The Interactive features of this manual are currently disabled.

Many graphics will not appear correctly unless these features are turned on. You should either see a popup window, or a yellow banner at the top of the application. To enable the Interactive features of this manual follow the steps illustrated below:

If you see a popup window do the following:

If you see a yellow banner, do the following:

Once you have completed either of the above procedures the features will be enabled for this document, and this warning won't appear again after you leave this page.
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.

**LEARNING OBJECTIVES**

When you have completed this chapter, you will be able to do the following:

1. 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.
2. Identify the purpose and use of bomb ejector racks to include their principles of operation, maintenance requirements, and operational description.
3. Identify the purpose and use of dispensers and ejectors.
4. Recognize safety precautions to follow when handling suspension, arming, and releasing equipment.

**BOMB RACKS**

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/1B Adapter Assembly**

The Aero 1A (Forward)/1B (Aft) adapter assemblies (*Figure 10-1*) are used on the forward and aft ends of the BRU-14/A or BRU-15/A bomb racks which enable them to load and carry weapons/stores that have suspension lugs spaced 30 inches apart and weigh up to 2,000 pounds.
The Aero 1A/1B adapter linkage attaches to the bomb rack. The movement of the Aero 1A/1B adapter suspension hooks corresponds to the movement of the bomb rack suspension hooks. More information on the Aero 1A/1B adapter assembly can be found in Bomb Rack Adapter Assembly Aero 1A/1B, NAVAIR 11-5E-17.

**BRU-12/A, BRU-12A/A BOMB RACK**

The BRU-12/A and BRU-12A/A bomb racks (Figure 10-2) are designed for fixed mounting in a bomb bay of the P-3 aircraft and can be used to carry, arm, and release a weapon/store weighing up to 1,450 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 Electro-mechanical Actuator (LEMA) provides electrical release of a weapon/store. No in-flight manual release mechanism is provided. A BRU-12/A bomb rack with improved positive arming latch installation creates a BRU-12A/A.

**BRU-14/A BOMB RACK**

The BRU-14/A bomb rack (*Figure 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/1B adapter assemblies are used to increase the bomb rack to 30-inch suspension capacity. It may be installed in the bomb bay of the P-3C aircraft and in the weapon pylon of the H-60 aircraft.

Sway braces are bolted to the rack frame. Installation of an in-flight operable bomb rack lock (IFOBRL) allows remote locking and unlocking of the rack when electrical power is applied to the aircraft.

![Figure 10-3 — BRU-14/A aircraft bomb rack (left-hand configuration).](image)

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

More information about the BRU-14/A bomb rack is contained in Bomb Rack BRU-14/A and BRU-15/A, NAVAIR 11-5E-18.

**BRU-15/A BOMB RACK**

The BRU-15/A bomb rack (Figure 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. Aero 1A/1B adapter assemblies can be attached to increase the bomb rack to 30-inch suspension capacity.

![Figure 10-4 — BRU-15/A bomb rack.](image)

The BRU-15/A bomb rack is a modification of the BRU-14/A bomb rack. 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.

**BOMB EJECTOR RACKS**

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 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-32 (SERIES) EJECTOR UNIT RACK ASSEMBLY**

The BRU-32 (series) ejector unit rack assembly (*Figure 10-5*) is a non-jettisonable single carriage rack used for carrying weapons or other external stores on the F/A-18 aircraft. The bomb rack is attached to the aircraft by four bolts and electrically connected to the aircraft weapons system.

![Diagram of BRU-32 (series) bomb ejector rack.](image)

*Figure 10-5 — BRU-32 (series) bomb ejector rack.*

The BRU-32A/A can carry weapons/stores of between 10 and 28 inches in diameter weighing up to 2,600 pounds, while the BRU-32B/A can carry weapons/stores of the same diameter weighing up to 4,200 pounds. There are two pairs of suspension hooks, 14 and 30 inches apart on the longitudinal centerline of the ejector unit rack.

It is used to suspend single stores, BRU-33/A vertical ejector racks (VER), BRU-33A/A canted vertical ejector rack (CVER), BRU-55/A ejector rack, and LAU-115/A, LAU-117/A, and LAU-118/A missile launchers by using a 14-inch suspension hook.

The BRU-32 (series) bomb ejector rack has safety interlock and two sway brace assemblies with self-adjusting wedges. 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 aircraft weapon system 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.

BRU-33 (SERIES) VERTICAL EJECTOR RACK ASSEMBLY

The BRU-33/A vertical ejector rack assembly (VER) (Figure 10-6) and BRU-33A/A canted vertical ejector rack (CVER) (Figure 10-7) are suspended by the BRU-32 (series) bomb ejector rack. It is used to carry two external stores weighing up to 1,000 pounds each, 10 to 16 inches in diameter by using 14-inch suspension hooks. The VER/CVER feature a special safety interlock and self-adjusting wedges. 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 store management system (SMS) 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.

**BRU-55 (SERIES) AIRCRAFT BOMB EJECTOR RACK**

The BRU-55 (*Figure 10-8*) allows carriage of two smart weapons (up to 1,000-pound class) on a single aircraft station. BRU-55 weapons currently consist of Joint Stand-off Weapon (JSOW), and 1,000-pound Joint Direct Attack Munition (JDAM).

---

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

**Figure 10-8 — BRU-55 aircraft bomb ejector rack.**
The BRU-55 uses the MIL-STD-1760 interface (Aircraft-to-Rack and Rack-to-Weapons). BRU-55 aircraft currently consist of the F/A-18. The BRU-55 is 70 inches long, 29 inches wide, and weighs between 228 and 236 pounds. Its aircraft interface is 30-inch lugs and single 1760 umbilical. Its weapons interface is 14-inch lugs and one 1760 umbilical each. The BRU-55 is equipped with two weapon umbilical retaining brackets to prevent damage to the weapon umbilical upon release.

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

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

**Figure 10-9 — BRU-41/A IMER.**

**Figure 10-10 — BRU-42/A ITER.**
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 has the capability of releasing stores at 35-millisecond intervals. The electronic control unit is disposable. If it malfunctions, it should be replaced with a new one.

Cable Assembly

The cable assemblies are modular wiring systems utilizing electromagnetic Interface (EMI) resistant filter line wiring. The cable assemblies interface the aircraft with a quick-release connector and provide routing of electrical power to the ejector unit assemblies or store sensing, arming, and breech assembly firing. When rocket stores are used, the cable assemblies route electrical power to the rocket harness assemblies to provide firing impulses to these stores. Three rocket adapter harness assemblies are provided to electrically couple rocket stores to the BRU-41/A or BRU-42/A.

Ejector Unit Assembly

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 (Figure 10-11).
The shoulder stations are attached to the adapter assembly by ejector unit attach blocks. The centerline stations are attached by ejector unit attach hangars.

An IMER/ITER ejector unit (Figure 10-12) 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.

![IMER/ITER ejector unit diagram](image)

**Figure 10-12 — IMER/ITER ejector unit.**

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. Figure 10-13 shows the locked and unlocked positions of the ejector unit safety stop lever.
Figure 10-13 — 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 MECHANICAL OPERATION—All ejector units on the IMER and ITER are operationally the same. An electrically initiated gas-generating cartridge actuates the ejection mechanism. Figure 10-14 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 (Figure 10-14).
Figure 10-14 — Ejector unit operation.
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 (Figure 10-14).

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 (Figure 10-14).

**IMER/ITER ELECTRICAL OPERATION**—Before discussing the electrical operation of the IMER/ITER, it is important to 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 (Figure 10-15). For the purpose of discussion, it should be assumed 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, the forward hooks should be 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 (Figure 10-16) is composed of two separate components—a bracket assembly, and a restrictor.

The hardware for practice bomb adapters is considered to be organizational-level equipment, and is to be maintained in the custody of the organizational unit.

Further information concerning the IMER and ITER can be found in Organizational, Intermediate, and Depot Level Maintenance IMER and ITER, NAVAIR 11-75A-603.

**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. Basic characteristics of dispensers and ejectors currently in use will be covered in this section of the RTM.
The SUU-25F/A dispenser (*Figure 10-17*) 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 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 fully loaded with eight LUU-2B/B flares and eight impulse cartridges, it weighs 490 pounds.

The shipping and flight configuration of the dispenser is shown in *Figure 10-17*. 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.
In the following section on the SUU-25F/A dispenser, Figure 10-18 contains information regarding location and identification of the components.

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

![Figure 10-18 — SUU-25F/A dispenser, exploded view (forward end).](image)

**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 an 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 direct current (dc) required to fire the impulse cartridge.

**Downloading Breech and Downloading Breech Cap**

There is one downloading breech and one downloading breech cap for each tube of the dispenser. 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 allows insertion of 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. The downloading breech caps should be reinstalled 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 used during dispenser electrical test procedures.

Stepper Switch
The stepper switch provides sequential firing of the impulse cartridges. The switch has ten functional settings—one safe setting, one arm setting, and eight firing steps. The stepper switch should always be placed in the SAFE position during dispenser loading and unloading. The switch should be moved 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. The retainer lock can be moved from either the locked or unlocked position through an access door located on either side of the dispenser. Before loading a store, the retaining lock should be rotated to the unlocked position. This pivots the retainer lock out of the tube. After the store has been loaded, the retaining lock should be rotated to the locked position, and secured 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 (Figure 10-19). 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, J1 and J2, are located forward and aft of the suspension lugs, respectively. Both receptacles provide 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 used.

![Figure 10-19 — SUU-25F/A dispenser, exploded view (aft end).](image)

An electrical wiring harness is routed internally from electrical connectors J1 and J2 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 a dispenser tube is loaded with munitions, each pair of flares is 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 munitions 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. A white cross-
shaped plastic spacer is mounted on the aft sealing ring of the forward munitions. This provides enough space between the forward and aft munitions to provide an expansion chamber for ejecting the aft munitions.

After the adapter has been installed, the munitions should be installed 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 No. 2 impulse 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 10-20.

**Maintenance Requirements**

Organizational-level maintenance is limited to a visual inspection of the dispenser. The dispenser should be examined 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.
Further information concerning the SUU-25F/A dispenser can be found in Dispenser SUU-25F/A, NAVAIR 11-75AA-48.

**AN/ALE-39 COUNTERMEASURES DISPENSING SYSTEM**

The AN/ALE-39 countermeasures dispensing system dispenses decoys to confuse and jam enemy electronic tracking, missile guidance, and homing systems. The system ejects expendable payloads consisting of chaff, flares, or radio frequency (RF) jammers singly or in groups from two 30-round dispenser magazines.

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 installations or radar-controlled missiles.

The countermeasure dispensing system includes two dispenser assemblies which consists of a dispenser system block and printed wiring board (PWB), two dispenser housings; electronic countermeasure (ECM) control panel, AN/ALE-39 programmer, and chaff/flare ECM dispense switches.

**Magazine, Block and Printed Wiring Board**

The dispensing system block and a PWB *(Figure 10-21)*, has 30 holes for loading payload units.
The PWB contains the circuitry and socket holes for installing 30 electrically-initiated impulse cartridges.

**NOTE**

Installation of the impulse cartridges must be accomplished in a designated RF-free area.

The dispenser is loaded by putting the 30 payload units into the block (*Figure 10-22*).
WARNING

Under no circumstances should a flare be hammered or forced into or out of a flare dispenser tube. Hand pressure is adequate for seating or removing flares.

Figure 10-22 — Payload installation.

An impulse cartridge should be installed in each of the 30 socket holes on the PWB (Figure 10-23). Then, the board should be attached to the block by two captive screws.

Figure 10-23 — Impulse cartridge installation.
Finally, the loaded dispenser magazine assembly should be installed in the dispenser housing (*Figure 10-24*), securing it with the four positive-lock studs of the dispenser block.

![Dispenser magazine loading](image1)

*Figure 10-24 — Dispenser magazine loading.*

The payload units are forced from their plastic or aluminum sleeves by the gas pressure generated when the impulse cartridges are fired. The chaff sleeve extractor, shown in *Figure 10-25*, is used during dispenser download procedures.

![Sleeve and payload extractor](image2)

*Figure 10-25 — Sleeve and payload extractor.*
Dispenser Housings

Housing assemblies are not removed from the aircraft when loading. The dispenser assembly is removed from the housing assembly by unlocking the four positive-lock studs. The dispenser assembly should be moved to a designated area and loaded. Then, it should be returned to the aircraft and reinstalled 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 installing the dispenser assembly into the housing assembly, a guide pin should be used to ensure proper alignment of the electrical connectors.

AN/ALE-47 COUNTERMEASURES DISPENSER SYSTEM (CMDS)

The AN/ALE-47 countermeasures dispenser system (CMDS) provides an integrated, reprogrammable, computer-controlled system for dispensing expendables/decoys. These include chaff, flares, RF expendables, and others. The AN/ALE system enhances aircraft survivability in sophisticated threat environments. The AN/ALE-47 CMDS is designed to employ electronic and infrared countermeasures according to a program developed and implemented by the aircrew.

The AN/ALE-47 CMDS provides the aircrew with a "smart" CMDS, allowing the aircrew to optimize the countermeasures employed against anti-aircraft threats.

The AN/ALE-47 contains a magazine (MX-12023/ALE-47(V)) block (Figure 10-26) and a breechplate (Figure 10-27).

![Figure 10-26 — ALE-47 block.](image-url)
During magazine assembly, the breechplate should be removed from the block by loosening the four captive screws (Figure 10-27), which secure the breechplate to the block. The block should be placed on its side in preparation to receive expendables. After verifying the expendables have been inspected, the expendables should be inserted into the block from the breechplate side in accordance with (IAW) the applicable ALE-47 (V) mission data file (MDF) magazine identification (ID) loadout configuration. The appropriate technical manual should be consulted for loadout configuration data.

Prior to using the breechplate, it should be inspected for cleanliness or fired impulse cartridge residue—particularly around impulse cartridge contacts. Before installing the impulse cartridge, all surfaces of the breechplates must be cleaned. If needed, the breechplate surface should be cleaned IAW procedures outlined in NAVAIR 16-30ALE-47-1.

Next, impulse cartridges should be installed onto the breechplate. Appropriate assembly manuals should be used for dispenser/component compatibility and to identify which impulse cartridge types are to be used with loaded expendables.

It is important to verify that Breechplate Magazine ID switch settings of S1 and S2 are correctly set for the selected MDF loadout configuration (Figure 10-28).
When installing the impulse cartridges, these procedures should be followed:

1. Insert impulse cartridge into the “Impulse cartridge alignment tool” located on the breechplate (Figure 10-28). Reject impulse cartridge if the base does not seat firmly on the breechplate.

2. Remove impulse cartridge from the alignment tool.

3. Insert impulse cartridge into the appropriate breechplate firing location, remembering that corresponding positions between magazine dispenser block and impulse cartridge side of breechplate are reversed (mirror image).

4. Repeat these steps until the breechplate is completely loaded.

The breechplate should then be installed on the dispenser block. With the loaded block on its side, the breechplate with impulse cartridges installed should be brought up to mate with the block and then the breechplate secured to the block using the four captive screws. This method has the advantage of not losing the impulse cartridge from the breechplate, and also directs the expendable away from the technician where an inadvertent ignition will produce a less hazardous situation.

The screws securing the breechplate to the block do not ensure a gas tight seal between the block, expendable, and the breechplate. These screws simply secure the breechplate to the block until the magazine is loaded into the dispenser. The four screws should be tightened securing the breechplate to the block using a torque wrench IAW applicable weapons assembly manual without overtightening. These screws are for alignment of the breechplate to the block only and are not designed as structural attachments. Finally, the AN/ALE-47 magazine should be loaded into the dispenser. Platform-specific loading manuals should be consulted for loading instructions.
SAFETY PRECAUTIONS

As an AO, safety is very important when working with suspension, arming, and releasing systems. It is doubtful there is a second class 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 an AO it is important to follow safety precautions and maintenance instructions and train new personnel. A few safety precautions that need to be followed (by technicians and subordinates) 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 one prescribed.
- 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.
- 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. Ensure operational tests are made on repaired systems where necessary.
• Because empty expendable countermeasure dispenser blocks are subject to cracking when dropped on corners, avoid rough handling and under no circumstances shall a payload be hammered or forced into the block.

• Handle impulse cartridges with care. Handle impulse cartridges IAW the general Hazards of Electromagnetic Radiation to Ordnance (HERO) requirements of NAVSEA OP 3565/NAVAIR 16-1-529.

• Carefully examine expendables, impulse cartridges, and retainers for possible damage before installation. Discard wet or cracked expendables, or expendables with damaged sleeves. Discard impulse cartridges with bent, deformed, or out-of-tolerance pins per applicable airborne weapon assembly manual.

• In the event that a decoy flare has visible damage or the device's pyrotechnic load is visible, segregate the flares from other decoy devices and notify explosive ordnance disposal (EOD) for proper disposition. Ensure decoy devices that have been dropped or roughly handled are disposed of by EOD personnel.

• Examine flares remaining in the magazine upon completion of a flight prior to downloading. If the pyrotechnic load is visible, inspect the magazine and make sure it is disassembled by EOD personnel.
End of Chapter 10

SUSPENSION, ARMING, AND RELEASING
EQUIPMENT

Review Questions

10-1. Bomb racks are used for which of the following purposes?

A. To carry stores only
B. To release stores only
C. To arm stores only
D. To carry, release, and arm stores

10-2. What is the acronym LEMA?

A. Linear Electro-mechanical Actuator
B. Linear Electro-mechanical Accelerator
C. Linear Electro-mechanical Ascending
D. Line Electro-mechanical Actors

10-3. The power required to operate the secondary release assembly of a BRU-14/A bomb rack is provided by what source?

A. A dc generator
B. A manual-release cable
C. An electromechanical device
D. A cartridge-actuated device

10-4. What bomb rack can be installed in the weapon pylon of the H-60 aircraft?

A. BRU-12/A
B. BRU-14/A
C. BRU-15/A
D. BRU-32A/A

10-5. A BRU-32A/A bomb ejector rack is used on which of the following types of aircraft?

A. EA-6B
B. F/A-18
C. H-60
D. P-3
10-6. A BRU-33/A bomb ejector rack is used to carry two external stores each weighing up to what maximum weight?

A. 1,000 pounds  
B. 2,000 pounds  
C. 3,000 pounds  
D. 4,000 pounds

10-7. How many impulse cartridges are required to be installed in the ejection unit of a BRU-33 (series) bomb ejector rack to generate the required gas pressure for rack operations?

A. One  
B. Two  
C. Three  
D. Five

10-8. The BRU-55 bomb ejector rack provides the interface from aircraft to rack and rack to weapons that allows the carriage of what weapons?

A. Two AIM-7 or two AIM-120  
B. Two Harpoon or two SLAM-ER  
C. Two JSOW or two 1,000 pound JDAM  
D. Two 2,000-pound class weapon

10-9. When the gas-generating cartridge is fired in an IMER/ITER ejector unit assembly, which of the following movements is part of the process of unlocking the suspension hooks?

A. The aft movement of the breech  
B. The aft movement of the hook release rod  
C. The downward movement of the cranks  
D. All the answers are correct

10-10. During ejection, the weight of the store, plus gas pressure, forces the suspension hooks of an IMER/ITER ejector unit assembly to open. Which of the following component(s) hold(s) the suspension hooks in the open position?

A. The hook toggle lever  
B. The hook toggle spring only  
C. The coil spring only  
D. The hook toggle spring and the coil spring

10-11. What maintenance level is responsible for maintaining both the hardware adapter kit and the practice bomb adapters used with an IMER/ITER?

A. Organizational  
B. Intermediate  
C. Depot  
D. Overhaul
10-12. What is the maximum weight of the SUU-25F/A dispenser when it is loaded with eight aircraft parachute flares?

A. 260 pounds  
B. 435 pounds  
C. 490 pounds  
D. 572 pounds

10-13. When the SUU-25F/A dispenser is fully loaded, it contains what maximum number of impulse cartridges?

A. Two  
B. Four  
C. Six  
D. Eight

10-14. The AN/ALE-39 dispensing system is capable of cartridge ejecting which of the following load configurations?

A. Chaff  
B. Flares  
C. RF jammers  
D. All the answers are correct

10-15. The AN/ALE-47 countermeasures dispenser system provides an integrated, reprogrammable, computer-controlled system for dispensing what items?

A. Radio frequency (RF) expendables only  
B. Chaff, flares, and radio frequency (RF) expendables  
C. Flares only  
D. None of the answers are correct

10-16. What manual should be referenced when handling of impulse cartridges shall be accomplished in accordance with the general HERO requirements?

A. NAVSEA OP 3565/NAVAIR 16-1-529  
B. NAVSEA OP 2173/NAVAIR 19-100-1  
C. NAVAIR 11-140-25  
D. SW030-AA-MMO-010

10-17. For proper disposition, who must be notified in the event a decoy flare has visible damage or the device's pyrotechnic load is visible?

A. Explosive ordnance disposal (EOD)  
B. NAVAIRSYSCOM  
C. NAVSEASYSCOM  
D. None of the answers are correct