

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT,
AND GENERAL SUPPORT MAINTENANCE MANUAL

SUPERSTRUCTURE INTERIOR BAY, MOBILE
FLOATING ASSAULT BRIDGE/FERRY,
NSN 5420-00-877-8682, CONDEC CORP. MODEL
2195-1, NSN 5420-00-017-8224, CONDEC CORP. MODEL
2272, COMPONENT OF INTERIOR BAY UNIT,
NSN 5420-00-491-6339, SUPERSTRUCTURE END BAY,
MOBILE FLOATING ASSAULT BRIDGE/FERRY,
NSN 5420-00-877-8684, CONDEC CORP. MODEL 2195-2,
NSN 5420-00-017-8225, CONDEC CORP. MODEL 2271,
COMPONENT OF END BAY UNIT, NSN 5420-00-491-6320

This copy is a reprint which includes current
pages from Changes 1 through 3.
FORMERLY BOUND

HEADQUARTERS, DEPARTMENT OF THE ARMY

AUGUST 1973

Changes in force C1, C2 and C3

TM 5-5420-205-14
C 3

CHANGE }
NO. 3 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 4 February 1977

Operators', Organizational, Direct Support and
General Support Maintenance Manual

SUPERSTRUCTURE INTERIOR BAY, MOBILE FLOATING ASSAULT
BRIDGE/FERRY, (NSN 5420-00-877-8682), CONDEC CORP MODEL
2195.1, (NSN 5420-00-017-8224), CONDEC CORP MODEL 2272,
COMPONENT OF INTERIOR BAY UNIT,
(NSN 5420-00-491-6339), SUPERSTRUCTURE END BAY,
MOBILE FLOATING ASSAULT BRIDGE/FERRY,
(NSN 5420.00-877-8684), CONDEC CORP MODEL 2195-2
(NSN 5420-00-017-8225), CONDEC CORP MODEL 2271
COMPONENT OF END BAY UNIT, (NSN 5420-00-491-6320)

Current as of 22 December 1976

TM 5-5420-205-14, 31 August 1973, is changed as follows:

Page ii. Table of contents. Add the following:

APPENDIX

- A.1. COMPONENTS OF END ITEMS LIST
- A.2. ADDITIONAL AUTHORIZATION LIST (Not Applicable)
- C. EXPENDABLE SUPPLIES AND MATERIALS LIST (Not Applicable)

Page 3-4. Table 3-1 is superseded as follows:

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services

NOTE: Within designated interval these checks are to be performed in the order list									
Item No	Interval					C	Item to be inspected	Procedures Check for and have repaired or adjusted as necessary	M-Monthly C-Combat Operability Checks Equipment will be reported Not Ready (Red) if
	B	D	A	W	M				
1								Lubricate in accordance with current LO 5-5420-205-12	
2	•						Hoses and fittings	Deterioration, cracks, leaks, ruptures and proper installation.	Any leaks, ruptured hoses or cracked fittings.
3	•						Tubing and fittings	Cracked or bent tubing, broken or missing brackets, loose or cracked fittings.	Any leaks, bent or kinked tubing restricting hydraulic flow.
4		•					Hydraulic cylinders	Damage or leaks. Proper operation. Proper operation.	Any leaks, bent piston rod or inoperative.
5	•						Locking pans and guides	Damage or defective pins and guides.	Bent or broken pins.
6	•	•					Curbing	Damaged curbs, bent or broken curb arm or torsion shaft. Loose or missing flange bolts.	Curbs inoperative.
7			•				Frame assembly and curbs.	Clean after each amphibious operation.	
8				•			Pivot points and locking Pins	Clean and lubricate after each amphibious operation.	

Page 4-8, Table 4-1 is superseded as follows:

Table 4-1 Organizational Preventive Maintenance Checks and Services

Item No.	Interval								Item to be inspected	Procedures	Equipment will be reported not ready (Red) if:
	W	M	Q	S	A	B	H	MI			
1											
2			•						Deck	Lubricate in accordance with current L05-5420-205-12. Inspect wearing surfaces for wear, structural welds for cracks or failures.	Indication of any structural failure.
3			•						Locking and hinge pins	Inspect pins for indication of binding, excessive wear.	Pins bind during operation. Interior or end bay has any vibration.
4			•						Hydraulic cylinders	Inspect for bent piston rods, worn hinge pins, rust or corrosion.	Cylinders erratic during operation. Any oil leaks or inoperative.

Page A-2. Appendix A. 1 is added as follows:

**APPENDIX A.1
COMPONENTS OF END ITEMS LIST**

Section I. INTRODUCTION

A.1-1. Scope

This appendix lists integral components of and basic issue items for the Mobile Assault Bridge to help you inventory items required for safe and efficient operation.

A.1.1. General

The Components of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item.

These items, when assembled, comprise the Mobile Assault Bridge and must accompany it whenever it is transferred or turned in. These illustrations will help you identify these items.

b. Section III. Basic Issue Items. These are minimum essential items required to place, the Mobile Assault Bridge in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the Mobile Assault Bridge during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on Table(s) of Organization and Equipment (TOE)/Modification Table of Organization and Equipment (MTOE) authorization of the end item.

A.1-3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) Figure number. Indicates the figure number of the illustration on which the item is shown (if applicable).

(2) Item number. The number used to identify item called out in the illustration.

b. National Stock Number (NSN). Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. Part Number (P/N). Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. Description. Indicates the Federal item name and, if required, a minimum description to identify the item.

e. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

f. Usable on Code. Not applicable.

g. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

h. Quantity. This column is left blank for use during inventory. Under the Rev'd column, list the quantity you actually receive on your major item. The Date columns are for use when you inventory the major item at a later date; such as for shipment to another site.

Section III. BASIC ISSUE ITEMS

(1) Illustration		(2) National stock number	(3) Part No. & FSCM	(4) Description	(5) Location	(6) Usable on code	(7) Qty Rev'd	(8) Quantity				
(a) Figure No.	(b) Item No.							Rev'd	Date	Date	Date	
				<p>MANUALS, TECHNICAL TM 5-5420-205-14 Operator, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List: Superstructure Interior Bay, Mobile Floating Assault Bridge/Ferry (NSN 5420-00-877-8682), CONDEC Corp Model 2195-1, and (NSN 5420-00-017-8224), CONDEC Corp Model 2272 Component of Interior Bay Unit (NSN 5420-00-491-6339); Superstructure End Bay, Mobile Floating Assault Bridge/Ferry (NSN 5420-00-877-8684), CONDEC Corp Model 2195-2, and (NSN 5420-00-017-8225), CONDEC Corp Model 2271 Component of End Bay Unit (NSN 5420-00-491-6320)</p> <p style="text-align: center;">- - -</p> <p>TM 5-5420-205-24P Operator, Organizational, Direct and General Support Maintenance Repair Parts and Special Tools List: Superstructure Interior Bay, Mobile Floating Assault Bridge/Ferry (NSN 5420-00-877-8682), CONDEC Corp Model 2195-1, and (NSN 5420-00-017-8224), CONDEC Corp Model 2272 Component of Interior Bay Unit (NSN 5420-00-491-6339); Superstructure End Bay, Mobile Floating Assault Bridge/Ferry (NSN 5420-00-877-8684), CONDEC Corp Model 2195-2, and (NSN 5420-00-017-8225), CONDEC Corp Model 2271 Component of End Bay Unit (NSN 5420-00-491-6320).</p>								

By Order of the Secretary of the Army:

Official:

PAUL T. SMITH
Major General, United States Army
The Adjutant General

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Distribution:

To be distributed in accordance with DA Form 12-25D, operator maintenance requirements for Mobile Assault Bridge.

CHANGE }
No. 2 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 10 October 1975

**Operator, Organizational, Direct Support,
and General Support Maintenance Manual**

**SUPERSTRUCTURE INTERIOR BAY, MOBILE FLOATING ASSAULT
BRIDGE/FERRY, NSN 542-00877-I882, CONDEC CORP. MODEL
2195-1, NSN 5420-0017-8224, CONDEC CORP. MODEL 2272,
COMPONENT OF INTERIOR BAY UNIT, NSN 5420 00 491-6339,
SUPERSTRUCTURE END BAY, MOBILE FLOATING ASSAULT
BRIDGE/FERRY, NSN 5420-00-87-004, CONDEC CORP. MODEL 2195-2
NSN 5420-0.1748225, CONDEC CORP. MODEL 2271 COMPONENT
OF END BAY UNIT, NSN 5420-0491-6320**

TM 5-5420-205-14, 31 August 1973, is changed as follows: Subparagraph *b(7)* is superseded as follows:

Page 1-1. Paragraph 1-3 is superseded as follows:

1-3. Reporting of Errors

You can help to improve this manual by calling attention to errors and by recommending improvements. Your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), and/or DA Form 2028-2 (Recommended Changes to Equipment Technical Manuals), may be used. Copies of DA Form 2028-2 are attached in the back of the manual for your use. Please mail your recommended changes direct to Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished direct to you.

Page 1-4, paragraph 1-8. Subparagraph *b(6)* is superseded as follows:

(6) *Rotation cylinder.*

Manufacturer:
Models 2195-1 and 2195-2 Consolidated Diesel Electric Company (13207E2860)
Models 2271 and 2272 The Sheffer Corp. (2SH-A040)
Type cylinder:
All models Hydraulic, double action
Stroke:
Models 2195.1 and 2195-2 16.00 in. (40.64 cm)
Models 2271 and 2272 16.08 in. (40.84 cm)

(7) *Pinning cylinder.*
Manufacturer:
Models 219-1 and 219s-2 Consolidated Diesel Electric Company (16207E2890)
Models 2271 and 2272 The Sheffer Corp. (3SH-A009)
Type cylinder:
All models Hydraulic, double action
Inside diameter of cylinder:
All models 3.000 in. (7.62 cm)
Stroke:
Models 21965-1 and 219652 11.25 in. (28.57 cm)
Models 2271 and 2272 10.87 in. (27.60 cm)
Subparagraph *b(8)* is superseded as follows:

(8) *Curbing cylinder.*
Manufacturer:
Models 2196-1 and 2195-2 Consolidated Diesel Electric Company (13207E2900)
Models 2271 and 2272 The Sheffer Corp. (2SH-A041)
Type cylinder:
All models Hydraulic, double action
Inside diameter of cylinder:
Models 219651 and 2195-2 3.000 in. (7.62 cm)
Models 2271 and 2272 2.000 in. (5.08 cm)
Stroke:
Models 2195-1 and 2195-2 1L312 in. (83.81 cm)
Models 2271 and 2272 11720 in. (29.76 cm)

Subparagraph *b(10)*, line 9. Change "Model 2272" to read, "Model 2271".

By Order of the Secretary of the Army:

Official:

FRED C. WEYAND
General, United States Army
Chief of Staff

PAUL T. SMITH
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25D, (qty rqr block No. 1129) Operator's Maintenance requirements for Amphibious Equipment Mobile Assault Bridge.

CHANGE }
No. 1

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DEPARTMENT OF THE ARMY
WASHINGTON, DC 23 December 1974

**Operator, Organizational, Direct Support,
and General Support Maintenance Manual**

**SUPERSTRUCTURE INTERIOR BAY, MOBILE FLOATING ASSAULT
BRIDGE/FERRY, NSN-5420-00-877-8682, CONDEC CORP. MODEL
2195.1, NSN-5420-00-017-8224, CONDEC CORP. MODEL 2272,
COMPONENT OF INTERIOR BAY UNIT, NSN-5420-00-491-6339,
SUPERSTRUCTURE END BAY, MOBILE FLOATING ASSAULT
BRIDGE/FERRY, NSN-5420-00-877-8684, CONDEC CORP. MODEL 2195-2
NSN-5420-00-017-8225, CONDEC CORP. MODEL 2271 COMPONENT
OF END BAY UNIT, NSN 5420-00-491-6320**

TM 55420-20514, 31 August 1973, is changed as follows:

The title is changed as shown above.
Page 1-2, paragraph 1-7b, line (i. "Rotated" is changed to read, "Unfolded".

Line 14. "Rotation" is changed to read, "Unfolding".
Page 1-3, paragraph 1-8b. Add subparagraph (14.1) as follows:
(14.1) .Nut and bolt torque data.

(a) General torque .specifications - bolts and screws

Size	Threads per inch	Standard heat treated bolts and screws	Special heat-treated bolts, screws, allen-head screws, and Self-locking cap screws torque ralux
¼	20	6-8	9-11
	28	8-10	10-12
5/16	18	15-18	17-20
	24	17-20	19-23
3/8	16	26-32	36-43
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9/16	12	85-100	103-123
	18	100-120	122-146
5/8	11	117-140	164-192
	18	134-160	193-225
¾	10	180-210	284-325
	16	215-250	373-385
7/8	9	315-360	490-550
	14	372-425	575-650
1	8	445-500	685-770
	14	535-600	830-925

NOTE

All Torque values are given in foot-pounds.
(b) Specific torque specifications

Deck mounting capscrews :38 in. 23 ft lbs.
Deck mounting capscrews 1"2 in. 60 ft lbs.
Curb torsion shaft capscrews 38 inch 23 ft lbs.
Spline ring mounting capscrews 3 4 in. 230 ft lbs.

Subparagraph b(16) Hydraulic functional schematic., is changed to read (17) Hydraulic functional' schematic.

Page 2-1, paragraph 2-2b is superseded as follows:
b. Each superstructure is equipped with a rotation cylinder (para 1-8b (6)). The cylinders are of double action type with integral hydraulic cushioning at each end. These cylinders are mounted with one end attached to the superstructure, the other end to the rotation spline, and will rotate the superstructure through a 90 degree angle. When, during construction, it becomes necessary to have a reversed direction of rotation of an end bay (as for example, one interior bay and two end bays), this is accomplished as follows: On the end bay requiring reversed rotation, perform steps 4 and 5 of Figure 4-13(1); swing the head end of the cylinder to the bracket (Figure 4-13(2)) provided on the opposite frame member and reinstall the pin, washer, and cotter pin.

Page 3-1, paragraph 3-1, line 3. Change LO to read "LO 5-5420-205-12".

Paragraph 3-2c, line 3. Change LO to read "LO 5-5420-205-12".

Page 3-4, paragraph 3-4, Table 3-1. Change LO in last

line of sequence number 8 to read "LO 5-5420-20512".

Page 4-8, paragraph 4-10, Table 4-1. Change LO in last line of sequence number 8 to read "LO 55420-20512".

Paragraph 4-14b, line 3. "Reservoir" is changed to read "pump".

Page 4-19, paragraph 4-22, line 2. "Figure 4-15" is changed to read "Figure 4-16".

Page 5-4, paragraph 5-8b, NOTE, is superseded as follows:

NOTE

Because of the high pressure involved, it is recommended that a new female rotation assembly be installed and that the splines be replaced on the male center post. These are four splines on the center post of models 21951 and 2195-2. Models 2271 and 2272 have only two center post splines.

Page 6-6, paragraph 6-3d(3) line 5. The word "temperature" is deleted.

By Order of the Secretary of the Army:

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

FRED C. WEYAND
General, United States Army
Chief of Staff

Distribution:

To be distributed in accordance With DA Form 12-25D (qry rqr block No. 1129). Operator requirements for Amphibious Equipment: Mobile Assault Bridge.

TECHNICAL MANUAL
No. 5-5420-205-14



HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 31 August 1973

**OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL**

SUPERSTRUCTURE INTERIOR BAY, MOBILE FLOATING

ASSAULT BRIDGE/ FERRY FSN 5420-877-8682,

CONDEC CORP. MODEL 2195-1, COMPONENT OF

INTERIOR BAY UNIT FSN 5420-010-5191,

AND FSN 5420-017-8224,

CONDEC CORP. MODEL 2272 COMPONENT OF

INTERIOR BAY UNIT FSN 5420-491-6339;

SUPERSTRUCTURE END BAY, MOBILE FLOATING

ASSAULT BRIDGE/ FERRY FSN 5420-877-8684,

CONDEC CORP. MODEL 2195-2, COMPONENT OF

END BAY UNIT FSN 5420-010-5192,

AND FSN 5420-017-8225,

CONDEC CORP. MODEL 2271 COMPONENT OF

END BAY UNIT FSN 5420-491-6320.

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*** This manual supersedes TM 5-5420-205-15, 19 October 1967 including all changes.**

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual is for your use in operating and maintaining the interior and end bay superstructures of the mobile floating assault bridge/ferry, models 2195-1, 2195-2, 2272, and 2271

1-2. Maintenance Forms and Records

Maintenance forms and records that you are required to use are explained in TM 38-750.

1-3. Reporting of Errors

You can improve this manual by calling attention to errors and by recommending improvements, using DA Form 2028 (Recommended Changes to Publications), or by a letter, and mail directly to:

Commander, U. S. Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Boulevard, St. Louis, Missouri, 63120. A reply will be furnished directly to you.

1-4. Equipment Serviceability Criteria (ESC)

This equipment is not covered by an ESC.

1-5. Destruction of Army Materiel to Prevent Enemy Use

Procedures to be used for destruction of the equipment to prevent enemy use are in TM 5-5420-204-12, TM 5-5420-210-12, and TM 750-244-3.

1-6. Administrative Storage

For administrative storage instructions, refer to TM 740-90-1.

Section II. DESCRIPTION AND DATA

1-7. Description

a. Interior Bay Superstructure. The interior bay superstructure (fig. 1-1) is a 4 stringer unit with a 26 foot effective span. It is a weldment of low-alloy structural steel. At each end it incorporates 2 pinned connections of a tongue and slot design which are joined to provide a continuous beam between adjoining units. The connection design facilitates speed of assembly and the connection is completed by a hydraulically driven pin which is actuated by a crewman in the cab. The roadway surface is of extruded aluminum alloy waffle pattern planking. This planking is applied in

approximately 12 inch wide sections which are easily removable and replaceable in the event of damage. The superstructure as carried on the transporter, is approximately 12 feet in width. To provide curb and additional width to form a 13 foot, 6 inch roadway, a 10 inch wide fold-down curb section is provided on each side of superstructure, model no. 2195-1. On superstructure model 2272 there are two fold-down curb sections on each side. This section is hydraulically rotated upward into position and is automatically secured in place after erection of the bridge.

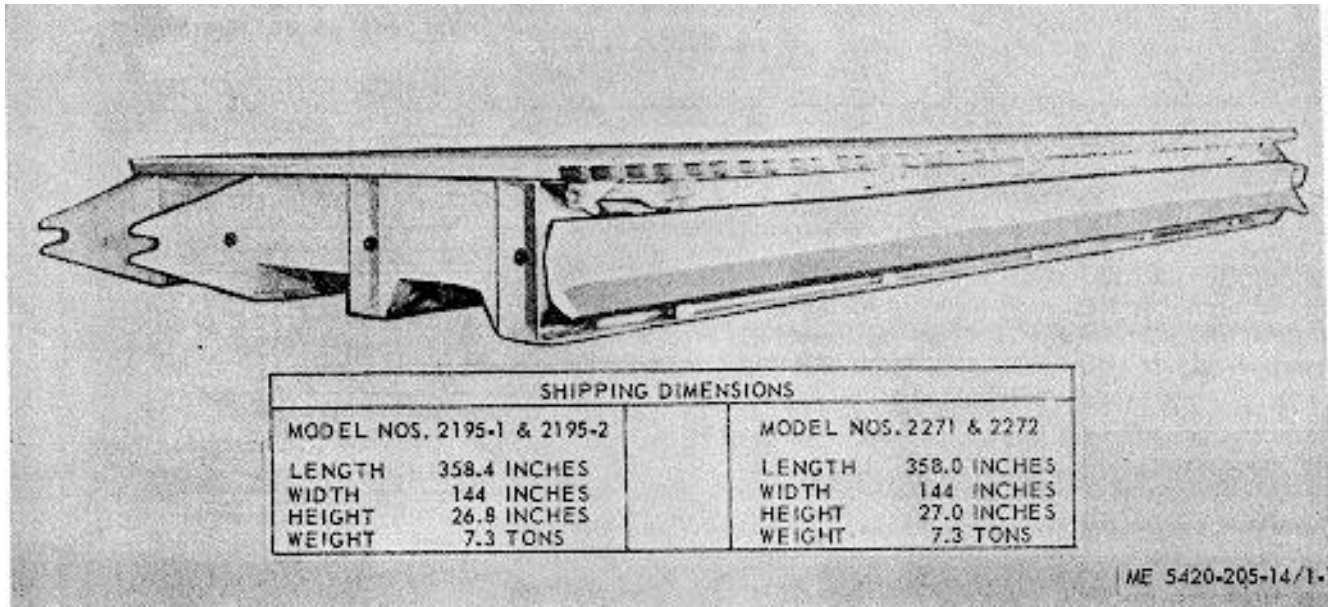


Figure 1-1. Interior bay superstructure, three-quarter view with shipping dimensions.

b. *End Bay Superstructure.* The end bay superstructure (fig. 1-2) is comprised of two basic elements: (1) a deck section similar to the interior bay superstructure but approximately 14 feet, 9 inches long; and (2) a tapered ramp approximately 22 feet, 9 inches long which can be rotated by hydraulic cylinders controlled from the vehicle cab to form the approach ramp for bridges and ferries. The sections are fabricated of aluminum alloy and steel. The hinges joining the 2 ramp sections are of high strength steel. The end and interior bay superstructures are adaptable to and transported by the same type transporter. The direction of rotation of the ramp for assembly into bridge or ferry position is controlled by a simple pin attachment between the main girders, so that right

and left approach ramps can easily be arranged and vehicle headings kept in the same direction. The hinged portion of the ramp superstructure can be rotated only after it has been connected to another vehicle. After that connection has been made, it is rotated upward and outward to the desired position. The ramp can be adjusted in grade positions ranging from any angle upslope to 15 percent down slope. In the desired position the ramp unfolding cylinders are hydraulically locked to secure the hinged joint from turning when the load moves onto the bridge. The maintenance paragraphs of this manual contain detailed descriptions of the interior bay superstructure components.

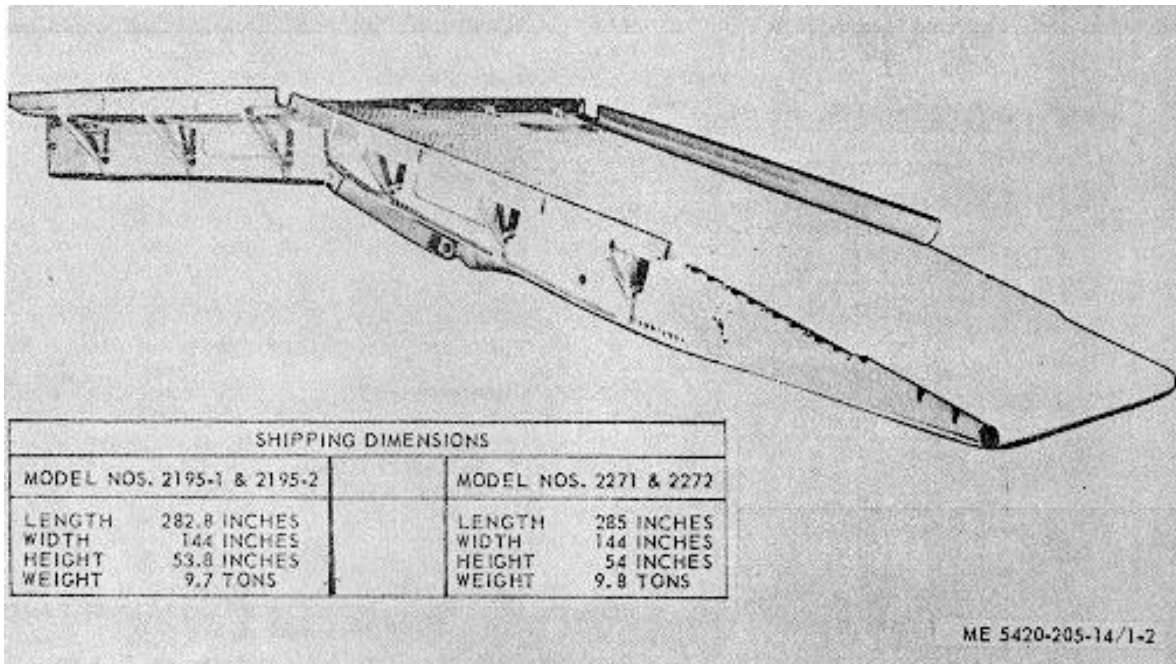


Figure 1-2. End bay and ramp superstructure. three-quarter view with shipping dimensions.

1-8. Identification and Tabulated Data

a. *Identification.* The interior bay and end bay superstructures each contain two major identification plates. This paragraph gives the location and description of the plates. Information contained on the plates will be found in b below.

(1) *Interior bay superstructure identification plate.* This plate is located on the left corner of the interior bay superstructure. It specifies the nomenclature, serial number, manufacturer, and contract number.

(2) *Interior bay superstructure transportation data plate.* This plate is located at the stern of the interior bay superstructure. It specifies the nomenclature, center of gravity, overall length, overall width, overall height, shipping cubage, shipping weight and shipping tonnage.

(3) *End bay superstructure identification plate.* This plate is located on the left corner at the stern of the end bay superstructure. It specifies the nomenclature, serial number, manufacturer, and contract number.

(4) *End bay superstructure transportation data plate.* This plate is located on the left at the stern of the end bay superstructure. It specifies the nomenclature, center of gravity, overall length, overall width, overall height, shipping cubage, shipping weight, and shipping tonnage.

b. *Tabulated Data.*

(1) *Interior bay superstructure identification plate.*

Nomenclature Superstructure Interior Bay for Mobile Floating Assault Bridge Ferry Unit.
 Manufactured by Consolidated Diesel Electric Company

Contract No:
 Model 2195-1 DA-11-184-AMC-720(T)
 Model 2272 DAAK01-71-C-7052

(2) *Interior bay superstructure transportation data plate, model nos. 2195-1 and 2272.*

Nomenclature Superstructure Interior Bay for Mobile Floating Assault Bridge Ferry Unit.

Center of gravity:
 Model 2195-1 178.8 inches from end of superstructure and 18 inches from bottom.
 Model 2272 179.0 inches from end of superstructure and 14 inches from bottom.

Overall length:
 Model 2195-1 358.4 inches
 Model 2272 358.0 inches

Overall height:
 Model 2195-1 26.8 inches
 Model 2272 27.0 inches

Overall width:
 Both models 144.0 inches

Shipping cubage:
 Both models 790 cubic feet
 Shipping weight:
 Model 2195-1 14,600 pounds
 Model 2272 14,500 pounds
 Shipping tonnage:
 Both models 7.3 tons
 (3) End bay superstructure identification plate.

Nomenclature Superstructure End Bay for
 Mobile Floating Assault
 Bridge Ferry Unit.
 Manufactured by Consolidated Diesel Electric
 Company
 Contract no:
 Model 2195-2 DA-11-184-AMC-720-(T)
 Model 2271 DAAK01-71-C-7052
 (4) End bay superstructure transportation data plate.

Nomenclature Superstructure, End Bay for
 Mobile Floating Assault
 Bridge Ferry Unit.
 Center of gravity:
 Model 2195-2 95.3 inches from hinged
 sections and 26.9 inches
 from bottom.
 Model 2271 104 inches from hinged sec-
 tions and 30.0 inches from
 bottom.
 Overall length:
 Model 2195-2 282.8 inches.
 Model 2271 285. inches.
 Overall height:
 Model 2195-2 53.8 inches
 Model 2271 54 inches
 Overall width:
 Both models 144 inches
 Shipping cubage:
 Model 2195-2 1,290 cubic feet
 Model 2271 1,266 cubic feet
 Shipping weight:
 Model 2195-2 19,300 pounds
 Model 2271 19,500 pounds
 Shipping tonnage:
 Model 2195-2 9.7 tons
 Model 2271 9.8 tons

(5) Ramp unfold cylinder.

Manufacturer Watervliet Arsenal
 Type cylinder Hydraulic, double action
 Inside diameter of cylinder 8.000 inches
 Stroke 57.500 inches

(6) Rotation cylinder.

Manufacturer:
 Models 2195-1 and 2195-2 Consolidated Diesel Electric
 Company
 Model 2SH-A040 The Sheffer Corporation
 Type cylinder:
 All models Hydraulic, double action
 Stroke:
 Models 2195-1 and 2195-2 16.00 inches
 Model 2SH-A040 16.08 inches

(7) Pinning cylinder.

Manufacturer:
 Models 2195-1 and 2195-2 Consolidated Diesel Electric Company
 Model 3SH-A009 The Sheffer Corporation
 Type cylinder:
 All models Hydraulic double action
 Inside diameter of cylinder:
 All models 3.000 inches
 Stroke:
 Models 2195-1 and 2195-2 11.25 inches
 Model 3SH-A009 10.87 inches

(8) Curbing cylinder.

Manufacturer:
 Models 2195-1 and 2195-2 Consolidated Diesel Electric Company
 Model 2SH-A041 The Sheffer Corporation
 Type cylinder:
 All models Hydraulic, double action
 Inside diameter of cylinder:
 Models 2195-1 and 2195-2 3.000 inches
 Model 2SH-A041 2.000 inches
 Stroke:
 Models 2195-1 and 2195-2 13.312 inches
 Model 2SH-A041 11.720 inches

(9) Valve, counterbalance.

Manufacturer Waterman Hydraulics Corp.
 Type valve Hydraulic, counterbalance
 Maximum working pressure 3,000 psi
 Actuating pilot pressure 25 percent of load pressure
 Vendor item no 666FT-16
 Drawing no 13207E2468

(10) Valve, check.

Manufacturer:
 Models 2195-2 and 2271 Racine Hydraulic and Machinery Inc.
 Type valve:
 Model 2195-2 Hydraulic, check, pilot operated
 Model 2271 High pressure ramp pilot operated check valve
 Pressure rating:
 Model 2195-2 10,000 psi
 Operating pressure:
 Model 2272 3,000 psi
 Pilot pressure:
 Both models 2,500 psi max.
 Vendor item no:
 Model 2195-2 995155
 Model 2271 975392
 Drawing no:
 Model 2195-2 13207E2466
 Model 2271 13207E6683

(11) Valve, check (End Bay Model 2271).

Manufacturer Sarasota Precision Products Inc.
 Type valve Hydraulic, check, pilot operated
 Operating pressure 3,000 psi
 Pressure set at 600 psi
 Vendor item no 25715-SAE-8-8-6
 Drawing no 13207E2640-2

(12) Valve, check (Interior Bay Model 2272).

Manufacturer Parker Hydraulics Inc.
 Type valve Hydraulic, check, pilot operated
 Operating pressure..... 3,000 psi
 Vendor item no VCPD8B19T
 Drawing no 13207E7387

Width 144 inches
 Height 27.0 inches
 Weight 14,500 pounds
 Superstructure end bay:
 Length 285 inches
 Width 144 inches
 Height 54 inches
 Weight 19,500 pounds

(13) Dimensions and weight (Model Nos. 2195-1 and 2195-2).

Superstructure interior bay:
 Length 358.4 inches
 Width 144 inches
 Height..... 26.8 inches
 Weight..... 14,600 pounds
 Superstructure end bay:
 Length 282.8 inches
 Width 144 inches
 Height..... 53.8 inches
 Weight..... 19,300 pounds

(14) Dimensions and weight (Model Nos. 2272 and 2271).

Superstructure interior bay:
 Length 358.0 inches

(15) Hydraulic diagrams. Refer to figure FO-1(1) and FO-1(2) for the interior bay super-structure hydraulic diagrams, models 2195-1 and 2272. Refer to figure FO-2(1) and FO-2(2) for end bay superstructure hydraulic diagrams for models 2195-2 and 2271.

(16) Electro-hydraulic functional schematic. Refer to figures FO-3 thru FO-9 for the electro-hydraulic functional schematics for the interior and end bay superstructures (models nos. 2195-1 and 2195-2).

(16) Hydraulic functional schematic. Refer to figures FO-10 thru FO-16 for the hydraulic functional schematics for interior and end bay superstructures (models nos. 2272 and 2271).

Figure FO-1. Interior bay hydraulic diagram, model 2195-1.
 (sheet 1 of 2)
(Located in back of manual)

Figure FO-1. Interior bay hydraulic diagram, model 2272.
 (sheet 2 of 2)
(Located in back of manual)

Figure FO-2. End bay hydraulic diagram, model 2195-2.
 (sheet 1 of 2)
(Located in back of manual)

Figure FO-2. End bay hydraulic diagram. model 2271.
 (sheet 2 of 2)
(Located in back of manual)

Figure FO-3. Electro-hydraulic functional schematic, interior bay superstructure. model no. 2195-1 girder pinning.
(Located in back of manual)

Figure FO-4. Electro-hydraulic functional schematic. superstructure rotation (model nos. 2195-1 and 2195-2).
(Located in back of manual)

Figure FO-5. Electro-hydraulic functional schematic. ramp fold and unfold. superstructure. model no.. 2195-2.
(Located in back of manual)

Figure FO-6. Electro-hydraulic functional schematic. end bay superstructure. model no. 2'195-2 girder pinning.
(Located in back of manual)

Figure FO-7. Electro-hydraulic functional schematic, superstructure model nos. 2195-1 and 2195-2, raise and lower.
(Located in back of manual)

Figure FO-8. Electro. hydraulic functional schematic, interior bay model no. 2195-1 superstructure, curbing up and down.
(Located in back of manual)

Figure FO-9. Electro-hydraulic functional schematic, interior bay superstructure, model no. 2195-2, curbing up and down.
(Located in back of manual)

Figure FO-10. Hydraulic functional schematic, interior girder pinning, superstructure, model no. 2272.
(Located in back of manual)

Figure FO-11. Hydraulic functional schematic, superstructure rotation, model nos. 2271 and 2272.
(Located in back of manual)

Figure FO-12. Hydraulic functional schematic, ramp fold and unfold, superstructure model no. 2271.
(Located in back of manual)

Figure FO-13. Hydraulic functional schematic, end bay girder pinning, superstructure model no. 2271,
(Located in back of manual)

Figure FO-14. Hydraulic functional schematic, raise and lower, superstructure model nos. 2271 and 22 72.
(Located in back of manual)

Figure FO-15. Hydraulic functional schematic, interior bay curbing up and down, superstructure model no. 2272.
(Located in back of manual)

Figure FO-16. Hydraulic functional schematic, end bay curbing up and down, superstructure model no. 2271.
(Located in back of manual)

1-9. Difference in Models

This manual covers the CONDEC (Consolidated Diesel Electric Company) interior bay superstructure, model no. 2195-1 (S / N 0001 through 0057) and model no. 2272 (S/N 0001 through 0122); end bay superstructures, model 2195-2 (S/N 0001 through 0029) and models 2271 (S/N 0001 through 0062). The differences between interior bay and end bay superstructure models are noted in the appropriate paragraphs throughout the manual. The following briefly describes the differences between superstructure models.

a. *Curbing.* Table 1-1 specifies the number of

curb sections and hydraulic cylinders used for actuation of the section.

b. *Hydraulic Systems.* Superstructure models no. 2271 and 2272 contain additional pilot controlled check valves. Check valve E7387 is located in interior bay model no. 2272, and check valve E2640 is located in end bay model no. 2271. Other differences between superstructure hydraulic systems are comprised of cylinder diameters, hose length and routing, tube length and routing, and fittings.

c. *Electrical Systems.* Interior bay model no. 2272 contains a terminal board in the electrical

junction box; interior bay model no. 2195-1 contains a wye connection.

1-8b(13) and (14) for dimension and weight differences.

d. *Dimensions and Weight.* Refer to paragraphs

Table 1-1. Curbing Differences.

Model No.	Superstructure Type	No. of Curb Sections	No. of Hyd. Cylinders
2195-1	Interior bay	2	4
2272	Interior bay	4	4
2195-2	End bay	4	8
2271	End bay	4	4

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. GENERAL

2-1. Superstructure Hydraulic Components

a. The superstructure hydraulic components consist of end bay unfolding cylinders, curbing cylinders, rotation assemblies, lines, hoses and fittings. These components are actuated through the high pressure hydraulic system, supplied and controlled through the transporter of the bridge ferry unit.

b. Refer to figure FO-1(1) or (2) for the interior bay superstructure hydraulic schematic diagram, and to figure FO-2(1) or (2) for the end bay superstructure hydraulic schematic diagram.

2-2. Hydraulic Cylinder Operation

a. The ramp section of the end bay superstructure is operated by two hydraulic cylinders. Each cylinder is equipped with a pilot operated check valve (fig. 4-7), and a counterbalance valve (fig. 4-10). The check valves are mounted on the rod end of the cylinders. The counterbalance valves are mounted on the superstructure I-beam. The unfolding cylinders, when activated, will fold or unfold the ramp section of the end bay, and will hold the ramp in any desired position to receive or discharge traffic (fig. 4-15).

(1) The end and interior bays are interchangeable on the transporters. When the interior bay is removed from a transporter and replaced by an end bay superstructure, the right pinning circuit on the vehicle function panel becomes the ramp folding or unfolding circuit. The hydraulic circuit on the transporter serving the right pinning circuit on the interior bay also serves as the ramp folding and unfolding circuit on the end bay, when exchanged.

(2) A detachable sign plate is provided to cover the right pinning action on the panel while being used with the end bay.

b. Each superstructure is equipped with a rotation cylinder (para 1-8 b (6)). The cylinders are of double action type with integral hydraulic cushioning at each end. These cylinders are mounted with one end attached to the superstructure, the other end to the rotation spline, and will rotate the superstructure through a 90 degree angle. When, during construction, it becomes necessary to have a reversed direction of rotation of an end bay (as for example, one interior bay and two end bays), this is accomplished as follows: On the end bay requiring the reversed rotation, perform steps 4 and 5 of figure 4-13(1); rotate the spline by manually rotating the rotation cylinder about 180 degrees until the eye of the rotation cylinder is aligned with holes of the bracket (fig. 4-13(2)). Drop in the pin and add washer and cotter pin removed by steps 4 and 5.

c. The pinning operation which is required to lock one superstructure to another when forming a bridge, requires the use of hydraulic pinning cylinders with necessary control valves. The end bay has two cylinders and a control valve for the left pinning operation. The interior bay has two cylinders on each end. The tubing, hoses and control valves, normally used for the right pinning of the interior bay, are also used to actuate the end bay ramp (fig. 4-12).

d. The raising and lowering of the curb extension requires the use of hydraulic curbing cylinders, double relief valves, and function selection control valves. The interior bay model 2195-1 has two curbs and four cylinders (model 2272 has four curbs and four cylinders). The end bay, model no. 2195-2, has two sections of superstructure and four curbs actuated by eight cylinders; model no 2271 is actuated by four cylinders.

Section II. OPERATING INSTRUCTIONS

Operating instructions for superstructure models 2195-1 and 2195-2 are listed in TM 5-5420-204-12. Instructions for superstructure models 2271

and 2272 operation are listed in TM 5-5420-210-12.

CHAPTER 3
OPERATOR'S MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

3-1. General

This section contains lubrication instructions which are supplemental to, and not specifically covered in lubrication order LO 5-5420-205-15.

3-2. Lubrication Instructions

a. General.

(1) Keep all lubricants in sealed containers and store in a clean, dry place away from external heat.

(2) Allow no dust, dirt, water, or other foreign material to mix with the lubricants.

(3) Keep lubricant equipment clean and ready for use.

b. Cleaning.

(1) Before lubricating the equipment, wipe all lubrication points free of dirt and grease.

(2) Clean all lubrication points after lubricating to prevent accumulation of foreign matter.

NOTE

Keep external parts not requiring lubrication clean of lubricants.

c. Points of Lubrication. Service the lubrication points illustrated in figure 3-1(1) and (2) at proper intervals (LO 5-5420-205-15).

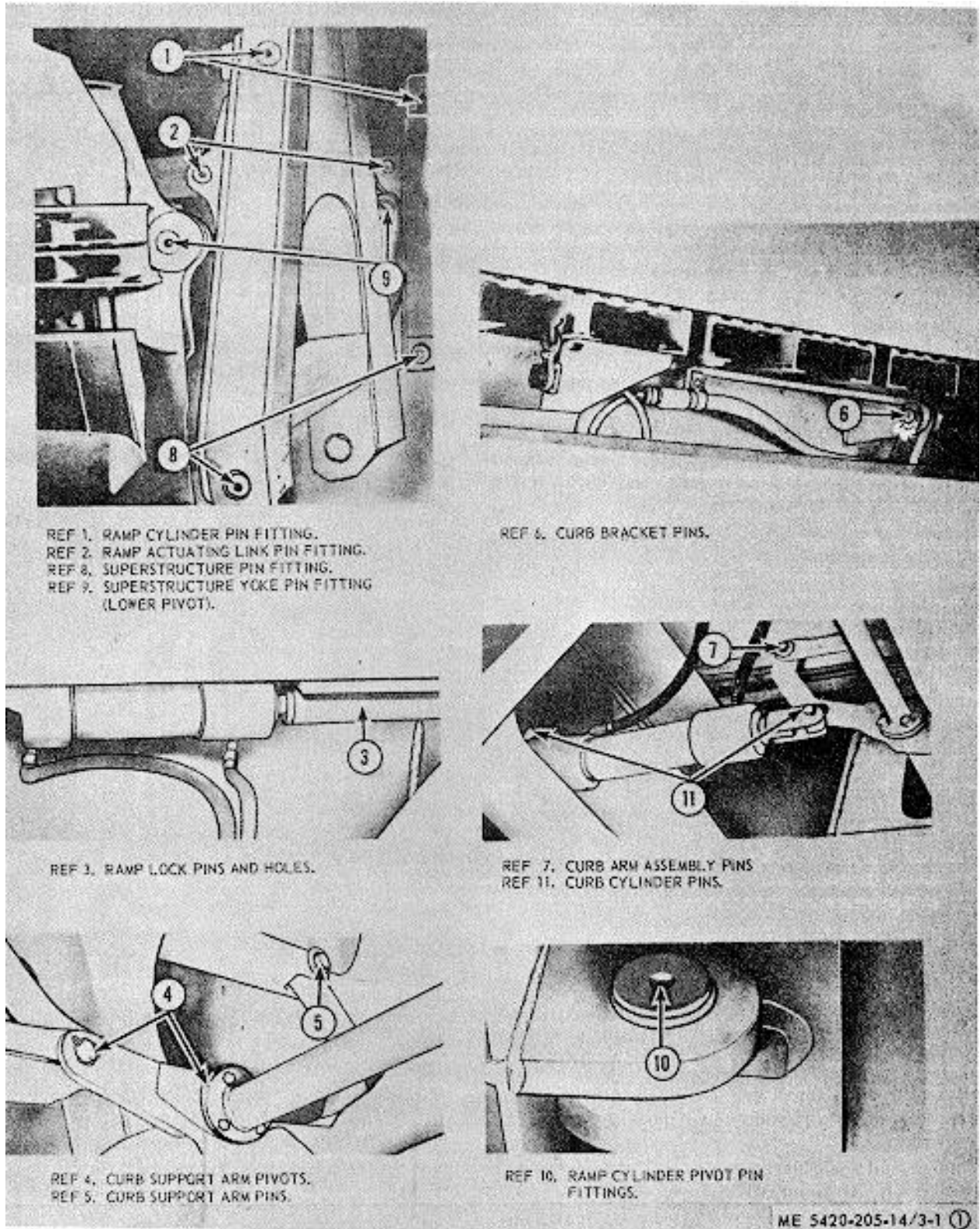


Figure 3-1. Lubrication points (sheet 1 of 2).

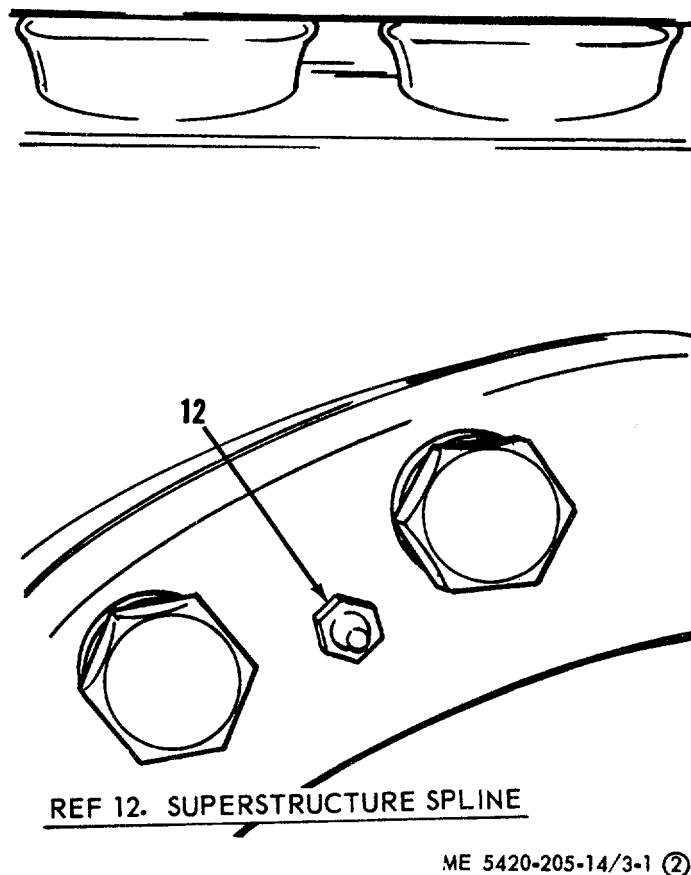


Figure 3-1. Lubrication points (sheet 2 of 2).

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

3-3. General

To insure that the interior bay and end bay superstructures are ready for operation at all times, they must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The preventive maintenance checks and services to be performed by the operator are listed and described in paragraph 3-4. The sequence numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. Only those faults that cannot be corrected by the operator/crew, or that are

corrected by replacing parts will be recorded on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

3-4. Operator's Preventive Maintenance Checks and Services

a. Table 3-1 contains a tabulated list of preventive maintenance checks and services which must be performed by the operator.

b. Refer to figure 3-2 and 3-3 for location of items to be serviced.

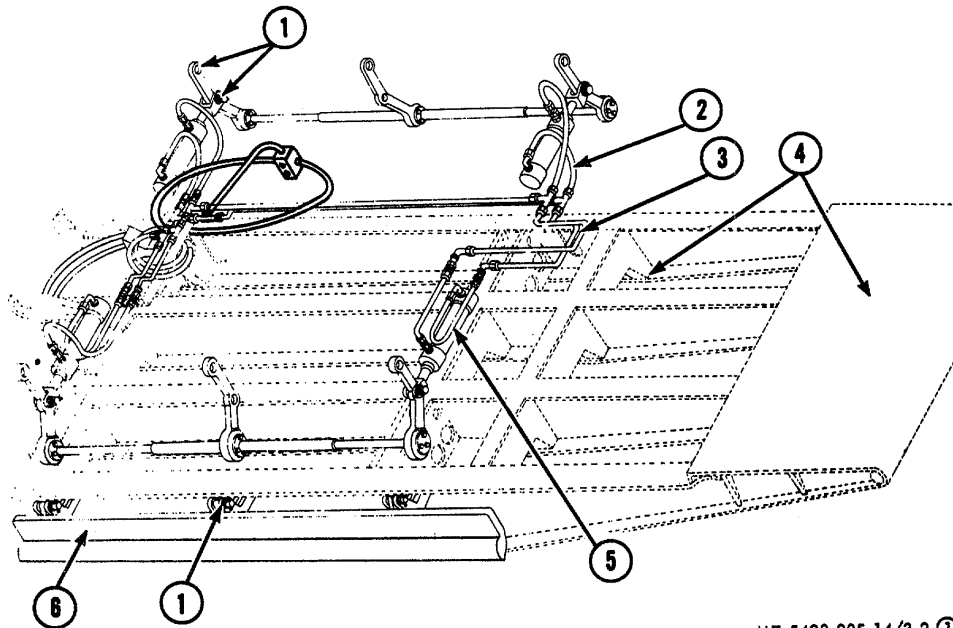
(1) Figure 3-2(1) through (3) illustrate items to be serviced for superstructure models 2195-1 and 2195-2.

(2) Figure 3-3(1) through (3) illustrate items to be serviced for superstructure models 2271 and 2272.

Table 3-1. Operator's Preventive Maintenance Checks and Services.

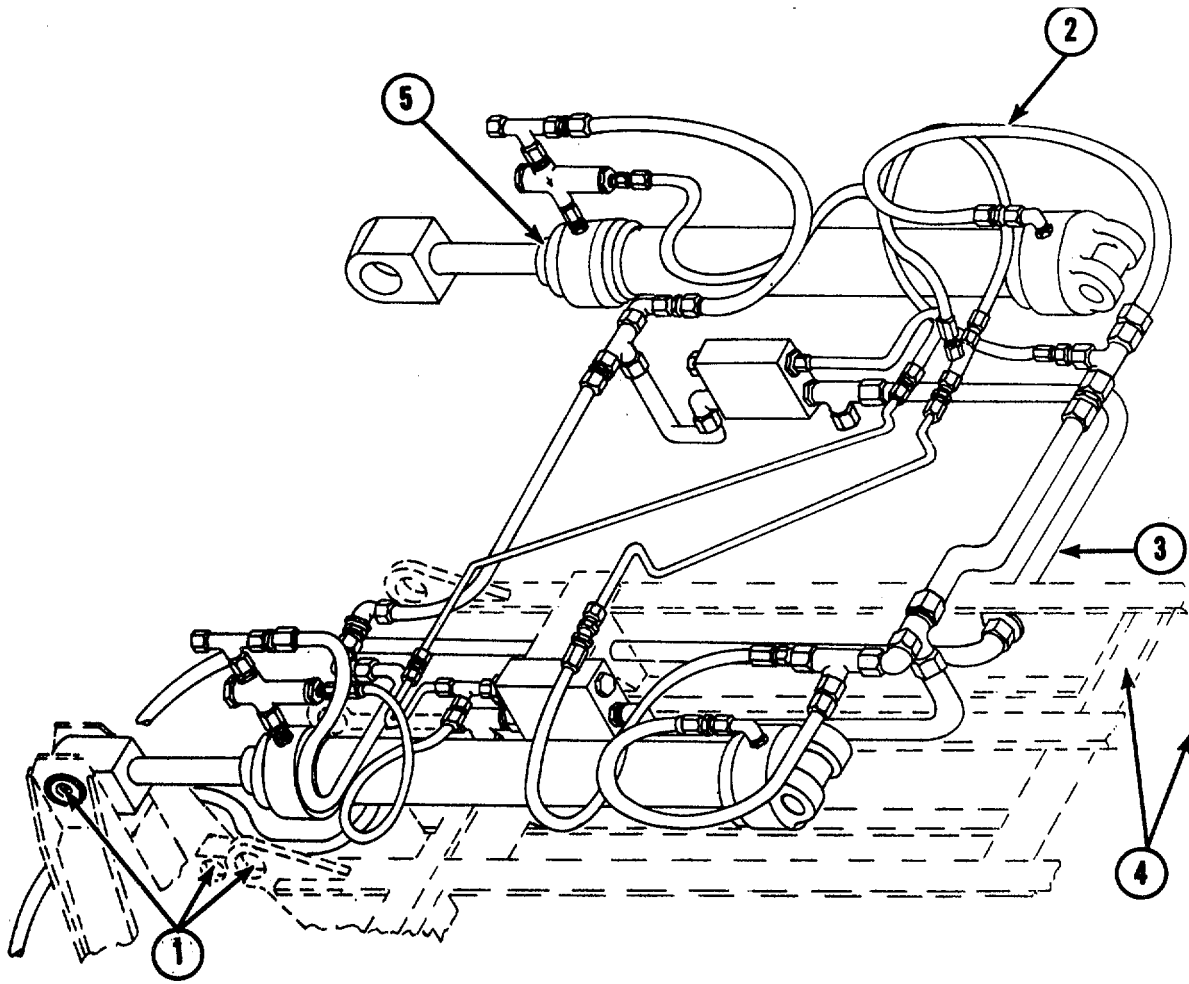
B-Before operation Time required:			D-During operation	A-After operation Time required:
Interval and Seq. No.			ITEM TO BE INSPECTED PROCEDURE	Work Time (M / H)
B	D	A		
			NOTE Figure item no. follows item to be inspected. Figure 3-2(1) thru (3) illustrates for models 2271 and 2272.	
			PIVOT POINTS (ITEM 1) Lubricate pivot points after each amphibious operation.	0.2
2			HOSES AND FITTINGS (ITEM 2) Inspect hoses and fittings for cracks and leaks. Tighten loose or leaking fittings.	0.3
3			TUBING AND FITTINGS (ITEM 3) Inspect tubing and fittings for cracks and leaks. Tighten loose or leaking fittings.	0.3
4			FRAME ASSEMBLY (ITEM 4) Clean after each amphibious operation.	0.4
5			HYDRAULIC CYLINDERS (ITEM 5) Inspect for leaks.	0.1
6			CURBING (ITEM 6) Clean after each amphibious operation.	0.1
7			LOCKING PINS AND GUIDES (ITEM 7) Inspect, clean and lubricate after each amphibious operation.	0.2
8			ROTATION ASSEMBLY Lubricate the superstructure spline (12, fig. 3-1(2)) with GAA automotive and artillery type grease. (See current LO 5-5420-205-15).	0.2

RAMP, SUPERSTRUCTURE



ME 5420-205-14/3-2 ①

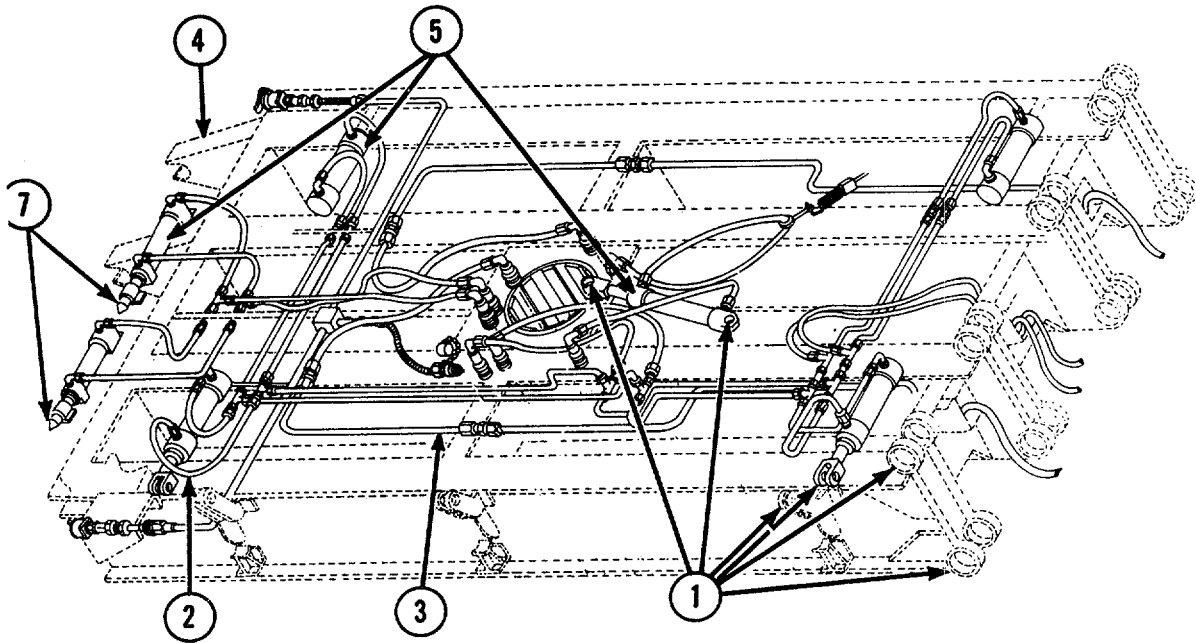
Figure 3-2. Preventive maintenance services, ramp, superstructure, models 2195-1 and 2195-2 (sheet 1 of 3).



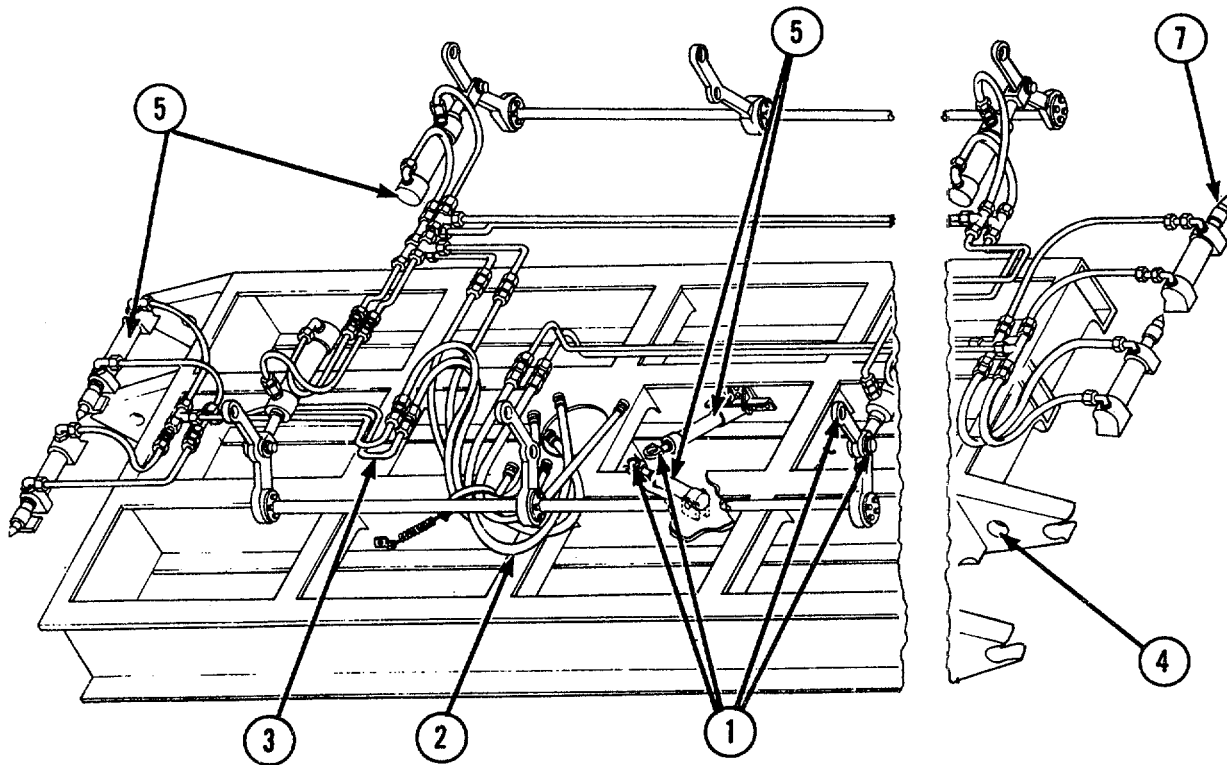
ME 5420-205-14/3-2 ②

Figure 3-2. Preventive maintenance services, ramp, superstructure, models 2195-1 and 2195-2 (sheet 2 of 3).

SHORT BAY, SUPERSTRUCTURE

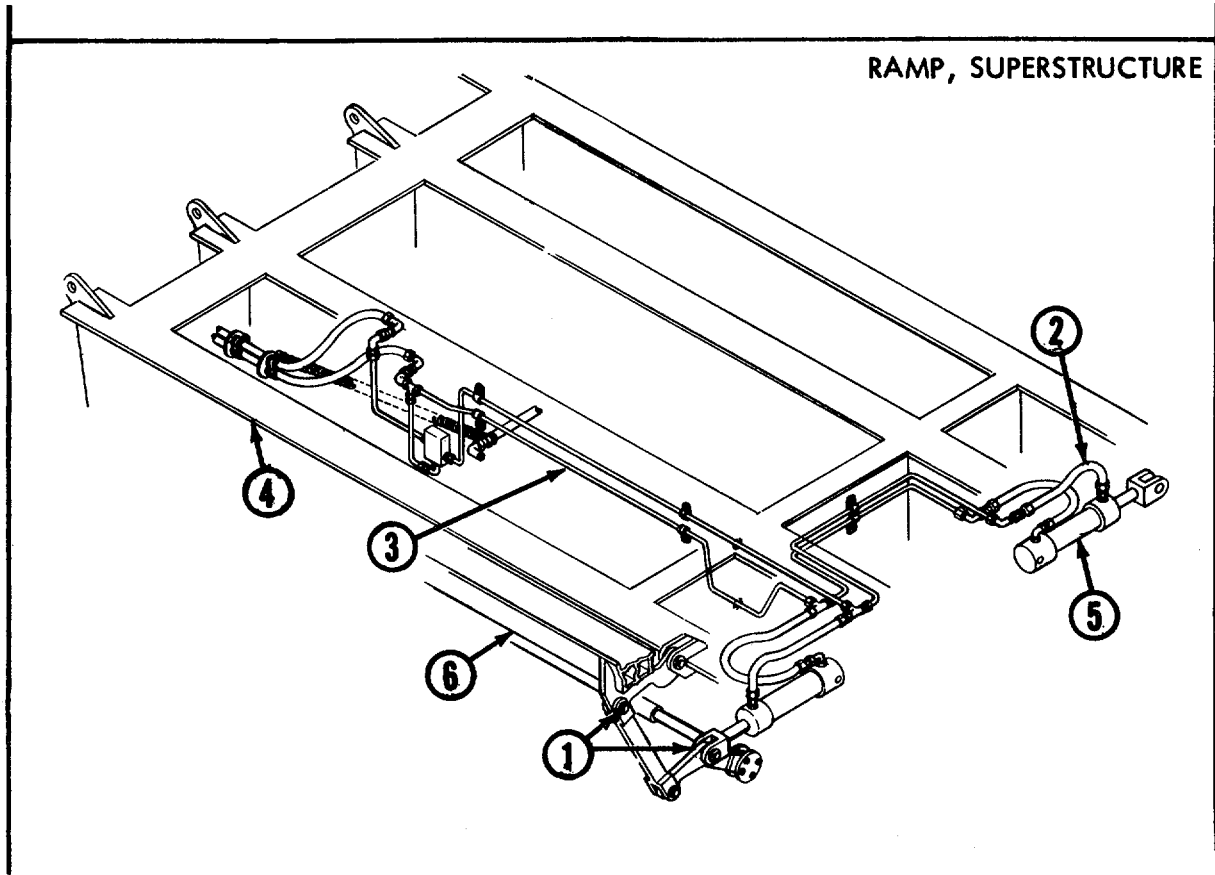


INTERIOR BAY, SUPERSTRUCTURE



ME 5420-205-14/3-2 ③

Figure 3-2. Preventive maintenance service, short bay and interior bay, superstructure, models 2195-1 and 2195-2 (sheet 3 of 3).



ME 5420-205-14/3-3 ①

Figure 3-3. Preventive maintenance services, ramp, superstructure, models 2271 and 2272 (sheet 1 of 3).

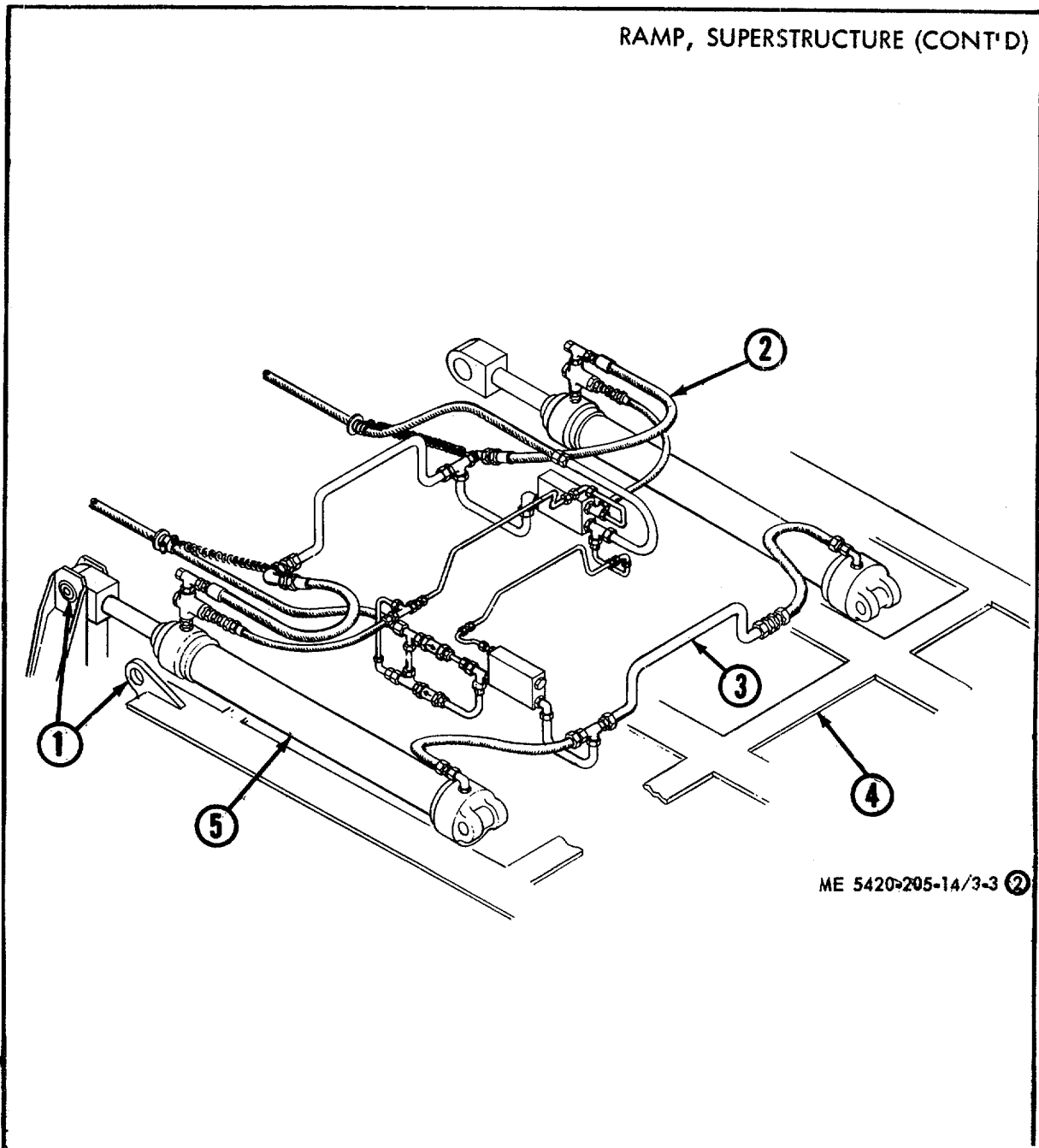
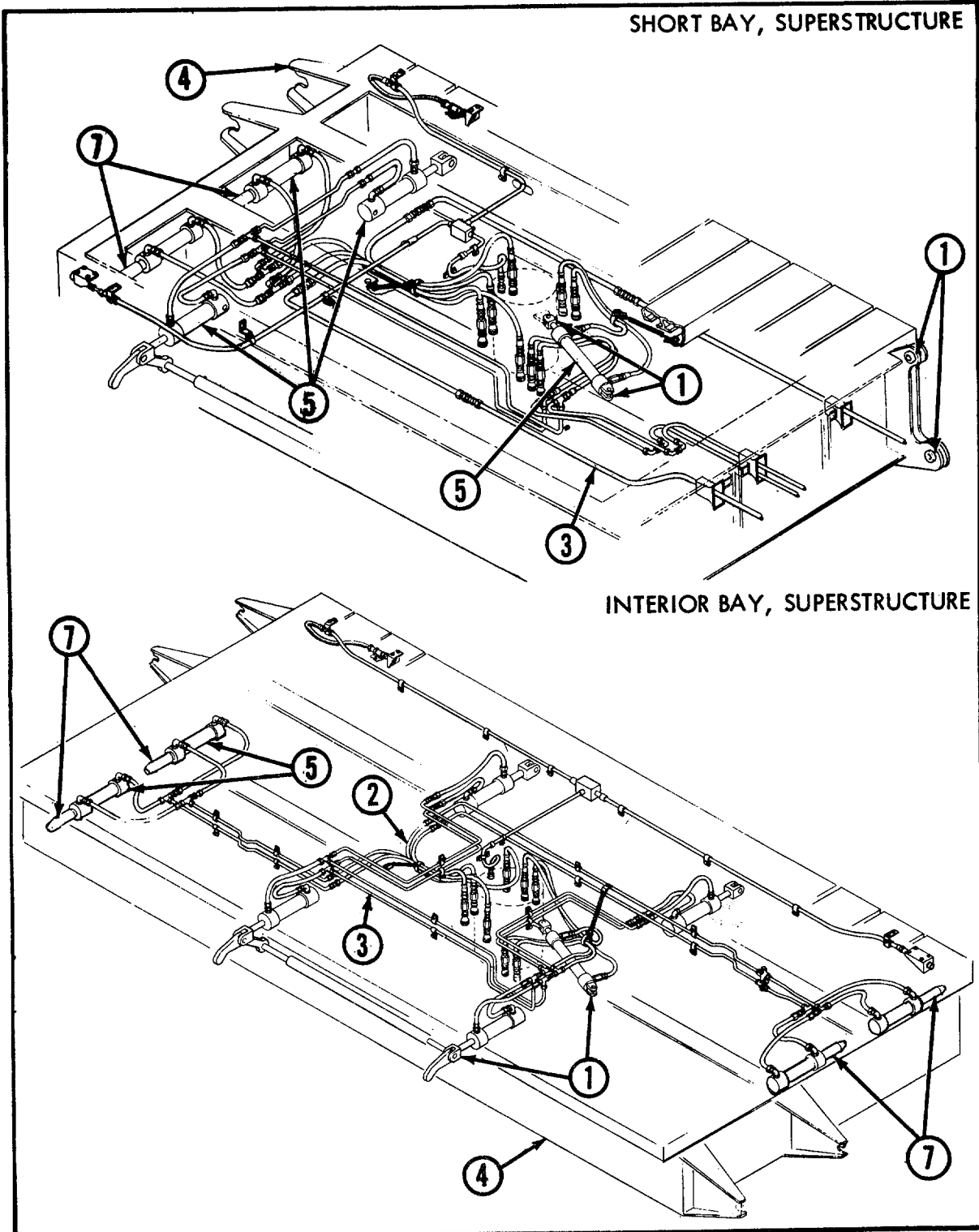


Figure 3-3. Preventive maintenance services, ramp. superstructure, models 2271 and 2272 (sheet 2 of 3).



ME 5420-205-14/3-3 ③

Figure 3-3. Preventive maintenance services, short bay and interior bay, superstructure, models 2271 and 2272 (sheet 3 of 3).

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

4-1. Unloading Equipment

a. *End Bay Superstructure.* Attach the link assembly clamp as shown in figure 4-1 and 4-3(1). This clamp holds the two sections of the end bay superstructure together for lifting. Attach the superstructure sling assembly (fig. 4-2) with each hook up against stop bolts on the end bay superstructure as illustrated in figure 4-3(2). Attach a suitable lifting device with a minimum capacity of 25,000 pounds and

lift the end bay superstructure from the carrier bed as illustrated in figure 4-3(3). Make sure that hooks are fully engaged on the I-beams before lifting (fig. 4-4).

b. *Interior Bay Superstructure.* This unit is the same at each end. Slip the superstructure sling hooks (fig. 4-5) in place between the eighth and ninth deck plank from each end and lift the unit from the carrier bed.

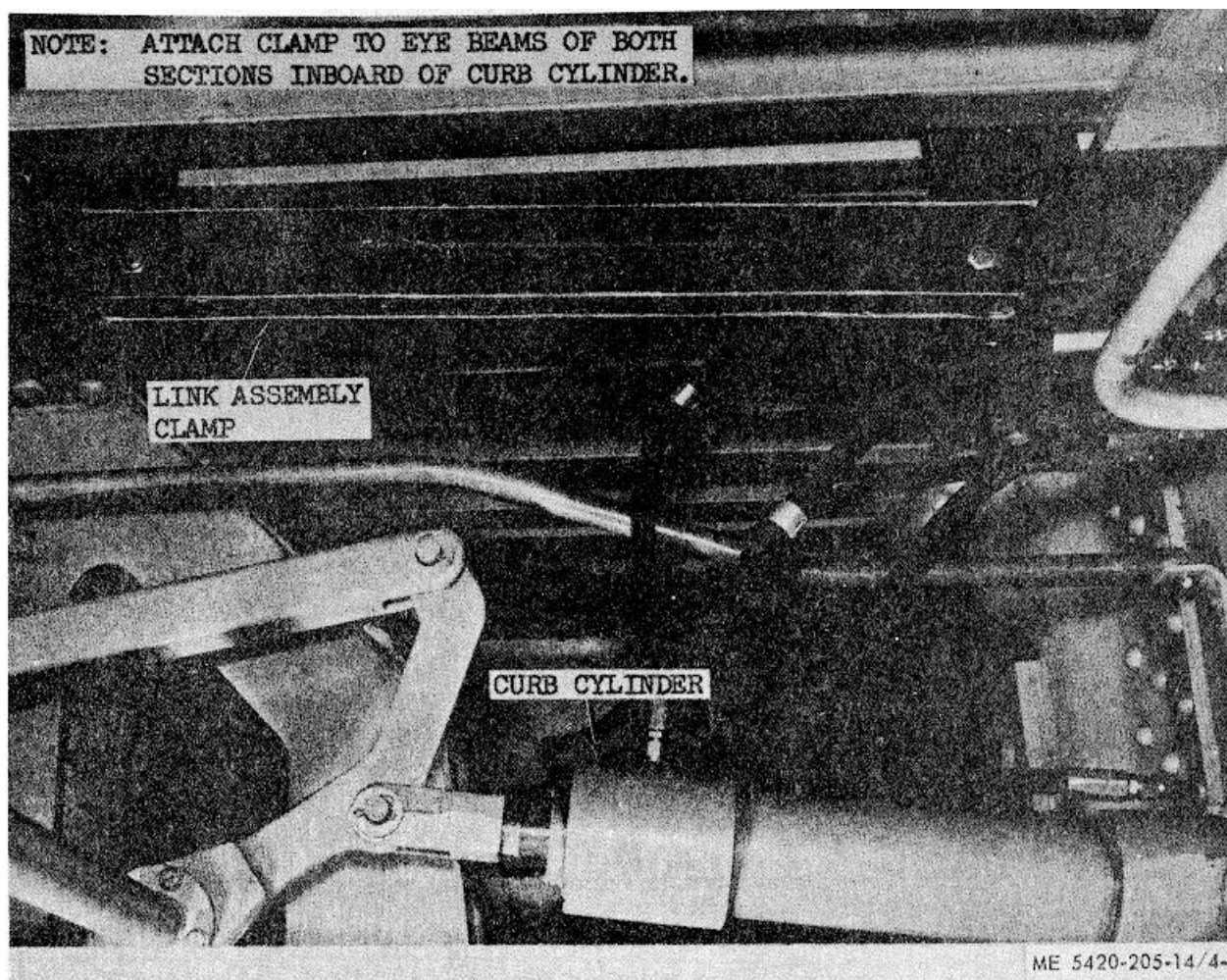


Figure 4-1. Link assembly clamp in place.

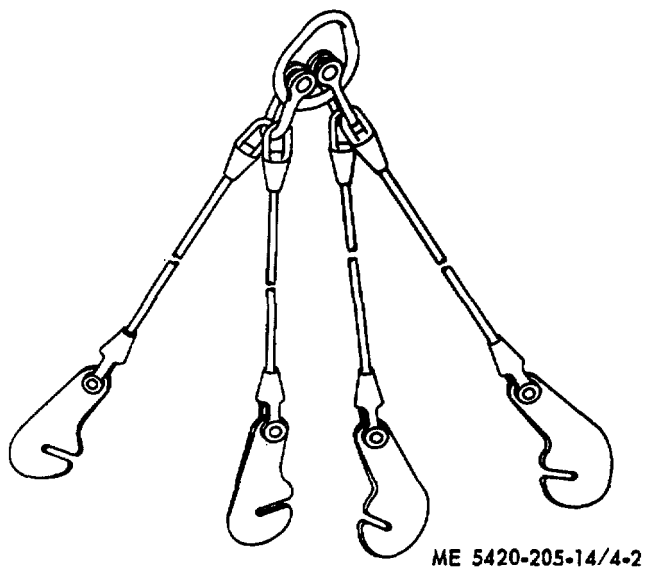
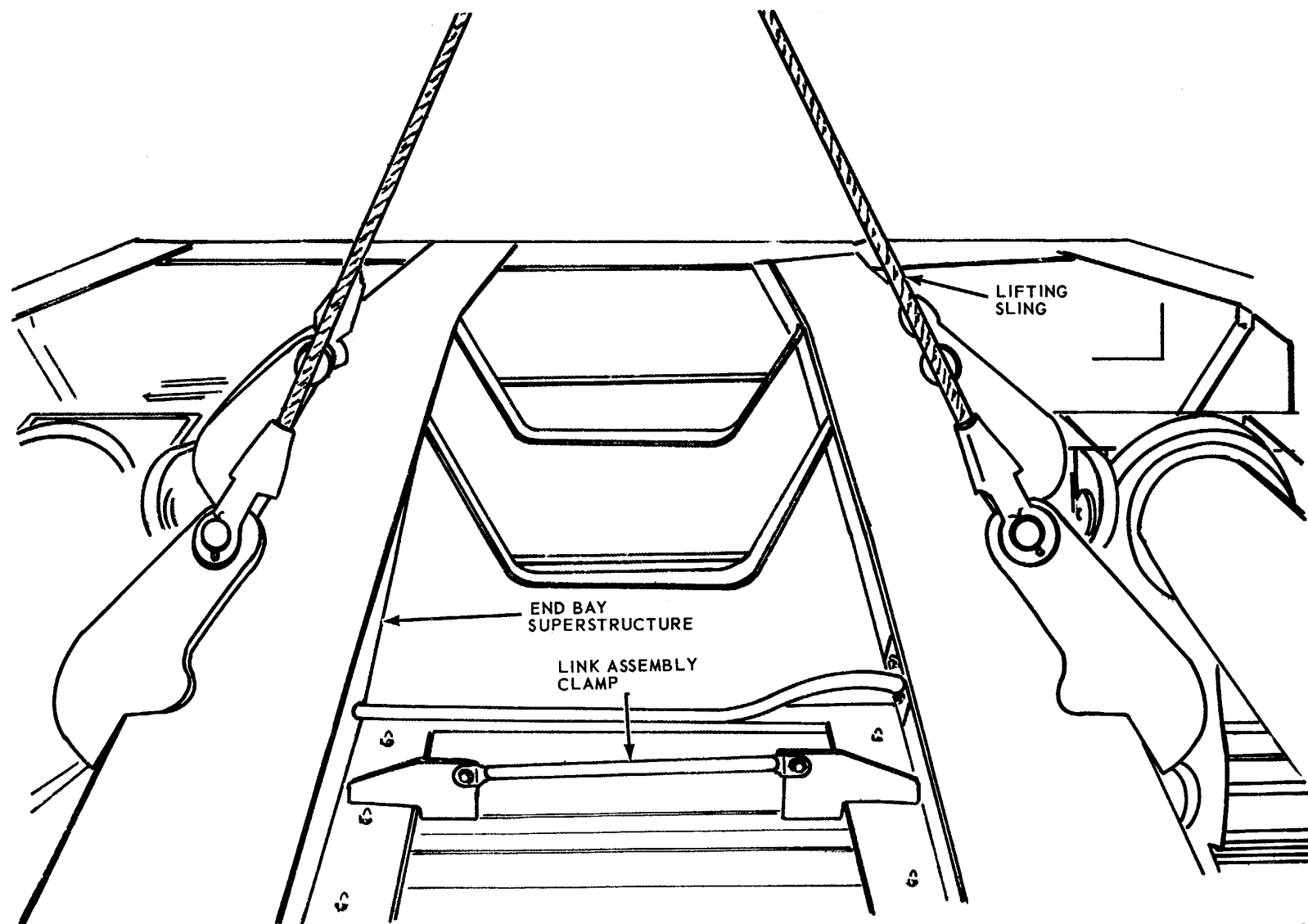


Figure 4-2. Superstructure sling assembly



ME 5420-205-14/4-3 ①

Figure 4-3. End bay superstructure, removal and installation.
(sheet 1 of 3)

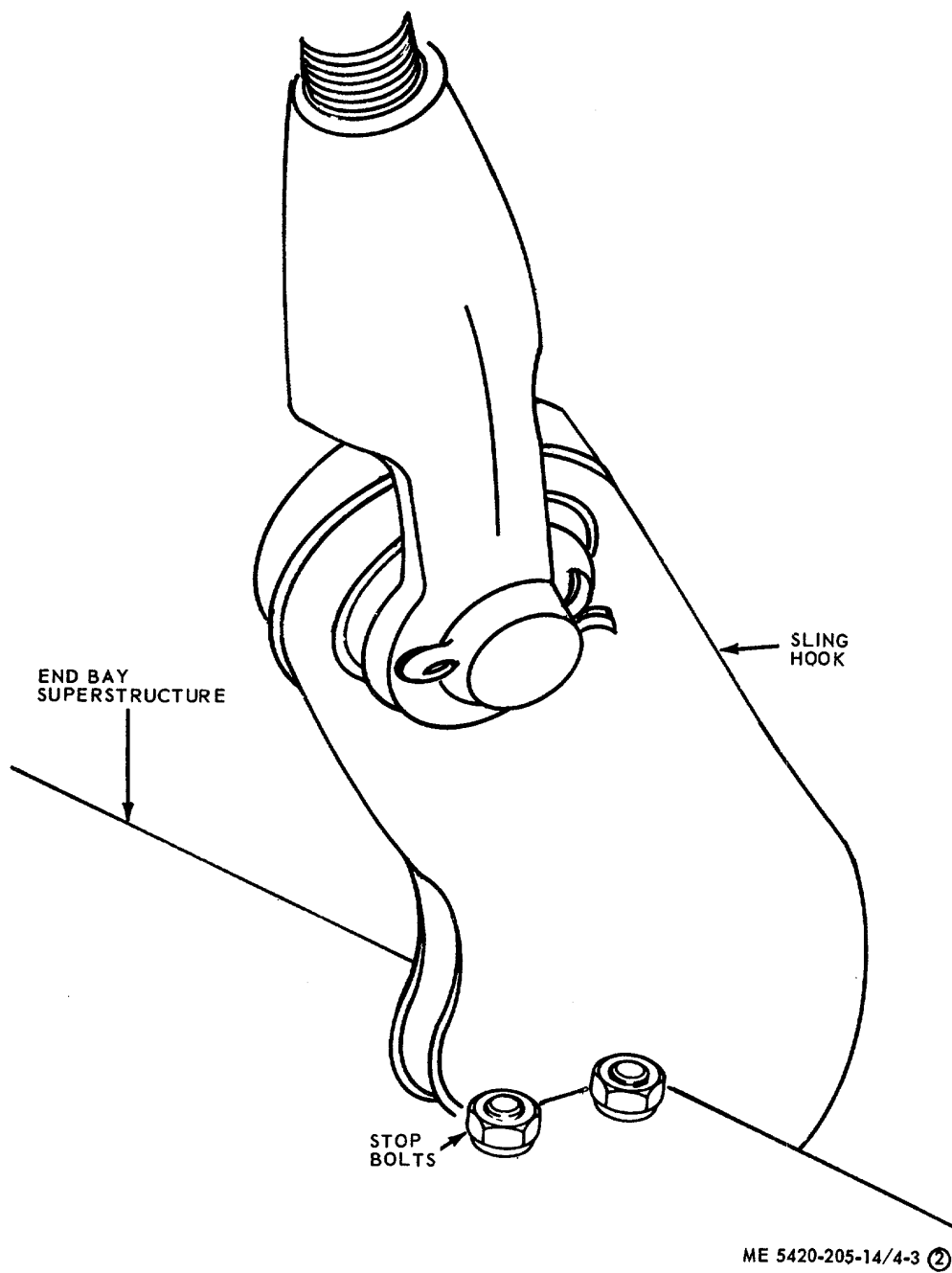


Figure 4-3. End bay superstructure, removal and installation.
(sheet 2 of 3)

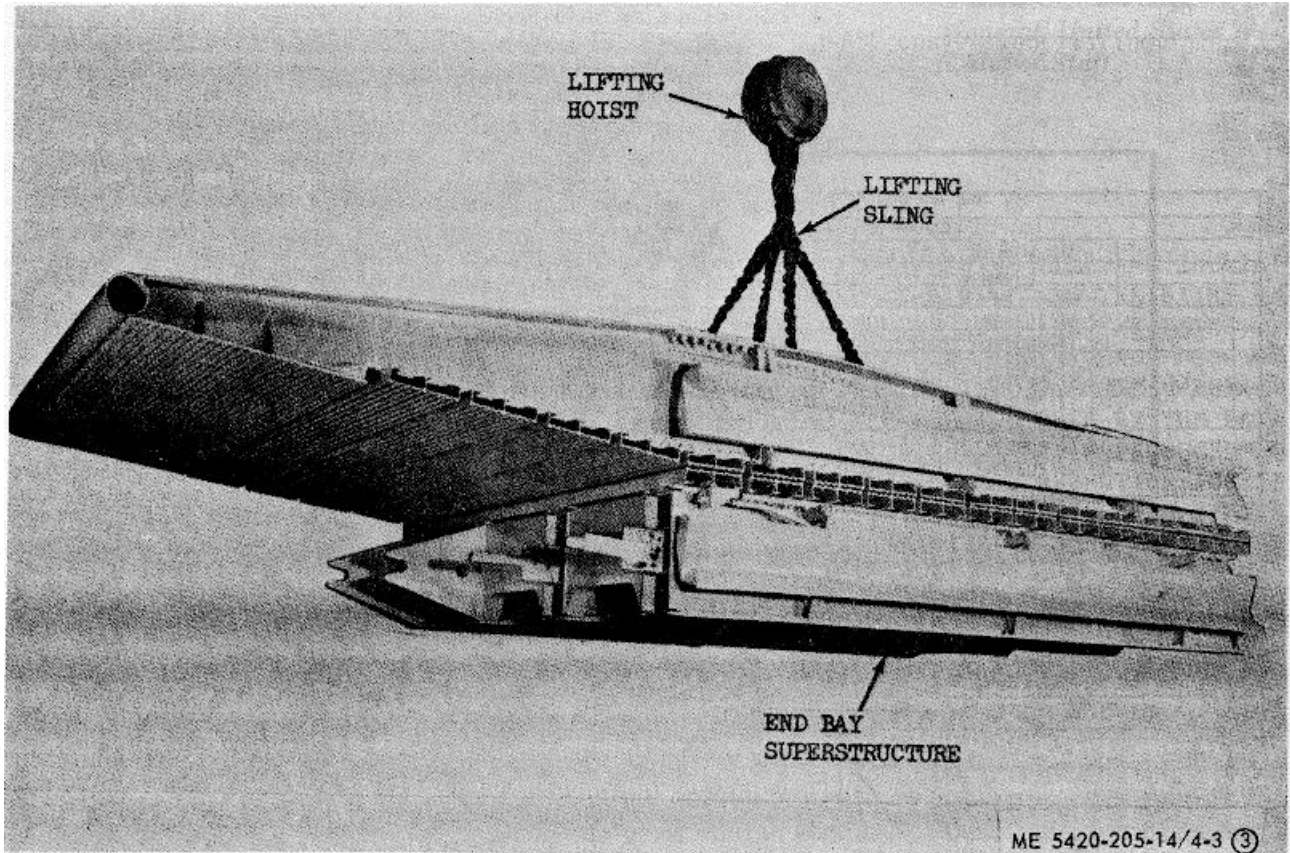


Figure 4-3. End bay superstructure, removal and installation.
(sheet 3 of 3)

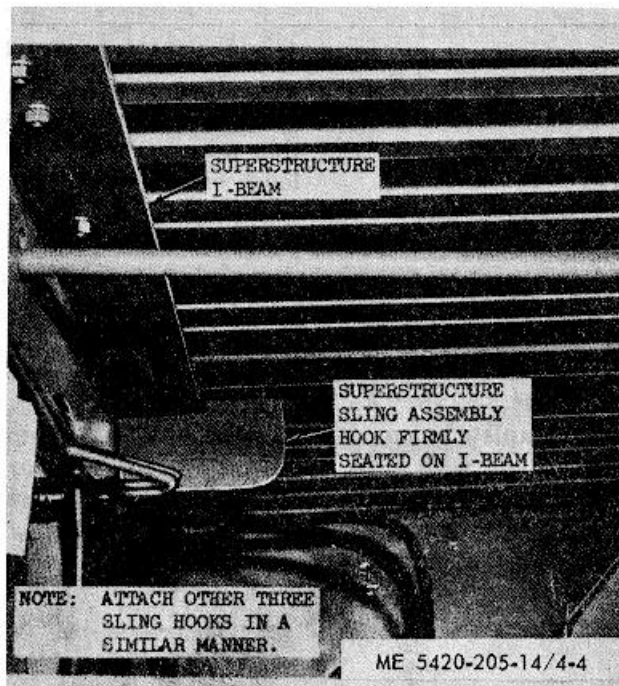


Figure 4-4. Superstructure sling assembly hook in place.

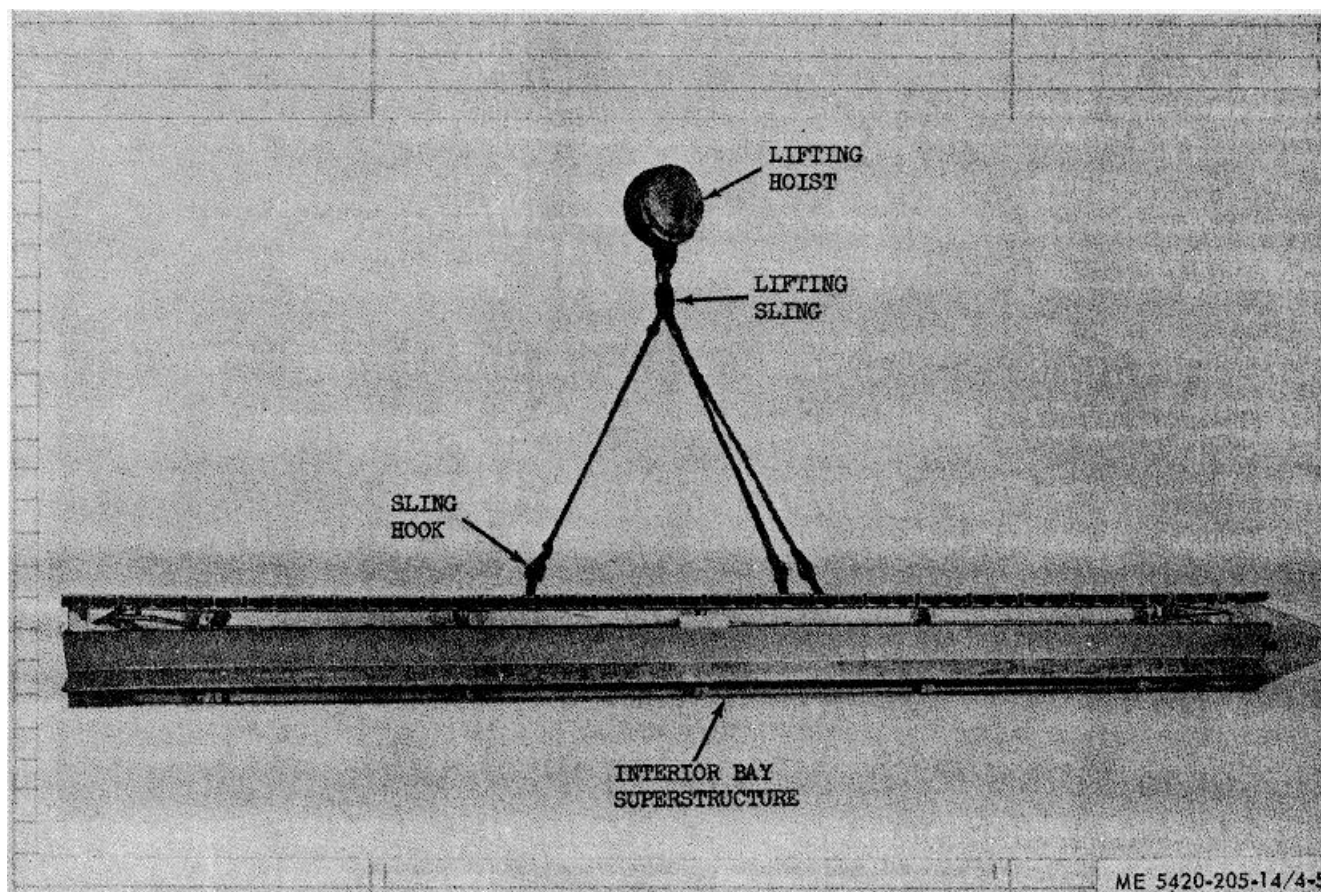


Figure 4-5. Interior bay superstructure. removal and installation.

4-2. Unpacking Equipment

a. *General.* The superstructure assemblies should be mounted on the carrier in such a way as to prevent damage to the units while in transit.

CAUTION

Use care in the use of crowbars and similar tools to avoid damage to the units.

b. *Depreservation.* Prior to placing the superstructure assemblies on the transporter, accomplish depreservation in accordance with instructions outlined on DA Form 2258. A depreservation guide will be completed concurrently with preservation for each item, with any peculiar requirements outlined in the blank spaces on DA Form 2258. The completed DA Form 2258 will be placed in a waterproof envelope and marked "Depreservation Guide"; and attached to each unit in a conspicuous location.

4-3. Inspecting and Servicing the Equipment

a. *Inspecting.*

- (1) Inspect the superstructure for damage that may have occurred during shipment, such as loose or missing bolts, nuts, or quick disconnect couplings.
- (2) Inspect all hydraulic hoses for leaks or damage.
- (3) Inspect the rotation, pinning, curbing, and ramp fold cylinder for leaks or other damage.
- (4) Inspect the superstructure decking for damage.
- (5) Inspect all pipe and hose straps for secure mounting. Make sure the hoses have adequate slack, and will not cause damage, or be damaged during operation.
- (6) Inspect electrical wiring harness for broken, frayed, or loose wires.
- (7) Correct all deficiencies.

b. *Servicing.* Perform the preventive maintenance services (para 3-4 and 4-9).

Section II. MOVEMENT TO A NEW WORKSITE

4-4. Dismantling for Movement

a. Obtain flatcar (50 ft min. length) with wooden floors laid over sills, durable stake pockets and without ends or sides.

b. Attach sling to superstructure (fig. 4-2), and lift to flatcar. (figs. 4-3 and 4-5).

NOTE

Lifting device used must have 25,000 lb minimum capacity. Be sure special clamp is installed before lifting end bay.

c. Position superstructure with weight load centered on flatcar, except when loading two end bays on one flatcar. Two interior bays on one flatcar must be double-checked. Folded end of the end bays should be

at center of car when loading two on one flatcar.

d. Block superstructure(s) on car and add tiedowns in manner prescribed by American Association of Railroads.

NOTE

As the superstructures are 12 feet wide, special routing instructions must be obtained prior to shipment by rail.

4-5. Reinstallation After Movement

Upon reaching new worksite, unload (para 4-1), unpack (para 4-2), inspect and service the superstructure (para 4-3).

Section III. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

4-6. Tools and Equipment

There are no basic issue tools or repair parts issued with or authorized for the superstructures.

4-7. Special Tools and Equipment

The only special tools or equipment required by the organizational maintenance personnel for removal and installation of the superstructures are the link assembly

clamp, and the superstructure's sling assembly. These are listed in Section III of Appendix B, and their use is explained in paragraph 4-1, figure 4-1 through 4-5.

4-8. Organizational Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5-5420-205-20P.

Section IV. LUBRICATION INSTRUCTIONS

Refer to lubrication instructions in paragraphs 3-1 and 3-2. Lubricate in accordance with Lubrication Order LO

5-5420-205-15.

Section V. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-9. General

This section contains a tabulated listing of the preventive maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, whichever

occurs first.

4-10. Quarterly Preventive Maintenance Services

Refer to figure 3-2(1) through (3) for location of items to be serviced on superstructure models 2195-1 and 2195-2, and to figures 3-3(1) through (3) for models 2271 and 2272.

Table 4-1. Organizational Preventive Maintenance Checks and Services

Q-Quarterly
Total man-hours required 2.2

Sequence Number	ITEM TO BE INSPECTED PROCEDURE	Work Time (M / H)
NOTE Figure 3-2(1) thru (3) illustrates items for models 2195-1 and 2195-2. Figures 3-3(1)i thru (3) illustrates items for models 2271 and 2272. Figure item number is same as sequence number.		
1	PIVOT POINTS Lubricate in accordance with LO 5-420-205-15.	0.2
2	HOSES AND FITTINGS Inspect for cracks and leaks. Tighten loose fittings. Replace worn or frayed hoses.	0.3
3	TUBING AND FITTINGS Inspect tubing and fittings for cracks and leaks. Tighten loose or leaking fittings.	0.3
4	FRAME ASSEMBLY Clean and inspect for damage.	0.5
5	HYDRAULIC CYLINDERS Inspect for damage or leaks. Replace a defective cylinder.	0.3
6	CURBING Clean and inspect for damage. Replace damaged curbing.	0.2
7	LOCKING PINS AND GUIDES Clean, inspect and lubricate. Replace damaged or defective pins and guides.	0.2
8	ROTATION ASSEMBLY Lubricate the superstructure spline 112, fig. 3-1(4)) with GAA automotive and artillery type grease. (See current LO 5-5420-205-151.	0.2

Section VI. REPLACEMENT OF DATA/ INSTRUCTION PLATES

4-11. General

Refer to paragraph 1-8 for description and general location of data plates and instruction plates.

Remove attaching drivescrews and data/instruction plate from superstructure and install new plate. Make sure the new plate is for the correct superstructure model.

4-12. Replacement

Section VII. MAINTENANCE OF SUPERSTRUCTURE HYDRAULIC COMPONENTS

4-13. General

Refer to paragraphs 2-1 and 2-2 for the purpose or function of superstructure hydraulic components in relationship to the transporter of the assault bridge ferry unit.

Appendix C, TM 5-5420-210-12 for models 2271 and 2272).

4-14. Fittings, Hose, and Tubing Replacement

a. *General.* The hoses, tubing, pipes, and fittings required are of commercial (off the shelf) items. These items are fabricated at GS level using high pressure tubing and fittings assembled with special tools and equipment (Basic Issue Items List, Appendix B, TM 5-5420-204-12 for models 2195-1 and 2195-2, and

b. *Typical Application.* The hoses, tubes and fittings supply high pressure hydraulic power from the transporter reservoir to the rotation, pinning, unfold and folding, and curbing cylinders. Tubing is used throughout the center section of each superstructure with flexible hose to each cylinder. Quick-disconnect couplings are used at the rotation assembly (fig. 4-19(1)). Figure 4-6 shows a typical line-to-hose-cylinder application.

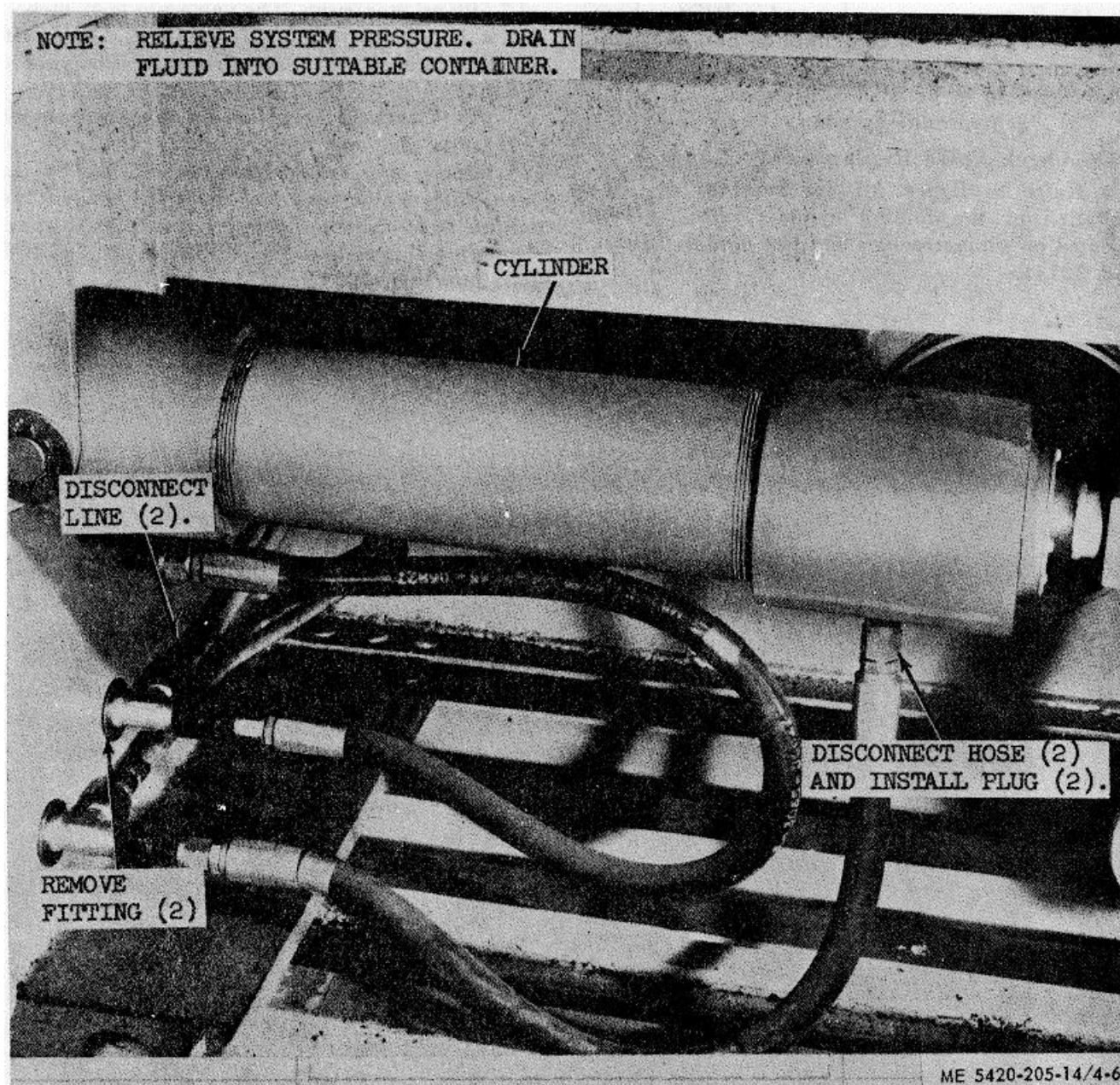


Figure 4-6. Typical line-hose cylinder application

c. *Hydraulic Hose.* Hydraulic hose must be properly installed by using correct length and type for pressure system involved, with no twist from coupling to coupling, as indicated by color code lines on hose. See TM 5-5420-204-12 for super-structure models 2195-1 and 2195-2, and TM 5-5420-210-12 for models 2271 and 2272 for correct tools to be used at installation to prevent damage to coupling nuts. A kit containing various sizes and lengths of hose is furnished at organizational level and is provided to enable emergency repairs to be made in the field, in event failure of hose or tube occurs. By connecting two or

more of these hoses together in proper combination, any hose or tube on the superstructure may be replaced in an emergency. Removal and installation of hydraulic hoses may be accomplished as follows:

- (1) Relieve all *pressure* from the system by gently unscrewing coupling nuts and allowing residual pressure in the lines to escape.
- (2) Drain the hydraulic system into a suitable container.
- (3) Disconnect coupling and cover or plug line

to prevent entry of foreign material. Disconnect opposite end of hose in similar manner.

(4) Remove cover or plug and install new hose at one end. Trace color code lines on hose, keeping it on same side complete distance of run; place other coupling in position and secure.

(5) Fill hydraulic system.

4-15. Check Valve Replacement

a. Refer to figure 4-7 for removal and installation of the folding cylinder check valves (located on superstructure end bay models 2195-2 and 2271).

(1) The valve located on end bay 2195-2 has a pressure rating of 10,000 psi, and a pilot pressure of 2,500 psi maximum. The valve size is 3/4 inch; it has a 26 gallons per minute at 40 psi drop, with opening ratio of 6.4:1, and decompression ratio of 39.2:1.

(2) The check valve located on end bay model 2271 has an operating pressure of 3,000 psi maximum, and pilot pressure of 2,500 psi maximum. Valve size is 1/2 inch; 26 gallons per minute at 40 psi drop, opening ratio of 6.4: 1, and decompression ratio of 35: 1 (TM 5-5420-205-20P, part number 13207E6683).

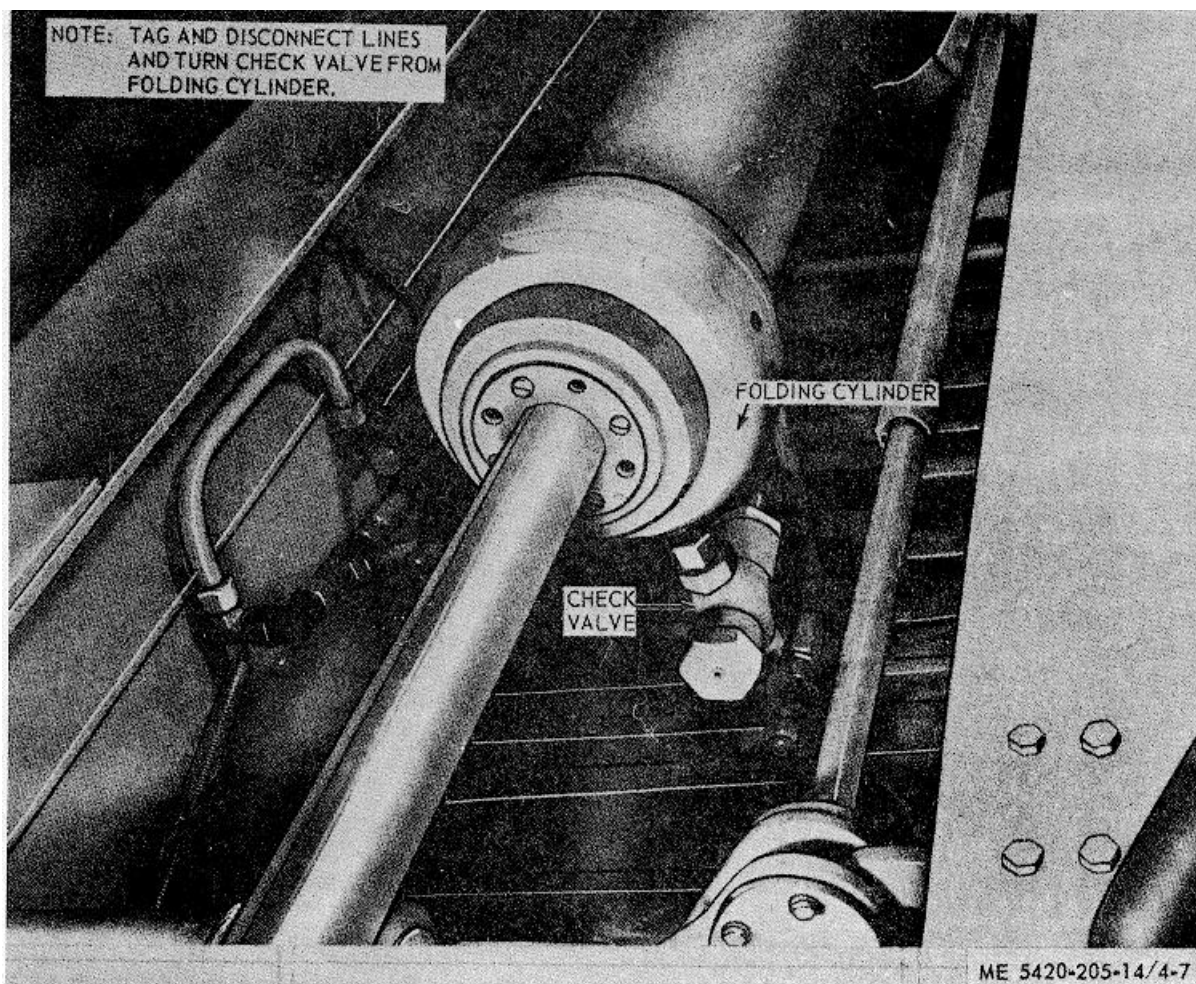
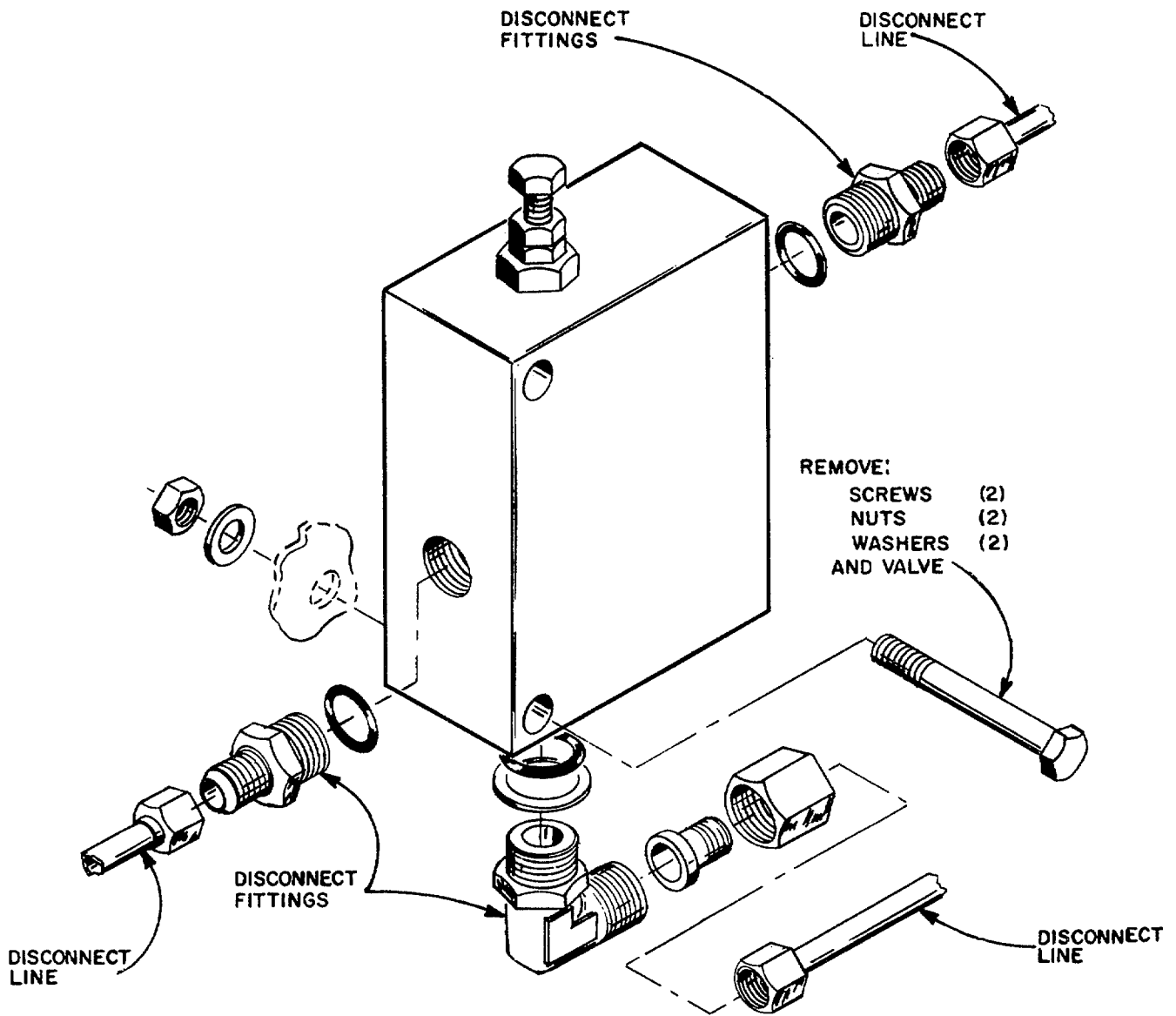


Figure 4-7. Checkvalve, removal and installation.

b. Refer to figure 4-8 for removal and installation of check valve, pilot operated (located on superstructure end bay model 2271). This valve has an operating pressure of 3,000 psi and a set pressure of 600 psi. The

pilot port is 3/8 inch; two ports are 1/2 inch. The valve passes 10 gallons per minute, has a proof pressure of 5,000 psi (minimum), and a burst pressure of 8,000 psi (minimum).

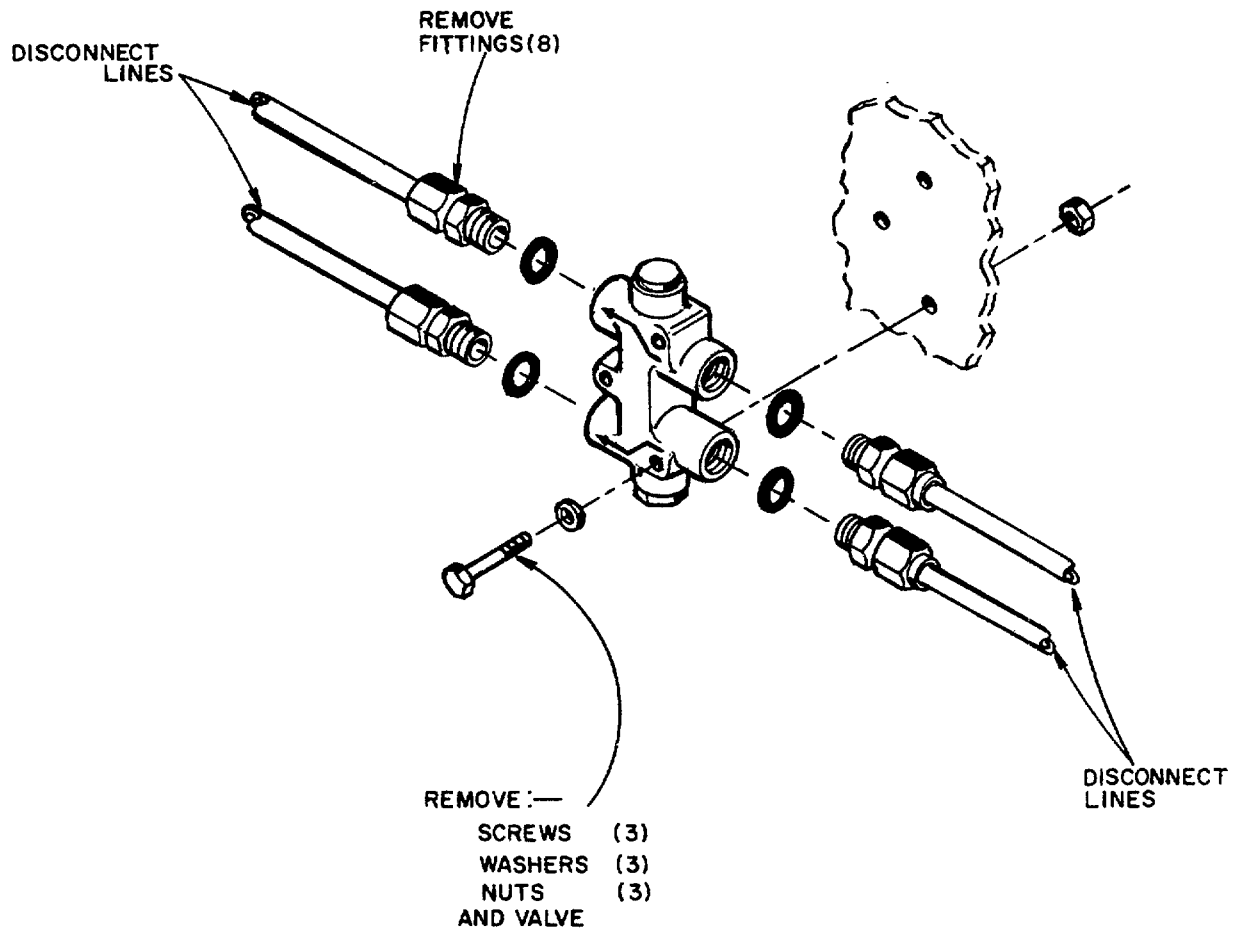


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Figure 4-8. Pilot operated check valve, end bay model no. 2271, removal and installation.

c. Refer to figure 4-9 for removal and installation of check valve, pilot operated (located on interior bay model no. 2272). This valve has an operating pressure

of 3,000 psi, proof pressure is 3,500 psi, and zero external leakage at 3,000 psi. Valve size is 1/3 inch.



ME 5420-205-14/4-9

Figure 4-9. Pilot operated check valve. interior bay model no. 2272, removal and installation.

4-16. Counterbalance Valve Replacement

Refer to figure 4-10 for removal and installation of the counterbalance valve located on end bay superstructure model 2195-2. End bay superstructure model 2271 is similar except for removal of cap on tee fitting, and

connection of line. The maximum working pressure of this valve is 3,000 psi. It has an actuating pilot pressure of 25 percent of load pressure, and proof pressure of 3,000 psi (TM 5-5420-205-24P, part no. 13207E2468).

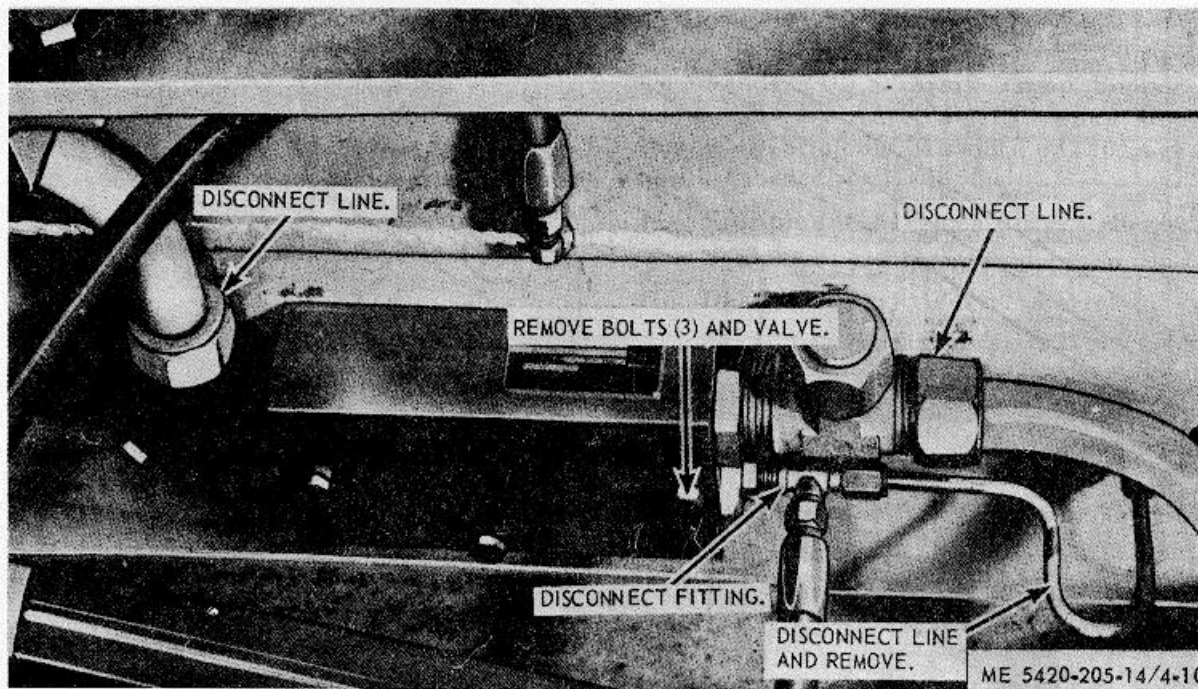


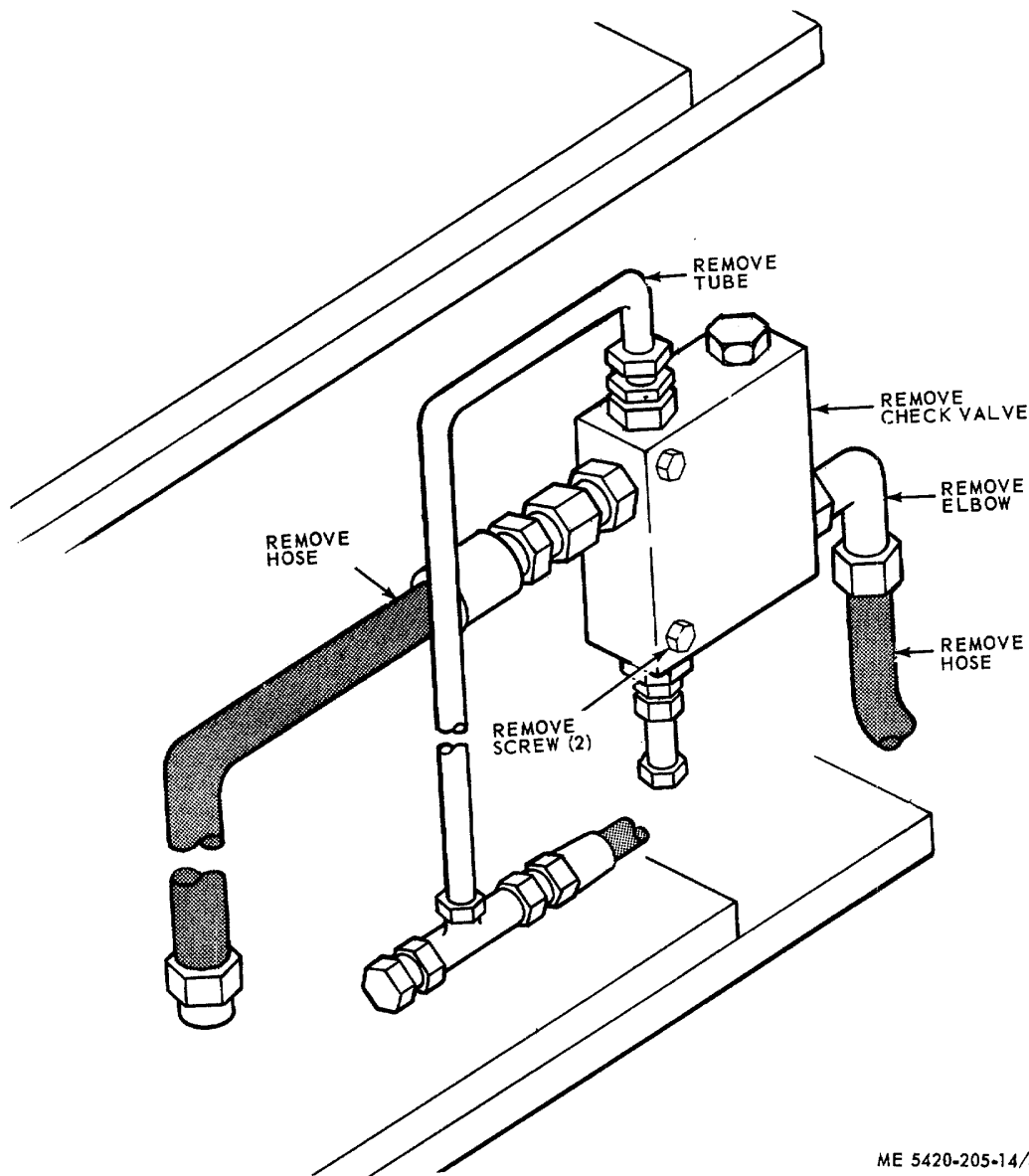
Figure 4-10. Counterbalance valve, removal and installation.

4-17. Curb End Bay Pilot Operated Check Valve Replacement

a. *General.* The curb end bay, pilot-operated, check valve is adjustable and has a maximum flow rate of 10 gallons per minute. The valve is set at 600 psi; it

has a proof pressure of 4500 psi a minimum burst pressure of 7,000 psi, and it is adjustable from 50 to 3,000 psi.

b. *Removal and Installation.* For removal and installation of the check valve refer to figure 4-11.



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Figure 4-11. Curb end bay pilot operated check valve, removal and installation.

4-18. Curbing Cylinder Replacement

Refer to figure 4-12 for removal and installation of the curbing cylinder.

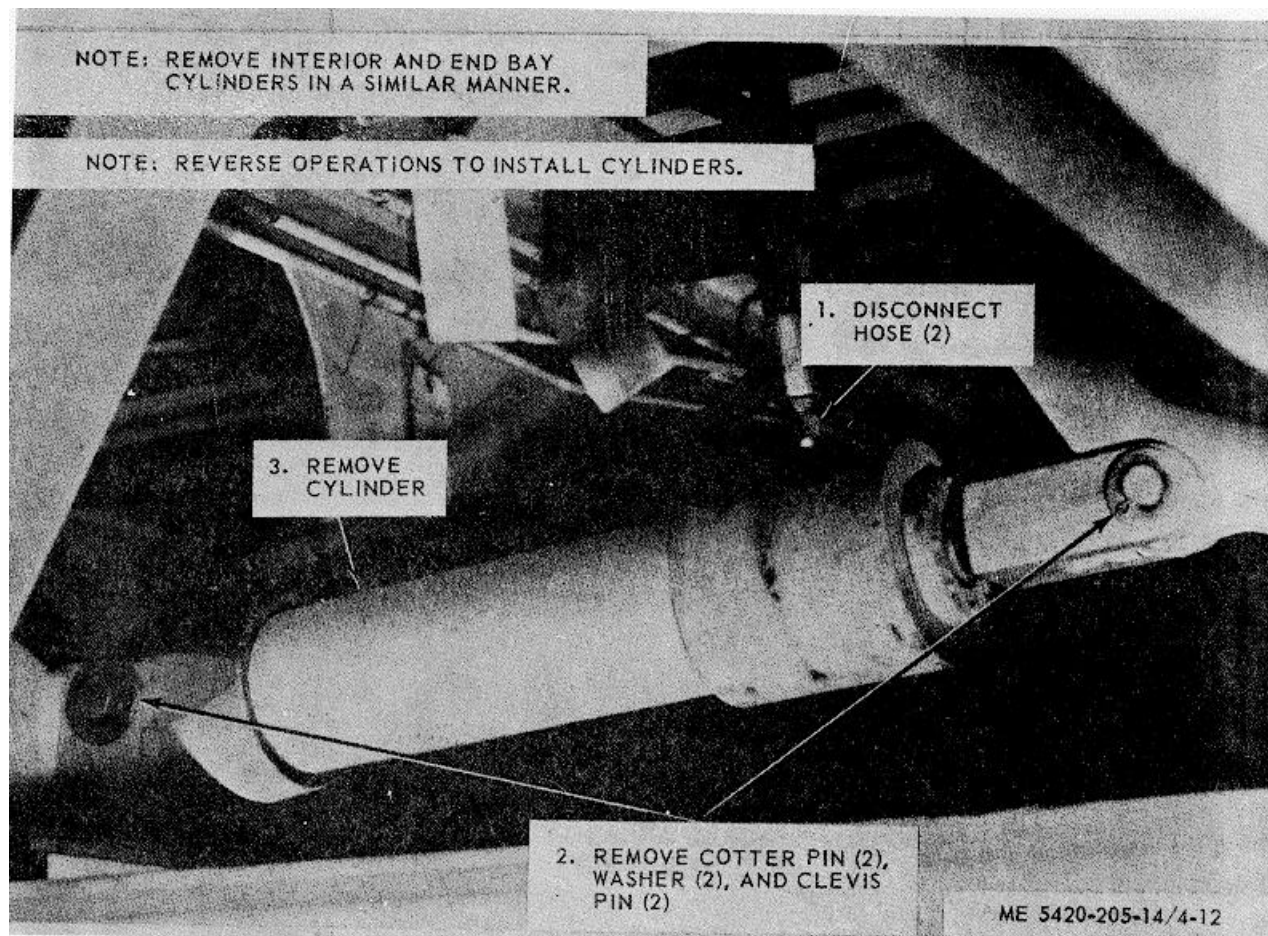


Figure 4-12. Curbing cylinder. removal and installation.

4-19. Rotation Cylinder

Replacement Refer to figure 4-13(1) and (2) for removal and installation of rotation cylinder.

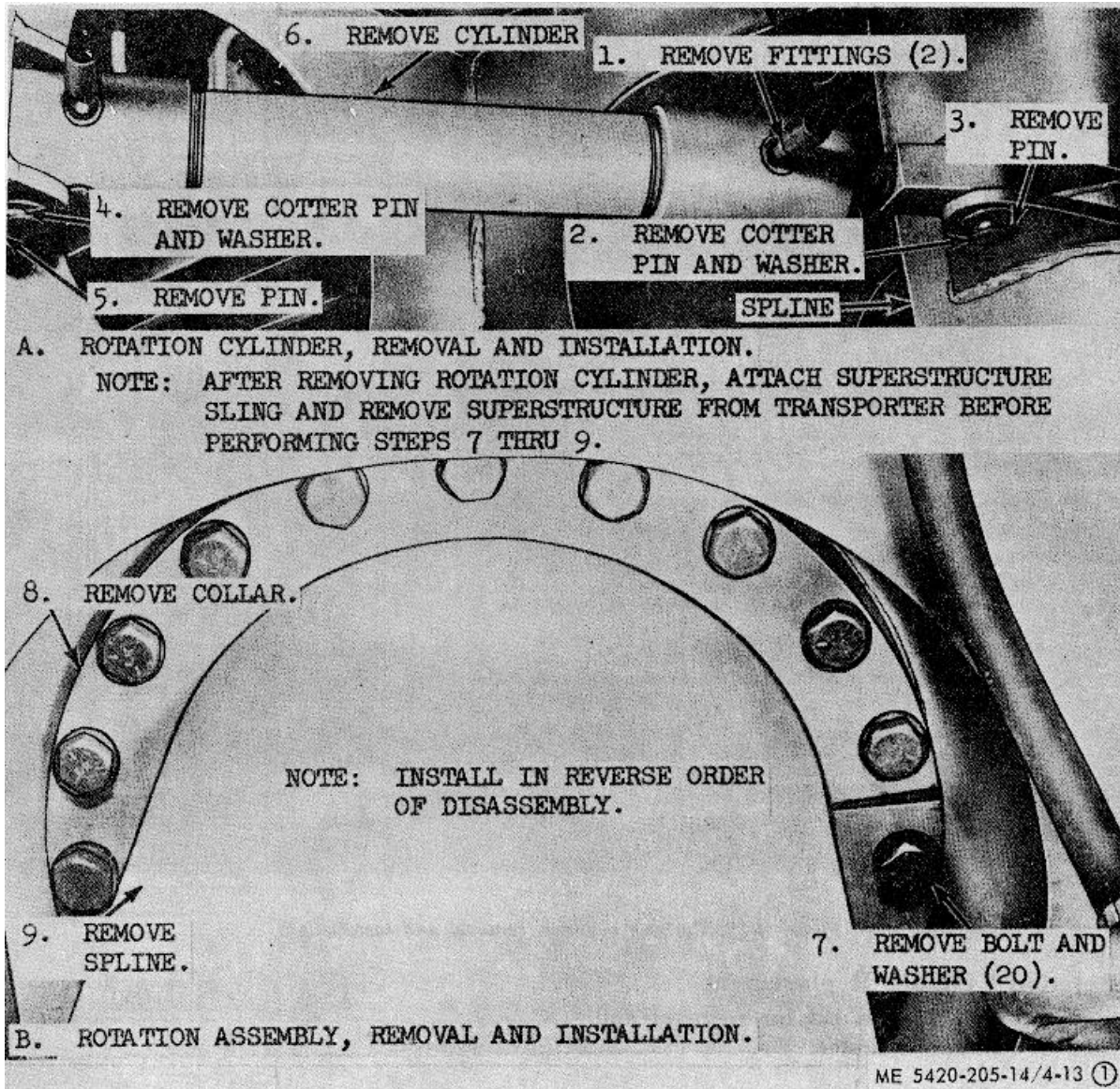


Figure 4-13. Rotation cylinder, removal and installation.
(sheet 1 of 2)

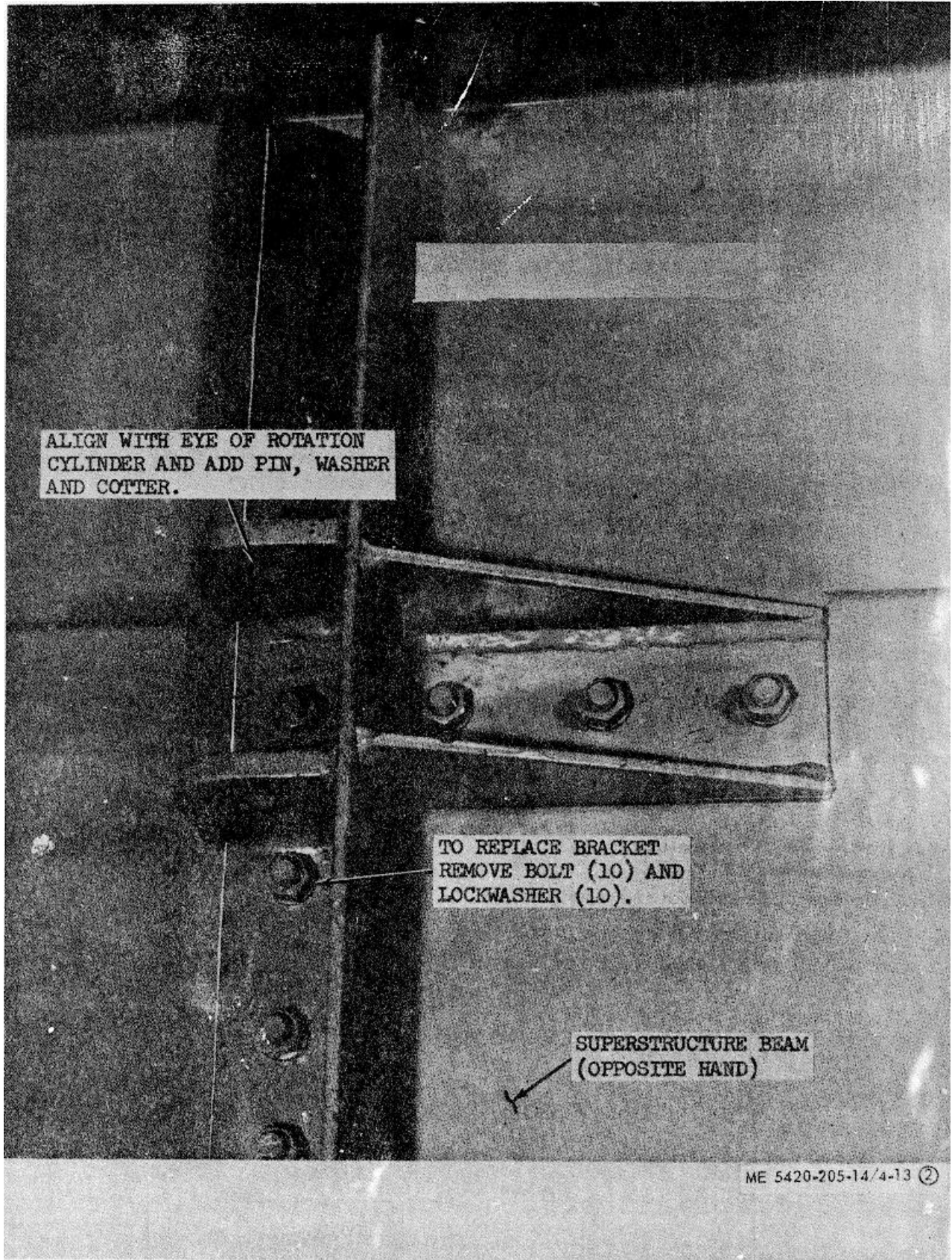


Figure 4-13. Rotation cylinder, removal and installation.
(sheet 2 of 2)

4-20. Pinning Cylinder Replacement

Refer to figure 4-14 for removal and installation of the pinning cylinder.

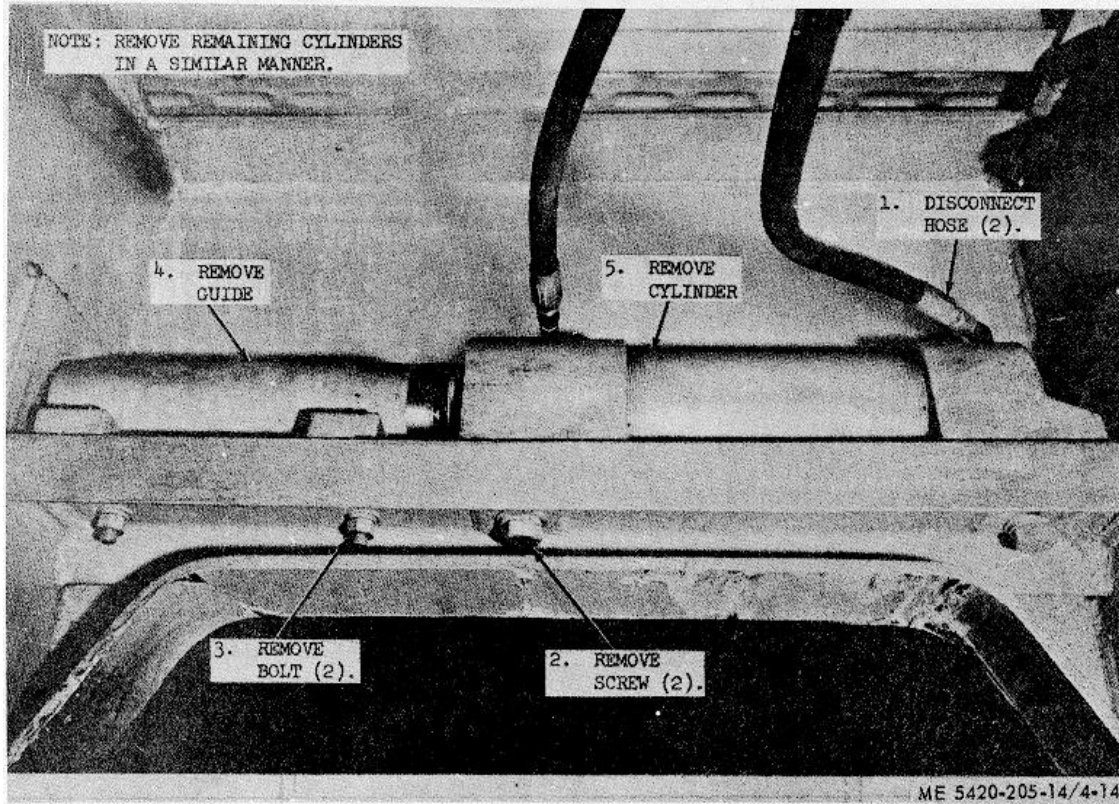


Figure 4-14. Pinning cylinder, removal and installation.

4-21. End Bay Unfolding Cylinder Replacement

Refer to figure 4-15 for removal and installation of the

end bay unfolding cylinder. Installation is reverse order of removal.

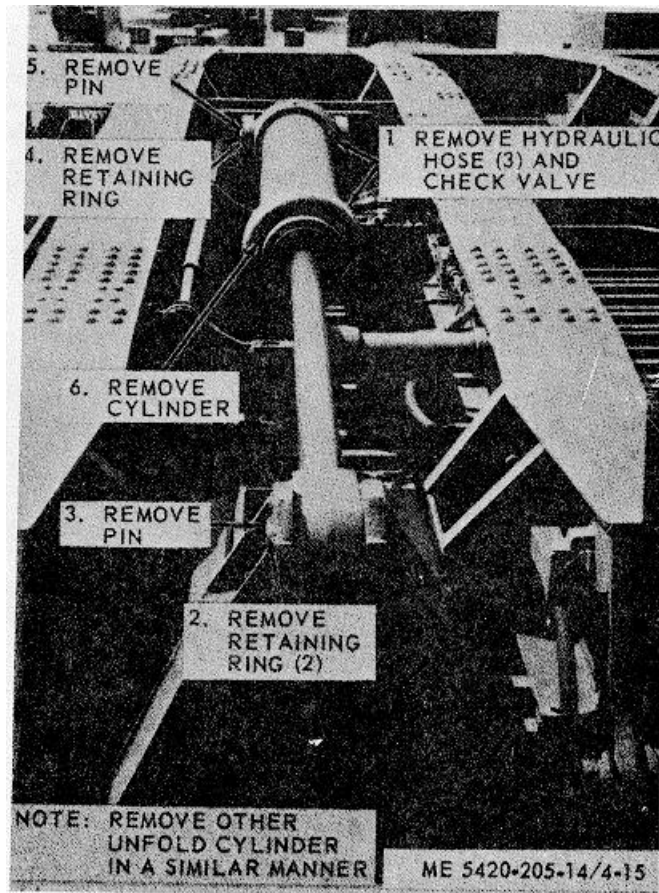


Figure 4-15. End bay unfolding cylinder, removal and installation.

4-22. Hose Clamp, Brackets, and Springs, Removal and Installation

There are a number of hose clamps, brackets, and

springs used on each superstructure; figure 4-15 shows removal at a typical installation. Installation is reverse order of removal.

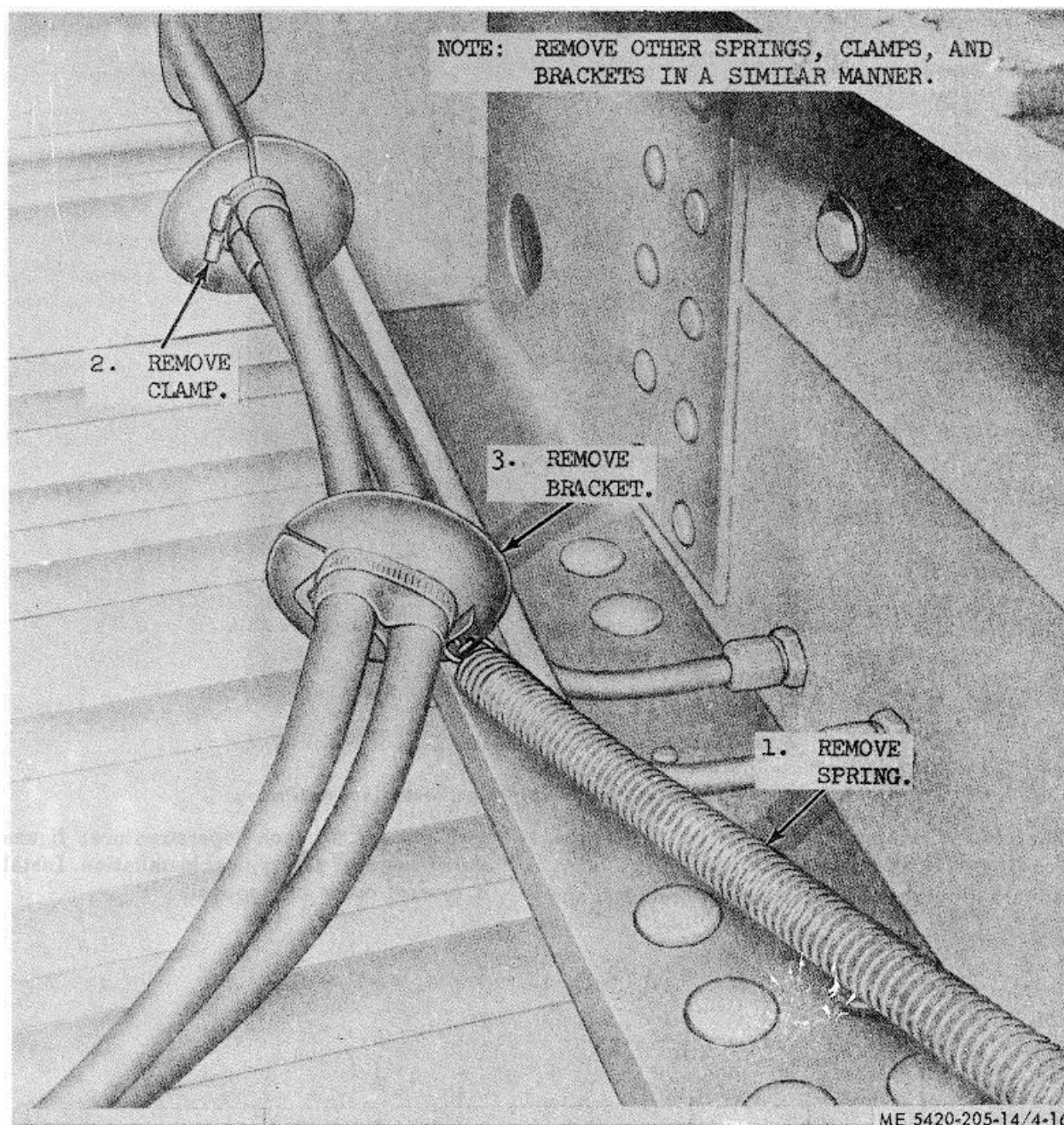


Figure 4-16. Typical hose clamp, bracket, and spring, removal.

Section VIII. MAINTENANCE OF ELECTRICAL SYSTEM

4-23. Electrical Cable Assembly, Test and Replacement

Refer to figures 1-5 through 1-11 and test cable assembly for continuity, open, short or grounded circuit. Replace a defective cable.

4-24. Electrical Receptacle and Bracket Replacement

a. Inspect receptacle and bracket (fig. 4-17), for damage or other defects. Replace defective receptacle and bracket.

b. Refer to figure 4-17 for removal and installation of receptacle and bracket. Installation is reverse order of removal.

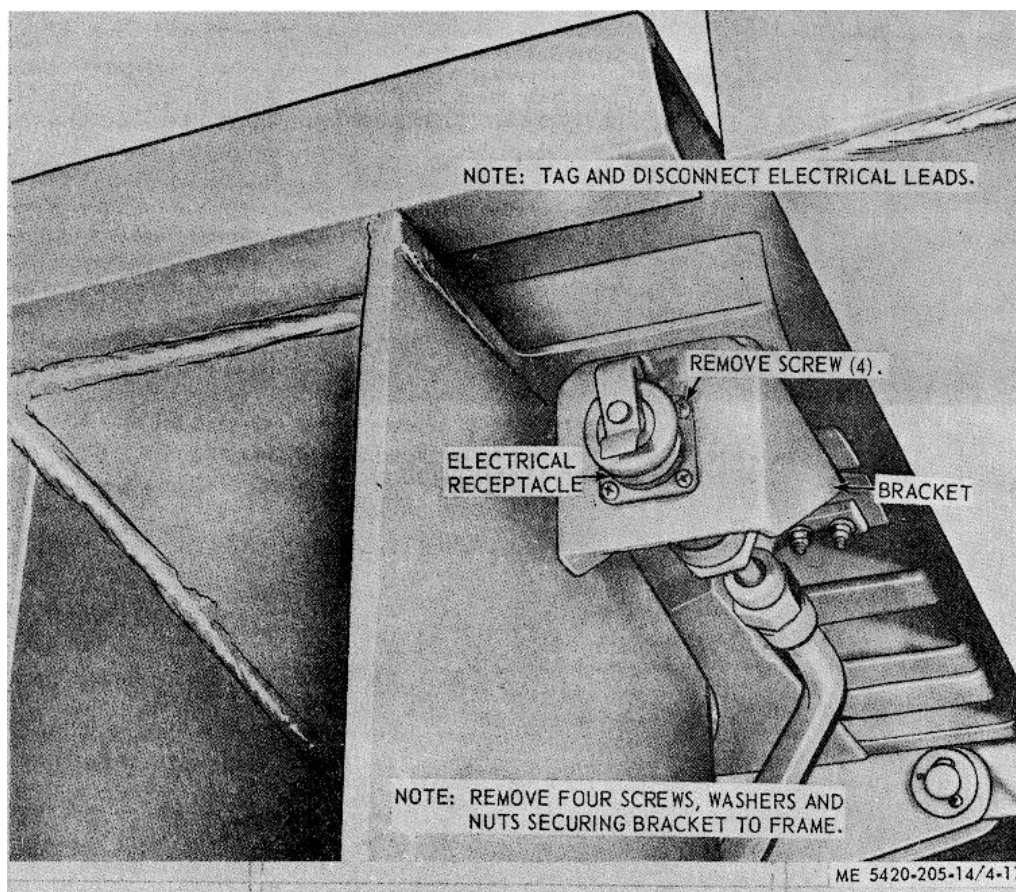


Figure 4-17. Electrical receptacle and bracket, removal and installation.

4-25. Junction Box Replacement

a. Remove junction box cover, and inspect for damage or other defects. Replace a defective junction box.

b. Refer to figure 4-18(1) for removal and installation of junction box, superstructure model 2195-1; refer to figure 4-18(2) for superstructure model 2272.

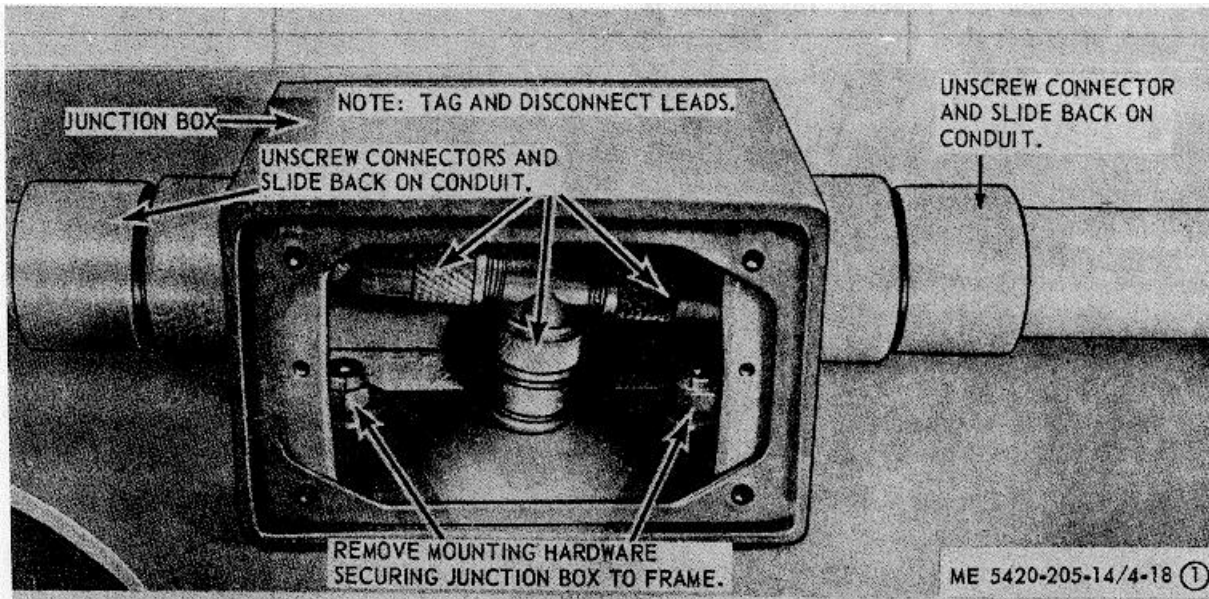
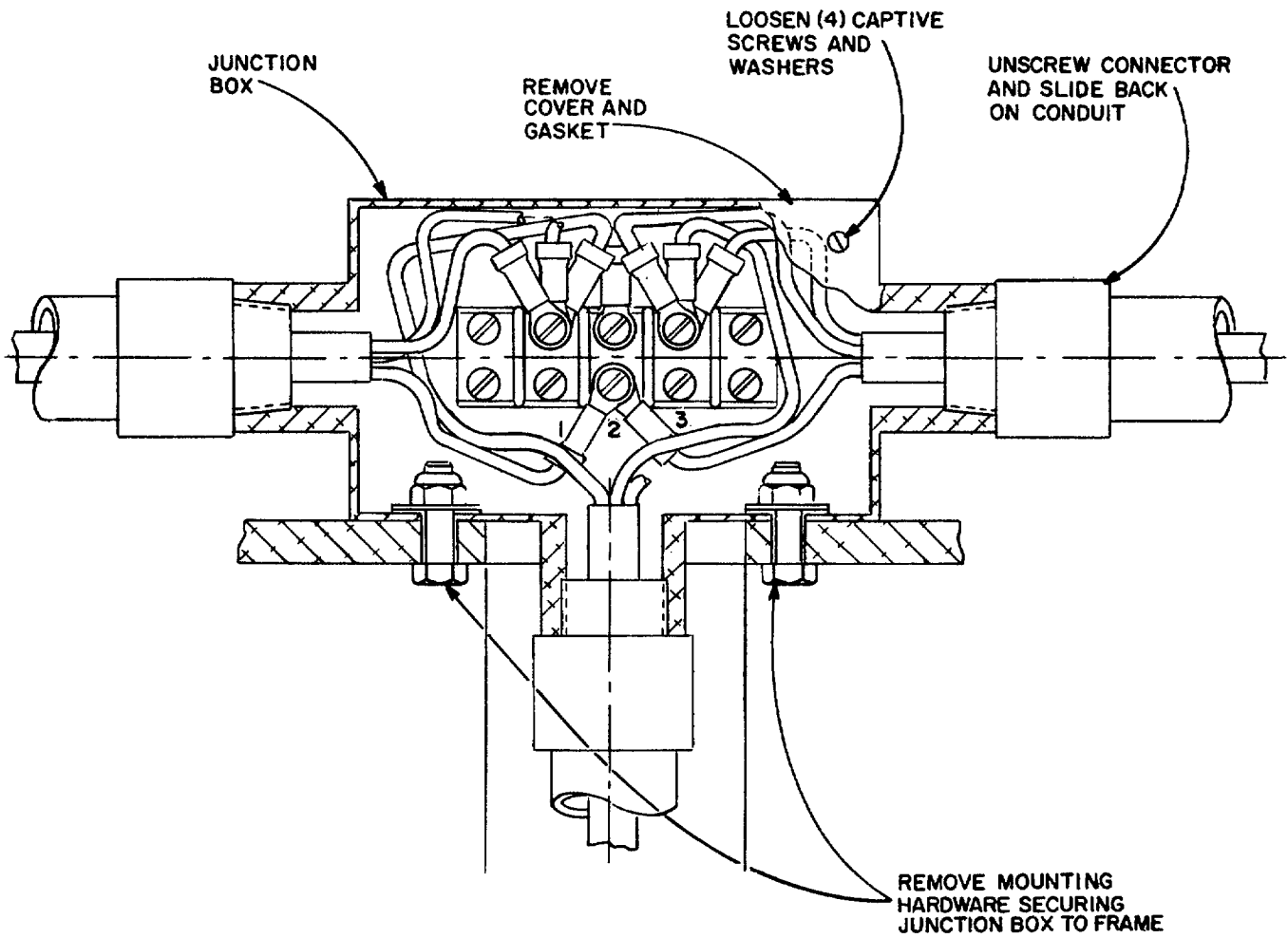


Figure 4-18. Junction box removal and installation, superstructure model 2195-1 (sheet 1 of 2).



NOTE:
TAG AND DISCONNECT TERMINAL LEADS

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Figure 4-18. Junction box removal and installation, superstructure model 2272 (sheet 2 of 2)

**Section IX. MAINTENANCE OF SUPERSTRUCTURE BRIDGE LAUNCHING
AND RETRIEVING EQUIPMENT**

4-26. General

a. The interior bay superstructure consists of the frame structure, decking, curbing, rotation spline, pinning, curb and rotation cylinders.

b. The end bay superstructure consists of the frame structure, yoke, decking, curbing, rotation spline, rotation cylinder, curb cylinders, ramp unfolding cylinders and cylinder mounting brackets.

c. The interior bay and end bay superstructure are similar in construction. They are fabricated from aluminum alloy and steel, welded or riveted together to form a frame to which the decking is bolted. The deck plates are ribbed aluminum alloy extrusions with non-skid top surface. The hydraulic cylinder mounting brackets are fabricated from plate or bar steel. The brackets for the end bay unfolding cylinders are attached to the frame with bolts. The curb and rotating cylinder brackets are welded to the frame. The pinning cylinders are bolted to the frame. The yoke and linkage is a forged steel weldment.

4-27. Quick Disconnect Couplings, Replacement

a. Refer to figure 4-19(1) and (2) for removal and installation of hydraulic quick disconnect couplings.

b. Care must be exercised when installing quick disconnect couplings that a good seat of the balls of the female fitting is made in the groove of the male fitting on the transporter deck. To check that a good connection has been made:

(1) Operate the pinning, curbing, rotation, and folding cylinders and observe whether the related hydraulic hose stiffens noticeably. If the hose does stiffen (indicating a pressure build-up, relieve the pressure from the hose, grasp the sleeve of the female coupling and lift it upward and off the male coupling.

(2) Observe both female and male coupling halves for defective O-rings, defective ball retainer, or missing balls.

(3) Reinstall the female coupling on the male coupling and again operate the cylinder. If the hose stiffens, release pressure and install a new female coupling on the hose.

(4) Operate the cylinder to see if the new female coupling eliminates the trouble. If it does not, install a new male coupling and test. If this does not eliminate the trouble, notify direct support maintenance.

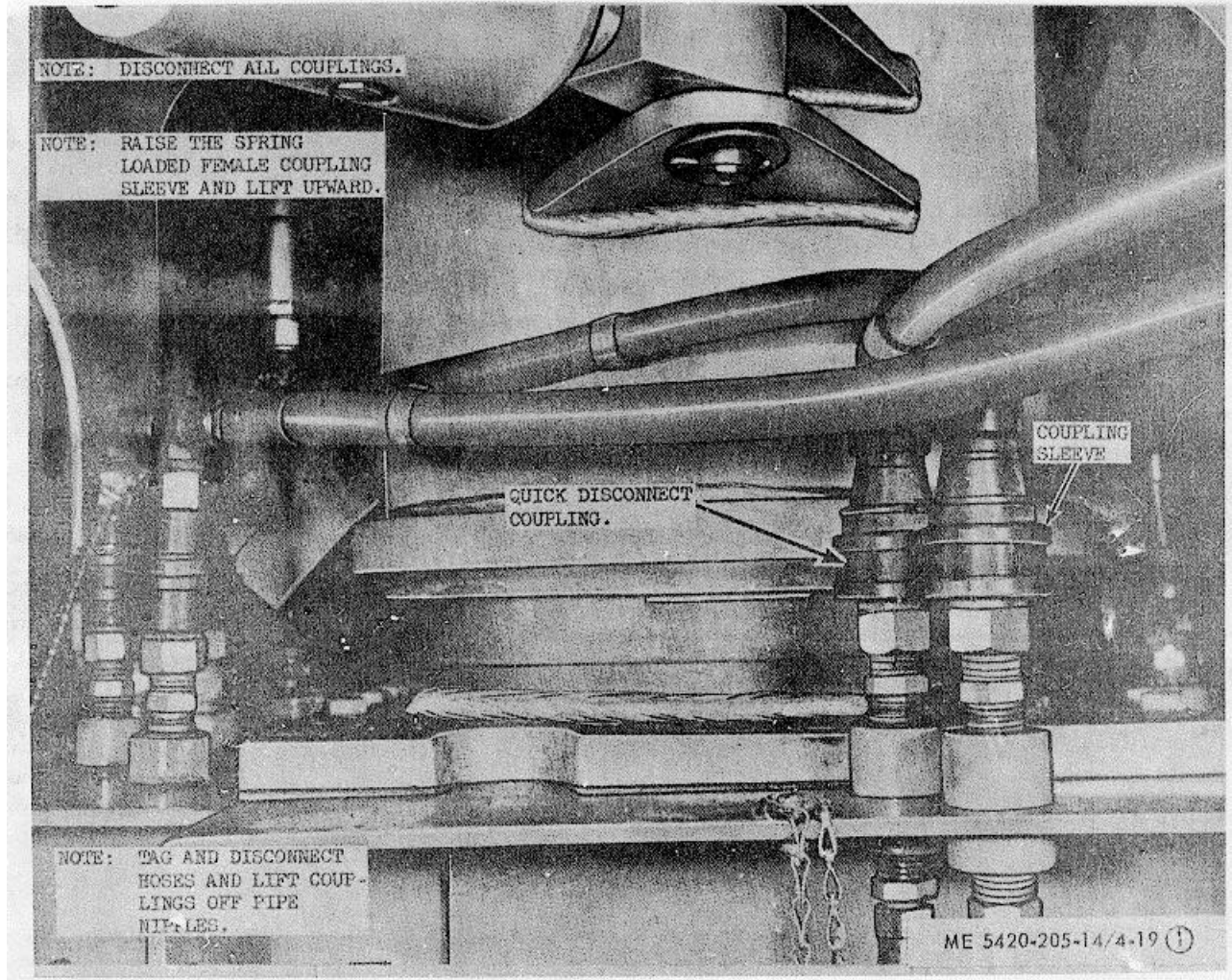


Figure 4-19. Quick disconnect couplings. removal and installation.
(sheet 1 of 2)

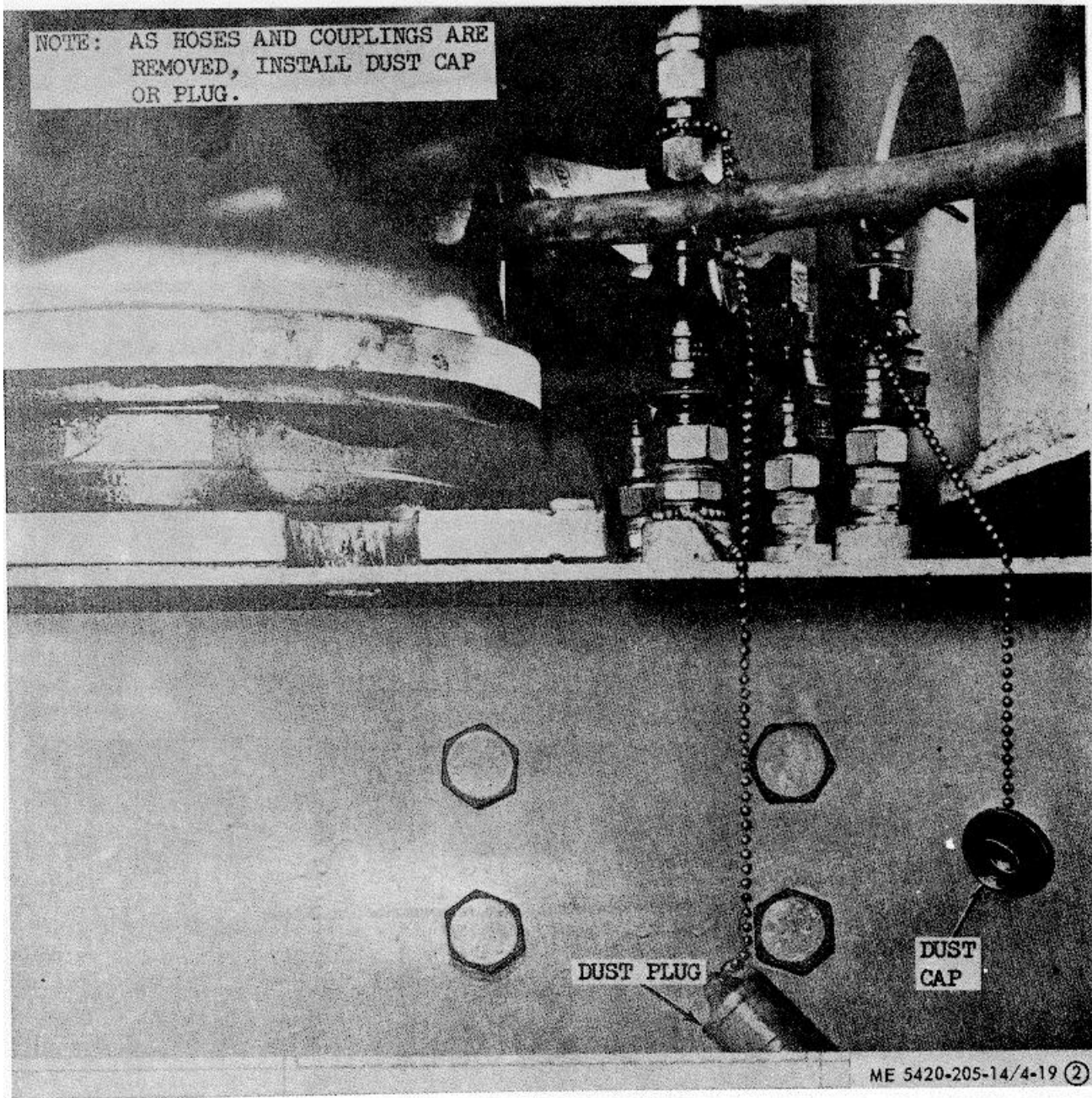


Figure 4-19. Quick disconnect couplings. removal and installation.
(sheet 1 of 2)

4-28. Decking Replacement

Refer to figure 4-20 for removal and installation of

decking. Installation procedure is reverse order of removal.

4-29. Curbing Mechanism, End and Interior Bay

a. *Curb Arm and Rod Replacement.* Refer to figure 4-21 for removal and installation of the curb arm and rod.

b. *Curbing and Torsion Shaft, and Ramp Bracket.* Refer to figure 4-22(1) thru (3) for removal and installation of the curbing and torsion shaft, and ramp bracket.

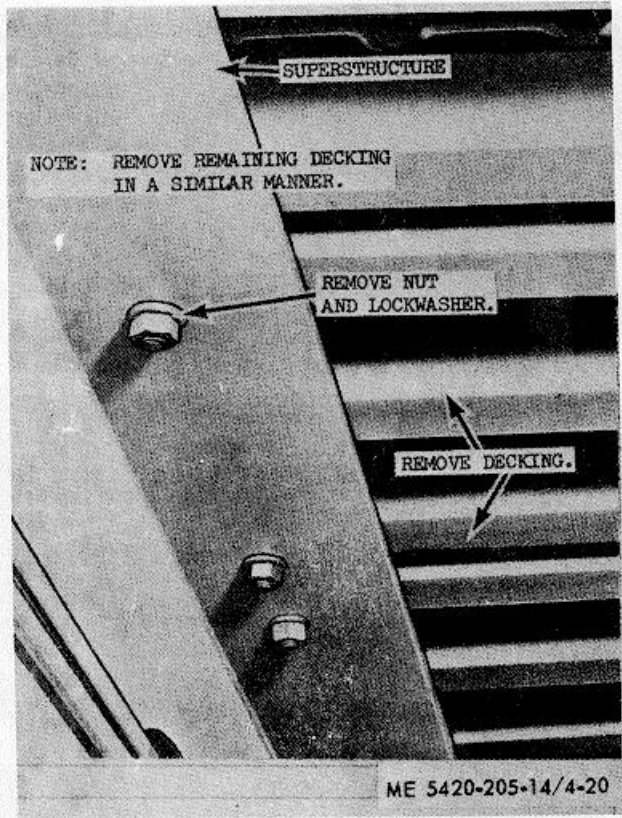


Figure 4-20. Decking, removal and installation.

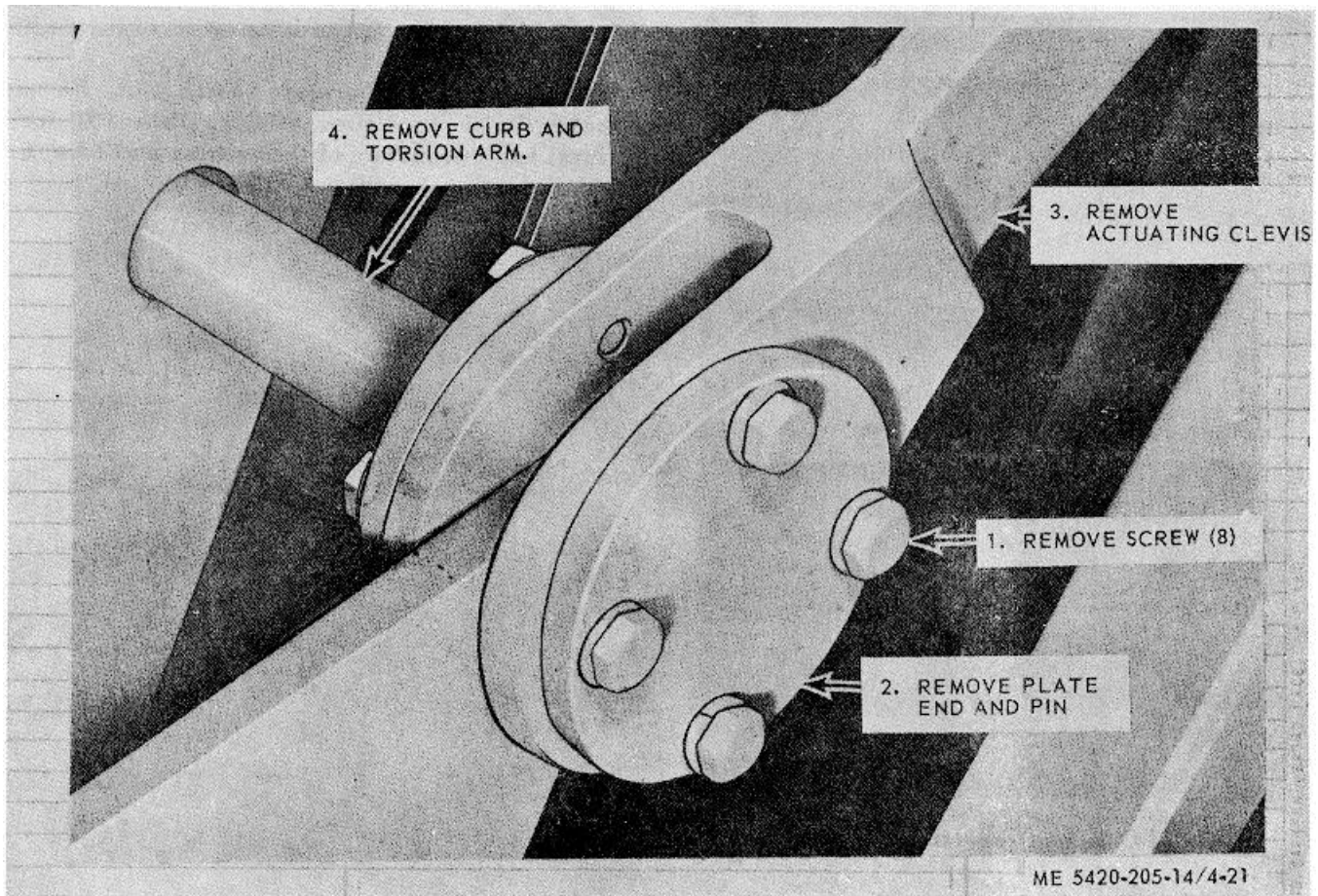


Figure 4-21. Curb arm and rod, removal and installation.

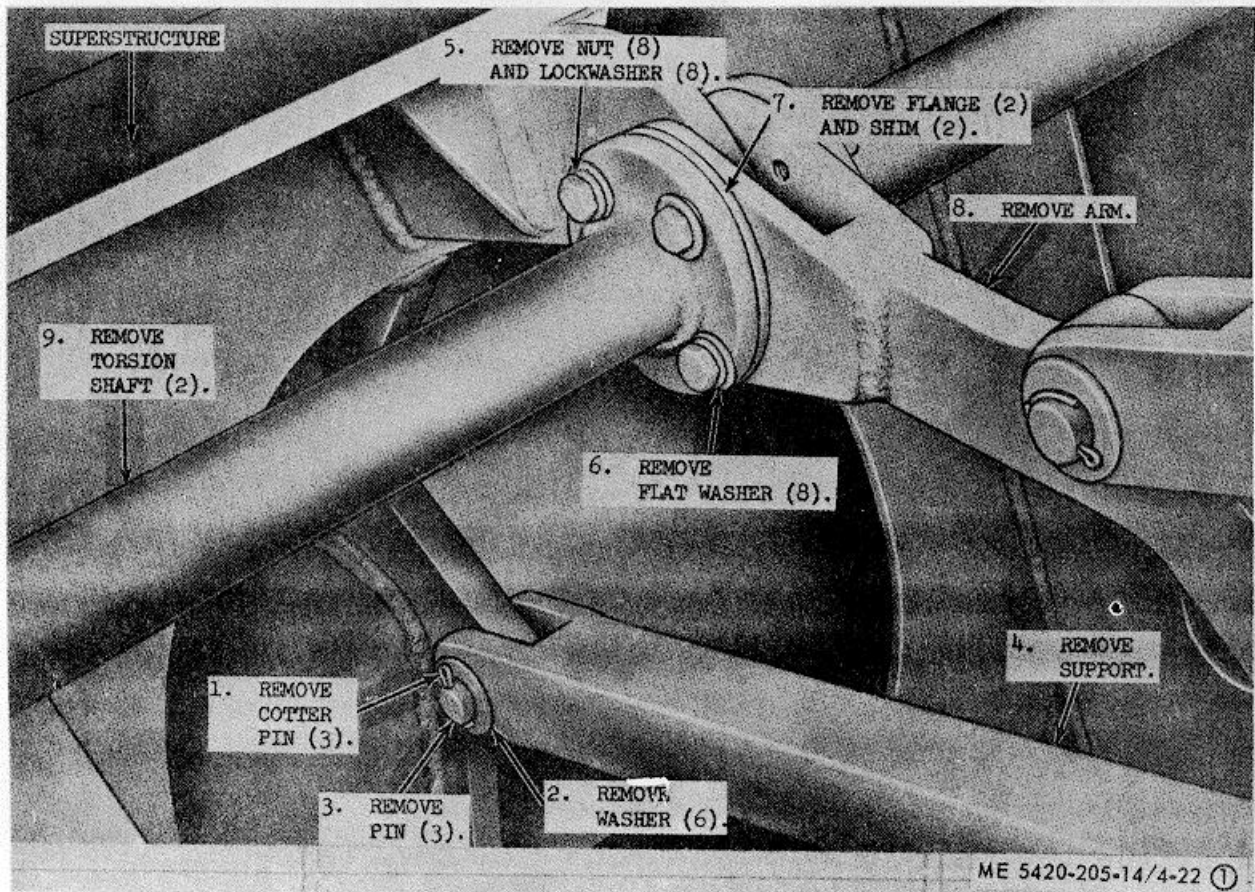


Figure 4-22. Curbing and torsion shaft, and ramp bracket, removal and installation (sheet 1 of 3)

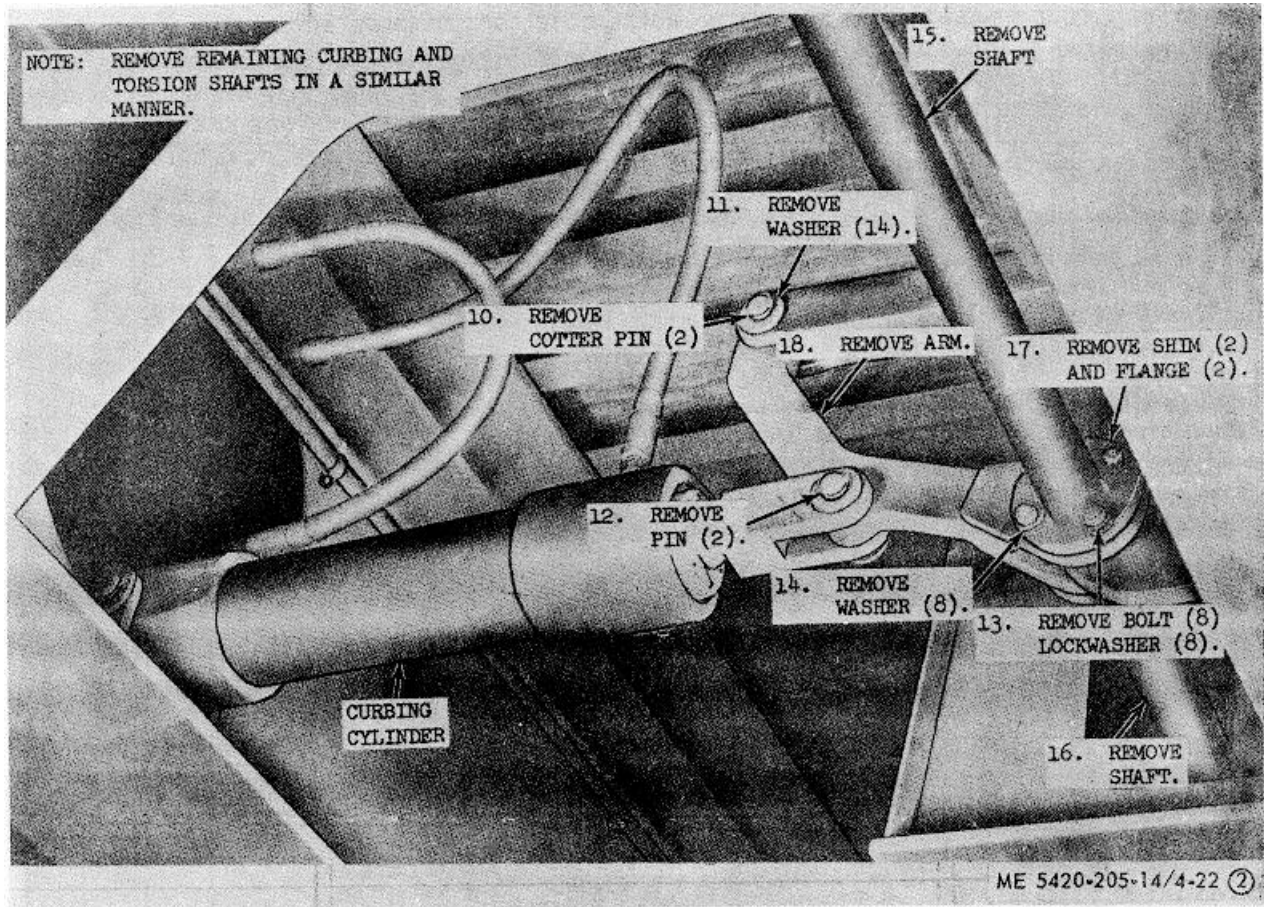


Figure 4-22. Curbing and torsion shaft, and ramp bracket, removal and installation. (sheet 2 of 3)

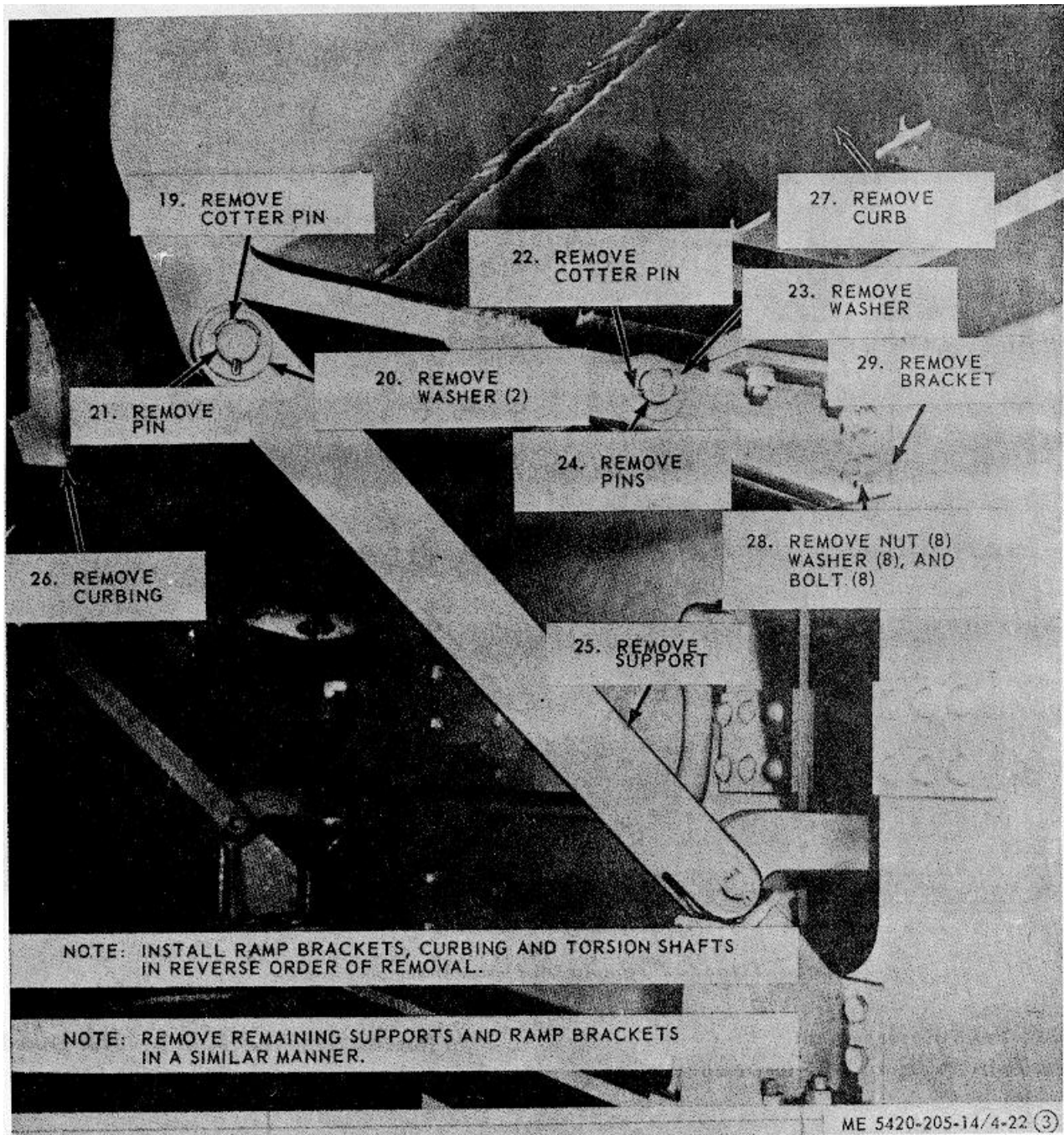


Figure 4-22. Curbing and torsion shaft, and ramp bracket, removal and installation. (sheet 3 of 3)

4-30. Pin Assembly, Stepped Head, Female Tapered Locator, Replacement

The interior bay has two female and two male locators at each end; the end bay has two male and two female locators at the end opposite the yoke. These locators are used in conjunction with the ropes, capstan and bitt to join transporter bridge connections. The female

connection (locator) receives the male locator with the taper guiding the section inward until secured about the inner pin; then it is locked in place by action of the pinning cylinder. The inner pin of the female tapered locator is subject to wear, and may be replaced as shown in figure 4-23.

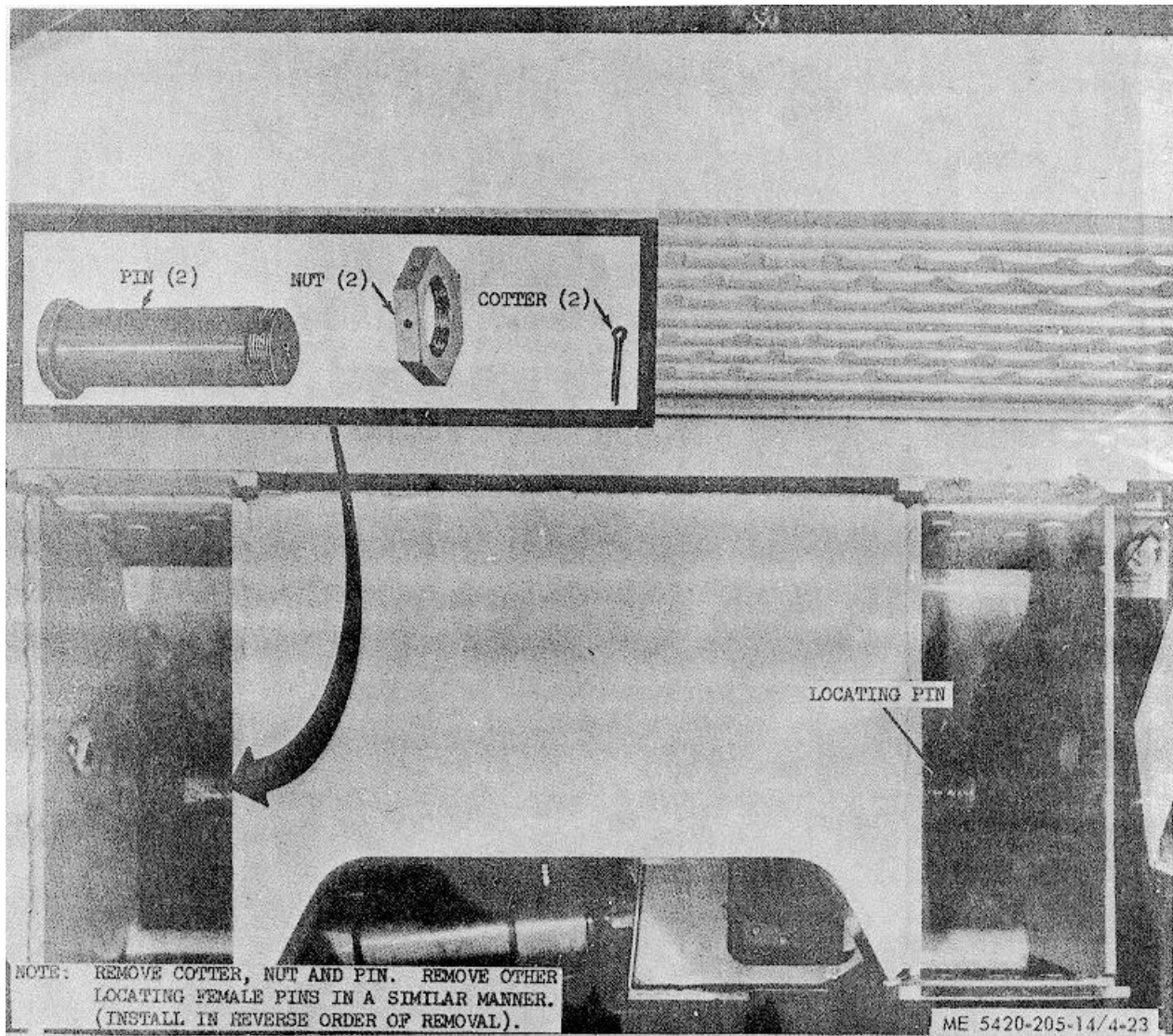


Figure 4-23. Typical tapered female locator pin assembly, removal and installation.

4-31. Yoke Replacement

- a. Refer to figure 4-24 for removal of yoke.
- b. Installation is reverse of removal procedure.

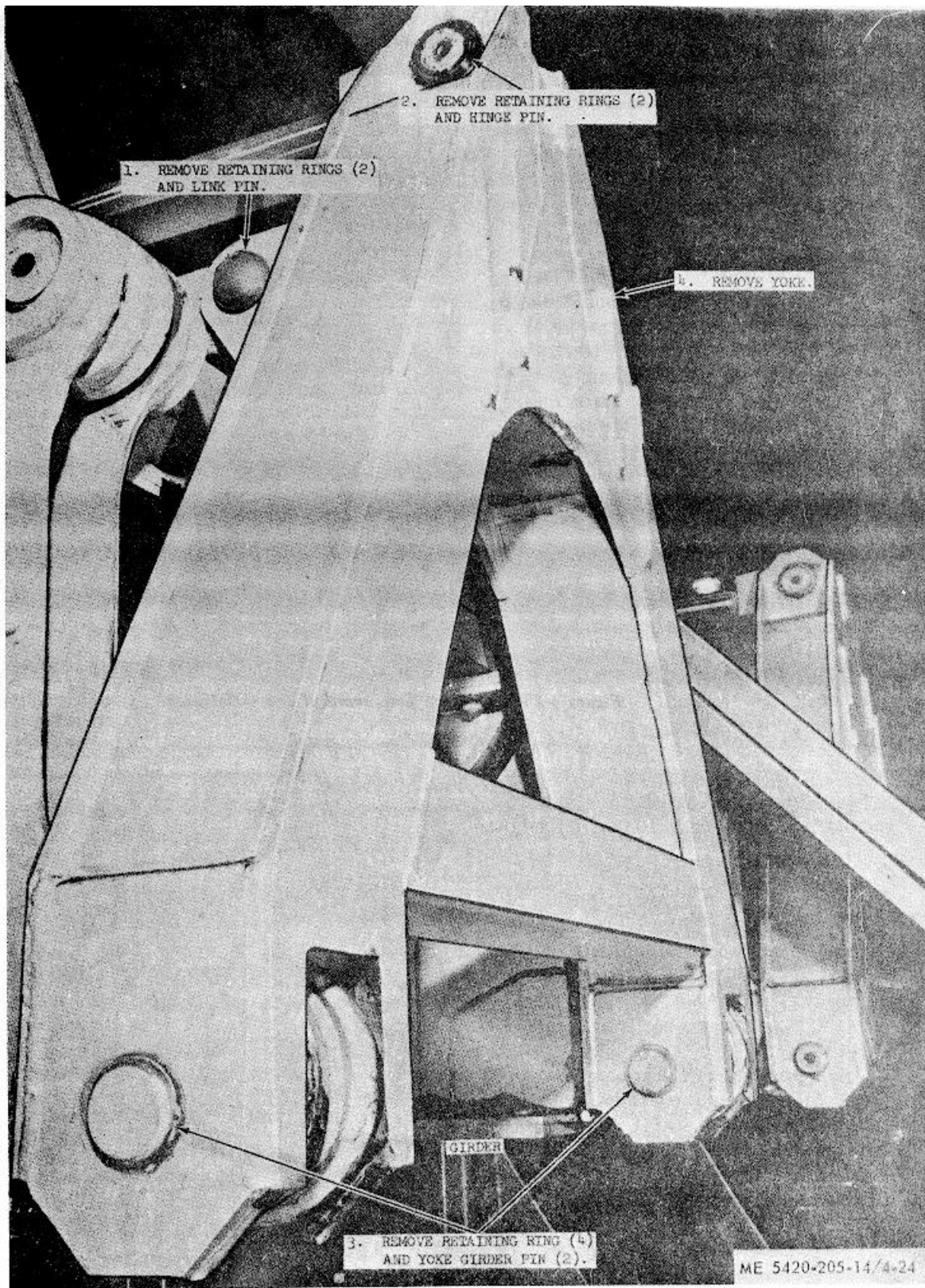


Figure 4-24. Yoke, removal and installation.

4-32. Holddown Bolt Assembly

a. *Removal and Installation.* Refer to figure 4-25 for removal and installation.

b. *Disassembly and Reassembly.* Refer to figure 4-26 for disassembly and reassembly of the holddown bolt assembly.

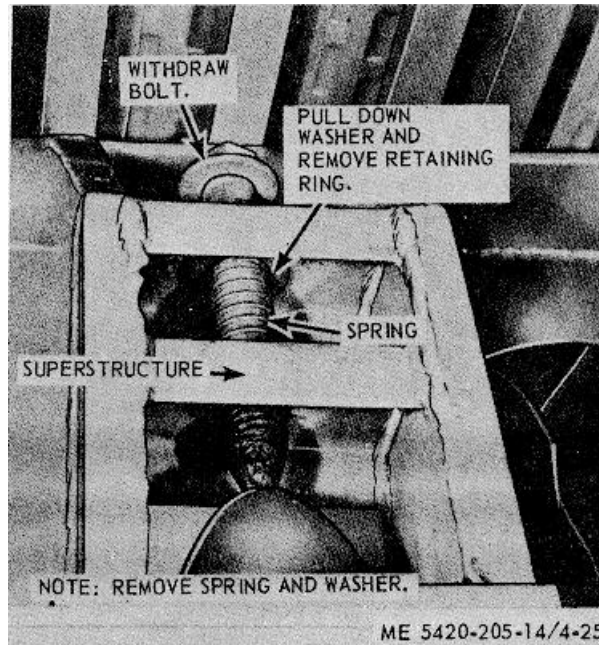
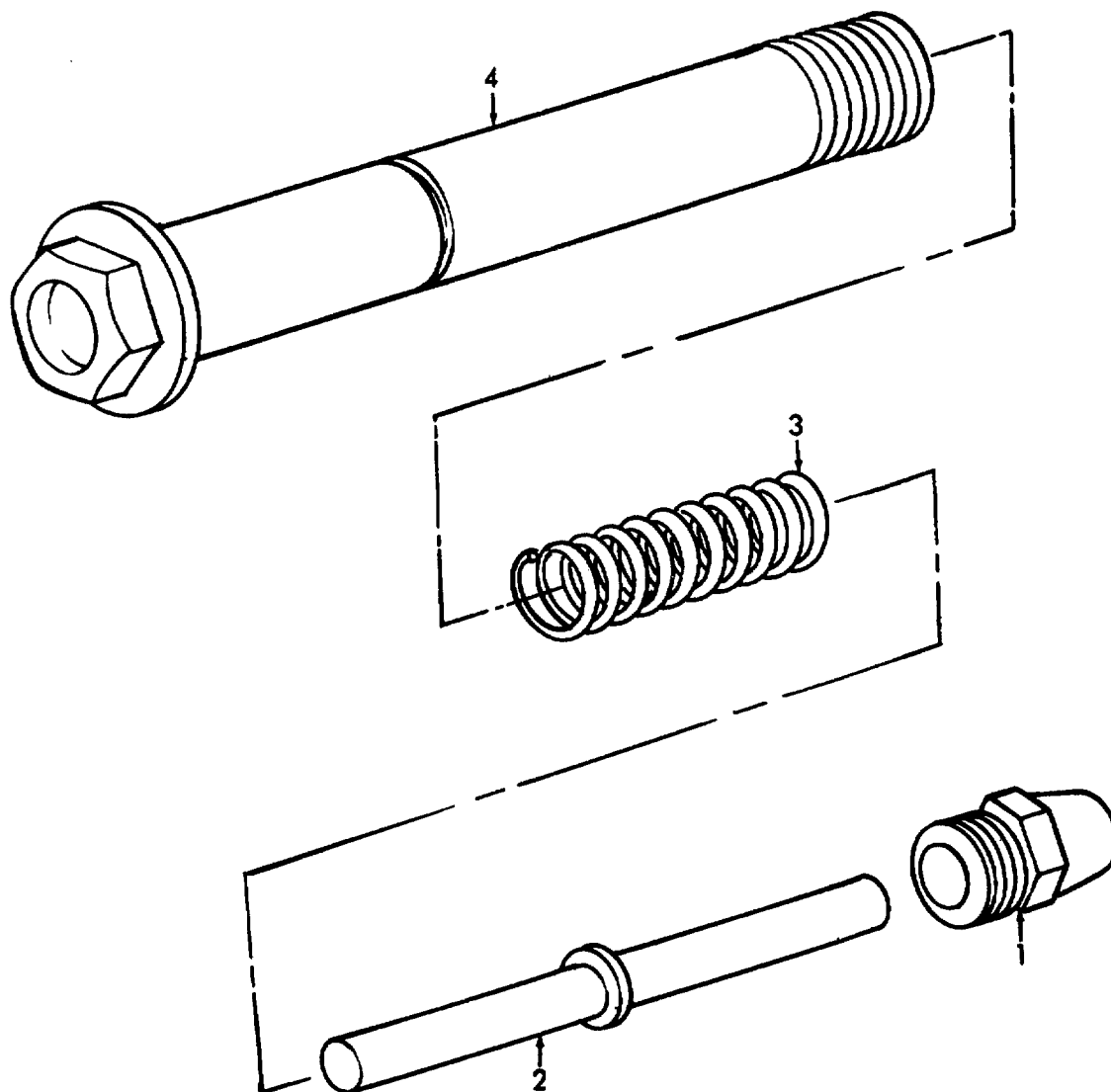


Figure 4-25. Holddown bolt, removal and installation.



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- 1. Nut
- 2. Plunger
- 3. Spring
- 4. Bolt

Figure 4-26. Holddown bolt assembly, disassembly and reassembly.

CHAPTER 5
DIRECT SUPPORT AND GENERAL SUPPORT
MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

5-1. Tools and Equipment

Refer to paragraph 4-6.

5-2. Special Tools and Equipment

Refer to paragraph 4-7.

5-3. Direct Support and General Support

Maintenance Repair Parts
 Direct Support and General Support maintenance repair parts are listed and illustrated in TM 5-5420-205-34P.

Section II. TROUBLESHOOTING

5-4. General

a. This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the superstructure end bay and interior bay. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine probable causes and corrective actions to take. You should perform the tests / inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

5-5. Direct Support and General Support Maintenance Troubleshooting

For direct support and general support maintenance troubleshooting, refer to table 5-1.

Table 5-1. Direct Support and General Support Maintenance Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. HYDRAULIC SYSTEM FAILS	Step 1. Inspect power take-off shaft and bearings. Step 2. Inspect hydraulic high pressure system for superstructure functions	Replace if necessary. (TM 5-5420-204-34 for models 2195-1 and 2195-2, or TM 5-5420-210-34 for models 2271 and 2272). Replace defective components.
2. RAMP (END BAY MODEL NO. 2195-2), OR RIGHT PINNING FUNCTION INTERIOR BAY MODEL NO. 2195-1) DOES NOT OPERATE	Step 1. Check continuity of switch S20. Step 2. Check for loose electrical lead or defective connector. Trace leads 655 to plug P66, and lead 655A to plug P119. Test for continuity.	Replace defective switch (TM 5-5420-204-34). Tighten loose lead on connector. Repair or replace defective lead (TM 5-5420-205-34).
3. RAMP (END BAY MODEL NO. 2271), OR RIGHT PINNING FUNCTION (INTERIOR BAY MODEL NO. 2272) DOES NOT OPERATE	Step 1. Check manual ramp/ right pinning valve.	Repair or replace defective valve (TM 5-5420-210-34).

Table 5-1. Direct Support and General Support Maintenance Troubleshooting -Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. CONTINUED		<p>Step 2. Check the pilot-operated check valve. Replace defective valve 7387 (para 4-15c).</p> <p>Step 3. Check the right pinning or ramp unfolding hydraulic cylinder. Replace defective cylinder (para 4-20).</p> <p>Step 4. Check quick-disconnect couplings. Replace defective coupling (figs. 4-19(1) and (2)).</p>
4. LEFT PINNING (DRIVE/RETRACT) FUNCTION INOPERATIVE (SUPERSTRUCTURE MODEL NOS. 2195-1 AND 2195-21).		<p>Step 1. Test continuity of switch S27. Replace defective switch (TM 5-5420-204-34).</p> <p>Step 2. Check for loose electrical lead or defective connector. Trace leads 654 to plug P67 and lead 654A to plug P120. Tighten loose lead or connector.</p> <p>Step 3. Test for continuity. Repair or replace defective lead (TM 5-5420-204-34).</p> <p>Step 4. Check solenoid valve or solenoid; test solenoid L16 and L17 receptacle for continuity. Operate manual control on end of solenoid; if solenoid valve does not operate, it must be replaced. Replace defective solenoid valve (TM 5-5420-204-34).</p> <p>Step 5. Check the holding valve. Replace defective valve.</p> <p>Step 6. Check the quick-disconnect coupling. Replace defective coupling (figs. 4-19(1) and(2)).</p> <p>Step 7. Check the pinning cylinder. Replace defective cylinder (para 4-20).</p>
5. LEFT PINNING (DRIVE/RETRACT) FUNCTION INOPERATIVE, (SUPERSTRUCTURE MODEL NOS. 2271 AND 2272).		<p>Step 1. Check manual pinning valve. Repair or replace valve (TM 5-5420-210-34).</p> <p>Step 2. Check flow control valve. Repair or replace valve (TM 5-5420-210-34).</p> <p>Step 3. Check quick disconnect coupling. Replace defective coupling (figs. 4-19(1) and(2)).</p> <p>Step 4. Check pinning cylinder. Replace defective cylinder (para 4-20).</p>
6. CURBING FUNCTION INOPERABLE (SUPERSTRUCTURE MODEL NOS. 2195-1 AND 2195-2).		<p>Step 1. Check continuity of switch S28. Replace defective switch (TM 5-5420-204-34).</p> <p>Step 2. Trace leads 653 to plug P68, and 653A to plug P117. Tighten loose lead or connector.</p> <p>Step 3. Test for continuity. Repair or replace defective lead (TM 5-5420-204-34).</p> <p>Step 4. Test solenoid L18 and L19 receptacle for continuity. Operate manual control on end of solenoid; if the solenoid valve does not operate, it must be replaced. Replace defective solenoid valve (TM 5-5420-204-34).</p> <p>Step 5. Check quick-disconnect coupling. Replace defective coupling (figs. 4-19(1) and(2)).</p> <p>Step 6. Check double pressure relief valve. Replace defective valve 2327 (TM 5-5420-204-34).</p> <p>Step 7. Check curbing hydraulic cylinders. Replace defective cylinder (para 4-18).</p>
7. CURBING FUNCTION INOPERABLE (SUPERSTRUCTURE MODEL NOS. 2271 AND 2272).		<p>Step 1. Check manual curbing valve. Repair or replace valve (TM 5-5420-210-34).</p> <p>Step 2. Check quick-disconnect coupling. Replace defective coupling (figs. 4-19(1) and(2)).</p> <p>Step 3. Check valve restrictors (interior bay only). Replace defective valve restrictors 6076.</p>

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

7. CONTINUED

Step 4. Check pilot operated check valve (end bay).

Replace defective pilot operated check valve (para 4-15b).

Step 5. Check curbing hydraulic cylinders.

Replace defective cylinder (para 4-18).

8. SUPERSTRUCTURE WILL NOT ROTATE (SUPERSTRUCTURE MODEL NOS. 2195-1 AND 2195-2).

Step 1. Check continuity of switch S29.

Replace defective switch (TM 5-5420-204-34).

Step 2. Trace lead 652 to plug P63 and lead 652A to plug P118.

Tighten loose lead or connector.

Step 3. Test for continuity.

Repair or replace defective lead (TM 5-5420-204-34).

Step 4. Test solenoid L22 and L23 receptacle for continuity. Operate manual control on end of solenoid; if the solenoid valve does not operate, it must be replaced.

Replace defective solenoid valve (TM 5-5420-204-341).

Step 5. Check flow control valve.

Replace defective valve 2639-5 or 2639-6 (TM 5-5420-204-34).

Step 6. Check double relief valve.

Replace defective valve 2327 (TM 5-5420-204-34).

Step 7. Check rotation cylinder.

Replace defective cylinder (para 4-19).

Step 8. Check quick-disconnect coupling.

Replace defective coupling (figs. 4-19(1) and 4-19(2)1).

9. SUPERSTRUCTURE WILL NOT ROTATE (SUPERSTRUCTURE MODEL NOS. 2271 AND 22721).

Step 1. Check flow regulation valves.

Repair or replace defective valve 8516 or 8517 (TM 5-5420-210-34).

Step 2. Check manual rotation valve.

Repair or replace valve 7105 (TM 5-5420-210-34).

Step 3. Check quick-disconnect couplings.

Replace defective coupling (figs. 4-19(1) and 4-19(2)).

Step 4. Check rotation cylinder.

Replace defective cylinder (para 4-19).

10. SUPERSTRUCTURE WILL NOT ELEVATE (SUPERSTRUCTURE MODEL NOS. 2195-1 AND 2195-21).

Step 1. Check continuity of switch S30.

Replace defective switch (TM 5-5420-204-34).

Step 2. Trace lead 650 to lead 606A, and trace lead 650A to plug P122.

Tighten loose lead or connector.

Step 3. Test for continuity.

Repair or replace defective lead (TM 5-5420-204-34).

Step 4. Test solenoid L20 and L21 receptacle for continuity. Operate manual control on end of solenoid; if the solenoid valve does not operate, it must be replaced.

Replace defective solenoid valve (TM 5-5420-204-34).

Step 5. Check pilot-operated holding valve.

Replace defective valve 2640 (TM 5-5420-204-34).

Step 6. Check flow control valve.

Replace defective flow control valve 2639-4 (TM 5-5420-204-34).

Step 7. Check superstructure elevating cylinder.

Replace defective cylinder (TM 5-5420-204-34).

11. SUPERSTRUCTURE WILL NOT ELEVATE, (SUPERSTRUCTURE MODEL NOS. 2271 AND 22721).

Step 1. Check flow regulator valve.

Repair or replace valve 8613 (TM 5-5420-210-34).

Step 2. Check manual elevating valve.

Repair or replace defective valve 7103 (TM 5-5420-210-34).

Step 3. Check elevating cylinder.

Repair or replace cylinder 2880 (TM 5-5420-210-34).

Section III. MAINTENANCE OF BRIDGE LAUNCHING AND RETRIEVING EQUIPMENT

5-6. Pivot Pins, Pivot Bushings, and Locking Pins

When inspection determines that a pin should be replaced or a new bushing should be pressed in place, obtain the Federal stock number (TM 5-5420-204-25P for superstructure model nos. 2195-1 and 2195-2, or TM 5-5420-210-34P for superstructure model nos. 2271 and 2272), requisition part from stock, and install new part in reverse order of removal.

5-7. Cylinder Bracket and Support

Refer to figure 4-13 for removal and installation of the cylinder bracket and support.

5-8. Rotation Assembly Spline

a. The end bay and interior bay superstructures have a female spline which fits over the male spline of the rotation assembly post on the upper center portion of the transporter. The male splines are bolted to the center post (TM 5-5420-204-35 for

superstructure model nos. 2195-1 and 2195-2; TM 5-5420-210-34 for superstructure model nos. 2271 and 2272). Refer to figure 4-13(1) for removal and installation of the rotation assembly spline.

b. If visual inspection indicates damage or wear of either male or female spline, obtain the FSN from TM 5-5420-204-34P for superstructure model nos. 2195-1 and 2195-2, or TM 5-5420-210-20P for model nos. 2271 and 2272 and replace the male spline (S). If the female spline is damaged, refer to TM 5-5420-205-24P for the FSN of the rotation assembly and requisition new part from stock.

NOTE

Because of the high pressure involved, it is recommended that if one spline is damaged, all four splines of the male center post and a new female rotation assembly be installed.

CHAPTER 6 REPAIR INSTRUCTIONS

Section I. HYDRAULIC SYSTEM REPAIR

6-1. General

a. This section contains repair instructions for the curbing, rotating, pinning and ramp unfolding cylinder assemblies, and fabrication of hydraulic line assemblies.

b. Refer to paragraph 1-8b (5) through (12) for cylinder tabulated data, and to paragraph 2-2 for purpose and function of the cylinder assemblies.

6-2. Curbing, Rotating, Pinning, and Ramp Unfolding Cylinder

a. *Removal and Installation.* Refer to paragraphs 4-18, 4-19, 4-20, and 4-21 for removal and installation of the curbing, rotating, pinning, and ramp unfolding cylinders.

b. *Disassembly and Reassembly.* Refer to figure 6-1, 6-2, 6-3, and 6-4 for disassembly and reassembly of the curbing, rotating, pinning, and ramp unfolding cylinders.

c. *Inspection and Repair.*

(1) Inspect piston and rings for scoring, wear, or chipping. Replace a defective piston or ring.

(2) Inspect cylinder for abrasion, scoring, dents or cracks. Replace a defective cylinder.

(3) Inspect rod bushing, cylinder head, cylinder cap, and scraper retainer plate for wear, scoring, nicks,

dents, and cracks. Replace parts as required.

(4) Check alignment of piston rod and inspect ends for damage or defective threads.

(5) Make sure piston rings are properly installed. The curbing cylinder piston rings (15, fig. 6-1), the pinning cylinder ring (14, fig. 6-3) and the ramp unfold cylinder ring (15, fig. 6-4), are installed with the "UP" side towards the rod end of the cylinder. Install the outer ring (11, fig. 6-2) of the rotation cylinder piston with the "UP" side toward each end of the cylinder.

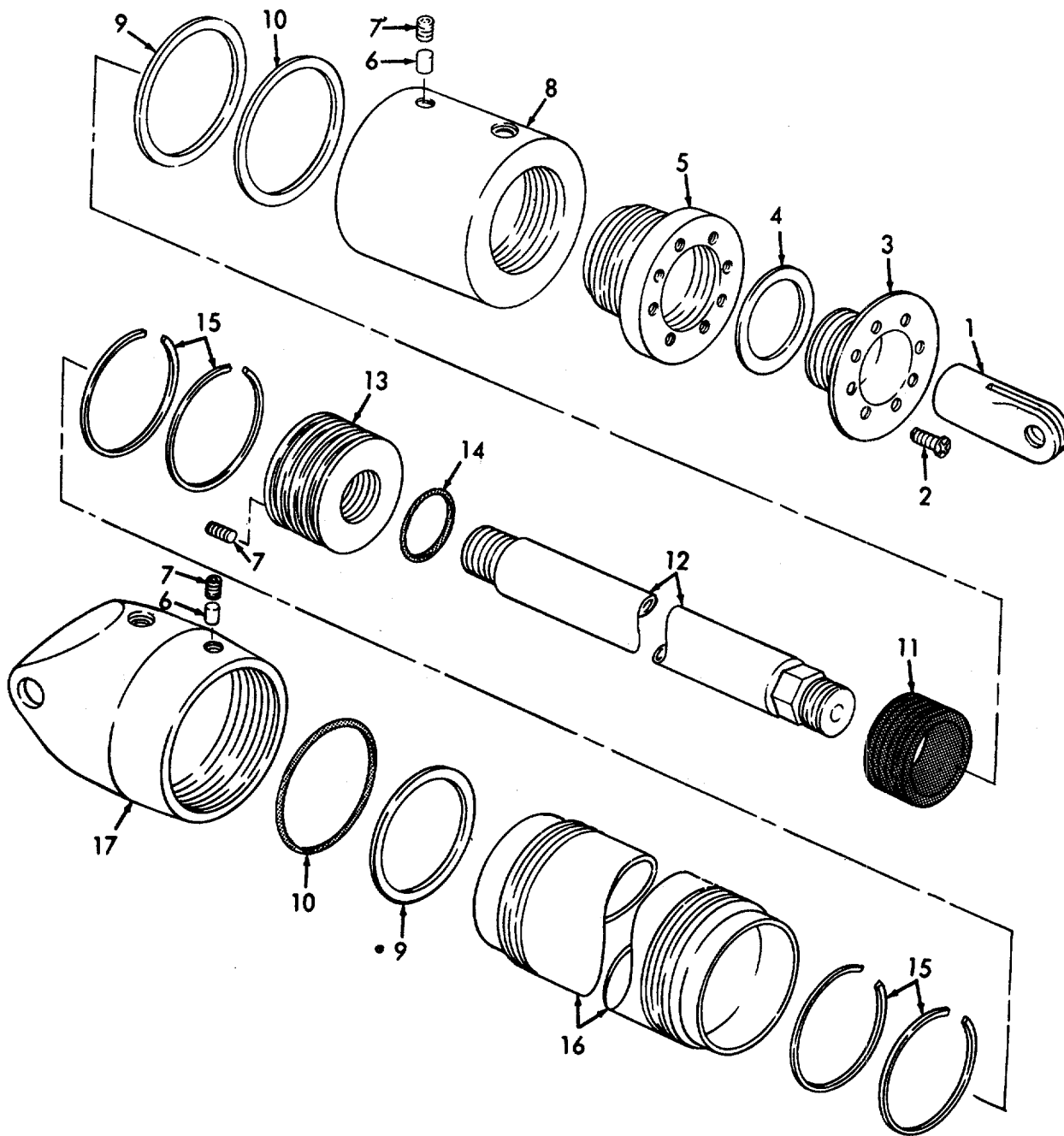
(6) Inspect to determine if ramp and rotation cylinder head and cylinder cap have port alignment within 5 degrees.

(7) Inspect ramp cylinder female eye bushing. If defective, press in new bushing and machine as per specification MIL-T-704, Type B.

(8) Inspect rotation cylinder ball check valves and needle valves. Replace defective valves.

(9) Inspect rotation cylinder female eye. Replace if defective.

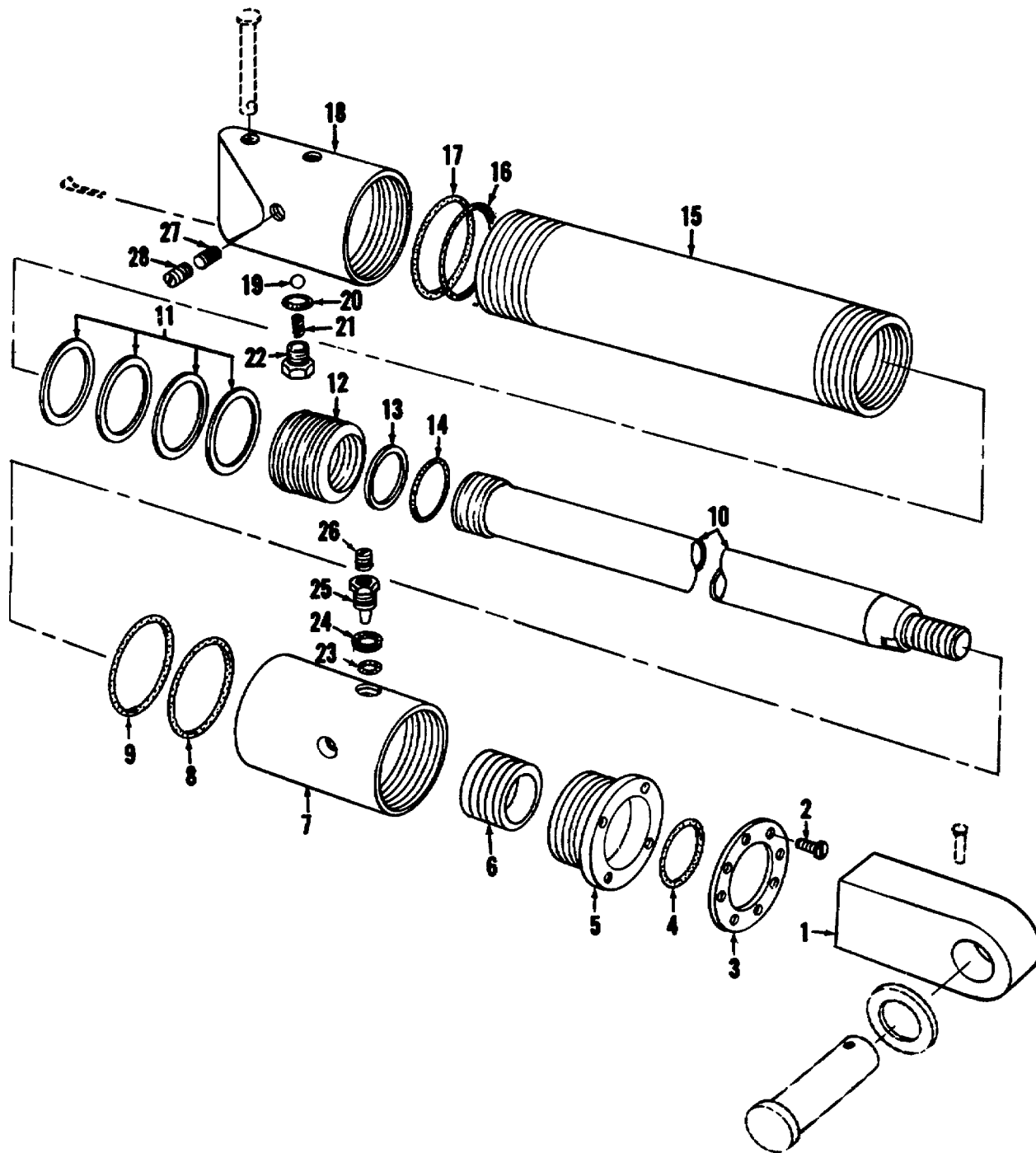
(10) Inspect female eye in rotation cylinder cap. Replace cap assembly if defective.



ME 5420-205-14/6-1

- | | | |
|------------|-------------|-------------|
| 1. Clevis | 7. Setscrew | 13. Piston |
| 2. Screw | 8. Head | 14. Packing |
| 3. Plate | 9. Retainer | 15. Ring |
| 4. Plate | 10. Packing | 16. Tube |
| 5. Bushing | 11. Packing | 17. Cap |
| 6. Plug | 12. Rod | |

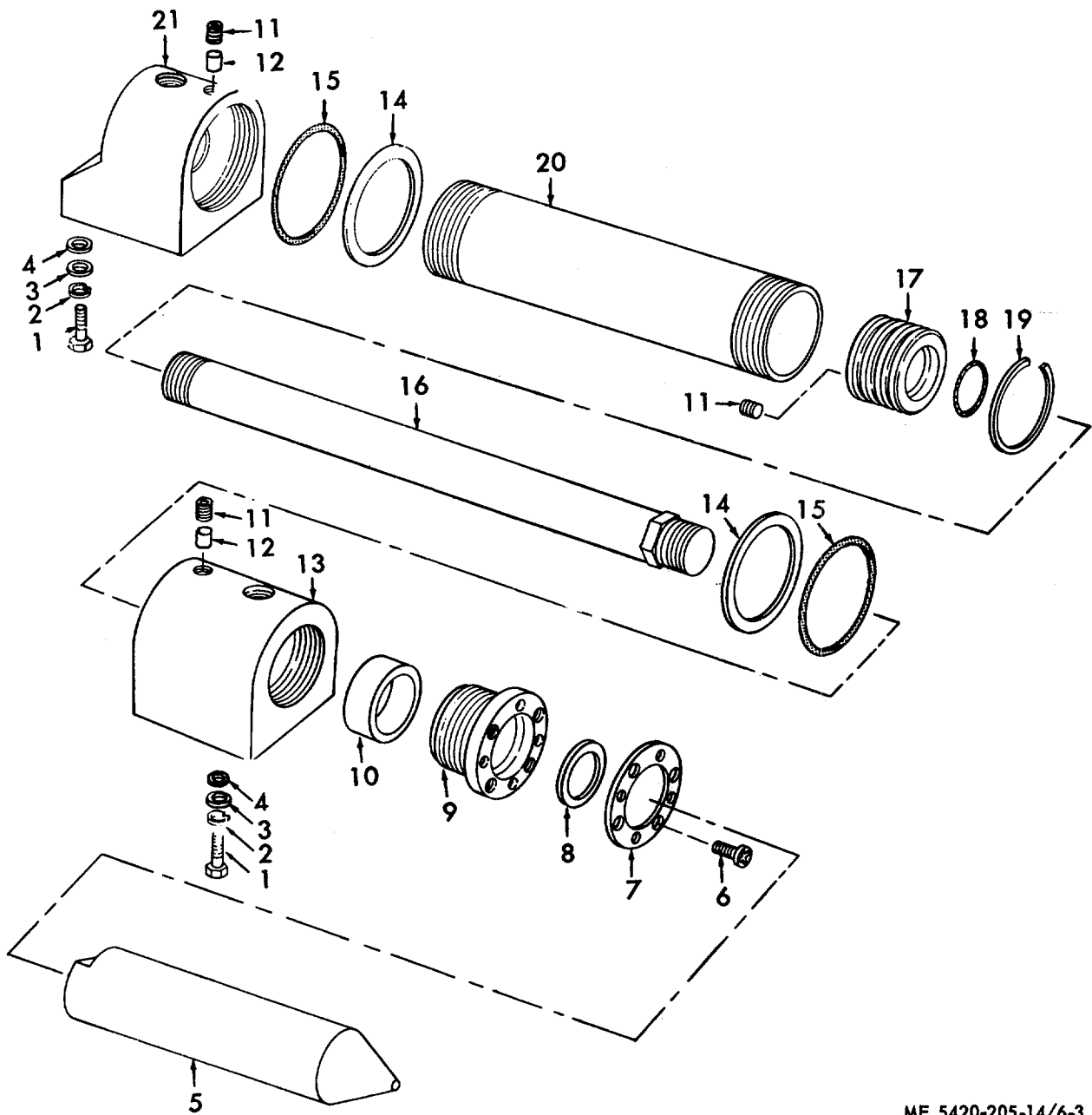
Figure 6-1. Curbing cylinder, disassembly and reassembly.



ME 5420-205-14/6-2

- | | | | |
|-------------|-------------|--------------|--------------|
| 1. Eye | 8. Packing | 15. Tube | 22. Plug |
| 2. Screw | 9. Packing | 16. Packing | 23. Packing |
| 3. Retainer | 10. Rod | 17. Packing | 24. Packing |
| 4. Ring | 11. Ring | 18. Cap | 25. Retainer |
| 5. Bushing | 12. Piston | 19. Ball | 26. Setscrew |
| 6. Head | 13. Packing | 20. Packing | 27. Plug |
| 7. Retainer | 14. Packing | 21. Setscrew | 28. Setscrew |

Figure 6-2. Rotation of cylinder, disassembly and reassembly.

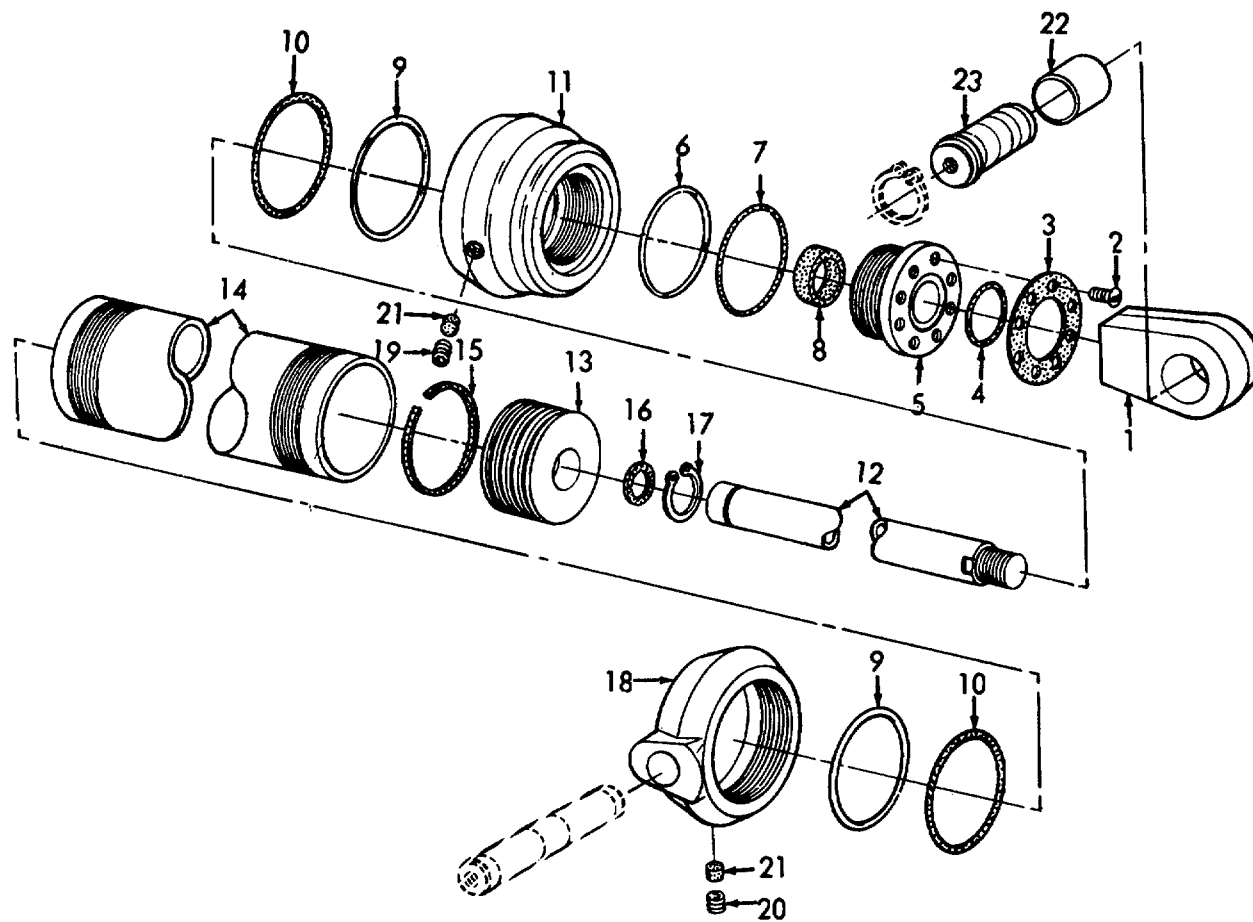


ME 5420-205-14/6-3

Figure 6-3. Pinning cylinder, disassembly and reassembly.

KEY to figure 6-3.

- | | | |
|---------------|--------------|-------------|
| 1. Setscrew | 8. Washer | 15. Packing |
| 2. Lockwasher | 9. Bushing | 16. Rod |
| 3. Washer | 10. Packing | 17. Piston |
| 4. Washer | 11. Setscrew | 18. Packing |
| 3. Pin | 12. Plug | 19. Ring |
| 6. Screw | 13. Head | 20. Tube |
| 7. Plate | 14. Washer | 21. Head |



ME 5420-205-14/6-4

- | | | |
|------------|-------------|--------------|
| 1. Eye | 9. Washer | 17. Retainer |
| 2. Screw | 10. Packing | 18. Cap |
| 3. Plate | 11. Head | 19. Setscrew |
| 4. Ring | 12. Rod | 20. Setscrew |
| 5. Bushing | 13. Piston | 21. Plug |
| 6. Packing | 14. Tube | 22. Bushing |
| 7. Ring | 15. Ring | 23. Pin |
| 8. Packing | 16. Packing | |

Figure 6-4. Unfolding mechanism hydraulic cylinder, disassembly and reassembly.

6-3. Hydraulic Cylinder Testing

a. *General.* Following repair, hydraulic cylinders shall be tested as described below. The tests should be conducted at an ambient air temperature of from plus 40°F. to plus 90°F. and a hydraulic fluid temperature of plus 40°F. to plus 150°F. at the pump discharge.

NOTE

Hydraulic oil conforming to MIL-L-10295 shall be used. and tests conducted in the order specified.

b. *Curbing, Rotation, and Pinning Cylinders Proof Pressure.*

(1) Cycle each cylinder with the piston unrestrained through not less than five complete cycles to demonstrate operation, stroke, and adjustment.

(2) Place each cylinder in a suitable test frame so that the cylinder piston is restrained from bearing against either cylinder head.

(3) Connect the rod-end port and the cap-end port of cylinder to a common hydraulic line so that both ends of cylinder will be pressurized simultaneously.

(4) Apply a hydraulic proof pressure of 7,000 psi to cylinder for five minutes.

(5) Evidence of leakage, damage, or inability to cycle as required, shall constitute failure of this test.

c. *Unfolding Cylinder Proof Pressure.*

(1) Cycle each cylinder with piston unrestrained through not less than five complete cycles to demonstrate operation, stroke, and adjustment.

(2) Place each cylinder on a suitable test frame, so that cylinder piston is restrained from bearing against either cylinder head.

(3) Connect rod-end port and cap-end port of cylinder to a common hydraulic line so that both ends of cylinder will be pressurized simultaneously.

(4) Apply hydraulic proof pressure of 12,000 psi to cylinder for five minutes.

(5) Evidence of leakage, damage, or inability to cycle as required, constitutes failure of this test.

d. *Curbing, Rotating, and Pinning Cylinders Internal Leakage.*

(1) Connect each curbing, rotating, and pinning cylinder to a hydraulic system and place

cylinder on a horizontal position with ports face up. The piston shall be unrestrained and cycled not less than 12 times to purge system of air.

(2) Insert cylinder in a suitable test frame or fixture so that piston is restrained from bearing against either cylinder head.

(3) Insert a graduated transparent tube of either plastic or glass, and fasten it vertically to the cap-end cylinder port in such a manner as to prevent leakage. One end of the tube shall be open to atmosphere temperature.

(4) Apply a 3,000 psi fluid pressure and maintain this pressure in the cylinder at rod end. Allow fluid bypassing piston to enter and collect in the vertical tube.

(5) Measure rise of fluid level during a period of not less than three minutes to determine the rate of internal leakage.

(6) Repeat the test on the other side of the cylinder after reversing the pressurized and plugged ports.

(7) Internal leakage rate past the piston at 3,500 psi for rotation, curbing, and pinning cylinders shall not exceed three fluid ounces per minute, using MIL-L-10295 hydraulic oil.

(8) Leakage in excess of the above rates constitutes failure of this test.

e. *Unfolding Cylinder Internal Leakage.*

(1) Test each unfolding cylinder as in d above, except that the rate of leakage shall be measured from one end of the cylinder only.

(2) Apply an 8,000 psi pressure at the rod-end port, and permit hydraulic fluid passing the pressurized piston to collect in a tube inserted in the cap-end port.

(3) The rate of internal leakage past the piston at 8,000 psi shall not exceed 8 fluid ounces per minute, using MIL-L-10295 hydraulic oil.

6-4. Fabrication of Hydraulic Lines

For fabrication of hydraulic lines using high pressure tubing and fittings, refer to TM 5-5420-204-12, Appendix B, for superstructure model nos. 2195-1 and 2195-2; refer to TM 5-5420-210-12, Appendix C, for model nos. 2271 and 2272.

Section II. ELECTRICAL SYSTEM CABLE ASSEMBLY REPAIR

6-5. General

The wiring harness of the end bays (model nos. 2195-2 and 2271), and interior bays (model nos. 2195-1 and 2272) consists of an intercom cable, connectors and mounting hardware as shown in figure 4-17, 4-18(1) and 4-18(2).

The intercom cabling starts with a quick-disconnect coupling at the base of the rotation cylinder on the transporter deck. The cabling is then routed through a flexible metal conduit to the junction box. The junction box contains a wye connection in interior bay model no. 2195-1, and a terminal board in interior bay model

no. 2272. From the junction box the intercom cable is routed (through pipes, clamps, etc.) to a dummy receptacle at one end of the interior bay superstructure as shown in figure 8 of TM 5-5420-205-24P.

frayed cable which could cause grounding. Refer to figures 4-17, 4-18(1), and 4-18(2) for removal of intercom components. Install new cable as determined by continuity check, and reassemble components in reverse order of disassembly. Tighten all connectors securely.

6-6. Cable Assembly Repair

If reception is faulty, inspect for loose RF connection, or a

Section III. SUPERSTRUCTURE REPAIR

6-7. Superstructures

Like the transporter, the MAB superstructures have been designed of high-strength materials to make efficient use of material with a minimum of weight. This design has resulted in a composite construction which uses various high-strength steel and aluminum alloy materials. Therefore, caution must be exercised to assure that all

superstructure repairs will provide high-strength characteristics equivalent to the original construction.

6-8. End Bay Superstructure Structural Description

a. The end bay superstructure is fabricated of the materials as listed in table 6-1 below:

Table 6-1. End Bay Superstructure Materials

Item description	Material and alloy	Welding repair recommended	Recommended weld filler material
(Tapered End Section)			
Girders	Aluminum 2014-T6	No	
Girders (nose section)	(Aluminum 5456-H-321	Yes	5356
Decking (bolted)	Aluminum 2014-T6	No	
Deck plate (welded at nose)	Aluminum 5083-H-112	Yes	5356
Pipe, 6" (at nose)	Aluminum 5456-H-112	Yes	5356
Hinge plates	Steel ASTM A441	Yes	AWS-ASTM E7000 Series
Curbs	Steel ASTM A441	Yes	AWS-ASTM E7000 Series
Curb support strut arms	Steel (Ends-ASTM A441)	Yes	AWS-ASTM E7000 Series
	(Tube- ASTM A519)	Yes	AWS-ASTM E7000 Series
Curb crank arms	Steel (ASTM A237, CL.B)	Yes	AWS-ASTM E7000 Series
Unfolding cylinder mounting structures	Steel (ASTM A441)	Yes	AWS-ASTM E7000 Series
Yoke assemblies	Steel (ASTM A441)	Yes	AWS-ASTM E7000 Series
Unfolding link and bars	Steel (ASTM A441)	Yes	AWS-ASTM E7000 Series
(Short End Section)			
Girders	Aluminum 2014-T6 No	No	
Decking (bolted)	Aluminum 2014-T6 No	No	
Hinge plates	Steel-A441	Yes	AWS-ASTM E7000 Series
Curbs	Steel-A441	Yes	AWS-ASTM E7000 Series
Curb support strut arms	(Ends-Steel-ASTM 441)	Yes	AWS-ASTM E7000 Series
	(Tube-Steel-ASTM A519)	Yes	AWS-ASTM E7000 Series

(Short End Section) Cont'd Curb crank arms	Steel-ASTM A237, CL.B	Yes	AWS-ASTM E7000 Series AWS-ASTM E7000 Series AWS-ASTM E7000 Series
Male and female end connectors	Steel-ASTM-A441	Yes	
Rotation spline assembly	Steel-ASTM A441	Yes	

b. The aluminum structural riveting used on both sections of the end-bay superstructure is of 7277-T4 aluminum alloy. These are large 3/4-inch diameter rivets which are hot-driven. Field replacement of these rivets by repair rivets is, therefore, not recommended. Rivets which have failed should be replaced by Grade 8, cadmium plated steel bolts, This grade and size of bolts should be torqued to about 275 foot-pounds to assure structural integrity.

c. Structural bolt replacement should be made with the same size and grade of bolts as are used in the original fabrication. That is, bolt heads with three radial markings are Grade 5, and those with six radial markings are of Grade 8 high-strength alloy steel.

6-9. Interior Bay Superstructure Structural Description

The interior bay superstructure is fabricated from the materials listed in Table 6-2 below:

Table 6-2. Interior Bay Superstructure Materials

Item description	Material and alloy	Welding repair recommended	Recommended weld filler material
Girders	Steel-ASTM A441	Yes	AWS or ASTM E7000 Series
Male and female end connectors	Steel-ASTM A441	Yes	AWS or ASTM E7000 Series
Curbs	Steel A441	Yes	AWS or ASTM E7000 Series
Curb support strut arms	Steel (Ends-ASTM-A441)	Yes	AWS or ASTM E7000 Series
Curb crank arms		Yes	AWS or ASTM E7000 Series
Rotation spline assembly		Yes	AWS or ASTM E7000 Series

6-10. Steel Repair of Superstructures by Welding

The structural steel used in the superstructure is high-strength low alloy structural steel with a tensile strength of 70,000 psi. Covered low alloy steel arc-welding electrodes recommended for satisfactory weld repairs are identified as AWS or ASTM E7000 series. These electrodes are identified in the military number series as "MIL-7000". These electrodes are manufactured with various covering materials for varying welding positions, and for AC and DC straight and reverse polarities. To protect against severe weakening of the weld due to hydrogen effects, it is necessary to assure that the electrode coverings have not absorbed excess moisture during their storage. Consult the applicable procedures for the specified welding equipment and material being used. The repair weld soundness should be verified as the

welds are highly stressed during MAB bridging and ferrying operations.

6-11. Aluminum Repair of Superstructures by Welding

The only aluminum areas of the superstructures, for which repairs by welding are recommended, are in the nose structure of the tapered section of the end-bay. Refer to the tabulation under "End-Bay Superstructure Structural Description" for the Alloy identifications and recommended weld filler materials. Good welding techniques, if utilized in this area, can produce structural repair equivalence if the weld size, penetration, fusion, and absence of porosity are controlled.

6-12. Refinishing and Repainting

a. The MAB transporter superstructure equipment are painted in accordance with Military Specification MIL-T-704., Type B, which uses

phenolic coatings. These procedures include a phenolic pretreatment primer and intermediate coating, and a lusterless phenolic enamel finish coat. Painting procedures prescribed for this paint system should be followed as applicable for repainting repaired areas. A clean, oil-free surface is the primary key to a successful paint application.

b. The deck, floor boards, ladder, and other main walkway surfaces have been coated with a nonskid walkway compound to help prevent personnel falls and injuries. Such areas should be maintained with reapplication, as necessary, of walkway compound, nonslip, MIL-W-5044, type II.

APPENDIX A

REFERENCES

A-1. Fire Protection		
	TB 5-4200-201-10	Hand Portable Fire Extinguishers for Rail, Marine, Amphibious, and Off-road Equipment.
A-2. Lubrication		
	C9100IL	Fuels, Lubricants, Oils, and Waxes.
	LO 5-5420-205-15	Superstructure, Interior Bay and Superstructure, End Bay, Components of Mobile Floating Assault Bridge-Ferry Unit.
	LO 5-5420-204-12	Transporter, Mobile Floating Assault Bridge-Ferry Unit w/Engine (Detroit Diesel Model 8V-71 (7083-7299).
	LO 5-5420-210-12-1 thru -6	Transporter Welded Hub for Mobile Floating Assault Bridge-Ferry
A-3. Painting		
	AR 740-1	Color, Marking, and Preparation of Equipment for Shipment
	AR 746-5	Color and Marking of Army Materiel
	TM 9-213	Painting Instructions for Field Use
A-4. Maintenance		
	TM 5-5420-204-12	Operator and Organizational Maintenance Manual: Transporter, Mobile Floating Assault Bridge/Ferry (FMC Corporation Model BF-FMC-1) FSN 5420-877-8679; Component of Interior Bay Unit, FSN 5420-010-5191; Component of End Bay Unit, FSN 5420-010-5192
	TM 5-5420-204-35	Direct and General Support and Depot Maintenance Manual: Transporter, Mobile Floating Assault Bridge/Ferry (FMC Corporation Model BF-FMC-1) FSN 5420-877-8679, Component of Interior Bay Unit, FSN 5420-010-5191, Component of End Bay Unit, FSN 5420-010-5192
	TM 5-5420-204-20P	Organizational Maintenance Repair Parts and Special Tools Lists: Transporter, Mobile Floating Assault Bridge/Ferry (FMC Corporation Model BF-FMC-1) FSN 5420-877-8679, Component of Interior Bay Unit FSN 5420-010-5191, Component of End Bay Unit FSN 5420-010-5192
	TM 5-5420-204-35P	Direct and, General Support and Depot Maintenance Repair Parts and Special Tools Lists: Transporter, Mobile Floating Assault Bridge / Ferry (FMC Corporation Model BF-FMC-1) FSN 5420-877-8679, Component of Interior Bay Unit, FSN 5420-010-5191; Component of End Bay Unit, FSN 5420-010-5192

TM 5-5420-205-24P

Operator, Organizational, Direct and General Support Maintenance Repair Parts and Special Tools List: Superstructure Interior Bay, Mobile Floating Assault Bridge/ Ferry, FSN 5420-877-8682, Condec Corp. Model 2195-1, Component of Interior Bay Unit, FSN 5420-010-5191 and Superstructure End Bay, Mobile Floating Assault Bridge/Ferry, FSN 5420-877-8684, Condec Corp. Model -2195-2, Component of End Bay Unit, FSN 5420-010-5192.

TM 5-5420-210-12

Operator and Organizational Maintenance Manual; Transporter, Welded Hull, for Mobile Floating Assault Bridge-Ferry.

TM 5-5420-210-34

Direct Support and General Support Maintenance Manual, Transporter, Welded Hull, for Mobile Floating Assault Bridge-Ferry

TM 5-5420-210-20P

Organizational Maintenance Repair Parts and Special Tools List: Transporter, Welded Hull, for Mobile Floating Assault Bridge-Ferry

TM 38-750
TM 385-101

The Army Maintenance Management System Safety Use of Cranes, Crane Shovel, Dragline, and Similar Equipment Near Electric Power Lines

A-5. Shipment and Storage

TB 740-97-2

Preservation of USAMECOM Mechanical Equipment

TM 740-90-1

Administrative Storage of Equipment

A-6. Demolition

TM 750-244-3
TM 9-237

Destruction of Materiel to Prevent Enemy Use
Welding; Theory and Operation

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions or explanatory notes for a particular maintenance function.

B-2. Explanation of Columns in Section II

a. *Column (1), Group Number.* A number is assigned to each group in a top down breakdown sequence. The applicable groups are listed on the MAC in disassembly sequence beginning with the first group removed.

b. *Column (2), Functional Group.* This column contains a brief description of the components of each numerical group.

c. *Column (3), Maintenance Functions.* This column lists the various maintenance functions (A through K). The lowest maintenance level authorized to perform these functions is indicated by a symbol in the appropriate column. Work measurement time standards (the active repair time required to perform the maintenance function) are shown directly below the symbol identifying the maintenance level. The symbol designations for the various maintenance levels are as follows:

- C-Operator or crew
- O-Organization maintenance
- F-Direct support maintenance
- H-General support maintenance
- D-Depot maintenance

The maintenance functions are defined as follows:

A. *Inspect:* To determine serviceability of an item by comparing its physical, mechanical, and

electrical characteristics with established standards through examination.

B. *Test:* To verify serviceability- and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

C. *Service:* Operations required periodically to keep an item in proper operating condition, i.e., to clean, to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

D. *Adjust:* To maintain within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

E. *Align:* To adjust specified variable elements of an item to bring about optimum or desired performance.

F. *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

G. *Install:* The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

H. *Replace:* The act of substituting a serviceable like type part, subassembly, or module (component or assembly); for an unserviceable counterpart.

I. *Repair:* The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

J. *Overhaul:* That maintenance effort (service/action) necessary to restore an item to a

completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publication. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

K. Rebuild: Consists of those services/ actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurement (hours/miles, etc.) considered in classifying Army equipment / components.

d. Column (4). Tools and Equipment. This column is provided for referencing by code the special tools and test equipment (sec III) required to perform the maintenance functions (sec II).

e. Column (5). Remarks. This column is provided for referencing by code the remarks (sec IV) pertinent to the maintenance functions.

B-3. Explanation of Columns in Section III

a. Reference Code. This column consists of a number and a letter separated by a dash entered

from column (4) on the MAC. The number references the special tools and test equipment requirements and the letter represents the specific maintenance function the item is to be used with. The letter is representative of columns A through K on the MAC.

b. Maintenance Category. This column shows the lowest level of maintenance authorized to use the special tools or test equipment.

c. Nomenclature. This column lists the name or identification of the tools or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number, or Federal stock number of tools and test equipment.

B-4. Explanation of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash, entered from column (5), section II. The first letter references the remark and the second letter references a maintenance function, column (3), A through K, to which the remark applies.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as indicated on the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional group	(3) Maintenance functions										(4) Tools and equipment	(5) Remarks				
		A	B	C	D	E	F	G	H	I	J			K			
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul			Rebuild			
01	DATA PLATES																
	Plates, data	C 0.1							O 0.2								
	Plates, instruction	C 0.1							O 0.2								
02	HYDRAULIC SYSTEM																
	Fittings, hose, tubing	O 0.1							O 0.5	H 1.0							
	Valve check	O 0.1							O 0.5								
	Valve, counterbalance	O 0.1							O 0.4								
	Seal	O 0.1							O 0.8								
	Cylinder assembly, curbing	O 0.1							O 0.6	F 1.0	D 1.5						A-I
	Cylinder assembly, rotating	O 0.1							O 0.6	F 1.0	D 1.5						A-I
	Cylinder assembly, pinning	O 0.1							O 0.6	F 1.0	D 1.5						A-I
	Cylinder assembly, ramp	O 0.1							O 0.8	F 1.2	D 2.5						A-I

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks			
		A	B	C	D	E	F	G	H	I	J	K					
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild					
03	ELECTRICAL SYSTEM																
	Cable assembly, electrical		O 0.4						O 0.5	F 1.0							
	Receptacle	O 0.1							O 0.5								
	Gasket	O 0.1							O 0.3								
	Conduit								O 1.0	O 1.5							
	Junction box	O 0.1							O 0.6								
04	FRAME ASSEMBLY	O 0.2							F 2.0								
05	BRIDGE LAUNCHING AND RETRIEVING EQUIPMENT																
	Bracket, quick disconnect connector	C 0.1							O 0.5								
	Bracket, support and cylinders	C 0.2							F 0.8	F 1.5							
	Decking	C 0.1							O 1.0								
	Curbing mechanism end and interior bay								O 0.5	F 1.5							
	Joints, guide and hinge	C 0.2							O 0.5								
	Pin, yoke	C 0.1							O 0.5								
	Rotation assembly	O 0.2		C 0.2					F 1.0	F 2.0							
	Bolt assembly, superstructure holddown								O 0.3	O 1.0							

Section III. SPECIAL TOOL AND EQUIPMENT REQUIREMENTS

Reference code	Remarks
X20	LINK ASSEMBLY CLAMP, P/N 13211E-3354 (19099)
X20	SLING ASSEMBLY, SUPERSTRUCTURE, P/N 13211E-3356 (19099)

Section IV. REMARKS

Reference code	Remarks
A-I	Repair of cylinder is limited to replacement of dirt wiper and rod seal only.

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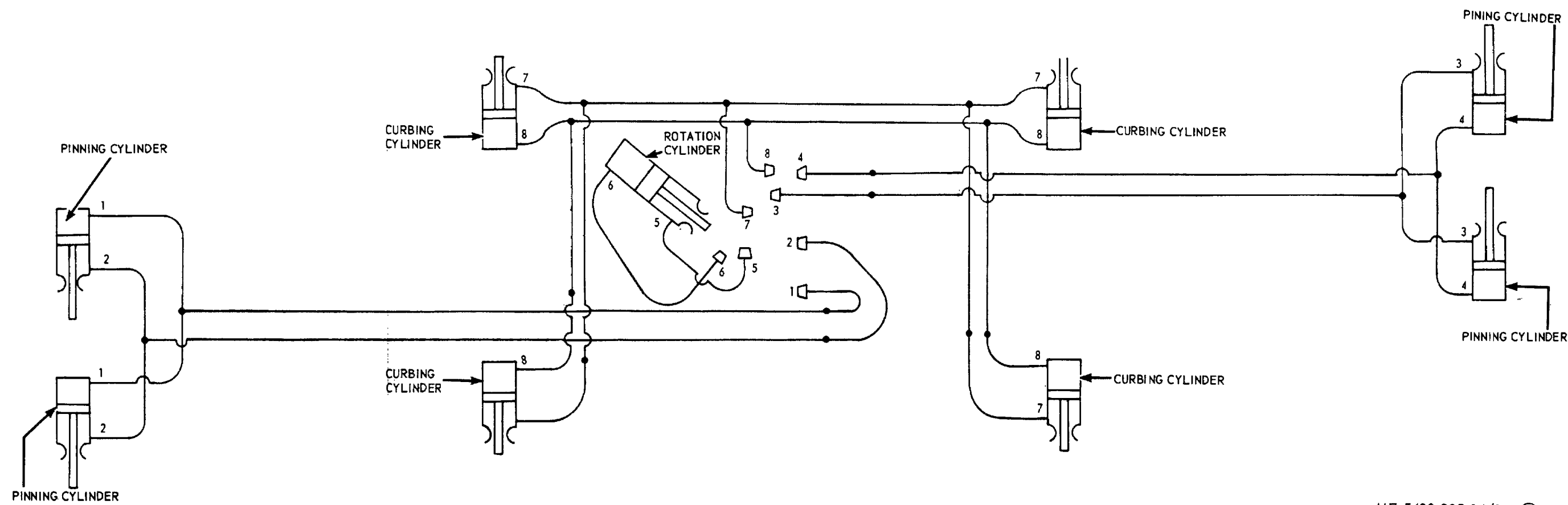
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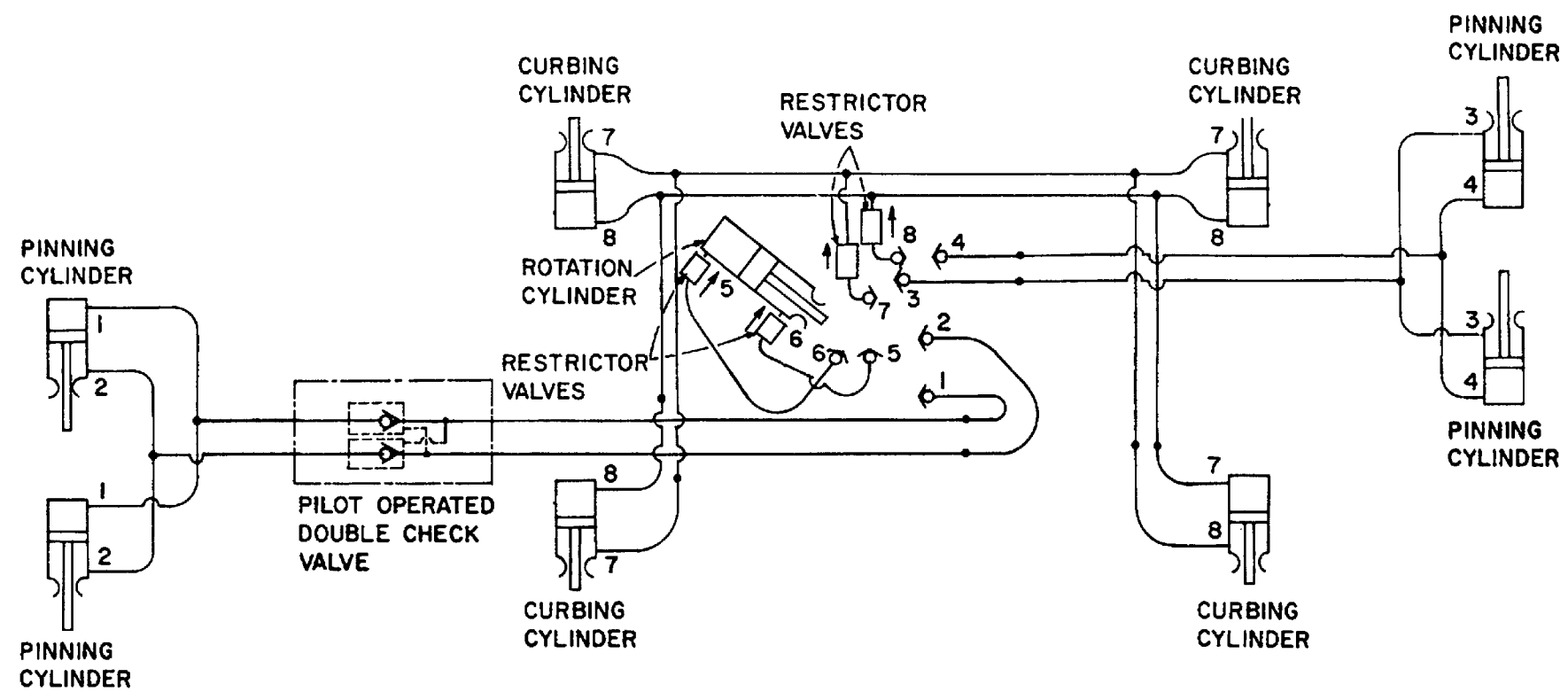
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ME 5420-205-14/1-3 ①

FO-1. Interior bay hydraulic diagram, model no. 2195-1. (sheet 1 of 2)

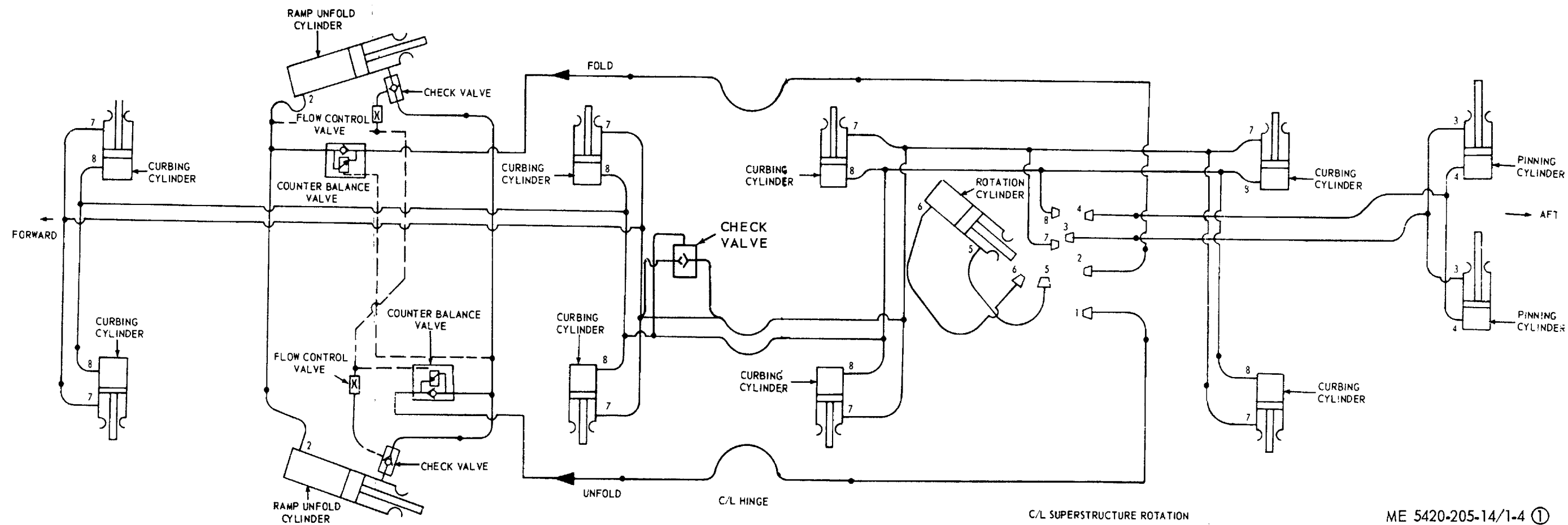
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ME 5420-205-14/1-3 ②

FO-1. Interior bay hydraulic diagram, model no. 2272. (sheet 2 of 2)

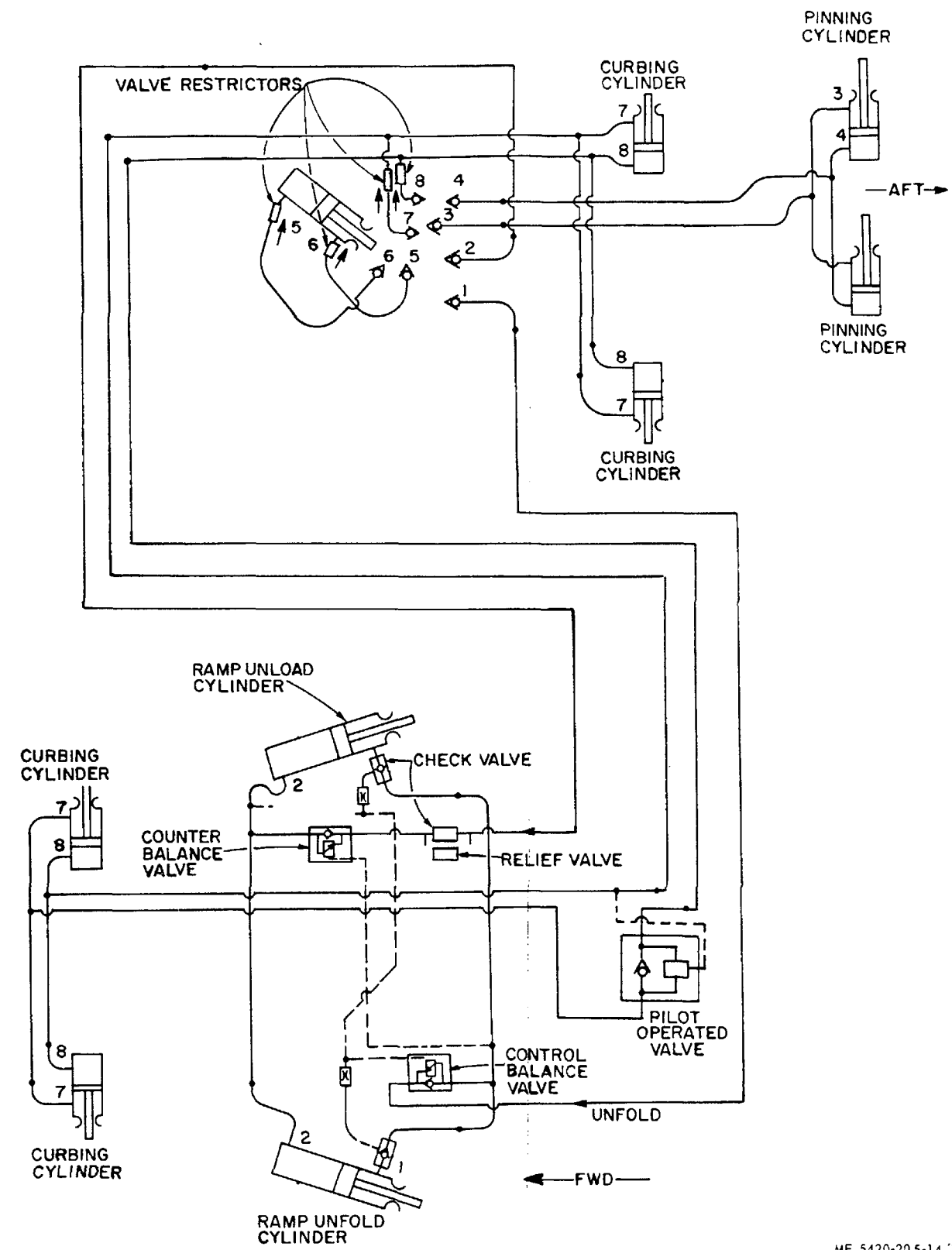
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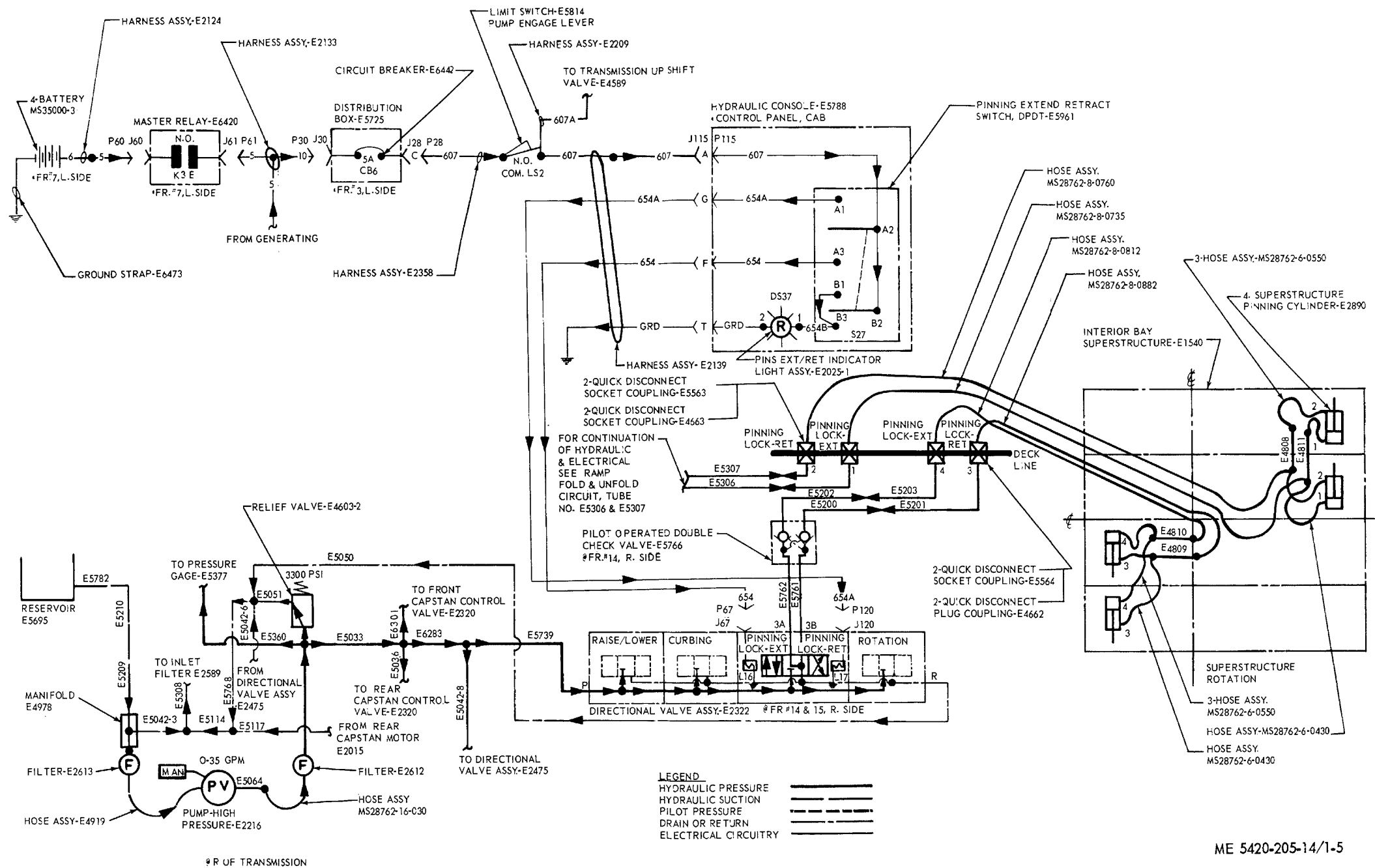
FO-2. End bay hydraulic diagram, model no. 2195-2. (sheet 1 of 2)

Figure FO-2 (1)



ME 5420-205-14 1-4 ②

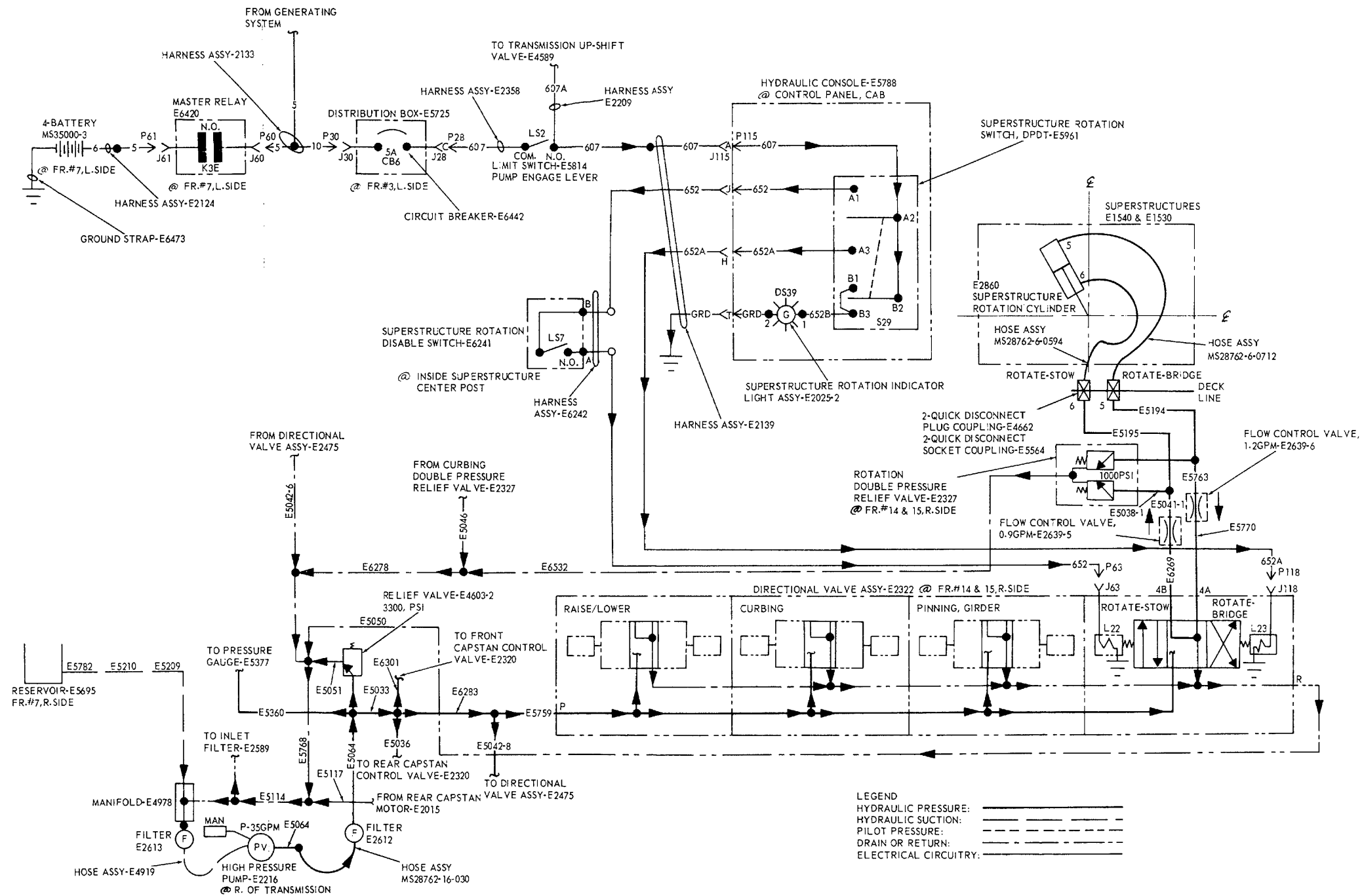
FO-2. End bay hydraulic diagram, model no. 2271. (sheet 2 of 2)
 Figure FO-2 (2)



FO-3. Electro-hydraulic functional schematic, interior bay superstructure, model no. 2195-1, girder pinning.

Figure FO-3

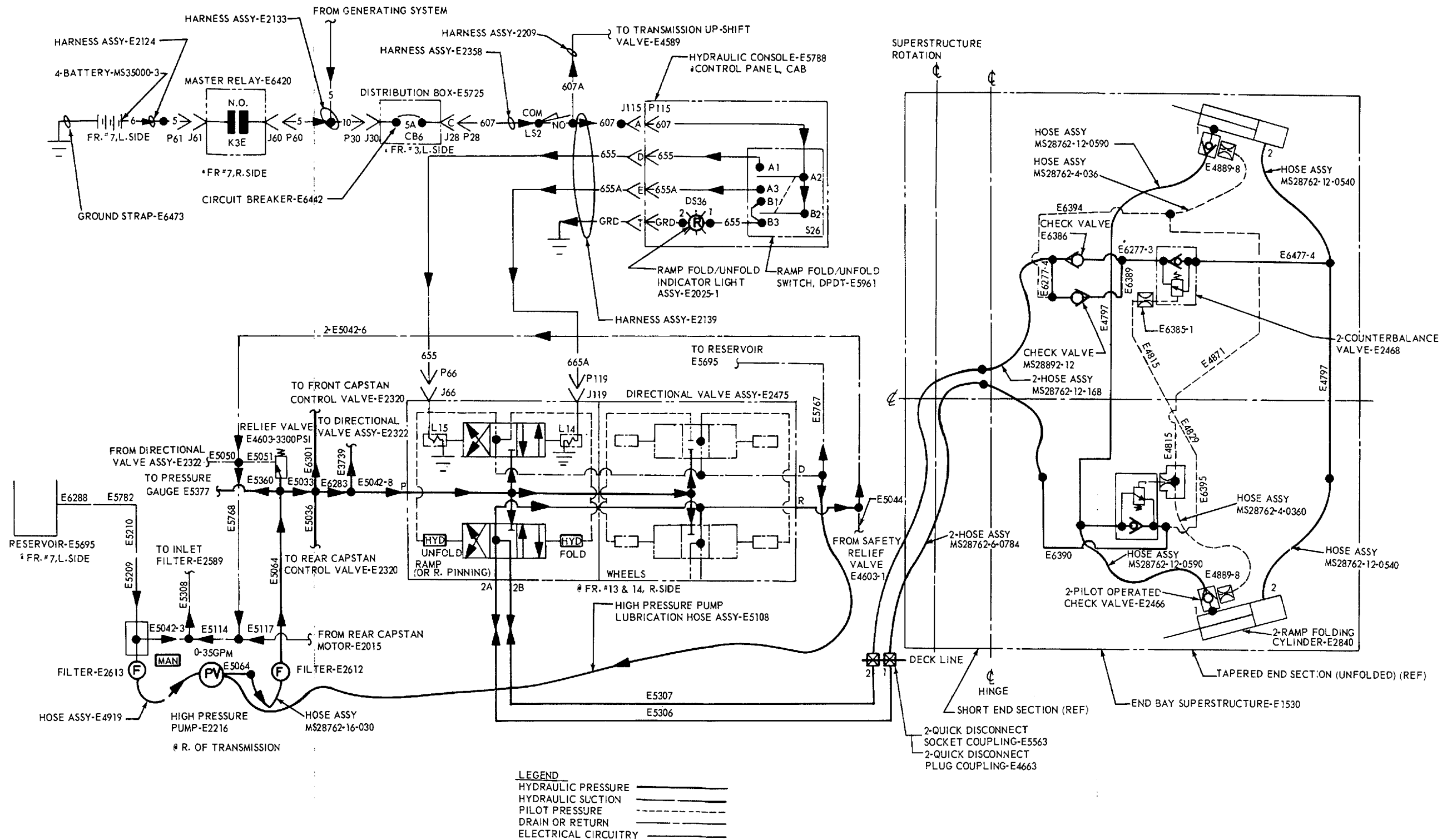
ME 5420-205-14/1-5



ME 5420-205-14/1-6

FO-4. Electro-hydraulic functional schematic, superstructure rotation, model nos. 2195-1 and 2195-2.

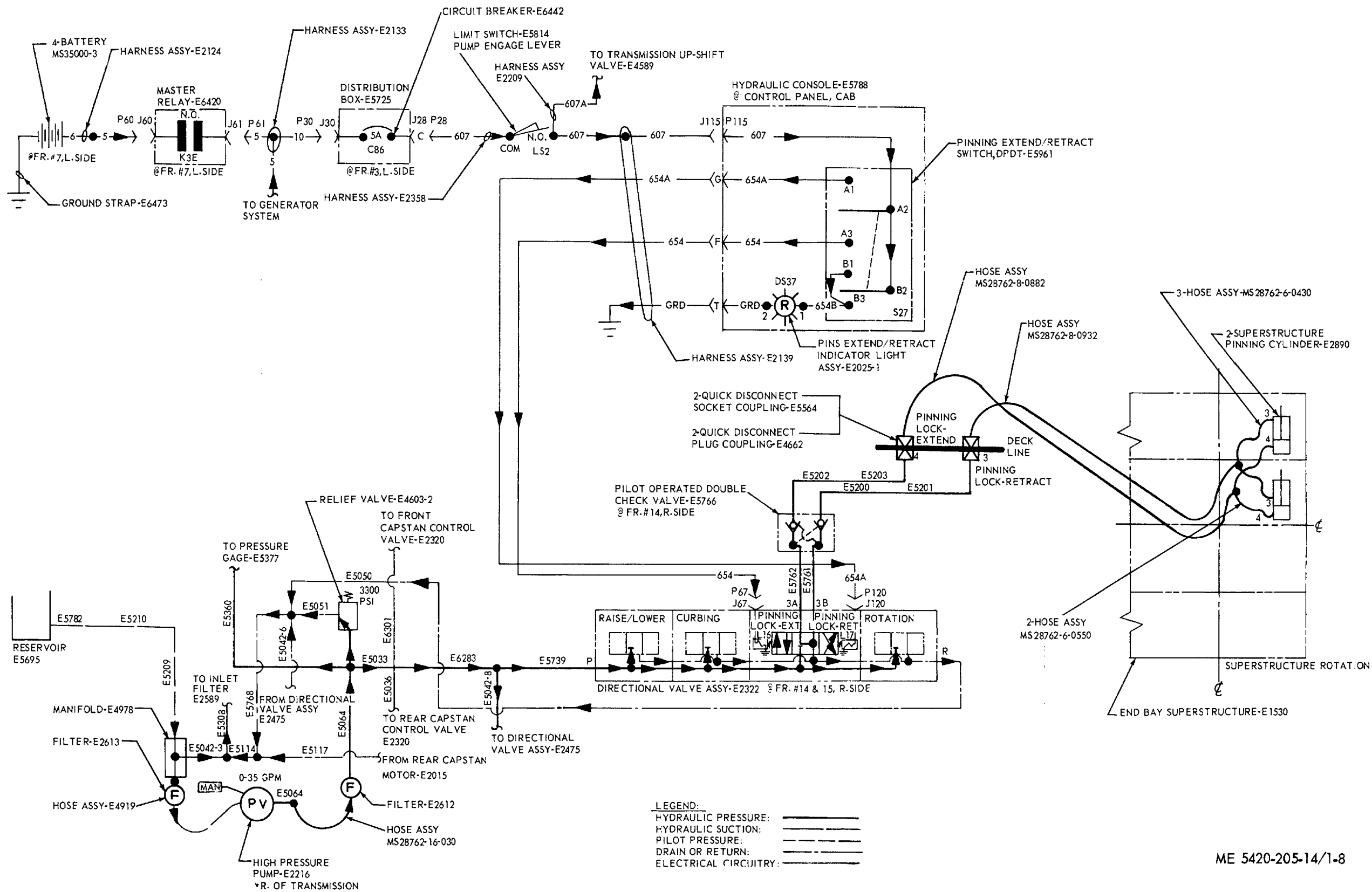
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FO-5. Electro-hydraulic function schematic, ramp fold and unfold, superstructure model no. 2195-2.

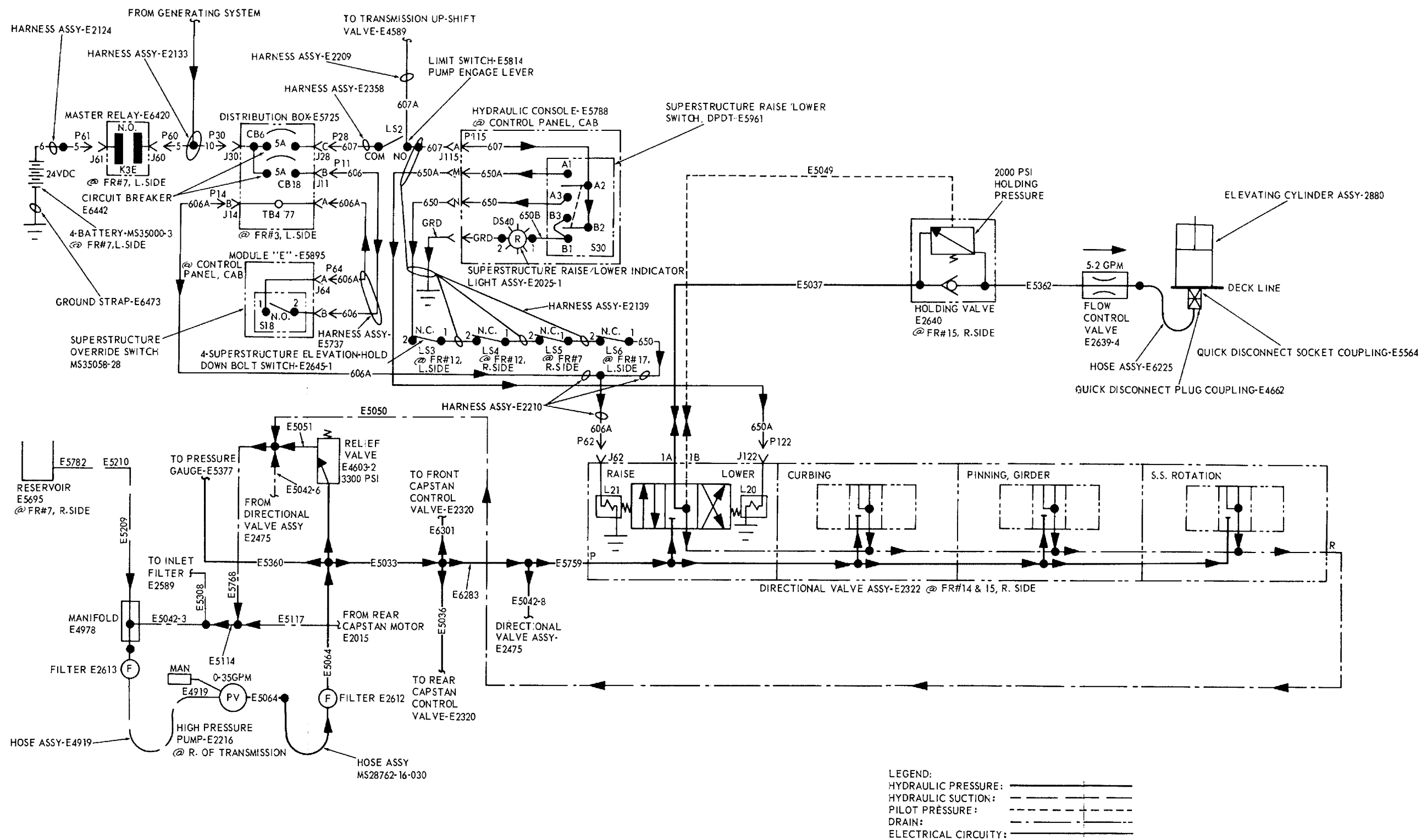
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FO-6. Electro-hydraulic function schematic, end bay superstructure model no.2195-2 girder pinning..

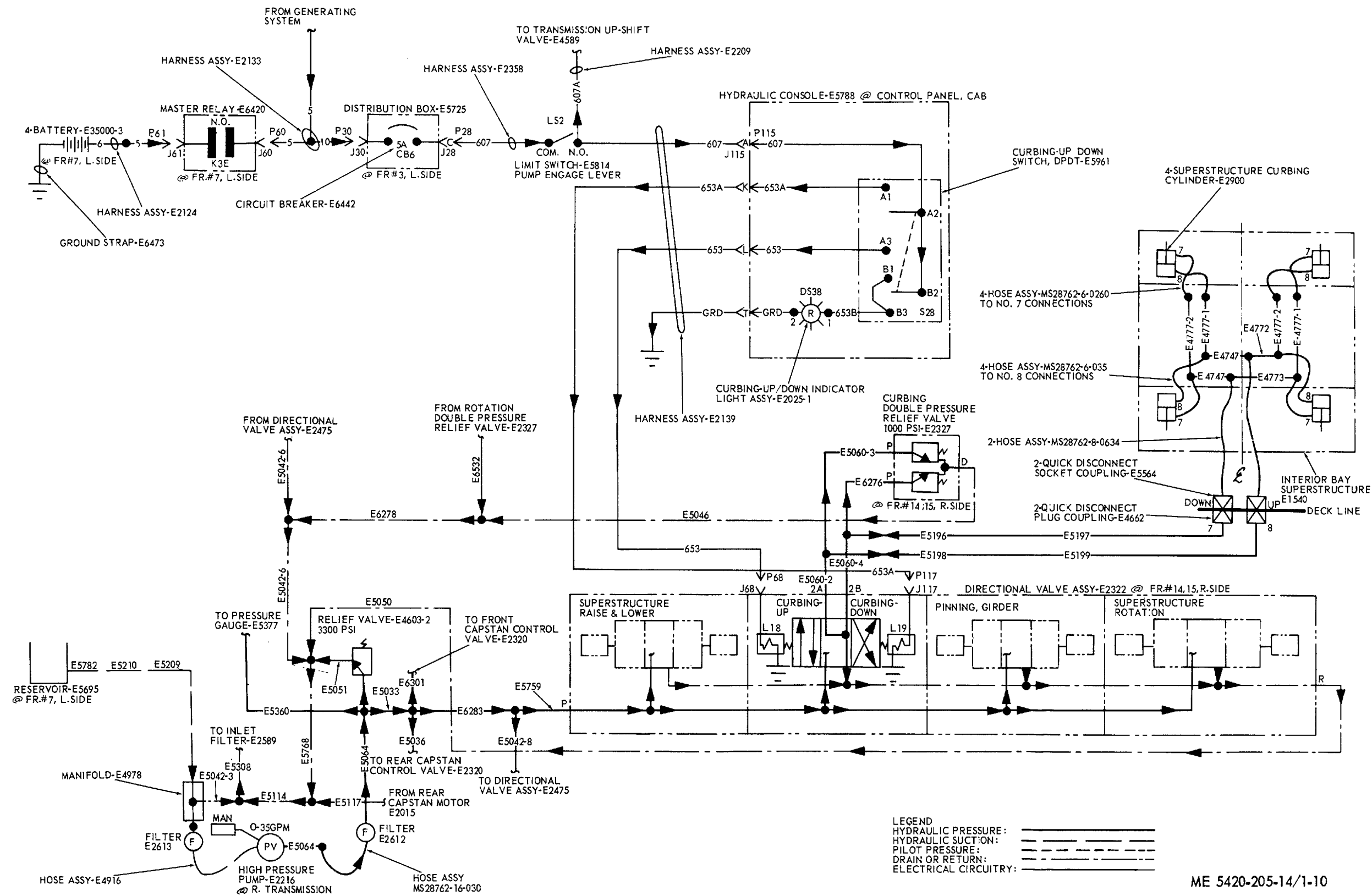
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FO-7. Electro-hydraulic function schematic, superstructure model nos. 2195-1 and 2195-2, raise and lower..

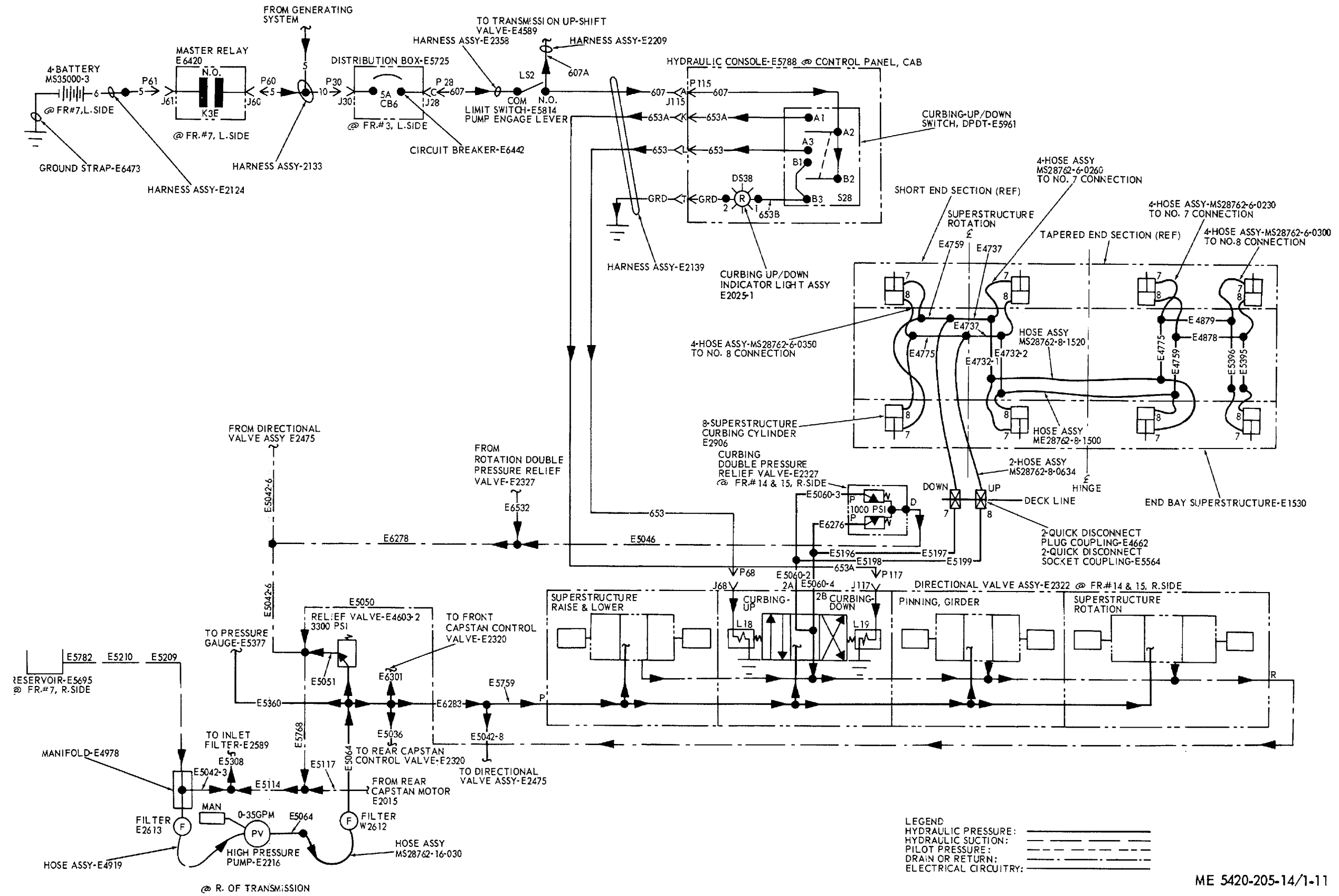
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FO-8. Electro-hydraulic schematic, interior bay model no.2195-1 superstructure curbing up and down.

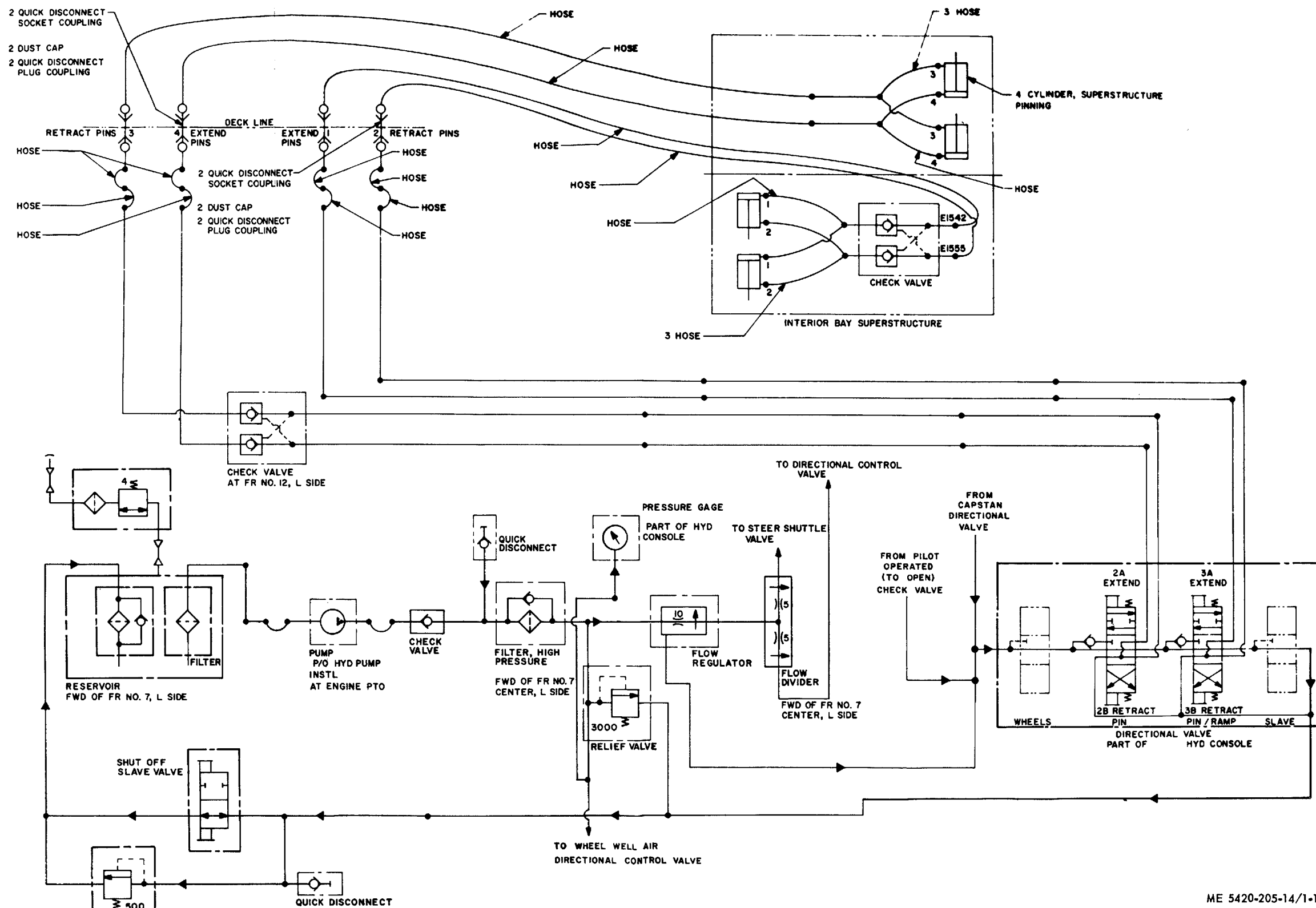
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FO-9. Electro-hydraulic function schematic, end bay superstructure model no. 2195-2, curbing up and down.

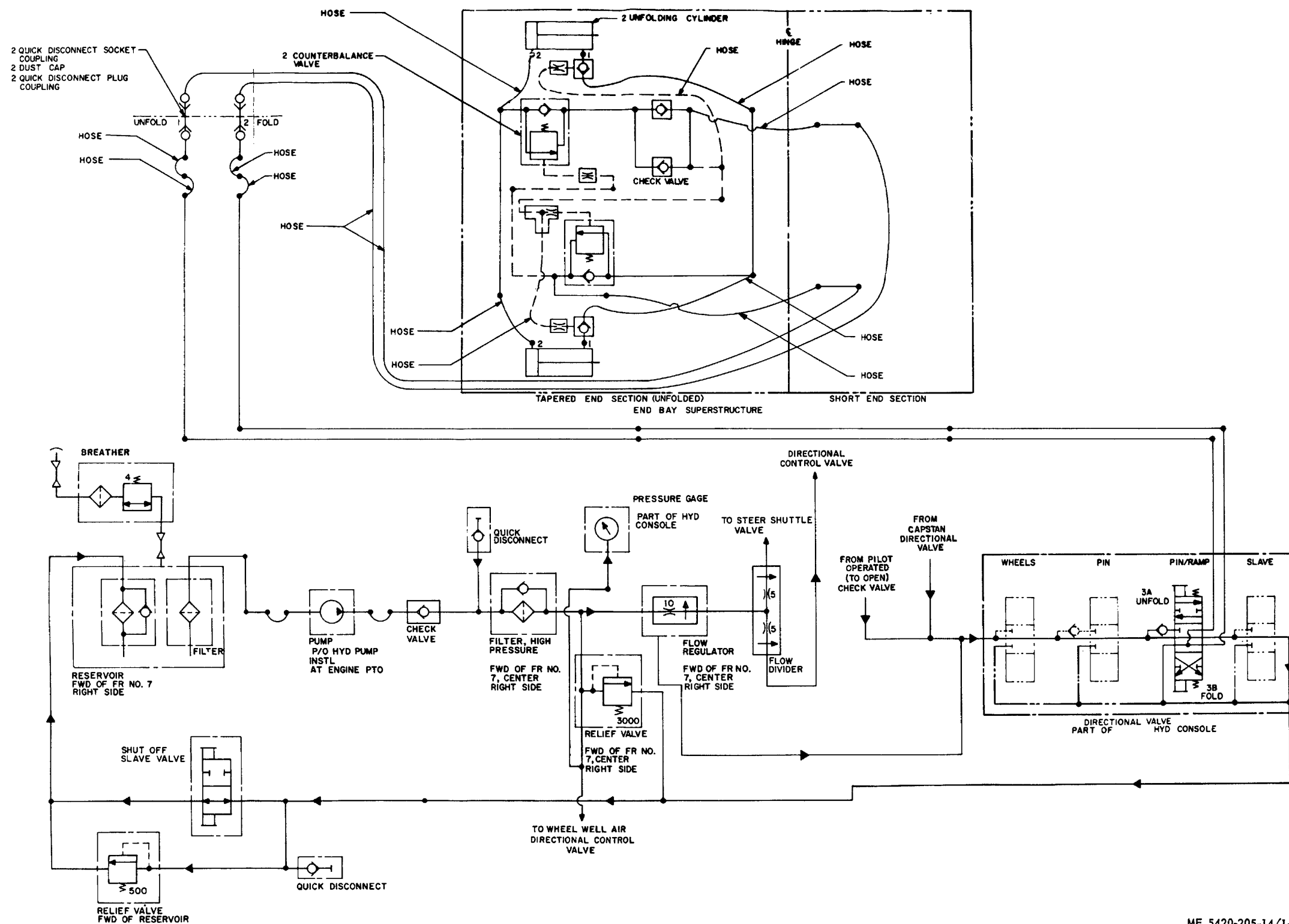
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FO-10. Hydraulic function schematic, interior girder pinning, superstructure model no. 2272.

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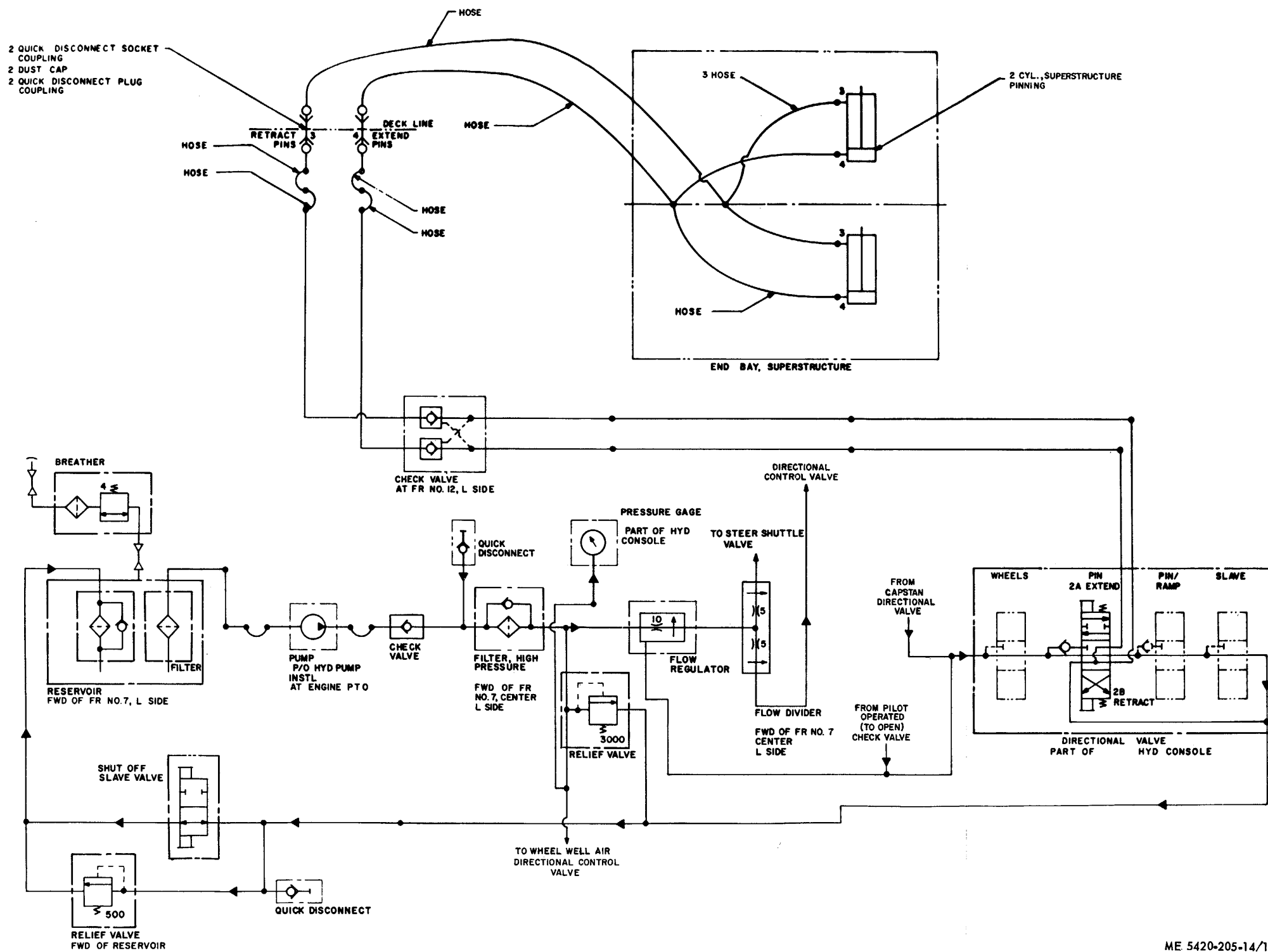
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FO-12. Hydraulic functional schematic, ramp fold and unfold, superstructure, model no. 2271.

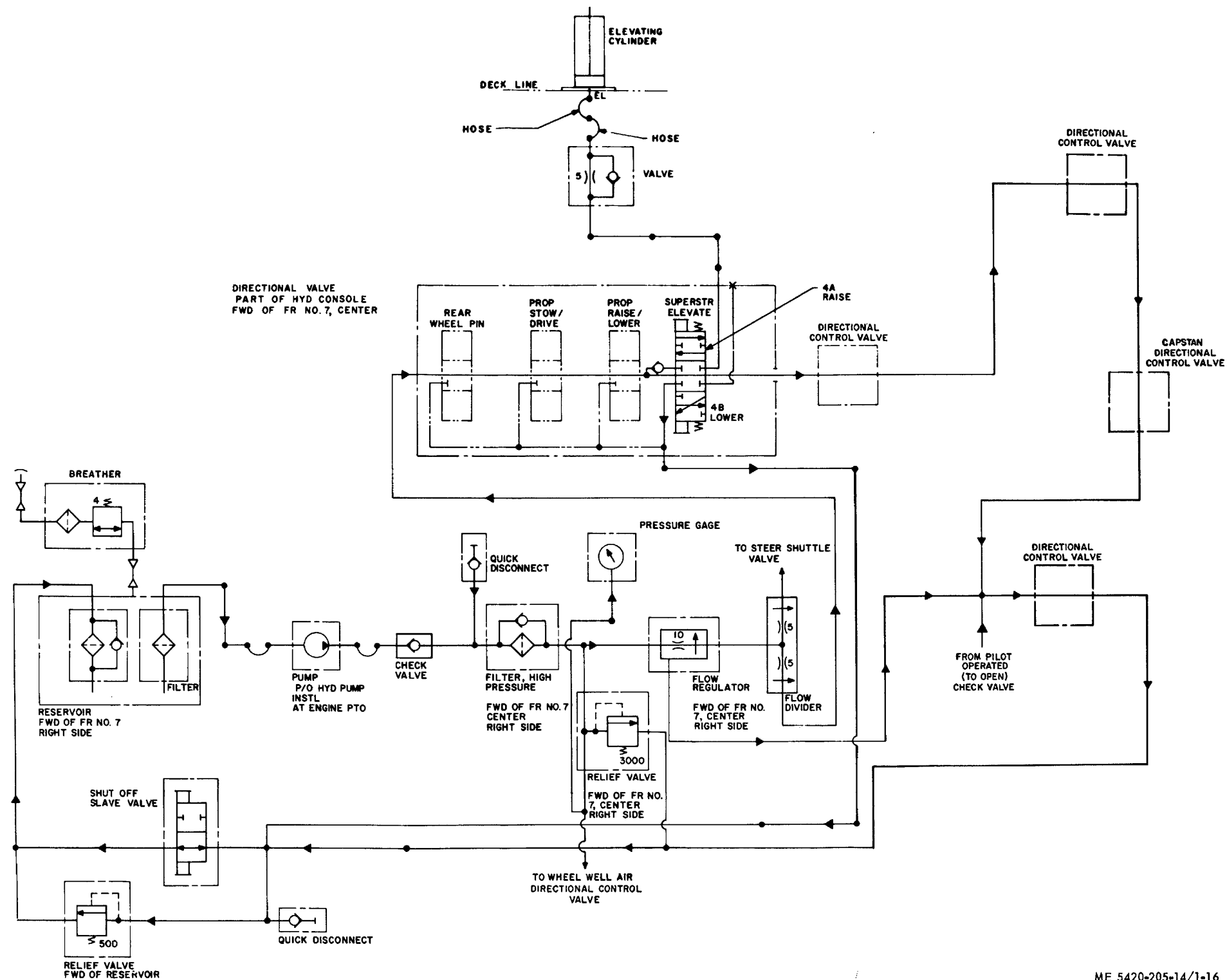
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Figure FO-12



FO-13. Hydraulic functional schematic, end bay girder pinning superstructure rotation, model nos. 2271.

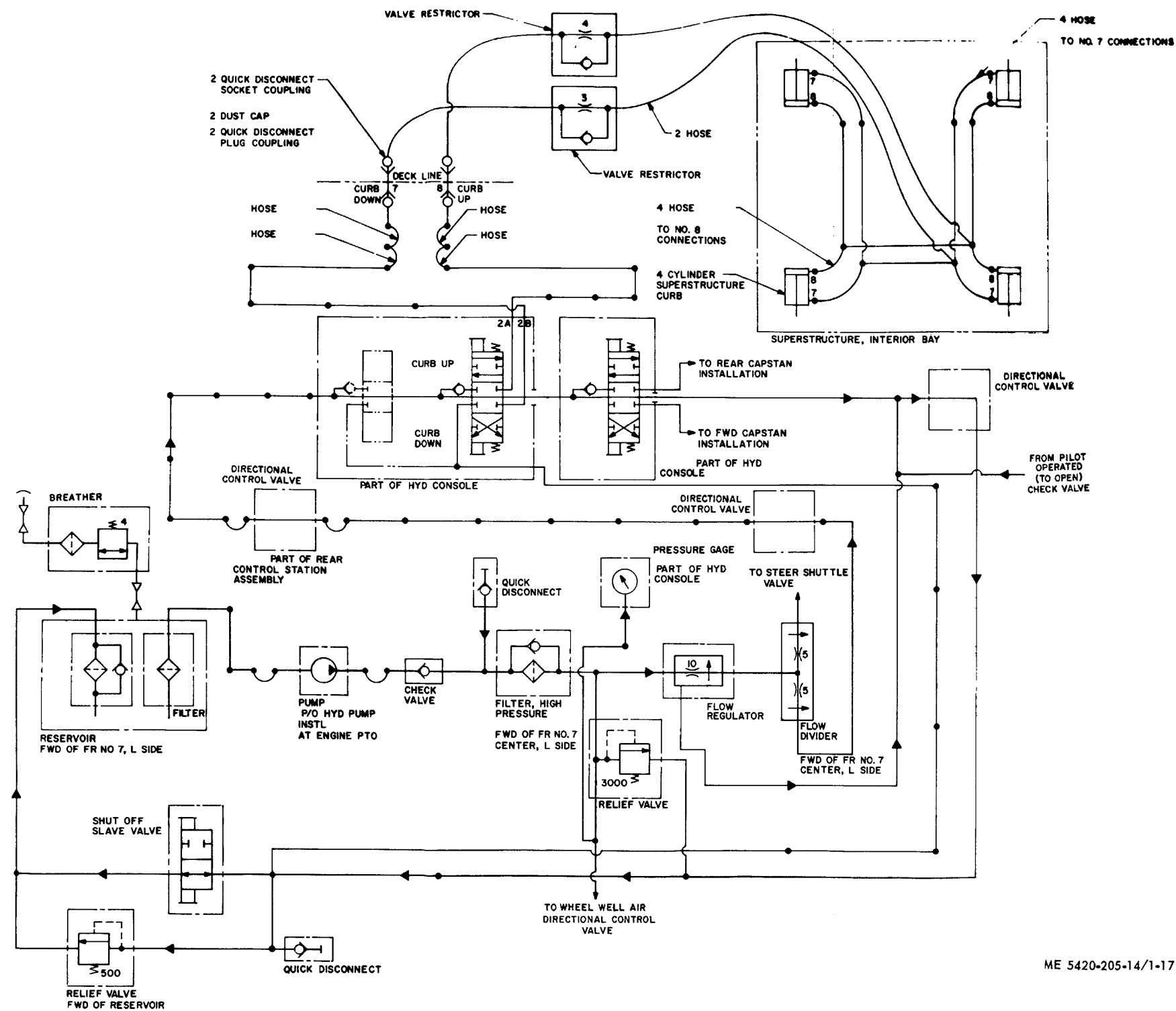
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FO-14. Hydraulic functional schematic, raise and lower, superstructure rotation, model nos. 2271 and 2272.

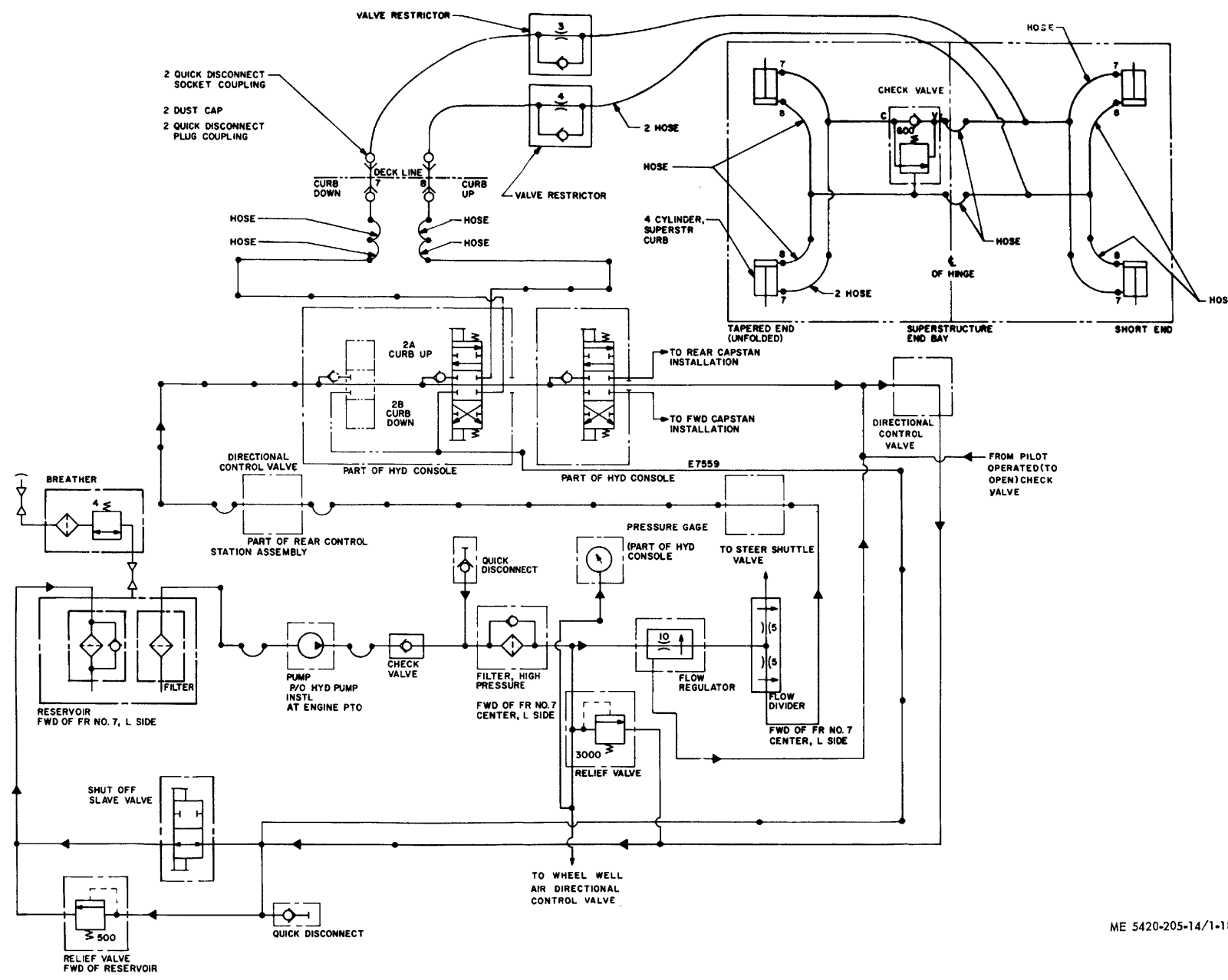
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FO-15. Hydraulic functional schematic, interior bay curbing up and down superstructure model nos. 2272.

Figure FO-15




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FO-16. Hydraulic functional schematic, end bay curbing up and down superstructure rotation ,model no. 2271 .

Figure FO-16

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