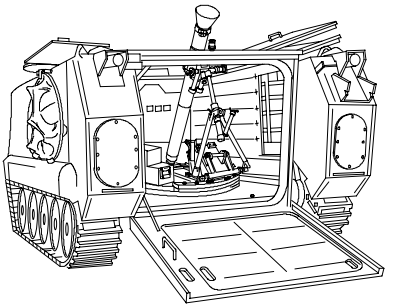




TM 9-1015-250-10

SUPERSEDES COPY DATED MARCH 1993

OPERATOR'S MANUAL
FOR
MORTAR, 120MM:
TOWED M120
(NSN 1015-01-226-1672)(EIC:4SL)
AND
MORTAR, 120MM:
CARRIER-MOUNTED
M121
(NSN 1015-01-292-3801)(EIC:4SE)

See back cover for warning, distribution, and destruction information.

HEADQUARTERS
DEPARTMENT OF THE ARMY

AUGUST 1996

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WARNING

GENERAL

RADIATION HAZARD



TRITIUM (H_3)

This item contains radioactive materiel. Control of this radioactive materiel is mandated by Federal law. Immediately report any suspected lost or damaged items to your Radiation Protection Officer. If your Radiation Protection Officer cannot be reached, contact the TACOM-RI safety office during regular duty hours; or call the Rock Island Arsenal Police office at DSN 793-6135 after duty hours.

A. *RULES and REGULATIONS*. Copies of the following rules and regulations are maintained at TACOM-RI, Rock Island, IL 61299-7630. Copies may be requested or information obtained by contacting the TACOM-RI Radiation Protection Officer (RPO), DSN 793-2962/2965, Commercial (309) 782-2962/2965.

(1) 10CFR Part 19 - Notices, Instructions, and Reports to Workers; Inspections.
(2) 10CFR Part 20 - Standards for Protection against Radiation.
(3) 10CFR Part 21 - Reporting of Defects and Noncompliance.
(4) NRC license, license conditions, and license application.

B. *SAFETY PRECAUTIONS*. The radioactive material used in these instruments is tritium gas (H_3) sealed in glass vials. These sources illuminate the instrumentation for night operations. Tampering with or removal of the sources in the field is prohibited by Federal law. In the event there is no illumination, notify the local RPO or TACOM-RI RPO. If skin contact is made with any area contaminated with tritium, wash immediately with soap and water.

The beta radiation emitted by tritium is a hazard only if the vial or source is broken. Tritium can be taken into the body by inhalation, ingestion, or skin absorption/ injection. If the vial is broken, the tritium gas will dissipate into the surrounding air. If released in a confined space such as a storage locker, container, unventilated room, or military vehicle, tritium is absorbed by lungs from air or by skin contact with contaminated surfaces. However, the body naturally eliminates absorbed tritium.

C. ***IDENTIFICATION.*** **Instruments containing radioactive self-luminous vials are identified by means of radioactive warning labels (see page a). These labels should not be defaced or removed and should be replaced immediately when necessary (item 8, app D). Refer to the local RPO or the TACOM-RI RPO for instructions on handling, storage, or disposal.**

D. ***STORAGE.*** **Spare equipment must be stored in the shipping container, as received, until installed on the weapon. Storage of these items is recommended to be in an outdoor shed-type storage or unoccupied building.**

E. ***SHIPPING.*** **All radioactively illuminated instruments will be evacuated to the appropriate echelon for inspection and repair. Non-illuminated instruments will be disposed of as radioactive waste. Contact installation Radiation Protection Officer.**

F. ***EMERGENCY PROCEDURES.*** **If a source breaks or is not illuminated, follow "SWIMN":**

Stop - and think.

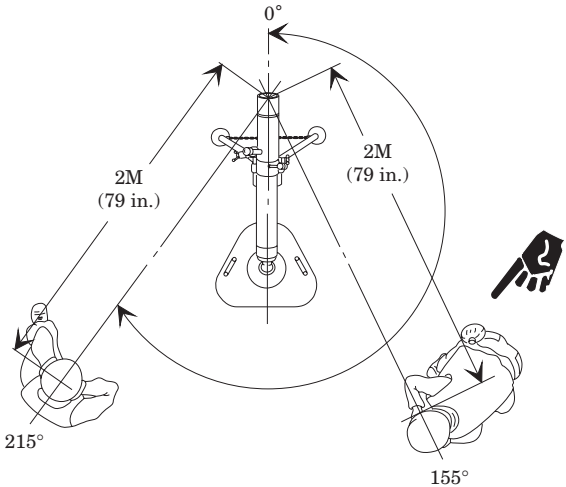
Warn - nearby personnel of situation to avoid additional exposure. Immediately open doors/hatches if exiting room/vehicle/area is not possible. If exiting, move upwind for 15 minutes.

Isolate - Do not handle broken tritium devices with bare hands. Use gloves (if available) or a bag. Quickly place item in plastic bag (item 1, app D) (or, if bag not immediately available, wrap in plastic) and, if possible, leave area.

Minimize - wash hands.

Notify - call the Radiation Protection Officer (RPO).

G. ***SPECIAL HANDLING.*** **Radioactive material is used in the M58/M59 aiming post lights and M67 sight unit. Radiation leakage may occur if broken or damaged. If exposed to a broken or damaged instrument, see medical personnel.**



Gunner and assistant gunner's heads must be away and below muzzle blast (no higher than 1.2 meters above ground) during all loading and firing operations.

WARNING (Cont)

GENERAL (Cont)

The mortar blast may cause bodily injury, as well as hearing loss. Crew members and all personnel within 5 meters of the M120/M121 mortar must wear double hearing protection when firing. All personnel within 200 meters must wear hearing protection.

Do not fire from carrier prior to the installation of the Blast Attenuator Device (BAD).

The mortar crew must have adequate cover for protection from fragments when firing to ranges of 600 meters or less.

Before firing:

- **Check that buffer housing assembly is locked, cross leveling locking knob is hand tight, and firing pin is present and fully seated.**
- **For M190, check that chain assembly is straight and tight.**
- **For M191, check that bipod support assembly is locked, safety pins are installed, turntable is locked in position, and cargo hatches are locked open.**

Do not move the mortar barrel assembly, bipod assembly, and the mortar baseplate as a unit. Use two crew members to move the mortar baseplate, barrel, or bipod.

Mortar bipod assembly, barrel assembly, and baseplate must be securely connected to each other.

All 120mm mortar crewmen must be trained in the proper use of both types (see p 2-103) of hearing protection.

All 120mm mortar crewmen must be checked by appropriate medical personnel to assure proper fit of earplugs.

The 120mm mortar poses a significant risk of hearing loss. Hearing loss is a certainty for those not using hearing protection properly. Significant damage can occur even for a single, unprotected exposure. Some individuals are particularly susceptible to noise, and they can only be identified if they report for scheduled hearing checks.

An individual (medical, safety, or range personnel), who has evidence of hearing conservation training equivalent to standards of the Council for Accreditation in Occupational Hearing Conservation, must inspect the insertion of the earplugs before firing.

WARNING (Cont)

GENERAL (Cont)

During rapid and sustained rates of fire, there is a possibility of residual flame and cookoffs. Rapid and sustained rates of fire are 16 and 4 rounds per minute. If a cookoff occurs, the crew should wait 10 minutes for the weapon to cool, swab the barrel, and resume firing.

Do not allow the bipod assembly to lean forward (downrange) of a vertical position under any circumstance of elevation setting or positioning of buffer housing assembly on the barrel.

High cross country speeds can result in damage or rollover of the M120 mortar. Therefore, cross country speeds when towing the M120 mortar should not exceed 15 MPH.

Mortar must be securely fastened to the trailer or to the turntable.

Stay clear of mortar baseplate while in towed position to avoid injury from sudden release.

Do not remove traversing stops on turntable indexing gear.

The mortar is placed on the trailer with the bipod, barrel, and baseplate joined. The white line on the barrel must be toward the trailer's cannon cradle (white line facing down) or baseplate will disengage from breech cap ball.

When the trailer is raised, it can tip and fall on people, causing injury. One crew member must steady the trailer by holding the towing eye or frame whenever it is raised.

Dry cleaning solvents (SD) and paint thinners (TPM) are flammable. Do not clean parts near an open flame or in a smoking area. Dry cleaning solvents and paint thinners evaporate quickly and have a drying effect on the skin. When used without protective gloves, these chemicals may irritate or crack the skin. Wash exposed area with soap and water after exposure.

MORTAR BARREL ASSEMBLY

The exterior surface of the barrel must be wiped free of lubrication prior to firing. If this portion is not dry, the buffer housing assembly may move excessively on the barrel during firing.

AMMUNITION

Handle explosive ammunition and components containing explosives with utmost care. Do not drop, drag, throw, tumble, or strike packaged or unpackaged ammunition or related components.

Do not fire unpackaged ammunition which has been dropped. These will be returned to the Ammunition Supply Point (ASP) as unserviceable. If an XM930 or M983 Illum Cartridge has been dropped, do not attempt to retrieve the cartridge for ten minutes. Personnel retrieving the cartridge must be sure that the fuze and fin ends of the cartridge are pointed away from their bodies in the event that the cartridge separates. The cartridge is to be placed in the dud pit and destroyed by EOD.

WARNING (Cont)

AMMUNITION (Cont)

Do not fire packaged M57, M68, or M91 cartridges that have been dropped from a height greater than one meter. These cartridges will be returned to Ammunition Supply Point (ASP) as unserviceable.

Unauthorized assembly and use of cartridges is extremely dangerous. Do not assemble or use a cartridge unless authorized.

Firing the M57, M68, or M91 120mm cartridges from the M121 carrier-mounted mortar may cause bodily injury and hearing loss. These cartridges are not authorized to be fired from the carrier.

At temperatures exceeding 111.4 °F (melting point of WP), store and transport WP cartridges in a vertical position (nose up) to prevent voids in the WP.

Ammunition must be secured to the bed of the transport vehicle or placed in ammunition racks (or in Loose Round Restraint System) during transport. Ammunition will not be transported as loosely stowed cargo.

Ammunition exposed directly to sunlight, or in unventilated containers, enclosures, shelters, freight cars, closed vehicles, and similar structures exposed to direct sunlight, may reach temperatures exceeding upper storage limits. Avoid exposure of ammunition and related components to direct sunlight.

Do not fire ammunition in temperatures above +145 °F (+63 °C) or below -28 °F (-33 °C).

Do not store ammunition under trees or next to towers or other structures that attract lightning.

Propelling charges are not interchangeable. Do not substitute one model for another. Do not mix lots.

Use only authorized fuze combinations. When seating fuze onto projectile body, do not stake fuze or use excessive force.

Do not drop a cartridge with the firing pin retracted. The firing pin must be removed when removing a misfire.

Do not try to force a cartridge down the barrel.

Firing a cartridge with cleaning fluid, rain water, or excess oil left in barrel results in discharge of heavy black smoke, and will result in the projectile falling short of its expected range.

Firing ammunition in a heavily lubricated bore can result in hangfires or failures to fire. Short rounds may occur if water or excessive oil is in the barrel during firing.

Use caution while cleaning the barrel bore in the carrier when it requires standing on top of carrier.

Firing site must have enough mask clearance and no overhead obstructions to prevent cartridge deflection or premature explosion. Heavy rainfall may prematurely explode PD and proximity fuzes.

Serious injury or death may result from misfire. Cookoff may result in an unexpected blast with the crew improperly positioned. Another cartridge dropped on top of a misfired cartridge may result in detonation of both propelling charges, both fuzes, and both main charges, rupturing the barrel. The cartridge may detonate while removing the misfire.

Do not stand directly behind barrel when removing a misfire.

Keep head and body away from the front of the mortar when removing a misfire.

When removing a misfire, do not open buffer housing assembly.

When removing the cartridge, do not touch the striker; the fuze may be armed.

If kicking the barrel does not cause the cartridge to fire during a misfire and the mortar is hot, wait until the mortar is cool enough to handle with bare hands. If the mortar is cool at the time of the misfire, wait one minute before removing the cartridge. Water or snow applied to the outside of the barrel can be used for cooling. This is to avoid an accident from possible delayed action of the ignition cartridge.

WARNING (Cont)

AMMUNITION (Cont)

When burning excess increments:

- **Burning area must be at least 100 meters from the nearest mortar position, parked vehicles, and ammunition piles.**
- **Burning area shall be cleared of all dead grass or brush within 30 meters.**

Follow misfire procedures on page 2-112 to remove cartridge before doing troubleshooting.

For more information on ammunition, refer to TM 9-1300-206.

FIRST AID

For first aid data, refer to FM 4-25.11.

TM 9-1015-250-10
C4

Change
No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., *30 September 2005*

OPERATOR'S MANUAL FOR
MORTAR, 120MM: TOWED M120
(NSN 1015-01-226-1672)(EIC:4SL)
AND
MORTAR, 120MM: CARRIER-MOUNTED M121
(NSN 1015-01-292-3801)(EIC:4SE)

DISTRIBUTION STATEMENT C - Distribution authorized to U.S. Government agencies and their contractors. This publication is required for administration and operational purposes, as determined 16 September 1994. Other requests for this document will be referred to: ATTN: AMSTA-LC-LMIT, TACOM-ROCK ISLAND, 1 Rock Island Arsenal, Rock Island, IL 61299-7630.

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TM 9-1015-250-10
C4

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Remove Pages	Insert Pages
c through f	c through f
k through n	k through n
A through F	A through F
i and ii	i and ii
1-5 through 1-8	1-5 through 1-8
1-13 and 1-14	1-13 and 1-14
1-17 and 1-18	1-17 and 1-18
2-1 and 2-2	2-1 and 2-2
2-15 through 2-18	2-15 through 2-18

Remove Pages	Insert Pages
2-39 through 2-42	2-39 through 2-42
2-47 through 2-50	2-47 through 2-50
2-97 through 2-100	2-97 through 2-100
2-105 and 2-106	2-105 and 2-106
2-109 though (2-125 blank)/2-126	2-109 through 2-126
3-5 and 3-6	3-5 and 3-6
3-9 through 3-12	3-9 through 3-12
3-23 through 3-28	3-23 through 3-28
4-7 and 4-8	4-7 through 4-8.1/(4-8.2 blank)
A-1 and A-2	A-1 and A-2
B-11 through B-23/(B-24 blank)	B-11 through B-23/(B-24 blank)
C-3 and C-4	C-3 through C-5/(C-6 blank)
Authentication Page and Back Cover	Authentication Page and Back Cover

By Order of the Secretary of the Army

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army

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TM 9-1015-250-10
C3

Change
No. 3

URGENT CHANGE

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., *28 May 2002*

OPERATOR'S MANUAL FOR
MORTAR, 120MM: TOWED M120
(NSN 1015-01-226-1672)(EIC:4SL)
AND
MORTAR, 120MM: CARRIER-MOUNTED M121
(NSN 1015-01-292-3801)(EIC:4SE)

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TM 9-1015-250-10
C3

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Remove Pages	Insert Pages
A through E/(F blank)	A through F
2-16.1/(2-16.2 blank)	2-16.1 through 2-16.3/(2-16.4 blank)
2-35 through 2-36.1/(2-36.2 blank)	2-35 through 2-36.8
2-99 and 2-100	2-99 and 2-100
2-115 through 2-126	2-115 through (2-125 blank)/2-126
3-3 and 3-4	3-3 and 3-4
None	3-8.1/(3-8.2 blank)

By Order of the Secretary of the Army

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
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TM 9-1015-250-10
C2

Change No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., *1 June 2001*

OPERATOR'S MANUAL FOR

MORTAR, 120MM: TOWED M120

(NSN 1015-01-226-1672)(EIC:4SL)

AND

MORTAR, 120MM: CARRIER-MOUNTED M121

(NSN 1015-01-292-3801)(EIC:4SE)

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TM 9-1015-250-10
C2

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Remove Pages	Insert Pages
a through d	a through d
i and j	i and j
A through D	A through E/(F blank)
i and ii	i and ii
v and vi	v and vi
1-3 and 1-4	1-3 and 1-4
2-31 and 2-32	2-31 and 2-32
2-35 and 2-36	2-35 and 2-36
None	(2-36.1 blank)/2-36.2

Remove Pages	Insert Pages
None	2-106.1 and 2-106.2
2-107 and 2-108	(2-107 blank)/2-108
4-1 and 4-2	4-1 and 4-2
None	4-6.3 through 4-6.6
4-20.1/(4-20.2 blank) through 4-22	4-20.1/(4-20.2 blank) through 4-22
A-1 and A-2	A-1 and A-2
B-17 and B-18	B-17 and B-18
B-23/(B-24 blank)	B-23/(B-24 blank)
C-1 through C-4	C-1 through C-4
Back cover	Back cover

By Order of the Secretary of the Army

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
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TM 9-1015-250-10
C1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., *1 March 1999*

Change No. 1

OPERATOR'S MANUAL FOR

MORTAR, 120MM: TOWED M120

(NSN 1015-01-226-1672)(EIC:4SL)

AND

MORTAR, 120MM: CARRIER-MOUNTED M121

(NSN 1015-01-292-3801)(EIC:4SE)

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TM 9-1015-250-10
C1

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Remove Pages	Insert Pages
a through h	a through h
None	h.1/(h.2 blank)
i through vii/(viii blank)	i through viii
1-3 through 1-10	1-3 through 1-10
1-13 and 1-14	1-13 and 1-14
1-17 and 1-18	1-17 and 1-18
2-1 through 2-4	2-1 through 2-4
2-15 through 2-18	2-15 through 2-18
2-29 and 2-30	2-29 and 2-30

Remove Pages	Insert Pages
2-41 and 2-42	2-41 and 2-42
None	2-44.1 and 2-44.2
2-59 through 2-62	2-59 through 2-62
2-69 and 2-70	2-69 and 2-70
2-85 and 2-86	2-85 and 2-86
2-91 through 2-98	2-91 through 2-98
2-101 through 2-108	2-101 through 2-108
2-115 and 2-116	2-115 and 2-116
None	2-118.1/(2-118.2 blank)
2-119 through 2-126	2-119 through 2-126
2-143 and 2-144	2-143 and 2-144
2-147 through 2-150	2-147 through 2-150
3-1 through 3-4	3-1 through 3-4
4-1 and 4-2	4-1 and 4-2
None	4-6.1 and 4-6.2
4-7 and 4-8	4-7 and 4-8

TM 9-1015-250-10
C1

Remove Pages	Insert Pages
4-15 and 4-16	4-14.1 through 4-16
4-19 and 4-20	4-18.1 through 4-20
None	4-20.1/(4-20.2 blank)
A-1 and A-2	A-1 and A-2
B-5 and B-6	B-5 and B-6
B-13 through B-18	B-13 through B-18
B-21 and B-22	B-21 and B-22
C-1 through C-4	C-1 through C-4

By Order of the Secretary of the Army

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LIST OF EFFECTIVE PAGES

Dates of issue for original and changed pages are:

Original..... 0 ..... 19 August 1996
Change..... 1 ..... 1 March 1999
Change..... 2 ..... 1 June 2001
Change..... 3 ..... 28 May 2002
Change..... 4 ..... 30 September 2005

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 380, CONSISTING OF THE FOLLOWING:

Page No.	*Change No.	Page No.	*Change No.
Front Cover	0	f	4
a - b	2	g - h	1
c	4	h.1 Added	1
d - e	1	h.2 Blank	1

*Zero in this column indicates an original page.

LIST OF EFFECTIVE PAGES (Continued)

Page No.	*Change No.	Page No.	*Change No.
i	2	1-8 - 1-9	1
j	0	1-10 - 1-13	0
k	4	1-14	4
l - m	0	1-15 - 1-16	0
n	4	1-17	1
A - F	4	1-18	4
i	1	2-1	4
ii	4	2-2	1
iii - iv	1	2-3	0
v	2	2-4	1
vi - viii	1	2-5 - 2-15	0
1-1 - 1-3	0	2-16	4
1-4	2	2-16.1	4
1-5 - 1-7	4	2-16.2 Blank	4

*Zero in this column indicates an original page.

Page No.	*Change No.	Page No.	*Change No.
2-16.3 Deleted	4	2-45 - 2-47	0
2-16.4 Blank Deleted	4	2-48 - 2-49	4
2-17	4	2-50 - 2-59	0
2-18	1	2-60	1
2-19 - 2-28	0	2-61	0
2-29 - 2-30	1	2-62	1
2-31	2	2-63 - 2-69	0
2-32 - 2-34	0	2-70	1
2-35	2	2-71 - 2-84	0
2-36	3	2-85 - 2-86	1
2-36.1 - 2-36.2	3	2-87 - 2-91	0
2-36.3 - 2-36.8 Added	3	2-92	1
2-37 - 2-38	0	2-93	0
2-39 - 2-41	4	2-94 - 2-96	1
2-42	1	2-97	4
2-43 - 2-44	0	2-98	1
2-44.1 - 2-44.2 Added	1	2-99	4

*Zero in this column indicates an original page.

LIST OF EFFECTIVE PAGES (Continued)

Page No.	*Change No.	Page No.	*Change No.
2-100	0	2-116.1 - 2-116.2	4
2-101 - 2-102	1	2-117 - 2-118	4
2-102.1 Added	1	2-118.1	4
2-102.2 Blank	1	2-118.2	3
2-103 - 2-104	1	2-118.3 Added	4
2-105	4	2-118.4 Blank	4
2-106	1	2-119	4
2-106.1 - 2-106.2 Added	2	2-120	3
2-107 Blank	2	2-120.1 - 2-120.3 Added	4
2-108	2	2-120.4 Blank	4
2-109	4	2-121	4
2-110 - 2-111	0	2-122	3
2-112	4	2-123 - 2-126	4
2-112.1 Added	4	2-127 - 2-142	0
2-112.2 Blank	4	2-143	1
2-113 - 2-116	4	2-144 - 2-146	0

*Zero in this column indicates an original page.

LIST OF EFFECTIVE PAGES (Continued)

Page No.	*Change No.	Page No.	*Change No.
2-147 - 2-149	1	4-2 - 4-6	0
2-150 - 2-154	0	4-6.1 - 4-6.2 Added	1
3-1	1	4-6.3 - 4-6.6 Added	2
3-2	0	4-7	1
3-3	3	4-8	4
3-4	1	4-8.1 Added	4
3-5	4	4-8.2 Blank	4
3-6 - 3-8	0	4-9 - 4-14	0
3-8.1 Added	3	4-14.1 - 4-14.2 Added	1
3-8.2 Blank	3	4-15	1
3-9	0	4-16 - 4-18	0
3-10 - 3-12	4	4-18.1 - 4-18.2 Added	1
3-13 - 3-23	0	4-19 - 4-20	1
3-24 - 3-28	4	4-20.1	2
3-29 - 3-33	0	4-20.2 Blank	1
3-34 Blank	0	4-21	2
4-1	2	4-22 - 4-25	0

*Zero in this column indicates an original page.

LIST OF EFFECTIVE PAGES (Continued)

Page No.	*Change No.	Page No.	*Change No.
4-26 Blank	0	C-1	0
5-1 - 5-2	0	C-2 - C-3	2
A-1	4	C-4	4
A-2	2	C-5 Added	4
A-3 - A-4	0	C-6 Blank	4
B-1 - B-5	0	D-1 - D-6	0
B-6	1	E-1 - E-8	0
B-7 - B-10	0	F-1 - F-2	0
B-11 - B-13	4	Authentication Page	0
B-14 - B-15	1	Back Cover	0
B-16 - B-19	4		
B-20	0		
B-21	1		
B-22 - B-23	4		
B-24 Blank	0		

*Zero in this column indicates an original page.

TECHNICAL MANUAL

NO. 1015-250-10*

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 19 August 1996

OPERATOR'S MANUAL
FOR
MORTAR, 120MM: TOWED M120
(NSN 1015-01-226-1672) (EIC:4SL)
MORTAR, 120MM: CARRIER-MOUNTED M121
(NSN 1015-01-292-3801) (EIC:4SE)

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*This manual supersedes TM 9-1015-250-10, dated March 1993, including all changes.

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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HOW TO USE THIS MANUAL

The safest, easiest, and best way to operate the 120mm mortar is to use this manual. Learning to use this TM is as easy as reading through the next few pages of this section. Knowing what is in this manual and how to use it will save you time and work and will help you to avoid exposing yourself to unnecessary hazards while performing your job.

So where do you start?

Right here, if this is the first time you are using this TM. Be sure to completely read this section on how to use this manual first. There's a lot of information here that you need to know.

ORGANIZATION

This manual covers the operation of both configurations of the 120mm mortar (Towed M120 and Carrier-mounted M121) and each is identified in the various sections of this manual as applicable. The manual itself is divided into five chapters and appendices A thru F. The five chapters, and what they contain, are found in the Table of Contents in the front of this manual. For example, to learn about operating the 120mm mortar, you would look in the table of contents and discover that Chapter 2 provides all pertinent information about the operation of the weapon system. Since Chapter 2 covers a great deal of information, you will have to scan the chapter to find the specific information you will need.

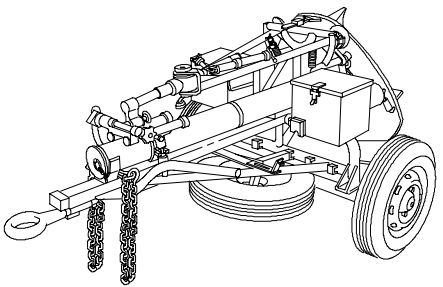
In the back of this manual, you will find the appendices A thru F. Each appendix provides specific information that will assist you in performing the various operational tasks. The appendices provide such information as additional references (i.e. other TMs or FMs), as in Appendix A, and Basic Issue Items (BII), as in Appendix B. Others provide information unique to the needs of the weapon system, as in Appendix F which provides information about how to obtain the trailer for the towed M120 weapon system. Become familiar with all appendices and what they contain before beginning any operational or maintenance task.

Am I ready to use this TM?

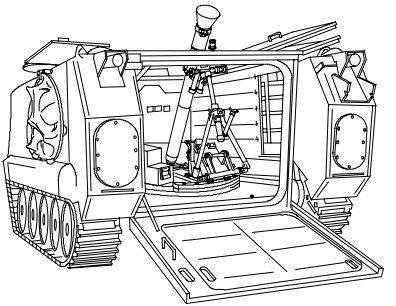
If you've taken the time necessary to read this section, and are sure of the location and arrangement of the different sections of this TM, you are ready to begin. Remember, this TM has been arranged with you, the user, in mind. Your safety and ability to perform the operational and maintenance tasks in the most efficient manner possible hinge on your ability to perform and understand the information contained in this manual. If you fully understand the arrangement and purpose of this TM, and have taken the time to read through this section, you will have no trouble operating and maintaining this weapon system(s) in the manner for which it was designed.

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION



TRAILER-MOUNTED, M120



CARRIER-MOUNTED, M121

120mm Mortar Assembly

SCOPE.

Type of Manual. Operator's manual, including operator maintenance.

NOTE

Many procedures are the same for the M120 and the M121 mortar, including firing, cleaning, lubricating, and breech assembly repair procedures. Procedures unique to the M120 or M121 are marked "trailer" or "carrier", respectively.

120mm Mortar. Consists of:

M298 120mm Cannon
M190 Mortar Mount
M191 Mortar Mount
M1100 120mm Mortar Trailer
M9 Mortar Baseplate
M67 Sight Unit
Blast Attenuator Assembly

Purpose of Equipment. The M120/M121 120mm mortar is a smooth bore, muzzle-loaded, crew-served, high angle fire weapon that provides indirect fire support.

MAINTENANCE FORMS AND PROCEDURES. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750 as contained in the Maintenance Management Update.

CORROSION PREVENTION AND CONTROL (CPC).

a. Corrosion Prevention and Control (CPC) of Army Material is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber, plastic, and felt. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

CORROSION AND PREVENTION CONTROL (CPC) (Cont).

c. If a corrosion problem is identified, it can be reported using SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion", "rust", "deterioration", or "cracking" will assure that the information is identified as a CPC problem.

d. The form should be submitted to: ATTN: AMSTA-AR-QAW-C, TACOM-ARDEC, 1 Rock Island Arsenal, Rock Island, IL 61299-7300 (Email: qawqdrs@ria.army.mil).

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE. Procedures and materials used for the destruction of the 120mm mortar in order to prevent enemy use will be found in TM 750-244-7.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs). If your 120mm mortar needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at: ATTN: AMSTA-AR-QAW-C, TACOM-ARDEC, 1 Rock Island Arsenal, Rock Island, IL 61299-7300 (FAX: Commercial (309) 782-6653, DSN 793-6653) (Email: qawqdrs@ria.army.mil). We will send you a reply.

NOMENCLATURE CROSS-REFERENCE LIST.

Common Name	Official Nomenclature
BAD/Blast Attenuator Device	Blast Attenuator Assembly
Barrel	Cannon Tube
Bipod Leg	Mortar Mount Leg
Coarse Deflection Index Arrow	Telescope Mount Index
Coarse Elevation Index Arrow	Telescope Mount Index
Cross Leveling Locking Knob	Handle Assembly
Dovetail Slot Cover	Sightunit Adapter Cover
Fine Elevation Index Arrow	Telescope Index Arrow
M190 Bipod Assembly	M190 Mortar Mount
M191 Bipod Assembly	M191 Mortar Mount
Mortar Barrel Assembly	M298 120mm Cannon
Mortar Baseplate	M9 Mortar Baseplate
Trailer	M1100 120mm Mortar Trailer
Turntable Locking Handle	Manual Control Handle

Section II. EQUIPMENT DESCRIPTION

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

Characteristics.

A mortar system that is transported by trailer (Ml20) or carrier (M121).

Can be emplaced on the ground (M120/M121) or be mounted, with the use of adapter kit, on a turntable in a special vehicle (M121).

Capabilities and Features.

Smooth bore barrel is muzzle loaded and has a removable firing pin.

Capable of delivering various types of cartridges with a variety of fuzes at a rapid rate of fire.

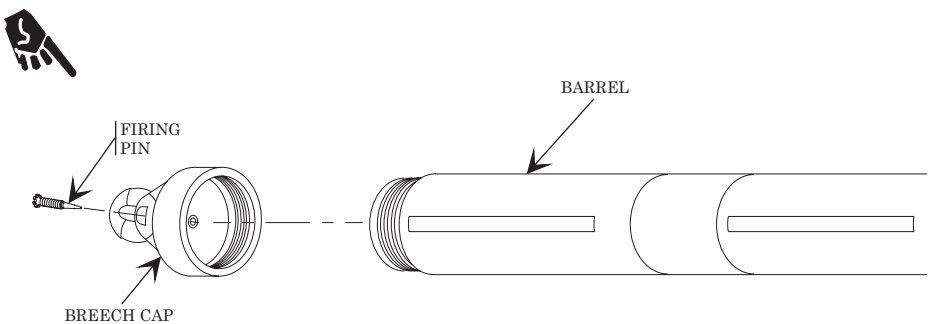
Breaks down into sections that mortar crew can handle or can be transported intact on specially designed trailer.

M67 sight unit gives indirect fire capability.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

WARNING

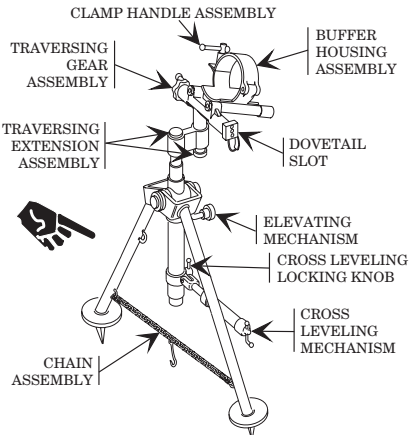
When fully assembled, firing pin on breech cap must line up with stripe on barrel.

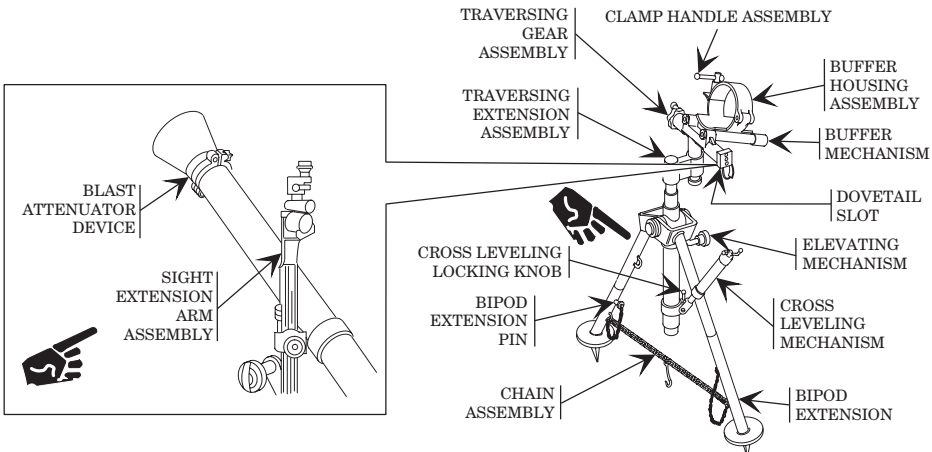


M298 120MM CANNON. Drop fired, smooth bore barrel equipped with a removable firing pin.

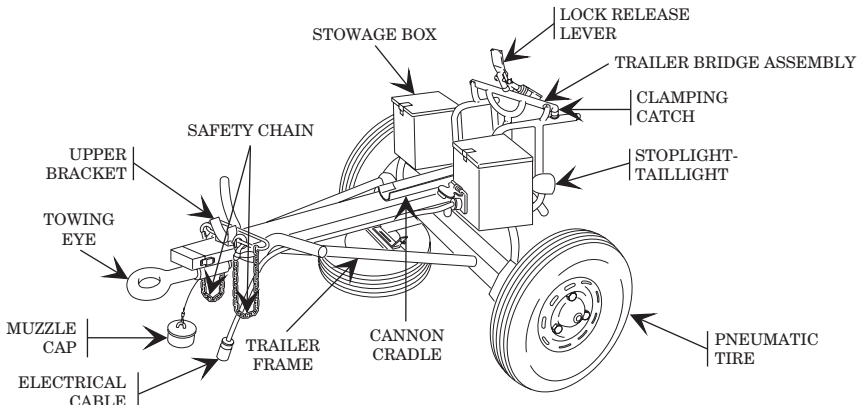
LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont).

M190 MORTAR MOUNT. Provides cross-leveling, elevation, and traversing adjustments. Equipped with buffer mechanism and traversing extension assembly. M67 sight unit attaches to bipod's dovetail slot.





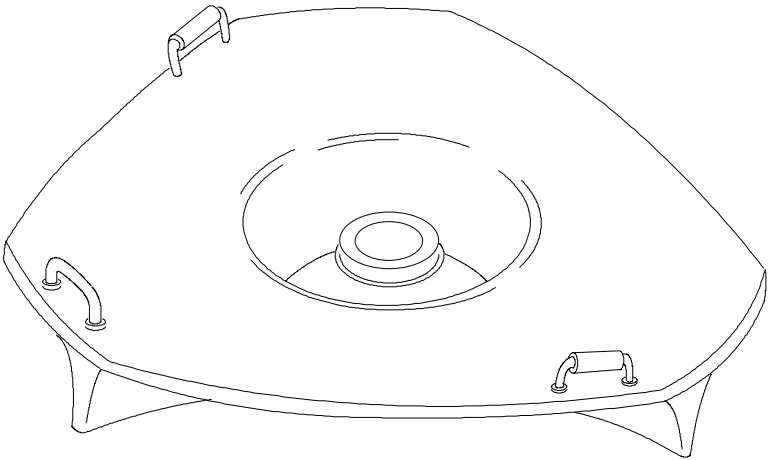
M191 MORTAR MOUNT. For carrier or ground mount (with removable leg extensions). Provides cross-leveling, elevation, and traversing adjustments. Equipped with buffer mechanism and traversing extension assembly. M67 sight unit attaches to bipod's dovetail slot. The sight extension arm assembly and BAD are used for the carrier.



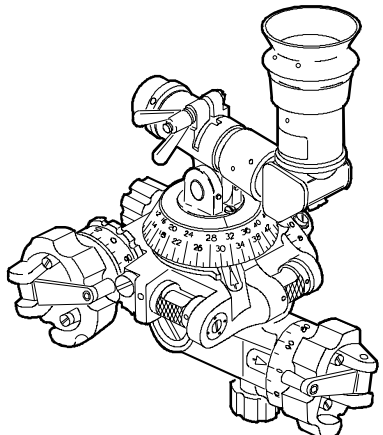
NOTE

The trailer is an ASIOE item and is not supplied with the M120 mortar system. Refer to Appendix F for further details.

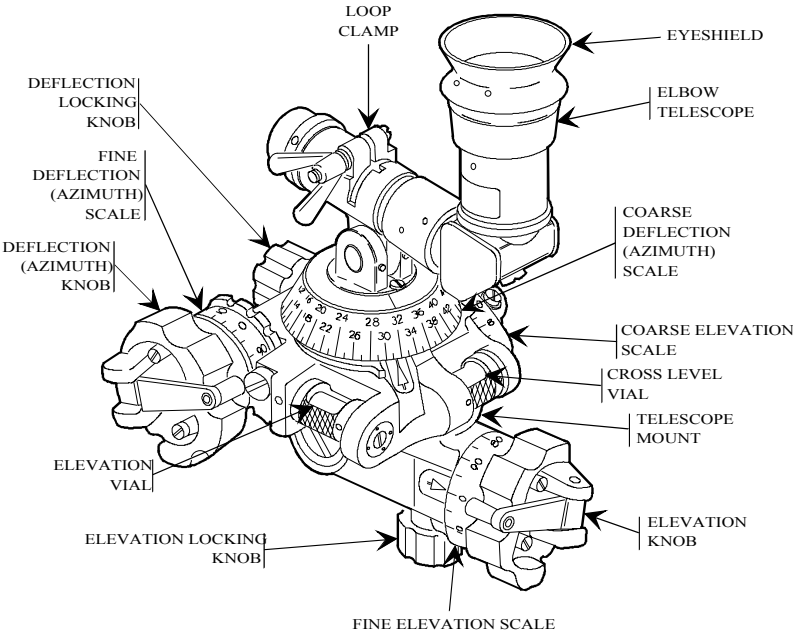
M1100 120MM MORTAR TRAILER. Provides for transportability of mortar and tools. Has taillights, stoplights, and turn signals.

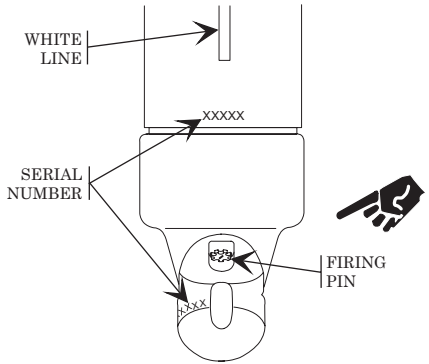


M9 MORTAR BASEPLATE. Transported on the side of the M1064 carrier or the trailer. Provides a stable base for firing when the mortar is ground-mounted.



M67 SIGHT UNIT. A sighting device used to lay the mortar in elevation and deflection (azimuth). Attaches to the bipod's dovetail slot.


LOOP CLAMP
EYESHIELD
DEFLECTION LOCKING KNOB
ELBOW TELESCOPE
FINE DEFLECTION (AZIMUTH) SCALE
COARSE DEFLECTION (AZIMUTH) SCALE
DEFLECTION (AZIMUTH) KNOB
COARSE ELEVATION SCALE
CROSS LEVEL VIAL
TELESCOPE MOUNT
ELEVATION VIAL
ELEVATION KNOB
ELEVATION LOCKING KNOB
FINE ELEVATION SCALE



WARNING

Do not use weapon if serial numbers on breech cap and cannon tube do not match, or barrel's white line does not align with firing pin when fully assembled.

EQUIPMENT DATA.

PHYSICAL CHARACTERISTICS

On trailer	716 lb (325 kg)
In firing position	317 lb (144 kg)
Mortar Barrel Assembly	
Weight	110 lb (50 kg)
Length	69 in. (175 cm)
M190 Bipod Assembly	
Weight	70 lb (32 kg)
Length (Collapsed)	51 in. (130 cm)
M191 Bipod Assembly	
Weight	68 lb (31 kg)
(with Bipod Leg Extension Assembly)	78 lb (35 kg)
Length	51 in. (130 cm)
Mortar Baseplate	136 lb (62 kg)
Sighting Equipment (with M58/M59 aiming post lights)	4.0 lb (1.8 kg)
M1100 Trailer	
Weight	399 lb (181 kg)
Width	59 in. (150 cm)
Length	79 in. (201 cm)
Height	45 in. (114 cm)

EQUIPMENT DATA (Cont).

ELEVATION - CARRIER MOUNTED

High Range
- Minimum ..... 1020 mils
- Maximum ..... 1510 mils

Low Range
- Minimum ..... 750 mils
- Maximum ..... 1110 mils

ELEVATION - GROUND MOUNTED

Minimum ..... 710 mils
Maximum ..... 1510 mils

TRAVERSE - GROUND AND CARRIER MOUNTED

Maximum right or left, using traversing wheel ..... 136 mils
One turn of traversing wheel - 5 mils (approximate)
With traversing extension ..... 316 mils

ARC OF FIRE

M120 ..... 6400 mils
M121 ..... 800 mils

RANGE

Minimum ..... 200 meters
Maximum ..... 7200 meters

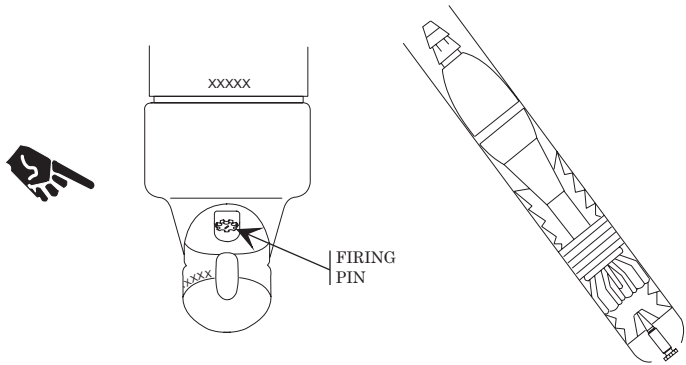
RATE OF FIRE

Maximum (for one minute) ..... 16 rounds
Intensive (sustained indefinitely, with max charge) ..... 4 rounds/min

DESIGNATED PRIME MOVER

M120 ..... HMMWV

Section III. PRINCIPLES OF OPERATION.



1 Cartridge is fired by dropping a complete round down the barrel and striking firing pin.

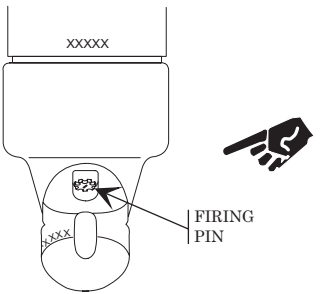
2 As cartridge hits firing pin, primer fires cartridge which ignites propellant.

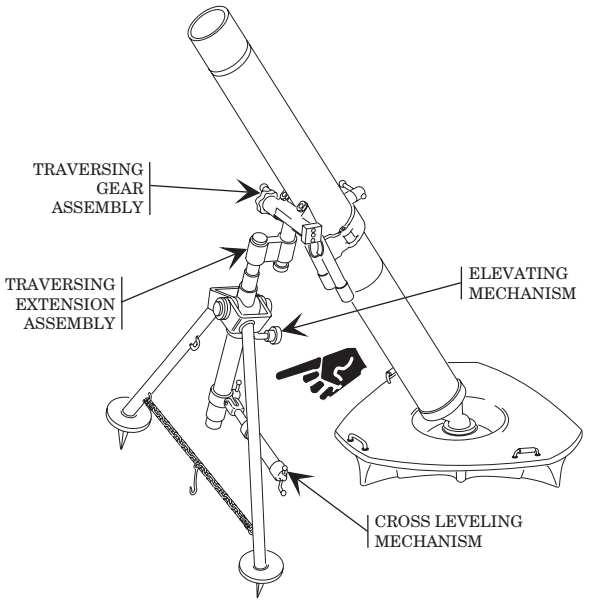
3 Gas from burning propellant pushes projectile out of barrel.

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS (Ml20/M121)

FIRING PIN. Design of M298 cannon incorporates a removable firing pin.




TRAVERSING GEAR ASSEMBLY
TRAVERSING EXTENSION ASSEMBLY
ELEVATING MECHANISM
CROSS LEVELING MECHANISM

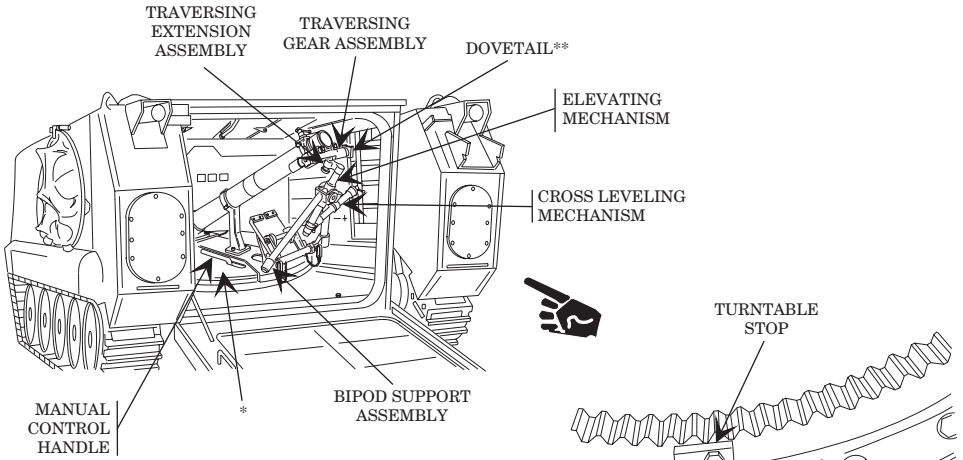
M120

CROSS LEVELING MECHANISM. Levels the cross-level vial of the sight unit.

ELEVATING MECHANISM. Elevates or lowers mortar.

TRAVERSING GEAR ASSEMBLY. Makes adjustments in traverse.

TRAVERSING EXTENSION ASSEMBLY. Changes mortar azimuth to avoid moving the bipod assembly in the ground-mounted M120 or the turntable in the carrier-mounted M121.


TRAVERSING EXTENSION ASSEMBLY
TRAVERSING GEAR ASSEMBLY
DOVETAIL**
ELEVATING MECHANISM
CROSS LEVELING MECHANISM
TURNTABLE STOP
MANUAL CONTROL HANDLE
*
BIPOD SUPPORT ASSEMBLY
*STEP OMITTED FOR CLARITY TO SHOW TURNTABLE DETAIL
**DOVETAIL IDENTIFIED FOR CLARITY

M121

CROSS LEVELING MECHANISM. Levels the cross-level vial of the sight unit.

ELEVATING MECHANISM. Elevates or lowers mortar.

BIPOD SUPPORT ASSEMBLY. Supports bipod in high or low elevation on carrier.

TRAVERSING GEAR ASSEMBLY. Makes adjustments in traverse.

TRAVERSING EXTENSION ASSEMBLY. Changes mortar azimuth to avoid moving the bipod assembly in the ground-mounted M120 or the turntable in the carrier-mounted M121.

MANUAL CONTROL HANDLE. When engaged, prevents turntable from traversing.

TURNTABLE STOP. Limits turntable movement to stay within extreme left and right of safe firing position. Do not remove turntable stops.

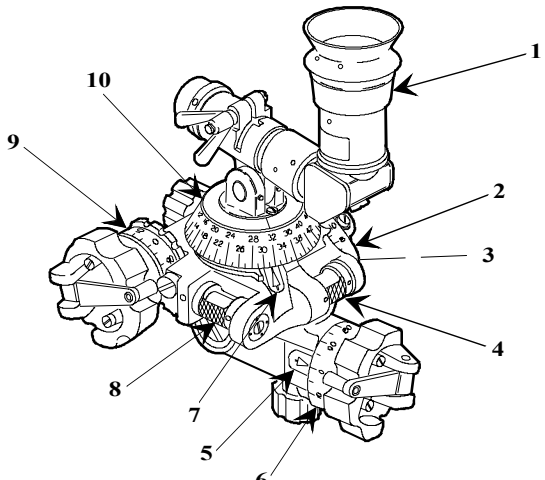
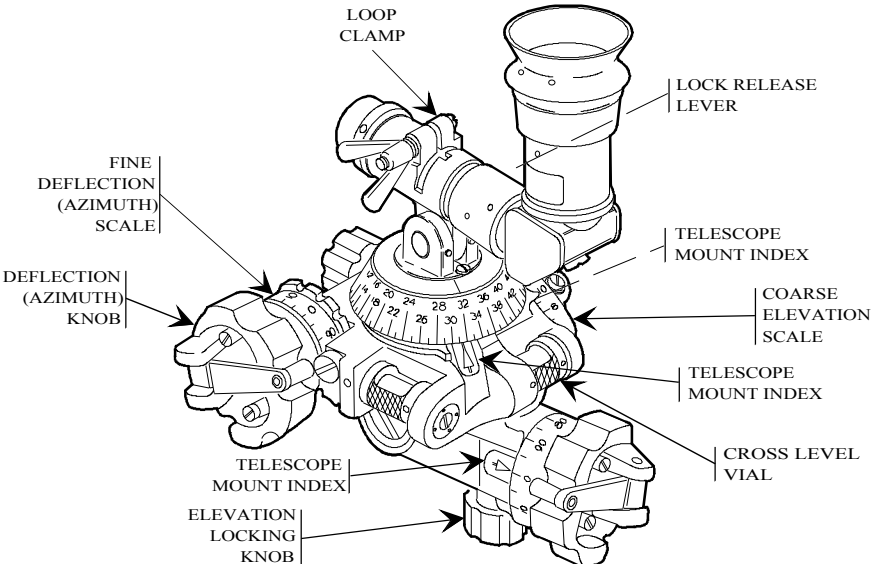


Figure 2-1. Location of Tritium Illuminated Components.

1) Elbow telescope
2) Coarse elevation scale
3) Coarse elevation index arrow
4) Cross level vial
5) Fine elevation index arrow
6) Fine elevation scale
7) Coarse deflection index arrow
8) Elevation vial
9) Fine deflection scale
10) Coarse deflection scale

M67 SIGHT UNIT (Cont).



LOOP CLAMP. Secures elbow telescope to telescope mount.

FINE DEFLECTION (AZIMUTH) SCALE. Indicates from 0 to 100 mils in 1 mil increments.

DEFLECTION (AZIMUTH) KNOB. Rotates deflection mechanism and scales.

CROSS LEVEL VIAL. Indicates level condition of sight unit.

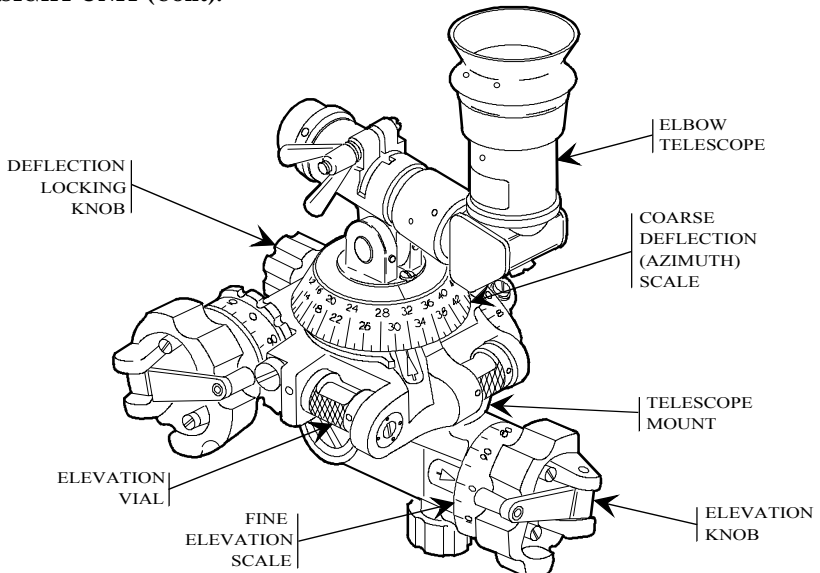
COARSE ELEVATION SCALE. Indicates from 700 to 1600 mils in 100 mil increments.

ELEVATION LOCKING KNOB. Unlocks or locks elevating mechanism and scales.

LOCK RELEASE LEVER. Unlocks or locks elbow telescope pivot.

TELESCOPE MOUNT INDEX. Indicates scale's true position from fixed point.

M67 SIGHT UNIT (Cont).



FINE ELEVATION SCALE. Indicates from 0 to 100 mils in 1 mil increments.

ELEVATION KNOB. Rotates elevating mechanism and scale.

TELESCOPE MOUNT. Body of sight unit to which elbow telescope attaches.

ELEVATION VIAL. Indicates level condition of sight unit.

COARSE DEFLECTION (AZIMUTH) SCALE. Indicates from 0 to 6400 mils in 100 mil increments.

DEFLECTION LOCKING KNOB. Locks and unlocks deflection mechanism and scales.

ELBOW TELESCOPE. Mounts to telescope mount providing optical line of sight.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

GENERAL. Table 2-1 (PMCS Table) has been provided so you can keep your 120mm mortar in good operating condition and ready for its primary mission.

WARNINGS AND CAUTIONS. Always observe the WARNINGS and CAUTIONS appearing in your PMCS table. Warnings and cautions appear before applicable procedures. You must observe these WARNINGS and CAUTIONS to prevent serious injury to yourself and others or prevent your 120mm mortar from being damaged.

EXPLANATION OF TABLE ENTRIES.

a. Item Number column. Numbers in this column are for reference. When completing DA Form 2404 (Equipment Inspection and Maintenance Worksheet), include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must do checks and services for the intervals listed.

b. Interval column. This column tells you when you must do the procedure in the procedure column. BEFORE procedures must be done before you operate or use the 120mm mortar for its intended mission. DURING procedures must be done during the time you are operating or using the equipment for its intended mission. AFTER procedures must be done immediately after you have operated or used the equipment.

c. Location, Item to Check/Service column. This column provides the location and the item to be checked or serviced. The item location is underlined.

d. Procedure column. This column gives the procedure you must do to check or service the item listed in the Check/Service column to know if the 120mm mortar is ready or available for its intended mission or for operation. You must do the procedure at the time stated in the interval column.

e. Not Fully Mission Capable if: column. Information in this column tells you what faults will keep your 120mm mortar from being capable of performing its primary mission. If you make check and service procedures that show faults listed in this column, do not operate the equipment. Follow standard operating procedures for maintaining the equipment or reporting equipment failure.

PAINTING. For any painting requirements, notify unit level maintenance.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		FORMS		
1	Before	DA Form 2408-4	Check to see if your weapon has been borescoped and pullover gaged within the past 180 days and/or every 500 rounds after initial 3000 rounds have been fired.	Weapon has not been borescoped and pullover gaged within the past 180 days and/or every 500 rounds after initial 3000 rounds have been fired.
		MORTAR BARREL ASSEMBLY		
		WARNING **The exterior surface of the barrel must be wiped free of lubrication prior to firing or the buffer housing assembly may move on the barrel. Firing ammunition in a heavily lubricated or wet bore can result in hangfires, failure to fire, or short rounds.**		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

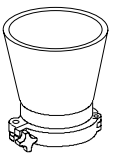
Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
2	Before	BAD		
			Check for cracks, rust, and loose or missing parts.	BAD has cracks or damaged parts, or cannot be secured to cannon tube.
3	Before	Barrel	Check for cracks, rust, and loose, missing, dented, or damaged parts on barrel.	Barrel has bulges, cracks, or loose, missing, dented, or damaged parts.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

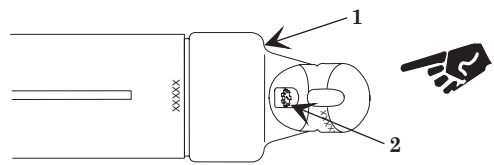
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		MORTAR BARREL ASSEMBLY (CONT)		
4	Before	Breech Assembly	 Breech cap (1) must not be loose.	Breech cap is loose.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
			Firing pin (2) must align with white line on barrel when fully assembled. Serial number on barrel must match serial number on breech cap (1).	Firing pin does not align with white line on barrel. Serial number on barrel does not match serial number on breech cap.

All data on pages 2-16.2 and 2-16.3/(2-16.4 blank) deleted.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
5	Before	Breech Assembly	Check for bulges, dents, and visible cracks. Check for evidence of gas leakage around firing pin (2) or breech cap (1) (visible discoloration).	Barrel shows evidence of gas leakage around firing pin or breech cap (visible discoloration).
		BIPOD ASSEMBLY		
6	Before	Bipod Assembly	Check bipod for cracks, broken welds, rust, and loose, missing, or damaged parts.	Bipod has cracks, broken welds, or loose, missing, or damaged parts.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

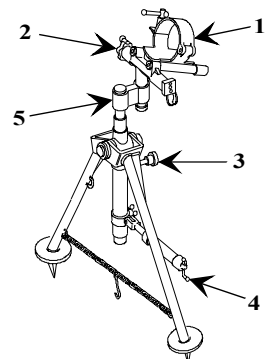
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		BIPOD ASSEMBLY (CONT)		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
7	Before	Bipod Assembly	Check that buffer housing assembly (1) operates properly and holds barrel securely.	Buffer housing assembly is inoperative or doesn't hold barrel securely.
8	Before	Bipod Assembly	Traversing gear assembly (2), elevating mechanism (3), cross leveling mechanism (4), and traversing extension assembly (5) must operate smoothly and without binding through entire range of travel.	Traversing gear assembly, elevating mechanism, cross leveling mechanism, or traversing extension assembly is binding or inoperative.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

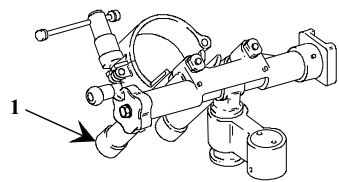
Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
9	Before	**BIPOD ASSEMBLY (CONT)** Buffer Mechanism	 Test function of buffer mechanism (1) by pulling down on both housing tubes at the same time; they should return to the original position when released.	Buffer mechanism is binding or inoperative.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

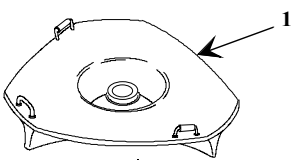
Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
		MORTAR BASEPLATE		
10	Before	Mortar Baseplate		
.	.		Check socket of mortar baseplate (1) for broken edges, cracks, or corrosion.	Socket edge is broken, cracked, or rusty.
11	Before	Mortar Baseplate	Check mortar baseplate (1) for cracks or broken welds.	Mortar baseplate has cracks or broken welds.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

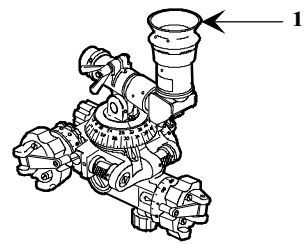
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		COMPONENTS OF END ITEM		
			WARNING TRITIUM (H_3) **Sight unit contains radioactive tritium (H_3). Exercise care to ensure glass vials are not broken. If any vial is broken or does not properly illuminate, do not attempt to replace or repair. Notify RPO.**	

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
12	Before	M67 Sight Unit	Check for proper illumination of tritium-lit sources (fig. 2-1) in a darkened area. If any source is not illuminated, notify RPO.	Any source is not illuminated.
13	Before	M67 Sight Unit	Check eyeshield (1) for damage. Check lenses for smears, scratches, cracks, moisture, or other obstructions. Check reticle (crosshairs) for clarity.	Image is obstructed.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

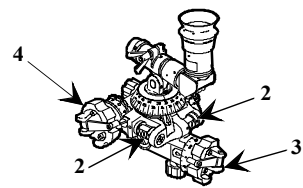
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		COMPONENTS OF END ITEM (CONT)		
14	Before	M67 Sight Unit		
			Level vials (2) must not be cracked, broken, or loose in mountings; cover must not be missing.	Vials are cracked, broken, or loose in mounting.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
15	Before	M67 Sight Unit	Check rotation of the elevation knob (3) and deflection (azimuth) knob (4) over entire range of movement. Motion must be smooth and even.	Rotation of knobs is excessively binding or uneven.
16	Before	M67 Sight Unit	Check all index lines and scales. They must be clear and distinct.	Scales and index lines cannot be read.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

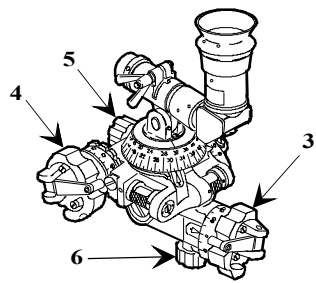
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		COMPONENTS OF END ITEM (CONT)		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
17	Before	M67 Sight Unit	Check that deflection (azimuth) knob (4) and elevation knob (3) stay in position while deflection locking knob (5) and elevation locking knob (6) are being tightened.	Deflection (azimuth) knob and/or elevation knob slip while locking knobs are being tightened.
18	Before	M67 Sight Unit	With deflection locking knob (5) and elevation locking knob (6) tightened, check for free movement of elevation knob (3) and deflection (azimuth) knob (4).	Azimuth knob or elevation knob moves more than ±1.0 mil when locked.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

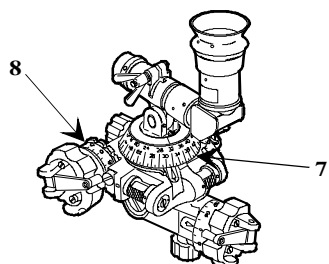
Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
		COMPONENTS OF END ITEM (CONT)		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
19	Before	M67 Sight Unit	Check that coarse deflection scale (7) and azimuth control dial (8) rotate freely when depressed and return to position under spring tension when released.	Dials do not return to position under spring tension or scales move freely when not depressed.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		COMPONENTS OF END ITEM (CONT)		



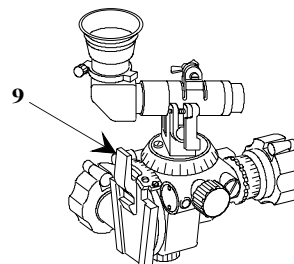


Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
20	Before	M67 Sight Unit	Check mortar sight latch (9) for looseness and cracks. Also check that latch secures sight unit to mortar.	Mortar sight latch broken and/or does not secure sight unit.
21	Before	M67 Sight Unit	Check that mounting surfaces are free of nicks and burrs.	Nicks and burrs prevent proper seating in dovetail slot.
21.1	Before	M67 Sight Unit	Check M67 Sight Unit for missing or damaged radiation warning, data plate, or other parts.	Radiation warning or data plate is missing, or radiation warning, data plate, or other parts is/are damaged.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

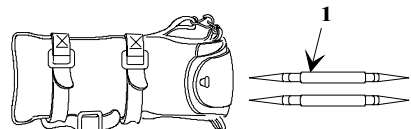
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		BASIC ISSUE ITEMS		
22	Before	M14 Aiming Post, Driving Stakes, and Case	 Check for completeness and that mating surfaces are clean, free of paint, and fit properly.	Mating surfaces do not fit properly.
23	Before	M14 Aiming Post Driving Stakes	Check that driving stakes (1) are not bent or broken.	Driving stakes are bent or broken.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
24	Before	M58 and M59 Aiming Post Lights	**WARNING**  **TRITIUM (H_3)** **M58 and M59 aiming post lights contain radioactive tritium (H_3). Exercise care to ensure glass vials are not broken or damaged. If any vial is broken or does not properly illuminate, do not attempt to replace or repair. Notify RPO.**	

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

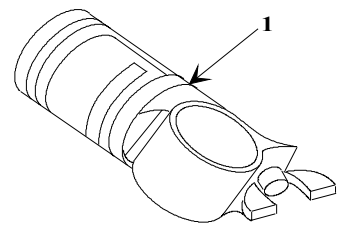
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		BASIC ISSUE ITEMS (CONT)		
24 (Cont)	Before (Cont)	M58 and M59 Aiming Post Lights (Cont)		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
			Check aiming post lights (1) for proper illumination in a darkened area. If they are damaged or not illuminated, notify the Radiation Protection Officer (RPO).	Items are damaged or not illuminated.
24.1	Before	M58 and M59 Aiming Post Lights	Check aiming post lights (1) for missing or damaged radiation warning, data plate, or other parts.	Radiation warning or data plate is missing, or radiation warning, data plate, or other parts is/are damaged.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		BASIC ISSUE ITEMS (CONT)		
24.2	Before	M58 and M59 Aiming Post Lights	Check for evidence of tampering (aiming post lights are factory sealed and no disassembly is authorized or required).	Evidence of tampering is present.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
24.3	Before	Cartridge Extractor	Inspect catches (1) of cartridge extractor (2) to ensure they are the latest configuration. There should be a 1/8 in. (0.32 cm) hole in the face of the catch. The hole indicates that catch is latest configuration.	If any or all of four catches do not have this hole, cartridge extractor is older configuration and should not be used. Immediately turn-in any non-conforming cartridge extractor for repair or replacement.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

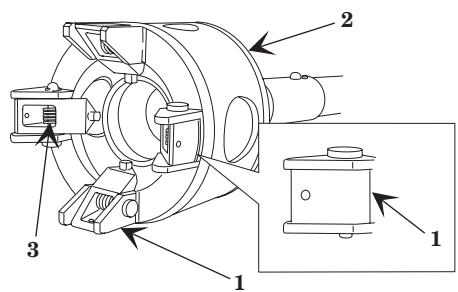
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		BASIC ISSUE ITEMS (CONT)		
24.3 (Cont)	Before (Cont)	Cartridge Extractor (Cont)		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
			Inspect catches (1) of cartridge extractor (2) for burrs, wear, or heavy rust/corrosion that would impair function. Test release of spring (3) on each of the four cartridge extractor catches. Each catch must snap positively into original position after being retracted and released.	Cartridge extractor catches have burrs, wear, or heavy rust/ corrosion which impairs function. Catches cannot be retracted. Catches do not snap positively into original position after release. Immediately turn-in any non-conforming cartridge extractors for repair or replacement.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

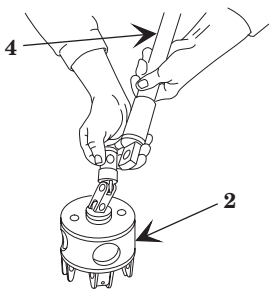
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		BASIC ISSUE ITEMS (CONT)		
24.3 (Cont)	Before (Cont)	Cartridge Extractor (Cont)		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
			Attach cartridge extractor (2) to artillery cleaning staff assembly (4).	Cartridge extractor (2) does not attach firmly and completely to artillery cleaning staff assembly. Immediately turn-in any non-conforming cartridge extractor assembly for repair or replacement.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

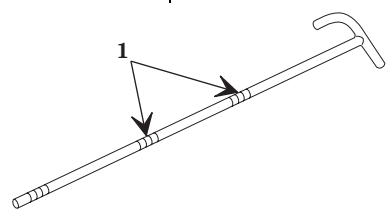
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		BASIC ISSUE ITEMS (CONT)		
24.4	Before	Artillery Cleaning Staff Assembly		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
			Fully extend and lock artillery cleaning staff assembly sleeves (1).	Section sleeves cannot be tightly locked. Immediately turn-in any non-conforming artillery cleaning staff assembly for repair or replacement.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

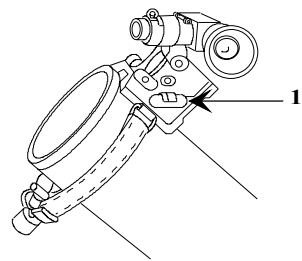
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
25	Before	**ADDITIONAL AUTHORIZED ITEMS** M45A1 Boresight		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
			Check eyeshield for damage. Check lenses and windows for smears, scratches, cracks, or other obstructions.	Image is obstructed.
26	Before	M45A1 Boresight	Level vials (1) must not be cracked, broken, or loose in mounting.	Vials are cracked, broken, or loose in mounting.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		ASSOCIATED SUPPORT ITEM OF EQUIPMENT		
27	Before	M1100 120mm Mortar Trailer	Check for proper operation of towing eye, trailer frame, tires, and all mounting assemblies. Check for broken welds and damaged, deformed, or missing parts.	Trailer has damaged or missing parts.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

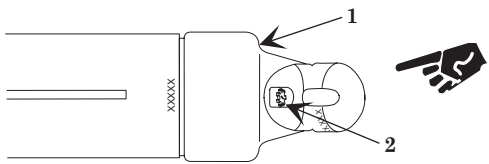
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		MORTAR BARREL ASSEMBLY		
28	During	Breech Assembly		
			Breech cap (1) must not be loose.	Breech cap is loose.
			Firing pin (2) must line up with stripe on barrel.	Firing pin does not align with stripe on barrel.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

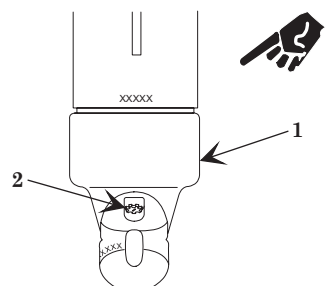
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
29	During	**MORTAR BARREL ASSEMBLY (CONT)** Breech Assembly		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
			Check for bulges, dents, and visible cracks. Check for evidence of gas leakage around firing pin (2) or breech cap (1) (visible discoloration).	Barrel shows evidence of gas leakage around firing pin or breech cap (visible discoloration).

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

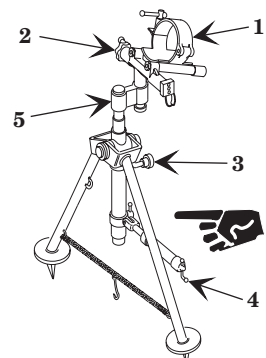
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
30	During	**BIPOD ASSEMBLY** / Bipod Assembly		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
31	During	Bipod Assembly	Check that buffer housing assembly (1) operates properly and holds barrel securely. Traversing gear assembly (2), elevating mechanism (3), cross leveling mechanism (4), and traversing extension assembly (5) must operate smoothly and without binding through entire range of travel.	Buffer housing assembly is inoperative or doesn't hold barrel securely. Traversing gear assembly, elevating mechanism, cross leveling mechanism, or traversing extension assembly is binding or inoperative.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		COMPONENTS OF END ITEM		
	 TRITIUM(H_3)	**WARNING** **Sight unit contains radioactive tritium (H_3). Exercise care to ensure glass vials are not broken. If any vial is broken or does not properly illuminate, do not attempt to replace or repair. Notify RPO.**		
32	During	M67 Sight Unit	Check for proper illumination of tritium-lit sources (fig. 2-1) during hours of darkness. If any source is not illuminated, notify RPO.	Any source is not illuminated.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

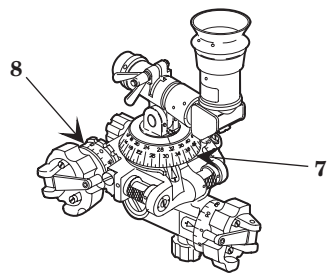
Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
32.1	During	M67 Sight Unit	 	

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		COMPONENTS OF END ITEM (Cont)		
32.1 (Cont)	During (Cont)	M67 Sight Unit (Cont)	Check that coarse deflection scale (7) and azimuth control dial (8) rotate freely when depressed and return to position under spring tension when released.	Dial scales slip during firing.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
33	During	**BASIC ISSUE ITEMS** / M58 and M59 Aiming Post Lights	**WARNING**  **TRITIUM (H_3)** **M58 and M59 aiming post lights contain radioactive tritium (H_3). Exercise care to ensure glass vials are not broken or damaged. If any vial is broken or does not properly illuminate, do not attempt to replace or repair. Notify RPO.**	

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

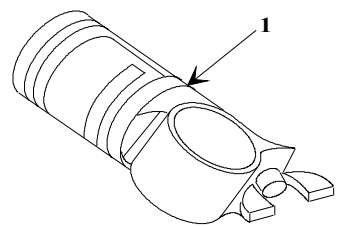
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
33 (Cont)	During (Cont)	**BASIC ISSUE ITEMS (CONT)** M58 and M59 Aiming Post Lights (Cont)		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
			Check aiming post lights (1) for proper illumination during hours of darkness at 50 and 100 meters. If they are damaged or not illuminated, notify the RPO.	Items are damaged or not illuminated.

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

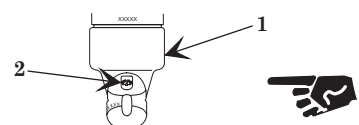
Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		FORMS		
34	After	DA Form 2408-4	Update DA Form 2408-4 to reflect day's firing. Assure that all standards for borescoping and pull-over gaging have not been exceeded.	DA Form 2408-4 has not been updated and/or standards for bore-scoping and pullover gaging have been exceeded.
		MORTAR BARREL ASSEMBLY		
35	After	Breech Assembly		

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
			Breech cap (1) must not be loose.	Breech cap is loose.
			Firing pin (2) must line up with stripe on barrel.	Firing pin does not align with stripe on barrel.
36	After	Breech Assembly	Check for bulges, dents, and visible cracks. Check for evidence of gas leakage around firing pin (2) or breech cap (1) (visible discoloration).	Barrel shows evidence of gas leakage around firing pin or breech cap (visible discoloration).

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
		MORTAR BARREL ASSEMBLY (CONT)		
37	After	Barrel	Use rifle bore cleaning compound (RBC) (item 4, app D) to thoroughly clean barrel bore after firing and two consecutive days thereafter. After firing, the breech assembly shall be disassembled for cleaning and the sealing surfaces inspected for pits, corrosion, or damage.	

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
	NOTE **For nonfiring periods, barrel is cleaned and lubricated on a weekly basis.**			
		BIPOD ASSEMBLY		
38	After	Bipod Assembly	Clean and lubricate exposed bearing surfaces with general purpose lubricating oil (item 9, app D).	

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
39	After	**COMPONENTS OF END ITEM** / M67 Sight Unit		
	 TRITIUM (H_3)	**WARNING** **Sight unit contains radioactive tritium (H_3). Exercise care to ensure glass vials are not broken. If any vial is broken or does not properly illuminate, do not attempt to replace or repair. Notify RPO.**		
			Check for proper illumination of tritium-lit sources (fig. 2-1) in a darkened area. If any source is not illuminated, notify RPO.	Any source is not illuminated.

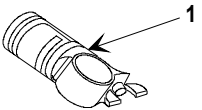
Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
40	After	M67 Sight Unit	**CAUTION** **Do not allow solvents or cleaning fluids to contact M67 sight unit.** Clean lenses and vial windows with optical lens cleaning compound (item 3, app D). Wipe clean with lens paper (item 11, app D). Clean plastic scales and sight body with clean wiping rag (item 12, app D).	

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
41	During	**BASIC ISSUE ITEMS** / M58 and M59 Aiming Post Lights	**WARNING**  **TRITIUM (H_3)** **M58 and M59 aiming post lights contain radioactive tritium (H_3). Exercise care to ensure glass vials are not broken or damaged. If any vial is broken or does not properly illuminate, do not attempt to replace or repair. Notify RPO.**	

Table 2-1. Preventive Maintenance Checks and Services for M120/M121 Mortar (Cont)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
42	After	M58 and M59 Aiming Post Lights	 Check aiming post lights (1) for proper illumination in a darkened area. If they are damaged or not illuminated, notify the RPO. Wipe aiming post lights with clean wiping rag (item 12, app D).	Items are damaged or not illuminated.

Section III. OPERATION UNDER USUAL CONDITIONS

EMPLACING THE MORTAR ON THE GROUND (TRAILER).

WARNING

- **Mortar must be securely fastened to the trailer.**
- **Bipod assembly, mortar barrel assembly, and mortar baseplate must be securely connected to each other.**
- **Ensure clamp handle assembly is not loosened more than two turns.**

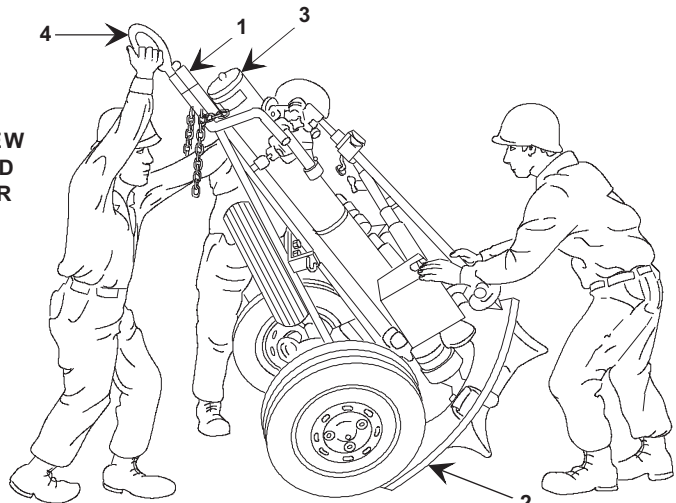
NOTE

- **If the first rounds are fired at 800 mils elevation or less, the mortar baseplate must be dug in first.**

- **The design of the clamp handle assembly will allow some slippage when firing the mortar. When this occurs, loosen clamp handle assembly and slide buffer housing assembly back down to correct location.**

- **The mortar squad consists of five soldiers. See FM 23-90.**

NOTE
THE FOURTH CREW MEMBER OMITTED TO SHOW TRAILER DETAIL.



NOTE

Ensure that the locking handle on the mortar baseplate is facing in the direction of fire.

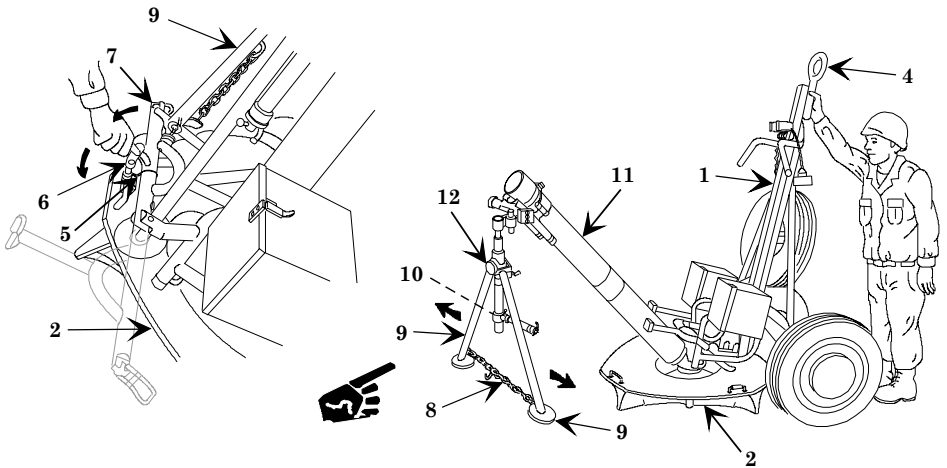
1 To emplace the mortar, select and prepare a firm, level, horizontal surface for the mortar baseplate and bipod legs, based on direction of intended fire.

2 Position the trailer (1) with the mortar baseplate (2) on ground in the firing direction.

3 Remove the muzzle plug cap (3).

4 Two crew members raise the towing eye (4) until the trailer (1) rests on the mortar baseplate (2). One crew member holds the trailer and a fourth member moves to the right side of weapon to assist in lowering weapon system to the ground.

EMPLACING THE MORTAR ON THE GROUND (TRAILER) (Cont).



WARNING

Stay clear of mortar baseplate to avoid injury from sudden release.

5 Remove locking pin assembly (5) and disengage lock release lever (6) to release mortar baseplate (2) from trailer (1).

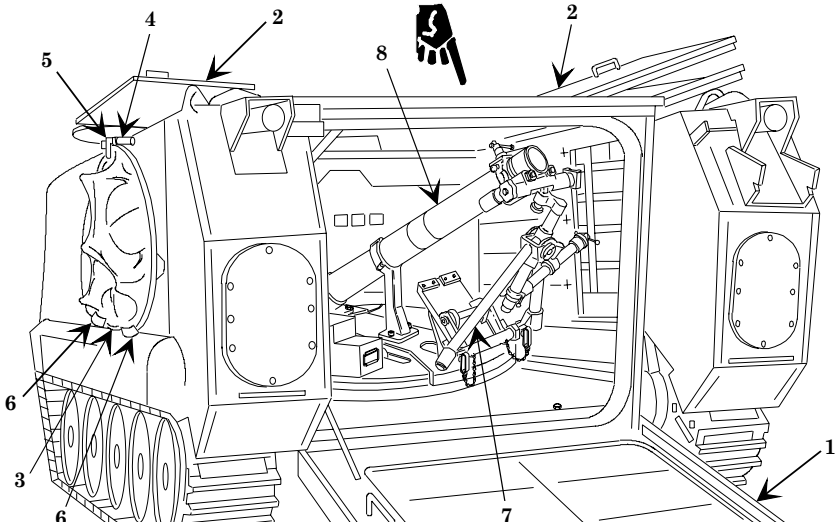
6 Open trailer bridge assembly (7) and swing it out of the way. Unhook the chain assembly (8) from the eye of the bipod leg (9).

7 Loosen cross leveling locking knob (10), spread bipod legs (9), and tighten cross leveling locking knob.

8 Lift towing eye (4) until mortar baseplate (2) is horizontal to the ground. Three crew members tilt the mortar barrel assembly (11) and the bipod assembly (12) to the ground with the bipod feet two feet from the mortar baseplate (2).

9 One crew member moves trailer to safe location.

EMPLACING THE MORTAR ON THE GROUND FROM M1064 CARRIER.



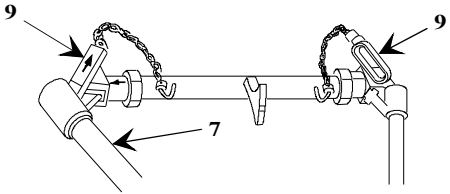
1 Lower the ramp (1).

2 Open and secure the cargo hatches (2).

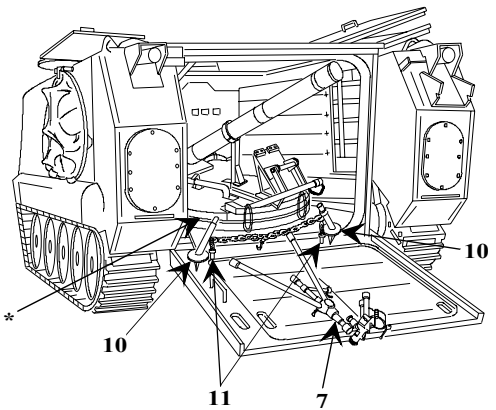
3 Two crew members release the mortar baseplate (3) by removing the pin (4) and pushing the handle (5) up. Tilt out top and lift mortar baseplate from lower brackets (6).

4 Two crew members place mortar baseplate (3) and M67 sight unit at firing location.

5 Holding bipod assembly (7), unlock it from mortar barrel assembly (8) and swing it down to rest on the ramp (1).

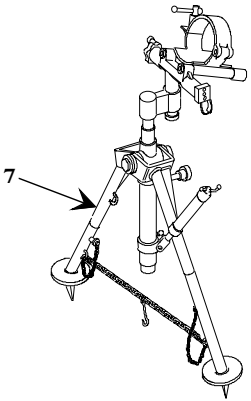


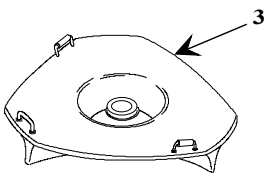
*STEP OMITTED FOR CLARITY TO SHOW TURNTABLE DETAIL.



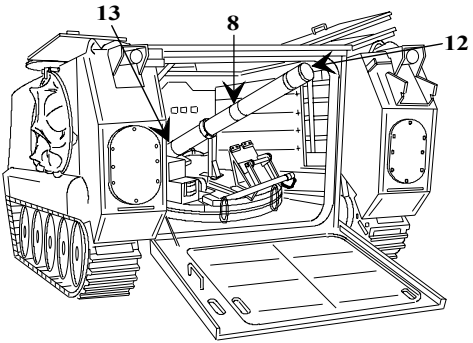
6 With arrows on handles (9) pointing toward each other, pull the handles out, releasing the bipod assembly (7).

7 Install leg extensions (10) onto bipod assembly (7) and secure with pins (11).





8 Two crew members carry the bipod assembly (7) to firing location, and place the bipod feet approximately two feet from the mortar baseplate (3) in the direction of fire.

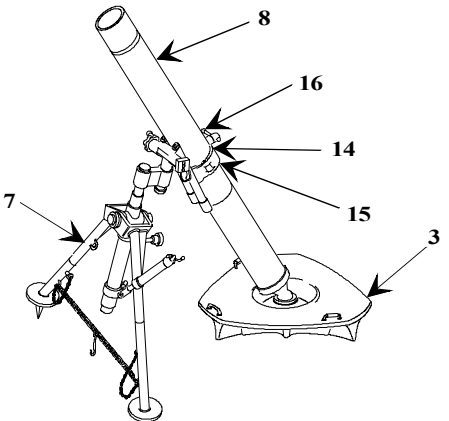


CAUTION

Be careful when taking the mortar barrel assembly from the breech cap socket, or when putting it in. The socket edge must not be broken.

9 Remove muzzle cover (12).

10 Two crew members rotate the mortar barrel assembly (8) until the white line is down, raise it to approximately 0400 mils, and remove it from the breech cap socket (13).



11 Two crew members carry mortar barrel assembly (8) to mortar baseplate (3). Tilt mortar barrel assembly just slightly with white line down and insert it carefully into the breech cap socket. Rotate mortar barrel assembly until white line is on top and lower it onto bipod assembly (7).

12 Slide buffer housing assembly (14) down to lower collar stop (15). Lock buffer housing assembly until clamp handle assembly (16) clicks once.

EMPLACING THE MORTAR ON THE M1064 CARRIER.

WARNING

Always check mask and overhead clearance at all firing locations.

1 Park the M1064 carrier on firm and level ground. Position M1064 carrier so the 120mm mortar can be moved throughout the estimated area of coverage.

2 Apply and lock the M1064 carrier brakes.

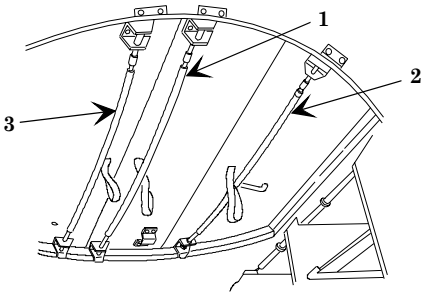
NOTE

Although normally closed, the ramp may be lowered when the tactical situation permits.

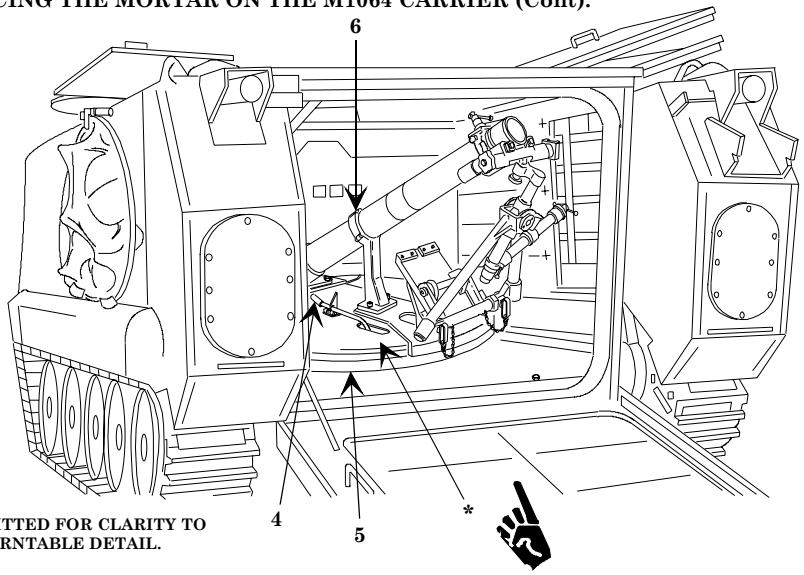
3 Pull on chain (1) to release center section. Fold center section back on right section until it locks. Pull on chain (2) to release right section, then push both sections back on top deck and secure.

4 Pull on chain (3) to release left section. Fold it back on top deck and secure.

5 Ensure all hatch sections are locked in the spring-loaded catches on the top deck.



EMPLACING THE MORTAR ON THE M1064 CARRIER (Cont).



***STEP OMITTED FOR CLARITY TO SHOW TURNTABLE DETAIL.**

WARNING

Do not remove turntable stops on turntable indexing gear.

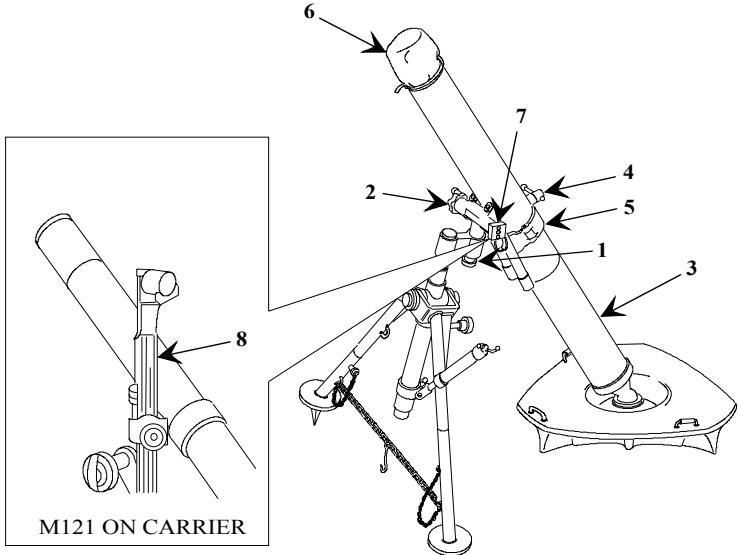
NOTE

The mortar can be rotated 0775 mils left of center and 0825 mils right of center in the direction of fire.

6 Unlock turntable manual control handle (4) and move turntable (5) to desired setting. Lock turntable.

7 Unlock and open the clamping support assembly (6).

PLACING MORTAR INTO ACTION.



NOTE

The mortar is emplaced on the ground or in the M1064 carrier.

1 Center the traversing extension assembly (1) and traversing gear assembly (2).

2 With one crew member holding the mortar barrel assembly (3), loosen the clamp handle assembly (4) no more than two turns and slide buffer housing assembly (5) down to lower collar stop. Tighten the handle until it clicks once. (Ensure that the white lines on buffer housing assembly and mortar barrel assembly line up.)

3 Remove gun muzzle cover (6).

4 Remove the dovetail slot cover (7).

5 On the M1064 carrier, install the sight extension (8).

INSTALLING M67 SIGHT UNIT.

NOTE

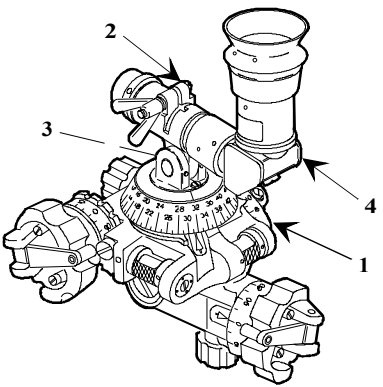
When not in use, store M67 sight unit in carrying case.

1 Remove M67 sight unit (1) from carrying case.

2 Loosen wing nut on loop clamp (2) and loosen lock release lever (3).

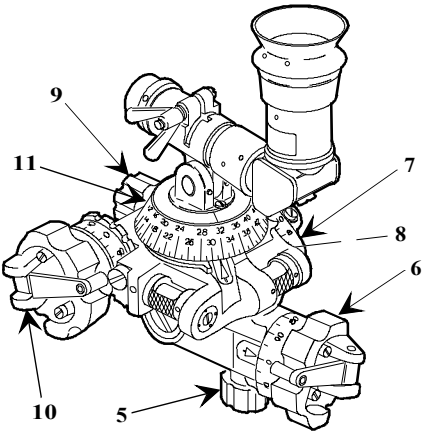
3 Turn and pivot elbow telescope (4) to vertical position as shown. Align indexing lines.

4 Tighten wing nut and lock release lever (3).



5 Loosen elevation locking knob (5). Rotate elevation knob (6) to align the 1100-mil graduation on coarse elevation scale (7) with coarse elevation index arrow (8).

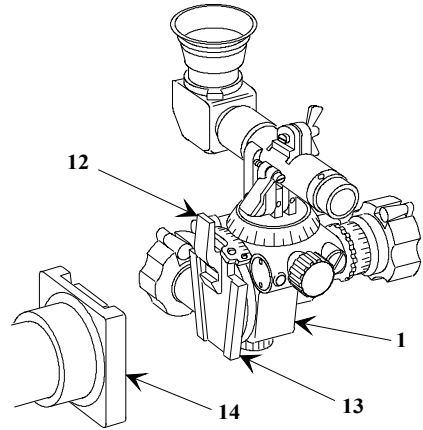
6 Loosen deflection locking knob (9). Rotate deflection (azimuth) knob (10) to set coarse deflection scale (11) on 3200.



7 Press and hold in mortar sight latch (12).

8 Install M67 sight unit (1) by inserting dovetail (13) into dovetail slot (14).

9 Release mortar sight latch (12) when M67 sight unit is fully seated. Ensure M67 sight unit is secure to bipod by pulling up slightly on sight body.



BORESIGHTING.

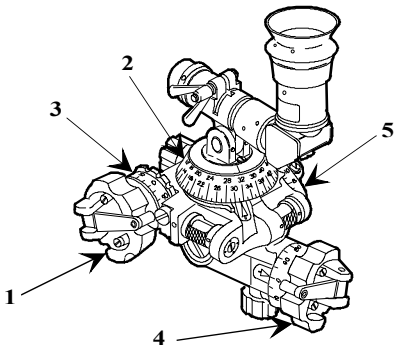
1 Check that elevation, traversing, and cross leveling mechanisms are approximately centered.

2 Make a visual check that elbow telescope is roughly parallel to ground.

3 Rotate deflection (azimuth) knob (1) to index coarse deflection scale (2) to 3200 mils.

4 Rotate deflection (azimuth) knob (1) to index fine deflection scale (3) to 0 mils.

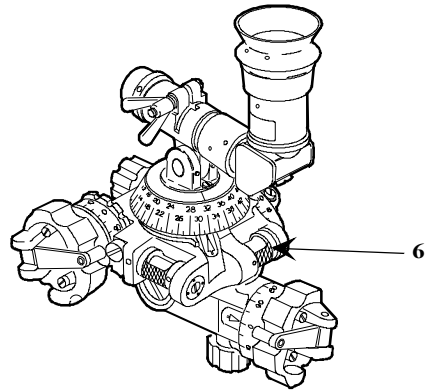
5 Rotate elevation knob (4) to index coarse elevation scale (5) to 0800 mils.

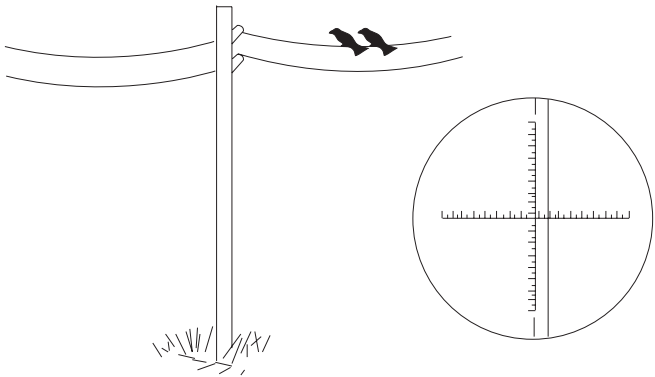


6 Remove cant, if present, by turning cross-leveling operating handle on bipod assembly until bubble in cross level vial (6) on sight unit is centered.

NOTE

Do not use deflection knob on sight unit to remove cant.





7 Select an aiming point that has a clearly defined vertical line. The aiming point should be as far away as possible and not less than 200 meters.

NOTE

Always sight along left edge of aiming point.

8 Look through elbow telescope and pick out distant aiming point. Move mortar if necessary to place the cross hairs on distant aiming point. Do not use traversing mechanism, but shift mortar to align it on aiming point.

9 Check both level bubbles and adjust if necessary using mortar controls only. You are now ready to boresight.

NOTE

It is important to have mortar barrel assembly in center of traverse at this time.

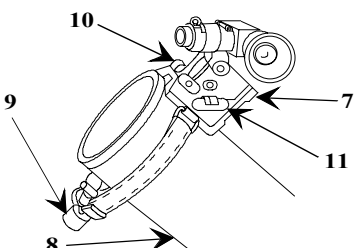
10 Remove M45A1 boresight (7) from carrying case and place on top of mortar barrel assembly (8) just below upper step band.

NOTE

- **The elbow telescope on boresight is not used to set cannon to 800 mils, so its orientation is not important.**
- **Slight movements of boresight may be made by loosening clamp screw (9) and lightly tapping boresight body.**

11 Center bubble in boresight cross level vial (10) by rotating boresight (7) slightly around mortar barrel assembly (8) and tightening clamp screw (9).

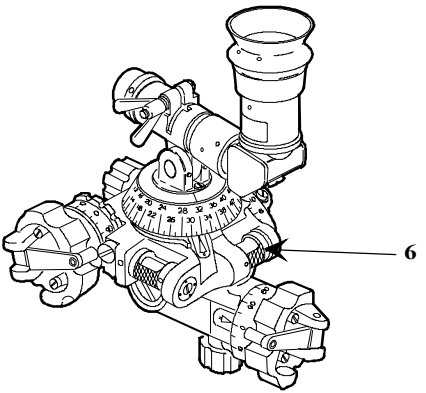
12 Elevate or depress cannon until bubble in boresight elevation level vial (11) is centered.



13 Check cross level vial (6) on sight unit. Center bubble if necessary and do not disturb the cross-level on boresight. You may have to go back and forth between these two units to get them both centered.

14 Repeat above steps until bubbles in cross level vial of sight unit, cross level vial of boresight, and elevation level vial of boresight are centered.

15 The cannon is now at 800 mils elevation.

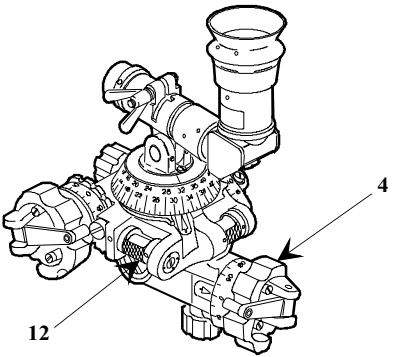


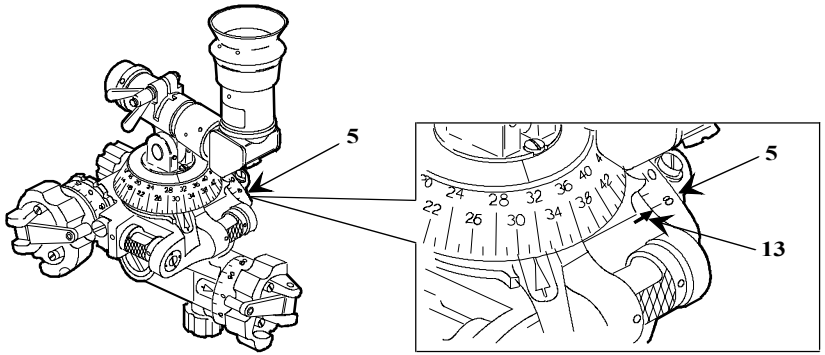
16 Adjust elevation knob (4) until bubble in elevation vial (12) of sight unit is centered.

17 Check cross level vials on sight unit and boresight to make sure bubbles are still centered. Adjust until bubbles are centered.

18 Check elevation level vial on boresight to ensure that bubble is still centered.

19 Repeat previous steps until all four bubbles are centered.





CAUTION

Do not tamper with coarse elevation scale. This could cause damage to scale or sight unit.

20 The reading on coarse elevation scale (5) should be 800 mils. (Coarse elevation index arrow (13) should point to 8 on coarse elevation scale.) A difference of ± 20 mils is acceptable. If over 20 mils off, remove and turn in sight unit for corrective maintenance.

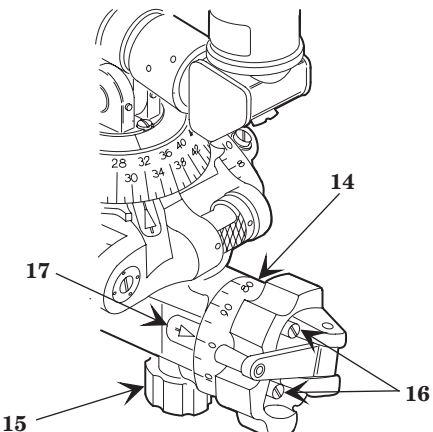
21 The reading on fine elevation scale (14) should be 0 mils. If it isn't, tighten elevation locking knob (15), loosen two screws (16), and slip scale until fine elevation index arrow (17) points to 0 mils. Tighten screws and loosen elevation locking knob.

22 Recheck all level bubbles and adjust as necessary.

23 The mortar is now boresighted for elevation.



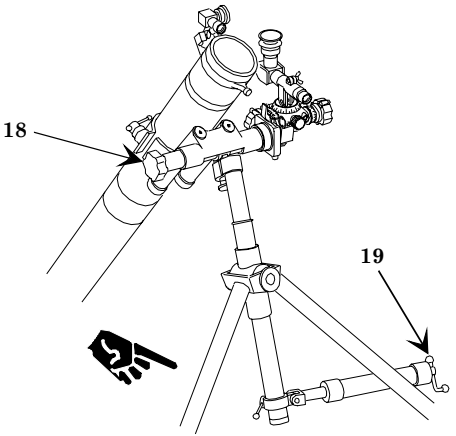
TRITIUM (H_3)



BORESIGHTING (Cont).

24 Look through boresight elbow telescope and find distant aiming point. Move cross hairs to vertical side of distant aiming point by moving traversing hand crank (18) no more than two turns in either direction from center.

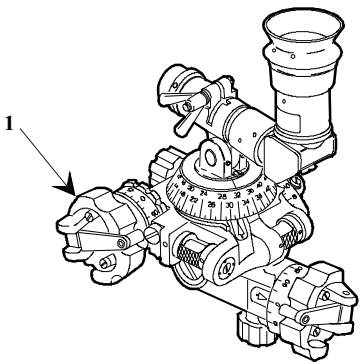
25 Re-level cross level vials on boresight and sight unit by using cross leveling hand crank (19). This step may have to be repeated several times until both boresight and sight unit are cross-leveled.



26 Look through sight unit and find distant aiming point. Move cross hairs to show exactly the same vertical side of distant aiming point as shown in boresight. Do this by turning deflection (azimuth) knob (1) on sight unit.

27 Recheck all level bubbles and adjust as necessary.

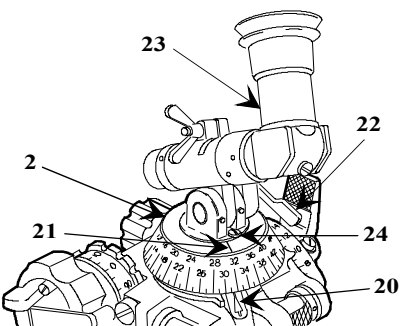
28 When both elbow telescopes show proper target patterns, proceed to step 29.



29 The 32 on coarse deflection scale (2) and coarse deflection index arrow (20) should line up (3200 mils). If not, push down on circumference of scale, turn it to 32, and release it.

30 Line on pointer dial (21) should align with 32 on coarse deflection scale (2). If it does not, loosen lock-release lever (22), pivot elbow telescope (23) out of way, and loosen two screws (24) holding pointer dial. Turn pointer dial until line is at 32 and tighten screws.

31 Reposition elbow telescope (23) and tighten lock-release lever (22).

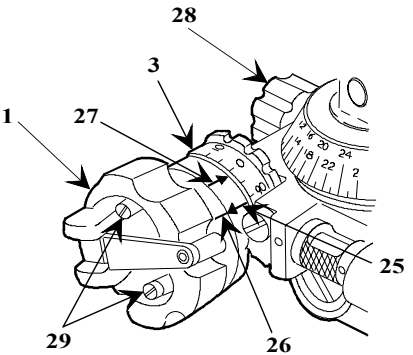


32 Fine deflection red index arrow (25) should align with red index line of control dial (26), and black index arrow (27) should align with 0 mils. If not, tighten azimuth locking knob (28). Loosen two screws (29) in deflection (azimuth) knob (1).

33 Turn red index line of control dial (26) to align with red index arrow (25).

34 Disengage fine deflection scale (3) and turn to align 0 mils with black index arrow (27).

35 Tighten two screws (29) and loosen azimuth locking knob (28).



NOTE

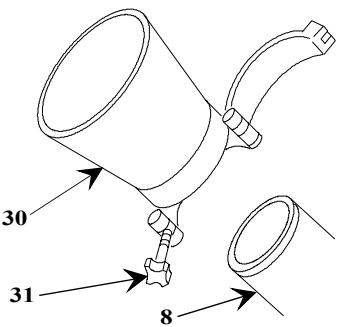
Weapon is now boresighted. Repeat boresighting procedure starting on page 2-77 if there are any errors.

36 Remove M45A1 boresight and store in carrying case.

NOTE

Step 37 applies only to mortar mounted in carrier.

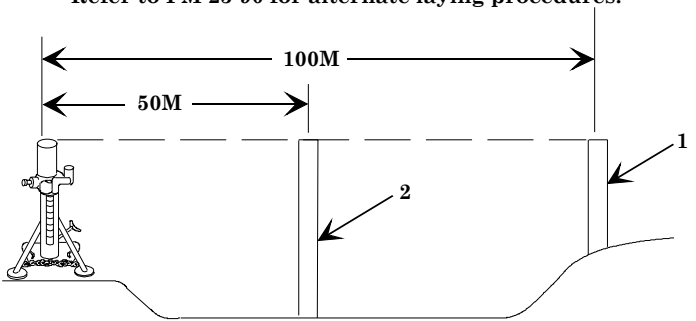
37 Install BAD (30) to mortar barrel assembly (8) and secure with locking knob (31).



EMPLACING AIMING POSTS FOR INDIRECT FIRE.

NOTE

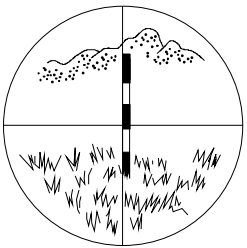
Refer to FM 23-90 for alternate laying procedures.

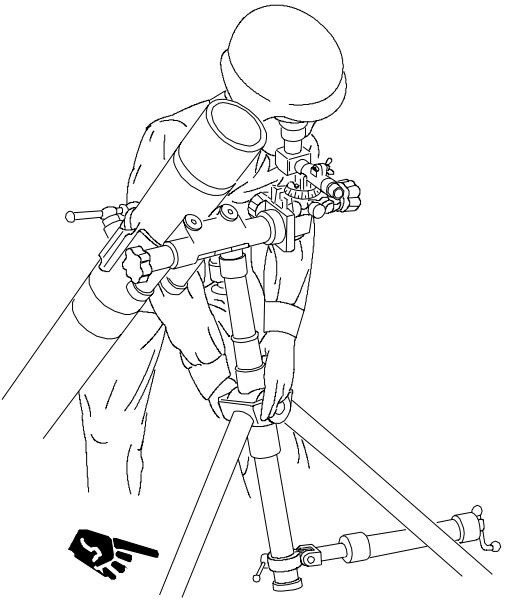


1 Place two sets of assembled aiming posts in the ground at a referred deflection from direction of fire. The far post (1) should be emplaced first, 100 meters from weapon where possible. Emplace near post (2) halfway between far post and weapon.

2 During hours of darkness, place an aiming post light on each post. Light on far post (1) should be visible above the light on near post (2).

OPERATION OF M67 SIGHT UNIT.





NOTE

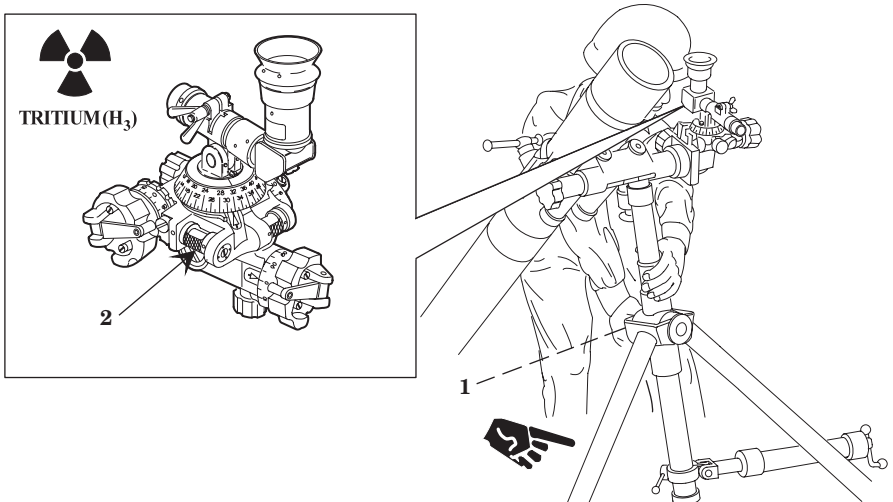
- **M14 aiming posts are in position during initial laying procedure. If required, M58 and M59 aiming post lights are used with aiming posts.**

- **Plotting board M16 is a portable instrument used to geometrically compute the range and azimuth to target from mortar. Refer to TM 9-1220-243-12&P for more information about the plotting board.**

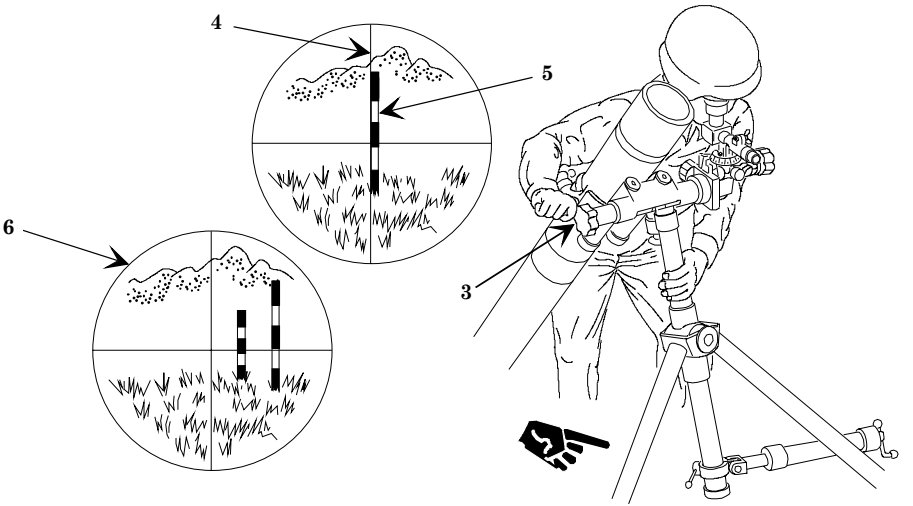
1 Place deflection received from fire direction center (FDC) on sight unit.

2 Place elevation received from FDC on sight unit.

3 If deflection is greater than 75 mils, center mortar cannon on traversing gear and shift bipod assembly to align vertical reticle line of mortar sight on aiming posts ± 20 mils.

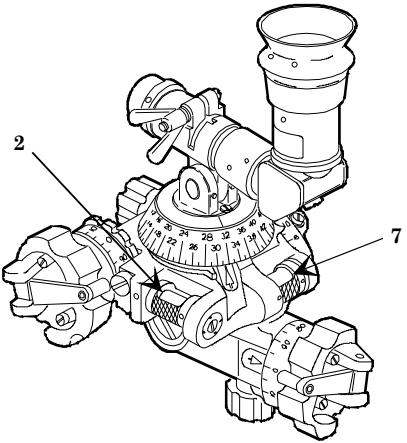


4 Turn elevating hand crank (1) to level bubble in elevation vial (2).



5 Look through sight unit, and turn traversing hand crank (3) to realign vertical reticle line (4) on aiming posts (5) or to obtain a correct compensated sight picture (6) (far post in the middle; equidistant between vertical reticle line and posts) if the deflection shift was large.

TRITIUM (H_3)



6 Check to ensure that sight unit picture is correct. If not, repeat adjustments until a correct sight picture is obtained with the bubbles level in both the elevation vial (2) and the cross level vial (7).

BEFORE FIRING CHECKS.

WARNING

- **Firing pin must line up with stripe on barrel.**
- **Do not fire from carrier prior to the installation of the Blast Attenuator Device (BAD).**
- **Before firing, wipe dry the cross leveling mechanism's clamping surface on elevating mechanism housing, the clamping surfaces of buffer mechanism, and the exterior surface of barrel with a clean cloth. DO NOT LUBRICATE.**
- **Do not allow the bipod assembly to lean forward (downrange) of a vertical position under any circumstance of elevation setting or positioning of buffer housing assembly on the barrel.**

CAUTION

- **Before firing, the sight unit and sight extension (carrier) must be firmly attached and the boresight must be removed.**
- **Check that sight unit is removed before settling the mortar baseplate.**

BEFORE FIRING CHECKS (Cont).

NOTE

- **The procedure for loading and firing is identical for the ground-emplaced and carrier-mounted 120mm mortar.**
- **The first two cartridges fired will be used to settle the mortar baseplate when ground-emplaced. Elevation should be at least 1100 mils unless baseplate is dug in.**
- **Steps 1 through 6 apply to all positions of mortar. Steps 7 through 11 apply only to carrier-mounted mortar.**
- **Ensure that deflection and elevation locking knobs on sight unit are tightened before each firing.**

1 Check mask and overhead clearance.

2 Check that mortar barrel assembly is locked to mortar baseplate (M120) or turntable socket (M121).

3 Check that buffer housing assembly is locked.

4 Check that cross leveling locking knob is hand tight.

5 Check that chain assembly is straight and tight (ground-mounted only).

6 Check that firing pin is present and fully seated.

7 Check that M191 bipod assembly is locked to turntable mount, arrows on mount handles are pointed down (vertical), and safety pins are installed.

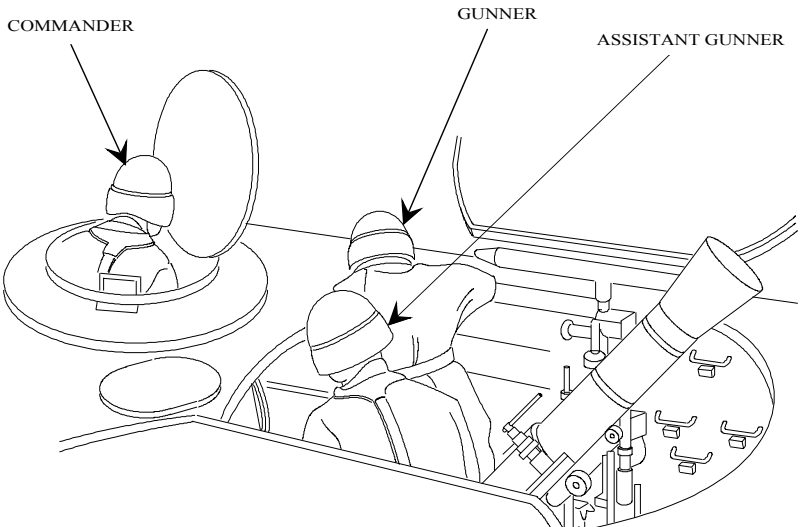
8 Check that bipod support assembly is locked in high or low position.

9 Check that turntable is locked in position.

10 Check that cargo hatches are locked open.

11 Check that BAD is in place and secure.

LOADING AND FIRING.



WARNING

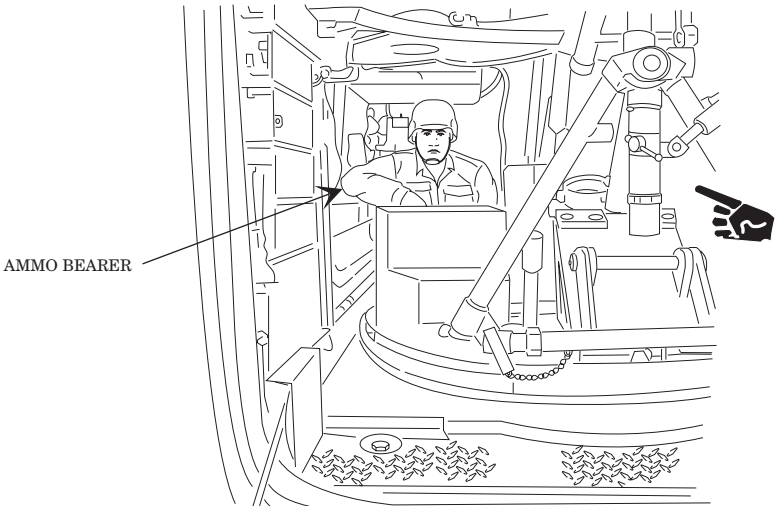
All 120mm mortar crewmen must be trained in the proper use of both types (see page 2-103) of hearing protection.

All 120mm mortar crewmen must be checked by appropriate medical personnel to assure proper fit of earplugs.

An individual (medical, safety, or range personnel), who has evidence of hearing conservation training equivalent to standards of Council for Accreditation in Occupational Hearing Conservation, must inspect the insertion of the earplugs before firing.

The 120mm mortar poses a significant risk of hearing loss. Hearing loss is a certainty for those not using hearing protection properly. Significant damage can occur even for a single, unprotected exposure. Some individuals are particularly susceptible to noise, and they can only be identified if they report for scheduled hearing checks.

LOADING AND FIRING (Cont).



WARNING (Cont)

Crews can fire the 120mm Battalion Mortar System with double hearing protection using the following matrix:

Charge Zone	Quadrant Elevation	Allowable Number of Rounds per Day	
		Towed	Carrier*
0, 1, 2	1422 and below	100**	115
3, 4	1215 and below	100**	115

The double hearing protection must consist of any approved earplug and either: 1) a Combat Vehicle Crewmen (CVC) helmet; or 2) a Communication Aural Protective System/Artillery Communication Aural Protective System (CAPS/ACAPS) with Personnel Armored System for Ground Troops (PASGT) helmet.

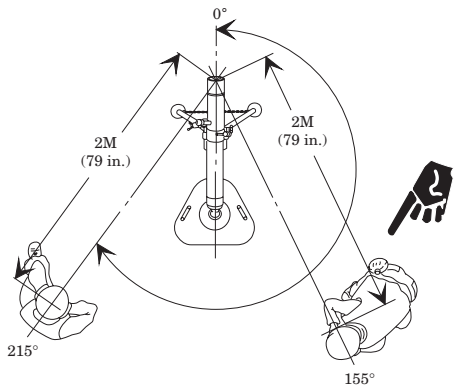
***The carrier configuration can be fired with ramp open or closed.**

****Towed units can fire 25 rounds per day with single hearing protection and head positions no higher than 0.8 meters above the ground.**

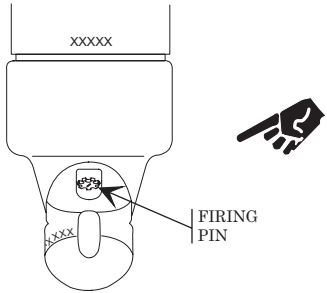
The mortar blast may cause bodily injury, as well as hearing loss. Crew members and all personnel within 5 meters of the M120/M121 mortar must wear double hearing protection when firing. All personnel within 200 meters must wear hearing protection.

LOADING AND FIRING (Cont).

WARNING (Cont)



Gunner and assistant gunner's heads must be away and below muzzle blast (no higher than 1.2 meters above ground) during all loading and firing operations.



Do not drop a cartridge down the cannon tube with the firing pin removed.

The exterior surface of the barrel must be wiped free of lubrication in the area of the buffer housing assembly prior to firing. If this portion is not dry, the buffer housing assembly may move excessively on the barrel during firing.

WARNING (Cont)

Do not allow the bipod assembly to lean forward (downrange) of a vertical position under any circumstance of elevation setting or positioning of buffer housing assembly on the barrel.

The mortar crew must have adequate cover for protection from fragments when firing to ranges of 600 meters or less.

Firing ammunition in a heavily lubricated bore can result in hangfires or failures to fire. Short rounds may occur if water or excessive oil is in the barrel during firing.

Heavy rainfall may prematurely explode PD and proximity fuzes.

Do not try to force a cartridge down the barrel.

Do not assemble or use a cartridge unless authorized.

Handle explosive ammunition and components containing explosives with utmost care. Do not drop, drag, throw, tumble, or strike packaged or unpackaged ammunition or related components.

Cannon bore is required to be dry-swab cleaned after every fire mission or ten rounds fired (approximately).

The normal time required for a round to drop down the barrel is 2 to 3 seconds. If a longer drop time is noticed, the barrel should be dry-swabbed before firing is resumed to reduce the chance of misfire.

During rapid and sustained rates of fire, there is a possibility of residual flame and cook offs. Rapid and sustained rates of fire are 16 and 4 rounds per minute. If a cookoff occurs, the crew should wait 10 minutes for the weapon to cool, swab the barrel, and resume firing.

Do not fire unpackaged ammunition that has been dropped. These will be returned to the Ammunition Supply Point (ASP) as unserviceable. If an XM930 or M983 Illum Cartridge has been dropped, do not attempt to retrieve the cartridge for ten minutes. Personnel retrieving the cartridge must be sure that the fuze and fin ends of the cartridge are pointed away from their bodies in the event that the cartridge separates. The cartridge is to be placed in the dud pit and destroyed by EOD.

WARNING (Cont)

Do not fire packaged M57, M68, or M91 cartridges that have been dropped from a height greater than one meter. These cartridges will be returned to the ASP as unserviceable.

Ammunition exposed directly to sunlight, or in unventilated containers, enclosures, shelters, freight cars, closed vehicles, and similar structures exposed to direct sunlight, may reach temperatures exceeding upper storage limits. Avoid exposure of ammunition and related components to direct sunlight.

WARNING (Cont)

Do not fire ammunition in temperatures above +145 °F (+63 °C) or below -28 °F (-33 °C).

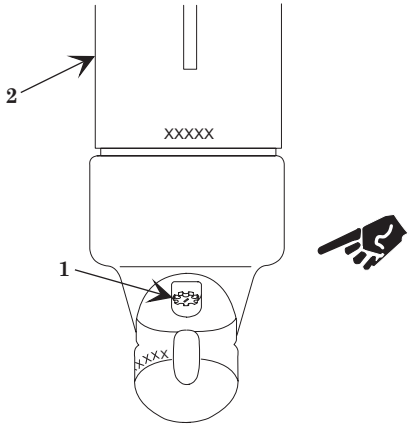
At temperatures exceeding 111.4 °F (44.1 °C) (melting point of WP), store and transport WP rounds in a vertical position (nose up) to prevent voids in the WP.

Do not store ammunition under trees or next to towers or other structures that attract lightning.

When burning excess increments:

- **Burning area must be at least 100 meters from the nearest mortar position, parked vehicles, and ammunition piles.**
- **Burning area shall be cleared of all dead grass or brush within 30 meters.**

Buffer housing assembly may slip along barrel. Weapon barrel elevation and cant should be checked frequently and adjusted as necessary.



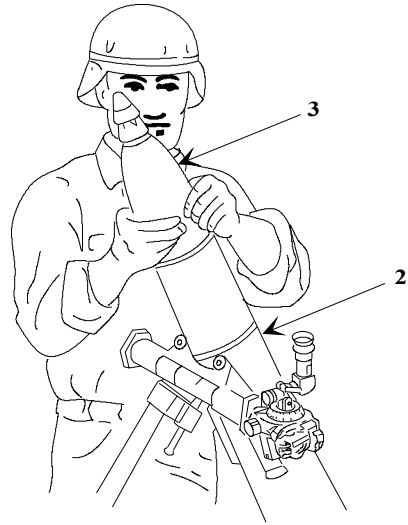
1 Make sure firing pin (1) on breech assembly end of barrel (2) is fully seated.

NOTE

Dry swab barrel after every ten rounds fired, except when firing charge 1 at elevations of 1000 mils and below, when barrel will be dry swabbed after every five rounds. Do not use any cleaner or lubricants. Use clean bore cleaning sleeve (item 13, app D) only.

2 Grasp cartridge (3) near center of body with both hands.

3 Insert fin-end of cartridge (3) into barrel (2) beyond narrow part of cartridge body.



WARNING

To avoid injury, do not bring hands over muzzle of barrel while releasing cartridge.

4 Upon command, "FIRE", release cartridge (3) into barrel (2). Assume proper head and body positions before cartridge slides down barrel, strikes firing pin, and fires.

5 After a firing session has been completed, enter the cartridges fired on DA Form 2408-4 (no entry is necessary in columns e, g, and h).

MISFIRE PROCEDURES.

WARNING

- **Serious injury or death may result from misfire. Cookoff may result in an unexpected blast with the crew improperly positioned. Another cartridge dropped on top of a misfired cartridge may result in detonation of both propelling charges, both fuzes, and both main charges, rupturing the barrel. The cartridge may detonate while removing the misfire.**

- **If kicking the barrel does not cause the cartridge to fire during a misfire and the mortar is hot, wait until the mortar is cool enough to handle with bare hands. If the mortar is cool at the time of the misfire, wait one minute before removing the cartridge. Water or snow applied to the outside of the barrel can be used for cooling. This is to avoid an accident from possible delayed action of the ignition cartridge.**

NOTE

- **A misfire is a failure of the cartridge to fire after cartridge is dropped into mortar barrel assembly. Misfires may be caused by defective ammunition, a damaged firing pin, or an obstruction in bore that prevents cartridge from sliding down and striking firing pin.**

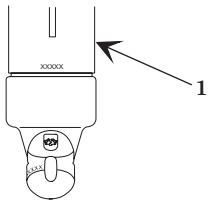
- **When carrier mounted, never change from high range to low range to perform misfire procedures. Lower the cannon to its lowest elevation, leaving 0.25 in. (0.64 cm) of inner elevating sleeve exposed.**

1 When a misfire occurs, any member of the crew immediately announces "MISFIRE".

WARNING

To avoid injury, all crewmembers must exit from front of carrier only.

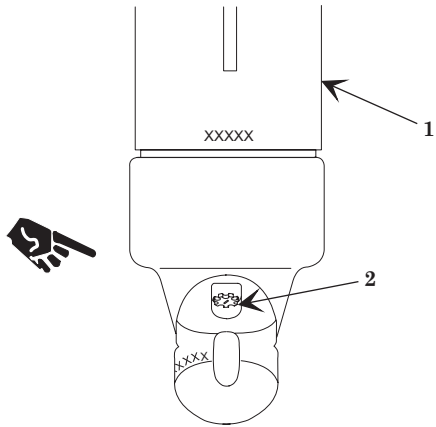
2 All crewmembers, except the gunner, move at least 100 meters to the rear of the mortar.



WARNING

Ensure cross-leveling loop clamp is as tight as physically possible.

3 The gunner stands to the left or right rear of the mortar and strikes barrel (1) several blows with the heel of his boot. If the cartridge fails to fire after kicking the barrel, the gunner joins the rest of the crew and waits one minute.


XXXXX
1
2
XXXX

WARNING

If the mortar is hot, avoid serious burns by waiting until the barrel is cool enough to touch with bare hands.

4 After waiting one minute, the gunner and squad leader return to the mortar and check to see if mortar is cool enough to handle. Gunner checks the barrel (1) for heat using bare hands. Starting at the muzzle, lightly touch the barrel every few inches with the fingertips and move down to breech cap. If barrel is too hot, crew uses some means (water or snow on exterior of barrel) or elapsed time to cool the barrel before attempting to remove the misfire.

5 When mortar is cool enough to handle, gunner does the following steps:

a. Gunner depresses barrel (1) to its lowest elevation, leaving 0.25 in. (0.64 cm) of inner elevating sleeve showing.

b. Using firing pin wrench (item 33, sec III, app B), gunner removes firing pin (2) by turning firing pin wrench in counterclockwise direction.

c. After removal of firing pin (2), gunner shouts, "Firing pin is removed."

d. Gunner hands firing pin (2) to squad leader.

e. Section leader physically confirms that firing pin (2) has been removed.

WARNING

- **Keep head and body away from the front of the mortar when removing a misfire.**
- **Do not stand directly behind mortar when removing a misfire.**
- **Do not open buffer housing assembly when removing a misfire.**
- **When carrier-mounted, all crewmembers must enter and exit from front of vehicle.**

6 Gunner calls rest of crew forward.

7 Assistant gunner removes Blast Attenuator Device (BAD) and stows it in a safe place (M121 only). Squad leader confirms actions of assistant gunner.

7.1 Gunner locks data on sight unit using the locking knob on last deflection and places sight unit in carrying case. If carrier-mounted, gunner removes sight extension and places it in a safe place. Squad leader confirms actions of gunner.

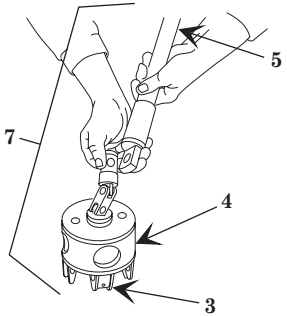
MISFIRE PROCEDURES (Cont).

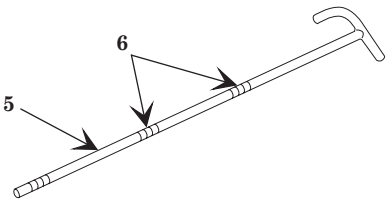
8 Assistant gunner inspects catches (3) on cartridge extractor (4) to ensure they are the latest configuration. There should be a 1/8 in. (0.32 cm) hole in the face of the catch. The hole indicates that the catch is the latest configuration. Assistant gunner inspects cartridge extractor and makes sure that cartridge extractor catches are free of burrs, wear, or rust/corrosion that would impair function. Assistant gunner will test each cartridge extractor catch to ensure free operation and that each catch will snap positively into original position. **If the cartridge extractor fails to meet inspection standards, cartridge extractor is non-mission capable.** Do not use cartridge extractor. Proceed to step 21 and follow the barrel tip method to remove misfired cartridge. Squad leader confirms actions of assistant gunner.

8.1 Assistant gunner makes sure artillery cleaning staff assembly section sleeves (6) are all tightly locked, so that staff assembly will not extend or retract. If section sleeves cannot be tightly locked, cartridge extractor assembly (7) is non-mission capable. Do not use cartridge extractor assembly. Proceed to step 21 and follow the barrel tip method to remove misfired cartridge. Squad leader confirms actions of assistant gunner.

8.2 Assistant gunner attaches cartridge extractor (4) securely to extended artillery cleaning staff assembly (5). Squad leader confirms actions of assistant gunner.

9 Assistant gunner rotates artillery cleaning staff assembly (5) until cartridge extractor (4) is secure against artillery cleaning staff assembly.

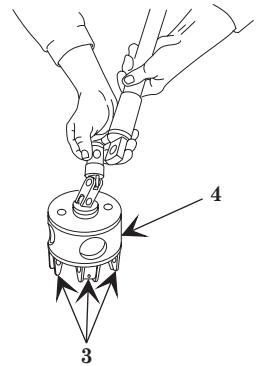


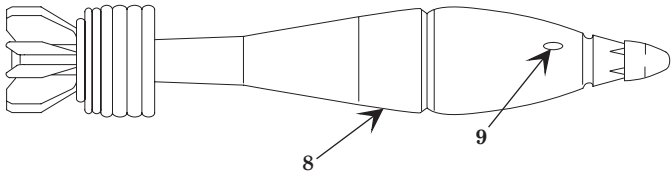


WARNING

To avoid injury to crew, if in high range, do not lower to low range. If in low range, do not raise to high range. To avoid serious injury, do not stand in front of or behind barrel. When removing cartridge, do not touch primer and do not stand directly in front of barrel.

10 Before inserting cartridge extractor (4), assistant gunner ensures that barrel has been lowered to its lowest elevation, leaving 0.25 in. (0.64 cm) of inner elevating sleeve showing.





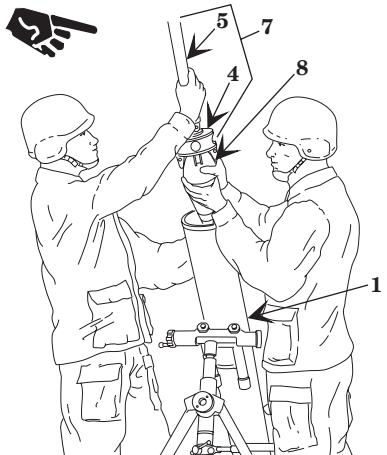
11 Insert cartridge extractor (4) into the barrel until it rests on the cartridge (8) and will not descend any further.

11.1 Slowly rotate cartridge extractor (4) until it grasps cartridge (8). You have grasped the cartridge when you feel the spring-loaded extractor catches (3) click into the holes (9) on the cartridge body.

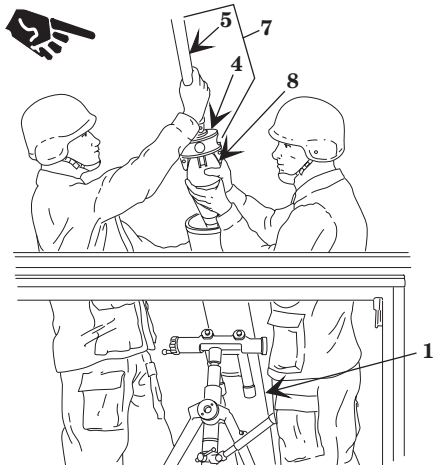
11.2 Continue rotating cartridge extractor (4) 1/4 turn. The resistance of the extractor should be much heavier because of latching onto the cartridge (8).

12 If extra resistance is not felt, cartridge extractor (4) has not successfully connected to the cartridge (8). Repeat steps 11.1 and 11.2. If resistance is still not felt, remove cartridge extractor assembly from barrel and proceed to step 21.

MISFIRE PROCEDURES (Cont).



M120



M121

NOTE

If cartridge is grasped, perform steps 13 through 20. If cartridge cannot be grasped, perform steps 21 through 26. If cartridge is grasped but cannot be removed, perform steps 13.1, 22, 23, and 26.

WARNING

When removing the cartridge, do not touch the primer and do not stand directly in front of barrel.

NOTE

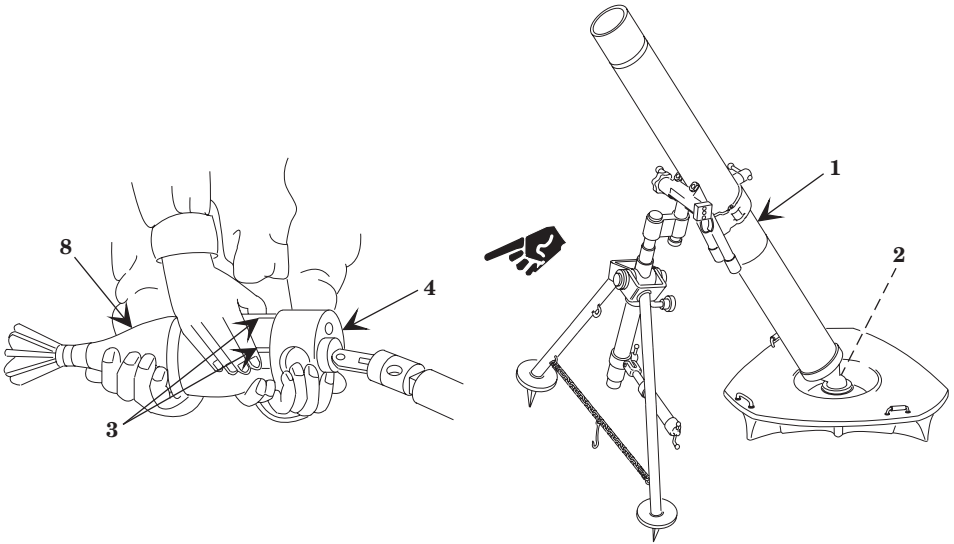
Due to the weight of the round, gunner may assist during the entire extraction process.

13 If resistance is felt, relax grip on the artillery cleaning staff assembly (5) momentarily. Then, without rotating, slowly pull the staff assembly slightly to ensure cartridge (8) is grasped. If cartridge is not grasped, remove cartridge extractor assembly (7) and proceed to step 21. If cartridge is connected, continue with next step.

13.1 Assistant gunner loosens sleeve on artillery cleaning staff assembly (5), depresses ball bearing spring lock, slowly lowers upper staff section into lower staff section, and tightens sleeve.

14 With the gunner's hands held ready at the muzzle, the assistant gunner withdraws the cartridge (8) straight out of the barrel (1) with the cartridge extractor (4). If cartridge cannot be withdrawn, proceed to step 21.

15 The gunner grasps the body of the cartridge (8) as it comes out of the barrel (1).


8
4
3
1
2

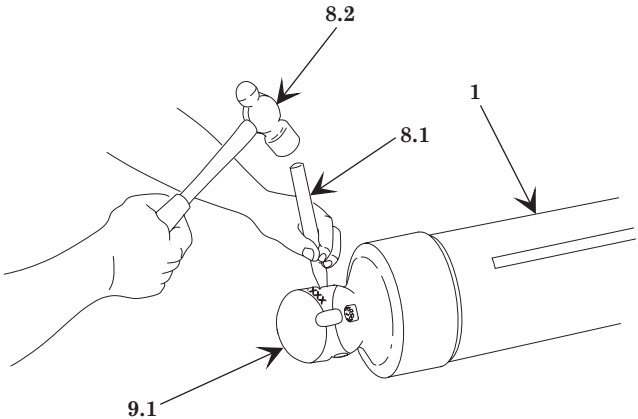
16 The ammo bearer will assist in releasing the cartridge (8) from the cartridge extractor (4). (Do not place the cartridge on the ground when removing the cartridge extractor.) Gunner holds the cartridge horizontally while the ammo bearer releases the extractor by depressing the four extractor catches (3) simultaneously.

17 Deleted.

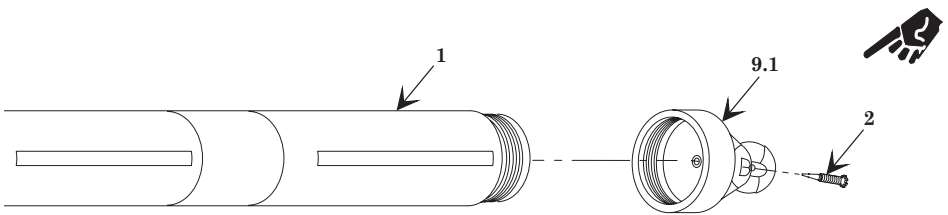
18 The gunner inspects the cartridge (8), to see if primer has been dented, and gives the cartridge to the ammo bearer. The ammo bearer attempts to replace the safety wire (if applicable), places the cartridge in the dud pit, and tags the cartridge. The safety officer notifies Explosive Ordnance Disposal (EOD).

NOTE

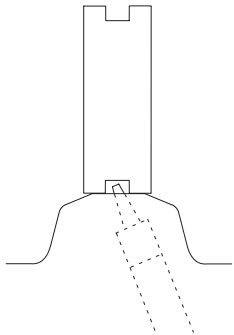
If primer has been dented, perform steps 18.1 through 18.4 before continuing with step 19. If primer has not been dented, proceed to step 19.


8.2
1
8.1
9.1

18.1 Assistant gunner and ammo bearer will stabilize barrel (1). Gunner inserts breech cap removal tool (8.1) (item 4, sec III, app B) into cross bore of breech cap. Tap the end of tool with hammer (8.2) to turn in counterclockwise direction. Unscrew and remove breech cap assembly (9.1) from barrel. Gunner will wipe any debris from inner part of breech cap.

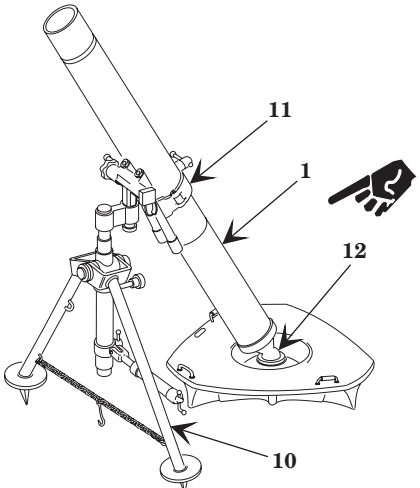


18.2 Gunner inspects firing pin housing on breech cap assembly (9.1) and removes any existing dirt or debris. Gunner replaces firing pin (2) by hand, ensuring that threads are aligned. Rotate firing pin in a clockwise direction until hand tight; then tighten with firing pin wrench (item 33, sec III, app B).

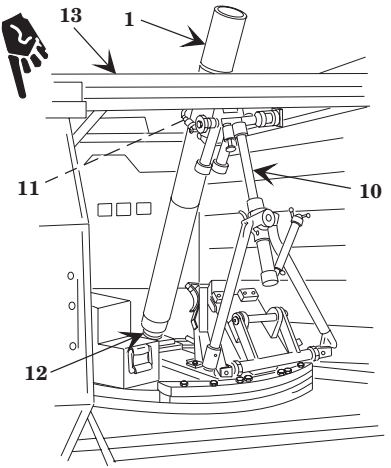


18.3 Measure protrusion of firing pin (2) using firing pin gage (item 17, sec III, app B). Firing pin must protrude above MIN and pass below MAX cutouts. Replace firing pin if defective.

18.4 Using a wiping rag, gunner cleans inner threads of breech cap assembly (9.1) and outer threads of barrel (1). Gunner applies light coat of grease (GA) (item 7, app D) to threads of breech cap assembly and installs breech cap on barrel. Tighten by using breech cap removal tool in breech cap cross bore and tap with hammer. White stripe on barrel must line up with firing pin (2). Actions of crew are confirmed by both squad leader and section leader.



M120



M121

19 Swab the barrel (1).

20 Re-lay the mortar.

21 Follow steps 21.1 through 26 only if the extractor assembly is unserviceable or if the extractor methods have failed.

21.1 If the ramp of the carrier is raised, the driver must lower the ramp.

22 The gunner holds barrel (1) near muzzle and assistant gunner holds bipod assembly (10). The ammo bearer opens buffer housing assembly (11).

23 The gunner and ammo bearer turn barrel (1) until the white line is in down position and carefully remove barrel from breech cap socket (12).

24 The mortar barrel is removed from the M1064 carrier by carrying the barrel under the crossmember of the carrier and down the ramp to a safe location. Keeping barrel horizontal and pointing in the direction of fire, the gunner and the ammo bearer carry barrel outside carrier (M121 only). The assistant gunner will then place the meaty portions of his thumbs over the edges of the muzzle, grasping the barrel with his fingers.

WARNING

When removing the cartridge, do not touch the primer and do not stand directly in front of barrel.

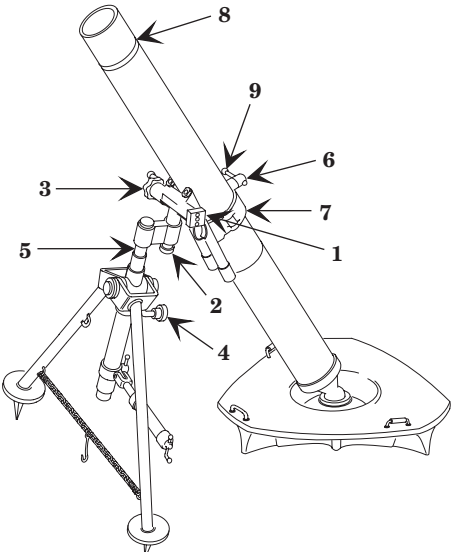
25 At the assistant gunner's command, the ammo bearer will lift the cannon's breech cap assembly with assistance from the gunner causing the cartridge to slide down to the assistant gunner's hands. The assistant gunner will then remove the cartridge, inspect it to see if primer has been dented, attempt to replace the safety wire (if applicable), place the cartridge in the dud pit, and tag the cartridge. The safety officer will notify Explosive Ordnance Disposal (EOD).

NOTE

If the primer has been dented, perform steps 18.1 through 18.4.

26 Keeping barrel horizontal and pointing in the direction of fire, the gunner and ammo bearer lift barrel (with cartridge extractor still attached to cartridge) and carefully remove the barrel under the ramp crossmember (13) (M121 only), handing it off to the assistant gunner and squad leader. They will then carry the barrel to the dud pit and tag barrel. The safety officer will notify Explosive Ordnance Disposal (EOD).

TAKING MORTAR OUT OF ACTION (TRAILER).



1 Remove the M67 sight unit and stow it in its case.

2 Replace dovetail slot cover (1).

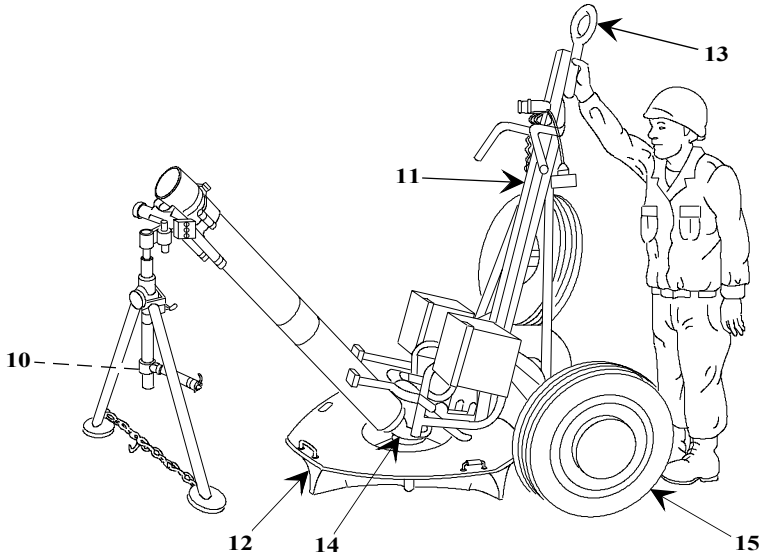
3 Retrieve M14 aiming posts and M58 and M59 aiming post lights and stow them in case.

4 Center the traversing extension assembly (2) and the traversing gear assembly (3).

5 Lower the barrel using the elevation hand crank (4) until 4 in. (10 cm) or four fingers of the inner elevating sleeve (5) is exposed.

6 Loosen the clamp handle assembly (6) no more than two turns and slide the buffer housing assembly (7) to the white line (8) near the muzzle. Match the white line on the buffer housing assembly with the white line down the barrel. Tighten the clamp handle assembly until it clicks once. Continue turning the manual control handle (9) until it is parallel to the barrel.

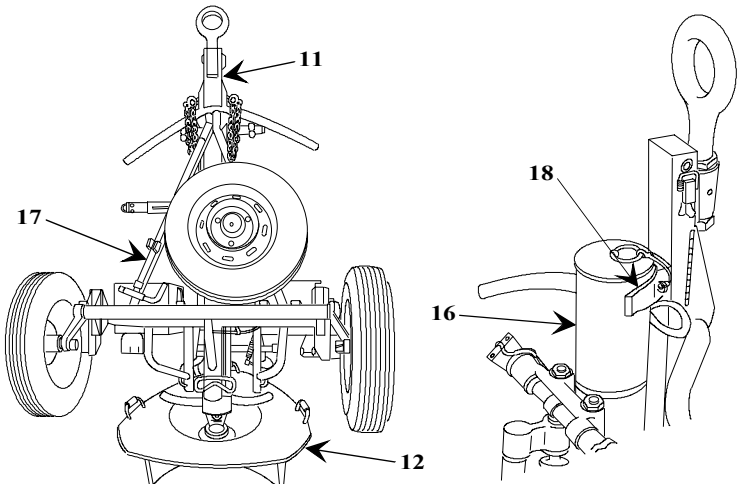
TAKING MORTAR OUT OF ACTION (TRAILER) (Cont).



7 Loosen cross leveling locking knob (10).

8 Two crew members position the trailer (11) on the rear of the mortar baseplate (12), with the towing eye (13) almost straight up.

9 One crew member holds the trailer (11) with the cannon cradle touching the breech cap (14) and the towing eye (13) almost straight up. Make sure wheels (15) do not roll.

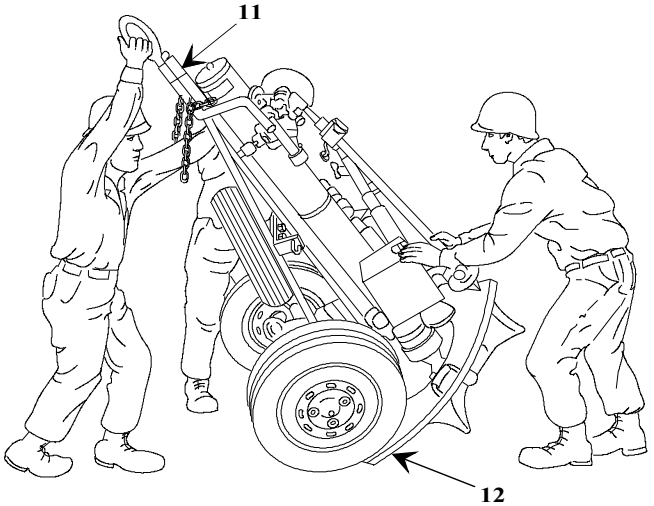

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WARNING

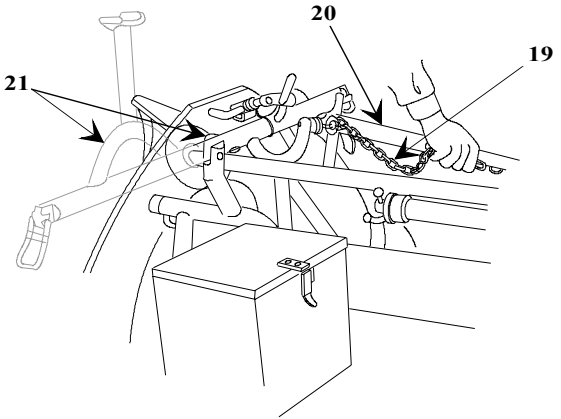
The mortar is placed on the trailer with the bipod assembly, mortar barrel assembly, and mortar baseplate joined. The white line on the mortar barrel assembly must be toward the cannon cradle or mortar baseplate will disengage from breech cap ball.

10 Two crew members lift the mortar barrel assembly (16) and the bipod assembly (17) over the mortar baseplate (12) and onto the trailer (11). Avoid detaching the mortar barrel assembly from the mortar baseplate.

11 Make sure the upper collar stop on the end of the mortar barrel assembly (16) is just forward of the forward barrel bracket (18) on the trailer (11).

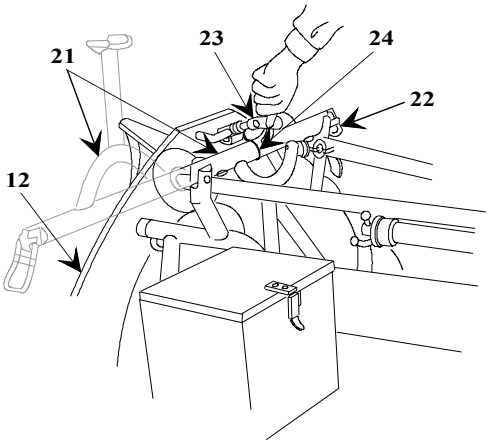


12 One crew member tilts the mortar baseplate (12) onto the trailer (11) as two crew members return trailer to towing position, lifting the entire mortar onto the trailer.



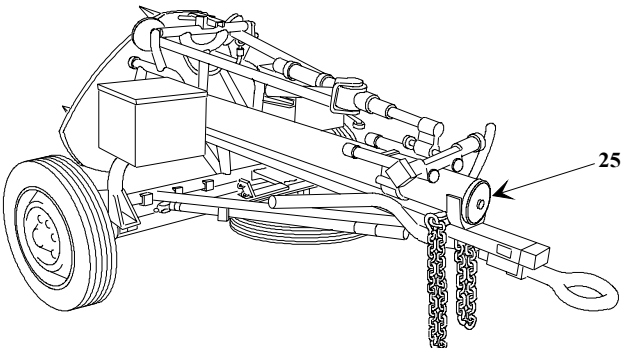
13 Attach hook on chain assembly (19) to eye on bipod leg (20).

14 Adjust elevation so that the bipod feet will fit under the trailer bridge assembly (21).



15 Close trailer bridge assembly (21) and secure with clamping catch (22).

16 Lock mortar baseplate (12) with lock release lever (23) and secure lever with locking pin assembly (24).



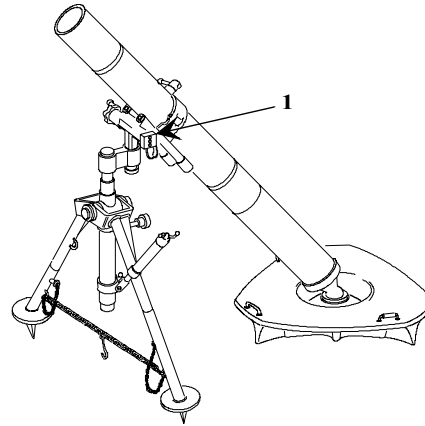
17 Install muzzle plug assembly (25).

TAKING MORTAR OUT OF ACTION (GROUND TO M1064 CARRIER).

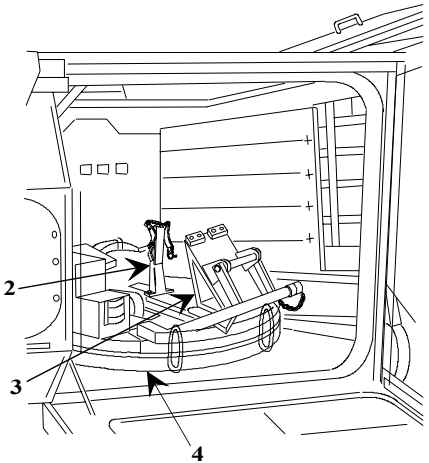
1 Remove the M67 sight unit and stow it in its case.

2 Replace the dovetail slot cover (1).

3 Retrieve M14 aiming posts and M58 and M59 aiming post lights and stow them in case.



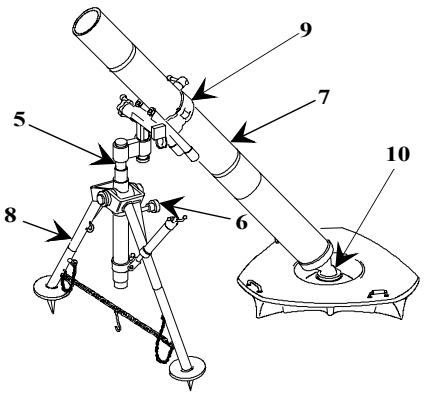
4 Make sure clamping support assembly (2) is open. Bipod support assembly (3) must be in lower position. Turntable (4) must be centered and locked.



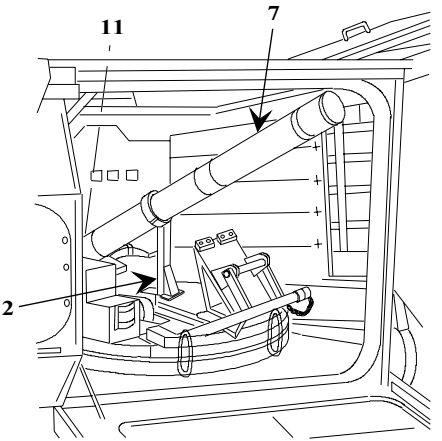
5 Lower elevation to expose 0.25 in. (0.64 cm) of inner elevating sleeve (5) using hand crank (6).

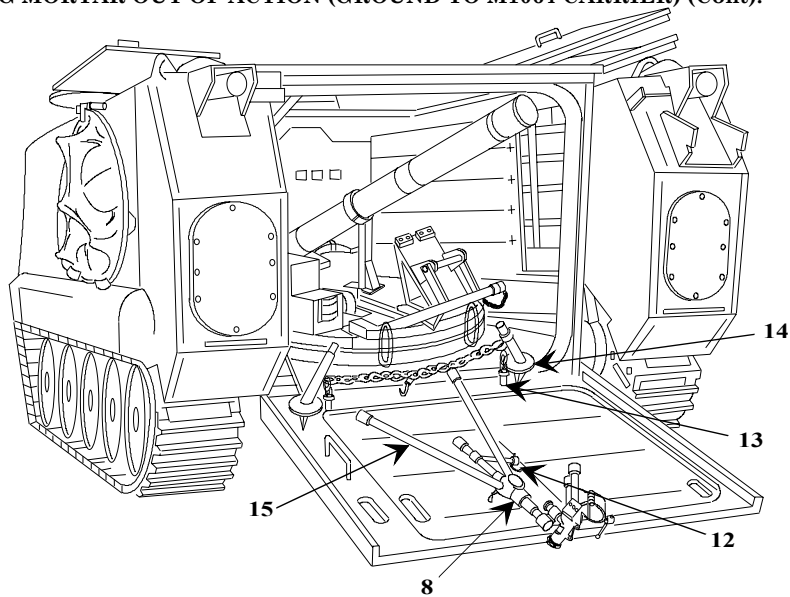
6 One crew member holds mortar barrel assembly (7) near muzzle and one crew member holds bipod assembly (8). Another crew member opens buffer housing assembly (9).

7 Two crew members turn mortar barrel assembly (7) until the white line is in down position and carefully remove mortar barrel assembly from breech cap socket (10). Carry mortar barrel assembly to M1064 carrier.



8 Carefully insert breech cap ball into socket (11). Raise mortar barrel assembly (7) and rotate it until the white line is in the up position. Lower mortar barrel assembly onto clamping support assembly (2).

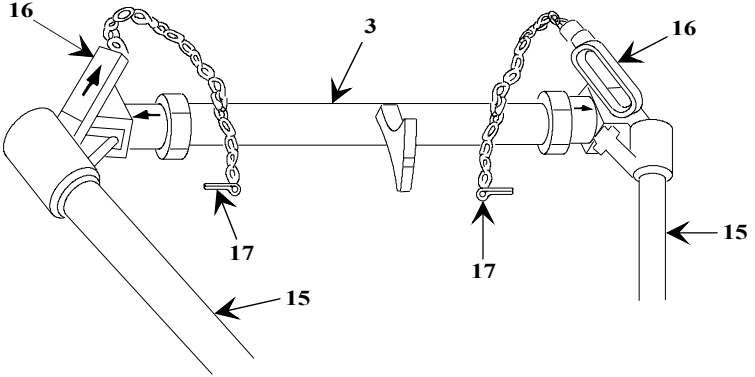



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9 One crew member takes bipod assembly (8) to M1064 carrier.

10 Rest bipod assembly (8) on carrier ramp with cross leveling mechanism (12) pointing toward gunner's position.

11 Remove pins (13) and leg extensions (14) from bipod legs (15) and stow them.



12 Remove handles (16) from bipod support assembly (3). The arrows must be facing each other.

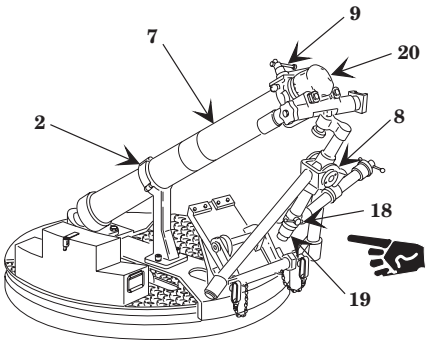
13 Slide bipod legs (15) onto attaching slot on bipod support assembly (3) with arrows on bipod support up.

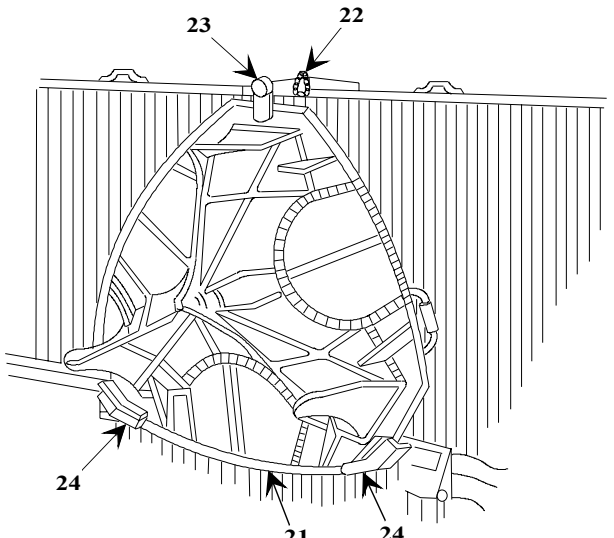
14 With arrows pointing toward one another, and holes matching, insert handles (16) through bipod legs (15) and bipod support assembly (3) slot. Turn handles to point arrows toward bipod legs. Attach pins (17).

15 Swing bipod assembly (8) up and clamp onto mortar barrel assembly (7) until the buffer housing assembly (9) clicks.

16 Loosen cross leveling locking knob (18). Center elevating mechanism (19). Tighten cross leveling locking knob.

17 Lock clamping support assembly (2) and install gun muzzle cover (20).




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18 Two crew members carry mortar baseplate (21) to the M1064 carrier.

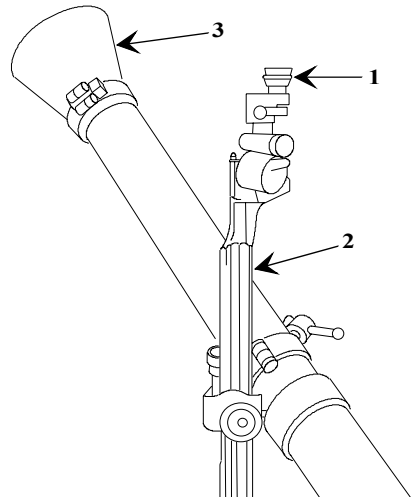
19 Make sure pin (22) is removed and handle (23) is up.

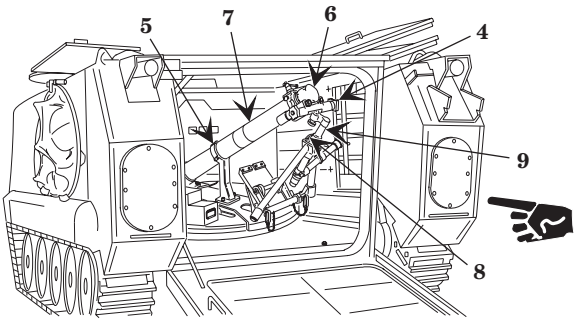
20 Two crew members lift mortar baseplate (21) with the spades away from the M1064 carrier and place the two corners without handles inside the rims of the lower brackets (24).

21 Tilt mortar baseplate (21) toward M1064 carrier and pull handle (23) down and lock with pin (22).

TAKING MORTAR OUT OF ACTION ON THE M1064 CARRIER.

1 Remove and stow M67 sight unit (1), sight extension (2), and BAD (3). Stow M67 sight unit in its case.





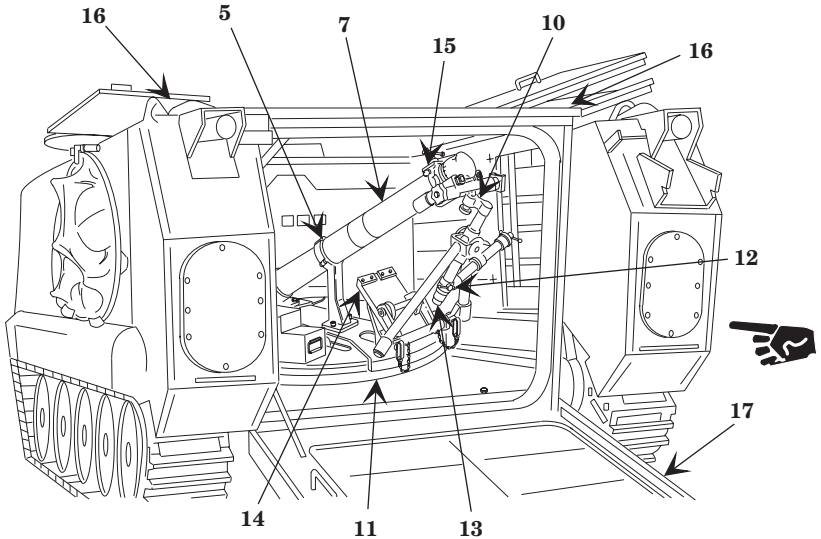
2 Put on dovetail slot cover (4).

3 Retrieve and stow M14 aiming posts and M58 and M59 aiming post lights in case.

4 Open the clamping support assembly (5).

5 Put gun muzzle cover (6) onto the muzzle end of mortar barrel assembly (7).

6 Lower the mortar barrel assembly (7), using the elevating hand crank (8), until 0.25 in. (0.64 cm) of the inner elevating sleeve (9) is exposed.


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7 Center the traversing extension assembly (10) and the turntable (11).

8 Loosen cross leveling locking knob (12). Center elevating mechanism (13). Tighten cross leveling locking knob.

9 Unlock the bipod support assembly (14) and two crew members lower the mortar to the low position on the bipod support assembly.

10 Gunner straddles mortar barrel assembly (7), loosens the clamp handle assembly (15) one to two turns, and slides buffer housing assembly toward muzzle until barrel rests on the clamping support assembly (5). Lock clamping support assembly. Retighten clamp handle assembly until it clicks.

CAUTION

- **Ensure the mortar has clearance for the ramp and cargo hatches to close.**
- **Ensure the mortar barrel assembly is clamped in the clamping support assembly anytime the carrier is moved from position.**

11 Close cargo hatches (16) and ramp (17).

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

COLD.

WARNING

When air is still and temperatures are below 15 °F (-9 °C), firing may cause fumes (yellow cloud) to linger around the M121 weapon area. If this occurs, use expedient means (i.e., waving poncho or field jacket) to dissipate fumes. If fumes are inhaled, coughing, nausea, and/or mild stomach cramps may occur.

Keep ammunition covered and M67 sight unit and M45A1 boresight in protective carrying cases when situations permit. Do not move fire control instruments directly from cold to warm areas.

Use arctic lubricant in continuous subzero environments.

Refer to FM 9-207, FM 31-70, and FM 31-71 for operation in cold climates.

HOT.

Lubricate mortar barrel assembly, bipod assembly, and mortar baseplate frequently with general purpose lubricating oil (GPL) (item 9, app D), paying particular attention to all hidden surfaces, such as bore, firing pin, and similar places where corrosion might occur. Clean, wipe dry, and restore oil film after handling. Keep equipment and ammunition covered when situations permit.

HOT AND DRY.

Clean and oil the bore of barrel more frequently than usual. Keep equipment covered when situations permit.

HOT, DAMP, AND SALTY ATMOSPHERE.

1 When mortar is being fired, clean and lubricate the bore and exposed metal surface more frequently than required for normal service and keep covers in place as often as firing conditions permit.

2 When mortar is not being used, cover unpainted surfaces with a film of GPL (item 9, app D) and keep all covers in place.

3 Minimize exposure of fire control instruments to water and high humidity.

SAND.

1 Clean and lubricate mortar frequently.

2 Before beginning an action in sandy areas, remove lubricant from machined surfaces of mortar barrel assembly and other exposed lubricated parts.

3 Clean and lubricate all exposed parts after action is over.

MUD.

Firing on very soft ground will require ground preparation (e.g., sandbags).

FROZEN GROUND.

1 Use sandbags (item 2, app C) to settle mortar baseplate.

2 Use tripods to support the M14 aiming posts.

3 Refer to FM 31-70, FM 31-71, and FM 9-207 for operation on frozen ground.

FORDING.

1 Disassemble weapon into major components and cover the components carefully to protect from water splashes.

2 Watch carefully for water seepage into all parts. This could contaminate the lubricant.

3 If immersion occurs, notify unit maintenance to schedule disassembly and lubrication of weapon and fire control instruments by support maintenance.

NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DECONTAMINATION PROCEDURES.

The following items must be discarded if contaminated by a chemical agent.

NOMENCLATURE	NSN
Bag, Tools & Spare	8105-01-286-6307
Bag, Tools & Roll	8105-01-320-0962
Cable, Special Purpose (Trailer)	6150-01-310-9376
Cover, Fire Control	1240-01-043-7502
Cover, Sight Unit Adapter	1015-01-285-0141
Cover, Trailer (Trailer)	1015-01-327-6125
Gun, Grease	4930-01-030-0304
Hammer, Hand	5120-00-061-8546
Oiler, Hand	4930-00-537-8977
Screwdriver, Crosstip	5120-00-820-2995
Screwdriver, Flat Tip	5120-00-010-7914

Refer to FM 3-4, FM 3-5, and FM 7-90 for decontamination procedures.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

Clean parts with dry cleaning solvent (item 6, app D). Dry before lubricating. Apply lubricants sparingly. Too much oil or grease will damage equipment. Instructions contained herein are mandatory.

WARNING

Before firing, wipe dry the cross leveling mechanism's clamping surface on elevating mechanism housing, the clamping surfaces of buffer mechanism, and the exterior surface of the barrel with a clean cloth. DO NOT LUBRICATE.

CAUTION

See Section IV of Chapter 2, Operation Under Unusual Conditions, for additional lubrication instructions.

NOTE

- **General purpose lubricating oil (GPL) (item 9, app D) is the prime lubricant. Weapons lubricating oil (LAW) (item 10, app D) may be used for continuous sub-zero environments.**

- **Rifle bore cleaning compound (RBC) (item 4, app D) is used on the bore.**

- **Aircraft grease (GA) (item 7, app D) is the grease that is used.**

1 Immediately after firing, and for two consecutive days thereafter, clean the barrel bore with RBC (item 4, app D). After the third cleaning, wipe dry and lightly coat with GPL (item 9, app D). Clean weekly with RBC, wipe dry, and lubricate with GPL.

2 Lubricate all visible unpainted surfaces and parts with a light coat of GPL (item 9, app D).

3 Move the traversing gear assembly through its full range of movement and lubricate unpainted surface with a light coat of GPL (item 9, app D).

4 Fully extend the elevating mechanism and lubricate the unpainted surface with a light coat of GPL (item 9, app D).

5 Fully extend the cross leveling mechanism and lubricate the unpainted surface with a light coat of GPL (item 9, app D).

6 M190/M191 mortar mount must be sent to direct support maintenance for complete service and lubrication semiannually.

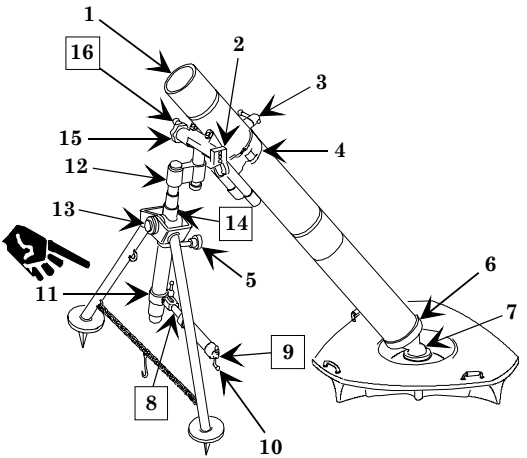
7 The cartridge extractor assembly must be sent to unit maintenance for complete inspection, lubrication, and service semiannually.

LUBRICATING POINTS.

RBC in bore only

GPL, unless otherwise marked

☐ GA



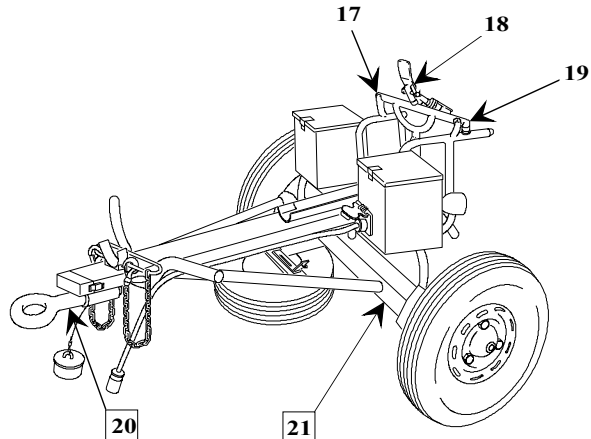
(D - Daily, W - Weekly)

1 Barrel bore (RBC after firing and for two days)
2 Sight dovetail slot (D)
3 Clamp handle assembly (D)
4 Buffer housing assembly (D)
5 Elevating hand crank (W)
6 Firing pin (W)
7 Breech cap threads and mortar baseplate socket (W)
8 Cross leveling eye bracket (D)
9 Cross leveling hand crank (W)
10 Cross leveling screw (W)
11 Cross leveling loop clamp (D)
12 Traversing extension assembly (W)
13 Bipod hinges (W)
14 Elevating screw (W)
15 Traversing hand crank (W)
16 Traversing screw (W)

LUBRICATING POINTS (Cont).

GPL, unless otherwise marked

☐ GA



(W - Weekly, M - Monthly)

17 Trailer bridge assembly hinge (W)
18 Lock release lever (W)
19 Trailer bridge assembly buckle (W)
20 Towing eye (M)
21 Torsion bar shaft (M)

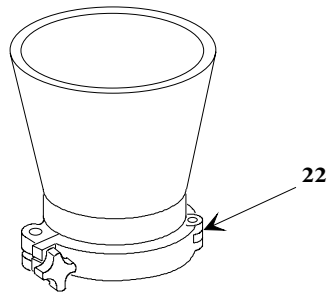
LUBRICATING POINTS (Cont).

(D - Daily, W - Weekly)

GPL, unless otherwise marked

☐ GA

22 Hinge (W)

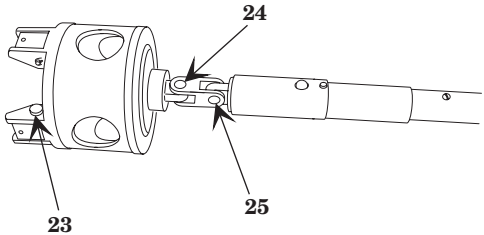


(D - Daily, W - Weekly)

GPL, unless otherwise marked

☐ GA

23 Catch pins (4) (W)
24 Hinge pin (W)
25 Hinge pin (W)



PIN: 071071-003

Section II. TROUBLESHOOTING PROCEDURES

(1) The table lists common malfunctions which you may find during the operation or maintenance of the 120mm mortar or its components. You should perform the tests/inspections and corrective actions in the order listed.

(2) This table cannot list all malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

MALFUNCTION INDEX

MALFUNCTION	PAGE
Failure to fire	3-11
Firing pin is difficult to remove or seat	3-12
Buffer mechanism binds or won't return	3-13
Buffer housing assembly won't close properly	3-13
Difficulty in traversing	3-14
Difficulty in positioning traversing extension assembly	3-14
Binding in cross leveling mechanism	3-15
Difficulty in elevating or depressing	3-15
M67 sight unit controls do not operate	3-16
No or low illumination in M58 and M59 aiming post lights and M67 sight unit	3-17
M67 sight unit won't attach and lock to bipod assembly	3-18
Poor visibility in M67 sight unit lens	3-19

Table 3-1. Troubleshooting Table

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. FAILURE TO FIRE.

WARNING

Follow misfire procedures in chapter 2 to remove cartridge before doing troubleshooting.

Step 1. Check for dirty bore or foreign matter in base of barrel.

Clean barrel.

Step 2. Check for proper firing pin protrusion.

Replace firing pin if defective.

Step 3. Check for defective ammunition.

Follow unit Standard Operating Procedures (SOP).

Table 3-1. Troubleshooting Table (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
2. FIRING PIN IS DIFFICULT TO REMOVE OR SEAT.
Step 1. Check for dirt or grit.
Remove and clean firing pin (p 3-25). Inspect threads. Lubricate and check function.
Step 2. Firing pin still won't seat.
Notify next higher level of maintenance.

Table 3-1. Troubleshooting Table (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. BUFFER MECHANISM BINDS OR WON'T RETURN.

Step 1. Extend buffer mechanism cylinders and check for dirt or grit.

Clean thoroughly.

Step 2. Check for damage (bent internal wrenching bolt, etc.) or excess grease.

Notify unit maintenance.

4. BUFFER HOUSING ASSEMBLY WON'T CLOSE PROPERLY.

Step 1. Check for dirt or grit.

Clean thoroughly. Lightly oil threads.

Step 2. Check for stripped threads or damaged barrel collar.

Notify unit maintenance.

Table 3-1. Troubleshooting Table (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
5. DIFFICULTY IN TRAVERSING.
Step 1. Check for dirt or grit.
Clean thoroughly.
Step 2. Check for damage (dents,etc.) to traversing gear housing.
Notify unit maintenance.
6. DIFFICULTY IN POSITIONING TRAVERSING EXTENSION ASSEMBLY.
Check for dirt or grit.
Clean thoroughly and lubricate.

Table 3-1. Troubleshooting Table (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
7. BINDING IN CROSS LEVELING MECHANISM.
Check for dirt or grit.
Clean thoroughly and lubricate.
8. DIFFICULTY IN ELEVATING OR DEPRESSING.
Step 1. Check for dirt or grit.
Clean thoroughly.
Step 2. Check for damage (bent elevating sleeve, etc.).
Notify unit maintenance.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

9. M67 SIGHT UNIT CONTROLS DO NOT OPERATE.

Step 1. Check for dirt and grit.

Clean thoroughly with clean wiping rag (item 12, app D).

Step 2. Check for damage.

Notify unit maintenance.

Table 3-1. Troubleshooting Table (Cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

10. NO OR LOW ILLUMINATION IN M58 AND M59 AIMING POST LIGHTS AND M67 SIGHT UNIT.

WARNING



TRITIUM (H_3)

Radioactive material is used in the M58 and M59 aiming post lights and M67 sight unit. Radiation leakage may occur if M58 and M59 aiming post lights or M67 sight unit are broken or damaged. If exposed to a broken or damaged M58 or M59 aiming post light or M67 sight unit, see medical personnel.

Check for broken or cracked lenses or improper illumination of tritium-lit sources.

Notify RPO.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

11. M67 SIGHT UNIT WON'T ATTACH AND LOCK TO BIPOD ASSEMBLY.

Step 1. Check dovetail slot for nicks and burrs.

Notify unit maintenance.

Step 2. Check dovetail slot for dirt.

Remove dirt. Be careful not to scratch or nick metal surfaces.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

12. POOR VISIBILITY IN M67 SIGHT UNIT LENS.

Step 1. Check lens for cracks or breaks.

Notify unit maintenance.

Step 2. Check lens for moisture.

Place M67 sight unit in a warm area to see if moisture clears. Don't apply heat directly to sight lens.

Section III. MAINTENANCE PROCEDURES

MORTAR BARREL ASSEMBLY CLEANING.

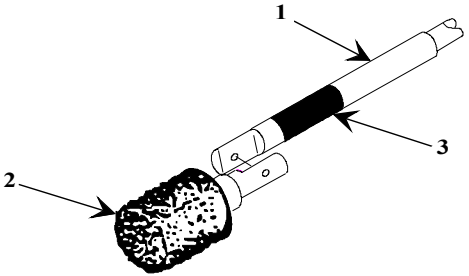
CAUTION

Use crocus cloth (item 5, app D) for minor deburring and to remove minor corrosion from unpainted surfaces. Do not use on sealing surfaces between breech cap and barrel.

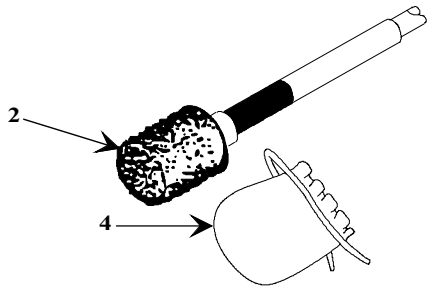
NOTE

- **Cleaning the barrel bore is accomplished with the use of a cleaning rod and brush. A bore cleaning sleeve (item 13, app D) wrapped around the bristle surface is employed to fine clean and lubricate.**

- **If required, stiff bristle bore brush (item 6, sec III, app B) is provided for the removal of residue buildup, prior to cleaning.**



1 Extend cleaning rod (1) until fully deployed and attach cleaning brush (2) by pulling back locking sleeve (3), mating brush with rod, and releasing locking sleeve.



2 Apply RBC (item 4, app D) to cleaning brush (2) (item 5, sec III, app B) for initial cleaning, then follow with bore cleaning sleeve (4) (item 13, app D) saturated with same cleaning compound. Insert cleaning brush in barrel and thoroughly scrub all surfaces with push-pull action for the entire length of barrel. Ensure that firing pin (raised in fire position) is thoroughly cleaned during the process (cleaning brush is tipped with center brush which provides rotary cleaning surface). Ensure that all RBC which has settled around the firing pin is removed.

3 Place a new bore cleaning sleeve (4) (item 13, app D) on cleaning brush (2). Dry swab bore thoroughly. Inspect bore for cleanliness.

WARNING

- **Firing a round with cleaning fluid, rain water, or excess oil left in barrel results in discharge of heavy black smoke, and will result in the projectile falling short of its expected range, or could cause misfire.**

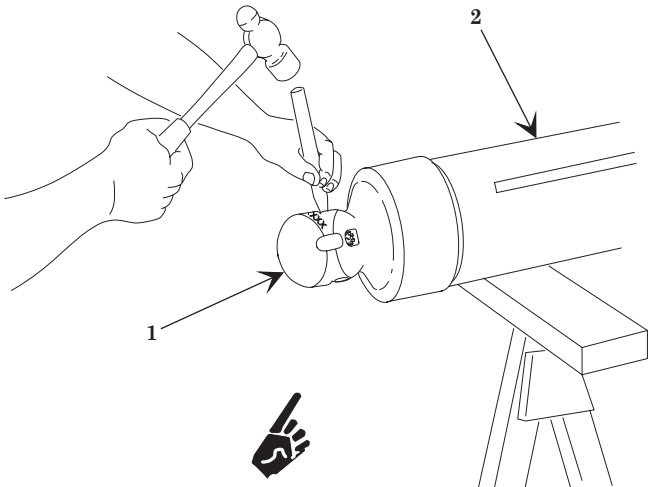
- **Use caution while cleaning the barrel bore in the carrier when it requires standing on top of the carrier.**

NOTE

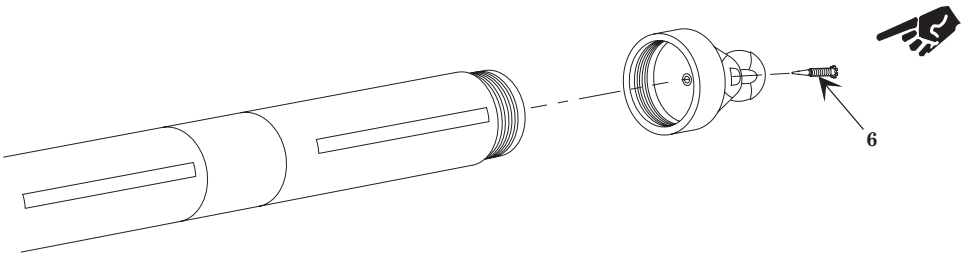
Immediately after firing and for the next two days, thoroughly clean with RBC (item 4, app D), making sure that all surfaces are well coated. Do not wipe dry. On third day after firing, clean with RBC, wipe dry, and lightly coat with GPL (item 9, app D). Clean weekly with RBC. Wipe dry and lubricate with GPL when weapon is not being fired.

4 Dry swab cleaning of the cannon bore is required after every fire mission or every 10 rounds fired (approximately).

BREECH ASSEMBLY REPAIR.

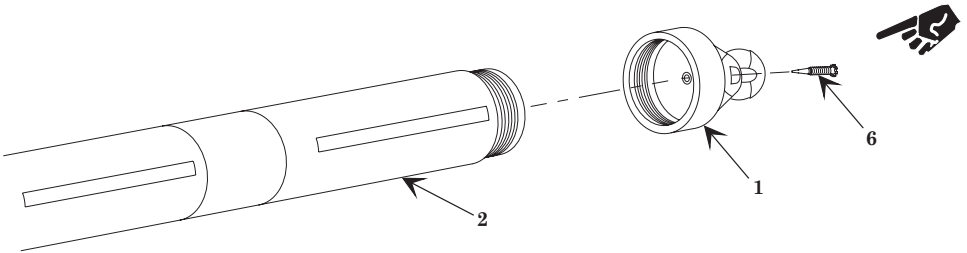


1 Insert breech cap removal tool (item 4, sec III, app B) into cross bore of breech cap (1). Tap the end of tool with hand hammer (item 19, sec III, app B) counterclockwise and unscrew the breech assembly from barrel (2).



2 Deleted.

3 Using firing pin wrench (item 33, sec III, app B), remove the firing pin (6).



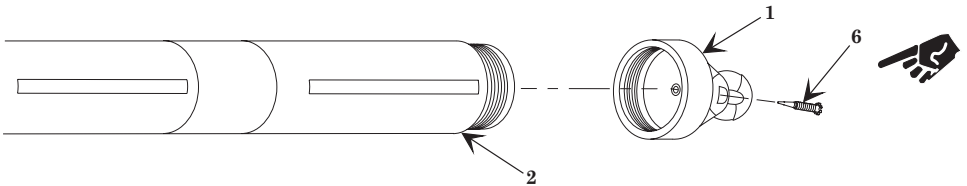
4 Clean parts using dry cleaning solvent (item 6, app D).

5 Inspect firing pin (6). Replace as necessary.

6 Carefully inspect the sealing surfaces on the barrel (2) and the breech cap (1) for nicks, scratches, gouges, or evidence of leakage. Inspect threads. Return matched barrel and breech cap to unit maintenance if defects are found.

7 Install firing pin (6) until properly seated.

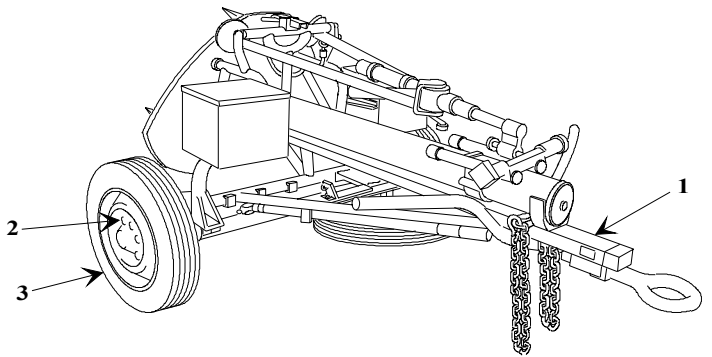
8 Use firing pin gage (item 17, sec III, app B) to check firing pin protrusion. Protrusion gage is a go/no go gage. Firing pin must protrude above MIN and pass below MAX cut outs. Replace firing pin if defective.



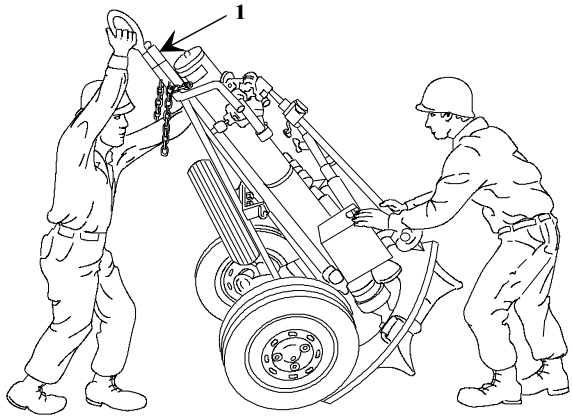
9 Deleted.

10 Apply a light coat of GA (item 7, app D) to breech cap threads and install breech cap (1) on barrel (2). Tighten by using breech cap removal tool in breech cap cross bore. White stripe on barrel must line up with firing pin (6).

PNEUMATIC TIRE REPAIR.



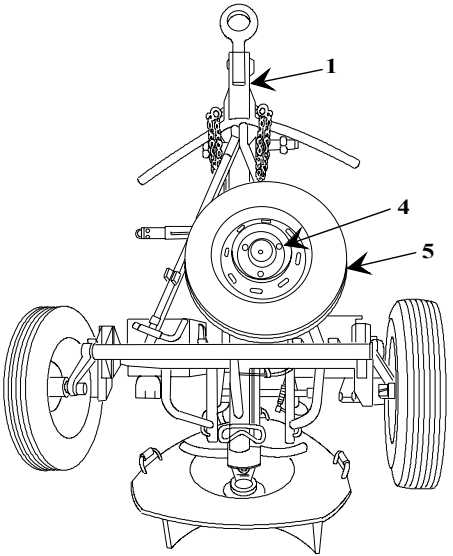
1 With trailer (1) in normal position, loosen three nuts (2) holding defective tire (3) on trailer.



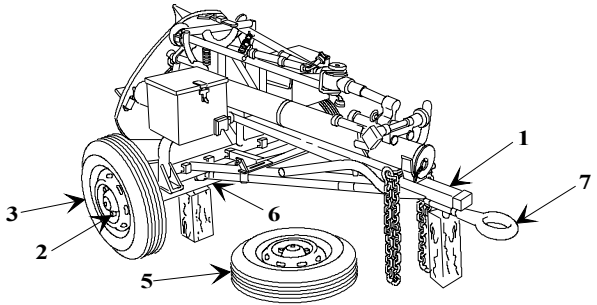
WARNING

When the trailer is raised, it can tip and fall on people, causing injury. One repair person must steady the trailer by holding the towing eye or trailer frame whenever it is raised.

2 Using two personnel, raise the trailer (1) until both tires leave the ground.



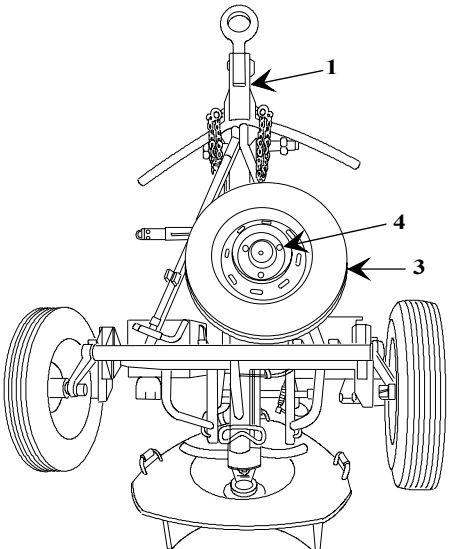
3 Remove three nuts (4) holding spare tire (5) to trailer (1). Remove spare tire from trailer and set aside for later use.



4 Using a third person, place a block or stand under the torsion bar shaft (6) near the hub and under the towing eye (7). Lower the trailer (1) onto blocks or stand until trailer is secure and steady.

5 Remove three nuts (2) holding the defective tire (3) to the hub. Remove the defective tire.

6 Place spare tire (5) onto the hub. Replace and hand-tighten three nuts (2). Remove blocks and allow tires to again settle on ground. Snug up nuts using wheel nut wrench.



7 Tip trailer (1) to upright position and store defective tire (3) to trailer using three nuts (4). Turn in defective tire for repair or replacement as soon as possible.

CHAPTER 4
AMMUNITION

Section I. AUTHORIZED CARTRIDGES

The following cartridges are authorized to be fired from the M120 towed 120mm mortar and the M121 carrier-mounted 120mm mortar.

120mm Cartridge: XM929 Smoke
120mm Cartridge: M929 Smoke
120mm Cartridge: M931 Full Range Practice
120mm Cartridge: XM930 Illum
120mm Cartridge: M933 HE
120mm Cartridge: M934 HE
120mm Cartridge: M934A1 HE
120mm Cartridge: M983 IR Illum

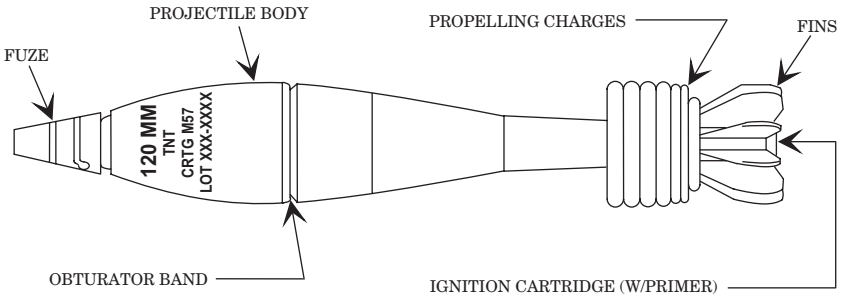
WARNING

Firing the M57, M68, or M91 120mm cartridges from the M121 carrier-mounted mortar may cause bodily injury and hearing loss. These cartridges are not authorized to be fired from the carrier.

The following cartridges are authorized to be fired from a ground-mounted 120mm mortar ONLY:

120mm Cartridge: M57 HE
120mm Cartridge: M68 Smoke
120mm Cartridge: M91 Illum

M57 HE CARTRIDGE.



Type/Use: High explosive fragmentation and blast

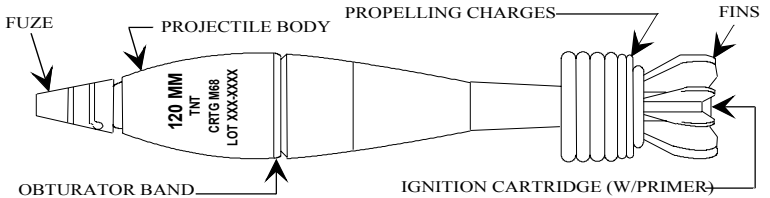
Identification: Olive drab with yellow markings

Components: M935 point detonating (PD) fuze

Maximum Range: 6300 meters at Charge 8/7200 meters at Charge 10

Remarks: Used against personnel (in open or in bunkers), light vehicles, and light bunkers; weight to 29.00 lb (13.18 kg).

M68 SMOKE CARTRIDGE.



Classification: Smoke, WP

Identification: Light green with red markings

Components: M935 PD fuze

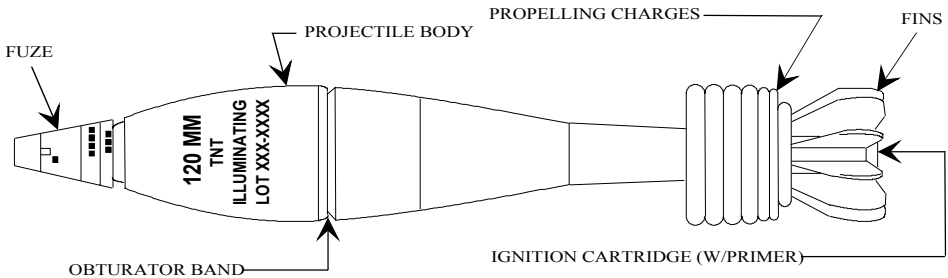
Maximum Range: 6300 meters at Charge 8/7200 meters at Charge 10

Remarks: Used for screening and spotting

WARNING

At temperatures exceeding 111.4 °F (44.1 °C) (melting point of WP), store and transport WP rounds in a vertical position (nose up) to prevent voids in the WP.

M91 ILLUM CARTRIDGE.



Type/Use: Illumination

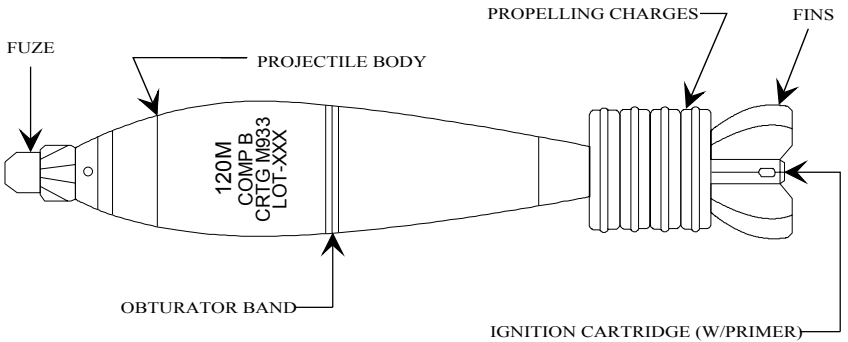
Identification: White with black markings

Components: M776 (DM93) mechanical time super quick (MTSQ) fuze

Maximum Range: 6200 meters at Charge 8/7100 meters at Charge 10

Remarks: Contains candle and parachute used for illumination (weight to 29.00 lb (13.18 kg)); burn time 45-60 sec; candle power 1,000,000.

M933 HE CARTRIDGE.



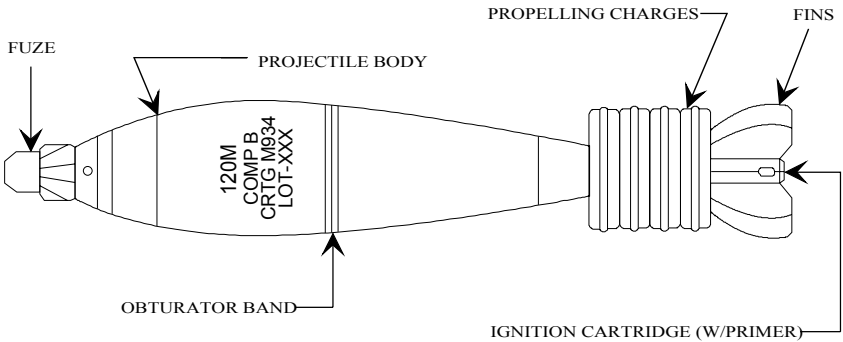
Type/Use: High explosive fragmentation and blast

Identification: Olive drab with yellow markings

Components: M745 PD fuze; M230 propelling charge

Maximum Range: 7200 meters at Charge 4

M934 HE CARTRIDGE.



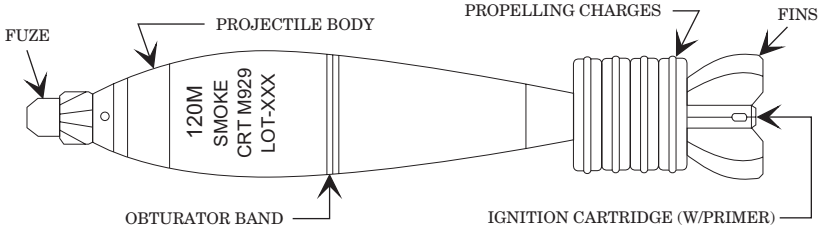
Type/Use: High explosive fragmentation and blast

Identification: Olive drab with yellow markings

Components: M734 multi-option fuze; M230 propelling charge

Maximum Range: 7200 meters at Charge 4

XM929 AND M929 SMOKE CARTRIDGES.



Type/Use: Smoke (white phosphorus)/screening and spotting

Identification: Light green with light red markings

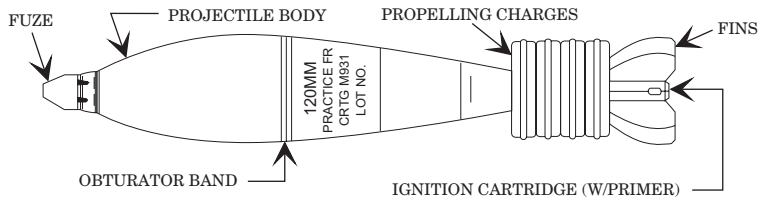
Components: M745 PD fuze (XM929) or M734A1 multi-option fuze (M929); M230 propelling charge

Maximum Range: 7200 meters at Charge 4

WARNING

At temperatures exceeding 111.4 °F (44.1 °C) (melting point of WP), store and transport WP rounds in a vertical position (nose up) to prevent voids in the WP.

M931 FULL RANGE PRACTICE CARTRIDGE



Type/Use: Target practice/Training

Identification: Blue with white markings

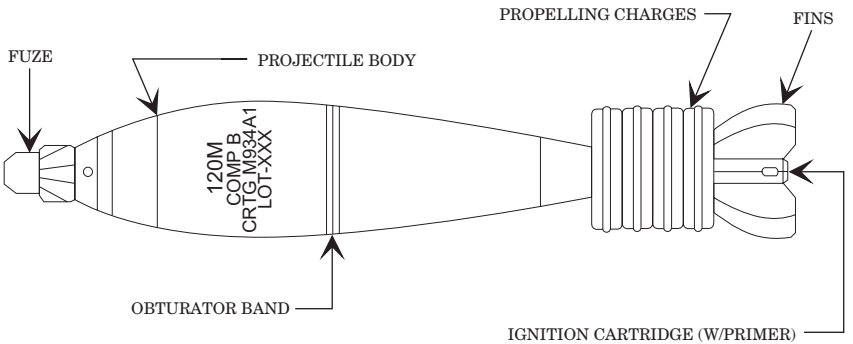
Components: M781 PD fuze; M233 propelling charge

Maximum Range: 7200 meters at Charge 4

Remarks: Fuze produces a flash, audible sound, and cloud of smoke upon functioning

Limitations: Do not fire Charges 3 and 4 at elevations higher than 1215 mils. Do not fire cartridge above 110 ºF (43.3 ºC) or below 0 ºF (-17.8 ºC).

M934A1 HE CARTRIDGE.



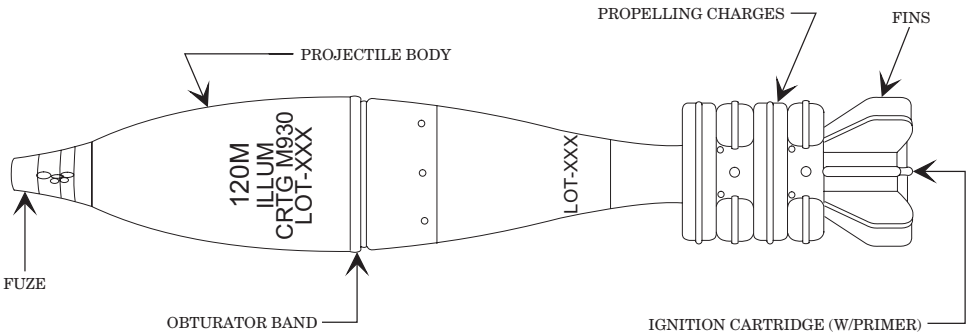
Type/Use: High explosive fragmentation and blast

Identification: Olive drab with yellow markings

Components: M734A1 multi-option fuze; M234 propelling charge

Maximum Range: 7200 meters at Charge 4

XM930 ILLUM CARTRIDGE.



Type/Use: Illumination

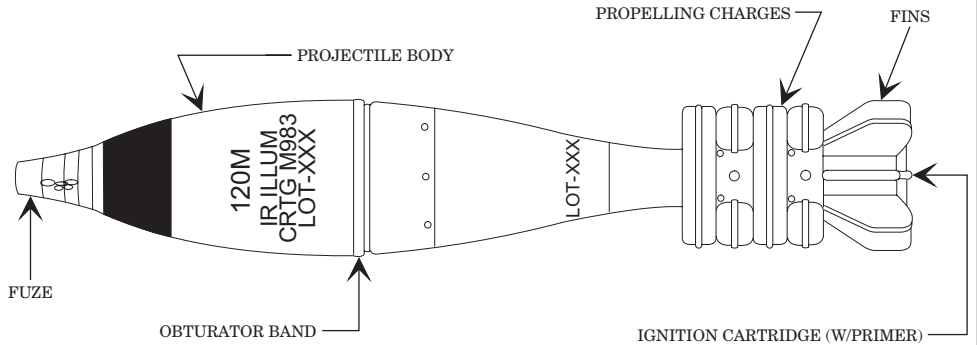
Identification: White with black markings

Components: M776 (DM93) MTSQ fuze; M234 propelling charge

Maximum Range: 6800 meters at Charge 4

Remarks: Burn time 50 - 60 seconds; 1 million candlepower

M983 IR ILLUM CARTRIDGE.



Type/Use: Covert illumination

Identification: White with black markings and orange band

Components: M776 (DM93) MTSQ fuze; M234 propelling charge

M983 IR ILLUM CARTRIDGE (Cont).

Maximum Range: 6800 meters at Charge 4

Remarks: Candle provides infrared illumination, and is intended for use with night vision devices; burn time 50 - 60 seconds

Section II. PREPARATION FOR FIRING

1 Unpack cartridge.

a Remove protective bag and desiccant bags (if any) secured to or covering fin assembly.

NOTE

Examine fin assembly for visible damage or looseness. Examine fuzes and propelling charges for visible damage. Tighten loose fin assemblies (by hand) before firing. Cartridges with damaged (bent) fin assemblies, fuzes, or propelling charges will be turned in to the Ammunition Supply Point (ASP) as unserviceable.

b Remove plastic shell/insert assembly (if any) covering propelling charge.

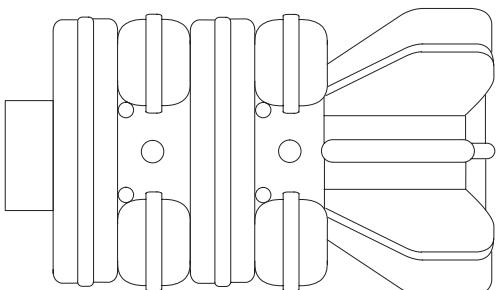
WARNING

M781 fuze may be armed if packing clip is missing or red band on striker is protruding from nose cap. Force applied to the nose of an armed fuze can result in ignition of propelling charge. Do not attempt to fire a cartridge with an armed fuze. Remove cartridge to dud pit without striking nose of fuze.

2 Set fuze for required time or desired type of burst (see Section VII on p 4-16).

NOTE

For all cartridges with horseshoe-shaped propellant charge increments, ensure that the propellant charges are positioned so that the open ends of the increments alternate position, as shown here.



3 Adjust propelling charge for desired range (see Section XI on p 4-23).

4 Remove/pull safety wires/packing clip (just prior to loading and firing cartridge).

Section III. LOADING AND FIRING
(SEE CHAPTER 2)

WARNING

- **Always check mask and overhead clearing before firing.**
- **PD and proximity fuzes may prematurely function when fired through extremely heavy rainfall.**
- **Do not fire ammunition in temperatures above +145 °F (+63 °C) or below -28 °F (-33 °C).**
- **Short rounds and misfires may occur if an excessive amount of oil or water is in barrel during firing.**

CAUTION

- **Before loading cartridge, ensure that barrel and cartridge are free of sand, mud, moisture, snow, wax, or other foreign matter.**
- **Ensure that all packing materials (packing stops, supports, and plastic bags) were removed from cartridge.**
- **Any glue or other foreign substance adhering to the cartridge, particularly at or near the obturator band, must be removed. If the substance cannot be removed, the cartridge shall not be fired.**

1 Check to ensure that cartridge has proper amount of charge.

2 Remove safety wire/clip (if any) before firing.

3 Refer to page 2-97 for loading and firing instructions.

1 Replace safety wire/clip if removed from fuze.

NOTE

If safety pins cannot be fully re-inserted into fuze, notify Explosive Ordnance Disposal (EOD).

2 Reset fuze (see Section VIII on p 4-20).

3 Re-install propellant increments so that cartridge has a full charge in proper order.

NOTE

- **M57, M68, and M91 cartridges should have seven propellant increments. The proper order is one brown, two blue, and four white.**
- **Do not mix propelling charge models or lots. Use original increments.**

4 Install packing stop. Repack cartridge.

Section V. CARE AND HANDLING OF CARTRIDGES

1 Do not throw or drop live ammunition.

2 Do not break moisture resistant seal of ammunition containers until cartridges are to be fired.

3 Protect cartridges when removed from ammo container. Protect ammunition from rain and snow. Do not remove plastic shell/insert assembly around propelling charge until propelling charge is to be adjusted. If protective bags were packed with cartridge, cover fin assembly and propelling charge to prevent moisture contamination. Stack cartridges on top of empty ammo boxes or 4 to 6 in. (10 to 15 cm) of dunnage. Cover cartridges with plastic sheets provided.

4 Do not expose cartridges to direct sunlight, extreme temperatures, flame, or other sources of heat.

5 Cartridges shall be shielded from small arms fire.

6 Store WP-loaded cartridges at temperatures below 111.4 °F (44.1 °C) to prevent melting of WP filler. If this is not possible, WP-loaded cartridges must be stored fuze-end up so that WP will resolidify with void space in nose end of cartridge (when temperature returns below 111.4 °F (44.1 °C)). Failure to observe this precaution could result in rounds with erratic flight.

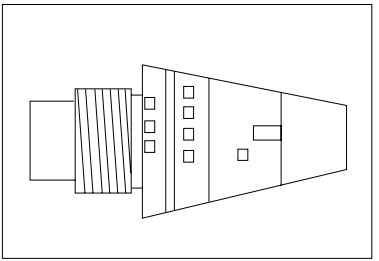
7 Store WP-loaded ammunition separate from other types of ammunition.

8 Notify EOD of leaking WP cartridges. Avoid contact with any leakers.

9 Protect primer of cartridge during handling.

10 Other than when performing misfire procedures, do not handle duds.

M776 MTSQ FUZE

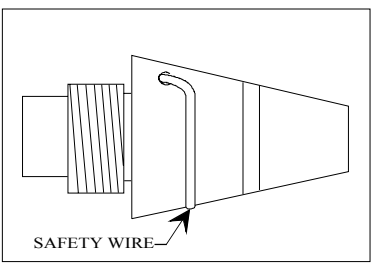


Functions: Airburst/Impact

Settings: 6 to 52 seconds

Remarks: Fuze has a mechanical arming/timing device, expulsion charge, and safety wire/pin.

M935 PD FUZE



Functions: Impact

Settings: Superquick or 0.05 second delay action

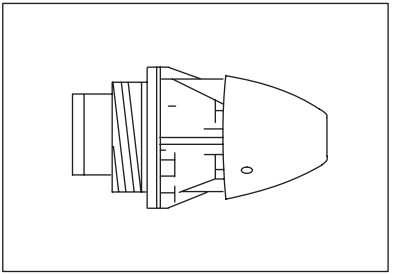
Remarks: Fuze has a safety wire.

M734 MULTI-OPTION FUZE

Functions: Proximity/Impact

Settings: PRX, NSB, IMP, or DLY

Remarks: Fuze is handsettable.

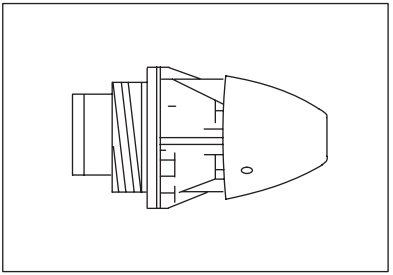


M745 PD FUZE

Functions: Impact

Settings: None

Remarks: Fuze functions on impact with superquick action only. The markings (PRX, NSB, IMP, and DLY) are dummy settings. Rotation of the fuze head does not alter the function mode.

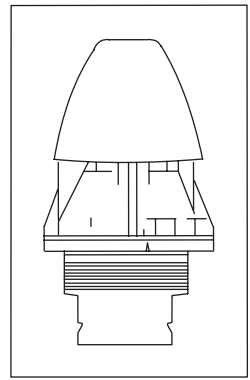


M734A1 FUZE

Functions: Proximity/Impact

Settings: 60/81 PRX, 120 PRX, IMP, or DLY

Remarks: Fuze is handsettable. 60/81 PRX setting is not for use on 120mm mortar cartridges, but is for use on 60mm and 81mm mortar cartridges only.

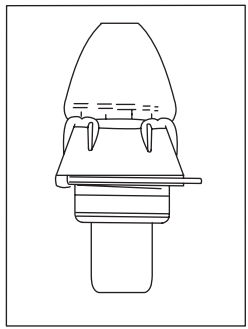


M781 FUZE

Functions: Impact

Settings: Dummy Multi-option
PRX, NSB, IMP, or DLY

Remarks: Fuze has a smoke cartridge and a safety/packing clip. If red band on striker is protruding from nose cap, fuze is in the armed position.



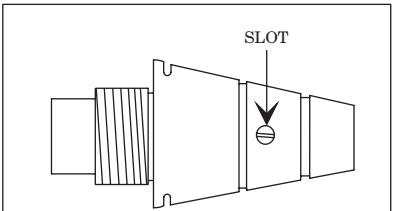
M935 PD FUZE

1 Superquick setting

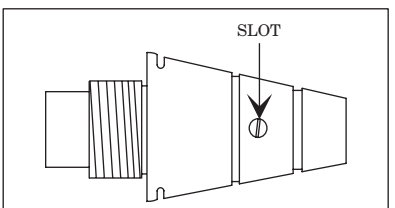
a These fuzes are shipped preset to function superquick on impact.
b Verify setting prior to firing. Selector slot should be aligned with SQ-mark.

2 Delay setting

a Turn selector slot in clockwise direction until slot is aligned with D-mark.
b Use coin or flat tip screwdriver to change settings.

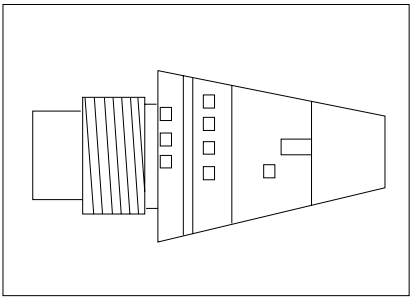


SUPERQUICK SETTING



DELAY SETTING

M776 (DM93) MTSQ FUZE



1 Rotate head of fuze to the left (counterclockwise direction) until the inverted triangle/index line is aligned with the correct line and number of seconds of the time scale.

2 Use fuze setter to rotate head of fuze.

NOTE

Once the desired setting has been passed, continue counterclockwise to reach the desired setting. Care should be taken to index desired setting in as few rotations as possible.

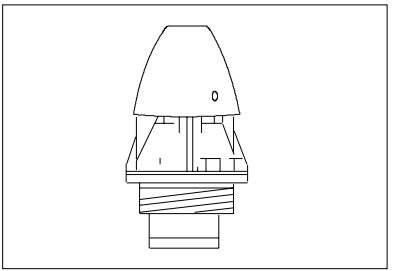
3 See firing table for correct time setting.

4 Remove fuze safety pin/wire prior to firing.

M745 PD FUZE

1 No setting is required.

2 Fuze functions on impact with superquick action only. Disregard the markings (PRX, NSB, IMP, and DLY) on the fuze head.

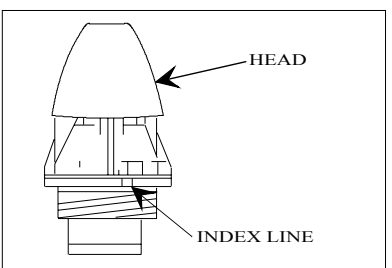


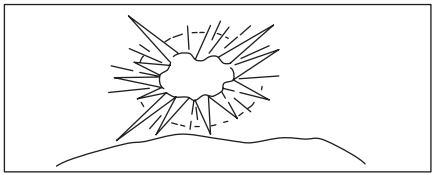
M734 MULTI-OPTION FUZE

1 Fuzes can be set by hand.

2 Set fuze by rotating fuze head (in clockwise direction) until correct marking (PRX, NSB, IMP, or DLY) is over index line.

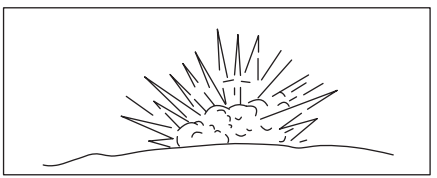
3 Next illustration depicts burst types.



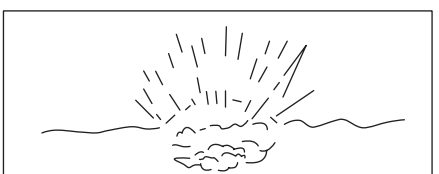


PRX - Proximity. The fuze comes set to PRX. Burst height is 3-13 ft (1-4 m).

NSB - Near Surface (nonjamming). Burst height is 0-3 ft (0-1 m).



IMP - Impact (SQ)



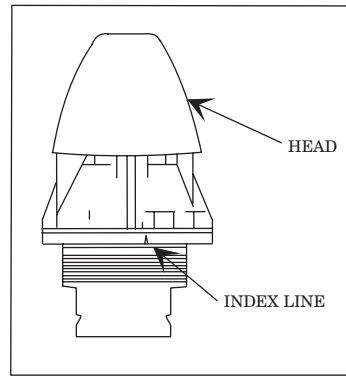
DLY - Delay (0.050 seconds)

M734A1 MULTI-OPTION FUZE

1 Fuzes can be set by hand.

2 Set fuze by rotating fuze head (in clockwise direction) until correct marking (120 PRX, IMP, DLY) is over index line.

3 Burst types are similar to the M734 multi-option fuze.

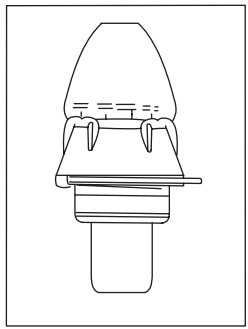


M781 PRACTICE FUZE

1 This fuze only functions superquick on impact.

2 Remove safety/packing clip from fuze just prior to firing.

3 This fuze has dummy multi-option PRX/NSB/IMP/DLY settings (for practice only).



Section VIII. RESETTING FUZES

M935 PD FUZE

Align selector slot with SQ-mark.

M776 MTSQ FUZE

1 Rotate head of fuze (counterclockwise) until safe line (S)/inverted triangle of the time scale is aligned with the index line of the fuze body.

2 Replace safety wires.

M734 MULTI-OPTION FUZE

Rotate fuze head (in counterclockwise direction) until PRX marking is over index line.

M734A1 MULTI-OPTION FUZE

Rotate fuze head (in counterclockwise direction) until 120 PRX-marking is over index line.

M745 PD FUZE

No resetting required.

M781 PRACTICE FUZE

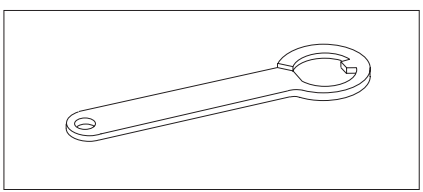
No resetting required.

Section IX. FUZE SETTER

FUZE SETTER

1 Sets DM93/M776 fuze.

2 Always turn wrench counterclockwise.



Section X. PROPELLING CHARGES

PROPELLING CHARGES

MODEL NUMBER	NUMBER OF INCREMENTS	TYPE OF CONTAINER	TYPE OF PROPELLANT
N/A (Used on M57, M68, and M91 cartridges)	1 brown 2 blue 4 white	Cloth bags (donut shaped)	M8M sheets (manufactured by Israel Military Ind.)
M230	4	Nitrocellulose/fiber containers (horseshoe shaped)	M45
M233	4	Nitrocellulose/fiber containers (horseshoe shaped)	M47
M234	4	Nitrocellulose/fiber containers (horseshoe shaped)	M47

MORTAR CARTRIDGE	CHARGE	MAKE UP OF CHARGE LEFT ON ROUND
HE, M933	0	Ignition cartridge only
HE, M934	1	Ignition cartridge and 1 increment
WP, M929	2	Ignition cartridge and 2 increments
	3	Ignition cartridge and 3 increments
	4	Ignition cartridge and 4 increments
HE, M57	0	1 brown charge
WP, M68	1	1 brown and 1 blue charge
	2	1 brown and 2 blue charges
	4	1 brown, 2 blue, and 1 white charges
	6	1 brown, 2 blue, and 2 white charges
	8	1 brown, 2 blue, and 3 white charges
	10	1 brown, 2 blue, and 4 white charges
ILLUM, M91	2	1 brown and 2 blue charges
	4	1 brown, 2 blue, and 1 white charges
	6	1 brown, 2 blue, and 2 white charges
	8	1 brown, 2 blue, and 3 white charges
	10	1 brown, 2 blue, and 4 white charges

Section XI. ADJUSTMENT OF PROPELLING CHARGES

WARNING

- **Propelling charges are not interchangeable. Do not substitute one model for another. Do not mix lots.**
- **Reposition remaining propellant increments toward rear of fin assembly.**

1 Cartridges are shipped with a complete propelling charge and primer/ignition cartridge.

2 Use firing table or graphical firing scales (12944306 for M57/M68, 12944305 for M91, 12972496 for M933/M934 HE, and 12972477 for M929 WP) to determine proper charge for firing.

3 Place excess increments in an empty ammunition box and close the lid. Mark excess increments by lot number. Protect excess increments from accidental ignition by ensuring ammunition box containing excess increments is closed before firing.

Section XII. UNUSED PROPELLING CHARGE INCREMENTS

WARNING

When burning excess increments:

- **Burning area must be at least 100 meters from the nearest mortar position, parked vehicles, and ammunition piles.**
- **Burning area shall be cleared of all dead grass or brush within 30 meters.**

NOTE

Check range and unit SOP for disposal of excess increments.

1 Excess increments should be destroyed daily.

2 Destroy increments by burning.

3 Place increments on the ground. Form a row 4 to 6 in. (10 to 15 cm) wide and as long as necessary. Do not pile increments more than 1 to 2 in. (3 to 5 cm) high.

4 End train of increments with a row of single increments, followed by at least a meter of combustible material.

5 Ignite combustible material.

6 Allow ensuing fire to self-extinguish.

CHAPTER 5
FOREIGN AMMUNITION (NATO)

Section I. GENERAL

As a result of recent agreements, the United States (US) and a number of its NATO allies intend to establish the interoperability of many weapons systems and ammunition of the various countries. The goal is to enable the safe and effective firing of major types of ammunition of the same size from the same compatible size and type weapon of the NATO armies. Interoperability criteria are now required for many weapons and ammunition items in current development. Determinations are now being made to establish which ammunition items will be authorized for use in US weapons by changes to the applicable ammunition and weapons manuals. NATO nations will provide similar authorization in their manuals. Only authorized NATO ammunition will be used. Those items covered in the manual have been authorized. If a munitions item has not been authorized, it is because (1) it has not yet been determined to be safe to fire from a US weapon or (2) it has been determined that the munitions item cannot be safely fired from the US weapon system.

Section II. AUTHORIZED CARTRIDGES

No NATO ammunition can be fired in the 120mm mortar.

Section III. FUZE SETTING

Not applicable.

Section IV. ADJUSTMENT OF PROPELLING CHARGE

Not applicable.

APPENDIX A
REFERENCES

SCOPE. This appendix lists all field manuals, firing tables, forms, miscellaneous publications, and technical manuals referenced in this manual.

FIELD MANUALS.

FM 3-4 ..... NBC Protection
FM 3-5 ..... NBC Decontamination
FM 7-90 ..... Tactical Employment of Mortars
FM 9-207 ..... Operation and Maintenance of Ordnance Materiel in Cold Weather (0° to -65°F)
FM 4-25.11 ..... First Aid
FM 23-90 ..... Mortars
FM 31-70 ..... Basic Cold Weather Manual
FM 31-71 ..... Northern Operations

FIRING SCALES AND TABLES.

FT-120-E-1 ..... Firing Tables for Mortar, 120mm: Carrier-Mounted M121; Mortar, 120mm: Towed M120 (Cartridge, HE, M934/M934A1/M933; Cartridge, WP, XM929/M929; Cartridge, Illum, XM930; Cartridge, IR Illum, XM983; Cartridge, FRPC, M931), June 1999

12944305 ..... Circular Firing Scales for 120mm Mortar: M91 Illum Cartridge

12944306 ..... Circular Firing Scales for 120mm Mortar: M68 Smoke and M57 HE

12972477 ..... Circular Firing Scales for 120mm Mortar: M929 WP Cartridge

12972496 ..... Circular Firing Scales for 120mm Mortar: M933, M934 HE Cartridge

FORMS.

DA Form 2028	Recommended Changes to Equipment Publications and Blank Forms
DA Form 2028-2	Recommended Changes to Equipment Technical Manuals
DA Form 2404	Equipment Inspection and Maintenance Worksheet
DA Form 2408-4	Weapons Record Data
SF 368	Product Quality Deficiency Report

MISCELLANEOUS PUBLICATIONS.

CTA 8-100	Army Medical Department Expendable/Durable Items
CTA 50-970	Expendable Items (Except: Medical, Class V, Repair Parts, and Heraldic Items)
DA PAM 738-750	The Army Maintenance Management System (TAMMS)
10 CFR Part 19	Notices, Instructions and Reports to Workers; Inspections
10 CFR Part 20	Standards for Protection Against Radiation
10 CFR Part 21	Reporting of Defects and Non-Compliance

TECHNICAL MANUALS.

TM 9-1000-202-14	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Evaluation of Cannon Tubes
TM 9-1220-243-12&P	Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List for Plotting Board, Indirect Fire, M16 W/E (1220-00-601-7941) and M19 W/E (1220-01-059-7989)
TM 9-1300-206	Ammunition Explosive Standards
TM 9-2350-261-10	Operator's Manual for Carrier, Mortar, M121
TM 43-0001-28	Army Ammunition Data Sheets for Artillery Ammunition: Guns, Howitzers, Mortars, Recoilless Rifles, Grenade Launchers, and Artillery Fuzes (FSC 1310, 1315, 1320, 1390)
TM 750-244-7	Destruction Process for Equipment in FSC 1000-1095

APPENDIX B
COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

Section I. INTRODUCTION

SCOPE. This appendix lists components of the end item and basic issue items for the 120mm mortar to help you inventory the items required for safe and efficient operation of the equipment.

GENERAL. The Components of End Item (COEI) and Basic Issue Items (BII) Lists are divided into the following sections:

a. Section II, Components of End Item. This listing is for information purposes only, and is not authority to requisition replacements. These items are part of the 120mm mortar, but they are to be removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to help you find and identify the items.

b. Section III, Basic Issue Items. These essential items are required to place the 120mm mortar in operation, to operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the 120mm mortar during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

EXPLANATION OF COLUMNS. The following provides an explanation of columns found in the tabular listings:

a. Column (1) - Illustration Number (Illus Number). Gives you the number of the item illustrated.

b. Column (2) - National Stock Number. Identifies the stock number of the item to be used for requisitioning purposes.

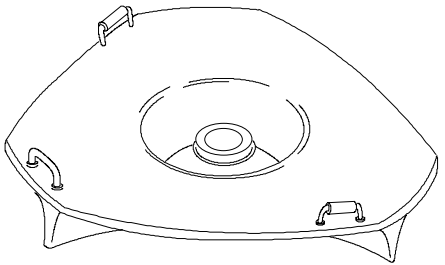
c. Column (3) - Description and Usable On Code. Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the CAGEC (Contractor and Government Entity Code) (in parentheses) and the part number.

d. Column (4) - Unit of Measure (U/M). Indicates how the item is issued for the National Stock Number shown in column (2).

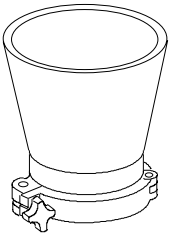
e. Column (5) - Quantity Required (Qty Rqr). Indicates the quantity required.

Section II. COMPONENTS OF END ITEM

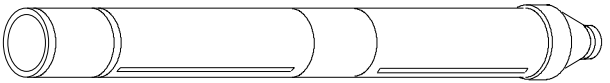
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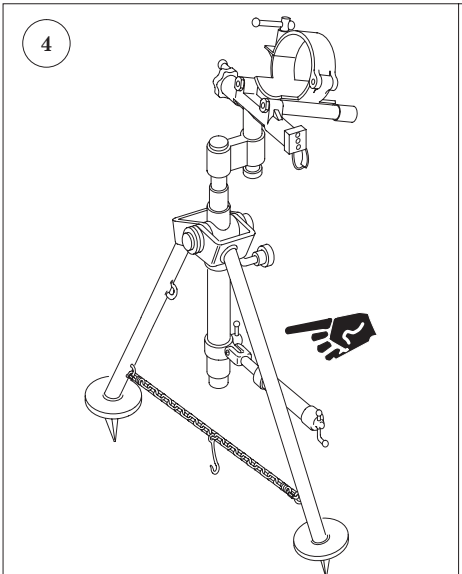
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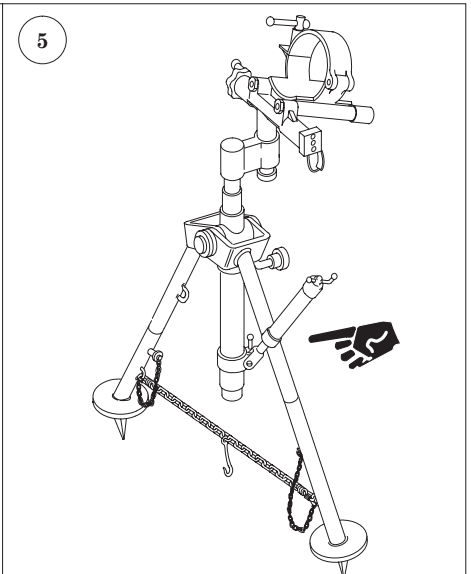
3



(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
1	1015-01-285-7417	BASEPLATE, MORTAR: M9 (19206) 12576881 SOLTAM P/N K-737	AD5, AD7	EA	1
2	1015-01-354-2152	BLAST ATTENUATOR DEVICE (19206) 12901012	AD7	EA	1
3	1015-01-410-7421	CANNON, 120MM: M298 (19206) 12577298-1 SOLTAM P/N K-1085	AD5, AD7	EA	1



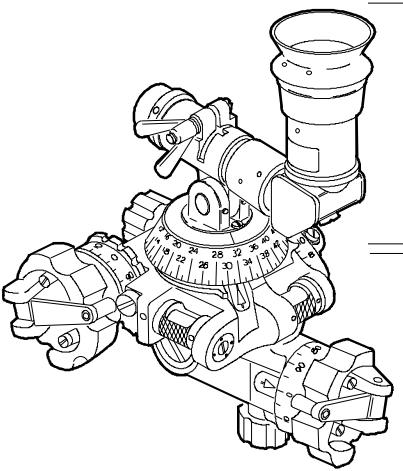
M190



M191

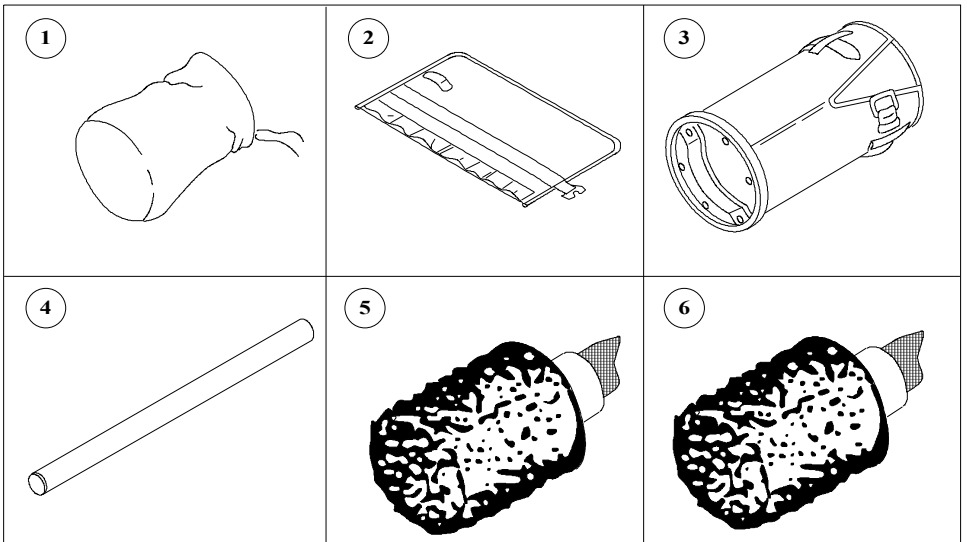
(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
4		MOUNT, MORTAR: M190 (19206) 12576999 SOLTAM P/N K-920	AD5	EA	1
5		MOUNT, MORTAR: M191 (19206) 12901000 SOLTAM P/N K-980	AD5, AD7	EA	1

6

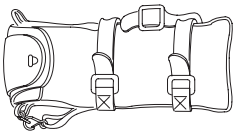
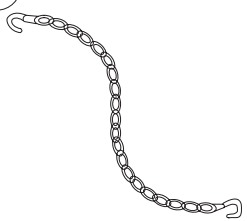
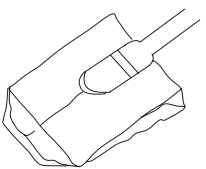
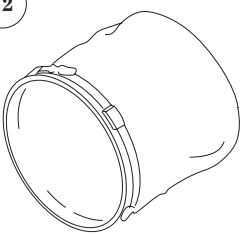


(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
6	1240-01-366-7322	SIGHT UNIT, M67 (19206) 9356182 Consists of:	V80		
	6650-01-341-5195	TELESCOPE, ELBOW (19206) 9356181		EA	1
	6650-01-340-6082	MOUNT, TELESCOPE (19200) 9356166		EA	1

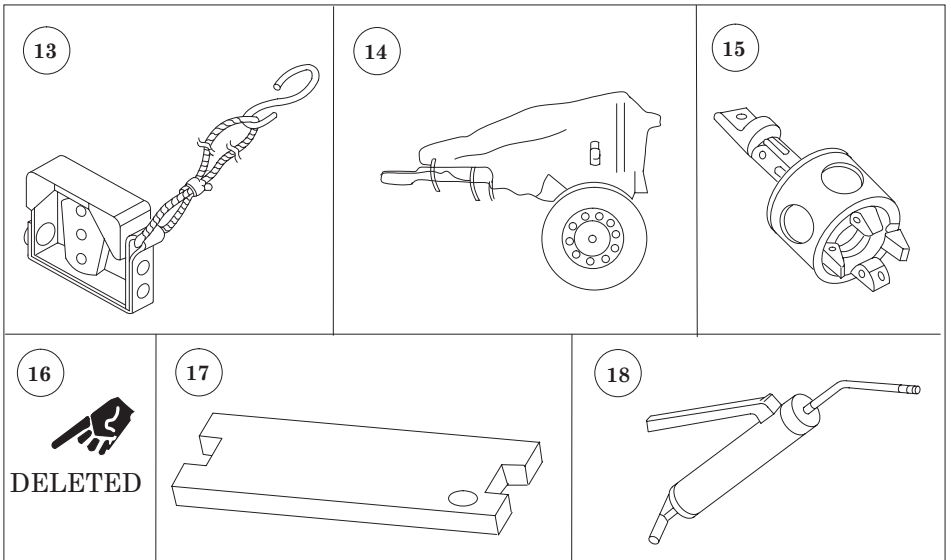
Section III. BASIC ISSUE ITEMS



(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
1	1025-01-340-0509	BAG, TEXTILE (Used with artillery cleaning brush assembly) (19206) 12901063	AD5, AD7	EA	1
2	8105-01-320-0962	BAG, TOOLS & ROLL (19200) 12576960	AD5, AD7	EA	1
3	8105-01-286-6307	BAG, TOOLS & SPARE (19206) 12576942/A-619	AD5, AD7	EA	2
4	5120-01-407-8044	BREECH CAP REMOVAL TOOL (19206) 12901153	AD5, AD7	EA	1
5	1015-01-408-9014	BRUSH ASSEMBLY, ARTILLERY CLEANING (Nylon bristle) (19206) 12901147	AD5, AD7	EA	1
6	1015-01-407-7616	BRUSH ASSEMBLY, ARTILLERY CLEANING (Brass bristle) (19206) 12972482	AD5, AD7	EA	1

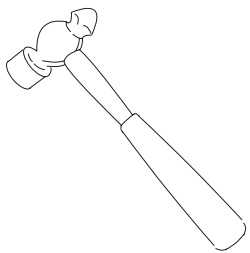
7 DELETED	8 	9 
10 	11 	12 

(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
7	DELETED				
8	1290-01-043-8288	CASE, AIMING POST (19206) 11733755	AD5, AD7	EA	2
9	6650-01-521-9875	CASE, SIGHT UNIT (19200) PRF13005489	V80	EA	1
10	4010-00-047-3902	CHAIN ASSEMBLY (16 FT) (19207) 7077062	AD5	EA	1
11	1240-01-043-7502	COVER, FIRE CONTROL (19200) 11733753	V80	EA	1
12	1015-01-407-4325	COVER, GUN MUZZLE (19206) 12901140	AD5, AD7	EA	1


13
14
15
16
DELETED
17
18

(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
13	1015-01-285-0141	COVER, SIGHT UNIT ADAPTER (19206) 12576976	AD5, AD7	EA	1
14	1015-01-327-6125	COVER, TRAILER (19206) 12577495	AD5	EA	1
15	1015-01-433-4471	EXTRACTOR, CARTRIDGE (19206) 12901167	AD5, AD7	EA	1
16	DELETED				
17	1015-01-406-9349	GAGE, FIRING PIN (19206) 12901151	AD5, AD7	EA	1
18	4930-01-030-0304	GUN, GREASE (81349) MIL-G-3859-1-14	AD5, AD7	EA	1

19



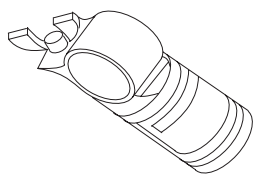
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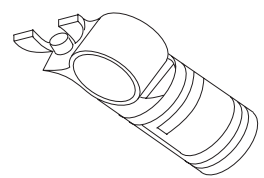
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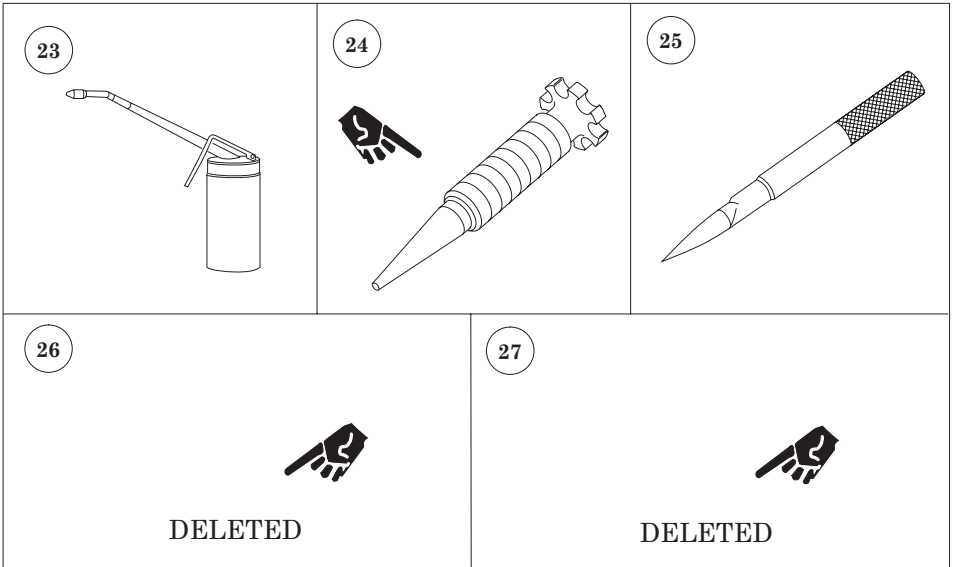
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22

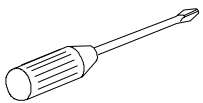


(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
19	5120-00-061-8546	HAMMER, HAND (19207) 11677028-3	AD5, AD7	EA	1
20	DELETED				
20.1	DELETED				
21	1290-00-169-1934	LIGHT, AIMING POST, M58 (GREEN) (19200) 12961204	AD5, AD7	EA	2
22	1290-00-169-1935	LIGHT, AIMING POST, M59 (ORANGE) (19200) 12961205	AD5, AD7	EA	1

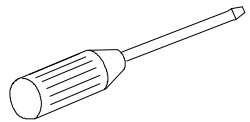

23
24
25
26
DELETED
27
DELETED

(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
23	4930-00-537-8977	OILER, HAND (96906) MS15766-1	AD5, AD7	EA	1
24	1015-01-522-0775	PIN, FIRING (1NUW7) 12901192 SOLTAM P/N K-1155	AD5, AD7	EA	2
25	1290-01-046-8320	POST, AIMING, M14 (19206) 11736201	AD5, AD7	EA	16
26	DELETED				
27	DELETED				

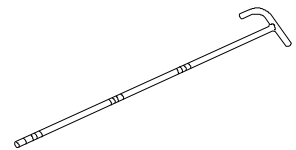
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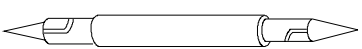
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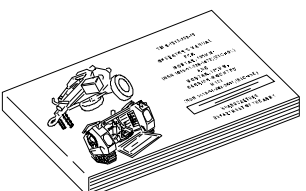
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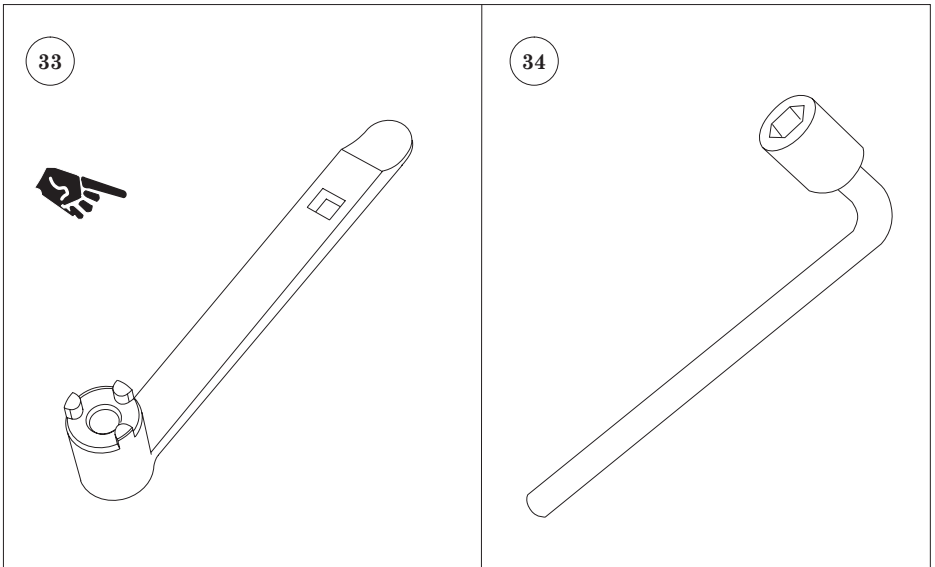
31



32



(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
28	5120-00-820-2995	SCREWDRIVER, CROSSTIP (81348) GGG-S-121	V80	EA	1
29	5120-00-278-1269	SCREWDRIVER, FLAT TIP (81348) B107.15	V80	EA	1
30	1015-01-292-0966	STAFF ASSEMBLY, CLEANING, ARTILLERY (19206) 12576922	AD5, AD7	EA	1
31	1010-01-043-8195	STAKE, DRIVING, AIMING POST, M14 (19206) 11741788	AD5, AD7	EA	2
32		TM 9-1015-250-10	AD5, AD7	EA	1


33
34

(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
33	5120-01-522-0776	WRENCH, FIRING PIN (19206) 12901194	AD5, AD7	EA	1
34	5120-01-163-4726	WRENCH, SOCKET (11862) 14036400	AD5	EA	1

APPENDIX C
ADDITIONAL AUTHORIZATION LIST (AAL)

Section I. INTRODUCTION

SCOPE. This appendix lists additional items you are authorized for the support of the 120mm mortar.

GENERAL. This list identifies items that do not have to accompany the 120mm mortar and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

EXPLANATION OF LISTING. National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name. If the item required differs for different models of this equipment, see the "Used On Code" column for the applicable model or models. Codes used are:

USED ON CODE	MODEL
AD5	M120
AD7	M121

Section II. ADDITIONAL AUTHORIZATION LIST

(1) National Stock Number	(2) Description CAGEC and Part Number	Used On Code	(3) U/M	(4) Qty Auth
1290-01-067-0687	AIMING CIRCLE (19200) 11785090	AD5, AD7	EA	1
2590-01-356-2294	AMMUNITION COVER, 120MM MORTAR ROUND (LRRS) (19206) 12901141	AD5	EA	1
8105-00-285-4744	BAG, SAND (81349) MIL-B-12233	AD5, AD7	EA	1
6920-01-383-2939	BATTALION TRAINING AID (19200) 12961064	AD5, AD7	EA	1
7510-00-889-3494	BINDER, LOOSE-LEAF (19207) 11677003	AD5, AD7	EA	1
1240-00-152-3512	BORESIGHT (W/E), M45A1, OPTICAL (19200) 10549221	AD5, AD7	EA	1
1240-00-152-2916	CASE, BORESIGHT (19200) 10549222	AD5, AD7	EA	1

(1) National Stock Number	(2) Description CAGEC and Part Number	Used On Code	(3) U/M	(4) Qty Auth
1290-00-930-4260	COMPASS, MAGNETIC (19200) 10547166	AD5, AD7	EA	1
8140-01-326-0128	DIVIDER ASSEMBLY LRRS, 120MM MORTAR (28620) AC200000591	AD5	EA	14
1220-01-339-4674	FIRING SCALE, GRAPHICAL (M57, HE/M68, WP) (19200) 12944306	AD5, AD7	EA	1
1220-01-338-4754	FIRING SCALE, GRAPHICAL (M91, ILLUM) (19200) 12944305	AD5, AD7	EA	1
1220-01-414-6399	FIRING SCALE, GRAPHICAL (M929, WP) (19200) 12972477	AD5, AD7	EA	1
1220-01-415-8787	FIRING SCALE, GRAPHICAL (M933, M934, HE) (19200) 12972496	AD5, AD7	EA	1

Section II. ADDITIONAL AUTHORIZATION LIST (Cont)

(1) National Stock Number	(2) Description CAGEC and Part Number	Used On Code	(3) U/M	(4) Qty Auth
1220-01-502-1296	FIRING SCALE, GRAPHICAL (M934A1, HE) (19200) 13002218	AD5, AD7	EA	1
1220-01-510-7985	FIRING SCALE, GRAPHICAL (M930, ILLUM) (19200) 13005827	AD5, AD7	EA	1
1290-01-328-3897	FUZE SETTER (19206) 12929737	AD5, AD7	EA	1
5965-01-388-4181	HEADSET, ACAPS (80063) A3206098	AD5, AD7	EA	AR
1220-00-602-7941	PLOTTING BOARD (19200) 8270330	AD5, AD7	EA	1
5120-00-180-0728	SCREWDRIVER, JEWELER'S SWIVEL KNOB (81348) GGG-S-1808	AD5, AD7	EA	1

(1) National Stock Number	(2) Description CAGEC and Part Number	Used On Code	(3) U/M	(4) Qty Auth
5340-00-980-9277	STRAP, WEBBING (LRRS) (19207) 10900880	AD5	EA	2
6675-00-240-1881	TRIPOD, SURVEYING (for arctic use only) (97403) 13207E1370	AD5, AD7	EA	2

APPENDIX D
EXPENDABLE AND DURABLE ITEMS LIST

Section I. INTRODUCTION

SCOPE. This appendix lists expendable and durable items that you will need to operate and maintain the 120mm mortar. This listing is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

EXPLANATION OF COLUMNS.

a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item (e.g., "Use cleaning compound (item 3, app D)").

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the item.

EXPLANATION OF COLUMNS (Cont).

c. Column (3)- National Stock Number. This is the National stock number assigned to the item which you can use to requisition it.

d. Column (4)- Item Name, Description, Contractor and Government Entity Code (CAGEC), and Part Number. This provides the other information you need to identify the item.

e. Column (5)- Unit of Measure (U/M). This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

Section II. EXPENDABLE/DURABLE SUPPLIES AND REQUIREMENTS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGEC, PAGE NUMBER	(5) U/M
1	C	8105-00-269-4662	BAG, PLASTIC Pkg of 100 (81349) MIL-B-117	EA
2	C	7920-00-205-2401	BRUSH, CLEANING, TOOL AND PARTS: Chinese bristle, rd (81349) MIL-B-43871	EA
3			CLEANING COMPOUND, OPTICAL LENS: Liquid	
	C	6850-00-227-1887	1 qt bottle	QT
	C	6850-00-392-9751	2 oz bottle (81349) MIL-C-43454	OZ

Section II. EXPENDABLE/DURABLE SUPPLIES AND REQUIREMENTS LIST (Cont)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGEC, PAGE NUMBER	(5) U/M
4			CLEANING COMPOUND, RIFLE BORE (RBC): Solution type	
	C	6850-00-224-6657	8 oz can	OZ
	C	6850-00-224-6663	1 gal. can (81349) MIL-C-372	GL
5	C	5350-00-221-0872	CLOTH, ABRASIVE: crocus 50 sheet pack (58536) A-A-1206	PK
6	C	6850-00-281-1985	DRY CLEANING SOLVENT (SD) 1 gal. can (58536) A-A-711	GL

(1) ITEM NUM-BER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGEC, PAGE NUMBER	(5) U/M
7	C	9150-00-145-0268	GREASE, AIRCRAFT (GA) -80° TO +450°F (-27° TO +232°C) EFFECTIVE (81349) MIL-G-81322	LB
8	C	9905-00-257-2746	INSTRUCTION DECAL (19200) 11731011	EA
9	C	9150-00-271-8427	LUBRICATING OIL, GENERAL PURPOSE (GPL) (81349) MIL-L-3150	QT
10	C	9150-00-292-9687	LUBRICATING OIL, WEAPONS (LAW) 1 qt can (81349) MIL-L-14107	QT

Section II. EXPENDABLE/DURABLE SUPPLIES AND REQUIREMENTS LIST (Cont.)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGEC, PAGE NUMBER	(5) U/M
11	C	6640-00-663-0832	PAPER, LENS: tissue sheet form (81348) NNN-P-40	EA
12	C	7920-00-205-1711	RAG, WIPING 50 lb bale (58536) A-A-2522	LB
13	C	1010-01-343-3883	SLEEVE, BORE CLEANING W/TIES (Box of 210) (19200) 12901064-1	BX

APPENDIX E
LOOSE ROUND RESTRAINT SYSTEM

GENERAL.

a. The Loose Round Restraint System (LRRS) is a system that provides a fast, simple method of securing "loose" 120mm cartridges (encased in cardboard tubing) in place for transport in the HMMWV (High Mobility Multi-Purpose Wheeled Vehicle). After assembly, the "egg crate" module rack is restrained in the cargo bed of a vehicle by means of authorized tiedown straps. The LRRS restrains cartridges from excessive longitudinal and lateral movement, and from contact with other cartridges. During cross country movement the divided racks and cartridges may slide a bit within the confines of the web strap tiedown assembly. The cartridges may bounce and sway back and forth over rough terrain, and the divided panels may bend and/or bow out in places. This is an expected characteristic of the divider rack, and after removal from the vehicle it will re-form itself to near original shape, unless extensive crushing damage has been done.

b. Use of the LRRS is optional. Appendix E shows the user how to assemble and secure the LRRS to accommodate 36 loose cartridges.

c. Individual panels making up the 36-round configuration are shown in Figure 1. Figure 2 shows the LRRS assembled and installed in the HMMWV vehicle. Figure 3 shows the disassembled LRRS in shipping configuration.

LRRS PANELS.

a. The panels that make up the LRRS rack are green blow-molded high density polyethylene, and contain "mating" slots that enable the panels to be mated together to form an "egg crate" module rack, strap notches to hold web straps for securing to vehicle side, front, or end wall, or to the floor, and "handles" to permit easy lifting for assembly or disassembly.

b. Fourteen panels make up the LRRS configuration. Each panel has seven "mating slots", is 47-5/8 in. x 1-1/8 in. (121.0 cm x 2.9 cm), and weighs approximately 7.0 lb (3.2 kg). Each panel has four strap notches and "handles" to permit easy lifting. Figure 4 shows a LRRS panel makeup.

c. The panels require no maintenance and are not reparable. If an individual panel should break, it will be discarded and a replacement obtained.

ASSEMBLY OF LRRS.

a. Each 36-round divider rack is fabricated of fourteen panels which comprise the system. Each panel has seven "mating slots". The seven panels are mated together by positioning panels on the floor, on edge, side-by-side, in line with each other, approximately 8.0 in. (20.3 cm) apart with slots-up. Starting at one end, an eighth panel is inserted, slots-down, into the end slots on all panels. Push the panel all the way down until it contacts the floor. This partial assembly will now stand by itself. Next, position the remaining six panels in the same manner. The assembled divided rack will have 36 compartments, each of which measures 5-3/4 in. x 5-3/4 in. (14.6 cm x 14.6 cm).

b. When placing an assembled 36-round divided rack in the vehicle, or assembling a 36-round divided rack in the vehicle, it should be noted that if the divider rack is positioned, or assembled in position, with the two handles at the top, each panel can be lifted up and out of the divided rack as needed to remove the cartridges.

GENERAL TIE-DOWN NOTES FOR RACK.

a. All divided racks must be held down with one or more web straps in such a manner that the divided rack cannot "work up" and "dump" the cartridges underneath. This strap must always be positioned in the top strap notches on the divided rack in order to provide the proper hold-down. Refer to Figure 5 for proper installation of the tie-down strap.

b. Tie-down straps are identified and listed in Appendix C, Additional Authorization List.

c. Ammunition cover (LRRS) is identified and listed in Appendix C, Additional Authorization List.

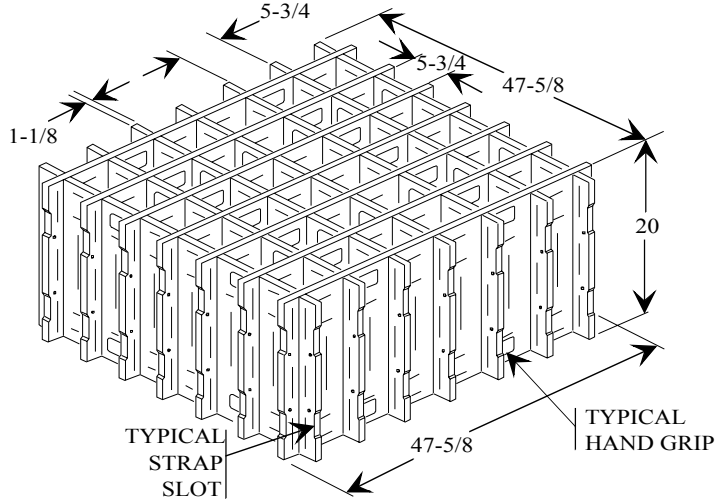

5-3/4
5-3/4
47-5/8
1-1/8
20
TYPICAL
STRAP
SLOT
47-5/8
TYPICAL
HAND GRIP

Figure 1.

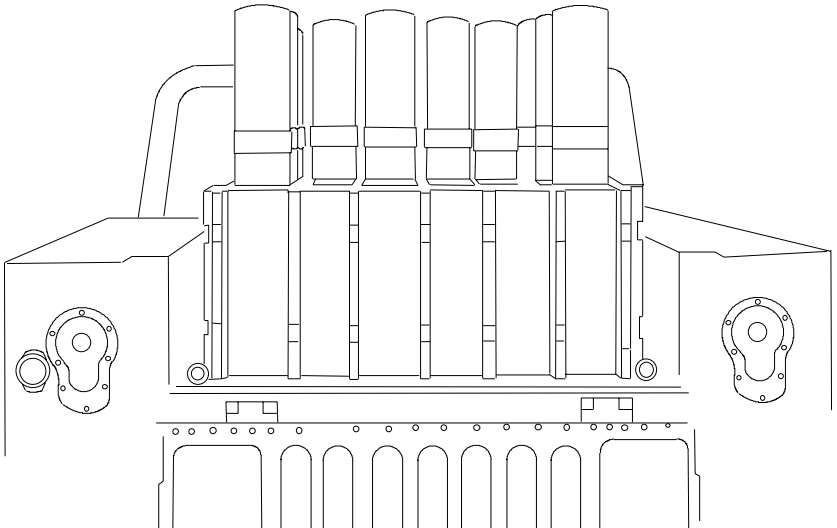


Figure 2.

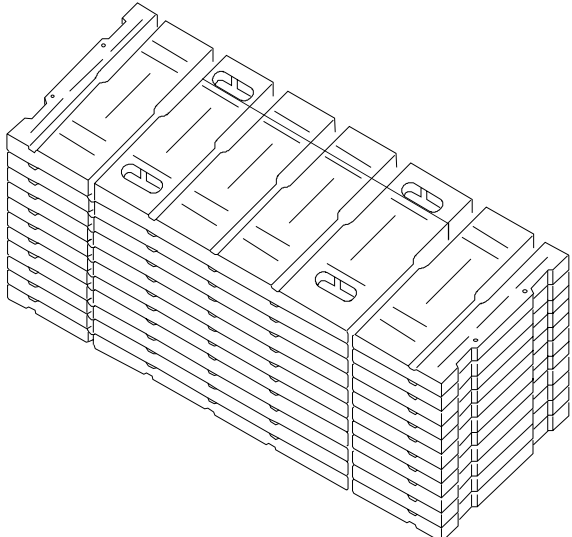


Figure 3.

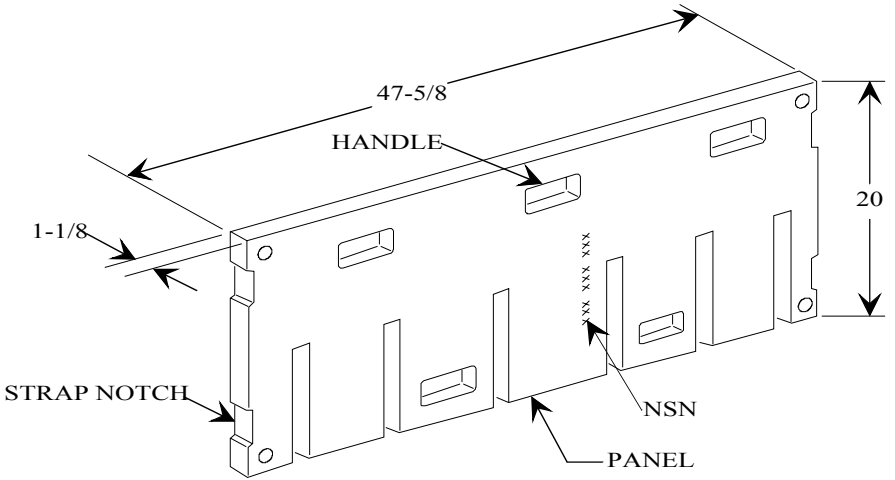


Figure 4.

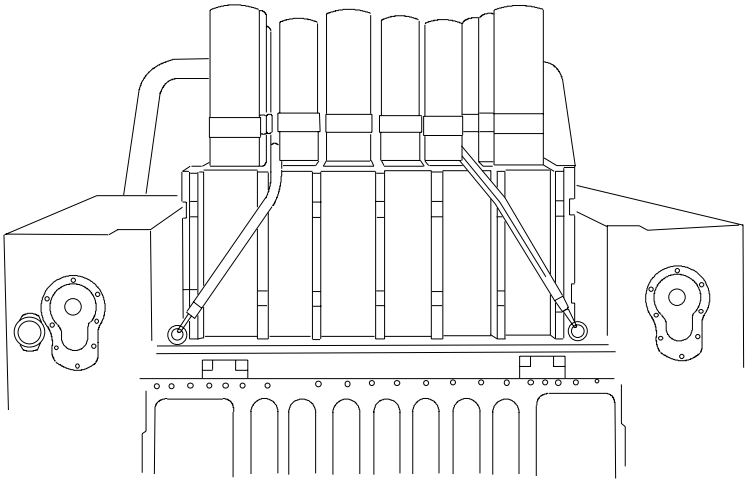
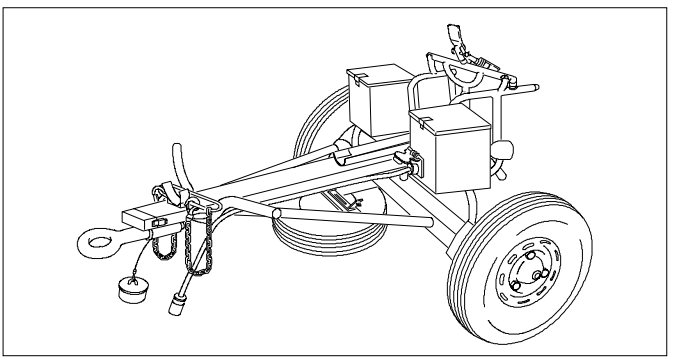


Figure 5.

APPENDIX F
TRAILER, 120MM MORTAR: M1100

GENERAL. The M1100 trailer is the principal means of transport for the 120MM Mortar System. However, the trailer is not supplied with the weapon system as it is an ASIOE (Associated Support Item of Equipment) item.



ACQUISITION DATA FOR OBTAINING TRAILER.

To obtain the trailer, refer to the following criteria.

(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/I	(5) Qty Rqr
1	2330-01-227-1736	TRAILER, MORTAR, 120MM: M1100 (19200) 12577141 SOLTAM P/N K-1070	AD5	EA	1

By Order of the Secretary of the Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
02312

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