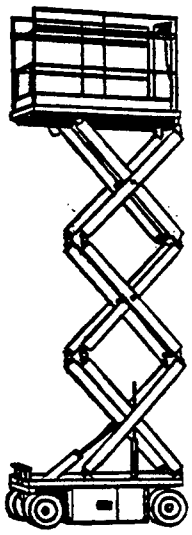
The Marklifts.®
A Product of Mark Industries

SELF-PROPELLED SCISSOR (SMALL SLAB MODELS)



OPERATION MAINTENANCE AND PARTS MANUAL

THIS TECHNICAL MANUAL APPLIES TO THE FOLLOWING ELECTRIC MODELS:

15E S15E S15EX 19E S19E S19EX S15ETD S15EFD
19ETD S19ETD S19EFD

REVISION 4 JUNE 1983

RE-PRINTING 5 MAY 1987

RE-PRINTING 6 AUGUST 1987

REVISION 3 OCTOBER 1982

REVISION 2 MARCH 1982

REVISION 1 FEBRUARY 1981

Mark Industries

P.O. Box 2255
Brea, California 92622
205 South Puente Street, Brea, California 92621
(714) 879-6275, FAX (714) 879-8885

INITIAL ISSUE MARCH 1980

17201

REV.2
3-82

TABLE OF CONTENTS

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)
OPERATION MAINTENANCE AND PARTS MANUAL

PAGE

INTRODUCTION. i
SPECIFICATIONS. ii
AVAILABLE OPTIONS viii
RECORD OF REVISIONS ix
WARRANTY x
NEW EQUIPMENT CONDITION REPORT. xi

OPERATION

UNLOADING AND TRANSPORTING. 1
INSPECTION AND CHECKOUT 2
SAFETY. 4
WARNING AND CAUTION DECALS. 9
OPERATING INSTRUCTIONS. 11
1. STARTING. 11
2. STEERING. 12
3. LIFT. 12
4. TRAVEL. 13
5. FREE WHEELING 13
6. OUTRIGGERS. 13
7. WARNING HORN. 14
8. WARNING LIGHT 14
9. HYDRAULIC SYSTEM PRESSURE 14
DISC BRAKE ADJUSTMENT 15.1

MAINTENANCE

HYDRAULIC FLUID TABLE 16
SERVICE TOOLS 16
TROUBLE SHOOTING. 17
RECOMMENDED SPARE PARTS LIST. 21
BATTERY MAINTENANCE 23

TABLE OF CONTENTS

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)
OPERATION MAINTENANCE AND PARTS MANUAL

PAGE

MARKLIFT SCISSOR MAINTENANCE CHECK LIST 25
MARKLIFT SERVICE MAINTENANCE RECORD 26

SCHEMATICS

ELECTRICAL DIAGRAM 27
HYDRAULIC SCHEMATIC 29
ELECTRICAL DIAGRAM (1980) 30
HYDRAULIC SCHEMATIC (1980) 32
ELECTRICAL DIAGRAM (APRIL 1982) 33
HYDRAULIC SCHEMATIC (AUGUST 1982) 35
ELECTRICAL SCHEMATIC (S15ETD) (19ETD) (S19ETD) 36
HYDRAULIC SCHEMATIC (S15ETD) 37
HYDRAULIC SCHEMATIC (19ETD) (S19ETD) 38

PARTS

ILLUSTRATED PARTS LIST INDEX i

VENDOR

CHRISTIE BATTERY CHARGER
PRESTOLITE PUMP MOTOR
ROSS GEAR DRIVE MOTOR
TROJAN BATTERY

SERVICE BULLETINS

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)
OPERATION MAINTENANCE AND PARTS MANUAL

The purpose of this manual is to provide the customer with operation maintenance and parts information that will enhance the reliable performance of the Marklift. Schematic and vendor information is also furnished.

WARNING: IMPROPER USAGE OF THIS MACHINE MAY RESULT IN SERIOUS PERSONNEL INJURY. TO PROTECT YOURSELF AND THE EQUIPMENT, STUDY THIS MANUAL BEFORE STARTING OPERATIONS.

The model capacity, pressure settings and serial number can be found on the ID Plate mounted on the rear of the main frame.

The serial number should be used when ordering parts. This will help our parts department in giving prompt and accurate service.

If additional information or service is needed, we urge the customer to contact his local dealer. If this is not possible, please get in touch with the Mark Industries Service Department.

All Marklifts are tested and operated to assure their proper operating condition before shipment. At this time, all necessary adjustments are made and an overall physical inspection is conducted. After the unit is delivered, some final minor adjustments and inspections must be made prior to putting the unit in service. These functions are outlined in the inspection and checkout instructions in the operation section of this manual.

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

15E

DESCRIPTION	ENGLISH	METRIC
HEIGHT-WORKING (EXTENDED)	21'	6.40 m.
HEIGHT-PLATFORM (EXTENDED)	15'	4.60 m.
(LOWERED)	41"	1.04 m.
LENGTH (OVERALL)	69"	1.75 m.
WIDTH (OVERALL)	39.5"	1.0 m.
PLATFORM-SIZE (INSIDE)	36 X 66.5"	91.4 X 169 cm.
PLATFORM-SAFETY RAILS (REMOVABLE)	42"	1.06 m.
PLATFORM-TOE PLATE	6"	15.2 cm.
LIFT CAPACITY	1000#	453.60 kg.
WHEEL BASE	56"	1.42 m.
WHEEL TRACK	35"	89 cm.
TURNING RADIUS (INSIDE)	9'	2.74 m.
DRIVE SPEED--CREEP	.5 MPH	.8 kms/hr.
DRIVE SPEED--LOW	1.5 MPH	2.4 kms/hr
DRIVE SPEED--HIGH	2.4 MPH	3.86 kms/hr
HIGH SPEED CUTOUT	7'6"	2.28 m.
LIFT/LOWER SPEED	35/25 sec.	35/25 sec.
POWER SYSTEM	12 VDC	12 VDC
BATTERY VOLTAGE	6 VDC	6 VDC
CAPACITIES-BATTERY	250 AMP/HR (4)	250 AMP/HR (4)
CAPACITIES-HYDRAULIC TANK	4 GAL	15.1 L.
CAPACITIES-FUEL TANK	--	--
ALTERNATOR	--	--
BATTERY CHARGER	40 AMP	40 AMP
TIRE SIZE	4.00 X 8 SOLID	--
OUTRIGGERS/STABILIZERS	NOT REQ'D	NOT REQ'D
SHIPPING WEIGHT	2600#	1179 kg.
SHIPPING CUBE	117 cu.ft	3.31 cu.m

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

S15E

DESCRIPTION	ENGLISH	METRIC
HEIGHT-WORKING (EXTENDED)	21'	6.40 m.
HEIGHT-PLATFORM (EXTENDED)	15'	4.60 m.
(LOWERED)	41"	1.04 m.
LENGTH (OVERALL)	69"	1.75 m.
WIDTH (OVERALL)	30"	76.2 cm.
PLATFORM-SIZE (INSIDE)	26X66.5"	66 cm. x 169 cm.
PLATFORM-SAFETY RAILS (REMOVABLE)	42"	1.06 m.
PLATFORM-TOE PLATE	6"	15.2 cm.
LIFT CAPACITY	750#	340 kg.
WHEEL BASE	56"	1.42 m.
WHEEL TRACK	24.5"	62.2 cm.
TURNING RADIUS (INSIDE)	9'	2.74 m.
DRIVE SPEED--CREEP	.5 MPH	.8 kms/hr.
DRIVE SPEED--LOW	1.5 MPH	2.4 kms/hr.
DRIVE SPEED--HIGH	2.4 MPH	3.86 kms/hr.
HIGH SPEED CUTOUT	7'6"	2.28 m.
LIFT/LOWER SPEED	35/25 sec.	35/25 sec.
POWER SYSTEM	12 VDC	12 VDC
BATTERY VOLTAGE	6 VDC	6 VDC
CAPACITIES-BATTERY	250 AMP/HR (4)	250 AMP/HR (4)
CAPACITIES-HYDRAULIC TANK	4 GAL.	15.1 L.
CAPACITIES-FUEL TANK	--	--
ALTERNATOR	--	--
BATTERY CHARGER	40 AMP	40 AMP
TIRE SIZE	4.00 X 8 SOLID	--
OUTRIGGERS/STABILIZERS	NOT REQ'D	NOT REQ'D
SHIPPING WEIGHT	2560#	1161 kgs.
SHIPPING CUBE	109.69 cu.ft	3.11 cu.m

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

S15EX

DESCRIPTION	ENGLISH	METRIC
HEIGHT-WORKING (EXTENDED	21'	6.40 m.
HEIGHT-PLATFORM (EXTENDED)	15'	4.60 m.
(LOWERED)	41"	1.04 m.
LENGTH (OVERALL)	99"	2.51 m.
WIDTH (OVERALL)	30"	76.2 cm.
PLATFORM-SIZE (INSIDE)	27.75X28"(PE) 26X66.5"	70.5 cm.X 71.1 cm. 66 cm.X 169 cm.
PLATFORM-SAFETY RAILS (REMOVABLE)	42"	1.06 m
PLATFORM-TOE PLATE	6"	15.2 cm
LIFT CAPACITY	500/250#	226.8/113.4 kg.
WHEEL BASE	56"	1.42 m.
WHEEL TRACK	24.5"	62.2 cm.
TURNING RADIUS (INSIDE)	9'	2.74 m.
DRIVE SPEED--CREEP	.5 MPH	.8 kms/hr.
DRIVE SPEED--LOW	1.5 MPH	2.4 kms/hr.
DRIVE SPEED--HIGH	2.4 MPH	3.86 kms/hr.
HIGH SPEED CUTOUT	7'6"	2.28 m.
LIFT/LOWER SPEED	35/25 sec.	35/26 sec.
POWER SYSTEM	12 VDC	12 VDC
BATTERY VOLTAGE	6 VDC	6 VDC
CAPACITIES-BATTERY	250 AMP/HR (4)	250 AMP/HR (4)
CAPACITIES-HYDRAULIC TANK	4 GAL	15.1 L.
CAPACITIES-FUEL TANK	--	--
ALTERNATOR	--	--
BATTERY CHARGER	40 AMP	40 AMP
TIRE SIZE	4.00 X 8 SOLID	--
OUTRIGGERS/STABILIZERS	NOT REQ'D	NOT REQ'D
SHIPPING WEIGHT	2870#	1301 kg.
SHIPPING CUBE	199.22 cu.ft.	5.64 cu.m

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

S15ETD

DESCRIPTION	ENGLISH	METRIC
HEIGHT-WORKING (EXTENDED)	21'	6.40 m
HEIGHT-PLATFORM (EXTENDED)	15'	4.57 m
(LOWERED)	43.5"	1.10 m
LENGTH (OVERALL)	69"	1.75 m
WIDTH (OVERALL)	30"	.76 m
PLATFORM-SIZE (INSIDE)	26 X 66.5"	.66 m X 1.69 m
TRAVERSES - FRONT	34"	.86 m
- REAR	34"	.86 m
PLATFORM-SAFETY RAILS (REMOVABLE)	42"	1.06 m
PLATFORM-TOE PLATE	6"	.15 m
LIFT CAPACITY	750#	340.19 kg
WHEEL BASE	56"	1.42 m
WHEEL TRACK	24.5"	.62 m
TURNING RADIUS (INSIDE)	9'	2.74 m
DRIVE SPEED-CREEP	.5 MPH	.8 km/hr
DRIVE SPEED-LOW	1.5 MPH	2.4 km/hr
DRIVE SPEED-HIGH	2.4 MPH	3.9 km/hr
HIGH SPEED CUTOUT	7'6"	2.29 m
LIFT/LOWER SPEED	35/25 SEC.	35/25 sec.
POWER SYSTEM	12 VDC	12 vdc
BATTERY VOLTAGE	6 VDC	6 vdc
CAPACITIES-BATTERY	250 AMP/HR (4)	250 amp/hr (4)
CAPACITIES-HYDRAULIC TANK	4 GAL	15 L.
CAPACITIES-FUEL TANK	---	---
ALTERNATOR	---	---
BATTERY CHARGER	40 AMP	40 amp
TIRE SIZE	4.00 X 8 SOLID	---
OUTRIGGERS/STABILIZERS	NOT REQ'D	Not req'd
SHIPPING WEIGHT	2680#	1215.20 kg
SHIPPING CUBE	90.00 CU. FT.	2.54 cu. m

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

19E

DESCRIPTION	ENGLISH	METRIC
HEIGHT-WORKING (EXTENDED)	25'	7.62 m.
HEIGHT-PLATFORM (EXTENDED)	19'	5.8 m.
(LOWERED)	46"	1.16 m.
LENGTH (OVERALL)	96"	2.43 m.
WIDTH (OVERALL)	54"	1.37 m.
PLATFORM-SIZE (INSIDE)	50 X 92"	1.27 X 2.33 cm.
PLATFORM-SAFETY RAILS (REMOVABLE)	42"	1.06 m.
PLATFORM-TOE PLATE	6"	15.2 cm.
LIFT CAPACITY	1000#	453.60 kg.
WHEEL BASE	58.5"	1.48 m.
WHEEL TRACK	47.5"	1.20 m.
TURNING RADIUS (INSIDE)	9'4"	2.84 m.
DRIVE SPEED--CREEP	.5 MPH	.8 kms/hr.
DRIVE SPEED--LOW	1.5 MPH	2.4 kms/hr.
DRIVE SPEED--HIGH	2.6 MPH	4.2 kms/hr.
HIGH SPEED CUTOUT	7'6"	2.28 m.
LIFT/LOWER SPEED	46/26 sec.	46/26 sec.
POWER SYSTEM	12 VDC	12 VDC
BATTERY VOLTAGE	6 VDC	6 VDC
CAPACITIES-BATTERY	250 AMP/HR (4)	250 AMP/HR (4)
CAPACITIES-HYDRAULIC TANK	4 GAL	15.1 L.
CAPACITIES-FUEL TANK	--	--
ALTERNATOR	--	--
BATTERY CHARGER	40 AMP	40 AMP
TIRE SIZE	18 X 650 X 8 (MF)	--
OUTRIGGERS/STABILIZERS	NOT REQ'D	NOT REQ'D
SHIPPING WEIGHT	3230#	1465 kgs.
SHIPPING CUBE	168 cu.ft	4.76 cu.m

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

19ETD

DESCRIPTION	ENGLISH	METRIC
HEIGHT-WORKING (EXTENDED) . .	25'	7.62 m
HEIGHT-PLATFORM (EXTENDED) .	19'	5.79 m
(LOWERED) . .	48.5"	1.23 m
LENGTH (OVERALL)	96"	2.44 m
WIDTH (OVERALL)	54"	1.37 m
PLATFORM-SIZE (INSIDE) . . .	50 X 92"	1.27 X 2.34 m
TRAVERSES - FRONT	24"	.61 m
- REAR	48"	1.22 m
PLATFORM-SAFETY RAILS . . . . (REMOVABLE)	42"	1.06 m
PLATFORM-TOE PLATE	6"	.15 m
LIFT CAPACITY	750#	340.19 kg
WHEEL BASE	58.5"	1.49 m
WHEEL TRACK	47.5"	1.21 m
TURNING RADIUS (INSIDE) . . .	9'4"	2.84 m
DRIVE SPPED-CREEP	.5 MPH	.8 km/hr
DRIVE SPEED-LOW	1.5 MPH	2.4 km/hr
DRIVE SPEED-HIGH	2.6 MPH	4.2 km/hr
HIGH SPEED CUTOUT	7'6"	2.29 m
LIFT/LOWER SPEED	46/26 SEC.	46/26 sec.
POWER SYSTEM	12 VDC	12 vdc
BATTERY VOLTAGE	6 VDC	6 vdc
CAPACITIES-BATTERY	250 AMP/HR (4)	250 amp/hr (4)
CAPACITIES-HYDRAULIC TANK . .	4 GAL	15 L.
CAPACITIES-FUEL TANK	---	---
ALTERNATOR	---	---
BATTERY CHARGER	40 AMP	40 amp
TIRE SIZE	18 X 650 X 8 (MF)	---
OUTRIGGERS/STABILIZERS. . . .	NOT REQ'D	Not req'd
SHIPPING WEIGHT	3500#	1587.57 kg
SHIPPING CUBE	174 CU. FT.	4.92 cu. m

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

S19E

DESCRIPTION	ENGLISH	METRIC
HEIGHT-WORKING (EXTENDED)	25'	7.62 m.
HEIGHT-PLATFORM (EXTENDED)	19'	5.8 m.
(LOWERED)	46"	1.16 m.
LENGTH (OVERALL)	96"	2.43 m.
WIDTH (OVERALL)	34.5"	87.6 cm.
PLATFORM-SIZE (INSIDE)	31 X 93"	78.7 X 236 cm.
PALTFORM-SAFETY RAILS (REMOVABLE)	41"	1.04 m.
PLATFORM-TOE PLATE	6"	15.2 cm.
LIFT CAPACITY	750#	340 kg.
WHEEL BASE	58.5"	1.48 m.
WHEEL TRACK	28.5"	72.3 cm.
TURNING RADIUS (INSIDE)	9'4"	2.84 m.
DRIVE SPEED--CREEP	.5 MPH	.8 kms/hr.
DRIVE SPEED--LOW	1.5 MPH	2.4 kms/hr.
DRIVE SPEED--HIGH	2.6 MPH	4.2 kms/hr.
HIGH SPEED CUTOUT	7'6"	2.28 m.
LIFT/LOWER SPEED	46/26 sec.	46/26 sec.
POWER SYSTEM	12 VDC	12 VDC
BATTERY VOLTAGE	6 VDC	6 VDC
CAPACITIES-BATTERY	250 AMP/HR (4)	250 AMP/HR (4)
CAPACITIES-HYDRAULIC TANK	4 GAL	15.1 L.
CAPACITIES-FUEL TANK	--	--
ALTERNATOR	--	--
BATTERY CHARGER	40 AMP	40 AMP
TIRE SIZE	5.00 X 8 SOLID	--
OUTRIGGERS/STABILIZERS	NOT REQ'D	NOT REQ'D
SHIPPING WEIGHT	3380#	1533 kg.
SHIPPING CUBE	149.33 cu.ft.	4.23 cu.m

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

S19ETD

DESCRIPTION	ENGLISH	METRIC
HEIGHT-WORKING (EXTENDED) . .	25'	7.62 m
HEIGHT-PLATFORM (EXTENDED) .	19'	5.79 m
(LOWERED) . .	48.5"	1.23 m
LENGTH (OVERALL)	96"	2.44 m
WIDTH (OVERALL)	34.5"	.88 m
PLATFORM-SIZE (INSIDE) . . .	31 X 93"	.79 m X 2.36 m
TRAVERSES - FRONT	24"	.61 m
- REAR	48"	1.22 m
PLATFORM-SAFETY RAILS . . . . (REMOVABLE)	42"	1.06 m
PLATFORM-TOE PLATE	6"	.15 m
LIFT CAPACITY	750#	340.19 kg
WHEEL BASE	58.5"	1.49 m
WHEEL TRACK	28.5	.72 m
TURNING RADIUS (INSIDE) . . .	9'4"	2.84 m
DRIVE SPEED-CREEP	.5 MPH	.8 km/hr
DRIVE SPEED-LOW	1.5 MPH	2.4 km/hr
DRIVE SPEED-HIGH	2.4 MPH	3.9 km/hr
HIGH SPEED CUTOUT	7'6"	2.29 m
LIFT/LOWER SPEED	46/26 SEC.	46/26 sec.
POWER SYSTEM	12 VDC	12 vdc
BATTERY VOLTAGE	6 VDC	6 vdc
CAPACITIES-BATTERY	250 AMP/HR (4)	250 amp/hr (4)
CAPACITIES-HYDRAULIC TANK . .	4 GAL	15 L.
CAPACITIES-FUEL TANK	---	---
ALTERNATOR	---	---
BATTERY CHARGER	40 AMP	40 amp
TIRE SIZE	5.00 X 8 SOLID	---
OUTRIGGERS/STABILIZERS . . .	NOT REQ'D	Not req'd
SHIPPING WEIGHT	3520#	1596.65 kg
SHIPPING CUBE	145.00 CU. FT.	4.10 cu. m

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

S19EX

DESCRIPTION	ENGLISH	METRIC
HEIGHT-WORKING (EXTENDED)	25'	7.62 m.
HEIGHT-PLATFORM (EXTENDED)	19'	5.8 m.
(LOWERED)	46"	1.16 m.
LENGTH (OVERALL)	126"	3.20 m.
WIDTH (OVERALL)	34.5"	87.6 cm.
PLATFORM-SIZE (INSIDE)	27.75 X 28"(PE) 31 X 93"	70.4X71.1 cm. 78.7X236 cm.
PLATFORM-SAFETY RAILS (REMOVABLE)	41"	1.04 m.
PLATFORM-TOE PLATE	6"	15.2 cm.
LIFT CAPACITY	500/250#	226.8/113.4 kg.
WHEEL BASE	58.5"	1.485 m.
WHEEL TRACK	28.5	72.3 cm.
TURNING RADIUS (INSIDE)	9'4"	2.84 m.
DRIVE SPEED--CREEP	.5 MPH	.8 kms/hr.
DRIVE SPEED--LOW	1.5 MPH	2.4 kms/hr.
DRIVE SPEED--HIGH	2.6 MPH	4.2 kms/hr.
HIGH SPEED CUTOUT	7'6"	2.28 m.
LIFT/LOWER SPEED	46/26 sec.	46/26 sec.
POWER SYSTEM	12 VDC	12 VDC
BATTERY VOLTAGE	6 VDC	6 VDC
CAPACITIES-BATTERY	250 AMP/HR (4)	250 AMP/HR (4)
CAPACITIES-HYDRAULIC TANK	4 GAL	15.14 LTR.
CAPACITIES-FUEL TANK	--	--
ALTERNATOR	--	--
BATTERY CAHRGER	40 AMP	40 AMP
TIRE SIZE	5.00 X 8 SOLID	--
OUTRIGGERS/STABILIZERS	NOT REQ'D	NOT REQ'D
SHIPPING WEIGHT	3740#	1696 kgs.
SHIPPING CUBE	273 cu.ft	7.73 cu.m

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)

OPTION	TITLE & MODELS
1.	Rotating Amber Beacon (All Models)
2.	Travel Warning Horn (All Models)
3.	Movement Warning Horn (All Models)
4.	Manual Outriggers (4) (19E) (S19E)
5.	36 in. Deck Extension (15E) (S15E)
6.	36 in. Deck Extension (19E) (S19E)
7.	Wiring Only for 5 AMP Inverter (19E)
8.	Wiring & Bracket for 5 AMP Inverter (15E) (S15E) (19E)
9.	Hourmeter (All Models)

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)
OPERATION MAINTENANCE AND PARTS MANUAL

When a revision is added to this manual, enter date inserted and initial.

REV. DATE	PAGE NUMBERS	DATE INSERTED	BY
REV.1 2-81	FRONT TITLE PAGE		
	CONTENTS ii,iii,iv		
	v,vi,vii viii,ix		
	x,xi,xii OPERATION		
	2,4,5,9,10 11,12,13,14		
	15 MAINT.		
	16,17,18,19 20,21,22,23		
	24,25,26 SCHEM.		
	27,28,29,30 31,32		
	PARTS INDEX i,ii		
	1 THRU 76 FRONT		
REV.2 3-82	TITLE PAGE CONTENTS ix		
	OPER.15.1 SCHEM.		
	33,34,35 PARTS INDEX		
	i,ii,iii 4,8,9,10,14		
	19,21,22,23 23.1,28,		
	28.1,29,33, 36,41,44,		
	50.1 THRU 50.30,60.1		
	THRU 60.4		

REV. DATE	PAGE NUMBERS	DATE INSERTED	BY
	71,72.1 73.1,73.2		
	74.1,77 THRU 83		
REV.3 10-82	TITLE PAGE CONTENTS		
	ix SCHEM.35		
	PARTS INDEX iii,47,48		
	50.1 THRU 50.30,83		
REV.4 6-83	TITLE PAGE CONTENTS		
	iv.i,v.i, vi.i,ix		
	OPERATION 9,10.1		
	PARTS INDEX i,ii,iii		
	10.1 THRU 10.4,15.1		
	THRU 15.4 22.1 THRU		
	22.7,25.1 27.1,27.2,		
	29 32.1 THRU		
	32.21 50.31 THRU		
	50.46,64.1 THRU 64.6		
	66.1 THRU 66.7,69.1		
	SCHEM. 36 37,38		

MANUFACTURERS' LIMITED WARRANTY

MARK INDUSTRIES makes no warranty, express or implied, on any product manufactured or sold by MARK INDUSTRIES except for the following limited warranty against defects in materials and workmanship on products manufactured by MARK INDUSTRIES.

> MARK INDUSTRIES warrants the products manufactured by MARK INDUSTRIES to be free from defects in material and workmanship under normal use and service for a period of six (6) months from the date of shipment. This limited warranty does not extend to any product of another manufacturer or to any part, component, accessory or attachment not manufactured by MARK INDUSTRIES, The warranty, if any, with respect to any product of another manufacturer or to any part, component, accessory or attachment not manufactured by MARK INDUSTRIES is limited to the warranty, if any extended to MARK INDUSTRIES by the manufacturer of the other product, part, component, accessory or attachment.

This limited warranty does not extend to any product (or any part or parts of any product which has been subject to improper use or application, misuse, abuse, operation beyond its rated capacity, repair or maintenance except in accordance with the sales and service manuals and special instructions of MARK INDUSTRIES, or modification without the prior written authorization of MARK INDUSTRIES (whether by the substitution of nonapproved parts or otherwise).

The sole obligation and liability of MARK INDUSTRIES under this limited warranty (and the exclusive remedy for any purchaser, owner or user of MARK INDUSTRIES products) is limited to the repair or replacement, at the option of MARK INDUSTRIES, of any product (or any part or parts of any product) manufactured by MARK INDUSTRIES which, within six (6) months from the date of shipment, shall have been returned to the MARK INDUSTRIES facility in Brea, California (or any other location within the United States as shall be designated by MARK INDUSTRIES), at no expense to MARK INDUSTRIES, and demonstrated to the satisfaction of MARK INDUSTRIES as being defective in material or workmanship.

To make a claim under this limited warranty, contact MARK INDUSTRIES or the MARK INDUSTRIES distributor from whom the product was originally purchased. A statement giving the model and serial number of the allegedly defective product, the date and a description of the alleged defect, the date of the purchase and proof of the purchase and purchase date must accompany the returned product (or any part or parts of any product). Any product (or any part or parts of any product) determined by MARK INDUSTRIES to be defective will be repaired or replaced, at the option of MARK INDUSTRIES, free of charge, f.o.b. Brea, California. No credit will be given for any allegedly defective product (or any part or parts of any product) not returned to MARK INDUSTRIES.

There are no other warranties, express or implied, in addition to this limited warranty. **This limited warranty is exclusive and in lieu of all other warranties, express or implied (in fact or by operation of law or otherwise), including the implied warranties of merchantability and fitness for a particular purpose.**

MARK INDUSTRIES shall not be liable for any special, indirect or consequential damages. Further, no representation or warranty made by any person, including any representative of MARK INDUSTRIES, which is inconsistent or in conflict with, or in addition to the terms of the foregoing limited warranty (or the limitations of the liability of MARK INDUSTRIES as set forth above) shall be binding upon MARK INDUSTRIES unless reduced to writing and approved by an officer of MARK INDUSTRIES.

Tires, batteries, filter elements and electrical components are specifically excluded from this limited warranty.

Mark Industries
P.O. BOX 2255 Brea, CA 92622-2255
714-879-6275 800-448-MARK
TELEX 194402 FAX 1-714-879-8884

This is a reduced copy of the actual report that is sent with each Machine.

NEW EQUIPMENT CONDITION REPORT

(WARRANTY REGISTRATION)

BOOMS	YES	NO
1 CAPACITY DECAL IS _____		
2 ALL APPLICABLE WARNING DECALS ARE INSTALLED		
3 EMERGENCY DESCENT VALVE FUNCTIONS PROPERLY		
4 OPERATORS INSTRUCTIONS ARE PROPERLY INSTALLED		
5 OPERATORS GUIDE RECEIVED		
6 ELECTRIC SCHEMATIC RECEIVED		
7 ALL CONTROLS (UPPER & LOWER) ARE IDENTIFIED & OPERATE PROPERLY		
8 STOP SWITCHES OPERATE PROPERLY (UPPER & LOWER)		
9 CONDITION OF PLATFORM GUARD RAILS		
10 BASKET ACCESS GATE WORKS PROPERLY		
11 HORN/BEACON OPERATE PROPERLY (OPTIONAL)		
12 BRAKES ARE ADJUSTED AND OPERATE PROPERLY		
13 CIRCUIT BREAKERS OPERATE PROPERLY		
14 ENGINE RPM'S ARE _____ RPM'S		
15 ALL HYDRAULIC CYLINDERS ARE FREE OF LEAKS		
16 ALL HYDRAULIC CYLINDER RODS ARE FREE OF PAINT/SCRATCHES		
17 110V GENERATOR OPERATES PROPERLY (OPTIONAL)		
18 HYDRAULIC PUMP IS FREE OF LEAKS		
19 DRIVE MOTORS ARE FREE OF LEAKS		
20 ROTATION GEAR BOX OIL LEVEL IS _____		
21 ROTATION RING GEAR BOLTS (UNDERCARRIAGE) ARE TORQUED AT _____ FT. LBS.		
22 LUG NUTS ON WHEELS ARE TORQUED AT _____ FT. LBS.		
23 BATTERY FLUID LEVEL IS FULL		
24 HYDRAULIC HOSES & FITTINGS ARE TIGHT & FREE OF LEAKS		
25 AIR PRESSURE IN TIRES IS _____ PSI		
26 HYDRAULIC OIL LEVEL IS _____		
27 SYSTEM PRESSURE IS _____ PSIG		
28 PILOT PRESSURE IS _____ PSIG		
29 FUEL TANK AND FITTINGS ARE FREE OF LEAKS		
30 HYDRAULIC TANK AND FITTINGS FREE OF LEAKS		
31 MANUAL OVERRIDES OPERATE PROPERLY		
32 MUFFLER TIGHT AND FREE OF LEAKS		
33 ENGINE OIL LEVEL IS FULL		
34 ENGINE OIL FILTER IS FREE OF LEAKS		
35 ALL ELECTRICAL CONNECTIONS ARE TIGHT		
36 ENGINE ALTERNATOR FUNCTIONING PROPERLY		
37 VALVE MANIFOLD & FITTINGS ARE FREE OF LEAKS		
38 PROPER OIL LEVEL IN DRIVE WHEEL TORQUE HUB		

SCISSORS	YES	NO
1 CAPACITY DECAL IS _____		
2 ALL APPLICABLE WARNING DECALS ARE INSTALLED		
3 EMERGENCY DESCENT VALVE FUNCTIONS PROPERLY		
4 OPERATORS INSTRUCTIONS ARE PROPERLY INSTALLED		
5 OPERATORS GUIDE RECEIVED		
6 ELECTRICAL SCHEMATIC RECEIVED		
7 ALL CONTROLS (UPPER & LOWER) ARE IDENTIFIED AND OPERATE PROPERLY		
8 PLATFORM GUARD RAILS IN GOOD CONDITION AND ATTACHMENT BOLTS INCLUDED		
9 PLATFORM ACCESS GATE WORKS PROPERLY		
10 HORN/BEACON OPERATES PROPERLY (OPTIONAL)		
11 BRAKES (IF INSTALLED) OPERATE PROPERLY		
12 CIRCUIT BREAKER OPERATES PROPERLY		
13 ENGINE RPM'S ARE _____ RPM'S		
14 SCISSOR ARM SHAFT COLLARS ARE IN PLACE AND ARE TIGHT		
15 LIFT CYLINDER IS FREE OF LEAKS		
16 110V INVERTER OPERATES PROPERLY (OPTIONAL)		
17 110V GENERATOR OPERATES PROPERLY (OPTIONAL)		
18 HYDRAULIC PUMP IS FREE OF LEAKS		
19 SYSTEM PRESSURE IS SET AT _____ PSIG		
20 DRIVE MOTORS ARE FREE OF LEAKS		
21 DRIVE GEAR BOX OIL LEVEL (SRT MODELS)		
22 ALL NUTS & BOLTS ARE TIGHT		
23 (2) WHEEL NUTS ARE TORQUED AT ____ FT. LBS.		
24 LUG NUTS ON THE WHEELS ARE ___ FT. LBS		
25 BATTERY FLUID LEVEL IS CORRECT		
26 HYDRAULIC HOSES AND FITTINGS ARE FREE OF LEAKS		
27 AIR PRESSURE IN TIRES IS _____ PSI		
28 HYDRAULIC OIL LEVEL _____		
29 FUEL TANK & FITTINGS ARE FREE OF LEAKS		
30 HYDRAULIC OIL TANK & FITTINGS ARE FREE OF LEAKS		
31 STEERING CYLINDER IS FREE OF LEAKS		
32 MANUAL OVERRIDE ON VALVES OPERATE PROPERLY		
33 MUFFLER TIGHT & FREE OF LEAKS		
34 ENGINE OIL LEVEL FULL		
35 ENGINE OIL FILTER FREE OF LEAKS		
36 ALL ELECTRICAL CONNECTIONS ARE TIGHT		
37 ENGINE ALTERNATOR FUNCTIONS PROPERLY		
38 CHARGER FUNCTIONS PROPERLY (ELECT. MACH.)		
39 VALVE MANIFOLD & FITTINGS ARE FREE OF LEAKS		

MODEL NUMBER_____ SERIAL NUMBER_____

OPTIONS_____

INSPECTOR #_____

PURCHASER

_____
COMPANY NAME

_____
ADDRESS

_____
CITY STATE ZIP CODE

( ) _____
AREA CODE TELEHONE NUMBER

DATE OF INVOICE _____ DATE SHIPMENT RECEIVED _____

DATE UNIT PUT INTO SERVICE _____

☐ UNIT WILL BE USED IN RENTAL FLEET

☐ UNIT WILL BE SOLD; THE INITIAL WORK APPLICATION WILL BE:

INSPECTION _____	GEN'L MAINTENANCE _____	PAINTING/SANDBLASTING _____
MINING _____	HEATING/AIR COND. _____	STEEL FABRICATION _____
WELDING _____	CARPENTRY _____	RIGGING _____
CONSTRUCTION _____	PLUMBING _____	ROOFING _____
SCAFFOLDING _____	ELECTRICAL _____	GLAZING _____
MECHANICAL _____	SPRINKLER _____	OTHER _____

COMMENTS:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

INSPECTION COMPLETED BY: _____
(Please print legibly)

WARRANTY WILL BE VOID UNLESS THIS INSPECTION REPORT IS POSTMARKED TO MARK INDUSTRIES NOT MORE THAN 14 DAYS FROM DATE SHIPMENT RECEIVED.

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)

UNLOADING

Before unloading the Marklift, inspect for any physical damage. Note any such damage on the freight bill and report same to carrier.

Every slab model is equipped with fork-lift boots at the rear of the unit. ALWAYS USE THE FORK-LIFT BOOTS TO LIFT THE SLAB MODEL. DO NOT ATTEMPT to lift the machine from the side or the front.

TRANSPORTING

The Marklift may be free wheeled for very short distances at a speed no greater than 5 mph. To transport the Marklift over long distances a truck or trailer must be used.

As in unloading, the slab models are equipped with fork-lift boots at the rear of the unit, and should be used for loading.

When securing the Marklift to the truck, put the chains or straps through the tie down brackets ONLY. DO NOT CHAIN OR STRAP OVER THE PLATFORM OR GUARD RAILS. Severe damage to the scissor arms may result from excess pressure due to securing the machine over the top of the platform.

Note: The emergency lowering valve must be OPEN whenever the Marklift is transported. This will prevent damage to the unit if a short occurs in the electrical system.

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

All Marklift units are tested and operated to assure their proper operating condition before shipment.

At this time, all necessary adjustments are made and an overall physical inspection is conducted. After the unit is delivered, some minor adjustments and inspections must be made before putting the unit into service.

The following items should be reviewed:

1. Check electric power units.
   - A. Electric Power
   - B. Battery Water Level
   - C. Battery Specific Gravity Readings
   - D. Battery Charger
   - E. Battery Connections

2. Check electrical system by plugging hand control box into the platform receptacle.
   - A. Forward
   - B. Reverse
   - C. Left
   - D. Right
   - E. up
   - F. Down

3. Inspect all electrical connections.
   - A. See
   - B. Feel
   - C. Tighten

4. Check hydraulic system.
   - A. Hydraulic Fluid Level
   - B. In-Line Pressure Valve Filter
   - C. Hydraulic Lines
   - D. Hydraulic Pump
   - E. Hydraulic Cylinders
   - F. Emergency Lowering Valve

5. Check Tires & Wheels.
   A. For Cuts
   B. Correct pressure
   C. Tight Lugs

6. Structural connections and fittings.
   A. Check all nuts and bolts for tightness.

7. Brakes.
   A. Check for holding on incline up to four (4) degrees.

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)

Every operator of the Marklift must know, understand and follow the safety rules set forth herein.

1. The Marklift self-propelled aerial work platform is a personnel lifting device, and it is essential that it be properly maintained and operated to perform all functions with maximum safety and efficiency.

2. The operation of any new and unfamiliar equipment can be hazardous in the hands of untrained operators. Only trained operators must be assigned to operate the Marklift.

3. It is the responsibility of the operator to be familiar with this manual and to follow all recommendations made. Never exceed manufacturer's recommended platform load capacity.

4. Although the Marklift conforms to specified ANSI & OSHA requirements, it is the responsibility of the owner to instruct the operators with safety requirements made not only by Mark Industries, but by the various safety boards in your area, as well as additional requirements set forth by ANSI & OSHA.

5. The Marklift is a non-insulated personnel carrier and must not be operated with in 10 feet of a 50,000 volt line. (See page 7 & 8 articles)

6. Remember, the load capacity of the Marklift is total combined weight of personnel and tools, fixtures, accessories, etc.

7. Always distribute load evenly over platform floor area.

8. Make sure platform rail holding bolts are secured.

9. It is recommended that head gear (Hard Hats) be worn by all personnel in the work platform.

10. Under no conditions should horseplay be tolerated. Report any misuse of equipment to the proper personnel

11. The Marklift structure must not be used as a welding ground. Disconnect both battery leads prior to performing any welding operations.

12. Do not lean over platform guard railings to perform work.

13. Do not use ladders or scaffolding on the platform to obtain greater height.

14. Battery sulphuric acid can cause a serious burn. Flush away acid with water.

15. Hydrogen and oxygen gases are produced during normal battery operation. This gas mixture can explode if flames or sparks are near battery vents.

16. Monitor batteries during charging. Do not allow batteries to overcharge and boil.

17. Do not override any hydraulic, mechanical, or electrical safety devices.

18. Do not drive on uneven, sloping or soft terrain, as this is hazardous and must be avoided.

19. Do not work on platform if your physical condition is such that you feel dizzy or unsteady in any way.

20. Do not jump start other vehicles using Marklift battery.

21. When machine is not in use, remove hand control box to prevent unauthorized use.

Article 86. Provisions for Preventing Accidents Due to Proximity to Overhead Lines

2946. Provisions for Preventing Accidents Due to Proximity to Overhead Lines. (a) **General.** No person, firm, or corporation, or agent of same, shall require or permit any employee to perform any function in proximity to energized high-voltage lines; to enter upon any land, building, or other premises and thereto engage in any excavation, demolition, construction, repair, or other operation; or to erect, install, operate, or store in or upon such premises any tools, machinery, equipment, materials, or structures (including scaffolding, house moving, well drilling, pile driving, or hoisting equipment) unless and until danger from accidental contact with said high-voltage lines has been effectively guarded against.

(b) **Clearances or Safeguards Required.** Except where electrical distribution and transmission lines have been de-energized and visibly grounded or effective barriers have been erected to prevent physical and arcing contacts with the high-voltage lines, the following provisions shall be met:

(1) **Over Lines.** The operation, erection, or handling of tools, machinery, apparatus, supplies, or materials, or any part thereof, over energized high-voltage lines shall be prohibited.

(2) **Equipment and Materials in Use.** The operation, erection, or handling of tools, machinery, equipment, apparatus, materials, or supplies, or any part thereof within the minimum clearances from energized lines set forth in Table X shall be prohibited.

Table X
Required Clearances from Overhead High-Voltage Lines

Nominal voltage (Phase to Phase)	*Minimum Required Clearance (Feet)*
750 - 50,000	10
over 50,000 - 75,000	11
over 75,000 - 125,000	13
over 125,000 - 175,000	15
over 175,000 - 250,000	17
over 250,000 - 370,000	21
over 370,000 - 550,000	27
over 550,000 - 1,000,000	42

(3) **Transportation or Transit.** The transportation or transit of any tool, machinery, equipment, or apparatus, or the moving of any house or other building in proximity to overhead high-voltage lines shall be expressly prohibited if at any time during such transportation or transit such tool, machinery, equipment, apparatus, or building, or any part thereof, can come closer to high-voltage lines than the minimum clearances set forth in Table Y.

Article 86. Provisions for Preventing Accidents

Except where the boom of boom-type equipment is lowered and no load is imposed thereon, the equipment in transit shall conform to the minimum required clearances set forth in Table X.

Table Y
Required Clearances from Energized High-Voltage Conductors (While in Transit)

Nominal Voltage (Phase to Phase)		*Minimum Required Clearance (Feet)*
750–	50,000	6
over 50,000–	345,000	10
over 345,000–	750,000	16
over 750,000–	1,000,000	20

(4) **Storage.** The storage of tools, machinery, equipment, supplies, materials, or apparatus under, by, or near energized high-voltage lines is hereby expressly prohibited if at any time during such handling or other manipulation it is possible to bring such tools, machinery, equipment, supplies, materials, or apparatus, or any part thereof, within the minimum required clearances from high-voltage lines as set forth in Table X.

(c) The specified clearance shall not be reduced by movement due to any strains impressed (by attachments or otherwise) upon the structures supporting the high-voltage line or upon any equipment, fixtures, or attachments thereon.

(d) Insulated cage-type boom guards, boom stops, insulating links, or proximity warning devices may be used on cranes, but the use of such devices shall not alter the required clearances set forth in Table X.

(e) Any overhead conductor shall be considered to be energized unless and until the person owning or operating such line verifies that the line is not energized, and the line is visibly grounded at the work site

2947. **Warning Signs Required.** The owner, agent, or employer responsible for the operations of equipment shall post and maintain in plain view of the operator and driver on each crane, derrick, power shovel, drilling rig, hay loader, hay stacker, pile driver, or similar apparatus, a durable warning sign legible at 12 feet reading: **"Unlawful To Operate This Equipment Within 10 Feet Of High-Voltage Lines of 50,000 Volts Or Less."**

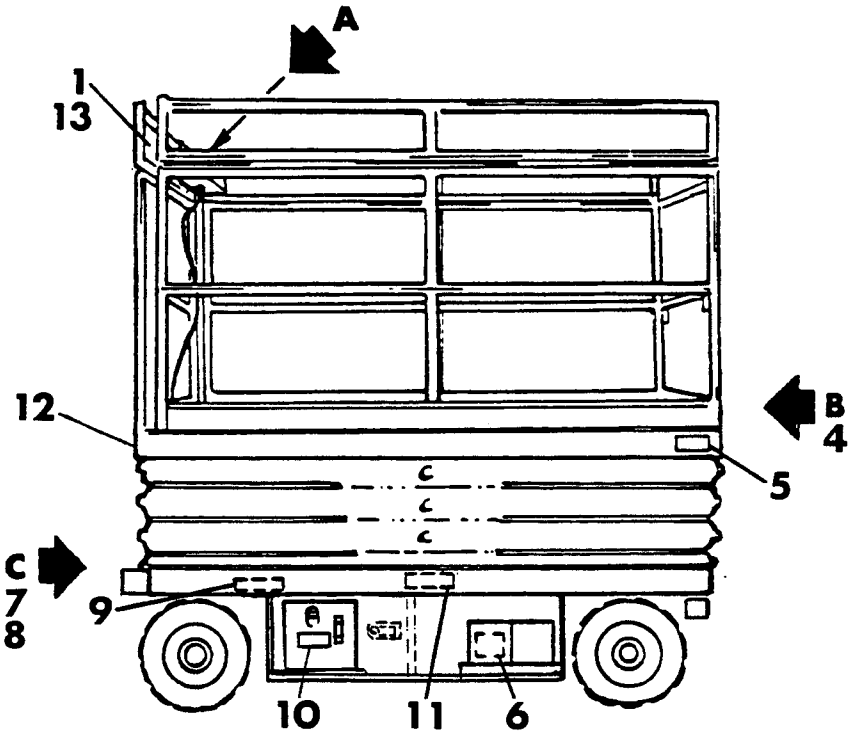
In addition to the above wording, the following statement in small lettering shall be provided on the warning sign: **"For Minimum Clearances of High-Voltage Lines In Excess of 50,000 Volts, See Article 86, Title 8, High-Voltage Electrical Safety Orders."**

MARKLIFT SELF-PROPELLED SCISSOR

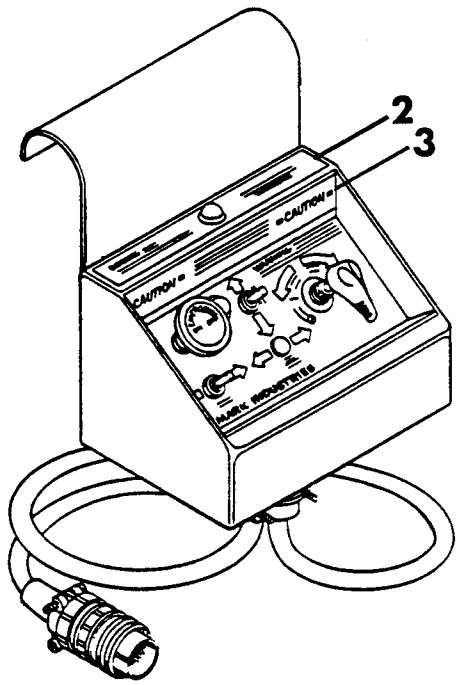
(SMALL SLAB MODELS)

Be completely familiar with all warning and caution decals that are posted on the unit.

Keep in mind to be alert and use common sense and judgement in responding to dangerous situations and conditions that might develope during unit operation.

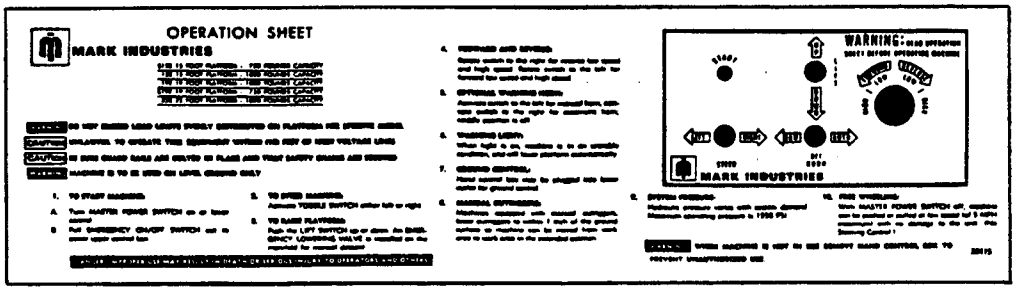


MODEL S15E SHOWN - OTHER
MODEL DECAL LOCATIONS SIMILAR



VIEW A
HAND CONTROL BOX

1



2

WARNING: LIGHT INDICATES UNSTABLE CONDITION

PLATFORM WILL LOWER AUTOMATICALLY

2015

3

CAUTION — UNLAWFUL TO OPERATE THIS EQUIPMENT WITHIN 10 FEET OF HIGH VOLTAGE LINES — CAUTION

2014

7

BATTERY CHARGER PLUG 115 VOLT ONLY

2005

4 This machine has been designed and tested to meet these standards:
ANSI A92.2 1969
ANSI A92.3 1973
OSHA GISO 1910.67

2018-1

VIEW B

6 IMPORTANT

CHECK BATTERY WATER LEVEL AT LEAST ONCE A WEEK.

2003

5 LOAD CAPACITY LBS.
(EVENLY DISTRIBUTED LOAD)

8 DO NOT LIFT FROM THIS END

2011

VIEW C

(19E & S19E)

9 EMERGENCY LOWERING VALVE
↓ OPEN VALVE TO LOWER PLATFORM

10 THE HYDRAULIC SYSTEM OF THIS MACHINE IS DESIGNED TO USE G.M. TRANSMISSION FLUID TYPE "B" WITH DEXRON

2017

11 — WARNING —

DO NOT WORK UNDERNEATH THIS LIFT UNLESS IT IS MECHANICALLY LOCKED.

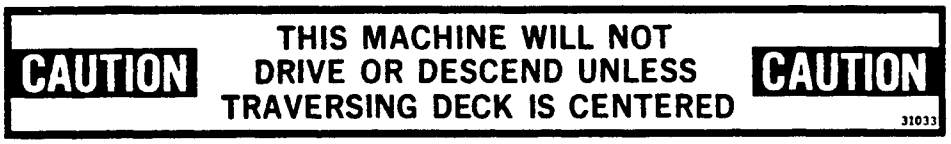
see service manual for location and use of mechanical locks

2016

12



13



TRAVERSING DECK MODELS

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)

It shall be the responsibility of all users of the Marklift to read and comply with the following operating instructions. They are designed to promote safety and a better understanding of the operation of the self-propelled aerial platform.

1. STARTING

The Marklift can be started from either the hand control box or the switch panel located in the bellypan component box under the frame of the machine. Before either position will function the Selector Switch must be activated. Push the Selector Switch in the component box to the left to activate the hand control box -- to the right to activate the component box switch panel.

A. HAND CONTROL BOX

After the Selector Switch has been turned to the left, pull out the red emergency ON/OFF button located in the upper left corner of the hand control box. Electric models are now operational.

B. COMPONENT BOX SWITCH PANEL

After the Selector Switch has been turned to the right, electric models are immediately operational. NOTE: The only functions that can be operated from the component box are ON/OFF and the lift circuit.

C. COMPONENT BOX EMERGENCY ON/OFF SWITCH

This red button is located at the front end of

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)

the component box under the frame. The button can be pulled out for ON or pushed in for OFF.

2. STEERING

The steering of the machine is done from the hand control box only. By pushing the toggle switch for the steering to the left, the front wheels will go left. Pushing the switch to the right, the front wheels will go to the right. Because a momentary type switch is used, when the operator releases the switch it will automatically return to the off position. The wheels will remain at an angle until returned, by pushing the toggle switch in the opposite direction.

3. LIFT

Raising and lowering of the platform is done from either the hand control box or the switch panel in the bellypan component box. A momentary switch has been positioned so that in order to raise the platform the operator must push the switch to the up position, and to lower the platform the operator must push the switch to the down position. When the switch is released, it will automatically return to the off position, and the platform will remain stationary.

There is an emergency lowering valve which can be reached through the hole in the front door of the bellypan component box. This valve, as part of the hydraulic system, can be used to safely lower

the platform if there is a loss of electrical power, or if the operator is injured while on the fully extended platform. Before the platform will lift again the emergency lowering valve must be closed.

4. TRAVEL

Forward and reverse travel of the machine is done from the hand control box only. The machine is capable of three speeds for both forward and reverse travel: Low speed, high speed and creep speed. Low and high speed travel is activated with a rotary switch. Turning the switch to forward travel; first position is low speed; second position is high speed. Turning the switch to reverse travel; the first position is low speed; second position is high speed.

5. FREE WHEELING

In order to move the machine is a free wheeling condition for loading, unloading and positioning, make sure that the component box selector switch is in the OFF position. The Marklift can be free-wheeled at a low speed (5 mph maximum) without damage to any of the components or structure.

6. OUTRIGGERS (OPTION)

The Marklift has been designed to meet all safety standards as interpreted by Mark Industries without the use of outriggers except on platform heights of 30 feet or over. However, for increased stability, outriggers are offered as an option on the (19E), (S19E) and (S19EX) units.

A. MANUAL OUTRIGGERS

Each manual outrigger must be extended individually before raising the platform. They may be extended to within one (1) inch of the ground surface to allow movement from work-area to work-area.

7. WARNING HORN (OPTION)

For some industrial applications, and to meet certain particular safety requirements, a warning horn may be needed. The warning horn option on the Marklift can be used as an automatic movement indicator, or manually activated, as required. The horn is activated by a 3-position switch on the hand control box. The middle position is OFF. When the switch is pushed to the right the horn will sound when either the drive or lift function is activated (forward and reverse up and down).

8. WARNING LIGHT

As a safety feature the Marklift has been equipped with a series of mercury switches that will cut-out the lift circuit whenever the unit is in an unstable condition. An unstable condition consists of a tilt of three (3) degrees side and six (6) degrees forward and aft. the platform is extended it will automatically descend. If the platform is already in the down position, it cannot be raised. This unstable condition is indicated by a light located in the top center of the control box.

9. HYDRAULIC SYSTEM PRESSURE

MARK INDUSTRIES has incorporated an integrated hydraulic system in all models. To prevent damage to either the

pumps or any other part of the hydraulic system, the pump settings should be as follows:

Maximum pressure 1950 PSIG for Small Slab Models.

DISC BRAKE ADJUSTMENT

THIS PROCEDURE IS TO BE FOLLOWED WHEN THE DISC BRAKES NEED TO BE ADJUSTED.

1. LIFT THE DRIVE END OF THE MACHINE.
2. APPLY HYDRAULIC PRESSURE TO RETRACT (OPEN) THE BRAKES. SWITCH ON LOW SPEED DRIVE (FORWARD OR REVERSE).
3. USING A 1/8" ALLEN WRENCH, LOOSEN THE SET SCREW LOCATED ON TOP OF THE CALIPER ASSEMBLY. (SEE ITEM - 16 OF FIG. 17 IN PARTS SECTION).
4. SLIGHTLY LOOSEN THE TUBE NUT TO ALLOW TURNING ADJUSTMENT OF BRAKE MODULE.
5. PREVENT THE WHEEL FROM TURNING AND PLACE A.012 FEELER GAUGE BETWEEN LINING AND DISC. SCREW IN BRAKE MODULE UNTIL FEELER GAUGE IS TIGHT BETWEEN LINING AND DISC; THEN, BACK OFF BRAKE MODULE UNTIL FEELER GAUGE IS FREE. USE SPANNER WRENCH IF NECESSARY.
6. TIGHTEN THE SET SCREW BACK.
7. TIGHTEN THE HYDRAULIC FITTING (TUBE NUT).

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)

HYDRAULIC FLUID TABLE

Oil Company	Chevron	Gulf	Shell	Union
Brand Name	ATF Dexron 11	ATF Dexron 11	Donax-T6	ATF Dexron
Viscosity -				
Sus @ 100°F	187.4	195	200	200
Sus @ 210°F	49.2	50.4	50	52.3
Viscosity Index typical	153°	155°	160°	172°
Flash Point°F	400°	405°	390°	395°
Pour Point°F	-40°	-50°	-50°	-45°

SERVICE TOOLS

To properly and efficiently service your Marklift, several basic tools are required. The following list of tools should be available.

1. Volt/Ohm Meter
2. Hydraulic Pressure Guage (0-3000 PSI)
3. Female Quick Disconnect Coupler (P/N 842)
4. Battery Hydrometer
5. Battery Load Tester
6. Standard Mechanics Hand Tools
7. Scissor Arm Supports
8. Electrical Test Light
9. Hydraulic Pressure Gauge (0-1000 PSI)

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)

INTRODUCTION

Whenever trouble shooting any problem the initial consideration MUST be to "Check the basics".

Check the basics, means to insure that the batteries are in good shape, and have at least a three quarter charge, determined by use of a hydrometer, and battery maintenance instructions (page 23)

A large percentage of electrical problems can be attributed to insufficiently charged or defective batteries.

(Some Helpful Hints)

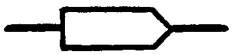
ELECTRICAL

1. If problem seems to be electrical, utilize your applicable schematic, and test light to trace power flow (electrical current) starting at battery and continuing through system until the problem is located.

2. Keep in mind, if you DO NOT have a good ground to a valve coil, relay etc., then even if you have proper electrical current to the coil or relay, the item will not function properly.

3. Diodes can be thought of as "One way electrical check valves" they permit current flow in one direction and stop it in the opposite direction.

Current Flow.



ACTUAL



SCHEMATIC

4. The basic purpose of a relay is to maintain full electrical current. When sending an electrical signal to the relay coil, the electrical current flows through relay contacts and to the desired valve coil.

HYDRAULIC

1. For the various functions the system pressure is utilized. If a slower drive speed is needed, a portion of the hydraulic fluid is dumped to tank by the creep or low speed valve.

2. Directional valves (Steering and Drive) have two opposite electrical coils with a moveable spool between the coils.

3. One way valves (Lift, Descent, Dump, Creep) can be both N/C (Normally Closed) or N/O (Normally Open) depending on if flow is desired or not.

(Trouble Shooting Check List)

LIFT

1. Will not lift. All other functions work.
   A. Emergency lowering valve is open.
   B. Loose electrical connections.
   C. Descent valve stuck open.
   D. Pressure limit switch out of adjustment.
   E. Tilt switches out of adjustment.
2. Will not lift rated load.
   A. Low system pressure.
   B. Pressure limit switch out of adjustment.
   C. Internal seal leaking in cylinder.

STEERING

1. Steers in one direction only.
   A. Loose electrical connection.
   B. Loss of ground to coil on affected direction.
   C. Spool sticking in one direction.
   D. Faulty steering switch in hand control box.
   E. Flow control valve to steering cylinder out of adjustment.
   F. Faulty diode.

DRIVE

1. Will drive forward. No reverse.
   A. Loose electrical connection in reverse circuit.
   B. Faulty drive switch.
   C. Valve spool sticking in one direction.
   D. Faulty diode.
2. No forward or reverse drive.
   A. Free wheeling valve open.
   B. Faulty drive switch
   C. Both forward and reverse diodes inoperative on terminal strip.
   D. Stuck valve spool
   E. Drive cut out switch in outrigger inoperative.
3. No high speed.
   A. Loose electrical connections.
   B. Low speed relay inoperative.
   C. High speed dump valve inoperative.
   D. High speed valve inoperative (3 speed machines only).
4. No creep speed.
   A. Loose electrical connections.
   B. Creep speed relay inoperative.
   C. Faulty creep switch.

D. Faulty creep dump valve.
E. Creep or low speed flow valve out of adjustment.

5. No functions working.
   A. Faulty circuit breaker.
   B. Loose power connections.
   C. Power relay inoperative (Electric Machines Only).
   D. Dump relay.
   E. Dump valve inoperative.

6. No system pressure.
   A. No hydraulic oil.
   B. Hydraulic tank valve is in "OFF" position.
   C. Loose electrical connections in dump circuit.
   D. Dump relay inoperative.
   E. Dump valve inoperative.
   F. Pressure relief valve inoperative.
   G. Hydraulic pump inoperative.

7. Low System pressure.
   A. Pressure relief valve out of adjustment.
   B. Dump valve faulty.
   C. Low speed dump valve faulty.
   D. Hydraulic pump faulty.
   E. Hydraulic tank sump filter obstructed.

If this trouble shooting check list does not help to solve your problem, contact your local MARKLIFT representative or the MARK INDUSTRIES Service Department.

MARKLIFT SELF-PROPELLED SCISSOR
(SMALL SLAB MODELS)

QUANTITY	PART NO.	DESCRIPTION
2	2206-2	Drive Hub
10	2227	Cone Bolts
6	4027	Terminal Block
3	117A	Terminal Block End
8	4021	Momentary Switches
12	4045	Diode (6 AMP)
2	3004	Sump Filter
2	4106	Forward and Reverse Switch
3	4018	Emergency On/Off Switch
4	4073	6 Volt Long Coil for Manifold
4	4074	6 Volt Short Coil for Manifold
1	2297	Pressure Switch
2	3045	Dump Valve
1	3047	Low Speed Valve
3	3051	Lift/Lowering Valve
4	4032	6 Volt Relay
2	3061 (Before 3/1/80)	1/4" Inline Filter Assembly
6	3061A (Before 3/1/80)	Filter Element, O-Ring, Gasket
2	63H	Charger Timer
2	4014	Mercury Switch
1	4020	On/Off Switch
1	4067-1	Hand Control Box
1	3039B (Before 3/1/80)	Pump (Only)
1	3053	Emergency Lowering Valve
1	5300	Emergency On/Off Knob
1	3009-1 (1 1/2 ROD)	Seal Kit - Lift Cylinder (15E) (S15E) (S15EX)
1	3011-1 (1 1/2 ROD)	Seal Kit - Lift Cylinder (19E) (S19E) (S19EX)
1	3036A	Seal Kit - Wheel Motor
1	3012-1 (1 1/4 ROD)	Seal Kit - Kick Cylinder
1	3039A (Before 3/1/80)	Motor (ONLY)

RECOMMENDED SPARE PARTS LIST

QUANTITY	PART NO.	DESCRIPTION
1	3014-1	Seal Kit - Steering Cylinder
1	3015-1	Pump (ONLY) (S19)(All Slab Models
1	3015-2	Motor (ONLY) (S19) After 3/1/80)
1	30306	Return Line Filter Assembly
4	16947	Return Line Filter Element

MARKLIFT SELF-PROPELLED SCISSOR
(MEDIUM SLAB MODELS)

A new fully charged battery will have a specific gravity of 1.260 or 1.280 at 80° F.

The tables (on page 25) show the specific gravity as a function of percentage battery charge.

1.260 Sp. Gr.	1.280	100% charged
1.230	1.250	75% charged
1.200	1.220	50% charged
1.170	1.190	25% charged
1.40	1.160	Very little useful capacity
1.110	1.130	Discharged

The percentage charge of a battery should be checked with a good hydrometer that has a thermometer and temperature correction scale built into it. This allows a temperature correction to be made readily. A correction of .04 points in gravity shall be made for each ten degrees either above or below 80° F. For every 10° F below 80° F, subtract .04 points; and for every 10° above 80° F, add .04 points.

Within every thirty day period, the cell of each battery should be checked to determine the percentage charge. If any cell has a hydrometer reading of more than .020 less than the other cells in the battery, that cell is bad and the battery should be removed from service.

Periodic checks by hydrometer after charging, but prior to any discharge, is recommended to determine if batteries are receiving a full charge.

dercharge can

harging time,
ies should give

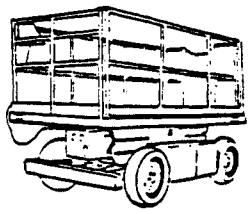
FOR BATTERIES

mperature*

°F	-65°F	Approx. State of Charge
°C)	(-54°C)	In %
30	1.338	100
00	1.308	75
70	1.278	50
40	1.248	25
10	1.218	0

Temperature

-68°C
-52°C
-27°C
-15°C
- 7°C



MARK INDUSTRIES

MARKLIFT SCISSOR
MAINTENANCE CHECK LIST

Model: _____ Serial No. _____

Date: _____ Equip. No. _____

Location: _____ Mechanic: _____

	ITEM	CODE	COMMENTS		ITEM	CODE	COMMENTS
1	Engine Oil			26	Safety Cut-outs		
2	Engine Oil Filter			27	Bushing		
3	Air Filter			28	Rollers		
4	Fuel Filter			29	Front End Assy.		
5	Tune-up			30	Tire Pressure		
6	Choke			31	Tire Condition		
7	Engine RPM			32	Lug Nuts		
8	Chargine System			33	Wheel Bearing		
9	Fuel System LPG-GAS			34	Nut & Bolts		
10	Batteries			35	Guard Rails		
	Battery Terminals			36	Lubrication		
12	Motor Brushes			37	Warning Decals		
13	Hydraulic Fluid			38	Operation Sheet		
14	Hyd. Oil Filter			39	General Decals		
15	Hydraulic System			40	Paint		
16	Hydraulic Pressure			41	All Operations		
17	Hydraulic Hoses			42	Lift		
18	Cylinders			43	Steering		
19	Drive Motors			44	Creep Drive		
20	Brakes			45	Low Drive		
21	Emergency Lowering Valve			46	High Drive		
22	Hand Control Box			47	Tilt Switches		
23	Lower Controls			48	Fuel Level		
24	Relays			49	Literature		
25	Wire Connections			50	Options		

CODE

F - Filled
R - Repaired
C - Checked
A - Adjusted
X - Needs Repair

Other Comments:

MARK INDUSTRIES

MARKLIFT SERVICE MAINTENANCE RECORD

MODEL: _____

SER. NO.: _____

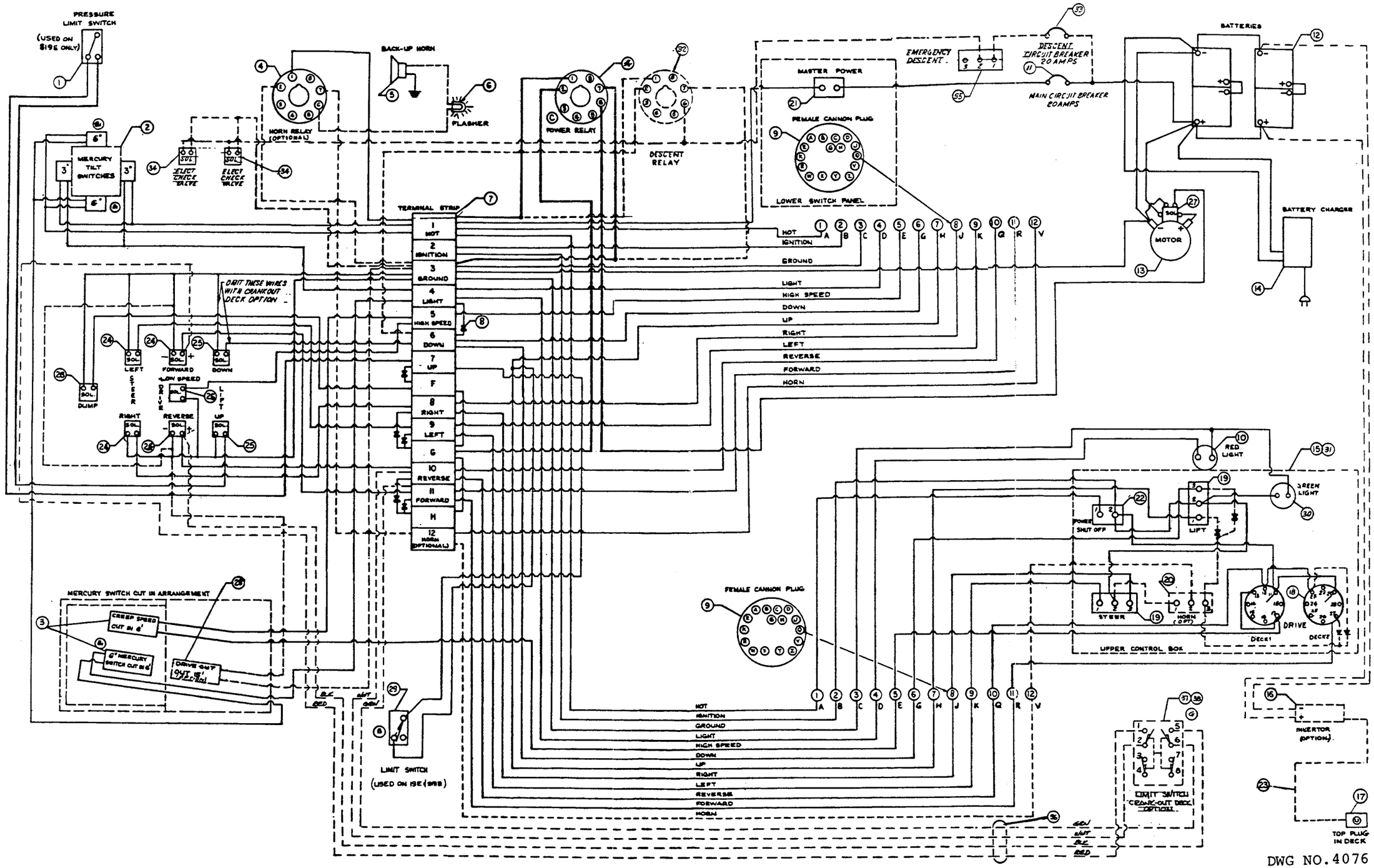
DATE SOLD _____

DATE IN SERVICE _____ OPTIONS _____ WARRANTY PERIOD _____

CODE:
C—CHECKED N—NEW PART
A—ADJUSTED X—NEEDS REPAIR
R—REPAIRED

DATE	W.O.	MECH.	HR METER	PREVENTATIVE MAINT.												ELECTRICAL						HYDRAULIC												FUEL				STEER				TIRE		MAJ.		MISC.					
				OIL CHANGE	OIL FILTER	AIR CLEANER	HYDRAULIC OIL CHANGE	HYDRAULIC OIL FILTER	WHEEL BEARING PACK	DRIVE MOTOR	PUMP MOTOR BRUSHES	ELECTRICAL CONTROLS	TRANS & DIFF OIL CHANGE	TUNE UP SPARK PLUGS	GENERATOR	VOLTAGE REGULATOR	BATTERY	STARTER	POINTS AND CONDENSER	HYDRAULIC SYSTEM	LEV CYL	LIFT CYL SEALS	HYDRAULIC CONTROL VALVE	HYD PUMP	ROTARY MANIFOLD	LIFT ROLLERS	HYD HOSES	BRAKES	FUEL SYS	CARBURATOR	FUEL PUMP	STEERING	STEER GEAR	STEER CYL	DRIVE TIRE	STEER TIRE	ENGINE O/H	DRIVE AXLE O/H								

DATE	REMARKS	DATE	REMARKS	AGENCY


PRESSURE LIMIT SWITCH
(USED ON 819E ONLY)
MERCURY TILT SWITCHES
6"
3"
3"
6"
SOL
ELECT CHECK VALVE
ELECT CHECK VALVE
HORN RELAY (OPTIONAL)
BACK-UP HORN
FLASHER
POWER RELAY
DESCENT RELAY
TERMINAL STRIP
1 HOT
2 IGNITION
3 GROUND
4 LIGHT
5 HIGH SPEED
6 DOWN
7 UP
F
8 RIGHT
9 LEFT
G
10 REVERSE
11 FORWARD
H
12 HORN (OPTIONAL)
DIGIT THESE WIRES WITH A CRANK OUT DECK OPTION
DUMP
LEFT
FORWARD
DOWN
STEER
LIFT
LOW SPEED
RIGHT
REVERSE
UP
MASTER POWER
FEMALE CANNON PLUG
LOWER SWITCH PANEL
EMERGENCY DESCENT
DESCENT CIRCUIT BREAKER 20 AMPS
MAIN CIRCUIT BREAKER 20AMPS
BATTERIES
MOTOR
BATTERY CHARGER
HOT
IGNITION
GROUND
LIGHT
HIGH SPEED
DOWN
UP
RIGHT
LEFT
REVERSE
FORWARD
HORN
A B C D E G H J K Q R V
1 2 3 4 5 6 7 8 9 10 11 12
MERCURY SWITCH CUT IN ARRANGEMENT
CREEP SPEED CUT IN 6°
6° MERCURY SWITCH CUT IN 6°
DRIVE CUT OUT 19° TILT
LIMIT SWITCH
(USED ON 19E (SSB)
RED LIGHT
GREEN LIGHT
POWER SHUT OFF
LIFT
STEER
HORN (OPT)
DRIVE
DECK1
DECK2
UPPER CONTROL BOX
INVERTOR (OPTION)
LIMIT SWITCH CRANK-OUT DECK (OPTION)
TOP PLUG IN DECK

DWG NO.4076

ELECTRICAL DIAGRAM (SMALL SLAB MODELS)

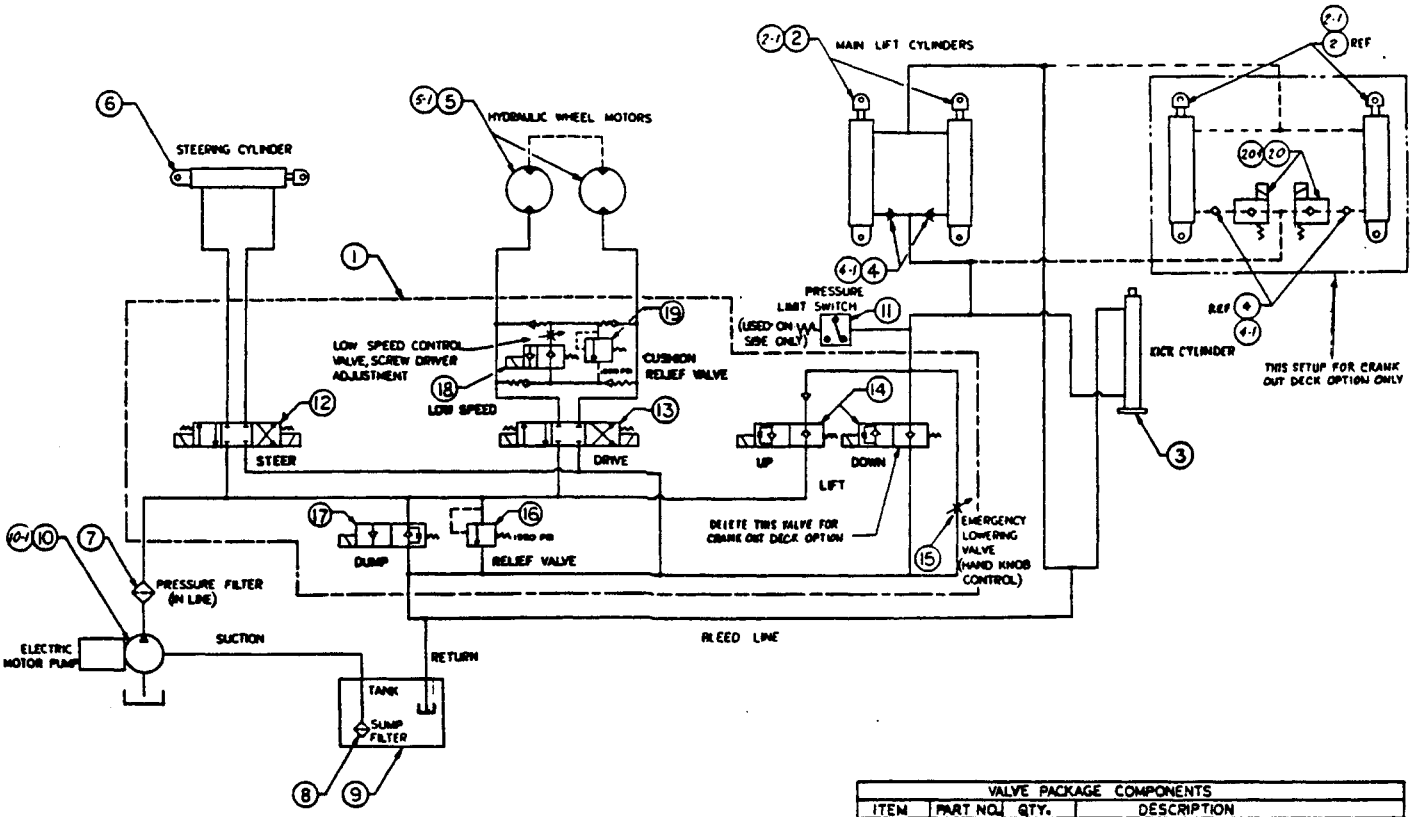
CABLE LENGTH TO ARMS

MACH.	PART NO.	QTY.	LENGTH	SIZE
15E	4035-1	1	28'	NO. 13/16
S15E	4035-1	1	28'	
19E	4035-2	1	36'	
S19E	4035-2	1	36'	

38	20804	1	S15E, S19E (OPTION)	ACTUATOR ASM, LIMIT SWITCH
37	20803	1	S15E, S19E (OPTION)	LIMIT SWITCH
36	2614-36"	1	S15E, S19E (OPTION)	CABLE, 4 CONDUCTOR
35	260	1	S15E, S19E (OPTION)	EMERGENCY DESCENT SWITCH
34	4116	1	S15E (OPTION)	ELECT CHECK VALVE
		2	S19E (OPTION)	
33	20562	1	S15E, S19E (OPTION)	EMERGENCY DESCENT CIRCUIT BREAKER (10AMPS
32	4032	1	S15E, S19E (OPTION)	DESCENT RELAY
31	4067-3	1	15E, S15E, 19E, S19E (OPTION)	UPPER CONTROL BOX (WITH HORN)
30	4107	1	15E, S15E, 19E, S19E	GREEN LIGHT
29	4085	1	19E, S19E	LIMIT SWITCH
28	4014	1	S19E	MERCURY SWITCH
27	4082	1	15E, S15E, 19E, S19E	MOTOR SOLENOID
26	4073	1	15E, S15E, 19E, S19E	DUMP COIL
25	4074	3	15E, S15E, 19E, S19E	LIFT, LOWER, LOW SPEED COIL
24	4073	4	15E, S15E, 19E, S19E	DRIVE, STEER COIL
23	4034-1	1-39'LG.	(OPTION) 19E, S19E	ELECTRIC WIRE NO. 14/3
	4034-4	1-34'LG.	15E, S15E, (OPTION)	WIRING HARNESS BASE TO PLATFORM
22	4018	1	15E, S15E, 19E, S19E	EMERGENCY ON AND OFF SWITCH
21	4013	1	15E, S15E, 19E, S19E	MASTER POWER SWITCH
20	4019	1	(OPTION) S15E, 19E, S19E, 15E	HORN SWITCH
19	4021	2	15E, S15E, 19E, S19E	MOMENTARY SWITCHES
18	4106	1	15E, S15E, 19E, S19E	HIGH AND LOW SPEED DRIVE SWITCH
17	4060	1	(OPTION) 15E, S15E, 19E, S19E	RECEPTACLE
16	4075	1	(OPTION) 15E, S15E, 19E, S19E	INVERTOR
15	4067-1	1	15E, S15E, 19E, S19E	UPPER CONTROL BOX ASSY.
14	4006	1	15E, S15E, 19E, S19E	BATTERY CHARGER
13-1	3015	1	S19E	MOTOR PUMP JOHN BARNES 12 VOLTS
13	3039	1	15E, S15E, 19E	MOTOR PUMP JOHN BARNES 12 VOLTS
12	4007	4	19E, S19E	6 VOLTS, 250 AMP. BATTERY
		2	15E, S15E	
11	20562	1	15E, S15E, 19E, S19E	MAIN CIRCUIT BREAKER 20 AMP
10	4031	1	15E, S15E, 19E, S19E	LIGHT
9	4026-2	1	15E, S15E, 19E, S19E	FEMALE CANNON PLUG
8	4045	4	(OPTION) 15E, S15E, 19E, S19E	DIODES
		7	(STANDARD) 15E, S15E, 19E, S19E	
7	4027	15	15E, S15E, 19E, S19E	TERMINAL BLOCK (14) STD (1) OPTIONAL
6	4029	1	(OPTION) 15E, S15E, 19E, S19E	FLASHER
5	4028	1	(OPTION) 15E, S15E, 19E, S19E	BACK-UP HORN
4	4032	2	15E, S15E, 19E, S19E	HORN RELAY (OPTIONAL) POWER RELAY (STD.)
3	4014	2	15E, S15E, 19E	MERCURY SWITCH
2	4008-103	1	15E, S15E, 19E, S19E	MERCURY TILT SWITCHES ARRANGEMENT
1	2297	1	S19E	PRESSURE LIMIT SWITCH

ITEM	PART NO.	QTY. PER MACH.	MACHINE USED ON:	DESCRIPTION	DWG NO. 4076

HYDRAULIC SCHEMATIC (SMALL SLAB MODELS)

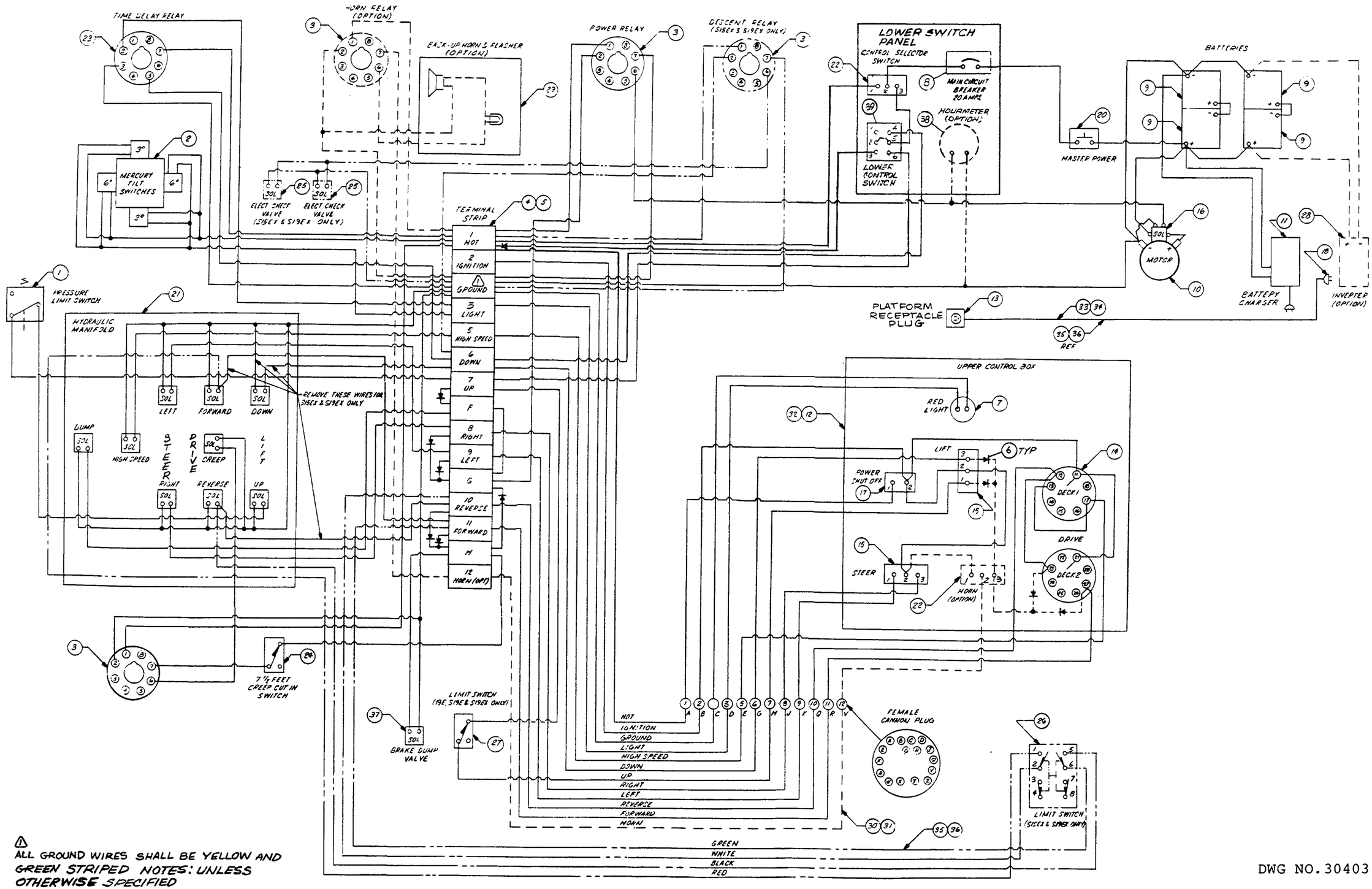


VALVE PACKAGE COMPONENTS			
ITEM	PART NO.	QTY.	DESCRIPTION
12	3019-2	1	STEERING VALVE ASSY.
13	3019-3	1	DRIVE VALVE ASSY.
14	3051	2	LIFT/LOWERING VALVE
15	3053	1	EMERGENCY LOWERING VALVE
16	3044	1	RELIEF VALVE
17	3045	1	DUMP VALVE
18	3047	1	LOW SPEED VALVE
19	3046	1	CUSHION RELIEF VALVE

NOTE:
1. VALVE PACKAGE PART NO. 3019 IS ENCLOSED BY PHANTOM LINES WHICH IS ITEM 1 AS SHOWN.

ITEM	PART NO.	QTY. PER MACH.	MACHINE USED ON:	DESCRIPTION	DWG NO. 3030
20-1	4116	2	S19E (OPTION)	ELECTRICAL CHECK VALVE	
20	4116	1	S15E (OPTION)		
11	2297	1	S19E	PRESSURE LIMIT SWITCH	
10-1	3015	1	S19E	MOTOR PUMP JOHN BARNES 12 VOLTS	
10	3039	1	S15E, 15E, 19E,	MOTOR PUMP JOHN BARNES 12 VOLTS	
9	7902	1	9I5E, 15E, 19E, S19E	HYDRAULIC TANK	
8	3004	1	S15E, 15E, 19E, S19E	SUMP FILTER	
7	3061	1	S15E, 15E, 19E, S19E	PRESSURE FILTER (IN LINE)	
6	3014	1	S15E, 15E, 19E, 919E	STEERING CYLINDER	
5-1	3040	2	S19E	HYDRAULIC WHEEL MOTOR MAB 24003	
5	3002	2	S15 E, 19E, 15E	HYDRAULIC WHEEL MOTOR MAB 16003	
4-1	3028	2	19E, S19E	DESCENT VALVE	
4	2028	1	S15E, 15E		
3	3012	1	S15E, 15E, 19E, S19E	KICK CYLINDER	
2-1	3011	2	19E, S19E	MAIN LIFT CYLINDER	
2	3009	1	S15E, 15E		
1	3019	1	S15E, 15E, 19E, S19E	HYDRAULIC CONTROLS, BASIC SYSTEM	

ELECTRICAL DIAGRAM (SMALL SLAB MODELS) 1980

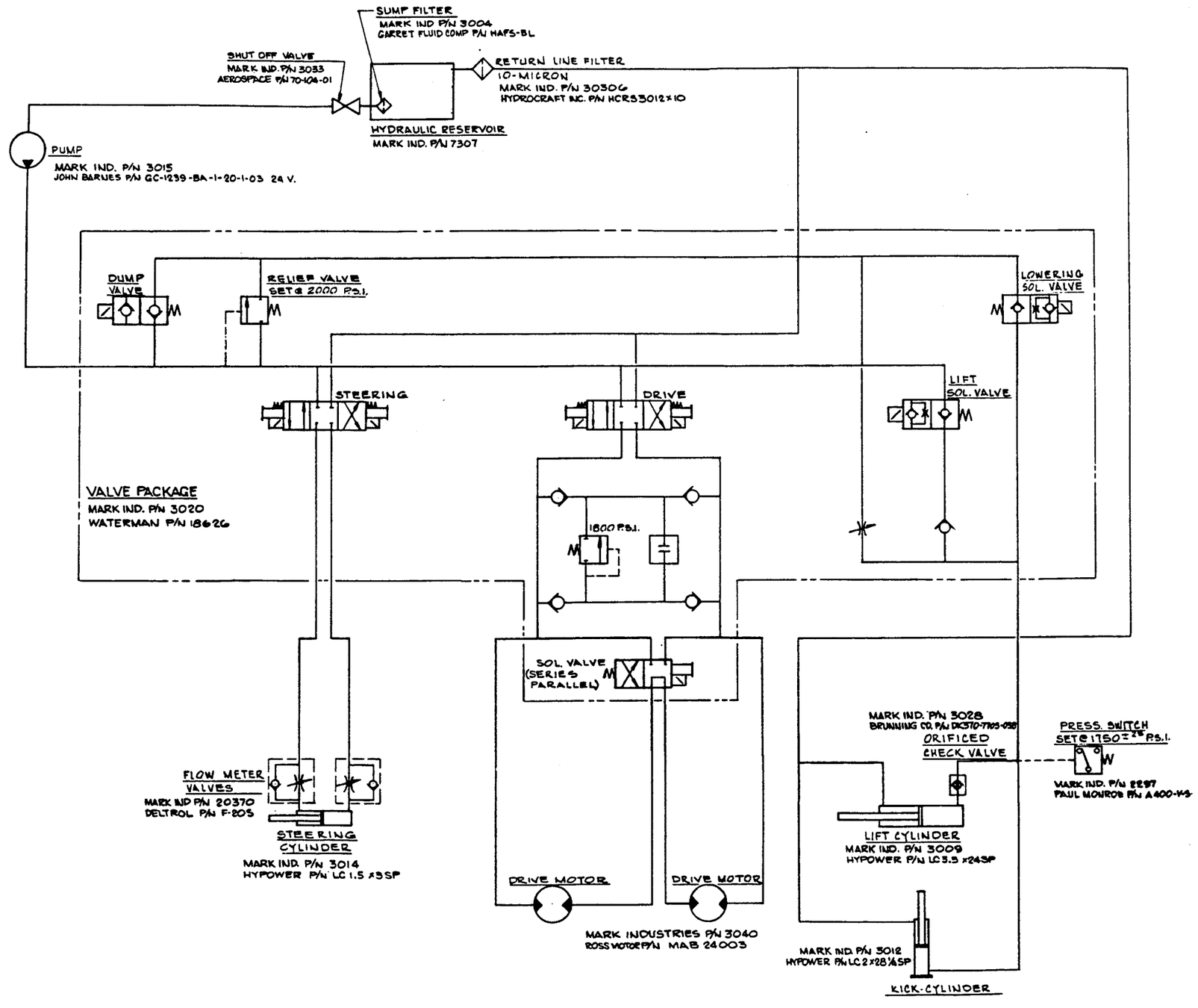


⚠ ALL GROUND WIRES SHALL BE YELLOW AND GREEN STRIPED NOTES: UNLESS OTHERWISE SPECIFIED

DWG NO. 30403

ELECTRICAL DIAGRAM (SMALL SLAB MODELS) 1980

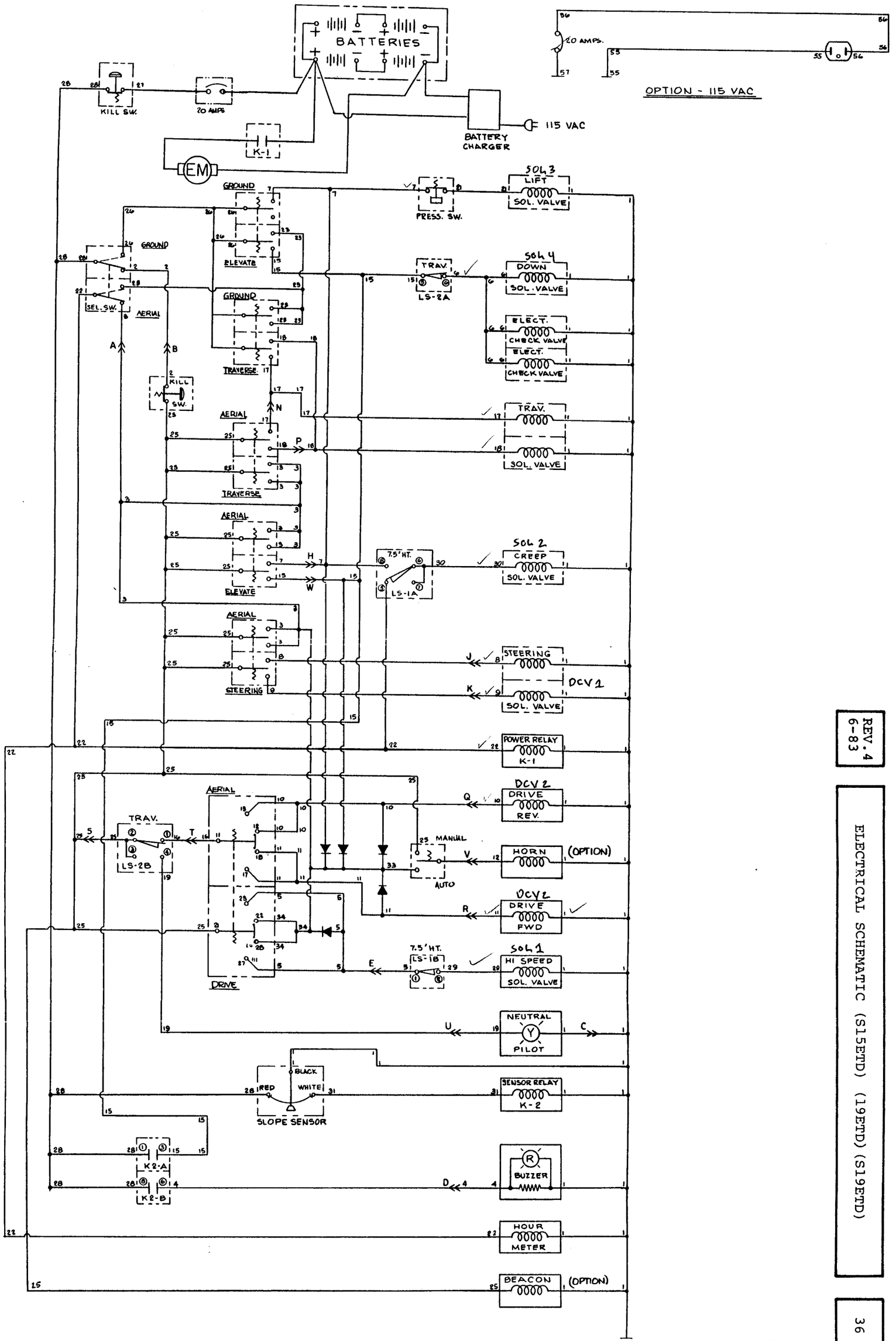
			1	1	1	1	1	1	39	20491	ON OFF SWITCH	
1									38	20571	HOURMETER	
			1	1	1	1	1	1	37	30460	3 WAY VALVE	
			1						36	16293	CABLE	7 CONDUCTOR 39 FEET LG
						1			35	16293	CABLE	7 CONDUCTOR 34 FEET LG
							1	1	34	4034-4	CABLE	3 CONDUCTOR 34 FEET LG
				1	1				33	4034-1	CABLE	3 CONDUCTOR 39 FEET LG
		1							32	4067 3	UPPER CONTROL BOX ASSEMBLY	
			1	1	1				31	4035-2	CABLE HARNESS ASSEMBLY	
						1	1	1	30	4035-1	CABLE HARNESS ASSEMBLY	
		1							29	30408	BACK-UP HORN & FLASHER	
	1								28	4075	INVERTER	
			1	1	1				27	4085	LIMIT SWITCH	
			1			1			26	20373	LIMIT SWITCH	
			2			1			25	4116	ELECTRICAL CHECK VALVE	
			1	1	1	1	1	1	24	20803	LIMIT SWITCH	
			1	1	1	1	1	1	23	20523	TIME DELAY RELAY	
		1	1	1	1	1	1	1	22	4019	MAINTAIN SWITCH	
			1	1	1	1	1	1	21	3020	HYDRAULIC MANIFOLD	
			1	1	1	1	1	1	20	4013	MASTER POWER SWITCH	
			1	1	1	1	1	1	18	2624	PLUG 3 PRONG	
			1	1	1	1	1	1	17	4018	EMERGENCY ON OFF SWITCH	
			1	1	1	1	1	1	16	4082	STARTER SOLENOID	
			3	3	3	3	3	3	15	4021	MOMENTARY SWITCH	
			1	1	1	1	1	1	14	4106	DRIVE SWITCH	
			1	1	1	1	1	1	13	4060	RECEPTACLE	
			1	1	1	1	1	1	12	4067-1	UPPER CONTROL BOX ASSEMBLY	
			1	1	1	1	1	1	11	4006	BATTERY CHARGER	
			1	1	1	1	1	1	10	3015	MOTOR PUMP	12 V
			4	4	4	4	4	4	9	4007	BATTERY	6 V 250 AMPS
			1	1	1	1	1	1	8	20562	CIRCUIT BREAKER	20 AMPS
			1	1	1	1	1	1	7	4031	LIGHT	RED
		4	6	6	6	6	6	6	6	4045	DIODE	6 AMPS
			1	1	1	1	1	1	5	117A	TERMINAL BLOCK END	
			15	15	15	15	15	15	4	4027	TERMINAL BLOCK	
		1	3	2	2	3	2	2	3	4032	RELAY	
			1	1	1	1	1	1	2	30387	TILT SWITCH ASSEMBLY	
			1	1	1	1	1	1	1	2297	PRESSURE LIMIT SWITCH	
11050	11018	11011	S19EX	S19E	19E	S15EX	S15E	15E	ITEM NO.	PART OR IDENTIFYING NO.	DESCRIPTION	DATA: SPECIFICATIONS SIZES, NOTES, SUPPLIERS.
QTY PER OPTION			QTY PER STANDARD MACHINE								BILL OF MATERIAL	DWG NO. 30403


SUMP FILTER
MARK IND P/N 3004
GARRET FLUID COMP P/N HAFS-BL
SHUT OFF VALVE
MARK IND. P/N 3033
AEROSPACE P/N 70-104-01
RETURN LINE FILTER
10-MICRON
MARK IND. P/N 30306
HYDROCRAFT INC. P/N HCR53012×10
HYDRAULIC RESERVOIR
MARK IND. P/N 7307
PUMP
MARK IND. P/N 3015
JOHN BARLIES P/N GC-1239-BA-1-20-1-03 24 V.
DUMP VALVE
RELIEF VALVE SET @ 2000 P.S.I.
LOWERING SOL. VALVE
STEERING
DRIVE
LIFT SOL. VALVE
VALVE PACKAGE
MARK IND. P/N 3020
WATERMAN P/N 18626
1800 P.S.I.
SOL. VALVE (SERIES PARALLEL)
MARK IND. P/N 3028
BRUNNING CO. P/N DK310-T105-030
ORIFICED CHECK VALVE
PRESS. SWITCH
SET @ 1750 +25 P.S.I.
MARK IND. P/N 8297
PAUL MONROE P/N A400-V-S
FLOW METER VALVES
MARK IND P/N 20370
DELTROL P/N F-805
STEERING CYLINDER
MARK IND. P/N 3014
HYPOWER P/N LC 1.5 ×3 SP
LIFT CYLINDER
MARK IND. P/N 3009
HYPOWER P/N LC 3.5 ×24 SP
DRIVE MOTOR
DRIVE MOTOR
MARK INDUSTRIES P/N 3040
ROSS MOTOR P/N MAB 24003
MARK IND P/N 3012
HYPOWER P/N LC 2 ×28 1/8 SP
KICK-CYLINDER

DWG NO.30590

ELECTRICAL DIAGRAM (SMALL SLAB MODELS) (APRIL 1982)

			1	1	1	1	1	1	39	20481	ON OFF SWITCH	
1									38	20571	HOURMETER	
			1						36	16293	CABLE	7 CONDUCTOR 39 FEET LG
						1			35	16293	CABLE	7 CONDUCTOR 34 FEET LG
							1	1	34	4034-4	CABLE	3 CONDUCTOR 34 FEET LG
				1	1				33	4034-1	CABLE	3 CONDUCTOR 39 FEET LG
		1							32	4067-3	UPPER CONTROL BOX ASSEMBLY	
			1	1	1				31	4035-2	CABLE HARNESS ASSEMBLY	
						1	1	1	30	4035-1	CABLE HARNESS ASSEMBLY	
		1							29	3040B	BACK-UP HORN & FLASHER	
	1								28	4075	INVERTER	
			1	1	1				27	4085	LIMIT SWITCH	
			1			1			26	20373	LIMIT SWITCH	
			2			1			25	4116	ELECTRICAL CHECK VALVE	
			1	1	1	1	1	1	24	20803	LIMIT SWITCH	
			1	1	1	1	1	1	23	20523	TIME DELAY RELAY	
		1	1	1	1	1	1	1	22	4019	MAINTAIN SWITCH	
			1	1	1	1	1	1	21	3020	HYDRAULIC MANIFOLD	
			1	1	1	1	1	1	20	4013	MASTER POWER SWITCH	
			1	1	1	1	1	1	18	2624	PLUG 3 PRONG	
			1	1	1	1	1	1	17	4018	EMERGENCY ON OFF SWITCH	
			1	1	1	1	1	1	16	4082	STARTER SOLENOID	
			3	3	3	3	3	3	15	4021	MOMENTARY SWITCH	
			1	1	1	1	1	1	14	4106	DRIVE SWITCH	
			1	1	1	1	1	1	13	4060	RECEPTACLE	
			1	1	1	1	1	1	12	4067-1	UPPER CONTROL BOX ASSEMBLY	
			1	1	1	1	1	1	11	4006	BATTERY CHARGER	
			1	1	1	1	1	1	10	3015	MOTOR PUMP	12 V
			4	4	4	4	4	4	9	4007	BATTERY	6 V 250 AMPS
			1	1	1	1	1	1	8	20562	CIRCUIT BREAKER	20 AMPS
			1	1	1	1	1	1	7	4031	LIGHT	RED
		4	6	6	6	6	6	6	6	4045	DIODE	6 AMPS
			1	1	1	1	1	1	5	117A	TERMINAL BLOCK END	
			15	15	15	15	15	15	4	4027	TERMINAL BLOCK	
		1	3	2	2	3	2	2	3	4032	RELAY	
			1	1	1	1	1	1	2	30387	TILT SWITCH ASSEMBLY	
			1	1	1	1	1	1	1	2297	PRESSURE LIMIT SWITCH	
11050	11018	11011	S78EX	S78E	78E	S75EX	S75E	75E	ITEM NO.	PART OR IDENTIFYING NO.	DESCRIPTION	DATA SPECIFICATIONS SIZES, NOTES, SUPPLIERS
QTY PER OPTION			QTY PER STANDARD MACHINE						BILL OF MATERIAL			DWG NO. 30873



REV. 4
6-83

ELECTRICAL SCHEMATIC (S15ETD) (19ETD) (S19ETD)

36

30934

TRAVERSING DECK
HYDRAULIC MOTOR
MARK IND. P/N 20520
CHAR-LYN 101-1028-007

NEEDLE VALVE
MARK IND. P/N 20357
DELTROL P/N N20S

HYDRAULIC VALVE PACKAGE
MARK IND. P/N 30622
PARKER P/N 812513

DRIVE MOTORS
MARK IND. P/N 3040
ROSS MOTOR P/N MAB 16003

MOTOR B
MOTOR D
MOTOR C
MOTOR A

TOW

TRAVERSE SOL. VALVE
MARK IND P/N 31071

DCV 3

SOL. 1
SERIES-PARALLEL

FC 3

CYL. B
CYL. A

CB1
CB2
C3

DCV 1
DCV 2

GAGE

FC 1
FC 2

SOL. 3
C2
C1

RAISE
SOL. 4
LOWER
FC 4

SOL 2
HI-LO SPEED

RV 1
SET @ 1950 P.S.I.

INLET
TANK

FLOW METER VALVES
MARK IND. P/N 20370
DELTROL P/N F-20S

STEERING CYLINDER
MARK IND. P/N 3014
HYPOWER P/N LC 1.5 x 3 SP

M
MOTOR PUMP ASSY
MARK IND. P/N 3015
JOHN BARNES P/N
GC-1239-BA-1-20-1-03 24 V.

HYDRAULIC RESERVOIR
MARK IND. P/N 7307

RETURN LINE FILTER
MARK IND. P/N 30306
PARKER P/N 12 AT 10 CN 15 BBN

SHUT-OFF VALVE
MARK IND. P/N 3033
AEROSPACE P/N 70-104-01

SUMP FILTER
MARK IND. P/N 3004
GARRET FLUID COMP. P/N HAFS-5L

300 PSI
PRESSURE REDUCING VALVE
M.I. P/N 21734
FLUID CONTROLS P/N 1PD11-F-2-15S

FLOW METER VALVE
MARK IND. P/N 30884
ALKON P/N JF1

CALIPER DISC BRAKES
MARK IND. P/N 30822
MINNESOTA AUTOMOTIVE
P/N 02-515-006

BRAKE

CHECK VALVE
M.I. P/N 30893
ALKON P/N JC1

INTENSIFIER
M.I. P/N 30829
MINNESOTA AUTOMOTIVE P/N 02-465-010

HOIST

SOLENOID VALVE
P/N 4116
WATERMAN
312-2-6VDC

SET @ 1750 ±25 P.S.I.

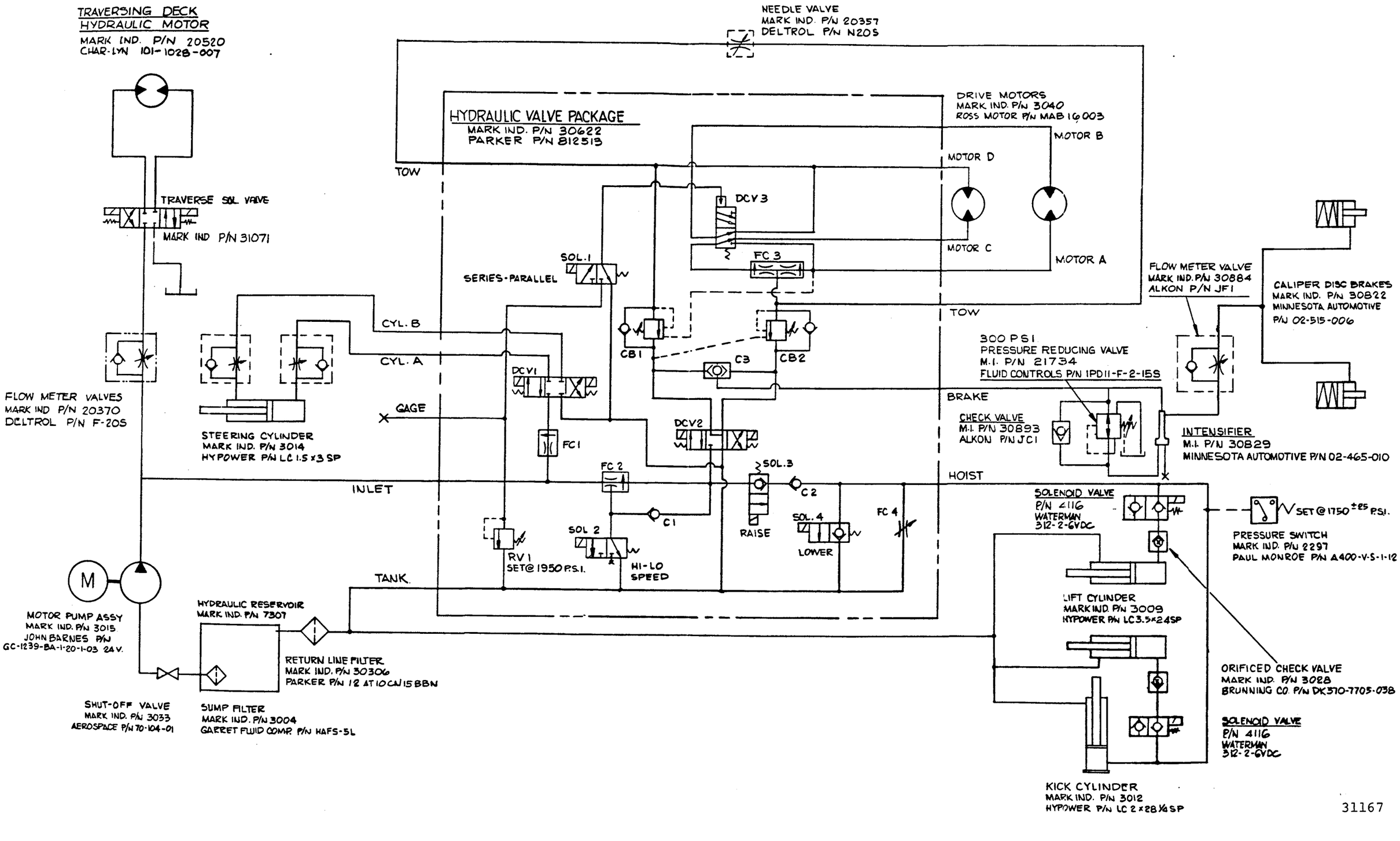
PRESSURE SWITCH
MARK IND. P/N 2297
PAUL MONROE P/N A400-V-S-1-12

LIFT CYLINDER
MARK IND. P/N 3009
HYPOWER P/N LC 3.5 x 24 SP

ORIFICED CHECK VALVE
MARK IND. P/N 3028
BRUNNING CO. P/N DK370-7705-038

KICK CYLINDER
MARK IND. P/N 3012
HYPOWER P/N LC 2 x 28 ¼ SP

31178


TRAVERSING DECK
HYDRAULIC MOTOR
MARK IND. P/N 20520
CHAR-LYN 101-1028-007
NEEDLE VALVE
MARK IND. P/N 20357
DELTROL P/N N20S
HYDRAULIC VALVE PACKAGE
MARK IND. P/N 30622
PARKER P/N 812513
DRIVE MOTORS
MARK IND. P/N 3040
ROSS MOTOR P/N MAB 16003
MOTOR B
MOTOR D
MOTOR C
MOTOR A
TOW
TRAVERSE SOL VALVE
MARK IND P/N 31071
DCV 3
FC 3
SOL. 1
SERIES-PARALLEL
CYL. B
CYL. A
CB1
CB2
C3
DCV1
DCV2
GAGE
FC1
FC 2
C1
SOL. 3
C2
RAISE
SOL. 4
LOWER
FC 4
SOL 2
HI-LO
SPEED
RV 1
SET@ 1950 P.S.I.
INLET
TANK
FLOW METER VALVES
MARK IND P/N 20370
DELTROL P/N F-20S
STEERING CYLINDER
MARK IND. P/N 3014
HYPOWER P/N LC 1.5 x 3 SP
FLOW METER VALVE
MARK IND. P/N 30884
ALKON P/N JF1
CALIPER DISC BRAKES
MARK IND. P/N 30822
MINNESOTA AUTOMOTIVE
P/N 02-515-006
300 PSI
PRESSURE REDUCING VALVE
M.I. P/N 21734
FLUID CONTROLS P/N 1PD11-F-2-15S
BRAKE
CHECK VALVE
M.I. P/N 30893
ALKON P/N JC1
INTENSIFIER
M.I. P/N 30829
MINNESOTA AUTOMOTIVE P/N 02-465-010
HOIST
SOLENOID VALVE
P/N 4116
WATERMAN
312-2-6VDC
SET @ 1750 ±25 P.S.I.
PRESSURE SWITCH
MARK IND. P/N 2297
PAUL MONROE P/N A400-V-S-1-12
LIFT CYLINDER
MARK IND. P/N 3009
HYPOWER P/N LC 3.5 x 24 SP
ORIFICED CHECK VALVE
MARK IND. P/N 3028
BRUNNING CO. P/N DK370-7705-038
SOLENOID VALVE
P/N 4116
WATERMAN
312-2-6VDC
KICK CYLINDER
MARK IND. P/N 3012
HYPOWER P/N LC 2 x 28 1/8 SP
M
MOTOR PUMP ASSY
MARK IND. P/N 3015
JOHN BARNES P/N
GC-1239-BA-1-20-1-03 24 V.
HYDRAULIC RESERVOIR
MARK IND. P/N 7307
RETURN LINE FILTER
MARK IND. P/N 30306
PARKER P/N 12 AT 10 CN 15 BBN
SHUT-OFF VALVE
MARK IND. P/N 3033
AEROSPACE P/N 70-104-01
SUMP FILTER
MARK IND. P/N 3004
GARRET FLUID COMP. P/N HAFS-5L

31167

MARKLIFT SELF-PROPELLED SCISSOR

(SMALL SLAB MODELS)

INDEX

FIG. NO.	TITLE & MODEL	PAGE
1	FINAL ASSEMBLY (15E)	1
1A	FINAL ASSEMBLY (S15E)	5
1B	FINAL ASSEMBLY (S15EX)	9
1B.1	FINAL ASSEMBLY (S15ETD)	10.1
1C	FINAL ASSEMBLY (19E)	11
1C.1	FINAL ASSEMBLY (19ETD)	15.1
1D	FINAL ASSEMBLY (S19E)	16
1E	FINAL ASSEMBLY (S19EX)	21
1E.1	FINAL ASSEMBLY (S19ETD)	22.1
1E.2	FINAL ASSEMBLY (S19EFD)	22.5
2	STEERING CYLINDER ASSEMBLY (ALL MODELS)	23
2A	STEERING CYLINDER (ALL MODELS)	23.1
3	MAIN LIFT CYLINDER (15E) (S15E) (S15EX)	24
3.1	MAIN LIFT CYLINDER ASSEMBLY (S15ETD)	25.1
3A	MAIN LIFT CYLINDER (19E) (S19E) (S19EX)	26
3B	MAIN LIFT CYLINDER ASSEMBLY (19ETD) (S19ETD)	27.1
3C	MAIN LIFT CYLINDER ASSEMBLY (19E) (S19E) (S19EFD)	27.2
4	KICK CYLINDER ASSEMBLY (ALL MODELS)	28
4A	KICK CYLINDER (ALL MODELS)	28.1
5	STEERING YOKE ASSEMBLY (ALL MODELS)	29
6	CRANK OUT DECK ASSEMBLY (S15EX) (S19EX)	30
6A	TRAVERSING DECK ASSEMBLY (S15ETD)	32.1
6B	FOLD DOWN DECK ASSEMBLY (S15EFD)	32.6
6C	TRAVERSING DECK ASSEMBLY (19ETD)	32.10
6D	TRAVERSING DECK ASSEMBLY (S19ETD)	32.14
6E	FOLD DOWN DECK ASSEMBLY (S19EFD)	32.18
7	BELLY PAN COMPONENTS ASSEMBLY (15E) (S15E) (S15EX)	33
7A	BELLY PAN COMPONENTS ASSEMBLY (19E)	38

FIG. NO.	TITLE & MODEL	PAGE
7B	BELLY PAN COMPONENTS ASSEMBLY (S19E) (S19EX)	43
7C	BELLY PAN HYDRAULIC TANK ASSEMBLY (ALL MODELS)	47
7D	BELLY PAN BATTERY TRAY ASSEMBLY (ALL MODELS)	49
7E	FRAME ASSEMBLY (APRIL 1982) (15E)	50.1
7F	FRAME ASSEMBLY (APRIL 1982) (S15E)	50.6
7G	FRAME ASSEMBLY (APRIL 1982) (S15EX)	50.11
7H	FRAME ASSEMBLY (APRIL 1982) (19E)	50.16
7J	FRAME ASSEMBLY (APRIL 1982) (S19E)	50.21
7K	FRAME ASSEMBLY (APRIL 1982) (S19EX)	50.26
7L	FRAME ASSEMBLY (S15ETD)	50.31
7M	FRAME ASSEMBLY (19ETD)	50.36
7N	FRAME ASSEMBLY (S19ETD)	50.41
8	HYDRAULIC MANIFOLD ASSEMBLY (BEFORE MAR. 1980) (ALL MODELS)	51
8A	HYDRAULIC MANIFOLD ASSEMBLY (AFTER MAR. 1980) (15E) (S15E) (S15EX)	53
8B	HYDRAULIC MANIFOLD ASSEMBLY (AFTER MAR. 1980) (19E)	55
8C	HYDRAULIC MANIFOLD ASSEMBLY (AFTER MAR. 1980) (S19E) (S19EX)	57
8D	MANIFOLD PACKAGE (AFTER MAR. 1980) (ALL MODELS)	59
8E	HYDRAULIC MANIFOLD ASSEMBLY (JAN. 1982) (ALL MODELS)	60.1
8F	MANIFOLD PACKAGE (JAN. 1982) (ALL MODELS) .	60.3
9	SCISSOR ASSEMBLY (15E) (S15E) (S15EX) . . .	61
9A	SCISSOR ASSEMBLY (19E) (S19E) (S19EX) . . .	63
9B	SCISSOR ASSEMBLY (15E) (S15E) (S15ETD) (S15EFD)	64.1
9C	SCISSOR ASSEMBLY (19E) (S19E) (S19EX) (19ETD) (S19ETD) (S19EFD)	64.4
10	HAND CONTROL BOX ASSEMBLY (ALL MODELS) . .	65

FIG. NO.	TITLE & MODEL	PAGE
10A	AERIAL CONTROL BOX ASSEMBLY (S15ETD) (19ETD) (S19ETD)	66.1
10B	GROUND CONTROL BOX ASSEMBLY (S15ETD) (19ETD) (S19ETD)	66.4
11	MANUAL OUTRIGGER ASSEMBLY (OPTION) (19E) (S19E) (S19EX)	67
12	SPRING LOADED GUARD RAIL GATE (ALL MODELS)	68
12A	TRAVERSING DECK SPRING LOADED GATE INSTALLATION (S15ETD)	69.1
13	BELLY PAN COMPONENT BOX PANEL ASSEMBLY (ALL MODELS)	70
14	BELLY PAN DOOR INSTALLATION (15E) (S15E) (S15EX)	72
14.1	BELLY PAN DOOR INSTALLATION (JAN. 1982) (15E) (S15E) (S15EX)	72.1
14A	BELLY PAN DOOR INSTALLATION (19E)	73
14A.1	BELLY PAN DOOR INSTALLATION (JAN. 1982) (19E)	73.1
14B	BELLY PAN DOOR INSTALLATION (S19E) (S19EX)	74
14B.1	BELLY PAN DOOR INSTALLATION (JAN. 1982) (S19E) (S19EX)	74.1
15	TILT SWITCH ASSEMBLY & INSTALLATION (ALL MODELS)	75
16	TIRE & WHEEL ASSEMBLY-SOLID (15E) (S15E) (S15EX)	77
16A	TIRE & WHEEL ASSEMBLY (19E)	78
16B	TIRE & WHEEL ASSEMBLY-SOLID (S19E) (S19EX)	79
17	CALIPER DISC BRAKE (APRIL 1982) (ALL MODELS)	80
17A	DISC BRAKE INTENSIFIER ASSEMBLY (APRIL 1982) (ALL MODELS)	82
17B	PRESSURE REDUCING VALVE ASSEMBLY (ALL MODELS)	83

NOTE: ALL NUMBERS LISTED IN THE FOLLOWING PARTS LIST "PART NUMBER" COLUMNS ARE MARK INDUSTRIES PART NUMBERS.

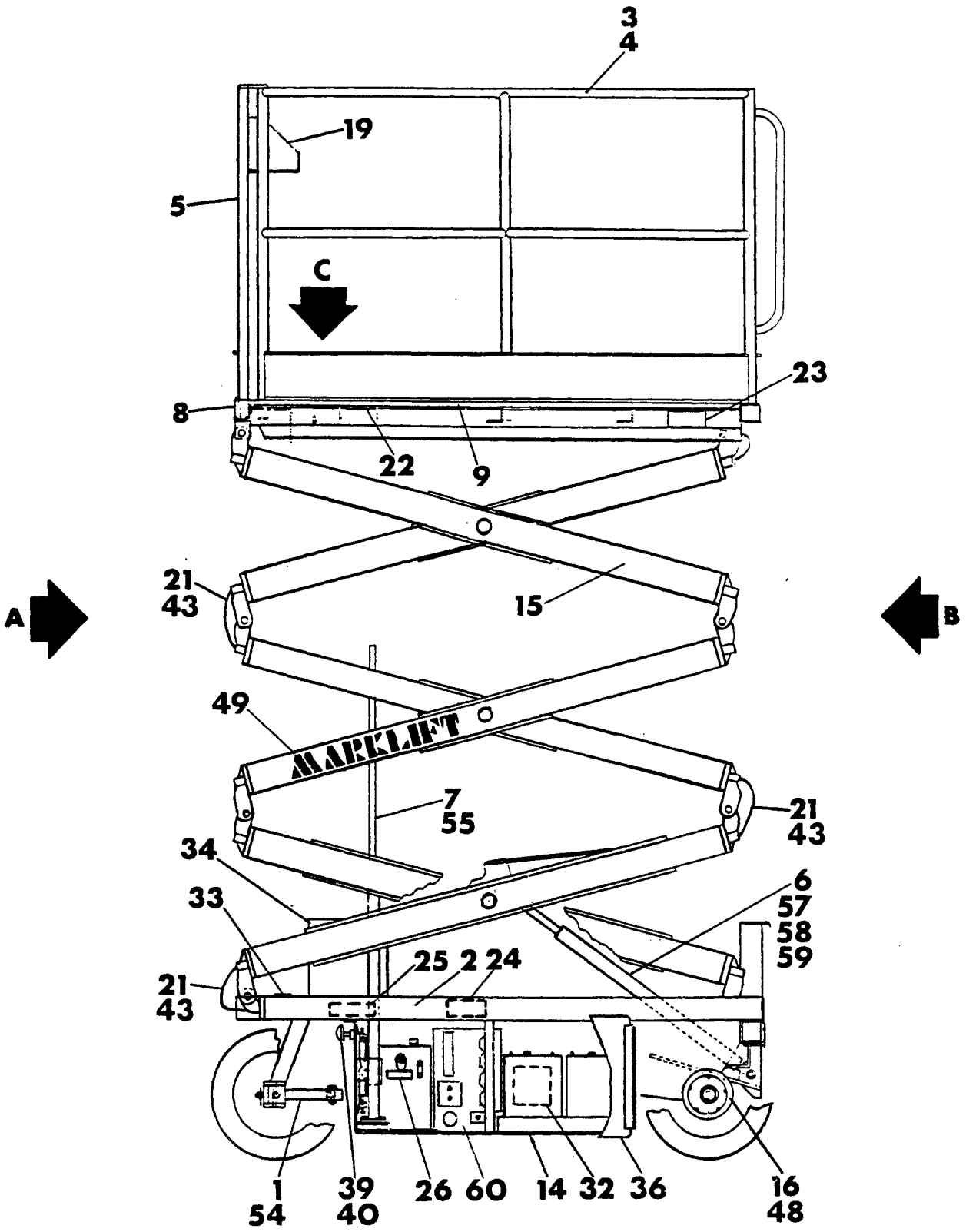

3
4
19
5
C
23
8
22
9
21
43
15
A
B
49
MARKLIFT
7
55
21
43
34
33
6
57
58
59
25 2 24
21
43
1
54
39
40
26 60
14 32 36
16
48

FIGURE 1 - FINAL ASSEMBLY (15E)

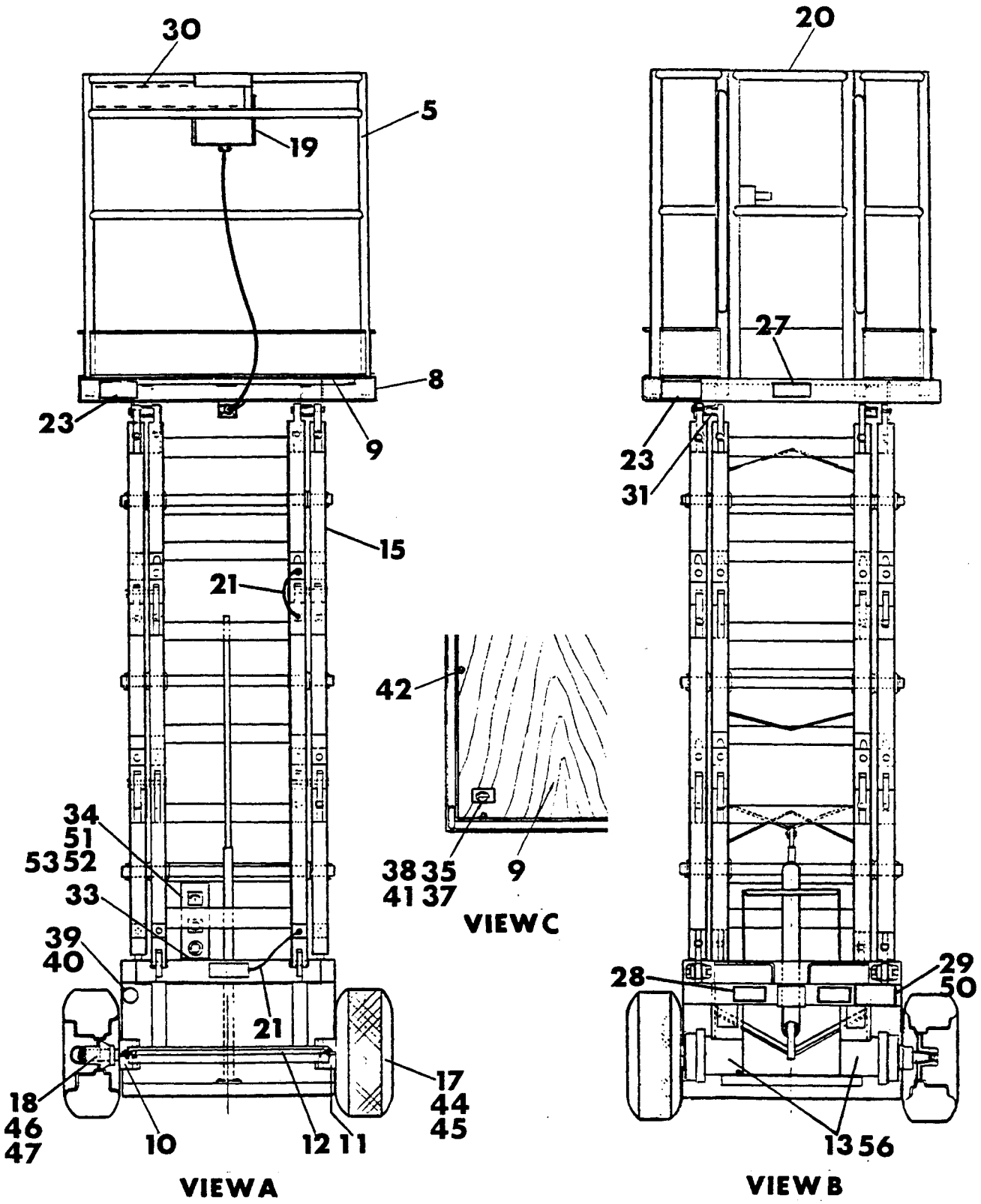


FIGURE 1 - FINAL ASSEMBLY (15E)

ITEM	PART NUMBER	DESCRIPTION	QTY
1-	30017 (9076)	FINAL ASSEMBLY	1
-1	3014	STEERING CYLINDER (SEE FIG.2)	1
-2	7090	FRAME WELDMENT	1
-3	7005	GUARD RAIL - LEFT SIDE	1
-4	7006	GUARD RAIL - RIGHT SIDE	1
-5	7007	GUARD RAIL - FRONT	1
-6	3009	MAIN LIFT CYLINDER (SEE FIG.3)	1
-7	3012	KICK CYLINDER (SEE FIG.4)	1
-8	7011	DECK WELDMENT	1
-9	2243	PLYWOOD FLOOR - 34 3/8 X 68 X 3/4	1
-10	6305-1	FRONT YOKE ASSEMBLY (R.H.) (SEE FIG.5)	1
-11	6305-2	FRONT YOKE ASSEMBLY (L.H.) (SEE FIG.5)	1
-12	6322-2	TIE ROD ASSEMBLY	1
-13	3002	DRIVE MOTOR	2
-14	7072	BELLY PAN COMPONENTS ASSEMBLY (SEE FIG.7)	1
-15	7009	SCISSOR ASSEMBLY (SEE FIG.9)	1
-16	6110-1	DRIVE HUB	2
-17	2222	TIRE & WHEEL ASSEMBLY	4
-18	134	HUB ASSEMBLY (WITH LM67048 BEARINGS)	2
-19	4067-1	HAND CONTROL BOX ASSEMBLY (SEE FIG.10)	1
-20	7310	SPRING LOADED GUARD RAIL GATE INSTALLATION (SEE FIG.12)	1
-21	30341	ARM CABLE ASSEMBLY	1
-22	768	KICK PAD	1
-23	2024	DECAL - "LOAD CAPACITY 1000 LBS."	4
-24	2016	DECAL - "WARNING - DO NOT WORK UNDERNEATH THIS LIFT UNLESS IT IS MECHANICALLY LOCKED"	1
-25	2019	DECAL - "EMERGENCY LOWERING VALVE"	1
-26	2017	DECAL - "THE HYDRAULIC SYSTEM OF THIS MACHINE IS DESIGNED TO USE G.M. TRANSMISSION FLUID TYPE "B" WITH DEXRON"	1
-27	2018-1	DECAL - "THIS MACHINE HAS BEEN DESIGNED AND TESTED TO MEET THESE STANDARDS: ANSI A92.3 1973, OSHA GISO 1910.67"	1
-28	2002	DECAL - "FORKLIFT BOOT"	2

ITEM	PART NUMBER	DESCRIPTION	QTY
-29	2012	PLATE - MODEL/SERIAL NUMBER	1
-30	30415	DECAL - OPERATION INSTRUCTIONS	1
-31	2272	DECK CAM ROLLER	2
-32	2003	DECAL - "IMPORTANT - CHECK BATTERY WATER LEVEL AT LEAST ONCE A WEEK"	1
-33	2005	DECAL - "BATTERY CHARGER PLUG 115 VOLT ONLY"	1
-34	63	BATTERY CHARGER	1
-35	4060	RECEPTACLE - 110 VAC	1
-36	30361	BELLY PAN DOOR INSTALLATION (SEE FIG.14)	1
-37	355	BELL BOX	1
-38	356	BELL BOX COVER	1
-39	4018	EMERGENCY ON/OFF SWITCH	1
-40	5300	KNOB - EMERGENCY ON/OFF	1
-41	117G	ROMEX CONNECTOR	1
-42	61706	SELF TAPPING FLAT HEAD SCREW ¼-20 X 1¼	8
-43	4034	CABLE - POWER TO PLATFORM	1
-44	2221	CONE BOLT ½ X 3/4 (REAR WHEELS)	10
-45	65123	LUG NUT ½-20 UNF (FRONT WEHEELS)	10
-46	60133	BOLT ½-13 X 2½	8
-47	63305	LOCK WASHER ½	8
-48	6110-1	DRIVE HUB	2
-49	2048	DECAL - MARKLIFT	1
-50	375	POP RIVET 1/8	4
-51	60131	HEX HEAD CAPSCREW ¼-20 UNC X 1	4
-52	63301	SPLIT LOCKWASHER ¼	4
-53	60701	HEX NUT ¼-20 UNC	4
-54	2449	MALE ELBOW	2
-55	2435	MALE ELBOW (TOP PORT)	1
-56	16513	ELBOW	4
-57	2504	PIPE THREAD REDUCER (TOP PORT)	1
-58	2435	MALE ELBOW (TOP PORT)	1
-59	2579	CONNECTOR (BOTTOM PORT)	1
-60	30402	PANEL ASSEMBLY (SEE FIG.13)	1

FIGURE 1A - FINAL ASSEMBLY (S15E)

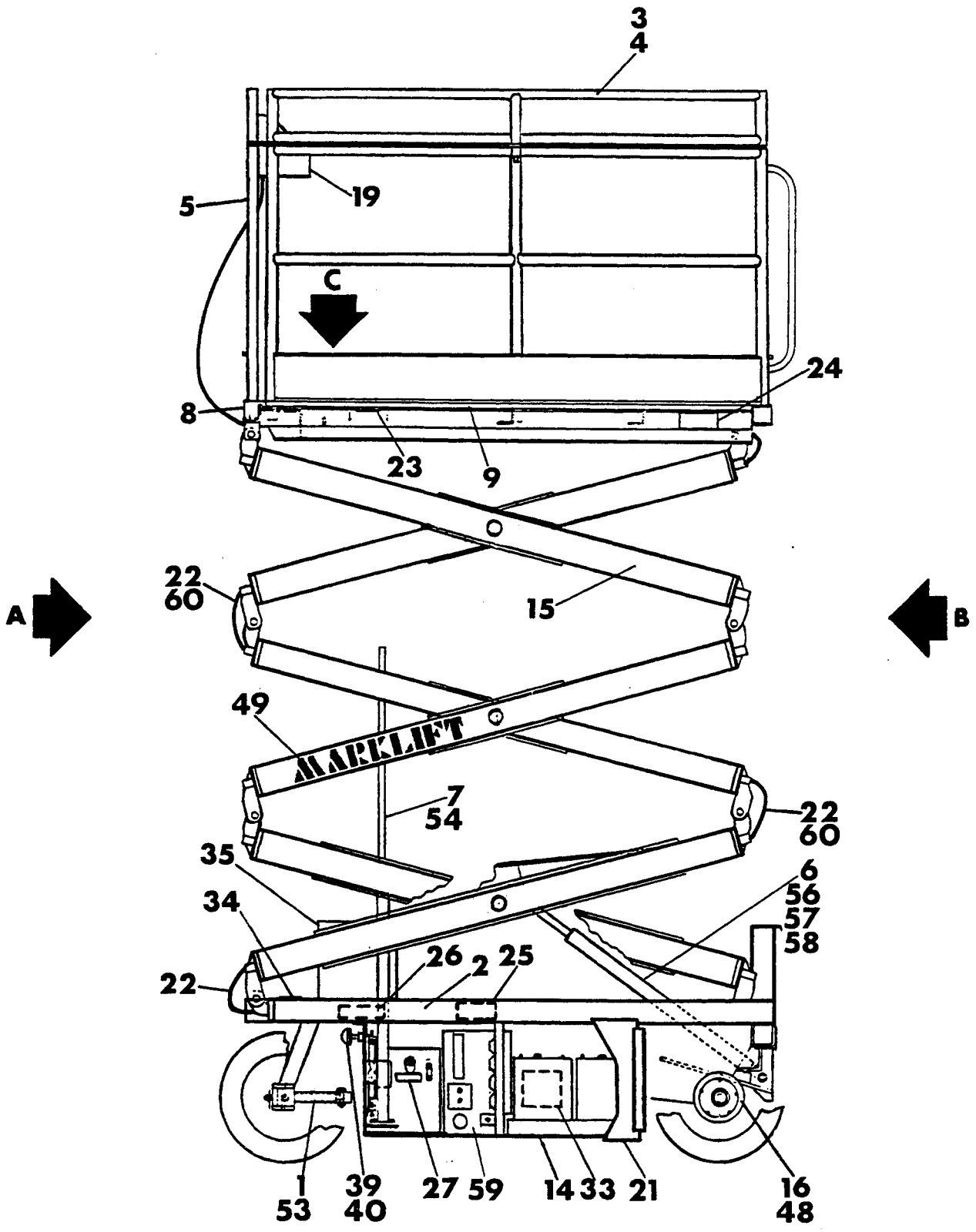


FIGURE 1A - FINAL ASSEMBLY (S15E)

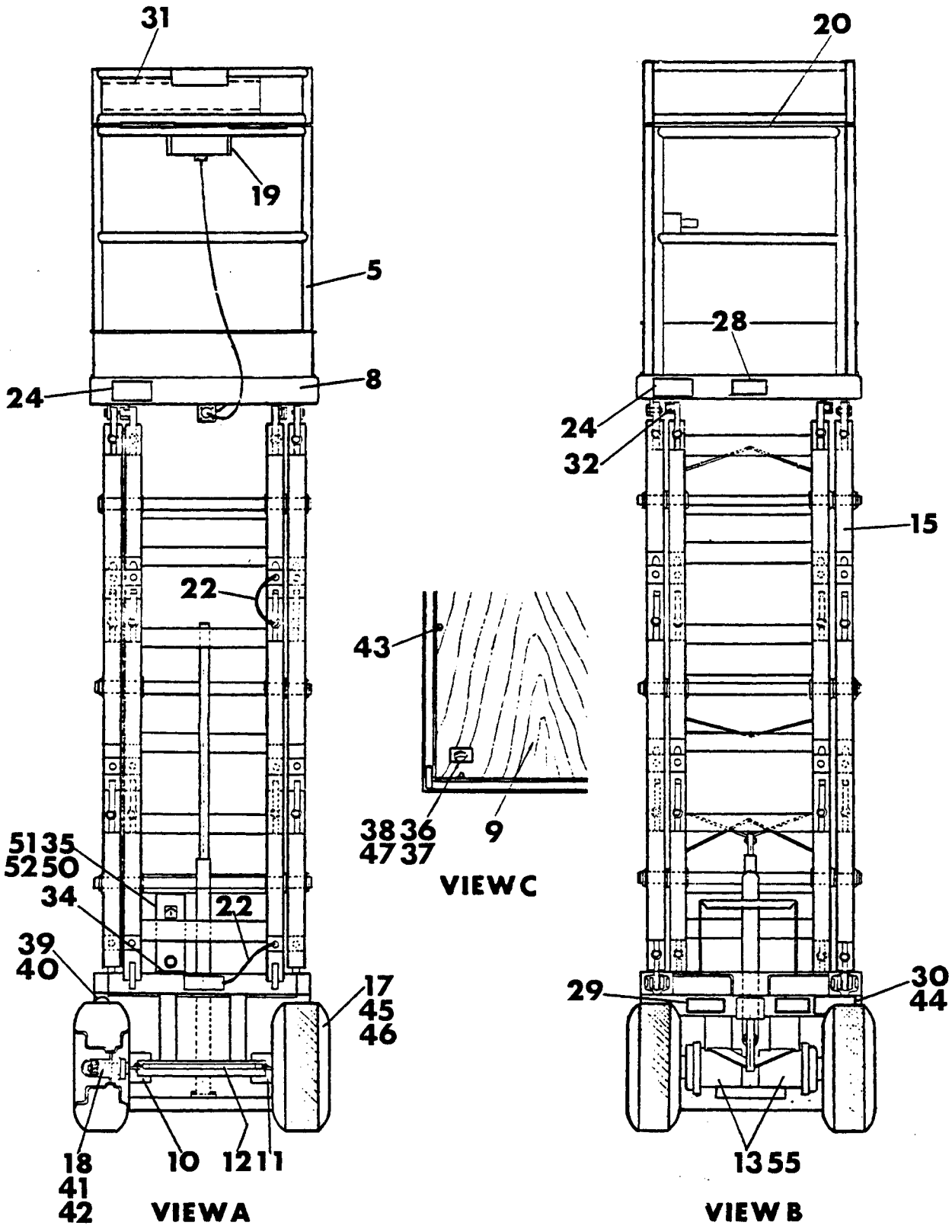


FIGURE 1A - FINAL ASSEMBLY (S15E)

ITEM	PART NUMBER	DESCRIPTION	QTY
1A-	30018 (9077)	FINAL ASSEMBLY	1
-1	3014	STEERING CYLINDER (SEE FIG.2)	1
-2	7080	FRAME WELDMENT	1
-3	7001	GUARD RAIL - LEFT SIDE	1
-4	7002	GUARD RAIL - RIGHT SIDE	1
-5	7003	GUARD RAIL - FRONT	1
-6	3009	MAIN LIFT CYLINDER (SEE FIG.3)	1
-7	3012	KICK CYLINDER (SEE FIG.4)	1
-8	7010	DECK WELDMENT	1
-9	2244	PLYWOOD FLOOR - 24½ X 68 X 3/4	1
-10	6305-3	FRONT YOKE ASSEMBLY (R.H.) (SEE FIG.5)	1
-11	6305-2	FRONT YOKE ASSEMBLY (L.H.) (SEE FIG.5)	1
-12	6322-1	TIE ROD ASSEMBLY	1
-13	3002	DRIVE MOTOR	2
-14	7072	BELLY PAN ASSEMBLY (SEE FIG.7)	1
-15	7009	SCISSOR ASSEMBLY (SEE FIG.9)	1
-16	6110-1	DRIVE HUB	2
-17	2222	TIRE & WHEEL ASSEMBLY	4
-18	134	HUB ASSEMBLY (WITH LM67048 BEARING)	2
-19	4067-1	HAND CONTROL BOX ASSEMBLY (SEE FIG.10)	1
-20	7311	SPRING LOADED GUARD RAIL GATE INSTALLATION (SEE FIG.12)	1
-21	30361	BELLY PAN DOOR INSTALLATION (SEE FIG.14)	1
-22	30341	ARM CABLE ASSEMBLY	1
-23	768	KICK PAD	1
-24	2023	DECAL - "LOAD CAPACITY 750 LBS."	4
-25	2016	DECAL - "WARNING - DO NOT WORK UNDERNEATH THIS LIFT UNLESS IT IS MECHANICALLY LOCKED"	1
-26	2019	DECAL - "EMERGENCY LOWERING VALVE"	1
-27	2017	DECAL - "THE HYDRAULIC SYSTEM OF THIS MACHINE IS DESIGNED TO USE G.M. TRANSMISSION FLUID TYPE "B" WITH DEXRON"	1
-28	2018-1	DECAL - "THIS MACHINE HAS BEEN DESIGNED AND TESTED TO MEET THESE STANDARDS: ANSI A92.3 1973, OSHA GISO 1910.67"	1

ITEM	PART NUMBER	DESCRIPTION	QTY
-29	2002	DECAL - "FORKLIFT BOOT"	2
-30	2012	PLATE - MODEL/SERIAL NUMBER	1
-31	30415	DECAL - OPERATION INSTRUCTIONS	1
-32	2272	DECK CAM ROLLER	2
-33	2003	DECAL - "IMPORTANT - CHECK BATTERY WATER LEVEL AT LEAST ONCE A WEEK"	1
-34	2005	DECAL - "BATTERY CHARGER PLUG 115 VOLT ONLY"	1
-35	63	BATTERY CHARGER	1
-36	4060	RECEPTACLE - 110 VAC	1
-37	355	BELL BOX	1
-38	356	BELL BOX COVER	1
-39	4018	EMERGENCY ON/OFF SWITCH	1
-40	5300	KNOB - EMERGENCY ON/OFF	1
-41	60133	BOLT - ½-1/3 X 2½	8
-42	63305	LOCK WASHER - ½	8
-43	64401	SELF TAPPING FLAT HEAD SCREW - ¼-20X1¼	6
-44	375	POP RIVET - 1/8	4
-45	2221	CONE BOLT	10
-46	65123	LUG NUT	10
-47	117G	ROMEX CONNECTOR	1
-48	6110-1	DRIVE HUB	2
-49	2048	DECAL - MARKLIFT	1
-50	60131	HEX HEAD CAPSCREW ¼ 20 UNC X 1	4
-51	63301	SPLIT LOCK WASHER ¼	4
-52	0701	HEX NUT ¼-20 UNC	4
-53	2449	MALE ELBOW	2
-54	2435	MALE ELBOW (TOP PORT)	1
-55	16513	ELBOW	4
-56	2504	PIPE THREAD REDUCER (TOP PORT)	1
-57	2435	MALE ELBOW (TOP PORT)	1
-58	2579	CONNECTOR (BOTTOM PORT)	1
-59	30402	PANEL ASSEMBLY (SEE FIG.13)	1
-60	4034	CABLE - POWER TO PLATFORM	1

FIGURE 1B - FINAL ASSEMBLY (S15EX)

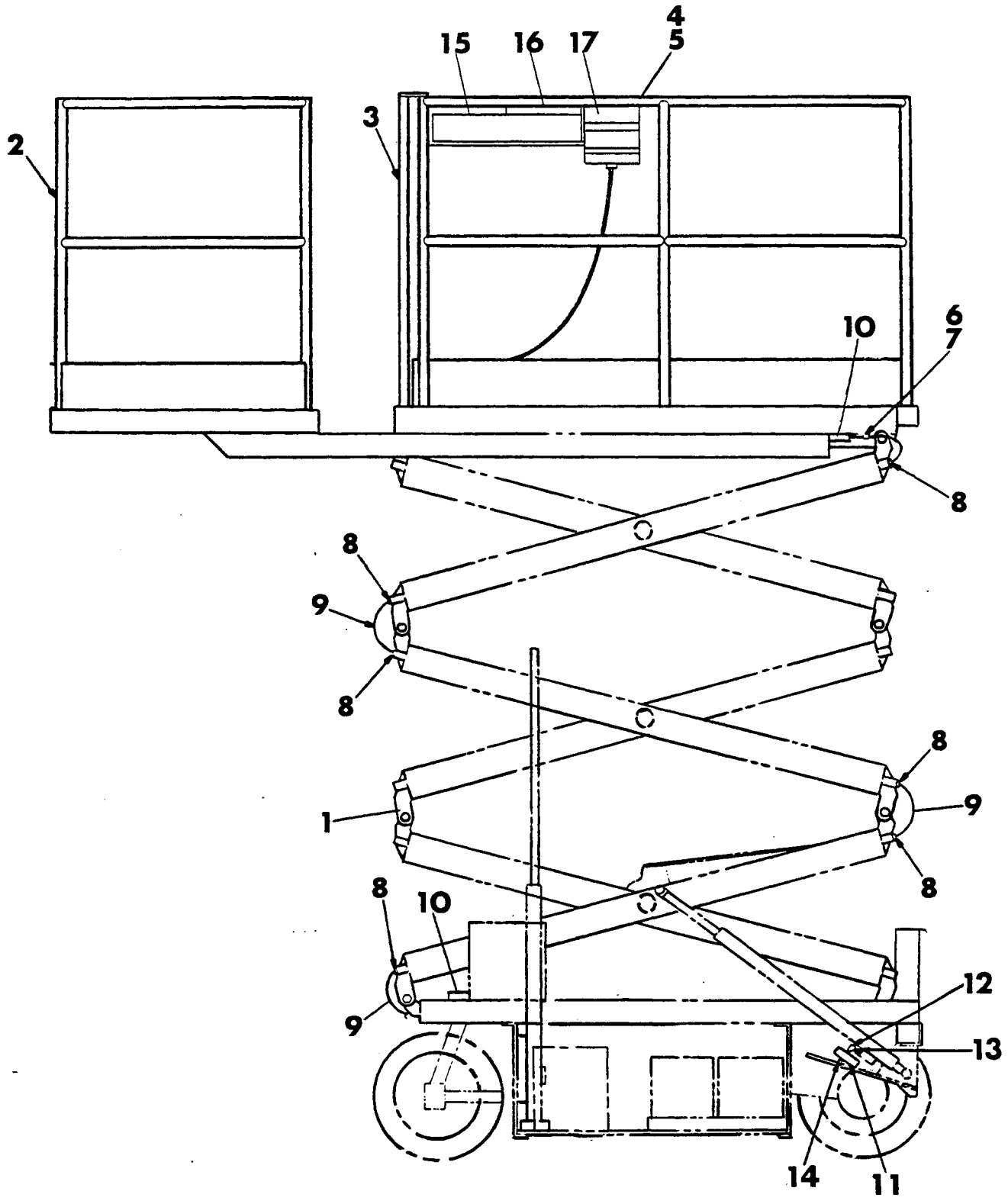


FIGURE 1B - FINAL ASSEMBLY (S15EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
1B-	30019	FINAL ASSEMBLY	1
-1	30018	FINAL ASSEMBLY (S15E) (SEE FIG.1A)	1
-2	9266	CRANK OUT DECK ASSEMBLY (S15EX)(REPLACES P/N 7010 ON S51E MACHINE) (SEE FIG.6)	1
-3	9299	GUARD RAIL - FRONT (REPLACES P/N 7003 ON S15E MACHINE)	1
-4	7127	GUARD RAIL - LEFT SIDE (REPLACES P/N 7001 ON S15E MACHINE)	1
-5	7128	GUARD RAIL - RIGHT SIDE (REPLACES P/N 7002 ON S15E MACHINE)	1
-6	734	POP RIVET	2
-7	22	JIFFY CLIP	2
-8	730	STRAIN RELIEF (REPLACES 6 OF P/N 777 ONLY ON S15E MACHINE)	6
-9		12GA 7 CONDUCTOR CABLE	1
-10	20803	LIMIT SWITCH	2
-11	4116	SOLENOID VALVE	1
-12	6416	90° ELBOW	1
-13	6415	O-RING BOSS INTERNAL PIPE SWIVEL ELBOW	1
-14	2448	90° ELBOW	1
-15	30415	DECAL-OPERATION INSTRUCTIONS	1
-16	30750	DECAL-"THIS MACHINE WILL NOT DRIVE UNLESS CRANK-OUT DECK IS FULLY RETRACTED AND LATCHED"	1
-17	4067-1	HAND CONTROL BOX ASSEMBLY (SEE FIG.10)	1

FIGURE 1B.1 - FINAL ASSEMBLY (S15ETD)

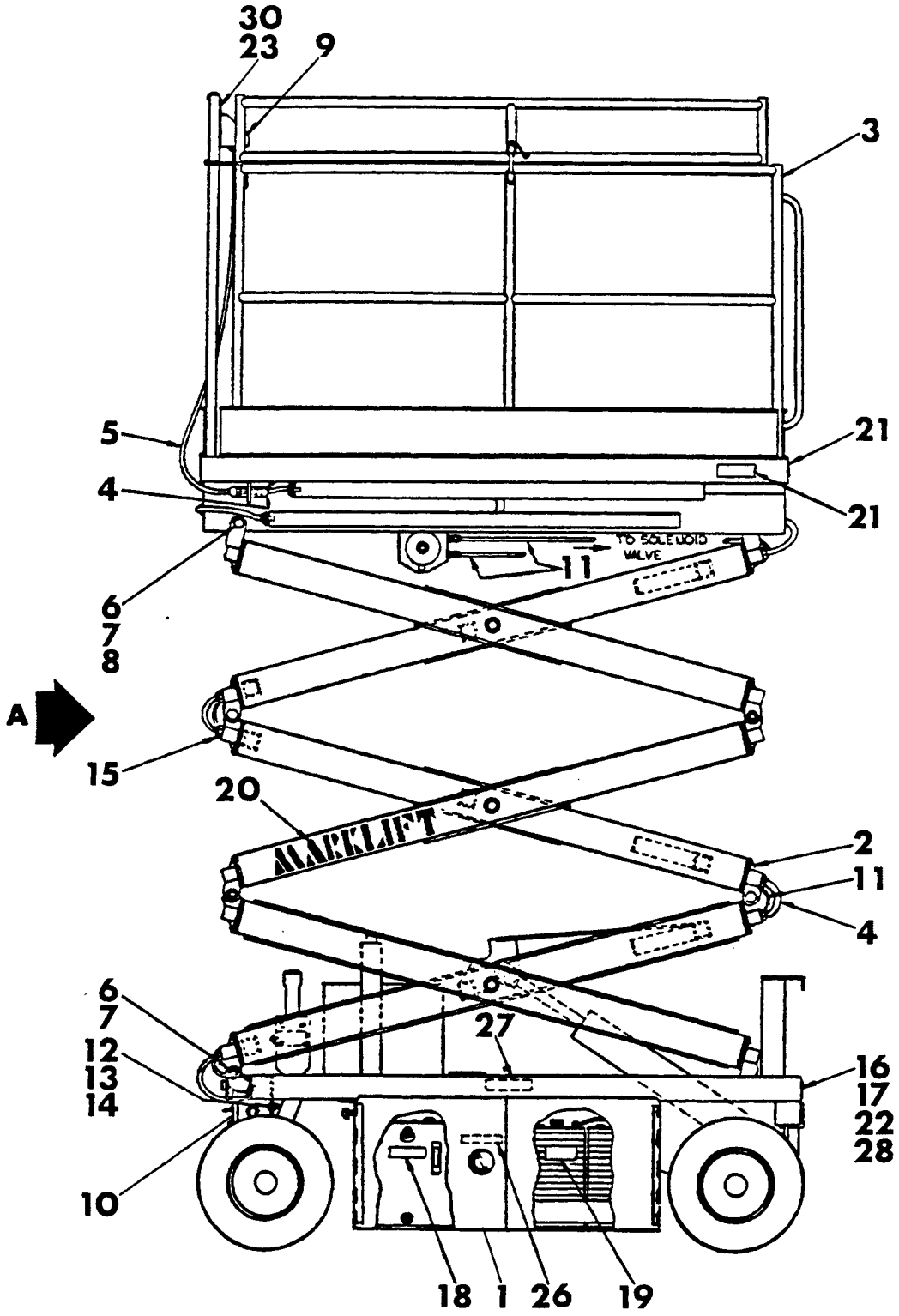
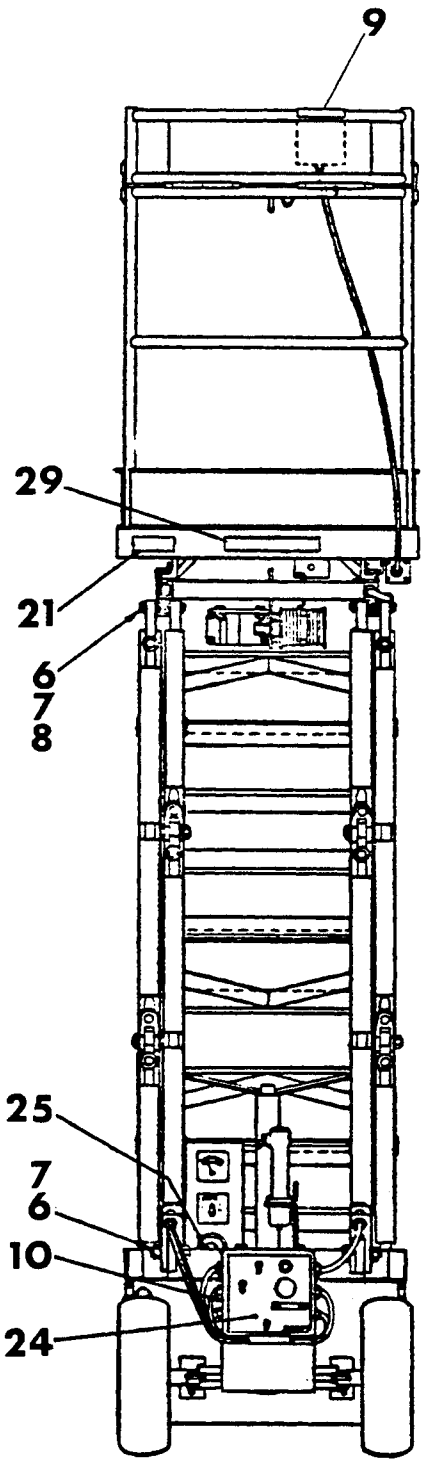


FIGURE 1B.1 - FINAL ASSEMBLY (S15ETD)



VIEW A

FIGURE 1B.1 - FINAL ASSEMBLY (S15ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
1B.1-	30027	FINAL ASSEMBLY	1
-1	30928	FRAME ASSEMBLY (SEE FIG. 7L)	1
-2	30930	SCISSOR ASSEMBLY (SEE FIG. 9B)	1
-3	30933	DECK ASSEMBLY (SEE FIG. 6A)	1
-4	30941	ARM CONTROL CABLE	1
-5	30937	CONTROL CABLE	1
-6	60392	HEX HEAD CAP SCREW - 3/4-10 UNC X 2 3/4	4
-7	61304	HEX NUT - 3/4-10 UNC	4
-8	63408	FLAT WASHER - 3/4	6
-9	30936	AERIAL CONTROL BOX ASSEMBLY (SEE FIG. 10A)	1
-10	30935	GROUND CONTROL BOX ASSEMBLY (SEE FIG. 10B)	1
-11	2568	HYDRAULIC HOSE	2
-12	60312	HEX HEAD CAP SCREW - 1/4-20 UNC X 1 (GR. 5)	4
-13	63301	SPLIT LOCK WASHER - 1/4	4
-14	60701	HEX NUT - 1/4-20 UNC	4
-15	16222	STRAIN RELIEF	6
-16	20660	PLATE - MODEL/SERIAL NUMBER	1
-17	2002	DECAL - "FORKLIFT BOOT"	2
-18	2017	DECAL - HYDRAULIC FLUID SPEC.	1
-19	2003	DECAL - "IMPORTANT-CHECK BATTERY WATER LEVEL AT LEAST ONCE A WEEK"	1
-20	2048	DECAL - MARKLIFT	2
-21	2023	DECAL - "LOAD CAPACITY 750 LBS."	4
-22	20661	PLATE - ANSI A92	1
-23	30415	DECAL - OPERATING INSTRUCTIONS	1
-24	30897	DECAL - GROUND CONTROL BOX	1
-25	2005	DECAL - "BATTERY CHARGER PLUG 115 VOLT ONLY"	1
-26	2019	DECAL - EMERGENCY LOWERING VALVE	1
-27	2016	DECAL - "WARNING - DO NOT WORK UNDER-NEATH THIS LIFT UNLESS IT IS MECHANI-CALLY LOCKED"	1

ITEM	PART NUMBER	DESCRIPTION	QTY
-28	30520	PLATE - PATENT NUMBER	1
-29	31109	DECAL - "CAUTION-GUARD RAILS ARE FOR YOUR SAFETY. DO NOT REMOVE"	2
-30	31033	DECAL - "CAUTION-THIS MACHINE WILL NOT DRIVE OR DESCEND UNLESS TRAVERSING DECK IS CENTERED"	1

FIGURE 1C - FINAL ASSEMBLY (19E)

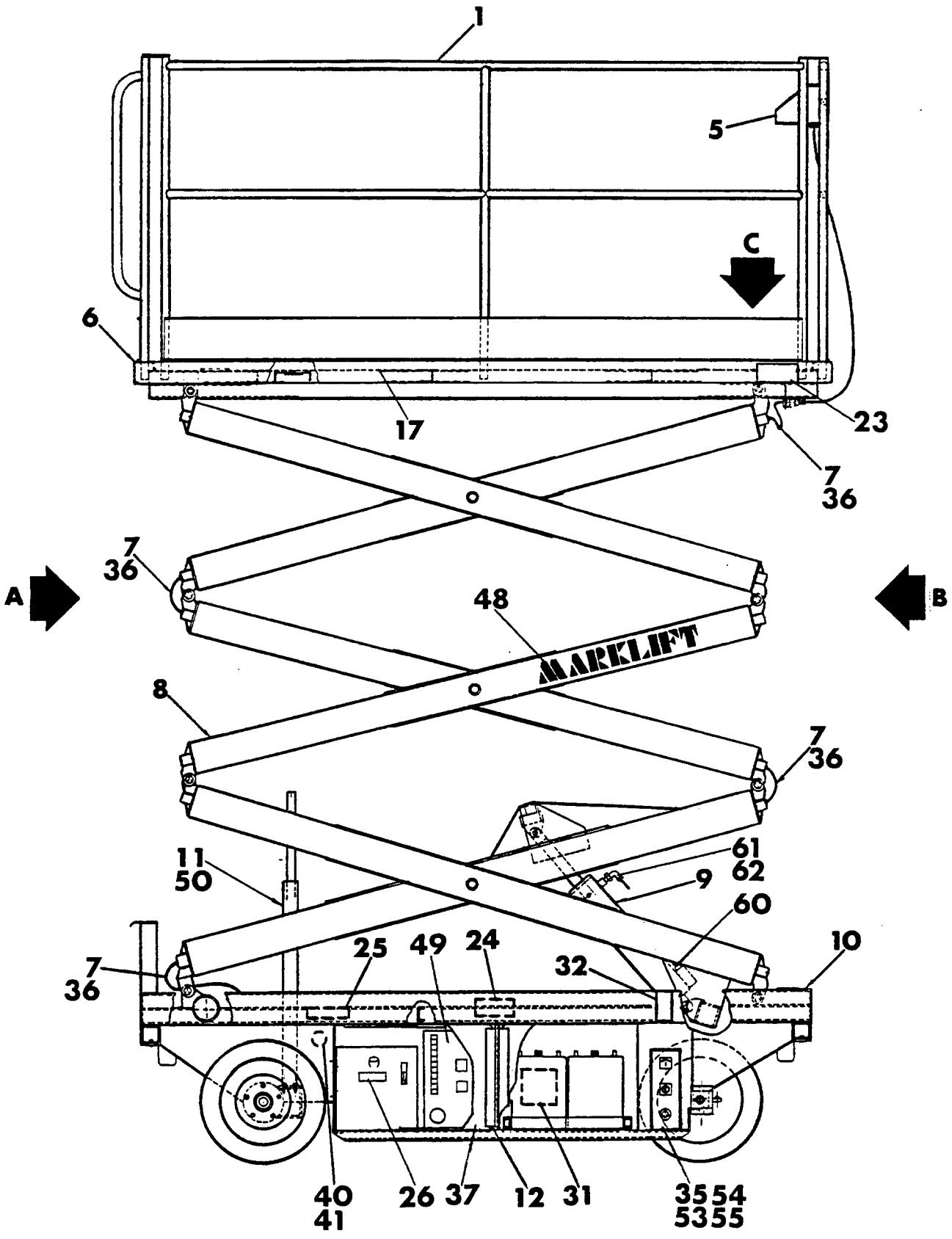
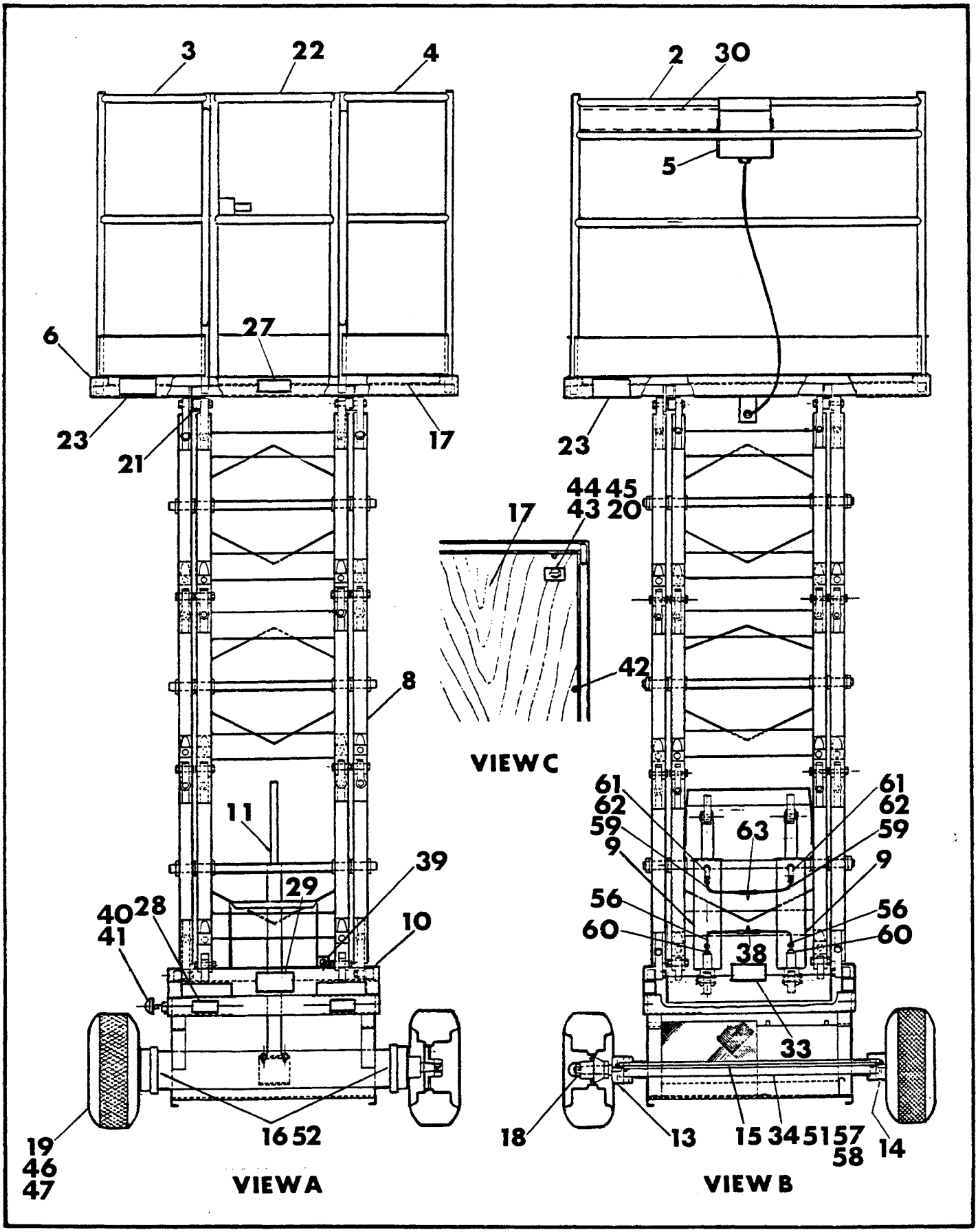


FIGURE 1C - FINAL ASSEMBLY (19E)



ITEM	PART NUMBER	DESCRIPTION	QTY
1C-	30014 (9074)	FINAL ASSEMBLY	1
-1	6006	GUARD RAIL - SIDE	2
-2	6007	GUARD RAIL - FRONT	1
-3	6008	GUARD RAIL - REAR (LEFT SIDE)	1
-4	6009	GUARD RAIL - REAR (RIGHT SIDE)	1
-5	4067-1	HAND CONTROL BOX ASSEMBLY (SEE FIG.10)	1
-6	6010	DECK WELDMENT	1
-7	30342	ARM CABLE ASSEMBLY	1
-8	6090	SCISSOR ASSEMBLY (SEE FIG.9A)	1
-9	3011	MAIN LIFT CYLINDER (SEE FIG.3A)	2
-10	6030	FRAME WELDMENT	1
-11	3012	KICK CYLINDER ASSEMBLY (SEE FIG.4)	1
-12		BELLY PAN COMPONENTS ASSEMBLY (SEE FIG. 7A)	1
-13	6305-1	FRONT YOKE ASSEMBLY (R.H) (SEE FIG.5)	1
-14	6305-2	FRONT YOKE ASSEMBLY (L.H) (SEE FIG.5)	1
-15	6322-4	TIE ROD ASSEMBLY	1
-16	3002	DRIVE MOTOR	2
-17	2245	PLYWOOD FLOOR 3/4 X 48 X 90½	1
-18	134	HUB ASSEMBLY (WITH LM67048 BEARINGS)	2
-19	2223	MONO FILLED TIRES	4
	814	TIRE & WHEEL 18X6.50-8 (UNFILLED)	4
-20	117G	ROMEX CONNECTOR	1
-21	2272	DECK CAM ROLLER	2
-22	7313	SPRING LOADED GUARD RAIL GATE INSTALLATION (SEE FIG.12)	1
-23	2024	DECAL - "LOAD CAPACITY 1000 LBS."	4
-24	2016	DECAL - "WARNING - DO NOT WORK UNDERNEATH THIS LIFT UNLESS IT IS MECHANICALLY LOCKED"	1
-25	2019	DECAL - "EMERGENCY LOWERING VALVE"	1
-26	2017	DECAL - "THE HYDRAULIC SYSTEM OF THIS MACHINE IS DESIGNED TO USE G.M. TRANSMISSION FLUID TYPE "B" WITH DEXRON"	1
-27	2018-1	DECAL - "THIS MACHINE HAS BEEN DESIGNED AND TESTED TO MEET THESE STANDARDS: ANSI A92.3 1973, OSHA GISO 1910.67"	1

ITEM	PART NUMBER	DESCRIPTION	QTY
-28	2002	DECAL - "FORKLIFT BOOT"	2
-29	2012	PLATE - MODEL/SERIAL NUMBER	1
-30	30415	DECAL - OPERATION INSTRUCTIONS	1
-31	2003	DECAL - "IMPORTANT - CHECK BATTERY WATER LEVEL AT LEAST ONCE A WEEK"	1
-32	2005	DECAL - "BATTERY CHARGER PLUG 115 VOLT ONLY"	1
-33	2041	DECAL - "DO NOT LIFT FROM THIS END"	1
-34	3014	STEERING CYLINDER (SEE FIG.2)	1
-35	63	BATTERY CHARGER	1
-36	4034	CABLE - POWER TO PLATFORM	1
-37	30371	BELLY PAN DOOR INSTALLATION (SEE FIG.14A)	1
-38	2421	UNION TEE	1
-39	4085	LIMIT SWITCH	1
-40	4018	EMRGENCY ON/OFF SWITCH (FARSIDE)	1
-41	5300	KNOB - EMERGENCY ON/OFF	1
-42	64401	SELF TAPPING FLAT HEAD SCREW-¼-20 UNC X 1 ¼	8
-43	355	BELL BOX	1
-44	356	BELL BOX COVER	1
-45	4060	RECEPTACLE 110 VAC	1
-46	2221	CONE BOLT ½-20 X 3/4 (REAR WHEELS)	10
-47	65123	CONE LUG NUTS ½-20 UNF (FRONT WHEELS)	10
-48	2048	DECAL - MARKLIFT	2
-49	30402	PANEL ASSEMBLY (SEE FIG.13)	1
-50	2435	MALE ELBOW (TOP PORT)	1
-51	2449	MALE ELBOW	2
-52	16513	ELBOW	4
-53	60131	BOLT ¼-20 UNC X 1	4
-54	63301	LOCK WASHER ¼	4
-55	60701	HEX NUT ¼-20 UNC	4
-56	16341	TUBE ASSEMBLY (LIFT CYLINDER CROSS OVER LOWER PORTS)	2
-57	13212-06-0116	HOSE ASSEMBLY (STEERING)	1
-58	13212-06-0144	HOSE ASSEMBLY (STEERING)	1

FIGURE 1C - FINAL ASSEMBLY (19E)

ITEM	PART NUMBER	DESCRIPTION	QTY
-59	13205-04-0090	HOSE ASSEMBLY (LIFT CYLINDER CROSS OVER UPPER PORTS)	2
-60	2511	STRAIGHT THREAD CONNECTOR	2
-61	2435	MALE LEBOW	2
-62	2477	PIPE THREAD REDUCER	2
-63	2417	UNION TEE	1

FIGURE 1C.1 - FINAL ASSEMBLY (19ETD)

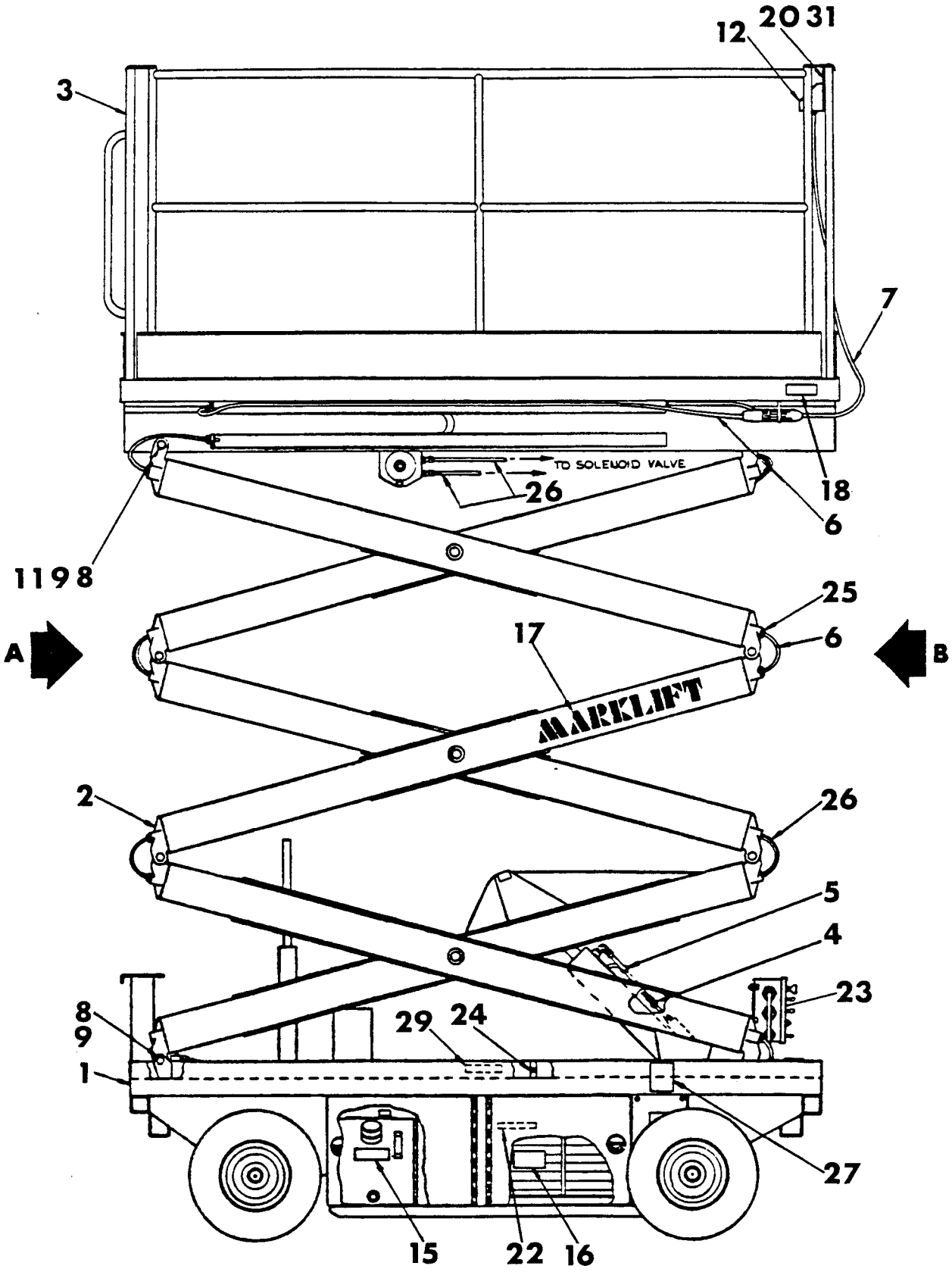
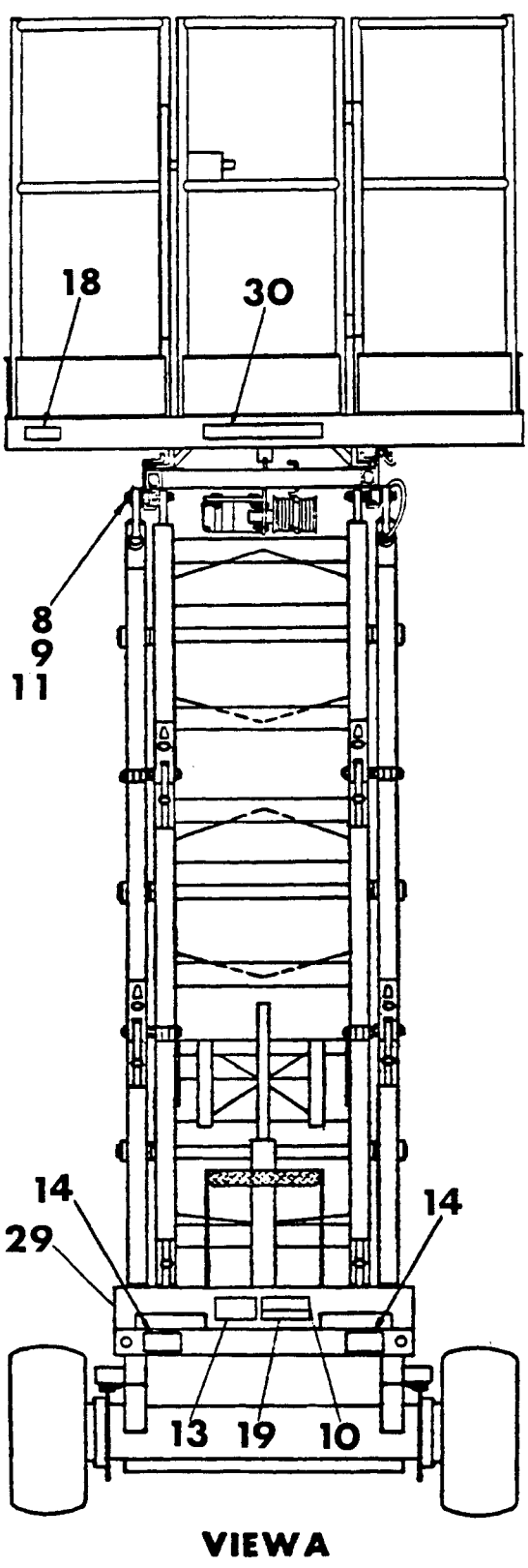
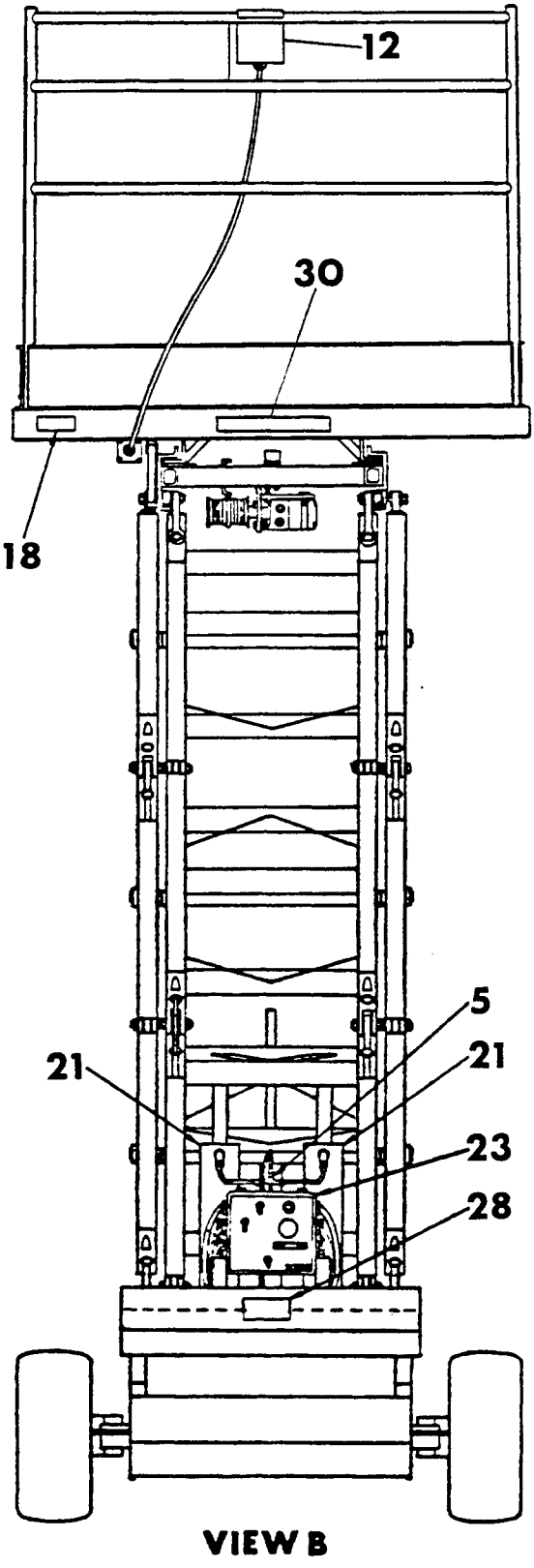


FIGURE 1C.1 - FINAL ASSEMBLY (19ETD)



VIEW A



VIEW B

FIGURE 1C.1 - FINAL ASSEMBLY (19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
1C.1-	30225	FINAL ASSEMBLY	1
-1	30925	FRAME ASSEMBLY (SEE FIG. 7M)	1
-2	30929	SCISSOR ASSEMBLY (SEE FIG. 9C)	1
-3	30931	DECK ASSEMBLY (SEE FIG. 6C)	1
-4	2421	UNION TEE	1
-5	2417	UNION TEE	1
-6	30942	ARM CONTROL CABLE	1
-7	30937	CONTROL CABLE	1
-8	60392	HEX HEAD CAP SCREW - 3/4-10 UNC X 2 3/4	4
-9	61304	HEX NUT - 3/4-10 UNC	4
-10	30520	PLATE - PATENT NUMBER	1
-11	63408	FLAT WASHER - 3/4	6
-12	30936	AERIAL CONTROL BOX ASSEMBLY (SEE FIG. 10A)	1
-13	20660	PLATE - MODEL/SERIAL NUMBER	1
-14	2002	DECAL - FORKLIFT BOOT	2
-15	2017	DECAL - HYDRAULIC FLUID SPEC.	1
-16	2003	DECAL - "IMPORTANT-CHECK BATTERY WATER LEVEL AT LEAST ONCE A WEEK"	1
-17	2048	DECAL - MARKLIFT	2
-18	2023	DECAL - LOAD CAPACITY 750 LBS.	4
-19	20661	PLATE - ANSI A92	1
-20	30415	DECAL - OPERATING INSTRUCTIONS	1
-21	31076	MAIN LIFT CYLINDER ASSEMBLY (SEE FIG. 3B)	2
-22	2019	DECAL - EMERGENCY LOWERING VALVE	1
-23	30935	GROUND CONTROL BOX ASSEMBLY (SEE FIG. 10B)	1
-24	30974	ROLLER STOPPER BLOCK	1
-25	16222	STRAIN RELIEF	6
-26	2568	HYDRAULIC HOSE	2
-27	2005	DECAL - "BATTERY CHARGER PLUG 115 VOLT ONLY"	1
-28	2041	DECAL - "DO NOT LIFT FROM THIS END"	1

FIGURE 1C.1 - FINAL ASSEMBLY (19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
-29	2016	DECAL - "WARNING - DO NOT WORK UNDER-NEATH THIS LIFT UNLESS IT IS MECHANI-CALLY LOCKED"	1 1
-30	31109	DECAL - "CAUTION - GUARD RAILS ARE FOR YOUR SAFETY. DO NOT REMOVE"	2
-31	31033	DECAL - "CAUTION - THIS MACHINE WILL NOT DRIVE OR DESCEND UNLESS TRAVERSING DECK IS CENTERED"	1

FIGURE 1D - FINAL ASSEMBLY (S19E)

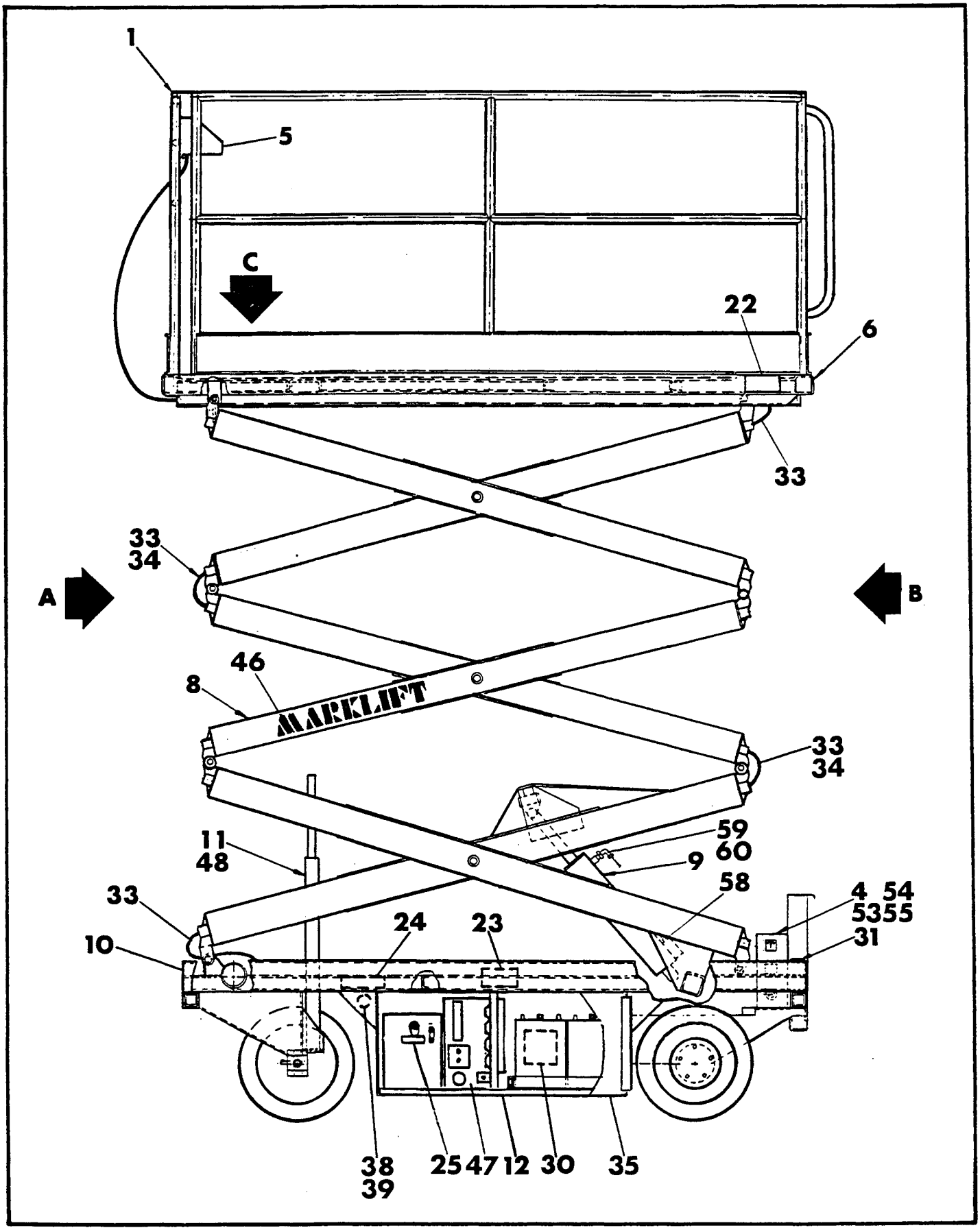


FIGURE 1D - FINAL ASSEMBLY (S19E)

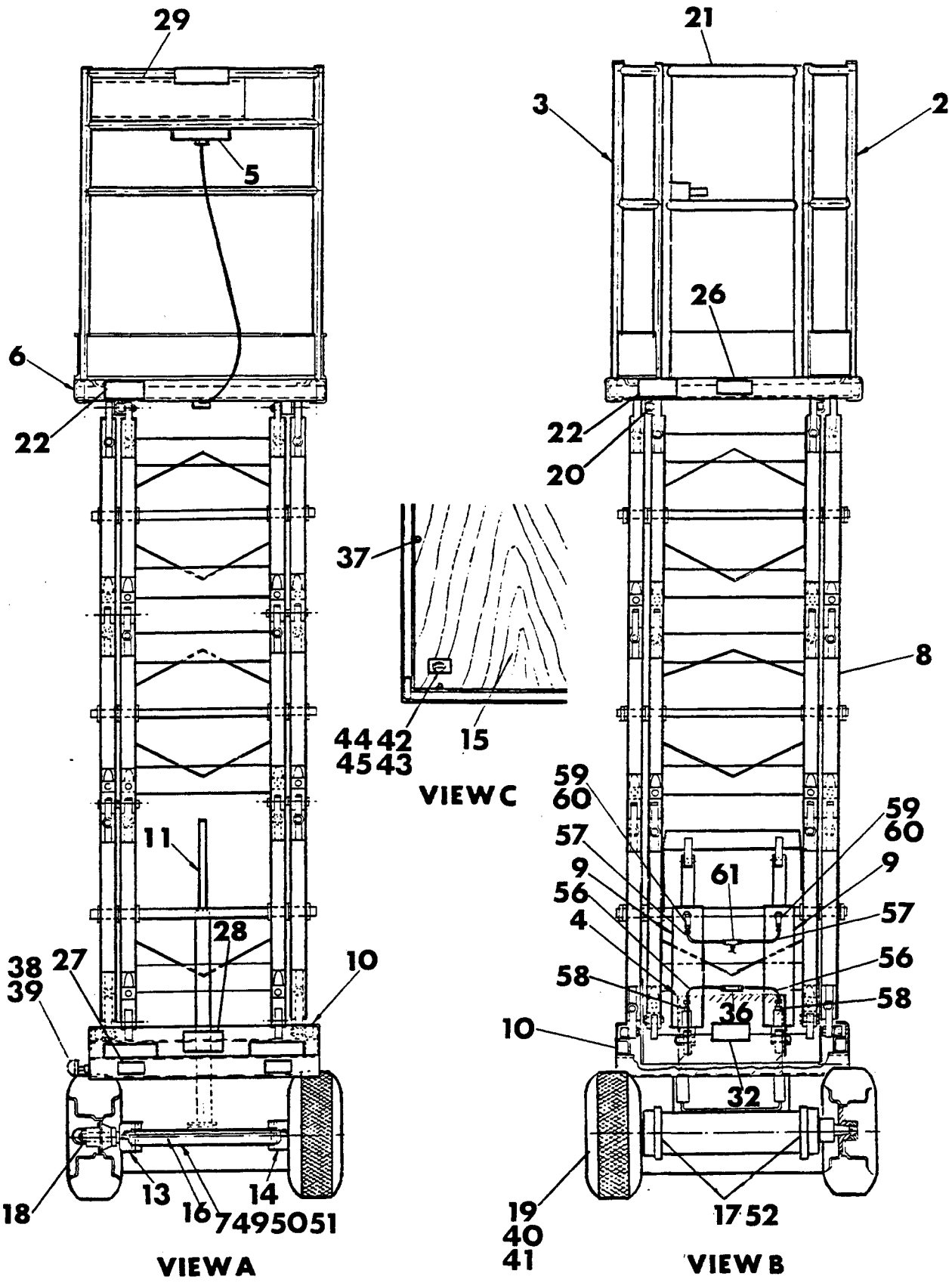


FIGURE 1D - FINAL ASSEMBLY (S19E)

ITEM	PART NUMBER	DESCRIPTION	QTY
1D-	30015 (9075)	FINAL ASSEMBLY	1
-1	6023	GUARD RAIL - FRONT	1
-2	6022	GUARD RAIL - SIDE (RIGHT SIDE)	1
-3	6024	GUARD RAIL - SIDE (LEFT SIDE)	1
-4	63	BATTERY CAHRGER	1
-5	4067-1	HAND CONTROL BOX ASSEMBLY (SEE FIG.10)	1
-6	6020	DECK WELDMENT	1
-7	3014	STEERING CYLINDER (SEE FIG.2)	1
-8	6090	SCISSOR ASSEMBLY (SEE FIG.9A)	1
-9	3011	MAIN LIFT CYLINDER (SEE FIG.3A)	2
-10	6050	FRAME WELDMENT	1
-11	3012	KICK CYLINDER (SEE FIG.4)	1
-12	30421 (7099)	BELLY PAN COMPONENTS ASSEMBLY (SEE FIG. 7B)	1
-13	6305-1	FRONT YOKE ASSEMBLY (R.H.) (SEE FIG.5)	1
-14	6305-2	FRONT YOKE ASSEMBLY (L.H.) (SEE FIG.5)	1
-15	2246	PLYWOOD FLOOR 3/4 X 28¼ X 90½	1
-16	6322-3	TIE ROD ASSEMBLY	1
-17	3040	DRIVE MOTOR	2
-18	134	HUB ASSEMBLY (WITH LM67048 BEARINGS)	2
-19	2223	MONO FILLED TIRES	4
	814	TIRE & WHEEL 18 X 6.50-8 (UNFILLED)	
-20	2272	DECK CAM ROLLER	2
-21	7314	SPRING LOADED GUARD RAIL GATE INSTALLATION (SEE FIG.12)	1
-22	2023	DECAL - "LOAD CAPACITY 750LBS."	4
-23	2016	DECAL - "WARNING - DO NOT WORK UNDERNEATH THIS LIFT UNLESS IT IS MECHANICALLY LOCKED"	1
-24	2019	DECAL - "EMERGENCY LOWERING VALVE"	1
-25	2017	DECAL - "THE HYDRAULIC SYSTEM OF THIS MACHINE IS DESIGNED TO USE G.M. TRANSMISSION FLUID TYPE "B" WITH DEXRON"	1
-26	2018-1	DECAL - "THIS MACHINE HAS BEEN DESIGNED AND TESTED TO MEET THESE STANDARDS: ANSI A92.3 1973, OSHA GISO 1901.67"	1
-27	2002	DECAL - "FORKLIFT BOOT"	2

ITEM	PART NUMBER	DESCRIPTION	QTY
-28	2012	PLATE - MODEL/SERIAL NUMBER	1
-29	30415	DECAL - OPERATION INSTRUCTIONS	1
-30	2003	DECAL - "IMPORTANT - CHECK BATTERY WATER LEVEL AT LEAST ONCE A WEEK"	1
-31	2005	DECAL - "BATTERY CHARGER PLUG 115 VOLT ONLY"	1
-32	2041	DECAL - "DO NOT LIFT FROM THIS END"	1
-33	4035-2	ARM CABLE ASSEMBLY	1
-34	4034	CABLE - POWER TO PLATFORM	1
-35	30366	BELLY PAN DOOR INSTALLATION (SEE FIG. 14B)	1
-36	2421	UNION TEE	1
-37	64401	SELF TAPPING SCREW ¼-20 UNC X 1¼	8
-38	4018	EMERGENCY ON/OFF SWITCH (FARSIDE)	1
-39	5300	KNOB - EMERGENCY ON/OFF	1
-40	2221	CONE BOLT ½-20 X 3/4 (REAR WHEELS)	10
-41	65123	CONE LUG NUTS ½-20 UNF (FRONT WHEELS)	10
-42	355	BELL BOX	1
-43	356	BELL BOX COVER	1
-44	4060	RECEPTACLE	1
-45	117G	ROMEX CONNECTOR	1
-46	2048	DECAL - MARKLIFT	2
-47	30402	PANEL ASSEMBLY (SEE FIG.13)	1
-48	2435	MALE ELBOW (TOP PORT)	1
-49	2449	MALE ELBOW	2
-50	13212-06-0116	HOSE (STEERING)	1
-51	13212-06-0144	HOSE (STEERING)	1
-52	16513	ELBOW	4
-53	60131	BOLT ¼-20 UNC X 1	4
-54	63301	LOCK WASHER ¼	4
-55	60701	HEX NUT ¼-20 UNC	4
-56	16341	TUBE ASSEMBLY (LIFT CYLINDER CROSS OVER LOWER PORTS)	2
-57	13205-04-0090	HOSE ASSEMBLY (LIFT CYLINDER CROSS OVER UPPER PORTS)	2

FIGURE 1D - FINAL ASSEMBLY (S19E)

ITEM	PART NUMBER	DESCRIPTION	QTY
-58	2511	STRAIGHT THREAD CONNECTOR	2
-59	2435	MALE ELBOW	2
-60	2477	PIPE THREAD REDUCER	2
-61	2417	UNION TEE	1

FIGURE 1E - FINAL ASSEMBLY (S19EX)

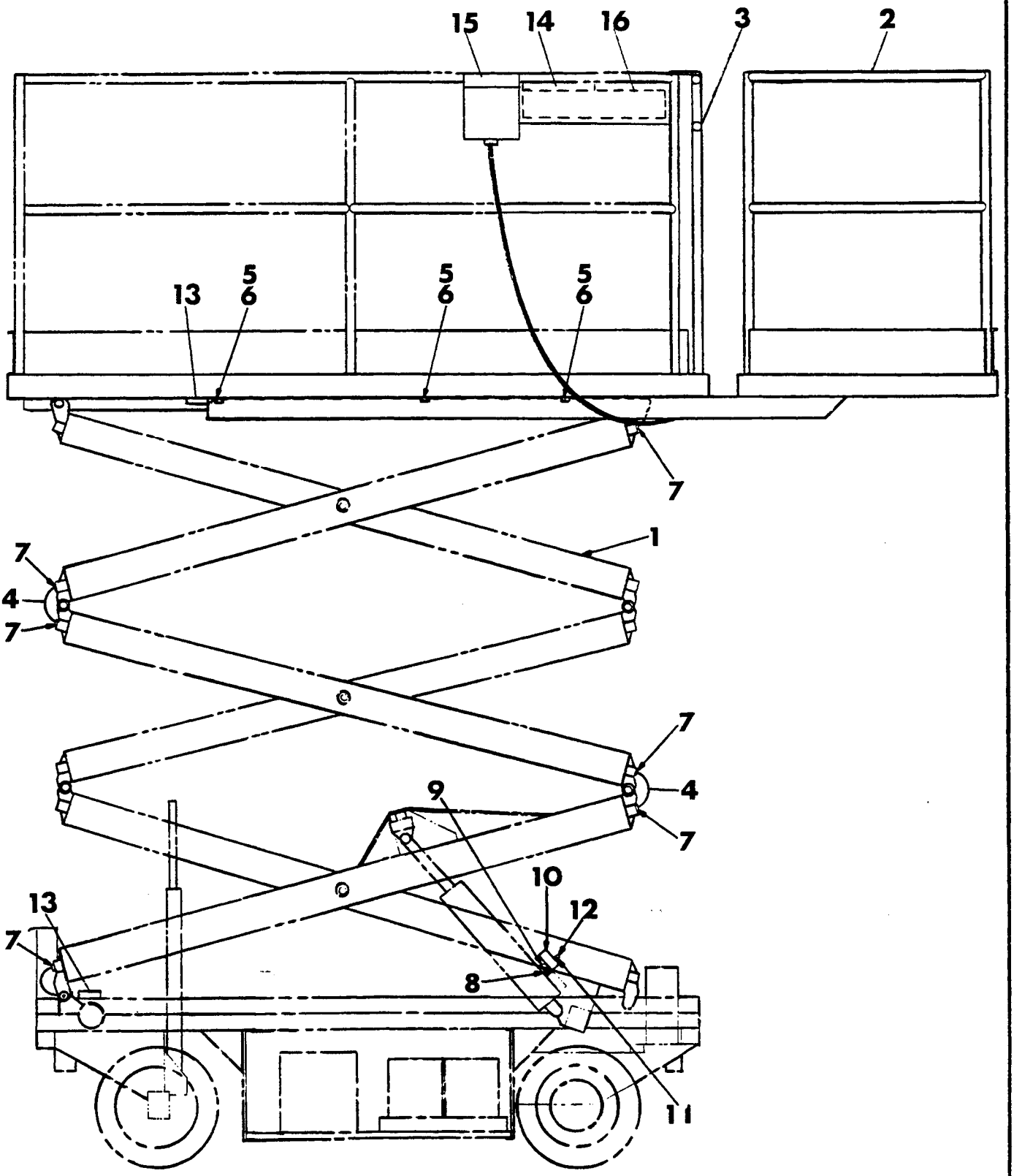


FIGURE 1E - FINAL ASSEMBLY (S19EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
1E-	30016	FINAL ASSEMBLY	1
-1	30015	FINAL ASSEMBLY (S19E) (SEE FIG.1D)	1
-2	9262	CRANK OUT DECK ASSEMBLY (S19EX)(REPLACES P/N 6020 ON S19E MACHINE) (SEE FIG.6)	1
-3	9273	GUARD RAIL - FRONT (REPLACES P/N 6023 ON S19E MACHINE)	1
-4		12GA 7 CONDUCTOR CABLE	1
-5	734	POP RIVET	3
-6	22	JIFFY CLIP	3
-7	730	STRAIN RELIEF (REPLACES 6 OF P/N 777 ONLY ON S19E MACHINE)	6
-8	6415	O-RING BOSS INTERNAL PIPE SWIVEL ELBOW (REPLACES HYDRAULIC TUBE ASSEMBLY QTY.2 ON S19E MACHINE)	2
-9	6416	90° ELBOW	2
-10	4116	SOLENOID VALVE	2
-11	13104-022	TUBE ASSEMBLY (REPLACES P/N 2511 QTY.2 ON S19E MACHINE)	2
-12	2448	90° ELBOW	2
-13	20803	LIMIT SWITCH	2
-14	30750	DECAL-"THIS MACHINE WILL NOT DRIVE UNLESS CRANK-OUT DECK IS FULLY RETRACTED AND LATCHED"	1
-15	4067-1	HAND CONTROL BOX ASSEMBLY (SEE FIG.10)	1
-16	30415	DECAL-OPERATION INSTRUCTIONS	1

FIGURE 1E.1 - FINAL ASSEMBLY (S19ETD)

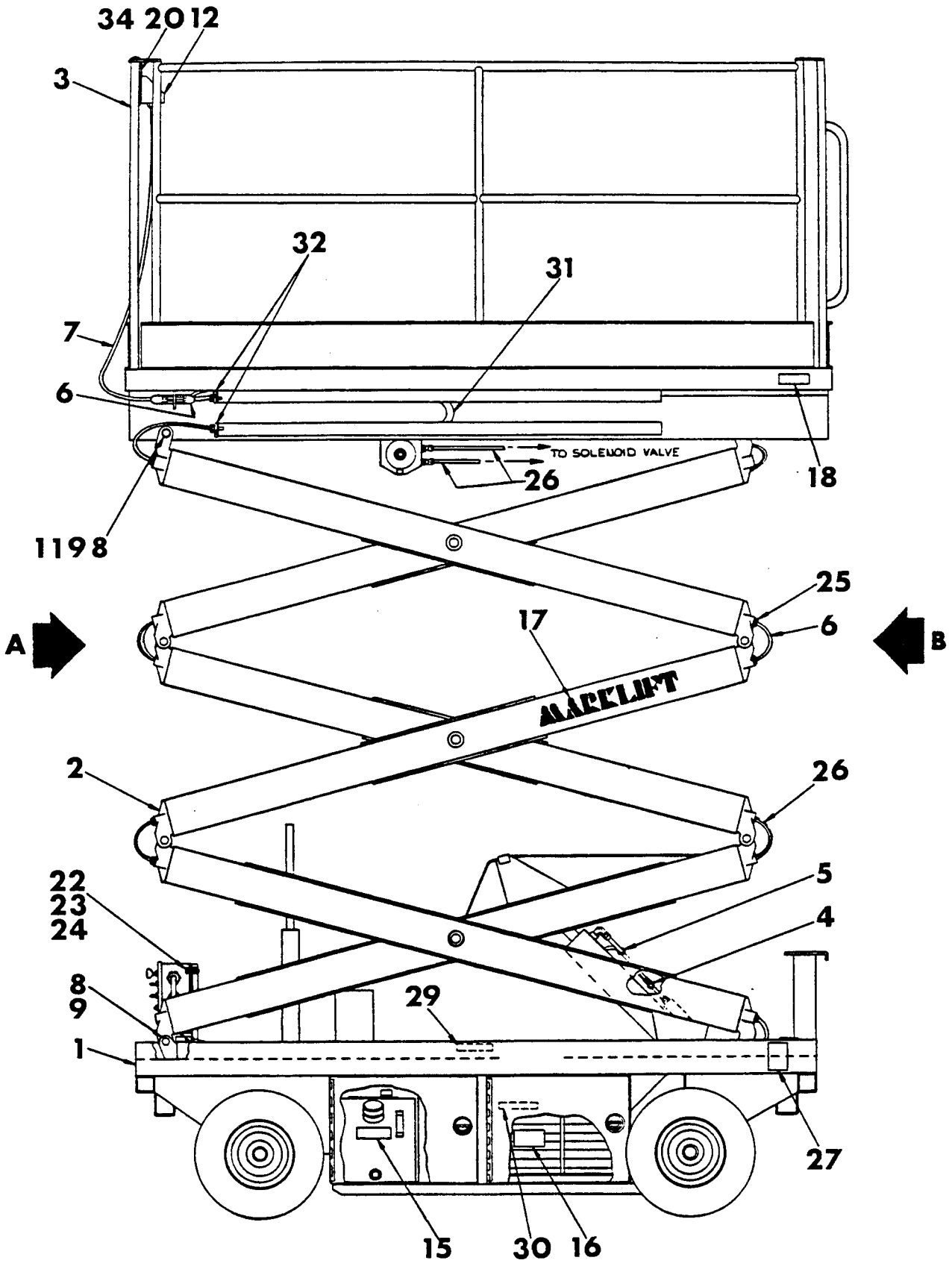


FIGURE 1E.1 - FINAL ASSEMBLY (S19ETD)

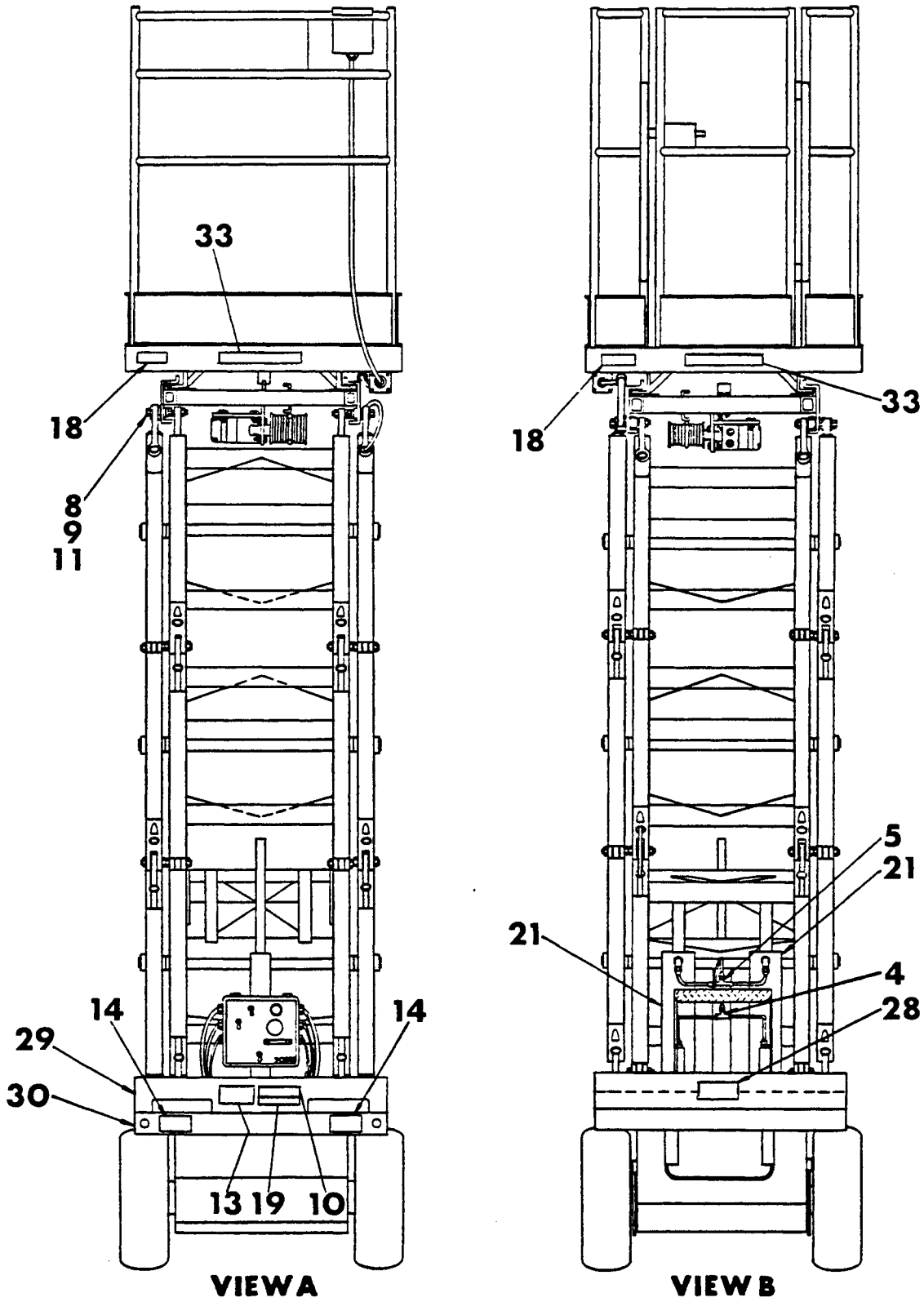


FIGURE 1E.1 - FINAL ASSEMBLY (S19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
1E.1-	30026	FINAL ASSEMBLY	1
-1	30926	FRAME ASSEMBLY (SEE FIG. 7N)	1
-2	30929	SCISSOR ASSEMBLY (SEE FIG. 9C)	1
-3	30932	DECK ASSEMBLY (SEE FIG. 6D)	1
-4	2421	UNION TEE	1
-5	2417	UNION TEE	1
-6	30938	ARM CONTROL CABLE	1
-7	30937	CONTROL CABLE	1
-8	60392	HEX HEAD CAP SCREW - 3/4-10 UNC X 2 3/4	4
-9	61304	HEX NUT - 3/4-10 UNC	4
-10	30520	PLATE - PATENT NUMBER	1
-11	63408	FLAT WASHER - 3/4	6
-12	30936	AERIAL CONTROL BOX ASSEMBLY (SEE FIG. 10A)	1
-13	20660	PLATE - MODEL/SERIAL NUMBER	1
-14	2002	DECAL - FORKLIFT BOOT	2
-15	2017	DECAL - HYDRAULIC FLUID SPEC.	1
-16	2003	DECAL - "IMPORTANT - CHECK BATTERY WATER LEVEL AT LEAST ONCE A WEEK"	1
-17	2048	DECAL - MARKLIFT	2
-18	2023	DECAL - LOAD CAPACITY 750 LBS.	4
-19	20661	PLATE - ANSI A92	1
-20	30415	DECAL - OPERATING INSTRUCTIONS	1
-21	31076	MAIN LIFT CYLINDER ASSEMBLY (SEE FIG. 3B)	2
-22	60312	HEX HEAD CAP SCREW - 1/4-20 UNC X 1 (GR. 5)	4
-23	63301	SPLIT LOCK WASHER - 1/4	4
-24	60701	HEX NUT - 1/4-20 UNC	4
-25	16222	STRAIN RELIEF	6
-26	2568	HYDRAULIC HOSE	2
-27	2005	DECAL - BATTERY CHARGER PLUG 115 VOLT ONLY	1
-28	3041	DECAL - "DO NOT LIFT FROM THIS END"	1

ITEM	PART NUMBER	DESCRIPTION	QTY
-29	2016	DECAL - "WARNING DO NOT WORK UNDER-NEATH THIS LIFT UNLESS IT IS MECHANI-CALLY LOCKED"	1
-30	2019	DECAL - EMERGENCY LOWERING VALVE	1
-31	31034	HYDRAULIC HOSE	1
-32	65451	HOSE CLAMP	2
-33	31109	DECAL - "CAUTION - GUARD RAILS ARE FOR YOUR SAFETY. DO NOT REMOVE"	2
-34	31033	DECAL - "CAUTION - THIS MACHINE WILL NOT DRIVE OR DESCEND UNLESS TRAVERSING DECK IS CENTERED"	1

FIGURE 1E.2 - FINAL ASSEMBLY (S19EFD)

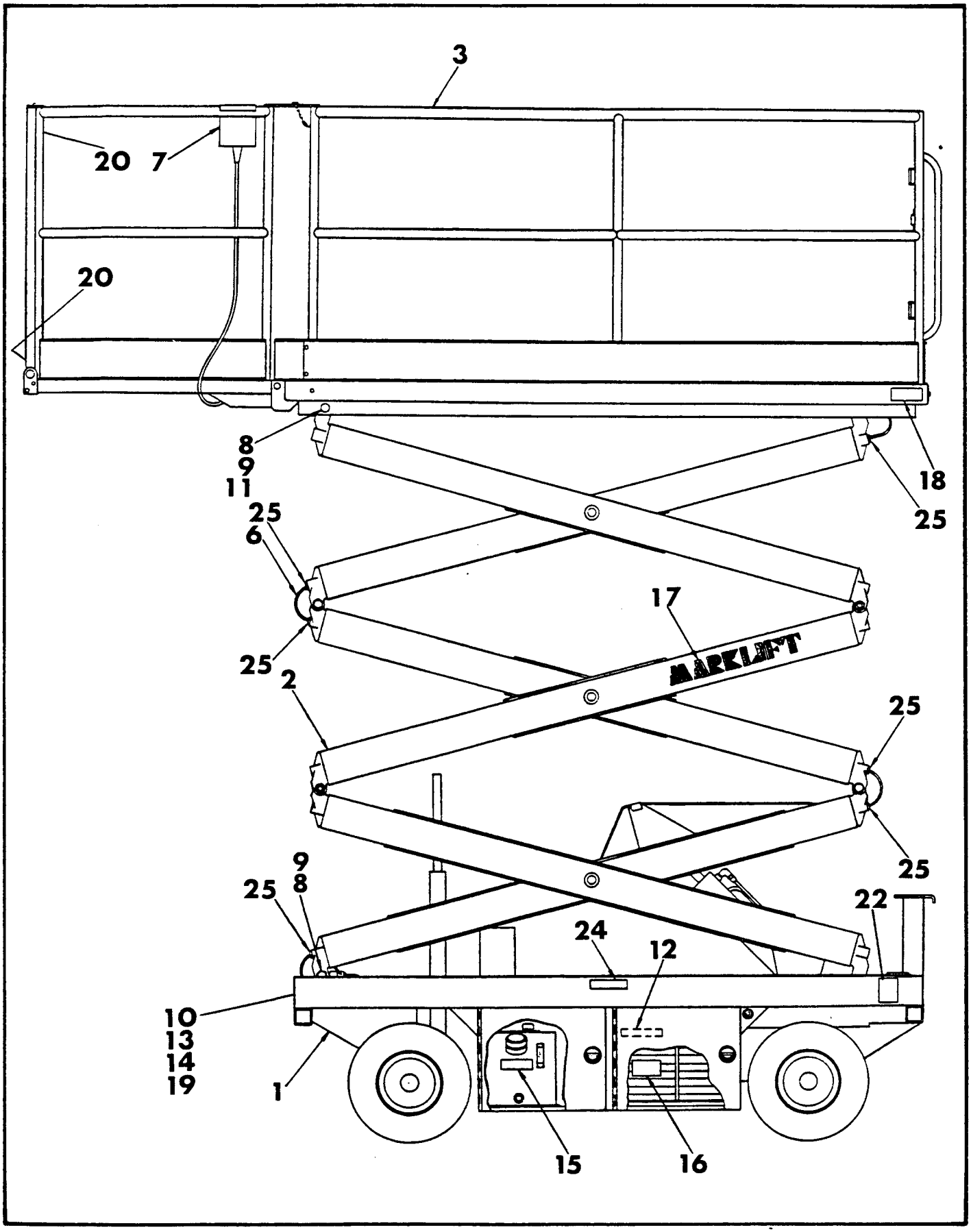


FIGURE 1E.2 - FINAL ASSEMBLY (S19EFD)

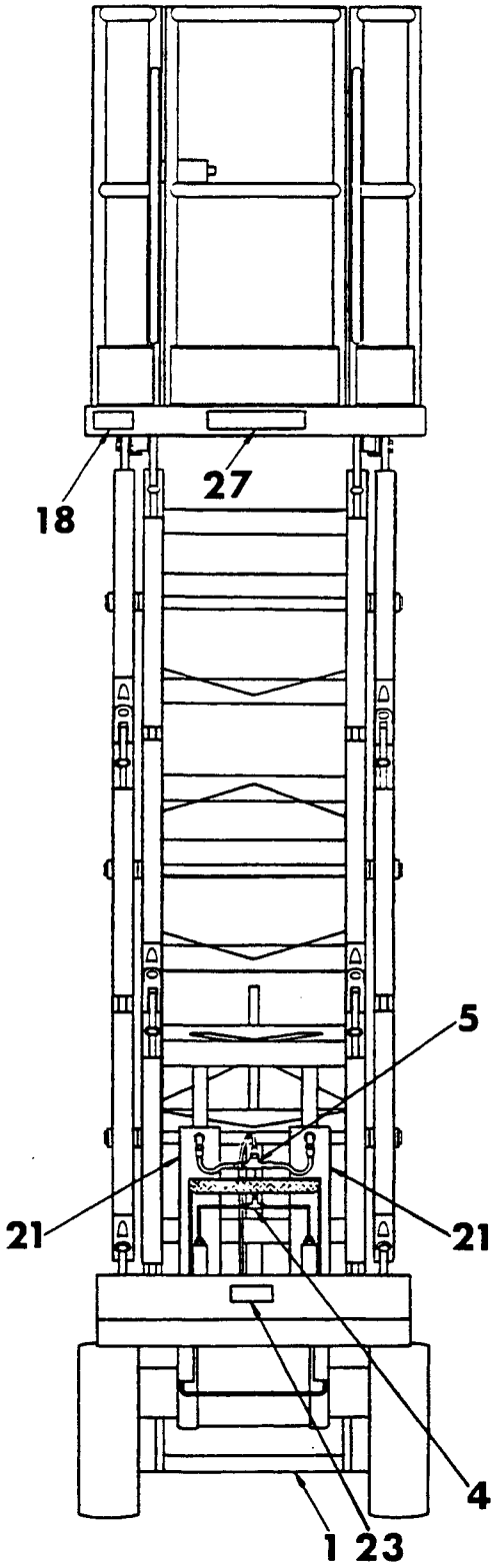
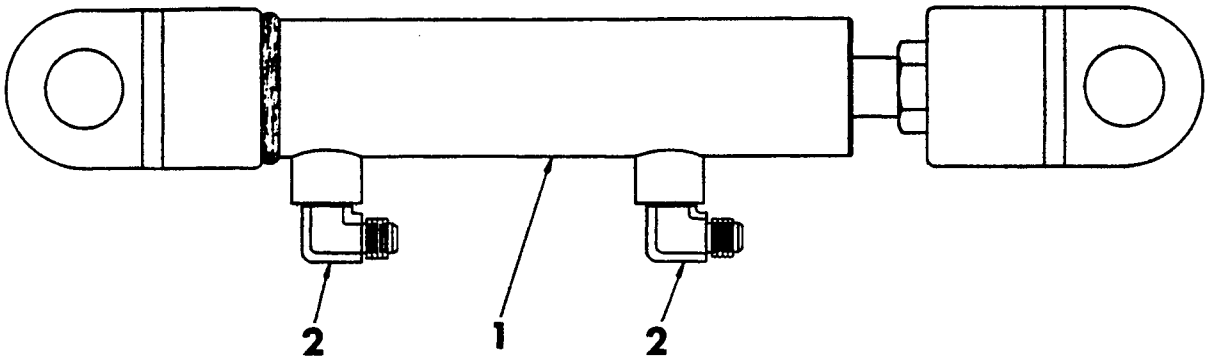


FIGURE 1E.2 - FINAL ASSEMBLY (S19EFD)

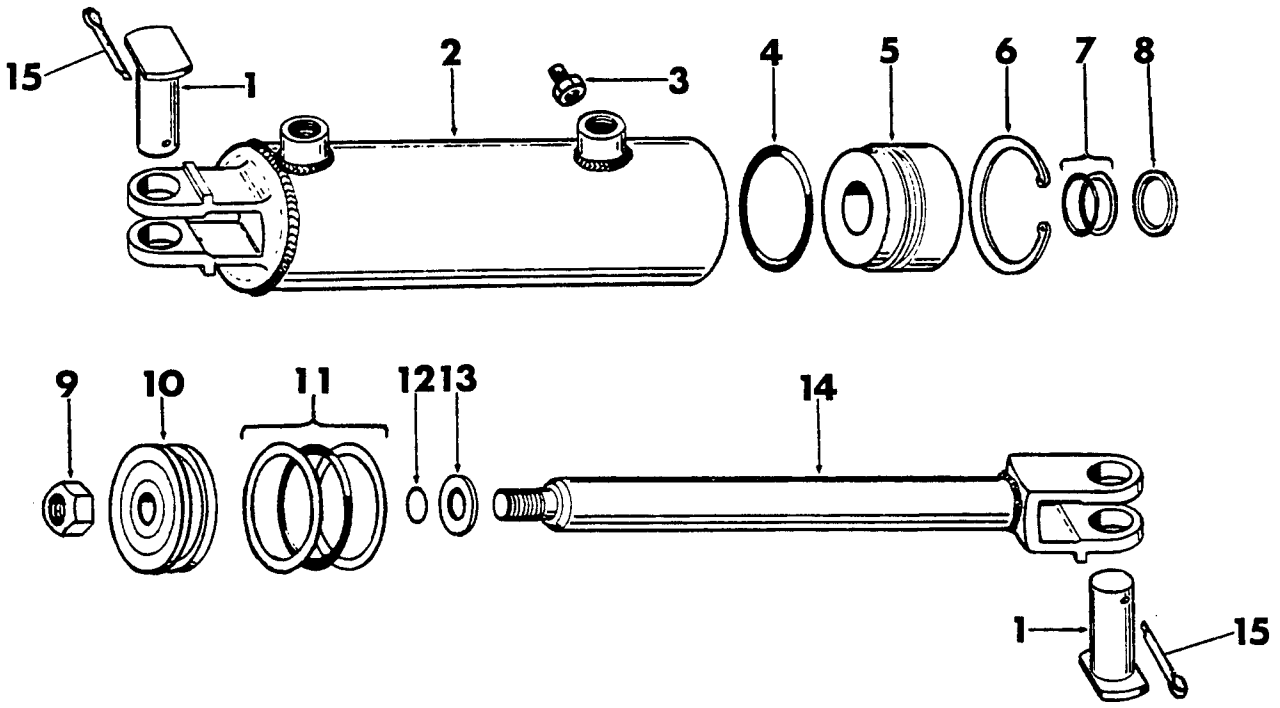
ITEM	PART NUMBER	DESCRIPTION	QTY
1E.2-	30028	FINAL ASSEMBLY	1
-1	31079	FRAME ASSEMBLY	1
-2	30929	SCISSOR ASSEMBLY (SEE FIG. 9C)	1
-3	30982	DECK ASSEMBLY (SEE FIG. 6E)	1
-4	2421	UNION TEE	1
-5	2417	UNION TEE	1
-6	30938	ARM CONTROL CABLE	1
-7	4067-1	HAND CONTROL BOX ASSEMBLY (SEE FIG. 10)	1
-8	60392	HEX HEAD CAP SCREW - 3/4-10 UNC X 2 3/4	4
-9	61304	HEX NUT - 3/4-10 UNC	4
-10	30520	PLATE - PATENT NUMBER	1
-11	63408	FLAT WASHER - 3/4	6
-12	2019	DECAL - EMERGENCY LOWERING VALVE	1
-13	20660	PLATE - MODEL/SERIAL NUMBER	1
-14	2002	DECAL - FORKLIFT BOOT	2
-15	2017	DECAL - HYDRAULIC FLUID SPEC.	1
-16	2003	DECAL - "IMPORTANT - CHECK BATTERY WATER LEVEL AT LEAST ONCE A WEEK"	1
-17	2048	DECAL - MARKLIFT	2
-18	2023	DECAL - LOAD CAPACITY 750 LBS.	4
-19	20661	PLATE - ANSI A92	1
-20	30415	DECAL - OPERATING INSTRUCTIONS	2
-21	31075	MAIN LIFT CYLINDER ASSEMBLY (SEE FIG. 3B)	2
-22	2005	DECAL - "BATTERY CHARGER PLUG 115 VOLT ONLY"	1
-23	2041	DECAL - "DO NOT LIFT FROM THIS END"	1
-24	2016	DECAL - "WARNING - DO NOT WORK UNDERNEATH THIS LIFT UNLESS IT IS MECHANICALLY LOCKED"	1
-25	16222	STRAIN RELIEF	6
-26	2568	HYDRAULIC HOSE	2
-27	31109	DECAL - "CAUTION - GUARD RAILS ARE FOR YOUR SAFETY. DO NOT REMOVE"	2

FIGURE 2-STEERING CYLINDER ASSEMBLY (ALL MODELS)



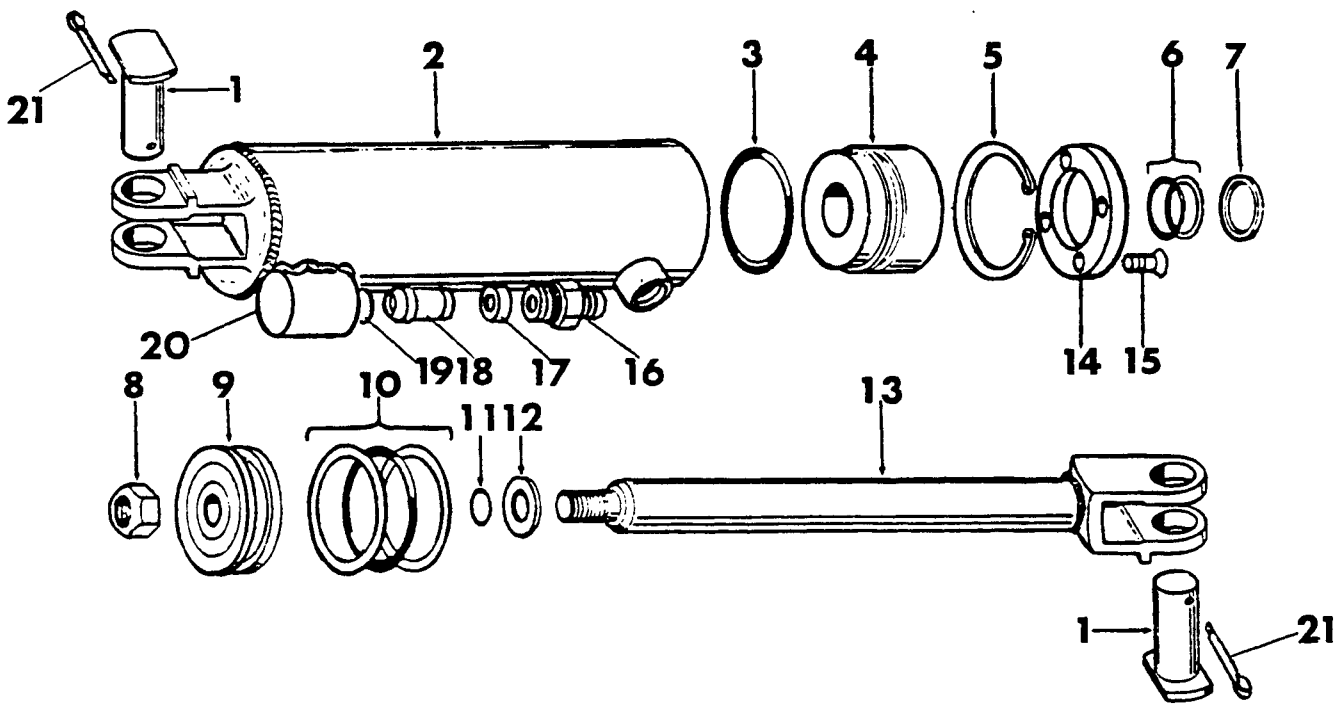
ITEM	PART NUMBER	DESCRIPTION	QTY
2-	30844	STEERING CYLINDER ASSEMBLY	1
-1	3014	STEERING CYLINDER (SEE FIG. 2A)	1
-2	2449	MALE ELBOW	2

FIGURE 2A- STEERING CYLINDER (ALL MODELS)



ITEM	PART NUMBER	DESCRIPTION		QTY
2A-	3014	Steering Cylinder (HPWR)		1
-1	2356	Clevis Pin	LC15SP.P	2
-2		Tube Assembly	LC15X3SP.C	1
-3		Head Set Screw	LC15A	1
-4		Head O-Ring	LC150	1
-5		Head	LC15E	1
-6		Lock Ring	LC15LR	1
-7		Shaft Packing Set	LC15US	1
-8		Rod Wiper	LC15RW	1
-9		Piston Lock Nut	LC15N	
-10		Piston	LC15V	1
-11		Piston O-Ring Assembly	LC15P0	1
-12		Small O-Ring	LC15S0	1
-13		Steel Washer	LC15M	1
-14		Shaft Assembly	LC15X3SP.S	1
-15	64303	Cotter Pin - 3/32 Dia X 1 3/4		2
-16	3062-1	Seal Kit (Item 4,7,8,11,12) (KL15)		1

FIGURE 3 - MAIN LIFT CYLINDER (15E) (S15E) (S15EX)

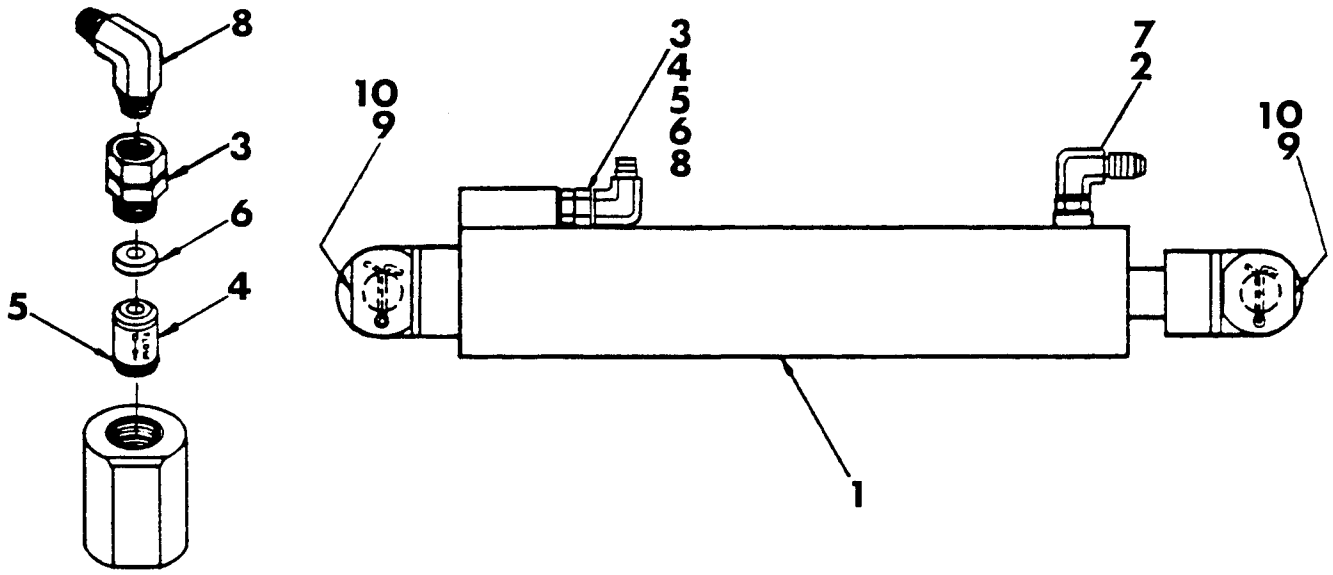


ITEM	PART NUMBER	DESCRIPTION		QTY
3-	3009	Main Lift Cylinder (HPWR)		1
-1	2346	Clevis Pin	LC35SP.P	2
-2		Tube Assembly	LC35X24SP.C	1
-3		Head O-Ring	LC350	1
-4		Head	LC35SP.E	1
-5		Lock Ring	LC35LR	1
-6		Shaft Packing	LC35SP.US	1
-7		Rod Wiper	LC35SP.RW	1
-8		Piston Lock Nut	LC35SP.N	1
-9		Piston	LC35SP.V	1
-10		Piston O-Ring Assembly	LC35PO	1
-11		Small O-Ring	LC35SP.SO	1
-12		Steel Washer	LC35SP.M	1
-13		Shaft Assembly	LC35X25SP.S (1½ Rod)	1
-14		Lock Ring Retainer Washer		1
-15		Lock Ring Retainer Washer Screw		4
-16	2511	O-Ring Adapter		1

FIGURE 3 - MAIN LIFT CYLINDER (15E) (S15E) (S15EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
-17	3025-1	Spacer	1
-18	31090	Descent Valve Cartridge #50 DRILL HOLE	1
-19	70020	O-Ring - 015	1
-20	3025	Cartridge Housing	1
-21	64303	Cotter Pin - 1 Dia x 2 5/8	2
-22	3009-A (1½ Rod)	Seal Kit (Item 3,6,7,10,11) (KL35SP)	1

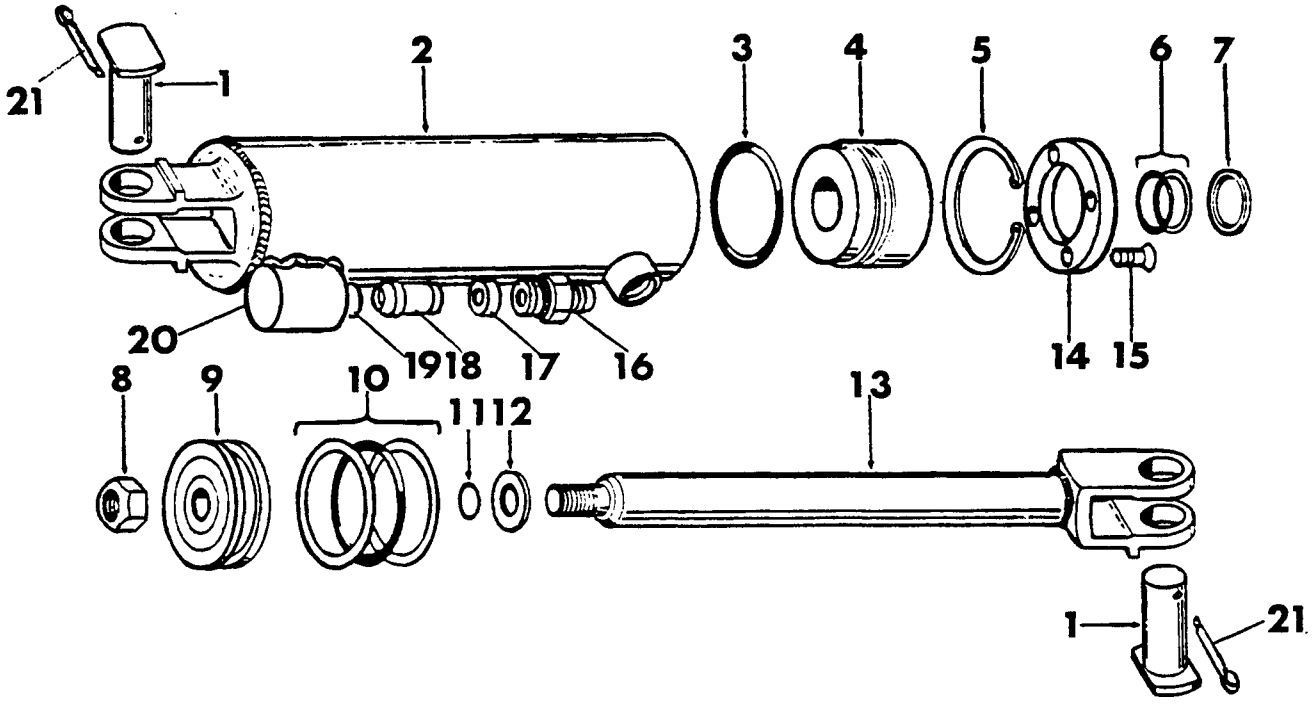
FIGURE 3.1 - MAIN LIFT CYLINDER ASSEMBLY (S15ETD)



DETAIL CHECK VALVE HOUSING ASSEMBLY

ITEM	PART NUMBER	DESCRIPTION	QTY
3.1-	31078	MAIN LIFT CYLINDER ASSEMBLY	1
-1	3009	MAIN LIFT CYLINDER (SEE FIG. 3)	1
-2	2435	MALE ELBOW	1
-3	2579	STRAIGHT THREAD CONNECTOR	1
-4	31090	MODIFIED CHECK VALVE	1
-5	2933	O-RING	1
-6	31120	SPACER	1
-7	2477	REDUCER	1
-8	6416	MALE PIPE ELBOW	1
-9	2346	CLEVIS PIN	2
-10	64305	COTTER PIN	2
	3009-A	SEAL KIT	

FIGURE 3A - MAIN LIFT CYLINDER (19E) (S19E) (S19EX)



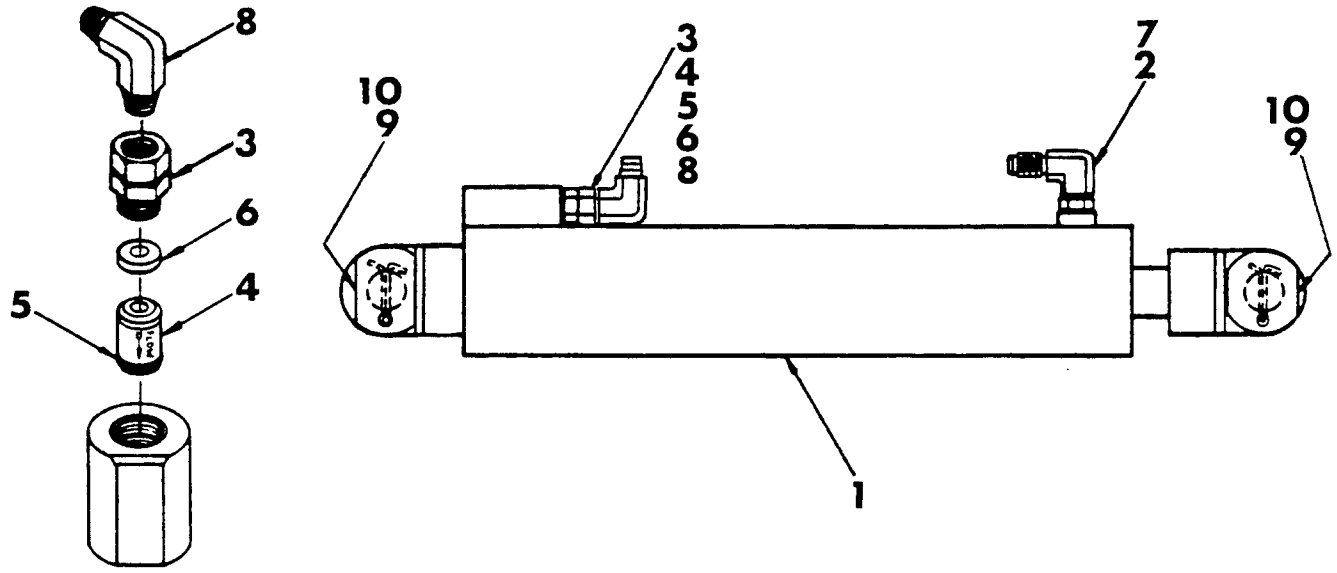
ITEM	PART NUMBER	DESCRIPTION		QTY
3A-	3011	Main Lift Cylinder (HPWR)		1
-1	2346	Clevis Pin	LC35SP.P	2
-2		Tube Assembly	LC35X16SP.C	1
-3		Head O-Ring	LC350	1
-4		Head	LC35SP.E	1
-5		Lock Ring	LC35LR	1
-6		Shaft Packing	LC35SP.US	1
-7		Rod Wiper	LC35SP.RW	1
-8		Piston Lock Nut	LC35SP.N	1
-9		Piston	LC35SP.V	1
-10		Piston O-Ring Assembly	LC35PO	1
-11		Small O-Ring	LC35SP.SO	1
-12		Steel Washer	LC35.M	1
-13		Shaft Assembly	LC35X16SP.S (1½ Rod)	1
-14		Lock Ring Retainer Washer		1
-15		Lock Ring Retainer Washer Screw		4
-16	2511	O-Ring Adapter		1

FIGURE 3A - MAIN LIFT CYLINDER (19E) (S19E) (S19EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
-17	3025-1	Spacer	1
-18	31090 *	Descent Valve Cartridge #50 DRILL HOLE	1
-19	66131	O-Ring - 015	1
-20	3025	Cartridge Housing	1
-21	64303	Cotter Pin 1 Dia. x 2 5/8	2
-22	3011-A (1½ Rod)	Seal Kit (Item 3,6,7,10,11) (KL35SP)	1

* 3028 N.L.A. use 31153 (.039/#61 hole) if speed is too fast

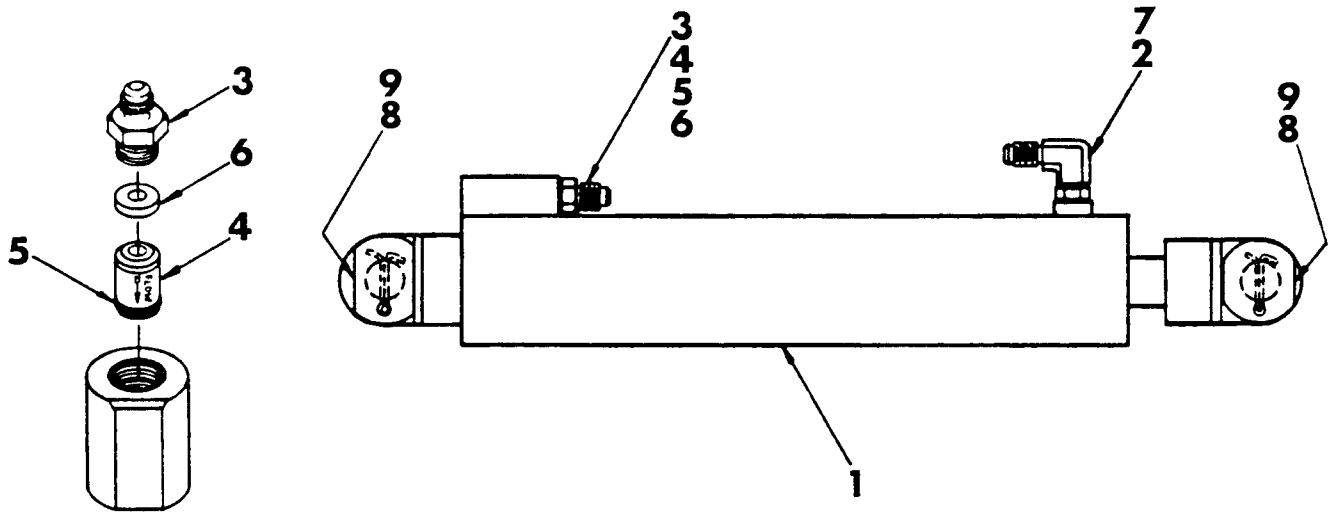
FIGURE 3B - MAIN LIFT CYLINDER ASSEMBLY (19ETD) (S19ETD)



DETAIL CHECK VALVE HOUSING ASSEMBLY

ITEM	PART NUMBER	DESCRIPTION	QTY
3B-	31076	MAIN LIFT CYLINDER ASSEMBLY	1
-1	3011	MAIN LIFT CYLINDER (FIG. 3A)	1
-2	2435	MALE ELBOW	1
-3	6415	STRAIGHT THREAD CONNECTOR	1
-4	31090	MODIFIED CHECK VALVE. #50 DRILL HOLE	1
-5	2933	O-RING	1
-6	31120	SPACER	1
-7	2477	REDUCER	1
-8	6416	MALE PIPE ELBOW	1
-9	2346	CLEVIS PIN	2
-10	64305	COTTER PIN	2
	3011-A	SEAL KIT	

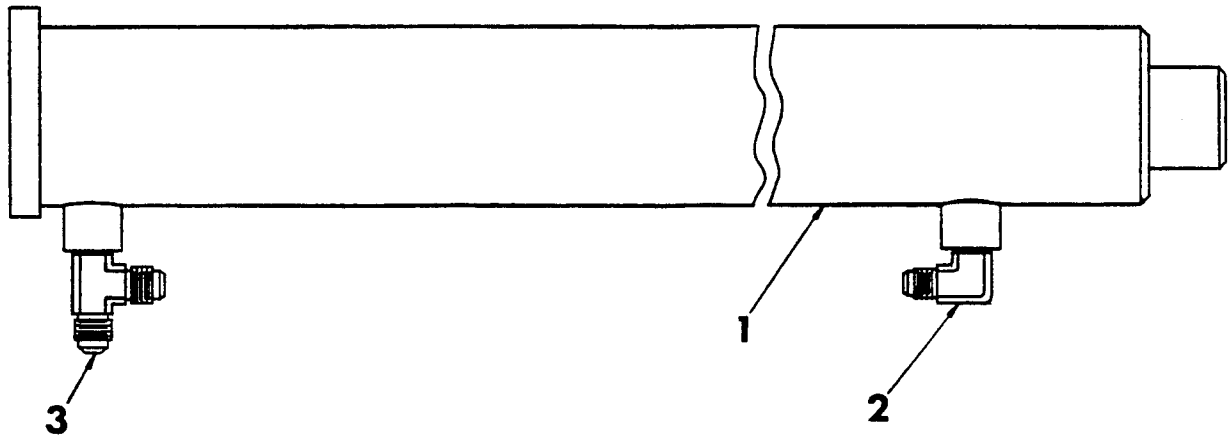
FIGURE 3C - MAIN LIFT CYLINDER ASSEMBLY (19E) (S19E) (S19EFD)



DETAIL CHECK VALVE HOUSING ASSEMBLY

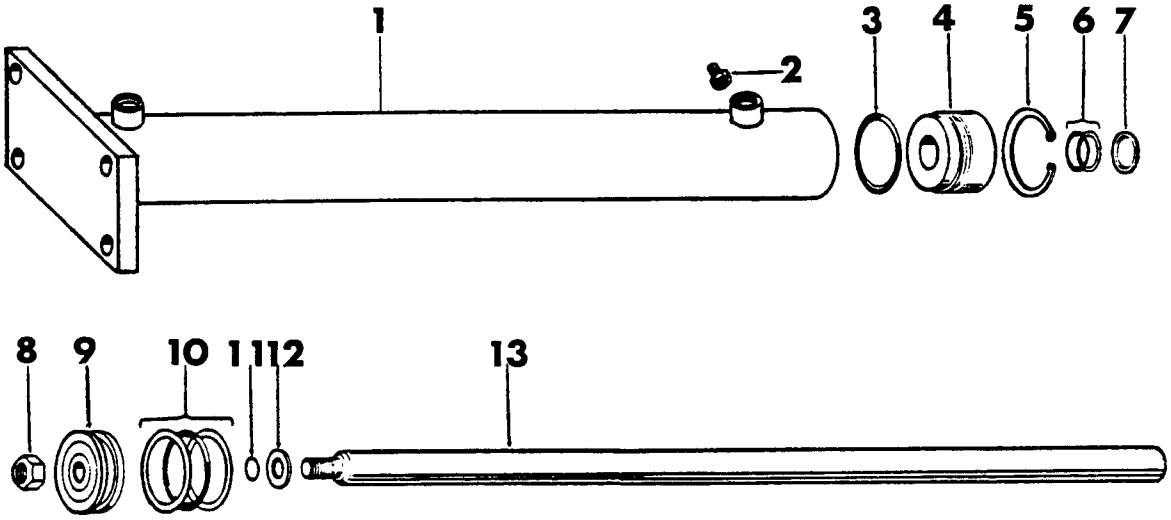
ITEM	PART NUMBER	DESCRIPTION	QTY
3C-	31075	MAIN LIFT CYLINDER ASSEMBLY	1
-1	3011	MAIN LIFT CYLINDER (SEE FIG. 3A)	1
-2	2435	MALE ELBOW	1
-3	2579	STRAIGHT THREAD CONNECTOR	1
-4	31090	MODIFIED CHECK VALVE #50 DRILL HOLE	1
-5	2933	O-RING	1
-6	31120	SPACER	1
-7	2477	REDUCER	1
-8	2346	CLEVIS PIN	2
-9	64305	COTTER PIN	2
	3011-A	SEAL KIT	

FIGURE 4-KICK CYLINDER ASSEMBLY (ALL MODELS)



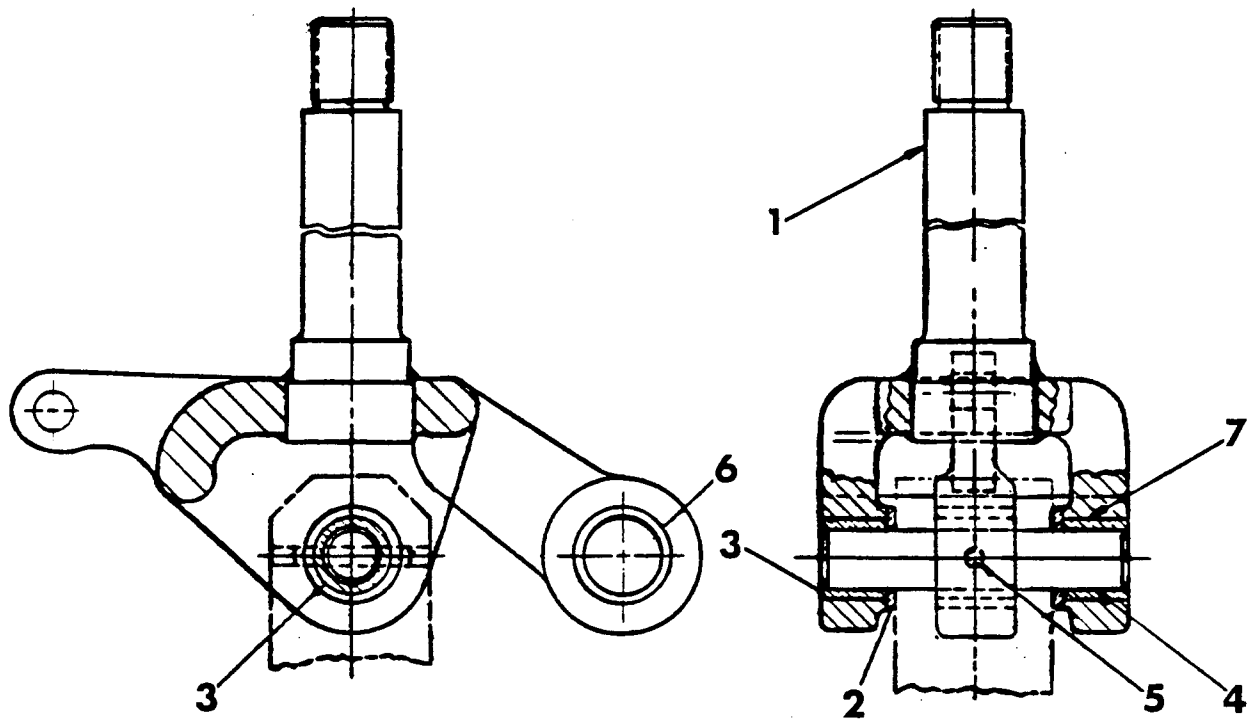
ITEM	PART NUMBER	DESCRIPTION	QTY
4-	30843	KICK CYLINDER ASSEMBLY	1
-1	3012	KICK CYLINDER (SEE FIG. 4A)	1
-2	2435	MALE ELBOW	1
-3	2425	MALE RUN TEE	1
	3012-1	SEAL KIT	

FIGURE 4A- KICK CYLINDER (ALL MODELS)



ITEM	PART NUMBER	DESCRIPTION		QTY
4A-	3012	Kick Cylinder (HPWR) HI/POWER CYLINDER		1
-1		Tube Assembly	LC2X28-¼SP.C	1
-2		Head Set Screw	LC2A	1
-3		Head O-Ring	LC2SP.O	1
-4	66028	Head	LC2SP.E	1
-5	66029	Lock Ring	LC2LR	1
-6		Shaft Packing	LC2SP.US	1
-7		Rod Wire	LC2SP.RW	1
-8	66031	Piston Lock Nut	LC2N	1
-9	66032	Piston	LC2V	1
-10		Piston O-Ring Assembly	LC2PO	1
-11		Small O-Ring	LC2SO	1
-12	66033	Steel Washer	LC2M	1
-13	66450 & 66449	Shaft Assembly	LC2X28-¼SP.S	1
-14	3012-1(1 1/4 Rod)	Seal Kit (3, 6, 10, 11)	(K2SP)	1

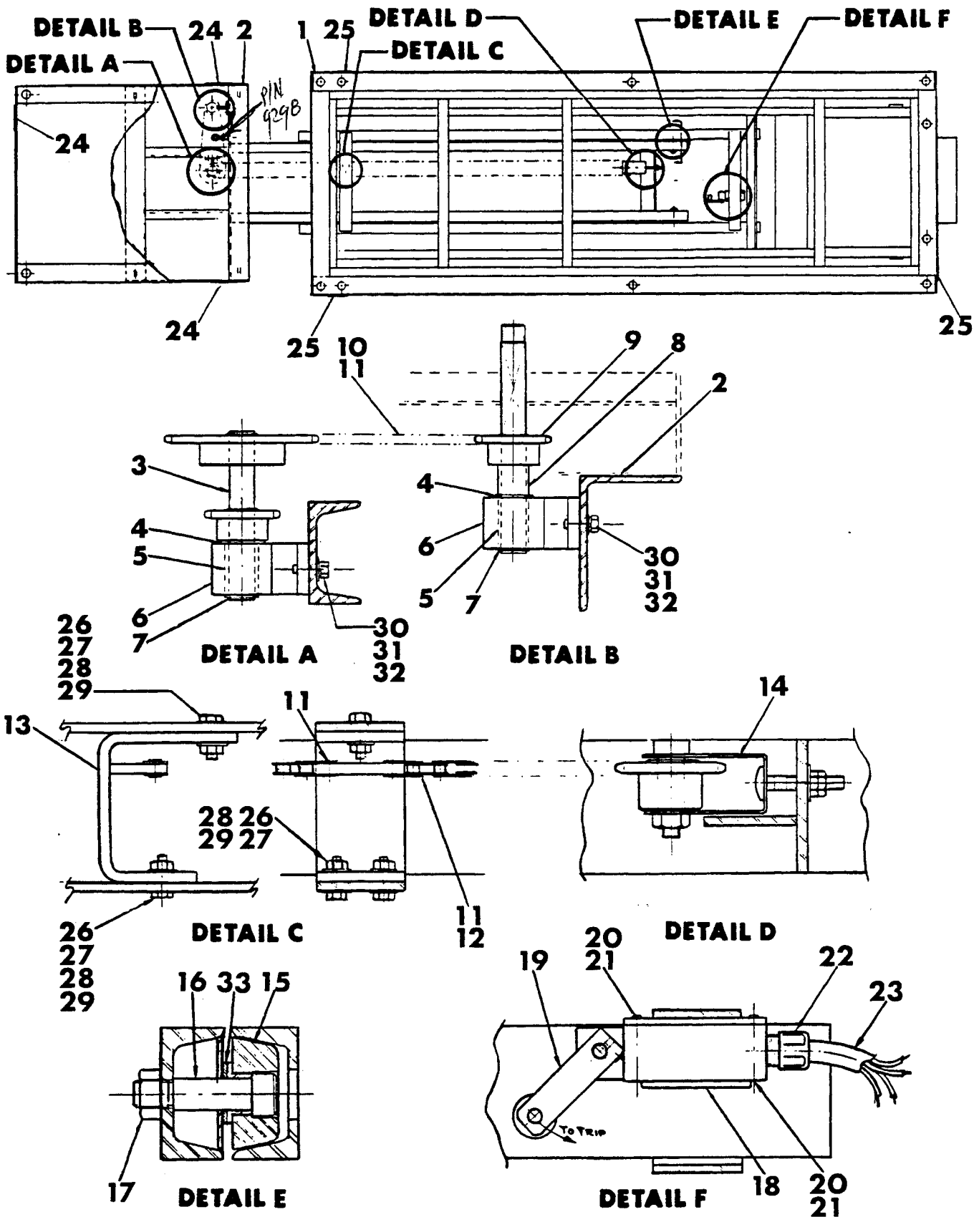
FIGURE 5-STEERING YOKE ASSEMBLY (ALL MODELS)



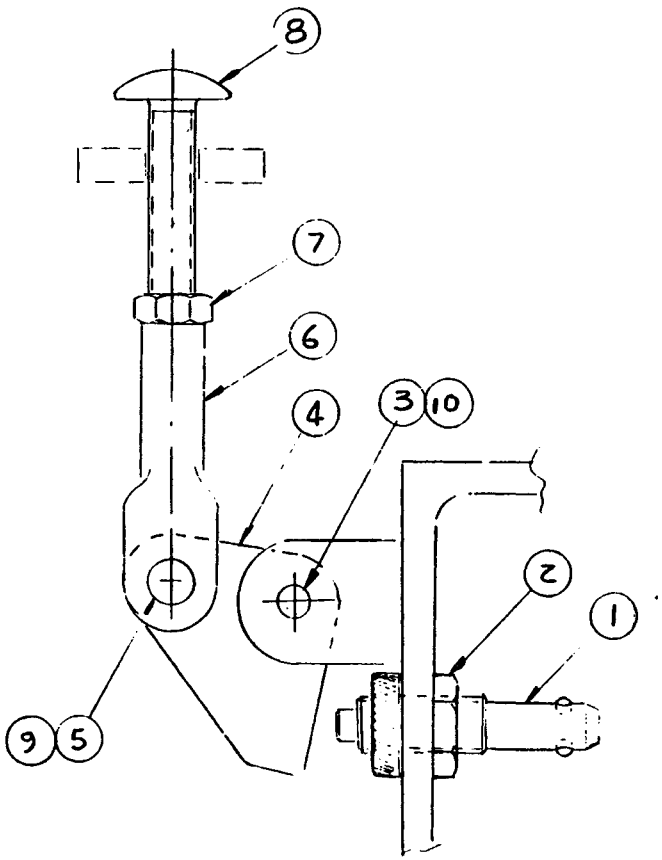
ITEM	PART NUMBER	DESCRIPTION	QTY
5-	~~6305-1~~ (31084) 6305-1	STEERING YOKE ASSEMBLY (R.H.) (15E) (19E) (S19E) (S19EX)	1
	6305-2 (31083) no dwg.	STEERING YOKE ASSEMBLY (L.H.) (15E) (S15E) (S15EX) (19E) (S19E) (S19EX)	1
	6305-3 (31085)	STEERING YOKE ASSEMBLY (R.H.) (S15E) (S15EX)	1
-1	6318	SPINDLE (REF.)	1
-2	2271	THRUST BEARING	1
-3	2268	SLEEVE BEARING	1
-4	6305-5 (31155)	KING PIN	1
-5	377	ROLL PIN	1
-6	2269	SLEEVE BEARING (6305-1 & -3)	1
-7	65176	FLANGE BEARING	1

NOTE: UNLESS OTHERWISE STATED, PARTS ARE COMMON FOR ALL MODELS.

FIGURE 6 - CRANK OUT DECK ASSEMBLY (S15EX) (S19EX)



REVISIONS			
REV.	ZONE	DESCRIPTION	BY
A		SEE E.O.	
B		SEE E.O.	
C		SEE E.O.	V.L.M.



QTY. REQ'D	ITEM NO.	PART OR IDENTIFYING NO.	DESCRIPTION	DATA: SPECIFICATIONS SIZES, NOTES, SUPPLIERS.
1	10		COTTER KEY	1/16 DIA X 1/2 LG
1	9		COTTER KEY	3/32 DIA X 1 LG
1	8		CARRIAGE BOLT	3/8-24 X 2 1/2 LG
1	7		HEX NUT	3/8-24
1	6	6407	CLEVIS	3/8-24 DORMAN Y4 (125004) OR EQUAL
1	5	6406	CLEVIS PIN	3/8 DIA. X 1 11/16 LG DORMAN C-7 OR EQUAL
1	4	9296	LOCK LEVER	
1	3	6405	CLEVIS PIN	1/4 DIA X 1 LG DORMAN C-1 OR EQUAL
1	2		HEX. NUT	5/8-18
1	1	9292	LOCK PIN	AVIBANK 51588 SBT1 (LESS HANDLE)

BILL OF MATERIAL

QTY	NEXT ASSY.	FINAL ASSY.
1	9277	SIZE (OPT)
1	9277	SIZE (OPT)

APPLICATION 11033

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON:

ANGLES ± ½° FRACTIONS ± 1/32 DECIMAL .XX=± .01 .XXX=± .005

DR. BY	RUSS	7/23/79
CHK BY	LYLE	7/27/79
APP'D		

THIS DRAWING EMBODIES A CONFIDENTIAL PROPRIETARY DESIGN ORIGINATED BY MARK INDUSTRIES, AND ALL DESIGN, MANUFACTURING, REPRODUCTION, USE, AND SALE RIGHTS REGARDING THE SAME ARE EXPRESSLY RESERVED. IT IS SUBMITTED UNDER A CONFIDENTIAL RELATIONSHIP FOR A SPECIFIED PURPOSE, AND THE RECIPIENT AGREES BY ACCEPTING THIS DRAWING NOT TO SUPPLY OR DISCLOSE ANY INFORMATION REGARDING IT TO ANY UNAUTHORIZED PERSON, OR TO INCORPORATE IN OTHER PROJECTS ANY SPECIAL FEATURES PECULIAR TO THIS DESIGN. ALL PATENT RIGHTS HERETO ARE EXPRESSLY RESERVED BY MARK INDUSTRIES.

MARK INDUSTRIES
2662 E. DEL AMO BLVD. CARSON, CALIFORNIA, 90746

LOCK RELEASE SUB-ASS'Y

SIZE	DWG. NO	REV.
B	MK9298	C

SCALE NONE | WEIGHT | SHEET OF

FIGURE 6 - CRANK OUT DECK ASSEMBLY (S15EX) (S19EX)

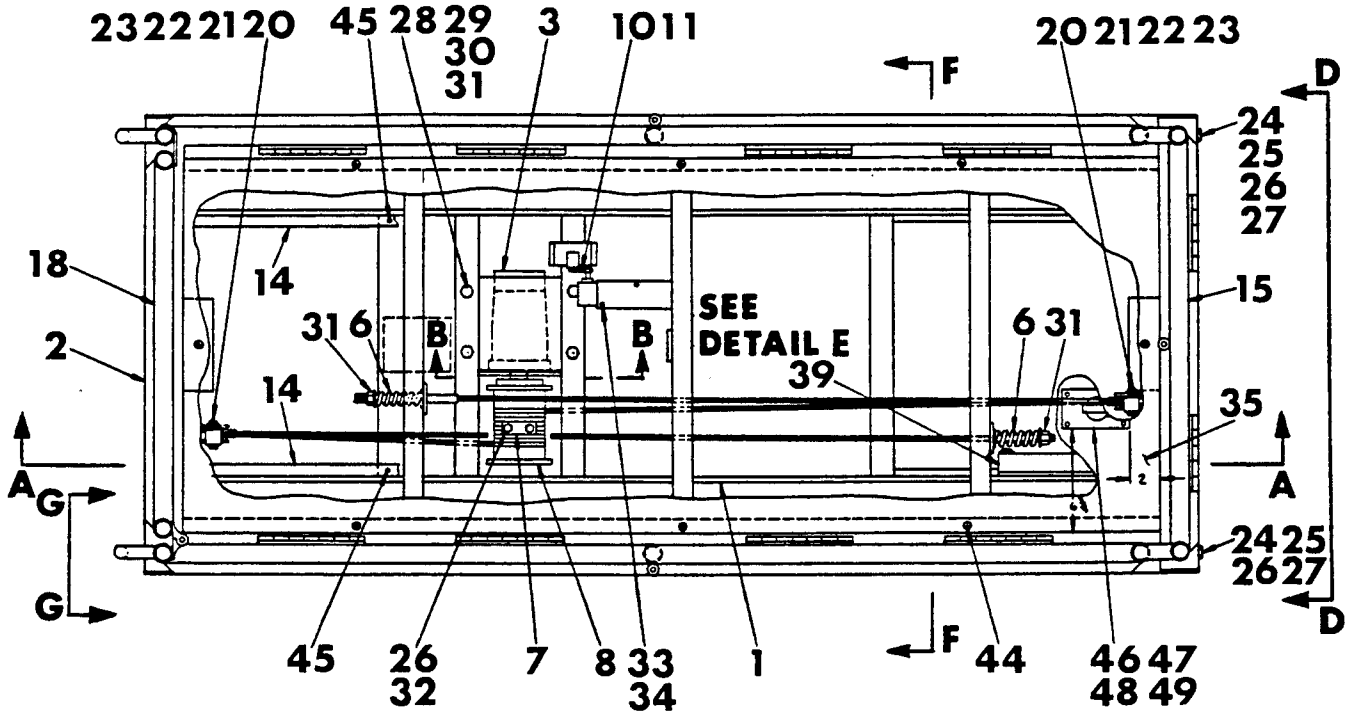
9245 HAND CRANK

ITEM	PART NUMBER	DESCRIPTION	QTY
6-	9266 (S15EX) 9262 (S19EX)	Crank Out Deck Assembly	1
-1	9280	(S15E) Deck Assembly with Crank Out Deck Rails	1
	9245	(S19E) Deck Assembly with Crank Out Deck Rails	1
-2	9277	Platform Assembly	1
-3	9268	Counter Shaft Weldment	1
-4	2271	Thrust Bearing	2
-5	6409	Sleeve Bearing	2
-6	9264	Bearing House Weldment	2
-7	6410	Retaining Ring	2
-8		Tubing - 1 Dia x .125 Wall x 1 3/4	1
-9	9271	Drive Shaft Weldment	1
-10	6411	Roller Chain	1
-11	6413	Connecting Link	3
-12	6412	Roller Chain	1
-13	9453	Chain Attachment Support Bar	1
-14	9260	Idler Sprocket Assembly	1
-15	9259	Roller	4
-16	62103	Socket Head Shoulder Bolt 3/4-5/8-11 x 2	4
-17	61309	Hex Nut 5/8-11 UNC	4
-18	20803	Limit Switch	1
-19	20804	Limit Switch Actuator Arm	1
-20	61905	Round Head Slotted Capscrew 12-24 x 1 3/4	2
-21	63314	Split Lockwasher - No. 12	2
-22	2807	Strain Relief	1
-23		7 Conductor 12GA Cable (Ref.)	1
-24	2050	Decal - Load Capacity 250 lbs.	3
-25	2022	Decal - Load Capacity 500 lbs.	3
-26	60136	Hex Head Capscrew 5/16-18 x 1	3
-27	16103	Hex Nut 5/16-18	3
-28	63302	Split Lockwasher 5/16	3
-29	63402	Flat Washer 5/16	3
-30	60102	Hex Head Capscrew 3/8-16 UNC x 1	4

FIGURE 6 - CRANK OUT DECK ASSEMBLY (S15EX) (S19EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
-31	2835	Flat Washer 3/8	4
-32	63303	Split Lockwasher 3/8	4
-33	6414	Thrust Bearing	4

FIGURE 6A - TRAVERSING DECK ASSEMBLY (S15ETD)



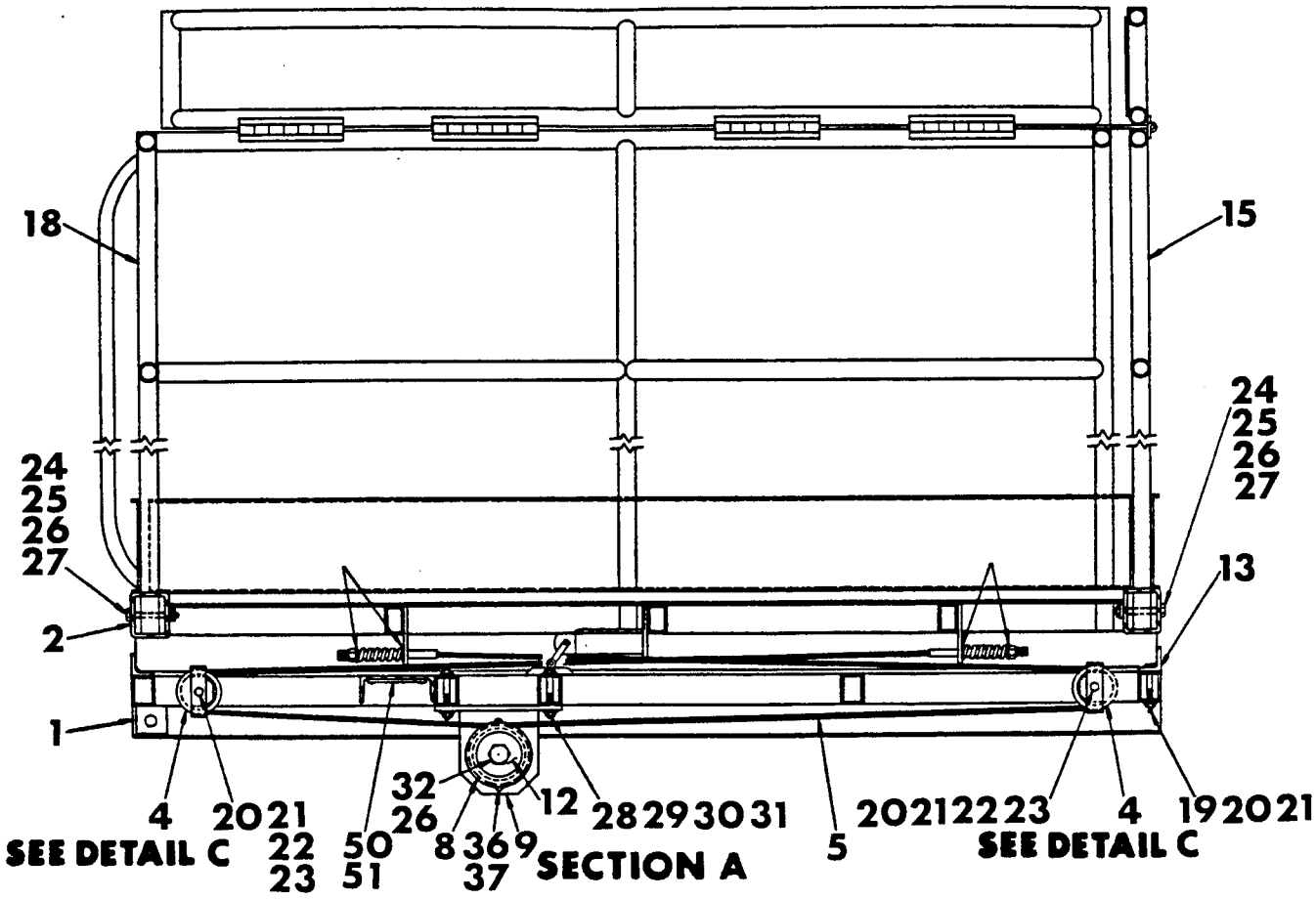
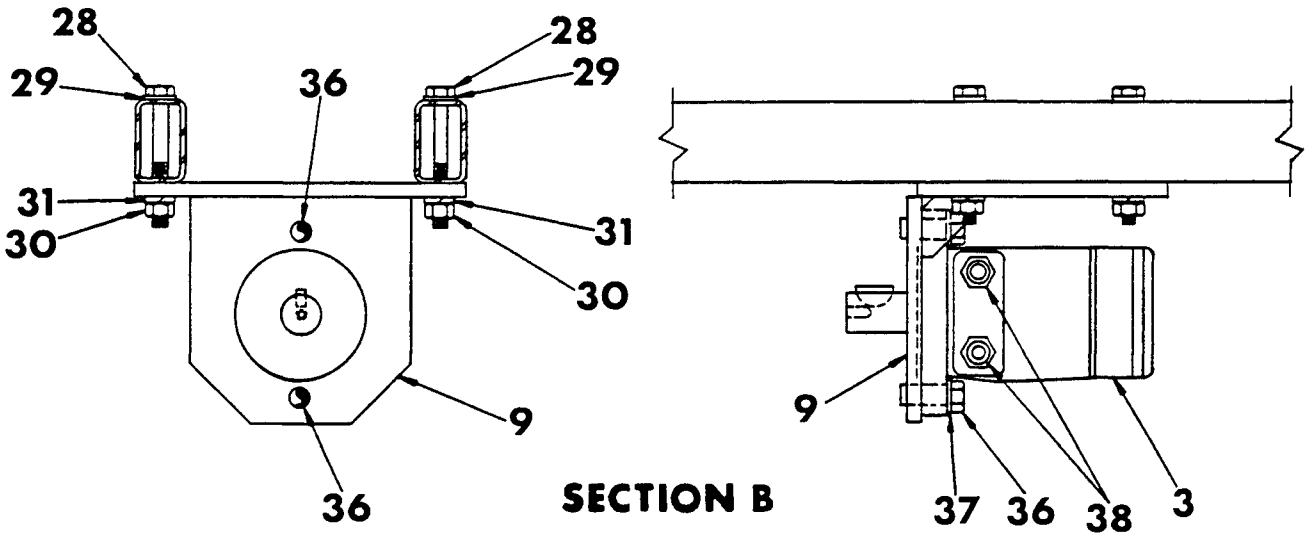
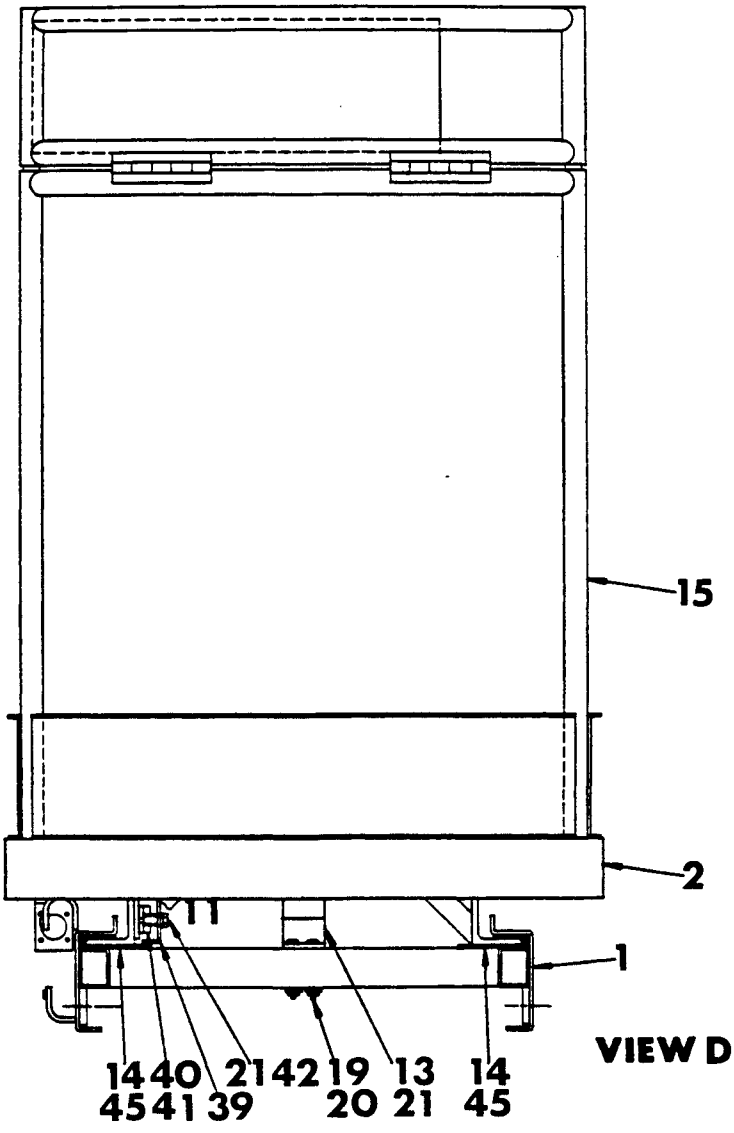


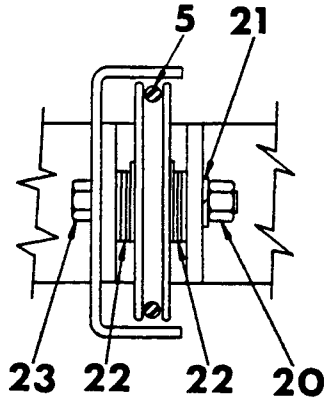
FIGURE 6A - TRAVERSING DECK ASSEMBLY (S15ETD)



SECTION B

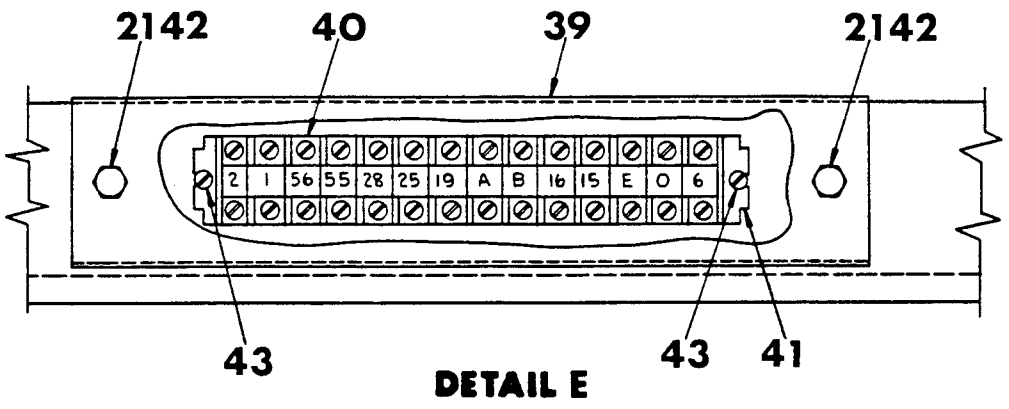


VIEW D

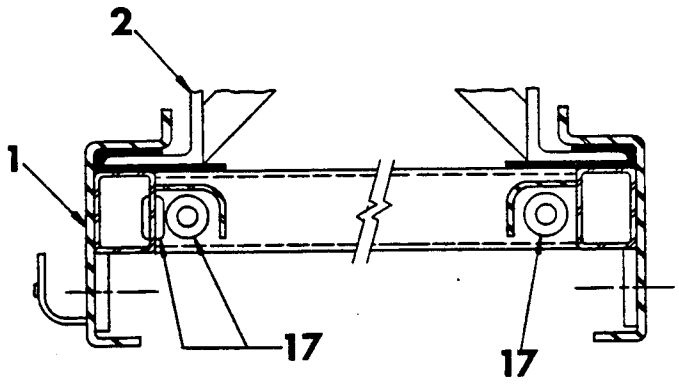


DETAIL C

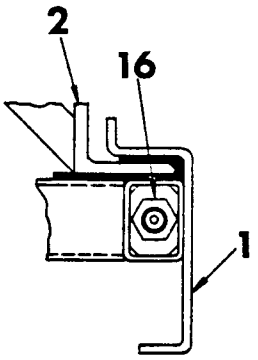
FIGURE 6A - TRAVERSING DECK ASSEMBLY (S15ETD)



DETAIL E



SECTION F



VIEW G

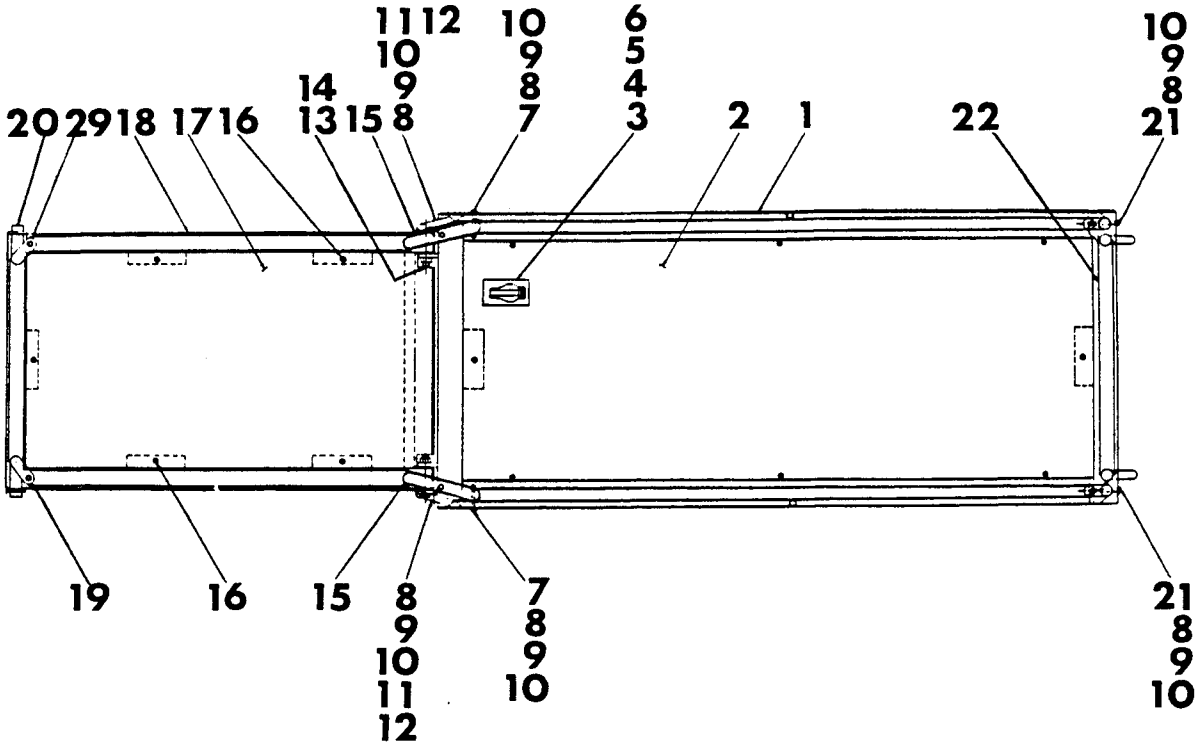
FIGURE 6A - TRAVERSING DECK ASSEMBLY (S15ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
6A-	30933	TRAVERSING DECK ASSEMBLY	1
-1	31044	TOP FRAME WELDMENT	1
-2	31056	TRAVERSING DECK WELDMENT	1
-3	20520	HYDRAULIC MOTOR	1
-4	20387	SHEAVE	2
-5	31068	EXTENSION CABLE ASSEMBLY	1
-6	30360	SPRING	2
-7	31038	WIRE ROPE HOLDER	1
-8	31037	DRUM WELDMENT	1
-9	31026	WINCH BRACKET WELDMENT	1
-10	70173	LIMIT SWITCH	1
-11	70169	LIMIT SWITCH ARM	1
-12	31061	DRUM WASHER	1
-13	30944	ANGLE STOP	1
-14	31059	WEAR PAD	2
-15	31088	FRONT GUARD RAIL	1
-16	2807	STRAIN RELIEF	1
-17	65388	RUBBER GROMMET	5
-18	31113	SPRING LOADED GATE INSTALLATION (SEE FIG. 12A)	1
-19	60339	HEX HEAD CAP SCREW - 5/16-18 UNC X 3 (GR. 5)	2
-20	60702	HEX NUT - 5/16-18 UNC	4
-21	63302	SPLIT LOCK WASHER - 5/16	4
-22	63402	FLAT WASHER - 5/16	8
-23	60360	HEX HEAD CAP SCREW - 5/16-18 UNC X 1 3/4	2
-24	60337	HEX HEAD CAP SCREW - 1/4-20 UNC X 3	4
-25	63401	FLAT WASHER - 1/4	4
-26	63301	SPLIT LOCK WASHER - 1/4	7
-27	60701	HEX NUT - 1/4-20 UNC	4
-28	60344	HEX HEAD CAP SCREW - 3/8-16 UNC X 3	4
-29	63403	FLAT WASHER - 3/8	8
-30	63303	SPLIT LOCK WASHER - 3/8	4

FIGURE 6A - TRAVERSING DECK ASSEMBLY (S15ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
-31	60703	HEX NUT - 3/8-16 UNC	6
-32	60309	HEX HEAD CAP SCREW	3
-33	62615	ROUND HEAD MACHINE SCREW - NO. 10-32 UNC X 1 3/4 (GR. 5)	2
-34	63313	SPLIT LOCK WASHER - NO. 10	2
-35	31069	DECK FLOOR	1
-36	60311	HEX HEAD CAP SCREW - 1/2-13 UNC X 1 1/4	2
-37	63305	SPLIT LOCK WASHER - 1/2	2
-38	2471	MALE CONNECTOR	2
-39	21386	TERMINAL BLOCK COVER	1
-40	4027	TERMINAL BLOCK	14
-41	117A	TERMINAL BLOCK END	1
-42	60323	HEX HEAD CAP SCREW - 5/16-18 UNC X 1 1/2	2
-43	62621	MACHINE SCREW - NO. 8-32 UNC X 3/8	3
-44	61713	SELF TAPPING PHILLIPS FLAT HEAD SCREW	8
-45	16217	POP RIVET - 3/16	14
-46	4060	RECEPTACLE	1
-47	356	BELL BOX COVER PLATE	1
-48	355	BELL BOX	1
-49	117G	ROMEX CONNECTOR	1
-50	768	KICK CYLINDER PAD	1
-51	374	POP RIVET	4

FIGURE 6B - FOLD DOWN DECK ASSEMBLY (S15EFD)



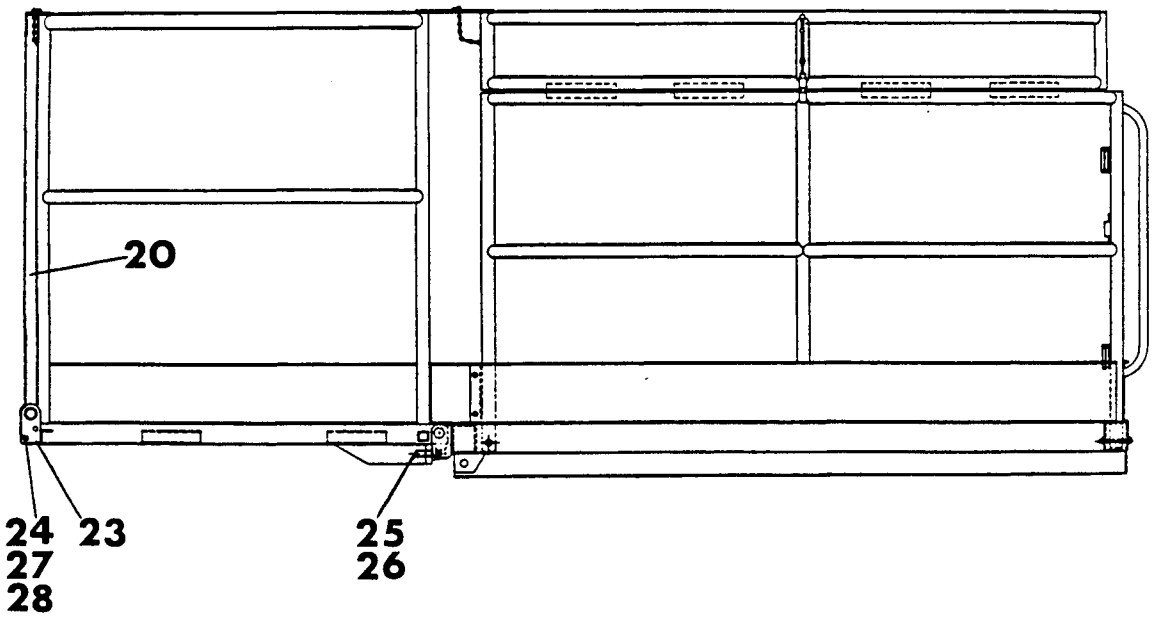


FIGURE 6B - FOLD DOWN DECK ASSEMBLY (S15EFD)

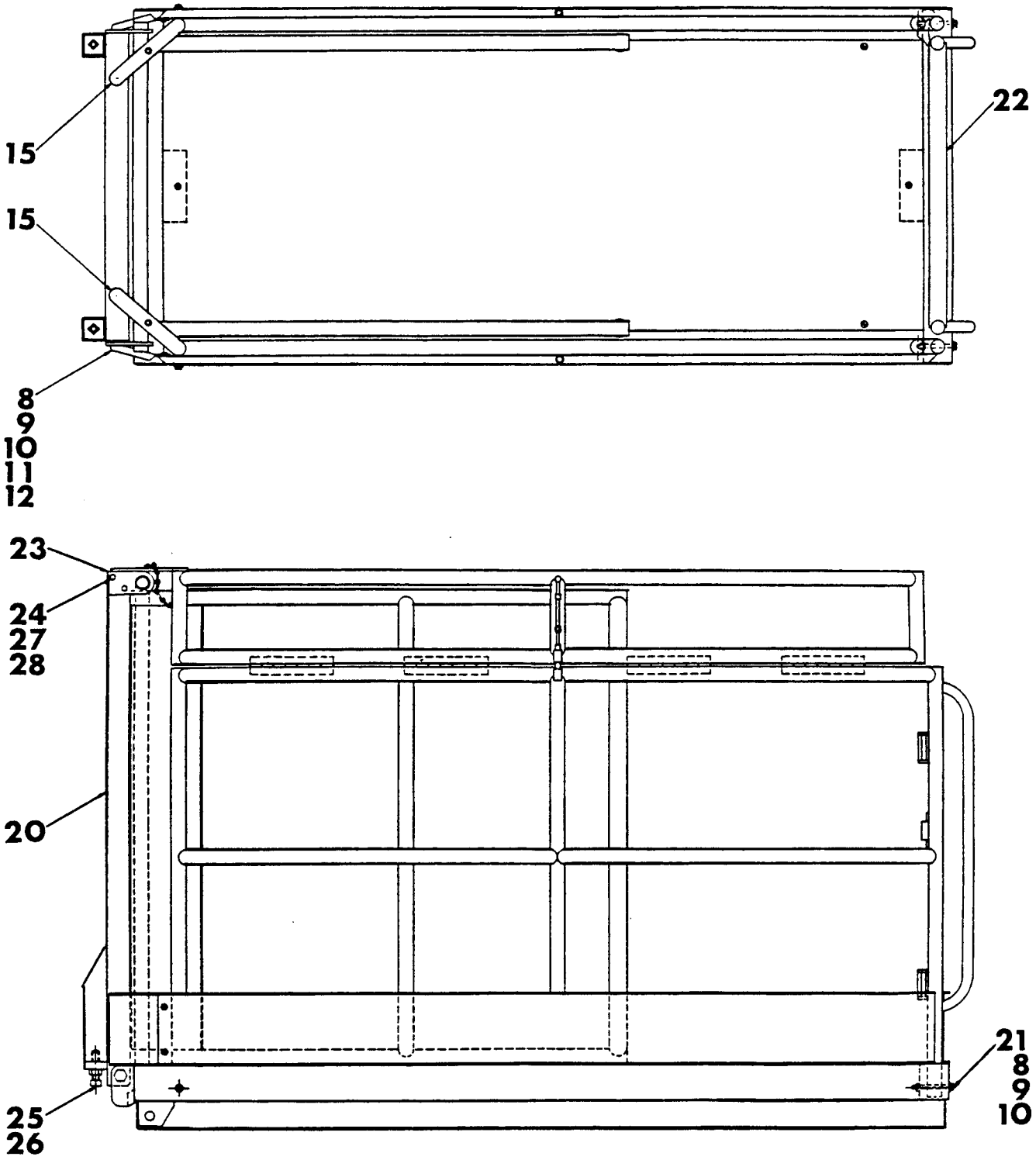


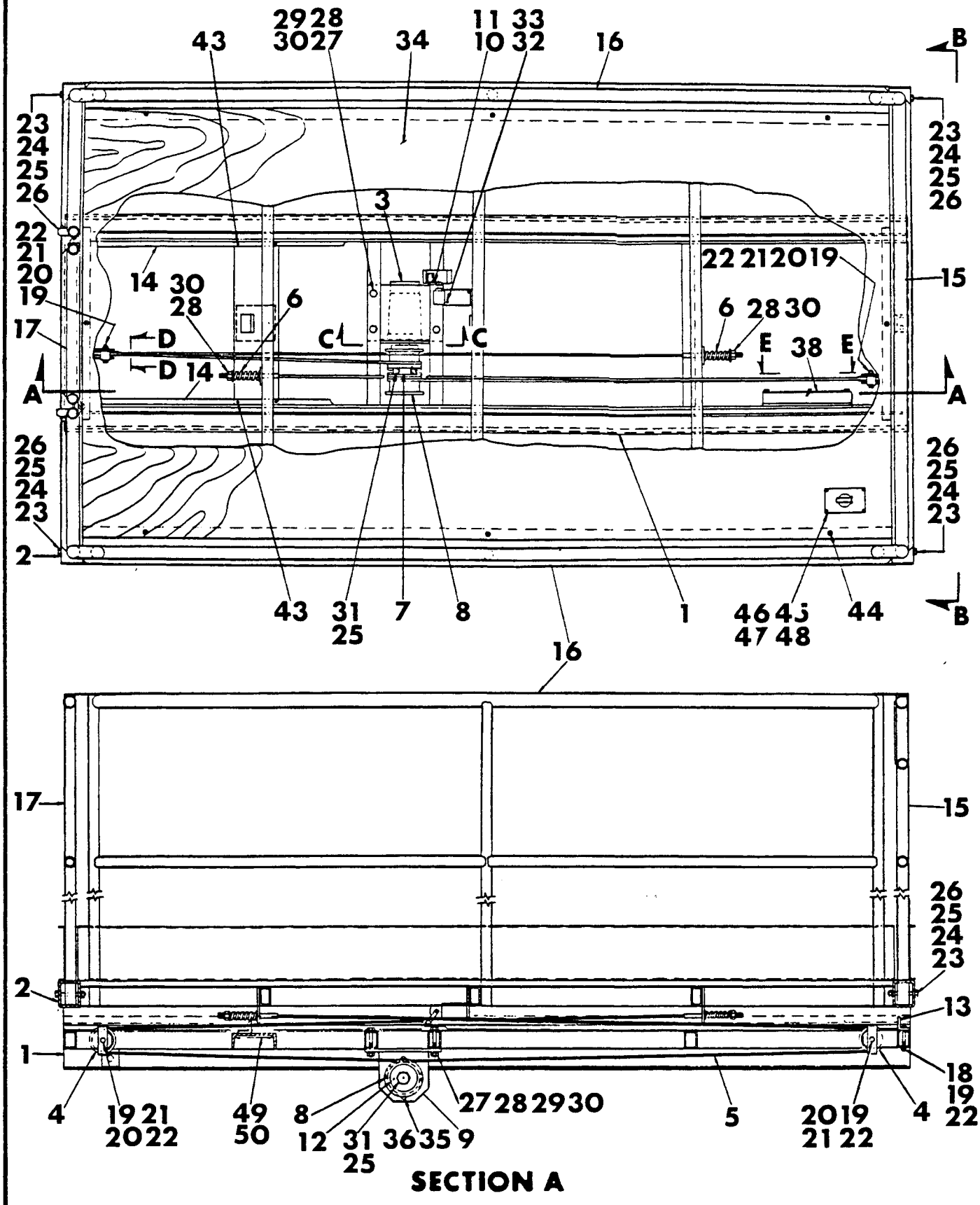
FIGURE 6B - FOLD DOWN DECK ASSEMBLY (S15EFD)

ITEM	PART NUMBER	DESCRIPTION	QTY
6B-	31000	FOLD DOWN DECK ASSEMBLY	1
-1	31065	MAIN DECK WELDMENT (S15E)	1
-2	31069	PLYWOOD FLOOR	1
-3	355	BELL BOX	1
-4	356	BELL BOX COVER PLATE	1
-5	4060	RECEPTACLE	1
-6	117-G	ROMEX CONNECTOR	1
-7	60352	HEX HEAD CAP SCREW - 1/4-20 UNC X 2 1/2 (GR. 5)	2
-8	60701	HEX NUT - 1/4-20 UNC	10
-9	63401	FLAT WASHER - 1/4	10
-10	63301	SPLIT LOCK WASHER - 1/4	10
-11	30983	TOE PLATE	2
-12	60309	HEX HEAD CAP SCREW - 1/4-20 UNC X 3/4 (GR. 5)	4
-13	60636	HEX HEAD CAP SCREW - 5/8-11 UNC X 4 (BOWMALOK 41037)	2
-14	61319	SELF LOCKING NUT - 5/8-11 UNC (BOWMAGRIP 36786)	2
-15	31008	CAP ASSEMBLY	2
-16	61706	SELF TAPPING FLAT HEAD SCREW - 1/4-20 UNC X 1 1/4	13
-17	31016	PLYWOOD FLOOR	1
-18	31013	FOLD DOWN DECK WELDMENT	1
-19	30988	SHORT CAP ASSEMBLY (L.H. SIDE)	1
-20	31014	BACK RAIL	1
-21	60337	HEX HEAD CAP SCREW - 1/4-20 UNC X 3 (GR. 5)	4
-22	7311	SPRING LOADED GUARD RAIL GATE (SEE FIG. 12)	1
-23	30979	PIVOT ARM (L.H. SIDE)	1
-24	60510	HEX HEAD CAP SCREW - 5/16-24 UNF X 1	2
-25	62224	SQUARE HEAD CUP POINT SET SCREW - 5/8-11 UNC X 2 1/2	2
-26	61102	JAM NUT - 5/8-11 UNC	2

FIGURE 6B - FOLD DOWN DECK ASSEMBLY (S15EFD)

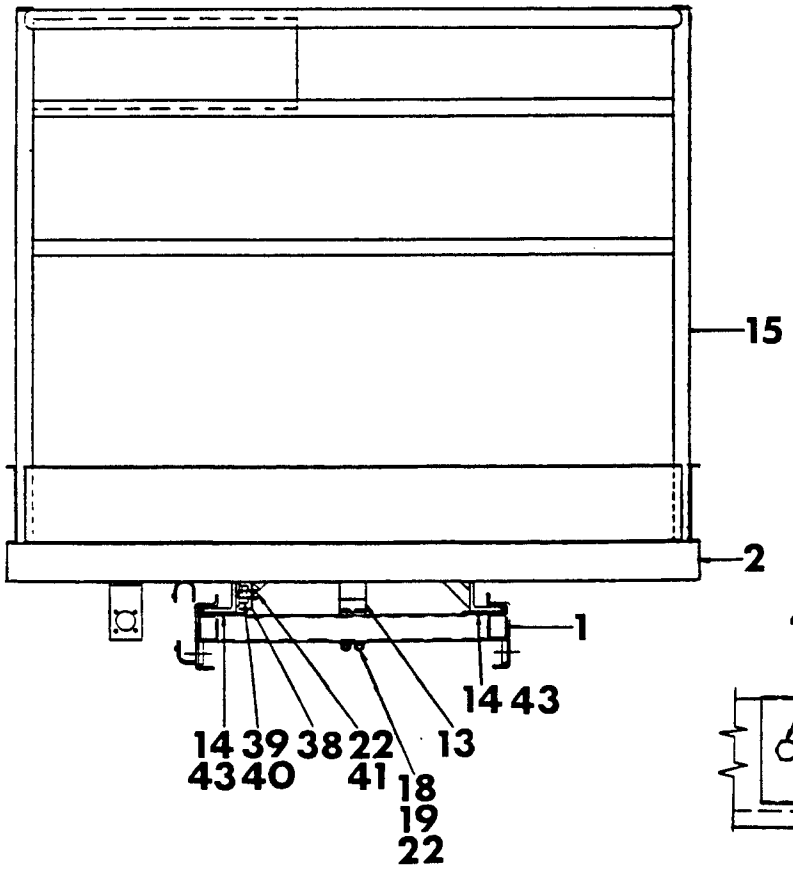
ITEM	PART NUMBER	DESCRIPTION	QTY
-27	63402	FLAT WASHER - 5/16	2
-28	63302	SPLIT LOCK WASHER - 5/16	2
-29	30997	SHORT CAP ASSEMBLY (R.H. SIDE)	2

FIGURE 6C - TRAVERSING DECK ASSEMBLY (19ETD)

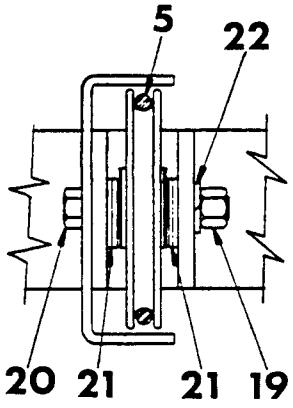


SECTION A

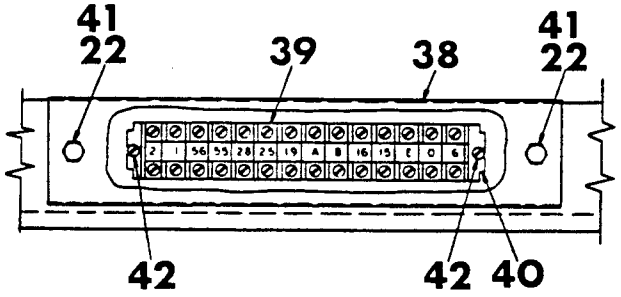
FIGURE 6C - TRAVERSING DECK ASSEMBLY (19ETD)



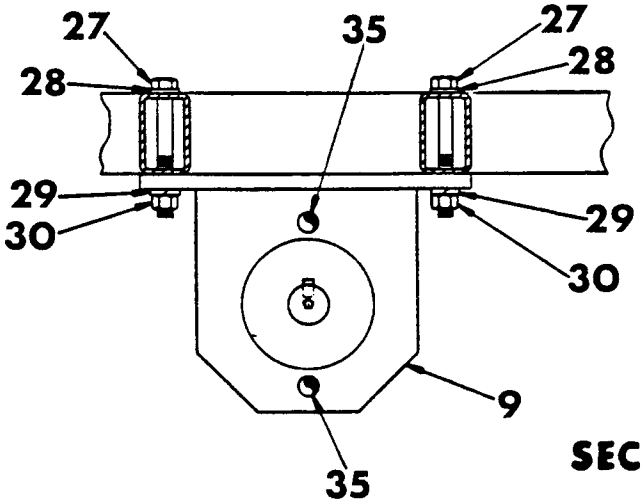
VIEW B



SECTION D



VIEW E



SECTION C

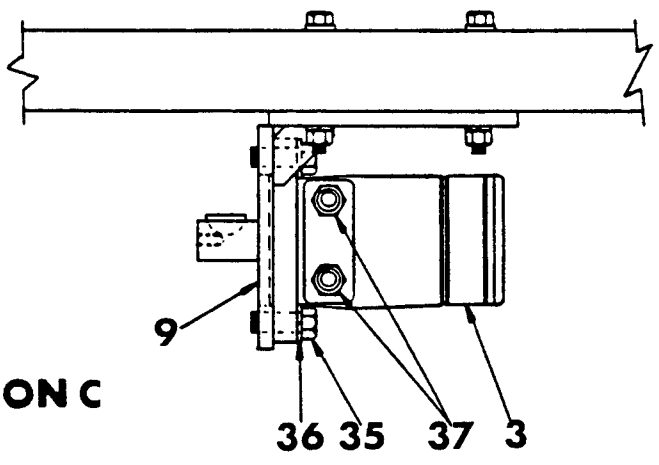


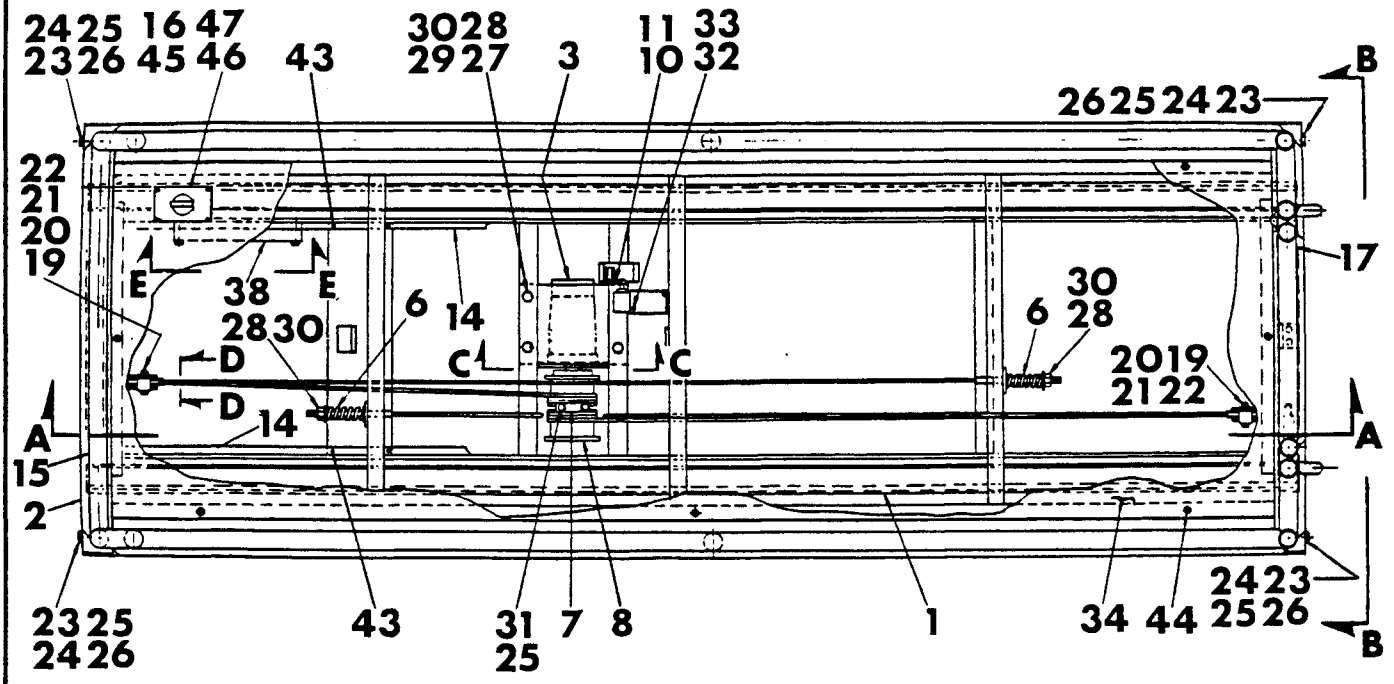
FIGURE 6C - TRAVERSING DECK ASSEMBLY (19ETD)

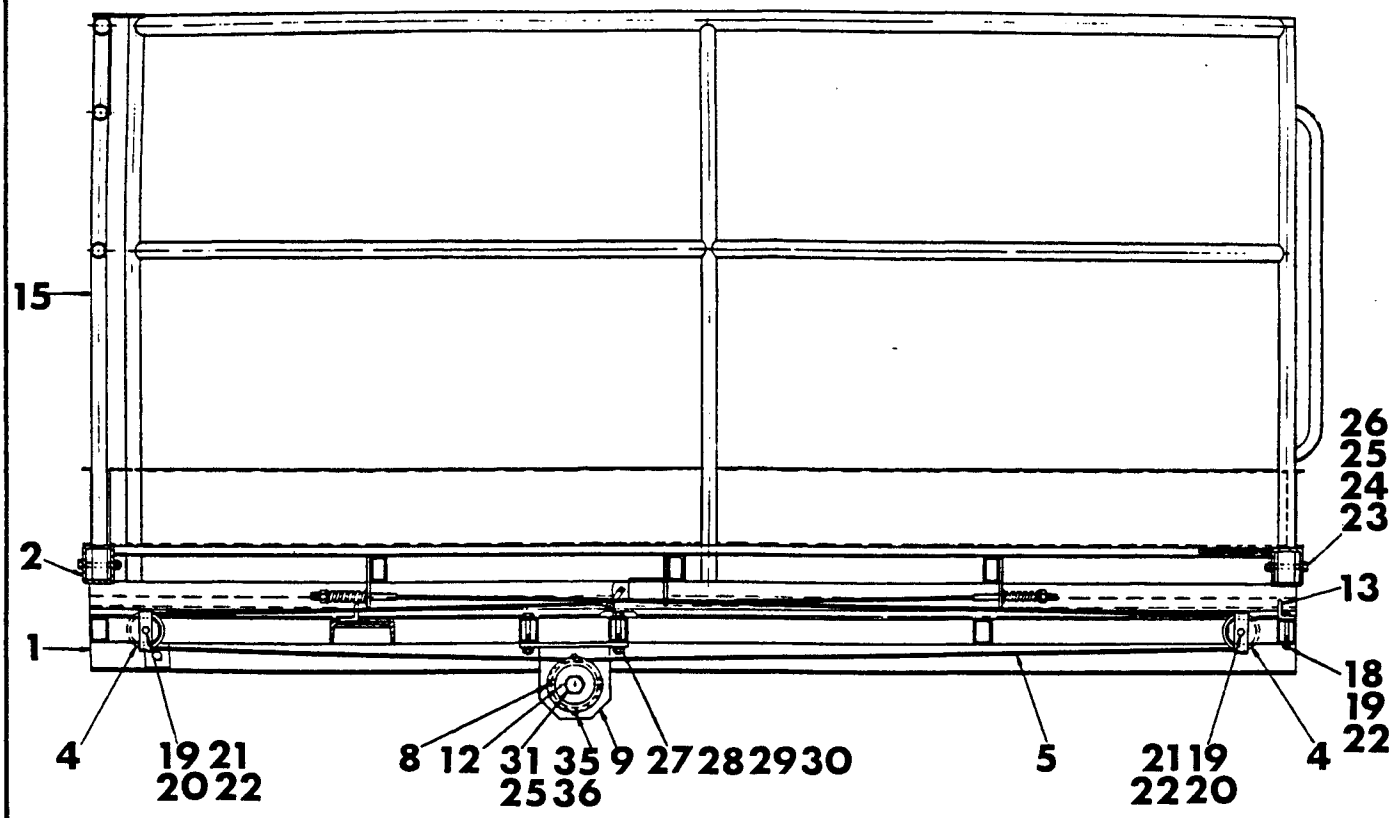
ITEM	PART NUMBER	DESCRIPTION	QTY
6C-	30931	TRAVERSING DECK ASSEMBLY	1
-1	30940	TOP FRAME WELDMENT	1
-2	30943	TRAVERSING DECK WELDMENT	1
-3	20520	HYDRAULIC MOTOR	1
-4	20387	SHEAVE	2
-5	31035	EXTENSION CABLE ASSEMBLY	1
-6	30360	SPRING	2
-7	31038	WIRE ROPE HOLDER	1
-8	31037	DRUM WELDMENT	1
-9	31026	WINCH BRACKET WELDMENT	1
-10	70173	LIMIT SWITCH	1
-11	70169	LIMIT SWITCH ARM	1
-12	31061	DRUM WASHER	1
-13	30944	ANGLE STOP	1
-14	31058	WEAR PAD	2
-15	6007	FRONT GUARD RAIL	1
-16	6006	SIDE GUARD RAIL	2
-17	7313	SPRING LOADED GUARD RAIL GATE (SEE FIG. 12)	1
-18	60339	HEX HEAD CAP SCREW - 5/16-18 UNC X 3 (GR. 5)	2
-19	60702	HEX NUT - 5/16-18 UNC	4
-20	60360	HEX HEAD CAP SCREW - 5/16-18 UNC X 1 3/4 (GR. 5)	2
-21	63402	FLAT WASHER - 5/16	8
-22	63302	SPLIT LOCK WASHER - 5/16	4
-23	60337	HEX HEAD CAP SCREW - 1/4-20 UNC X 3	6
-24	63401	FLAT WASHER - 1/4	6
-25	63301	SPLIT LOCK WASHER - 1/4	9
-26	60701	HEX NUT - 1/4-20 UNC	6
-27	60344	HEX HEAD CAP SCREW	4
-28	63403	FLAT WASHER	8
-29	63303	SPLIT LOCK WASHER - 3/8	4
-30	60703	HEX NUT - 3/8-16 UNC	6

FIGURE 6C - TRAVERSING DECK ASSEMBLY (19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
-31	60309	HEX HEAD CAP SCREW - 1/4-20 UNC X 3/4 (GR. 5)	3
-32	62615	ROUND HEAD MACHINE SCREW - NO. 10-32 UNF X 1 3/4 (GR. 5)	2
-33	63313	SPLIT LOCK WASHER - NO. 10	2
-34	31066	DECK FLOOR	1
-35	60311	HEX HEAD CAP SCREW - 1/2-13 UNC X 1 1/4 (GR. 5)	2
-36	63305	SPLIT LOCK WASHER - 1/2	2
-37	2471	MALE CONNECTOR	2
-38	21386	TERMINAL BLOCK COVER	1
-39	4027	TERMINAL BLOCK	14
-40	117A	TERMINAL BLOCK END	1
-41	60323	HEX HEAD CAP SCREW - 5/16-18 UNC X 1 1/2 (GR. 5)	2
-42	62621	MACHINE SCREW - NO. 8-32 UNC X 3/8 (GR. 5)	3
-43	16217	POP RIVET - 3/16	12
-44	61713	SELF TAPPING FLAT HEAD PHILLIPS SCREW	8
-45	4060	RECEPTACLE	1
-46	356	BELL BOX COVER PLATE	1
-47	355	BELL BOX	1
-48	117G	ROMEX CONNECTOR	1
-49	768	KICK CYLINDER PAD	1
-50	374	POP RIVET	4

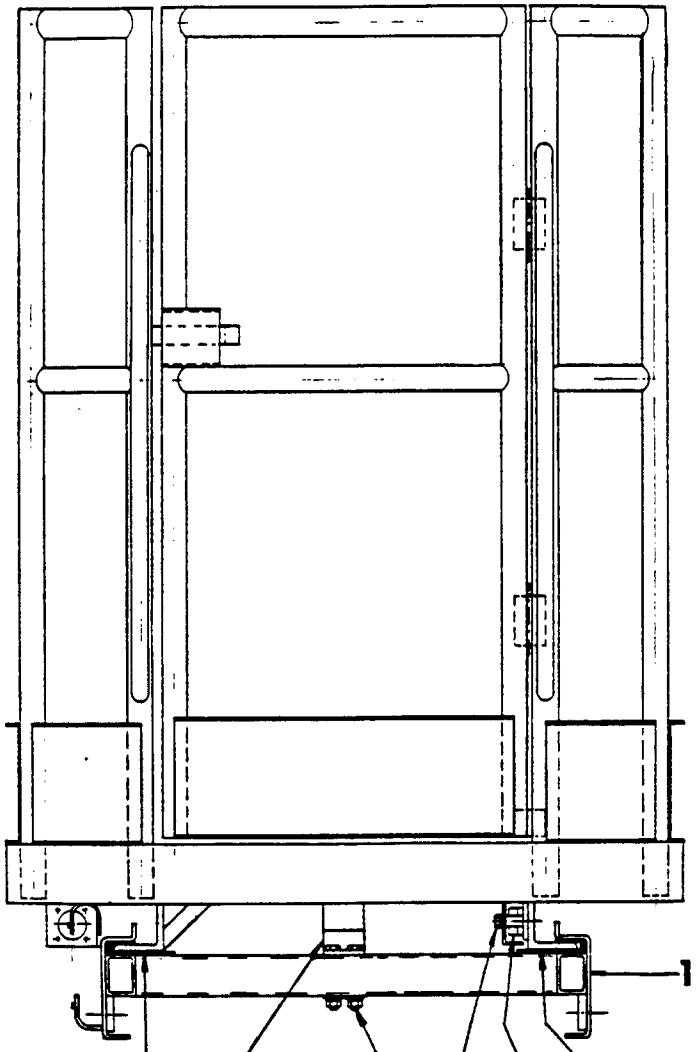
FIGURE 6D - TRAVERSING DECK ASSEMBLY (S19ETD)



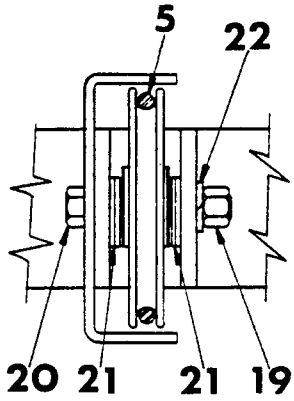


SECTION A

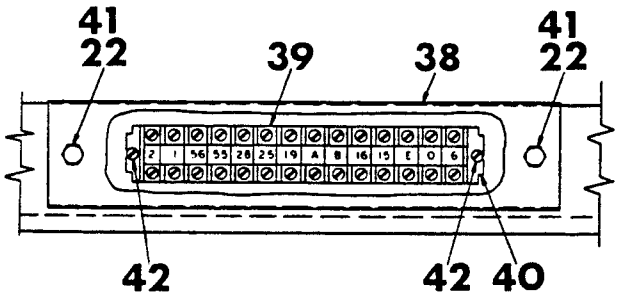
FIGURE 6D - TRAVERSING DECK ASSEMBLY (S19ETD)



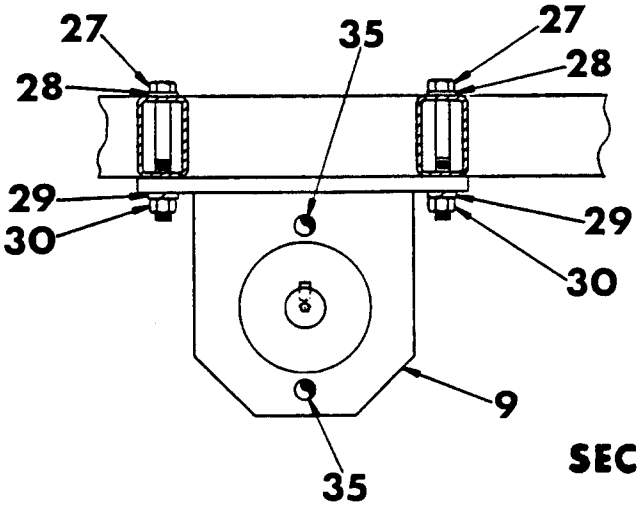
VIEW B



SECTION D



VIEW E



SECTION C

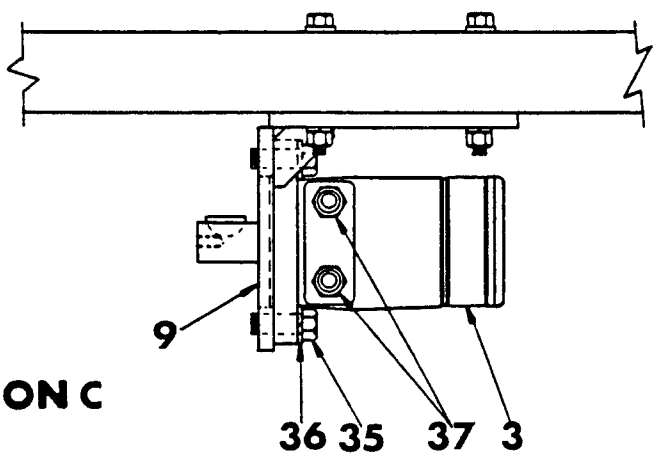


FIGURE 6D - TRAVERSING DECK ASSEMBLY (S19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
6D-	30932	TRAVERSING DECK ASSEMBLY	1
-1	30940	TOP FRAME WELDMENT	1
-2	30939	TRAVERSING DECK WELDMENT	1
-3	20520	HYDRAULIC MOTOR	1
-4	20387	SHEAVE	2
-5	31035	EXTENSION CABLE ASSEMBLY	1
-6	30360	SPRING	2
-7	31038	WIRE ROPE HOLDER	1
-8	31037	DRUM WELDMENT	1
-9	31026	WINCH BRACKET WELDMENT	1
-10	70173	LIMIT SWITCH	1
-11	70169	LIMIT SWITCH ARM	1
-12	31061	DRUM WASHER	1
-13	30944	STOP ANGLE	1
-14	31058	WEAR PAD	2
-15	6023	FRONT GUARD RAIL	1
-16	117G	ROMEX CONNECTOR	1
-17	7314	SPRING LOADED GUARD RAIL GATE (SEE FIG. 12)	1
-18	60339	HEX HEAD CAP SCREW - 5/16-18 UNC X 3 (GR. 5)	2
-19	60702	HEX NUT - 5/16-18 UNC	4
-20	60360	HEX HEAD CAP SCREW - 5/16-18 UNC X 3/4	2
-21	63402	FLAT WASHER - 5/16	8
-22	63302	SPLIT LOCK WASHER - 5/16	4
-23	60337	HEX HEAD CAP SCREW - 1/4-20 UNC X 3	6
-24	63401	FLAT WASHER - 1/4	6
-25	63301	SPLIT LOCK WASHER - 1/4	9
-26	60701	HEX NUT - 1/4-20 UNC	6
-27	60344	HEX HEAD CAP SCREW - 3/8-16 UNC X 3 (GR. 5)	4
-28	63403	FLAT WASHER - 3/8	8
-29	63303	SPLIT LOCK WASHER - 3/8	4
-30	60703	HEX NUT - 3/8-16 UNC	6

FIGURE 6D - TRAVERSING DECK ASSEMBLY (S19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
-31	60309	HEX HEAD CAP SCREW - 1/4-20 UNC X 3/4	3
-32	62615	ROUND HEAD MACHINE SCREW- NO. 10-32 UNF X 1 3/4	2
-33	63313	SPLIT LOCK WASHER - NO. 10	2
-34	31072	DECK FLOOR	1
-35	60311	HEX HEAD CAP SCREW - 1/2-13 UNC X 1 1/4 (GR. 5)	2
-36	63305	SPLIT LOCK WASHER - 1/2	2
-37	2471	MALE CONNECTOR	2
-38	21386	TERMINAL BLOCK COVER	1
-39	4027	TERMINAL BLOCK	14
-40	117A	TERMINAL BLOCK END	1
-41	60323	HEX HEAD CAP SCREW - 5/16-18 UNC X 1 1/2 (GR. 5)	2
-42	62621	MACHINE SCREW - NO. 8-32 UNC X 3/8 (GR. 5)	3
-43	16217	POP RIVET - 3/16	14
-44	61713	SELF TAPPING FLAT HEAD PHILLIPS SCREW	8
-45	355	BELL BOX	1
-46	4060	RECEPTACLE	1
-47	356	BELL BOX COVER PLATE	1

FIGURE 6E - FOLD DOWN DECK ASSEMBLY (S19EFD)

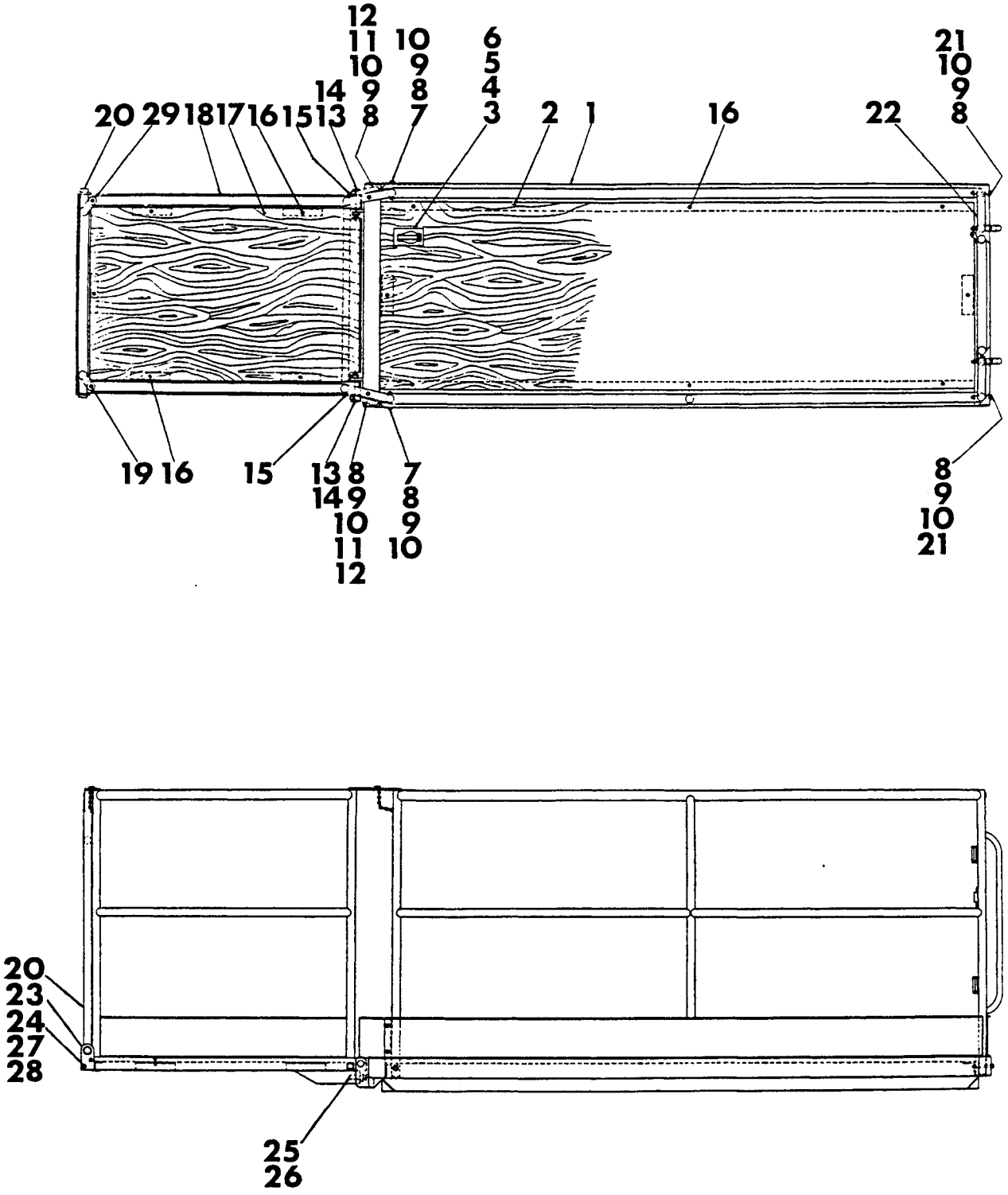


FIGURE 6E - FOLD DOWN DECK ASSEMBLY (S19EFD)

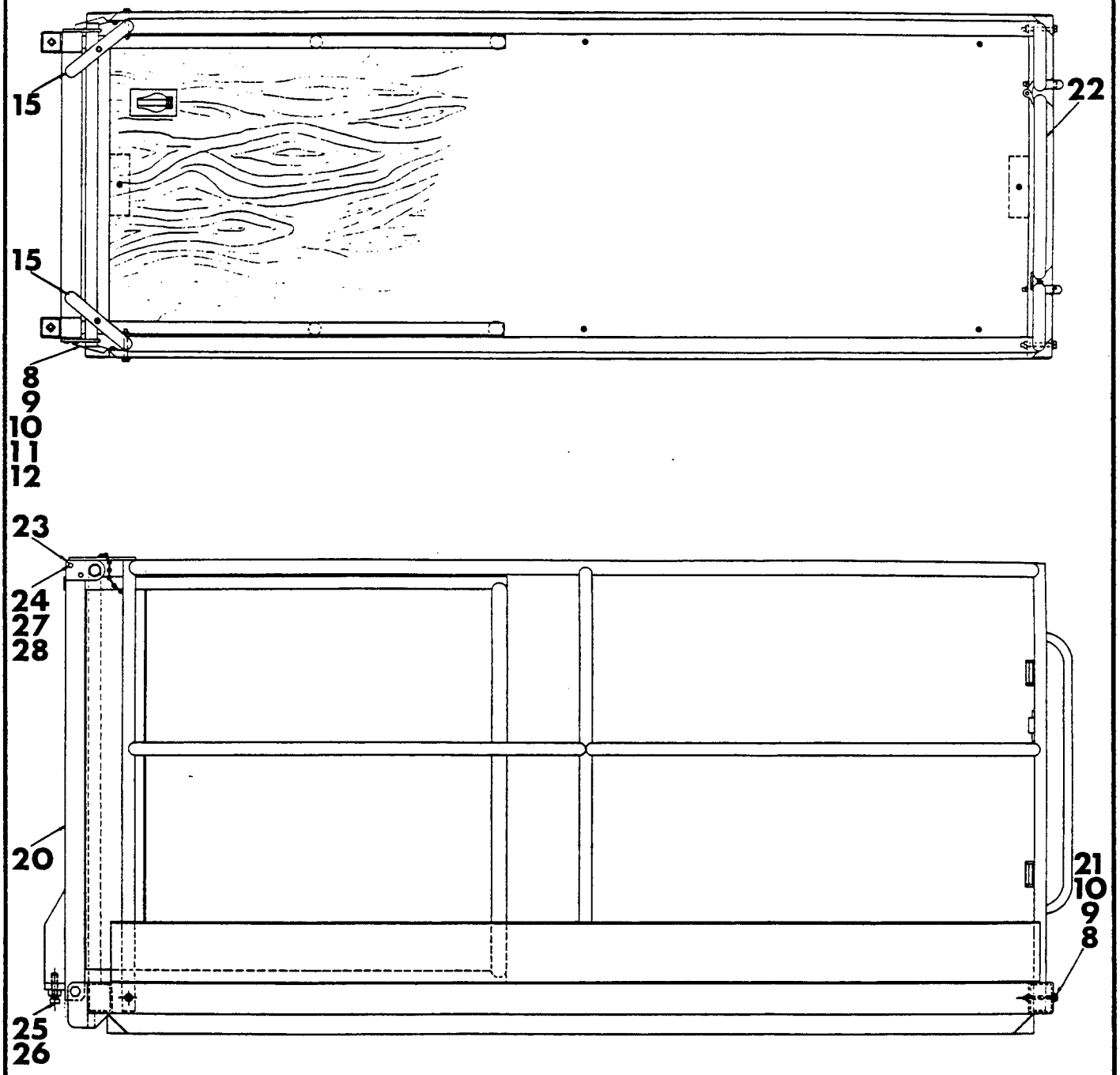


FIGURE 6E - FOLD DOWN DECK ASSEMBLY (S19EFD)

ITEM	PART NUMBER	DESCRIPTION	QTY
6E-	30982	FOLD DOWN DECK ASSEMBLY	1
-1	30989	MAIN DECK WELDMENT	1
-2	31072	PLYWOOD FLOOR	1
-3	355	BELL BOX	1
-4	356	BELL BOX COVER	1
-5	4060	RECEPTACLE	1
-6	117G	ROMEX CONNECTOR	1
-7	60352	HEX HEAD CAP SCREW - 1/4-20 UNC X 2 1/2 (GR. 5)	2
-8	60701	HEX NUT - 1/4-20 UNC	10
-9	63401	FLAT WASHER - 1/4	10
-10	63301	SPLIT LOCK WASHER - 1/4	10
-11	30983	TOE PLATE	2
-12	60309	HEX HEAD CAP SCREW - 1/4-20 UNC X 3/4 (GR. 5)	4
-13	60636	HEX HEAD CAP SCREW - 5/8-11 UNC X 4 (BOWMALOK 41037)	2
-14	61319	SELF LOCKING NUT - 5/8-11 UNC (BOWMA GRIP 36786)	2
-15	30984	LONG CAP ASSEMBLY	2
-16	61706	SELF TAPPING FLAT HEAD SCREW - 1/4-20 UNC X 1 1/4	11
-17	30993	PLYWOOD FLOOR	1
-18	30975	FOLD DOWN DECK WELDMENT	1
-19	30988	SHORT CAP ASSEMBLY (L.H. SIDE)	1
-20	30981	BACK RAIL	1
-21	60337	HEX HEAD CAP SCREW - 1/4-20 UNC X 3 (GR. 5)	4
-22	7314	SPRING LOADED CUARD RAIL GATE INSTALLATION (SEE FIG. 12)	1
-23	30979	PIVOT ARM (L.H. SIDE)	1
-24	60510	HEX HEAD CAP SCREW - 5/16-24 UNF X 1 (GR. 8)	2
-25	62224	SQUARE HEAD SET SCREW - 11 UNC X 2 1/2	2
-26	61102	JAM NUT - 5/8-11 UNC	2

FIGURE 6E - FOLD DOWN DECK ASSEMBLY (S19EFD)

ITEM	PART NUMBER	DESCRIPTION	QTY
-27	63402	FLAT WASHER - 5/16	2
-28	63302	SPLIT LOCK WASHER - 5/16	2
-29	30997	SHORT CAP ASSEMBLY (R.H. SIDE)	1

FIGURE 7 - BELLY PAN COMPONENTS ASSEMBLY (15E) (S15E) (S15EX)

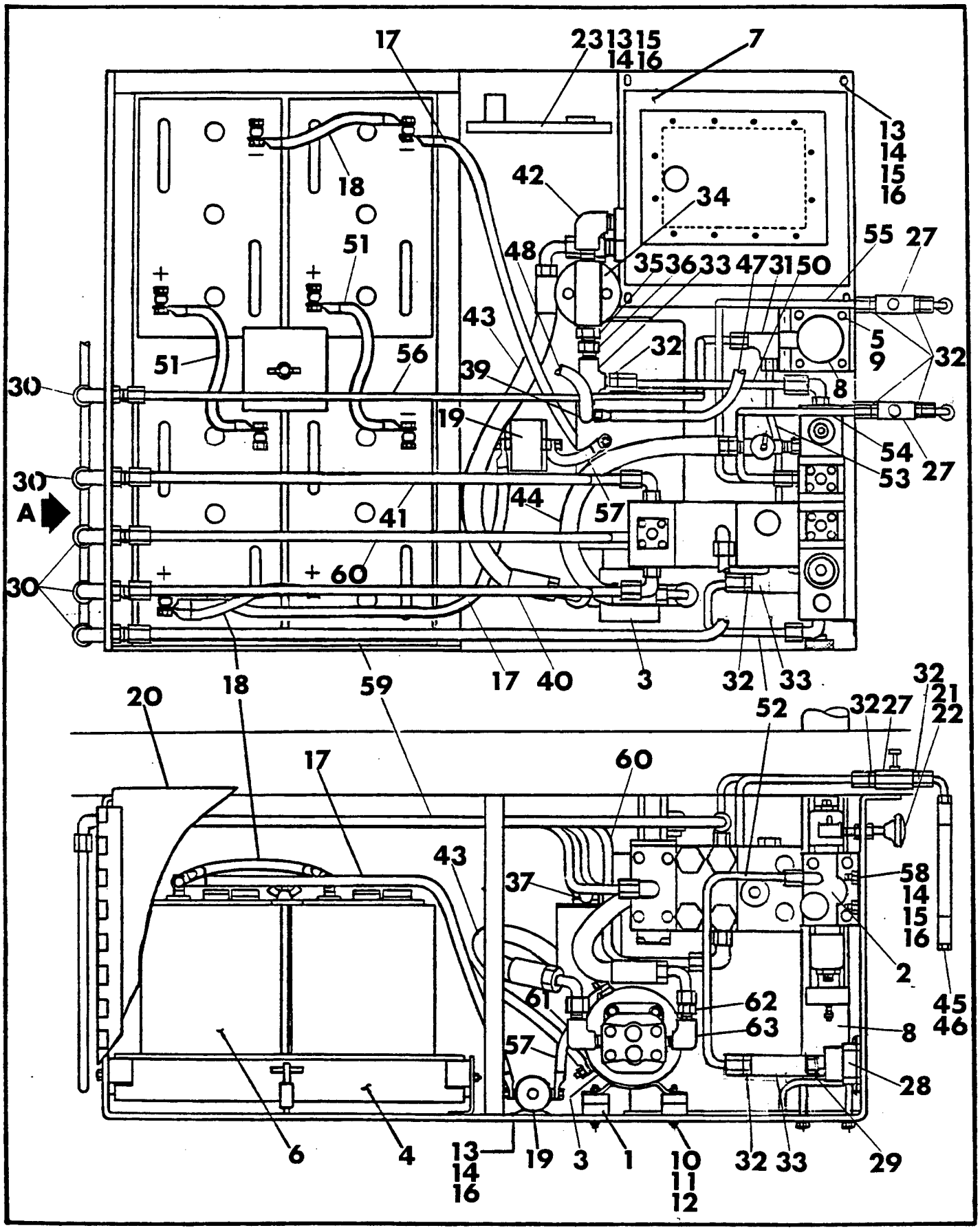
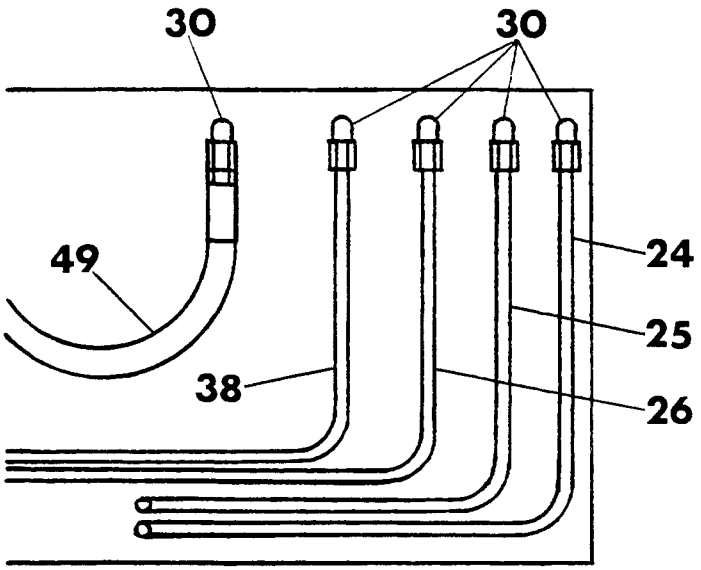


FIGURE 7 - BELLY PAN COMPONENTS
ASSEMBLY (15E) (S15E) (S15EX)



VIEW A

FIGURE 7 - BELLY PAN COMPONENTS ASSEMBLY (15E) (S15E) (S15EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
7-	7072	BELLY PAN COMPONENTS ASSEMBLY	1
-1	882	SHOCK MOUNT	4
-2	9389	HYDRAULIC MANIFOLD ASSEMBLY (AFTER MAR. 1980) (SEE FIG.8A)	1
	3072	HYDRAULIC MANIFOLD ASSEMBLY (BEFORE MAR. 1980) (SEE FIG.8)	1
-3	3015	PUMP MOTOR (AFTER OCT.1979)	1
	3039	PUMP MOTOR (BEFORE OCT.1979)	1
-4	7070	BATTERY TRAY ASSEMBLY (SEE FIG.7D)	1
-5	60128	HEX HEAD CAPSCREW - 3/8-16 X 2	4
-6	4007	BATTERY - 6 VOLT TROJAN J250WCT	4
-7	7308	HYDRAULIC TANK ASSEMBLY (SEE FIG.7B)	1
-8	3012	KICK CYLINDER (SEE FIG.4)	1
-9	63303	LOCKWASHER - 3/8	4
-10	63403	FLAT WASHER - 3/8	8
-11	63302	LOCK WASHER - 5/16	8
-12	60702	HEX NUT - 5/16-18 UNC	8
-13	60112	HEX HEAD CAPSCREW - ¼-20 UNC X 1½	10
-14	63401	FLAT WASHER - ¼	14
-15	63301	LOCK WASHER - ¼	12
-16	60701	HEX NUT - ¼-20 UNC	14
-17	4103-5	BATTERY CABLE ASSEMBLY	2
-18	4103-1	BATTERY CABLE ASSEMBLY	2
-19	4083	SOLENOID - 12 VOLT	1
-20	30361	BELLY PAN DOOR INSTALLATION (SEE FIG.14)	1
-21	4018	EMERGENCY ON/OFF SWITCH	1
-22	5300	KNOB - EMERGENCY ON/OFF	1
-23	30402	PANEL ASSEMBLY (SEE FIG.13)	1
-24	30617-12	TUBE ASSEMBLY - 3/8 (BULKHEAD ELBOW TO DRIVE MOTOR RIGHT SIDE LOWER ELBOW)	1
-25	30617-13	TUBE ASSEMBLY - 3/8 (BULKHEAD ELBOW TO DRIVE MOTOR RIGHT SIDE UPPER ELBOW)	1
-26	30617-14	TUBE ASSEMBLY - 3/8 (BULKHEAD ELBOW TO DRIVE MOTOR LEFT SIDE UPPER ELBOW)	1
-27	2521	FLOW VALVE	2

FIGURE 7 - BELLY PAN COMPONENTS
ASSEMBLY (15E) (S15E) (S15EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
-28	2297	PRESSURE LIMIT SWITCH	1
-29	815	PIPE NIPPLE	1
-30	2461	90° BULKHEAD ELBOW	5
-31	2416	BRANCH TEE	1
-32	2476	MALE CONNECTOR	7
-33	2426	FEMALE PIPE TEE	2
-34	30306	FILTER CANISTER - RETURN LINE	1
-35	2516	PIPE THREAD REDUCER	1
-36	2495	PIPE NIPPLE	1
-37	2450	STREET ELBOW	1
-38	30617-15	TUBE ASSEMBLY - 3/8 (BULKHEAD ELBOW TO DRIVE MOTOR LEFT SIDE LOWER ELBOW)	1
-39	2575	TEE (UNDER HOSE)	1
-40	30617-16	TUBE ASSEMBLY - 3/8 (MANIFOLD TO 90° BULKHEAD ELBOW)	1
-41	30617-17	TUBE ASSEMBLY - 3/8 (MANIFOLD TO 90° BULKHEAD ELBOW)	1
-42	2453	ELBOW	1
-43	13214-08-0190-90°	HOSE ASSEMBLY (SUCTION)	1
-44	13213-06-0190	HOSE ASSEMBLY (PRESSURE)	1
-45	13213-06-0112	HOSE ASSEMBLY (STEERING)	1
-46	13213-06-0110	HOSE ASSEMBLY (STEERING)	1
-47	13205-04-0320	HOSE ASSEMBLY (TO KICK CYLINDER TOP PORT)	1
-48	13205-04-0230	HOSE ASSEMBLY (TO LIFT CYLINDER TOP PORT)	1
-49	13210-06-0174	HOSE ASSEMBLY (TO LIFT CYLINDER BOTTOM PORT)	1
-50	30617-1	TUBE ASSEMBLY - 3/8 (MANIFOLD TO RETURN LINE)	1
-51	4103-15	BATTERY CABLE ASSEMBLY	2
-52	30617-3	TUBE ASSEMBLY - 3/8 (PRESSURE SWITCH TO MANIFOLD)	1
-53	30617-4	TUBE ASSEMBLY - 3/8 (PRESSURE SWITCH TO KICK CYLINDER)	1
-54	30617-5	TUBE ASSEMBLY - 3/8 (MANIFOLD TO STEERING VALVE-RIGHT SIDE)	1
-55	30617-6	TUBE ASSEMBLY - 3/8 (MANIFOLD TO STEERING VALVE-LEFT SIDE)	1

FIGURE 7 - BELLY PAN COMPONENTS
ASSEMBLY (15E) (S15E) (S15EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
-56	30617-7	TUBE ASSEMBLY - 3/8 (KICK CYLINDER TO LIFT CYLINDER)	1
-57	4103-16	BATTERY CABLE ASSEMBLY	1
-58	60131	HEX HEAD CAPSCREW - ¼-20 UNC X 1	4
-59	30617-10	TUBE ASSEMBLY - 3/8 (MANIFOLD TO 90° BULKHEAD ELBOW)	1
-60	30617-11	TUBE ASSEMBLY - 3/8 (MANIFOLD TO 90° BULKHEAD ELBOW)	1
-61	2451	ELBOW	1
-62	2478	CONNECTOR	1
-63	2440	MALE/FEMALE ELBOW	1

FIGURE 7A - BELLY PAN COMPONENTS ASSEMBLY (19E)

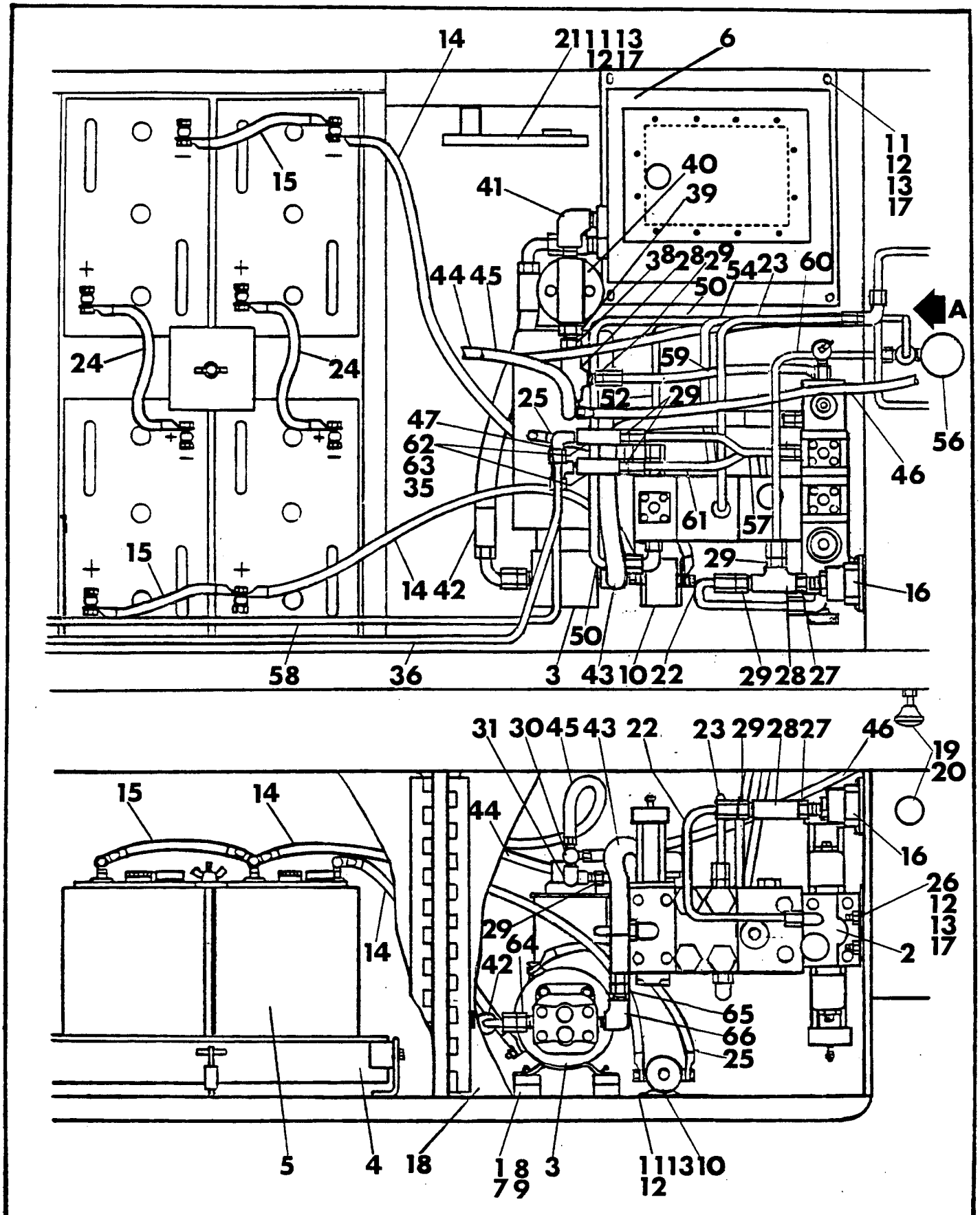


FIGURE 7A - BELLY PAN COMPONENTS ASSEMBLY (19E)

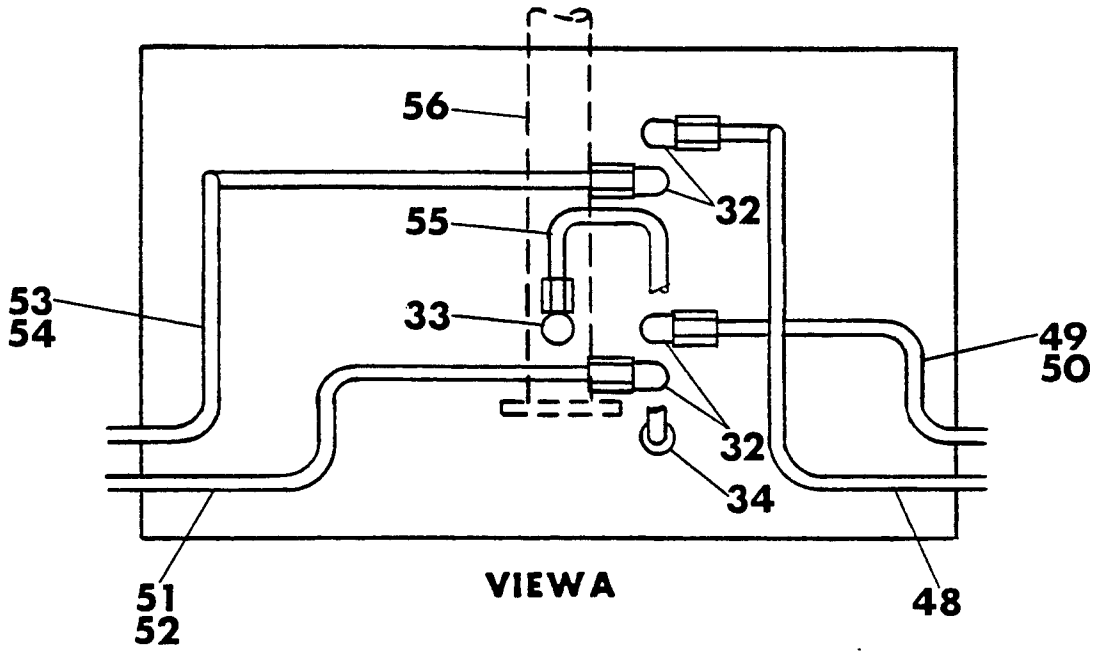


FIGURE 7A - BELLY PAN COMPONENTS ASSEMBLY (19E)

ITEM	PART NUMBER	DESCRIPTION	QTY
7A		BELLY PAN COMPONENTS ASSEMBLY	1
-1	882	SHOCK MOUNT	4
-2	9390	HYDRAULIC MANIFOLD ASSEMBLY (AFTER MAR. 1980) (SEE FIG.8B)	1
	3072	HYDRAULIC MANIFOLD ASSEMBLY (BEFORE MAR. 1980) (SEE FIG.8)	1
-3	3015	PUMP MOTOR (S19E) (SINCE 1977) (19E) (S19EX) (AFTER OCT.1979)	1
	3039	PUMP MOTOR (19E) (BEFORE OCT.1979)	1
-4	7070	BATTERY TRAY ASSEMBLY (SEE FIG.7D)	1
-5	4007	BATTERY - 6 VOLT TROJAN J250W	4
-6	7302	HYDRAULIC TANK ASSEMBLY (SEE FIG.7C)	1
-7	63402	FLAT WASHER - 5/16	4
-8	63302	LOCK WASHER - 5/16	4
-9	60702	HEX NUT - 5/16-18	4
-10	4082	SOLENOID - 12 VOLT	1
-11	60112	HEX HEAD CAPSCREW - ¼-20 X 1½	10
-12	63401	FLAT WASHER - ¼	14
-13	60701	HEX NUT - ¼-20	14
-14	4103-5	BATTERY CABLE ASSEMBLY	2
-15	4103-1	BATTERY CABLE ASSEMBLY	2
-16	2297	PRESSURE LIMIT SWITCH	1
-17	63301	LOCKWASHER - ¼	12
-18	30371	BELLY PAN DOOR INSTALLATION (SEE FIGURE 14A)	1
-19	4018	EMERGENCY ON/OFF SWITCH	1
-20	5300	KBOB-EMERGENCY ON/OFF	1
-21	30402	PANEL ASSEMBLY (SEE FIG.13)	1
-22	16341-14	TUBE ASSEMBLY - 3/8 (MANIFOLD TO PRESSURE SWITCH)	1
-23	16341-20	TUBE ASSEMBLY - 3/8 (MANIFOLD TO TOP BULKHEAD FITTING)	1
-24	4103-15	BATTERY CABLE ASSEMBLY	2
-25	4103-16	BATTERY CABLE ASSEMBLY	1
-26	60131	HEX HEAD CAPSCREW - ¼-20 UNC X 1	4
-27	815	PIPE NIPPLE	1

ITEM	PART NUMBER	DESCRIPTION	QTY
-28	2426	FEMALE PIPE TEE	2
-29	2476	MALE CONNECTOR	5
-30	2575	TEE	1
-31	2450	STREET ELBOW	1
-32	2461	90° BULKHEAD ELBOW	4
-33	2416	BRANCH TEE	1
-34	2486	BULKHEAD UNION	1
-35	60701	HEX NUT	2
-36	16341-12	TUBE ASSEMBLY - 3/8 (FLOW VALVE TO STEERING CYLINDER)	1
-37	2466	UNION TEE	1
-38	2495	PIPE NIPPLE	1
-39	2516	PIPE THREAD REDUCER	1
-40	30306	FILTER CANISTER - RETURN LINE	1
-41	2453	ELBOW	1
-42	13213-08-0230	HOSE ASSEMBLY (SUCTION LINE)	1
-43	13210-06-0216	HOSE ASSEMBLY (PUMP TO MANIFOLD)	1
-44	13210-06-0580	HOSE ASSEMBLY (BULKHEAD TO LIFT CYLINDER CROSS OVER TEE LOWER PORTS) (SEE FIG.1C)	1
-45	13205-04-0400	HOSE ASSEMBLY (RETURN LINE TO LIFT CYLINDER CROSS OVER TEE UPPER PORTS) (SEE FIG.1C)	1
-46	13205-04-0380	HOSE ASSEMBLY (RETURN LINE TO KICK CYLINDER UPPER PORT)	1
-47	2448	90° ELBOW	2
-48	16341-1	TUBE ASSEMBLY 3/8 (BULKHEAD TO DRIVE MOTOR LOWER ELBOW-RIGHT SIDE)	1
-49	16341-2	TUBE ASSEMBLY 3/8 (BULKHEAD TO DIRVE MOTOR UPPER ELBOW-RIGHT SIDE)	1
-50	16341-16	TUBE ASSEMBLY 3/8 (INSIDE BULKHEAD TO MANIFOLD)	1
-51	16341-3	TUBE ASSEMBLY 3/8 (BULKHEAD TO DRIVE MOTOR LOWER ELBOW-LEFT SIDE)	1
-52	16341-11	TUBE ASSEMBLY 3/8 (INSIDE BULKHEAD TO MANIFOLD)	1
-53	16341-4	TUBE ASSEMBLY 3/8 (BULKHEAD TO DIRVE MOTOR UPPER ELBOW-LEFT SIDE)	1

FIGURE 7A - BELLY PAN COMPONENTS ASSEMBLY (19E)

ITEM	PART NUMBER	DESCRIPTION	QTY
-54	16341-10	TUBE ASSEMBLY 3/8 (INSIDE BULKHEAD TO MANIFOLD)	1
-55	16341-15	TUBE ASSEMBLY 3/8 (BULKHEAD TO KICK CYLINDER)	1
-56	3012	KICK CYLINDER (SEE FIG.4)	1
-57	16341-5	TUBE ASSEMBLY 3/8 (MANIFOLD TO STEERING FLOW VALVE-RIGHT SIDE)	1
-58	16341-13	TUBE ASSEMBLY - 3/8 (FLOW VALVE TO STEERING CYLINDER)	1
-59	16341-7	TUBE ASSEMBLY 3/8 (MANIFOLD TO TANK RETURN LINE)	1
-60	16341-8	TUBE ASSEMBLY 3/8 (PRESSURE SWITCH TEE TO KICK CYLINDER TEE)	1
-61	16341-9	TUBE ASSEMBLY 3/8 (MANIFOLD TO STEERING FLOW VALVE LEFT SIDE)	1
-62	2521	FLOW VALVE	2
-63	65158	"U" BOLT	2
-64	2481	CONNECTOR	1
-65	2478	CONNECTOR	1
-66	2440	MALE/FEMALE ELBOW	1

FIGURE 7B - BELLY PAN COMPONENTS ASSEMBLY (S19E) (S19EX)

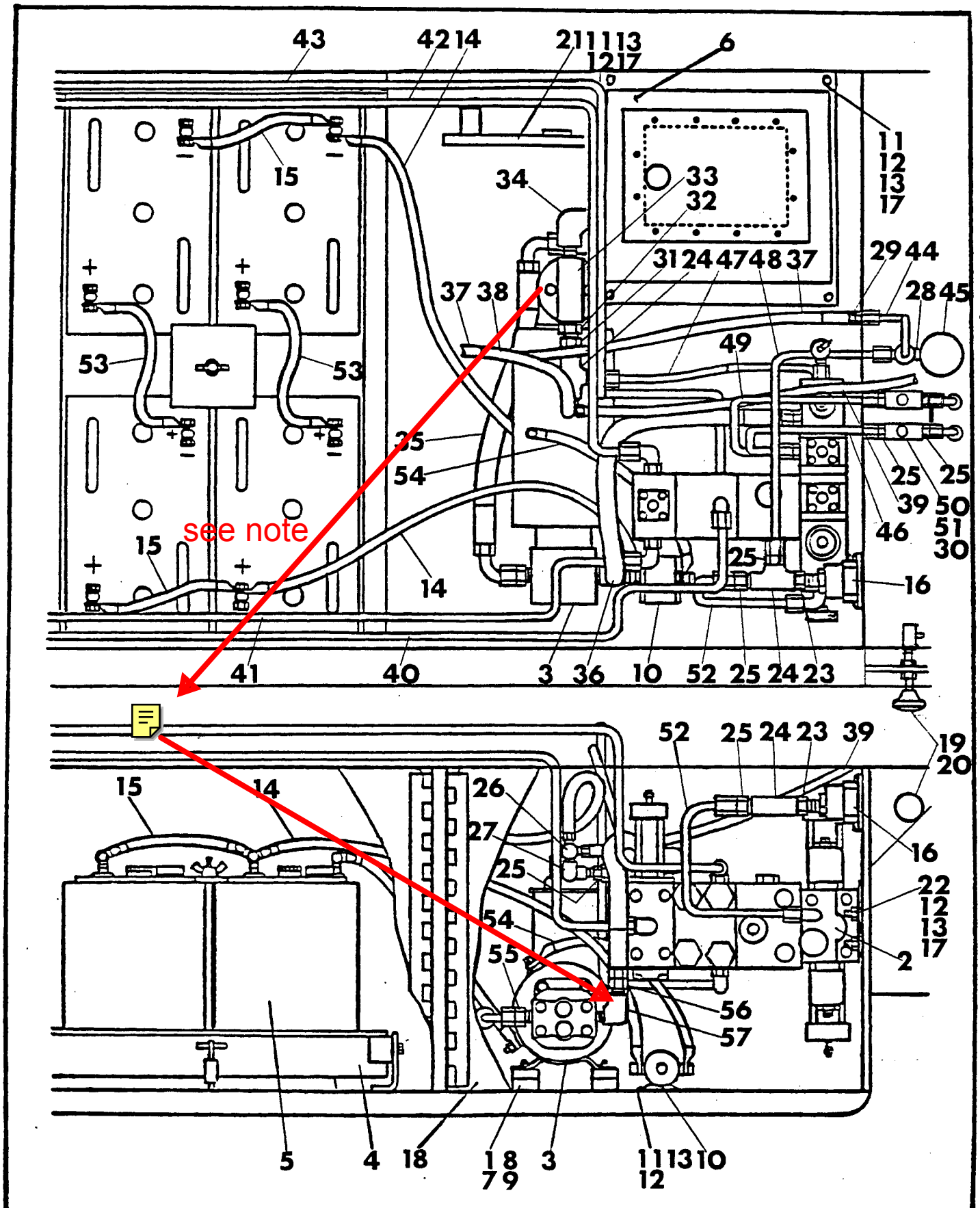


FIGURE 7B - BELLY PAN COMPONENTS ASSEMBLY (S19E) (S19EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
7B-	30421 (7099)	BELLY PAN COMPONENTS ASSEMBLY	1
-1	882	SHOCK MOUNT	4
-2	9391	HYDRAULIC MANIFOLD ASSEMBLY (AFTER MAR. 1980) (SEE FIG.8)	1
	3072	HYDRAULIC MANIFOLD ASSEMBLY (BEFORE MAR. 1980) (SEE FIG.8)	1
-3	3015	PUMP MOTOR (S19E) (SINCE 1977) (19E) (S19EX) (AFTER OCT.1979)	1
-4	7070	BATTERY TRAY ASSEMBLY (SEE FIG.7D)	1
-5	4007	BATTERY - 6 VOLT TROJAN J250W	4
-6	7302	HYDRAULIC TANK ASSEMBLY (SEE FIG.7C)	1
-7	63402	FLAT WASHER - 5/16	4
-8	63302	LOCK WASHER - 5/16	4
-9	60702	HEX NUT - 5/16-18	4
-10	4082	SOLENOID - 12 VOLT	1
-11	60112	HEX HEAD CAPSCREW - ¼-20 X 1½	10
-12	63401	FLAT WASHER - ¼	14
-13	60701	HEX NUT - ¼-20	14
-14	4103-5	BATTERY CABLE ASSEMBLY	2
-15	4103-1	BATTERY CABLE ASSEMBLY	2
-16	2297	PRESSURE LIMIT SWITCH	1
-17	63301	LOCKWASHER - ¼	12
-18	30366	BELLY PAN DOOR INSTALLATION (SEE FIG.14B)	1
-19	4018	EMERGENCY ON/OFF SWITCH	1
-20	5300	KNOB-EMERGENCY ON/OFF	1
-21	30402	PANEL ASSEMBLY (SEE FIG.13)	1
-22	60131	HEX HEAD CAPSCREW - ¼-20 UNC X 1	4
-23	815	PIPE NIPPLE	1
-24	2426	FEMALE PIPE TEE	2
-25	2476	MALE CONNECTOR	7
-26	2575	TEE	1
-27	2450	STREET ELBOW	1
-28	2416	BRANCH TEE	1
-29	2486	BULKHEAD UNOIN	1
-30	60701	HEX NUT	2

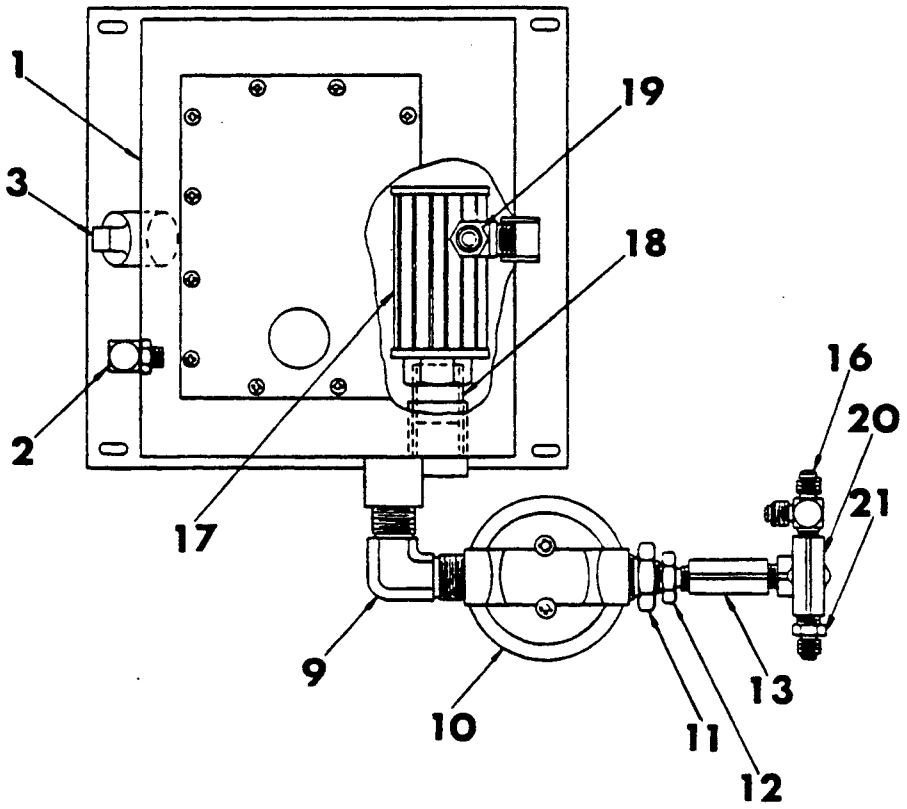
FIGURE 7B - BELLY PAN COMPONENTS ASSEMBLY
(S19E) (S19EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
-31	2495	PIPE NIPPLE	1
-32	2516	PIPE THREAD REDUCER	1
-33	30306	FILTER CANISTER-RETURN LINE	1
-34	2453	ELBOW	1
-35	13213-08-0230	HOSE ASSEMBLY (SUCTION LINE)	1
-36	13210-06-0216	HSOE ASSEMBLY (PUMP TO MANIFOLD)	1
-37	13210-06-0580	HOSE ASSEMBLY (BULK HEAD TO LIFT CYLINDER CROSS OVER TEE LOWER PORTS) (SEE FIG.1D)	1
-38	13205-04-0400	HOSE ASSEMBLY (RETURN LINE TO LIFT CYLINDER CROSS OVER TEE UPPER PORTS) (SEE FIG.1D)	1
-39	13205-04-0380	HOSE ASSEMBLY (RETURN LINE TO KICK CYLINDER UPPER PORT)	1
-40		TUBE ASSEMBLY 3/8 (MANIFOLD TO DRIVE MOTOR LOWER ELBOW-RIGHT SIDE)	1
-41		TUBE ASSEMBLY 3/8 (MANIFOLD TO DIRVE MOTOR UPPER ELBOW-RIGHT SIDE)	1
-42		TUBE ASSEMBLY 3/8 (MANIFOLD TO DRIVE MOTOR LOWER ELBOW-LEFT SIDE)	1
-43		TUBE ASSEMBLY 3/8 (MANIFOLD TO DRIVE MOTOR UPPER ELBOW-LEFT SIDE)	1
-44		TUBE ASSEMBLY 3/8 (BULKHEAD TO KICK CYLINDER)	1
-45	3012	KICK CYLINDER (SEE FIG.4)	1
-46		TUBE ASSEMBLY 3/8 (MANIFOLD TO STEERING FLOW VALVE-RIGHT SIDE)	1
-47		TUBE ASSEMBLY 3/8 (MANIFOLD TO TANK RETURN LINE)	1
-48		TUBE ASSEMBLY 3/8 (PRESSURE LIMIT SWITCH TEE TO KICK CYLINDER TEE)	1
-49		TUBE ASSEMBLY 3/8 (MANIFOLD TO STEERING FLOW VALVE LEFT SIDE)	1
-50	2521	FLOW VALVE	2
-51	65158	"U" BOLT	2
-52		TUBE ASSEMBLY 3/8 (MANIFOLD TO PRESSURE SWITCH)	1
-53	4103-15	BATTERY CABLE ASSEMBLY	2
-54	4103-16	BATTERY CABLE ASSEMBLY	1

FIGURE 7B - BELLY PAN COMPONENTS ASSEMBLY
(S19E) (S19EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
-55	2481	CONNECTOR	1
-56	2478	CONNECTOR	1
-57	2440	MALE/FEMALE ELBOW	1

FIGURE 7C - HYDRAULIC TANK ASSEMBLY
(ALL MODELS)



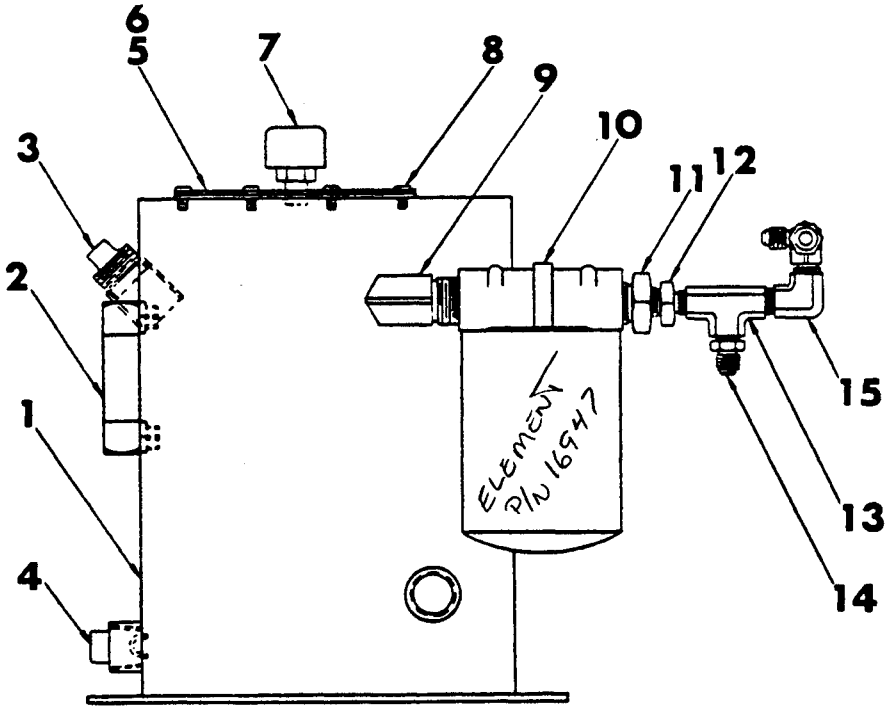


FIGURE 7C - HYDRAULIC TANK ASSEMBLY (ALL MODELS)

ITEM	PART NUMBER	DESCRIPTION	QTY
7C-	7308	HYDRAULIC TANK ASSEMBLY	1
-1	7307	HYDRAULIC TANK	1
-2	3018	SIGHT GAUGE	1
-3	53903	PIPE PLUG - SOLID SQUARE HEAD	1
-4	3027	MAGNETIC PLUG	1
-5	8320	GASKET	1
-6	7302-2	COVER	1
-7	883	BREATHER CAP	1
-8	61718	PHILLIPS HEAD SELF TAPPING SCREW - 10-32UNF X 1/2	12
-9	2453	MALE PIPE ELBOW	1
-10	30306	RETURN LINE FILTER CANISTER	1
-11	2516	REDUCER	1
-12	2495	PIPE NIPPLE	1
-13	2426	FEMALE PIPE TEE	1
-14	2476	MALE CONNECTOR	1
-15	2450	90° STREET ELBOW	1
-16	2575	MALE RUN TEE	1
-17	3004	SUCTION FILTER	1
-18	54803	HALF COUPLING	1
-19	2435	MALE ELBOW	1
-20	2427	MALE BRANCH TEE	1
-21	2415	MALE CONNECTOR	1

FIGURE 7D - BELLY PAN BATTERY TRAY ASSEMBLY
(ALL MODELS)

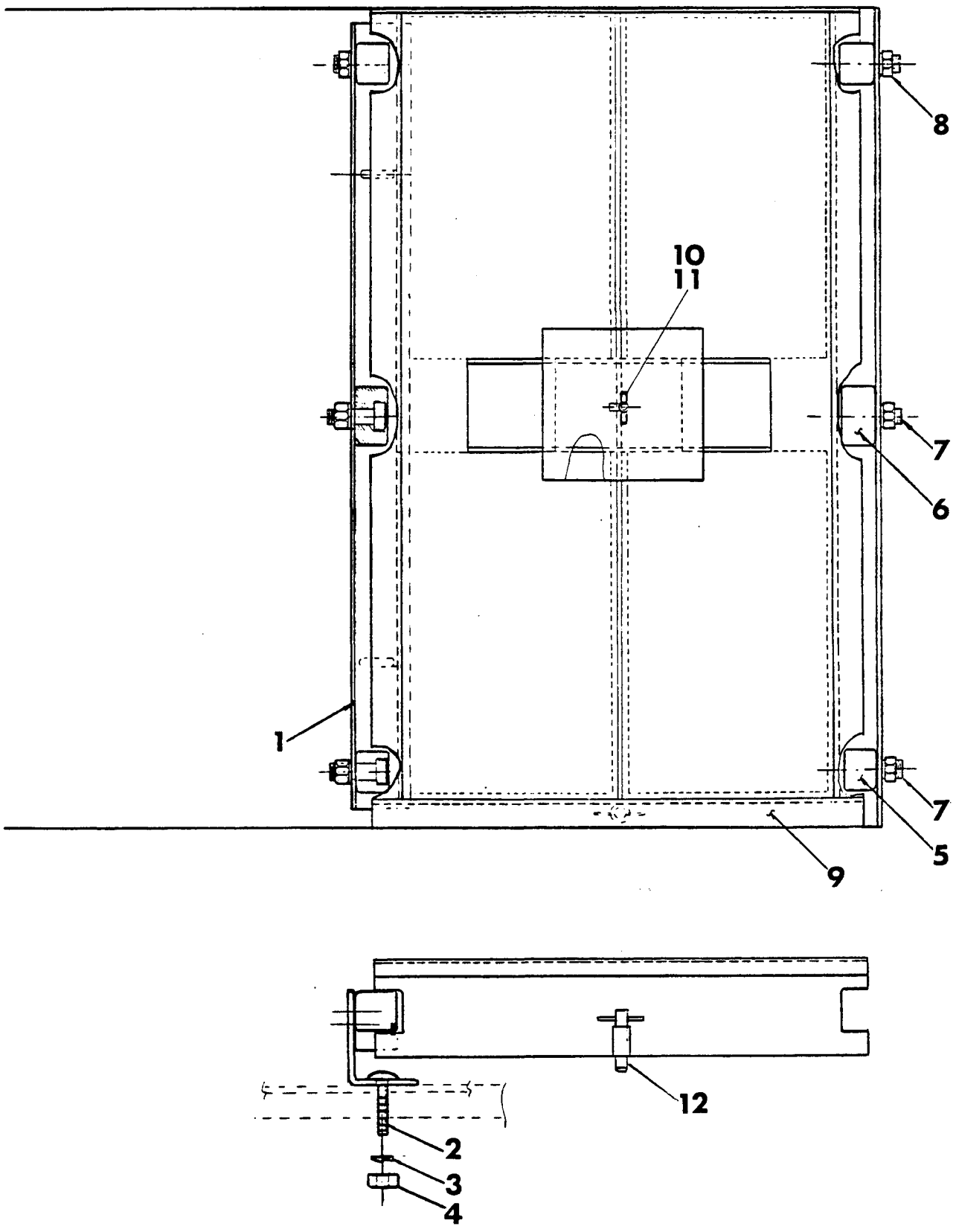


FIGURE 7D - BELLY PAN BATTERY TRAY ASSEMBLY (ALL MODELS)

ITEM	PART NUMBER	DESCRIPTION	QTY
NOTE:	Quantities are for models (15E) (S15E) (S15EX). Items 1 thru 4 are doubled, if used for Models (19E) (S19E) (S19EX)		
7D-	7070	Belly Pan Battery Tray Assembly	1
-1	7071	Battery Tray Roller Bracket	1
-2	65341	Round Head Square Neck Carriage Bolt 5/16-18 x 1 1/4	2
-3	63302	Lock Washer 5/16	2
-4	60702	Hex Nut 5/16-18 UNC	2
-5	7073	Roller	4
-6	2296	Roller	2
-7	62101	Shoulder Bolt 1/2 Dia-3/8-16 UNC x 5/8	6
-8	61302	Self Locking Hex Nut 3/8-16 UNC	6
-9	7069	Battery Tray	1
-10	65125	STEEL WING NUT 3/8-16 UNC	1
-11	7084	J-BOLT	1
-12	7085	BATTERY TRAY LOCK	1

FIGURE 7E-FRAME ASSEMBLY (APRIL 1982) (15E)

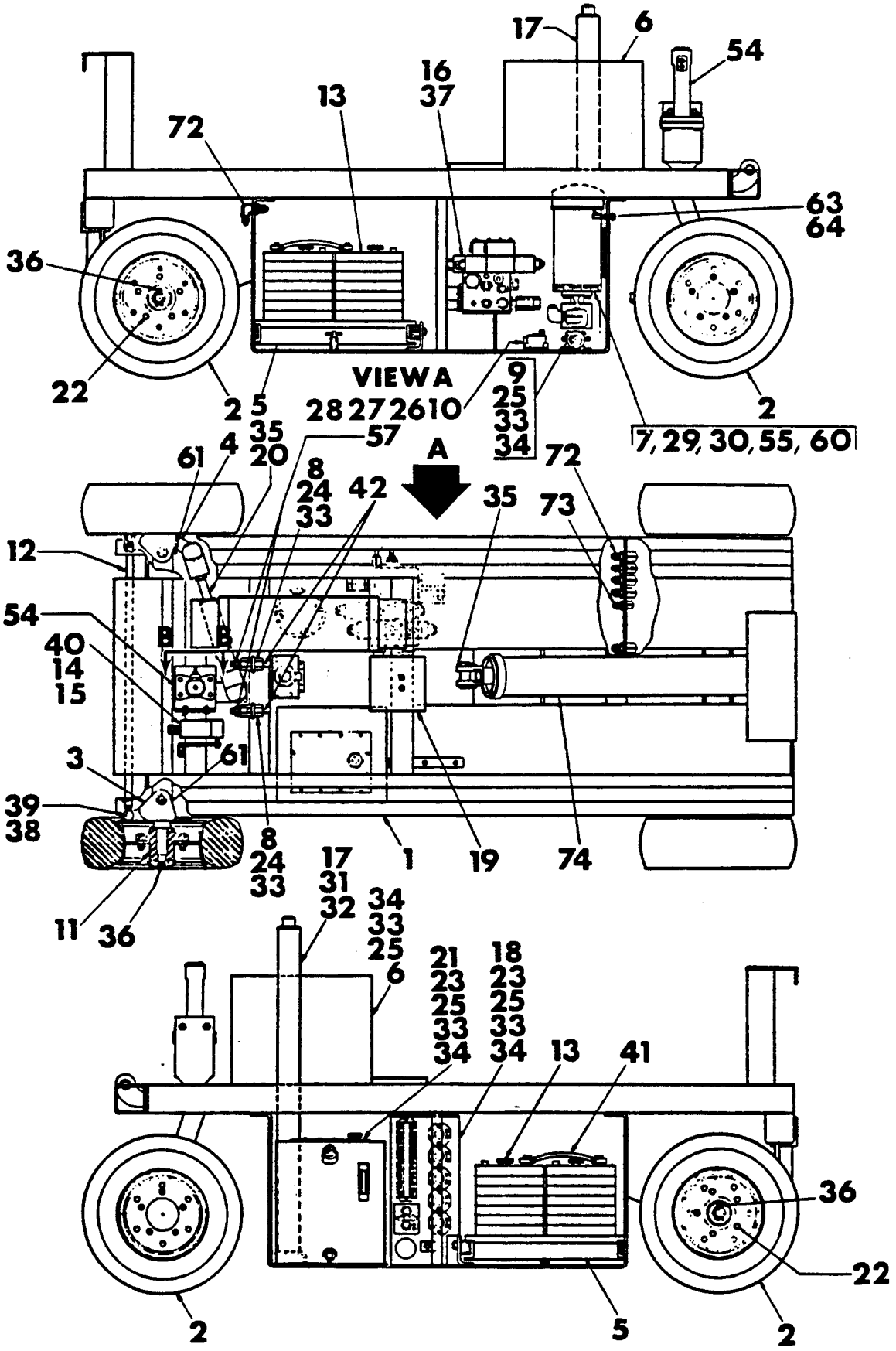
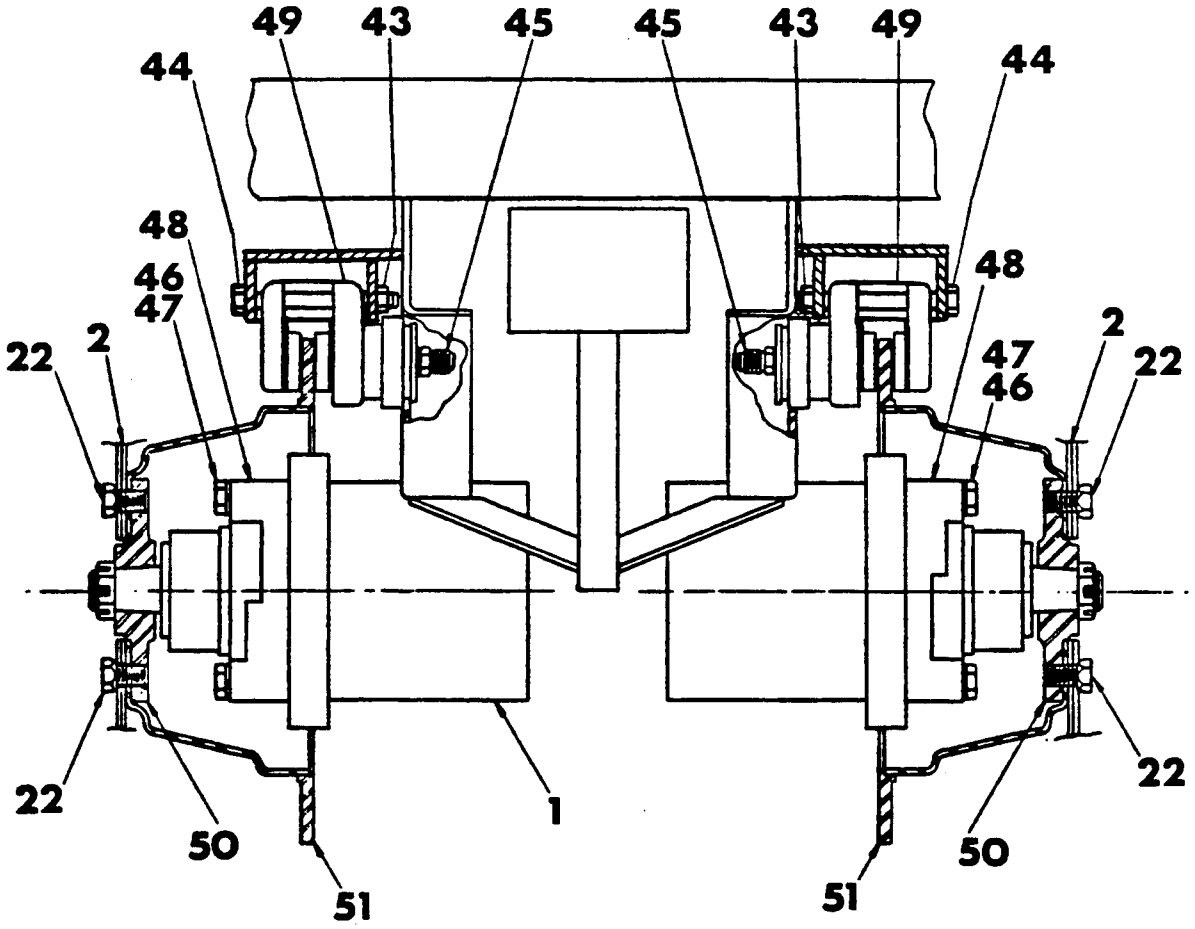


FIGURE 7E-FRAME ASSEMBLY (APRIL 1982) (15E)



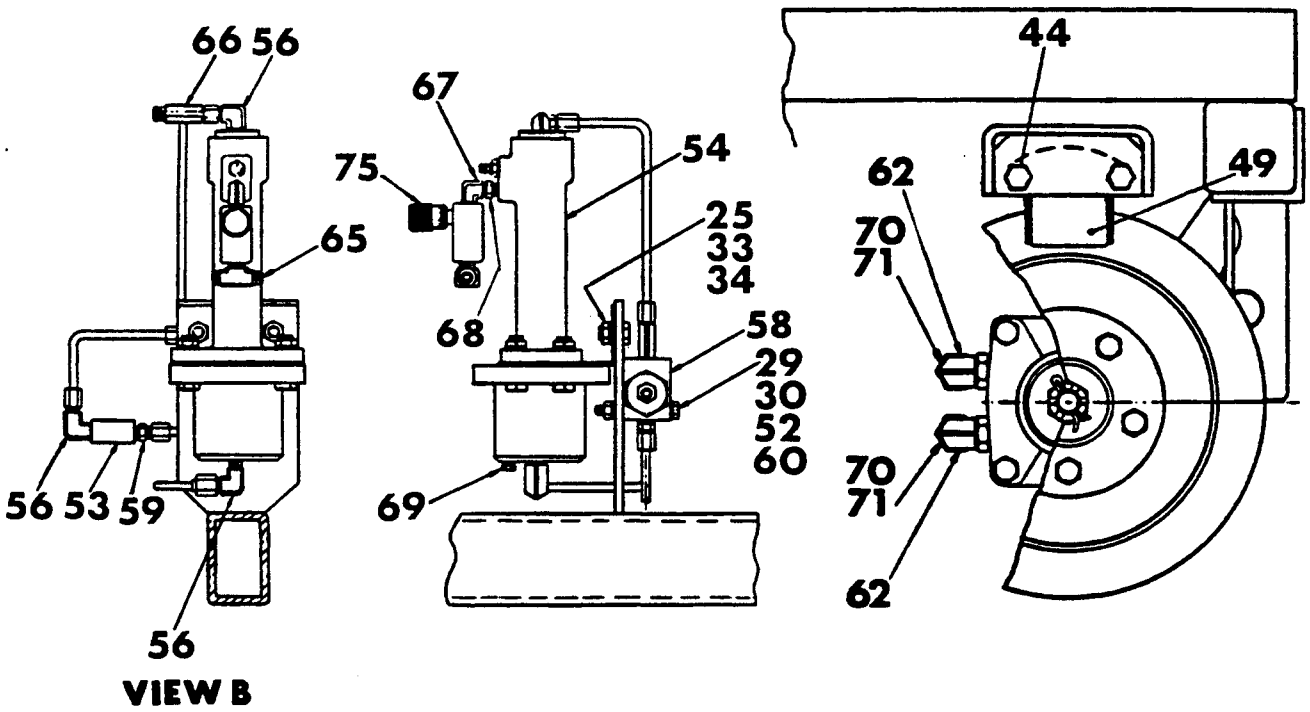


FIGURE 7E - FRAME ASSEMBLY (APRIL 1982) (15E)

ITEM	PART NUMBER	DESCRIPTION	QTY
7E-	30835	FRAME ASSEMBLY	1
	30777	FRAME ASSEMBLY (JAN 1982) (BEFORE DISC BRAKES)	
-1	30840	FRAME WELDMENT	1
-2	30786	TIRE & WHEEL ASSEMBLY (SEE FIG. 16)	4
-3	6305-1	STEERING YOKE ASSEMBLY (R.H.) (SEE FIG. 5)	1
-4	6305-2	STEERING YOKE ASSEMBLY (L.H.) (SEE FIG. 5)	1
-5	7070	BATTERY TRAY ASSEMBLY (SEE FIG. 7D)	1
-6	63	BATTERY CHARGER	1
-7	3015	PUMP MOTOR	1
-8	30884	STEERING VALVE	3
-9	4082	SOLENOID	1
-10	2297	PRESSURE SWITCH	1
-11	134	HUB ASSEMBLY	2
-12	6322	TIE ROD ASSEMBLY	1
-13	4007	BATTERY	4
-14	70107	LIMIT SWITCH	1
-15	70032	SWITCH LEVER	1
-16	60372	HEX HEAD CAPSCREW - 3/8-16UNC X 7/8	3
-17	30843	KICK CYLINDER ASSEMBLY (SEE FIG. 4)	1
-18	30402	PANEL ASSEMBLY (SEE FIG. 13)	1
-19	30387	TILT SWITCH ASSEMBLY (SEE FIG. 15)	1
-20	30844	STEERING CYLINDER ASSEMBLY (SEE FIG. 2)	1
-21	7308	HYDRAULIC TANK ASSEMBLY (SEE FIG. 7C)	1
-22	34044	CONE BOLT	10
-23	63401	FLAT WASHER - 1/4	8
-24	65218	"U" BOLT	2
-25	60701	HEX NUT - 1/4-20UNC	16
-26	60802	HEX NUT - NO. 10-32UNC	2
-27	63313	LOCKWASHER - NO. 10	2
-28	62607	ROUND HEAD SCREW - NO. 10-32UNC X 3/4	2
-29	60702	HEX NUT - 5/16-18UNC	6

ITEM	PART NUMBER	DESCRIPTION	QTY
-30	63302	LOCKWASHER - 5/16	6
-31	60118	HEX HEAD CAPSCREW - 3/8-16UNC X 1 1/4	4
-32	63303	LOCKWASHER - 3/8	4
-33	63301	LOCKWASHER - 1/4	20
-34	60312	HEX HEAD CAPSCREW - 1/4-20UNC X 1 (GR. 5)	16
-35	64309	COTTER PIN - 3/16 DIA. X 1 1/2	4
-36	64315	COTTER PIN - 1/8 DIA. X 2 1/4	4
-37	30776	MANIFOLD ASSEMBLY (SEE FIG. 8E)	1
-38	60705	HEX NUT - 1/2-13UNC	2
-39	60370	HEX HEAD CAPSCREW - 1/2-13UNC X 2	2
-40	62708	ROUND HEAD CAPSCREW - NO. 10-32UNF X 1 3/4	2
-41	30780	BATTERY CABLE KIT	1
-42	2448	MALE ELBOW	2
-43	61305	SELF LOCKING NUT - 1/2-13UNC (BOWMALOK 36784)	4
-44	60385	HEX HEAD CAPSCREW - 1/2-13UNC X 4 (GR. 5)	4
-45	2581	STRAIGHT THREAD CONNECTOR	2
-46	60512	HEX HEAD CAPSCREW - 1/2-13UNC X 2 1/2 (GR. 8)	8
-47	63305	LOCKWASHER - 1/2	8
-48	3002	HYDRAULIC MOTOR	2
-49	30822	CALIPER DISC BRAKE (SEE FIG. 17)	2
-50	6110-1	DRIVE HUB	2
-51	30830	DRUM & DISC WELDMENT	2
-52	60335	HEX HEAD CAPSCREW - 5/16-13UNC X 2 1/4 (GR. 5)	2
-53	30893	CHECK VALVE	1
-54	30829	DISC BRAKE INTENSIFIER ASSEMBLY (SEE FIG. 17A)	1
-55	60380	HEX HEAD CAPSCREW - 5/16-18UNC X 1 1/4 (GR. 5)	4
-56	2434	MALE ELBOW	3
-57	2414	MALE CONNECTOR	2

FIGURE 7E - FRAME ASSEMBLY (APRIL 1982) (15E)

ITEM	PART NUMBER	DESCRIPTION	QTY
-58	30745	PRESSURE REDUCING VALVE ASSEMBLY (SEE FIG. 17B)	1
-59	2414	MALE CONNECTOR	1
-60	63402	FLAT WASHER - 5/16	6
-61	64206	ROLL PIN - 1/4 DIA. X 2 1/4	2
-62	16511	STRAIGHT THREAD ELBOW	4
-63	5300	EMERGENCY ON-OFF KNOB	1
-64	4018	SWITCH	1
-65	2492	MALE BRANCH TEE	1
-66	51800	SWIVEL NUT RUN TEE	1
-67	52308	STREET ELBOW	1
-68	51005	MALE CONNECTOR	1
-69	53910	PLUG	1
-70	2578	TUBE END REDUCER	4
-71	2501	NUT	4
-72	2461	BULKHEAD UNION	5
-73	53401	BULKHEAD UNION	1
-74	3009	MAIN LIFT CYLINDER (SEE FIG. 3)	1
-75	30884	FLOW CONTROL VALVE	1

FIGURE 7F-FRAME ASSEMBLY (APRIL 1982) (S15E)

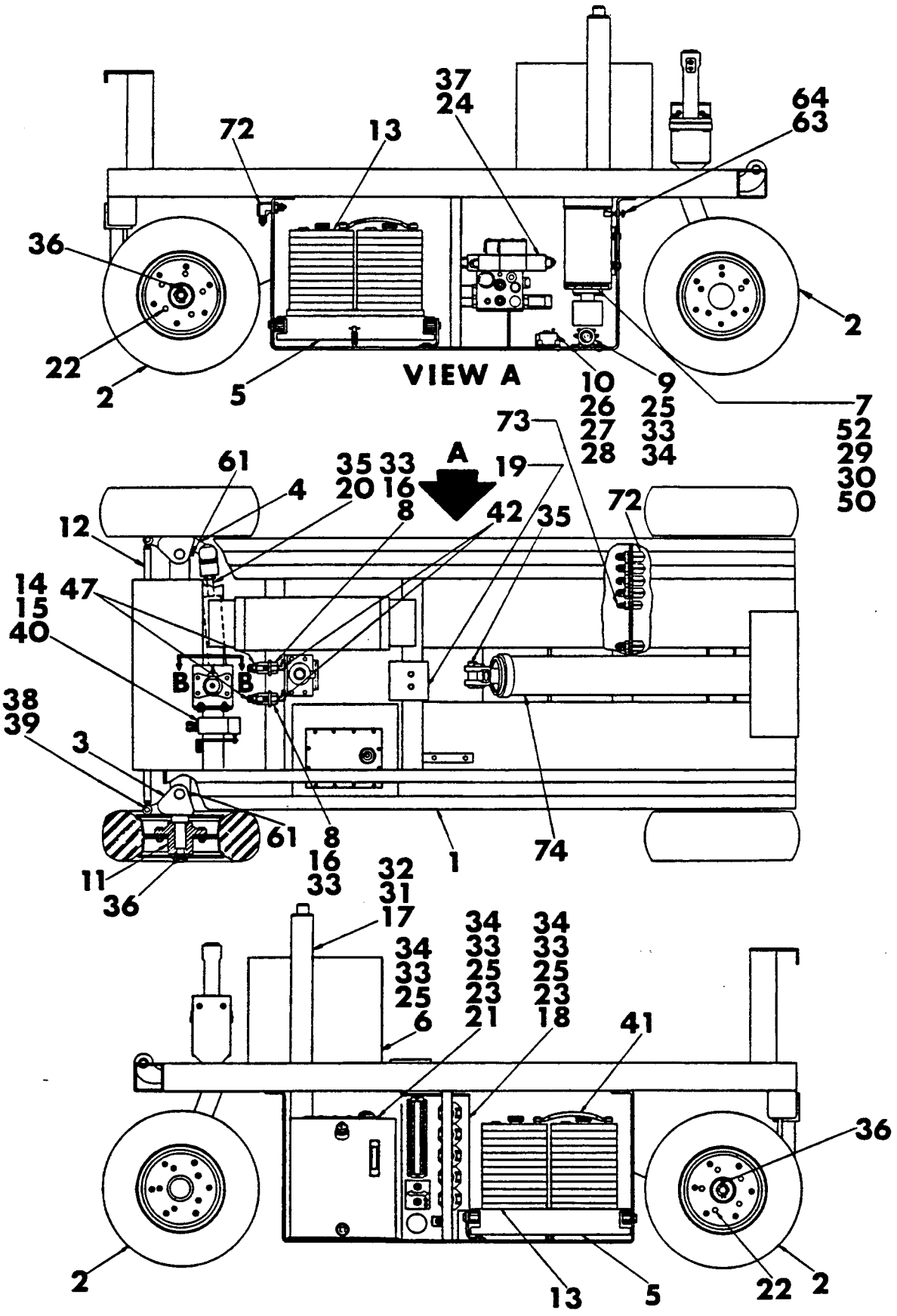
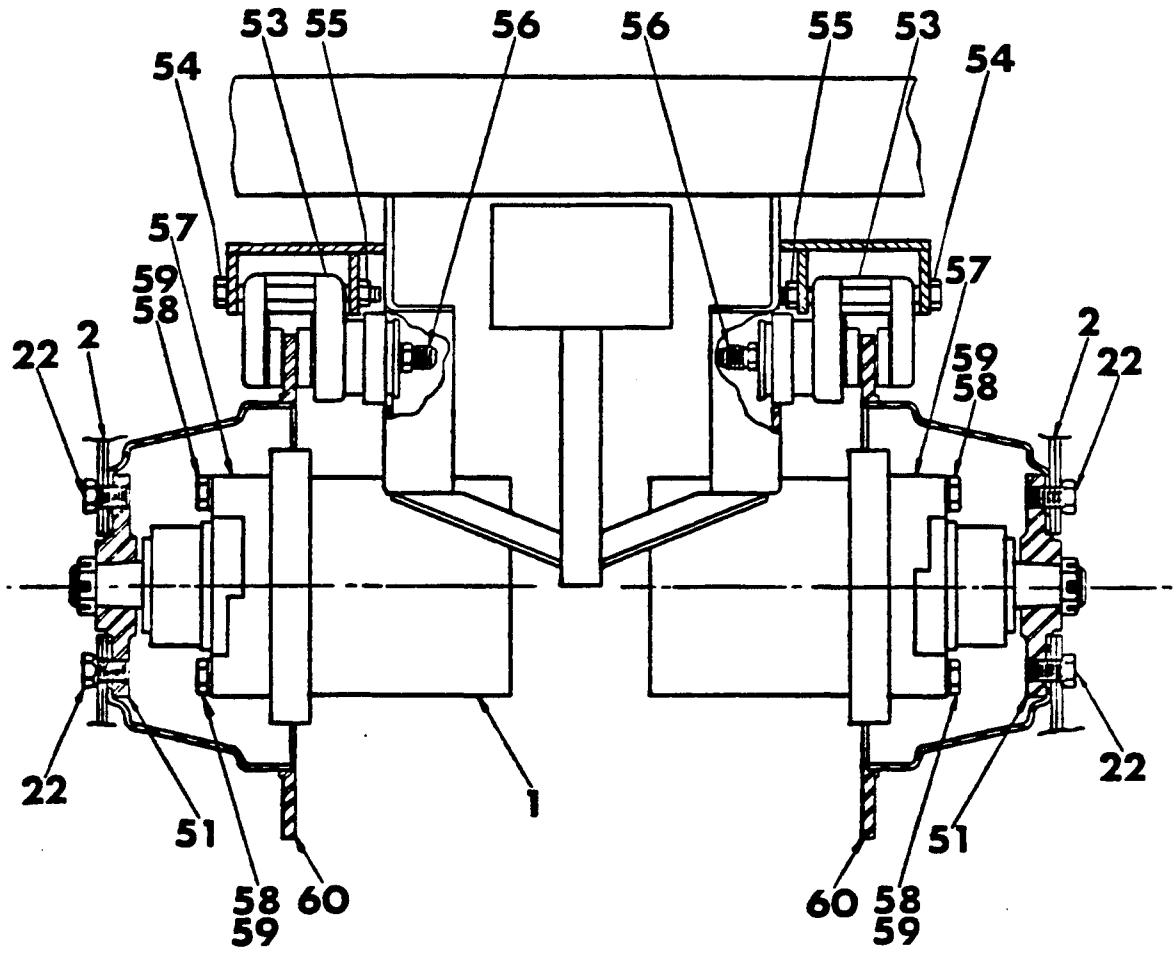
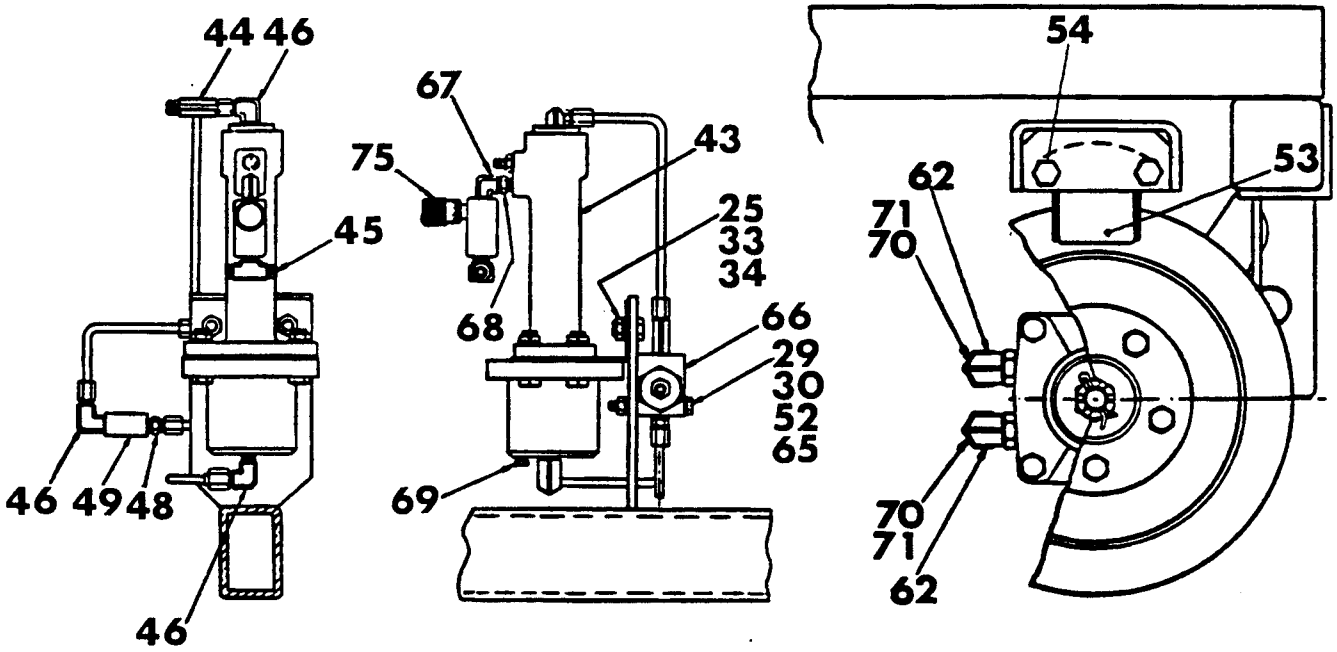


FIGURE 7F-FRAME ASSEMBLY (APRIL 1982) (S15E)





VIEW B

FIGURE 7F - FRAME ASSEMBLY (APRIL 1982) (S15E)

ITEM	PART NUMBER	DESCRIPTION	QTY
7F-	30836	FRAME ASSEMBLY	1
	30777	FRAME ASSEMBLY (JAN 1982) (BEFORE DISC BRAKES)	
-1	30841	FRAME WELDMENT	1
-2	30786	TIRE & WHEEL ASSEMBLY (SEE FIG. 16)	4
-3	6305-3	STEERING YOKE ASSEMBLY (R.H.) (SEE FIG. 5)	1
-4	6305-2	STEERING YOKE ASSEMBLY (L.H.) (SEE FIG. 5)	1
-5	7070	BATTERY TRAY ASSEMBLY (SEE FIG. 7D)	1
-6	63	BATTERY CHARGER	1
-7	3015	PUMP MOTOR	1
-8	30884	STEERING VALVE	2
-9	4082	SOLENOID	1
-10	2297	PRESSURE SWITCH	1
-11	134	HUB ASSEMBLY	2
-12	6322	TIE ROD ASSEMBLY	1
-13	4007	BATTERY	4
-14	70107	LIMIT SWITCH	1
-15	70032	SWITCH LEVER	1
-16	65218	"U" BOLT	2
-17	30843	KICK CYLINDER ASSEMBLY (SEE FIG. 4)	1
-18	30402	PANEL ASSEMBLY (SEE FIG. 13)	1
-19	30387	TILT SWITCH ASSEMBLY (SEE FIG. 15)	1
-20	30844	STEERING CYLINDER ASSEMBLY (SEE FIG. 2)	1
-21	7308	HYDRAULIC TANK ASSEMBLY (SEE FIG. 7C)	1
-22	34044	CONE BOLT	10
-23	63401	FLAT WASHER - 1/4	8
-24	60372	HEX HEAD CAPSCREW - 3/8-16UNC X 7/8	3
-25	60701	HEX NUT - 1/4-20UNC	16
-26	60802	HEX NUT - NO. 10-32UNF	2
-27	63313	LOCKWASHER - NO. 10	2
-28	62607	ROUND HEAD SCREW - NO. 10-32UNC X 3/4	2
-29	60702	HEX NUT - 5/16-18UNC	6

ITEM	PART NUMBER	DESCRIPTION	QTY
-30	63302	LOCKWASHER - 5/16	6
-31	60118	HEX HEAD CAPSCREW - 3/8-16UNC X 1 1/4	4
-32	63303	LOCKWASHER - 3/8	4
-33	63301	LOCKWASHER - 1/4	20
-34	60312	HEX HEAD CAPSCREW - 1/4-20UNC X 1 (GR. 5)	16
-35	64309	COTTER PIN - 3/16 DIA. X 1 1/2	4
-36	64315	COTTER PIN - 1/8 DIA. X 2 1/4	4
-37	30776	MANIFOLD ASSEMBLY (SEE FIG. 8E)	1
-38	60705	HEX NUT - 1/2-13UNC	2
-39	60370	HEX HEAD CAPSCREW - 1/2-13UNC X 2	2
-40	62708	ROUND HEAD CAPSCREW - NO. 10-32UNF X 1 3/4	2
-41	30780	BATTERY CABLE KIT	1
-42	2448	MALE ELBOW	2
-43	30829	DISC BRAKE INTENSIFIER ASSEMBLY (SEE FIG. 17A)	1
-44	51800	SWIVEL NUT RUN TEE	1
-45	2492	MALE BRANCH TEE	1
-46	2434	MALE ELBOW	3
-47	2414	MALE CONNECTOR	2
-48	2414	MALE CONNECTOR	1
-49	30893	CHECK VALVE	1
-50	60380	HEX HEAD CAPSCREW - 5/16-18UNC X 1 1/4 (GR. 5)	4
-51	6110-1	DRIVE HUB	2
-52	63402	FLAT WASHER - 5/16	6
-53	30822	CALIPER DISC BRAKE (SEE FIG. 17)	2
-54	60385	HEX HEAD CAPSCREW - 1/2-13UNC X 4 (GR. 5)	4
-55	61305	SELF LOCKING NUT - 1/2-13UNC (BOWMALOK 36784)	4
-56	2581	STRAIGHT THREAD CONNECTOR	2
-57	3002	HYDRAULIC MOTOR	2
-58	63305	LOCKWASHER - 1/2	8

ITEM	PART NUMBER	DESCRIPTION	QTY
-59	60512	HEX HEAD CAPSCREW - 1/2-13UNC X 2 1/2 (GR. 8)	8
-60	30830	DRUM & DISC WELDMENT	2
-61	64206	ROLL PIN - 1/4 DIA. X 2 1/4	2
-62	16511	STRAIGHT THREAD ELBOW	4
-63	5300	EMERGENCY ON-OFF KNOB	1
-64	4018	SWITCH	1
-65	60335	HEX HEAD CAPSCREW - 5/16-18UNC X 2 1/4 (GR. 5)	2
-66	30745	PRESSURE REDUCING VALVE ASSEMBLY (SEE FIG. 17B)	1
-67	52308	STREET ELBOW	1
-68	51005	MALE CONNECTOR	1
-69	53910	PLUG	1
-70	2578	TUBE END REDUCER	4
-71	2501	NUT	4
-72	2461	BULKHEAD UNION	5
-73	53401	BULKHEAD UNION	1
-74	3009	MAIN LIFT CYLINDER (SEE FIG. 3)	1
-75	30884	FLOW CONTROL VALVE	1

FIGURE 7G-FRAME ASSEMBLY (APRIL 1982) (S15EX)

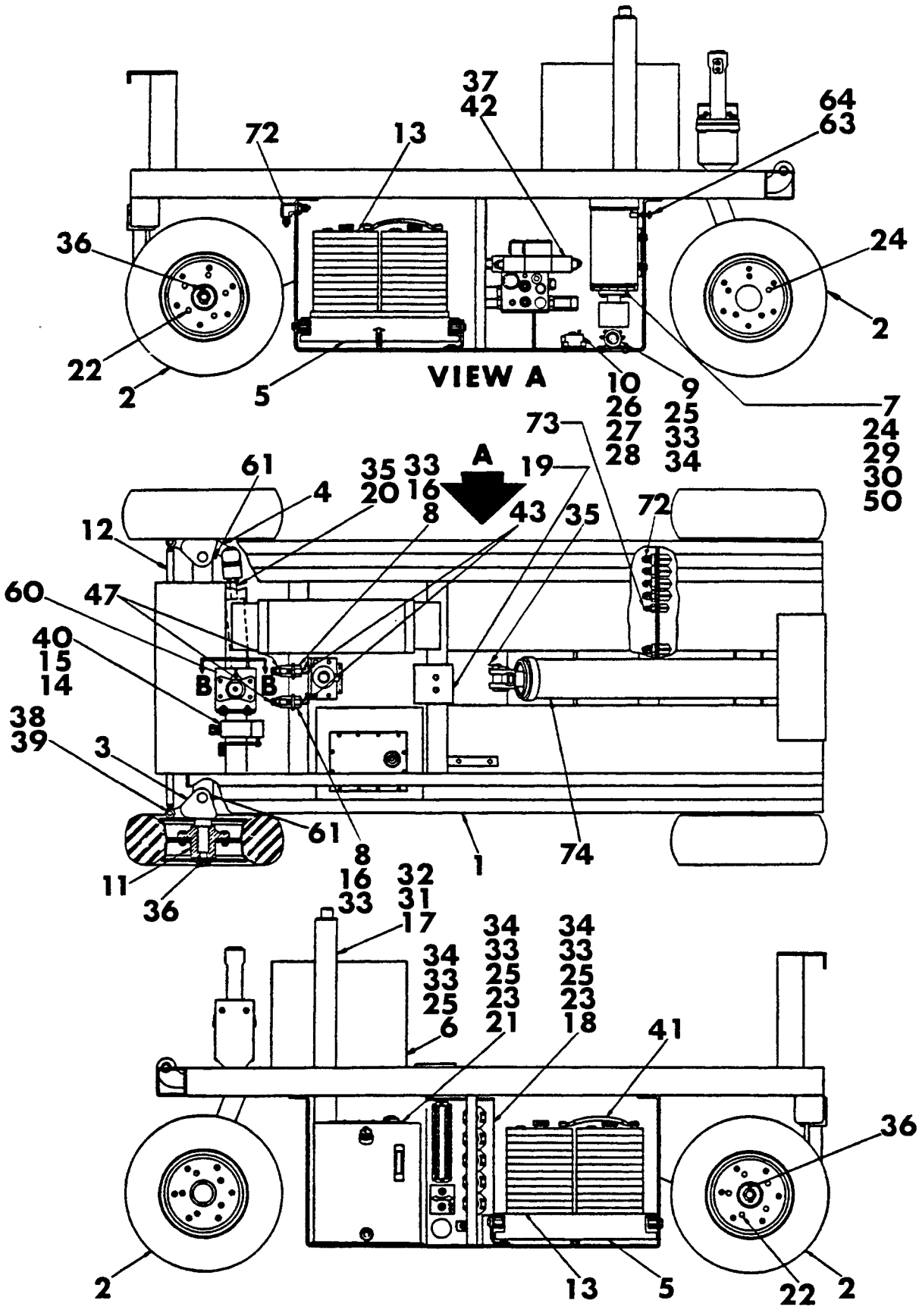


FIGURE 7G - FRAME ASSEMBLY (APRIL 1982) (S15EX)

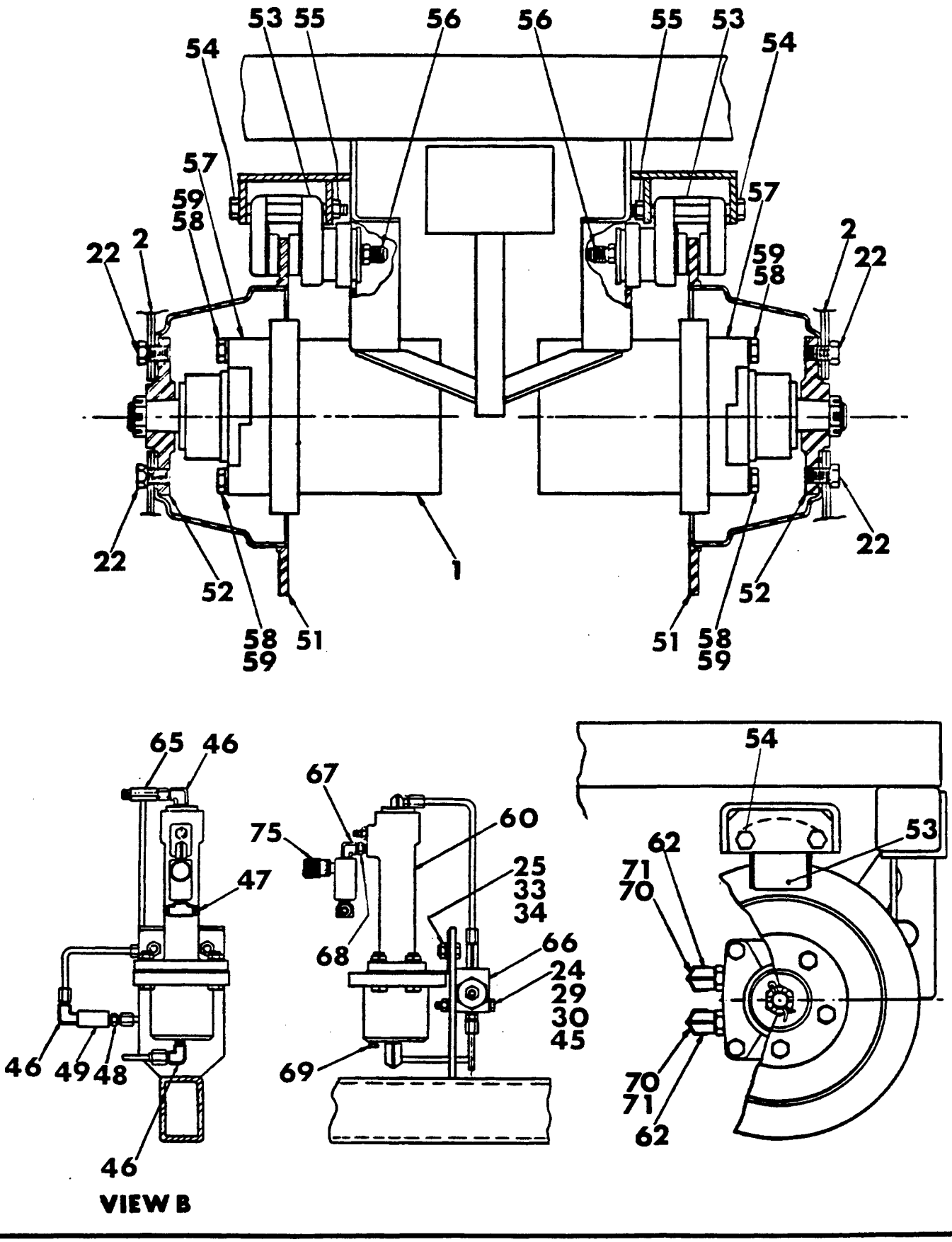


FIGURE 7G-FRAME ASSEMBLY (APRIL 1982) (S15EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
7G-	30837	FRAME ASSEMBLY	1
	30777	FRAME ASSEMBLY (JAN 1982) (BEFORE DISC BRAKES)	
-1	30841	FRAME WELDMENT	1
-2	30786	TIRE & WHEEL ASSEMBLY (SEE FIG. 16)	4
-3	6305-3	STEERING YOKE ASSEMBLY (R.H.) (SEE FIG. 5)	1
-4	6305-2	STEERING YOKE ASSEMBLY (L.H.) (SEE FIG. 5)	1
-5	7070	BATTERY TRAY ASSEMBLY (SEE FIG. 7D)	1
-6	63	BATTERY CHARGER	1
-7	3015	PUMP MOTOR	1
-8	30884	STEERING VALVE	2
-9	4082	SOLENOID	1
-10	2297	PRESSURE SWITCH	1
-11	134	HUB ASSEMBLY	2
-12	6322	TIE ROD ASSEMBLY	1
-13	4007	BATTERY	4
-14	70107	LIMIT SWITCH	1
-15	70032	SWITCH LEVER	1
-16	65218	U" BOLT	2
-17	30843	KICK CYLINDER ASSEMBLY (SEE FIG. 4)	1
-18	30768	PANEL ASSEMBLY (SEE FIG. 13)	1
-19	30387	TILT SWITCH ASSEMBLY (SEE FIG. 15)	1
-20	30844	STEERING CYLINDER ASSY (SEE FIG. 2)	1
-21	7308	HYDRAULIC TANK ASSEMBLY (SEE FIG. 7C)	1
-22	34044	CONE BOLT	10
-23	63401	FLAT WASHER-1/4	8
-24	63402	FLAT WASHER-5/16	6
-25	60701	HEX NUT-1/4-20UNC	16
-26	61503	HEX NUT-NO. 10-32UNC	2
-27	63313	LOCKWASHER-NO. 10	2
-28	62607	ROUND HEAD SCREW-NO. 10-32UNC X 3/4	2
-29	60702	HEX NUT-5/16-18UNC	6

ITEM	PART NUMBER	DESCRIPTION	QTY
-30	63302	LOCKWASHER-5/16	6
-31	60118	HEX HEAD CAPSCREW-3/8-16UNC X 1 1/4	4
-32	63303	LOCKWASHER-3/8	4
-33	63301	LOCKWASHER-1/4	20
-34	60312	HEX HEAD CAPSCREW-1/4-20UNC X 1 (GR.5)	16
-35	64309	COTTER PIN-3/16 DIA. X 1 1/2	4
-36	64315	COTTER PIN-1/8 DIA. X 2 1/4	4
-37	30776	MANIFOLD ASSEMBLY (SEE FIG. 8E)	1
-38	60705	HEX NUT-1/2-13UNC	2
-39	60370	HEX HEAD CAPSCREW-1/2-13UNC X 2	2
-40	62708	ROUND HEAD CAPSCREW-NO. 10-32UNF X 1 3/4	2
-41	30780	BATTERY CABLE KIT	1
-42	60372	HEX HEAD CAPSCREW-3/8-16UNC X 7/8	3
-43	2448	MALE ELBOW	2
-44	2411	CAP	1
-45	60335	MALE ELBOW	2
-46	2434	MALE ELBOW	3
-47	2492	MALE BRANCH TEE	1
-48	2414	MALE CONNECTOR	1
-49	30893	CHECK VALVE	1
-50	60380	HEX HEAD CAPSCREW-5/16-18UNC X 1 1/4 (GR. 5)	4
-51	30830	DRUM & DISC WELDMENT	2
-52	6110-1	DRIVE HUB	2
-53	30822	CALIPER DISC BRAKE (SEE FIG. 17)	2
-54	60385	HEX HEAD CAPSCREW-1/2-13UNC X 4 (GR. 5)	4
-55	61305	SELF LOCKING NUT-1/2-13UNC	4
-56	2581	STRAIGHT THREAD CONNECTOR	2
-57	3002	HYDRAULIC MOTOR	2
-58	63305	LOCKWASHER-1/2	8
-59	60512	HEX HEAD CAPSCREW-1/2-13UNC X 2 1/2 (GR. 8)	8
-60	30829	DISC BRAKE INTENSIFIER ASSEMBLY (SEE FIG. 17A)	1

ITEM	PART NUMBER	DESCRIPTION	QTY
-61	64206	ROLL PIN-1/4 DIA. X 2 1/4	2
-62	16511	STRAIGHT THREAD ELBOW	4
-63	5300	EMERGENCY ON-OFF KNOB	1
-64	4018	SWITCH	1
-65	51800	SWIVEL NUT RUN TEE	1
-66	30745	SWIVEL NUT ELBOW	1
-67	52308	STREET ELBOW	1
-68	51005	MALE CONNECTOR	1
-69	53910	PLUG	1
-70	2578	TUBE END REDUCER	4
-71	2501	NUT	4
-72	2461	BULKHEAD UNION	5
-73	53401	BULKHEAD UNION	1
-74	3009	MAIN LIFT CYLINDER (SEE FIG. 3)	1
-75	30884	FLOW CONTROL VALVE	1

FIGURE 7H-FRAME ASSEMBLY (APRIL 1982) (19E)

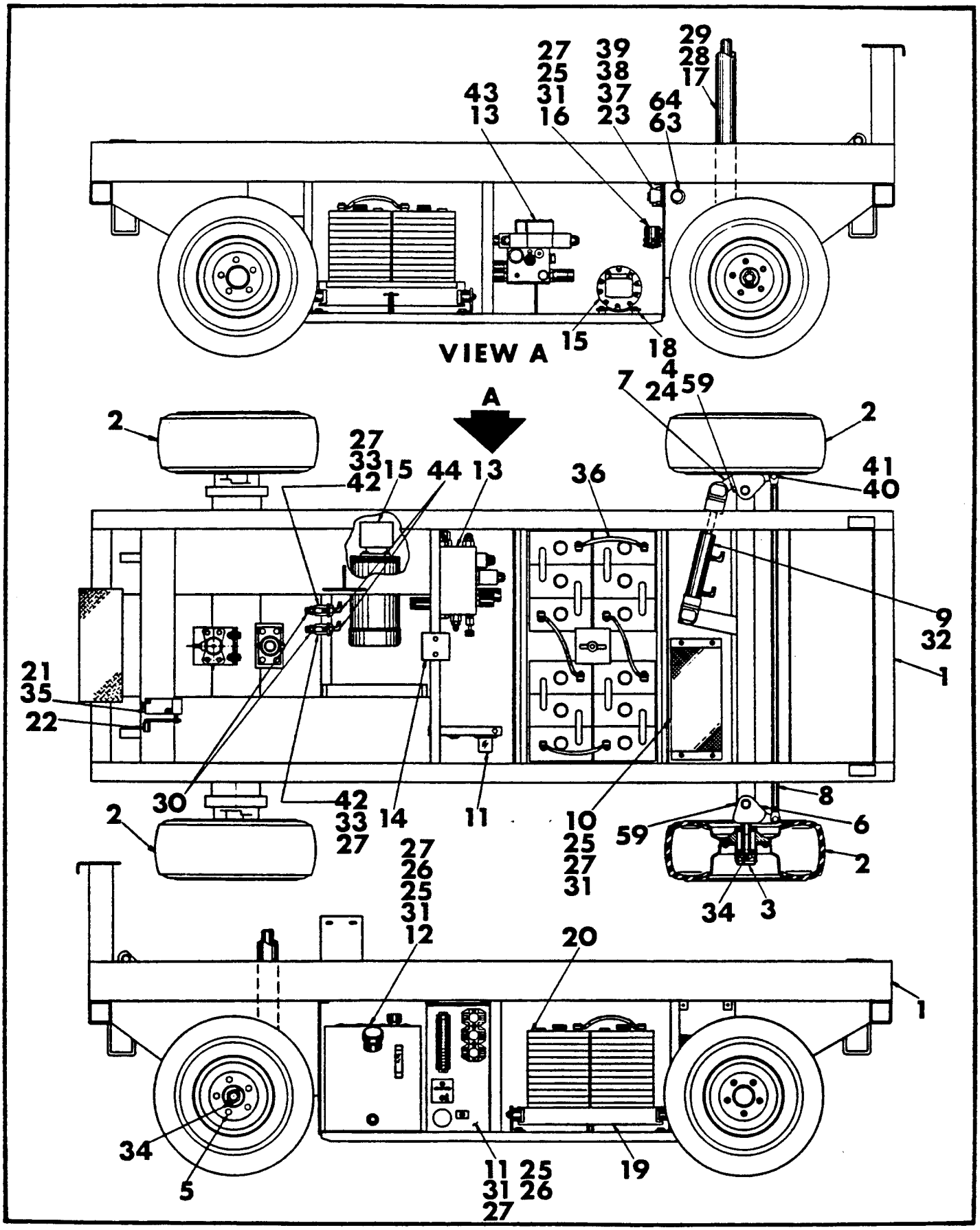


FIGURE 7H - FRAME ASSEMBLY (APRIL 1982) (19E)

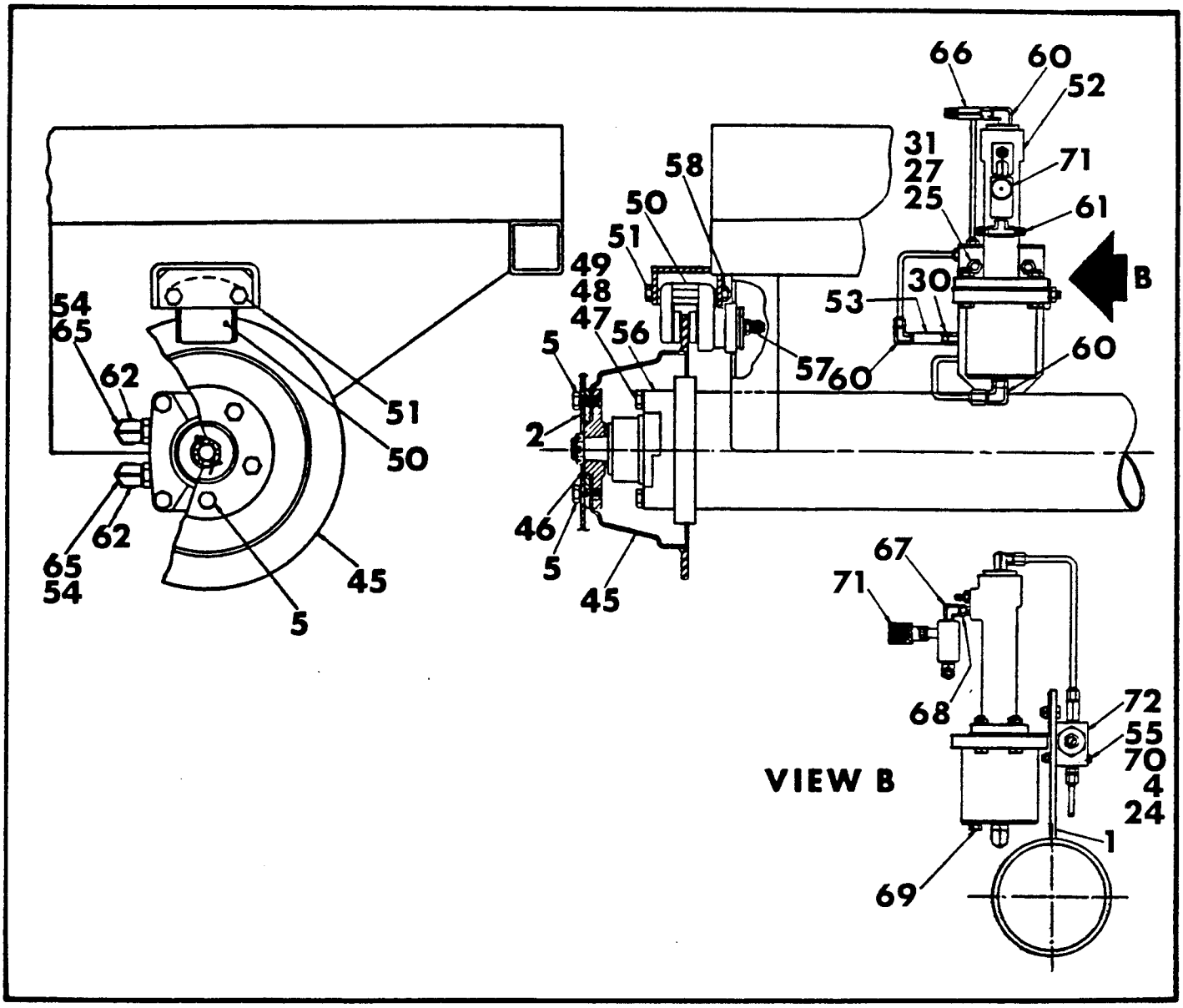


FIGURE 7H-FRAME ASSEMBLY (APRIL 1982) (19E)

ITEM	PART NUMBER	DESCRIPTION	QTY
7H-	30832	FRAME ASSEMBLY	1
	30778	FRAME ASSEMBLY (JAN 1982) (BEFORE DISC BRAKES)	1
-1	30838	FRAME WELDMENT	1
-2	30785	TIRE & WHEEL ASSEMBLY (SEE FIG. 16A)	4
-3	134	STEERING HUB ASSEMBLY	2
-4	60702	HEX NUT-5/16-18UNC	10
-5	34044	CONE BOLT	10
-6	6305-2	STEERING YOKE ASSEMBLY (L.H.) (SEE FIG. 5)	1
-7	6305-1	STEERING YOKE ASSEMBLY (R.H.) (SEE FIG. 5)	1
-8	6322-4	TIE ROD ASSEMBLY	1
-9	30844	STEERING CYLINDER ASSEMBLY (SEE FIG. 2)	1
-10	63	BATTERY CHARGER	1
-11	30402	PANEL ASSEMBLY (SEE FIG. 13)	1
-12	7308	HYDRAULIC TANK ASSEMBLY (SEE FIG. 7C)	1
-13	30776	MANIFOLD ASSEMBLY (SEE FIG. 8E)	1
-14	30387	TILT SWITCH ASSEMBLY (SEE FIG. 15)	1
-15	3015	PUMP MOTOR	1
-16	4082	SOLENOID	1
-17	30843	KICK CYLINDER ASSEMBLY (SEE FIG. 4)	1
-18	882	SHOCK MOUNT	4
-19	7070	BATTERY TRAY ASSEMBLY (SEE FIG. 7D)	1
-20	4007	BATTERY	4
-21	70107	LIMIT SWITCH	1
-22	70032	SWITCH LEVER	1
-23	2297	PRESSURE SWITCH	1
-24	63402	FLAT WASHER	10
-25	60701	HEX NUT-1/4-20UNC	16
-26	63401	FLAT WASHER-1/4	8
-27	63301	LOCKWASHER-1/4	20
-28	63302	LOCKWASHER-3/8	4
-29	60118	HEX HEAD CAPSCREW-3/8-16UNC X 1 1/4	4

ITEM	PART NUMBER	DESCRIPTION	QTY
-30	2414	MALE CONNECTOR	4
-31	60312	HEX HEAD CAPSCREW-1/4-20UNC X 1 (GR.5)	16
-32	64309	COTTER PIN-3/16 DIA. X 1 1/2	2
-33	65218	"U"-BOLT	2
-34	64315	COTTER PIN-1/8 DIA. X 2 1/4	4
-35	62708	ROUND HEAD CAPSCREW-NO. 10-32UNF X 1 3/4	2
-36	30780	BATTERY CABLE KIT	1
-37	60802	HEX NUT-NO. 10-32UNF	2
-38	63313	LOCKWASHER-NO. 10	2
-39	62607	ROUND HEAD SCREW-NO. 10-32UNC X 3/4	2
-40	60705	HEX NUT-1/2-13UNC	2
-41	60370	HEX HEAD CAPSCREW-1/2-13UNC X 2	2
-42	30884	STEERING VALVE	3
-43	60372	HEX HEAD CAPSCREW-3/8-16UNC X 7/8	3
-44	2448	MALE ELBOW	2
-45	30830	DRUM & DISC WELDMENT	2
-46	6110-1	DRIVE HUB (31158 without caliper brake)	2
-47	60512	HEX HEAD CAPSCREW-1/2-13UNC X 2 1/2	8
-48	63305	LOCKWASHER-1/2	8
-49	63405	FLAT WASHER-1/2	8
-50	30822	CALIPER DISC BRAKE (SEE FIG. 17)	2
-51	60385	HEX HEAD CAPSCREW-1/2-13UNC X 4 (GR.5)	4
-52	30829	DISC BRAKE INTENSIFIER ASSEMBLY (SEE FIG. 17A)	1
-53	30893	CHECK VALVE	1
-54	2501	NUT	4
-55	60335	HEX HEAD CAPSCREW-5/16-18UNC X 2.1/4	4
-56	3002	HYDRAULIC MOTOR	2
-57	2581	STRAIGHT THREAD CONNECTOR	2
-58	61305	SELF LOCKING NUT-1/2-13UNC	4
-59	64206	ROLL PIN-1/4 DIA. X 2 1/4	2
-60	2434	MALE ELBOW	3

FIGURE 7H-FRAME ASSEMBLY (APRIL 1982) (19E)

ITEM	PART NUMBER	DESCRIPTION	QTY
-61	2492	MALE BRANCH TEE	1
-62	16511	STRAIGHT THREAD ELBOW	4
-63	5300	EMERGENCY ON-OFF KNOB	1
-64	4018	SWITCH	1
-65	2578	TUBE END REDUCER	4
-66	51800	SWIVEL NUT RUN TEE	1
-67	52308	STREET ELBOW	1
-68	51005	MALE CONNECTOR	1
-69	53910	PLUG	1
-70	63302	LOCKWASHER - 5/16	2
-71	30884	FLOW CONTROL VALVE	1
-72	30745	PRESSURE REDUCING VALVE ASSEMBLY (SEE FIG. 17B)	1

FIGURE 7J-FRAME ASSEMBLY (APRIL 1982) (S19E)

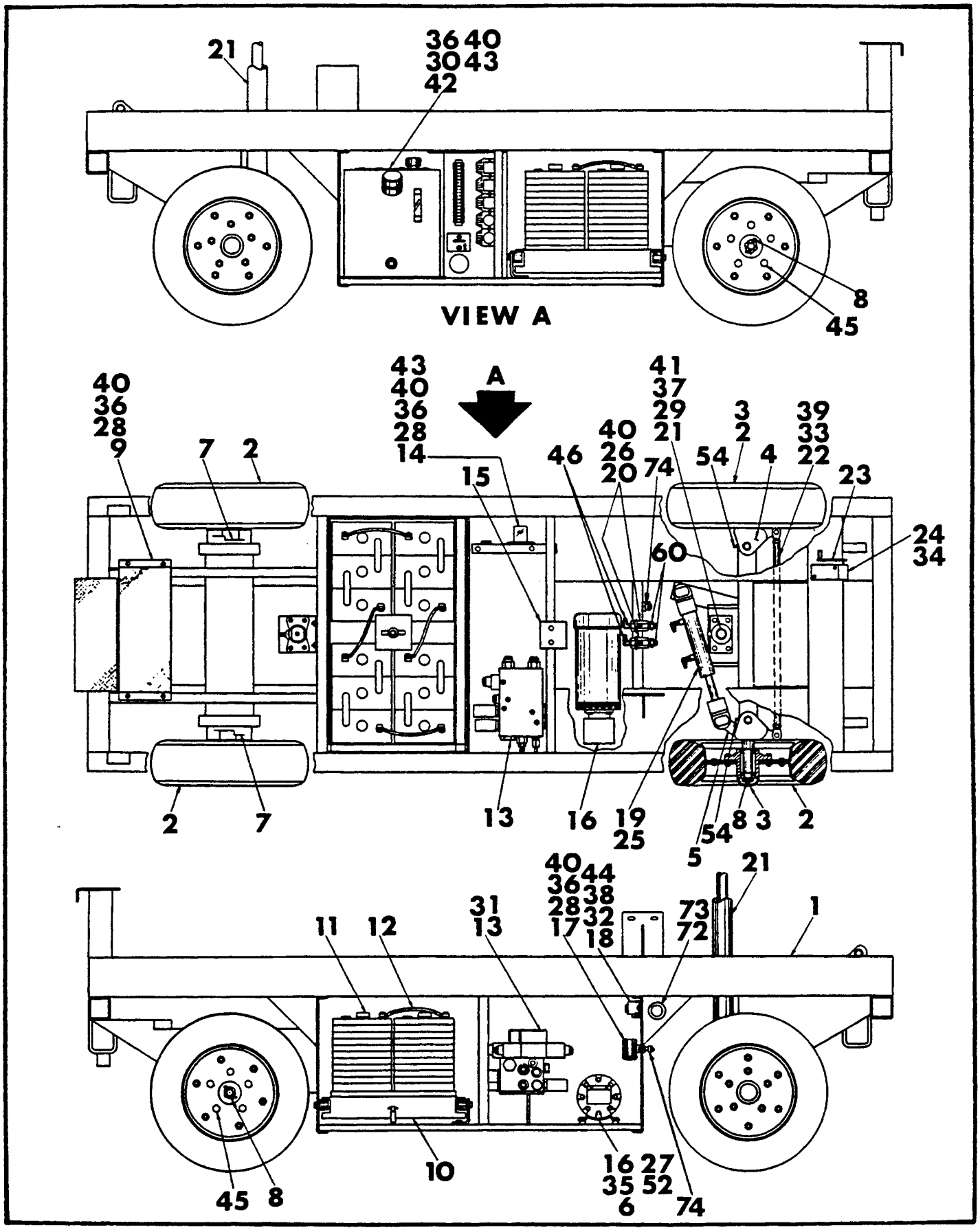


FIGURE 7J-FRAME ASSEMBLY (APRIL 1982) (S19E)

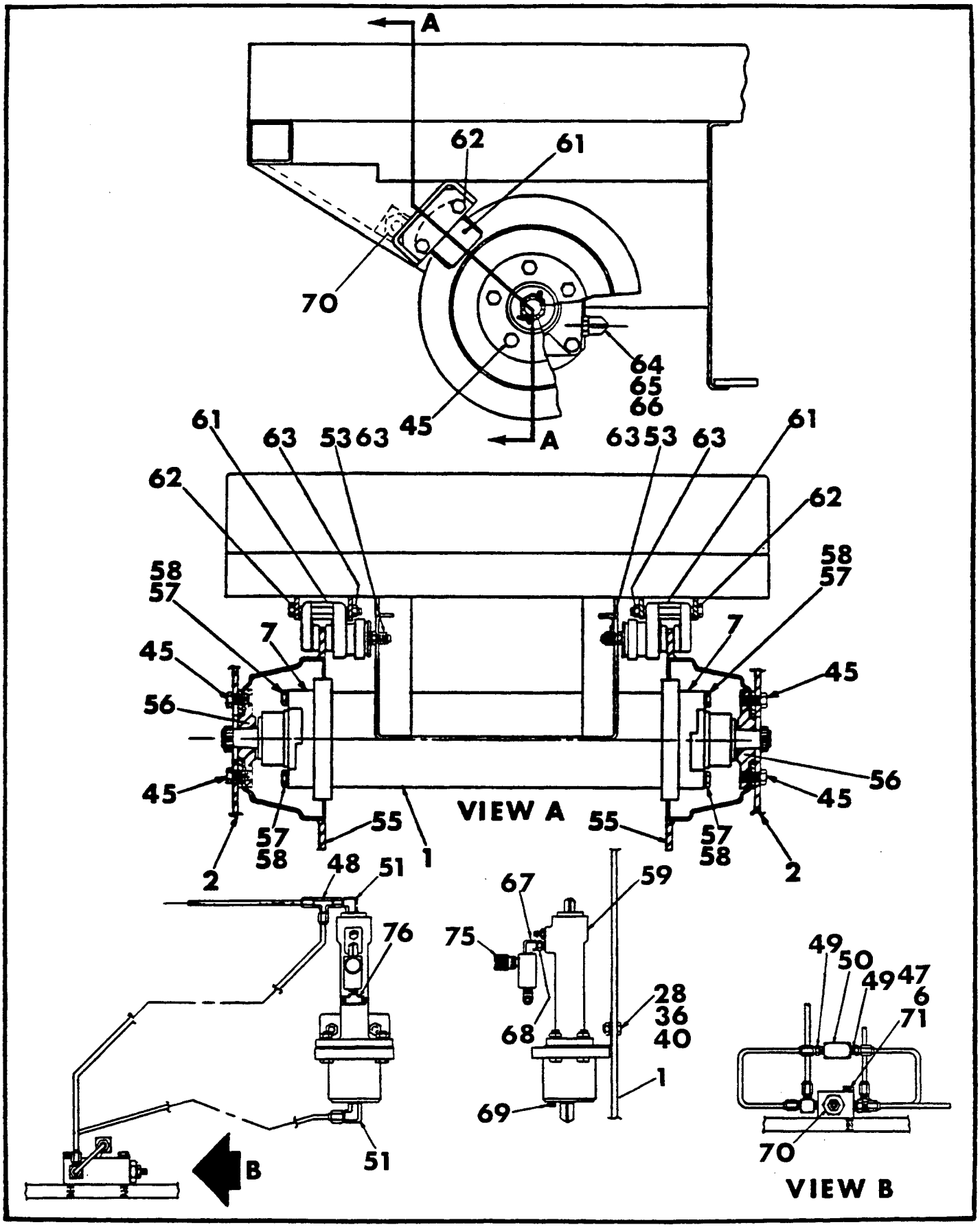


FIGURE 7J-FRAME ASSEMBLY (APRIL 1982) (S19E)

ITEM	PART NUMBER	DESCRIPTION	QTY
7J-	30833	FRAME ASSEMBLY	1
	30779	FRAME ASSEMBLY (JAN 1982) (BEFORE DISC BRAKES)	1
-1	30839	FRAME WELDMENT	1
-2	30787	TIRE & WHEEL ASSEMBLY (SEE FIG. 16B)	4
-3	134	FRONT HUB ASSEMBLY	2
-4	6305-1	STEERING YOKE ASSEMBLY (R.H.) (SEE FIG. 5)	1
-5	6305-2	STEERING YOKE ASSEMBLY (L.H.) (SEE FIG. 5)	1
-6	63302	LOCKWASHER-5/16	10
-7	3040	DRIVE MOTOR	2
-8	64315	COTTER PIN-1/8 DIA. X 2 1/4	4
-9	63	BATTERY CHARGER	1
-10	7070	BATTERY TRAY ASSEMBLY (SEE FIG. 7D)	1
-11	4007	BATTERY	4
-12	30780	BATTERY CABLE KIT	1
-13	30776	MANIFOLD ASSEMBLY (SEE FIG. 8E)	1
-14	30402	PANEL ASSEMBLY (SEE FIG. 13)	1
-15	30387	TILT SWITCH ASSEMBLY (SEE FIG. 15)	1
-16	3015	PUMP MOTOR	1
-17	4082	SOLENOID	1
-18	2297	PRESSURE SWITCH	1
-19	30844	STEERING CYLINDER ASSEMBLY (SEE FIG.2)	1
-20	30884	STEERING VALVE	3
-21	30843	KICK CYLINDER ASSEMBLY (SEE FIG. 4)	1
-22	6322	TIE ROD ASSEMBLY	1
-23	70032	LIMIT SWITCH ARM	1
-24	70107	LIMIT SWITCH	1
-25	64309	COTTER PIN-3/16 DIA. X 1 1/2	2
-26	65218	"U" BOLT	2
-27	60702	HEX NUT-5/16-18UNC	8
-28	60312	HEX HEAD CAPSCREW-1/4-20UNC X 1 (GR.5)	12
-29	60118	HEX HEAD CAPSCREW-3/8-16UNC X 1 1/4	4

ITEM	PART NUMBER	DESCRIPTION	QTY
-30	60112	HEX HEAD CAPSCREW-1/4-20UNC X 1 1/2	4
-31	60372	HEX HEAD CAPSCREW-3/8-16UNC X 7/8	3
-32	62607	ROUND HEAD SCREW-NO. 10-32UNF X 3/4	2
-33	60370	HEX HEAD CAPSCREW-1/2-13UNC X 2	2
-34	62708	ROUND HEAD SCREW-NO. 10-32UNF X 1 3/4	2
-35	882	SHOCK MOUNT	4
-36	60701	HEX NUT-1/4-20UNC	16
-37	60703	HEX NUT-3/8-16UNC	4
-38	60802	HEX NUT-NO. 10-32UNF	2
-39	60705	HEX NUT-1/2-13UNC	2
-40	63301	LOCKWASHER-1/4	20
-41	63302	LOCKWASHER-3/8	4
-42	7308	HYDRAULIC TANK ASSEMBLY (SEE FIG. 7C)	1
-43	63401	FLAT WASHER-1/4	8
-44	63313	LOCKWASHER-NO. 10	2
-45	34044	CONE BOLT	10
-46	2448	90° MALE ELBOW	2
-47	63402	FLAT WASHER-5/16	2
-48	51800	SWIVEL NUT RUN TEE	1
-49	2414	MALE CONNECTOR	2
-50	30893	CHECK VALVE	1
-51	2434	MALE ELBOW	2
-52	60380	HEX HEAD CAPSCREW-5/16-18UNC X 1 1/4 (GR. 5)	4
-53	2581	STRAIGHT THREAD CONNECTOR	2
-54	64206	ROLL PIN-1/4 DIA. X 2 1/4	2
-55	30830	DRUM & DISC WELDMENT	2
-56	6110-1	DRIVE HUB (31158 without caliper brake)	2
-57	63305	LOCKWASHER-1/2	8
-58	60512	CAPSCREW-1/2-13UNC X 2 1/2 (GR. 8)	8
-59	30829	DISC BRAKE INTENSIFIER ASSEMBLY (SEE FIG. 17A)	1
-60	2414	MALE CONNECTOR	2
-61	30822	CALIPER DISC BRAKE (SEE FIG. 17)	2

FIGURE 7J-FRAME ASSEMBLY (APRIL 1982) (S19E)

ITEM	PART NUMBER	DESCRIPTION	QTY
-62	60385	HEX HEAD CAPSCREW-1/2-13UNC X 4 (GR.5)	4
-63	61305	SELF LOCKING NUT-1/2-13UNC	4
-64	16511	STRAIGHT THREAD ELBOW	4
-65	2501	NUT	4
-66	2578	TUBE END REDUCER	4
-67	52308	STREET ELBOW	1
-68	51005	MALE CONNECTOR	1
-69	53910	PLUG	1
-70	30745	PRESSURE REDUCING VALVE ASSEMBLY (SEE FIG. 17B)	1
-71	60330	HEX HEAD CAPSCREW-5/16-18UNC X 2 3/4 (GR. 5)	1
-72	4018	SWITCH	1
-73	5300	EMERGENCY ON-OFF KNOB	1
-74	53400	BULKHEAD UNION	1
-75	30884	FLOW CONTROL VALVE	1
-76	2492	MALE BRANCH TEE	1

FIGURE 7K-FRAME ASSEMBLY (APRIL 1982) (S19EX)

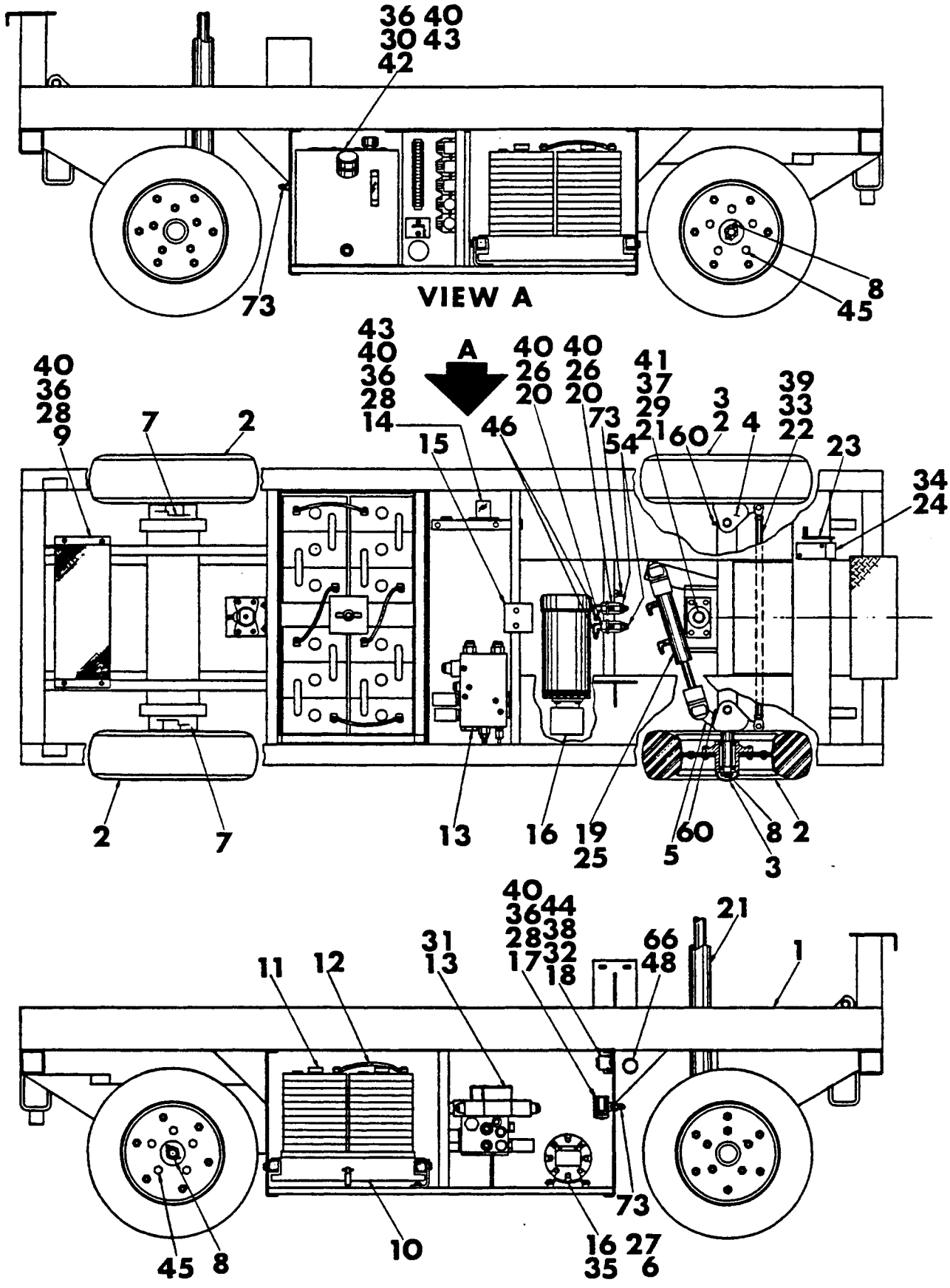


FIGURE 7K-FRAME ASSEMBLY (APRIL 1982) (S19EX)

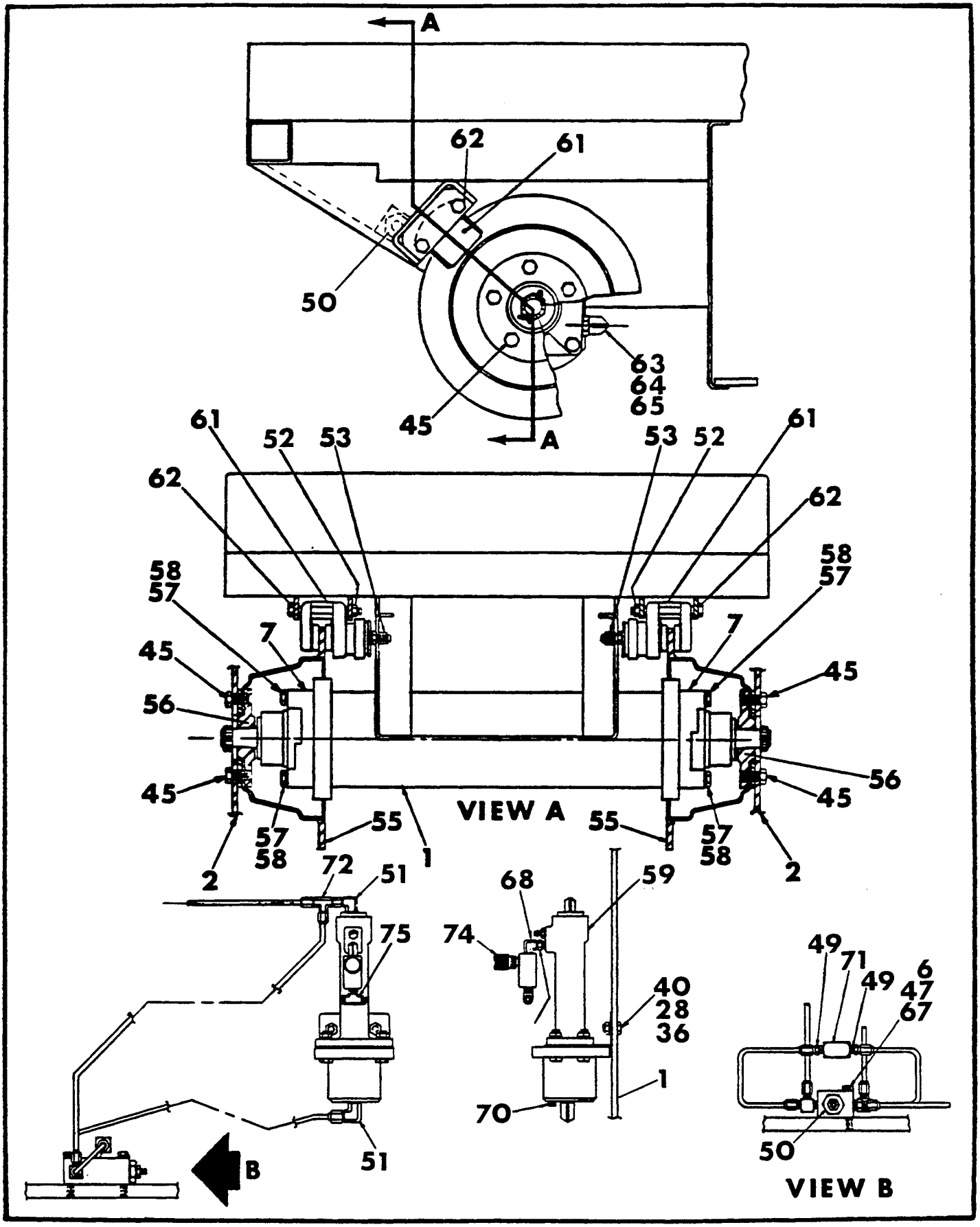


FIGURE 7K-FRAME ASSEMBLY (APRIL 1982) (S19EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
7K-	30834	FRAME ASSEMBLY	1
	30779	FRAME ASSEMBLY (JAN 1982) (BEFORE DISC BRAKES)	1
-1	30839	FRAME WELDMENT	1
-2	30787	TIRE & WHEEL ASSEMBLY (SEE FIG. 16B)	4
-3	134	FRONT HUB ASSEMBLY	2
-4	6305-1	STEERING YOKE ASSEMBLY (R.H.) (SEE FIG. 5)	1
-5	6305-2	STEERING YOKE ASSEMBLY (L.H.) (SEE FIG. 5)	1
-6	63302	LOCKWASHER	10
-7	3040	DRIVE MOTOR	2
-8	64315	COTTER PIN - 1/8 DIA. X 2 1/4	4
-9	63	BATTERY CHARGER	1
-10	7070	BATTERY TRAY ASSEMBLY (SEE FIG. 7D)	1
-11	4007	BATTERY	4
-12	30780	BATTERY CABLE KIT	1
-13	30776	MANIFOLD ASSEMBLY (SEE FIG. 18E)	1
-14	30768	PANEL ASSEMBLY (SEE FIG. 13)	1
-15	30387	TILT SWITCH ASSEMBLY (SEE FIG. 15)	1
-16	3015	PUMP MOTOR	1
-17	4082	SOLENOID	1
-18	2297	PRESSURE SWITCH	1
-19	30844	STEERING CYLINDER ASSEMBLY (SEE FIG. 2)	1
-20	30884	STEERING VALVE	2
-21	30843	KICK CYLINDER ASSEMBLY (SEE FIG. 4)	1
-22	6322	TIE ROD ASSEMBLY	1
-23	70032	LIMIT SWITCH ARM	1
-24	70107	LIMIT SWITCH	1
-25	64309	COTTER PIN - 3/16 DIA. X 1 1/2	2
-26	65218	"U"-BOLT	2
-27	60702	HEX NUT-5/16-18UNC	8
-28	60312	HEX HEAD CAPSCREW-1/4-20UNC X 1	12
-29	60118	HEX HEAD CAPSCREW-3/8-16UNC X 1 1/4	4

ITEM	PART NUMBER	DESCRIPTION	QTY
-30	60112	HEX HEAD CAPSCREW-1/4-20UNC X 1 1/2	4
-31	60372	HEX HEAD CAPSCREW-3/8-16UNC X 7/8	3
-32	62607	ROUND HEAD SCREW-NO. 10-32UNF X 3/4	2
-33	60370	HEX HEAD CAPSCREW-1/2-13UNC X 2	2
-34	62708	ROUND HEAD SCREW-NO. 10-32UNF	2
-35	882	SHOCK MOUNT	4
-36	60701	HEX NUT-1/4-20UNC	16
-37	60703	HEX NUT-3/8-16UNC	4
-38	60802	HEX NUT-NO. 10-32UNF	2
-39	60705	HEX NUT-1/2-13UNC	2
-40	63301	LOCKWASHER-1/4	20
-41	63302	LOCKWASHER-3/8	4
-42	7308	HYDRAULIC TANK ASSEMBLY (SEE FIG. 7)	1
-43	63401	FLAT WASHER-1/4	8
-44	63313	LOCKWASHER-NO. 10	2
-45	34044	CONE BOLT	10
-46	2448	MALE ELBOW	2
-47	63402	FLAT WASHER-5/16	2
-48	5300	EMERGENCY ON-OFF KNOB	1
-49	2414	MALE CONNECTOR	2
-50	30745	PRESSURE REDUCING VALVE ASSEMBLY (SEE FIG. 17B)	1
-51	2434	MALE ELBOW	2
-52	61305	SELF LOCKING NUT-1/2-13UNC	4
-53	2581	STRAIGHT THREAD CONNECTOR	2
-54	2414	MALE CONNECTOR	2
-55	30830	DRUM & DISC WELDMENT	2
-56	6110-1	DRIVE HUB (31158 without caliper brake)	2
-57	63305	LOCKWASHER-1/2	8
-58	60512	CAPSCREW-1/2-13UNC X 2 1/2 (GR. 8)	8
-59	30829	DISC BRAKE INTENSIFIER ASSEMBLY (SEE FIG. 17A)	1
-60	64206	ROLL PIN-1/4 DIA. X 2 1/4	2
-61	30822	CALIPER DISC BRAKE (SEE FIG. 17)	2

ITEM	PART NUMBER	DESCRIPTION	QTY
-62	60385	HEX HEAD CAPSCREW-1/2-13UNC X 4 (GR.5)	4
-63	16511	STRAIGHT THREAD ELBOW	4
-64	2578	TUBE END REDUCER	4
-65	2501	NUT	4
-66	4018	SWITCH	1
-67	60330	HEX HEAD CAPSCREW-5/16-18UNC X 2 3/4 (GR. 5)	2
-68	52308	STREET ELBOW	1
-69	51005	MALE CONNECTOR	1
-70	53910	PLUG	1
-71	30893	CHECK VALVE	1
-72	51800	SWIVEL NUT RUN TEE	1
-73	53400	BULKHEAD UNION	1
-74	30884	FLOW CONTROL VALVE	1
-75	2492	MALE BRANCH TEE	1

FIGURE 7L - FRAME ASSEMBLY (S15ETD)

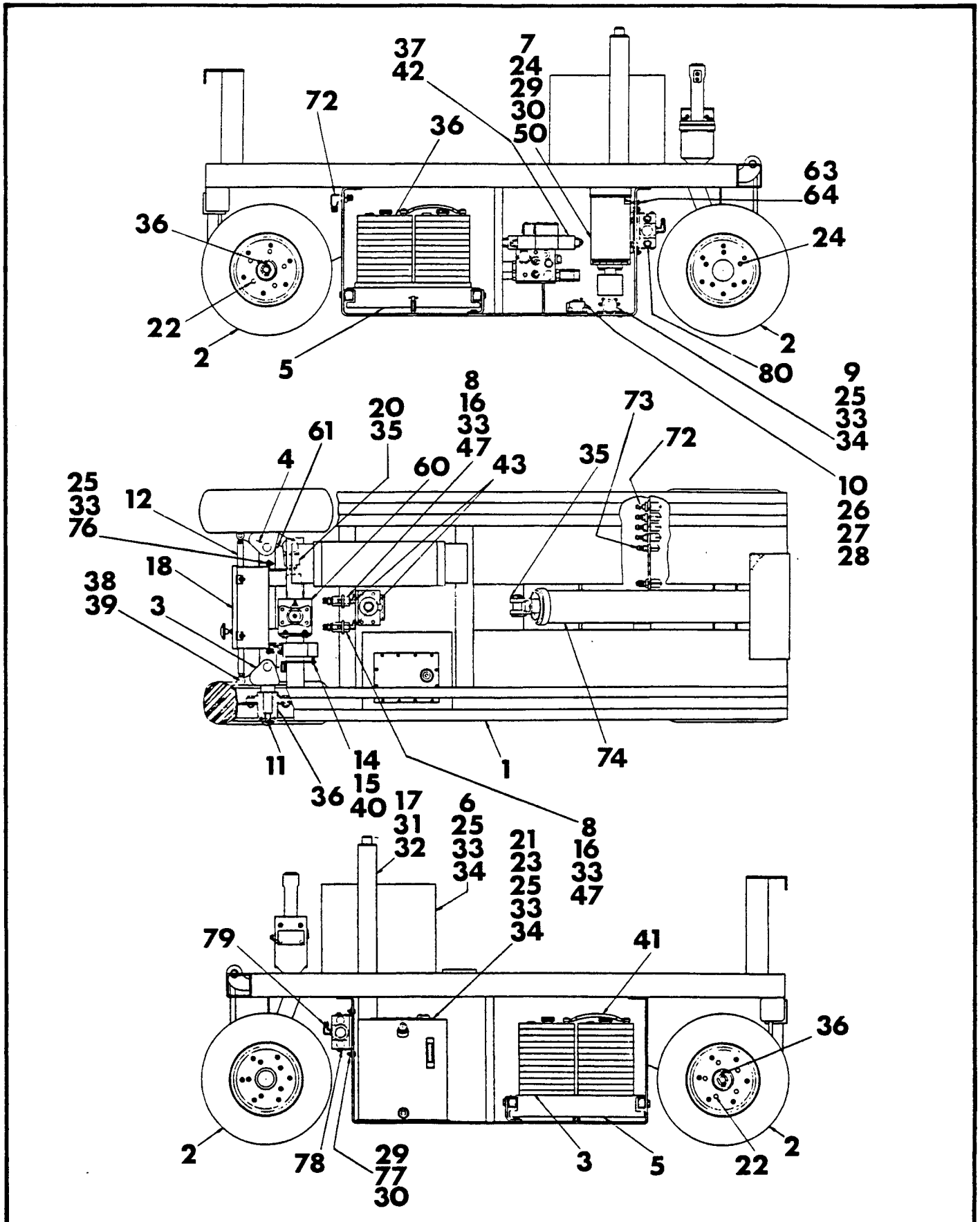


FIGURE 7L - FRAME ASSEMBLY (S15ETD)

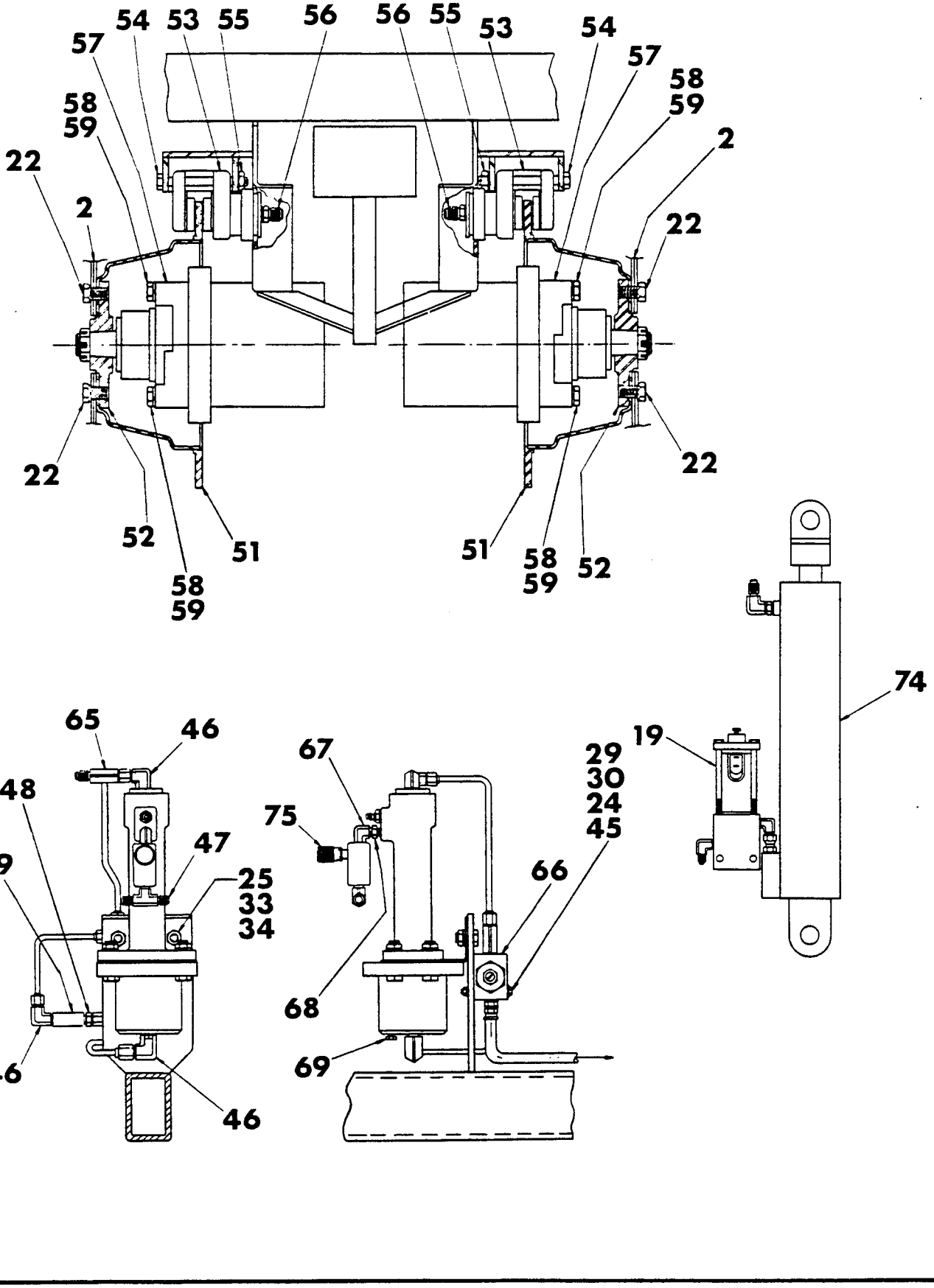


FIGURE 7L - FRAME ASSEMBLY (S15ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
7L-	30928	FRAME ASSEMBLY	1
-1	31031	FRAME WELDMENT	1
-2	30786	TIRE & WHEEL ASSEMBLY (SEE FIG. 16)	4
-3	31084	FRONT YOKE ASSEMBLY R.H. (SEE FIG. 5)	1
-4	31083	FRONT YOKE ASSEMBLY L.H. (SEE FIG. 5)	1
-5	7070	BATTERY TRAY ASSEMBLY (SEE FIG. 7D)	1
-6	63	BATTERY CHARGER	1
-7	3015	PUMP MOTOR	1
-8	20370	STEERING VALVE	2
-9	4082	SOLENOID	1
-10	2297	PRESSURE SWITCH	1
-11	134	STEERING HUB ASSEMBLY	2
-12	31102	TIE ROD ASSEMBLY	1
-13	4007	BATTERY	4
-14	70107	LIMIT SWITCH	1
-15	70032	SWITCH LEVER	1
-16	65218	U-BOLT	2
-17	30843	KICK CYLINDER ASSEMBLY (SEE FIG. 4)	1
-18	30935	GROUND CONTROL BOX ASSEMBLY (SEE FIG. 10B)	1
-19	31077 (4116)	ELECTRIC VALVE ASSEMBLY (4116 W/FITTING)	1
-20	30844	STEERING CYLINDER ASSEMBLY (SEE FIG. 2)	1
-21	7308	HYDRAULIC TANK ASSEMBLY (SEE FIG. 7C)	1
-22	34044	CONE BOLT - 1/2-20 UNF X 1 3/8	10
-23	63401	FLAT WASHER - 1/4	8
-24	63402	FLAT WASHER - 5/16	6
-25	60701	HEX NUT - 1/4-20 UNC	20
-26	61503	HEX NUT - NO. 10-32 UNF	2
-27	63313	SPLIT LOCK WASHER - NO. 10	2
-28	62607	ROUND HEAD CAP SCREW - NO. 10-32 UNF X 3/4	2
-29	60702	HEX NUT - 5/16-18 UNC	8
-30	63302	SPLIT LOCK WASHER - 5/16	8

ITEM	PART NUMBER	DESCRIPTION	QTY
-31	60331	HEX HEAD CAP SCREW - 3/8-16 UNC X 1 1/4 (GR. 5)	4
-32	63303	SPLIT LOCK WASHER - 3/8	4
-33	63301	SPLIT LOCK WASHER - 1/4	24
-34	60312	HEX HEAD CAP SCREW - 1/4-20 UNC X 1 (GR. 5)	16
-35	64309	COTTER PIN - 3/16 DIA. X 1 1/2	4
-36	64315	COTTER PIN - 1/8 DIA. X 2 1/4	4
-37	30776	MANIFOLD ASSEMBLY (SEE FIG. 8E)	1
-38	60705	HEX NUT - 1/2-13 UNC	2
-39	60370	HEX HEAD CAP SCREW - 1/2-13 UNC X 2	2
-40	62708	ROUND HEAD CAP SCREW - NO. 10-32 UNF X 1 3/4	2
-41	30780	BATTERY CABLE KIT	1
-42	60372	HEX HEAD CAP SCREW - 3/8-16 UNC X 7/8	3
-43	2448	MALE ELBOW	2
-44	2411	CAP	1
-45	60335	HEX HEAD CAP SCREW - 5/16-18 UNC X 2 1/4	2
-46	2434	MALE ELBOW	3
-47	2492	MALE BRANCH TEE	1
-48	2414	MALE CONNECTOR	1
-49	30893	CHECK VALVE	1
-50	60380	HEX HEAD CAP SCREW - 5/16-18 UNC X 1 1/4 (GR. 5)	4
-51	30830	DRUM & DISC WELDMENT	2
-52	31158	DRIVE HUB	2
-53	30822	CALIPER DISC BRAKE (SEE FIG. 17)	2
-54	90564	HEX HEAD CAP SCREW - 1/2-13 UNC X 4 1/2 (GR. 5)	4
-55	61305	SELF LOCKING NUT - 1/2-13 UNC (BOMALOCK 36784)	4
-56	2581	STRAIGHT THREAD CONNECTOR	2
-57	3002	HYDRAULIC MOTOR	2
-58	63305	SPLIT LOCK WASHER - 1/2	8
-59	60512	HEX HEAD CAP SCREW - 1/2-13 UNC X 2 1/2 (GR. 8)	8

FIGURE 7L - FRAME ASSEMBLY (S15ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
-60	30829	INTENSIFIER ASSEMBLY (SEE FIG. 17A)	1
-61	64206	ROLL PIN - 1/4 DIA. X 2 1/4	2
-62	16511	STRAIGHT THREAD ELBOW	4
-63	5300	EMERGENCY ON-OFF KNOB	1
-64	4018	SWITCH	1
-65	51800	SWIVEL NUT RUN TEE	1
-66	30745	PRESSURE REDUCING VALVE ASSEMBLY (SEE FIG. 17B)	1
-67	52308	STREET ELBOW	1
-68	51005	MALE CONNECTOR	1
-69	53910	PLUG	1
-70	2578	TUBE END REDUCER	4
-71	2501	B-NUT	4
-72	2461	BULKHEAD UNION ELBOW	5
-73	53401	BULKHEAD UNION ELBOW	1
-74	31078	MAIN LIFT CYLINDER ASSEMBLY (SEE FIG. 3.1)	1
-75	30884	FLOW CONTROL VALVE	1
-76	60309	HEX HEAD CAP SCREW - 1/4-20 UNC	4
-77	60322	HEX HEAD CAP SCREW - 5/16-18 UNC X 3/4	2
-78	31071	SOLENOID VALVE - COIL - P/N 6012440	1
-79	50906	STRAIGHT THREAD ELBOW	2
-80	2474	STRAIGHT THREAD CONNECTOR	2

FIGURE 7M - FRAME ASSEMBLY (19ETD)

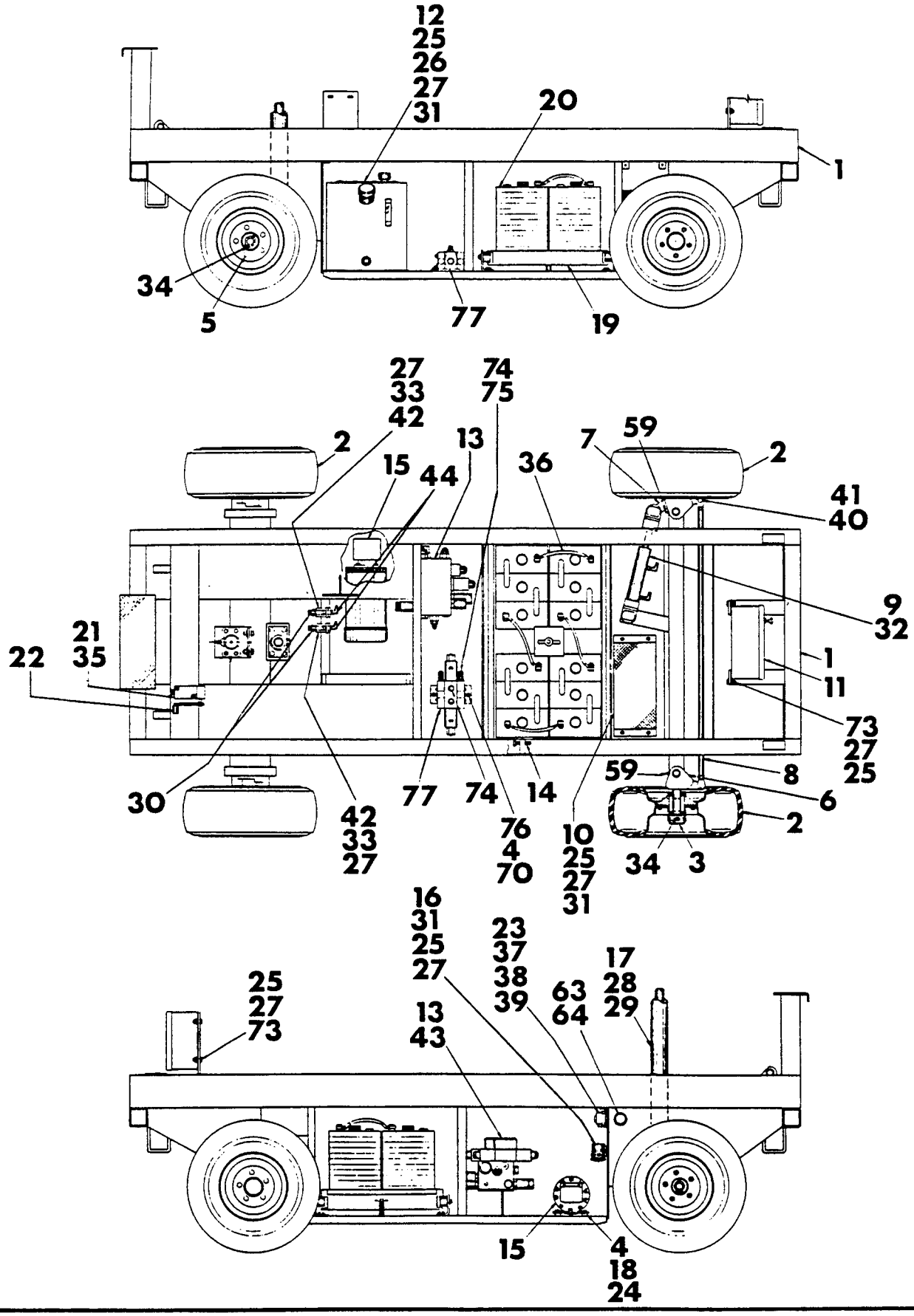


FIGURE 7M - FRAME ASSEMBLY (19ETD)

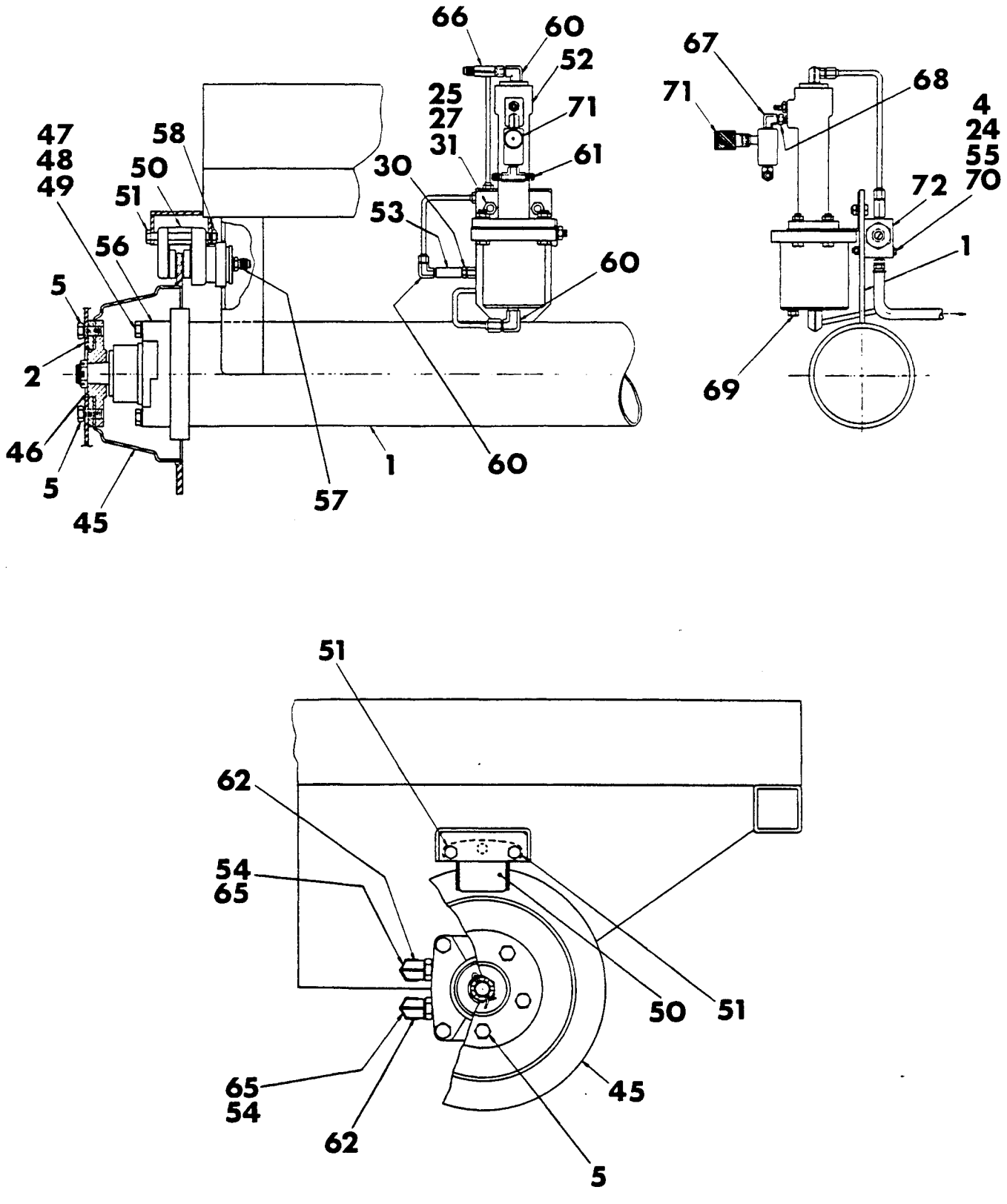


FIGURE 7M - FRAME ASSEMBLY (19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
7M-	30925	FRAME ASSEMBLY	1
-1	31032	FRAME WELDMENT	1
-2	30785	TIRE & WHEEL ASSEMBLY (SEE FIG. 16A)	4
-3	134	STEERING HUB ASSEMBLY	2
-4	60702	HEX NUT - 5/16-18 UNC	12
-5	34044	CONE BOLT - 1/2-20 UNF X 1 3/8	10
-6	31083	FRONT YOKE ASSEMBLY (L.H.) (SEE FIG. 5)	1
-7	31084	FRONT YOKE ASSEMBLY (R.H.) (SEE FIG. 5)	1
-8	31100	TIE ROD ASSEMBLY	1
-9	30844	STEERING CYLINDER ASSEMBLY (SEE FIG. 2)	1
-10	63	BATTERY CHARGER	1
-11	30935	GROUND CONTROL BOX ASSEMBLY (SEE FIG. 10B)	1
-12	7308	HYDRAULIC TANK ASSEMBLY (SEE FIG. 7C)	1
-13	30776	MANIFOLD ASSEMBLY (SEE FIG. 8E)	1
-14	60609	CAP SCREW - 1/2-13 UNC X 2 (BOWMALOK 41028)	1
-15	3015	PUMP MOTOR	1
-16	4082	SOLENOID	1
-17	30843	KICK CYLINDER ASSEMBLY (SEE FIG. 4)	1
-18	882	SHOCK MOUNT	4
-19	7070	BATTERY TRAY ASSEMBLY (SEE FIG. 7D)	1
-20	4007	BATTERY	4
-21	70107	LIMIT SWITCH	1
-22	70032	SWITCH LEVER	1
-23	2297	PRESSURE SWITCH	1
-24	63402	FLAT WASHER - 5/16	10
-25	60701	HEX NUT - 1/4-20 UNC	16
-26	63401	FLAT WASHER - 1/4	4
-27	63301	SPLIT LOCK WASHER - 1/4	16
-28	63303	SPLIT LOCK WASHER - 3/8	4
-29	60331	HEX HEAD CAP SCREW - 3/8-16 UNC X 1 1/4 (GR. 5)	4
-30	2414	MALE CONNECTOR	1

ITEM	PART NUMBER	DESCRIPTION	QTY
-31	60312	HEX HEAD CAP SCREW - 1/4-20 UNC X 1	12
-32	64309	COTTER PIN - 3/16 DIA. X 1 1/2	2
-33	65218	U-BOLT	2
-34	64315	COTTER PIN - 1/8 DIA. X 2 1/4	4
-35	62708	ROUND HEAD CAP SCREW - NO. 10-32 UNC X 1 3/4	2
-36	30780	BATTERY CABLE KIT	1
-37	60802	HEX NUT - NO. 10-32 UNF	2
-38	63313	LOCK WASHER - NO. 10	2
-39	62607	ROUND HEAD SCREW - NO. 10-32 UNC X 3/4	2
-40	60705	HEX NUT - 1/2-13 UNC	2
-41	60370	CAP SCREW - 1/2-13 UNC X 2	2
-42	20370	STEERING VALVE	2
-43	60372	HEX HEAD CAP SCREW - 3/8-16 UNC X 7/8	3
-44	2448	MALE ELBOW	2
-45	30830	DRUM & DISC WELDMENT	2
-46	31158	DRIVE HUB	2
-47	60512	CAP SCREW - 1/2-13 UNC X 2 1/2 (GR. 8)	8
-48	63305	SPLIT LOCK WASHER - 1/2	8
-49	63405	FLAT WASHER - 1/2	8
-50	30822	CALIPER DISC BRAKE (SEE FIG. 17)	2
-51	90564	HEX HEAD CAP SCREW - 1/2-13 UNC X 4 1/2 (GR. 5)	4
-52	30829	INTENSIFIER ASSEMBLY (SEE FIG. 17A)	1
-53	30893	CHECK VALVE	1
-54	2501	B-NUT	4
-55	60335	HEX HEAD CAP SCREW - 5/16-18 UNC X 2 1/4	2
-56	3002	HYDRAULIC MOTOR	2
-57	50801	STRAIGHT THREAD CONNECTOR	2
-58	61305	SELF LOCKING NUT - 1/2-13 UNC (BOWMALOK 36784)	4
-59	64206	ROLL PIN - 1/4 DIA. X 2 1/4	2
-60	2434	MALE ELBOW	3

FIGURE 7M - FRAME ASSEMBLY (19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
-61	2492	MALE BRANCH TEE	1
-62	16511	STRAIGHT THREAD ELBOW	4
-63	5300	EMERGENCY ON-OFF KNOB	1
-64	4018	SWITCH	1
-65	2578	TUBE END REDUCER	4
-66	51800	SWIVEL NUT RUN TEE	1
-67	52308	STREET ELBOW	1
-68	51005	MALE CONNECTOR	1
-69	53910	PLUG	1
-70	63302	SPLIT LOCK WASHER - 5/16	4
-71	30884	FLOW CONTROL VALVE	1
-72	30745	PRESSURE REDUCING VALVE ASSEMBLY (SEE FIG. 17B)	1
-73	60309	HEX HEAD CAP SCREW - 1/4-20 UNC X 3/4	4
-74	2474	STRAIGHT THREAD CONNECTOR	4
-75	2538	SWIVEL NUT ELBOW	2
-76	60322	HEX HEAD CAP SCREW - 5/16-18 UNC X 3/4	2
-77	31071	SOLENOID VALVE	1

FIGURE 7N - FRAME ASSEMBLY (S19ETD)

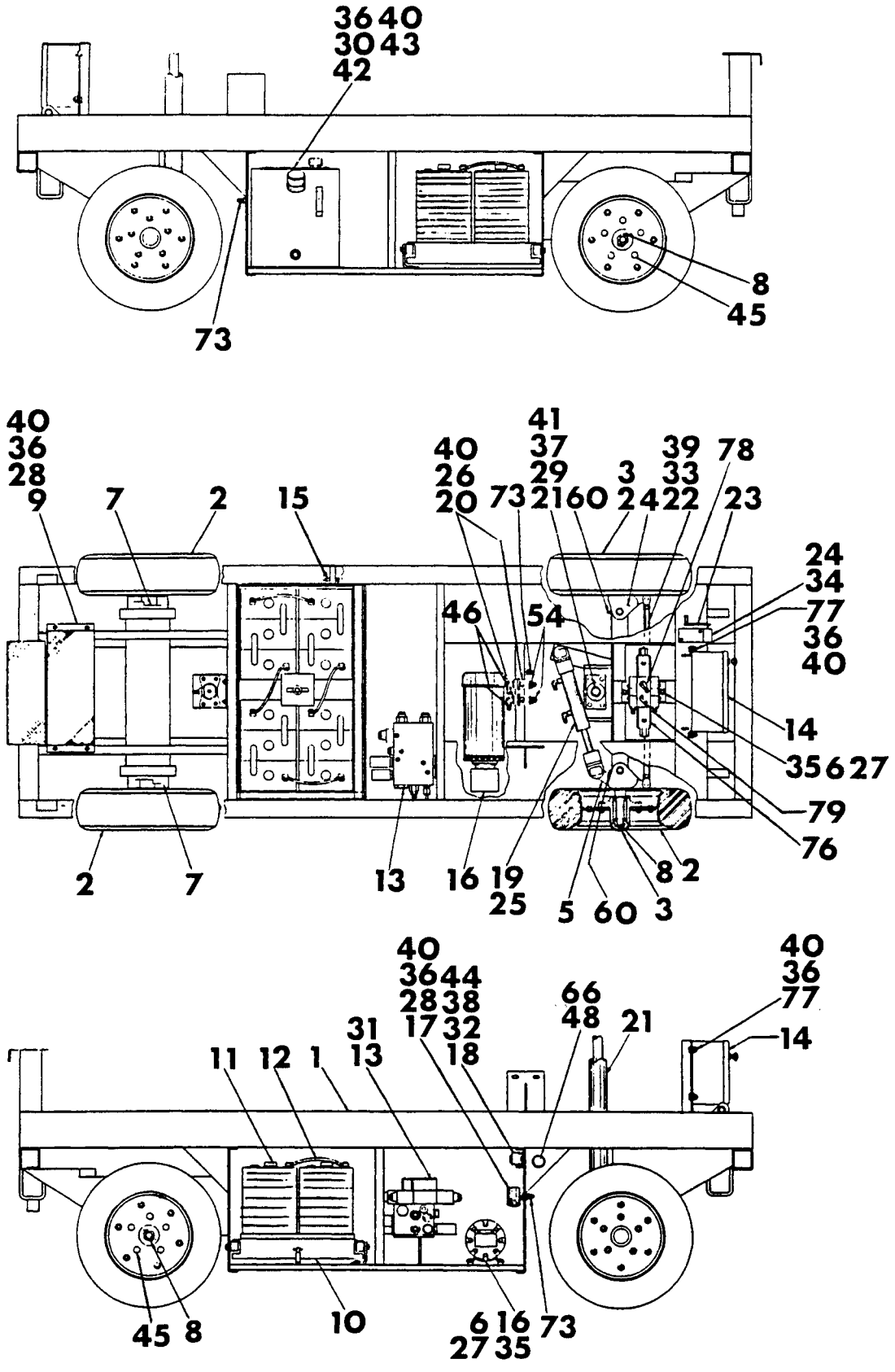
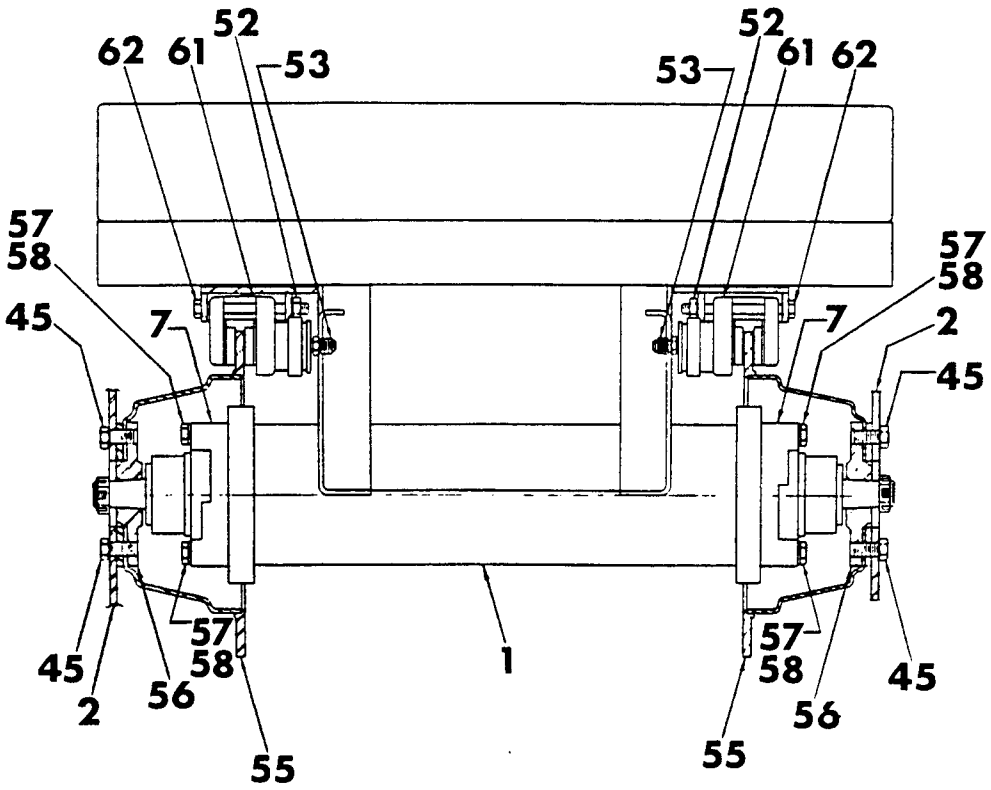


FIGURE 7N - FRAME ASSEMBLY (S19ETD)



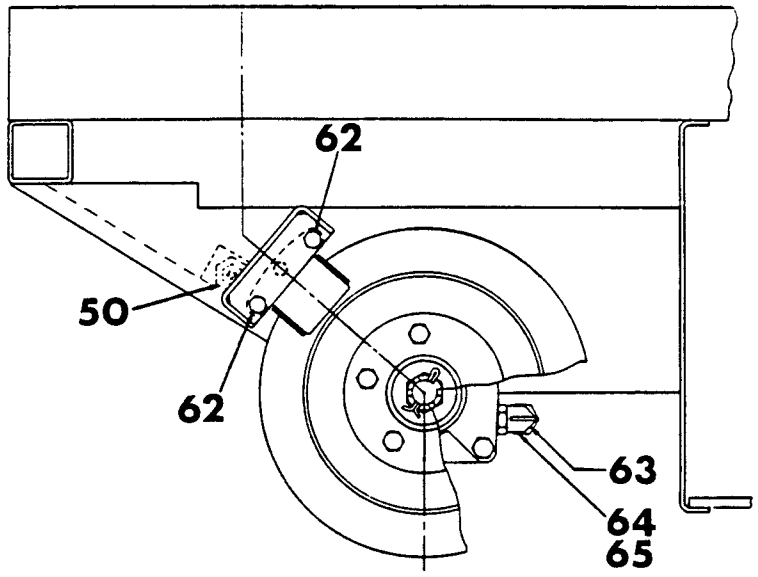
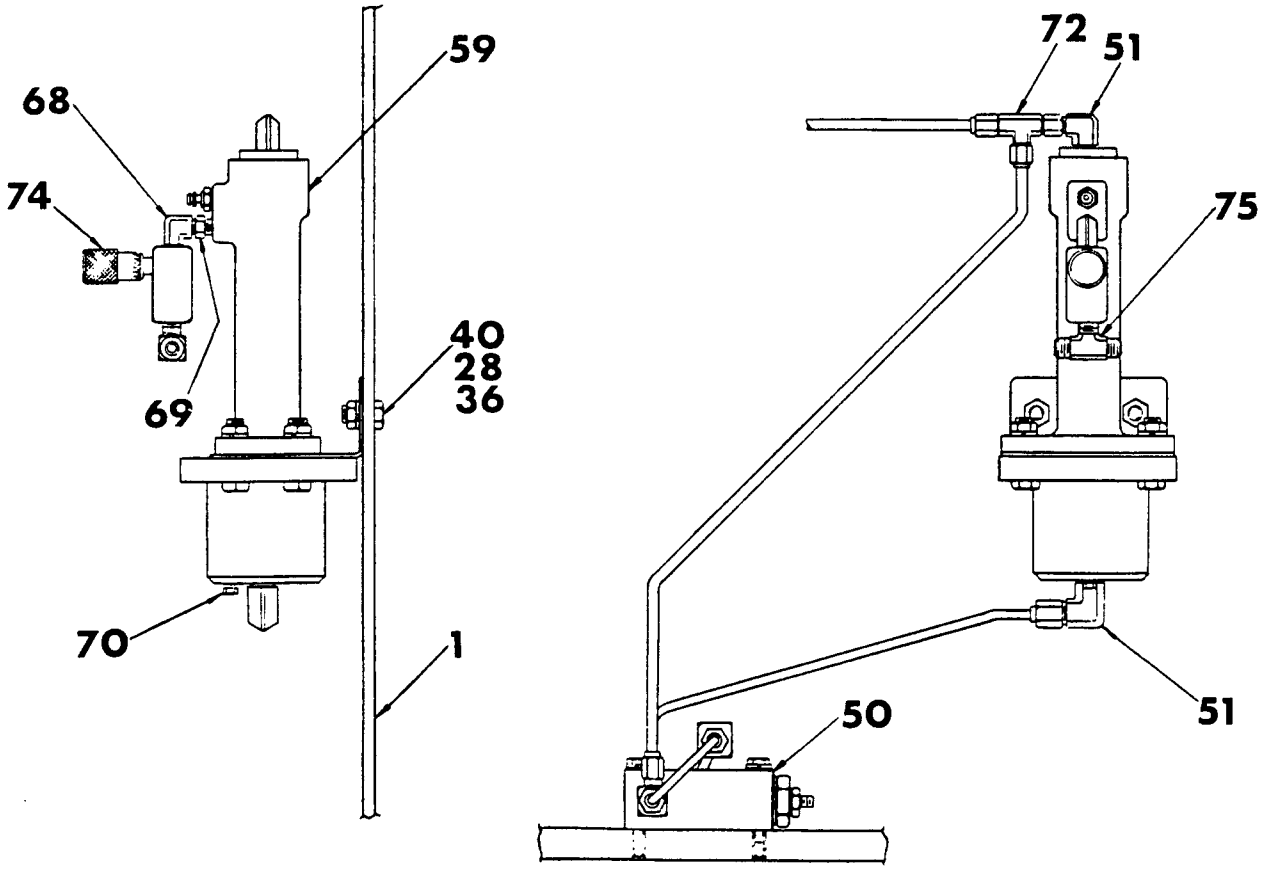
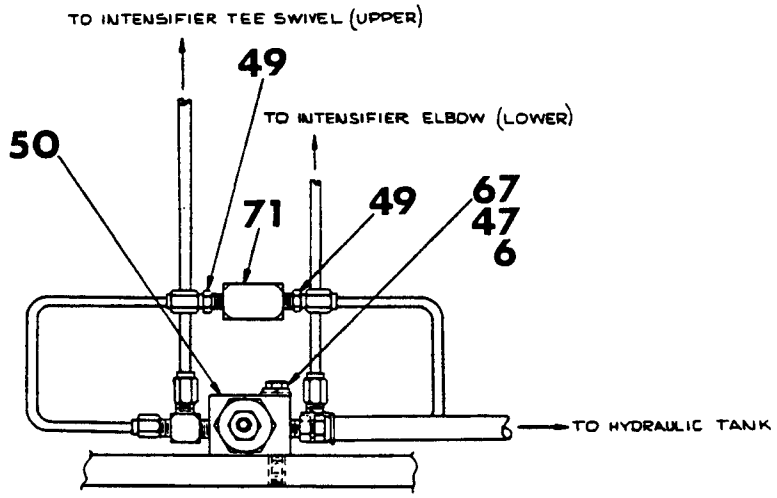


FIGURE 7N - FRAME ASSEMBLY (S19ETD)





DETAIL PRESSURE REDUCING VALVE ASSEMBLY

FIGURE 7N - FRAME ASSEMBLY (S19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
7N-	30926	FRAME ASSEMBLY	1
-1	31025	FRAME WELDMENT	1
-2	30787	TIRE & WHEEL ASSEMBLY (SEE FIG. 16B)	4
-3	134	STEERING HUB ASSEMBLY	2
-4	31084	STEERING YOKE ASSEMBLY (R.H.) (SEE FIG. 5)	1
-5	31083	STEERING YOKE ASSEMBLY (L.H.) (SEE FIG. 5)	1
-6	63302	SPLIT LOCK WASHER - 5/16	14
-7	3040	DRIVE MOTOR	2
-8	64315	COTTER PIN - 1/8 DIA. X 2 1/4	4
-9	63	BATTERY CHARGER	1
-10	7070	BATTERY TRAY ASSEMBLY (SEE FIG. 7D)	1
-11	4007	BATTERY	4
-12	30780	BATTERY CABLE KIT	1
-13	30776	MANIFOLD ASSEMBLY (SEE FIG. 8E)	1
-14	30935	GROUND CONTROL BOX ASSEMBLY (SEE FIG. 10B)	1
-15	60609	CAP SCREW - 1/2-13 UNC X 2 (BOWMALOK 41028)	1
-16	3015	PUMP MOTOR	1
-17	4082	SOLENOID	1
-18	2297	PRESSURE SWITCH	1
-19	30844	STEERING CYLINDER ASSEMBLY (SEE FIG. 2)	1
-20	20370	STEERING VALVE	2
-21	30843	KICK CYLINDER ASSEMBLY (SEE FIG. 4)	1
-22	31103	TIE ROD ASSEMBLY	1
-23	70032	LIMIT SWITCH ARM	1
-24	70107	LIMIT SWITCH	1
-25	64309	COTTER PIN - 3/16 DIA. X 1 1/2	2
-26	65218	U-BOLT	2
-27	60702	HEX NUT - 5/16-18 UNC	12
-28	60312	HEX HEAD CAP SCREW - 1/4-20 UNC X 1 (GR. 5)	8
-29	60331	HEX HEAD CAP SCREW - 3/8-16 UNC X 1 1/4 (GR. 5)	4

FIGURE 7N - FRAME ASSEMBLY (S19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
-30	60315	HEX HEAD CAP SCREW - 1/4-20 UNC X 1 1/2 (GR. 5)	4
-31	60372	HEX HEAD CAP SCREW - 3/8-16 UNC X 7/8	3
-32	62607	ROUND HEAD SCREW - NO. 10-32 UNF X 3/4	2
-33	60370	HEX HEAD CAP SCREW - 1/2-13 UNC X 2	2
-34	62708	ROUND HEAD SCREW - NO. 10-32 UNF X1 3/4	2
-35	882	SHOCK MOUNT	6
-36	60701	HEX NUT - 1/4-20 UNC	16
-37	60703	HEX NUT - 3/8-16 UNC	4
-38	60802	HEX NUT - NO. 10-32 UNF	2
-39	60705	HEX NUT - 1/2-13 UNC	2
-40	63301	SPLIT LOCK WASHER - 1/4	20
-41	63303	SPLIT LOCK WASHER - 3/8	4
-42	7308	HYDRAULIC TANK ASSEMBLY (SEE FIG. 7C)	1
-43	63401	FLAT WASHER - 1/4	4
-44	63313	SPLIT LOCK WASHER - NO. 10	2
-45	34044	CONE BOLT	10
-46	2448	MALE ELBOW	2
-47	63402	FLAT WASHER - 5/16	2
-48	5300	EMERGENCY ON/OFF KNOB	1
-49	2414	MALE CONNECTOR	2
-50	30745	PRESSURE REDUCING VALVE ASSEMBLY (SEE FIG. 17B)	1
-51	2434	MALE ELBOW	2
-52	61305	SELF LOCKING NUT - 1/2-13 UNC (BOWMALOK 36784)	4
-53	50801	STRAIGHT THREAD CONNECTOR	2
-54	2415	MALE CONNECTOR	2
-55	30830	DRUM & DISC WELDMENT	2
-56	31158	DRIVE HUB	2
-57	63305	SPLIT LOCK WASHER - 1/2	8
-58	60512	CAP SCREW - 1/2-13 UNC X 2 1/2	8
-59	30829	INTENSIFIER ASSEMBLY (SEE FIG. 17A)	1
-60	64206	ROLL PIN - 1/4 DIA. X 2 1/4	2

FIGURE 7N - FRAME ASSEMBLY (S19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
-61	30822	CALIPER DISC BRAKE (SEE FIG. 17)	2
-62	90564	HEX HEAD CAP SCREW - 1/2-13 UNC X 4 1/2 (GR. 5)	4
-63	16511	STRAIGHT THREAD ELBOW	4
-64	2578	TUBE END REDUCER	4
-65	2501	B-NUT	4
-66	4018	SWITCH	1
-67	60330	HEX HEAD CAP SCREW - 5/16-18 UNC X 2 3/4 (GR. 5)	2
-68	52308	STREET ELBOW	1
-69	51005	MALE CONNECTOR	1
-70	53910	PLUG	1
-71	30893	CHECK VALVE	1
-72	51800	SWIVEL NUT RUN TEE	1
-73	2486	BULKHEAD UNION	1
-74	30884	FLOW CONTROL VALVE	1
-75	2492	MALE BRANCH TEE	1
-76	31071	SOLENOID VALVE - coil P/N 6012440	1
-77	60309	HEX HEAD CAP SCREW - 1/4-20 UNC X 3/4	4
-78	50906	STRAIGHT THREAD ELBOW	2
-79	2474	STRAIGHT THREAD CONNECTOR	2

FIGURE 8 - HYDRAULIC MANIFOLD ASSEMBLY (BEFORE MAR. 1980) (ALL MODELS)

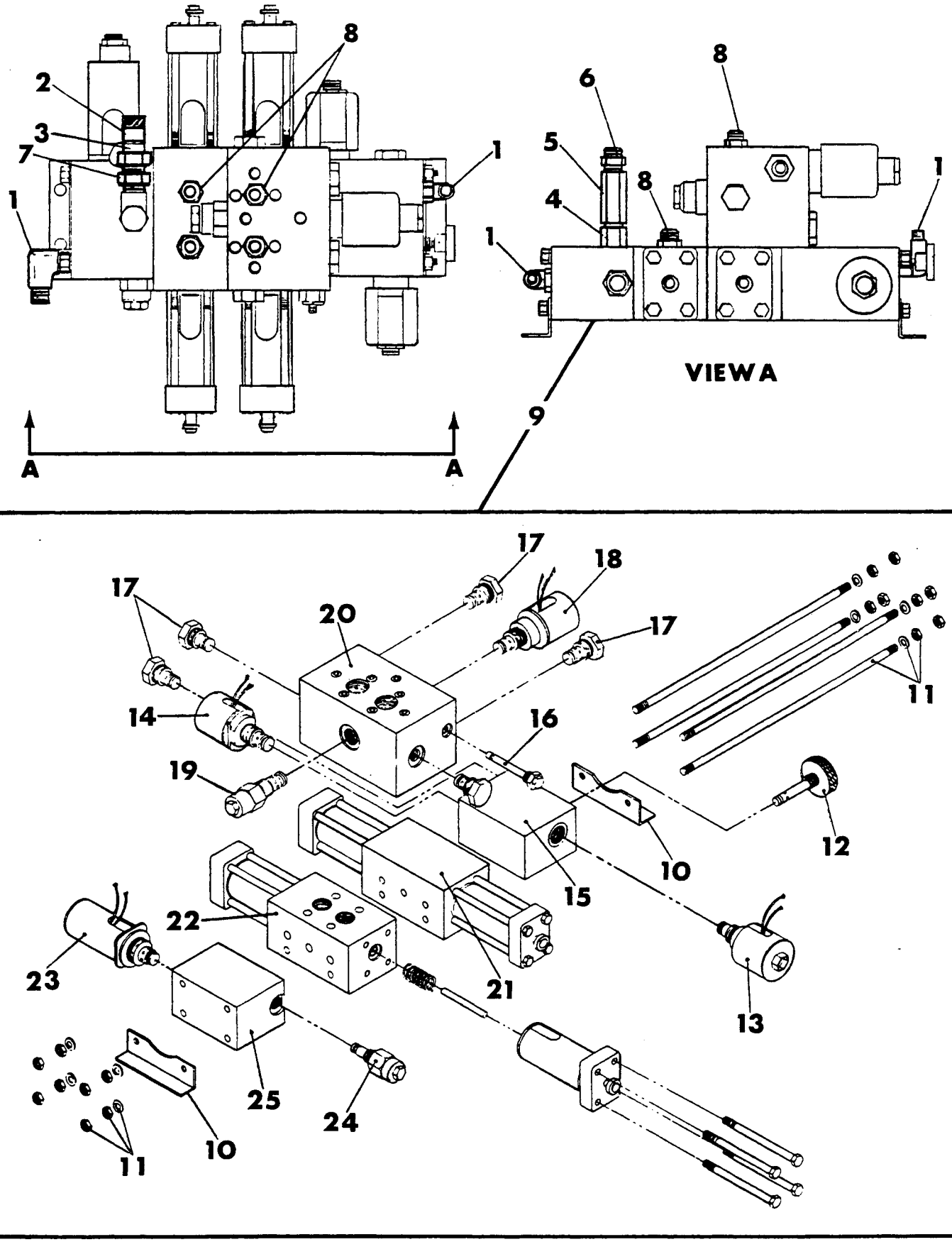
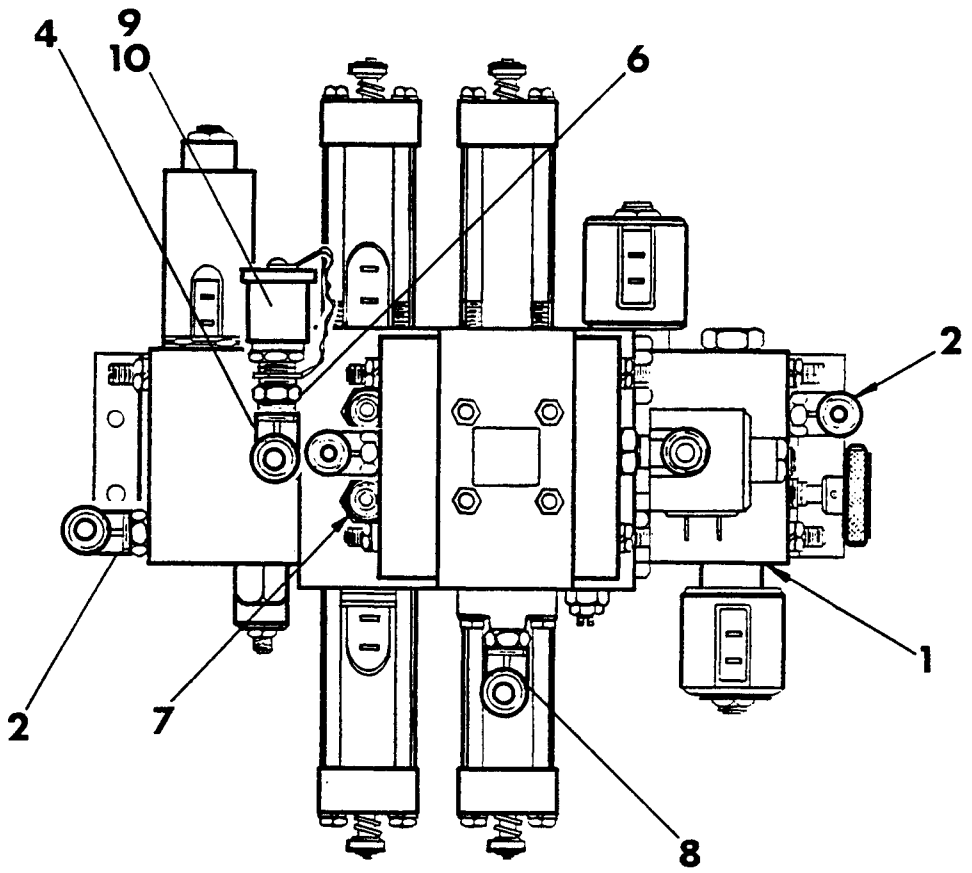


FIGURE 8 - HYDRAULIC MANIFOLD ASSEMBLY
(BEFORE MAR. 1980) (ALL MODELS)

ITEM	PART NUMBER	DESCRIPTION	QTY
8-	3072	Hydraulic Manifold Assembly	1
-1	2446	90° Elbow	2
-2	845	Quick Disconnect	1
-3	844	Male Quick Disconnect	1
-4	2498	Adapter	1
-5	2420	Street Tee	1
-6	2476	Adapter	1
-7	2475	Pipe Nipple	1
-8	2474	Adapter	4
-9	*6355	Hydraulic Valve Package *(Order by Basic Model 3019)	1
-10	3019-6	Steel Bracket	2
-11	3054	Tie Rods - with Washers & Nuts	4
-12	3053	Emergency Lowering Valve	1
-13	3051	Lift Valve	1
-14	3051	Lowering Valve	1
-15	3019-5	Lift Valve Assembly	1
-16	3050	Control Orifice	1
-17	3048	Check Valve	5
-18	3047	Low Speed Valve	1
-19	3046	Cushion Relief Valve	1
-20	3019-4	Low Speed - Cushion Valve Assembly	1
-21	3019-3	Drive Valve Assembly	1
-22	3019-2	Steering Valve Assembly	1
-23	3045	Dump Valve	1
-24	3044	Relief Valve	1
-25	3019-1	Dump - Relief Valve Assembly	1

FIGURE 8A - HYDRAULIC MANIFOLD ASSEMBLY
(AFTER MARCH 1980) (15E) (S15E) (S15EX)



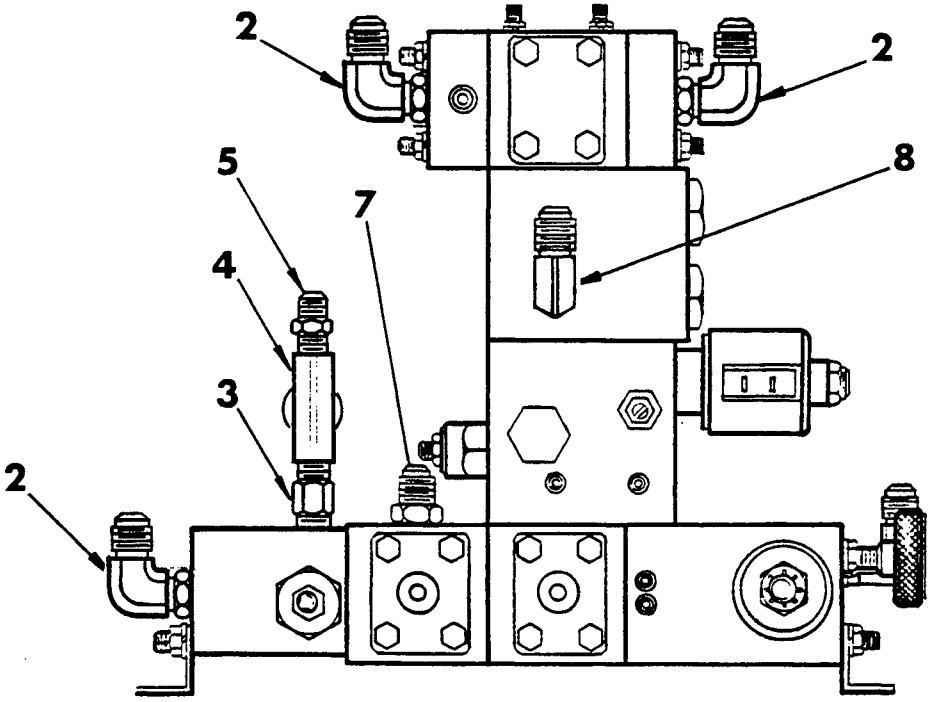
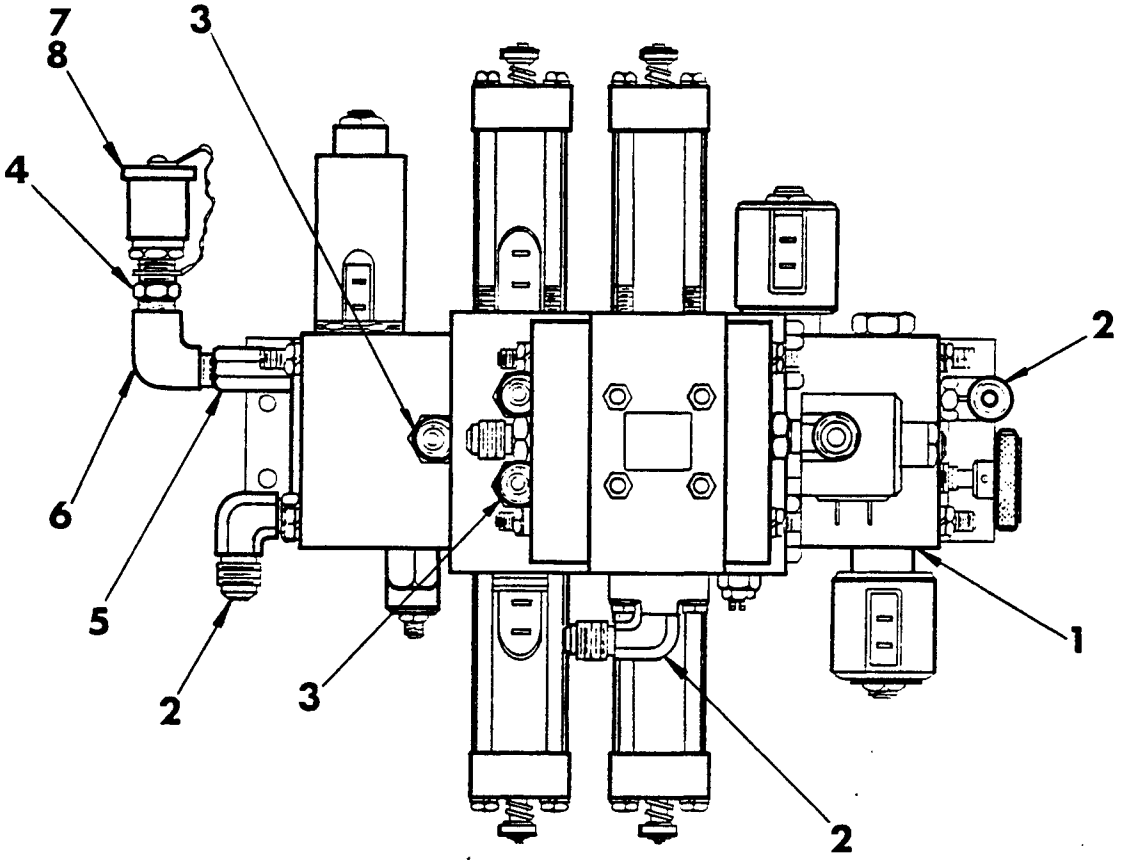


FIGURE 8A - HYDRAULIC MANIFOLD ASSEMBLY
(AFTER MARCH 1980) (15E) (S15E) (S15EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
8A-	9389	HYDRAULIC MANIFOLD ASSEMBLY	1
-1	3020	MANIFOLD PACKAGE (SEE FIG.8D)	1
-2	2447	STRAIGHT THREAD ELBOW	3
-3	2498	FEMALE PIPE ADAPTER	1
-4	2420	STREET TEE	1
-5	2476	MALE CONNECTOR	1
-6	2475	PIPE NIPPLE	1
-7	2474	STRAIGHT THREAD CONNECTOR	2
-8	2448	MALE ELBOW	2
-9	2527	QUICK DISCONNECT COUPLING	1
-10	845	CAP	1

FIGURE 8B - HYDRAULIC MANIFOLD ASSEMBLY
(AFTER MARCH 1980) (19E)



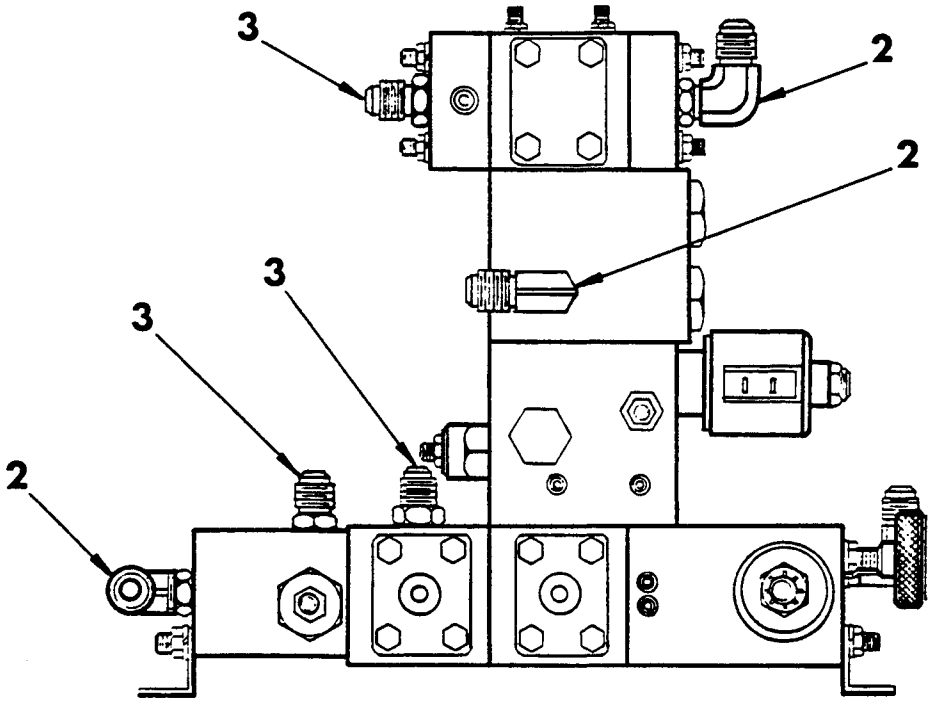
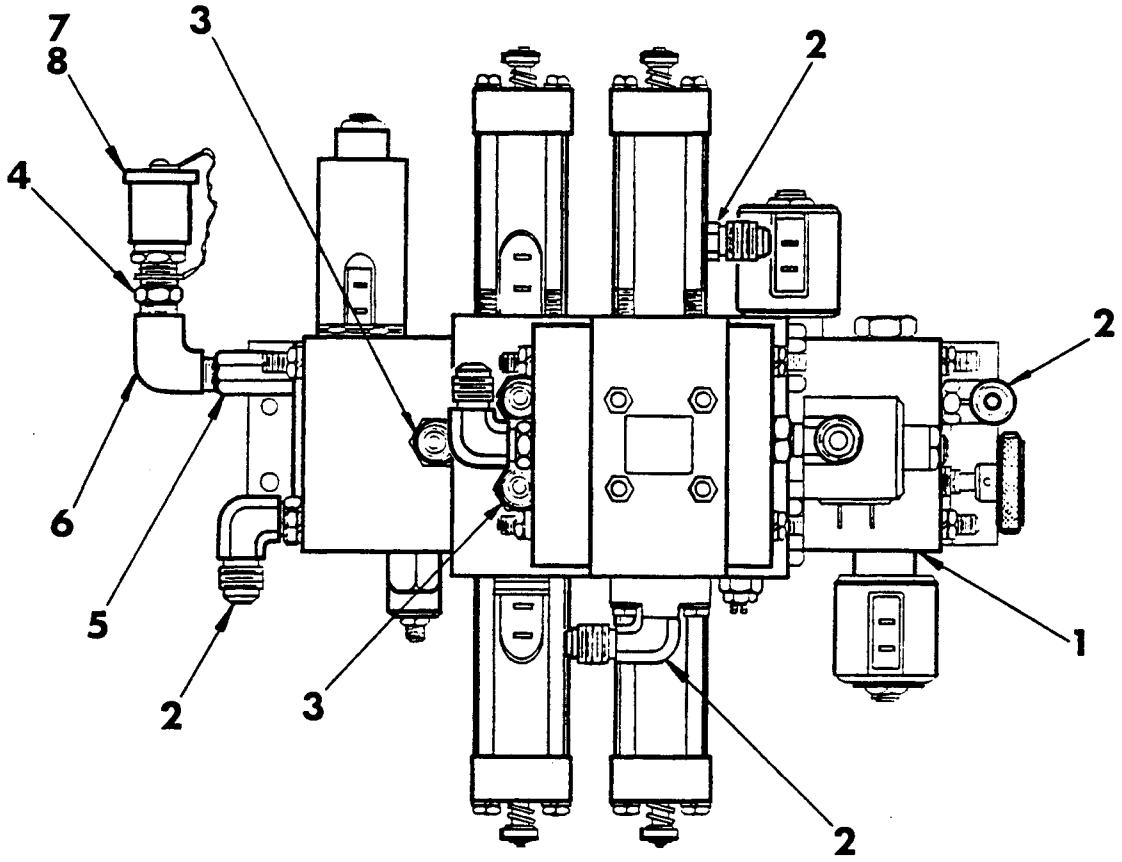


FIGURE 8B - HYDRAULIC MANIFOLD ASSEMBLY (AFTER MARCH 1980) (19E)

ITEM	PART NUMBER	DESCRIPTION	QTY
8B-	9390	HYDRAULIC MANIFOLD ASSEMBLY	1
-1	3020	MANIFOLD PACKAGE (SEE FIG.8D)	1
-2	2447	STRAIGHT THREAD ELBOW	4
-3	2474	STRAIGHT THREAD CONNECTOR	5
-4	2475	PIPE NIPPLE	1
-5	2498	FEMALE PIPE ADAPTER	1
-6	2450	90° ELBOW	1
-7	845	CAP	1
-8	2527	QUICK DISCONNECT COUPLING	1

FIGURE 8C - HYDRAULIC MANIFOLD ASSEMBLY (AFTER MARCH 1980) (S19E) (S19EX)



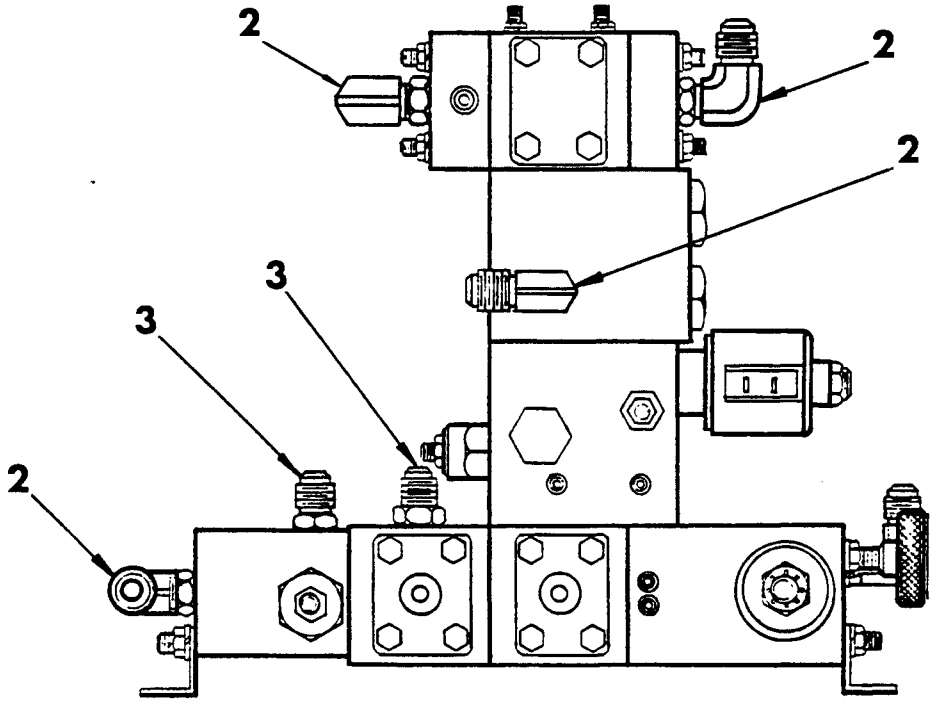


FIGURE 8C - HYDRAULIC MANIFOLD ASSEMBLY (AFTER MARCH 1980) (S19E) (S19EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
8C-	9391	HYDRAULIC MANIFOLD ASSEMBLY	1
-1	3020	MANIFOLD PACKAGE (SEE FIG.8D)	1
-2	2447	STRAIGHT THREAD ELBOW	5
-3	2474	STRAIGHT THREAD CONNECTOR	4
-4	2475	PIPE NIPPLE	1
-5	2498	FEMALE PIPE ADAPTER	1
-6	2450	90° STREET ELBOW	1
-7	845	CAP	1
-8	2527	QUICK DISCONNECT COUPLING	1

FIGURE 8D - MANIFOLD PACKAGE (AFTER MAR.1980) (ALL MODELS)

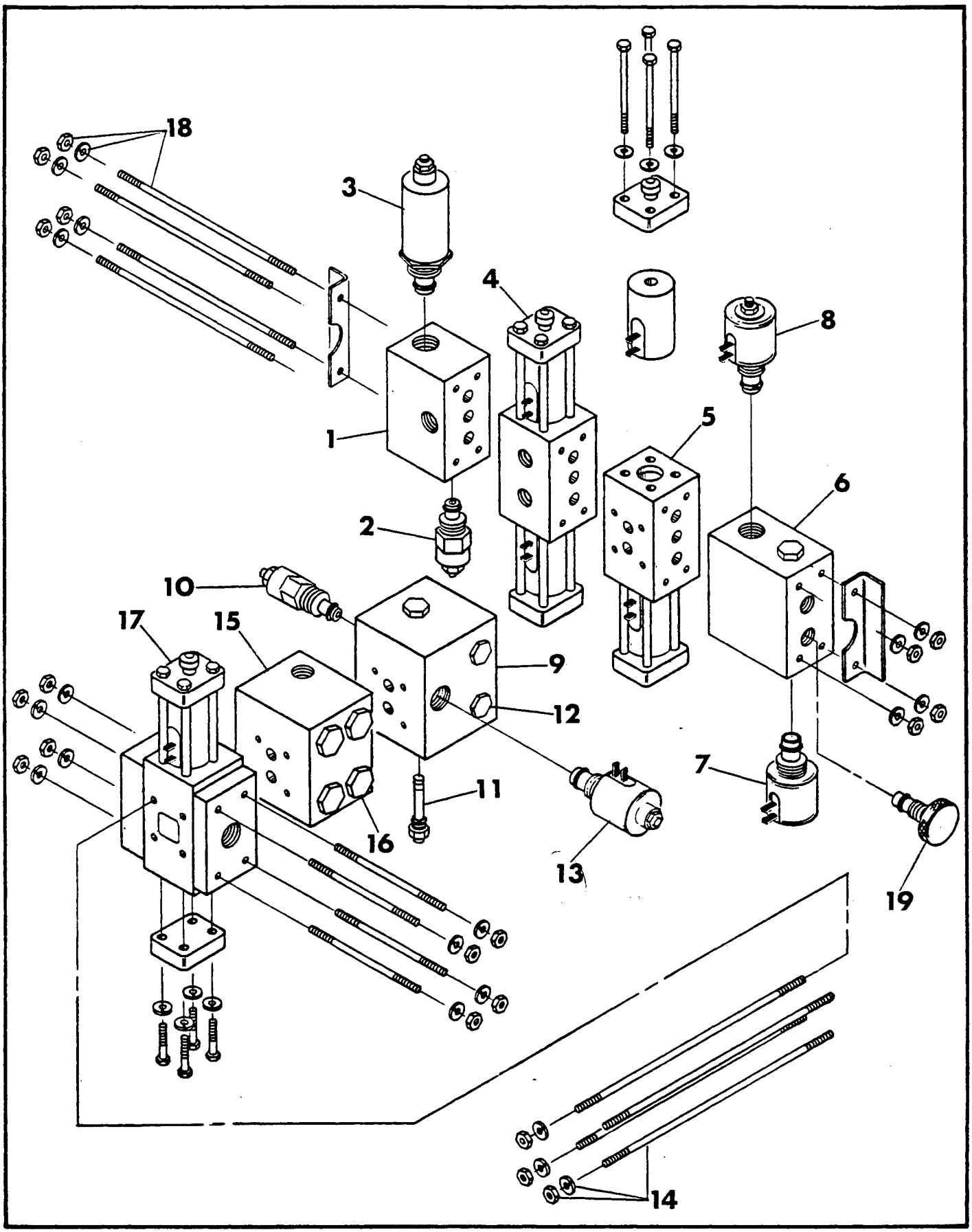


FIGURE 8D - MANIFOLD PACKAGE (AFTER MAR.1980)
(ALL MODELS)

ITEM	PART NUMBER	DESCRIPTION	QTY
8D-	3020 (6356)	MANIFOLD PACKAGE	1
-1	3019-1	DUMP/RELIEF VALVE ASSEMBLY	1
-2	3044	RELIEF VALVE	1
-3	3045	DUMP VALVE	1
-4	3019-2	STEERING VALVE ASSEMBLY	1
-5	3019-3	DRIVE VALVE ASSEMBLY	1
-6	3019-5	LIFT VALVE ASSEMBLY	1
-7	3051	LIFT VALVE	1
-8	3051	LOWERING VALVE	1
-9	3020-1	LOW SPEED/CREEP VALVE ASSEMBLY	1
-10	3046	CUSHION RELIEF VALVE ASSEMBLY	1
-11	3050	CONTROL-ORIFICE	1
-12	3048	CHECK VALVE	5
-13	3047	LOW SPEED VALVE (CREEP)	1
-14	3056	TIE RODS - WITH WASHERS & NUTS	4
-15	3020-1	FLOW REGULATOR VALVE ASSEMBLY	1
-16	3057	FLOW REGULATOR	4
-17	3020-2	HIGH SPEED VALVE ASSEMBLY	1
-18	3055	TIE RODS - WITH WASHERS & NUTS	4
-19	3053	EMERGENCY LOWERING VALVE	1
NOTE:	3043	OUTRIGGER VALVE ASSEMBLY & LOCK VALVE (NOT SHOWN) IS AN OPTION.	

FIGURE 8E-HYDRAULIC MANIFOLD ASSEMBLY (JAN 1982) (ALL MODELS)

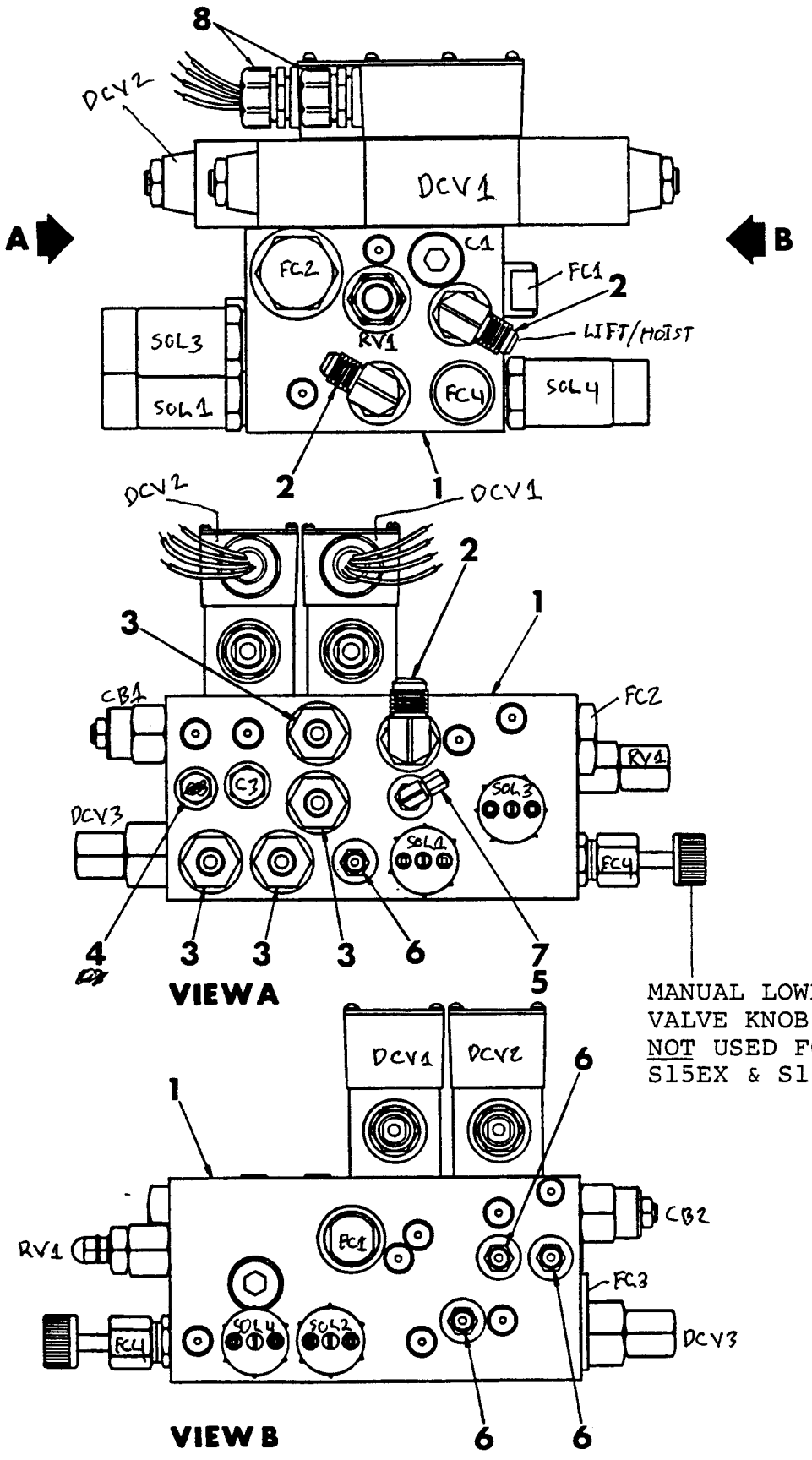
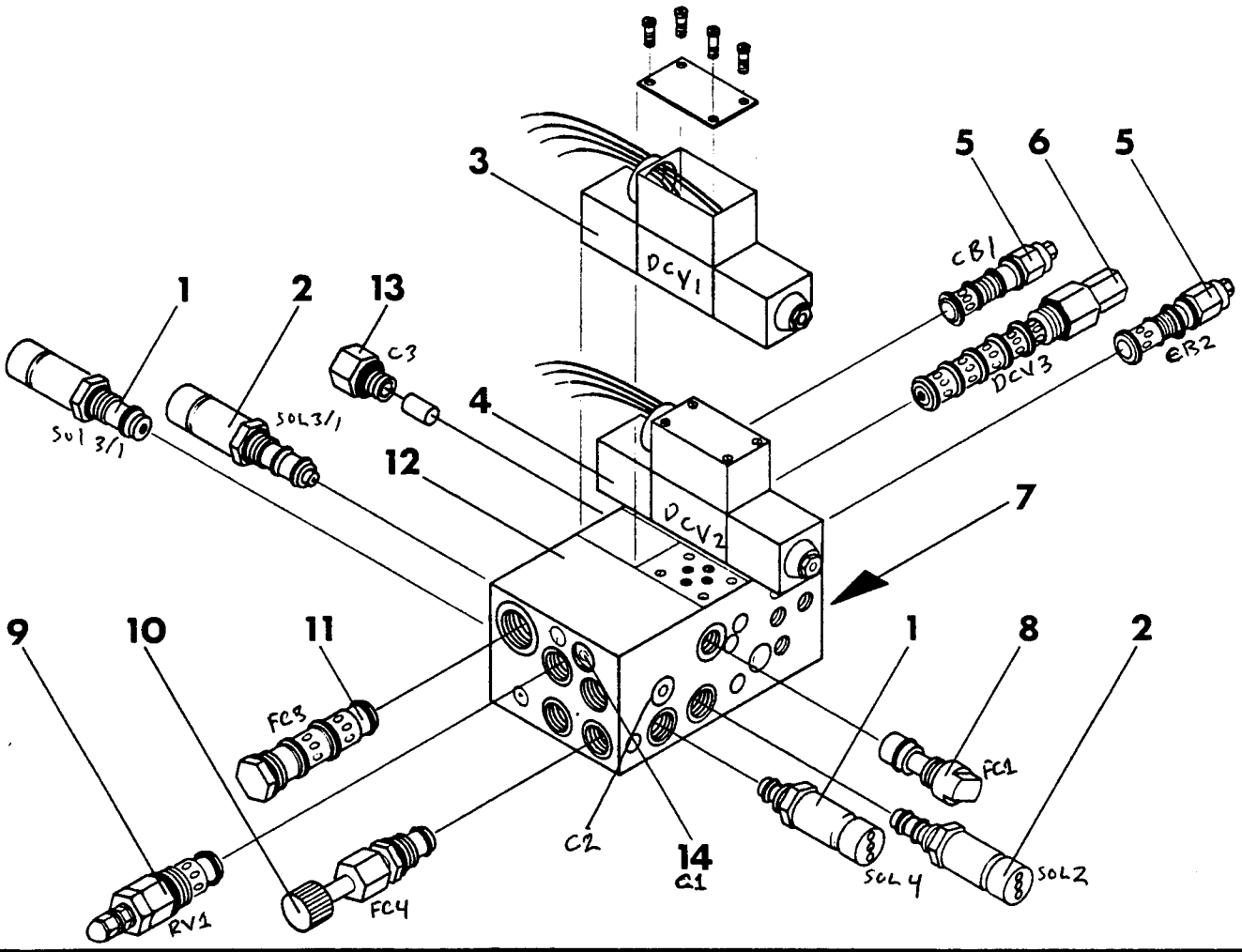


FIGURE 8E-HYDRAULIC MANIFOLD ASSEMBLY (JAN 1982) (ALL MODELS)

ITEM	PART NUMBER	DESCRIPTION	QTY
8E-	30776	HYDRAULIC MANIFOLD ASSEMBLY	1
-1	30622	MANIFOLD PACKAGE (SEE FIG. 8F)	1
-2	2520	STRAIGHT THREAD ELBOW	3
-3	2511	COUPLING	5
-4	53701	STRAIGHT THREAD HEX HEAD PLUG	1
-5	54300	CAP	
-6	50801	STRAIGHT THREAD CONNECTOR	4
-7	50900	STRAIGHT THREAD ELBOW	1
-8	70141	STRAIN RELIEF	2

FIGURE 8F-MANIFOLD PACKAGE (JAN 1982) (ALL MODELS)



ITEM	PART NUMBER	DESCRIPTION	QTY
8F-	30622	MANIFOLD PACKAGE	
-1	66264	TWO-WAY SOLENOID VALVE	2
-2	66263	THREE-WAY SOLENOID VALVE	2
-3	66261	DIRECTIONAL CONTROL VALVE	4
-4	66262	DIRECTIONAL CONTROL VALVE	4
-5	66295	COUNTER BALANCE VALVE	2
-6	66293	DIRECTIONAL VALVE CARTRIDGE	1
-7	66294	FLOW DIVIDER COMBINER	1
-8	66302	PRESS. COMP. FLOW CONTROL CARTRIDGE	1
-9	66297	DIRECT ACTING RELIEF VALVE	1
-10	66265	NEEDLE VALVE	1
-11	66299	FLOW DIVIDER CARTRIDGE	1
-12	66296	BODY	1

FIGURE 8F-MANIFOLD PACKAGE (JAN 1982) (ALL MODELS)

ITEM	PART NUMBER	DESCRIPTION	QTY
-13	66300	SHUTTLE VALVE	1
-14	66298	CHECK VALVE CARTRIDGE	2

FIGURE 9 - SCISSOR ASSEMBLY (15E) (S15E) (S15EX)

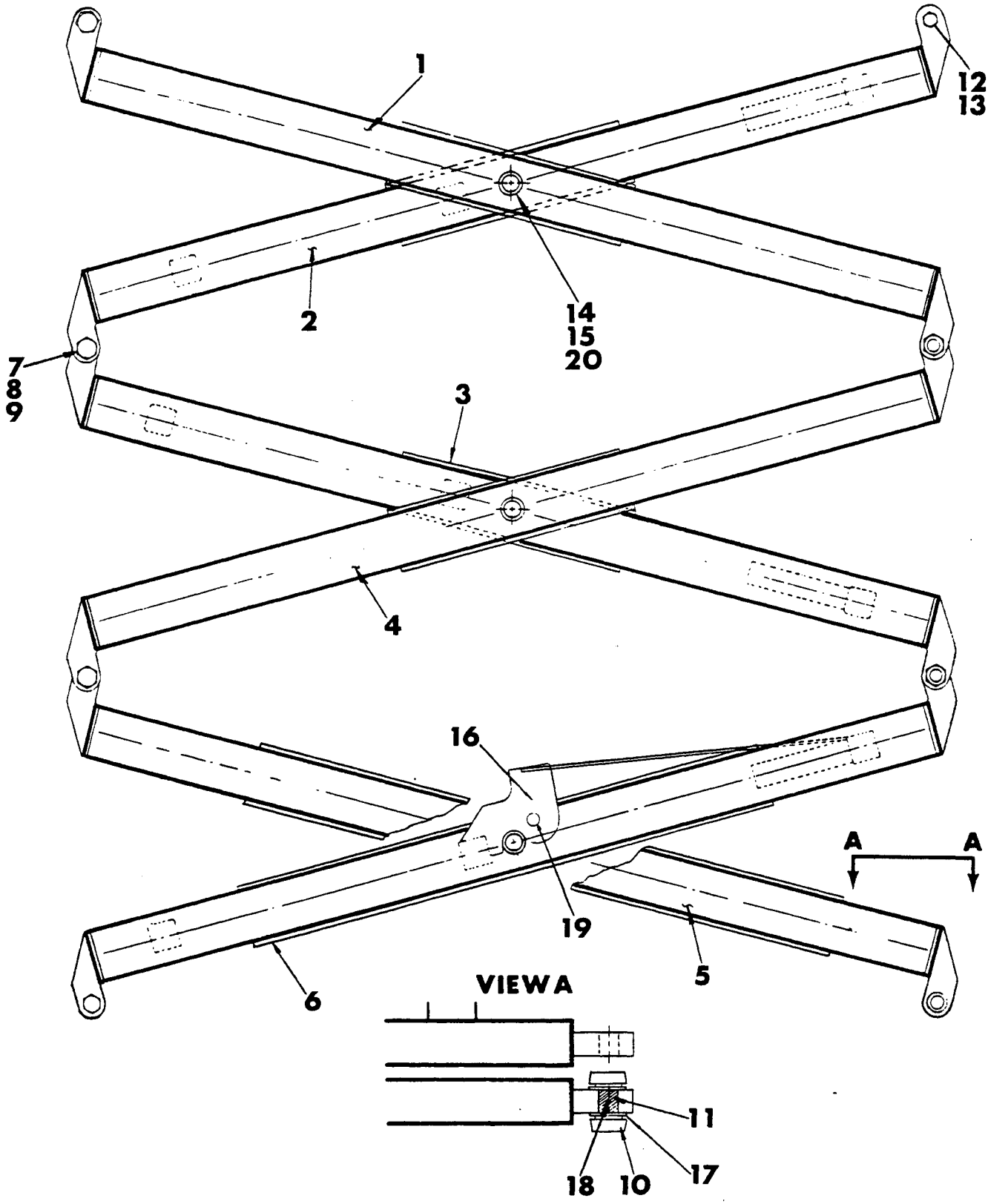


FIGURE 9 - SCISSOR ASSEMBLY (15E) (S15E) (S15EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
9-	7009	Scissor Assembly	1
-1	7027	Inner Top Arm	2
-2	7024	Outer Top Arm	2
-3	7026	Inner Middle Arm	2
-4	7023	Outer Middle Arm	2
-5	7025	Inner Bottom Arm	2
-6	7022	Outer Bottom Arm	2
-7	2265	Oilite Bushing	12
-8	60130	Hex Head Bolt 3/4-10 x 2 3/4	12
-9	60703	Hex Nut 3/4-10	12
-10	7304	Roller - Lower Arm Guide Assembly	4
-11	35051	Shaft - 3/4 Dia x 3 1/4 Cold Finish C1018	2
-12	2272	Cam Roller	2
-13	60707	Hex Nut 5/8-11	2
-14	7091	Center Pivot Shaft	3
-15	2213	Shaft Collar	6
-16	7028	Arm - Hydraulic Cylinder Mount	1
-17	63408	Washer - 3/4	4
-18	62205	Socket Head Set Screw - 1/4-20-5/8	2
-19	2270	Dorcolube Bearing	1
-20	2266	Oilite Bushing - Arm Pivot	6

FIGURE 9A - SCISSOR ASSEMBLY (19E) (S19E) (S19EX)

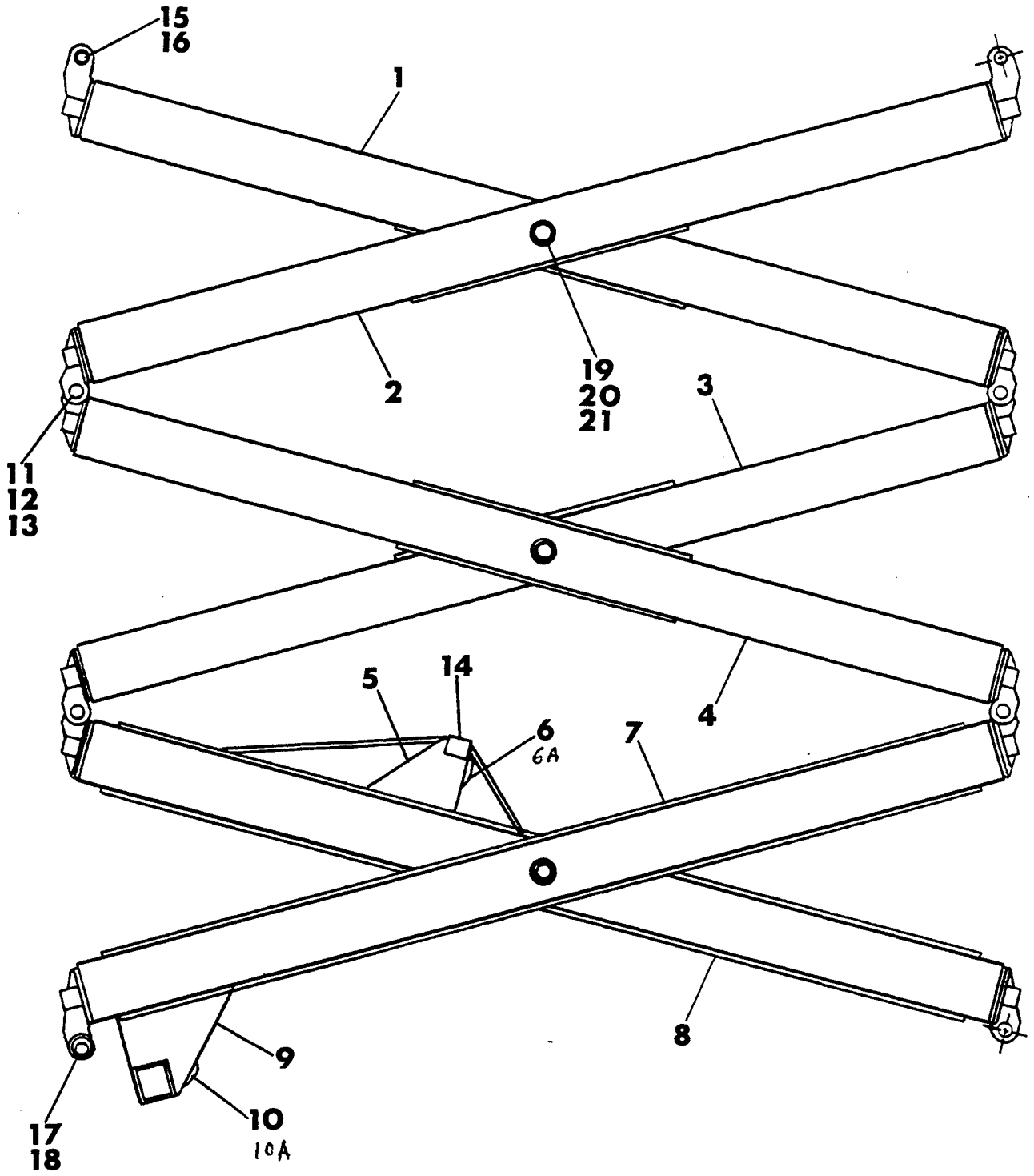
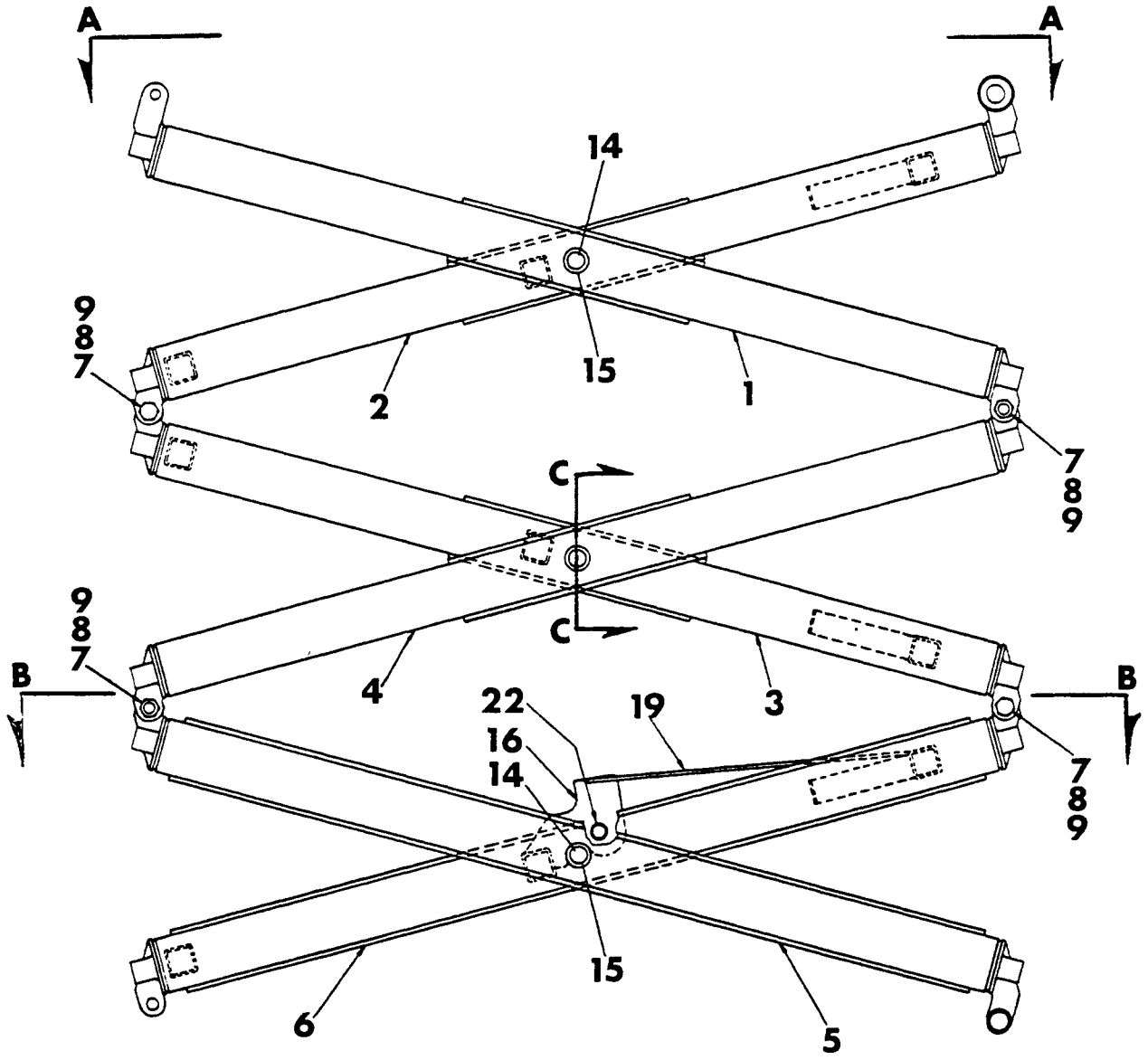
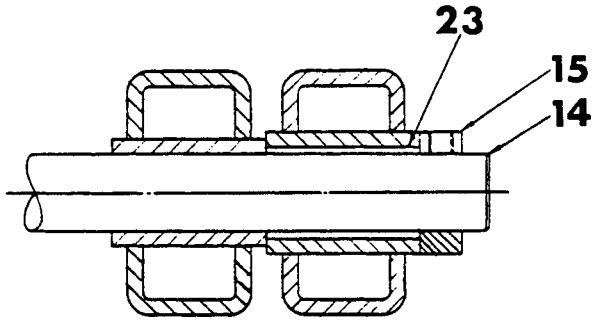


FIGURE 9A - SCISSOR ASSEMBLY (19E) (S19E) (S19EX)

ITEM	PART NUMBER	DESCRIPTION	QTY
9A-	6090	Scissor Assembly	1
-1	6090-1	Arm Assembly - Welded Inner Top	2
-2	6090-2	Arm Assembly - Welded Outer Top	2
-3	6090-3	Arm Assembly - Welded Inner Middle	2
-4	6090-4	Arm Assembly - Welded Outer Middle	2
-5	6098-2	Upper Hydraulic Cylinder Mounting Plate	1
-6	6094	Upper Hydraulic Cylinder Mount	2
-6A	2270	Bushing	
-7	6090-7	Arm Assembly - Welded Outer Bottom	2
-8	6090-8	Arm Assembly - Welded Inner Bottom	2
-9	6093	Lower Hydraulic Cylinder Mounting Plate	2
-10	6095	Lower Hydraulic Cylinder Mount	2
-10A	2270	bushing	
-11	2265	Oilite Bushing	8
-12	60130	Hex Head Bolt 3/4-10 UNC x 2 3/4	8
-13	61304	Lock Nut 3/4-10 UNC	8
-14	6090-11	Formed Angle	2
-15	2272	Deck Cam Roller	2
-16	61306	Lock Nut 5/8-18 UNF	2
-17	2273	Cam Roller	2
-18	61307	Lock Nut 7/8-14 UNF	2
-19	6114	Center Pivot Shaft	3
-20	2213	Shaft Collar	6
-21	2266	Oilite Bushing - Arm Pivot	6

FIGURE 9B - SCISSOR ASSEMBLY (15E) (S15E) (S15ETD) (S15EFD)





SECTION C

FIGURE 9B - SCISSOR ASSEMBLY (15E) (S15E)
(S15ETD) (S15EFD)

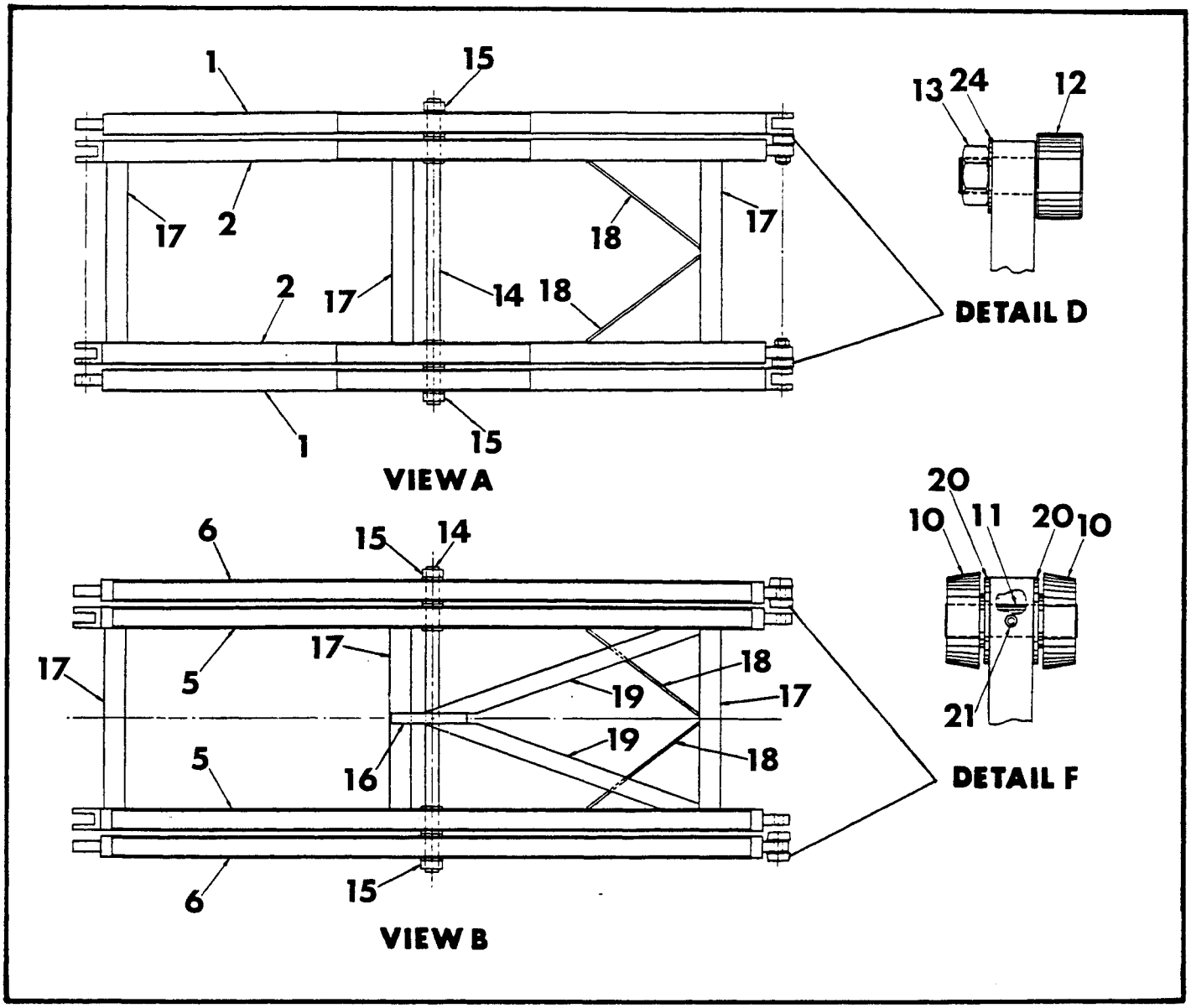


FIGURE 9B - SCISSOR ASSEMBLY (15E) (S15E) (S15ETD) (S15EFD)

ITEM	PART NUMBER	DESCRIPTION	QTY
9B-	30930	SCISSOR ASSEMBLY	1
-1	7027	OUTER TOP ARM	2
-2	31043	INNER TOP ARM	2
-3	7026	INNER MIDDLE ARM	2
-4	7023	OUTER MIDDLE ARM	2
-5	7022	OUTER BOTTOM ARM	2
-6	7025	INNER BOTTOM ARM	2
-7	2265	BUSHING	8
-8	30889	EAR PIVOT BOLT	8
-9	61304	LOCK NUT - 3/4-10 UNC	8
-10	7304	LOWER ARM ROLLER	4
-11	35457	ROUND BAR	2
-12	2273	CAM ROLLER	2
-13	61307	HEX NUT	2
-14	7091	CENTER PIVOT SHAFT	3
-15	2213	SHAFT COLLAR	6
-16	7028	HYDRAULIC CYLINDER MOUNT ARM	1
-17	35033	SQUARE TUBE	9
-18	35458	FLAT BAR	6
-19	35490	FLAT BAR	2
-20	63437	FLAT WASHER - 2 O.D. X .812 I.D. X .148 THK - TYPE A SERIES W	4
-21	62205	SOCKET HEAD SET SCREW - 1/4-20 UNC X 5/8	2
-22	2270	BEARING	1
-23	2266	BUSHING	6
-24	63421	FLAT WASHER - 7/8	2

FIGURE 9C - SCISSOR ASSEMBLY (19E) (S19E)
(S19EX) (19ETD) (S19ETD) (S19EFD)

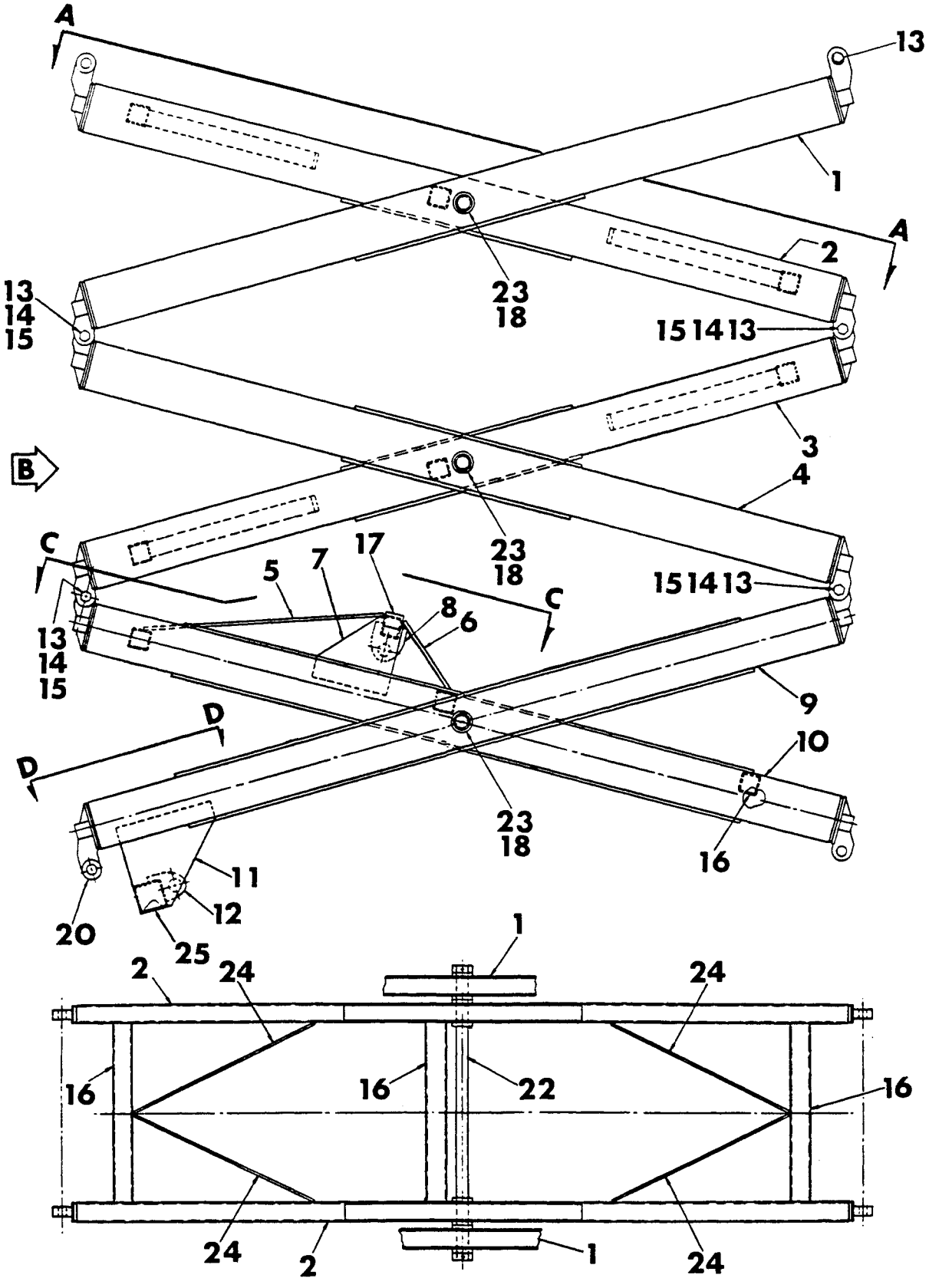
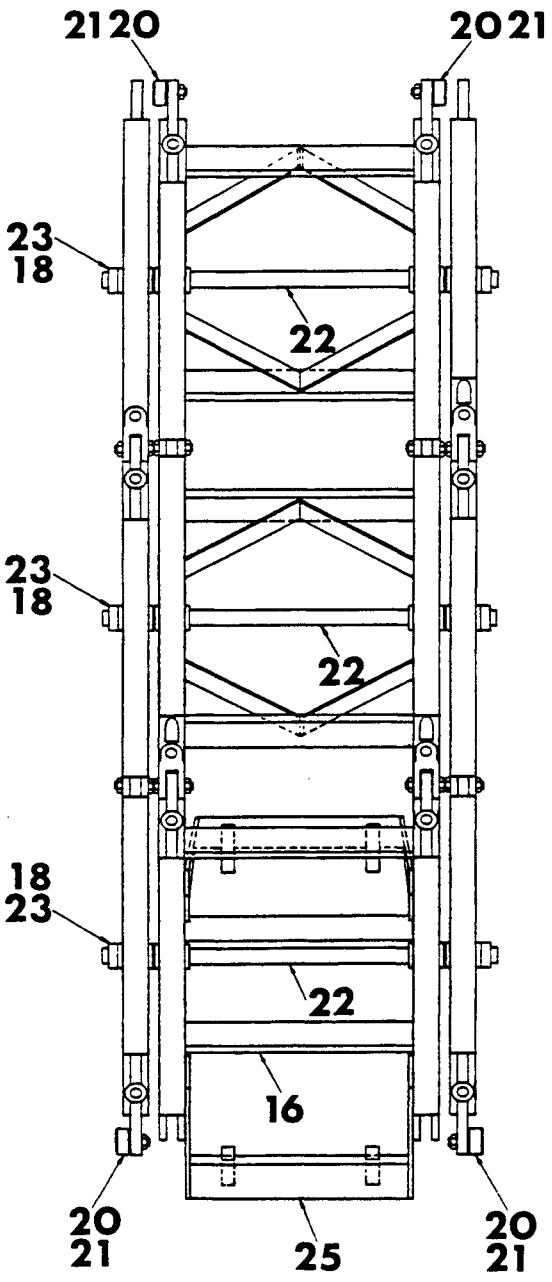
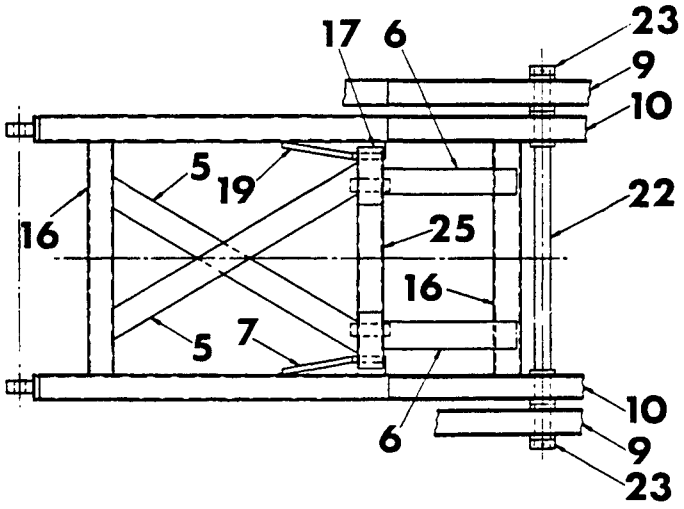


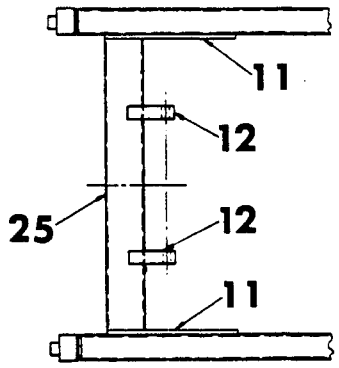
FIGURE 9C - SCISSOR ASSEMBLY (19E) (S19E) (S19EX) (19ETD) (S19ETD) (S19EFD)



VIEW B



VIEW C



VIEW D

FIGURE 9C - SCISSOR ASSEMBLY (19E) (S19E) (S19EX) (19ETD) (S19ETD) (S19EFD)

ITEM	PART NUMBER	DESCRIPTION	QTY
9C-	30929	SCISSOR ASSEMBLY	1
-1	6090-2	WELDED OUTER ARM ASSEMBLY	2
-2	31027	WELDED INNER ARM ASSEMBLY	2
-3	6090-3	WELDED INNER MIDDLE ARM ASSEMBLY	2
-4	6090-4	WELDED OUTER MIDDLE ARM ASSEMBLY	2
-5	35067	FLAT BAR	2
-6	35068	FLAT BAR	2
-7	6098-2	UPPER HYDRAULIC CYLINDER MOUNTING PLATE	1
-8	6094	UPPER HYDRAULIC CYLINDER MOUNT	2
-9	2270 6090-7	bushing WELDED OUTER BOTTOM ARM ASSEMBLY	2 2
-10	6090-8	WELDED INNER BOTTOM ARM ASSEMBLY	2
-11	6093	LOWER HYDRAULIC CYLINDER MOUNTING PLATE	2
-12	6095	LOWER HYDRAULIC CYLINDER MOUNT	2
-13	2270 2265	bushing BUSHING	2 10
-14	30889	EAR PIVOT BOLT	8
-15	60707	LOCK NUT - 3/4-10 UNC	8
-16	35481	SQUARE TUBE	6
-17	6090-11	FORMED ANGLE	2
-18	2266	BUSHING	6
-19	6098-1	UPPER HYDRAULIC CYLINDER MOUNTING PLATE	1
-20	2273	CAM ROLLER	4
-21	61228	LOCK NUT	4
-22	6114	CENTER PIVOT SHAFT	3
-23	2213	SHAFT COLLAR	6
-24	35070	FLAT BAR	10
-25	35071	TUBE	1

FIGURE 10 - HAND CONTROL BOX ASSEMBLY (ALL MODELS)

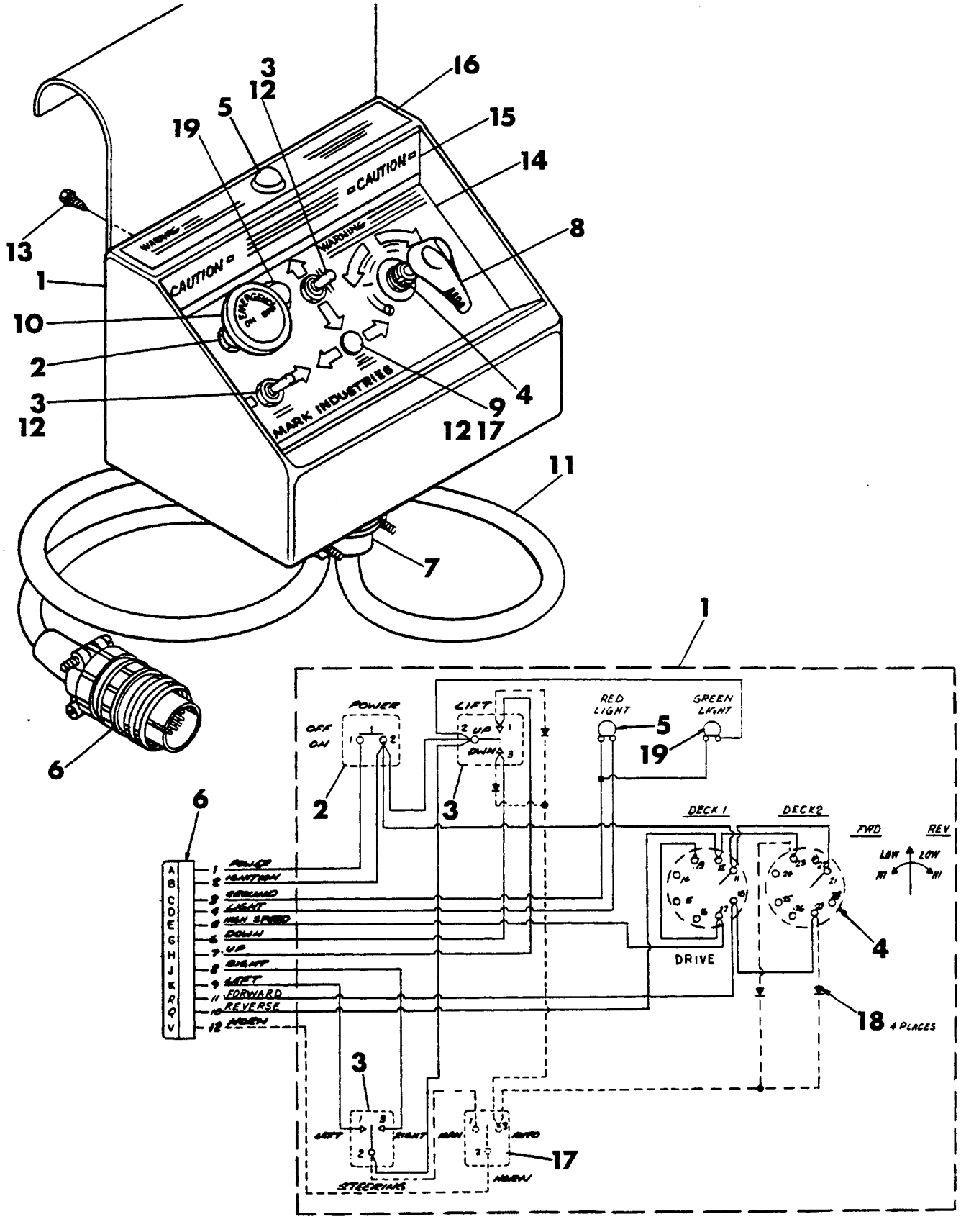


FIGURE 10 - HAND CONTROL BOX ASSEMBLY (ALL MODELS)

ITEM	PART NUMBER	DESCRIPTION	QTY
10-	4067-1	Hand Control Box Assembly	1
-1	7301	Control Box Weldment	1
-2	4018	Emergency On-Off Switch	1
-3	4021	Momentary Switch	2
-4	4106	5 Position Spring Return Switch	1
-5	4031	Warning Light	1
-6	4026-1	Cannon Plug - Male	1
-7	117G	Strain Relief	1
-8	2667	Knob	1
-9	772	Hole Plug	1
-10	5300	Knob - Emergency On-Off	1
-11	30392	Cable (6 ft. LG)	1
-12	2305	Key Washer	2
-13	61702	Hex Head Self-Tapping Screw - No. 6-32 x 3/8	6
-14	2009	Decal - Control Box	1
-15	2014	Decal - Warning High Voltage	1
-16	2015	Decal - Warning Unstable Condition	1
-17	4019	Horn Switch (Option)	1
-18	4045	Diode (Option)	4
-19	4107	Power-On Light (Green)	1

FIGURE 10A - AERIAL CONTROL BOX ASSEMBLY (S15ETD) (19ETD) (S19ETD)

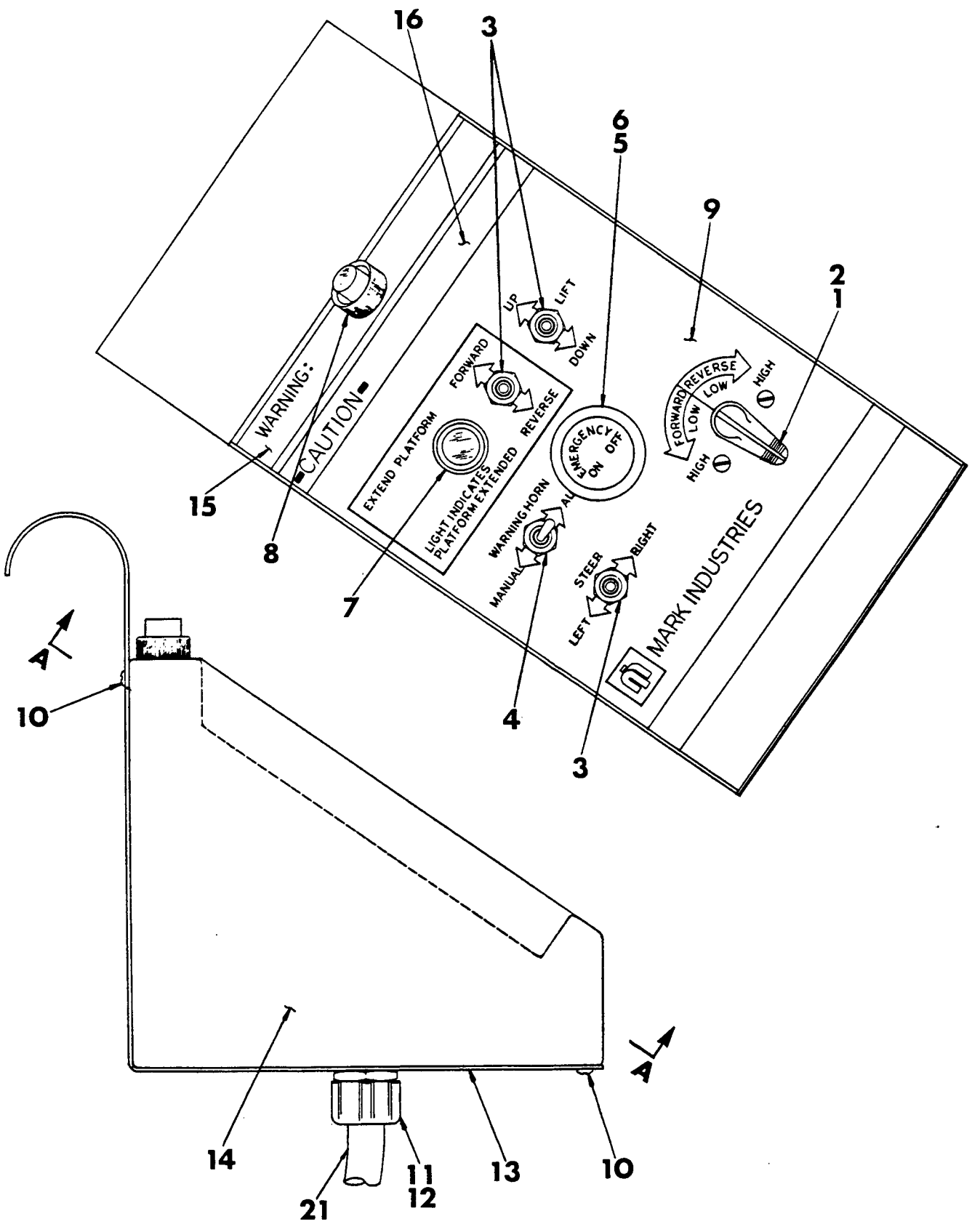
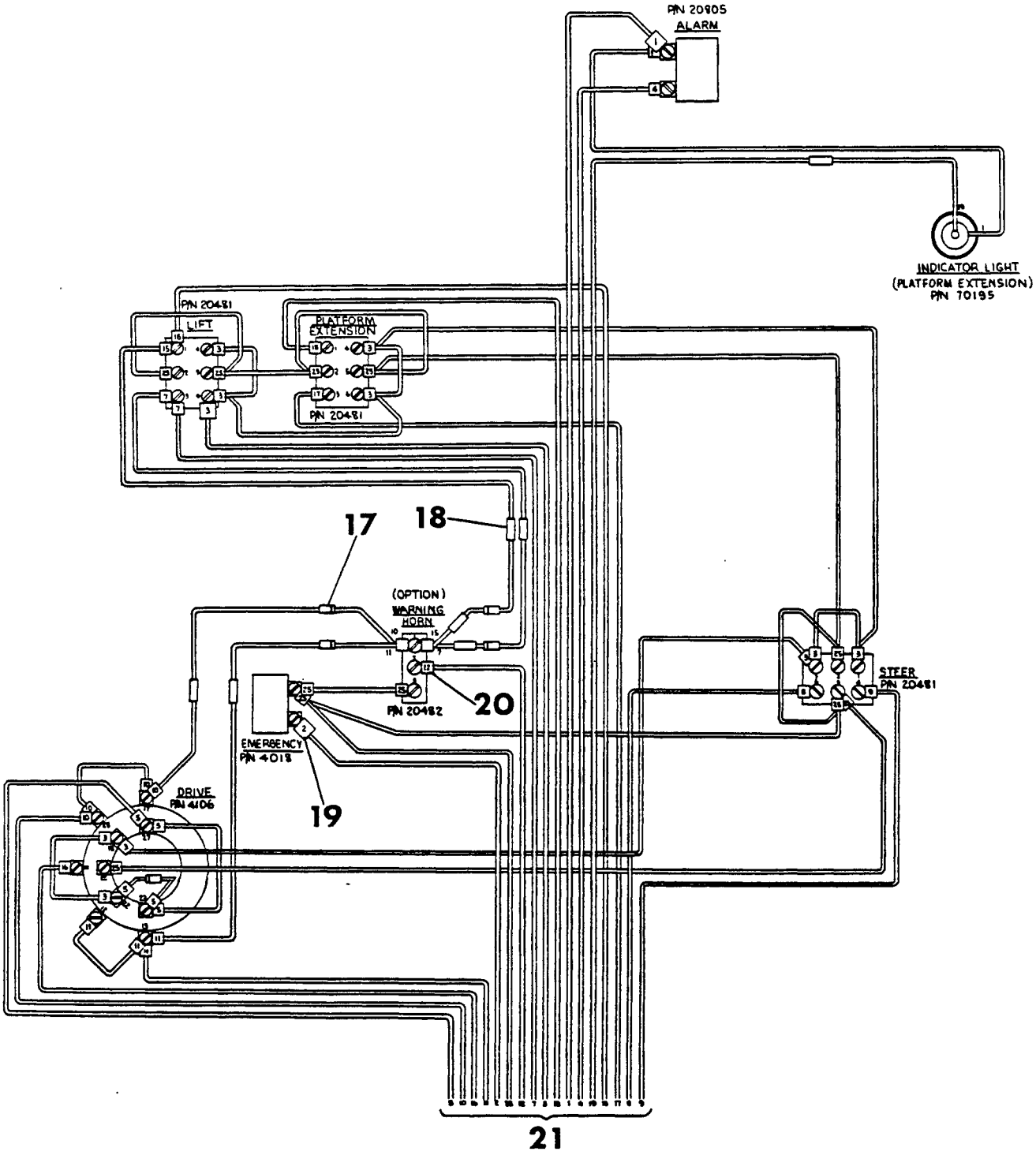


FIGURE 10A - AERIAL CONTROL BOX ASSEMBLY (S15ETD) (19ETD) (S19ETD)



VIEW A

FIGURE 10A - AERIAL CONTROL BOX ASSEMBLY (S15ETD) (19ETD) (S19ETD)

ITEM	PART NUMBER	DESCRIPTION	QTY
10A-	30936	AERIAL CONTROL BOX ASSEMBLY	1
-1	65151	DRIVE SWITCH KNOB	1
-2	4106	(5) POSITION SWITCH	1
-3	20481	TOGGLE SWITCH	3
-4	20482	TOGGLE SWITCH	1
-5	4018	PUSH PULL SWITCH	1
-6	5300	EMERGENCY ON/OFF KNOB	1
-7	70195	AMBER LAMP	1
-8	20805	ALARM BUZZER	1
-9	30896	DECAL - AERIAL CONTROL BOX	1
-10	61712	ROUND SLOTTED HEAD SELF TAPPING SCREW NO. 8 X 1/2 (TYPE A)	6
-11	2807	STRAIN RELIEF	1
-12	2809	NUT	1
-13	31107	COVER	1
-14	31106	CONTROL BOX MACHINING	1
-15	2015	DECAL - WARNING-UNSTABLE CONDITION	1
-16	2014	DECAL - WARNING-HIGH VOLTAGE	1
-17	4045	DIODE	5
-18	70069	BUTT CONNECTOR	7
-19	70198	TERMINAL	3
-20	7019	TERMINAL	47
-21	30937	TRAVERSING DECK CONTROL CABLE	1

FIGURE 10B - GROUND CONTROL BOX ASSEMBLY
(S15ETD) (19ETD) (S19ETD)

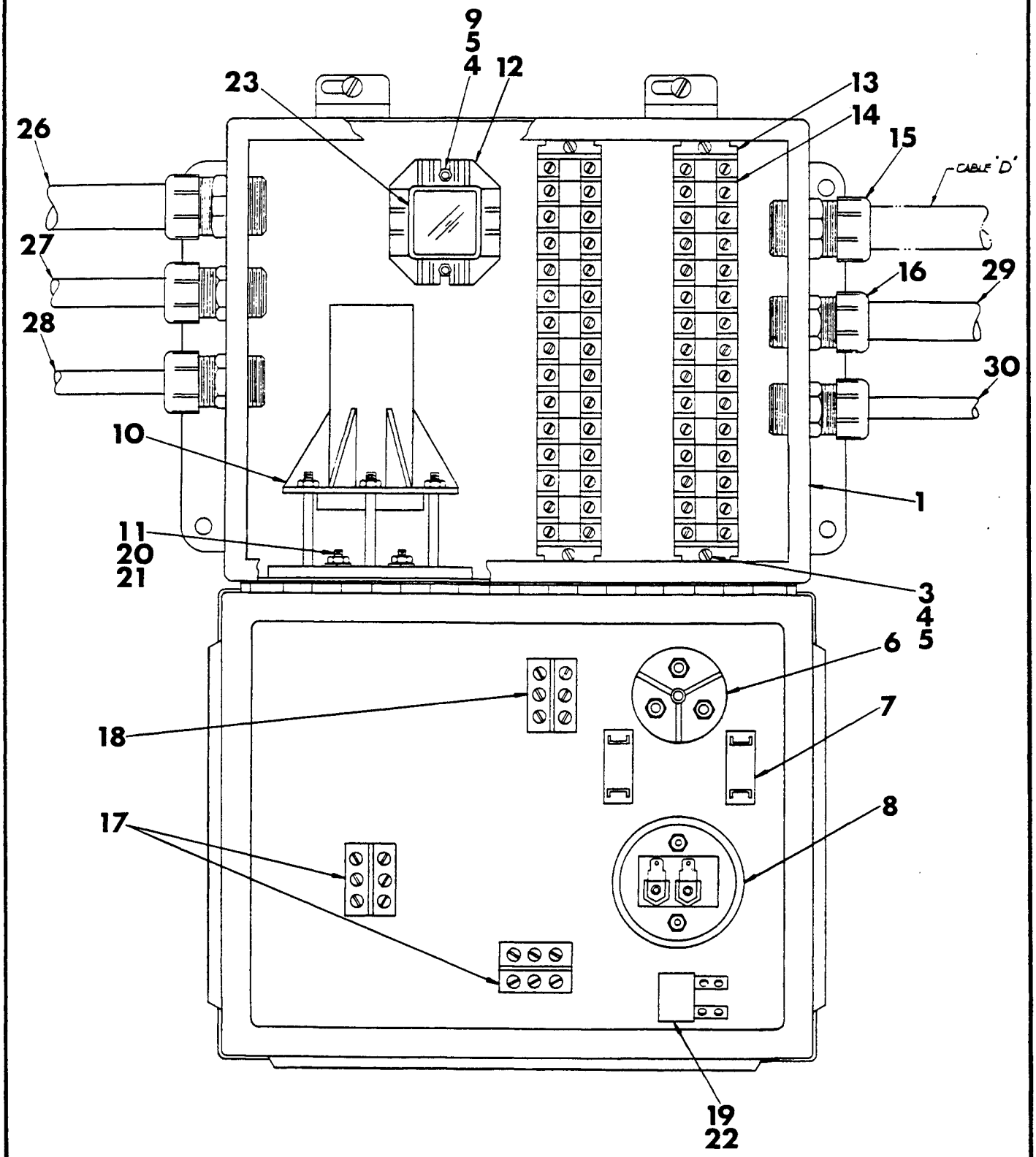
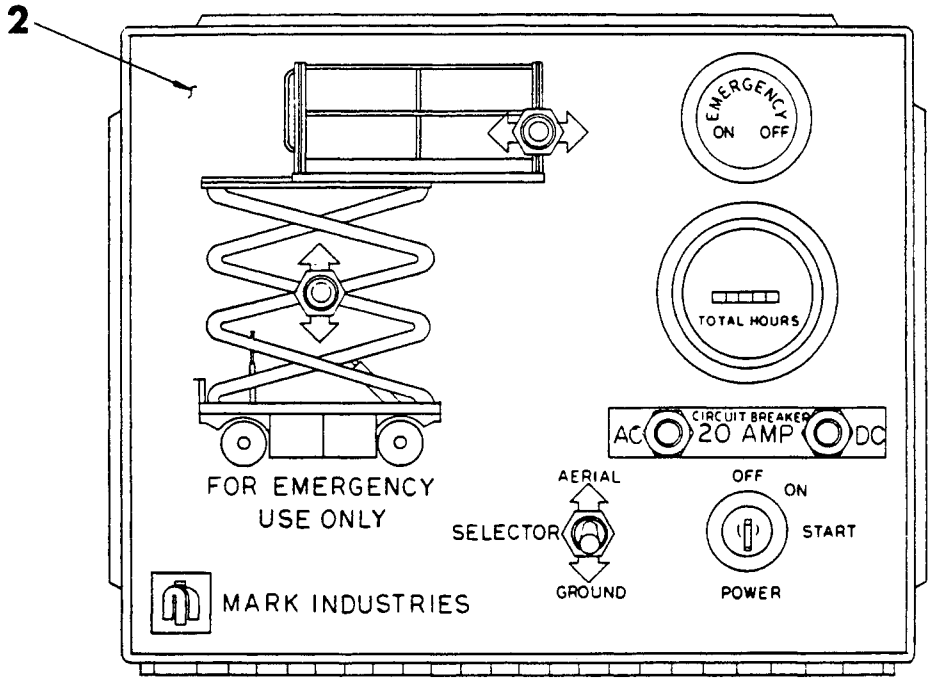
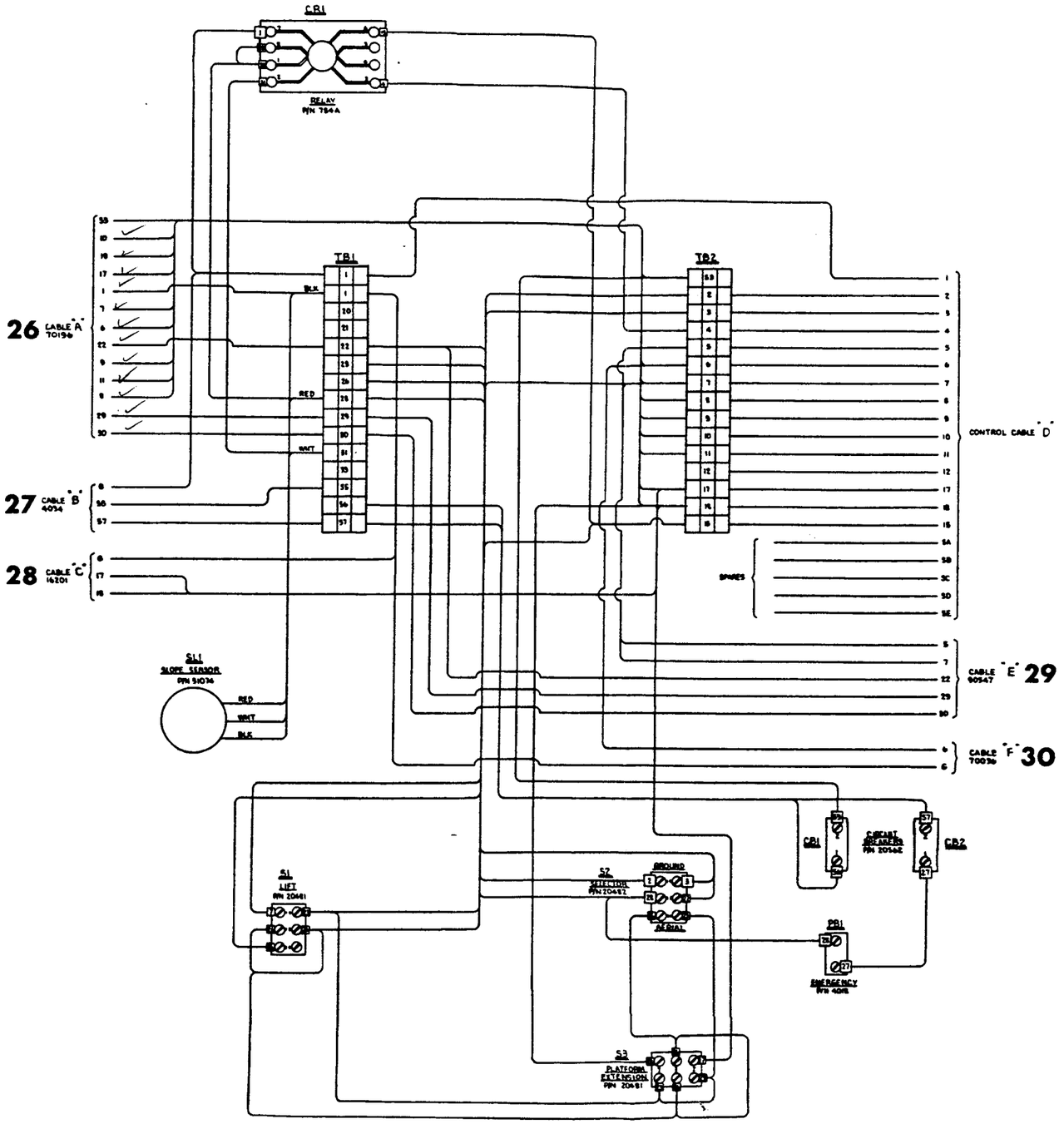


FIGURE 10B - GROUND CONTROL BOX ASSEMBLY (S15ETD) (19ETD) (S19ETD)



REV.4
6-83

FIGURE 10B - GROUND CONTROL BOX ASSEMBLY (S15ETD) (19ETD) (S19ETD)



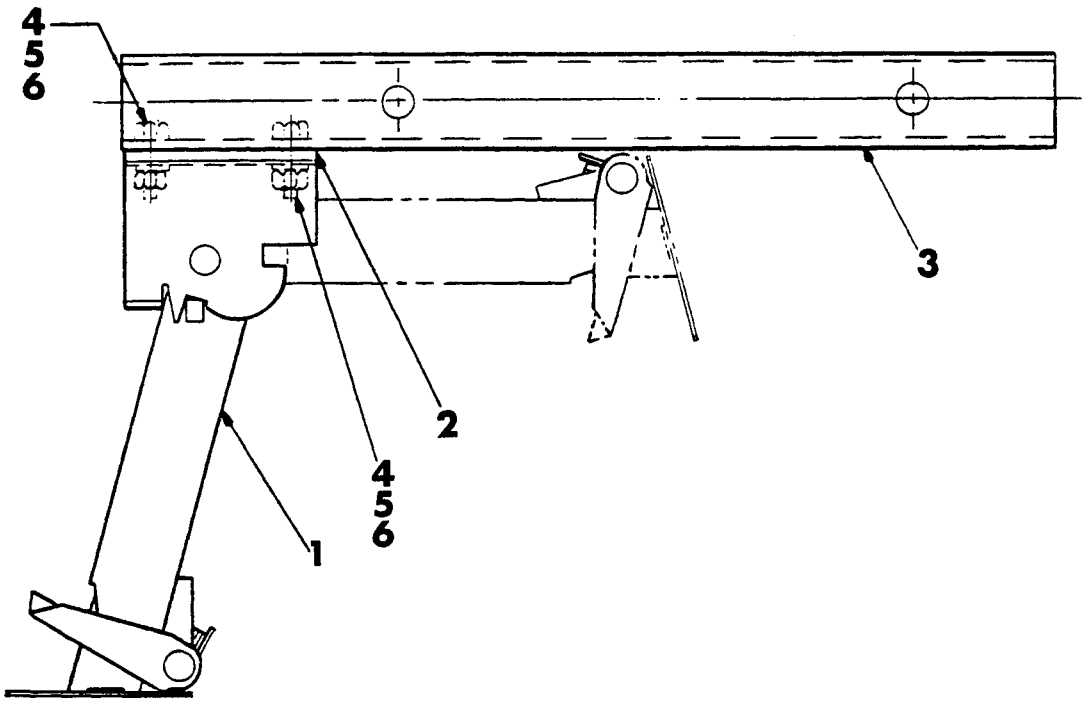
WIRE LIST

WIRE NO	FROM	WIRE SIZE	TO	WIRE SIZE	WIRE SIZE
55	CABLE-A	–	TB2-55	–	18GA
58	TB2-55	–	CB1-2	12-10	12GA
10	CABLE-A	–	TB2-10	–	18GA
18	CABLE-A	–	TB2-18	–	18GA
16	TB2-18	–	S2-4	18-22	18GA
17	CABLE-A	–	TB2-17	–	18GA
17	TB2-17	–	S3-6	18-22	18GA
1	CABLE-A	–	TB1-1	–	12GA
7	CABLE-A	–	TB2-7	–	18GA
7	TB2-7	–	S1-1	18-22	18GA
6	CABLE-A	–	TB2-6	–	18GA
22	CABLE-A	–	TB1-22	–	18GA
9	CABLE-A	–	TB2-9	–	18GA
11	CABLE-A	–	TB2-11	–	18GA
8	CABLE-A	–	TB2-8	–	18GA
29	CABLE-A	–	TB1-29	–	18GA
30	CABLE-A	–	TB1-30	–	18GA
31	CR1-2	18-22	TB1-31	–	18GA
28	CR1-1	18-22	TB1-28	–	18GA
26	CR1-3	–	CR1-8	18-22	18GA
4	CR1-3	18-22	TB2-4	–	18GA
15	CR1-6	18-22	TB2-15	–	18GA
1	CR1-7	12-10	TB1-1	–	12GA
15	TB2-15	–	S1-3	18-22	18GA
6	CABLE-B	–	TB1-1	–	12GA
55	CABLE-B	–	TB1-55	–	12GA
57	CABLE-B	–	TB1-57	–	12GA
8	CABLE-C	–	TB1-1	–	12GA
17	CABLE-C	–	TB2-17	–	12GA
18	CABLE-C	–	TB2-18	–	12GA
1	CABLE-D	–	TB1-1	–	12GA
2	CABLE-D	–	TB2-2	–	12GA
3	CABLE-D	–	TB2-3	–	12GA
4	CABLE-D	–	TB2-4	–	18GA
5	CABLE-D	–	TB2-5	–	18GA
6	CABLE-D	–	TB2-6	–	18GA
7	CABLE-D	–	TB2-7	–	18GA
8	CABLE-D	–	TB2-8	–	18GA
9	CABLE-D	–	TB2-9	–	18GA
10	CABLE-D	–	TB2-10	–	18GA
11	CABLE-D	–	TB2-11	–	18GA
12	CABLE-D	–	TB2-12	–	18GA
17	CABLE-D	–	TB2-17	–	18GA
18	CABLE-D	–	TB2-18	–	18GA
15	CABLE-D	–	TB2-15	–	18GA
5A	SPARE	–	——	–	18GA
5B	SPARE	–	——	–	18GA
5C	SPARE	–	——	–	18GA
5D	SPARE	–	——	–	18GA
5E	SPARE	–	——	–	18GA
5	CABLE-E	–	TB2-5	–	18GA
7	CABLE-E	–	TB2-7	–	18GA
22	CABLE-E	–	TB1-22	–	18GA
22	CABLE-E	–	S2-5	18-22	18GA
29	CABLE-E	–	TB1-29	–	18GA
30	CABLE-E	–	TB1-30	–	18GA
6	CABLE-F	–	TB2-6	–	18GA
6	CABLE-F	–	TB1-1	–	18GA
RED	SL1	–	TB1-29	–	18GA
WHT	SL1	–	TB1-31	–	18GA
BLK	SL1	–	TB1-1	–	18GA
26	TB1-26	–	S1-5	18-22	18GA
26	S1-5	–	S2-5	18-22	18GA
25	S2-5	–	S3-5	18-22	18GA
26	S3-5	–	S3-6	18-22	18GA
26	S3-6	–	S3-2	18-22	18GA
29	TB1-29	–	S1-29	18-22	18GA
29	S1-29	–	S3-1	18-22	18GA
29	S3-1	–	S3-9	18-22	18GA
29	S3-9	–	S2-9	18-22	18GA
2	TB2-2	–	S2-1	12-10	12GA
3	TB2-3	–	S2-4	12-10	12GA
28	TB1P28	–	S2-2	12-10	12GA
28	S2-2	–	PB-1	12-10	12GA
27	PB1-2	12-10	CB2-1	12-10	12GA
57	CB2-2	12-10	TB1-57	–	12GA
56	CB1-1	12-10	TB1-56	–	12GA

FIGURE 10B - GROUND CONTROL BOX ASSEMBLY
(S15ETD) (19ETD) (S19ETD)

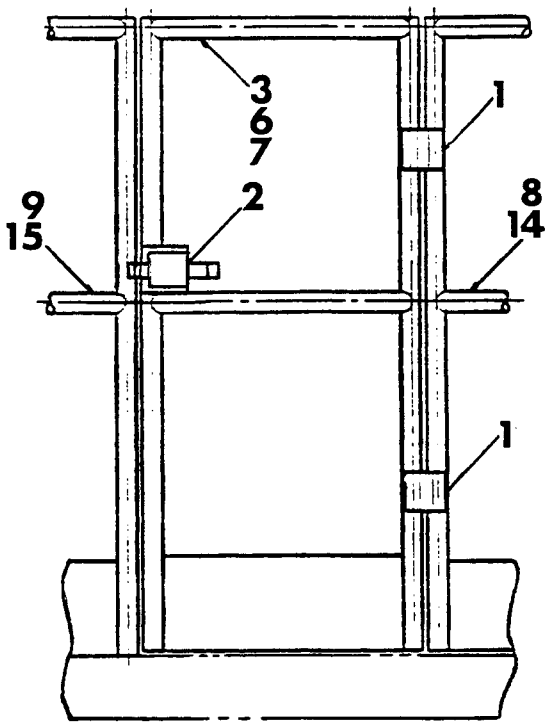
ITEM	PART NUMBER	DESCRIPTION	QTY
10B-	30935	GROUND CONTROL BOX ASSEMBLY	1
-1	31089	GROUND CONTROL BOX MACHINING	1
-2	30897	DECAL - GROUND CONTROL BOX	1
-3	62612	ROUND SLOTTED HEAD MACHINE SCREW - NO. 8-32 UNC X 1/2	4
-4	63312	SLIT LOCK WASHER - NO. 8	6
-5	61502	HEX NUT - NO. 8-32 UNC	6
-6	2717	IGNITION SWITCH	1
-7	20562	CIRCUIT BREAKER	2
-8	20571	HOUR METER	1
-9	62623	ROUND SLOTTED HEAD MACHINE SCREW - NO. 8-32 UNC X 3/4	2
-10	31074	SLOPE SENSOR	1
-11	60309	HEX HEAD CAP SCREW - 1/4-20 UNC X 3/4 (GR. 5)	4
-12	784-A	8 PIN SOCKET	1
-13	117-A	TERMINAL BLOCK END	4
-14	3027	TERMINAL BLOCK	30
-15	2807	STRAIN RELIEF	2
-16	2806	STRAIN RELIEF	4
-17	20481	TOGGLE SWITCH	2
-18	20482	TOGGLE SWITCH	1
-19	4018	SWITCH	1
-20	63301	SPLIT LOCK WASHER - 1/4	4
-21	60701	HEX NUT - 1/4-20 UNC	4
-22	5300	EMERGENCY ON/OFF KNOB	1
-23	70171	RELAY	1
-24	70198	TERMINAL	10
-25	70071	TERMINAL	19
-26	70196	CABLE	1
-27	4034	CABLE	1
-28	16201	CABLE	1
-29	90547	CABLE	1
-30	70036	CABLE	1

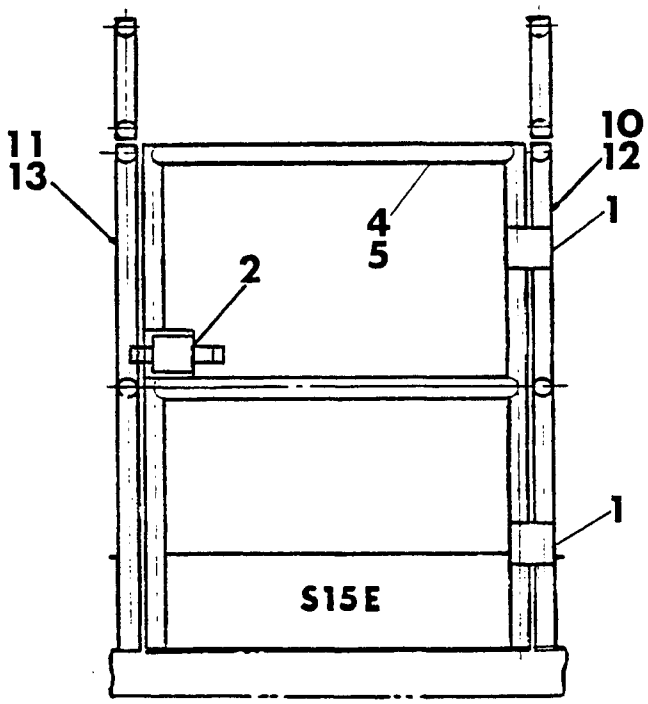
FIGURE 11 - MANUAL OUTRIGGER ASSEMBLY (OPTION) (19E) (S19E) (S19EX)



ITEM	PART NUMBER	DESCRIPTION	QTY
11-	2309	Manual Outrigger Assembly	1
-1	12003	Outrigger	1
-2	7120	Outrigger Mounting Plate	1
-3	7123	Outrigger Slide Tube Assembly	1
-4	60122	Hex Head Bolt 3/8-16 x 1 1/2	2
-5	60703	Hex Nut 3/8-16	2
-6	63303	Lock Washer 3/8	2
	12004	pin, ball-lock detent	

FIGURE 12 - SPRING LOADED GUARD RAIL GATE INSTALLATION (ALL MODELS)



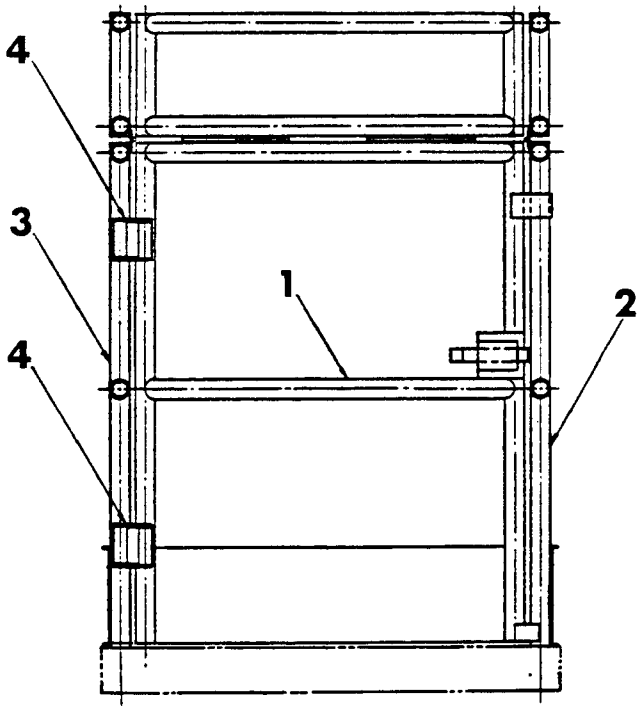


ITEM	PART NUMBER	DESCRIPTION	QTY
NOTE:	UNLESS OTHERWISE STATED, PARTS ARE COMMON FOR ALL MODELS.		
12-	7310 (15E)	Spring Loaded Guard Rail Gate Installation	1
	7311 (S15E)	" " " " " "	1
	7312 (S15EX)	" " " " " "	1
	7313 (19E)	" " " " " "	1
	7314 (S19E)	" " " " " "	1
	(S19EX)	" " " " " "	1
-1	12005	Spring Hinge	2
-2	16231	Latch Bolt	1
-3	6065	Spring Loaded Gate Weldment (15E)	1
-4	6131	" " " " (S15E)	1
-5	6133	" " " " (S15EX)	1
-6	6064	" " " " (19E)	1
-7	6132	" " " " (S19E)(S19EX)	1
-3	7005	Guard Rail - Left Side (15E)	1
-9	7006	Guard Rail - Right Side (15E)	1
-10	7001	Guard Rail - Left Side (S15E)	1

FIGURE 12 - SPRING LOADED GUARD RAIL GATE INSTALLATION (ALL MODELS)

ITEM	PART NUMBER	DESCRIPTION	QTY
-11	7002	Guard Rail - Right Side (S15E)	1
-12	7127	Guard Rail - Left Side (S15EX)	1
-13	7128	Guard Rail - Right Side (S15EX)	1
-14	6022	Guard Rail - Left Side (S19E) (S19EX)	1
-15	6024	Guard Rail - Right Side (S19E) (S19EX)	1

FIGURE 12A - TRAVERSING DECK SPRING LOADED GATE INSTALLATION (S15ETD)



ITEM	PART NUMBER	DESCRIPTION	QTY
12A -	31113	TRAVERSING DECK SPRING LOADED GATE INSTALLATION	1
-1	31112	SPRING LOADED GATE WELDMENT	1
-2	31111	RIGHT SIDE GUARD RAIL	1
-3	31110	LEFT SIDE GUARD RAIL	1
-4	12005	SPRING HINGE	2

FIGURE 13 - BELLY PAN COMPONENT BOX PANEL ASSEMBLY (ALL MODELS)

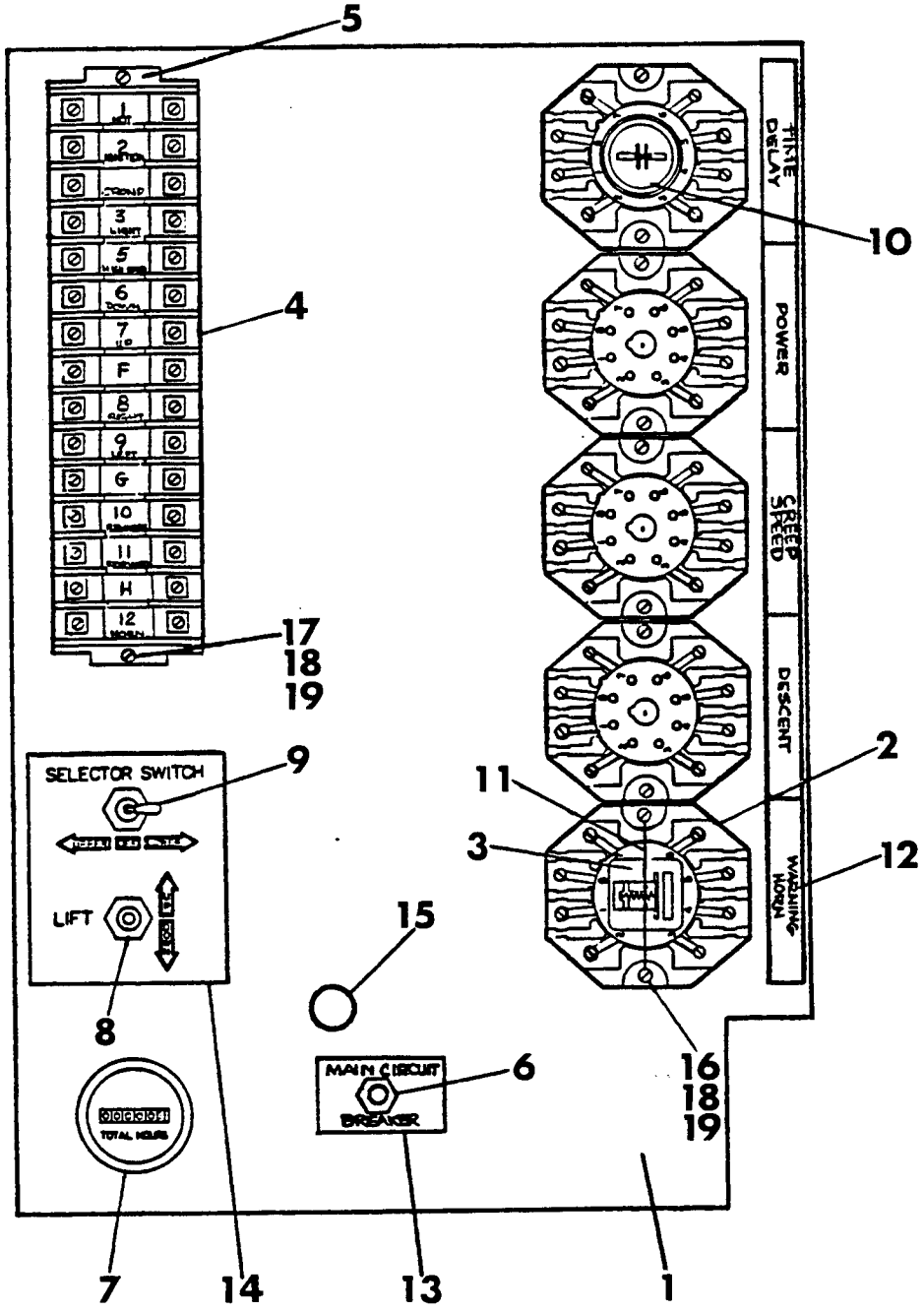
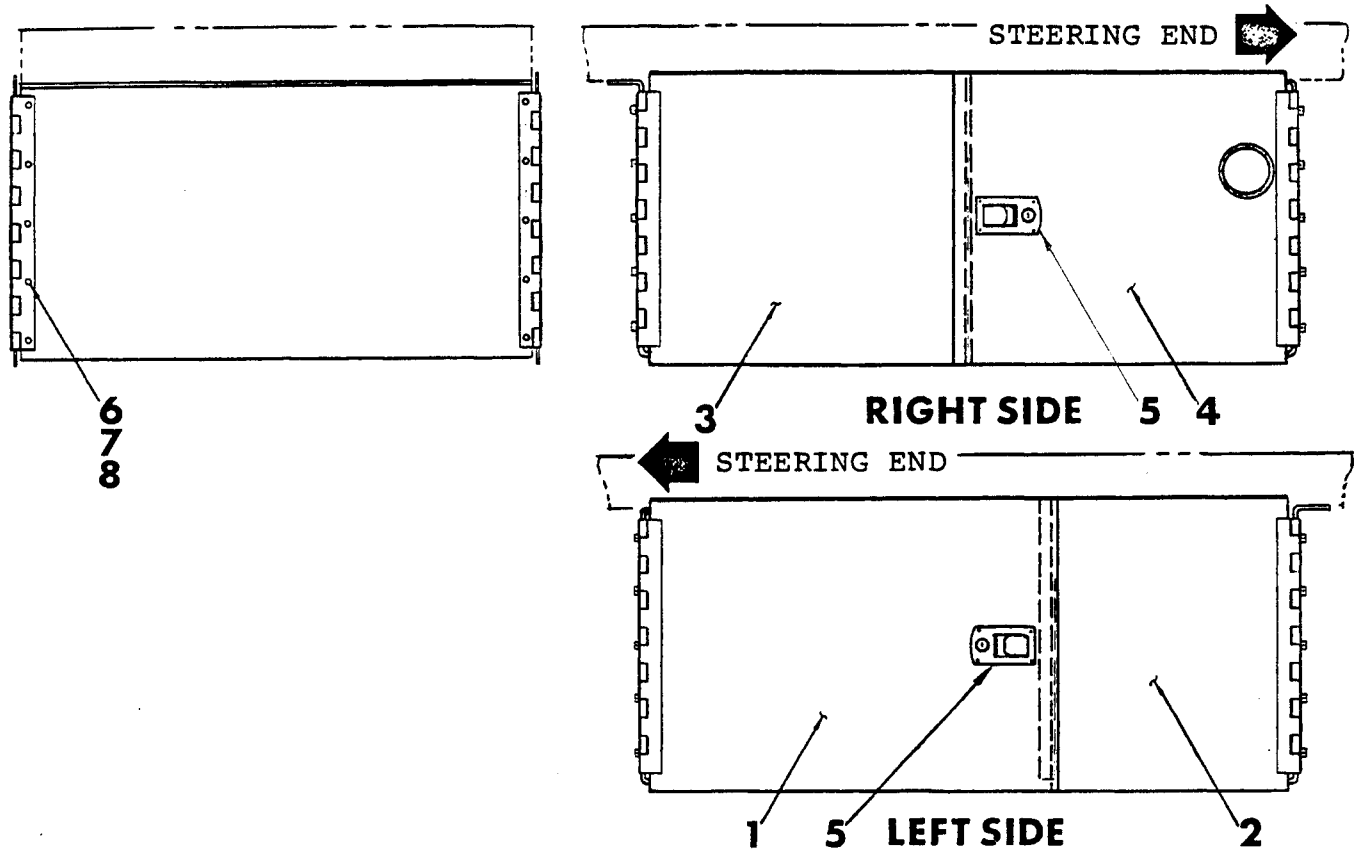


FIGURE 13-BELLY PAN COMPONENT BOX PANEL ASSEMBLY (ALL MODELS)

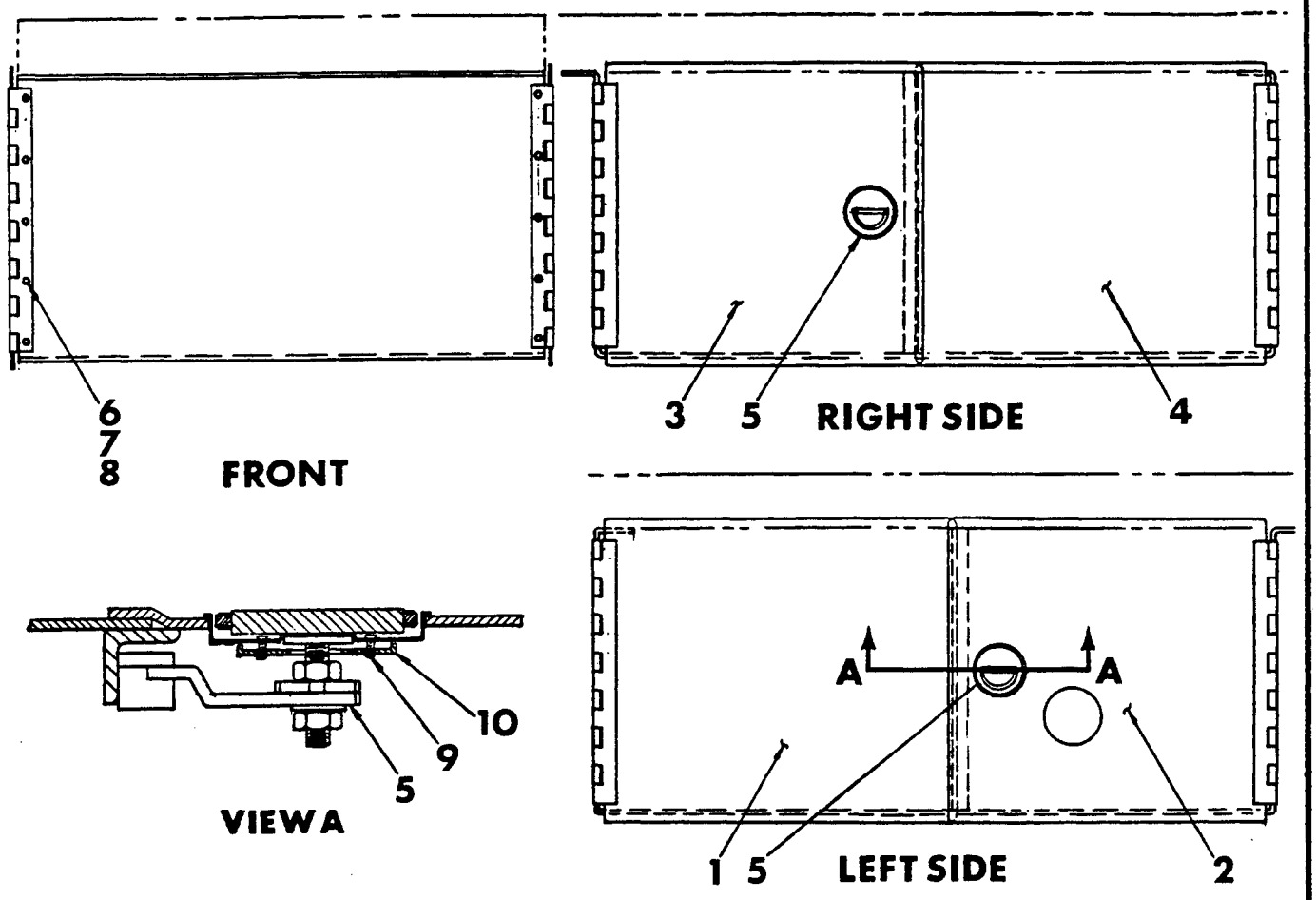
ITEM	PART NUMBER	DESCRIPTION	QTY
13-	30402	PANEL ASSEMBLY (15E) (S15E) (19E) (S19E)	1
	30768	PANEL ASSEMBLY (S15EX) (S19EX)	
-1	30401	RELAY MOUNTING BRACKET	1
-2	784A	8 PIN SOCKET	5
-3	4032	RELAY	3
		RELAY-WARNING HORN (OPTION)	1
-4	4027	TERMINAL BLOCK	15
-5	117A	TERMINAL BLOCK END	1
-6	20562	CIRCUIT BREAKER	1
-7	20571	HOURMETER (OPTION)	1
-8	20481	LIFT SWITCH	1
-9	4019	SELECTOR SWITCH	1
-10	20523	TIME DELAY RELAY	1
-11	30215	RELAY HOLD DOWN	3
		RELAY HOLD DOWN-WARNING HORN (OPTION)	1
-12	30406	DECAL-RELAYS	1
-13	30405	DECAL-CIRCUIT BREAKER	1
-14	30404	DECAL-SELECTOR SWITCH	1
-15	16298	GROMMET	1
-16	62601	ROUND HEAD SLOTTED SCREW 6-32UNC X 3/8	10
-17	62609	ROUND HEAD SLOTTED SCREW 6-32UNC X 1/2	2
-18	63311	LOCKWASHER-No. 6	12
-19	61501	HEX NUT-6-32UNC	12

FIGURE 14 - BELLY PAN DOOR INSTALLATION (15E) (S15E) (S15EX)



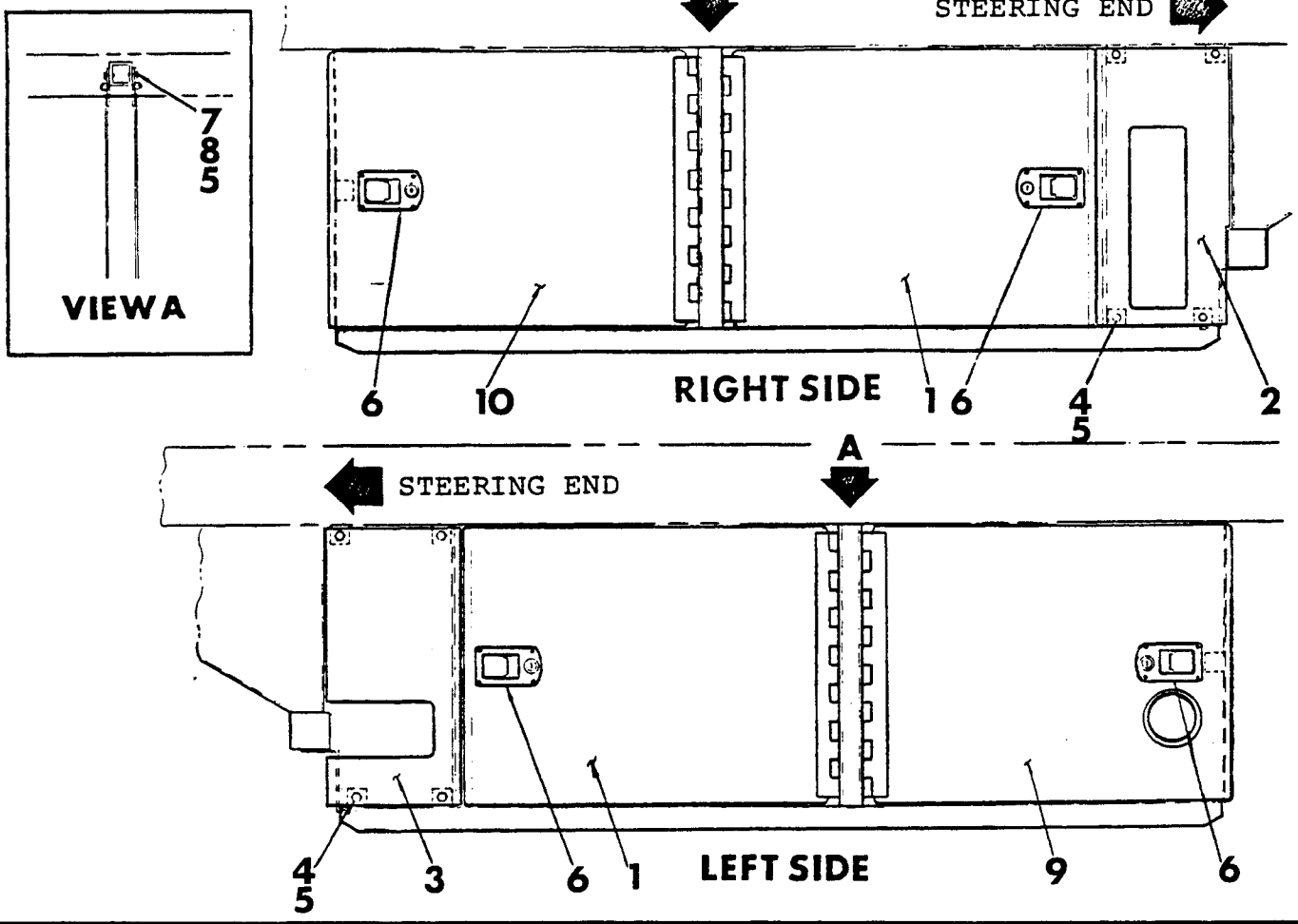
ITEM	PART NUMBER	DESCRIPTION	QTY
14-	30361	Belly Pan Door Installation	1
-1	30363	Door - Left Front	1
-2	30362	Door - Left Rear	1
-3	30365	Door - Right Rear	1
-4	30364	Door - Right Front	1
-5	30446	Paddle Handle Recessed Door Lock-5-4860	2
-6	60107	Hex Head Capscrew 1/4-20 UNC x 5/8	20
-7	63301	Lockwasher 1/4	20
-8	60701	Hex Nut - 1/4-20 UNC	20

FIGURE 14.1-BELLY PAN DOOR INSTALLATION (JAN 1982) (15E) (S15E) (S15EX)



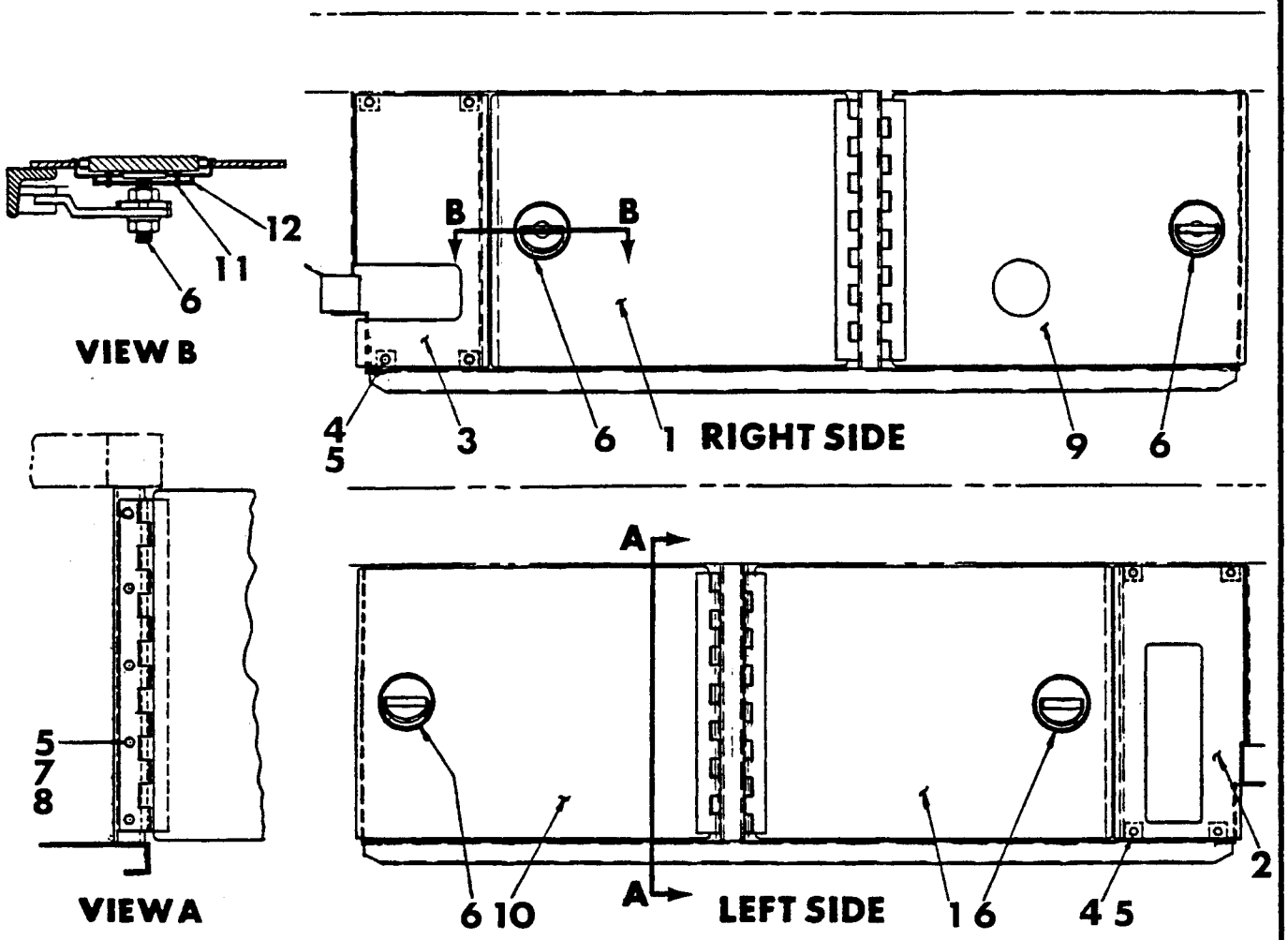
ITEM	PART NUMBER	DESCRIPTION	QTY
14.1-	30361	BELLY PAN DOOR INSTALLATION	1
-1	30365	DOOR-REAR LEFT SIDE	1
-2	30364	DOOR-FRONT LEFT SIDE	1
-3	30363	DOOR-FRONT RIGHT SIDE	1
-4	30362	DOOR-REAR RIGHT SIDE	1
-5	65186	LOCK-RECESSED	2
-6	60342	HEX HEAD CAPSCREW-1/4-20UNC X 5/8	20
-7	63301	LOCKWASHER-1/4	20
-8	60701	HEX NUT-1/4-20UNC	20
-9	62403	FLAT HEAD MACHINE SCREW-NO. 6-32 X 1/2	4
-10	65187	ADAPTER PLATE	2

FIGURE 14A - BELLY PAN DOOR INSTALLATION (19E)



ITEM	PART NUMBER	DESCRIPTION	QTY
14A-	30371	Belly Pan Door Installation	1
-1	30372	Door	2
-2	30374	Cover - Battery Charger	1
-3	30373	Cover - Steering Cylinder	1
-4	60107	Hex Head Capscrew 1/4-20 UNC x 5/8	8
-5	63301	Spring Lockwasher 1/4	18
-6	30446	Paddle Handle Recessed Door Lock-5-4860	4
-7	60135	Hex Head Capscrew - ¼-20 UNC X 1¼	10
-8	63401	Flat Washer - ¼	8
-9	30425	Door	1
-10	30424	Door	1

FIGURE 14A.1-BELLY PAN DOOR INSTALLATION (JAN 1982) (19E)

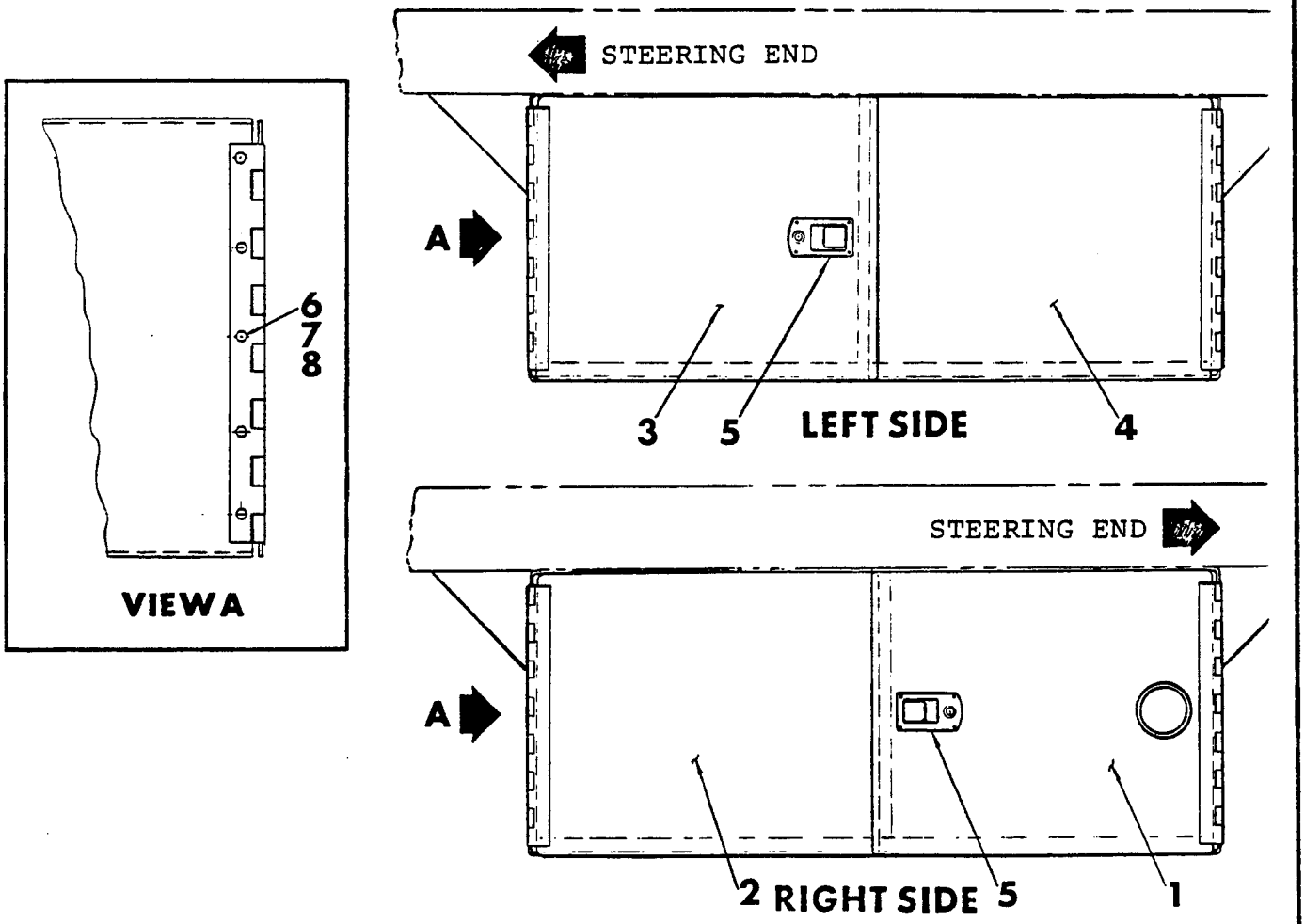


ITEM	PART NUMBER	DESCRIPTION	QTY
14A.1	30371	BELLY PAN DOOR INSTALLATION	1
-1	30372	DOOR	2
-2	30374	BATTERY CHARGER COVER	1
-3	30373	STEERING CYLINDER COVER	1
-4	60342	HEX HEAD CAPSCREW-1/4-20UNC X 5/8	8
-5	63301	LOCKWASHER-1/4	18
-6	65186	LOCK-RECESSED	4
-7	60135	HEX HEAD CAPSCREW-1/4-20UNC X 1 1/4	10
-8	63423	PLAIN WASHER-1/4 TYPE B SERIES "N"	8
-9	30425	DOOR	1
-10	30424	DOOR	1

FIGURE 14A.1-BELLY PAN DOOR INSTALLATION
(JAN 1982) (19E)

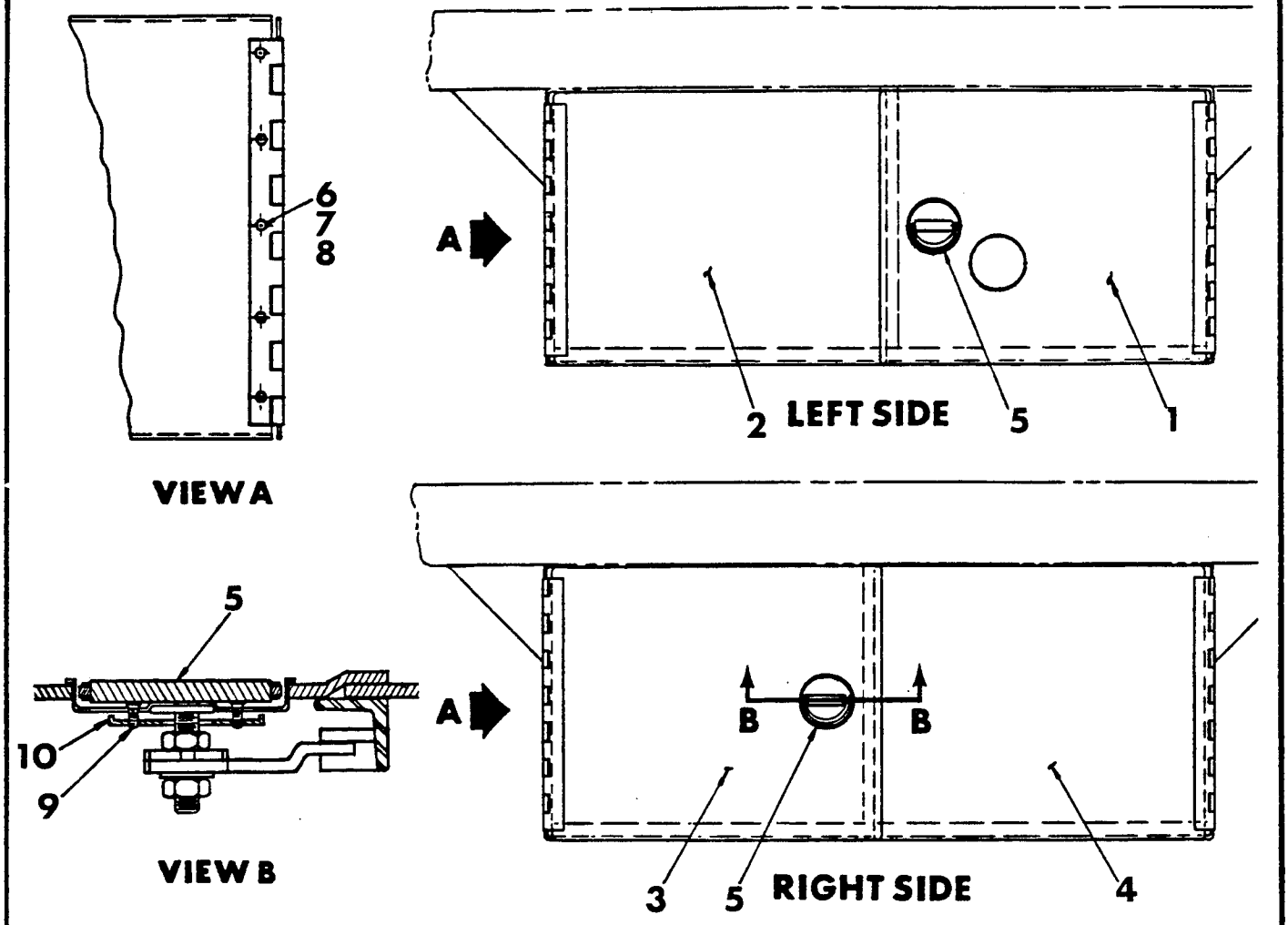
ITEM	PART NUMBER	DESCRIPTION	QTY
-11	62403	SLOTTED FLAT HEAD SCREW NO. 6-32UNC X 1/2	8
-12	65187	ADAPTER PLATE	4

FIGURE 14B - BELLY PAN DOOR INSTALLATION (S19E) (S19EX)



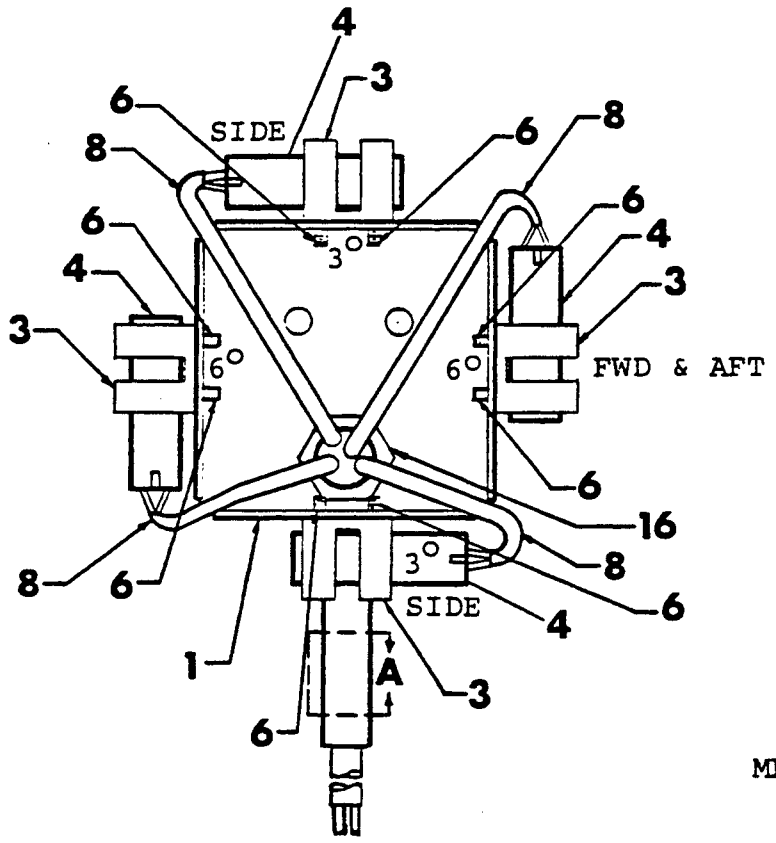
ITEM	PART NUMBER	DESCRIPTION	QTY
14B-	30366	Belly Pan Door Installation	1
-1	30369	Door - Right Front	1
-2	30370	Door - Right Rear	1
-3	30367	Door - Left Front	1
-4	30368	Door - Left Rear	1
-5	30446	Paddle Handle Recessed Door Lock	2
-6	60123	Hex Head Capscrew 1/4-20 UNC x 3/4	20
-7	63301	Split Lockwasher - 1/4	20
-8	60701	Hex Nut - 1/4-20 UNC	20

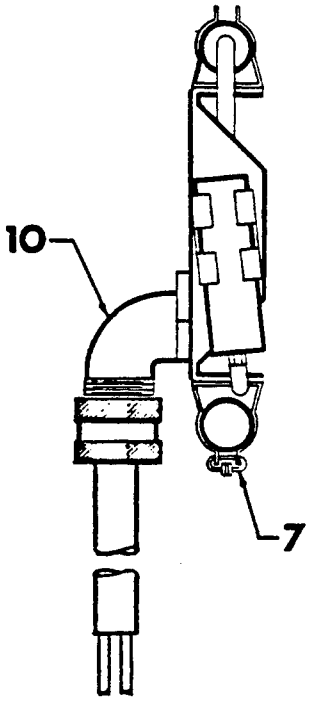
FIGURE 14B.1-BELLY PAN DOOR INSTALLATION (JAN 1982) (S19E) (S19EX)



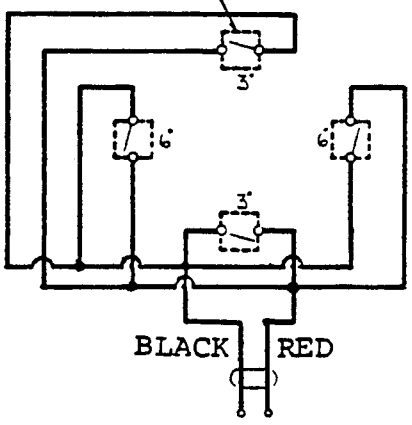
ITEM	PART NUMBER	DESCRIPTION	QTY
14B.1	30366	BELLY PAN DOOR INSTALLATION	1
-1	30369	DOOR-FRONT LEFT SIDE	1
-2	30370	DOOR-REAR LEFT SIDE	1
-3	30367	DOOR-FRONT RIGHT SIDE	1
-4	30368	DOOR-REAR RIGHT SIDE	1
-5	65186	LOCK-RECESSED	2
-6	60342	HEX HEAD CAPSCREW-1/4-20UNC X 3/4	20
-7	63301	LOCKWASHER-1/4	20
-8	60701	HEX NUT-1/4-20UNC	20
-9	62403	FLAT HEAD MACHINE SCREW-NO. 6-32 X 1/2	4
-10	65187	ADAPTER PLATE	2

FIGURE 15 - TILT SWITCH ASSEMBLY & INSTALLATION (ALL MODELS)

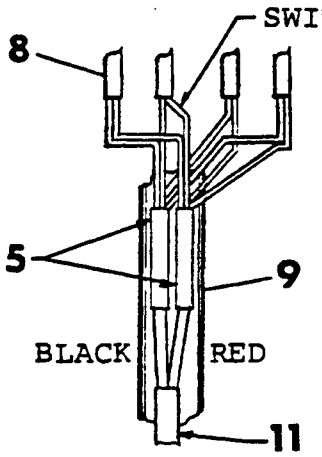




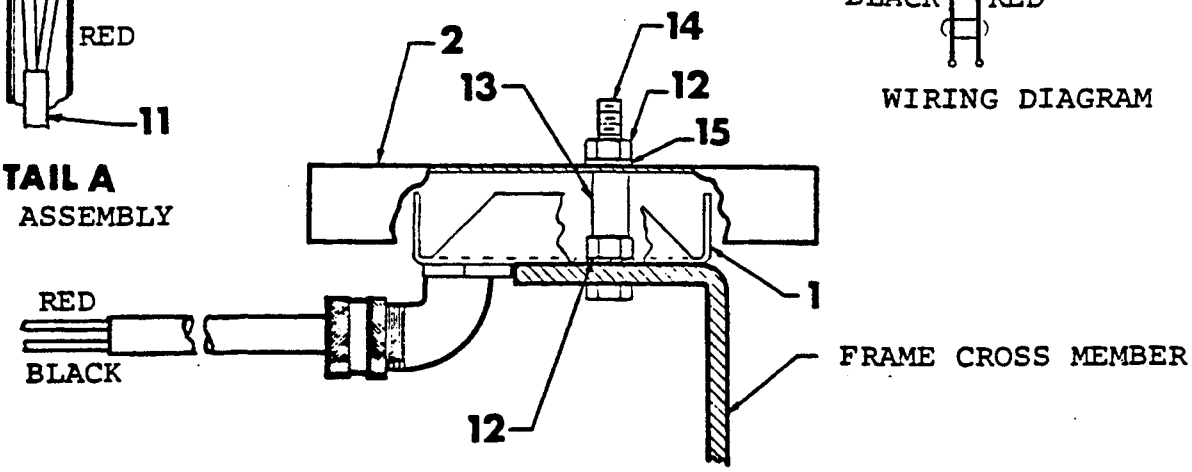
MERCURY SWITCH 4 PLCS.



WIRING DIAGRAM



DETAIL A
WIRING ASSEMBLY

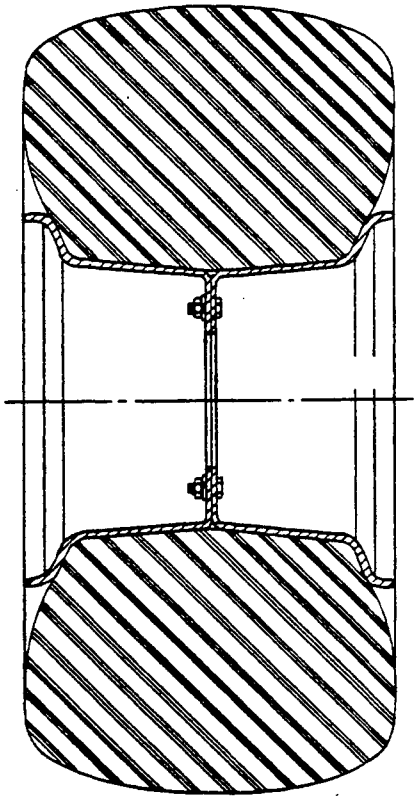


TILT SWITCH INSTALLATION

FIGURE 15 - TILT SWITCH ASSEMBLY & INSTALLATION (ALL MODELS)

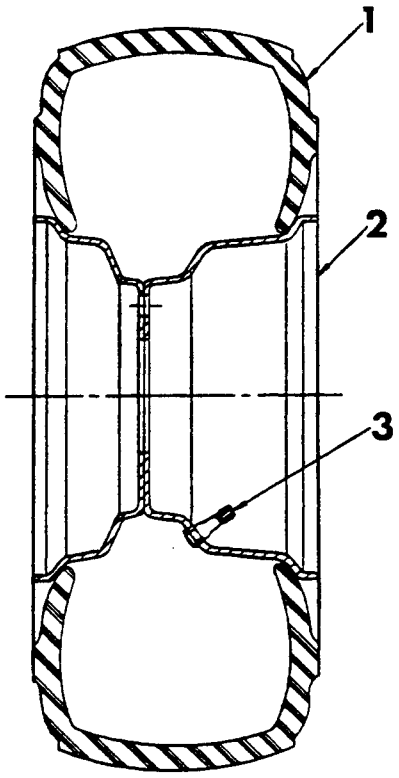
ITEM	PART NUMBER	DESCRIPTION	QTY
15-	30387	TILT SWITCH ASSEMBLY	1
-1	30385	TILT SWITCH BRACKET	1
-2	30386	TILT SWITCH COVER	1
-3	199 A	SWITCH BRACKET	4
-4	4014	MERCURY SWITCH	4
-5	117-D	BUTT CONNECTOR	2
-6	62605	ROUND HEAD SCREW 4-40 X ¼	8
-7	2626	SAFETY WIRE	8
-8	16307	ELECTRICAL SLEEVING	4
-9	16306	ELECTRICAL SLEEVING	2
-10	16308	90° CONNECTOR	1
-11	70023	ELECTRIC CABLE - 2 conductor X 16 AWG	1
-12	60701	HEX NUT ¼-20	4
-13	35158	SPACER 3/8 O.D. X ¼ I.D. X 3/4	2
-14	60119	HEX HEAD CAPSCREW ¼ - 20 X 1 3/4	2
-15	63301	LOCK WASHER ¼	2
-16	65129	HEX LOCK NUT - ½ BL 50 BONDING TYPE	1

FIGURE 16-TIRE & WHEEL ASSEMBLY-SOLID (15E) (S15E) (S15EX)



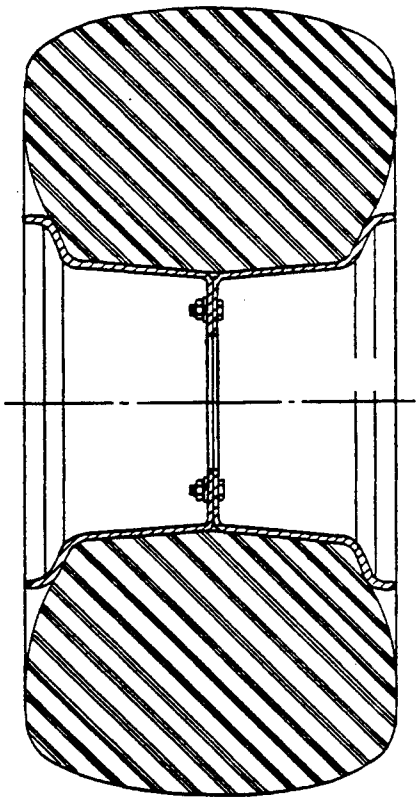
ITEM	PART NUMBER	DESCRIPTION	QTY
16-	30786	TIRE & WHEEL ASSEMBLY-SOLID	1

FIGURE 16A-TIRE & WHEEL ASSEMBLY (19E)



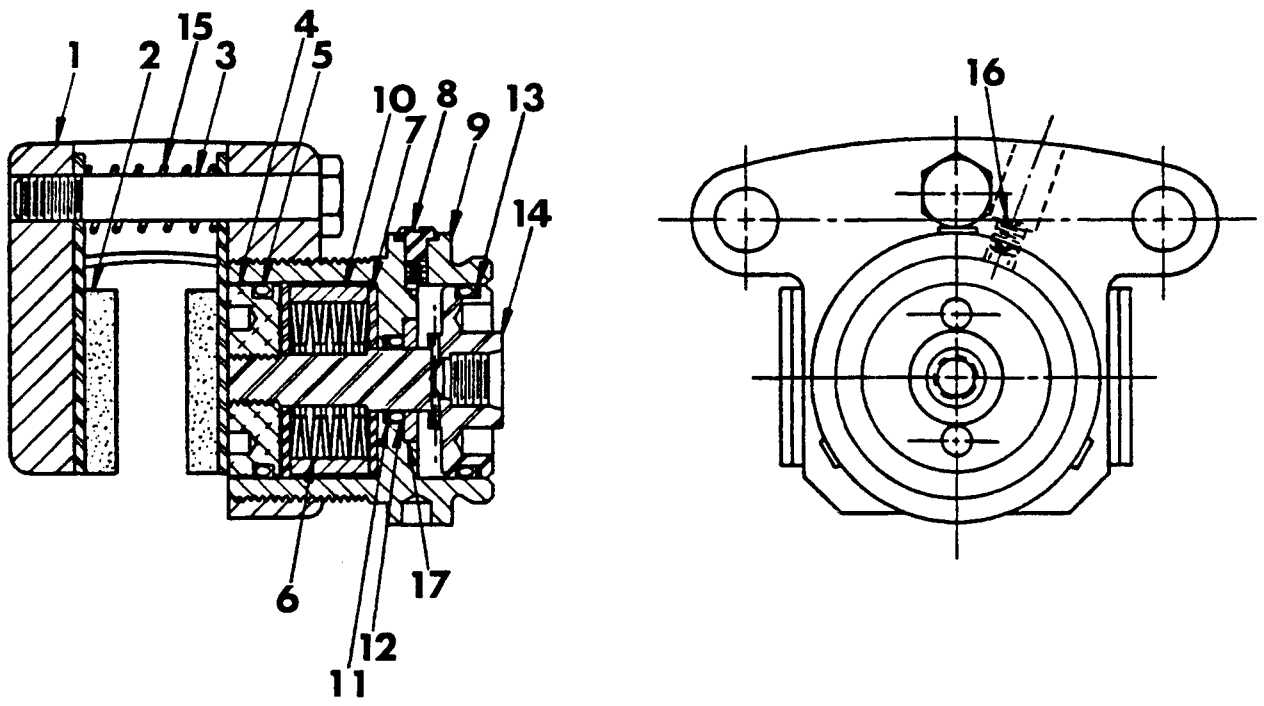
ITEM	PART NUMBER	DESCRIPTION	QTY
16A-	30785	TIRE & WHEEL ASSEMBLY	1
-1		TIRE-ULTRA-TRAC ARMSTRONG "MONOFILL"	
-2		WHEEL	1
-3	2252	VALVE STEM	1

FIGURE 16B-TIRE & WHEEL ASSEMBLY (S19E) (S19EX)



ITEM	PART NUMBER	DESCRIPTION	QTY
16B-	30787	TIRE & WHEEL ASSEMBLY-SOLID	1

FIGURE 17-CALIPER DISC BRAKE (APRIL 1982)(ALL MODELS)

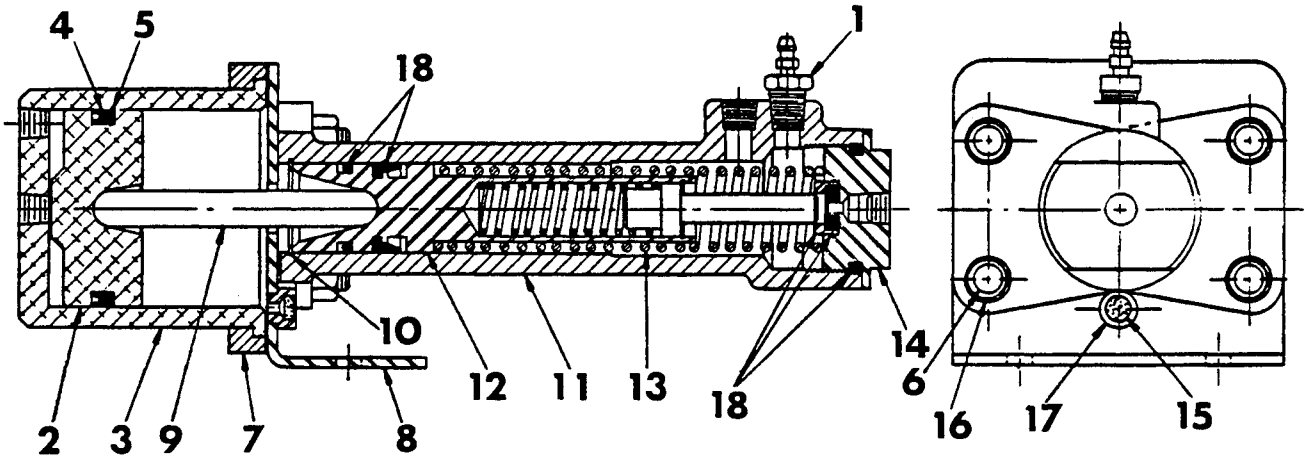


ITEM	PART NUMBER	DESCRIPTION	QTY
17-	30822	CALIPER DISC BRAKE (SERIES 515-SPRING APPLY)	1
-1	66276	CALIPER	1
-2	66277	LINING ASSEMBLY	2
-3	66278	CAP SCREW	1
-4	66279	PISTON	1
-5	66280 *	O-RING	2
-6	66281	BELLEVILLE SPRING	10
-7	66282	WASHER	2
-8	66283 *	BLEEDER SCREW	3
-9	66284	HOUSING	1
-10	66285	SPACER	1
-11	66286 *	BACK-UP RING	1
-12	66287 *	O-RING	1
-13	66288	BACK-UP RING	1
-14	66289	PISTON	1
	68679	repair kit (inc. *)	

FIGURE 17-CALIPER DISC BRAKE (APRIL 1982)(ALL MODELS)

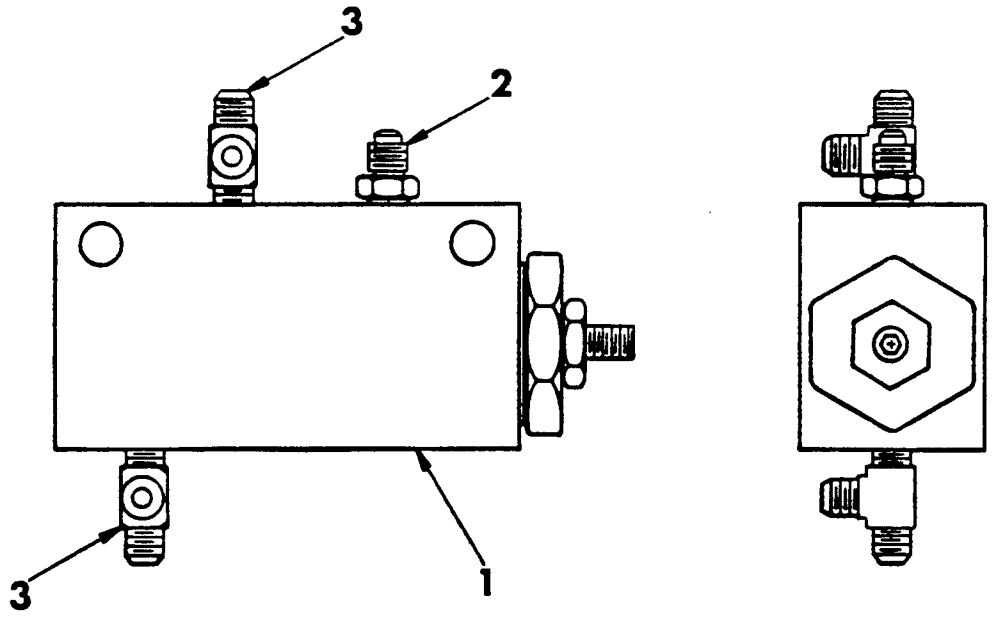
ITEM	PART NUMBER	DESCRIPTION	QTY
-15	66290	SPRING	1
-16	66291	SET SCREW	1
-17	66292	INSERT	1

FIGURE 17A-DISC BRAKE INTENSIFIER ASSEMBLY (APRIL 1982) (ALL MODELS)



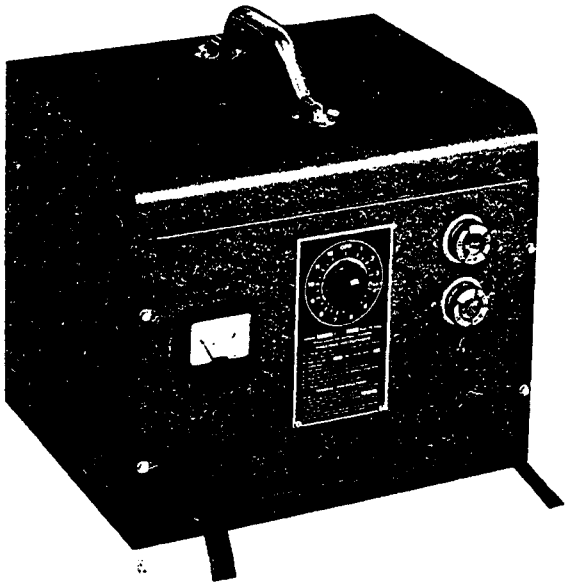
ITEM	PART NUMBER	DESCRIPTION	QTY
-17A	30829	DISC BRAKE INTENSIFIER ASSEMBLY	1
-1	66303	BLEEDER SCREW ASSEMBLY	1
-2	66304	PISTON	1
-3	66305	HOUSING	1
-4	66306	SEAL	1
-5	66307	BACK-UP WASHER	1
-6	66308	SCREW	4
-7	66309	RETAINER	1
-8	66310	BRACKET	1
-9	66311	PUSH ROD	1
-10	66312	SNAP RING	1
-11	66313	HOUSING	1
-12	66314	PISTON ASSEMBLY	1
-13	66315	SPRING	1
-14	66316	END PLUG ASSEMBLY	1
-15	66320	SNUBBER	1
-16	66318	LOCK NUT	4
-17	66319	ADAPTOR	1
-18	66332	REPAIR KIT (INCLUDES ITEMS 2,4 & 5)	1

FIGURE 17B - PRESSURE REDUCING VALVE ASSEMBLY (ALL MODELS)



ITEM	PART NUMBER	DESCRIPTION	QTY
17B-	30745	PRESSURE REDUCING VALVE ASSEMBLY (ALL MODELS)	1
-1	21734	PRESSURE REDUCING VALVE	1
-2	2415	MALE CONNECTOR	1
-3	2575	MALE RUN TEE	2

OPERATING & SERVICING
HANDBOOK



SINCE 1929

CHRISTIE

ELECTRIC CORP.

SERIES "L" BATTERY CHARGERS

INTRODUCTION

This handbook describes the installation, operation, trouble shooting, and repair of the CHRISTIE Series L portable and built-in battery chargers. These units are self-contained, fully automatic, ruggedized, commercial battery chargers, designed for operation on the normal electrical service. The output of the Series L charger is regulated by use of a resonance transformer. The built-in model is permanentaly mounted on the battery powered vehicle.

SPECIFICATIONS

INPUT POWER	115 Volts; 60 Hz
OUTPUT VOLTAGE	12,24 or 36 volts, DC
OUTPUT CURRENT	25 to 40 Amp
OUTPUT MONITOR	Ammeter
OUTPUT CONTROL	12 or 24 hour Automatic Timer
TRANSFORMER PROTECTION-	D-C output fuses
PERSONNEL PROTECTION	Grounded cabinet (3rd wire)

INSPECTION AND INSTALLATION

Inspect the exterior of the shipping container for visual signs of rough handling during shipment

Remove the charger from the shipping container and inspect the exterior of the unit for damage (broken glass, cracked knobs, etc.). CLAIMS FOR SHIPPING DAMAGE SHOULD BE FILED WITH THE CARRIER.

Install the charger on any suitable working surface so that there is free access to the front (control) panel and at least six (6) inches of free clearance on each side. There should be at least two (2) inches of clearance on the top of the charger. (The charger may be suspended overhead by the handle.) The clearance is required to allow proper flow of air through the side and top louvers for cooling.

There must be a separately fused, three-wire, single-phase, 115 volt, power receptacle sufficient rating (see A-C Amp in table on back page) within reach of the AC input cord of the charger.

OPERATING INSTRUCTION.

1. Connect the AC plug to a suitable power receptacle.
2. Connect the DC plug to the battery receptacle (permanently connected on built-in models).

NOTE

Check the output plug for the correct polarity.
The WHITE or RED lead must be connected to the POSITIVE terminal
The BLACK lead must be connected to the NEGATIVE terminal

3. Turn the charger ON by setting the timer to the desired charging time (See Charging Time Chart).
4. Verify that the OUTPUT METER indicates a charging current. (If it does not, see TROUBLE SHOOTING SECTION.)
5. The timer control will turn off the charger (positive turn-off feature) at the completion of the charge cycle.
6. Disconnect the battery from the charger (on built-in model disconnect the AC cord).
7. Using a hydrometer, verify that the battery has been properly charged.

TROUBLE SHOOTING & REPAIR INSTRUCTIONS

LOW OR NO CHARGING CURRENT

1. Verify that the battery being charged has no open or dead cells. Check jumper cables between batteries for tight and clean connections,and also verify that the battery is not already fully charged.
2. Check the output fuses of the charger.
3. Verify that the AC receptacle has power by plugging in an electrical appliance.
4. Turn the charger ON and verify that the transformer hums. If no hum is heard, proceed with step 4.1.
   - 4.1 Remove the cabinet cover to gain access to the interior of the charger.
   - 4.2 On larger chargers furnished with a power relay (see wiring diagram)verify that the relay accuates when charger is turned on. If relay does not close, check continuity across relay coil.Also check for burned or damaged relay contacts
   - 4.3 Disconnect the transformer primary leads from the timer assembly or power relay. Check for continuity between the primary input leads of the transformer on the terminal board. If no continuity is found, replace the transformer. If continuity is found proceed as follows:
   - 4.4 With the timer switch ON, check for continuity across the switch. If the switch is open with the timer on, replace the timer assembly.

CHARGING TIME CHART

The following chart provides useful information for determining the minimum charging time needed to restore a battery to a full charge condition. In addition to normal charging, the cells of the batteries should be equalized twice each month. This is done by charging the batteries an additional seven (7) hours after a normal charge cycle. The current indications of the ammeter will be low during cell equalization.

Specific Gravity Reading	Condition of Battery	Hours Needed* to Charge
1100	fully discharged	12
1125	10% charged	10
1150	20% charged	8
1175	30% charged	7
1200	60% charged	4
1225	75% charged	2
1250	95% charged	1/2
1260	fully charged	0

*Charging time will vary with the AH capacity of the battery.

INSPECTION OF BATTERIES AND ASSOCIATED CIRCUITS

An inspection of batteries and associated circuits is required often to assure that the batteries are capable of being fully charged. This inspection requires the use of a single-cell voltmeter, a hydrometer and a continuity tester.

1. Verify that all connections within the unit to be charged are clean and tight.

2. Check each battery for loose terminal posts.

3. Test for continuity between all battery terminals and the charging receptacle.

4. Verify that the top of each battery is free of moisture, grease and acid flims which may cause a current leakage.

5. Test each individual cell in each battery after recharging with the hydrometer to verify that all specific gravity readings are within 10 points of one another.

6. Using the hydrometer, pull out acid from a cell and then vigorously expel the acid back into the cell to cause a violent stirring action. Immediately draw out another sample of acid and visually inspect it to see if it contains a brownish sediment (indicates positive plates are deteriorated).

IMPORTANT FACTS ON BATTERIES AND CHARGERS

Do not discard a good battery as being defective because its specific gravity does not show an increase immediately upon applying a charge. Many good batteries require a charging period as long as three (3) hours before they show any increase in the specific gravity.

Do not charge a battery if the electrolyte temperature could rise above 120°F. This could damage both battery and charger. As a rule of thumb, the electrolyte temperature during normal charging is about 25°F above the local air temperature.

There are only two test methods to determine if a discharged battery is defective without applying a charge. These tests are given in steps 5 and 6 of the INSPECTION OF BATTERIES AND ASSOCIATED CIRCUITS. Voltage testing methods without fully charging or made while charging have no relationship to battery defectiveness.

Failure to keep the battery electrolyte to the proper level will result in a crumbling (abnormal sulfation) of the plates and cause failure of the battery. Distilled water must be added to the battery regularly to make up for the loss due to evaporation, especially during periods of high charging rates. Add water only to fully charged batteries.

Both overcharging and undercharging can cause a premature failure of a battery. Overcharging destroys the positive plates. Consistent undercharging causes a buckling of the plates.

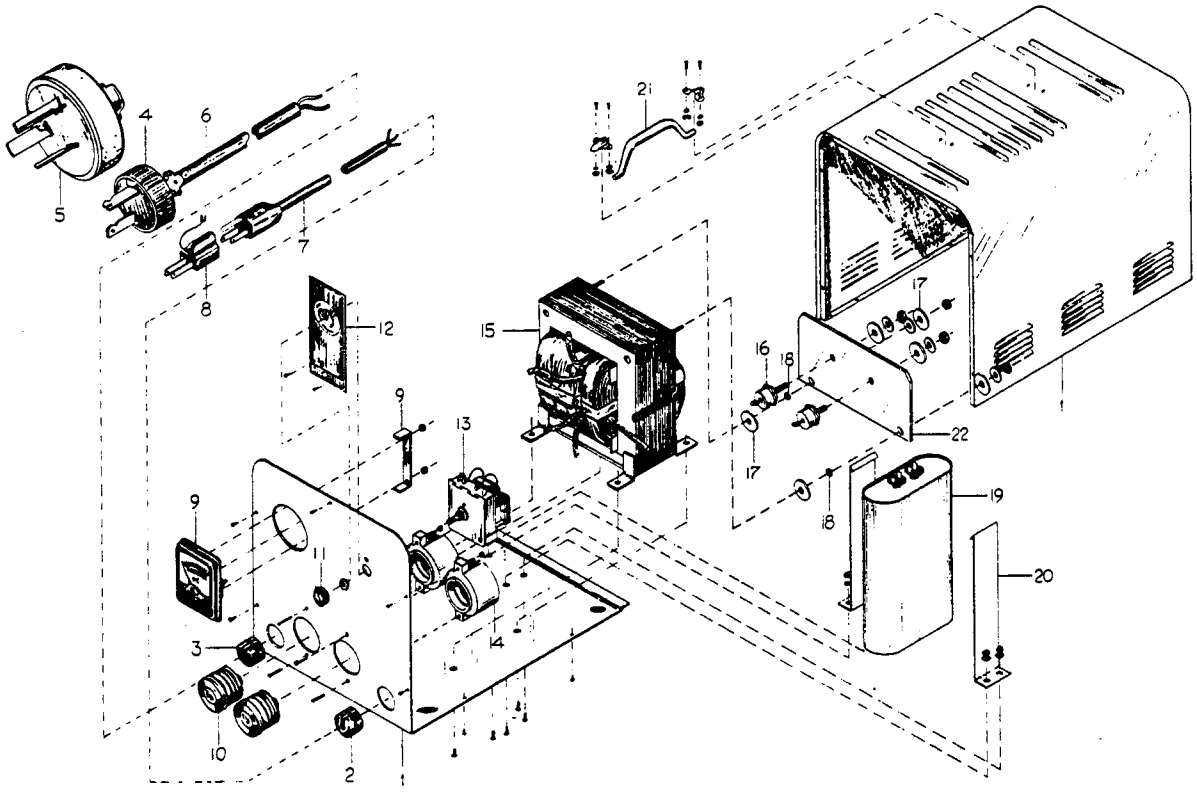
OUTPUT FUSES BLOW

7. Verify that the circuit under charge is not shorted by disconnecting the charger and operating it disconnected.
8. If fuses continue to blow, test the charger as per steps 5.1 through 5.13.

TIMER DOES NOT TURN UNIT OFF

9. Indicates that timer motor or switch is faulty. Replace timer assembly.

EXPLODED DIAGRAM (Typical Charger)



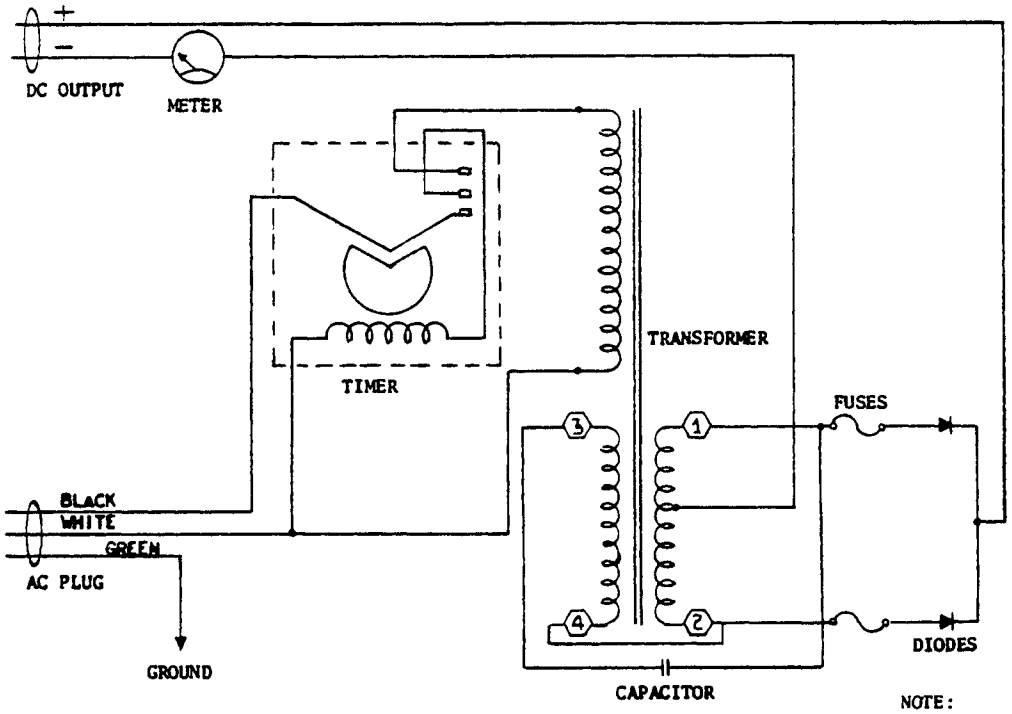
CHRISTIE SERIES "L" BATTERY CHARGERS

PARTS LIST

	Item		Item		Item
1	Portable Cabinet	9	Ammeter	18	Washer Assembly (3/8")
2	Bushing (AC)	10	Fuse	19	Capacitor
3	Bushing (DC)	11	Control knob	20	Bracket Set
4	DC Plug (2 prongs)	12	Timer Dial	21	Handle Assembly
5	DC Plug (3 prongs)	13	Timer Assembly (12 hr.)	22	Heat Sink
6	Output Cord	13	Timer Assembly (24 hr.)		
7	AC Cord and Plug (portable)	14	Fuse Holder		
		15	Transformer		
7	Recessed Male Plug (built-in model)	16	Diode		
8	Adaptor	17	Washer Assembly (3/4")		

When ordering parts, please specify both serial number and model.

Wiring Diagram Models 1225L, 2425L and 3625L
(Separate appropriate diagram is furnished for other models)



NOTE
1) Make voltage checks with capacitor disconnected.

Test Voltages (tp 1 & 2)

Model	Vac
1225	22
2425	42

Test Voltages (tp 3 & 4)

Model	Vac
1225	180
2425	180

NOTE:
SCHEMATIC SHOWS DIAGRAM FOR TIMER MANUFACTURED BY MALLORY TIMERS AND USED ON CHGRS MANUFACTURED AFTER 4/1/76.

CHRISTIE SERIES "L" CHARGERS

4.5 If all of the foregoing checks indicate continuity, but the transformer does not hum, check for loose or broken leads between the AC plug, timer assembly, and terminal board.

5. If the transformer hums, proceed as follows:

5.1 Check the output fuses to insure they are good. Inspect the fuse holders for damage or a blackened appearance. (If the fuse holder is blackened it indicates oxidation and should be replaced.)

5.2 Remove the cabinet cover to gain access to the interior of the charger.

5.3 Disconnect the capacitor or capacitors for the following test:

5.4 Remove one of the output fuses. With the timer switch OFF, check for continuity across the DC output, connecting the continuity indicator first in one direction and then in the other. The indicator should show an open in one direction and continuity in the other

5.5 Repeat step 5.4 interchanging the condition of the two output fuses.

5.6 If the indications obtained in steps 5.4 and 5.5 are normal, the secondary of the transformer is shorted, and it should be replaced. If a short is measured in both directions in either step 5.4 or 5.5, the diode associated with the installed fuse is defective and should be replaced. If the indications in both directions in either step 5.4 or 5.5 are open, then the diode or transformer secondary may be open.

5.7 To isolate the defective part with one of the output fuses installed, check for continuity between its fuse holder and both terminals of the output ammeter. If continuity exists between the fuse holder and one of the meter terminals but not the other, the meter and the shunt are defective and must be replaced.

5.8 If continuity exists, repeat step 5.7 by interchanging fuses and connecting the continuity meter to the other fuse holder.

5.9 If continuity does not exist in either step 5.7 or 5.8, the transformer secondary may be open. Check for continuity directly across the transformer secondary with both output fuses removed.

5.10 If all indications to this point are normal, test the entire DC output circuitry for continuity by progressing from the +DC output terminal to the -DC terminal in incremental test sections, checking for open circuits and poor connections.

5.11 Test the resonance transformer for continuity between test points (3) and (4). If open replace transformer.

5.12 Test the resonance transformer under operating conditions by making the voltage measurements noted in the schematic diagram. Replace the transformer if these voltages are not normal.

5.13 Remove one lead from capacitor. Check across capacitor for continuity. If continuity exists, replace capacitor.

AC LINE FUSES BLOW

6. With unit unplugged and timer turned ON, check for continuity between each input prong of the AC plug and the ground prong. If all indications are open, the transformer or timer is shorted Operate the timer with the transformer disconnected to isolate the faulty item. If continuity is found, a short circuit exists and must be found and removed.

CHRISTIE BATTERY CHARGER REFERENCE CHART

Model			AC Volts	AC Amp	Battery* Amp Hours	DC Volts	DC Amp
Portable	Built-in						
1225L	1225LC		115	4	130/220	12	25
1240L	1240LC		115	5	170/250	12	40
2425L	2425LC	2425LB	115	7	130/220	24	25
2440L	2440LC		115	12	170/250	24	40
3625L	3625LC		115	12	130/220	36	25
3640L	3640LC		115	18	170/250	36	40

*Higher capacity batteries may be charged if longer than 12 hours recharge time is available. Some units are furnished with 24 hr. timers for this purpose.

WARRANTY

CHRISTIE ELECTRIC CORP. agrees to correct any defects in workmanship or material which may develop under proper and normal use by repair or replacement, F.O.B. Los Angeles, California, for a period of one year from date of purchase. The purchaser assumes full responsibility for proper installation and installation adjustments. Parts or equipment claimed defective must be returned to the factory, transportation prepaid, for inspection. If found defective, parts or equipment will be repaired or replaced and returned, transportation collect, to the purchaser. We undertake no responsibility for work done, or expense incurred in connection with repairs or replacements except on specific authority from Christie Electric Corp.

In no event does Christie Electric Corp. assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of these products. There are no warranties, either expressed or implied other than those provided herein.

SINCE 1929

CHRISTIE ELECTRIC CORP.

L-1001
7/77

3410 WEST 67TH STREET • LOS ANGELES, CALIFORNIA 90043 • (213) 750-1151

ASSY. NO. MBD-5007

prestolite.

SERVICE PARTS LIST

PUMP MOTOR
Issued 1-8-79

Application J.S. Barnes

ITEM	SERVICE PART NO.	NO. USED	PART DESCRIPTION
1	MBD-2525	1	ARMATURE
12	MBD-1468A	1	BAND,COVER
5	X-3991	1	BEARING, BALL,SEALED,#201,C.E.
7	X-3990	1	BEARING,BALL,SHIELDED,#203,D.E.
11	MBD-1427	1	FAN
3	MBD-1005PS	1	FIELD COIL PKG.(POLE SCREWS INCL.)
4	MBD-502	1	HEAD, COMM. END
6	MBD-423B	1	HEAD, DRIVE END
8	MBD-1564	1	PLATE ASSEMBLY, BRUSH
9	MBD-19S	1	SPRING SET, BRUSH
2	MBD-1512S	1	BRUSH SET, SERVICE
10	90-2591 +	1	TERMINAL STUD PKG.(HDWE. INCL.)
13	90-701	1	THRUST WASHER PACKAGE

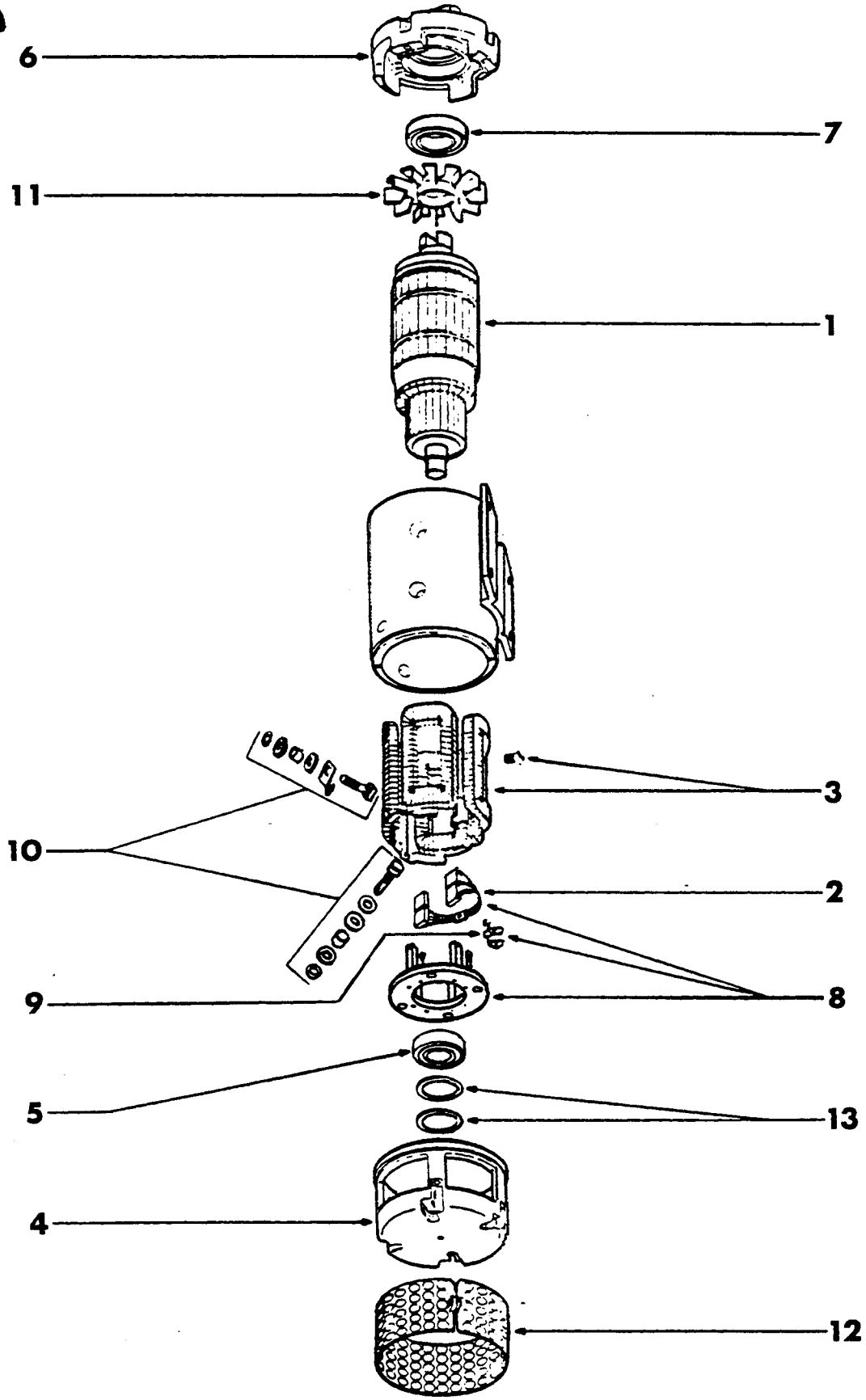
+ Contains additional parts to service other applications.

Note: This is a Ventilated Motor; for totally enclosed version use SP-6058(70-42)Enclosing Kit.

prestolite.

ASSY. NO. MBD-5007

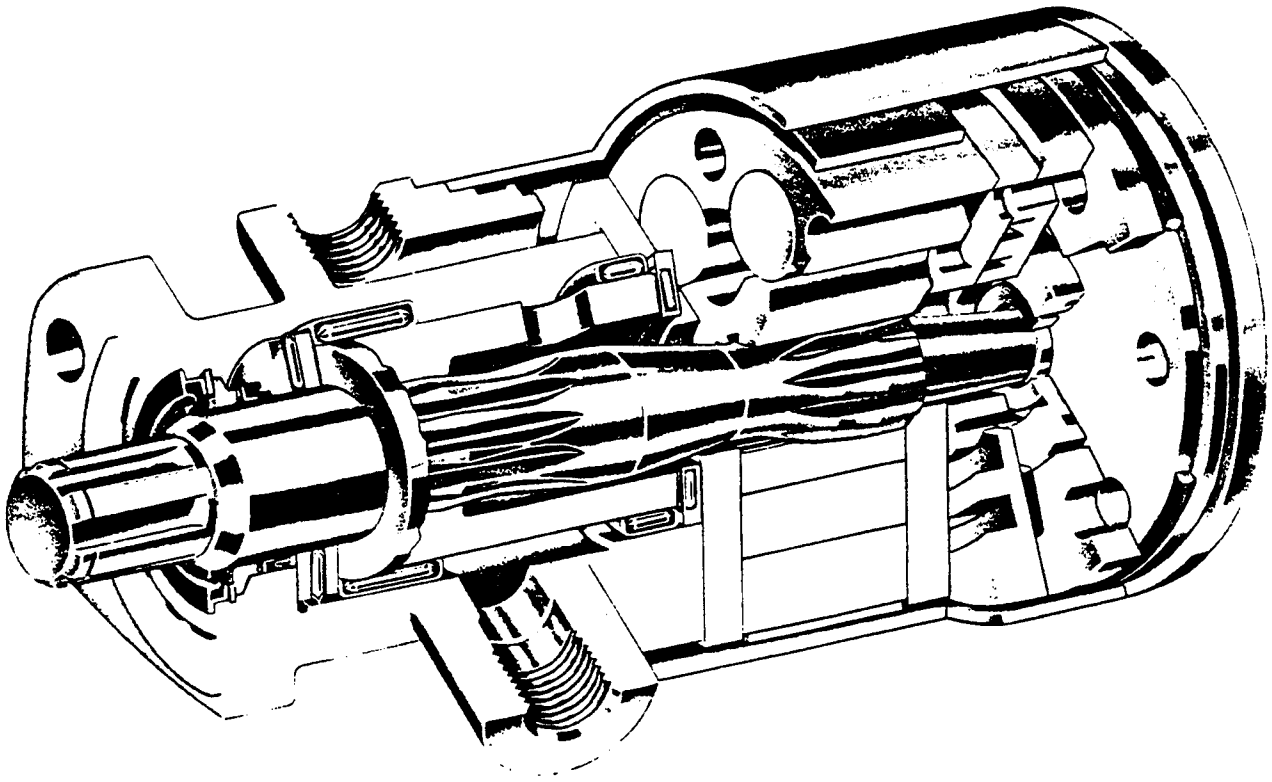
PUMP MOTOR



TORQMOTOR®

SERVICE PROCEDURE

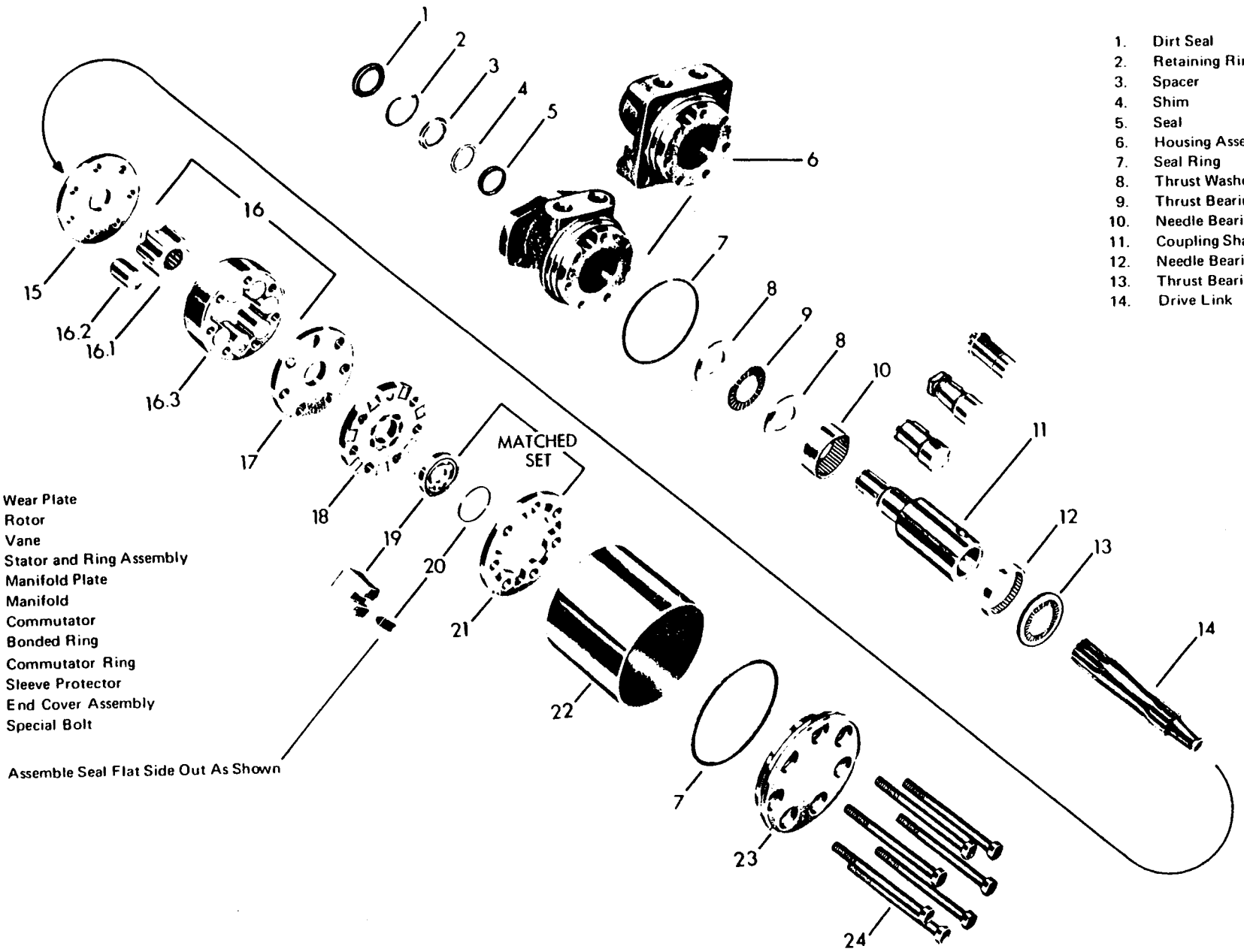
MAB SERIES



The *MAB* TORQMOTOR

- Low Speed,
- High Torque
- Hydraulic Motor.

FORM NO. TMB-4



1. Dirt Seal
2. Retaining Ring
3. Spacer
4. Shim
5. Seal
6. Housing Assembly
7. Seal Ring
8. Thrust Washer
9. Thrust Bearing
10. Needle Bearing
11. Coupling Shaft
12. Needle Bearing
13. Thrust Bearing
14. Drive Link

15. Wear Plate
16.1 Rotor
16.2 Vane
16.3 Stator and Ring Assembly
17. Manifold Plate
18. Manifold
19. Commutator
20. Bonded Ring
21. Commutator Ring
22. Sleeve Protector
23. End Cover Assembly
24. Special Bolt

Note: Assemble Seal Flat Side Out As Shown

FIGURE MAB-200-2

SERVICE PROCEDURE

Preparation Before Disassembly

Remove port hole plugs before attempting to rotate shaft. Drain the motor assembly by turning the output shaft. Wash the complete motor in solvent and remove all particles of dirt from the exterior and blow dry before placing on work bench.

Clean Work Conditions

If it is necessary to disassemble the TORQMOTOR, make certain to use a clean work bench (a piece of clean wrapping paper makes an excellent and disposable top). The hands and tools of the repairman should be clean, and the operation should be carried out in a sheltered area free from drafts that may carry foreign material into the disassembled pieces. (Precision fits in the TORQMOTOR needs "white room" type care.)

Caution: Avoid wiping parts with a cloth, as lint and foreign particles may adhere to the working parts of the TORQMOTOR.

Handling

Care must be taken in handling the close fitting parts, as nicks and mutilations will result in serious damage.

REPLACEMENT OF HIGH PRESSURE SEAL (5) IN TORQMOTOR

(Reference Figure MAB-200-2)

1. Remove dirt seal (1) and retaining ring (2), if burr exists on retaining ring groove, remove with a scraping tool.
2. Set the motor with coupling shaft (11) down in a suitable clean can. Plug "A" port and connect "B" port to 120 psi air hose, or use a piston type hydraulic hand pump. Note: The air connection should be made with provisions for quick shut-off after the spacer (3), shim (4) and seal (5) have been ejected.
3. Apply clean grease to new seal (5) and assemble into housing assembly (6) with lip side inward.
4. Assemble shim (4), spacer (3) and retaining ring (2), be sure the rounded edge of the retaining ring is faced inward. Apply a small amount of clean grease to the back side of new dirt seal (1) and assemble into housing assembly (6).

TORQMOTOR DISASSEMBLY

(Reference Figure MAB-200-2)

1. In a vise, clamp down on the housing assembly (6) port bosses with the coupling shaft (11) pointed down.
2. Using wrench with a 12 point 9/16" socket, remove the seven special bolts (24) and place them on the work bench.
3. Remove the end cover assembly (23) and seal ring (7) by inserting screw driver between end cover assembly (23) and sleeve protector (22). Pry up end cover assembly (23) and lift from unit with seal ring (7) attached.
4. Remove seal ring (7) from end cover assembly (23) and discard.
5. Remove the commutator ring (21), commutator (19), bonded ring (20) and manifold (18) by using two of the special bolts (24) as a lifting tool, insert the two special bolts (24) into two holes and lift out the previously mentioned parts.
6. Remove bonded ring (20) from commutator (19) by using an air hose, blow air down into ring groove until bonded ring (20) is lifted out and discard.
7. Inspect manifold (18) for cracks and replace with new manifold if cracks are visible.
8. Remove manifold plate (17) by using the two special bolts (24) and method previously mentioned.
9. Remove rotor assembly (16), wear plate (15) and drive link (14) by using the two special bolts (24) and method previously mentioned.
10. Remove vanes (16.2) and rotor (16.1) from rotor assembly (16). Use caution not to drop these parts when handling.
11. Inspect rotor (16.1) outside lobes for pits and marks. If pits or wear marks are visible, discard rotor (16.1) and replace complete rotor assembly (16) with a new rotor assembly.
12. Remove thrust bearing (13).
13. Remove coupling shaft (11).
14. Remove sleeve protector (22) by inserting screw driver between sleeve protector (22) and housing assembly (6) and pry up. If rust exists on ends of sleeve protector (22), remove by sanding lightly.
15. Remove seal ring (7) from housing assembly (6) and discard.
16. Remove housing assembly (6) from vise, turn over and reclamp housing assembly in vise so that dirt seal (1) is pointed upward.
17. Remove dirt seal (1), retaining ring (2), spacer (3), shim (4) and seal (5) from housing assembly (6). Discard dirt seal (1) and seal (5). If burr exists on retaining ring groove, remove with a scraping tool.
18. Do not remove thrust washers (8), thrust bearing (9) and needle bearings (10) and (12) unless there is absolute evidence of damage. Needle bearings should be free to rotate and not show signs of surface breakdown. If needle bearing (10) requires replacement, use a 1.490 maximum diameter shaft and press out thrust washers (8), thrust bearing (9) and needle bearings (10) and (12). The housing assembly face should be placed on a block of wood during the pressing operation to protect it. Discard thrust washers, thrust bearing and needle bearings and replace with new parts as parts may have been damaged when being pressed out.

    If needle bearing (12) needs replacement use a bearing puller to remove needle bearing, care should be taken to not damage the housing assembly (6) face with the bearing puller.

TOROMOTOR ASSEMBLY

(Reference Figure MAB-200-2)

Important: Before starting assembly, clean all parts with a clean petroleum base solvent and air dry. **Do not wipe dry with rags.** Be sure all dried paint lips have been removed from edges of lapped surfaces. Unless otherwise indicated, do not oil or grease parts before assembly. Note: Lubricate All Seals before assembly with SAE 10W-40 SD oil or clean grease.

1. In a vise, clamp down on the housing assembly (6) port bosses with the small bore end pointed up. Assemble new seal (5) with lip side inward, assemble shim (4), spacer (3) and retaining ring (2). Be sure the rounded edge of the retaining ring (2) is faced inward.

2. Apply a small amount of clean grease to the back side of new dirt seal (1) and assemble into housing assembly (6).

3. Remove housing assembly (6) from vise, turn over and reclamp in vise with large bore end up. (*** See Note.)

4. Apply "Scotch" tape around splines or keyway on coupling shaft (11) to prevent damaging seal (5). Assemble coupling shaft (11).

5. Assemble thrust bearing (13).

6. Assemble drive link (14).

7. Assemble wear plate (15).

8. Assemble rotor assembly (16) with counterbore in rotor (16.1) down.

9. Assemble manifold plate (17), manifold (18) and commutator ring (21).

10. Assemble commutator (19) and new bonded ring (20).

11. Assemble new seal rings (7) on housing assembly (6) and end cover assembly (23).

12. Apply a generous amount of "STP" to both ends on sleeve protector (22) and assemble over unit and onto unit and onto housing assembly (6). Make sure sleeve protector is setting in a non-cocked position.

13. Assemble end cover assembly (23) onto sleeve protector (22) in a non-cocked position.

14. Assemble seven special bolts (24) and screw in finger tight. Alternately and progressively tighten the seven special bolts to pull end cover assembly (23) and sleeve protector (22) down into place. (Torque the seven special bolts to 50 ± 5 ft. lbs.)

*** NOTE

If it was necessary to remove thrust washers (8), thrust bearing (9), needle bearing (10) and needle bearing (12), the following assembly procedure must be followed.

1. Assemble new thrust washer (8), new thrust bearing (9), new thrust washer (8) in this order into housing assembly (6).

2. Press in new needle bearing (10) with suitable tools to a 2.365 ± .030 dimension into housing assembly (6). Note: Bearing should indicate which side to press against.

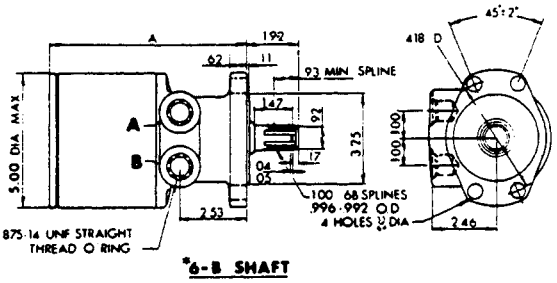
3. Press in new needle bearing (12) with suitable tools to a .18 ± .03 dimension into housing assembly (6). Note: Bearing should indicate which side to press against.

TROUBLE SHOOTING

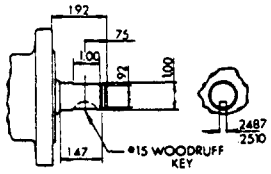
Trouble	Cause	Remedy
Oil leakage	1. Hose fittings leaking	(a) Tighten fittings
		(b) Replace O ring in 7/8", 14 thread fitting
	2. Seal ring leak	(a) Replace seal ring by disassembling motor
	3. Special bolt leakage	(a) Tighten single bolt to 50 foot lbs.
	4. Faulty high pressure seal	Remove dirt seal, retaining ring and spacer. Blow out seal. Replace seal.
	5. Coupling shaft and high pressure seal	Replace coupling shaft and seal package.
High loss of speed, under load.	1. Lack of sufficient oil supply	(a) Adjust faulty pressure relief valve.
		(b) Repair worn pump.
		(c) Use correct oil for temperature of operation.
	2. High internal motor leakage.	(a) Replace worn rotor set with new rotor assembly
		(b) Replace worn commutator ring
		(c) Replace worn manifold
		(d) Replace worn wear plate.
Low mechanical efficiency or undue high pressure required to operate TORQMOTOR	1. Line blockage	(a) Replace blocked line.
	2. Internal Interference.	(a) Correct clearance of rotor set. (Replace rotor set)

PROVISIONING DATA

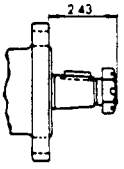
STANDARD MOUNT



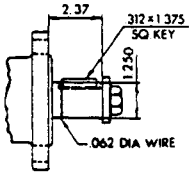
*6-B SHAFT
(SAE J499 STANDARD)



*WOODRUFF KEY



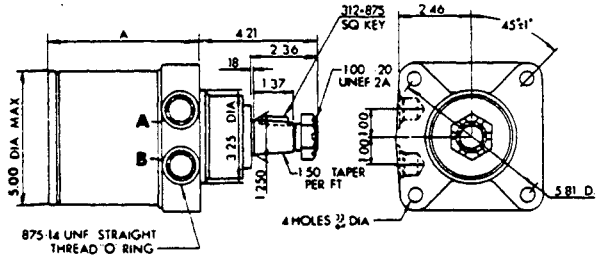
TAPERED SHAFT



STRAIGHT KEY

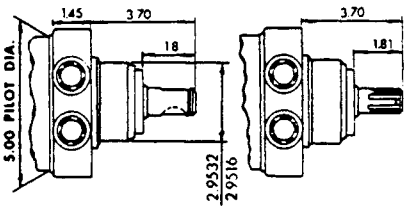
WHEEL MOUNT

Use this design mounting when maximum side load is applied to the output shaft.



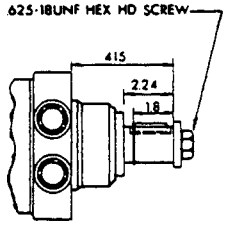
TAPERED SHAFT
(SAE J501 STANDARD)

The Wheel Mount design (w/ 1-¼ taper output shaft) can be used to apply power direct to and support small vehicle wheels.



*WOODRUFF KEY

*6-B SHAFT



STRAIGHT KEY

*The 6-B Spline shaft and Woodruff Key shaft are machined for a WALDES TRUARC Snap Ring No 5100-100 (or equivalent)

MOTOR SERIES	DISPLACEMENT CU. IN. / REV.	DIMENSION "A" STD. MTG.	DIMENSION "A" WHL. MTG.	APPROX RPM WITH 10 GPM NO LOAD	APPROX. RPM WITH 10 GPM @1500 PSI	THEO. TORQUE IN. LBS/100 PSI	IN. LB TORQUE @ 1500 PSI STARTING	IN. LB TORQUE @ 1500 PSI RUNNING
MAB 08	5.9	7.409	5.630	400	365	94	1,040	1,250
MAB 16	11.8	7.910	6.131	200	180	188	2,150	2,850
MAB 24	17.7	8.410	6.631	130	115	282	3,600	4,150
MAB 40	29.6	9.410	7.631	78	65	470	6,050	6,800

Dimensional Values Shown Are Reference.

MAB TORQMOTOR

NOTE: System Relief Valve Setting from 2,000-3,000 PSI Require Prototyping and Evaluation by Sales Engineer.

SPECIFICATION & IDENTIFICATION TAG GUIDE

EXAMPLE: MAB 08 0 02

SERIES

ROTOR WIDTH IN $\frac{1}{16}$ 'S
- 08
- 16
- 24
- 40

MOUNTING & SHAFT
- 02 STD. MTG. 6-B SHAFT
- 03 WHL. MTG. TAPERED SHAFT
- 04 STD. MTG. TAPERED SHAFT
- 05 WHL. MTG. 6-B SHAFT
- 08 STD. MTG. WOODRUFF KEY
- 09 WHL. MTG. WOODRUFF KEY
- 10 STD. MTG. STRAIGHT KEY
- 11 WHL. MTG. STRAIGHT KEY

THE PRODUCT REPRESENTED HEREIN IS PROTECTED BY THE FOLLOWING PATENTS:

U.S.A. PATENT NO. 3,288,034
U.S.A. PATENT NO. 3,289,602
3,452,680

OTHER U.S.A. AND FOREIGN PATENTS GRANTED AND PENDING

Another Product

of —



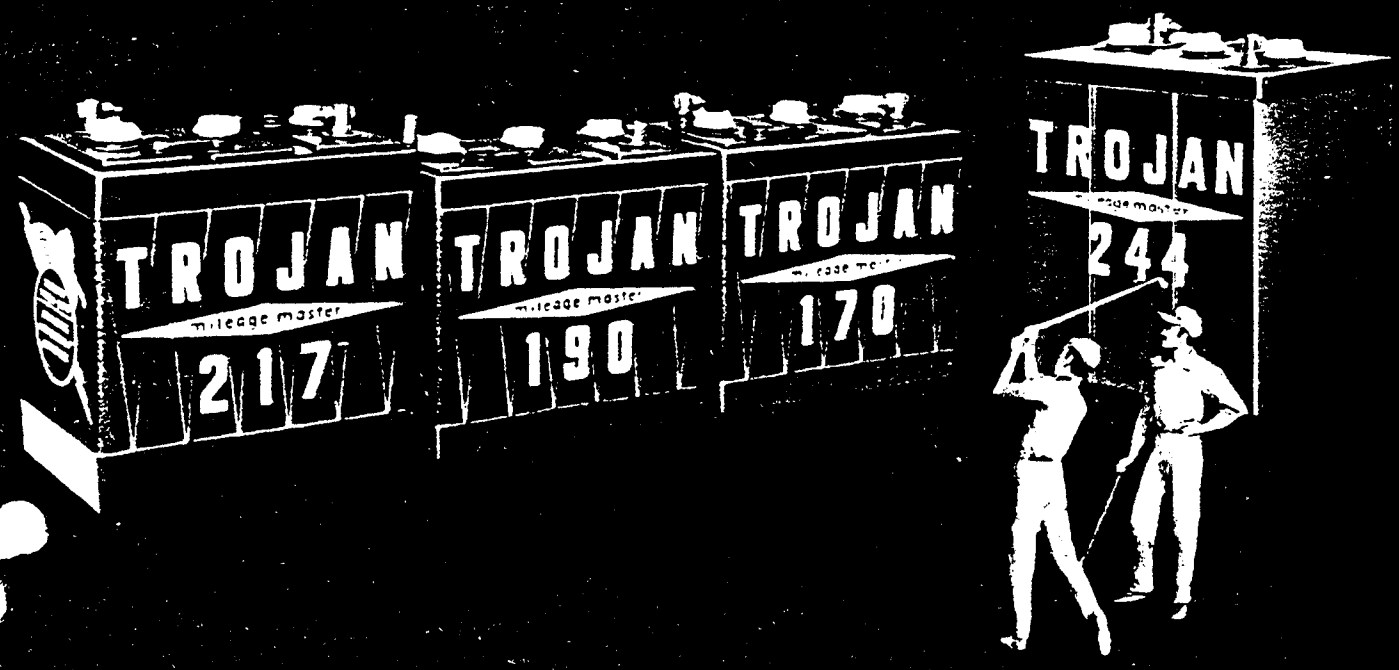
TRW

ROSS GEAR DIVISION

LAFAYETTE, INDIANA 47902

PROPER CARE AND MAINTENANCE OF ELECTRIC VEHICLE GOLF CAR BATTERIES

THE INFORMATION INSIDE IS AN IMPORTANT CONTRIBUTION TO BETTER SERVICE AND MORE EFFICIENT USE OF ELECTRIC GOLF CARS AND WAS PREPARED BY BATTERY COUNCIL INTERNATIONAL.



proper care and maintenance of electric vehicle GOLF CART BATTERIES

1. NEW BATTERY RECEIVAL AND INSTALLATION

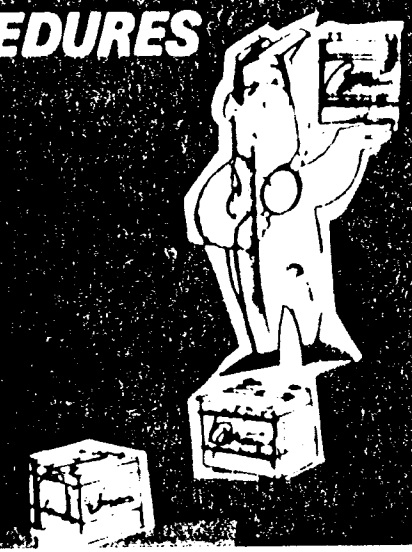


1. **Always** inspect incoming shipments of batteries for damage. Look for and pay particular attention for damage to or wet spots on the shipping cartons, examine those batteries for signs of breakage
2. If damaged batteries are found secure acknowledgment of the damage from the carrier's representative and file a claim against the transportation company. Contact your supplier for battery replacement.
3. If batteries are received wet and **not** immediately placed in service, they must be charged at regular interals as follows:

Storage Temperature	Charge
Below 40° F	None required
40° F to 60° F	Every 2 months
60° F and above	Once a month

4. **Never stack one battery directly on top of another.** Post damage and/or container damage can occur from improper stacking. If batteries are stored individually, place supporting boards between layers. **Do not** stack layers more than three (3) high and rotate stock so that the oldest batteries can be used first.
5. Dry charge batteries should be activated in accordance with instructions of the battery manufacturer.
6. Batteries should be installed in accordance with the vehicle manufacturer's instructions. Connections should be made tight enabling good contact between connector lugs and battery terminals. Always charge sets of batteries immediately after installation into the car.

2. MAINTENANCE-INSPECTION PROCEDURES



1. **Water batteries at least once a week.**
   a. Add only approved water to the cells. Distilled water is recommended; high mineral content water must not be used. Maximum allowable impurities in percent: Iron (.003), chloride (.004), fixed residue (.075).
   b. Remove vent caps and water batteries preferably after charging to prevent over flow of acid due to expansion.
   c. Fill all cells to the proper level. **Do not overfill cells.** Fill to level indicator or ½ inch over the top of the separators if there is no level indicator. Do not use a hose to water batteries
   d. Spot check cells between weekly waterings to assure electrolyte is above separators. Excess water usage indicates the presence of any one or all of the following conditions which should be checked
      1. Overcharging
      2. High temperature operation
      3. Nearing end of service life
   e. **Do not allow the electrolyte level to drop** below the top of the separators since this will lead to shortened battery life.
2. **Clean batteries after weekly watering or when washing cars.**
   a. Wash the tops of the batteries making sure the vent caps are in place. Do not allow water or other foreign matter to enter the cells
   b. Use a solution of bicarbonate of soda and water to wash batteries if there is an accumulation of acid.
3. **Inspection** to insure good conditions which will give better battery service.
   a. When watering batteries inspect battery and other terminal connections for:
      1. **Corrosion** — If any exists, clean connection and apply a non-metallic grease or protective spray to retard further corrosion.
      2. **Loose Connections** — Be sure all connections are tight and that good contact is made between terminals
      3. **Broken or Frayed Cables** — Be sure all cable connections are good and that no loose or broken wires are exposed. Replace any which look suspicious.
   b. Once a week after the batteries have been charged, spot check two (2) or more cells for specific gravity reading. Gravity should be 1.250 - 1.280. If low readings are noted
      1. Check charger to insure that proper charge is being returned to the batteries
      2. Check connections as specified under **Inspection 3a.**
      3. Check all cells to determine if batteries are near the end of life. This should be done to the same procedure as called for under **Section IV** covering **"Trouble Shooting" of batteries.**
   c. On a regular interval, check car as outlined in the instruction manual for:
      1. Brake drag
      2. Proper tire pressure
      3. Proper alignment
      4. Proper lubrication
      5. Proper operation of electrical system
      6. Proper operation of drive and transmission system
      7. Condition of charger plug and receptacle in car

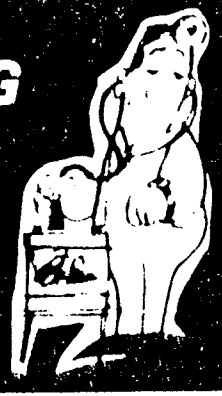
      Any of these conditions which are detrimental to car operation will shorten battery life.

3. CHARGING PROCEDURE



1. Become familiar with instructions issued with the charger or car manual.
2. Batteries are to be charged after each day's use as soon as play has been completed. Charging between rounds is permissible if it is determined feasible to do so.
3. **Do not charge batteries** if car was not used that day.
4. **Do not allow batteries to sit in discharged condition** for prolonged periods of time.
5. **Always be sure batteries are fully charged** each day prior to starting play.

4. TROUBLE SHOOTING FOR WEAK OR BAD BATTERIES



When a car fails to operate properly performing less than one round of golf, the car is to be brought into the shop and the batteries examined as follows

1. Check terminal connections for corrosion, loose connections and broken or frayed cables.
2. If terminal connections appear to be in good condition, check all cells with a hydrometer for variation in specific gravity among cells. A variation of .030 points or more between cells of a battery is cause for suspect. Mark the low cells.
3. Recharge the batteries as recommended by the manufacturer.
4. Read all gravities again after recharge. Be sure that batteries are fully charged at gravities of 1.250 to 1.280. If cells vary by .030 points or more it is an indication of possible trouble within that battery.
5. Connect a load tester to the set of batteries and discharge the batteries at 75 Amps and record the time to a terminal voltage of 31.5 volts. Testers are now available having an automatic Shut-Off at this voltage. New batteries should run a minimum of 75 minutes on this test.
   a. If the batteries run less than 40 minutes they have either reached the end of life or a defective battery is in the circuit. Battery replacement is then necessary.
   b. If batteries run 40-50 minutes they have lost capacity and may be nearing the end of their useful life. In golf car service one round of golf may be expected on an average golf course.
   c. If batteries run more than 50 minutes, they are in good condition and satisfactory for continued service. Prior to putting the car back in service it should be checked for the existence of other trouble as outlined in the instruction manual.

5. BATTERY REPLACEMENT



Defective Batteries (Premature Failures)

1. Defective battery can be determined either by observation of gravity variance at the end of the 75 Amp discharge (.030 or more points between cells of a battery) or by turning the discharge tester back on and determining the battery or cell which is defective by use of a voltmeter.
2. Mark the defective battery.
3. Recharge the batteries with the defective battery in the circuit.
4. Remove the defective battery and replace with new battery or battery of comparable age which is fully charged.

Worn Out Batteries

1. Remove old set of batteries.
2. Clean and recondition battery trays, holddowns and cables.
3. Inspect new batteries for broken containers and proper electrolyte level before installing in the car.
4. Install batteries in car being sure that they are properly held down; firm but not too tight.
5. Replace cables, being sure terminals and connectors are clean and connections are tight.
6. Apply a light coating of non-metallic grease or protective coating.

6. WINTER STORAGE OF WET BATTERIES



1. Prior to storing car, batteries should be cleaned, fully charged and properly leveled.
2. While in storage the batteries should be recharged to full charge at time intervals shown below

Storage Temperature	Charge
Below 40° F	None required
40° F to 60° F	Every 2 months
60° F and above	Once a month

3. Check batteries after car has been removed from storage and before service begins. Follow **inspection and trouble shooting procedures** to determine the condition of the batteries.

Battery Council International

TROJAN MILEAGE MASTER BATTERIES

GROUP NUMBER	TYPE	VOLTS	REF. 20 HOUR RATE A.H.	75 AMPS TO 5.25 VOLTS AT 80° F MINUTES	OVERALL DIMENSIONS			SHIP WEIGHT
					LENGTH	WIDTH	*HEIGHT	
GC-2	J-170W	6	170	88	10 3/8	7 1/16	10 1/4	57
GC-2	J-190W	6	190	95	10 3/8	7 1/16	10 1/4	59
GC-2H	J-217W	6	217	108	10 3/8	7 1/16	11 1/2	66
GC-2H	J-244W	6	244	130	10 3/8	7 1/16	11 1/2	73

*For Universal Terminals or Angle Terminals, increase height one quarter inch.

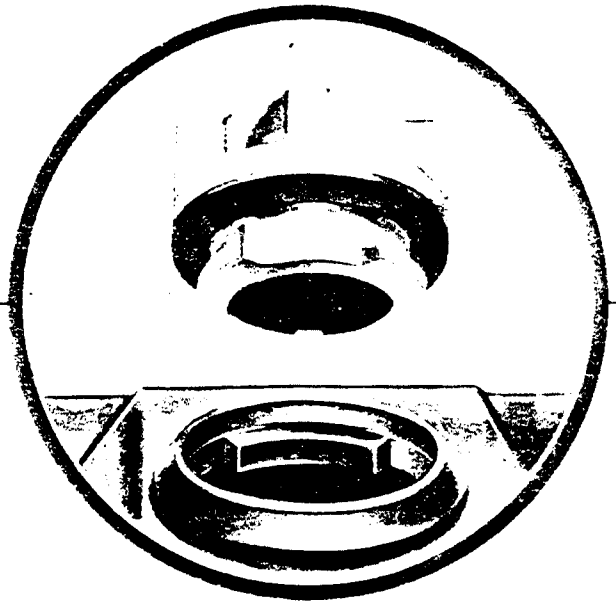
OTHER SPECIAL BATTERIES AVAILABLE TO FIT MOST TYPES OF ELECTRICAL VEHICLES.

TROJAN "MILEAGE MASTER" TYPES FEATURE QUARTER-TURN VENT CAPS REDUCING SERVICE TIME 75%



TYPE AP

STRAIGHT POST





TYPE WT

WING NUT TERMINAL
3/16 or 5/16 Stud

TYPE LT

ANGLE TERMINAL
5/16 Lead coated bolt



TYPE UT

UNIVERSAL TERMINAL



ALL BATTERIES COME WITH UNIVERSAL TERMINALS
UNLESS OTHERWISE SPECIFIED

DISTRIBUTED BY

TROJAN BATTERY COMPANY

THIS CHAPTER HAS BEEN PROVIDED TO KEEP **MARK INDUSTRIES** SERVICE BULLETINS THAT APPLY TO THE IMPROVEMENT OF YOUR **MARKLIFT.**