CHAPTER 10

SUSPENSION, ARMING, AND RELEASING EQUIPMENT

The Navy uses complex suspension, arming, and releasing devices in combat aircraft and weapons. The high speed and performance of potential targets and our own aircraft require the electronic operation of suspension, arming, and releasing equipment.

The equipment covered in this chapter is part of the aircraft search or kill stores systems. Generally, these devices operate electrically and are controlled by aircraft electrical circuits. A circuit-closing device actuates them manually by a hand switch or automatically in the system.

BOMB RACKS

LEARNING OBJECTIVE: *Identify the purpose and use of bomb racks. Recognize the bomb racks used for various configurations, and identify the operation of bomb racks to include electrical and manual release and arming.*

Aircraft bombs, torpedoes, mines, and other stores are suspended internally or externally from the aircraft by bomb racks. Bomb racks carry, arm, and release stores.

Aero 1A Adapter Assembly

The Aero 1A adapter assembly (fig. 10-1) lets you load and carry weapons/stores that have suspension lugs spaced 30 inches apart and weigh up to 2,000 pounds. When you install two Aero 1A adapter assemblies on the bomb rack (one on either end), the adapter assemblies let you attach the bomb rack to the aircraft pylon assembly. The Aero 1A adapter linkage attaches to the bomb rack. The movement of the Aero 1A adapter suspension hooks corresponds to the movement of the bomb rack suspension hooks. If you need more information about the Aero 1A adapter assembly, refer to *Bomb Rack Adapter Assembly Aero 1A*, NAVAIR 11-5E-17.

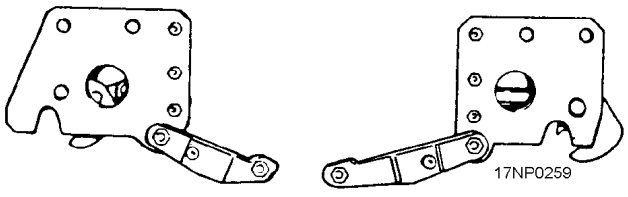


Figure 10-1.—Aero 1A bomb rack adapter assembly.

PENGUIN MISSILE LAUNCH ADAPTER

The MLA attaches to the left outboard pylon of the SH-60 helicopter and provides mechanical attachment points for the missile launch and release system. The missile launch adapter is equipment with the BRU-14 bomb rack with Aero 1B adapters, which provide the rack with 30-inch suspension.

BRU-12/A BOMB RACK

The BRU-12/A bomb racks (fig. 10-2) is designed for fixed mounting inn a bomb bay of military aircraft and can be used to carry, arm, and release a weapon/store weighing up to 1450 pounds and has two hooks, spaced 14 inches apart. Two solenoid actuated arming units, at the bottom of the rack, provide mechanical arming for the nose and tail of a weapon/store. These units are electrically actuated to arm a weapons/store as it is dropped. If the arming units are not electrically actuated, the weapon/store will drop unarmed. A Linear Electromechanical Actuator (LEMA) provides electrical release of a weapon/store. No in-flight manual release mechanism is provided.

BRU-14/A BOMB RACK

The BRU-14/A bomb rack (fig. 10-3) provides suspension and release of conventional and special weapons/stores up to 2,200 pounds with 14-inch suspensions. At times, Aero 1A adapter assemblies are used to increase the bomb rack to 30-inch suspension capacity. You may install it in the bomb bay of the P-3C and S-3 aircraft.

Sway braces are bolted to the rack frame. Installation of an IFOBRL allows remote locking and unlocking of the rack when electrical power is applied to the aircraft.

The BRU-14/A bomb rack has an auxiliary unlock assembly. It releases the IFOBRL if it fails to function

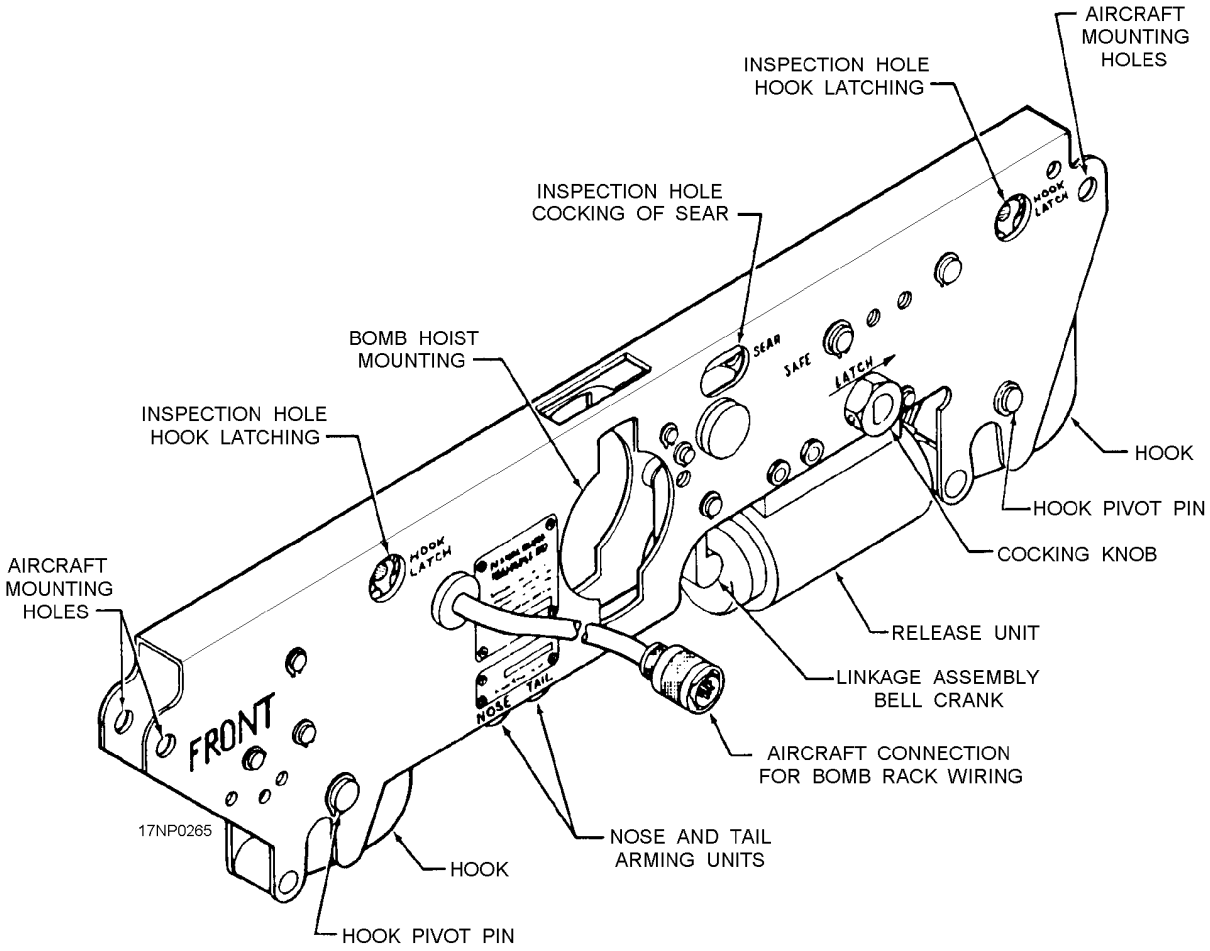


Figure 10-2.—BRU-12/A aircraft bomb rack.

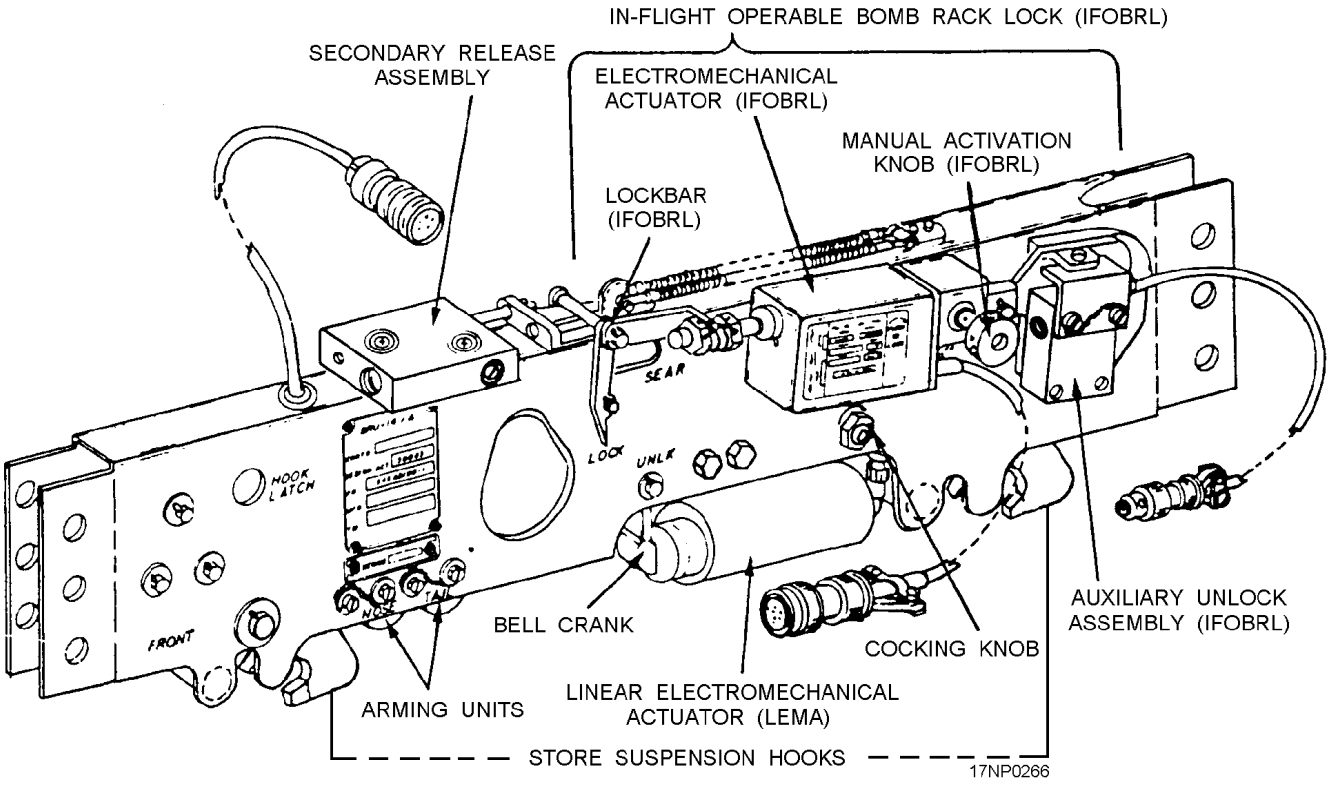


Figure 10-3.—BRU-14A aircraft bomb rack (left-hand configuration).

in the normal release mode. The auxiliary unlock assembly is a cartridge-actuated device (CAD) that provides a mounting point for the aft end of the IFOBRL. When actuated, the unlock assembly releases the IFOBRL and allows it to move forward. This frees the sear link from restraint and lets the rack linkage function normally.

The BRU-14A bomb rack has a secondary release assembly. It initiates hook release if the LEMA fails to function. The secondary release assembly is a CAD that consists of a housing, piston, and release slider assembly mounted on the top of the bomb rack frame. When actuated, the secondary release moves the sear link forward to release the bomb rack. The BRU-14/A doesn't have remote manual-release capabilities.

If you want more information about the BRU-14/A bomb rack, refer to *Bomb Rack BRU-14/A and BRU-15/A*, NAVAIR 11-5E-18.

BRU-15/A BOMB RACK

The BRU-15/A bomb rack (fig. 10-4) is installed on the wing stations of the P-3 aircraft. It is used with the aircraft wing store launcher assembly, which is modified to launch a Harpoon missile. You can attach Aero 1A adapter assemblies to increase the bomb rack to 30-inch suspension capacity.

The BRU-15/A bomb rack is a modification of the BRU-14/A bomb rack. The functional and physical characteristics of the BRU-15/A are shown below.

- The IFOBRL mechanism and associated auxiliary unlock device are not included.
- There is a safety mechanism to positively lock the release mechanism of the bomb rack when a safety pin is installed.
- There is a cable-actuated manual release mechanism that operates the primary release linkage through an added manual release cable and lever.

REVIEW NUMBER 1

Q1. The BRU-14/A bomb rack is installed in what aircraft?

Q2. What bomb rack is used on the wing stations of the P-3C aircraft?

BOMB EJECTOR RACKS

LEARNING OBJECTIVE: *Identify the purpose and use of bomb ejector racks to include their principles of operation, maintenance requirements, and operational description.*

When in flight, today's high-speed fighter and attack aircraft create a vacuum under the fuselage and wings. If a weapon/store is released from the bomb rack, this vacuum can prevent the weapon/store from entering the airstream and falling to the target. If this happens, the weapon/store may physically contact the aircraft structure, causing serious damage to or loss of the aircraft.

Bomb ejector racks are different from bomb racks. Bomb ejector racks use electrically fired impulse

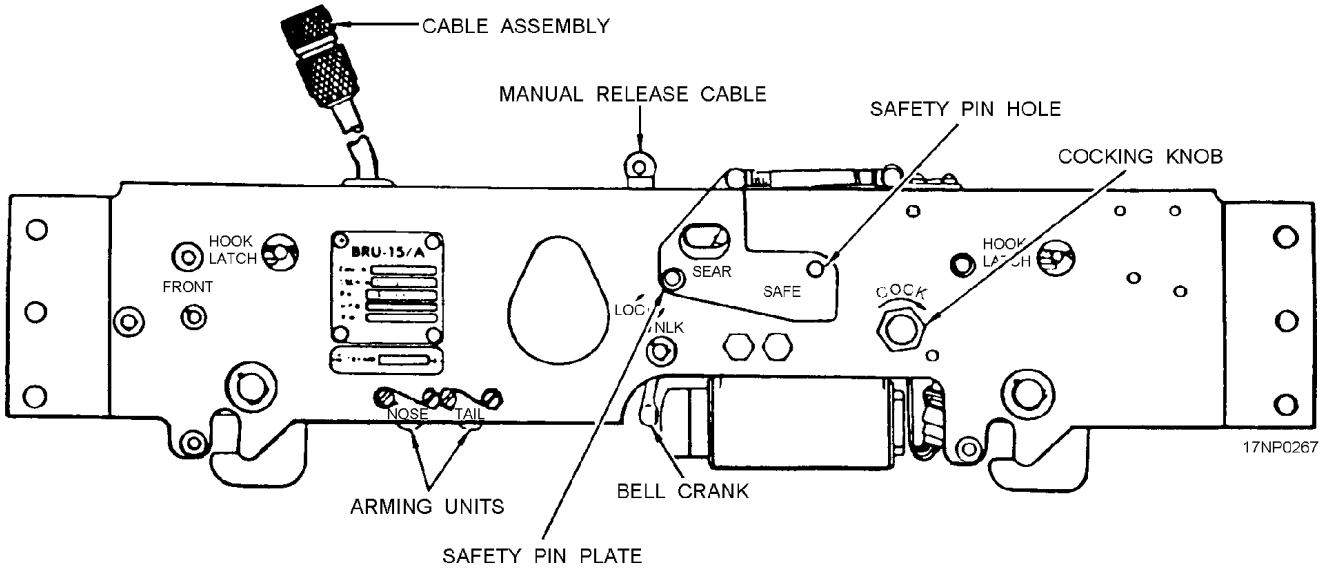


Figure 10-4.—BRU-15/A bomb rack.

cartridges to eject the weapon/store free of the bomb racks. Bomb ejector racks eject the weapon/store from the bomb rack with sufficient force to overcome vacuum buildup and ensure a safe weapon/store-launching environment.

BRU-11A/A Bomb Ejector Rack

The BRU-11A/A bomb rack (fig. 10-5) is used on the wing stations of the S-3 aircraft. The rack provides mounting and bracing for single weapons/stores or a triple ejector rack. Electrical connection and mechanisms for release and mechanical arming of stores are an integral part of the bomb rack.

Four suspension hooks, asymmetrically positioned, provide for attachment of weapons/stores having either 14-inch or 30-inch suspension and weighing up to 4,000 pounds (because of aircraft structural limitations only weapons/stores weighing up to 2850 pounds are authorized).

Major components consist of a rack assembly, ejector unit, auxiliary release unit, and an in-flight operable bomb rack lock (IFOBRL) mechanism.

The ejector unit is equipped to accept two bomb ejector cartridges. When the cartridges are fired, the suspension hooks open and the ejector foot forcibly ejects the weapon/store from the rack assembly. The auxiliary release unit provides an emergency method of release should the ejector assembly or its electrical system fail. The IFOBRL mechanism consists of a remotely controlled bomb rock lock and an emergency release (auxiliary unlock) for the bomb rack lock. The lock/unlock actuator is controlled electrically or manually during loading/unloading or ground checks. The locking feature replaces the use of the mechanical safety pin. Daily and preflight inspections ensure that the bomb rack is in a safe operating condition.

If you need more information about the BRU-11A/A bomb ejector racks, refer to *Bomb Ejector Rack BRU-11A/A*, NAVAIR 11-10C-24.

REVIEW NUMBER 1 ANSWERS

A1. The BRU-14/A bomb rack is installed in the P-3C aircraft.

A2. The BRU-15/A bomb rack is used on the wing stations of the P-3C aircraft.

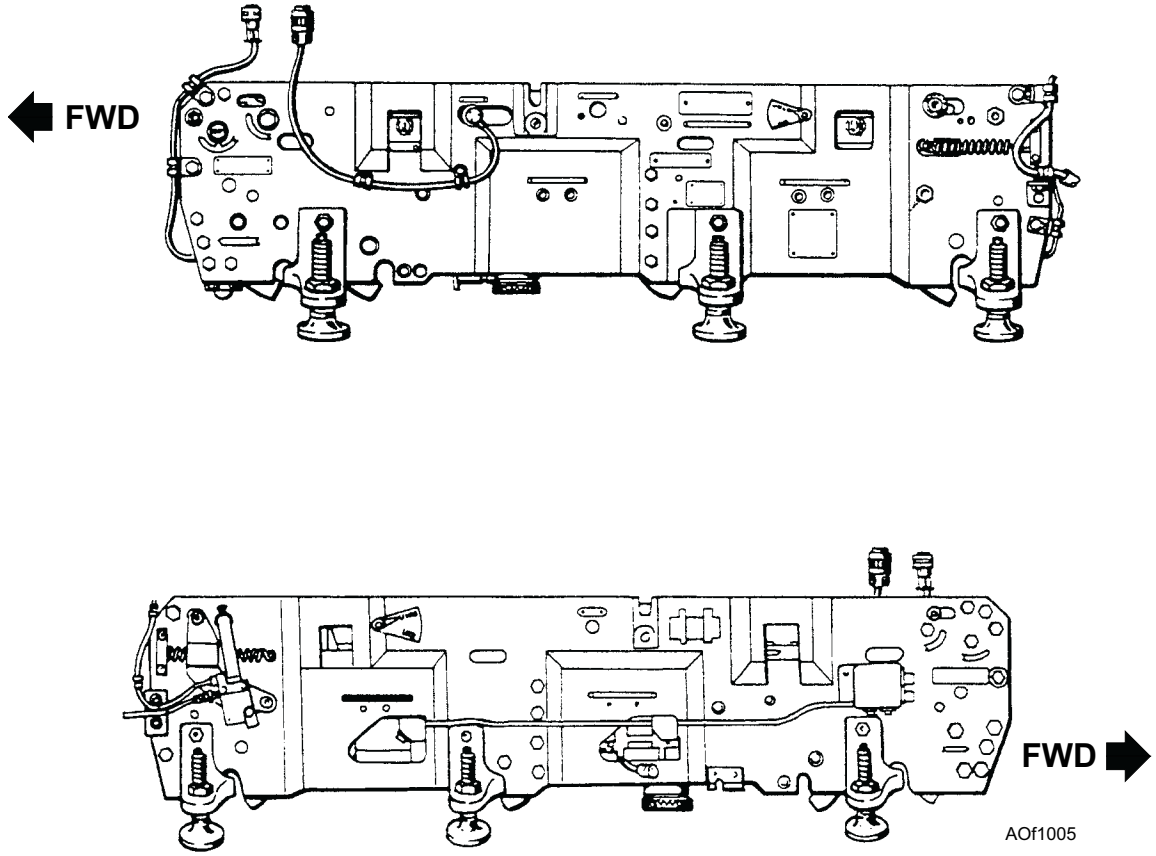


Figure 10-5.—BRU-11A/A bomb rack.

REVIEW NUMBER 2

Q1. What is the maximum store capacity of the BRU-11A/A bomb ejector rack?

Q2. What does the auxiliary release unit provides on a BRU-11A/A?

BRU-32/A BOMB EJECTOR RACK

The BRU-32/A bomb ejector rack (fig. 10-6) is installed on the F/A-18 aircraft. It is used to suspend single stores, BRU-33/A vertical ejector racks (VER), and LAU-115/A, LAU-117/A, and LAU-118/A missile launchers by using a 14-inch suspension hook.

The BRU-32/A bomb ejector rack has safety interlock and automatic sway bracing. The safety interlock mechanically prevents the accidental opening of the suspension hooks. It is also used to lock and unlock the suspension hooks during loading operations. Automatic sway bracing is controlled by the opening and closing of the suspension hooks.

Sensing switches are incorporated within the rack to indicate to the stores management processor (SMP) that a store is loaded. The primary ejection uses two cartridges to generate the required gas pressure for rack operations. If the primary ejection fails, the auxiliary release unit provides emergency release. The auxiliary release unit uses one cartridge that opens the hooks only. Nose and tail arming solenoids are used with mechanical fuzing. The Mk 39 electric fuzing receptacle is used for electric fuzing. The bomb rack is interchangeable with the centerline or the inboard and outboard pylons.

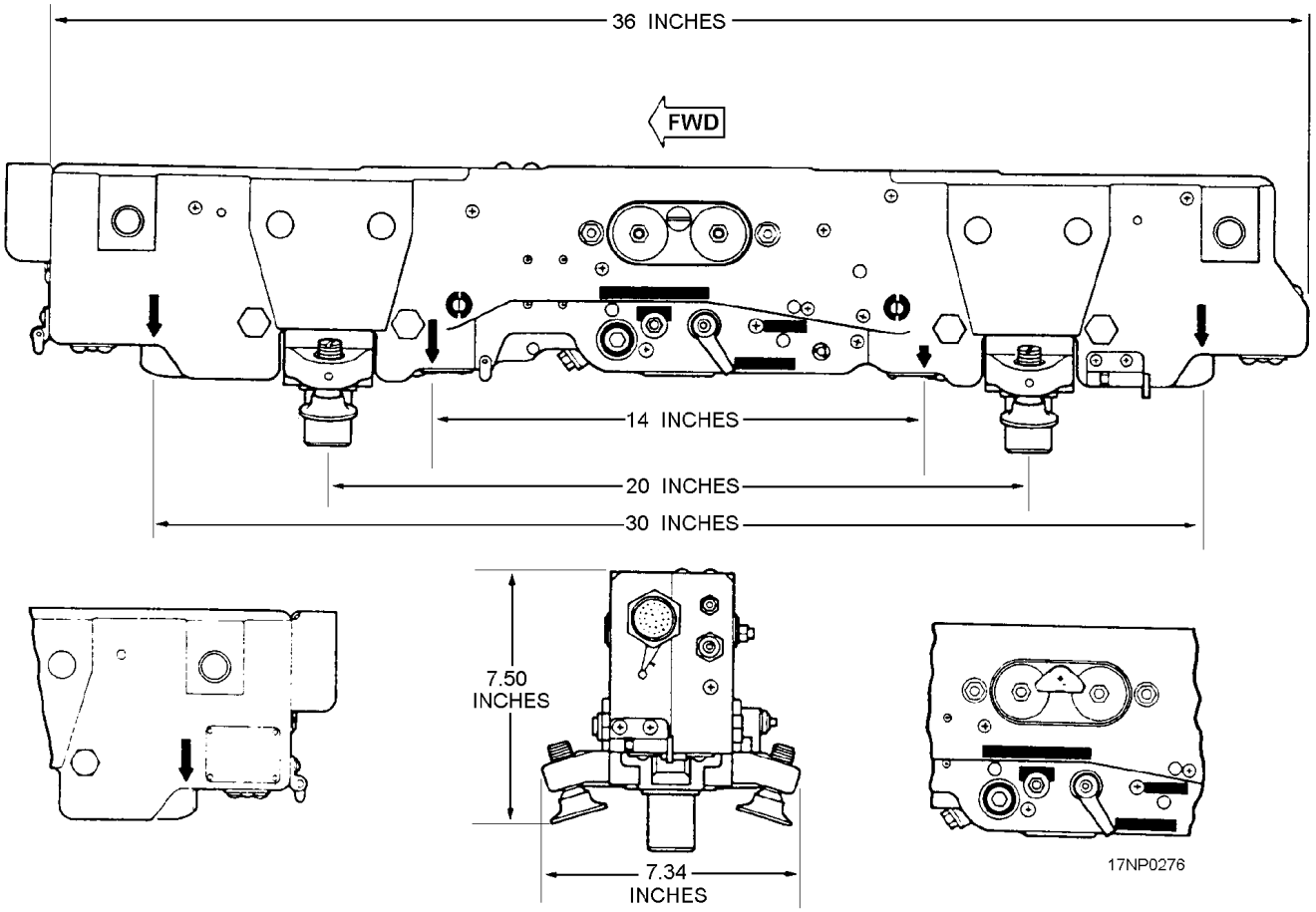


Figure 10-6.—BRU-32/A bomb ejector rack.

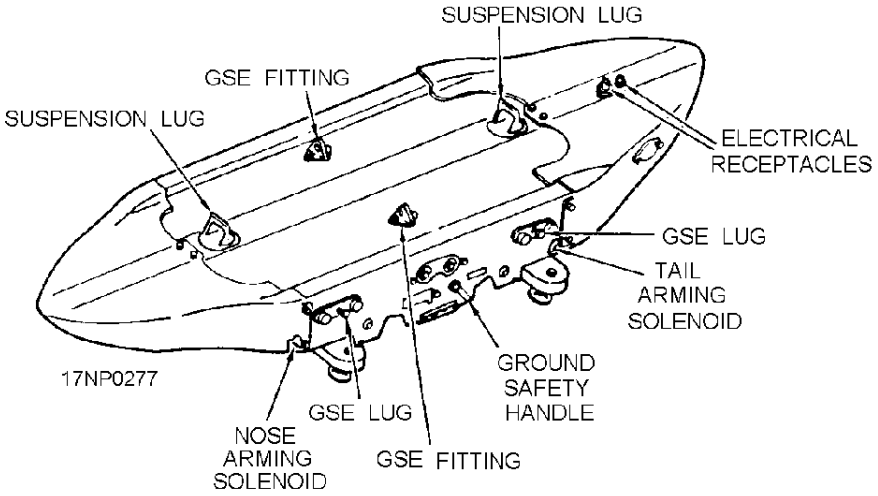


Figure 10-7.—BRU-33/A bomb ejector rack.

BRU-33/A BOMB EJECTOR RACK

The BRU-33/A bomb ejector rack (VER) (fig. 10-7) is suspended by the BRU-32/A bomb ejector rack. It is used to suspend two stores weighing up to 1,000 pounds each by using 14-inch suspension hooks. The VER features a special safety interlock and automatic sway bracing. The safety interlock is electrically controlled by the aircraft and mechanically prevents accidental opening of the suspension hooks.

Sensing switches are incorporated to indicate to the SMP that a store is loaded. The rack has provisions for mechanical and electric fuzing. The ejection unit uses two cartridges to generate the required gas pressure for rack operations.

REVIEW NUMBER 2 ANSWERS

A1. The maximum store capacity of the BRU-11A/A bomb ejector rack is 4,000 pounds.

A2. The auxiliary release unit provides an emergency method of release should the ejector assembly or its electrical system fail.

IMPROVED MULTIPLE EJECTOR RACK BRU-41/A (IMER) AND IMPROVED TRIPLE EJECTOR RACK BRU-42/A (ITER)

The BRU-41/A (fig. 10-8) and the BRU-42/A (fig. 10-9) operate and function basically the same. There are four major subassemblies—the structural adapter assembly, the electronic control unit, the cable

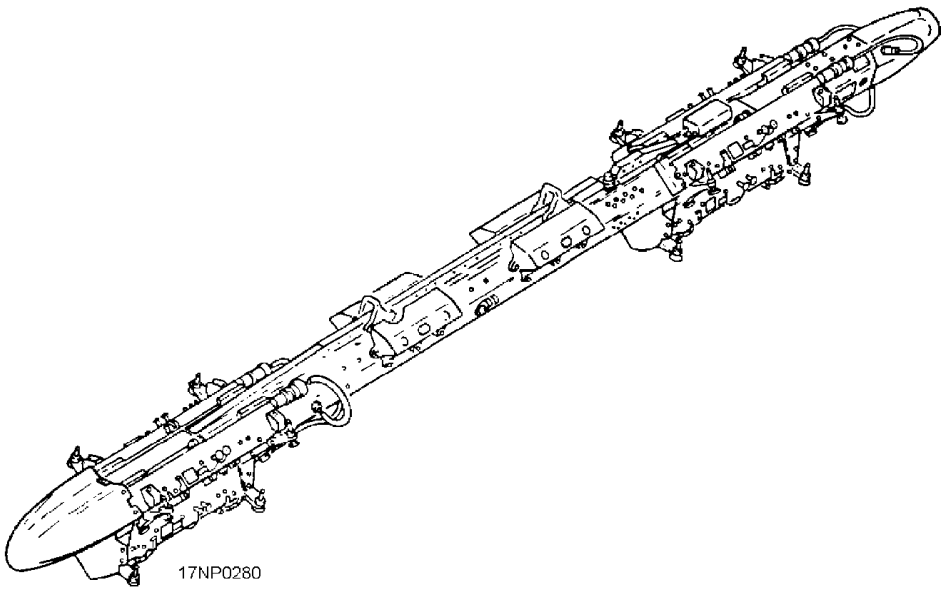
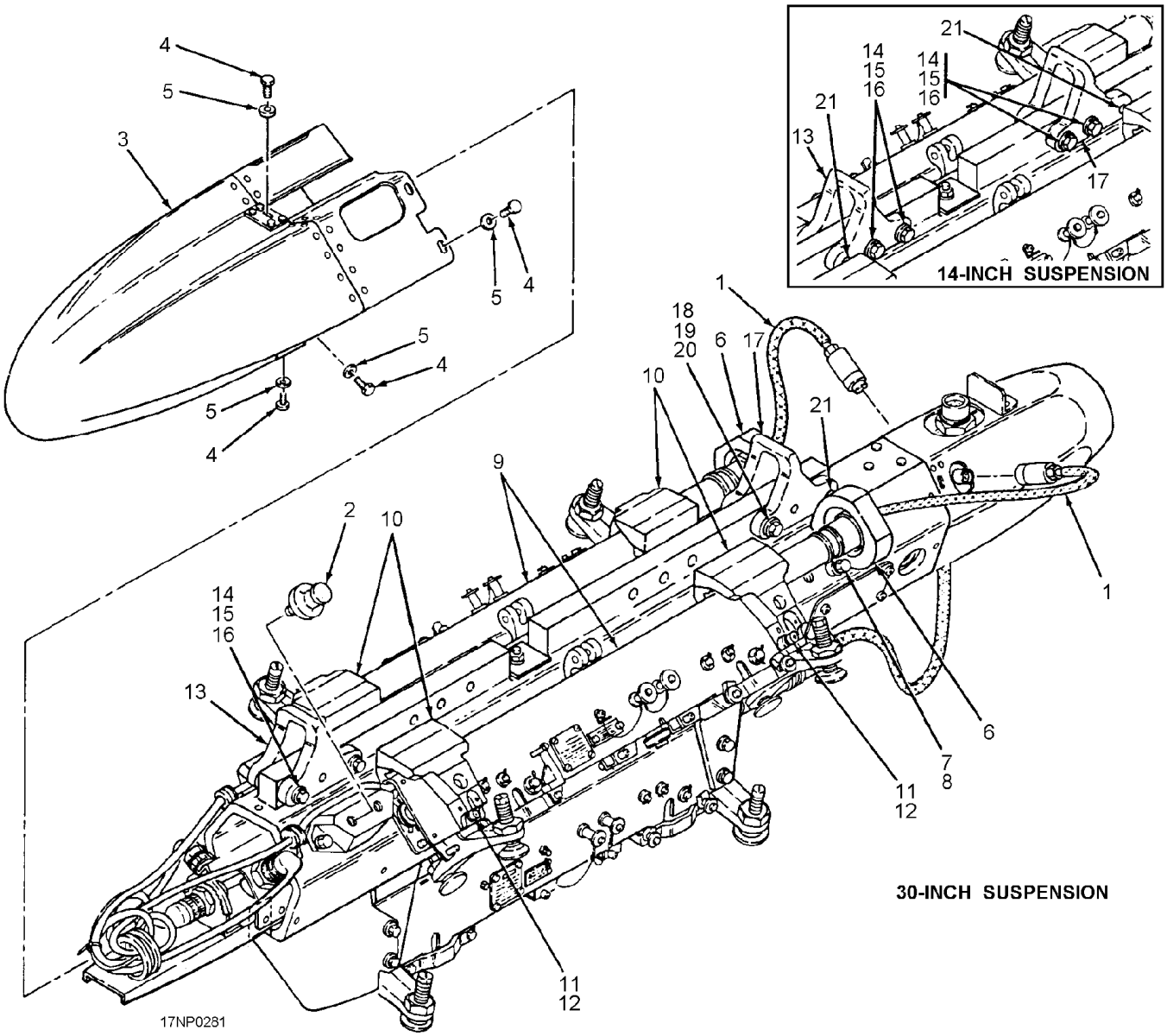


Figure 10-8.—BRU-41/A IMER.



1. **Firing lead cables/breech caps**
2. **Sway brace pad extensions**
3. **Nose cone**
4. **Bolts**
5. **Washers**
6. **Aft sway brace pads**
7. **Bolts**
8. **Washers**
9. **Shoulder ejector units**
10. **Sway brace pads**
11. **Bolts**
12. **Washers**
13. **Forward suspension lug**
14. **Bolts**
15. **Nuts**
16. **Washers**
17. **Aft suspension lug**
18. **Bolt**
19. **Nut**
20. **Washers**
21. **Pin**

Figure 10-9.—BRU-42/A ITER.

assembly, and the ejector unit. The electronic control unit and the ejector unit are the same for both the BRU-41/A and the BRU-42/A.

Adapter Assembly

The adapter assembly is a hollow, hexagonal aluminum extrusion that forms the main support for the rack assembly hardware. Attaching points on the adapter assembly provide 14-inch or 30-inch spacing of the suspension lugs, which allows installation on the various types of aircraft.

The adapter assembly houses the electronic control unit and cable assembly and provides for attachment of six or three individual ejector units. A nose-cone assembly and a tail-cone assembly enclose the ends of the adapter assembly for aerodynamic purposes.

Electronic Control Unit

The electronic control unit is a solid-state electronic control unit in a sealed container. The electronic control unit controls all the functions of the bomb rack and have the capability of releasing stores at 35-millisecond intervals. The electronic control unit is disposable. If it malfunctions, replace it with a new one.

Ejector Unit Assemblies

The ejector unit assemblies used on the IMER and ITER are identical. The only difference between them is the internal configuration of the release linkage. The ejector units are configured for right-hand shoulder installation, left-hand shoulder installation, or centerline installation (fig. 10-10). Part number identifies them. The shoulder stations are attached to the adapter assembly by ejector unit attach blocks. The centerline stations are attached by ejector unit attach hangars. A IMER/ITER ejector unit (fig. 10-11) consists of a housing assembly equipped with integral wiring, a breech and ejector mechanism, store suspension hooks, a store sensing switch, two mechanical arming solenoids, an electrical arming unit, adjustable sway braces, and mechanical linkage driven by the breech or manual release lever to open the suspension hooks.

The suspension hooks are spaced 14 inches apart and are independently self-latching. There is a manual release lever, which is used to open the hooks during ground operation. The safety stop lever is used to safe the ejector unit mechanically. Look at figure 10-12. It shows the locked and unlocked positions of the ejector unit safety stop lever. When the safety lever is in the locked position, the hook release rod is physically blocked from rearward movement and prevents suspension hook release. If the hook release rod is not in the full forward position, the safety stop lever cannot be rotated to the locked position. A store-sensing switch is located under the forward suspension hook, and is actuated by the opening and closing of the hook.

IMER/ITER Operational Description

The functional description of the IMER/ITER ejector rack is discussed in two categories—ejector unit mechanical operation and IMER/ITER electrical operation.

EJECTOR UNIT OPERATIONAL DESCRIPTION.—All ejector units on the IMER and ITER are operationally the same. An electrically initiated gas-generating cartridge actuates the ejection mechanism. As you read this section, look at figure 10-13. It shows the mechanical operation of the ejector unit.

When a store is loaded onto the ejector unit, the store suspension lugs force the suspension hooks to the closed position. The suspension hooks are locked in the closed position by the over center position of the hook toggle levers. The link stops, located over each of the hook toggle levers, prevent the suspension hooks from opening until the cartridge is fired or the manual release lever is pulled, even if the safety stop lever is in the unlocked position (fig. 10-13, view A).

When the gas-generating cartridge is fired, the resulting gas pressure moves the breech aft. The aft movement of the breech also moves the hook release rod aft, lifting the toggle hook levers from the over center position. The cranks are forced down. This unlocks the suspension hooks (fig. 10-13, view B).

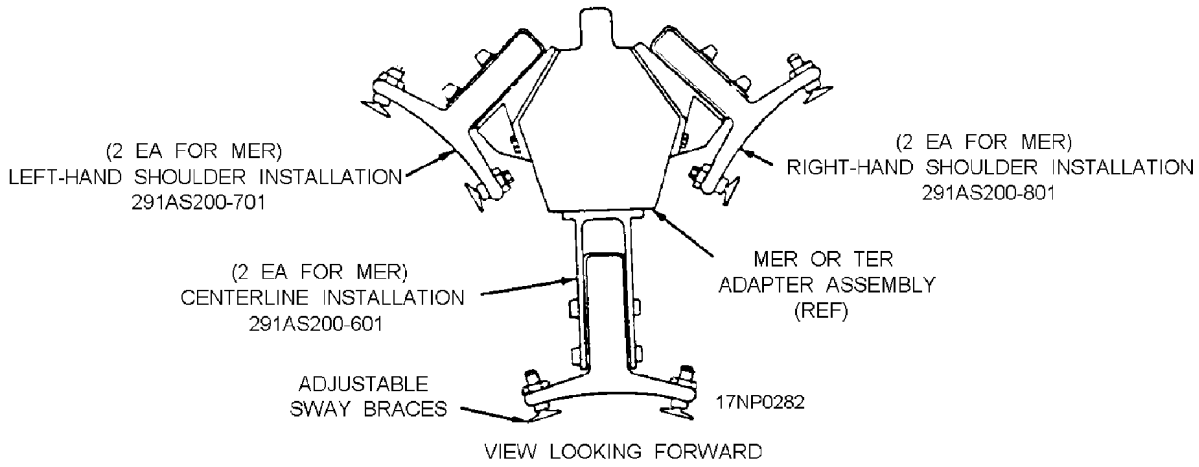
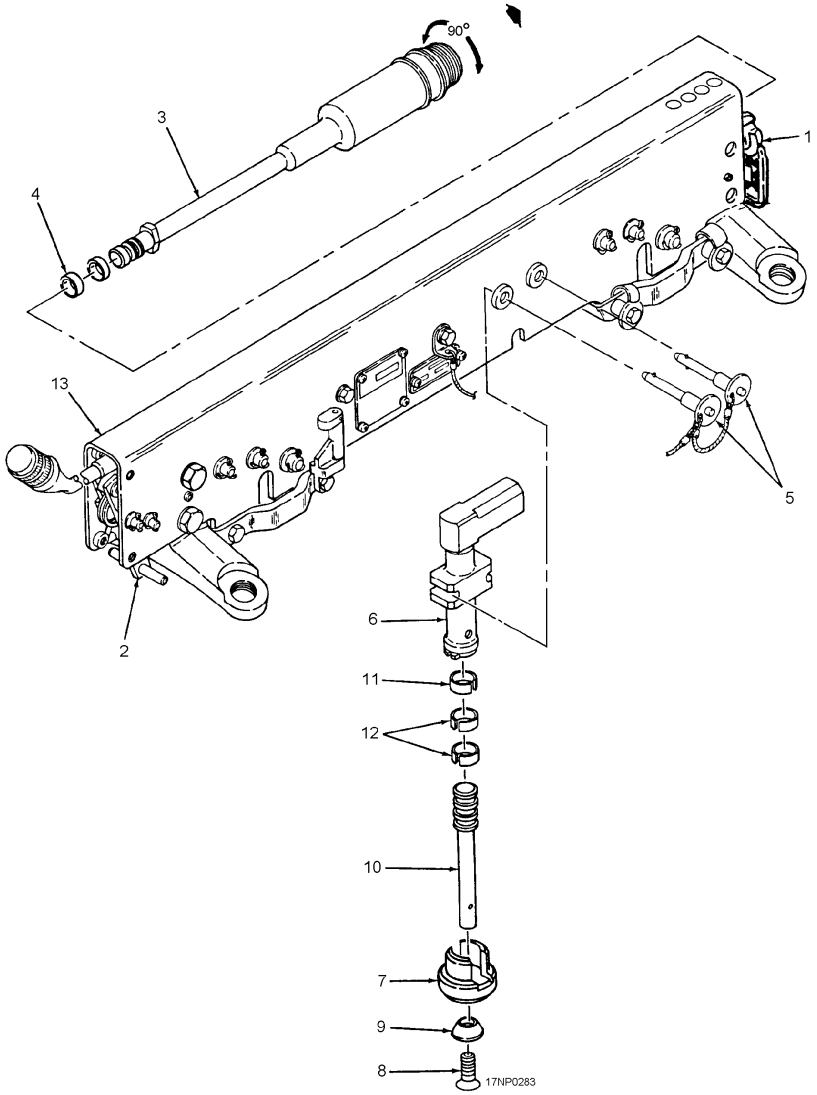


Figure 10-10.—IMER/ITER ejector unit locations.



1. **Safety stop lever**
2. **Manual release lever**
3. **Breech**
4. **Pressure ring (2)**
5. **Gun retaining pin assembly (2)**
6. **Gun assembly**
7. **Retainer**
8. **Bolt**
9. **Washer**
10. **Piston**
11. **Bearing ring**
12. **Pressure ring (2)**
13. **Ejector unit housing**

Figure 10-11.—IMER/ITER ejector unit.

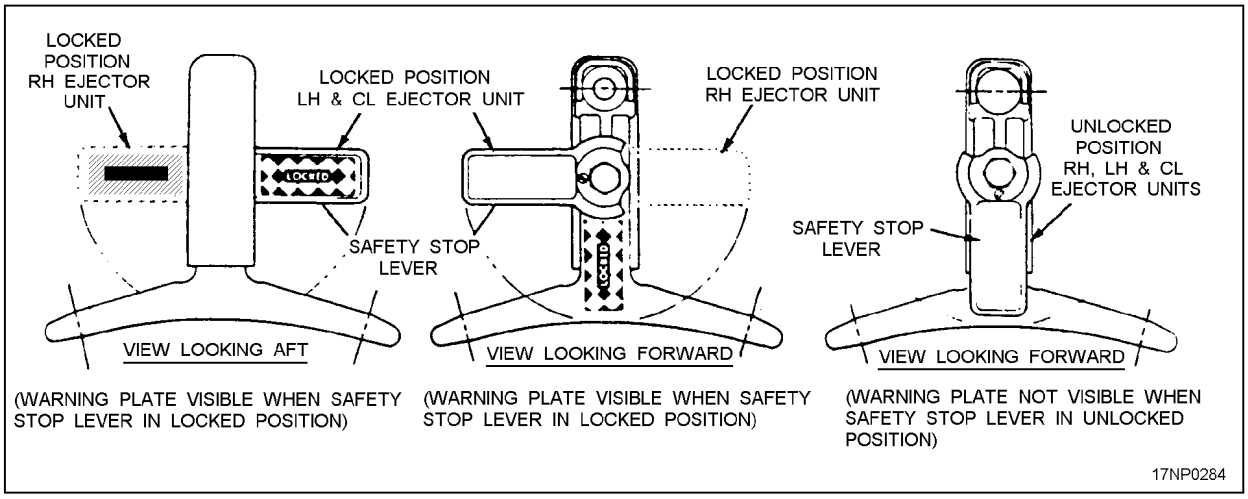


Figure 10-12.—Ejector unit safety stop lever.

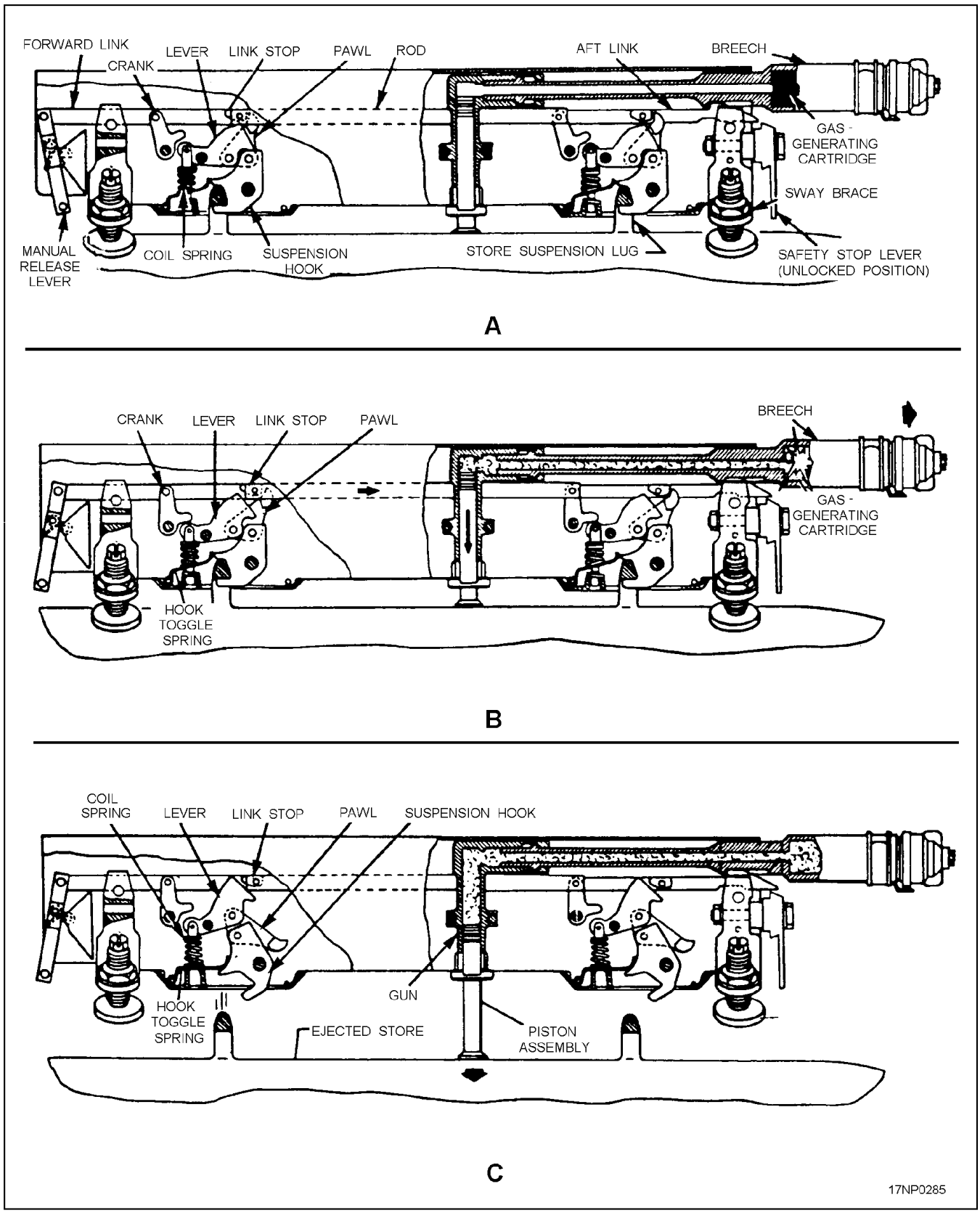


Figure 10-13.—Ejector unit operation.

Gas pressure from the cartridge acting against the gun piston, plus the weight of the store, forces the unlocked suspension hooks to open, releasing the store. The hooks are held in the open position by the hook toggle spring and coil spring. The gun piston continues to act against the store to provide positive separation from the ejector unit (fig. 10-13, view C).

IMER/ITER ELECTRICAL OPERATION.—Before discussing the electrical operation of the IMER/ITER, you must understand the function of several electrical components. These components are briefly discussed in the following paragraphs.

IMER and ITER ejector units are numbered according to their firing sequence (fig. 10-14). For the purpose of discussion, assume that an IMER has stores loaded on stations 1, 2, 4, and 6, and that the release mode selector is set for single release.

When the pilot depresses the cockpit bomb button, a firing pulse is routed from the aircraft through the rack safety switch and the release mode selector switch to energize the necessary rack circuits. With a weapon loaded on station 1, the forward suspension hook is in the closed position, automatically closing the stores sensing switch. The firing voltage is then routed to the firing circuit, firing the cartridge and ejecting the weapon. Ejection of the stores from all remaining loaded stations will occur in sequence each time the pilot presses and releases the bomb button. In this particular load, stations 3 and 5 were not loaded; therefore, make sure the forward hooks are left open. If they are closed, the stores sensing switch signals the rack that a weapon is loaded on that station and will not automatically step to the next station.

Hardware Adapter Kits

Hardware adapter kits are used to adapt the IMER/ITER to various aircraft. The kits include electrical harness assemblies, suspension lugs, sway brace pads and extensions, and attaching hardware required to configure the racks for a desired pylon station on a particular aircraft. Additionally, practice bomb adapters are used to adapt the IMER and ITER for the attachment of practice bombs or externally carried LUU-2B/B aircraft parachute flares and Mk 58 marine location markers. The adapter (fig. 10-15) is composed of three separate components—a bracket, an ejector foot lock, and a hook actuation spring.

Both the hardware adapter kit and practice bomb adapter is considered to be organizational-level equipment, and are to be maintained in the custody of the organizational unit.

For further information concerning the Improved Multiple Ejector Rack (IMER) and Improved Triple Ejector Rack (ITER), refer to the publication NAVAIR 11-5-603.

REVIEW NUMBER 3

Q1. The BRU-32/A bomb ejector rack is installed on the _____ aircraft.

Q2. What is the maximum capacity of the BRU-33/A bomb ejector rack?

Q3. How many individual ejector units can you attach to the adapter assembly of the ITER?

Q4. How are IMER and ITER ejector units numbered?

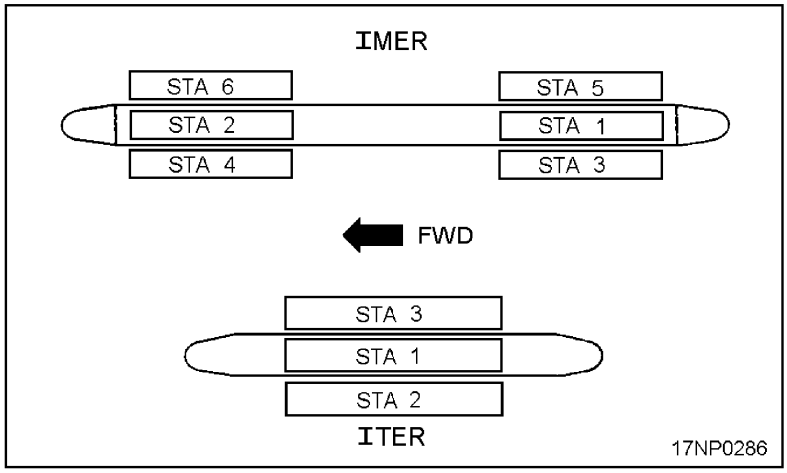


Figure 10-14.—IMER/ITER firing sequence.

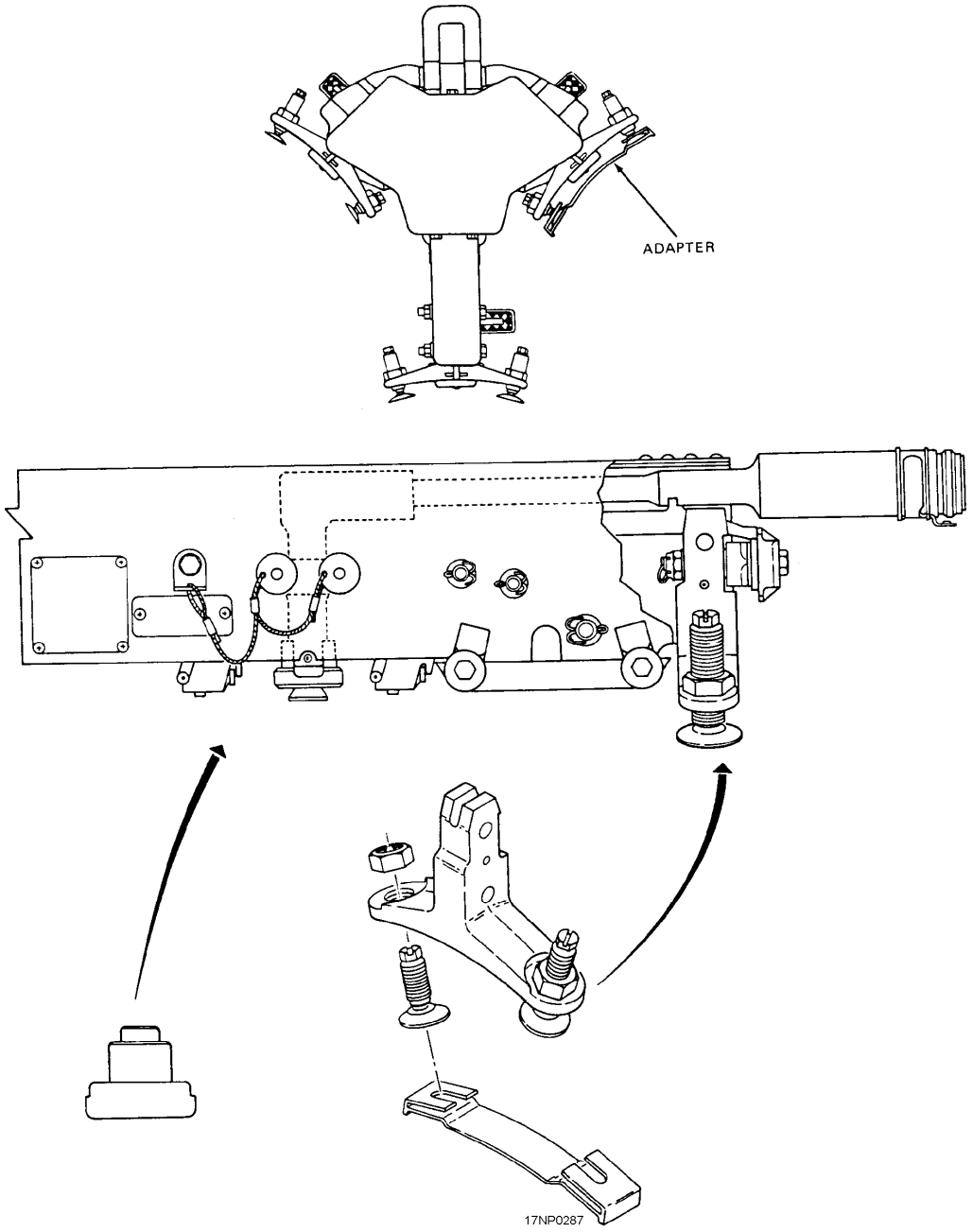


Figure 10-15.—Practice bomb adapter kit.

Q5. What is the purpose of the stores sensing switch located on the forward hook of each station?

Q6. At what level is the custody of the IMER/ITER hardware kit and practice bomb adapter kits maintained?

DISPENSERS AND EJECTORS

LEARNING OBJECTIVE: *Identify the purpose and use of dispensers and ejectors.*

Dispensers and ejectors are used during tactical situations to provide additional offensive and defensive capabilities to the aircraft. These units are usually detachable. They are suspended from other installed suspension equipment, or they are mounted directly to the aircraft. They are used to suspend and release ordnance items, such as aircraft parachute flares and sonobuoys. In this section of the TRAMAN, you will learn about the basic characteristics of dispensers and ejectors currently in use.

REVIEW NUMBER 3 ANSWERS

A1. The BRU-32/A bomb ejector rack is installed on the F/A-18 aircraft.

A2. The maximum capacity of the BRU-33/A bomb ejector rack is 2,000 pounds.

A3. You can attach three individual ejector units to the adapter assembly of the ITER.

A4. The IMER and ITER ejector units are numbered according to the firing sequence.

A5. The stores sensing switch, located on the forward hook of each station, signals the rack whether a weapon is loaded on a particular station or not. If the forward hook is closed, the switch signals the rack that the station is loaded, and will not automatically step to the next station.

A6. Custody of the IMER/ITER hardware kit and practice bomb adapter kits is maintained at the organizational level.

SUU-25F/A DISPENSER

The SUU-25F/A dispenser (fig. 10-16) is an airborne, externally mounted, reusable four-tube, rearward ejecting-launching device. The dispenser may be loaded on any aircraft weapons station that has a 14-inch suspension and is authorized to carry the SUU-25F/A dispenser.

The SUU-25F/A has a cylindrically shaped, all-metal body. It has four aluminum tubes that will hold either eight LUU-2B/B aircraft parachute flares. The tubes are 5 inches in diameter, clustered together inside an outer skin. There is an aluminum die-cast bulkhead at each end. When empty, the dispenser weighs 260 pounds. When loaded with eight LUU-2B/B flares, it weighs 490 pounds.

The shipping and flight configuration of the dispenser is shown in figure 10-16. The shipping configuration (view A) has shock pan assemblies at either end of the dispenser so it is easier to handle during shipment and storage. A lock wire is attached to the two suspension lugs to prevent them from becoming lost during shipment or storage. Both the lock wire and shock pan assemblies must be removed before the dispenser is used. When the dispenser is configured for flight (view B), a phenolic or metal cover (nose cone) is mounted on the forward flange. Covers are not shipped with the dispenser; they are ordered as separate components.

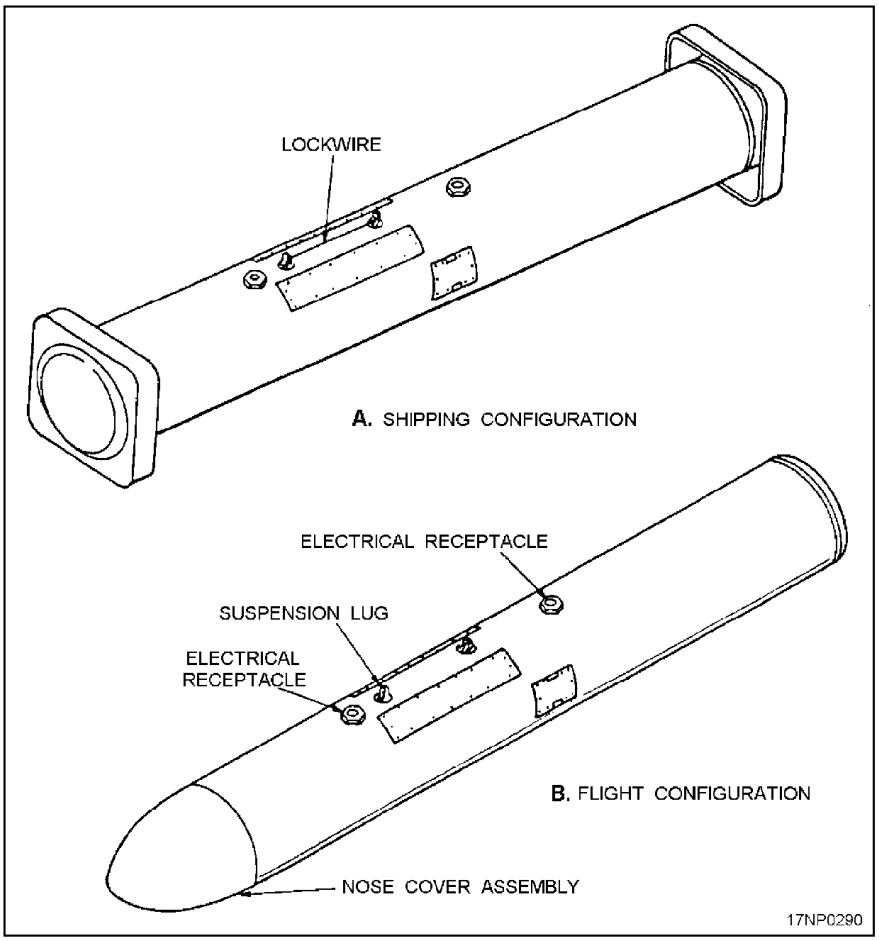


Figure 10-16.—SUU-25F/A dispenser.

As you read the following section on the SUU-25F/A dispenser, look at figure 10-17 for the location and identification of the components.

The breech, breech cap, breech lead, downloading breech, downloading breech cap, the manifold, and the stepper switch are located on the forward bulkhead.

Breech, Breech Cap, and Breech Lead

There are two breeches, two breech caps, and two breech leads for each tube of the dispenser. The breech is screwed into the bulkhead so a CUU-44 impulse cartridge can be installed. The breech cap, containing the firing pin, screws onto the breech. The breech lead connects to the breech cap and provides a path for the 28-volt dc required firing the impulse cartridge.

Downloading Breech and Downloading Breech Cap

There is one downloading breech and a downloading breech cap for each tube of the dispenser.

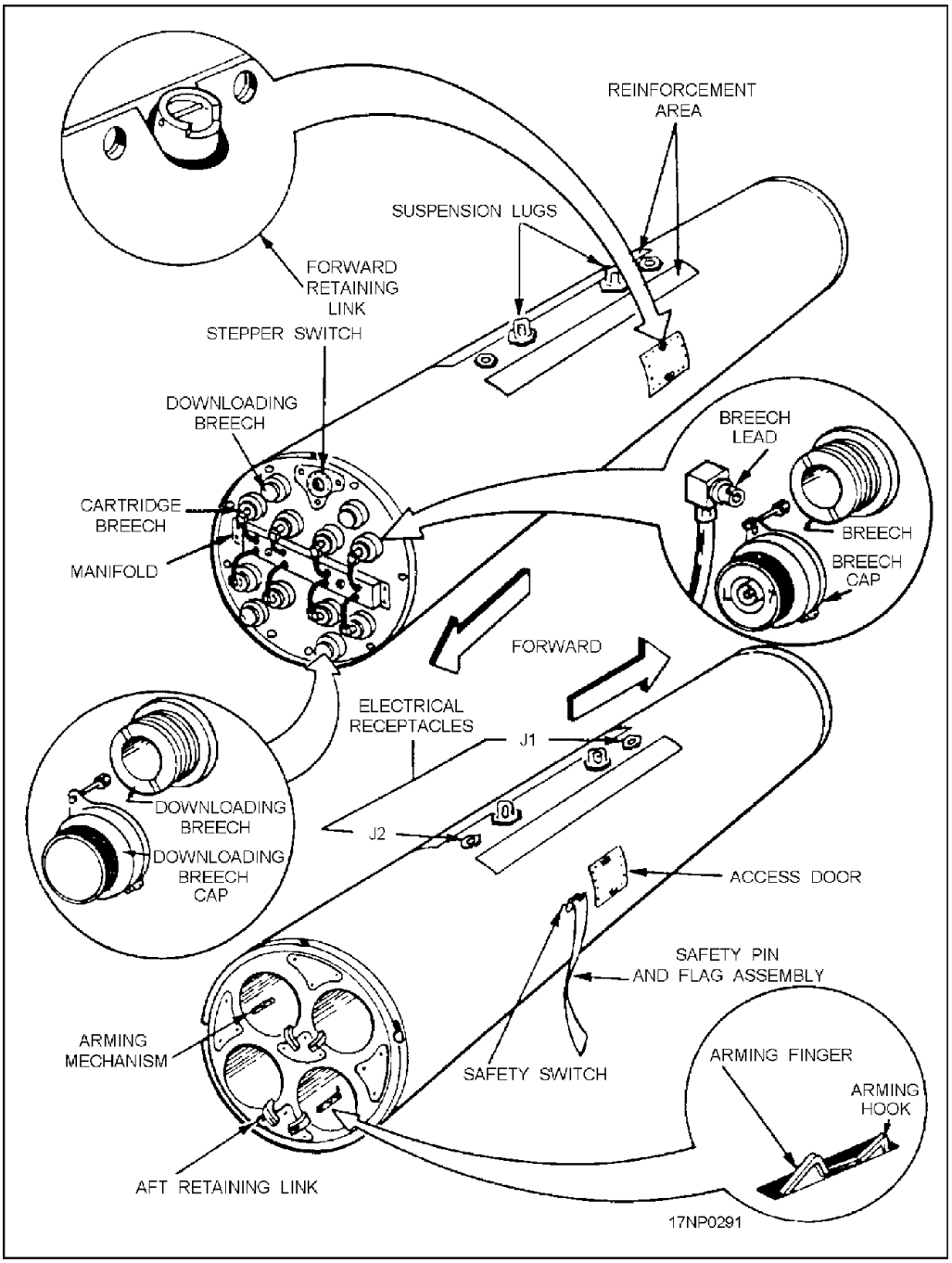


Figure 10-17.—SUU-25F/A dispenser, exploded view.

The downloading breech mounts to the bulkhead. The downloading breech cap screws onto the downloading breech. With the downloading breech cap removed, the downloading breech lets you insert the loading, unloading, cleaning, push rod tool so the stores can be easily removed during downloading procedures. It also prevents air pressure buildup in the tubes when uploading stores. Reinstall the downloading breech caps after the loading or unloading procedures have been completed.

Manifold

The manifold has eight manifold breech lead receptacles for connection of the breech leads. It also has two test socket assemblies you can use during dispenser electrical test procedures.

Stepper Switch

The stepper switch provides sequential firing of the impulse cartridges. The switch has 10 functional settings—one safe setting, one arm setting, and eight firing steps. Always place the stepper switch in the safe position during dispenser loading and unloading. Move the switch to the arm position during aircraft arming procedures just before flight.

Forward and Aft Retaining Lock

Each of the four dispenser tubes contains a forward retaining lock, an aft retaining lock, and an arming mechanism.

The forward and aft retaining locks, when in the locked position, protrude into the dispenser tube. This prevents loaded stores from being inadvertently ejected by the forces during aircraft catapult launches.

The forward retaining lock is located between the dispenser outer skin and the tube near the midpoint of the dispenser. You can move the retainer lock from the either the locked or unlocked position through an access door located on either side of the dispenser. Before loading a store, rotate the retaining lock to the unlocked position. This pivots the retainer lock out of the tube. After the store has been loaded, rotate the retaining lock to the locked position, and secure it by installing a shear pin. The forward retaining lock retains the forward-loaded store only.

The aft retaining lock is attached to the aft bulkhead and retains the aft loaded store. It is also secured in the locked position by installing a shear pin.

Arming Mechanism

The arming mechanism is located in the aft end of the dispenser tube. The arming mechanism initiates the arming sequence of a store as it is ejected from the tube.

The dispenser is suspended by two screw-type lugs spaced 14 inches apart. The area around the suspension lugs has a hardback reinforcement to permit sway bracing and forced ejection of the dispenser.

Two electrical receptacles, V1 and V2, are located forward and aft of the suspension lugs, respectively. Both receptacles give you a way to electrically connect the dispenser to the aircraft weapons control system. **Only one receptacle is used at a time**. The electrical configuration of the rack determines the receptacle you will use.

An electrical wiring harness is routed internally from electrical connectors V1 and V2 to the stepper switch. A safety switch that is normally in the closed position interrupts the wiring harness. When the safety pin and flag assembly is inserted, the safety switch is held in the open position and the electrical circuits are grounded, making the dispenser electrically safe.

Functional Description

When you load a dispenser tube with munitions, each pair of flares are configured with an ADU-381/A flare adapter kit.

A yellow-colored sealing ring is pressed on each end of the munition as a seal between the munition and the tube body. This prevents gas pressure from escaping during ejection. A green-colored arming cap is installed on the timer end of a flare or on the rotochute end of a sonobuoy. The green arming cap lanyard is connected to the timer knob of the flare, and then pressed on over the flange of the sealing ring. Mount a white cross-shaped plastic spacer on the aft sealing ring of the forward munition. This provides enough space between the forward and aft munition to provide an expansion chamber for ejecting the aft munition.

After you have installed the adapter, install the munitions in the dispenser tube.

When an SUU-25F/A dispenser is fully loaded and uploaded on the aircraft, the pilot may eject flares. The pilot must first select the weapons control system, and then trigger the dispensing switch. A 28-volt dc electrical signal passes through an electrical cable from the aircraft to either receptacle J1 or J2 of the dispenser. The signal is routed from the dispenser receptacle to the

stepper switch, causing the stepper switch to step from the preset ARM position to the No. 1 position. This fires the No. 1 impulse cartridge. The gas pressure, generated by the fired cartridge, is ported through a gas tube, internally along the side of the dispenser, into the aft expansion chamber ahead of the aft flare.

As the gas pressure increases, the aft retaining lock shear pin is cut, allowing the aft flare to eject. As the timer end of the flare approaches the rear of the tube, the arming finger of the arming mechanism engages the yellow sealing ring. The sealing ring cams the arming finger down, which, in turn, cams the arming hook up to engage the green arming cap. This action allows the flare to extend the lanyard. The lanyard extracts the timer knob and arms or starts the flare functioning sequence.

When the pilot triggers the system again, the stepper switch steps to the No. 2 position and fires the cartridge. This meters the gas pressure directly into the forward expansion chamber. As the gas pressure increases, the forward retaining lock shear pin is cut. This allows the forward flare to be dispensed in the same manner as the aft flare. If the aft flare failed to eject, the gas pressure generated for ejecting the forward flare produces sufficient gas pressure to purge both flares out of the tube.

The procedure for the remaining three tubes is the same. The firing sequence of the breeches is stamped into the metal of the breech caps, as shown in figure 10-18.

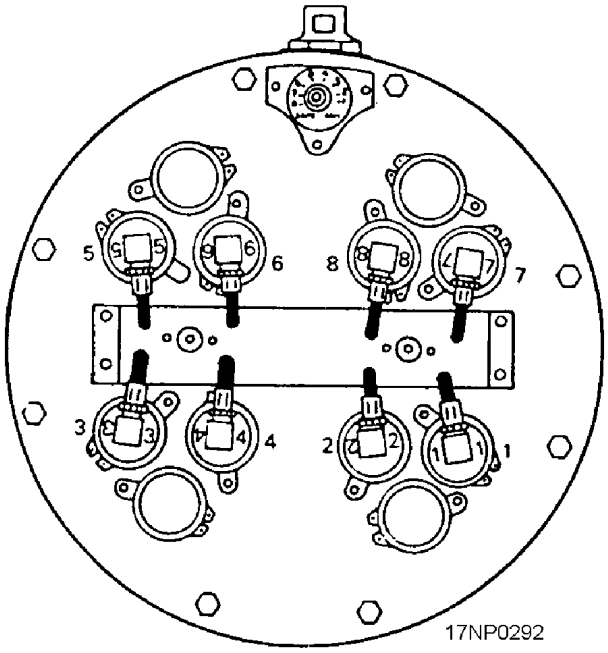


Figure 10-18.—Breech cap identification numbers.

Maintenance Requirements

Organizational-level maintenance is limited to a visual inspection of the dispenser. You need to look for damage, such as cracks or breaks in the aft retaining locks or suspension lugs, unburned pellets or obstructers in the breech sleeve, and frayed or broken breech leads.

For further information concerning the SUU-25F/A dispenser, you should refer to *Dispenser SUU-25F/A*, NAVAIR 11-75AA-48.

REVIEW NUMBER 4

Q1. What impulse cartridge is installed in the SUU-25F/A to launch flares?

Q2. What voltage fires the impulse cartridge?

Q3. When performing organizational-level maintenance on the SUU-25F/A, you should look for what types of damage?

AN/ALE-29A COUNTERMEASURES CHAFF DISPENSING SET

The AN/ALE-29A countermeasure chaff dispensing set, known as the *chaff dispenser,* is an electronic countermeasure device. It may be installed in almost all Navy combat aircraft. The chaff dispensing set includes two dispenser assemblies, two dispenser housings, two sequencer switches, and a programmer. The cartridge in the chaff dispenser can eject various load configurations of Mk 46 or MJU-8/B decoy flares and RR-129 or RR-144 chaff.

Decoy flares are used during evasive maneuvers against heat-seeking missiles. Chaff rounds consist of fine-shredded metal strips contained in a cylindrical metal container. When ejected from the chaff dispenser, the metal strips are forced from the cylindrical container and dispersed into the atmosphere. This *jams* ground controlled radar installation or radar-controlled missiles.

Dispenser Assemblies

The dispenser assembly (fig. 10-19) contains two major subassemblies—a glass-reinforced phenolic plastic block and a printed circuit board. The block has 30 holes so you can load the payload units. There are four quick-release, positive-lock studs so you can secure the block in the dispenser housing, and two telescoping handles to make it easier to handle.

The printed circuit board contains the circuitry and jacks so you can install 30 electrically initiated Mk 131 or CCU-63/B impulse cartridges. You must also install a connector to act as an interface between the dispenser assembly and the dispenser housing.

You load the dispenser by putting the 30 payload units (in plastic sleeves with plastic cartridge retainers installed) into the block. Install an impulse cartridge in each of the 30 jacks on the printed circuit board. Then, attach the board to the block by two captive screws.

NOTE: Installation of the impulse cartridges must be accomplished in a designated RF (radio frequency) free area.

Finally, install the loaded dispenser assembly in the dispenser housing. You need to secure it with the four positive-lock studs of the dispenser block. The payload units are forced from the plastic sleeves by the gas pressure generated when the impulse cartridges are fired. The chaff sleeve extractor, shown in figure 10-19, is used during dispenser download procedures.

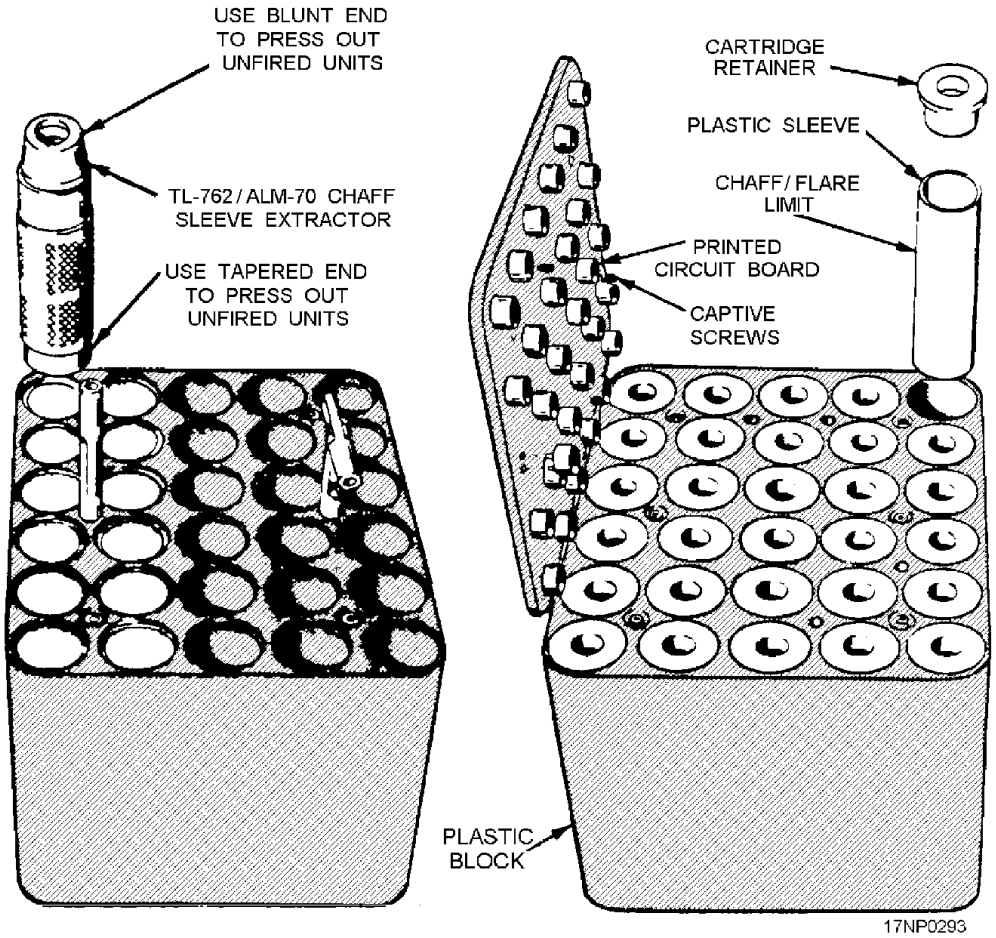


Figure 10-19.—AN/ALE-29A countermeasures chaff dispensing set.

Dispenser Housings

There are two different housing configurations available, as shown in figure 10-20. You can identify the housings by the mounting flange configuration, number and arrangement of mounting fasteners, location of the sequence switch, and the cable arrangement. These configurations are supplied so aircraft manufacturers have flexibility in mounting locations.

You **don't** remove the housing assemblies from the aircraft when loading. You **do** remove the dispenser assembly from the housing assembly by unlocking the four positive-lock studs. Move the dispenser assembly to a designated area and load it. Then, return it to the aircraft and reinstall it in the dispenser housing. Safety switches, installed in the aircraft near the dispenser housings, make the dispenser's assemblies electrically safe when the safety pin or flag assemblies are installed. When the dispensers are loaded, the safety pin or flag assemblies must remain installed until just before flight.

The rear of the housing assembly has a dispenser interconnect that electrically connects the dispenser assembly to the system. When you are installing the dispenser assembly into the housing assembly, you should use a guide pin to ensure proper alignment of the electrical connectors.

REVIEW NUMBER 4 ANSWERS

A1. The CUU-44 impulse cartridge is used to fire flares from the SUU-25F/A.

A2. 28 volts of dc fire the impulse cartridge.

A3. When performing organizational-level maintenance on the SUU-25F/A, you should look for cracks or breaks in the aft retaining locks or suspension lugs, unburned pellets or obstructers in the breech sleeve, or frayed or broken breech leads.

Sequencer Switch

Two sequencer switches (fig. 10-21) are used in a system—one for the right- and left-dispenser assemblies. The sequencer switch is a solenoid-actuated, multideck, rotary stepping switch contained in a hermetically sealed case.

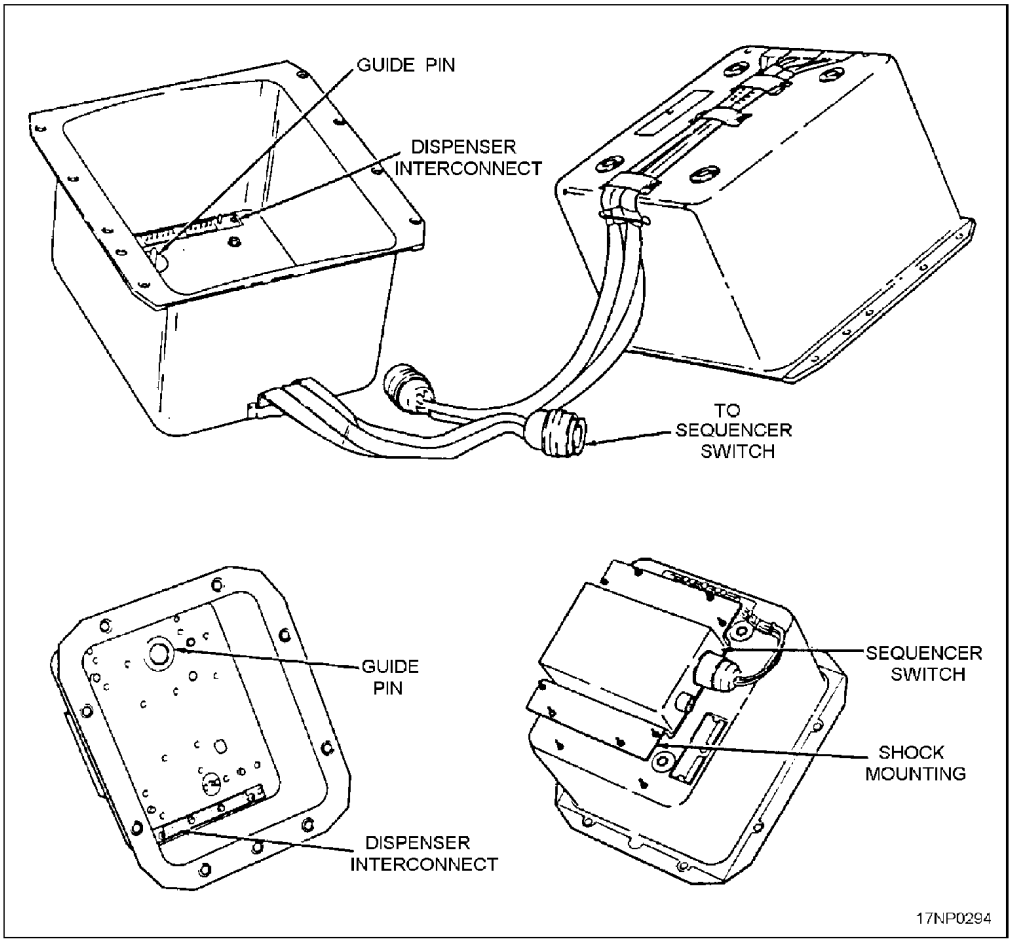


Figure 10-20.—Dispenser housings.

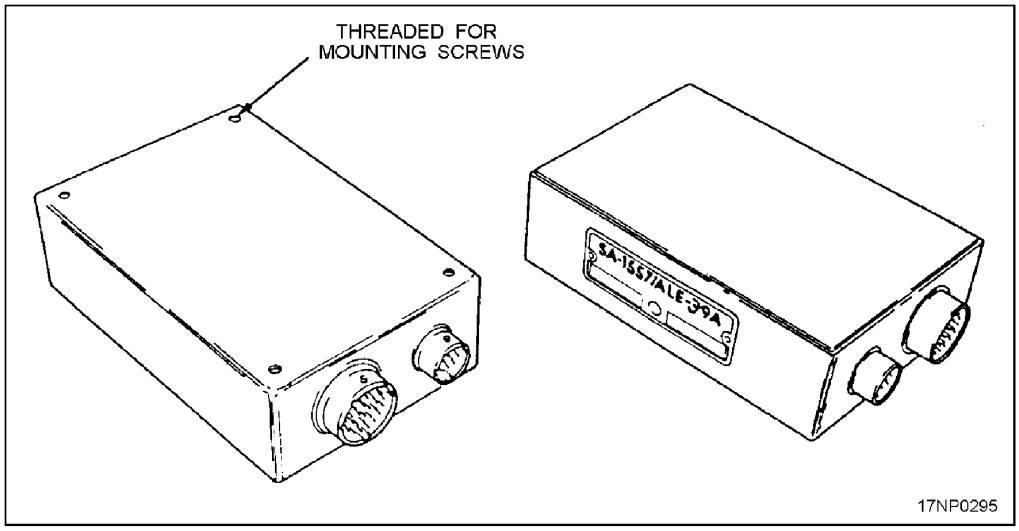


Figure 10-21.—Sequencer switch.

The sequencer switch is actuated by control signals received from the programmer. Each control signal from the programmer actuates a relay in the sequencer switch, which applies 28-volt dc to the rotary switch. As the rotary steps, a firing pulse is supplied directly from the aircraft's 28-volt dc power supply. This firing pulse is directed to the applicable impulse cartridge in the dispenser assembly.

Dispensing starts with the selection of one or both dispensers (right or left) from the cockpit and the initiation of the dispensing switch. When only one dispenser has been selected and is emptied, the programmer control pulses are automatically transferred to the second sequencer switch. When both dispensers are selected by the cockpit control, simultaneous signals are directed to both sequencer switches. The sequencer switches are connected to the dispenser housing by an electrical cable supplied as part of the dispenser housing.

Dispensing Set Programmer

The dispensing set programmer (fig. 10-22) provides electronic control of the dispensing modes. The AN/ALE-39A programmer generates control

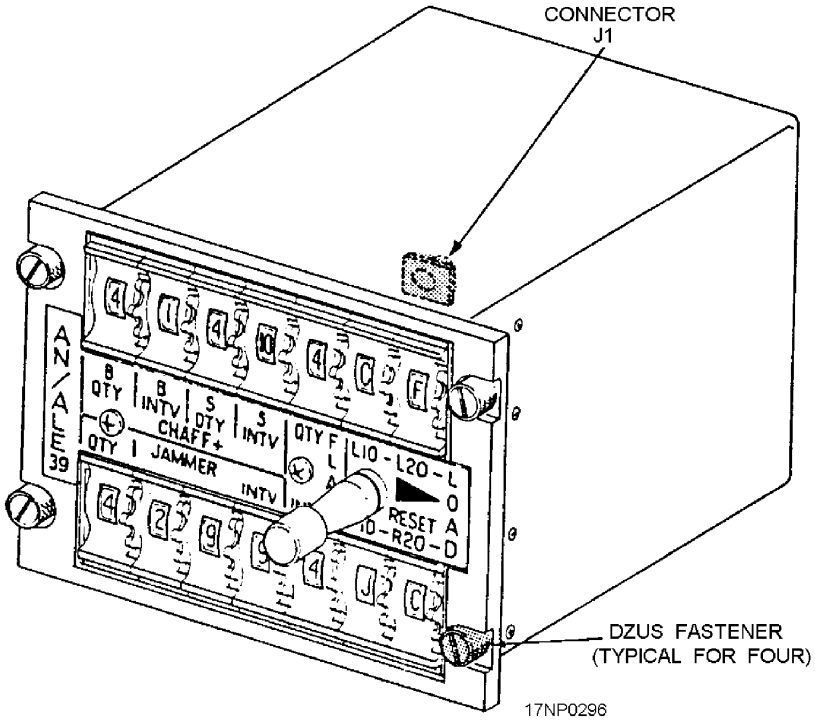


Figure 10-22.—Dispensing set programmer.

signals for the programmed payload ejection sequences. It also generates control signals for single ejection of payloads initiated manually. Manual (single) dispensing is performed during a programmed dispensing sequence without disrupting the program.

AN/ALE-37A COUNTERMEASURES CHAFF DISPENSING SET

The AN/ALE-37A countermeasure chaff dispensing set (fig. 10-23) is externally mounted on aircraft IMER/ITER ejector racks that have 14-inch suspensions. When mounted on the aircraft, the AN/ALE-37A has various patterns of chaff, decoy flares, or expendable jammers. Dispensing is dependent upon control settings and aircraft speed. Several dispensing pods may be employed on a single aircraft to provide maximum countermeasure capabilities.

The dispensing set is of modular construction, making maintenance easier and reducing turnaround time. Each dispensing pod contains two lightweight payload modules. Each payload module has a capacity of 120 rounds, providing a total capacity of 240 rounds. When empty, the pod weighs 180 pounds. When fully loaded, the pod weighs approximately 277 pounds.

Component Description

The functional theory and a physical description of individual dispensing set components are discussed in the following paragraphs. As you read about the components, look at figure 10-24. It shows their location and identifies them by item number.

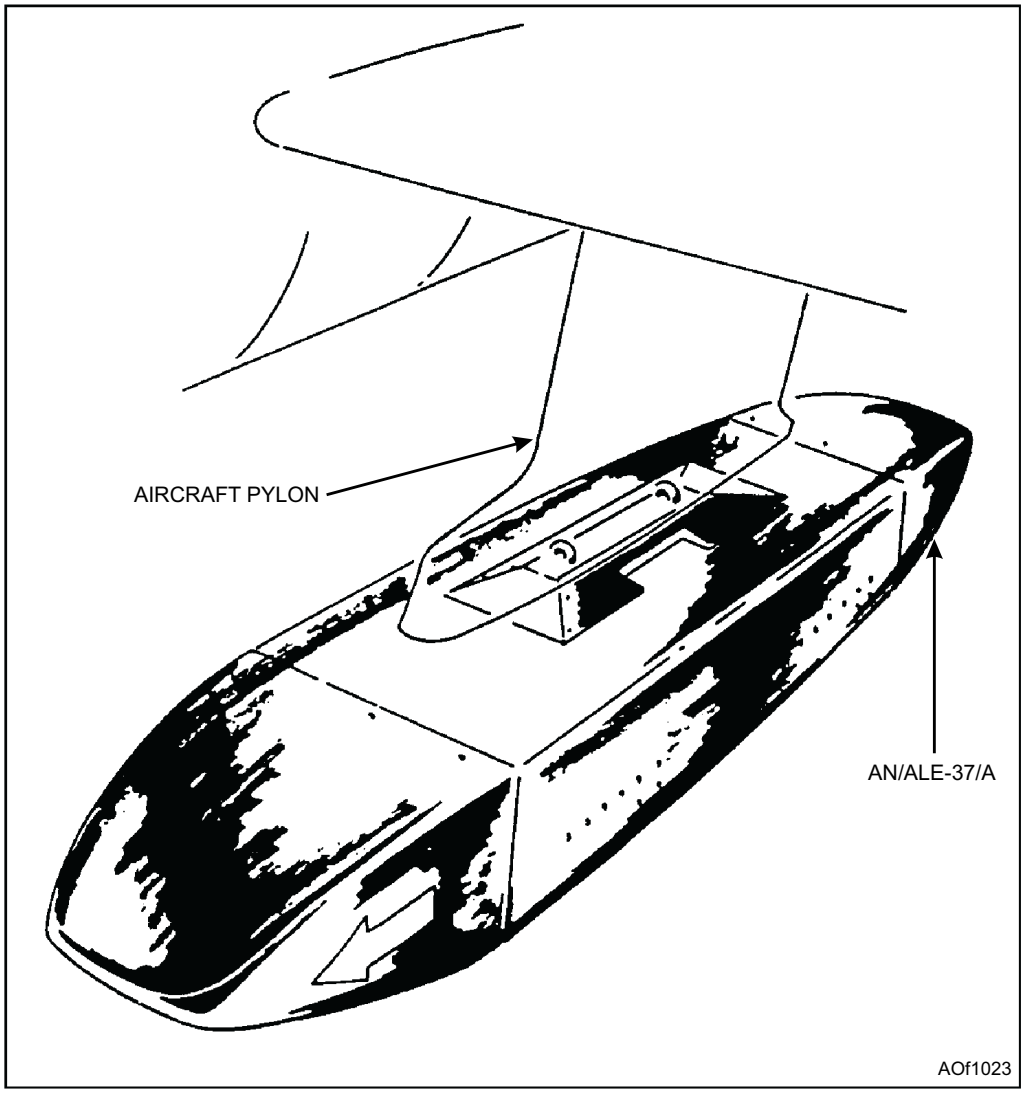
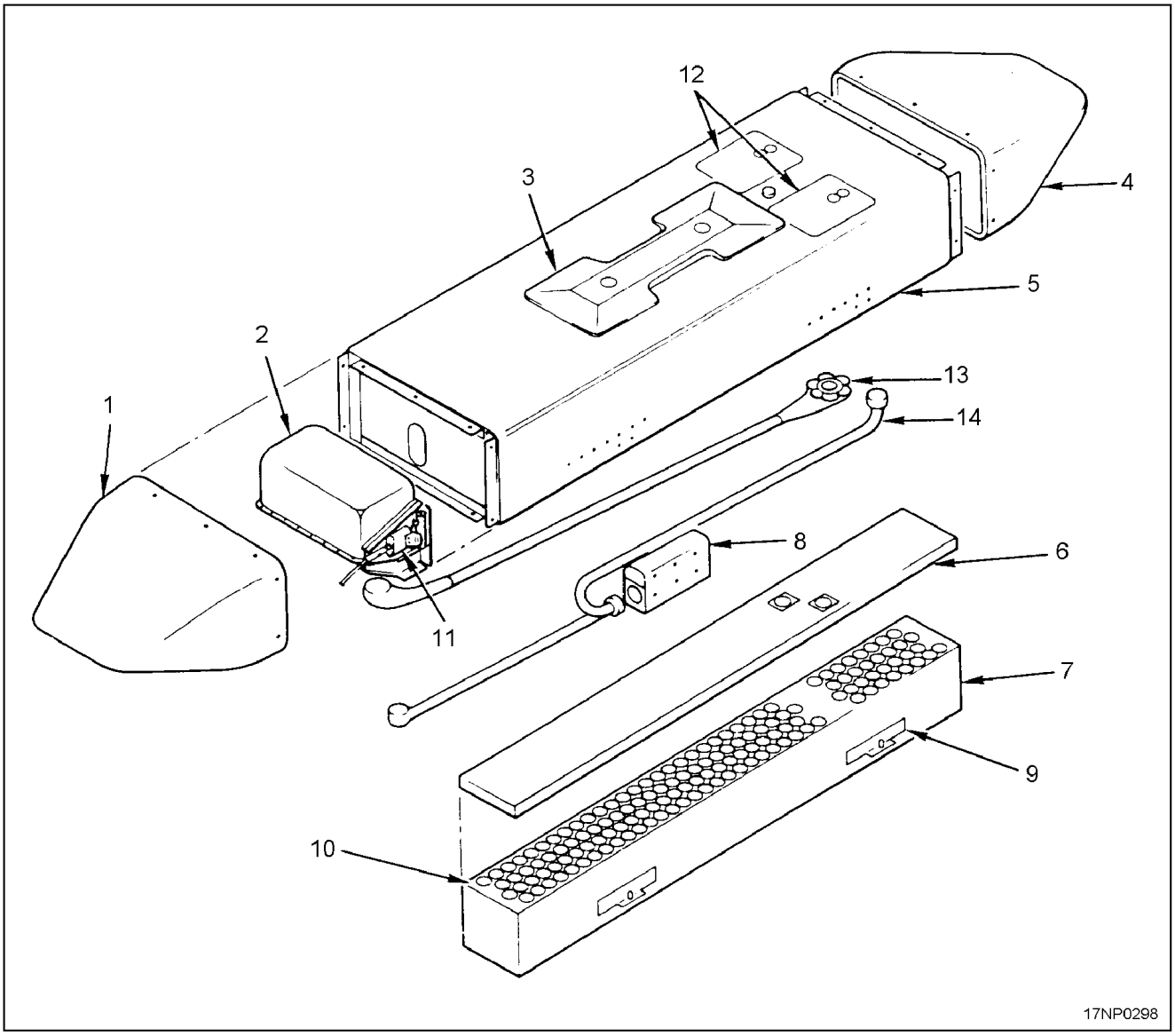


Figure 10-23.—AN/ALE-37A countermeasures chaff dispensing set.



1. **Nose cone**
2. **Intervalometer**
3. **Hardback**
4. **Tail cone**
5. **Module cavity**
6. **Squib board**
7. **Chaff module**
8. **Control indicator**
9. **Module latch**
10. **Chaff tube**
11. **Lanyard disconnect switch**
12. **Access plate**
13. **Squib board harness**
14. **Power wiring**

Figure 10-24.—AN/ALE-37A countermeasures dispensing set, exploded view.

Chaff Dispensing Pod

The chaff dispensing pod is constructed of heat-treated aluminum alloy formed sheet metal, extruded shapes, and machined parts. The pod is designed for quick reloading by using the spare loaded modules with squib boards installed. The pod hardback (item 3) has a rigid surface for mounting the pod to the bomb rack. The nose cone (item 1) houses the intervalometer, interlock switch, and provides aerodynamics to the pod. The tail cone (item 4) is identical to the nose cone, except it has extra markings and a hole for the insertion of a lanyard pin. An electrical connector at the aft end of the pod is used to interface with the aircraft's 28-volt dc power supply for pod operation. Power is routed internally, through the electrical wiring (item 14), from the connector to the intervalometer (item 2).

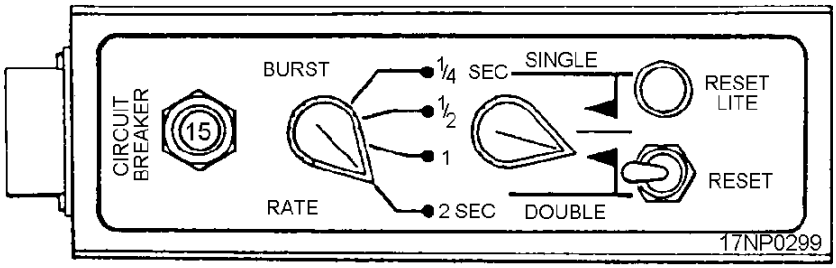


Figure 10-25.—Pod control indicator.

Chaff Module

You load the chaff module (item 7) with chaff, decoy flares, jammers, or a mixture of these payloads and a squib board (item 6). Then, insert it into the module cavity (item 5). Secure the chaff module in the cavity by locking the four positive locking latches (item 9). The 120 chaff tubes (item 10) contain the payloads. Each pod houses two separate modules.

Squib Board

The squib board (item 6) has four layers fastened and bonded together. The top layer is a thin sheet metal cover. The second layer is composed of edge spacers to provide a wire cavity for squib circuits. The remaining layers are composed of electrical insulating and fire-retardant materials. Two 61-pin electrical connectors connect the squib board harness (item 13) to the intervalometer circuitry. Place the squib board, with 120 Mk 131 or CCU-63/B impulse cartridges inserted, on top of the chaff module and secure it with eight captive attachment screws.

Intervalometer

The intervalometer (item 2) is used to control the burst rate. The intervalometer circuitry responds to the settings on the pod control indicator or the cockpit control indicator. The intervalometer contains a solid-state component electronic timing pulsar to switch the two automatic stepping switches. The stepping switches will operate individually for singles firing or in parallel for doubles firing.

Lanyard Disconnect Switch

The lanyard disconnect switch (item 11) is the main safety feature preventing cartridge detonation during chaff loading and ground maintenance. The switch is normally in the closed position. It is deactivated (opened) by inserting the lanyard pin in the switch socket. With the pin inserted, the lanyard disconnect switch opens the intervalometer circuitry and removes the electrical path to the squib board circuits.

Access Plates

The two access plates (item 12) provide access to the pod electrical connectors.

Pod Control Indicator

The pod control indicator (fig. 10-25) is located on the bottom center of the pod. It provides a means of selecting the burst rate and firing sequence. The controls are preset before flight to meet expected mission requirements. Table 10-1 lists the eight

Table 10-1.—Firing Time and Sequence

SINGLE-DOUBLE POSITION	BURST RATE POSITION	TOTAL TIME TO EMPTY
SINGLE	1/4 SEC (0.25 Sec)	1 minute
SINGLE	1/2 SEC (0.5 Sec)	2 minutes
SINGLE	1 SEC	4 minutes
SINGLE	2 SEC	8 minutes
DOUBLE	1/4 SEC (0.25 Sec)	30 seconds
DOUBLE	1/2 SEC (0.5 Sec)	1 minute
DOUBLE	1 SEC	2 minutes
DOUBLE	2 SEC	4 minutes

combinations of firing that can be obtained by positioning of the two rotary selector switches (BURST RATE and SINGLE/DOUBLE) on the pod control indicator. There is also a reset switch and reset light indicator on the pod control indicator so the intervalometer can be recycled to the starting position.

Cockpit Control Indicator

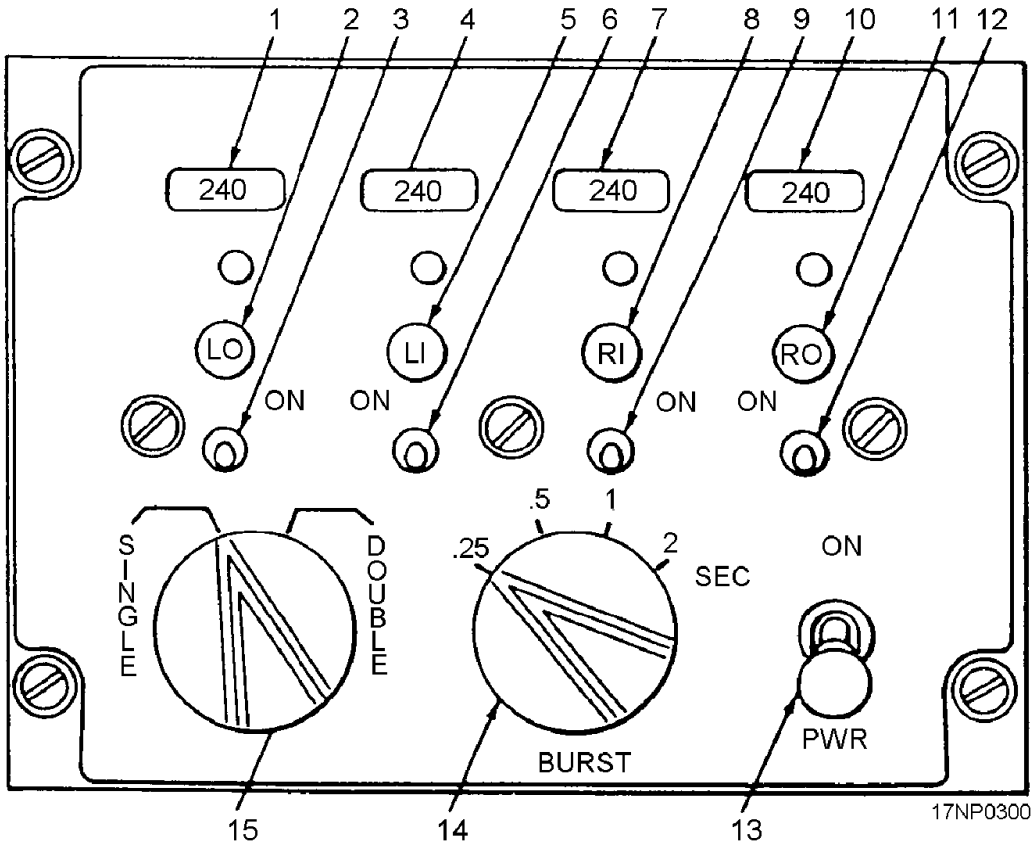
The cockpit control indicator (fig. 10-26) is an optional feature of the dispensing set. The controls on the cockpit control indicator override those on the pod control indicator, letting the operator select the burst rate and dispensing pattern after the aircraft is airborne.

In addition to the burst rate and single or double rotary switches, the cockpit control indicator has four pod select switches, a power ON switch, and four chaff remaining counters. This gives the pilot individual or simultaneous control of four separate dispensing sets while airborne. The cockpit control indicator has no reset feature. When the aircraft doesn't use the cockpit control indicator, any 28-volt dc power source having a cockpit control switch may be used for operation. When the system is used, the burst rate and dispensing pattern are controlled by the preset controls on the pod control indicator.

For further information on the AN/ALE-37A chaff dispensing set, you should refer to *Countermeasures Chaff Dispensing Set, AN/ALE-37A*, NAVAIR 16-30ALE37-1.

REVIEW NUMBER 5

Q1. What chaff dispenser is installed in Navy combat aircraft?



1. **Left outboard counter**
2. **Left outboard pod activate indicator**
3. **Left outboard pod activate switch**
4. **Left inboard counter**
5. **Left inboard pod activate indicator**
6. **Left inboard pod activate switch**
7. **Right inboard counter**
8. **Right inboard pod activate indicator**
9. **Right inboard pod activate switch**
10. **Right outboard counter**
11. **Right outboard pod activate indicator**
12. **Right outboard pod activate switch**
13. **Power switch**
14. **Burst rate selector switch**
15. **Single double selector switch**

Figure 10-26.—Cockpit control indicator.

Q2. List the two major subassemblies of the AN/ALE-29A countermeasure chaff dispensing set.

Q3. What is the maximum capacity of the AN/ALE-29A?

Q4. When the AN/ALE-37A is fully loaded, what is its weight?

Q5. The AN/ALE-37A chaff dispenser contains _____ modules.

Q6. There are _____ chaff tubes contained in an AN/ALE-37A chaff module.

SAFETY PRECAUTIONS

LEARNING OBJECTIVE: *Recognize safety precautions to follow when handling suspension, arming, and releasing equipment.*

As an AO, you need to be concerned with safety when working with suspension, arming, and releasing systems. It is doubtful there is a petty officer in the Navy who has not witnessed a minor mishap with suspension, arming, and releasing equipment. Accidents can be prevented if safety precautions and maintenance instructions are followed. Accidents can be prevented if personnel are trained and educated to work on the equipment. As a petty officer, it is part of your job to follow safety precautions and maintenance instructions and train new personnel. A few safety precautions that you need to follow, and train your subordinates to follow, are shown below.

- Keep all components of the various systems clean, well adjusted, and lubricated as prescribed.
- Make operational checks or periodic inspections of the system under the direct supervision of fully qualified personnel.
- **Never** insert your fingers or tools into a rack when the rack is cocked.
- Check wiring and electrical fittings regularly. Replace frayed or broken wiring. Check plugs for condition and proper installation.
- **Never** bypass safety circuits or devices or make them inoperative.
- **Don't** use any safety pin other than the prescribed one.
- When stores are loaded, install safety pins or other safety devices as prescribed while the aircraft is on the ground.
- **Never** install or arm an ejector rack unless the safety pin(s) and flag(s) are in place.
- **Don't** use an ohmmeter to check electrical continuity of an electrically primed cartridge.
- Remove or electrically disconnect all cartridges from the rack firing circuits before removing any component.
- Install only the prescribed cartridges in ejector devices.
- **Never** allow a dual breech ejector unit to be fired without two cartridges or a cartridge and authorized filler plug in the breeches.
- **Never** allow an ejector unit to be fired without a store latched in place.
- When loading stores, inspect all handling gear carefully. **Don't** use doubtful gear.
- When loading stores, make sure that the store is in position and the rack is securely locked before removing hoists.
- **Don't** place any part of your body under stores being loaded or unloaded if it is possible to accomplish the job without doing so.
- When installing suspension equipment, torque all installation bolts or screws to the prescribed torque value.
- Make sure quality assurance personnel familiar with the system inspect all final work performed on the armament system. Operational tests should be made on repaired systems where necessary.

REVIEW NUMBER 5 ANSWERS

A1. The AN/ALE-29A chaff dispenser is installed in Navy combat aircraft?

A2. The two major subassemblies of the AN/ALE-29A countermeasure chaff dispensing set are the glass-reinforced phenolic plastic block and a sandwich-type printed circuit board.

A3. The maximum capacity of the AN/ALE-29A is 30 payload units.

A4. When the AN/ALE-37A is fully loaded, it weighs 277 pounds.

A5. The AN/ALE-37A chaff dispenser contains two modules.

A6. There are 120 chaff tubes contained in each module of the AN/ALE-37A.