

E. Sullivan, MMT

TM 9-1440-250-10/1

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

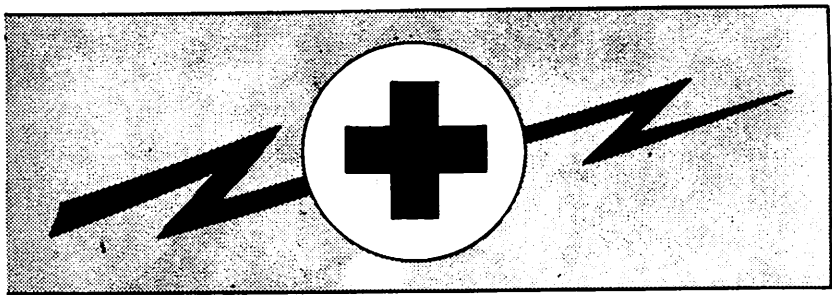
OPERATOR'S MANUAL:

GUIDED MISSILE LAUNCHING SET (NIKE-HERCULES AND IMPROVED NIKE-HERCULES AIR DEFENSE GUIDED MISSILE SYSTEMS)

HEADQUARTERS, DEPARTMENT OF THE ARMY
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WARNING



RA PD 404264

HIGH VOLTAGE

is used in the operation of this equipment

DEATH ON CONTACT

may result if personnel fail to observe safety precautions

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Be careful not to contact high-voltage connections for 115-volt ac input connection when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

EXTREMELY DANGEROUS POTENTIALS

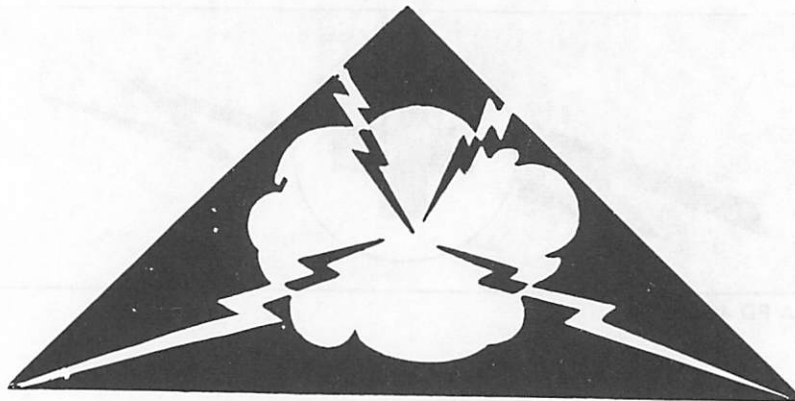
greater than 500 volts exist in the following units:

- Flight Simulator Group
- Radar Modulator
- Transmitter Wave Guide Assembly

Warning: Potentials less than 500 volts may cause death under certain conditions: therefore, reasonable precautions should be taken at all times.

For Artificial Respiration, refer to FM 21-11.

W A R N I N G



RA PD 461691

RADIATION HAZARD

This equipment contains the following radioactive tubes:

OB2,395A,0A2WA,0B2WA

Refer to TM 38-250, AR 755-380, and AR 55-55 for safety information relative to shipping, storage, handling, and disposal of radioactive tubes.

FIRST AID FOR RADIOACTIVE CONTACT

The following first aid procedure for wounds caused by anything coated with a radioactive material represents the only reasonable first aid treatment which would possibly be available.

a. Stimulation of mild bleeding by normal pressure about the wound and by use of suction cups.

Warning: Do not suck the wound by mouth. The wound must be washed with soap and flushed with plenty of clear water.

b. If the wound is of the puncture type, or the opening is quite small, an incision should be made to promote free bleeding and to facilitate cleaning and flushing of the wound.

c. Evacuate patient to a medical facility where monitoring of the wound can be accomplished. All such wounds should be examined by a medical officer.

d. For wounds involving the extremities, pending medical attention, place a lightly constricting band (tourniquet) 2 to 4 inches closer to the heart than the site of the wound. The band should be tight enough to halt the flow of blood in superficial blood vessels but not tight enough to stop the pulse (arterial flow).

CLEANING SURFACES ON WHICH TUBES HAVE BEEN BROKEN

Wet method. Put on rubber or plastic gloves. Pick up large fragments with forceps; then, using a wet cloth, wipe across the area. Make one wipe at a time and fold cloth in half, using the clean side for wiping each time. When cloth becomes too small, discard and start again with a clean piece of cloth. Care must be taken not to rub the radioactive particles into the surface being cleaned by using a back and forth motion. All debris and cloths used for cleaning should be sealed in a container such as a plastic bag, heavy waxed paper, ice cream carton, or glass jar for disposal.

W A R N I N G



RA PD 461690

SAFETY MEASURES FOR HANDLING HIGH-PRESSURE AIR SYSTEMS

1. Personnel who handle high-pressure airhoses and components shall be thoroughly trained in the use and maintenance of the equipment, and in the application of safety measures to protect against existing hazards. Comply with all precautionary measures.
2. Inspect all systems using high-pressure air before, during, and after use for leaks, defective airhoses, improperly adjusted valves, malfunctioning regulators and relief valves, and the presence of foreign materials in the system.
3. Clear all airhoses and valves at regular intervals. Release pressure through bleeder valves before disconnecting any lines or hoses or making any repairs.
4. When pressuring a system, personnel operating the valves shall stand clear of hose connections, and shall turn the valves slowly to prevent shock loading or pressure surges which may damage hoses or components. Close valves manually to prevent overtightening; never tighten with a wrench or tool.
5. Observe the following precautions pertaining to high-pressure airhoses:
 - a. The minimum bending radius for flexible airhoses shall be: 4 inches for $\frac{1}{4}$ -inch ID hose; 6 inches for $\frac{3}{8}$ -inch ID hose; 7 inches for $\frac{1}{2}$ -inch ID hose; $9\frac{1}{4}$ inches for $\frac{3}{4}$ -inch ID hose.
 - b. Never coat or paint an airhose, because this impairs the normal breathing tendency of the airhose.
 - c. Depressurize and protect airhoses from the sun when not in use.
 - d. Do not kink, twist, strike, walk on, run over, jerk, or otherwise abuse airhoses.
 - e. Allow 2 feet of slack for each 100 feet of airhose to compensate for contraction during pressurization.
 - f. Secure high-pressure airhose at 36-inch intervals. Use equipment straps, ground stakes, or sandbags as necessary.
 - g. 3000 PSIG air pressure is used in the operation of this equipment.
(On the line provided in g. above, insert the maximum air pressure used with this equipment.)

NOTE: For inspection and test of air and other gas compressors refer to TB 742-93-1.

TECHNICAL MANUAL }
 No. 9-1440-250-10/1 }

HEADQUARTERS,
 DEPARTMENT OF THE ARMY
 WASHINGTON, D. C. 29 November 1965

GUIDED MISSILE LAUNCHING SET

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*This manual supersedes TM 9-1440-250-10, 4 December 1959; C1, 20 June 1960; C2, 4 August 1960; C4, 23 January 1961; C5, 8 February 1961; C6, 16 March 1961; C7, 2 June 1961; C8, 26 September 1961; C9, 24 January 1962; C10, 9 April 1962; C11, 16 August 1962; C12, 15 January 1963; C13, 4 September 1963; C14, 21 July 1965; and TB 9-5096-1/1, 27 February 1959.

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CHAPTER 1

INTRODUCTION

1. Scope

a. This technical manual (TM) provides the necessary information and instructions needed by personnel responsible for the operation of the launching set. This TM contains physical descriptions, functions of controls and indicators, non-tactical operations required during energizing, normal operation, and deenergizing of the equipment, non-tactical operations required under emergency conditions, and non-tactical operations required during misfire procedures.

b. This TM is one of a series of TM's on operation, emplacement, and maintenance of the NIKE-HERCULES and Improved NIKE-HER-

CULES Air Defense Guided Missile Systems. A list of TM's covering launching area equipment is provided in appendix I of TM 9-1400-250-10.

c. Appendix I contains a reference to two TM's which list publications applicable to this equipment. Appendix II contains a list of abbreviations used in this TM.

d. Destruction to prevent enemy use of the launching set is covered in TM 9-1400-250-15/2.

e. This TM is technically correct for all launching sets provided that all of the outstanding Modification Work Orders (MWO's) listed in table 1 have been incorporated.

Table 1. Modification Work Orders

MWO	Description
ORD Y31-W1	Modifies pulse delay network 8511425 in the simulator group and allows it to use the same delay line as the missile guidance set (simulator groups 1001 through 1125).
ORD Y75-W1	Protects taillight connectors from rocket motor cluster blast (launchers 1021 through 1252).
ORD Y75-W3, Changes 1 and 2	Protects exposed launcher cables from rocket motor cluster blast (all launchers).
ORD Y75-W5, Changes 1	Incorporates a deloader valve in the launcher hydraulic pumping unit to prevent excessive loading of the electric pump motor (launchers 1021 through 1492 and 50001 through 50038).
ORD Y75-W9	Modifies the launcher control-indicator to obtain a "prepared" signal without regard to the delay line condition (launcher control-indicators 1021 through 1352).
ORD Y75-W10	Modifies the warhead monitor circuits in the launcher control-indicator because of special revised circuits in the warhead (launcher control-indicators 1021 through 2396 and 50000 through 50023).
ORD Y75-W13	Removes the 25-ohm resistor from the BARO SET switch circuit and revises circuitry to conform to revised warhead circuitry (launcher control-indicators 1021 through 1844 and 50000 through 50029).
ORD Y75-W15	Provides stops which prevent missiles from rolling off the loading racks or extensions (launcher subsurface four-rack modification kits 6 through 271 and 50000 and 50001).
ORD Y75-W16, Changes 1 and 2	Removes the AC-DC switch and replaces relay K2D with relay K9BP (launcher control-indicators 1161 through 3324 and 50000 through 50041).
ORD Y75-W17, Changes 1	Reworks the equilibrator bypass valve to prevent contamination and adds drain holes in the down-latch clevis bracket pads (all launchers).

Table 1. Modification Work Orders—Continued

MWO	Description
ORD Y75-W18	Installs an audible warning device to provide a signal when a missile is improperly positioned on the launcher or loading racks (launcher subsurface four-rack modification kits 6 through 51).
ORD Y75-W19	Modifies the interlock circuit to permit operation of missile hydraulics without disabling the NIKE-AJAX fail-safe switch (launchers 1021 through 2396 and 50001 through 50023).
ORD Y75-W20	Installs a circuit breaker panel in place of the fuse panel in the launcher power distribution box, and waterproofs the power distribution box (launchers 1021 through 4085 and 50000 through 50087).
ORD Y75-W24	Provides four-rack spacing between launchers in place of three-rack spacing (launcher subsurface four-rack modification kits 6 through 271).
ORD Y75-W32	Replaces fuseholders and fuses with circuit breakers (launcher control-indicators 1021 through 1252).
ORD Y75-W37	Adds a lamp guard for the battery charge lamps on the relay panel (launcher control-indicators 1021 through 1352 and 50000 through 50030).
ORD Y75-W47 and Y86-W15, Changes 1 and 2	Provides additional output voltage for the operation of the transponder-control group (mush-room) (launcher control-indicators 1021 through 4085 and 50000 through 50087; launchers 1021 through 3084 and 50000 through 50087; and launching-handling rails 1081 through 4895 and 50000 through 50351).
ORD Y75-W50, Changes 1	Adds an identification plate to the HPU GLOW COIL switch to clarify the switch positions, and provides a keying hole for the switch washer tab (launcher control-indicators 1021 through 1302 and 50000 through 50087).
ORD Y75-W55	Installs a boot on exposed toggle switches to prevent water seepage from shorting the contacts (all launcher control-indicators).
ORD Y75-W58, Y81-W8 and Y86-W17, Changes 1 and 2	Provides launcher and launching section with rocket motor cluster winterization kits (launching sections as determined by the area commander).
ORD Y75-W63	Replaces five hydraulic valve identification decals with metal identification plates (launchers 1021 through 3324 and 50000 through 50043).
ORD Y75-W65	Prevents the contacts of connectors P72A and P1X from being accidentally shorted to the dust cover retaining chains (all launchers).
ORD Y75-W67, Y81-W9, and Y90-W3, Changes 1, 2, 3, 4, and 5	Modifies the squib circuits to prevent accidental firing of a missile (launcher control-indicators 1021 through 3862 and 50000 through 50087; launchers 1021 through 3862 and 50000 through 50087; section control-indicators 1001 through 1856; and section simulator groups 1001 through 1856).
ORD Y75-W71	Provides loading rack stops to prevent the missile from rolling off the loading rack adapters (launcher subsurface four-rack modification kits 1 through 271 and 50000 through 50021).
ORD Y75-W83	Adds a switch guard on the circuit breaker panel (launcher control-indicators 1021 through 4085 and 50000 through 50087).
ORD Y79-W2	Replaces and relocates the centrifugal fan in the launching control console, and replaces all fuses with circuit breakers in the console and the main switch box (launching control stations 1001 through 1125).
ORD Y79-W3	Adds an electronic-filter assembly in the launching control console to prevent momentary deenergizing of relay K2M when switching from yellow to blue equipment status (launching control stations 1001 through 1044).
ORD Y81-W2 and Y90-W1, Changes 1, 2, and 3	Replaces fuses with circuit breakers, and replaces the centrifugal fan, wiring harnesses, and an interconnecting cable (section control-indicators 1001 through 1582).

Table 1. Modification Work Orders—Continued

MWO	Description
ORD Y86-W10, Changes 1	Replaces the rail release locking pin and the bolt on the left-hand missile-rocket motor cluster positioning stop with shear-type externally relieved body bolts (launching-handling rails 1081 through 4498 and 50000 through 50129).
ORD Y86-W11	Adds a right-hand missile-rocket motor cluster positioning stop to support the weight of the missile-rocket motor cluster combination more evenly (all launching-handling rails).
ORD Y86-W12	Eliminates possible damage to the dummy receptacle lockup switch handle by inverting the dummy receptacle (launching-handling rails 1001 and subsequent).
ORD Y86-W13	Adds a launcher-hook-fitting positioning bolt to facilitate alinement of the missile T-hook adapter with the hook on the rail release assembly (launching-handling rails 1081 and subsequent and 50000 and subsequent).
ORD Y86-W16, Changes 1, 2, 3, and 4	Modifies the rail release assembly to withstand a greater G load during the erecting cycle (launching-handling rails 1081 through 5380 and 50000 through 50153).
9-1400-250-30/22, Changes 1	Provides a heat monitor indication for each launcher and for missiles at the test stations, replaces the MANUAL ORDERS—LAUNCH switch with a 2 1/4-second delay timer, and changes circuitry to improve reliability (launcher control-indicators 1021 through 4085 and 50000 through 50087, and section control-indicators 1001 through 1957).
9-1400-250-50/43	Provides an interlock between the missile ready circuit and the connection of the rocket motor igniter cable to prevent accidental activation of the missile batteries, and adds a SIMULATE indicator light on both the section control-indicator and launching control console which illuminates when the missile firing simulator assembly is used (launching control stations 1001 through 1393; section control-indicators 1001 through 1984; and launchers 1021 through 4085 and 50000 through 50121).
9-1440-251-30/4 and 9-1440-253-30/3	Interlocks the reject and fire command circuits to prevent damage to missile internal wiring when a misfire occurs, and disconnects the APS GLOW COIL switch to prevent firing the missile battery squibs under certain test conditions (launcher control-indicators 1021 through 4085 and 50000 through 50087; and section control-indicators 1001 through 1933).
9-1440-251-30/5	Adds a voltmeter to permit a more accurate adjustment of line voltage, and changes the voltage-regulation sensing from phase A to phase C (section simulator groups 1001 through 1946).
9-1440-251-34/3	Adds a switch stop to prevent the closing of the MANUAL ORDERS door if the GYRO PRE-SET switch is not set to AUTO (section control-indicators 1001 through 1933).
9-1440-252-30/18, Changes 1	Adds higher rated circuit breakers in the launcher power distribution box to compensate for the additional current required by new circuits (launchers 1001 through 4085 and 50000 through 50087).
9-1440-252-30/20	Adds loading rack stops to prevent the rocket motor cluster fins from striking the magazine wall (as specified in the MWO).
9-1440-252-30/32	Provides the capability for operation of the missile and rocket motor cluster heaters from a 60-cps commercial power source (as specified in the MWO).
9-1440-253-30/1	Adds a switch guard to the APS switch, and adds a decal and nameplate to change the HPU identification to APS (launcher control-indicators 1021 through 4085 and 50000 through 50087).

2. Maintenance Allocation

In general, the prescribed maintenance responsibilities of the operator apply as reflected in TM's 9-1440-250-15P/1/1, 9-1440-250-15P/2/1, 9-1440-250-12P/3/1, 9-1440-250-12P/4/1, and 9-1440-250-12P/6/1. Normally, operator

maintenance may be performed only under the supervision of a trained organizational maintenance technician. When the repair, modification, or adjustment is beyond the scope of the maintenance technician, the supporting maintenance unit should be informed so that personnel with suitable tools and equipment can be provided.

3. Forms, Records, and Reports

Refer to TM 38-750 for instructions on the use and completion of all forms required for operating and maintaining this equipment.

4. Reporting of Equipment Manual Improvements

The direct reporting of errors, omissions, and recommendations for improving this equipment manual by the individual user is authorized and encouraged. DA Form 2028 will be used for reporting these improvements. This form may be completed using pencil, pen, or typewriter. DA Form 2028 will be completed by the individual using the manual and forwarded direct to: Commanding General, U. S. Army Missile Command, ATTN: AMSMI-SMPT, Redstone Arsenal, Alabama 35809.

5. Equipment Serviceability Criteria

a. General. This paragraph establishes the equipment serviceability criteria for the launch-

ing set. Serviceability criteria are furnished to users to enable them to determine if the equipment can perform its primary mission. The commander is required to evaluate the equipment using the criteria furnished. As a result of the evaluation, the equipment will be rated in one of two categories:

- (1) *Green.* Equipment that is free of any condition limiting the reliable performance of its primary mission.
- (2) *Red.* Equipment that is unable to perform its mission immediately or is unreliable.

b. Serviceability Determination. Serviceability of the launching set is determined by user personnel while performing the check procedures contained in TM 9-1440-250-12/1.

c. Recording the Evaluation. Record the results of the evaluation on DA Form 2404 in accordance with the instructions contained in TM 38-750 and AR 750-10.