CONFIDENTIAL

Change)
No. 2)

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *19 October 1973*

Operator and Organizational Maintenance Manual:

THEORY AND FUNCTIONAL SCHEMATICS FOR INTERCEPT-AERIAL GUIDED MISSILES MIM-14A AND MIN-14B (NIKE-HERCULES AND IMPROVED NIKE-HERCULES AIR DEFENSE GUIDED MISSILE SYSTEMS) (U)

TM 9-1410-250-12/2, 27 November 1967, is changed as follows:

1 (U). The effectivity for material in these changes is for all systems.

2 (U). Change security markings from CONFIDENTIAL—MODIFIED HANDLING AUTHORIZED to CONFIDENTIAL on all pages.

3 (U). The attached pages, as enumerated below, will be inserted in the manual and the old pages will be removed and destroyed in accordance with security regulations. The material on a new page affected by these changes is indicated by a vertical line in the margin of the page.

Remove pages	*Insert pages*
3-47, 3-48	3-47, 3-48

4 (U). Change the downgrading and declassification statement to read:

Classified by NIKE Security Guide, Sep 72
Exempt from Gen Declass Sched of EXO 11652
Exemption Category 3
Declassify on — Indefinite

5 (U). This transmittal should be filed in the front of the publication for reference purposes.

Applicata
1-6-76

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS,
General, United States Army,
Chief of Staff.

Official:
VERNE l. BOWERS
Major General, Unites States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-32 (qty rqr block no. 597), requirements for publications pertainint to Organizational Maintenance applicable to the NIKE-HERCULES and Improved NIKE-HERCULES Missile Systems.

"NATIONAL SECURITY INFORMATION"
"Unauthorized Disclosure Subject to Criminal Sanctions"

CONFIDENTIAL

Classified by NIKE Security Guide, Sep 72
Exempt from Gen Declass Sched of EXO 11652
Exemption Category 3
Declassify on — Indefinite

INSTRUCTION SHEET

TM 9-1410-250-12/2

READ THESE INSTRUCTIONS CAREFULLY

1 (U). These instructions provide a listing of those pages held in front of this manual because of MWO 9-1410-250-20/16. → Applicata

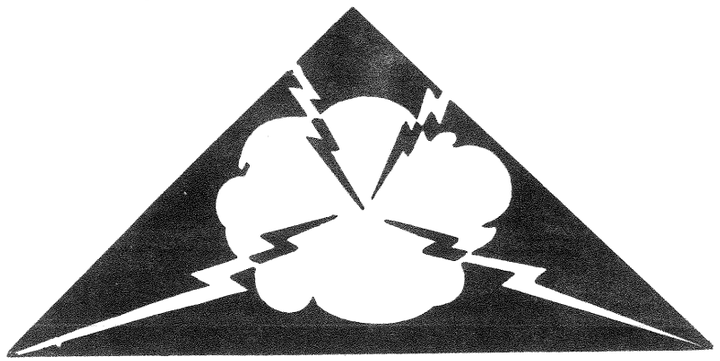
2 (U). If the equipment in use has had the applicable MWO applied insert the following new pages, and remove the old ones. Do not remove the old pages however, until the applicable MWO has been installed. New or changed text material is identified on these pages by a vertical line in the page margin. New or changed illustrations are identified by a vertical line adjacent to the illustration file number. Extensively changed or added sections, paragraphs, etc. are indicated by a vertical line by the title only.

Old pages	New pages	Effectivity	
		MWO	Production cut-in serial no.
i	i	9-1410-250-20/16	None
1-1-1-3	1-1,1-2	9-1410-250-20/16	None
3-1,3-2	3-1,3-2	9-1410-250-20/16	None
3-5,3-6	3-5,3-6	9-1410-250-20/16	None
	3-6.1		
3-25,3-25	3-25,3-26	9-1410-250-20/16	None
3-29,3-30	3-29,3-30	9-1410-250-20/16	None
4-27,4-28	4-27,4-28	9-1410-250-20/16	None

Applicata 8-5-98

3 (U). Retain these instructions in the front of this publication for future reference.

WARNING



RA PD 461691

RADIATION HAZARD

This equipment contains the following radioactive tubes:

OA2WA 395A

Refer to TM 3–261 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.

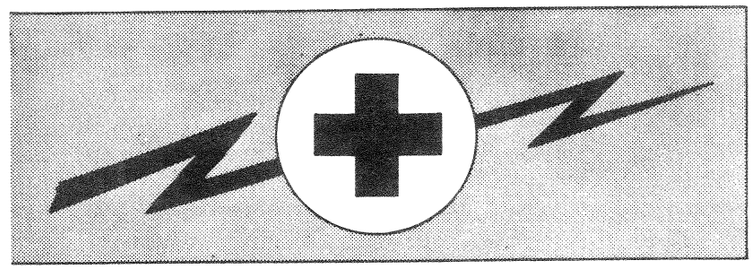
c. Evacuate patient to a medical facility where monitoring of the wound can be accomplished. All such wounds should be examined by a medical officer.

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.

WARNING



RA PD 404264

HIGH VOLTAGE

(over 500 volts)

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 familar 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 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
- Radio Transmitter
- Radar Modulator
- Transmitter Waveguide Assembly

Warning: **Do not be mislead by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.**

For Artificial Respiration, refer to FM 21–11.

TECHNICAL MANUAL

No. 9-1410-250-12/2

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *27 November 1967*

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL:

THEORY AND FUNCTIONAL SCHEMATICS FOR INTERCEPT-AERIAL GUIDED MISSILES MIM-14A AND MIM-14B (NIKE-HERCULES AND IMPROVED NIKE-HERCULES AIR DEFENSE GUIDED MISSILE SYSTEMS) (U)

*This manual, together with TM 9-1410-250-12/1, supersedes TM 9-1410-250-12, 21 February 1963, including all changes in their entirety.

CHAPTER 1 (U)

INTRODUCTION

1-1 (U). Scope

a. This is one of a series of technical manuals on operation, emplacement, and maintenance of the NIKE-HERCULES and Improved NIKE-HERCULES Air Defense Guided Missile Systems. Refer to DA PAM 310-2 and DA PAM 310-4 for a listing of publications indexes, administrative publications, forms and records publications, supply publications, and NIKE technical manuals.

b. This manual is published for the information and guidance of personnel responsible for the operation and organizational maintenance of NIKE-HERCULES Air Defense Guided Missiles MIM-14A and MIM-14B.

c. Refer to TB 9-1425-250-15/1 for configuration history of the system.

d. This manual is technically correct for all NIKE-HERCULES and Improved NIKE-HERCULES Air Defense Guided Missile Systems provided the modification work orders (MWO's) listed on the transmittal sheet of each change have been applied.

e. Refer to DA PAM 310-7 for all MWO's applicable to the equipment.

f. Refer to AR 310-50 for a listing of standard abbreviations. A listing of nonstandard abbreviations is contained in TM 9-1400-250-15/3.

g. Differences among models which affect NIKE-HERCULES Air Defense Guided Missiles MIM-14A and MIM-14B are found in the forward body section, the equipment section, the actuator, and the missile guidance set. Table 1—1 lists the components of the mushroom missile guidance set and indicates the interchangeability of the different models of the components.

(1) *Forward body section.* In missiles 11188 through 11935 and 13001 and subsequent, there is a change in the configuration of the forward body section, the break being made at station 40.000, instead of station 18.000.

(2) *Equipment section.* In missiles 13684 and subsequent, the missile battery is squib activated. The use of a squib-activated battery results in differences in the internal wiring of the missile distribution box and changes of the battery cable assemblies and the support structure. There is a change in the configuration of the accessory power supply (APS). Minor differences in connectors and placarding exist between APS 9032190 and APS 9030900. On missiles 14965 and subsequent, the APS is replaced by the hydraulic pumping unit (HPU). The HPU and the APS are interchangeable at this effectivity.

(3) *Actuator section.* In missiles 10206 through 10603, there is only one overlapping joining pad on each actuator section access door assembly. In missiles 10604 through 11935 and 13001 and subsequent, there are two overlapping joining pads on each actuator section access door assembly.

(4) *Missile guidance set.* Missiles 10206 through 11935 are equipped with the stovepipe missile guidance set, and missiles 13001 and subsequent are equipped with the mushroom missile guidance set. Many minor circuit differences exist between mushroom missile guidance sets with serial numbers prior to G-111 and missile guidance sets with serial numbers G-111 and subsequent. These circuit differences cause the voltages and waveforms observed at various test points, within the missile guidance sets, to differ between the two models. Since these differences are minor, only missile guidance sets with serial numbers G-111 and subsequent are given detailed coverage in this manual.

1-2 (U). Organizational Maintenance Allocation

In general, the maintenance responsibilities of the operator and the organizational maintenance technician will apply as reflected in TM 9-1410-250-24P/1/1. In cases where the nature of repair, modification, or adjustment is beyond the scope of the maintenance technician, the direct support unit should be informed so that personnel with suitable tools and equipment may be provided or other proper instructions issued.

1-3 (U). Forms, Records, and Reports

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

1-4 (U). Report of Equipment Publication Improvements

Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to: Commanding General, U. S. Army Missile Command, ATTN: AMSMI-NPM, Redstone Arsenal, Alabama 35809.

1-5. (Deleted)

Table 1-1 (U). Major Electronic Components of Mushroom Missile Guidance Set Showing Interchangeability (U)

Component	Transponder-control group serial number with component specification and part number																			
	1-110		111-666	667-797	798-949	950-1360	1361-1413	1414-1880	1881-2331	2332-2533	2534-2722	2723-2841	2842-3456	3457-3518	3519-4470	4471-4540	4541-6279	8280-7040 (Est)		Selected Systems
Missile guidance set	9017423 GS-19672	X							9149099[1] GS-65250										X	10666975 GS-69530
Antenna horn	GS-18756[2]																			
Waveguide assembly set	9011093 GS-19688																			
Fail-safe control	9141841 GS-57391A	←	←	←	←	←	←	←	→	9141836 GS-59103										
Sequential timer									9149044[1] GS-19319											
Transponder-control group	9017425 GS-19689	↔	9141460 GS-19689A																X	10666973 GS-69529
Flight control group	9138524 GS-19690																			
Radio set	9012495 GS-19691	↔	9138567 GS-19691A																X	10666970 GS-69528
Transistor oscillator inverter (A1)	9017496 GS-19791	←	←	←	←	←	←	←	←	←	←	←	←	→	9158645 GS-19791A	↔	GS-19791B 9989616			
Radio set power supply (A2)	9017469 GS-19993	←	←	←	→	9144508 GS-19993A	←	←	←	←	←	←	←	←	→	9989646 GS-19993B				
Direct current power filter (A3)	9010439 GS-56854	↔	9141446 GS-59137																	
P or Y steering amplifier (A4, A5)	9012378 GS-19697																		X	10666546 GS-69524
Roll control amplifier (A6)	9012373 GS-19698																			
Sweep generator (A7)	9017491 GS-19708	←	←	←	←	←	←	←	←	←	←	→	9981781 GS-19708A							
Pulse delay oscillator (A8)	9012047 GS-19694	←	←	←	←	←	←	←	←	←	→	9981783 GS-19694A								
Command signal converter (A9, A11)	9011887 GS-19695	←	←	←	←	←	→	9158778 GS-19695A	↔	↔	↔	↔	↔	9981971 GS-19695B						
Command signal decoder (A10)	9012299 GS-56703	X	9138595 GS-59101	←	←	←	←	←	←	←	→	9981408 GS-59101A								
P-Y-burst delay network (A12)	9009824 GS-19709																			
Command detonation electronic switch (A13)	9012252 GS-19696	X	9138599 GS-59102	←	←	→	9158790 GS-59102A													
Delay line driver (A14)	9009030 GS-19693	X	9138584 GS-59100																	
RF detector (A15)	9009033 GS-19792	X	9141428 GS-59116																	
Amplifier bias control (A16)	9012257 GS-56702	←	←	→	9154225 GS-56702A															
Amplifier-decoder (A17)	9007576 GS-19692	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	GS-19692A 9989896		
Radio transmitter (A18)	9012500 GS-19699	↔	↔	9144597 GS-19699A																
Radar modulator	9012755 GS-57317			9149004 GS-57317A																
Tapped delay line	9012756 GS-57356																			
Radio receiver (A19)	9008148 GS-56704																			
Missile code delay line (DL1)	GA-10424[3]																			

[1] DA MWO Y77-W42 adds sequential timer to 9017423 creating 9149099.

[2] Two of GS-18756, L6 8520836 for transmitting are shipped with guidance set. Two of L1 through L5 of GS-18756, 8520831 through 36 for receiving are installed at site.

[3] One of L1 through L16 of GA-10424, 9007575, 9007613 through 9007627 is installed on site.

→ Directly interchangeable with earlier vintage.

↔ Interchangeable but later vintage is preferred.

X Units are electrically or mechanically non-interchangeable.

(serial numbers 10206 through 11838, 13001 through 13450, and 10206 through 12618).

q. ORD Y77–W33 adds a check valve to the hydraulic system return line to reduce hydraulic oil leakage at the actuator valves (serial numbers 10206 through 11935 and 13001 through 13683).

r. ORD Y77–W34 adds a spring-loading feature to the access door for additional safety and easier access to the accessory power supply (APS) service panel (serial numbers 10206 through 11745 and 13001 through 13160).

s. ORD Y77–W35 replaces the main fin seals and seal retainers to facilitate future seal replacement by lower echelons of maintenance (serial numbers 10206 through 12288).

t. ORD Y77–W36, Changes 1, modifies the check valve port of valve body 9030837 in the accessory power supply (APS) in order to incorporate an improved high-pressure cartridge check valve 9018827 (serial numbers 10206 through 10284).

u. ORD Y77–W37 replaces the fuel control valves in the APS with functionally identical values to reduce the possibility of fuel leakage (serial numbers as listed in the MWO).

v. ORD Y77–W39 replaces the bolts used to attach the lanyard bracket to the booster thrust fitting assembly (serial numbers 10206 through 11187 and 13001 through 13120).

w. ORD Y77–W40, Changes 1, provides additional access holes to allow replacement of the nut plates damaged by the access cover plate screws (serial numbers 10206 through 11970 and 13001 through 13938).

x. ORD Y77–W42 replaces the warhead-timer jumper assembly with the sequential timer to provide added capability to the missile (serial numbers 10206 through 11970 and 13001 through 14764).

y. ORD Y77–W43 modifies the accumulator valve in the APS hydraulic system so that it will remain open in case of the failure of the accumulator valve pilot valve (serial numbers 10206 through 11935 and 13001 through 13683).

z. ORD Y77–W44, Changes 1, adds pad eyes to the warhead shipping container to facilitate securing the container during air lift and transportation (all warhead section shipping containers M409).

aa. ORD Y77–W45 replaces the air pressure relief valve for the main housing covers, thus giving positive relief of the air pressure after the pressure tests (transponder-control groups serial numbers 1 through 601).

ab. ORD Y77–W46 adds an air input valve for the access cover as a personnel safety feature (transponder-control groups serial numbers 1 through 1331).

ac. ORD Y77–W49 isolates the reject circuit from the internal-external control circuit, thus reducing the possibility of a missile being launched without the quick-activate battery voltage necessary for a successful flight (serial numbers 13684 through 14069).

ad. ORD Y77–W50, Changes 1, provides a procedure for the replacement of the actuator assembly filters (serial numbers 11361 through 11970 and 13015 through 13797).

ae. ORD Y77–W51 reworks safety and arming device mounting plate XM2 to safety and arming device mounting plate M2E2 (all warhead sections M21, M22, or M23).

af. ORD Y77–W52 isolates the internal charge circuit in missiles with BA–472/U batteries to remove the possibility of burnout of the battery charge lamp in the launcher control-indicator (serial numbers 13684 through 14793 and 14965 through 14976).

ag. 9–1410–206–30/1 removes the wire rope sling from the shipping and storage containers (all warhead section shipping containers M–409 and rear body and forward body section containers M–410).

ah. 9–1410–206–50/2 provides procedures for repairing the steel container of the missile rocket motor subassembly (all steel containers which have defective welds at the rear extension sleeve assembly).

ai. 9–1410–206–50/3 replaces gas generator 8034201 with igniter M72 in rocket motor M30 to extend the service life (applied to rocket motors M30 prior to 8½ years after the date loaded by special depot teams).

aj. 9–1410–250–20/2 replaces the adjustable lanyard with a flexible lanyard (serial numbers 10206 through 11935 and 13001 through 15255).

ak. 9–1410–250–20/5 provides improvised fuel-fill quick-disconnect valve in the APS fuel system (serial numbers 1001 through 14964).

al. 9–1410–250–20/6, Changes 1, replaces rocket motor igniter cables with an improved cable which incorporates additional protection for the resistors located in the cable connector (all warhead shipping containers XM409).

am. 9–1410–250–20/12 provides missiles MIM–14A and MIM–14B with a closure ring assembly that will adapt it for use with the missile rocket motor subassembly both before and after incorporation of MWO 9–1410–206–50/2 (serial numbers 10206 through 11935 and 13001 through 20805 when used with missile rocket motor subassembly 8031093 or 8031094 that has MWO 9–1410–206–50/2 incorporated).

an. 9–1410–250–20/14 removes the terminal board assembly containing diode CR115 from the missile distribution box installed in guided missiles MIM–14B by MWO ORD Y77–W52 (missile serial numbers 13684 through 20805).

ao. 9–1410–250–30/1 eliminates an accumulator-pilot-valve malfunction caused by deformation of the pilot-valve seat and binding of ball-actuating pin (serial numbers as listed in the MWO).

ap. 9–1410–250–30/4, Changes 1, facilitates installation of the APS winterization kit by relocating electrical connector in missile equipment section (serial numbers 13684 through 15547).

aq. 9–1410–250–30/7, Changes 1 and 2, provides a supplemental fail-safe capability by the addition of separation switches at stations 87.500 and 136.000, and also provides a shunt path around relay K1 in the transponder-control group to maintain the beacon response during the interval between the burst command and warhead detonation when the sequential timer is used (all missiles employed in annual service practice firings).

ar. 9–1410–250–30/8 eliminates improper indications on the launcher control-indicator voltmeter during the warhead battery load tests by relocating metering circuits within missile distribution box (serial numbers 10206 through 13683).

as. 9–1410–250–30/9 prevents the pump drive shaft from becoming disengaged from the pump due to the failure of the shaft safety lockwire (serial numbers as listed in the MWO).

at. 9–1410–250–30/11 replaces the outlet tube assembly connecting the hydraulic pump assembly and the oil manifold assembly, components of the HPU, with an automatic shutoff valve and redesigned outlet tube assembly (serial numbers 14965 through 20307 and all missiles prior to serial number 14965 equipped with an HPU).

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CHAPTER 2 (C)

PHYSICAL DESCRIPTION AND DATA

Section I (U). GENERAL

2–1 (U). NIKE–HERCULES and Improved NIKE–HERCULES Air Defense Guided Missile Systems

The command guidance system is used in both the NIKE–HERCULES and Improved NIKE–HERCULES Systems. This guidance system employs commands provided by radar equipment on the ground which directs the missile to intercept the target and detonate the missile warhead. The ground guidance equipment consists of an acquisition radar system, a target-tracking radar system, a target-ranging radar system, a missile-tracking radar system, a computer system, and associated tactical control equipment. The acquisition radar system is used for continuous target surveillance. The target-tracking, target-ranging, and missile-tracking radar systems obtain precise target and missile position information. The computer system solves intercept problems using the target and missile position information, and then issues the coded guidance commands required to direct the missile-to-target intercept. The guidance commands are sent to the missile via the missile-tracking radar system. At the proper time before intercept, a burst command from the computer system is sent to the missile.

2–2 (U). Guided Missiles MIM–14A or MIM–14B

a. General. The missile is a supersonic air defense missile with a cruciform and dart-type configuration which consists of a missile body (fig. 2–1) and a rocket motor cluster (fig. 2–2). To facilitate location of missile components, station and fin numbering systems are used. These systems are described in *b* and *c* below. Also the terms "front," "rear," "left," and "right" are used to orient personnel in relation to areas of the missile. When these terms are used, it is assumed that the missile is in the normal flight position with personnel standing at the rear facing forward.

b. Station Numbering Systems. Station numbers (figs. 2–1 and 2–2) measure distances in inches from an imaginary perpendicular line 2½ inches forward of a tactical nose tip to any given location on the missile body and the rocket motor cluster; for example, station 87.500 (fig. 2–1) is 87.500 inches from the imaginary perpendicular line.

c. Fin Numbering System. Main fin No. 1 (A, fig. 2–3) is at the upper left of the missile body when the index pin at the rear of the missile body is at the top center position. The remaining three fins are numbered clockwise from fin No. 1. Rocket motor cluster fin No. 1 (B, fig. 2–3) is at the upper left of the rocket motor cluster. The remaining three fins are numbered clockwise from fin No. 1.

Section II (C). PHYSICAL DESCRIPTION OF MISSILE BODY (LESS MISSILE GUIDANCE SET)

2–3 (U). General

The missile body (fig. 2–1), which is approximately 27 feet long, consists of a forward body section, a warhead body section, a rear body section, and four main fins. Three aerodynamic sections are contained in the missile body: ogive, constant body, and boattail. Four functional systems are contained in the missile body: guidance, hydraulic, warhead, and propulsion.

2–4 (U). Forward Body Section

a. The forward body section (figs. 2–4 and 2–5) consists of a forward nose section, a rear nose section, and four forward fins. In missiles 10206 through 11187, the forward nose section

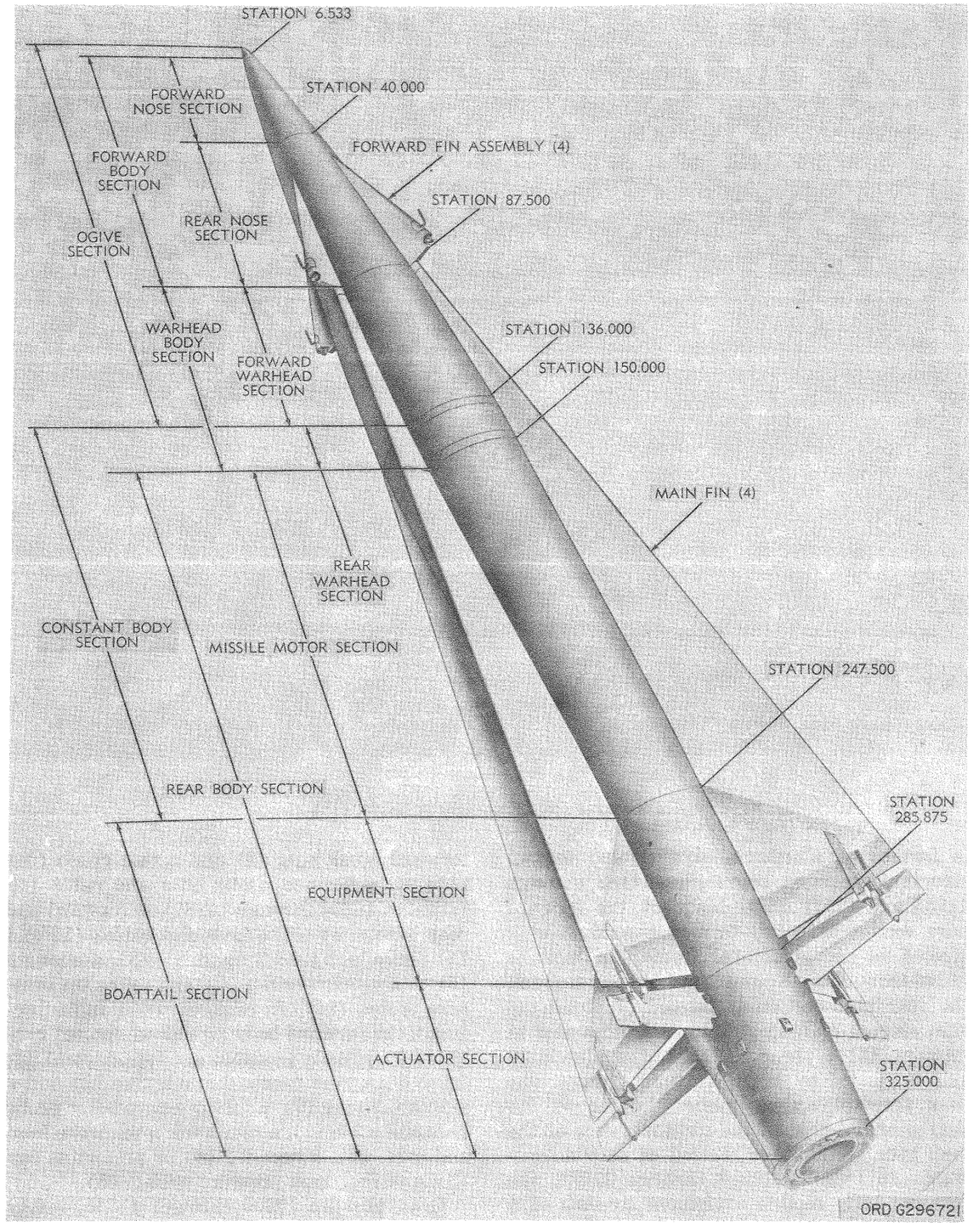


Figure 2–1 (U). Missile body (U).

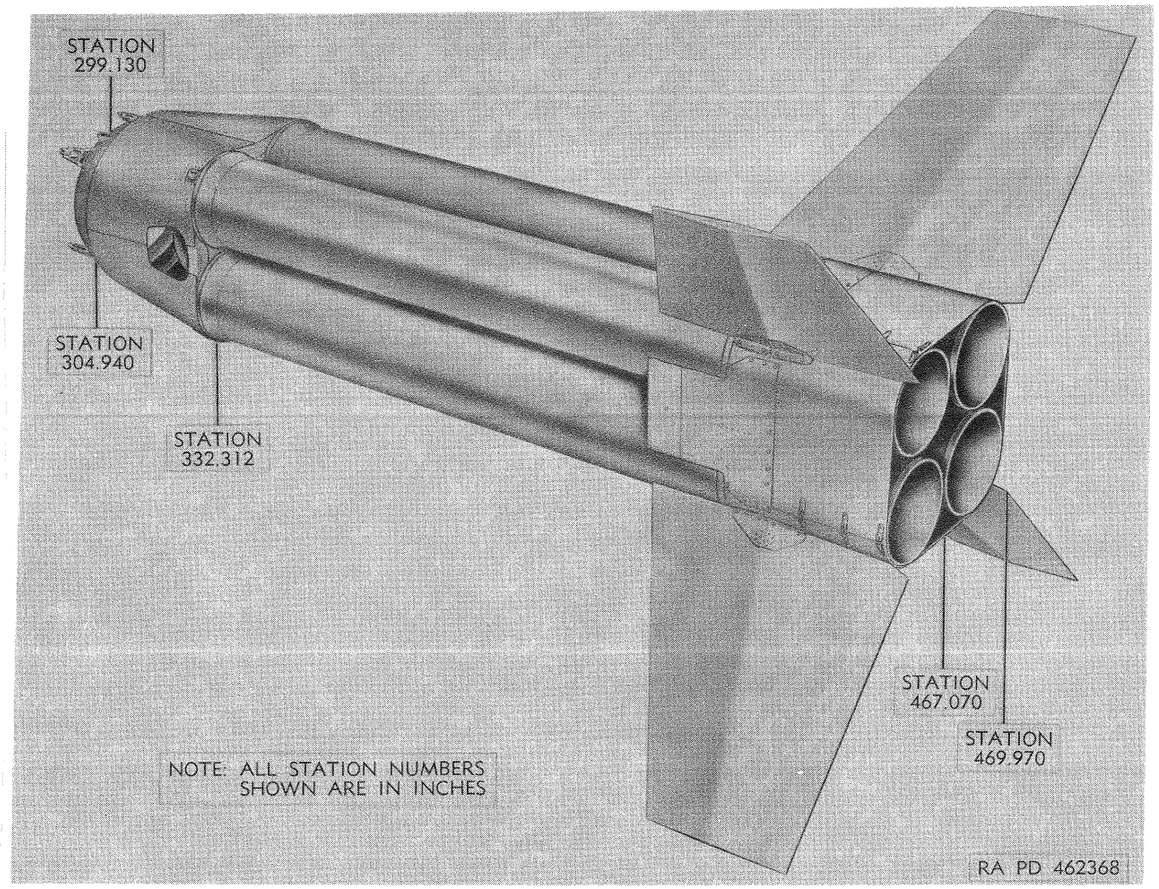


Figure 2–2 (U). Rocket motor cluster (U).

is formed of aluminum skin riveted to two structural frames; in missiles 11188 through 11935 and 13001 and subsequent, the forward nose section is rolled-formed aluminum skin riveted to one structural frame. In missiles 10206 through 11187 and 13001 and subsequent, the rear nose section is formed of aluminum skin riveted to four structural frames and in missiles 11188 through 11935, the aluminum skin is riveted to three structural frames. The four forward fin assemblies, located at 90-degree angles around the circumference of the rear nose section, are formed of cast magnesium. In missiles 10206 through 11935, the forward body section equipment consists of a missile guidance set (stovepipe) (11, fig. 2–4), safety and arming switch S30 (12), a nose forward crush ring (3) and a rear crush ring (10), a barometer probe hose and cable (1) (missiles 10206 through 11187) or forward and rear barometer probe hose and cables (16 and 15) (missiles 11188 through 11935), a nose tip (5) or a protective cap (4), and four ram pressure probes (14). In missiles 13001 and subsequent, the forward body section equipment consists of a missile guidance set (mushroom) (9, fig. 2–5), a nose forward crush ring (2) and a rear crush ring (7), a forward barometer probe hose and cable (1), a rear barometer probe hose and cable (6), a nose tip (4) or protective cap (3), and four ram pressure probes (8).

b. In missiles 10206 through 11935, safety and arming switch S30, (12, fig. 2–4), mounted in the lower portion of the rear nose section,

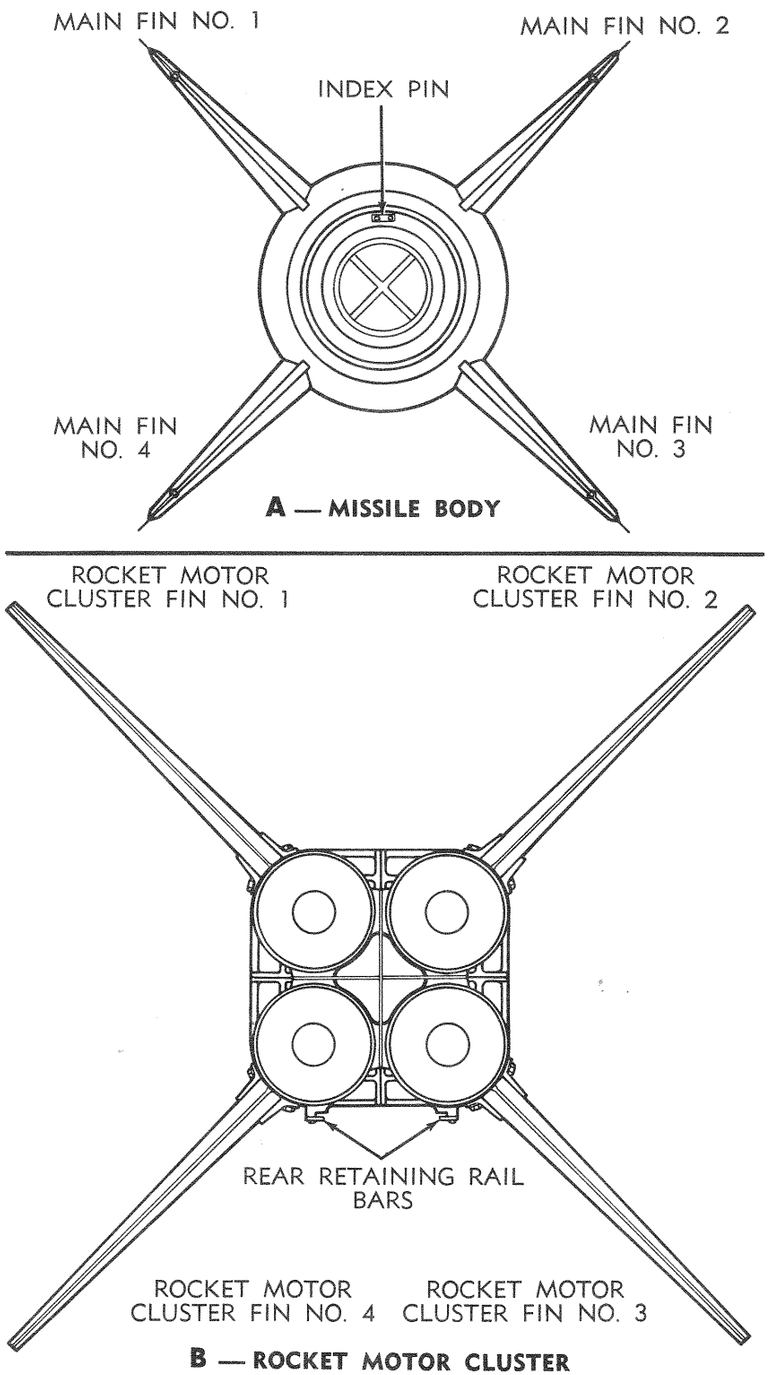
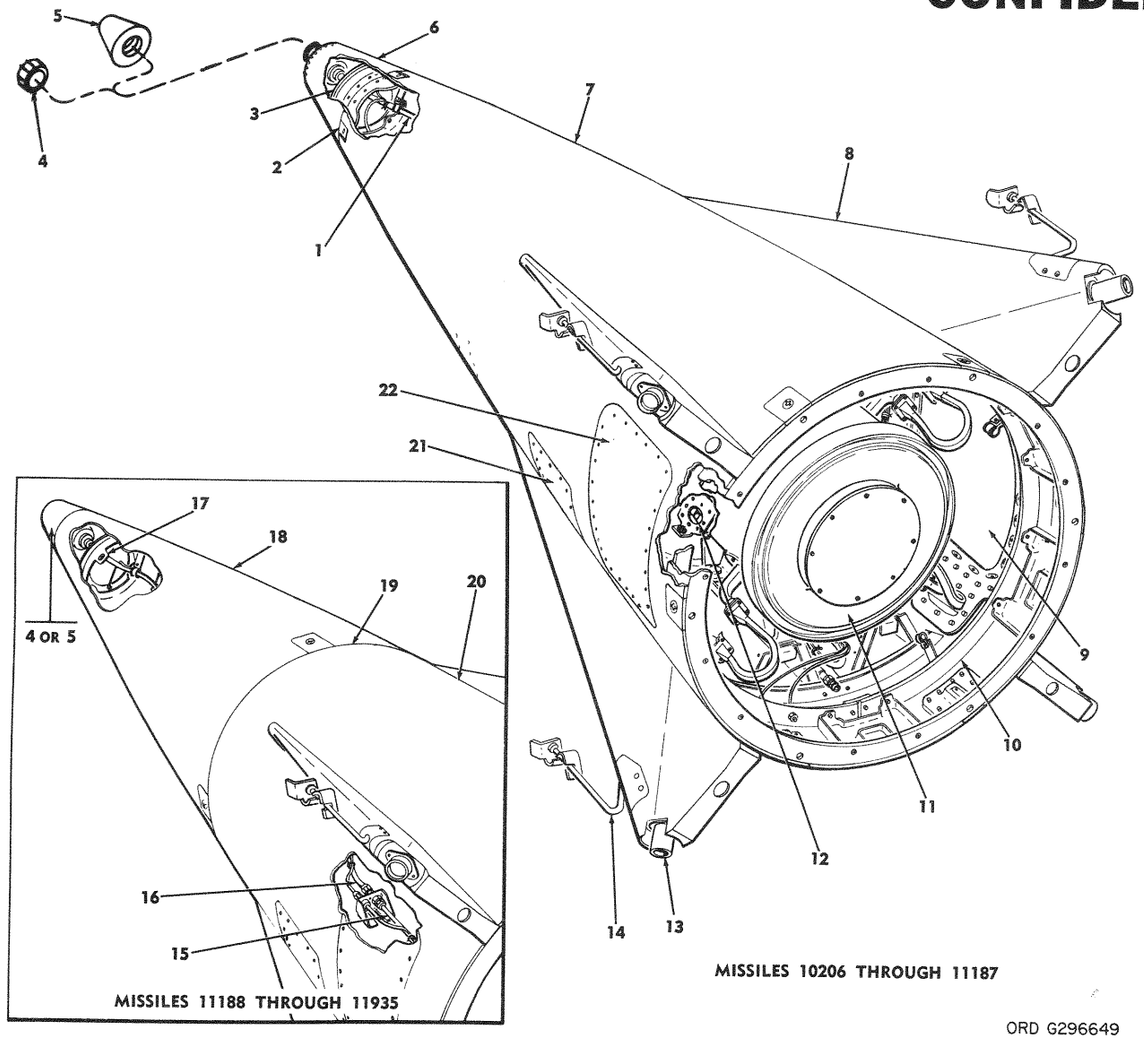


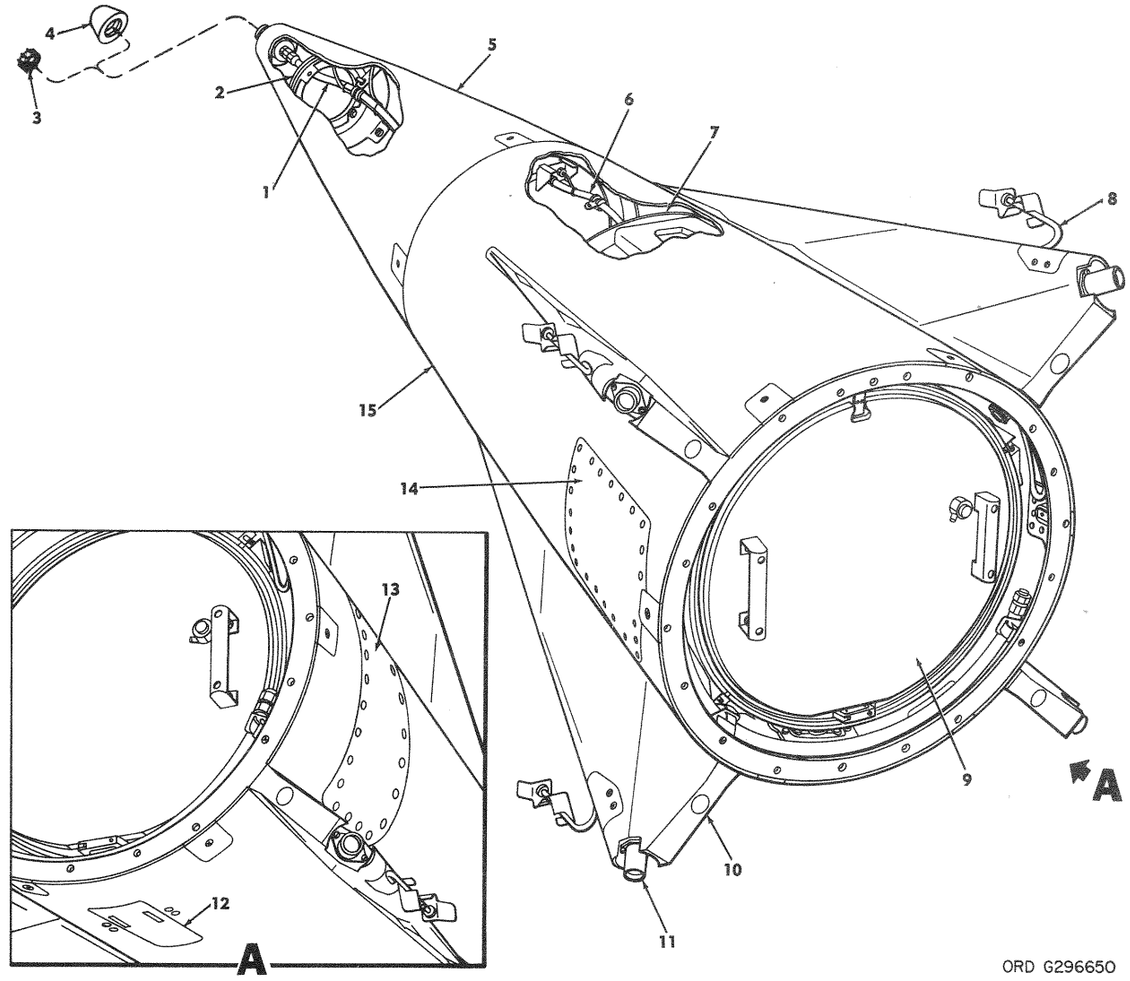
Figure 2–3 (U). Fin numbering system (U).



1—Barometer probe hose and cable
2—Station 18.000
3—Nose forward crush ring
4—Protective cap[1]
5—Nose tip[1]
6—Forward nose section
7—Rear nose section
8—Forward fin assy (4)
9—J1 + XMTR ACCESS DOOR
10—Rear crush ring
11—Missile guidance set (stovepipe)
12—Safety and arming switch S30
13—Antenna horn (4)
14—Ram pressure probe (4)
15—Rear barometer probe hose and cable
16—Forward barometer probe hose and cable
17—Nose forward crush ring
18—Forward nose section
19—Station 40.000
20—Rear nose section
21—INERTIA SWITCH AND ADJUST ACCESS DOOR
22—GUIDANCE TEST AND ADJUST ACCESS DOOR

[1]Either one may be used.

Figure 2-4 (U). Forward body section (missiles 10206 through 11935) (U).



1—Forward barometer probe hose and cable
2—Nose forward crush ring
3—Protective cap[1]
4—Nose tip[1]
5—Forward nose section
6—Rear barometer probe hose and cable
7—Rear crush ring
8—Ram pressure probe (4)
9—Missile guidance set (mushroom)
10—Forward fin assembly (4)
11—Antenna horn (4)
12—Guidance set cooling access door
13—J1 + XMTR ACCESS DOOR
14—GUIDANCE TEST AND ADJUST ACCESS DOOR
15—Rear nose section

[1]Either one may be used.

Figure 2-5 (U). Forward body section (missiles 13001 and subsequent) (U).

is an inertia switch used to transfer the roll control circuit in the missile guidance set from the preset to the flight condition.

Note. Information on the functional use of the components mentioned in *c* and *d* below will be found in TM 9–1100–250–12.

c. The nose forward crush ring and the rear crush ring are located in the forward nose section and the rear nose section, respectively. These crush rings have no functional use in missiles containing high-explosive (HE) warheads.

d. Missiles 10206 through 11187 contain a barometer probe hose and cable (1, fig. 2–4); missiles 11188 through 11935 and 13001 and subsequent contain a forward barometer probe hose and cable (16) and a rear barometer probe hose and cable (15). They are routed through the forward nose section and the rear nose section to a position at the rear of the missile guidance set, where they are secured. They have no functional use in missiles containing HE warheads.

e. The four ram pressure probes (14, fig. 2–4 and 8, fig. 2–5) protrude from a point near the rear end of the four forward fin assemblies. These probes sample stagnation pressure (summation of atmospheric and dynamic (ram pressures)) for the pressure transmitter in the missile guidance set.

2–5 (C). Warhead Body Section

a. The warhead body section (fig. 2–6) consists of a forward warhead section and a rear warhead section. The warhead body section is formed of aluminum skin riveted to five structural frames, three in the forward warhead section and two in the rear warhead section. A T-hook adapter extends downward from the bottom portion of the rear warhead section to secure the missile to the launching-handling rail. The warhead body section equipment consists of a warhead, a safety and arming device mounting plate, a mounting plate support assembly, two safety and arming devices, an explosive harness assembly, a fail-safe control, and a sequential timer. Three cover plates provide access to the equipment.

b. The warhead, a fragmentation type, is supported by a cantilever mount attached to the forward structural frame of the rear warhead section by a ring which is part of the mounting.

c. The two safety and arming devices are acceleration-type arming-delay devices that prevent premature detonation of the warhead. They are plugged into receptacles accessible through the ARMING MECHANISM access cover plate. An explosive harness assembly connects the safety and arming devices to the warhead.

d. The fail-safe control (fig. 2–13), a component of the missile guidance set, initiates detonation of the missile warhead if ground guidance ceases. In missiles 10206 through 11935, it is mounted in the upper portion of the forward body section during shipment, storage, and test of the missile. In missiles 13001 and subsequent, it is mounted on the outside of the forward body section directly above the transponder-control group during shipment, storage, and test of the missile. It is installed in the forward warhead section during assembly.

e. The sequential timer (fig. 2–13), a component of the missile guidance set, introduces additional time delay between missile burst command and warhead detonation. In missiles 10206 through 11935, it is placed with the accessories in the rear body section and forward body section container during shipment and storage. It is removed from the container and taped in the forward body section during test of the missile. In missiles 13001 and subsequent, it is mounted on the outside of the forward body section directly above the transponder-control group during shipment, storage, and test of the missile. It is installed in the forward warhead section during assembly.

2–6 (U). Rear Body Section

a. General. The rear body section (fig. 2–7) consists of a missile motor section, an equipment section, an actuator section, and the missile rocket motor. The missile rocket motor extends through all three sections of the rear body section.

b. Missile Motor Section. The missile motor section (fig. 2–8) is formed of aluminum skin riveted to five structural frames. The missile motor section equipment consists of eight elec-

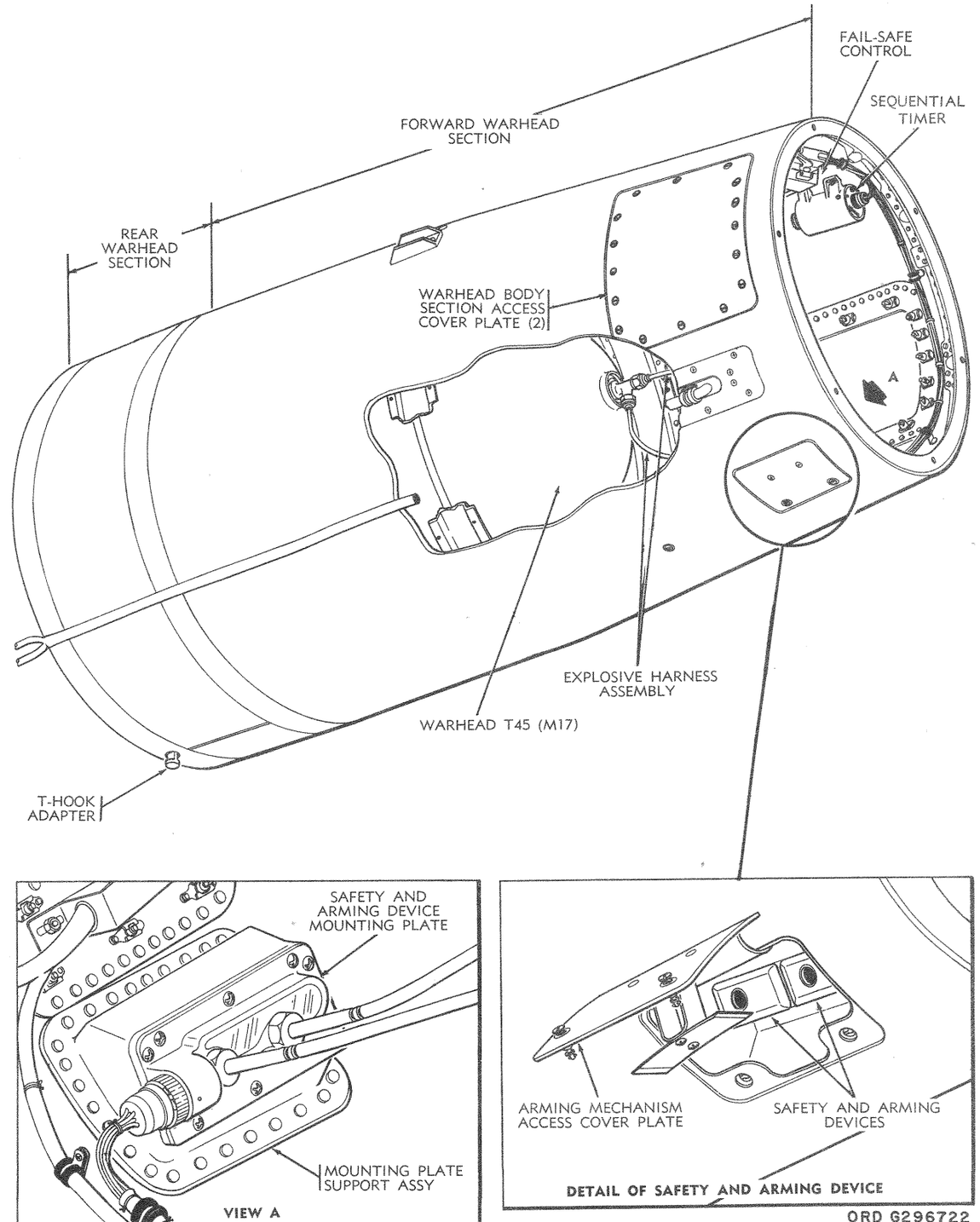


Figure 2–6 (C). Warhead body section (U).

tric heaters, a missile motor head heater, a special shape insulation or an insulator, eight insulation blankets, a safety and arming switch S31, and two thermostat assemblies. The forward portion of the missile rocket motor (missile rocket motor subassembly) is also located in this section. Two doors and three cover plates provide access to the equipment.

(1) The eight electric heaters are located around the inner surface of the missile motor section. The missile motor head heater is located around the forward end of the missile rocket motor subassembly. The heaters maintain the missile rocket motor subassembly at the correct operating temperature prior to lift-off.

(2) The special shape insulation or insulator provides heat retaining insulation around a gas generator (igniter) located on the forward end of the missile rocket motor subassembly.

(3) The eight insulation blankets, located between the eight heaters and the skin of the missile motor section, provide heat-retaining insulation around the inner surface of the missile motor section.

(4) Safety and arming switch S31, located in the forward portion of the missile motor section, is an inertia-type switch used to enable the two missile rocket motor initiators.

(5) The two thermostat assemblies are attached to the inner side of the two thermostat access cover plates, one assembly on each side of the missile motor section. The thermostats provide heat control for the heaters.

c. Equipment Section. The equipment section (fig. 2–9) is formed of aluminum skin riveted to structural members. The equipment contained in the equipment section consists of an accessory power supply or a hydraulic pumping unit (HPU), with HPU squib battery and ventilator assembly, a missile battery box, or a missile battery rack with squib and dummy batteries, a missile distribution box, a motor start delay timer relay or a dummy connector assembly, and a missile umbilical cable. The forward portion of the blast tube (part of the missile rocket motor) is also located in this section. Two cover plates provide access to the equipment.

(1) The accessory power supply (APS), located on the right side of the equipment section, provides hydraulic power to the three actuator assemblies (fig. 2–10).

(2) In missiles 14965 and subsequent, the equipment section (fig. 2–9) contains a hydraulic pumping unit (HPU), an HPU squib battery to provide electrical power for the HPU, and a ventilator assembly for the battery. The HPU is located on the right side of the equipment section and provides hydraulic power to the three actuator assemblies (fig. 2–10).

(3) In missiles 10206 through 11935 and 13001 through 13683, the missile battery box (fig. 2–9), located in the rear portion of the equipment section on the left side, contains a 28 volt nickel-cadmium battery (missile guidance set battery) and two dummy batteries.

(4) In missiles 13684 and subsequent, the missile battery system consists of a missile battery rack, a single 28 volt squib battery (missile guidance set battery), and two dummy batteries.

(5) The missile distribution box, located on the left side in the forward end of the equipment section, is the distribution point for electrical power to the entire missile body.

(6) The missile umbilical cable passes through the skin of the missile body in the lower portion of the equipment section. The umbilical cable provides electrical connectors for an external power source to the missile prior to lift-off. A shear plug in the cable severs external connections at lift-off.

d. Actuator Section. The actuator section (fig. 2–10) is formed of aluminum skin riveted to three structural frames. The actuator section equipment consists of three actuator assemblies, a thermal battery assembly, and a propulsion arming lanyard. The rear portion of the blast tube and the blast tube nozzle are also located in this section.

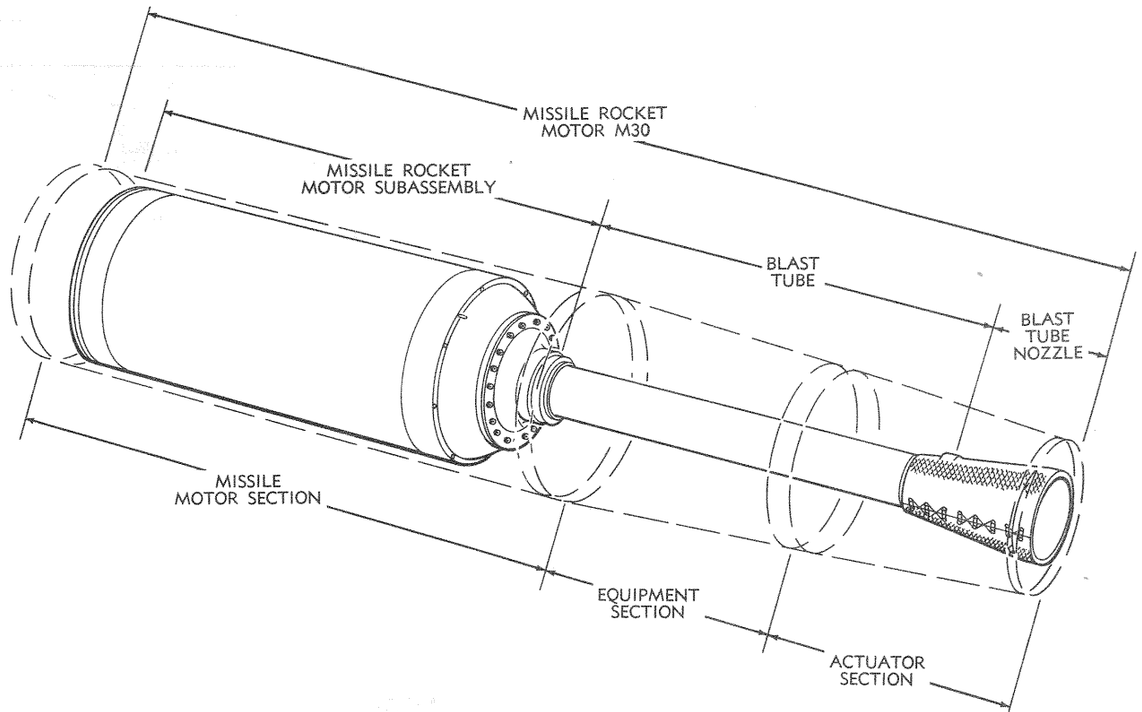


Figure 2–7 (U). Rear body section—phantom view (U).

(1) The three actuator assemblies, located on the forward frame of the actuator section, hydraulically actuate a series of mechanical linkages to drive the elevons. Two actuator section door assemblies, one on each side of the actuator section, provide access.

(2) The thermal battery assembly, located in the upper forward portion of the actuator section, contains two thermal batteries. These batteries provide an electrical charge that activates the missile rocket motor initiators after rocket motor cluster separation. An actuator section door assembly, located on the left side of the actuator section, provides access.

(3) The propulsion arming lanyard is attached to the thermal battery assembly and to the rocket motor thrust ring assembly (fig. 2–12) in the rocket motor cluster. The lanyard (fig. 2–10) activates the two thermal batteries at separation.

e. Missile Rocket Motor M30/M30A1. The missile rocket motor (fig. 2–7) consists of a missile rocket motor subassembly, a blast tube, a blast tube nozzle, and two missile rocket motor initiators (fig. 2–8). The missile rocket motor supplies thrust to the missile body after separation.

(1) The missile rocket motor subassembly (fig. 2–7), located in the missile motor section, consists of a solid propellant encased in a steel container with a gas generator or igniter (fig. 2–8) at the forward end and a motor adapter at the rear end.

(2) The blast tube (fig. 2–7) extends from the rear end of the missile rocket motor subassembly through the center of the equipment section and into the forward portion of the actuator section. The blast tube provides a

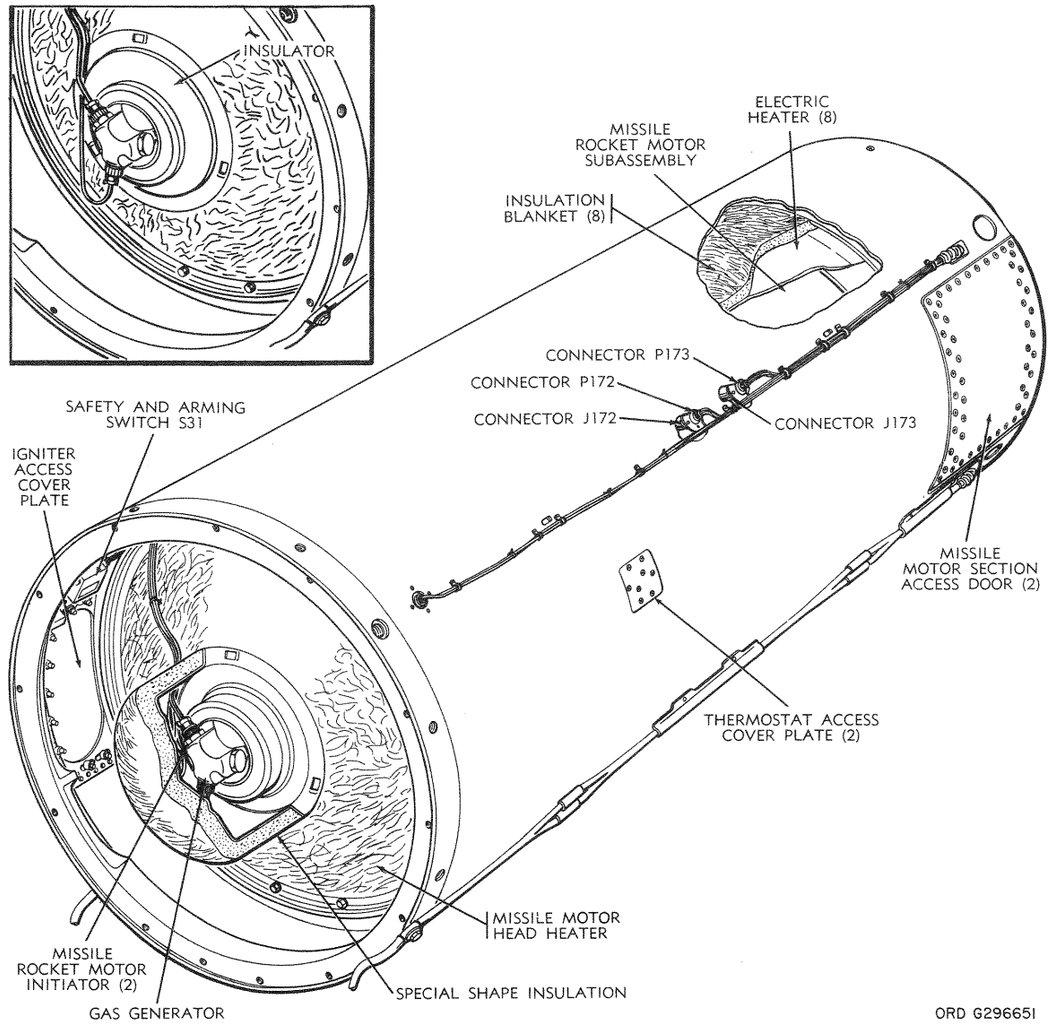


Figure 2–8 (U). Missile motor section (U).

means of escape for the exhaust gases from the missile rocket motor subassembly.

(3) The blast tube nozzle extends from the rear end of the blast tube to the rear end of the actuator section. The exhaust gases from the blast tube are expelled through the nozzle to supply thrust to the missile body. The insulation blanket provides heat retaining insulation around the nozzle.

(4) The two missile rocket motor initiators (fig. 2–8) are located in the forward end of the gas generator or igniter in the missile rocket motor subassembly. Each initiator is a threaded fitting containing an explosive charge that causes the gas generator or igniter to ignite the propellant in the missile rocket motor subassembly. An IGNITOR access cover plate on the right side of the missile motor section provides access.

2–7 (U). Main Fin

a. The four main fins (fig. 2–1) located at

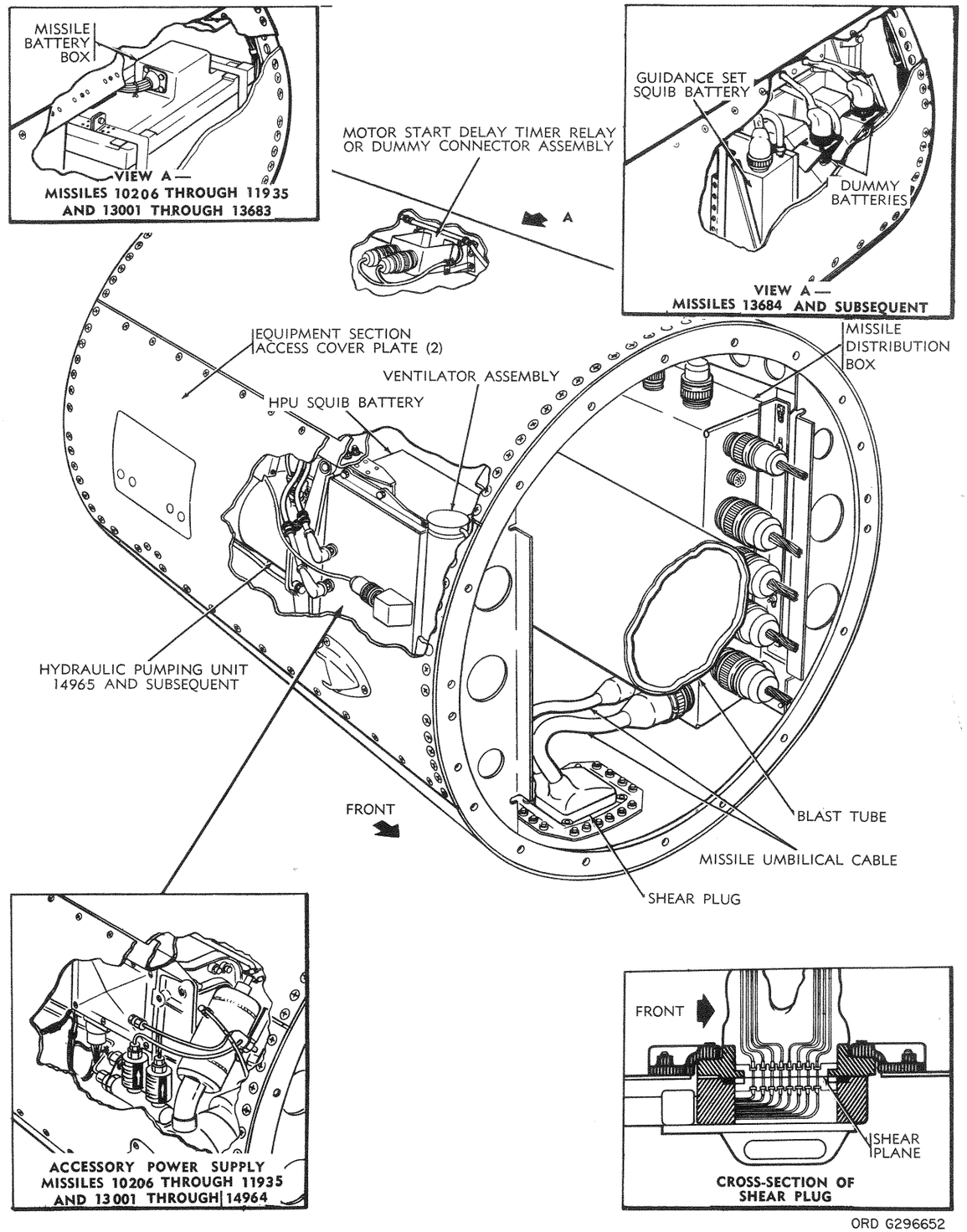


Figure 2–9 (U). Equipment section (U).

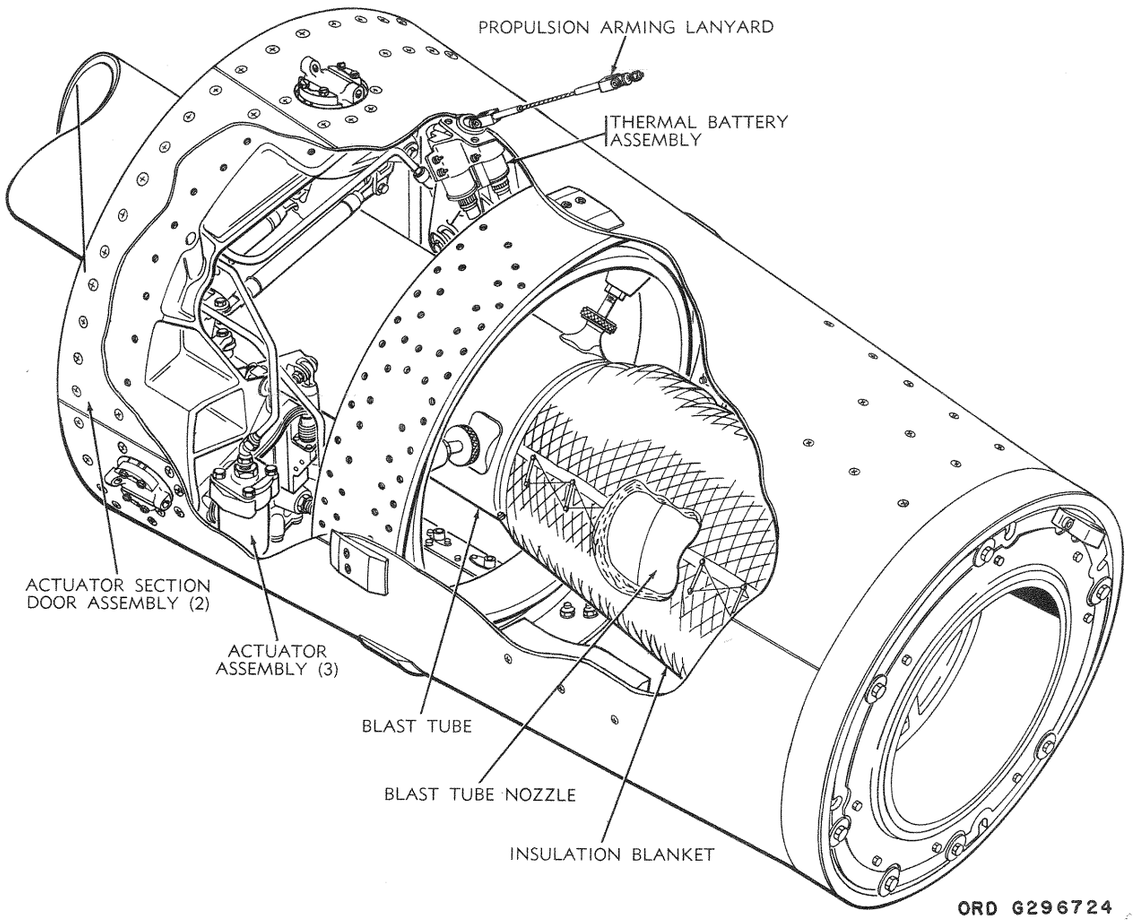


Figure 2–10 (U). Actuator section (U).

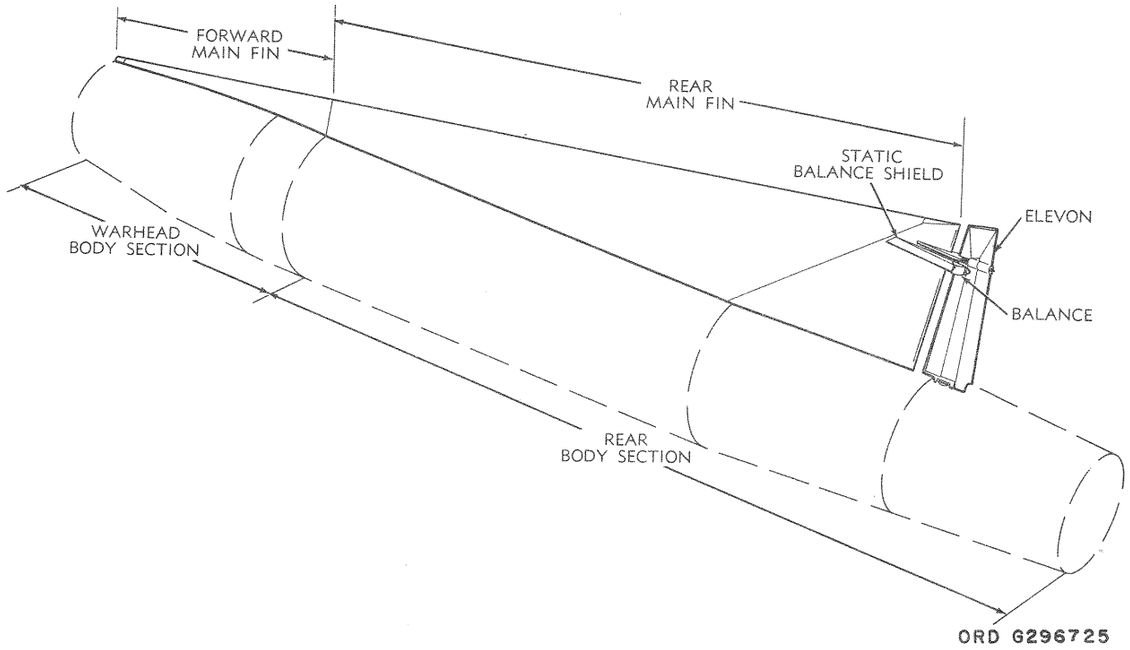


Figure 2–11 (U). Main fin (U).

90-degree angles around the circumference of the missile body are alined with the four forward fins on the forward body section. Each main fin consists of a forward main fin (fig. 2–11), a rear main fin, and an elevon.

b. Each forward main fin is attached to, and extends almost the entire length of, the warhead body section. Each fin is formed of aluminum skin attached to three structural members.

c. Each rear main fin is attached to, and extends most of the length of, the rear body section. Each fin is formed of aluminum skin attached to several structural members. To each rear main fin is attached a static balance shield formed of aluminum skin.

d. Each elevon is formed of forged aluminum, and is attached to the trailing edge of a rear main fin. A balance is bolted to the leading edge of each elevon to maintain aerodynamic stability.

Section III (U). PHYSICAL DESCRIPTION OF ROCKET MOTOR CLUSTER

2–8 (U). General

The rocket motor cluster (fig. 2–12) is a cluster-type booster with cruciform fins, and is approximately 14 feet long. It supplies the initial thrust to the missile. A propulsion system is the only functional system contained in the rocket motor cluster.

2–9 (U). Major Components

a. The rocket motor cluster (fig. 2–12) consists primarily of a rocket motor thrust ring assembly, four rocket motors, four rocket motor igniters, four rocket motor cluster fins, four fitting assemblies, and fairings.

b. The rocket motor thrust ring assembly, located on the forward end of the rocket motor cluster, is formed of aluminum skin riveted to a forming ring and a structural frame. It contains an internally tapered opening that mates with the taper of the rear body section to form a rigid slip-joint. Four elevon locks are attached to the forward end of the thrust ring assembly.

c. The four rocket motors are located in the center portion of the rocket motor cluster. Each rocket motor consists of solid propellant encased in a steel cylinder, with a steel closure at the forward end and a steel nozzle at the rear end.

d. Each of the four rocket motor igniters is located in the forward end of a rocket motor. Each igniter is a threaded fitting containing an explosive charge that ignites the propellant in the rocket motor. An opening on each side of the rocket motor thrust ring provides access.

e. The four rocket motor cluster fins, located at 90-degree angles around the rear portion of the rocket motor cluster, are used to stabilize the missile aerodynamically during the boost period. They are formed of aluminum skin riveted to a spar and several ribs.

f. Four forward nozzle fairings, four fairing wedges, and four nozzle fairings are attached to the fitting assemblies to improve the aerodynamic characteristics of the rocket motor cluster.

Section IV (U). PHYSICAL DESCRIPTION OF THE MISSILE GUIDANCE SET (STOVEPIPE)

2–10 (U). General

The missile guidance set (fig. 2–13) is located in the rear nose section of the missile body. The missile guidance set consists of the missile guidance set group and the transponder-control

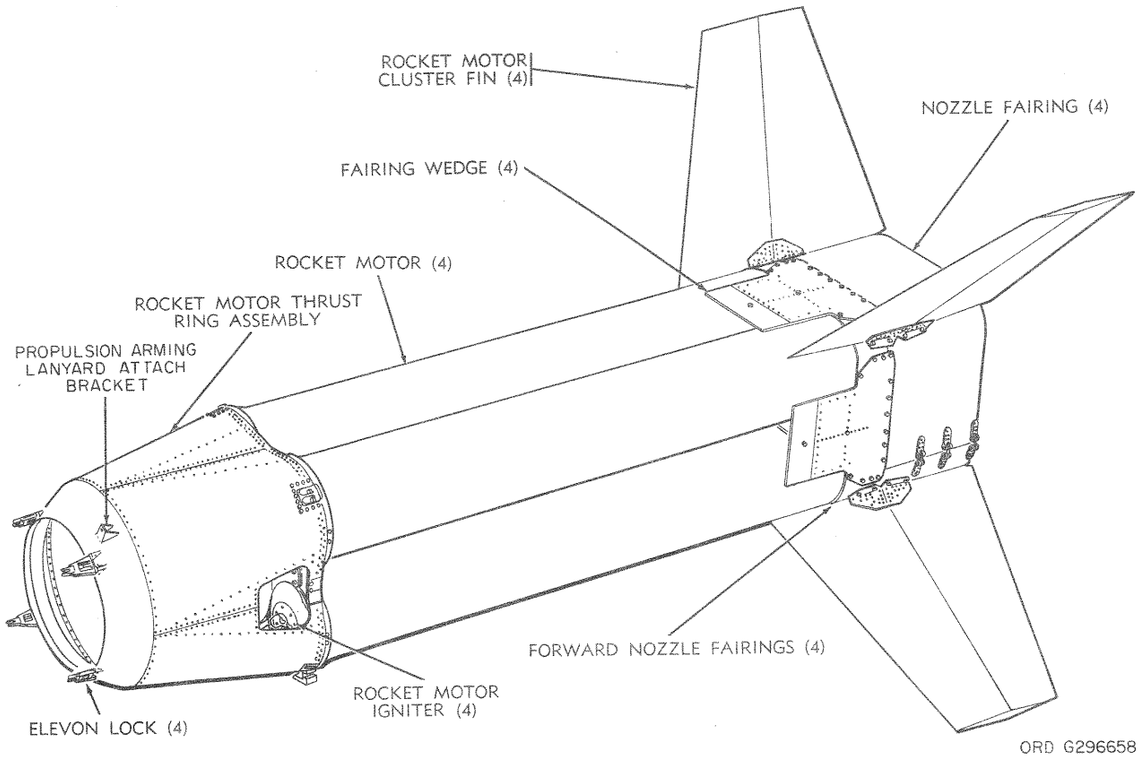


Figure 2–12 (U). Rocket motor cluster—major components (U).

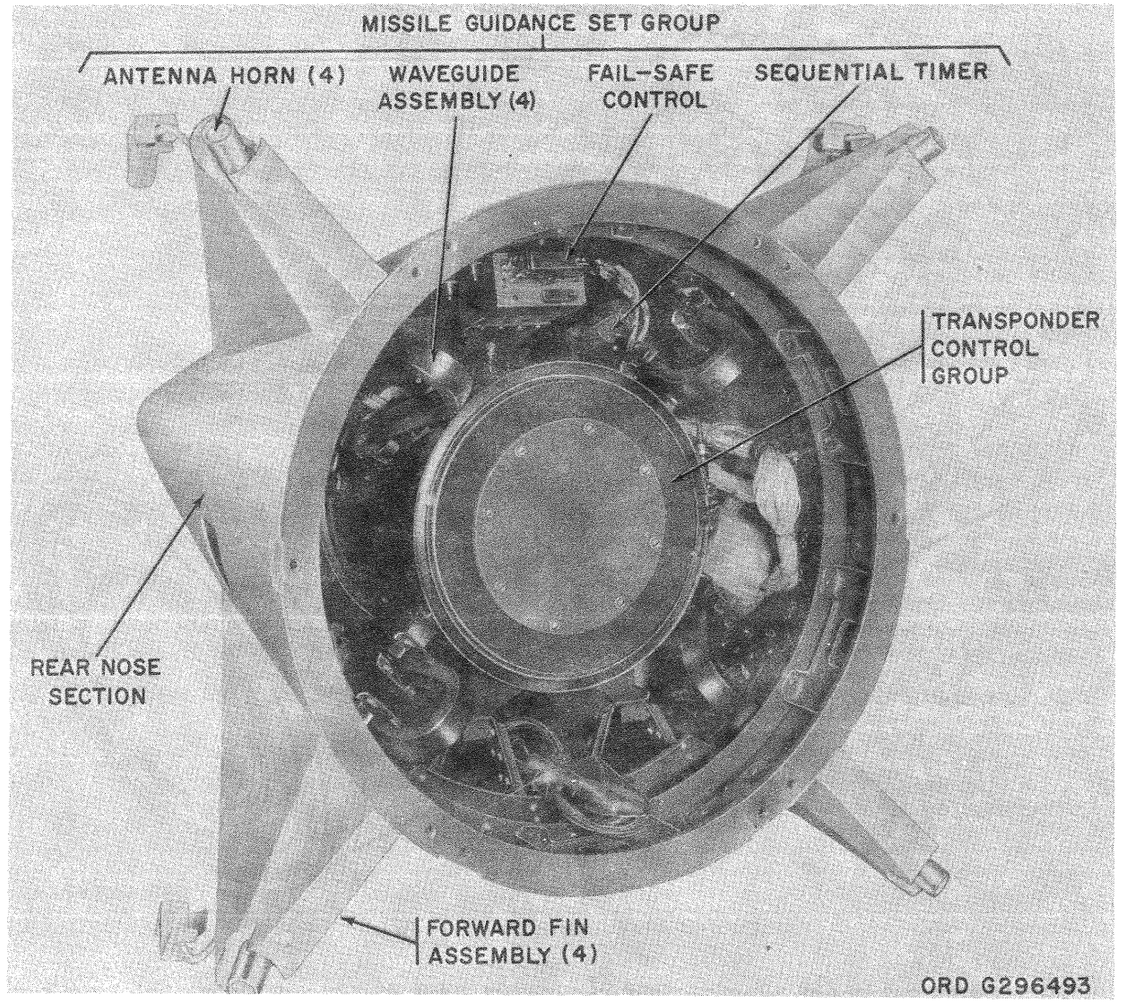


Figure 2–13 (U). Missile guidance set (stovepipe) (U).

group. The major components of these two groups are listed below.

a. Missile Guidance Set Group.
- (1) Antenna horn (4).
- (2) Fail-safe control.
- (3) Waveguide assembly set.
- (4) Sequential timer.

b. Transponder-Control Group.
- (1) *Radio set.*
  - (*a*) Missile-code delay line.
  - (*b*) Transmitter waveguide assembly.
  - (*c*) Radar modulator.
  - (*d*) RF detector (2).
  - (*e*) Signal data converter.
    1. Delay pulse generator.
    2. P and Y pulse demodulator.
    3. P-Y-burst delay network.
    4. Command detonation control.
  - (*f*) Delay line driver-detector.
  - (*g*) Amplifier-decoder.
  - (*h*) Tapped delay line.
- (2) *Gyro servo control.*
  - (*a*) P accelerometer.
  - (*b*) Y accelerometer.
  - (*c*) Roll amount gyro.
  - (*d*) Roll rate gyro.
  - (*e*) P rate gyro.
  - (*f*) Y rate gyro.
  - (*g*) Roll control amplifier.
  - (*h*) P steering amplifier.
  - (*i*) Y steering amplifier.
- (3) *Power supply.*
  - Pressure transmitter.

2–11 (U). Missile Guidance Set Group

The missile guidance set group (fig. 2–14) consists of four antenna horns, a fail-safe control, a waveguide assembly set, and a sequential timer. The four antenna horns (fig. 2–13) are mounted 90 degrees apart in the rear portion of the four forward fins. The antenna horns on fins Nos. 2 and 4 are receiving antenna horns, located 180 degrees apart. The antenna horns on fins Nos. 1 and 3 are transmitting antenna horns, and are also located 180 degrees apart. The fail-safe control is mounted in the rear nose section directly above the transponder-control group during shipment, storage, and test of the guided missile. For tactical operation, the fail-safe control is installed in the forward warhead section (fig. 2–6). The waveguide assembly set consists of four waveguide assemblies (fig. 2–13) that connect the four antenna horns to the transponder-control group. Quick disconnect connectors are provided on the waveguide assemblies to facilitate their removal and replacement. The sequential timer is placed in the accessory carton in the rear body section and the forward body section container during shipment and storage. For tactical operation, the sequential timer is installed in the forward warhead section (fig. 2–6).

2–12 (U). Transponder-Control Group

a. The transponder-control group (fig. 2–13) is mounted in the center portion of the rear nose section. The electronic guidance components are mounted within the housing (A and B, fig. 2–15) of the transponder-control group. External connections to the electronic compo-

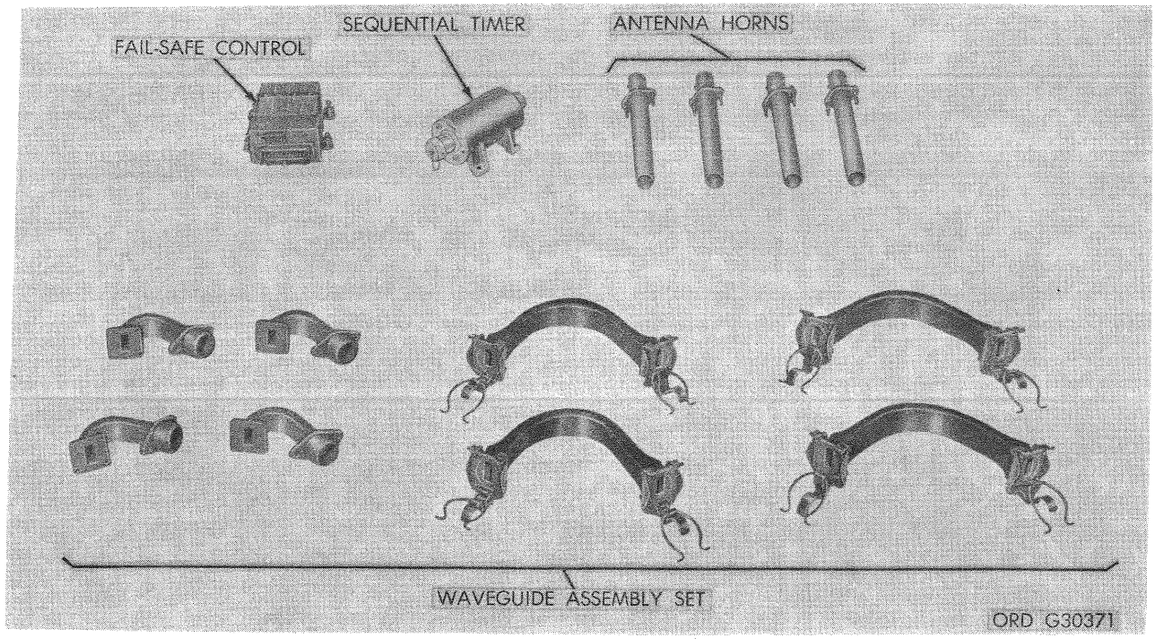


Figure 2–14 (U). Missile guidance set group (stovepipe) (U).

nents are made through two electrical connectors in the side of the housing. Removable covers on the forward and rear ends of the housing permit removal of the electronic components. A desiccant cover plate on the rear cover permits replacement of the guidance set desiccant. A removable cover plate on the side of the housing permits installation of the missile-code delay line. Seven screw-type access plugs in the housing and the forward cover permit organizational maintenance adjustments of the electronic components without removing the components from the housing. The external adjustments that can be performed are listed in (1) through (9) below.

(1) Roll buzz
(2) Y buzz
(3) P buzz
(4) Roll balance
(5) Y balance
(6) P balance
(7) Control signal voltage
(8) Inertia switch S1
(9) Magnetron frequency

b. An air valve (B, fig. 2–15) in the top of the housing of the transponder-control group permits a pressurization test of the transponder-control group. This test assures an airtight seal of the transponder-control group. An airtight seal maintains the transponder-control group at normal atmospheric pressure during missile flight to prevent arcing of the electronic components, to prevent the entrance of dirt and moisture, and to assure correct operation of the flight-control instruments.

c. The radio set (A and B, fig. 2–16) and the gyro servo control comprise the major electronic components of the transponder-control group. The radio set is mounted in the rear portion of the housing of the transponder-control group and the gyro servo control is mounted in the forward portion. Electrical connections between these two assemblies are automatically made when the two assemblies are installed.

d. The radio set (fig. 2–17) contains a missile-code delay line, a delay line driver-detector, a tapped delay line, a signal data converter, two RF detectors, an amplifier-decoder, a radar modulator, and a transmitter waveguide assembly. The signal data converter (fig. 2–18) contains a P-Y-burst delay network, a

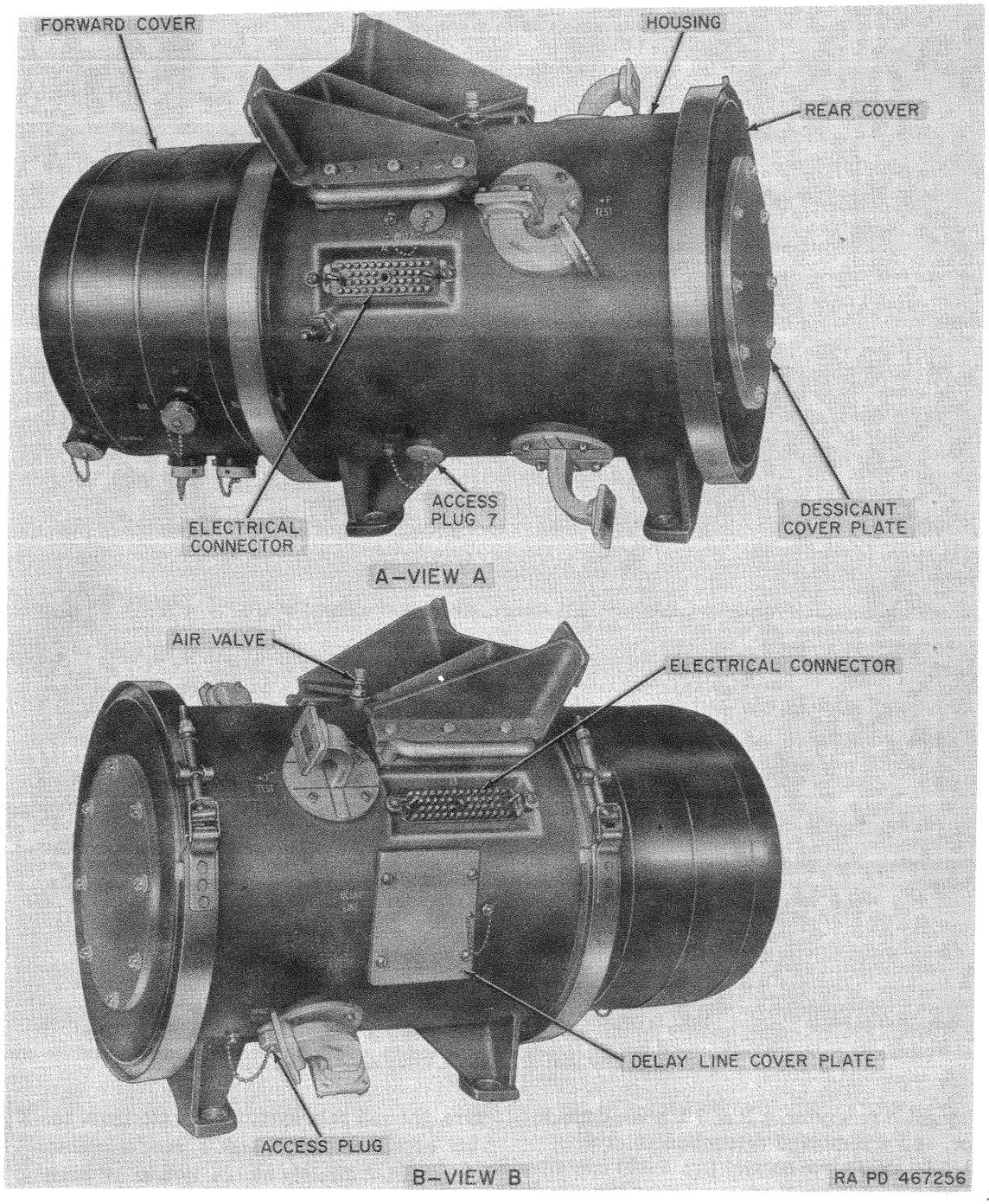


Figure 2–15 (U). Transponder-control group (stovepipe) (U).

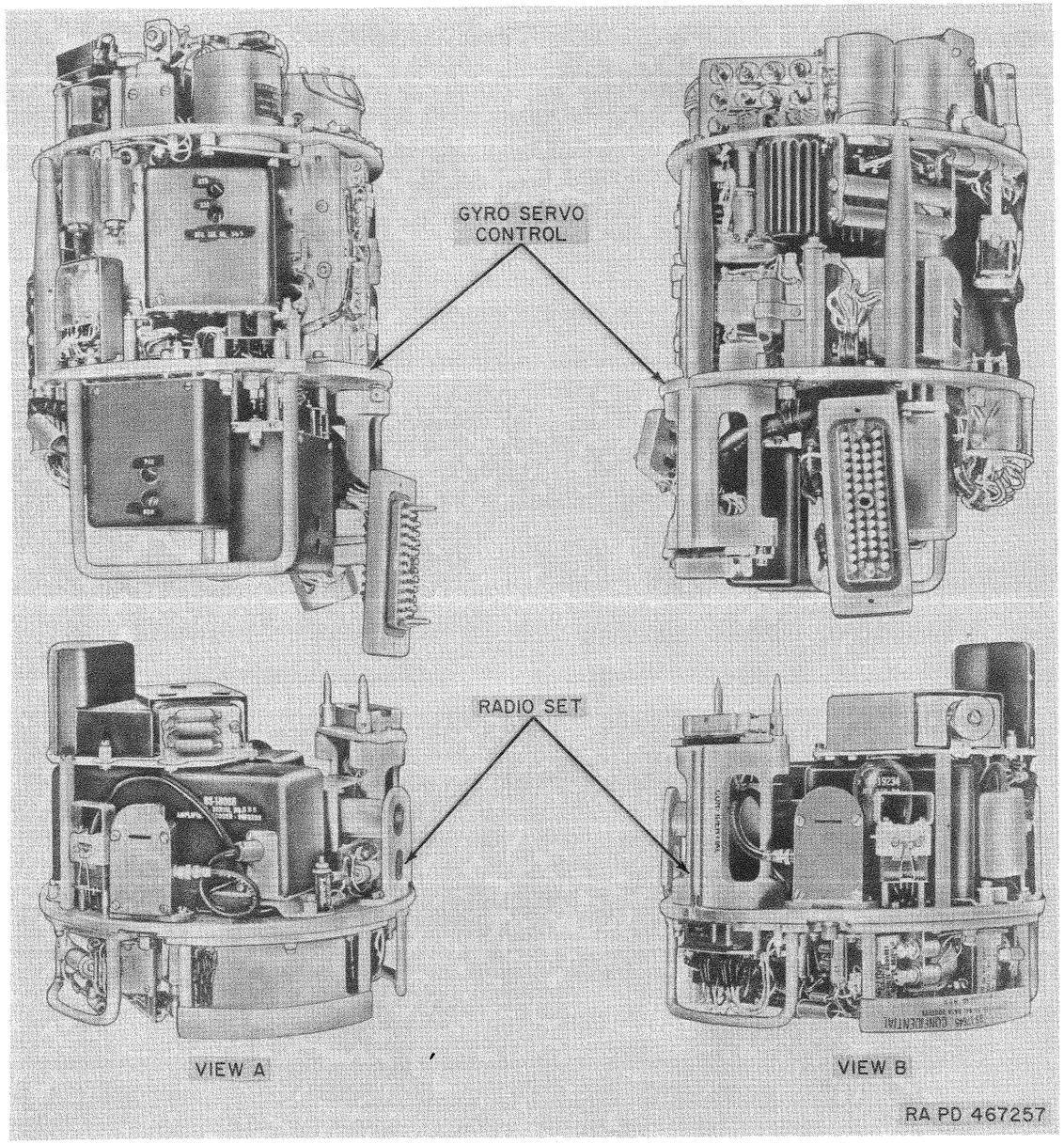


Figure 2–16 (U). Transponder-control group—housing removed (stovepipe) (U).

delay pulse generator, a P and Y pulse demodulator, and a command detonation control.

e. The gyro servo control (fig. 2–19) contains a power supply, a P steering amplifier, a Y steering amplifier, a roll control amplifier, and seven flight-control instruments. Six of the flight-control instruments—the roll amount gyro, the roll rate gyro, the P rate gyro, the Y rate gyro, and the P and Y accelerometers—are mounted directly on the gyro servo control. The seventh flight-control instrument is a pressure transmitter (A, fig. 2–20), mounted on the power supply.

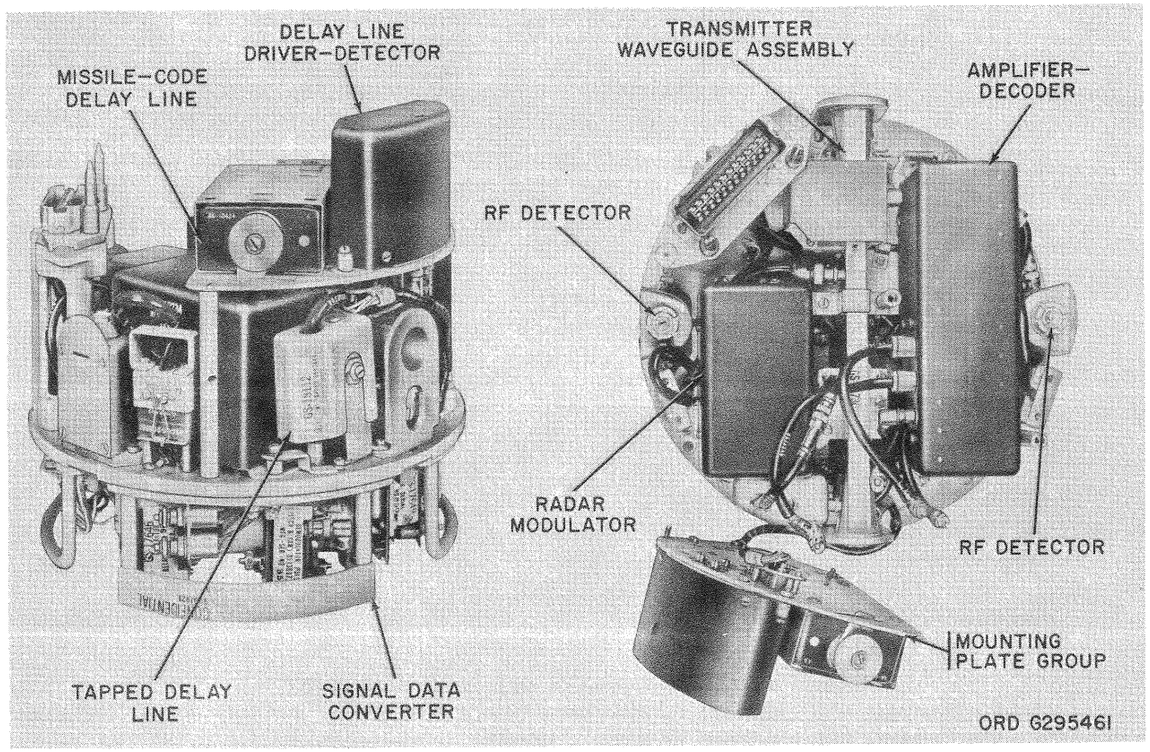


Figure 2–17 (U). Radio set (stovepipe) (U).

Section V (U). PHYSICAL DESCRIPTION OF THE MISSILE GUIDANCE SET (MUSHROOM)

2–13 (U). General

The missile guidance set (fig. 2–21) consists of the four antenna horns, a waveguide assembly set, a fail-safe control, a sequential timer, and a transponder-control group. The four antenna horns are mounted 90 degrees apart in the rear portion of the four forward fins (fig. 2–5). The antenna horns on fins No. 2 and No. 4 are receiving antenna horns located 180 degrees apart. The antenna horns on fins No. 1 and No. 3 are transmitting antenna horns, also located 180 degrees apart. The waveguide assembly set (fig. 2–21) consists of four flexible waveguide assemblies and four rigid waveguide assemblies that connect the four antenna horns to the transponder-control group, which is located in the rear portion of the forward body section (fig. 2–5). The fail-safe control (fig. 2–21) and the sequential timer are mounted on the fail-safe and timer bracket on the outside of the forward body section directly above the transponder-control group during shipment, storage, and test of the missile body. For tactical operation, the fail-safe control and the sequential timer are installed in the forward warhead section (fig. 2–6). Major components of the missile guidance set (fig. 2–21) are listed below.

a. Antenna Horn.
b. Waveguide Assembly Set.
c. Fail-Safe Control.
d. Sequential Timer.
e. Transponder-Control Group.
  (1) Flight control group.
    (*a*) P accelerometer.
    (*b*) Y accelerometer.
    (*c*) Roll amount gyro.
    (*d*) Roll rate gyro.
    (*e*) P rate gyro.

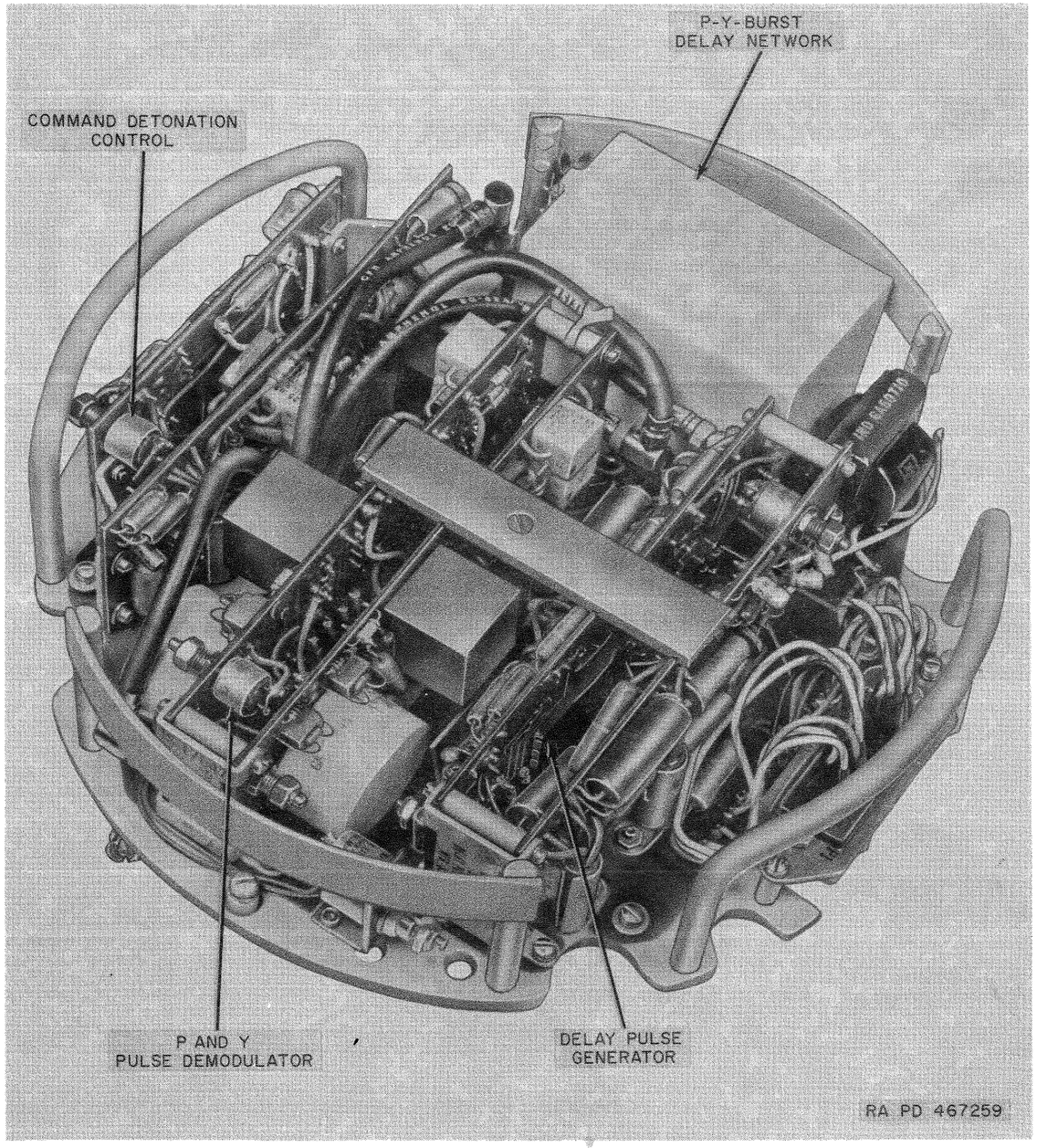


Figure 2–18 (U). Signal data converter (stovepipe) (U).

(*f*) Y rate gyro.
(*g*) Pressure transmitter.

(2) Radio set.
(*a*) Amplifier-decoder.
(*b*) Delay line driver.
(*c*) Pulse delay oscillator.
(*d*) P command signal converter.
(*e*) Y command signal converter.
(*f*) Command detonation electronic switch.

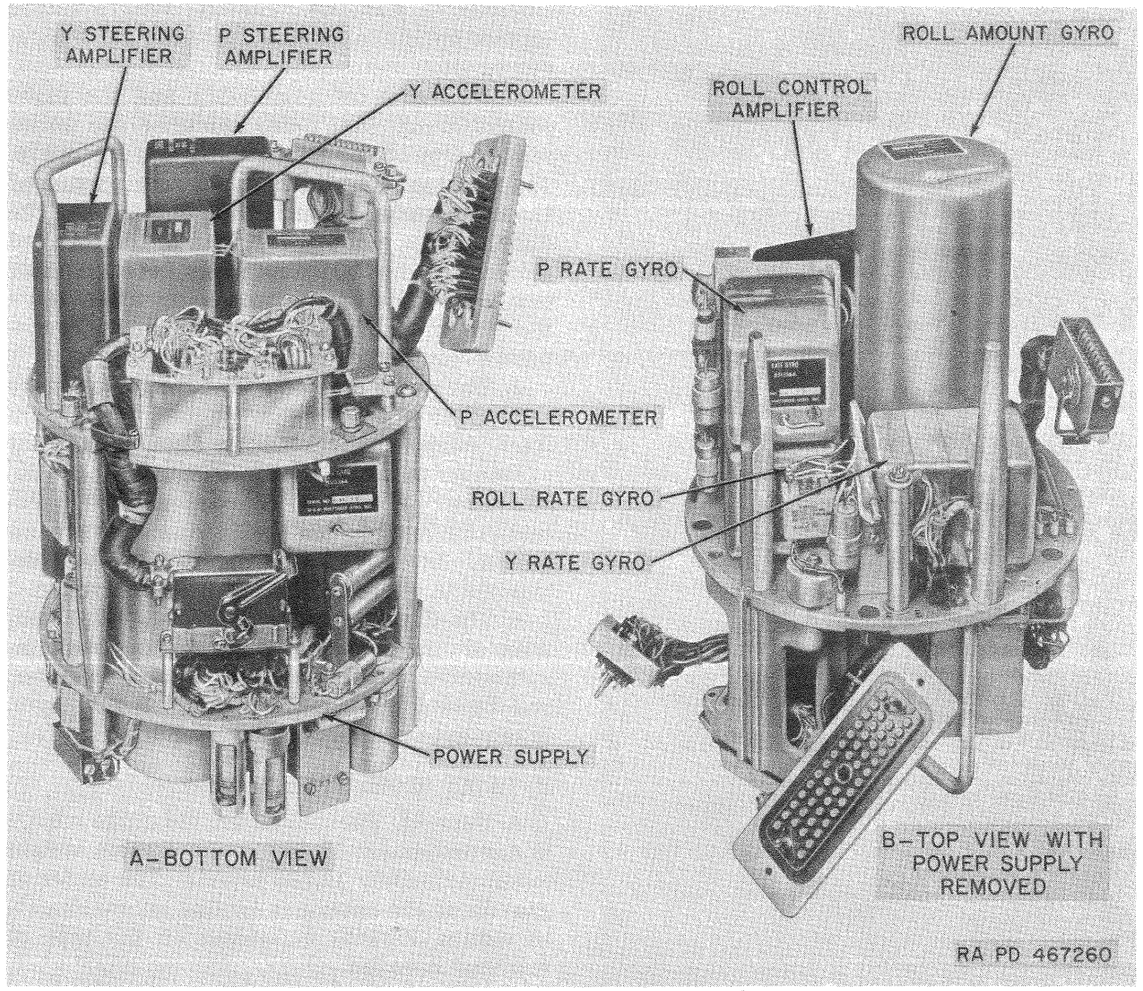


Figure 2–19 (U). Gyro servo control (stovepipe) (U).

(*g*) P steering amplifier.
(*h*) Y steering amplifier.
(*i*) Roll control amplifier.
(*j*) Radio transmitter.
(*k*) Sweep generator.
(*l*) P–Y–burst delay network.
(*m*) Transistor oscillator inverter.
(*n*) RF detector.
(*o*) Radio set power supply.
(*p*) Amplifier bias control.
(*q*) Command signal decoder.
(*r*) Radio receiver.
(*s*) DC power filter.
(*t*) Missile–code delay line.

2–14 (U). Transponder-Control Group

a. The electronic guidance components of the missile guidance set are mounted within the housing (fig. 2–21) of the transponder-control group. External connections to the electronic components are made through two electrical connectors located 180 degrees apart in the side of the housing. Removable covers on the rear and forward ends of the housing permit access to the electronic components. A removable cover plate on the side of the housing permits access to inertia switches S1 and S2 and the following six adjustments: P buzz, Y buzz, roll

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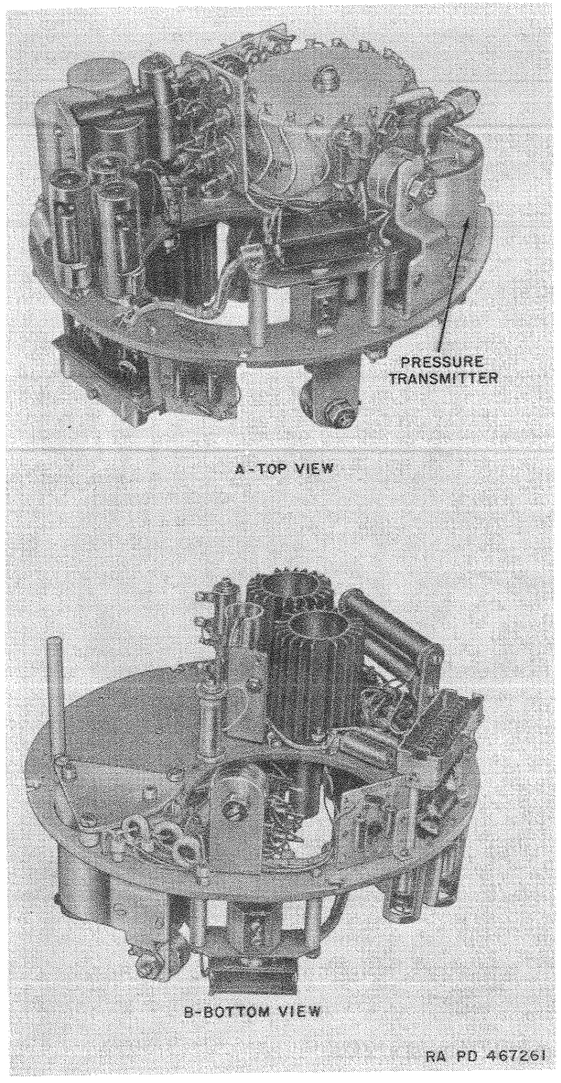


Figure 2–20 (U). Power supply (stovepipe) (U).

buzz, P centering, Y centering, and roll centering. Removal of the cover on the rear end of the housing permits access to two additional adjustments—the delay line adjust and the magnetron frequency.

b. An air valve permits a pressurization test of the transponder-control group. This test assures an airtight seal of the transponder-control group. An airtight seal maintains the transponder-control group at normal atmospheric pressure during missile flight to prevent arcing of the electronic components, to prevent entrance of dirt and moisture, and to assure correct operation of the flight-control instruments.

c. The radio set (fig. 2–22) and the flight control group (fig. 2–23) comprise the major components of the transponder–control group. The radio set is mounted in the rear portion of the transponder–control group housing and the flight control group is mounted in the forward portion. Electrical connections between these two assemblies are automatically made when the two assemblies are installed in the transponder–control group housing.

d. The major components of the radio set are secured to a heat exchanger (20, fig. 2–22). Each component is keyed to slots in the heat exchanger to insure proper orientation upon installation. Electrical connections are automatically made when the components are installed. Excessive heat generated by the components is dissipated by the heat exchanger.

e. The flight control group (fig. 2–23) consists of the following seven flight-control instruments: P accelerometer, Y accelerometer, roll amount gyro, roll rate gyro, P rate gyro, Y rate gyro, and pressure transmitter.

2–15 (C). Guided Missile Data

a. General. The overall lengths of the missile is approximately 39 feet and the gross weight is approximately 10,550 pounds. The center of gravity of the missile is located approximately at station 290.000, depending on the type of warhead installed.

b. Missile Body.

Overall length	27 ft (approximately)
Diagonal span at the elevon tips	90.36 in.
Diagonal span at the forward fin tips	41.24 in.
Maximum diameter of the constant body section	31.50 in.
Length of the ogive section	133.50 in.
Length of the constant body section	111.50 in.
Length of the boattail section	77.50 in.
Length of the forward body section with the nose tip	85.00 in.
Length of the forward body section with the plastic nose cap	81.72 in.
Maximum diameter of the forward body section	24.79 in.
Length of the forward nose section (missiles 10206 through 11187)	11.47 in.

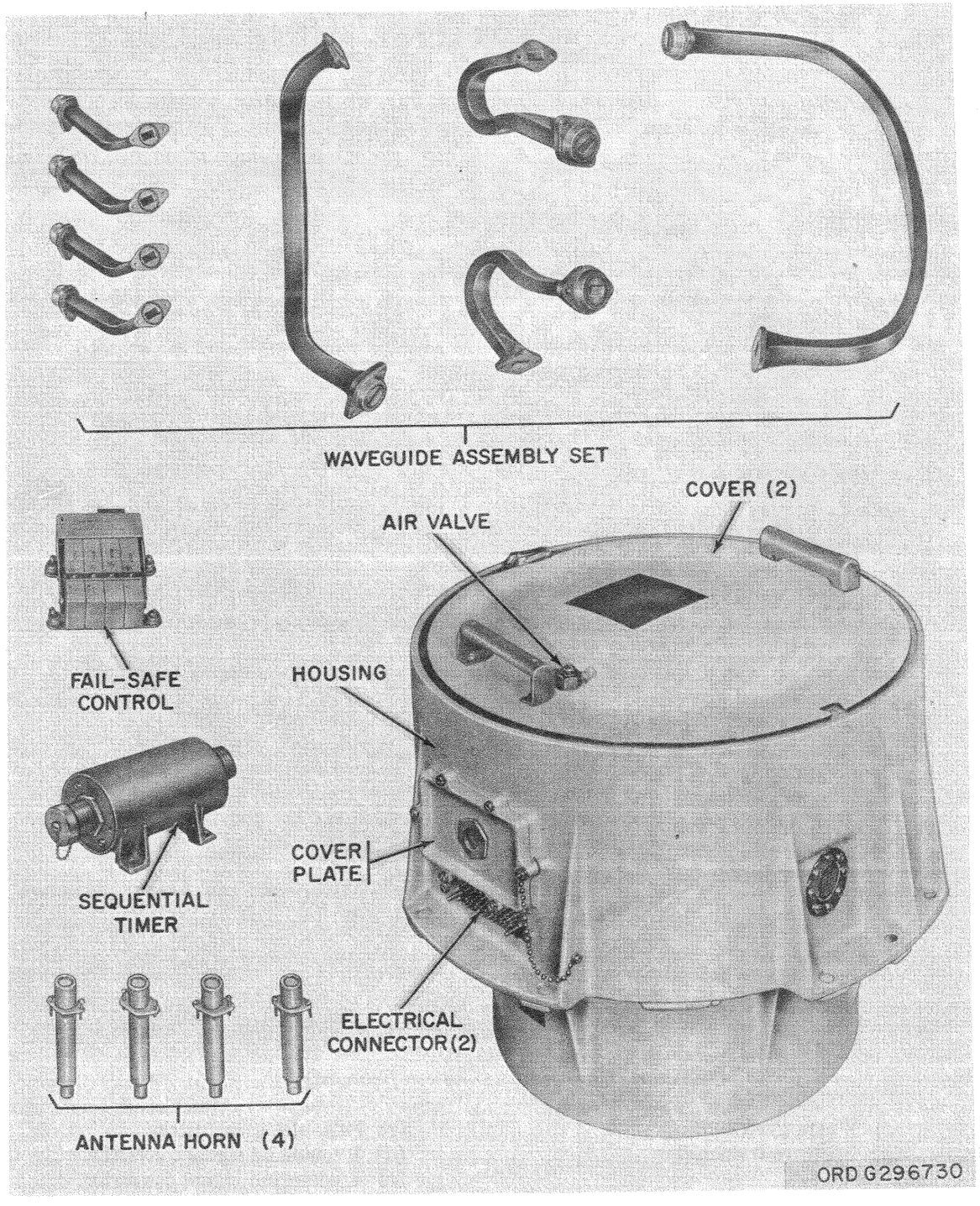
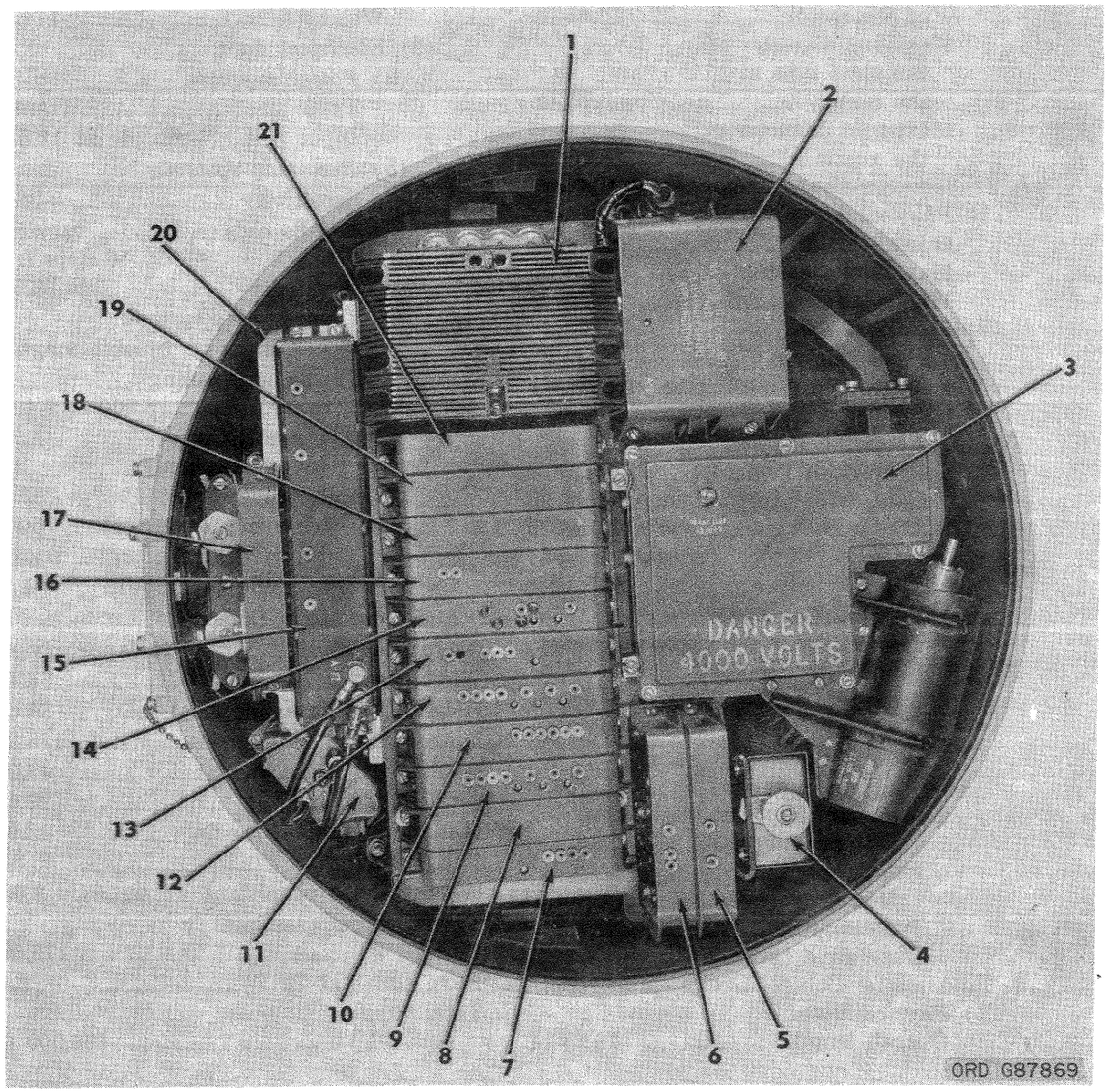


Figure 2–21 (U). Missile guidance set group (mushroom) (U).



1—Radio set power supply
2—Transistor oscillator inverter
3—Radio transmitter
4—Missile–code delay line
5—RF detector
6—Delay line driver
7—Command detonation electronic switch
8—P–Y–burst delay network
9—Y command signal converter
10—Command signal decoder
11—Radio receiver
12—P command signal converter
13—Pulse delay oscillator
14—Sweep generator
15—Amplifier-decoder
16—Roll control amplifier
17—Amplifier bias control
18—Y steering amplifier
19—P steering amplifier
20—Heat exchanger
21—DC power filter

Figure 2–22 (U). Radio set (mushroom) (U).

Length of the forward nose section (missiles 11188 through 11935 and 13001 and subsequent)	33.47 in.
Maximum diameter of the forward nose section (missiles 10206 through 11187)	7.44 in.
Maximum diameter of the forward nose section (missiles 11188 through 11935 and 13001 and subsequent)	13.42 in.
Length of the rear nose section (missiles 10206 through 11187)	69.50 in.
Length of the rear nose section (missiles 11188 through 11935 and 13001 and subsequent)	47.50 in.
Length of the warhead body section	62.50 in.
Maximum diameter of the warhead body section	31.50 in.
Length of the forward warhead section	48.50 in.
Maximum diameter of the forward warhead section	31.50 in.
Length of the rear warhead section	14.00 in.
Maximum diameter of the rear warhead section	31.50 in.

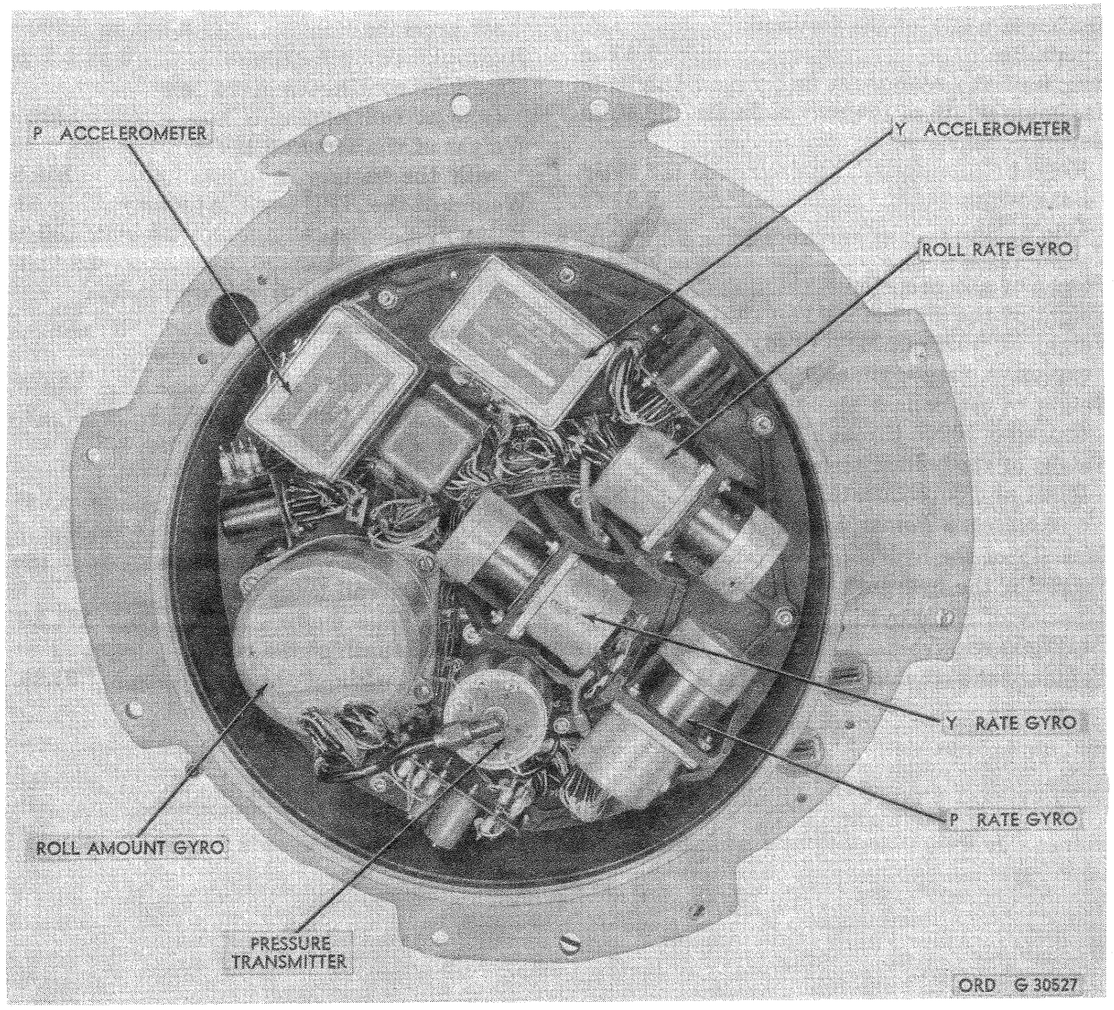


Figure 2–23 (U). Flight control group (mushroom) (U).

Length of the rear body section	175.00 in.
Maximum diameter of the rear body section	31.50 in.
Length of the missile motor section	97.50 in.
Maximum diameter of the missile motor section	31.50 in.
Length of the equipment section	38.38 in.
Maximum diameter of the equipment section	31.50 in.
Length of the actuator section	39.12 in.
Maximum diameter of the actuator section	26.60 in.
Length of the forward fin	37.69 in.
Maximum width of the forward fin	8.62 in.
Length of the forward main fin	62.52 in.
Maximum width of the forward main fin	7.48 in.
Length of the rear main fin	132.73 in.
Maximum width of the rear main fin	30.40 in.
Elevon dimensions:	
Height	32.19 in.
Base width	9.91 in.
Top width	6.55 in.
Weigth (gross)	5,421 lb
Weight of the propellant	2,196 lb
Weight of the warhead M17 (T45)	1,035 lb
Weight of warhead M17 (T45) explosive (approximate)	651 lb
Weight of the ballast (missiles 10206 through 11935)	70 lb
Weight of the ballast (missiles 13001 and subsequent)	100 lb

c. Accessory Power Supply (APS).

Capacity of the hydraulic reservoir	140 cu in.
Weight of the hydraulic oil required	4 lb
Capacity of the ethylene oxide (ET_hO) reservoir	370 cu in.
Weight of the ethylene oxide (ET_hO)	10.80 lb
Hydraulic oil type	MIL H 5606, MPD 2067 or hydraulic oil 9979182
Operating hydraulic oil pressure	2,880 to 3,200 psi
Hydraulic pump oil flow rate	2 gpm
Maximum continuous operating time at full load (with 370 cu in. of ET_hO)	360 sec
Weight (gross)	98.26 lb

d. Hydraulic Pumping Unit (HPU).

Capacity of the hydraulic reservoir	200 cu in.
Weight of the hydraulic oil required	6.25 lb
Hydraulic oil type	MIL H 5606, MPD 2067 or hydraulic oil 9979182
Operating hydraulic oil pressure	2,700 to 3,200 psi
Hydraulic pump flow rate	0 to 2.5 gpm
Maximum continuous operating time at full load	420 sec
Weight of the serviced HPU with the battery	108.5 lb
Weight of the HPU less the battery	61 lb
Battery	28 volt, 200-amp
Motor	—28 volt dc

e. Missile Rocket Motor M30 Series.

(1) *Technical data.*

Thrust output (sea level at 60°F)	13,500 lb
Burn time (at 60°F)	29 sec

(2) *Physical data.*

Weight of the complete motor	2,681 lb
Weight of the blast tube with the nozzle	184 lb
Overall length of the motor	175.30 in.
Length of the motor without the blast tube	91.95 in.
Maximum diameter of the motor	28.45 in.
Maximum diameter of the blast tube at the center	8.75 in.
Maximum diameter of the nozzle	14.10 in.

f. Transponder-Control Group (Stovepipe).

(1) *Physical data.*

Overall length	23.30 in.
Maximum diameter	16.00 in.
Weight	88.35 lb

(2) *Electrical data.*

(*a*) *Power supply.*

Type	transistor
Input	—28v dc at 8 amp

(*b*) *Receiving system.*

Bandwidth (video)	10 mc
Gain with ¼-mv input	90 db
Missile code	variable, in 16 steps from 2 to 23.5 usec

(*c*) *Transmitting system.*

Transmitter	tunable magnetron
Frequency (tuning range)	8,900 to 9,400 mc
Peak RF power (at one antenna)	24 w
Average RF power (at one antenna)	3 mw
Pulse repetition frequency (average)	500 pps
Pulse width	0.25 usec
Duty cycle (average)	1/8000

g. Transponder-Control Group (Mushroom).

(1) *Physical data.*

Overall length	19.25 in.
Maximum diameter	21.00 in.
Weight	114.50 lb

(2) *Electrical data.*

(*a*) *Power supplies.*

Type	transistor
Input	—28v dc at 12.5 amp

(*b*) *Receiving system.*

Sensitivity	—38 dbm
Missile code	variable, in 16 steps from 2 to 23.5 usec

(*c*) *Transmitting system.*

Transmitter	tunable magnetron
Frequency (tuning range)	8,900 to 9,400 mc
Average RF power (at one antenna)	8 dbm
Pulse repetition frequency (average)	500 pps
Pulse width	0.25 usec
Duty cycle (average)	1/8000

h. Rocket Motor Cluster.

Overall length	14 ft (approximately)
Width (less fin assemblies)	34.48 in.
Height (less fin assemblies)	34.48 in.
Diagonal span of the fins	138.21 in.
Base length of the fin	45.00 in.
Tip length of the fin	23.40 in.
Maximum width of the fin	2.98 in.
Weight (gross)	5,300 lb
Weight of the propellant	3,020 lb
Thrust output (sea level at 70°F)	173,600 lb
Burn time (at 70°F)	3.4 sec
Total impulse (at 70°F)	590,000 lb-sec