

TM 9-1265-370-10-2

Supersedes copy dated 22 January 1982

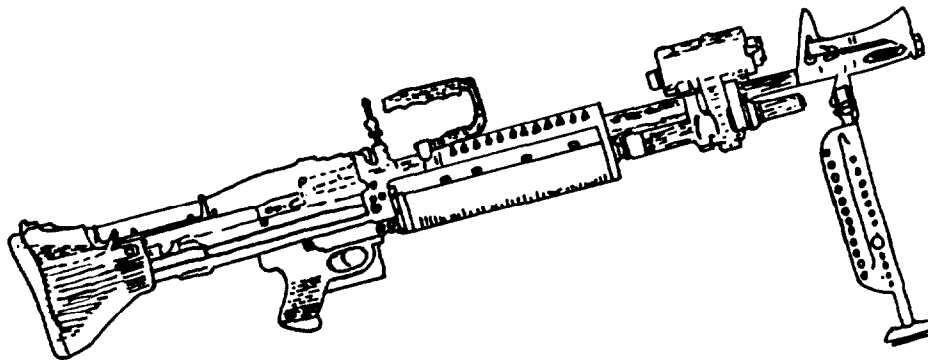
OPERATOR'S MANUAL

MULTIPLE INTEGRATED LASER
ENGAGEMENT SYSTEM
(MILES)

SIMULATOR SYSTEM, FIRING LASER: M61
(NSN 1265-01-092-7665)

FOR

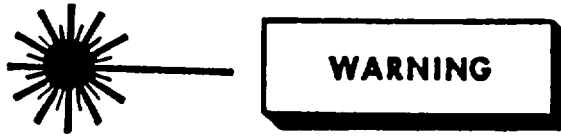
M60 MACHINE GUN



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HEADQUARTERS, DEPARTMENT OF THE ARMY

12 AUGUST 1988



ALTHOUGH THE LASER LIGHT FIRED BY MILES EQUIPMENT TRANSMITTERS IS CONSIDERED SAFE BY THE BUREAU OF RADIOLOGICAL HEALTH, SUITABLE PRECAUTIONS MUST BE TAKEN TO AVOID POSSIBLE DAMAGE TO THE EYE FROM OVEREXPOSURE TO THIS RADIATED ENERGY. TAKE THE FOLLOWING PRECAUTIONS:

- 0 NEVER LOOK AT THE LASER EMITTER AT CLOSE RANGE (LESS THAN 12 METERS),
- 0 NEVER LOOK AT THE LASER EMITTER THROUGH OPTICS SUCH AS BINOCULARS, TELESCOPES, OR WEAPON SIGHTS AT RANGES LESS THAN 75 METERS.
- 0 NEVER LOOK AT THE LASER EMITTER DIRECTLY ALONG THE AXIS OF THE BORE OF THE WEAPON.

NEVER LOAD MILES-EQUIPPED WEAPONS WITH LIVE OR THE WRONG BLANK AMMUNITION. USE ONLY M200 BLANK ROUNDS. THE USE OF IMPROPER AMMUNITION MAY CAUSE FATAL INJURIES TO PERSONNEL. REFER TO M60 MACHINE GUN OPERATOR'S MANUAL, TM 9-1005-224-10, FOR ADDITIONAL INFORMATION ON THE USE OF AMMUNITION.

FOR INFORMATION ON FIRST AID, SEE FM 21-11.

TECHNICAL MANUAL

TM9-1265-370-10-2

TM 9-1265-370-10-2*
HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 12 August 1988

OPERATOR'S MANUAL
FOR
MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM (MILES)
SIMULATOR SYSTEM, FIRING, LASER: M61
(NSN 1265-01-092-7665)
FOR
M60 MACHINE GUN

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Armament, Munitions and Chemical Command, ATTN: AMSMC-MAS, Rock island, IL 61299-6000. A reply will be furnished to you.

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* Supersedes TM9-1265-370-2 dated 22 January 1982

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Storage Instructions

Equipment Distribution:

The MILES equipment for the M60 is shown in Task 1 of this Technical Manual (TM). Use the picture with Task 1 as a guide for equipment distribution. Be sure to issue a copy of this TM along with the MILES equipment.

Equipment Return and Storage:

CAUTION

Make certain that the MMLD torso and helmet harnesses are completely dry before storage in transit case.

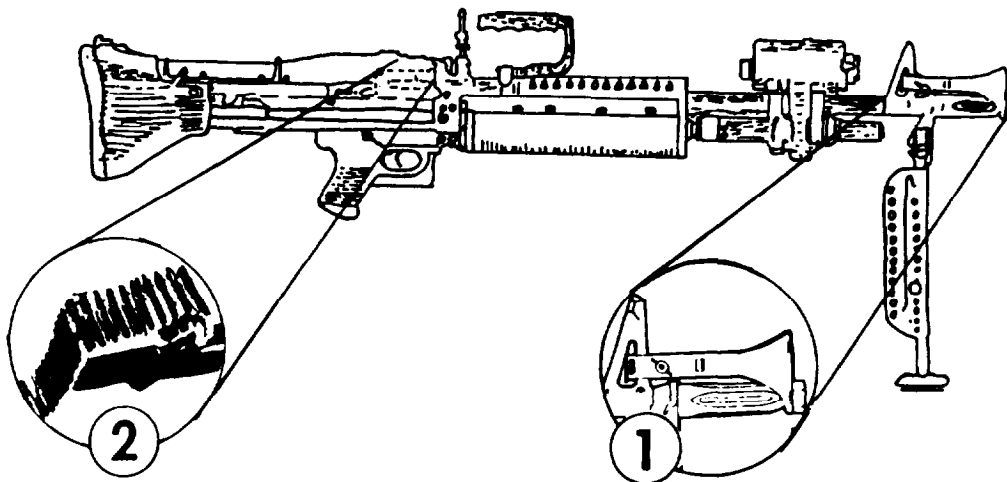
When receiving equipment for storage, always inspect the returned equipment, using Task 8 in this TM for guidance.

Return all MILES equipment and the TMs to their transit cases.

Special Instructions for Infrequently Used Equipment:

If M60/MILES equipment is unused for 60 days remove from transit case and perform Tasks 1, 2, and 8.

Skills Needed To Use This Manual



TO USE THIS MANUAL
YOU SHOULD BE ABLE TO:

1. Install a blank fire attachment on the M60.
2. Load and fire blank ammunition.
3. Complete DA Form 2402.
4. Zero the M60 machine gun (See TM9-1005-24-101).

3

1. SUPPORT AGENCY ADDRESS		4. DATE	
3. ORGANIZATION / DOD/DA/US		<input type="checkbox"/> SHIP EXHIBIT <input type="checkbox"/> DISCHARGE	
5. ICDN		6. ICDN NOMENCLATURE	
7. PD		8. AUTHORIZATION	
9. END ITEM IDENTIFICATION		10. ITEM NUMBER/CLASSIFICATION	
11. ORIGINATOR OR EMPLOYER		12. SERIAL NO.	
13. DATE ACCEPTED BY SUPPORT AGENCY		14. CODE	
15. JOB		16. SPECIAL	
17. DATE RECEIVED		18. SPECIAL	

If you can not do all these tasks ask your NCO or instructor to show you how. When you can do all the tasks, go on to the next page.

M60 machine gun operators also wear a Man Worn Laser Detector (MWLD) assembly. Instructions for using the MWLD found in TM9-1265-370-10-1.



How to Use This Manual

Before You Use Any M60 MILES Equipment, Read This Manual:

- 0 The first part of the manual briefly explains the purpose of the equipment and how it is used.
- 0 Then comes step-by-step guidance for every task you need to do with the M60/MILES equipment.

TASK
4 Place Transmitter on Barrel

1. Set the M60 down on its bipod, as shown.
2. Pull transmitter mounting clamps apart.
3. With lens pointed forward, lower transmitter onto barrel as shown.

CAUTION
Ensure transmitter is seated properly on barrel

4. Press transmitter forward until it seats against but not on top of front barrel clamp.
5. Hold transmitter and fasten clamp.

NOTE
It should be easy to fasten clamp. If it is hard to fasten, repeat step 4.

- The task pages look like this. Some longer tasks run more than one page. Before you begin a task, read all of the steps in that task and look at each drawing carefully. To help perform the task, some steps have matching numbers in the drawing. Do each step just the way you are instructed.

HOW TO USE THIS MANUAL, CONTINUED.

- Do each task in the order it occurs in the manual.

- DON'T JUMP AHEAD - DON'T SKIP ANY STEPS -
- If your equipment has a problem you can't fix using this manual, report it on DA Form 2402. To get a replacement, turn in the faulty equipment and the completed DA Form 2402 to your NCOIC.
- In the back of this manual is a list of abbreviations and an explanation of terms used in this manual. If you read a word you don't understand, check Pages 24 and 25 for an explanation.



General Information

This manual shows you how to operate and maintain the M60/MILES Laser simulator equipment. The operator and organizational maintenance tasks are listed in the Table of Contents on Page i.

Purpose of Equipment

The M60/MILES simulator is a battery powered laser transmitter. The simulator allows realistic combat training without the hazards of using live ammunition.

Forms and Records

- a. Reports of Maintenance or Equipment Replacement.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, the Army Maintenance Management System (TAMMS).

- b. Reporting Equipment Improvement Recommendations (EIRs).

EIRs can and must be submitted by anyone who is aware of an unsatisfactory condition with the equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure, just simply tell why the design is unfavorable or why a procedure is difficult. EIRs may be submitted on SF 368.

Mail direct to:

Commander, U.S. Army Armament, Munitions and Chemical Command,
ATTN: AMSMC-QAD
Rock Island, IL 61299-6000

A reply will be furnished to you.

c. Hand Receipts Manual

Hand receipts for Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL) items are published in a Hand Receipt Manual TM 9-1265-370-10-2-HR. This manual is published to aid in property accountability and is available through: Commander, the U.S. Army Adjutant General Publications Center, 2800 Eastern Boulevard, Baltimore, MD 21220.

Equipment Description

Capabilities and Features:

Major features of the M60/MILES include an eye-safe laser transmitter mounted on the M60 machine gun barrel, and activated by sound of blank cartridges being fired.

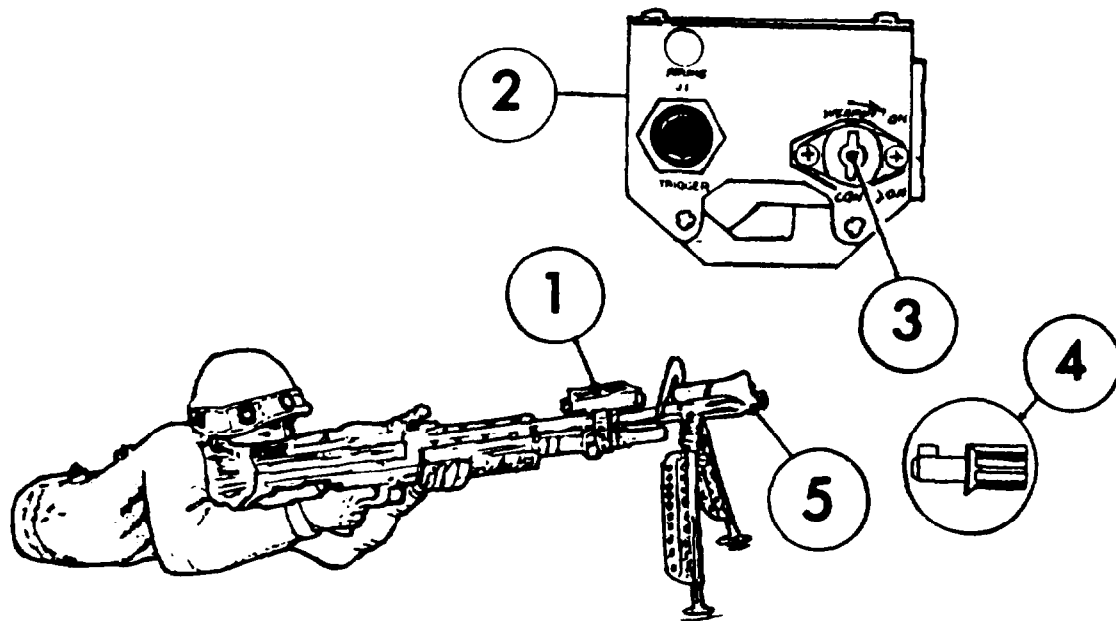
The M60/MILES can be operated in temperatures from -35°C (-31°F) to 62°C (144°F). It permits tactical skills to be practiced under realistic conditions.

The laser transmitter sends harmless, invisible laser (light) beams toward the target. If the laser beam hits the target, detector assemblies on the target sense the beam, and cause an alarm to sound. In addition, if the target is a vehicle, an externally-mounted light (CVKI) on the vehicle will flash.

Battery Information:

The M60/MILES uses a BA-3090/U, 9-volt alkaline battery which provides approximately 100 hours of power.

LOCATION OF COMPONENTS



1. Transmitter
2. Transmitter (rear view)
3. Weapon key receptacle
4. Yellow weapon key
5. Blank fire attachment

How it Works

The M60/MILES works much like a real M60 machine gun. However, instead of firing live ammunition, the M60/MILES fires blank ammunition and a harmless laser (light) beam at targets.

The targets wear Man Worn Laser Detectors (MWLD) equipped with laser detector assemblies and alarms. When a laser beam from a transmitter strikes a soldier's MWLD, an alarm sounds. To shut off the alarm, the soldier must remove the yellow key from his weapon transmitter and put it into a receptacle on his MWLD. With the key removed from the transmitter, it will not operate. Removing the weapons' capability to fire a laser beam simulates a combat "kill".

The M60/MILES operator wears a harness equipped with a laser detector assembly and alarm. If opposing forces fire a MILES-equipped weapon at you, the M60/MILES operator, one of two things will happen:

- Your MWLD alarm sounds for one second. Take cover; a "near miss" has been scored on you.
- Your alarm sounds continuously. You have been "killed". Use your yellow M60 weapon key to shut off the alarm.

Once the alarm sounds, the weapon key must be left in the MWLD assembly harness. If it is removed, the alarm will sound continuously. With the weapon key removed from the transmitter of the M60/MILES, it will no longer operate.

How The M60 MILES Is Used:

After the M60/MILES transmitter and MWLD have been installed and tested, you will be ready for the training exercise.

- To begin, attach a blank-fire attachment and load the M60 with blank ammunition.
- Turn the transmitter yellow weapon key to the ON position.
- Aim and fire. The laser transmitter will operate until you run out of blank ammunition.

Limitations of Equipment:

The M60 laser transmitter has the same range and operational capabilities as the M60 machine gun, but a dirty laser transmitter lens may reduce the effective range of the transmitter. The M60/MILES transmitter will "kill" out to a range of 800 meters, and provides suppressive fire in the form of "near miss" indications to a range of 1100 meters.

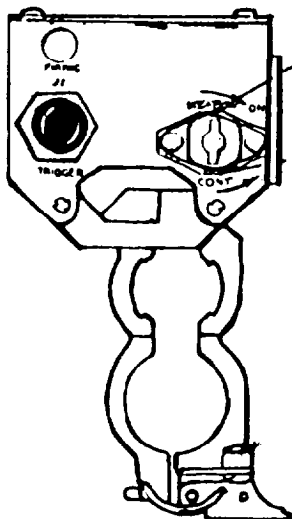
The laser is only effective against exposed personnel wearing MWLDs. On hot days, long periods of rapid fire could result in laser transmitter failure. If your transmitter becomes too hot to touch, stop firing. Wait until transmitter has cooled off before firing again.

TASK

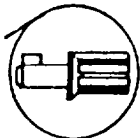
1

Get This Equipment From Your NCOIC

M60 TRANSMITTER



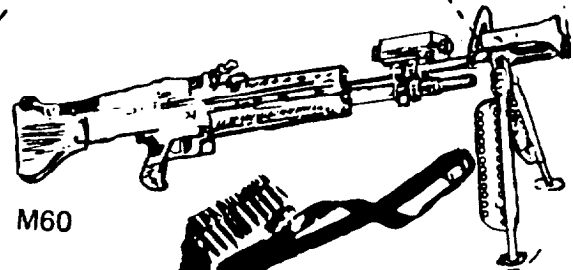
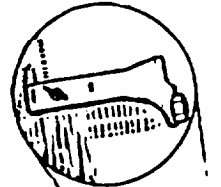
YELLOW WEAPON KEY (IN TRANSMITTER)



9 VOLT BATTERY BA3090/U



M60
BLANK FIRE
ATTACHMENT



M60

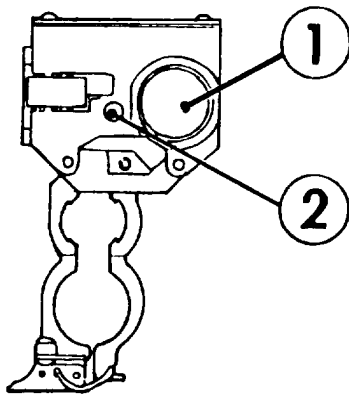
AMMUNITION BELT WITH BLANKS



- Match the equipment with the pictures. If you are missing anything, get it from your NCOIC.

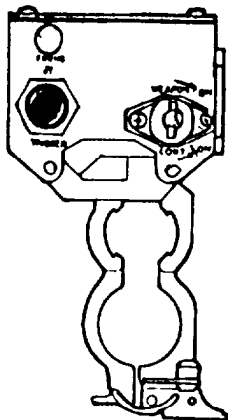
TASK

2 Inspect and Clean Transmitter



1. Gently remove any dirt or oil from the lens with a lens paper or soft cloth.

2. Make sure the foam microphone cover is dry and not caked with dirt or blank-fire residue.



3. Check for damage that would prevent normal operation of the transmitter.

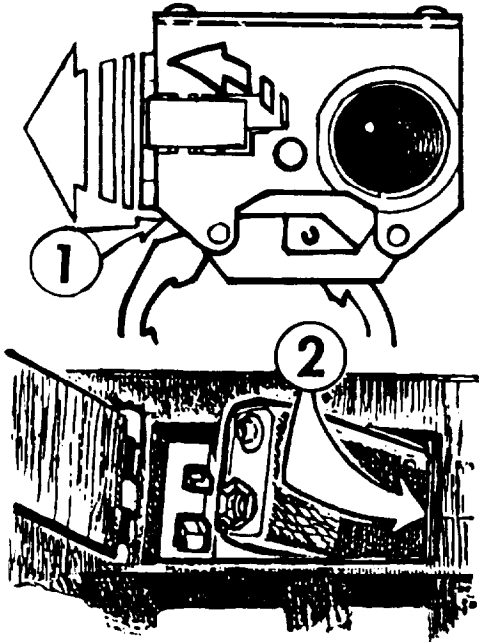
Report any damage on DA Form 2402. Replace transmitter.

TASK

3

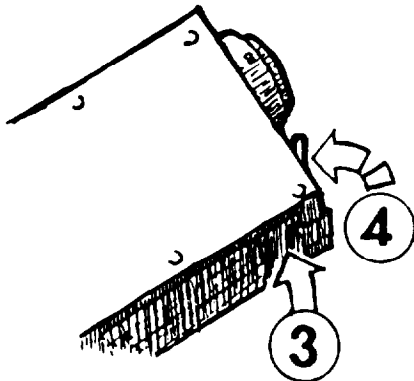
Put Battery in Transmitter

1. Flip latch and open door.



2. Insert a BA-3090/U battery as shown.

3. Press door closed. Holding door closed with one hand, fasten clamp with other hand.

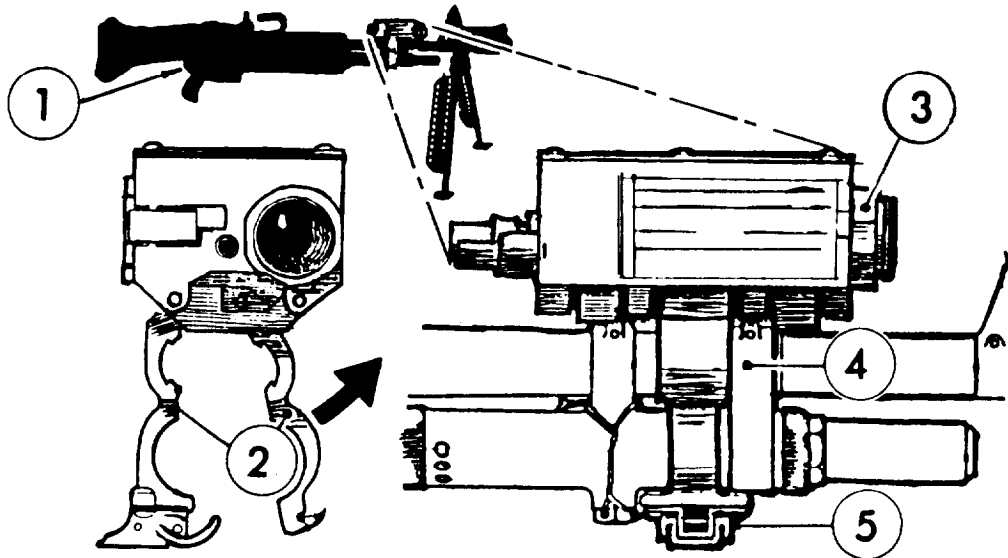


4. Press latch closed.

TASK

4

Place Transmitter on Barrel



1. Set the M60 down on its bipod, as shown.
2. Pull transmitter mounting clamps apart.
3. With lens pointed forward, lower transmitter onto barrel as shown.

CAUTION

MAKE SURE TRANSMITTER IS SEATED PROPERLY ON BARREL.

4. Press transmitter forward until it seats against, but not on top of front barrel clamp.
5. Hold transmitter in place and fasten clamp.

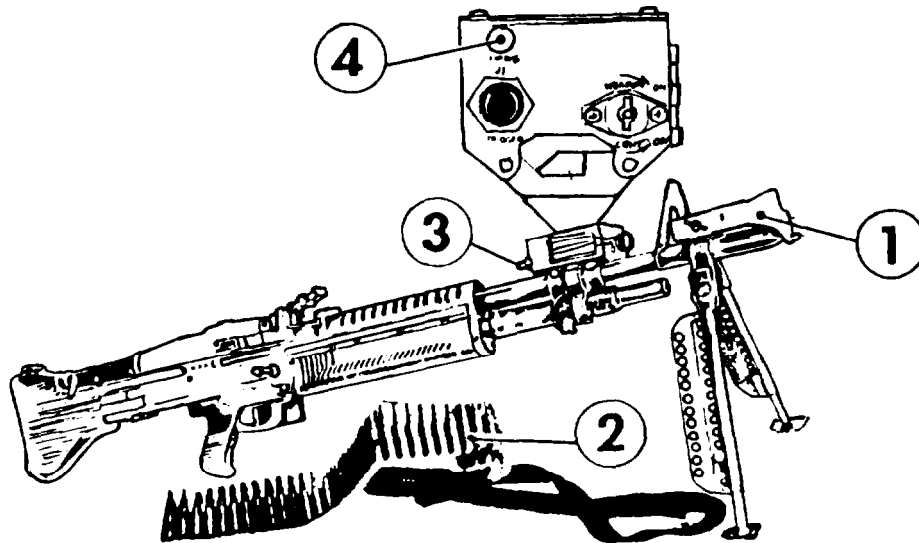
NOTE

It should be easy to fasten clamp. If it is hard to fasten, repeat step 4.

TASK

5

Blank-Fire Operation



1. Attach blank-fire attachment to barrel of M60.

WARNING

NEVER LOAD M60/MILES WITH LIVE OR THE WRONG BLANK AMMUNITION. THE USE OF IMPROPER AMMUNITION MAY CAUSE FATAL INJURIES TO PERSONNEL.

2. Load M60 with blank ammunition.
3. Insert yellow key in transmitter key receptacle. Turn to WEAPON ON position.
4. While watching FIRING indicator, fire a short burst. The lamp should light.

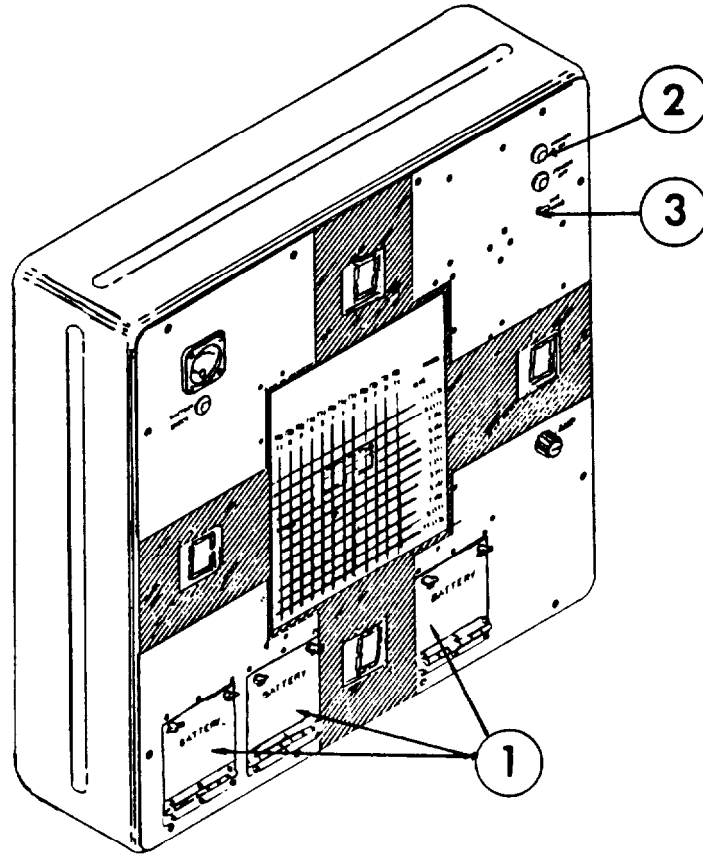
If lamp does not light, fire again. If lamp still does not light, remove and reinsert same battery in transmitter and test again. If lamp still does not light, replace battery and test again. If still no light, report on DA Form 2402. Replace transmitter.

If lamp goes out or does not light while you are firing the M60 during an exercise, replace transmitter battery.

TASK

6

Align the Transmitter

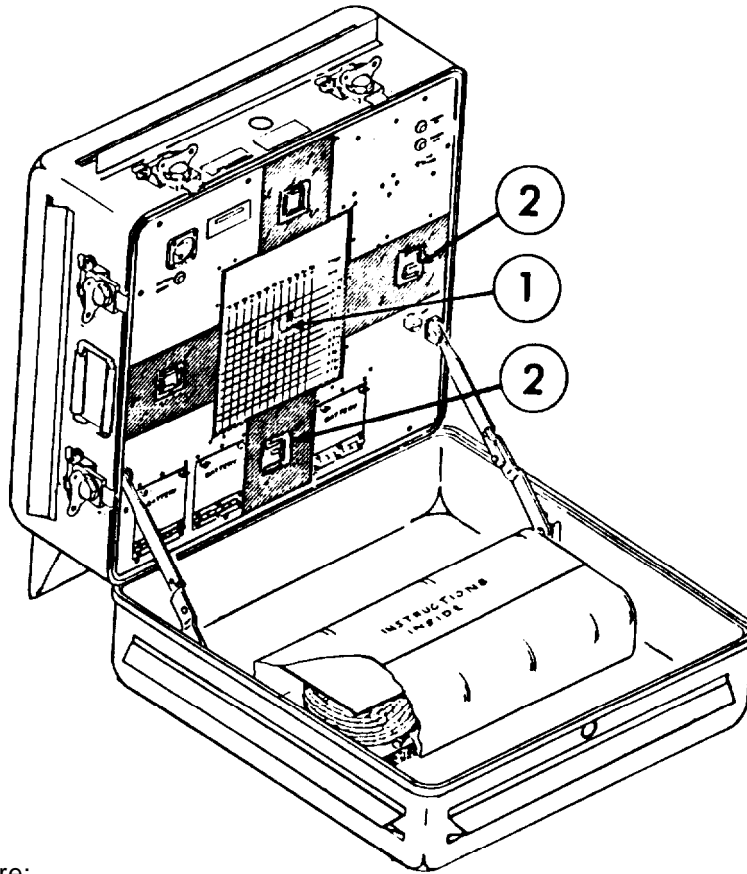


The Small Arms Alignment Fixture (SAAF) is a laser detecting device that is used to align your weapon's sights with the MILES transmitter. use the SAAF alignment target, you must:

- Set up the target at a range of 25 meters from the firing point.
 1. Install three BA-200/U batteries.
 2. Turn Power Switch ON.
 3. Set Weapon Switch to M60.

TASK

6



Alignment Procedure:

The M60 transmitter can be aligned in either blank-fire or dry-fire mode.

NOTE

To put your weapon in dry-fire mode, see the next page.

If your weapon is in blank-fire mode, be sure it is loaded with blank ammunition.

- Adjust the sights:
 - a. Set range to 500 meters.
 - b. Set windage to zero.

- 1. Fire one round at the target's bull's-eye.
- 2. The target displays show you what to do next. For example, if the right display shows 2, move the windage 2 clicks to the right. If the lower display shows 3, move the range adjustments 3 clicks down, etc.

TASK

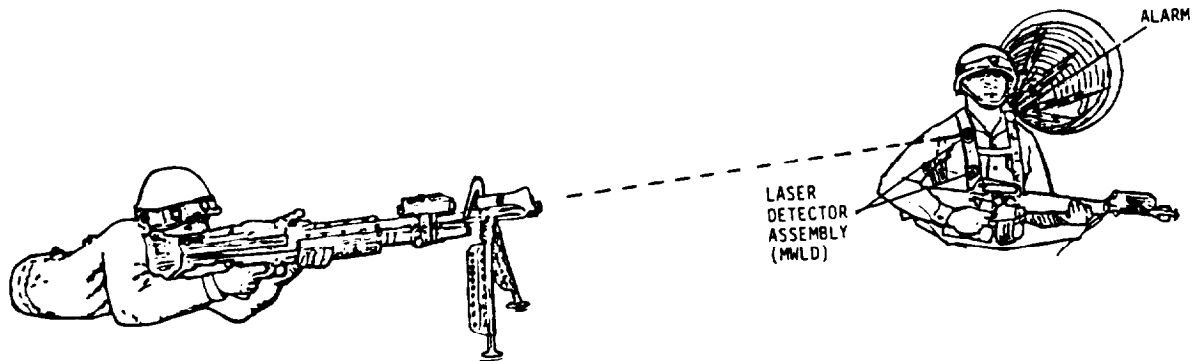
6

To align your transmitter in the dry-fire mode, you must perform the following steps:

1. Secure a dry-fire cable from the accessory bag in the SAAF.
2. Remove and secure the protective cap from J-1 connector on rear of transmitter.
3. Attach plug on dry-fire cable to J-1 connector; make sure that the slot on plug aligns with tooth on connector. Screw locking sleeve down securely; finger tight, use no tools.
4. Have a Controller insert his green key into transmitter. Turn key. Press trigger button on rear of transmitter. A red light should illuminate in the window above J-1 connector. When it does, Controller will remove his green key.
5. Insert your yellow weapons key into transmitter key receptacle and turn to on position.
6. Assume a good firing position.
7. Fire transmitter by holding TRIGGER button on rear of transmitter in your left hand and squeezing button for one second and releasing it.
8. Adjust your sights according to the display on the SAAF.

TASK

6



If no display appears, at close range, fire at soldier who is wearing an operable MWLD. While firing, observe the FIRING indicator. It should light when the transmitter fires. If no MWLD alarm sounds or no firing light appears, replace the battery in the transmitter. If still no response, report on DA Form 2402. Replace transmitter.

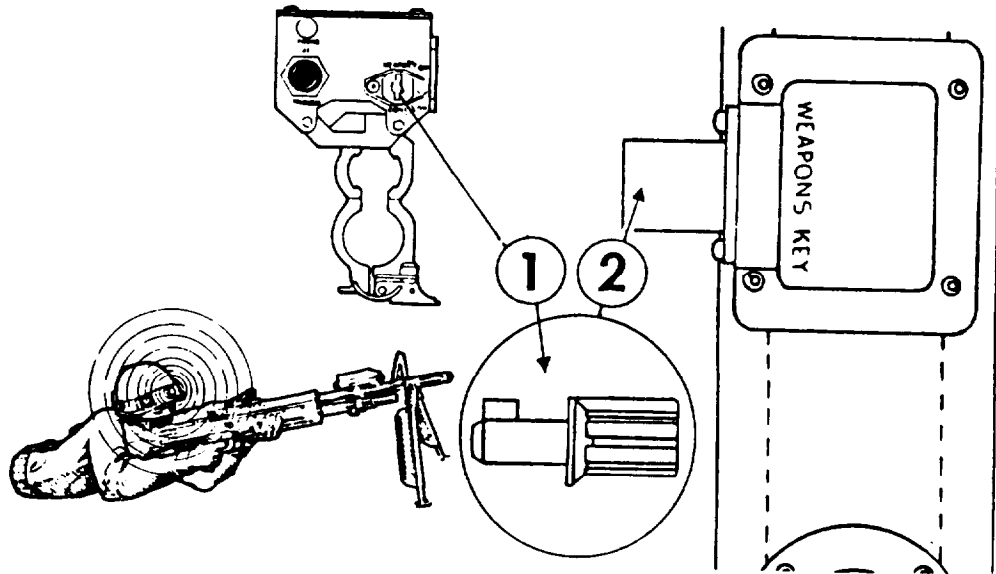
Verify alignment as follows:

1. From a distance of 100 meters, fire at a soldier wearing an operable MWLD. The alarm should sound indicating a "kill" or "near miss".
2. If alarm does not sound or sounds briefly, indicating a "near miss", your transmitter may not be properly aligned. Realign using the SAAF alignment target.

TASK

7

Turn Off Alarm and Reset



NOTE

A one-second alarm means a "near miss", continuous alarm means you have been "killed".

TO TURN OFF ALARM AFTER A "KILL":

1. Remove the yellow weapon key from your M60 transmitter.
2. Insert the key into key receptacle on torso harness and turn key to silence alarm. If you remove key from receptacle, the alarm will sound again.

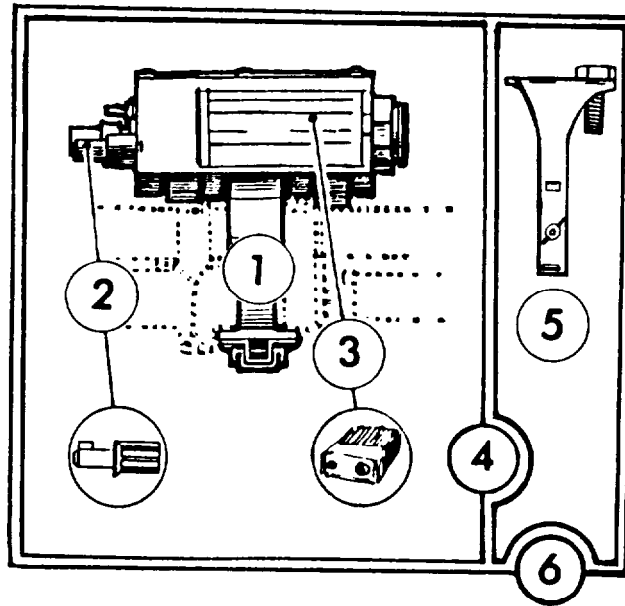
TO RESET MWLD:

1. Ask your NCOIC to call the Controller.
2. Remove the yellow weapon key from your torso harness. Alarm will sound.
3. Ask Controller to use his green key to silence your alarm.
4. Put yellow weapon key back in transmitter and turn to WEAPON ON position.

TASK

8

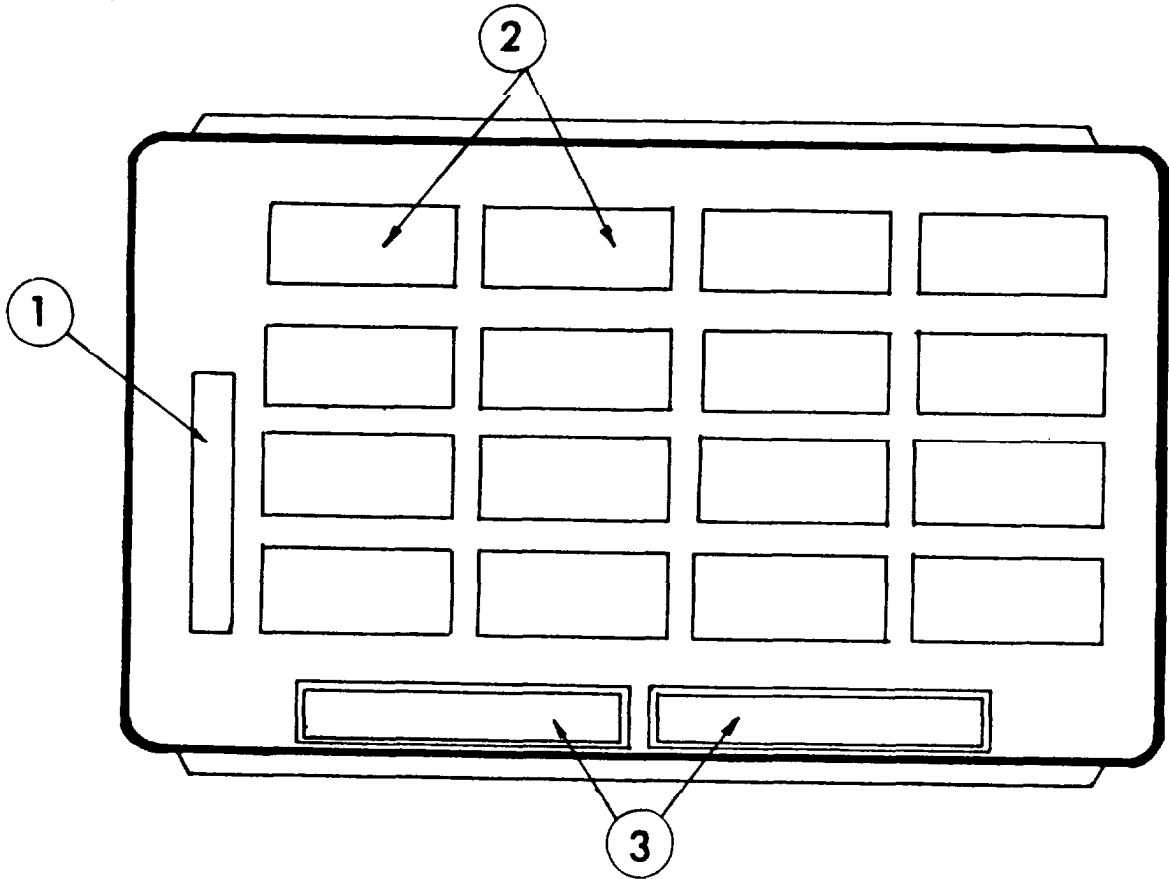
Inspect, Clean, and Return MILES Equipment



- Unload your weapon.
1. Remove M60 transmitter from M60 barrel (See Task 4).
 2. Make sure that yellow weapon key is in transmitter.
 3. Remove transmitter battery and close door (See Task 3).
 4. Do Task 2: Inspect and clean transmitter.
 5. Remove blank-fire attachment from M60.
 6. Make sure you have all your equipment (See Task 1).
 7. Return all MILES equipment, and blank-fire attachment, to its transit case following the instructions on the next page.

TASK

8



Transit Case Loading Instructions

1. Remove the yellow weapon key from each transmitter and place all keys in the spaces provided.
2. Insert transmitters with mounting clamp down into the spaces provided.
3. Place all 16 copies of Operator's Manuals in spaces provided.

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, and technical manuals referenced in this manual.

A-2. FORMS

SF 368	Quality Deficiency Report
DA Form 2028-2	Recommended changes to Equipment Technical Publications
DA Form 2062	Hand Receipt
DA Form 2402	Exchange Tag
DA Form 2404	Equipment Inspection and Main- tenance Work Sheet

A-3. FIELD MANUALS

FM 21-11	Field Manual: First Aid for Soldiers
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A-4. TECHNICAL MANUALS

Operator's Manual: M60 Machine Gun	TM-1005-224-10
Hand Receipt for Simulation System, Firing Laser: M61 for M60 Machine Gun	TM-9-1265-370-10-2-HR

A-5. MISCELLANEOUS PUBLICATIONS

AR 310-2	Identification and Distribu- tion of DA Publications
SB 11-6	Dry Battery Supply Data
DA PAM 738-750	The Army Maintenance Manage- ment System (TAMMS)

APPENDIX B

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

SECTION I. INTRODUCTION

This Appendix lists integral components of the M60/MILES system. All of these items must be returned to your NCOIC following a training exercise.

Explanation of Columns:

National Stock Number:

Stock requisition number.

Description:

Lines 1 and 2 give a brief item description. Line 3 lists the Federal Supply Code for Manufacturer (FSCM) and the reference or part number.

U/M:

Unit of Measure

Qty:

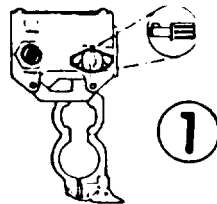
Quantity of item furnished.

Illustration Number:

Illustration that shows the item.

SECTION II. COMPONENTS OF END ITEM

National Stock Number	Description FSCM & Part Number	U/M	Qty	Illustration Number
1265-01-092-7665	M60 Laser Transmitter Assembly	ea.	1	1
	(19200) 1174927 1		1	1



SECTION III. BASIC ISSUE ITEMS

1 ea. ltd 9-1265-370-10-2

Operator's Manual f/Simulator System, Firing Laser: M61 for M60 Machine Gun

APPENDIX C.

ADDITIONAL AUTHORIZATION LIST

This Appendix lists additional items you will need to operate the M60/MILES system.

Explanation of Columns:

National stock numbers, descriptions, unit of measure, and quantities are provided to help you identify and request the additional items you will need to operate the M60/MILES system.

National Stock Number	Description FSCM & Part Number	U/M	Qty	Illustration Number
6135-01-063-1978	*Battery, 9 volt (80058) BA-3090/U	ea.	1	Task 1

*Dry battery listed is used with the equipment. It will not be shipped automatically but is to be requisitioned in quantities necessary for the particular organization in accordance with SB 11-6.

APPENDIX D

EXPENDABLE SUPPLIES AND MATERIALS LIST

This Appendix lists the expendable supplies and materials that you will need to operate and maintain the M60/MILES system.

Explanation of Columns:

National stock numbers, descriptions and unit of measure are provided to help you identify and request the expendable supplies and materials used with the MGO/MILES system.

National Stock Number	Description FSCM & Part Number	U/M
6640-00-240-5851	Paper, Lens (81349) NNN-P-40	pk.

REFERENCE INFORMATION

This section includes the nomenclature cross reference list, list of abbreviations, and explanations of terms (glossary) used in this manual.

A. NOMENCLATURE CROSS REFERENCE LIST

<u>Common Name</u>	Official Nomenclature
Alignment Target	Small Arms Alignment Fixture
Controller Gun	Controller's Gun, Simulator System, Laser
Helmet Harness	Detector Assembly, Simulator System, Laser: Man Worn
M60 Transmitter	Transmitter Assembly, Simulator System, Laser: For M60 Machine
Torso Harness	Detector Assembly, Simulator System, Laser: Man Worn

B. LIST OF ABBREVIATIONS

MILES	Multiple Integrated Laser Engagement System
MWLD	Man Worn Laser Detector
SAAF	Small Arms Alignment Fixture

C. GLOSSARY

Controller	The umpire or referee in a MILES training exercise.
Controller Gun	The device used to test MILES detector systems. May also be used to disqualify soldiers or vehicle from exercise.
Helmet Harness	The part of the laser detector assembly worn on a combat helmet.

Kill	In MILES training exercise, a continuous alarm sounds indicating the detector assembly was hit by a laser beam.
Laser Beam	In MILES, a harmless invisible beam of light which simulates weapon fire.
Laser Detector Assembly	A device that senses the laser directed at it. When the assembly senses a laser beam, it triggers an alarm.
Laser Transmitter	A device that sends the laser beam.
Man Worn Laser Detector	The helmet and torso assembly worn by personnel which senses a laser beam directed at it.
Near Miss	A one second alarm from the MWLD indicates laser fire directed towards you.
Simulator	A training device that takes the place of real equipment and has many of its characteristics.
Torso Harness	The part of the laser detector assembly worn on the upper body.
Weapon Key	This yellow key has two uses: <ol style="list-style-type: none"> 1. To turn on the M60 transmitter. 2. When alarm sounds, remove from transmitter and insert in MWLD weapon key receptacle to silence alarm.
Weapon Key Receptacle	A device on the MWLD that receives the yellow weapon key to shut off alarm.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-40, Operator's Maintenance requirements for Simulator System, Firing, Laser, M61.

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		2L	
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18	2		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Change drawing to read illustrations.

Add after the word spray "and allowing 5 minutes of drying time between coats."

Change: Washer, Flat $\frac{1}{4}$ " to read
Washer, Lock $\frac{1}{4}$ "

Reason: Correct nomenclature

Figure should be shown as flat washer

Figure should be shown as a lock washer

Reason: Figures should depict actual noun nomenclature.

TOW standard Kill Range Meters reads "25-3000", should be "65-3750"

SAMPLE

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TM 9-1265-370-10-2

PUBLICATION DATE

12 August 1988

PUBLICATION TITLE Operator's Manual,
MILES for M60 Machine Gun

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TEAR ALONG PERFORATED LINE

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

- 1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
- 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
- 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

- 1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
- 1 Kilogram = 1000 Grams = 2.2 Lb
- 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

- 1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
- 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

- 1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
- 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
- 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

- 1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
- 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

- $5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
- 212 $^{\circ}$ Fahrenheit is equivalent to 100 $^{\circ}$ Celsius
- 90 $^{\circ}$ Fahrenheit is equivalent to 32.2 $^{\circ}$ Celsius
- 32 $^{\circ}$ Fahrenheit is equivalent to 0 $^{\circ}$ Celsius
- $9/5 \text{ C} + 32 = \text{F}^{\circ}$

APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

