

ROUTINE

MWO effective date is 10 January 1995 and its completion date is 10 January 1999.

MODIFICATION WORK ORDER

**STOWAGE BRACKETS FOR NIGHT VISION DEVICE (NVD) AND M45 PERISCOPE
FOR:
MEDIUM
M109A6 SP HOWITZER
12553195
NSN 2350-01305-0028
(EIC: 3FC)**

Headquarters, Department of the Army, Washington, D.C.

10 January 1995

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this MWO. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028, Recommended Changes to Publications and Blank Forms, direct to Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-IM-MMAA, Warren, MI 48397-5000.

Distribution Statement A: This publication is approved for public release; distribution is unlimited.

1. **PURPOSE.** The purpose of this modification is to provide procedures to install two new stowage brackets, one for the modified ANNVIS-2(V)4 Night Viewer Device (NVD) and one for the M45 periscope. This modification will provide stowage space for the modified NVD and M45 periscope, when one of the items are not mounted; and procedures to modify three M45 periscopes and vehicle periscope supports, which will prevent water from leaking into the driver's compartment.
2. **PRIORITY.** This modification is classified ROUTINE.
3. **END ITEM(S) OR SYSTEM(S) TO BE MODIFIED.** See Table 1.

Table 1. End Item Or System To Be Modified.

NOMENCLATURE	NSN	PART NO.	MODEL	CAGEC	SERIAL NO. RANGE
Howitzer, Self-Propelled, Medium	2350-01-305-0028	12553195	M109A6	19204	1 thru 164

4. **MODULE(S) (COMPONENTS, ASSEMBLIES, SUBASSEMBLIES, BOARDS, AND CARDS) TO BE MODIFIED.** Not applicable.
5. **PART(S) TO BE MODIFIED.** Not applicable.
6. **APPLICATION.**
 - a. Time Compliance Schedule: MWO effective date is 10 January 1995 and completion date is 10 January 1999.
 - b. Level of Maintenance. Unit maintenance is the lowest level of maintenance authorized to apply this MWO.
 - c. Work Force And Man-hour Requirements. See information below for total requirements.

REQUIREMENTS	
WORK FORCE/SKILLS	MAN-HOURS
1 Track Vehicle Mechanic (MOS 63D10) or equivalent	2.0

- d. MWOs to be Applied Prior to or Concurrently with this MWO. None.
 - e. Additional Information Deemed Necessary to Assist in the Application of the MWO. None.
7. **TECHNICAL PUBLICATIONS AFFECTED/CHANGED.** The following technical manuals have been or will be changed as a result of this MWO:
- TM 9-2350-314-10, OCT 1993 TM 9-2350-314-24P-1, OCT 1993 TM 9-2350-314-201-2, OCT 1993

8. **MWO KIT(SYPART(S) AND THEIR DISPOSITION.**
 - a. Kit(s)/Part(s) Required to Apply the MWO. The contents of MWO Kit, PN 12390076, CAGE 19207, are listed in Table 2.

8. MWO KIT(S)PART(S) AND THEIR DISPOSITION - CONTINUED

- b. Security Classification: Unclassified.
- c. Weight And Dimensions:
- (1) 18.5 pounds gross
- (2) 28x13.5x12.5 inches (4725 cubic inches)
- d. Contents of MWO Kits. See Table 2.

Table 2. Contents of MWO Kilt, PN 12390076

NOMENCLATURE	NSN	CAGEC	PART NUMBER	QTY
NVD STOWAGE BRACKET				
Bracket, Mounting Night Viewer	TBD	19207	12390059	1
Screw	5305-00-081-6729	96906	MS24667-53	4
Washer, Lock	5310-00-194-9213	96906	MS35336-39	4
Washer, Flat	5310-00-877-5972	19200	10910174-3	7
Washer, Lock	5310-00-011-5314	96906	MS35338-65	7
Nut, Plain, Hexagon	5310-00-761-0654	96906	MS51967-9	4
Decal	7690-01-327-4574	19207	12352821	1
Plate	TBD	19207	12390073	1
Screw	5305-00-068-0510	96906	MS90728-60	3
Decal	TBD	19200	12910522-41	1
PERISCOPE/NVD SUPPORT LOCKS				
Spring, Helical, Compression	5630-01-331-1492	19207	12352838	4
Washer, Flat	5310-00-080-6004	96906	MS27183-14	6
Spacer	TBD	19207	12390058	6
Bracket, Solenoid	5945-01-327-7762	19207	12352822-1	2
Bracket, Solenoid	5945-01-323-4997	19207	12352822-2	2
PERISCOPE STOWAGE BRACKET				
Bracket	TBD	19207	12390061	1
Screw, Cap Hexagon	5305-00-068-0511	96906	MS90728-62	4
Washer, Flat	5310-00-080-6004	96906	MS27183-14	8
Washer, Lock	5310-00-637-9541	96906	MS35338-46	4
Nut, Plain, Hexagon	5310-00-732-0558	96906	MS51967-8	4
Strap, Webbing	5340-00-753-3742	19204	8690471	1
Strap, Webbing	5340-00-543-3155	19207	8690476	1
Decal	TBD	19200	12910522-14	1
SHROUD ADDED TO PERISCOPE				
Gasket	TBD	19200	12927750	3
Shroud	TBD	19200	12927746	3
Clamp	TBD	19200	12927748	6
Screw, Cap, Socket Head	5305-00-469-6798	96906	MS16996-80B	12
Washer, Flat	5310-00-194-3649	96906	MS15795-808B	12
Washer, Lock	5310-00-224-0749	96906	MS35338-138B	12

8. MWO KIT(SYPART(S) AND THEIR DISPOSITION - CONTINUED

- e. Bulk and Expendable Material. See Table 3.

Table 3. Bulk and Expendable Material.

NOMENCLATURE	NSN	CAGEC	PART NO.	QTY
Sealing Compound	8030-00-081-2333	81349	MIL-S-22473	A/R

- f. Parts Disposition. The parts listed in Table 4 are to be returned to the supporting activity in accordance with AR 725-50. Those parts in Table 5 are to be disposed of in accordance with AR 725-50. The parts in Table 6 will be removed and reused when applying the MWO.

Table 4. Parts to be Returned for Disposition.

NOMENCLATURE	NSN	CAGEC	PART NO.	QTY
Bracket, Mounting, Night Viewer	5340-01-315-6282	19207	12361671	1
Box Accessories Stowage	2540-01-347-6127	19207	12361829	1
Periscope, Subassembly	6650-01-329-1674	19207	12352894	1
Sleeve, Periscope	2510-00-443-0134	19207	10903581	1
Periscope, M45	1240-00-509-2743	19200	8213430	1

Table 5. Parts to be Discarded.

NOMENCLATURE	NSN	CAGEC	PART NO.	QTY
Washer, Lock	5310-00-194-9213	96906	MS35336-39	4
Screw, Cap, Hexagon	5305-00-068-0510	96906	MS90728-60	4
Washer, Lock	5310-00-637-9541	96906	MS35338-46	4
Washer, Flat	5310-00-877-5972	19200	10910174-3	6
Screw, Cap Hexagon Head	5305-01-140-9118	80204	B1821BH038C088N	6
Retainer, Periscope	2510-00-105-9305	19207	10903580	1
Spacer, Sleeve	5365-01-314-2841	19207	12352825	2
Cam, Control	3040-00-885-8460	19207	10903639	6
Washer, Flat	5310-00-080-6004	96906	MS27183-14	10
Decal	TBD	19200	12910522-14	1
Screw, Cap, Hex	5305-00-900-4614	96906	MS24667-51	4

8. MWO KIT(S) PART(S) AND THEIR DISPOSITION - CONTINUED

Table 6. Parts to be Removed and Reused.

NOMENCLATURE	NSN	CAGEC	PART NO.	QTY
Rod, Periscope, Lock	2590-00-724-1511	19207	10888686	6
Spring, Helical, Compression	5630-01-331-1492	19207	12352838	2
Bracket, Solenoid	5945-01-327-7762	19207	12352822-1	1
Bracket, Solenoid	5945-01-323-4997	19207	12352822-2	1
Periscope, Armored Vehicle	1240-00-509-2743	19200	8213430	1

9. SPECIAL TOOLS; TOOL KITS; JIGS, TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND FIXTURES REQUIRED.

Not applicable.

10. MODIFICATION PROCEDURES.

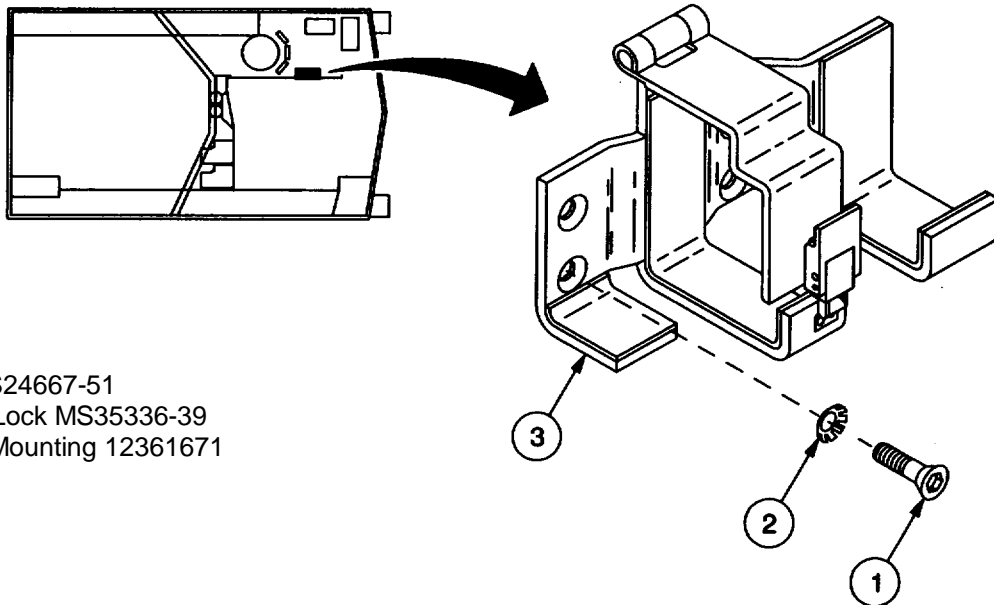
a. NVD Stowage Bracket

(1) Removal.

(a) Remove four screws (1) and four lockwashers (2) securing NVD stowage bracket (3). Set aside bracket and lockwashers for disposition per para 8f.

(b) Remove NVD decal.

FORWARD



Legend:

1. Screw MS24667-51
2. Washer, Lock MS35336-39
3. Bracket, Mounting 12361671

10. MODIFICATION PROCEDURES - CONTINUED

(2) Installation.

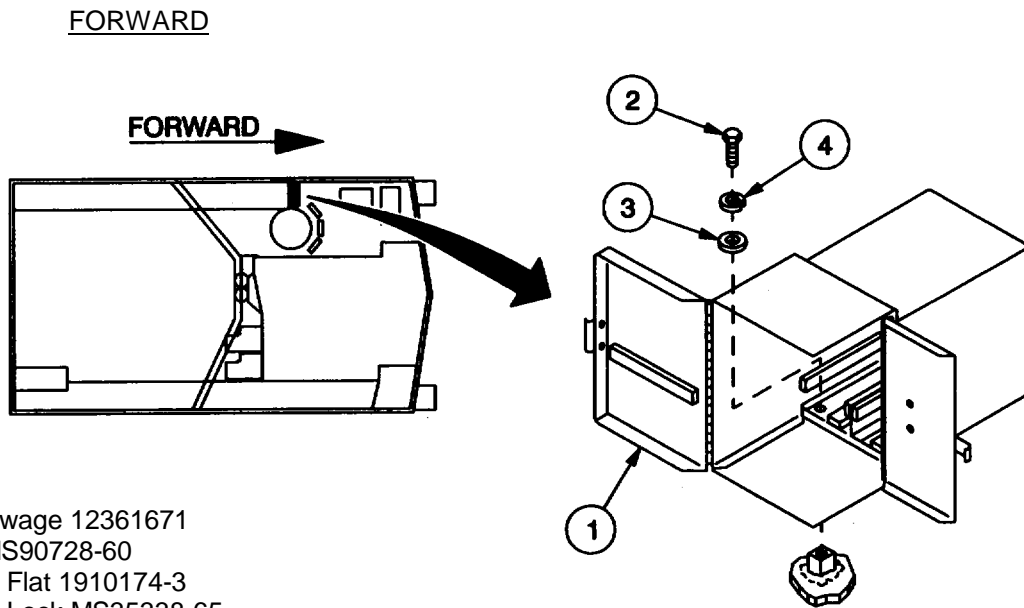
Refer to step b below.

b. M145 Periscope Box

(1) Removal:

(a) Open periscope box (1).

(b) Remove four screws (2), four flat washers (3), four lockwashers (4), and periscope box (1). Set aside periscope box, flat washers, and lockwashers for disposition per para 8f.



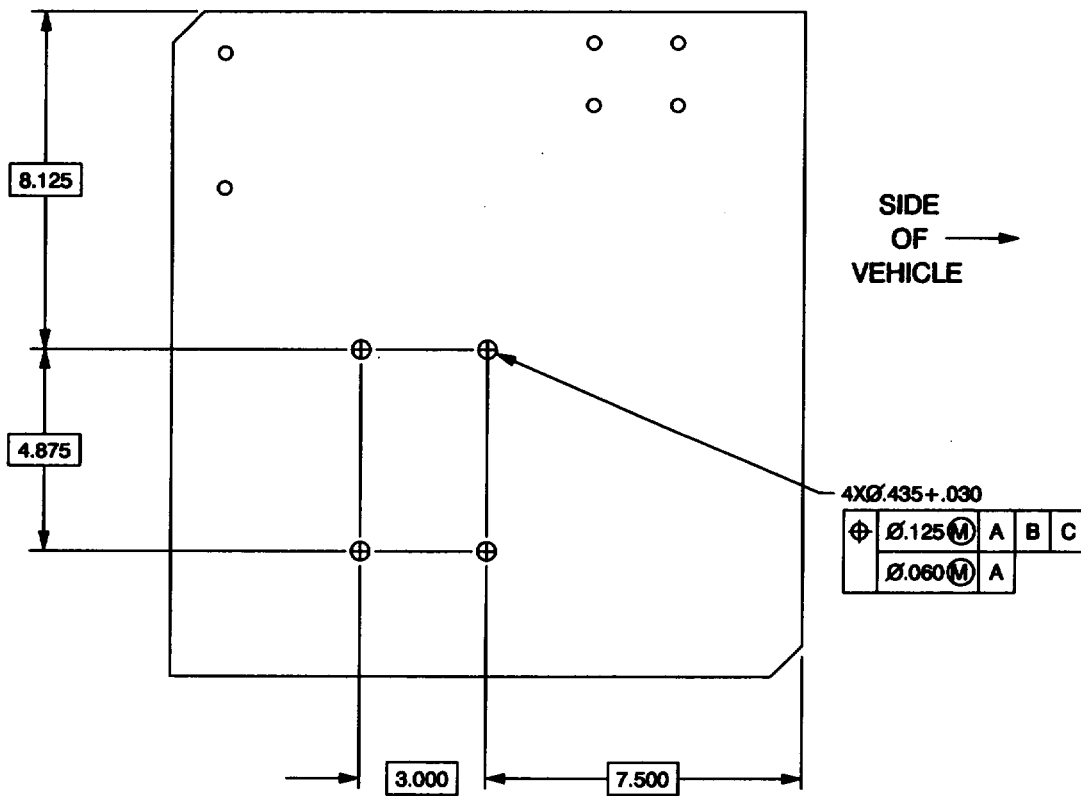
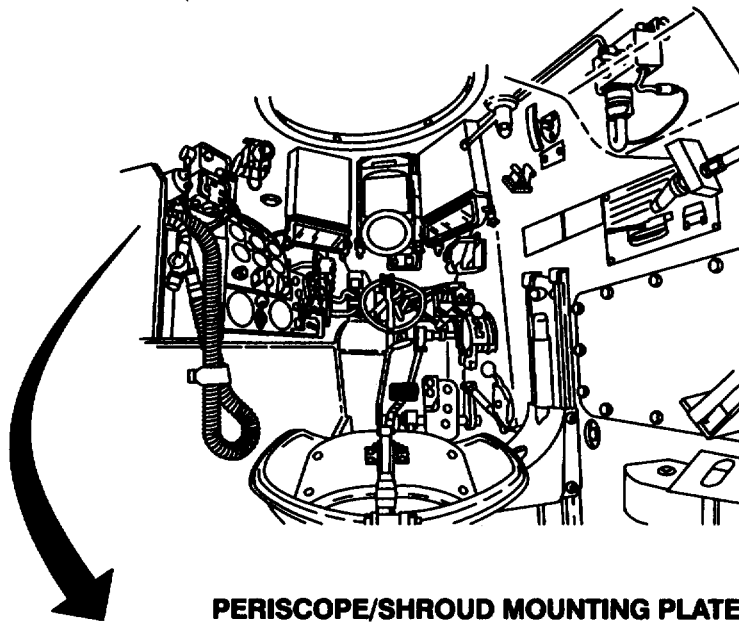
Legend:

1. Box, Stowage 12361671
2. Screw MS90728-60
3. Washer, Flat 1910174-3
4. Washer, Lock MS35338-65

(2) Installation:

(a) Drill four holes in the existing plate located on the sponson using drill (PIN W-D-661, NSN 5130--0807-3009), drill bit 0.125 (1/8) Inch for pilot holes, and drill bit 0.438 (7/16) inch for final through holes.

10. MODIFICATION PROCEDURES - CONTINUED

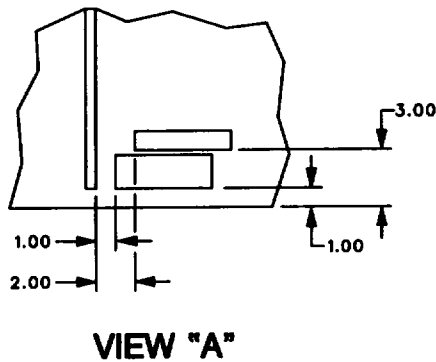
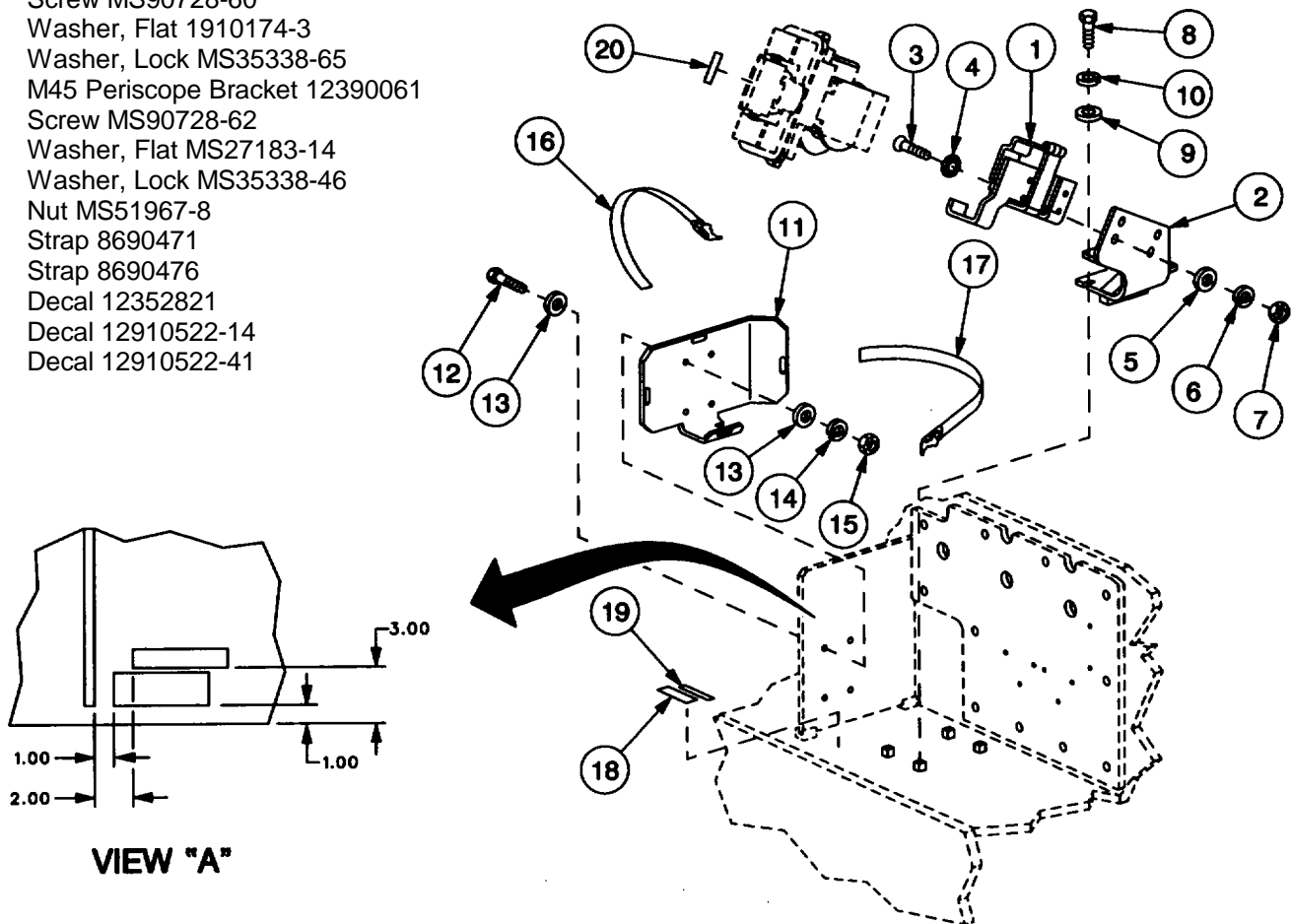


10. MODIFICATION PROCEDURES - CONTINUED

- (b) Install NVD stowage bracket (1) to mounting plate (2) with four screws (3), four lockwashers (4), four flat washers (5), four lockwashers (6), and four nuts (7).
- (c) Install NVD stowage bracket mounting plate (2) and NVD stowage bracket (1) with three screws (8), three flat washers (9), and three lockwashers (10).
- (d) Install M45 periscope stowage bracket (11), four screws (12), eight flat washers (13), four lockwashers (14), four nuts (15), and straps (16 and 17).
- (e) Apply NVD decal (18) and M45 periscope decal (19) to vehicle as shown.
- (f) Apply NVD decal (20) to NVD periscope head cover guard.

Legend:

- 1. NVD Bracket 12390059
- 2. Plate 12390073
- 3. Screw MS24667-3
- 4. Washer, Lock MS35336-39
- 5. Washer, Flat 10910174-3
- 6. Washer, Lock MS35338-65
- 7. Nut MS51967-9
- 8. Screw MS90728-60
- 9. Washer, Flat 1910174-3
- 10. Washer, Lock MS35338-65
- 11. M45 Periscope Bracket 12390061
- 12. Screw MS90728-62
- 13. Washer, Flat MS27183-14
- 14. Washer, Lock MS35338-46
- 15. Nut MS51967-8
- 16. Strap 8690471
- 17. Strap 8690476
- 18. Decal 12352821
- 19. Decal 12910522-14
- 20. Decal 12910522-41



10. MODIFICATION PROCEDURES -CONTINUED

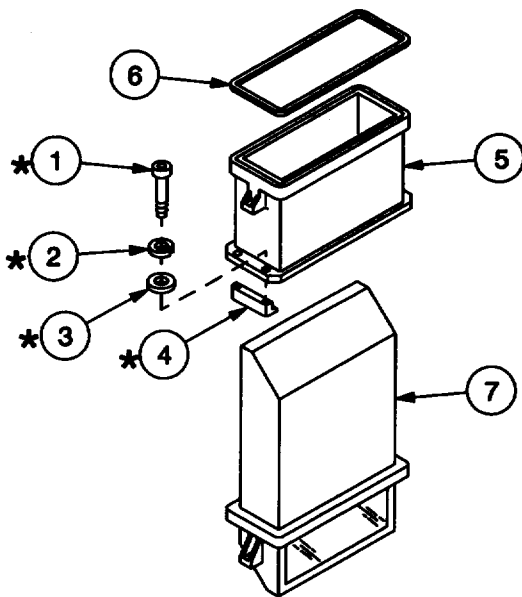
c. Add Shrouds to M45 Periscopes:

- (1) Remove four M45 periscopes from vehicle in accordance with TM 9-2350-314-10. Set aside one M45 periscope for disposition per para 8f.

NOTE

The following procedure is applied to all three M45 periscopes.

- (2) Remove four screws (1), four lockwashers (2), four flat washers (3), and two clamps (4) from shroud (5).
- (3) Slide shroud (5) and gasket (6) over the head of the periscope (7).
- (4) Place clamp (4) on each side of periscope (7) by installing two screws (1), two lockwashers (2), and two flat washers (3) per each clamp (4).
- (5) For installation of modified M45 periscopes refer to step d below.



Legend:

1. Screw, Socket Head MS1 6996-80B
2. Washer, Lock MS35338-138B
3. Washer, Flat MS1 5795-808B
4. Clamp 12927748
5. Shroud 12927746
6. Gasket 12927750
7. Periscope 8213430

*Parts removed and reused.

10. MODIFICATION PROCEDURES -CONTINUED

d. Periscope/NVD Support Locks:

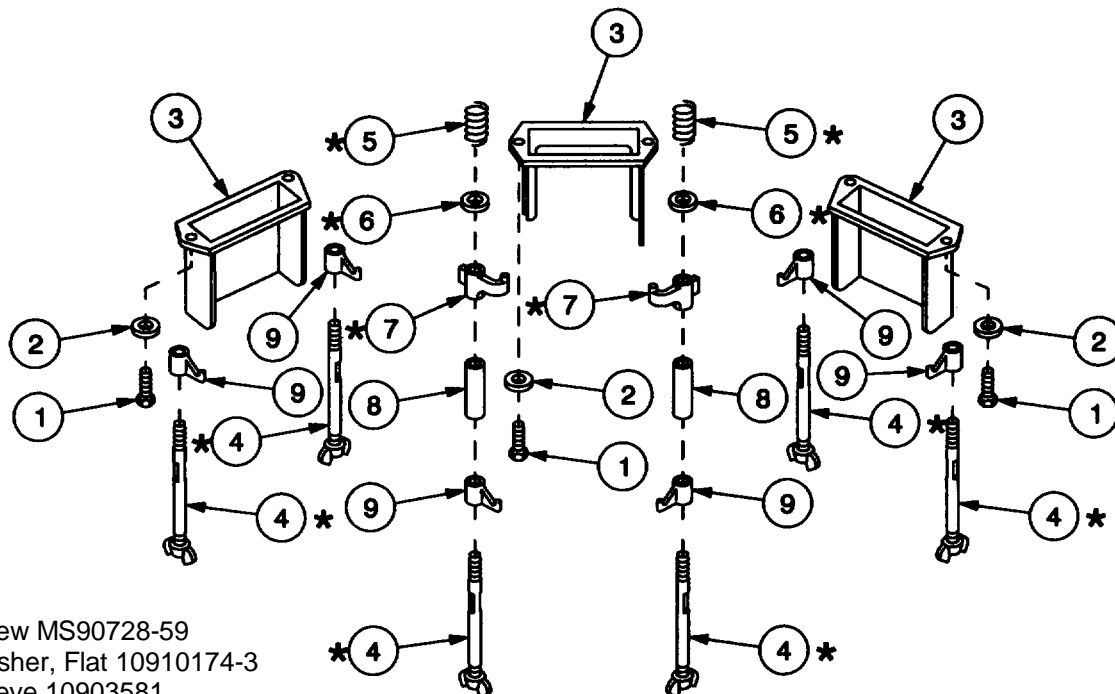
(1) Removal:

- (a) Remove two screws (1), two flat washers (2), and sleeve (3). Set aside screws, fiat washers, and sleeve for disposition per para 8f.
- (b) Remove rod (4) from hull.

NOTE

Steps c, d, and e are for the center periscope position only.

- (c) Remove spring (5) and flat washer (6) from rod (4).
- (d) Remove bracket, solenoid (7) from rod (4).
- (e) Remove spacer (8). Set aside spacer for disposition per para 8f.
- (f) Remove cam control (9). Set aside cam control for disposition per para 8f.



Legend:

1. Screw MS90728-59
2. Washer, Flat 10910174-3
3. Sleeve 10903581
4. Rod 10888686
5. Spring 12352838
6. Washer, Flat MS27183-14
7. Bracket, Solenoid, 12352822-1, 12362822-2
8. Spacer 12352825
9. Cam Control 10903639

*Parts removed and reused.

10. MODIFICATION PROCEDURES - CONTINUED

(2) Installation:

(a) Install spacer (1) on rod (2).

NOTE**There are two types of cam support brackets; either left (3) or right (4).**

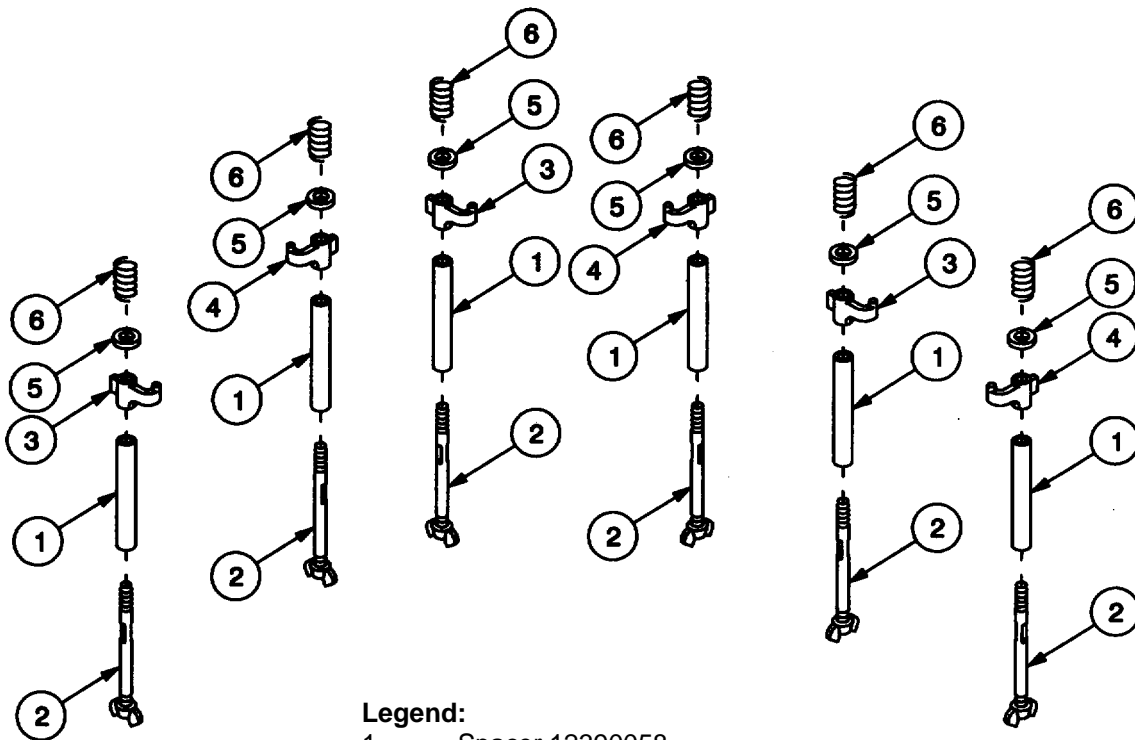
(b) Install cam support bracket (3 or 4) and flat washer (5) on rod (2).

(c) Install spring (6) on rod (2).

(e) Apply sealing compound to rod (2) end.

(f) Install rod (2) into hull.

(g) Install M45 periscopes in accordance with TM 9-2350-314-10.

**Legend:**

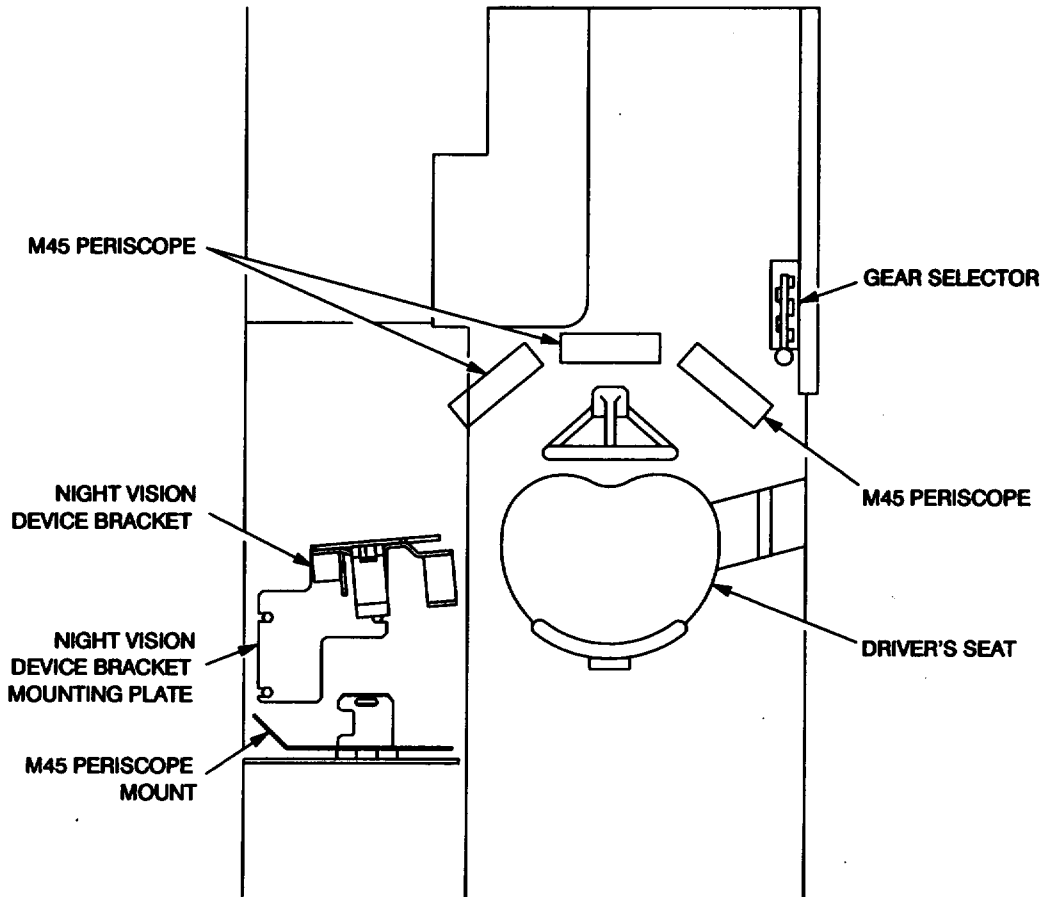
1. Spacer 12390058
2. Rod 10888686
3. Bracket, Solenoid 12352822-1
4. Bracket, Solenoid 12352822-2
5. Washer, Flat MS27183-14
6. Spring 12352838

11. **CALIBRATION REQUIREMENTS.** Not applicable.
12. **WEIGHT AND BALANCE DATA.** Weight and balance are not significantly affected.
13. **QUALITY ASSURANCE REQUIREMENTS.** Not applicable.
14. **RECORDING AND REPORTING OF THE MODIFICATION.**
 - a. Records And Reports. Refer to DA PAM 738-750, The Army Maintenance Management System (TAMMS), for recording and reporting accomplishments of the modification.
 - (1) Completion of DA Form 2407, Maintenance Request, to report MWO application is mandatory. Refer to DA PAM 738-750, paragraph 3-8 and figure 3-12 for instructions on how to request and report MWO applications.
 - (2) On the DA Form 2407, block 2, Serial Number, must contain the serial number of the M 109A6 SP Howitzer. This serial number may be found on the data plate located in the driver's compartment.
 - (3) On the DA Form 2407, block 6, National Stock Number (NSN), must contain the NSN of the M109A6 SP Howitzer. Refer to paragraph 3 of this MWO for this NSN.
 - (4) The DA Form 2407 used to record the MWO application must be completed and the NMP copy #2 mailed within 3 working days after completion of the MWO application. Mail copy #2 of the DA Form 2407 to the following address:

Director, Armament and Chemical Acquisition & Logistics Activity
ATTN: AMSTA-AC-MAE-M
Rock Island, IL 61299-7630
 - b. Marking Equipment. Reference Drawing Number 12563068.
 - c. Identification Data. Not applicable.
15. **MATERIAL CHANGE (MC) NUMBER.** This MWO is authorized by MC number 1-81-05-1002.
16. **MODIFICATION IDENTIFICATION.** To verify that this MWO has been applied, occupy the operator position and look for the configuration identified in the artwork below, ensuring that:
 - a. M45 Periscope Box has been removed and that
 - (1) M45 Periscope Mounting Bracket, PN 12390061, has been mounted as shown. Bracket will be covered with a black rubber substance (plastisol).
 - (2) Plate, NVD Bracket Mounting, PN 12390073, is installed to the vehicle hull and that mounted to the plate is NVD Bracket, PN 12390059. The NVD bracket also has black plastisol coating and is hinged to allow installation and removal of the NVD.
 - b. There is no NVD bracket mounted to the right side of the driver position (above and slightly forward of the gear selector).

16. MODIFICATION IDENTIFICATION - CONTINUED

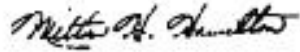
- c. The M45 periscopes have an attached shroud, PN 12927746 (see artwork page 9 of this MWO). Shrouds are attached to the M45 even when stowed in the M45 bracket
- d. Identification of a thru c verifies that this MWO has been applied.



By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:



MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
09114

Distribution:

To be distributed in accordance with DA Form 12-37-E, Block 2403, requirements for MWO 9-2350-314-20-1.

* U.S. GOVERNMENT PRINTING OFFICE: 1995 646-018/20039

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THEN . . . JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

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PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.
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TEAR ALONG PERFORATED LINE

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JUL 79

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

THE METRIC SYSTEM AND EQUIVALENTS

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

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
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
its	Liters	0.473
arts	Liters	0.946
allons	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

TO CHANGE	TO	MULTIPLY BY
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
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
ometers per Liter	Miles per Gallon	2.354
ometers per Hour	Miles per Hour	0.621



PIN: 073672-000