures, description and capability, controls, and types and number of missiles that can be carried. Special precautions, if any, shall be listed.

3.2.5.4 Section III - Cargo handling. This section shall describe cargo handling systems and equipment to include hoists, winches, and cargo hooks.

3.2.5.5 Section IV - Passive defense. Passive defense equipment shall be described, procedures outlined, and controls and precautions listed. Employment methods shall be discussed.

3.2.5.6 Additional sections. Additional sections may be used as required to describe systems not covered in other sections.

3.2.6 Chapter 5 - Operating Limits and Restrictions

3.2.6.1 General. This chapter shall include all important operating limits and restrictions that shall be observed during ground and flight operations. Special emphasis shall be placed on any unusual restrictions which are particularly characteristic of the aircraft. All time limited operations shall include a time limit and the upper and lower boundaries.

3.2.6.2 Section I - General. This section shall contain general information on aircraft limits and restrictions, including decals and placards. The following statements shall be included in the TM:

Purpose. This chapter identifies or refers to all important operating limits and restrictions that shall be observed during ground and flight operations.

General. The operating limitations set forth in this chapter are the direct result of design analysis, tests, and operating experiences. Compliance with these limits will

allow the pilot to safely perform the assigned missions and to derive maximum utility from the aircraft.

Exceeding operational limits Any time an operational limit is exceeded, an appropriate entry shall be made on DA Form 2408-13-1. The entry shall state what limit or limits were exceeded, range, time beyond limits, and any additional data that would aid maintenance personnel in the maintenance action that may be required.

The TM shall list the minimum crew required for flight. The following statement shall be included:

The minimum crew required for flight is (fill in proper number). Additional crew members, as required, will be added at the discretion of the commander in accordance with pertinent DA regulations.

3.2.6.3 Section II - System limits. This section shall contain all aircraft system limits not covered elsewhere in this chapter that may restrict operation.

3.2.6.3.1 Instrument, interactive display, or display operating ranges and markings. Each instrument, interactive display, or display that indicates an operating limit(s) shall be illustrated and accurately reflect the actual markings/displays on the instrument, interactive display, or display (Figure 15). The information appearing on the illustration depicting markings or displays shall not be repeated in the text or table. The color coded markings/displays or interactive display graphic symbols shall be fully explained. If the instrument, interactive display, or display limits cannot be adequately explained in the space provided for the captions, explanations shall be included under the appropriate paragraph heading in this section. The paragraph shall state or describe all limit ranges, including gaps that may be shown in range markings.

3.2.6.3.2 Propeller limitations. Propeller limitations shall be discussed including, but not limited to, reverse pitch and restricted rpm.

3.2.6.3.3 Rotor limitations. For rotary wing aircraft, rotor limitations during both flight and ground operation shall be discussed, covering such points as restricted rpm, autorational rpm, limitations for startup and shutdown during high winds, and wind gust spread.

3.2.6.3.4 Power limitations. Power limits shall include engine and drive train and idle limitations. This shall include limitations that must be observed when alternate fuel grades are used. Acceleration limits and restrictions that apply to the engine shall be covered. Limits shall be expressed in terms of observable indications that are available to the flight crew; e.g., 360°C, 46 lb.,10 psi. Terms such as military power or takeoff power should not be used.

3.2.6.3.5 Additional limitations. All system limits and restrictions not described by the instrument markings shall be included. Limits and restrictions that should be observed when operating utility, heating, ventilation, cooling, or rain removal systems shall also be included.

3.2.6.4 Section III - Loading limits. Loading limits pertaining to the aircraft shall be discussed in detail in this section.

3.2.6.4.1 Center-of-gravity limitations. Longitudinal limitations shall be described. Lateral limitations shall be described when specified by the contracting activity (6.2). Also, the following statement shall be included:

> CG limits for the aircraft to which this manual applies and appropriate charts for computation of the CG are contained in Chapter 6.

3.2.6.4.2 Weight limitations. All minimum/maximum aircraft weight limitations including parking, towing, taxiing, and takeoff and landing from prepared/unprepared fields shall be provided. For aircraft in which weight distribution is a problem (such as minimum fuel to be carried in the wings at various gross weights), coverage of the limitations involved shall be included. References shall be made to fuel management in Chapter 2, as necessary.

3.2.6.4.3 Turbulence. Restrictions regarding flying in all levels of turbulence shall be discussed. Limitations shall be covered.

3.2.6.4.4 Other limitations. Other types of limitations that affect operations shall be covered, including:

a. Additional restrictions to be observed when carrying stores. For aircraft equipped to carry a variety of external stores, information concerning the stores carried at each station and the maximum lateral unbalanced load that can be carried shall be included.

b. Limitations as to the weight for external sling loads on rotary wing aircraft and speed restrictions, if any.

c. Floor loading limits which are to be observed when carrying internal cargo.

d. Restrictions on jettisoning external stores and sling loads.

3.2.6.5 Section IV - Maximum and minimum airspeed limits. Airspeed limitations shall be discussed, including level flight airspeed, diving airspeed, airspeed for various degrees of flap extension, airspeed for various stabilator positions, airspeed for door opening, and airspeeds under various conditions of weight and configuration. For rotary wing aircraft, sideward and rearward airspeed limits and restrictions shall be discussed. Airspeeds shall be expressed as knots indicated airspeed (KIAS), unless otherwise specified by the contracting activity (6.2).

3.2.6.5.1 Airspeed operating limits chart. This chart shall present operating limits for forward flight at various gross weights, pressure altitudes, free air temperature (FAT), and KIAS (Figure 16).

3.2.6.6 Section V - Maneuvering limits. Maneuvering flight limitations to include acrobatic flight, if applicable, shall be described. Acceleration limitations shall also be covered, including maximum acceleration with tip tanks and maximum bank angle at high gross

NOTICE OF CANCELLATION

NOT MEASUREMENT SENSITIVE

MIL-PRF-63029D(AV)
NOTICE 1
25 October 2001

PERFORMANCE SPECIFICATION

MANUALS, TECHNICAL: REQUIREMENTS FOR OPERATORS' MANUALS AND CHECKLISTS FOR AIRCRAFT

MIL-PRF-63029D(AV), Interim Amendment 1, dated 13 May 1998, is hereby canceled without replacement.

Preparing activity:
Army - AV

(Project TMSS-A380)

AMSC A6038 AREA TMSS

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