CHAPTER 12
MAINTENANCE OF HERCULES MOBILE LAUNCHING SECTION MODIFICATION KIT

Section I. GENERAL

204. Scope

This chapter contains maintenance information covering the components of the mobile launching section modification kit within the scope of direct and general support personnel. The scope of maintenance is determined by the listing of parts in TM 9-1440-250-25P/1/1, and the listing of special tools in SC 4935-92-CL-011.

205. References

Organizational maintenance of the mobile launching section modification kit is covered in TM 9-1440-250-20/1. Schematic diagrams are furnished in TM 9-1440-250-12/2 and wiring lists are provided in TM 9-1440-250-35/1, to eliminate duplication of coverage. General maintenance procedures are provided in TM 9-1400-250-15/3. Additional general maintenance procedures applicable to performing maintenance on the mobile launching section modification kit are provided in chapter 4. It is especially important that personnel become familiar with the contents of chapter 4 and TM 9-1400-250-15/3. No references to general maintenance procedures are provided in this chapter.

Section II. MAINTENANCE OF TRANSPORT MODIFICATION KIT

207. Mobile Launcher Axle

a. General. Maintenance operations will normally be performed on components of the mobile launcher axle (fig. 295) with the axle removed from the HERCULES monorail launcher. Refer to TM 9-1440-250-12/2 for axle removal procedures. After the axle has been removed from the launcher, the parking brake lever (10, view A) should be actuated to set the brakes, and the draincock (11, view A) should be opened to relieve the brake system air pressure.


(1) Location and access. The brake system power cluster includes the air cleaner (1, fig. 296), relay valve assembly (2), air cylinder assembly (3), and master cylinder assembly (4). To gain access to these components of the power cluster for units 145 and subsequent, remove the cover (9, fig. 296).

Caution: Brake system air pressure must be relieved as described in paragraph 207a, and hydraulic fluid drained from the brake system before performing procedures in (2) through (6) below. Refer to TM 9-1440-250-20/1 for the brake system hydraulic fluid drain procedures.

(2) Tube assemblies. Remove the tube assemblies (fig. 297) as necessary to perform maintenance. Cap all open lines or tubes to prevent entry of foreign material.

(3) Relay valve assembly.

(a) Removal. Disconnect the tube assemblies and remove the relay valve assembly (6D, fig. 298).
(b) Disassembly.
1. Remove the diaphragm and cover group (3, fig. 299) and the diaphragm spring (4) from the valve and housing assembly (5).
2. Disassemble the diaphragm and cover group (fig. 300).
3. Remove the emergency valve assembly (8, fig. 299) and the gasket (9).
4. Disassemble the emergency valve assembly (fig. 301).
5. Disassemble the valve and housing assembly (fig. 302).

(c) Assembly.
1. Assemble the valve and housing assembly (fig. 302).
2. Assemble the emergency valve assembly (fig. 301) and install in the valve and housing assembly (5, fig. 299) with the spring (4).
3. Assemble the diaphragm and cover group (fig. 300) and install in the valve and housing assembly (5, fig. 299) with the spring (4).

(d) Installation.
1. Install the relay valve assembly (6D, fig. 298) on the double-angle bracket (5).
2. Connect the associated tube assemblies (fig. 297).
3. Test the brake system and adjust in accordance with procedures in TM 9-1440-250-20/1.

(4) Air cylinder assembly.
(a) Removal.
1. Disconnect the tube assemblies as required (fig. 297).
1—Air cleaner (2)  
2—Relay valve assembly 9026938-1 (145 and subsequent) or 8016936 (1 through 144)  
3—Air cylinder assembly  
4—Master cylinder assembly

Figure 296. Component location for brake system power cluster.

Note. The key numbers shown in parentheses in 2 and 3 below refer to figure 303.

2. Remove stroke indicator assembly (1), bolts (3), master cylinder group (5), and air cylinder group (6).
3. Remove elbow (6A) from air cylinder assembly (6B).
   (b) Disassembly. Disassemble air cylinder assembly (fig. 304).
   (c) Assembly.
   Note. The key numbers shown in parentheses in 1 through 4 below refer to figure 304.
   1. Position strainer (4B) and curled hair (4C) in cylinder head (4D) and secure with remaining strainer (4B) and retainer (4A).
   2. Install felt oil retainer (9) and cup and spring assembly (8) on piston and rod assembly (7), and install in cylinder and inlet assembly (3).
   3. Install boot (5), power cylinder spring (6), and cylinder head assembly (4) in cylinder and inlet assembly (3).
   4. Check piston and rod assembly (7) for freedom of travel within cylinder and inlet assembly (3).
   (d) Installation.
   Note. The key numbers shown in parentheses in 1 and 2 below refer to figure 303.
   1. Install elbow (6A) on air cylinder assembly (6B).
   2. Position air cylinder group (6) and master cylinder group (5) on mounting plate (7) and secure with lockwasher (2), stroke indicator assembly (1), lockwasher (4), and hexagon-head bolts (3).
1. Connect tube assemblies (fig. 297).

4. Test brake system and adjust in accordance with procedures in TM 9–1440–250–20/1.

(a) Removal.
1. Disconnect tube assemblies as required (fig. 297).

Note. The key numbers shown in parentheses in 2 and 3 below refer to figure 303.

2. Remove stroke indicator assembly (1), bolts (3), master cylinder group (5), and air cylinder group (6).

3. Remove connector bolt (5A), preformed packing (5B), and tee connector (5C) from master cylinder assembly (5D).

(b) Disassembly. Disassemble master cylinder assembly as shown in figure 305.

(c) Assembly.

Note. The key numbers shown in parentheses in 1 through 4 below refer to figure 305.

1. Apply a light coat of hydraulic brake fluid 9150–231–9071 to components and interior of master cylinder and plug assembly (8).

2. Assemble cup (8B) and ring (3A) on piston and protector assembly (3C).
Figure 238. Removal and installation of relay valve assembly.

Figure 299. Disassembly and assembly of relay valve assembly.
3. Install valve seat (7), check valve assembly (6), spring assembly (5), cylinder cup (4), and master cylinder piston assembly (3) in master cylinder and plug assembly (8).
4. Install stop plate (2) and retaining clip (1).

(d) Installation.

Note. The key numbers shown in parentheses in 1 and 2 below refer to figure 303.

1. Install connector bolt (5A), preformed packing (5B), and tee connector (5C) on master cylinder assembly (5D).
2. Position master cylinder group (5) and air cylinder group (6) on mounting plate (7) and secure with lockwasher (2), stroke indicator assembly (1), lockwasher (4), and hexagon-head bolts (3).

3. Connect tube assemblies (fig. 297).
4. Test brake system and adjust in accordance with procedures in TM 9-1440-250-20/1.

(6) Air cleaner assembly.

(a) Removal.
1. Disconnect tube assemblies as required (fig. 297).

Note. The key numbers shown in parentheses in 2 and 3 below refer to figure 306.

2. Remove nuts (1), lockwashers (2), U-bolt (3), and air cleaner group (4).
3. Remove elbows (4A and 4B) from air cleaner assembly (4C).

(b) Disassembly. Disassemble air cleaner assembly as shown in figure 307.

(c) Assembly. Assemble air cleaner assembly as shown in figure 307.
1—5/16-18 x 3/4 hexagon-head bolt
2—5/16-inch lock washer
3—Cap
4—Gasket
5—Spring
6—Piston and valve assembly

A—Shuttle valve assembly
B—41/64-inch flat washer
C—Valve piston
7—Preformed packing
8—Preformed packing
9—Valve body

Figure 301. Disassembly and assembly of emergency valve assembly.

(d) Installation.

Note. The key numbers shown in parentheses in 1 and 2 below refer to figure 306.

1. Install elbows (4A and 4B) on air cleaner assembly (4C).
2. Install air cleaner group (4).
3. Connect tube assemblies (fig. 297).
4. Test brake system and adjust in accordance with procedures in TM 9-1440-250-20/1.

c. Wheel and Tire Group.

Note. The key numbers shown in parentheses in (1) through (4) below refer to figure 308 unless otherwise indicated.

(1) Removal.
(a) Check that parking brake lever (10, fig. 295) is in locked position on wheel that is not to be removed.
(b) Install automotive jack (4) and remove wheel and tire group (2).
(2) Disassembly. Disassemble wheel and tire group (2).
d. Hub and Brake Drum Group.

Note. The key numbers shown in parentheses in (1) through (4) below refer to figure 309 unless otherwise indicated.

(1) Removal.
   (a) Remove wheel and tire group (2, fig. 308) as described in paragraph 207c(1).
   (b) Remove hub and brake drum group (8) from brake group (9).

(2) Disassembly. Disassemble hub and brake drum group (8).

(3) Assembly.
   Warning: Volatile mineral spirits and dry cleaning solvent are flammable and should not be used near an open flame.
   (a) Wash hub and brake drum group (8) with dry cleaning solvent 6850-336-8170 or mineral spirits 8010-242-2089. Use brush to remove old lubricant.
   (b) Inspect hub and brake drum group (8) for excessive wear, cracks, or other damage. Replace parts that are not serviceable.
   (c) Lubricate cones (8A) and (8D) as described in TM 9-1440-250-20/1.
   (d) Assemble hub and brake drum group (8).

(4) Installation.
   (a) Install hub and brake drum group (8).
   (b) Install wheel and tire group (2, fig. 308) and remove automotive jack (4, fig. 308).
   (c) Perform hydraulic brake adjustment as described in TM 9-1440-250-20/1.
   (d) Perform parking brake adjustment as described in TM 9-1440-250-20/1.
   (e) Perform brake test as described in TM 9-1440-250-20/1.

e. Brake Group and Wheel Cylinder Assembly.

(1) Removal.
   (a) Open draincock (11, view A, fig. 295).
Figure 303. Removal and installation of air cylinder group and master cylinder group.

(b) Remove wheel and tire group (2, fig. 308) as described in paragraph 207c(1).

(c) Remove hub and brake drum group (8, fig. 309) from brake group (9, fig. 309).

Note. The key numbers shown in parentheses in (d) through (g) below refer to figure 310 unless otherwise indicated.

(d) Remove shoe spring (3).

(e) Compress spring (2) and disengage wire rope assembly (1) from lever (6).

(f) Remove retaining clips (4), shoe spring (5), lever (6), and connecting link (7).

(g) Remove brake shoes (13 and 18).

Note. The key numbers shown in parentheses in (h) and (i) below refer to figure 311.

(h) Remove headed straight pin (11) and remove wire rope assembly (12).

(i) Remove wheel cylinder assembly (8), connect to ground (13, view A), and tube assemblies (14 and 15, view A).

Note. The key numbers shown in parentheses in (2) through (4) below refer to figure 311 unless otherwise indicated.

(2) Disassembly.

(a) Disassemble wheel cylinder assembly (8).

(b) Disassemble connector group (13, view A).

(3) Assembly.

(a) Clean links (8a), bleeder valve
Figure 304. Disassembly and assembly of air cylinder assembly.

1—5/16-18 x 5/8 hexagon-head bolt (8)
2—5/16-inch lockwasher (8)
3—Cylinder head assembly
A—Retainer
B—Strainer
C—Curled hair
D—Cylinder head
5—Boot
6—Power cylinder spring
7—Piston and rod assembly
8—Cup and spring assembly
9—Felt oil retainer

(8e), and cylinder (8f) with hydraulic brake fluid 9150-231-9071.
(b) Inspect inside of cylinder (8f) for corrosion or scratches and replace cylinder (8f) if necessary.
(c) Apply a light coat of hydraulic brake fluid 9150-231-9071 to inside of cylinder (8f) and other components of wheel cylinder assembly (8).

Note. Overhaul kit 7412066 containing boot (8b), retainers (8c, cc), cups (8c, bb, and pistons (8c, aa) is to be used.
(d) Assemble piston assembly (8c).
(e) Assemble wheel cylinder assembly (8).
(f) Assemble connector group (13, view A).

4) Installation.
(a) Install wheel cylinder assembly (8).
Figure 305. Disassembly and assembly of master cylinder assembly.

(b) Install connector group (13, view A) and tube assemblies (14 and 15, view A).
(c) Install wire rope assembly (12, view A) and secure with headed straight pin (11, view A).
(d) Install brake shoes (13 and 18, fig. 310).
(e) Compress spring (2, fig. 310) and engage wire rope assembly (1, fig. 310) to lever (6, fig. 310).
(f) Install hub and brake drum group (8, fig. 309).
(g) Install wheel and tire group (2, fig. 308) and remove automotive jack (4, fig. 308).
(h) Close draincock (11, view A, fig. 295).
(i) Perform brake bleed procedures as described in TM 9-1440-250-20/1.
(j) Perform hydraulic brake adjustment as described in TM 9-1440-250-20/1.
(k) Perform parking brake adjustment as described in TM 9-1440-250-20/1.

f. Air Line Coupling.

Note. The key numbers shown in parentheses in (1) through (4) below refer to figure 312 unless otherwise indicated.

(1) Removal.
(a) Disconnect air hose assembly (5) from prime mover and depressurize air system on axle (3, fig. 295) by opening draincock (11, fig. 295).
(b) Remove adapter (1), reducer (2), and couplings (3 and 4).

(2) Disassembly. Disassemble coupling (3).

(3) Assembly.
(a) Assemble ring (3d) in coupling body (3e).
Figure 306. Removal and installation of air cleaner group.

1—1/4-20 hexagon nut (2)
2—1/4-inch lockwasher (2)
3—U-bolt
4—Air cleaner group
   A—Elbow 137425
   B—Elbow MS20822-6S
   C—Air cleaner assembly

Figure 307. Disassembly and assembly of air cleaner assembly—legend.

1—Plug
2—Nut
3—Gasket
4—Spring
5—Washer
6—Filter
7—Housing

Figure 307. Disassembly and assembly of air cleaner assembly.
(b) Assemble plunger (3c), spring (3b), and retainer (3a) into coupling body (3e).

4) Installation.
(a) Install air line coupling (3) on mobile launcher axle (3, fig. 295) with reducer (2) and adapter (1).
(b) Install coupling (3) on air hose assembly (5).
(c) Connect hose assembly (5) to prime mover.
(d) Test brake system and adjust in accordance with procedures in TM 9-1440-250-20/1.

(g) Cable Assembly.
Note. The key numbers shown in parentheses in (1) and (2) below refer to figure 313.

1) Removal.
(a) Remove loop clamps (3 and 10).
(b) Remove cable assembly (4).

2) Installation.
(a) Install cable assembly (4) on mobile launcher axle and secure with bracket (13) and loop clamp (10).
(b) Install cable assembly (4) on arms of axle and secure with loop clamps (8).
1—3/8-16 x 1/2 drilled fillister-head screw (4)
2—3/8-inch lockwasher (4)
3—Cover plate
4—Gasket
5—1/4 x 3 1/2 cotter pin
6—Axle nut
7—Key washer
8—Hub and brake drum group
   A—Cone
   B—Cup
   C—Seal

D—Cone
E—Cup
F—1/2-20 x 1 1/4 bolt (6)
G—1/2-inch lockwasher (6)
H—Brake drum
J—Hub
K—3/4-16 hexagon nut (10)
L—Stud 81919-12247 (RH) (10) or 81919-12248 (LH) (10)
9—Brake group

Figure 809. Removal and installation of hub and brake drum group.

**h. Connecting Link.**

(1) **Removal.** Remove connecting link (8, fig. 313).

(2) **Installation.** Install connecting link (8, fig. 313).

i. **Tiedown Linkage.** Remove and install tiedown linkage (8, fig. 5.1) as shown in TM 9-1440-250-12/2

**208. Electrical Installation**

*Note.* The key numbers shown in parentheses in a below refer to figure 314 unless otherwise indicated.

a. **General.**

(1) The electrical installation (2, fig. 5.1) consists of two marker light assemblies (2B, fig. 5.1) and two stop
light-taillight assemblies (2A and 2C, fig. 5.1). During travel the marker light assemblies (1) and stop light-taillight assemblies (3 and 4) are installed on the HERCULES monorail launcher (2). When the HERCULES monorail launcher (1, fig. 5.3) is emplaced, the marker light assemblies (6) and stop light-taillight assemblies (5 and 7) are installed on the mobile launcher axle (8).

Figure 310. Disassembly and assembly of brake group and wheel cylinder.

(2) Perform maintenance on the marker light assemblies (1) and the stop light-taillight assemblies (3 and 4) as described in b and c below.

b. Marker Light Assembly.

(1) Removal. Remove marker light assembly as shown in TM 9-1440-250-12/2.

(2) Disassembly. Disassemble marker light assembly (fig. 315).

Note. The key numbers shown in parentheses in (3) below refer to figure 315 unless otherwise indicated.
Figure 311. Disassembly and assembly of brake group and wheel cylinder—continued.

(3) Assembly.
(a) Assemble blackout clearance light assembly (1) and clearance light assembly (2).
(b) Connect wire 3100Q18 (fig. 316) to clearance light assembly (2, fig. 316).
(c) Connect wire 3101Q18 (fig. 316) to blackout clearance light assembly (3, fig. 316).
(d) Clean and prepare the area of housing (17) where ground terminal (14) is secured to housing to insure adequate bond of ground terminal (14) and housing (17). Refer to TM 9-1400-250-15/3 for cleaning and preparation instructions.

(e) Install ground terminal (14) and reflector (16).

(f) Secure cable assembly (8) to base (5) with locknut (6).

(g) Install base (5).

(4) Install marker light assembly as shown in TM 9-1440-250-12/2.

c. Stop Light-Taillight Assemblies.

(1) Removal. Remove stop light-taillight assembly as shown in TM 9-1440-250-12/2.

(2) Disassembly. Disassemble stop light-taillight assembly (fig. 317).

Note. The key numbers shown in parentheses in (3) below refer to figure 317 unless otherwise indicated.
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(a) Assemble clearance light assembly (1) and blackout clearance light assembly (2).
(b) Assemble reflector (11).
(c) Clean and prepare the area of cabinet (24 or 27) where ground terminal (7 or 15, fig. 318) is secured, to insure adequate bond of ground terminal (7 or 15, fig. 318). Refer to TM 9-1400-250-15/3 for cleaning and preparation instructions.
(d) Install ground terminal (7 or 15, fig. 318) and reflector (19).
(e) Assemble stop light-taillight (13 or 25).
(f) Secure cable assembly (20 or 26) to cabinet (24 or 27) with locknut (14).
(g) Connect cable connections for the cable assembly (1 or 8, fig. 318).
(h) Install the cover (12).

4 Installation. Install the stop light-taillight assembly as shown in TM 9-1440-250-12/2.

209. Kingpin Support

The kingpin support (3, fig. 5.1) adapts the launcher to enable it to be connected to a prime mover for travel. After travel, the kingpin support is stowed on the mobile launcher axle.

a. Removal. Remove the kingpin support as described in TM 9-1440-250-12/2.

b. Disassembly. Disassemble the kingpin support (fig. 318.1).

c. Assembly.

Note. The key numbers shown in parentheses in steps (1) through (3) below refer to figure 318.1.
(1) Install the guide (16) and the kingpin (15).

(2) Install the cover plate (12) and the shock mount (14). Torque the hexagon-head bolts (7) and the cap screws (10) to 30-35 foot-pounds and install the lock wire (6) on the hexagon-head bolts.

(3) Install the springs (4), pins (3), and handles (2).

d. Installation. Install the kingpin support as described in TM 9-1440-250-12/2.
8—Cable assembly
9—No. 10-32 self-locking hexagon nut (4)
10—No. 10 flat washer (4)
11—No. 10-32 x 1/2 round-head screw (4)
12—1/4-28 self-locking hexagon nut (2)
13—0.281-inch-Id flat washer (2)
14—Ground terminal (part of cable assembly)
15—1/4-28 x 1/2 round-head screw (2)
16—Reflector
17—Housing

Figure 315. Disassembly and assembly of marker light assembly—continued—Legend.
1—Cable assembly 9021572
2—Clearance light assembly
3—Blackout clearance light assembly
4—Ground terminal (part of cable assembly 9021572)

Figure 316. Cable connections for marker light assembly.
1—Clearance light assembly
   A—No. 10-24 x 3/8 oval-head screw (2)
   B—Lamp assembly door
   C—Lens
   D—Incandescent lamp
   E—Lamp base group

2—Blackout clearance light assembly
   A—No. 10-24 x 3/8 oval-head screw (2)
   B—Lamp assembly door
   C—Blackout lens
   D—Incandescent lamp
   E—Lamp base group

3—No. 10-32 x 1/2 round-head screw (8)
4—No. 10 flat washer (8)
5—No. 10-32 self-locking hexagon nut (8)
6—No. 10 flat washer (8)
7—No. 10-32 x 1/2 round-head screw (8)
8—1/4-28 self-locking hexagon nut (2)
9—0.281-inch-id flat washer (2)
10—1/4-28 x 1/2 round-head screw (2)
11—Reflector
12—Cover
13—Stop light-taillight

A—Door
B—Lamp assembly door
C—Preformed packing
D—Incandescent lamp
E—Lamp

14—Locknut
15—Synthetic rubber and cork gasket
16—1/4-28 self-locking hexagon nut (2)
17—0.281-inch-id flat washer (2)
18—1/4-28 x 1/2 round-head screw (2)
19—Reflector
20—Cable assembly 9021455
21—3/8-16 x 3 hexagon-head cap screw (2)
22—3/8-inch lockwasher (2)
23—Sleeve spacer (2)
24—Cabinet
25—Stop light-taillight
   A—Door
   B—Preformed packing
   C—Incandescent lamp (2)
   D—Lamp base group
   E—Cable assembly 9021473
27—Cabinet

Figure 317. Disassembly and assembly of stop light-taillight assemblies 9021410 and 9081409.
Figure 318. Cable connections for stop light-taillight assemblies.

1—Cable assembly 9021473
2—Blackout-stop band
3—Stop light-taillight
4—Blackout-tail band
5—Blackout clearance light assembly
6—Clearance light assembly
7—Ground terminal (part of cable assembly 9021473)
8—Cable assembly 9021455
9—Service-stop band
10—Stop light-taillight
11—Blackout-tail band
12—Service-tail band
13—Clearance light assembly
14—Blackout clearance light assembly
15—Gnd terminal (part of cable assembly 9021455)
Section III. MAINTENANCE OF THE LAUNCHER FIELD MODIFICATION KIT

210. General

This section provides instructions for performing maintenance on the forward jacks, auxiliary jack, center jacks, outriggers, outrigger jacks, bracket assemblies, electrical test station, hydraulic test station, and loading rack clamp assemblies (fig. 5.3).

211. Forward and Auxiliary Jacks

Two forward jacks and one auxiliary jack are used in the emplacement of the launcher. The procedures described in a through d below are for the maintenance of the forward and auxiliary jacks.

a. Removal. Remove the jacks as described in TM 9-1440-250-12/2.

Caution: Maintenance should be performed in as dust-free an area as possible. Care should be exercised to prevent the entrance of any foreign matter into the hydraulic components of the jack.
b. Disassembly.

(1) Drain and discard the hydraulic oil by extending the oil level indicator (12, fig. 318.2) to its fullest extent and inverting the jack.

Caution: Care should be exercised during removal of the cylinder head (5) to prevent damage to the head gasket (6).

(2) Remove the cylinder head and the head gasket.

(3) Remove and discard the preformed packing (7).

(4) Remove the baffle (9) and the breather (10) from the cylinder head.

(5) Remove the oil level indicator retainer (11) from the oil level indicator.

(6) Remove the chain assembly (15).

(7) Remove the locking bar (18) by loosening the setscrew (16) enough to remove the hexagon-head bolt (17).

(8) Remove the adapter (20) by loosening the two setscrews (19) and turning the adapter counterclockwise.

(9) Remove the piston (21) by using the jack ram inserter (1, fig. 55.1). Exert a gentle force on the handle of the jack ram inserter and force the piston upward until it protrudes three inches above the top of the jack. Pull the piston the remaining distance to complete the removal.

(10) Remove and retain the retaining ring (22, fig. 318.2) and the scraper ring (23).

(11) Remove and discard the preformed packings (24 and 25).

Caution: When attempting to remove the locknut, observe the control valve sleeve to determine if it is beginning to turn. If this condition is noted, first remove the valve retaining screws and then remove the locknut. This operation will prevent shearing the screws.

(12) Remove the relief valve (1, fig. 318.3), control valve (9), and hydraulic pump (13).

(13) Remove and discard the preformed packings (2, 10 and 14).

(14) Disassemble the relief valve (fig. 318.4), control valve (fig. 318.5), and hydraulic pump (fig. 318.6).

c. Assembly.

Caution: Dip new preformed packings in clean hydraulic oil before installation.

Note. Replace old preformed packings with new packings.

Note. To prevent probable damage to the preformed packing (12, fig. 318.5), the slide (11) should be inserted into the sleeve (9) before installing the packing.

(1) Assemble the hydraulic pump (fig. 318.6), control valve (fig. 318.5), and relief valve (fig. 318.4).

(2) Install the preformed packings (14, fig. 318.3) on the hydraulic pump (13) and the preformed packings (10) on the control valve (9).

(3) Install the hydraulic pump and the control valve.

(4) Install the preformed packings (2) on the relief valve (1).

(5) Install the relief valve.

(6) Install the preformed packings (24 and 25, fig. 318.2).

(7) Install the retaining ring (22) and the scraper ring (23).

(8) Coat the piston (21) lightly with clean hydraulic oil. Install the piston into the cylinder of the jack by using the handle of the jack ram inserter (1, fig. 55.1).

(9) Install the adapter (20, fig. 318.2) and tighten the two setscrews (19).

(10) Install the locking bar (18) by installing the hexagon-head bolt (17) and tightening the setscrew (16).

(11) Install the chain assembly (15).

(12) Install the tube vent (14). Install the preformed packing (18) and the oil level indicator (12) on the cylinder head (5), and install the oil level indicator retainer (11) on the indicator.

(13) Install the breather (10) and the baffle (9) on the cylinder head.

(14) Install the preformed packing (7) on the cylinder head.

(15) Install the cylinder head and the head gasket (6). Torque the hexagon-head
bolts (1) to 300 pound-inches, and the hexagon-head bolts (3) to 120 pound-inches.

(16) Extend the oil level indicator to its fullest extent and refill the jack with MIL-H-5606 hydraulic oil only. Replace the indicator.

d. Installation. Install the jacks as outlined in TM 9–1440–250–12/2.

212. Center Jacks

Two center jacks are used in the emplacement of the launcher. The procedures outlined in a through d below are for the maintenance of the center jacks.


Caution: Maintenance should be performed in as dust-free an area as possible. Care should be exercised to prevent the entrance of any foreign matter into the hydraulic components of the jack.

b. Disassembly.

Note. The key numbers shown in parenthesis in steps (1) through (6) below refer to figure 318.7.

1. Drain and discard the hydraulic oil by extending the oil level indicator (5) to its fullest extent and inverting the jack.

Caution: Care should be exercised during removal of the cover plate (2) to prevent damage to the gasket (3).

2. Remove the cover plate and the gasket.

3. Remove the oil level indicator retainer (4) from the oil level indicator. Remove the indicator, and remove and discard the preformed packing (6). Remove the baffle (8) and the breather (9).

4. Disconnect and remove the tube assembly (10) and the elbow (11).
Figure 318.2. Forward and auxiliary jacks—disassembly and assembly.

1- 5/8-18 x 2 3/4 hex-hd bolt (4)
2- 5/8-in-id fl washer (4)
3- 5/16-24 x 1 1/2 hex-hd bolt (2)
4- 5/8-in-id fl washer (2)
5- Cylinder head
6- Head gasket
7- 3/8 id x 0.139 thk preformed packing
8- No. 00 x 3/8 rd-hd dr screw (2)
9- Baffle
10- Breather
11- Oil level indicator retainer (p/o oil level indicator)
12- Oil level indicator
13- 0.755 id x 0.097 thk preformed packing
14- Tube vent
15- Chain assy
16- 5/16-24 x 3/8 cone-pt setscrew
17- 5/8-20 x 1 1/2 hex-hd bolt
18- Locking bar
19- 5/16-24 x 3/8 cone-pt setscrew
20- Adapter
21- Piston
22- Retaining ring
23- 3/4 in-od scraper ring
24- 3/4 id x 0.210 thk preformed packing
25- 3/4 id x 0.210 thk preformed packing
1—Relief valve
2—Preformed packing AN6227-15
3—No. 10-32 x 2/32 hex-hd bolt (2)
4—No. 10 lk washer (2)
5—1 7/16-18 hex. coupling nut
6—1 15/32-id x 2-od fl washer
7—Gasket
8—Plug
9—Control valve
10—Preformed packing
11—5/16-24 x 1 5/32 hex-hd bolt (4)
12—5/16 int-teeth lk washer (4)
13—Hydraulic pump
14—Preformed packing

Figure 318.3. Forward, auxiliary, and outrigger jacks—disassembly and assembly—continued.

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1—No. 10-32 x 3 rd-hd screw
2—Plate
3—Guide
4—Spring
5—Guide
6—Ball
7—Seat
8—Preformed packing
9—Manifold 9152504
10—Manifold 9152509

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1 Component of valve 9152504
2 Component of valve 9162499

Figure 318.4. Relief valve—disassembly and assembly.
Figure 318.5. Control valve—disassembly and assembly.

(5) Remove the reservoir end plug (15) and the tubes (16) and (17).

(6) Remove and discard the preformed packing (19).

Note. The key numbers shown in parentheses in steps (7) through (21) below refer to figure 318.8 unless otherwise indicated.

(7) Pull the adapter (1) until the second stage ram (22) extends six inches from the lower end of the jack. Using strap wrench FSN 5120-262-8491 around the extended portion of the ram so that it will resist counterclockwise motion, remove the adapter by turning it counterclockwise.

(8) Remove and discard the preformed packing (2).

(9) Remove the clamp (6) and the chain assembly (7).

(10) Remove the locking bar (10) by loosening the set screw (8) enough to remove the hexagon-head bolt (9).

(11) Pull the ring (11) until the first stage ram (23) extends six inches from the lower end of the jack. Using a strap wrench around the extended portion of the ram so that it will resist counterclockwise motion, remove the ring by turning it counterclockwise.

(12) Install the jack ram inserter (3, fig. 55.1) on the second stage ram and install the thread protector (7, fig. 55.1) using the spanner wrench (4, fig. 55.1) Exert a gentle force on the protruding end of the jack ram inserter until the piston (17), first stage ram, and second stage ram protrude three inches above the jack. Remove the piston and rams as a unit.

(13) Remove and discard the preformed packing (12).

(14) Remove and retain the retaining ring (13) and the scraper ring (14).

(15) Place a strap wrench around the first stage ram (23) so that it will resist
(18) Remove and discard the preformed packings (18, 19, 20, and 21).
(19) Remove the rams (22 and 23).
(20) Remove and discard the preformed packings (24, 25, and 26).
(21) Remove and retain the retaining ring (27) and the scraper ring (28).
(22) Remove the clip (1, fig. 318.9), relief valve (2), control valve (9), and hydraulic pump (13).
(23) Remove and discard the preformed packings (3, 10, and 14).
(24) Disassemble the relief valve (fig. 318.4), control valve (fig. 318.5), and hydraulic pump (fig. 318.6).

c. Assembly.

**Caution:** Dip new preformed packings in clean hydraulic oil before installation.

*Note.* Replace old preformed packings with new packings.

*Note.* To prevent probable damage to the preformed packing (12, fig. 318.5), the slide (11) should be inserted into the sleeve (9) before installing the packing.

(1) Assemble the hydraulic pump (fig. 318.6), control valve (fig. 318.5), and relief valve (fig. 318.4).
(2) Install the preformed packings (14, fig. 318.9) on the hydraulic pump (13) and the preformed packings (10) on control valve (9).
(3) Install the tube nipple (8).
(4) Install the hydraulic pump and the control valve.
(5) Install the preformed packings (3) on the relief valve (2).
(6) Install the relief valve and the clip (1).
(7) Install the preformed packings (25 and 26, fig. 318.8) on the second stage ram (22) and install the preformed packing (24) in the groove on the lower end of the first stage ram (23).
(8) Coat the interior of the first stage ram and the exterior of the second stage ram lightly with hydraulic oil.
(9) Install the jack ram inserter (3, fig. 55.1) on the second stage ram, and insert the second stage ram into the
first stage ram. Grasp the handle of the jack ram inserter and carefully pull the second stage ram until it protrudes six inches from the first stage ram.

(10) Install the retaining ring (27, fig. 318.8), and the scraper ring (28).

(11) Install the preformed packings (21, 20, 19, and 18) on the piston (17).

(12) Install the tube (16) in the bottom of the piston and line up the holes in the tube and the piston so that the straight pin (15) can be installed. Coat the tube and piston lightly with clean hydraulic oil.

**Caution:** During this operation, make certain that the straight pin does not drop out.

(13) Install the assembled piston and tube into the first stage ram by turning clockwise. Secure firmly using the spanner wrench and the strap wrench in combination.

(14) Install the preformed packing (12) in the lower end of the jack cylinder (29).

(15) Coat the exterior of the first stage ram and the interior of the jack cylinder lightly with clean hydraulic oil.

(16) Install the thread protector (7, fig. 55.1) on the first stage ram using the spanner wrench.

(17) Install the assembled rams and piston in the jack cylinder by gently pulling on the jack ram inserter until the first stage ram protrudes six inches from the bottom of the jack cylinder. Remove the thread protector and the jack ram inserter.

(18) Install the retaining ring (13, fig. 318.8) scraper ring (14).

(19) Install and secure the ring (11) on the first stage ram.

(20) Install the locking bar (10) by installing the hexagon head bolt (9) and securing with the setscrew (8). Use the shim (6, fig. 55.1) to correctly space the distance between the ring and the locking bar.

(21) Install the chain assembly (7, fig. 318.8) on the clamp (6) and install the clamp.

(22) Install the preformed packing (2) on the adapter (1).
1 - Adapter
2 - 2.337 id x 0.118 thk preformed packing
3 - ¾ - 28 x 3% hex-hd bolt
4 - ¾ - 28 self-lkg hex. nut
5 - ¾-in-id fl washer
6 - Clamp
7 - Chain assy
8 - ¾ - 24 x ¾ cone-pt setscrew
9 - ½ - 20 x 3% hex-hd bolt
10 - Locking bar
11 - Ring
12 - 3% id x 0.210 thk preformed packing
13 - Retaining ring
14 - First stage ram retaining ring
15 - 3% in-od scraper ring
16 - Tube
17 - Piston
18 - 3% id x 0.189 thk preformed packing
19 - 1½ id x 0.105 thk preformed packing
20 - 1½ id x 0.139 thk preformed packing
21 - 3.000 id x 0.189 thk preformed packing
22 - Second stage ram
23 - First stage ram
24 - 3% id x 0.210 thk preformed packing
25 - 1½ id x 0.139 thk preformed packing
26 - 2% id x 0.210 thk preformed packing
27 - Second stage retaining ring
28 - 2½-in-od scraper ring
29 - Jack cylinder

Figure 318.8. Center jack—disassembly and assembly—Continued.
(23) Install and secure the adapter on the second stage ram.

(24) Install the preformed packing (19, fig. 318.7) in the groove on the reservoir end plug (15). Coat the exterior of the tubes (16 and 17) and the underside of the end plug lightly with hydraulic oil and install in the jack. Torque the cap screws (14) to 500 pound-inches.

(25) Install and connect the elbow (11) and the tube assembly (10).

(26) Install the breather (9) and the baffle (8).

(27) Install the preformed packing (6) and the oil level indicator (5), and install the oil level indicator retainer (4).

(28) Install the gasket (3) and the cover plate (2).

(29) Extend the oil level indicator to its fullest extent and refill the jack with MIL-H-5606 hydraulic oil only. Replace the indicator.

d. Installation. Install the jacks as outlined in TM 9-1440-250-12/2.

213. (Deleted)

214. Outrigger Assemblies

Two outrigger assemblies, each consisting of an outrigger and a jack, are used in the emplacement of the launcher. The procedures outlined in a through d below are for the maintenance of the outrigger assemblies.


b. Disassembly. Remove the jack from the outrigger (fig. 318.10).

c. Assembly. Install the jack on the outrigger (fig. 318.10).

d. Installation. Install the outrigger assemblies as outlined in TM 9-1440-250-12/2.

214.1. Outrigger Jacks

a. Removal. Remove the jacks from the outriggers (fig. 318.10).

Caution: Maintenance should be performed in an area as free of foreign matter as possible. Care should be exercised to prevent the entrance of any foreign matter into the hydraulic components of the jack.

b. Disassembly.

Note. The key numbers shown in parentheses in steps (1) through (13) below refer to figure 318.10.1 unless otherwise indicated.
Figure 8.10. Outrigger jack — removal and installation.

(1) Drain and discard the hydraulic oil by extending the oil level indicator (12) to its fullest extent and inverting the jack.

Caution: Care should be exercised during removal of the cylinder head (5) to prevent damage to the head gasket (6).

(2) Remove the cylinder head and the head gasket.

(3) Remove and discard the preformed packing (7).

(4) Remove the baffle (9) and the breather (10) from the cylinder head.

(5) Remove the oil level indicator retainer (11) from the oil level indicator (12). Remove the indicator and remove and discard the preformed packing (18).

(6) Remove the tube (14).

(7) Remove the chain assembly (15).

(8) Loosen the setscrew (16) enough to remove the hexagon-head bolt (17), and remove the locking bar (21).

(9) Remove the adapter (24) by loosening the setscrews (23) and turning the adapter counterclockwise.

(10) (Deleted)

(11) Remove the piston (30) by using the jack ram inserter (1, fig. 55.1). Exert a gentle force on the handle of the jack ram inserter and force the piston upward until it protrudes three inches above the top of the jack. Pull the piston the remaining distance to complete the removal.

(12) Remove and retain the retaining ring (31) and the scraper ring (32).

(13) Remove and discard the preformed packings (33 and 34).

Caution: When attempting to remove the locknut, observe the control valve sleeve to determine if it is beginning to turn. If this condition is noted, first remove the valve retaining screws and then remove the locknut. This operation will prevent shearing the screws.

(14) Remove the relief valve (1, fig. 318.3), control valve (9), and hydraulic pump (13).

(15) Remove and discard the preformed packings (2, 10, and 14).

(16) Disassemble the relief valve (fig. 318.4), control valve (fig. 318.5), and hydraulic pump (fig. 318.6).

c. Assembly.

Caution: Dip new preformed packings in clean hydraulic oil before installation.

Note. Replace old preformed packings with new packings.

Note. To prevent probable damage to the preformed packing (12, fig. 318.5), the slide (11) should be inserted into the sleeve (9) before installing the packing.
1—%/-18 x 2½/₄ hex-hd bolt (4)
2—½ fl washer (4)
3—%/-24 x 1¾%₂ hex-hd bolt (2)
4—½% fl washer (2)
5—Cylinder head
6—Head gasket
7—¾ id x ¾ thk preformed packing
8—No. 00 x ¾ rd-hd dr screw (2)
9—Baffle
10—Breather
11—Oil level indicator retainer 9153625 (p/o oil level indicator 9153627)
12—Oil level indicator
13—¾ id x 0.097 thk preformed packing
14—Tube
15—Chain assembly
16—%/-24 x ¾ cone-pt setscrew
17—½ x 1¾%₂ hex-hd bolt

18—(Deleted)
19—(Deleted)
20—(Deleted)
21—Locking bar
22—(Deleted)
23—%/-24 x ¾ cone-pt setscrew (2)
24—Adapter
25—(Deleted)
26—(Deleted)
27—(Deleted)
28—(Deleted)
29—(Deleted)
30—Piston
31—Retaining ring
32—Scraper ring
33—¾ id x 3/16 thk preformed packing
34—¾ id x 3/16 thk preformed packing

Figure 318.10.1. Outrigger jack — disassembly and assembly.
Figure 318.11. Bracket assembly—disassembly and assembly.

(1) Assemble the hydraulic pump (fig. 318.6), control valve (fig. 318.5), and relief valve (fig. 318.4).

Note. The key numbers shown in parentheses in steps (2) through (4) below refer to figure 318.3.

(2) Install the preformed packings (14) on the hydraulic pump (13) and the preformed packings (10) on the control valve (9).

(3) Install the hydraulic pump and the control valve.

(4) Install the preformed packings (2) on the relief valve (1).

(5) Install the relief valve.

Note. The key numbers shown in parentheses in steps (6) through (19) below refer to figure 318.10.1 unless otherwise indicated.

(6) Install the preformed packings (33 and 34).

(7) Install the scraper ring (32) and the retaining ring (31).

(8) Coat the piston (30) lightly with clean hydraulic oil. Install the piston in the cylinder of the jack by using the handle of the jack ram inserter (1, fig. 55.1).

(9) Slide the bellows (29) over the extended portion of the piston. Position the clamp (28) under the three supports on the bellows, and secure the clamp to the jack.

(10) Install the adapter (24) and tighten the setscrews (23).

(11) Install the locking bar (21) and the stop (22) with the hexagon-head bolt (18), flat washer (20), and self-locking hexagon nut (19).

(12) Secure the locking bar with the hexagon-head bolt (17) and the setscrew (16).

(13) Install the chain assembly (15).

(14) Install the tube (14).

(15) Install the preformed packing (13) and install the oil level indicator (12). Secure the indicator with the oil level indicator retainer (11).

(16) Install the breather (10) and the baffle (9) on the cylinder head (5).

(17) Install the preformed packing (7) on the cylinder head.

(18) Install the cylinder head and the head gasket (6). Torque the hexagon-head...
bolts (1) to 300 pound-inches and the hexagon-head bolts (3) to 120 pound-inches.

(19) Extend the oil level indicator (12) to its fullest extent and refill the jack with MIL-H-5606 hydraulic oil only. Replace the indicator.

d. Installation. Install the jacks as described in paragraph 214c.

215. Bracket Assemblies

Two bracket assemblies are used in the emplacement of the launcher. The procedures described in a through d below are for the maintenance of the bracket assemblies.

a. Removal. Remove the bracket assemblies as described in TM 9-1440-250-12/2.

b. Disassembly. Disassemble the bracket assembly (fig. 318.11).

c. Assembly. Assemble the bracket assembly (fig. 318.11).

d. Installation. Install the bracket assemblies as described in TM 9-1440-250-12/2.

216. Electrical and Hydraulic Installations

The electrical and hydraulic installations consist of an electrical test station, a test station valve assembly, and two loading rack clamp assemblies.

a. Electrical Test Station. Remove and install the electrical test station as described in TM 9-1440-251-10.

b. Test Station Valve Assembly.

(1) Removal. Remove the valve assembly as described in TM 9-1440-250-12/2.

(2) Disassembly. Disassemble the valve assembly as described in paragraph 176b.

(3) Assembly. Assemble the valve assembly as described in paragraph 176c.

(4) Installation. Install the valve assembly as described in TM 9-1440-250-12/2.

c. Loading Rack Clamp Assemblies.

(1) Removal. Remove the clamp assemblies as described in TM 9-1440-250-12/2.

(2) Disassembly. Disassemble the clamp assemblies (fig. 264).

(3) Assembly. Assemble the clamp assemblies as described in paragraphs 171c and 172c.

(4) Installation. Install the clamp assemblies as described in TM 9-1440-250-12/2.

Section IV. MAINTENANCE OF THE BLAST SHIELD

217. General

This section covers maintenance of the blast shields (fig. 5.2). One Blast shield is used in the emplacement of each HERCULES monorail launcher (1, fig. 5.3).

218. Blast Shield

Maintenance procedures for the blast shield (fig. 5.2) are described in a and b below.

Note. The key numbers shown in parentheses in a and b below refer to figure 5.2 unless otherwise indicated.

a. (Deleted)
1—Bolt (4)
2—Washer (4)
3—Nut (4)
4—Roller 9153938 (2)
5—Roller 9153940 (2)
6—Bearing (2)
7—Roller 9153927 (1)
8—Roller 9153939 (1)
9—Screw (4)
10—Plate (1)
11—Deflector kit (1)
12—Pin MS-24665-490 (2)
13—Stud Assembly (2)
14—Sleeve (1)
15—Spring (1)
16—Pin MS-16562-66 (2)
17—Pin MS-9048-233 (1)
18—Stud (1)
19—Pin MS-24665-490 (1)
20—Chain (A/R)

* Component of item 4
** Component of item 5

Figure 319. Disassembly and assembly of deflector assembly.

Figure 320. (Deleted)
Figure 321. Blast deflector positioner—disassembly and assembly.
b. Blast Shield (73 and Subsequent).

(1) Removal.

(a) Remove the blast deflector positioner (12) as shown in TM 9-1440-250-12/2.

(b) Remove the ratchet wrenches (10) as shown in TM 9-1440-250-12/2.

(c) Remove the rods (9) as shown in TM 9-1440-250-12/2.

(d) Remove the arm assemblies (8) as shown in TM 9-1440-250-12/2.

(2) Disassembly.

(a) Disassemble the blast deflector positioner (fig. 321).

(b) Disassemble the arm assembly.

(3) Assembly.

(a) Assemble the arm assembly, as described in 1 through 3 below.


2. Install the bearings and secure with the retaining rings.

3. Install the lubrication fittings.

(b) Assemble the blast deflector positioner (fig. 321).

(4) Installation.

(a) Install the arm assemblies (8) as shown in TM 9-1440-250-12/2.

(b) Install the rods (9) as shown in TM 9-1440-250-12/2.

(c) Install the ratchet wrenches (10) as shown in TM 9-1440-250-12/2.

(d) Install the blast deflector positioner (12) as shown in TM 9-1440-250-12/2, if required.

(e) Refer to LO 9-1400-250-20 for lubrication of the arm assemblies.
Section V. MAINTENANCE OF HERCULES MOBILE LAUNCHING
SECTION MODIFICATION KIT ELECTRICAL SYSTEM

219. General
This section provides the procedures for performing maintenance on the components of the mobile launching section modification kit electrical system. Maintenance of the cable assemblies and loudspeaker is described in TM 9-1440-250-12/2. The precautions described in paragraph 58a must be observed when performing maintenance on these items.

220. Generator Junction Box
The generator junction box is mounted on the generator trailer and distributes power to the section operating equipment trailer and the launcher.

Note. The key numbers shown in parentheses in a and b below refer to figure 322.

a. Disassembly.
(1) Remove the cover (3).
(2) Disconnect and remove the wiring harnesses (14, 15, 16, 17, 18, and 19).
(3) Disconnect and remove the transformer and wiring harness (22).
(4) Remove the transformer bracket (25).
(5) Disconnect and remove the resistor assembly (29).
(6) Remove the terminal board groups (33).

b. Assembly.
(1) Install the terminal board groups (33).
(2) Install the resistor assembly (29) and connect to the terminal board groups as described in TM 9-1440-250-35/1.
(3) Install the transformer bracket (25).
(4) Install the transformer and wiring harness (22) on the transformer bracket and connect to the terminal board groups as described in TM 9-1440-250-35/1.
(5) Position each wiring harness connector at its appropriate mounting hole. Apply sealant as described in TM 9-1400-250-15/3.
(6) Install the wiring harness (14, 15, 16, 17, 18, and 19) and connect to the terminal board groups as described in TM 9-1440-250-35/1.
(7) Install the cover (3).
Figure 322. Generator junction box—disassembly and assembly.