TECHNICAL MANUAL

CARGO LOADING MANUAL

NAVY MODEL

MV-22B
TILTROTOR

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CHAPTER 1

Introduction

1.1 PURPOSE

The purpose of this manual is to provide cargo-handling personnel with sufficient information and data to load, secure, and off-load all types of cargo efficiently and safely, and to explain the restrictions governing these operations. The manual includes procedure pertaining to ground functions only.

1.2 WARNINGS, CAUTIONS, AND NOTES

The following definitions apply to WARNINGS, CAUTIONS, and NOTES found throughout the manual.

WARNING

An operating procedure, practice, condition, statement, etc., which, if not strictly observed, could result in injury to, or death of, personnel.

CAUTION

An operating procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to, or destruction of equipment, or loss of mission effectiveness.

NOTE

An essential operating procedure, condition, or statement, that is essential to emphasize.

1.3 MANUAL CONTENT

The manual is divided into seven chapters:

Chapter1 - Introduction. This chapter contains a brief introduction to the aircraft and to this publication.

Chapter 2 - Description of Aircraft Features (other than installation and operation). This chapter presents a general description of the cargo compartment, including profile and cross chapter, loading capabilities, entrances and exits, cargo floor, tiedown fittings, seat and litter provisions, cargo loading aids, and stowage provisions for cargo loading aids and tiedown devices.

Chapter 3 - Aircraft Configuration (Application). This chapter presents aircraft preparation instructions with respect to aircraft cargo loading, airdrop provisions, and personnel equipment.

Chapter 4 - General Procedures (Operation). This chapter contains instructions relative to load planning, loading, post-loading, and off-loading procedures to include checklist.

Chapter 5 - Emergency Procedures. This chapter describes all ground preparations required for cargo emergency procedures.

Chapter 6 - Specific Procedures (Operation). This chapter contains all instructions necessary relative to preloading, loading, post-loading, preflight, and off-loading procedures for cargo which, due to physical characteristics, cannot be handled in accordance with the general procedures of Chapter 4.

Chapter 7 - Airdrop Procedures (Personnel and Cargo). This chapter presents instruction relative to the procedures required for airdrop of personnel and cargo.

1.4 THE AIRCRAFT

[A] Data specifically pertaining to aircraft without Internal Cargo System modification (BuNo 164939 through 165440) will be identified with an **[A]** effectivity code throughout this manual**.** Data identified by an **[A]** effectivity code does not pertain to aircraft BuNo 165441 and subsequent.

The MV-22 Osprey is a tiltrotor, Vertical Takeoff and Landing (VTOL), multimission aircraft manufactured by Bell Helicopter Textron and Boeing Helicopters. The tiltrotor design allows the engine nacelles and

rotor system (proprotors) to be rotated to the horizontal position after takeoff. Thus, the V-22 combines the VTOL capability of a helicopter with the speed and range performance of a turboprop airplane.

The aircraft is a twin engine, high wing, H-empennage design with retractable tricycle landing gear. The airframe is constructed primarily of graphite reinforced epoxy composite material. The composite structure provides improved strength-to-weight ratio, corrosion resistance, and damage tolerance compared to typical metal construction.

The two turboshaft engines are housed in wing tip nacelles. Each engine drives a proprotor through a Proprotor Gearbox (PRGB) attached to the front of the engine. The proprotor gearboxes are connected by drive shafting to Tilt-axis Gearboxes (TAGB) which are aligned with the nacelle pivot axis. The TAGB are connected to each other by interconnect shafting.

The interconnect shafts power a Midwing Gearbox (MWGB) located in the center wing aft of the rear spar. The MWGB drives two ac generators, a flight control/utility hydraulic pump, a pneumatic compressor, and an oil cooling fan. A gas turbine auxiliary power unit (APU) mounted on the MWGB drives the gearbox to supply ground electrical, hydraulic, and pneumatic power when the engines are not operating. Hydraulic, electrical, and pneumatic power can also be supplied by external power units.

Seating is provided for 4 crewmembers and 24 troops or 12 litter patients and 4 passengers. A cargo ramp and a roller rail handling system facilitate loading and unloading of personnel and cargo. Heavy cargo can be winched into the aircraft using a hydraulic winch installed under the cockpit entry way. Tandem cargo hooks permit flight with external loads.

An integrated Cockpit Management System (CMS) replaces conventional cockpit instruments and control panels. Four Multifunction Displays (MFD), two in front of each pilot, provide display of flight symbology data, sensor video, communications, navigation and aircraft system status. A Control Display Unit (CDU), located in the center console, is used to input data to the CMS. Cargo weight and location can be input, and the CMS will display aircraft gross weight and center-of-gravity (cg) location for both the VTOL and airplane (APLN) modes.

Shipboard compatibility is enhanced by the Blade Fold/Wing Stow system. The proprotor blades are folded parallel to the wing leading edge, the nacelles rotated horizontal, and the wing rotated 90° clockwise to the fore and aft position.

CHAPTER 2

Description of Aircraft Features

2.1 CARGO COMPARTMENT

The cargo compartment (Figure 2-3) extends from fuselage station 309.0 to station 559.0. The cargo compartment is intermittently fitted with cargo tie-down fittings. The cargo compartment is divided into four zones which are identified D through G. Cargo compartment minimum width is a constant 68 inches when the troop seats are in the stowed position. Minimum cabin height, from the top of the cargo floor, is 66.2 inches (Figure 2-4). Aft of the cargo compartment is hydraulically operated ramp and door. The ramp is fitted with 4 cargo tie-down fittings, and is identified as zone H. The cargo compartment and ramp are equipped with roller conveyors to aid in cargo loading. The cargo compartment is equipped with a hydraulic winch to aid in loading heavy cargo. The aircraft also may be fitted with an air drop kit for aerial delivery of internal cargo loads.

2.1.1 Cargo Area Floors. The cargo compartment floor consists of individually removable floor panels. Each section consists of fiberglass skin panels bonded to a Nomex core. Two hinged hatches provide access to the external cargo hooks. Watertight pans in both the cabin and ramp floor allow the cargo tiedown rings to lie flush with the floor when not in use. Cargo compartment floor load limit is 300 pounds per square foot.

2.1.2 Tie-down Fittings. 18 (**[A]** 16) of the tie-down fittings located in the cargo compartment floor (Figure 2-5) are rated at 7,000 lbs when used with a traditional unattenuated tiedown device, and 10,000 lbs. when used with an attenuated tiedown device. The remaining 26 (**[A]** 30) tie-down fittings (including four on the ramp) are rated at 3,500 lbs when used with an unattenuated device, and 5,000 lbs. when used with an attenuated device. A 5,000/3,500 lb tiedown fitting is installed on each side of the cabin frame at stations 371, 505, and 422 (**[A]** stations 371 and 505 only) for installation of the barrier net.

WARNING

The maximum cargo tie-down ratings are only valid if the cargo tie-down strap with attenuators are used. If cargo tie-down straps or chains are used that do not have attenuators, the cargo tie-down limitations are reduced. Cargo tie-down calculations must be made with this taken into consideration.

2.1.3 Cargo Ramp and Door. The cargo ramp and door provides a means of loading and deployment of troops and cargo. The cargo ramp floor is a single panel, similar in construction to the cabin floor panels. The ramp is lowered by gravity when the aircraft is on the ground, and is powered down by the No.3 hydraulic system during flight.

An electrically operated hydraulic maintenance pump, located in the aft right sponson, provides 3000 psi to operate the ramp and door when the No.3 hydraulic system is not operating. The maintenance hydraulic pump is supplied hydraulic fluid from system No.3. Electrical operating power (28 vdc) is supplied from the battery by the MAINTENANCE/UNSWITCHED bus through a circuit breaker marked MAINT PUMP on the No.3 circuit breaker panel. The maintenance pump can be activated at the FCCS RAMP/DOOR control panel, the aft cabin control panel, or the external ramp control panel. The pump is activated by pushing and holding the switch.

NOTE

The battery must be ON for the HYDRAULIC MAINTENANCE PUMP switch at the FCCS to operate. The battery is not required to be ON to use the HYDRAULIC MAINTENANCE PUMP switches on the aft cabin control station or the external ramp control station.

The ramp and door can be controlled from the cockpit RAMP/DOOR control panel on the overhead con-

sole, the RAMP/DOOR control panel at the FCCS, the aft cabin control station, or externally on the right sponson under panel 7RS7 (Figure 2-6). Ramp control power is supplied by the dc ESSENTIAL/BATTERY bus through the FWD RAMP/DOOR circuit breaker in the No.3 circuit breaker panel, and the MAINTENANCE/UNSWITCHED bus through the AFT RAMP/DOOR circuit breaker on the No.3 circuit breaker panel.

WARNING

Before raising or lowering the ramp, visually ensure that the ramp and ramp area are clear of personnel.

CAUTION

Before lowering the ramp, ensure the ramp extensions are up, the area under the ramp is clear, and the ground is of equal load carrying capability to avoid twisting the ramp when loads are applied.

2.1.3.1 Ramp Control Valve. The ramp control valve, located in the aft cabin right side, controls hydraulic fluid to and from the ramp actuators, the ramp door actuators, and the ramp door latch actuators. The ramp control valve has a lever for operating the ramp (square head), and a lever for operating the ramp door (round head). When the RAMP control lever is set to CLOSE, hydraulic power (5000 psi from system No.3, or 3000 psi from the maintenance pump) is applied to retract the ramp actuators. When fully retracted, mechanical uplocks retain the actuator piston. A mechanical indicator and a position switch on each actuator provide a visual and electrical indication that the actuator pistons are locked. Two hydraulically operated latches, internal to the actuators, secure the ramp when the ramp actuators are fully retracted. The position switches are actuated closed when the ramp is latched. When the DOOR control lever is set to CLOSE, hydraulic pressure is supplied to the extend chamber of the door actuators, extending the actuators. When the actuators reach the fully extended position (door closed), the locking mechanism engages and locks the actuators in the extended position.

Moving the RAMP control lever to OPEN directs hydraulic pressure to the latch actuators, ramp actuator uplocks, and connects the extend and retract sides of the ramp actuators together and to system return. A 1-second delay valve in each ramp actuator allows the latches to unlock before releasing the ramp actuator locks. When the latches and actuators are unlocked and the aircraft is on the ground (weight-on-wheels), gravity opens the ramp as fluid in the bottom end of the actuator is displaced through the control valve to the top end of the actuator. When the aircraft is off the ground, the ramp control valve will hydraulically power the ramp to the down position by pressing down the POWER DOWN plunger. When the DOOR control lever is set to OPEN, hydraulic pressure is applied to each door latch actuator (extending the latch actuators and unlatching the door), and to the door actuators unlock ports. Through a delay valve, pressure is sent to the door actuator's locking mechanism. The door actuators retract, and the door opens. Removal of fluid pressure will cause the actuator to stop and hydraulically lock at it's current position. Movement of the latches and unlocking of the actuators open the four position switches, causing a RAMP/DOOR ASI to be displayed on the CDU. Setting the control valve lever to the centered position shuts off fluid flow and stops the ramp at any intermediate position.

CAUTION

Do not use the POWER DOWN plunger while the aircraft is on the ground. Failure to comply may result in damage to the ramp.

2.1.3.2 Cockpit RAMP/DOOR Control Panel. The RAMP/DOOR Control panel (Figure 2-6) allows the position of the ramp or door to be controlled from the cockpit. Both the ramp and cargo door may be controlled individually and independently. The control panel provides the capability to automatically set the ramp to the full open, level, or closed positions in the AUTO mode, or to any intermediate position between open and closed using the MANUAL mode. A ramp position indicator provides ramp position in relation to the aircraft fuselage. The ramp position indicator legends illuminate when the ramp is in the full open (OPN), level (LVL), or full closed (CLS) position. The ramp position indicator fills incrementally to show any position between full open and full closed. A separate door position indicator illuminates when the door is in the full OPEN or PARTIAL open positions. Half of the door position indicator illuminates yellow when the door is partially open, while the other half illuminates green when the door is full open. Only one light is displayed at a time. The cockpit control panel has override authority over the other ramp control stations.

2.1.3.3 [A] Cockpit RAMP/DOOR Control Panel. The RAMP/DOOR control panel allows for operation of the ramp control valve electrically from the cockpit. The RAMP and DOOR switches are two-position toggle switches marked OPEN and CLOSE. The switches will illuminate when either the ramp is not up and locked, or the door is not down and locked. The cockpit control panel has override authority over the other ramp control stations.

2.1.3.4 FCCS RAMP/DOOR Control Panel. The FCCS RAMP/DOOR control panel (Figure 2-7) allows for operation of the ramp control valve and maintenance pump (electrically) from the forward cabin area. The HYDRAULIC MAINTENANCE PUMP switch will only operate if the aircraft battery is ON, or ac power is applied. When using the maintenance pump to operate the ramp or door, the pump switch and the directional switch (RAMP/DOOR, UP/DOWN) must be used simultaneously.

2.1.3.5 External Ramp Control Panel. The external ramp control panel allows for external operation of the ramp control valve and maintenance pump (electrically) from the aft right sponson area. The HYDRAULIC MAINTENANCE PUMP switch will operate without the aircraft battery being ON, or ac power applied. When using the maintenance pump to operate the ramp or door, the pump switch and the directional switch (RAMP/DOOR, UP/DOWN) must be used simultaneously

2.1.4 Personnel and Troop Provisions.

2.1.4.1 Cabin Door. The cabin door is located on the right side of the aircraft between sta 269 and 309. It is a two-piece door; the upper half opens upward into the cabin on roller tracks, the lower half hinges outward at the bottom to provide steps when opened. Door latch pins on each side of both doors engage holes in the doorway frame. The latch pins for the upper and lower doors are operated by an internal handle on each door and an external flush mounted lever on the lower door. When opened, the upper door is retained by a latch at the top of the aft track. The lower door is supported by cables attached to the door frame.

Internal and external emergency release levers are installed in the upper door. Pulling either lever disengages the door rollers from their tracks, the door lock pin (if engaged), and the door latch pins. The upper door can then be withdrawn into the cabin if the cabin is not pressurized.

2.1.4.2 Intercommunications System (ICS). The aircraft ICS consists of six internal stations and one external station. Three ICS are installed in the cabin, one at the jump-seat, and two in the cockpit. The crewchief's ICS panel is located on the right cabin bulkhead at station 334. An ICS control panel is located at the aft control station on the right bulkhead at station 575, and at the troop commander's position on the forward left bulkhead at station 371. An intercom push-to-talk switch is incorporated in the Hoist/Winch Operators Grip (H/WOG). The H/WOG can be plugged into either the Forward Cabin Control Station (FCCS) (Figure 2-7), or a receptacle located at sta 466, right side. When the grip is connected to the FCCS, communications are controlled by the crewchief's ICS panel. When connected to the aft receptacle, control is by the aft cabin ICS panel.

2.1.4.3 Cabin Lighting. General cabin lighting is provided by four dual-lamp white/NVIS blue-green selectable dome lights. The FCCS, aft control station, and the ICS control panels are integrally lighted panels. Cabin lighting is controlled by the DOME LIGHTS rotary control and the PANEL LIGHTS toggle switch on the FCCS, and the NVG/NORM MODE push-button on the cockpit overhead LIGHTING control panel (Figure 2-1). The white dome lamps are disabled and the blue-green lamps enabled when the NVG lighting MODE is selected. Cabin dome light power is supplied by the No.3 dc bus through the CABIN DOME LIGHTS circuit breaker on the No.3 circuit breaker panel. Panel lighting power is provided by the No.2 ac bus through the CABIN PANEL LIGHTS circuit breaker on the No.2 circuit breaker panel.

2.1.4.4 Troop Seats. Cabin seating is provided for the crewchief and twenty-four troops (Figure 2-8). The seats are individual crash-attenuating and face inboard. Twelve troop seats are arranged on the left side of the cabin and thirteen on the right, with the forward seat on the right side being the crewchief seat. Each seat is fitted with an automotive style seat belt and shoulder harness. When not in use, the hinged seat bottoms are stowed against the cabin wall. Installation of the litters or loading of cargo does not require removal of the seats.

Installed, the troop seats restrict access to the window escape hatches. Pulling the escape hatch handle will release the adjacent seat attachments, releasing the seat and allowing access to the window escape hatch.

2.1.4.5 Crash Worthiness. All seats in the cabin are crash attenuating with a vertical stroke of 12 inches minimum. Three-point straps restrain seat occupants. Load attenuation is performed by the seat attachment fittings (seat side frames) which taper down from bot-

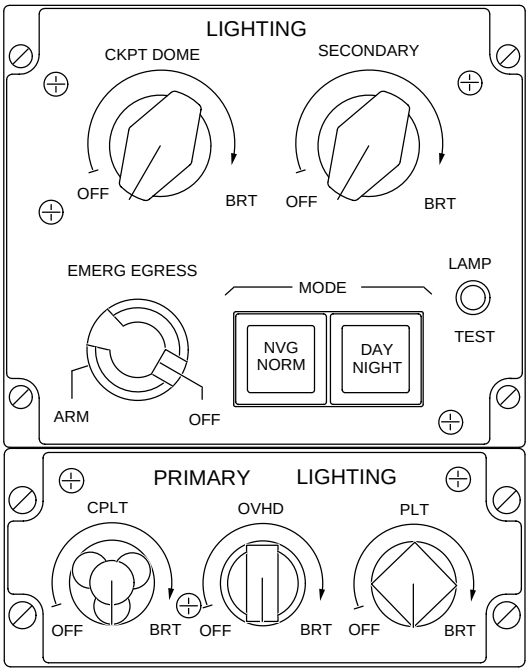

Figure 2-1. Cockpit Lighting Control Panel

tom to top, and provide constant attenuation as the seat strokes down.

WARNING

Do not stow equipment or place feet and legs under seats to prevent injury and loss of seat load attenuation in the event of crash/hard landing.

2.1.4.6 Litter Provisions. When the provisions kit is installed, up to 12 litter patients can be accommodated with 4 cabin seats available for medical attendants (Figure 2-9). The litters are supported by four stanchion and strap assemblies on each side of the cabin. The stanchions support the outboard litter poles. Hooks, located on the adjustable strap assemblies, support the inboard litter poles. No troop seats need be removed for the installation of the litter kit.

2.1.4.7 Emergency Provisions and Exits. For emergency provisions and exits refer to Chapter 12 of the NATOPS Flight Manual (A1-V22AB-NFM-000).

2.1.4.8 Utility Receptacles. Four 115 volt, 3 phase utility receptacles are provided in the cabin. Two at mid cabin, left and right sides and two at the aft cabin, left and right sides.

2.2 AIRCRAFT CARGO AIDS

Cargo aids consist of the following items:

- Cargo Winch System
- Cargo Roller Rails
- Guide Rails
- Cargo Buffer Boards
- Cargo Straps/Attenuators
- Barrier Nets
- Ramp Extenders
- Roller Rail Pallet Stops

2.2.1 Cargo Winch System. A 2000-pound capacity hydraulically powered cargo winch with 150 feet of cable is installed under the cockpit passageway floor between station 250 and 269 (Figure 2-10). Power for the winch motor is supplied by the No.3 utility hydraulic system through the hoist/winch control module. The winch drum is equipped with automatic cable level wind and maintains a slight tension on the cable during rewind to prevent snarling of the cable. Limit switches stop the drum on reel in and reel out when the cable travel limit is reached. When stopped, the drum brake is automatically applied to prevent further cable movement. The winch cable terminates with a quick disconnect fitting for attaching a removable hook. The hook and four winch accessory pulleys are provided as aircraft equipment. The rigging for internal loading may be accomplished using the pulleys to increase mechanical leverage of the winch.

2.2.1.1 Winch Control. Setting the HOIST/WINCH switch on the FCCS (Figure 2-7) to WINCH energizes the selector valve solenoid directing No.3 hydraulic system utility pressure to the cargo winch. The H/WOG can be removed from it's stowage bracket and connected at either the FCCS or to a receptacle at sta 466, right side. The two control locations allow the operator to be anywhere in the cabin, or outside the aircraft adjacent to the ramp. Direction and speed of the winch is controlled by the WINCH/HOIST control on the H/WOG. The variable speed control allows a max-

imum winch cable speed of 80 fpm, or 25 fpm with 2,000 lbs. attached.

2.2.1.1.1 Hoist/Winch Control Module. Operation of the cargo winch and the rescue hoist is controlled by a hydraulic control module located at station 316, aft of the cabin door, and above the FCCS (Figure 2-7). The control module directs No.3 hydraulic system pressure to either the winch or the rescue hoist system, controls operation of the winch or hoist brake, and both the direction and speed of the winch/hoist drum. The control module is normally operated electrically by controls on the HOIST/WINCH section of the FCCS, and the H/WOG. In case of an electrical malfunction, the control module can be operated manually. Stencils identify the valves and indicate the direction of control.

2.2.1.2 Pulley Blocks. Four 5000 pound capacity pulley blocks (Figure 2-2) are used to guide the winch cable or to increase the winching capacity during cargo handling. The pulley blocks may be connected to any tiedown fitting as long as the cable loads applied do not exceed the rated strength of the fitting for the direction in which the load is applied.

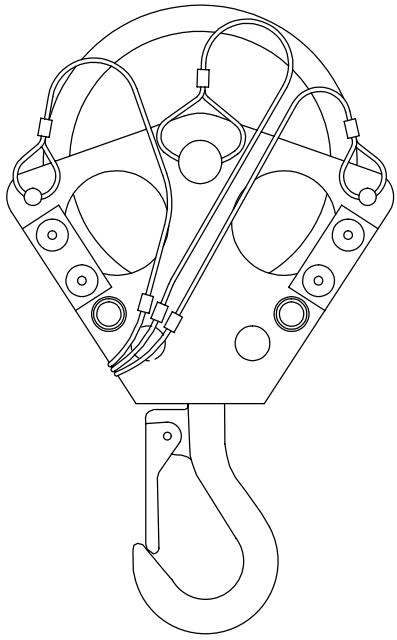

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Figure 2-2. Pulley Block (Typical)

2.2.2 Cargo Roller Rails. Eight cargo roller rails (Figure 2-11) are used on the cargo floor and ramp to assist the loading and unloading of palletized or large crated cargo. One row of roller rails is centered on LBL 18.58, and one row is centered on RBL 18.58. When not in use, the cargo roller rails can be stowed in the cabin floor channels with the rollers facing down. Latches installed in the floor channels are used to hold the roller rails in either the stowed or deployed position. The four forward cabin roller rails are interchangeable. The aft cabin roller rails are interchangeable, and the ramp roller rails are interchangeable.

2.2.3 Cargo Guide Rails. Eight cargo guide rails are used to assist in keeping palletized or large crated cargo aligned on the cargo roller rails during loading or unloading (Figure 2-12). The cargo guide rails are installed into tracks on the cabin floor. The tracks allow each guide rail to be adjusted in one-inch increments to allow for various sizes of cargo. Each track has three index ridges to facilitate quick positioning of guide rails for 40, 48, and 54 inch wide pallets. The ramp guide rails have a slight bend to provide a channeling effect. To compensate for this bend, the aft ramp guide rail fittings must be installed offset one increment outboard of the forward fittings. When not in use, the guide rails are stowed in brackets on the cabin wall (Figure 2-22).

2.2.4 [A] Cargo Roller Rails. Roller rails (Figure 2-13) are installed on the cargo floor and ramp to assist the loading and unloading of palletized or large crated cargo. The eight rail assemblies (six used in the cabin and two used on the ramp) are identical and can be installed at any location. Each assembly consists of 11 polyethylene rollers mounted between rails.The location of the individual rails and the lock pin receptacles are marked on the cabin floor. Cargo roller rail installation is accomplished by inserting the rail assemblies into the floor receptacles, and sliding the assemblies until the locking pins engage. The roller rails are then secured by tightening the wing-nuts. The rails are installed with the guides outboard. The right hand cargo rails are installed along RBL 25.56. The left hand rails are installed at LBL 8.91 for standard 40 x 48-inch pallets or at LBL 22.60 if 463L half pallet (54 inches by 88 inches) spacing is needed. Folding guides are attached to each roller assembly to prevent the cargo from shifting off the rails. The guides stow over the rollers when not in use. Guide stowage is accomplished by pulling out the locking pins, folding the guides into the stowed position, and inserting the locking pins.

2.2.5 Cargo Buffer Boards. The buffer boards are designed to be deployed when loading and unloading wheeled vehicles to protect the troop seats and/or aircraft structure from damage (Figure 2-14). The buffer

boards, in their stowed position, are designed to be compatible with the litter installation as well as the troop seats, allowing the seats to fully stroke in the event of a crash.

NOTE

- With the buffer boards in the deployed position, the last four troop seats on each side of the cabin must be stowed.
- **[A]** With the forward buffer boards in deployed position, the first six troop seats on each side (and the crewchief seat on the right side) must be stowed, and with the aft buffer boards in the deployed position, the last seven troop seats on each side must be stowed.

2.2.6 CH-46 Ramp Roller Rail Extension Interface Kit. The CH-46 ramp roller rail extension interface kit is used to provide a means to load palletized cargo when a forklift is not available or practical. (Figure 2-16).

2.2.7 Tiedown Strap/Load Attenuator Assemblies. The tie down straps/load attenuators (Figure 2-17) are designed to absorb the inertial energy of a load during a crash or hard landing. When properly used, the strap/attenuators increase the limit of the load that can be secured to the cabin floor tie-downs, as compared to a typical cargo tie-down strap/chain without an integral attenuator. Each strap has index marks in one-inch increments to determine the length of the strap that is extended from the ratchet. 16 dual attenuator straps, and 16 single attenuator straps are provided on the aircraft.

2.2.8 MB-1 Tiedown Devices. MB-1 tiedown devices are 10,000 pound capacity tiedown chains (Figure 2-18). These devices consist of a hook/tensioning device and a chain with and integrated hook.

2.2.9 CGU-1/B Tiedown Devices. CGU-1/B tiedown devices are 5,000 pound capacity tiedown straps (Figure 2-19), and can be used to tiedown light loads. These devices consist of a ratchet/hook, nylon webbing, and a flat tiedown hook assembled together to form a unit.

2.2.10 Barrier Net. The barrier net (Figure 2-20) may be attached to the cabin frame and cargo tiedowns in the floor to provide forward restraint for bulk cargo.

NOTE

- When the barrier net is used to restrain low profile loads, adjust attachment points of restraint members to the barrier net so that primary effect is for forward restraint.
- To aid in installation of barrier net, use markings on attenuated straps to ensure straps on each side of load are cinched to equal lengths.

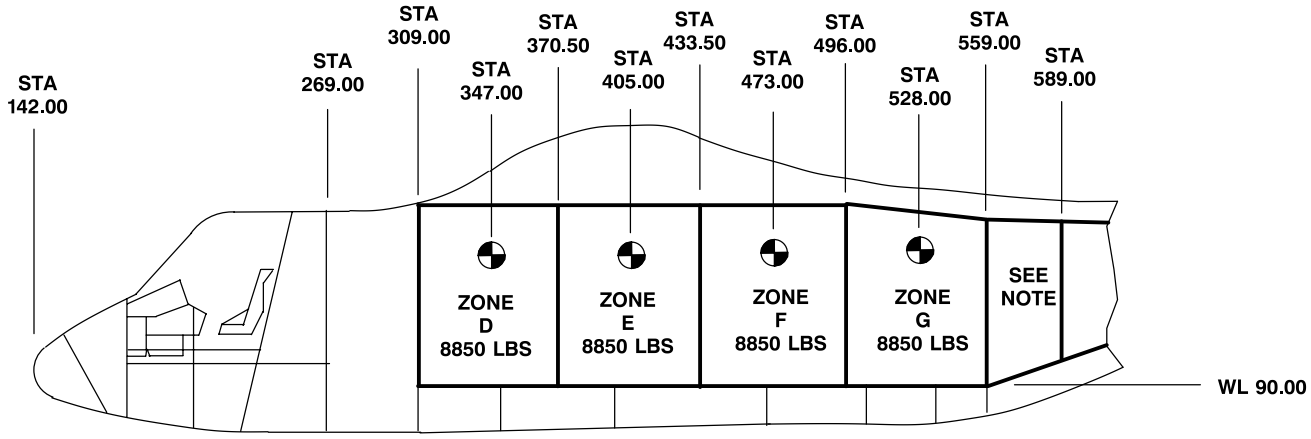
2.2.11 Ramp Extenders. Two ramp extenders (flippers) can be attached to the aft end of the ramp to aid in loading of wheeled cargo (Figure 2-21). When not in use, the extenders are folded back onto the ramp and secured in the stowed position with latches on the outside edge of the ramp.

CAUTION

The ramp extenders must be stowed prior to raising the ramp and closing the ramp door.

2.2.12 Roller Rail Pallet Stops. Two pallet stops are used on the forward end of the cabin roller rails to prevent palletized cargo from rolling off of the forward end of the roller rails. Each pallet stop is installed over the forward roller, and secured in place with a pin latch. **[A]** One pallet stop is provided to be utilized on the forward end of either cabin roller rail to prevent palletized cargo from rolling off of the forward end of the roller rails.

2.2.13 Cargo Aid Stowage. Refer to Figure 2-22.



NOTE: FOR LOADS IN EXCESS OF 1000 POUNDS, POSITION CG OF LOAD WITHIN EXTREMES PRIOR TO LEVELING RAMP

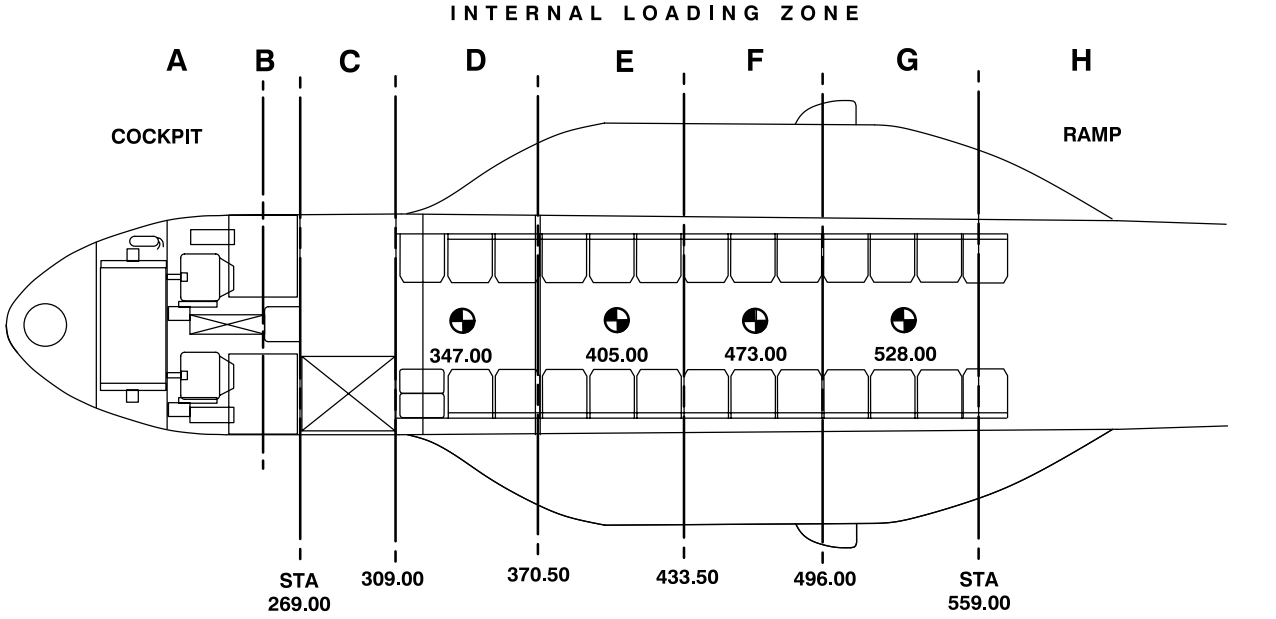


Figure 2-3. Cargo Loading Zones

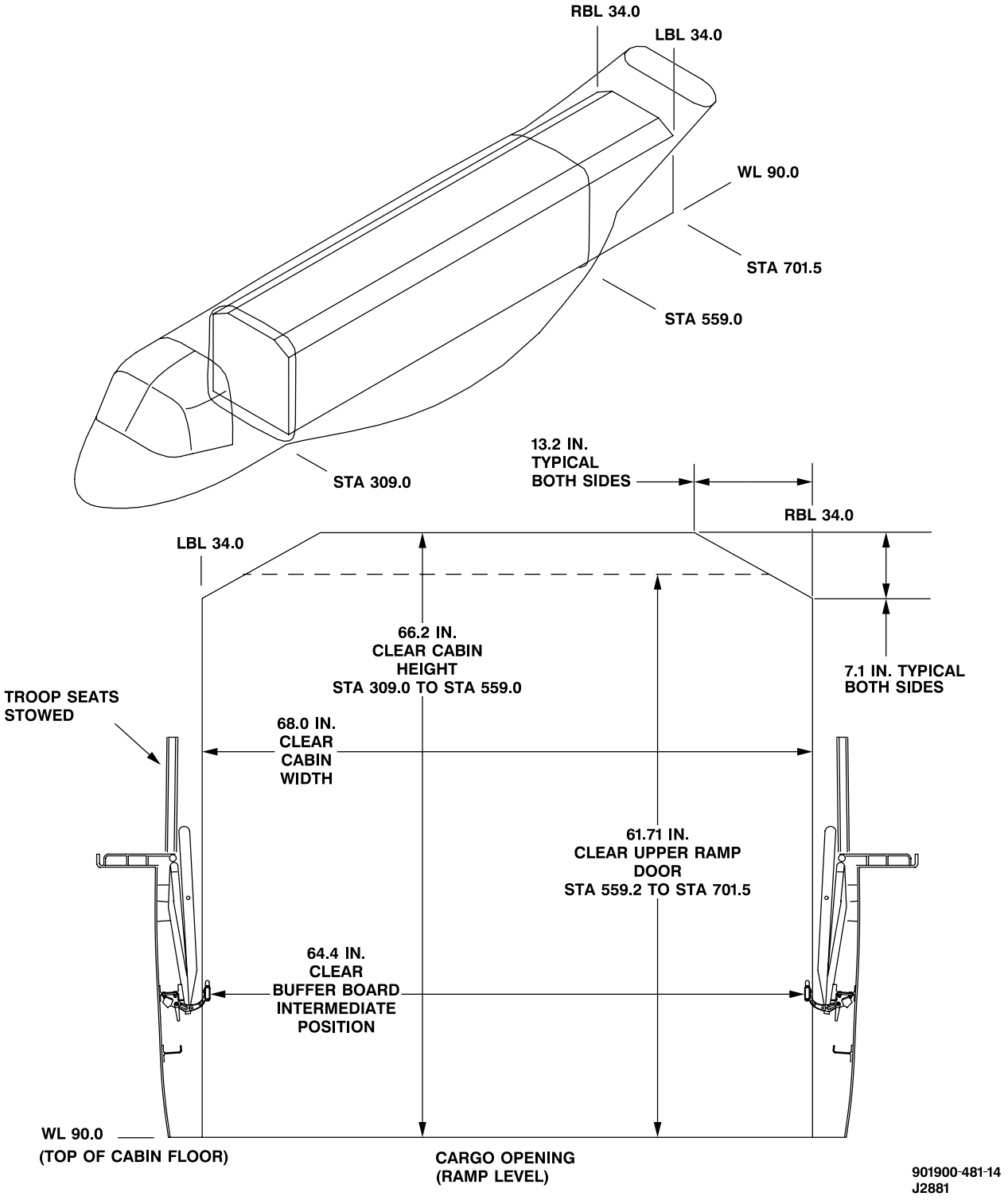


Figure 2-4. Cargo Compartment Dimensions

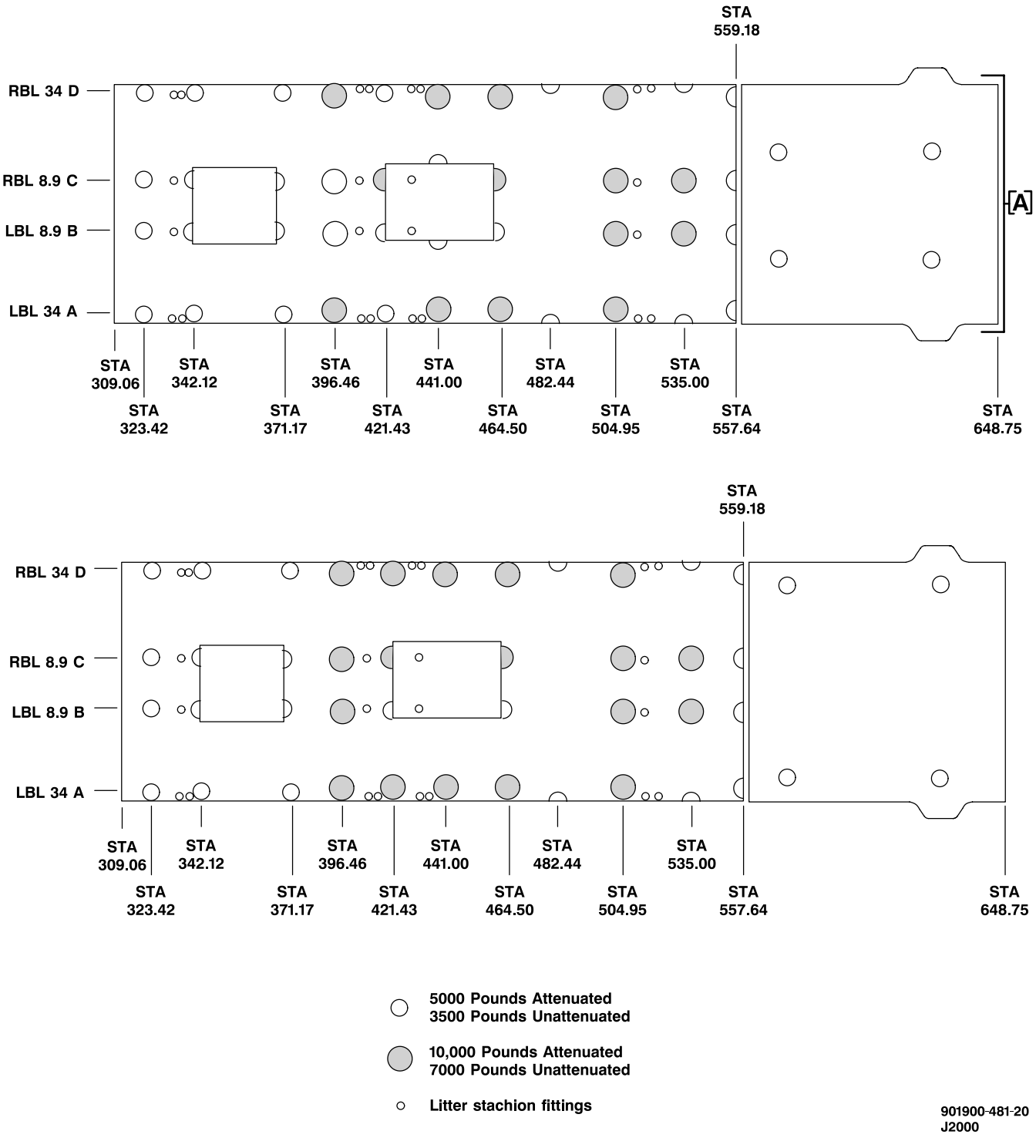


Figure 2-5. Cargo Compartment Floor Tiedown Fitting Locations

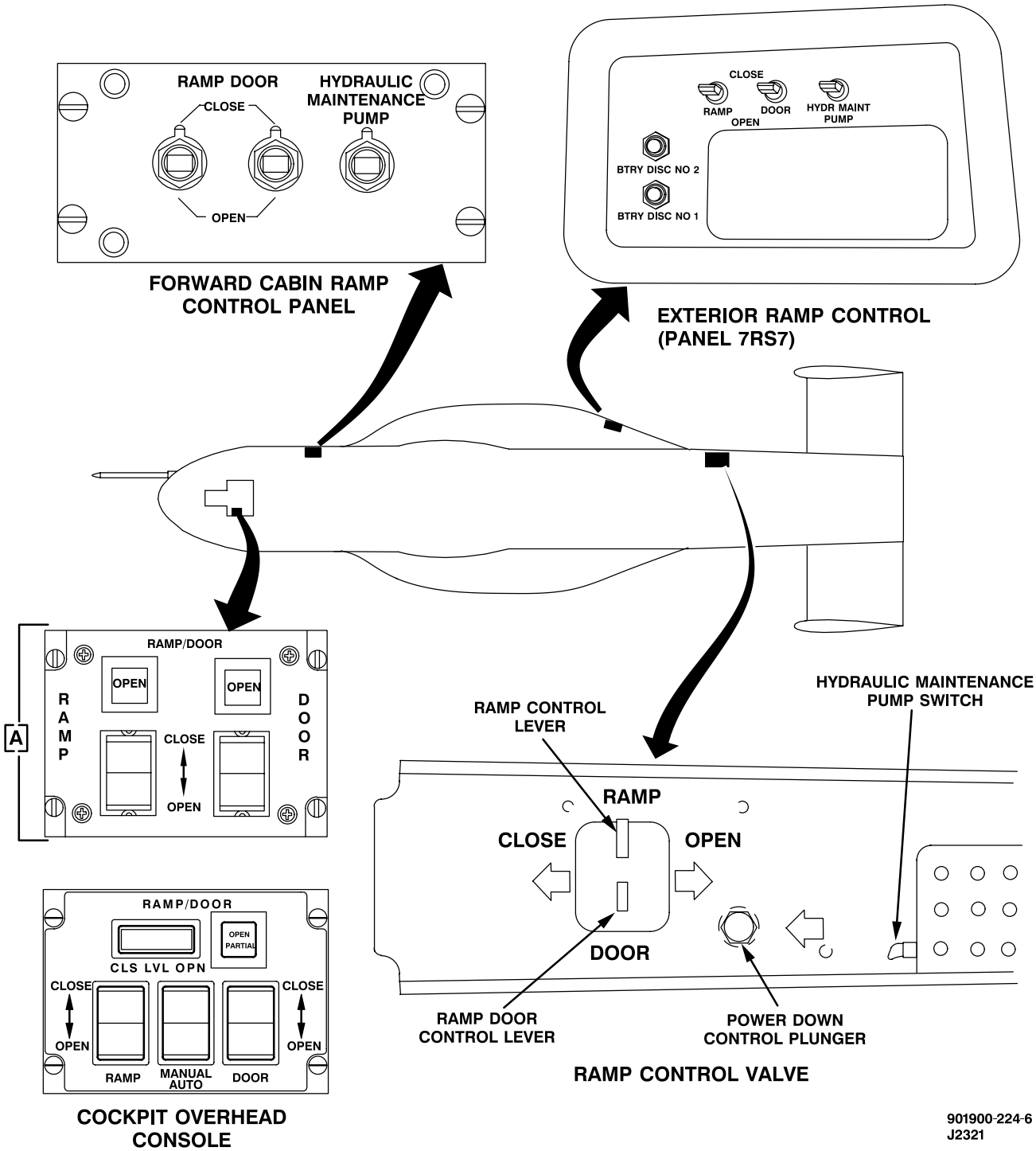


Figure 2-6. Ramp and Door Controls