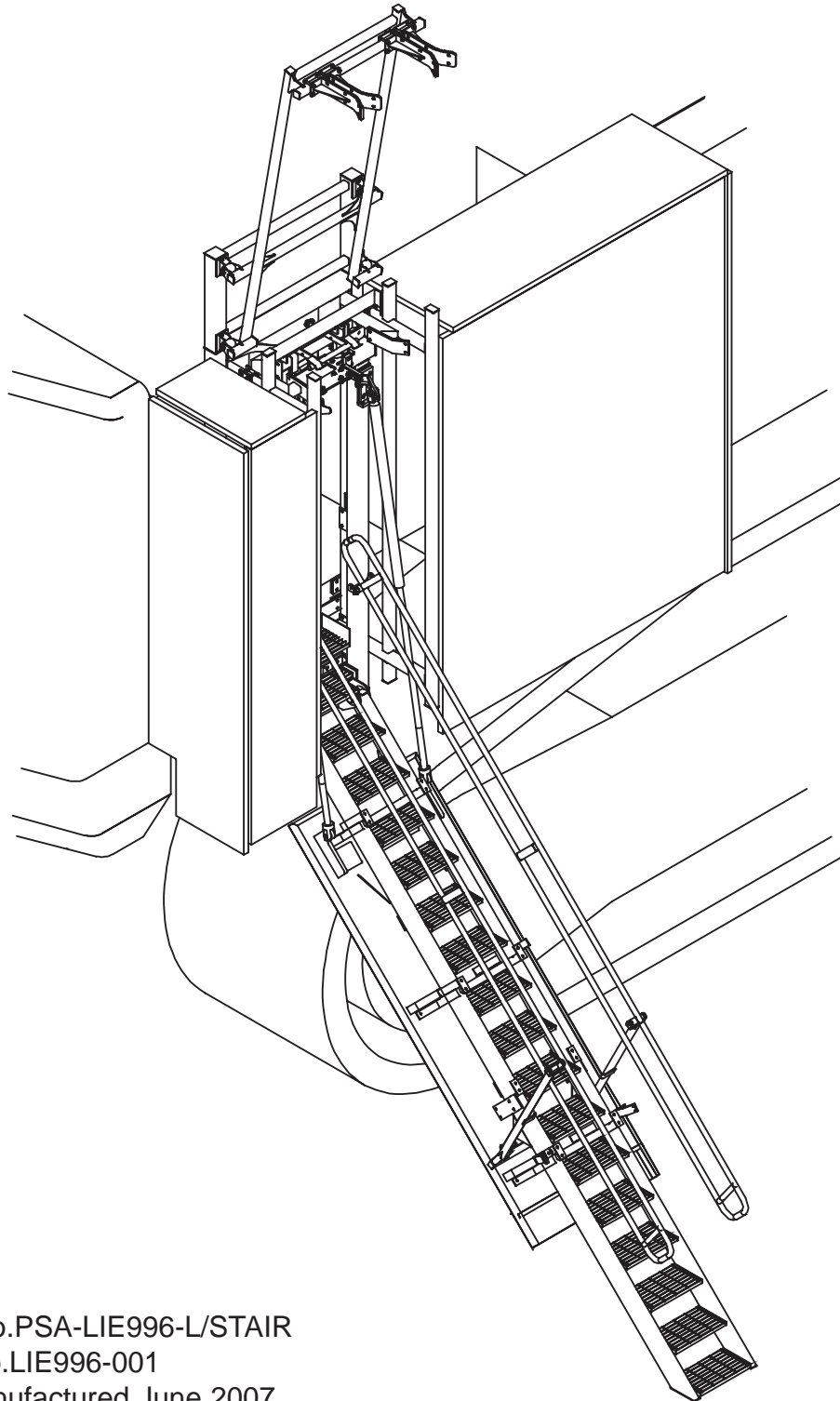


# LIGHT STAIRWAY

## Manual for Liebherr 996 (M.A.C.)



Model No.PSA-LIE996-L/STAIR

Serial No.LIE996-001

Date manufactured June 2007

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## CONTENTS

Page 3	Section 1 <u>Installation and Mounting instructions</u> Installation Drawings
9	Section 3 <u>Operating Procedure</u>
10	Section 3 <u>Recommended Maintenance Procedure</u>
	Section 4 <u>Drawings and Repair Parts lists</u>
11	4 Assembly Complete Parts List
13	4-1 Stair Assembly Parts List
15	4-2 Noise Control Door Assembly Parts List
17	4-3 Main Frame Assembly Parts List
19	4-4 Portal Assembly Parts List
21	4-5 Handrail Restraint Assembly Parts List
23	4-6 Hydraulic Latch Assembly Parts List
25	4-7 Stair Bumper Assembly Parts List
26	4-8 Pad Assembly Parts List
27	4-9 Electrical Controls, Components, Switches & Wiring Diagram Parts List
31	4-10 Power Pack (Hydraulic Diagram)

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 1

### Installation and Mounting Instructions

#### **NOTE**

**Follow all on-site/Mine lifting and safety procedures when installing Light Stairway to Liebherr 996 Excavator**

#### GENERAL NOTES:

While the actuator mounting is clamped but not welded to the frame, the stair may be prone to movement in the frame. Take care to avoid injury.

All welding is to be Cat SP to AS 1554, 6cfw uno.

Flat washer under each bolt head and nut, uno.

#### See Installation Drawings Pg 5 &6

1. Remove external acoustic enclosure (if fitted). Remove existing, original access ladder.
2. Using Mounting Frame as a template fit and weld 22631-01 Bolting Pads to the plate skin of the excavator house, per Views 1A.
3. Bolt Stair Assembly to Mounting Frame per View 2A.
4. Fit fixed handrails to excavator and Mounting Frame
5. Fit Power Unit Enclosure in position to suit near/below second window opening where it will be accessible from floor in acoustic attenuator enclosure. Weld Bolting Pads to skin.

#### As per Drawing Pgs 5,6 & 7:

1. Fit the acoustic enclosure with any flared skirt eliminated (provision for access on original ladder), with a 1115 wide opening down the full depth of the side and 1115 x (100) notch in top.
2. Fit Stair Mounted Acoustic Door to the underside of the lowered stairs, per View 2A. Note that the single-skinned end of the door goes to the bottom in the lowered orientation. Fit Handrail Locking Hook to lower acoustic door mountings, per View 2A. Fit seal to suit (insertion rubber or similar) around door where it contacts/approaches door portal.
3. Fit Noise Door Guides to the door mounting frames per Views 2A, 2B and 2C aligned (with a 2.5mm gap each side) with the inside of Portal Noise Control Door.
4. Fit handrail Restraint as to Drawing 22 657 (See page 7)

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 1

### Installation and Mounting Instructions (cont.)

#### **WARNING**

Raising the POWER STEP Light Stair by external means can create a vacuum in the hydraulic cylinder and create the opportunity to allow air into the hydraulic system, defeating the inherent safety features of the POWER STEP.

This must be avoided to maintain safe operation of the POWER STEP and to avoid damage to the cylinders and step assembly.

In instances where the use of external means to raise the Light Stair must be used, please follow the following instructions:

Tag or lock out the Power pack assembly.

Loosen hard plumbed hydraulic lines on cylinder side of lock valve on cylinder.

Raise Light Stair by available means.

**NOTE:** Make necessary arrangements to collect displaced oil, and be aware that air enters the piston side of the cylinder as Light Stair is raised. Lock in raised position.

Tagout the POWER STEP.

**SECURE THE LIGHT STAIR IN THE RAISED POSITION, MECHANICALLY, CHAIN & RETIGHTEN HYDRAULIC FITTINGS.**

To recommission the POWER STEP:

Connect Step to the correct lifting device.

Remove the lock out device and take the load.

Loosen hydraulic fittings on cylinder side of lock valve.

Note: Collect displaced oil.

Lower Light Stair to lowest position, using alternate safety approved means, fully retracting cylinder. Ensure all personnel are clear of step radius.

Operate electrical control switch to purge air from the hydraulic line systems, lock valve and cylinder.

Tighten the hydraulic fittings either side of lock valve to restriction fitting.

Cycle step unloaded several times to purge all air from hydraulic system.

The Power Step will not operate correctly if there is any air in the hydraulic circuit (due to the incorrect operation of the lock valve).

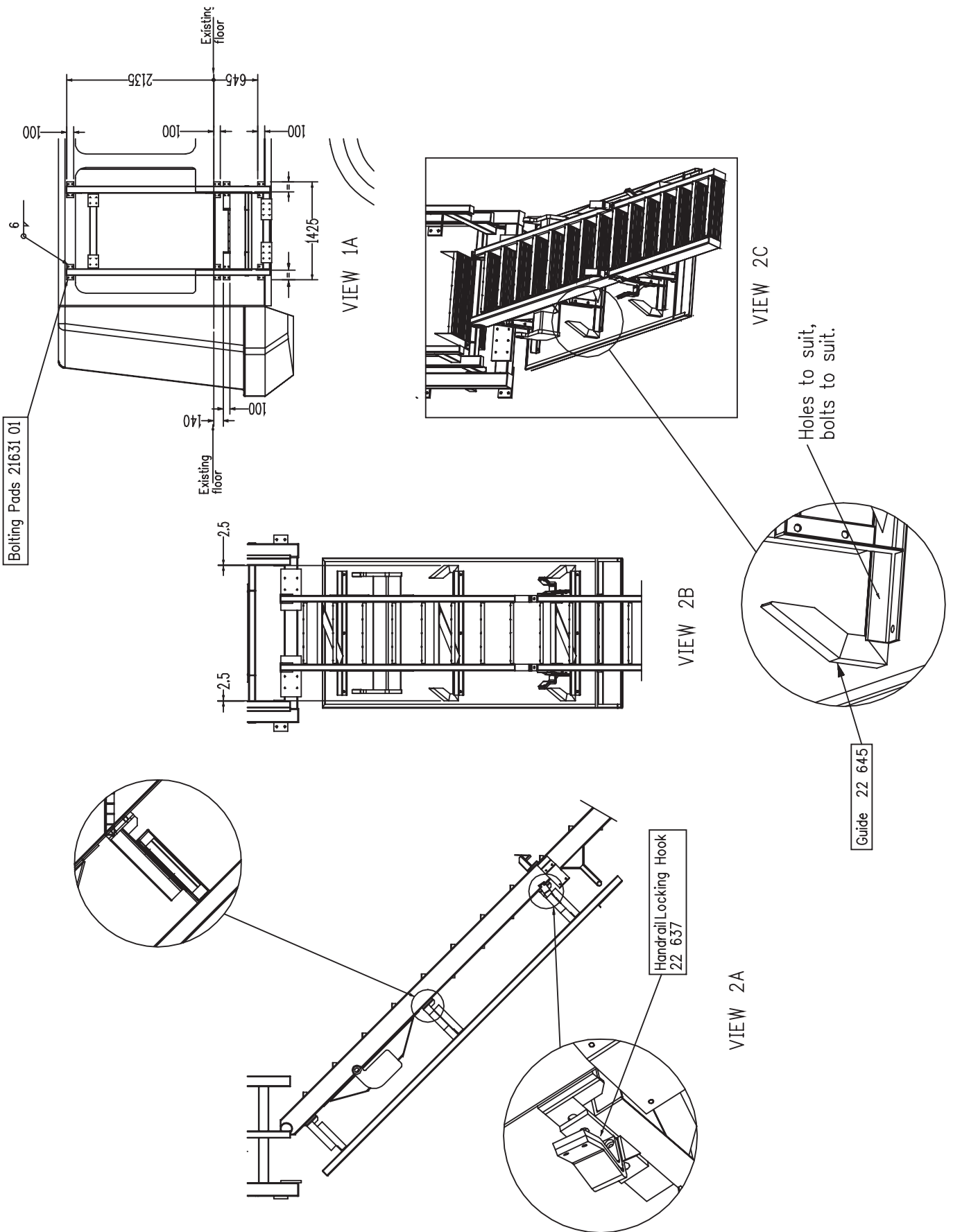
Once step is working correctly check the oil level in the Power Pack.

Clean up work area and remove all safety Tags.

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



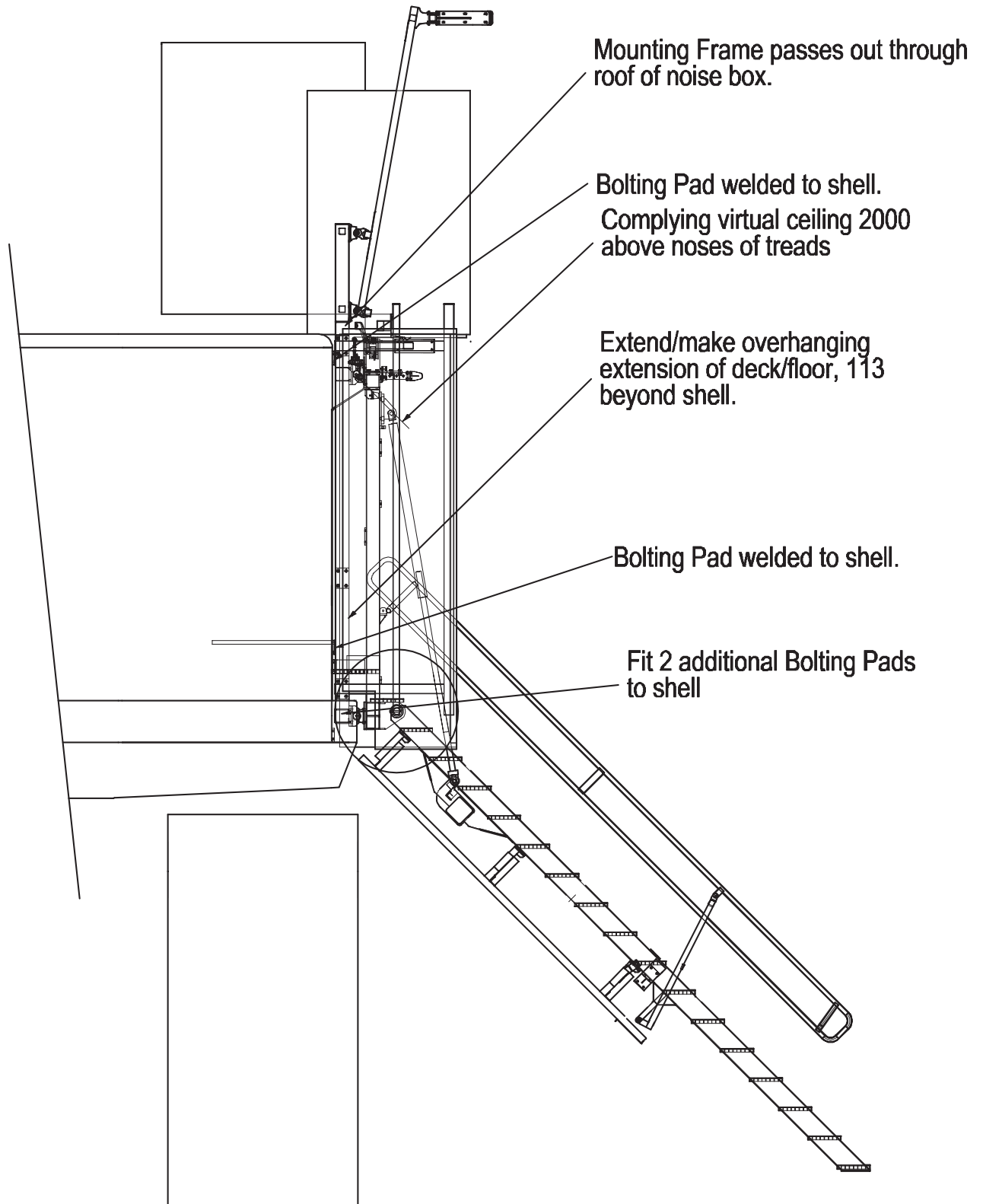
## Section 1 Installation Drawing 1



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



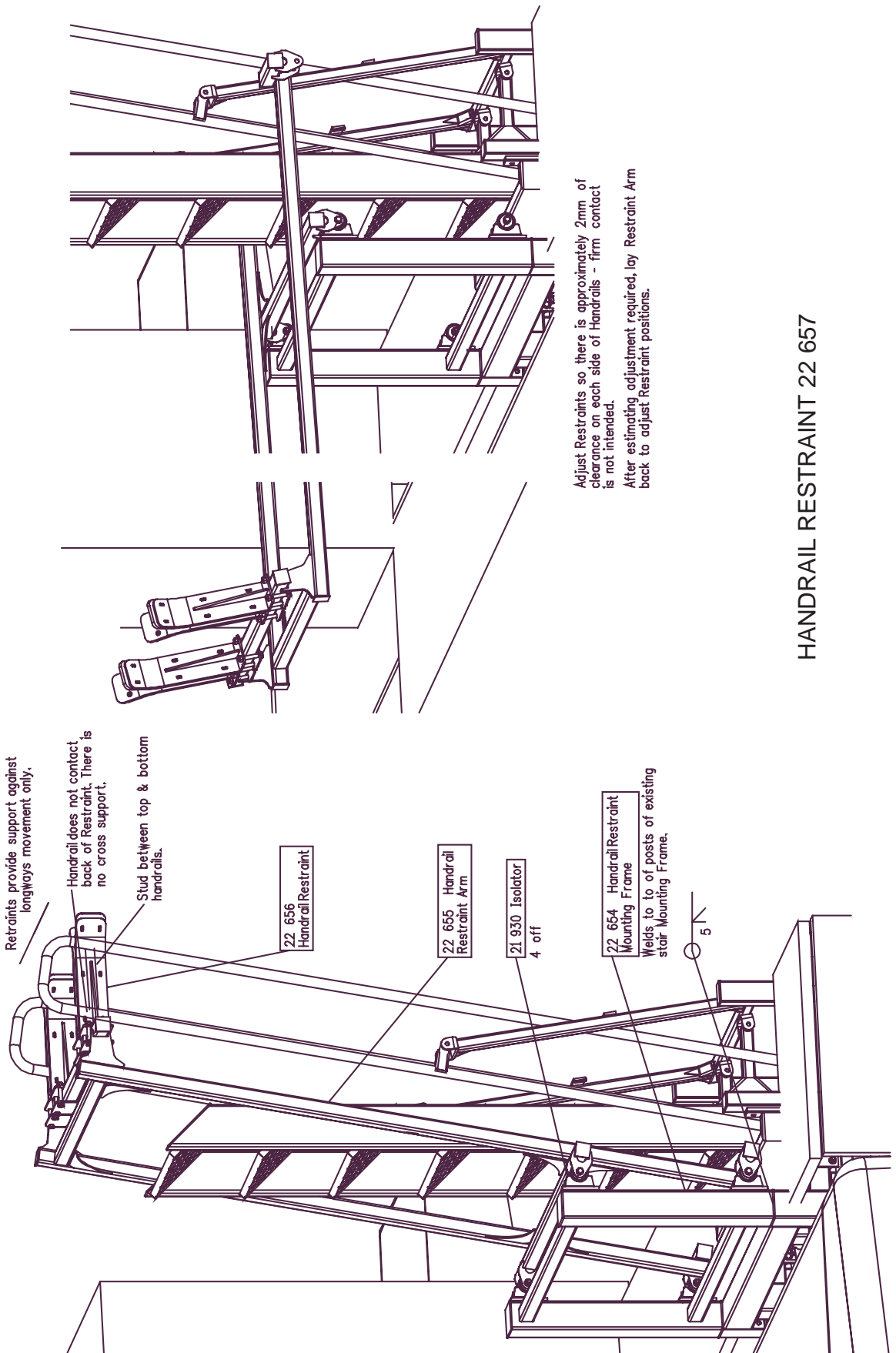
## Section 1 Installation Drawing 2



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 1 Installation Drawing 3

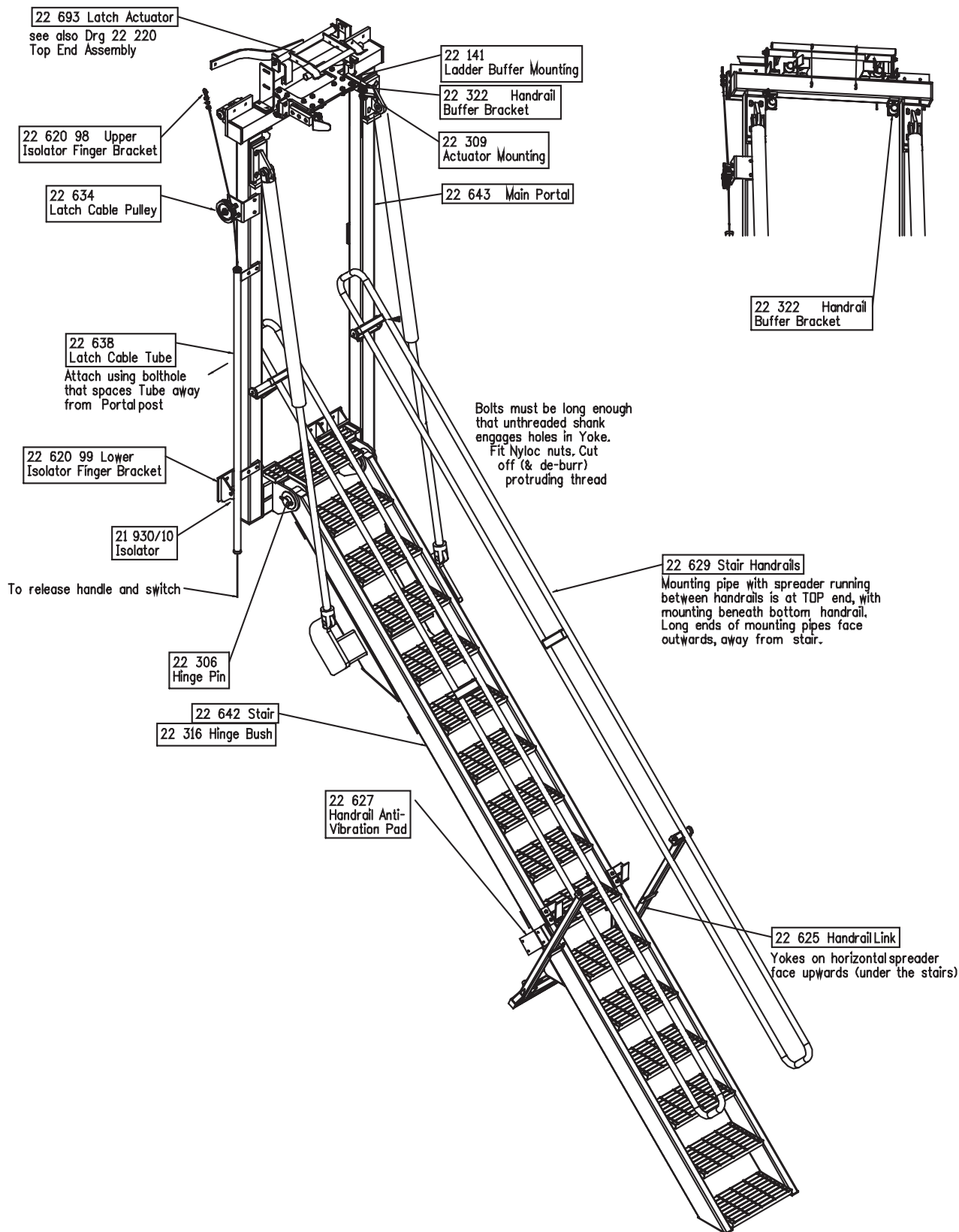


HANDRAIL RESTRAINT 22 657

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 1 Installation Assembly Drawing





# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## SECTION 2

### Operating Procedure

#### **To Lower Stairway (from the machine)**

Position machine in a level, safe area, away from the work face, whenever possible.  
Apply park brake and lower engine speed to idle.

Check that the area below the Ladder Access System is clear of people and obstacles, and lower ladder by operating the two position electrical switch adjacent to the ladder, by pressing the down switch down.

Hold the switch in the down position until ladder is fully lowered.

If the Excavator is parked on uneven ground, the bottom of the stairway may touch the ground before the ladder is in the fully lowered position.

Should this occur, descend the ladder with caution or raise the ladder and move the machine to a clear flat area.

#### **To Raise Stairway**

Ascend the ladder onto the landing of the Excavator.

Ensure the area around the ladder is clear of people and standing to the side, clear of the area the handrails and ladder raises into, operate the electrical switch to the raise position (up) Switch.

Hold the switch in the up position until the ladder is in the fully raised position.

The ladder is now raised and stored.

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## SECTION 3

### Recommended Maintenance Procedure

#### Daily

Visually check stairway and structure for damage, loose components, handrails, cylinder pins, split pins and up and down switches.

Check for hydraulic oil leaks from hydraulic cylinders, plumbing and hoses.  
Check all rubber stops.

Notify the appropriate supervisor for any observed damage or malfunction.

#### 500 Hours

Grease any nipples where used.

Check and adjust all rubber stops and safety latches/ladder

Check main mounting bolts for torque.

Check hydraulic oil level in power pack and top up as necessary. (Stairway in raised position).

Top up using same hydraulic oil as used in hydraulics of machine. (Val 68)

Thoroughly check all electrical wiring for damage, replace as necessary.

Check all switches, up, down, slew blocks, go switches (magnetic)

**Repeat daily check as above**

#### 5000 Hours

Change hydraulic oil in tank of hydraulic power pack (10 litres) (Val 68)

It is recommended that the same hydraulic oil be used in the power pack as the hydraulics of the machine.

Carry out daily and 500 hour service procedure.

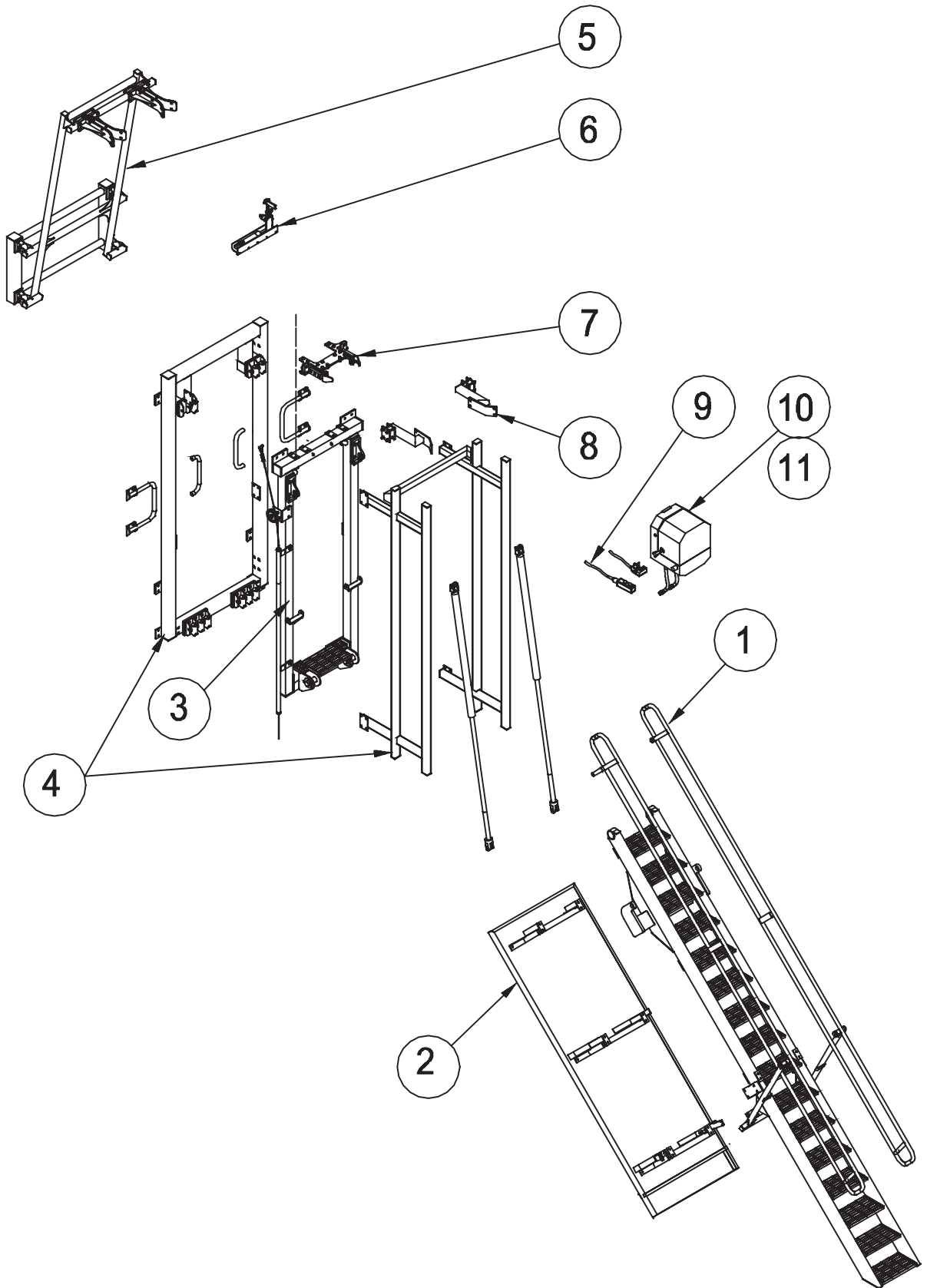
Check and inspect all main bolts on light stair system.  
Retorque if required.

**Repeat daily check as above**

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4 Assembly Complete



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



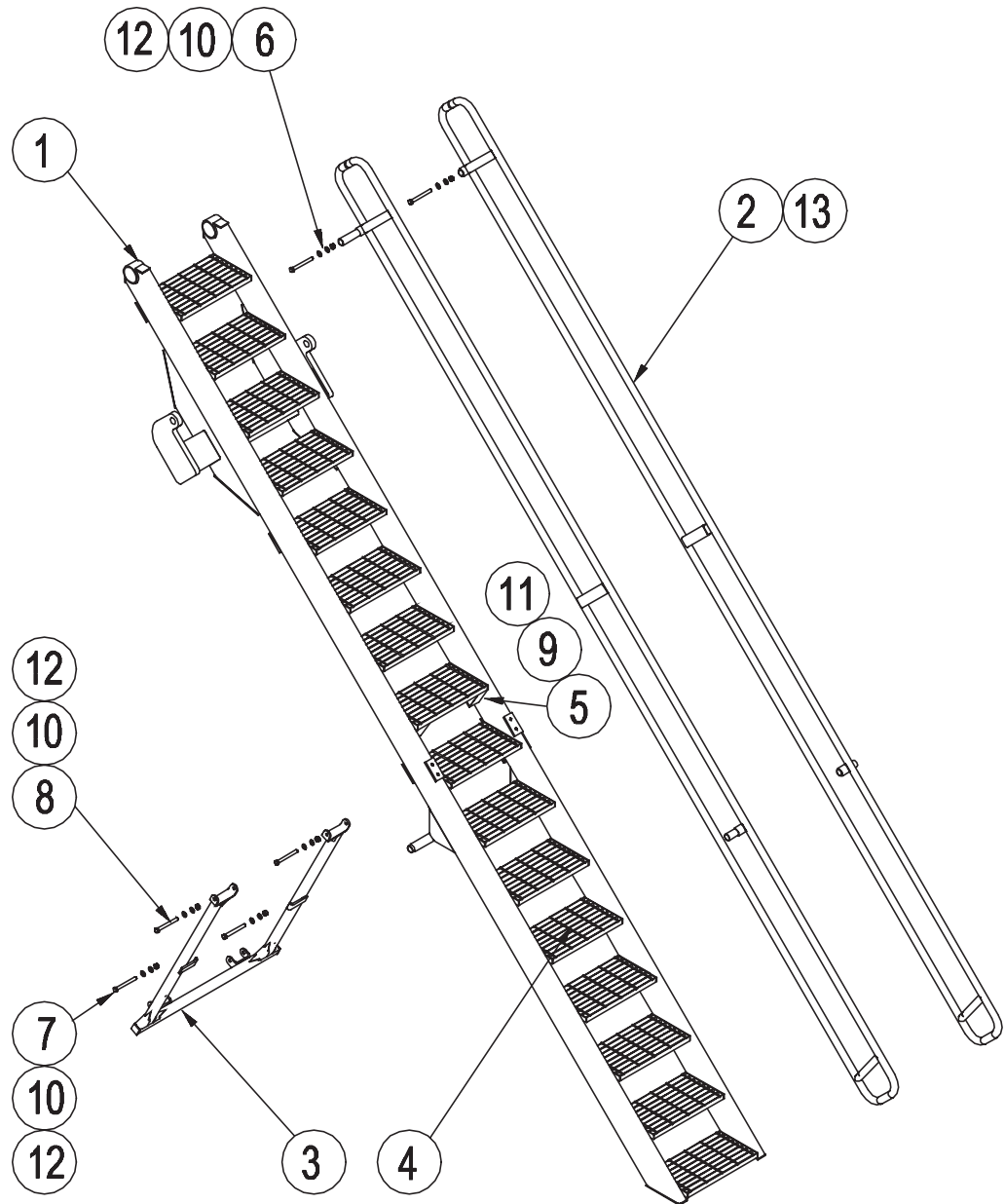
## Section 4 Assembly Complete

ITEM	PART NO.	PART NAME	QTY		
1	PS-642A	STAIR ASSEMBLY	1		
2	PS-641A	NOISE CONTROL DOOR ASSEMBLY	1		
3	PS-22643	MAIN FRAME ASSEMBLY	1		
4	PS-22636	PORTAL ASSEMBLY	1		
5	PS-22657	HANDRAIL RESTRAINT ASSEMBLY	1		
6	PS-22693	HYDRAULIC LATCH ASSEMBLY	1		
7	PS-22651	STAIR BUMPER ASSEMBLY	1		
8	PS-22628A	PAD ASSEMBLY	1		
9	-	ELECTRICAL CONTROLS, COMPONENTS, SWITCHES, WIRING DIAGRAM	1		
10	PS-80104A	POWER PACK HYDRAULIC DIAGRAM	1		

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-1 Stair Assembly



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



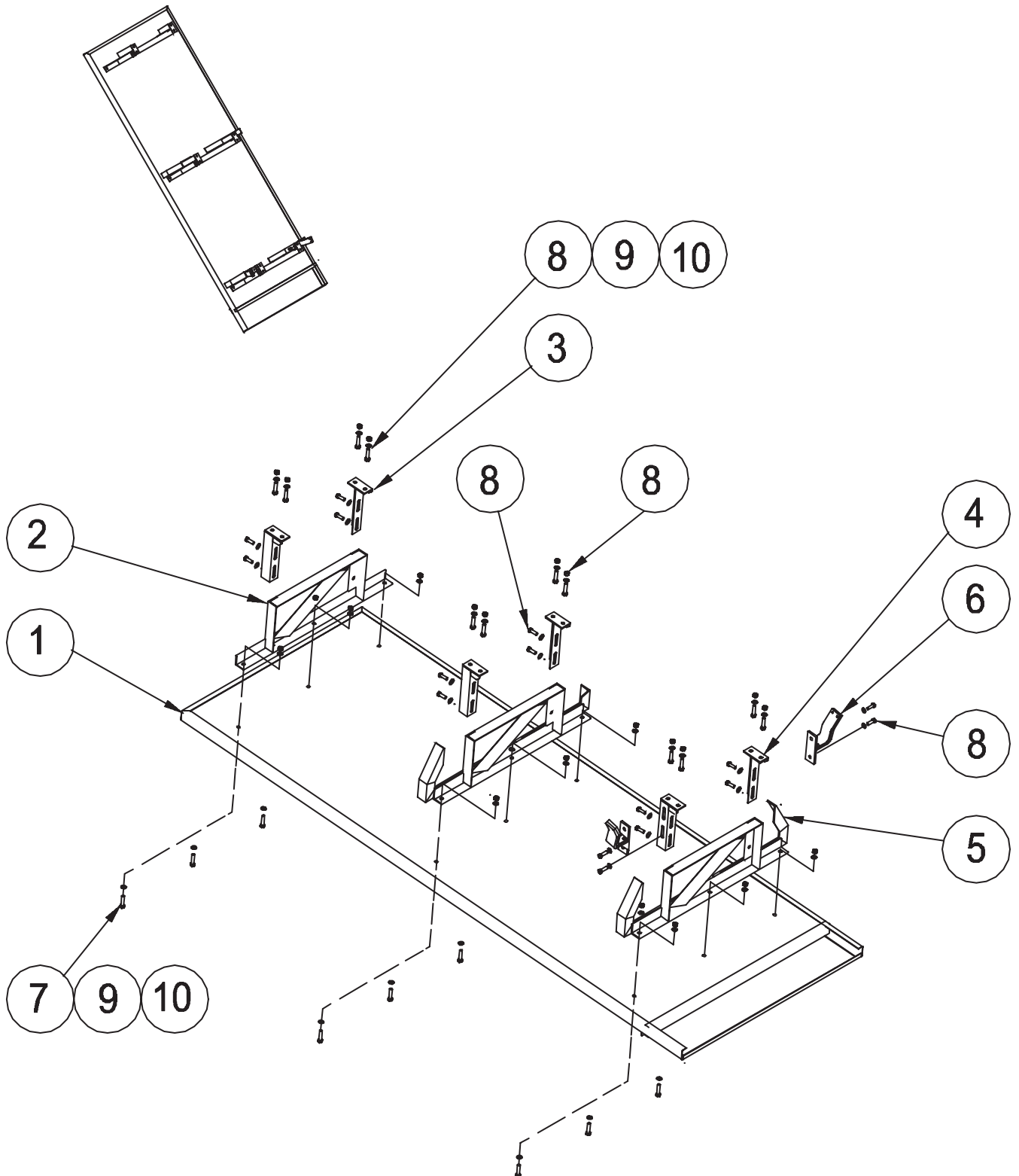
## Section 4-1 Stair Assembly

Item	Part No.	Part Name	Qty		
1	PS-22642	STAIR FABRICATION	1		
2	PS-22629	STAIR HANDRAILS	1		
3	PS-22625	HANDRAIL LINK POST	1		
4	PS-22640	STAIR TREAD	16		
5	PS-CB-12MM	ANTI - VIBRATION PADS (Conv. Belting)	2		
6	CPS-M12X215ZP	BOLT-M12 x 215	2		
7	CPS-M12X165ZP	BOLT-M12 x 165	2		
8	CPS-M12X130ZP	BOLT-M12 x 130	2		
9	CPS-M8X25ZP	BOLT PAN HD.M8 x 25	4		
10	CPS-M12NN	NUT-NYLOC-M12	6		
11	CPS-M8NN	NUT-NYLOC-M8	4		
12	CPS-M12WH	WASHER-HARDENED-M12	12		
13	PS-S245	RUBBER BUSHES (Mackay S245)	14		

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-2 Noise Control Door Assembly



**LIGHT STAIRWAY  
LIEBHERR 996 (M.A.C.) (M.A.C.)**



**Section 4-2 Noise Control Door Assembly**

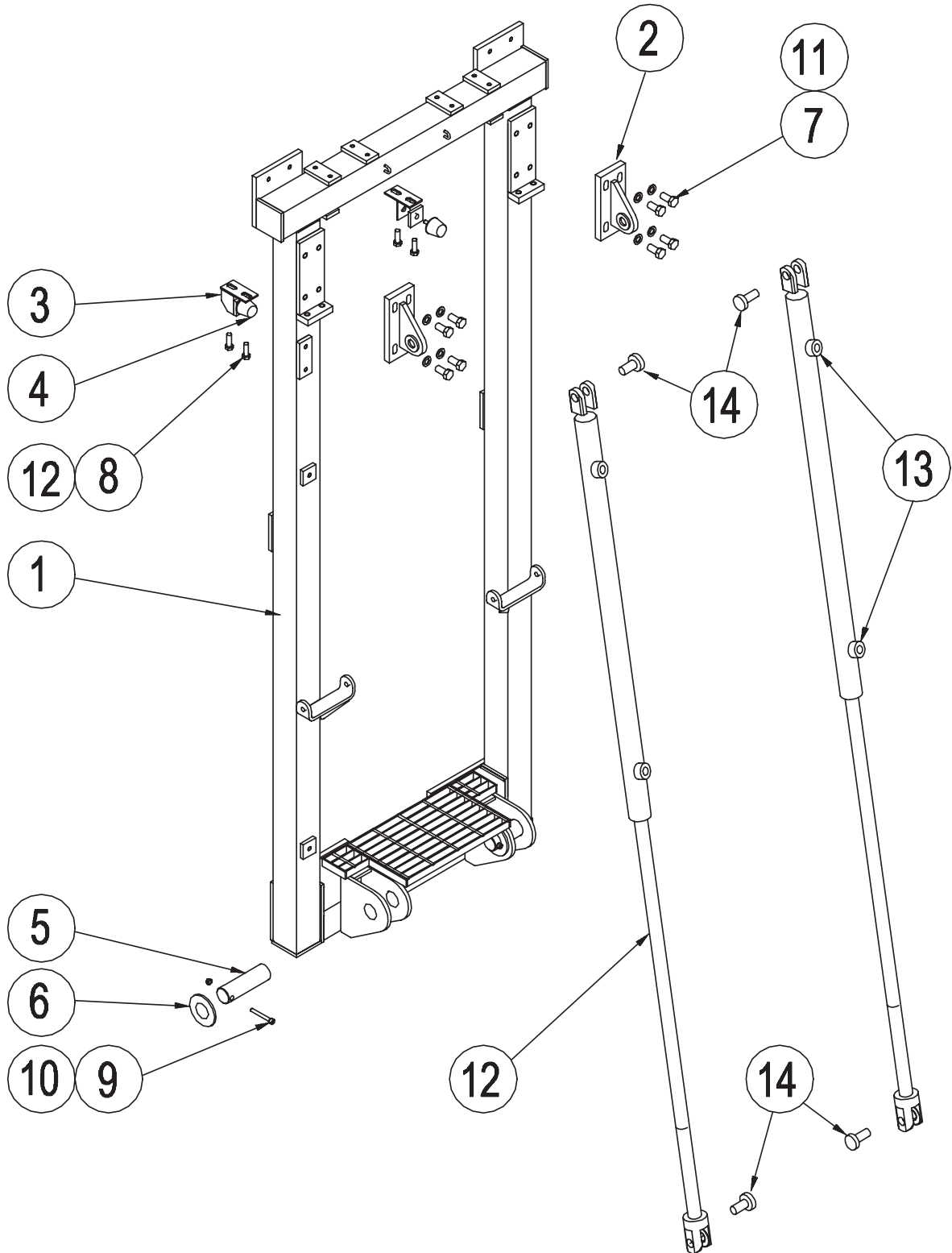
Item	Part No.	Part Name	Qty		
1	PS-22641	PANEL FABRICATION	1		
2	PS-22760	MOUNTING	3		
3	PS-22639-98	MOUNTING POST	4		
4	PS-22639-97	MOUNTING POST(SPECIAL)	2		
5	PS-22645	NOISE DOOR GUIDE	2		
6	PS-22637	“J” HOOK	2		
7	CPS-M12X75ZP	BOLT-M12 x 75	9		
8	CPS-M12X25	BOLT-M12 x 25	24		
9	CPS-M12ZP	NUT-M12	21		
10	CPS-M12WH	WASHER-HARDENED-M12	24		



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-3 Main Frame Assembly



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



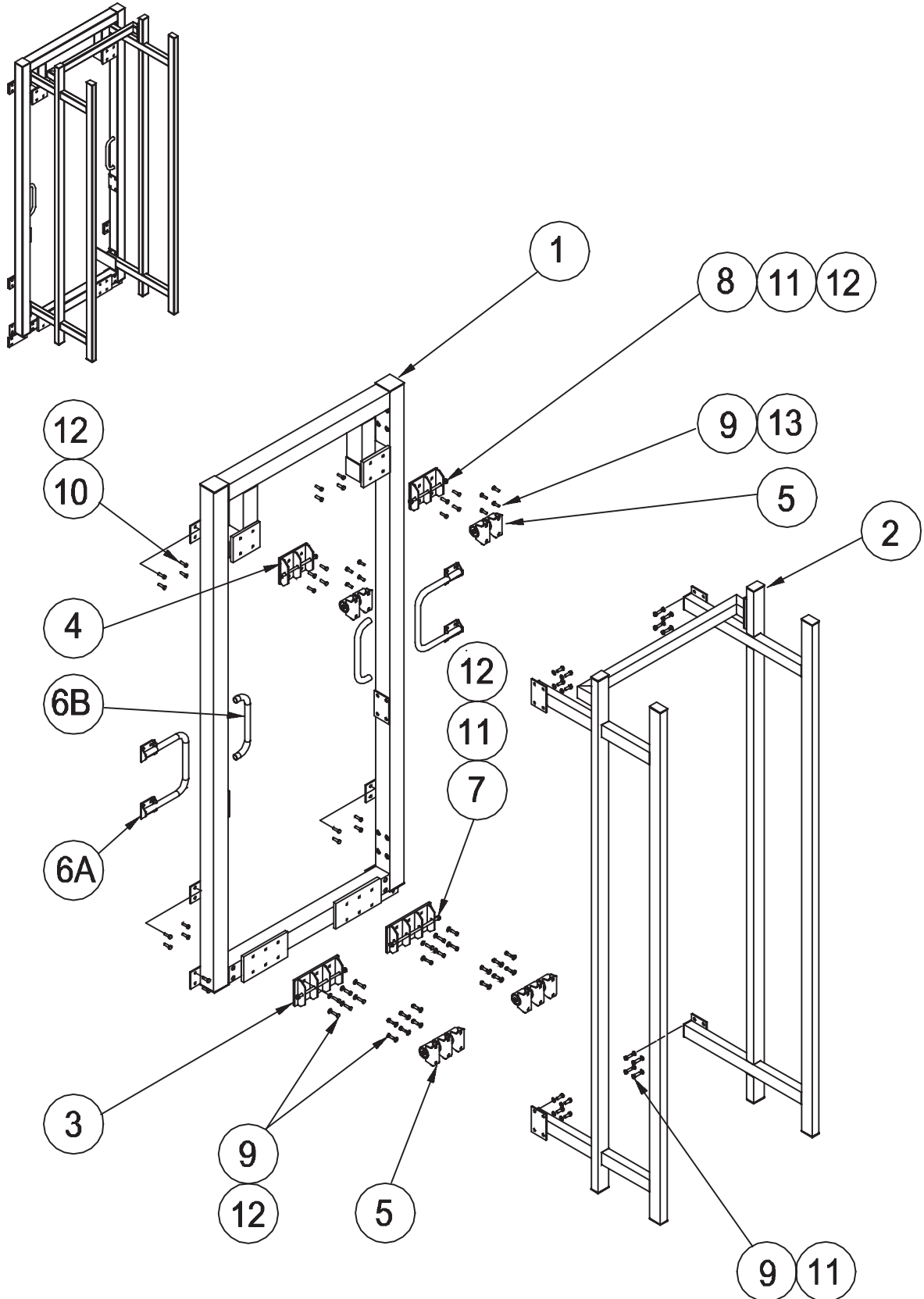
## Section 4-3 Main Frame Assembly

Item	Part No.	Part Name	Qty		
1	PS-22643	MAIN PORTAL	1		
2	PS-22309	ACTUATOR MOUNTING	2		
3	PS-22322	BUFFER BRACKET	2		
4	PS-400043	RUBBER STOP	2		
5	PS-22306	PIVOT PIN-1' x 65MM	2		
6	PS-22303-06	SPACER 50OD x 26ID x 6MM	4		
7	CPS-M12X30	BOLT-M12 x 30MM	4		
8	CPS-M12X25	BOLT-M12 x 25MM	8		
9	CPS-M10MMC/S	ALLEN SCREW-M10 x 75	2		
10	CPS-M8NL	NYLOC NUT-M8	2		
11	CPS-M12WH	WASHER-HARDENED-M12	12		
12	PS-63016	CYLINDER 2.5" 1.5"Rod 48"stroke Port 45 deg	2		
13	PS-61174	FITTINGS	4		
14	PS-63009-P	PINS-CYLINDER	4		

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-4 Portal Assembly



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



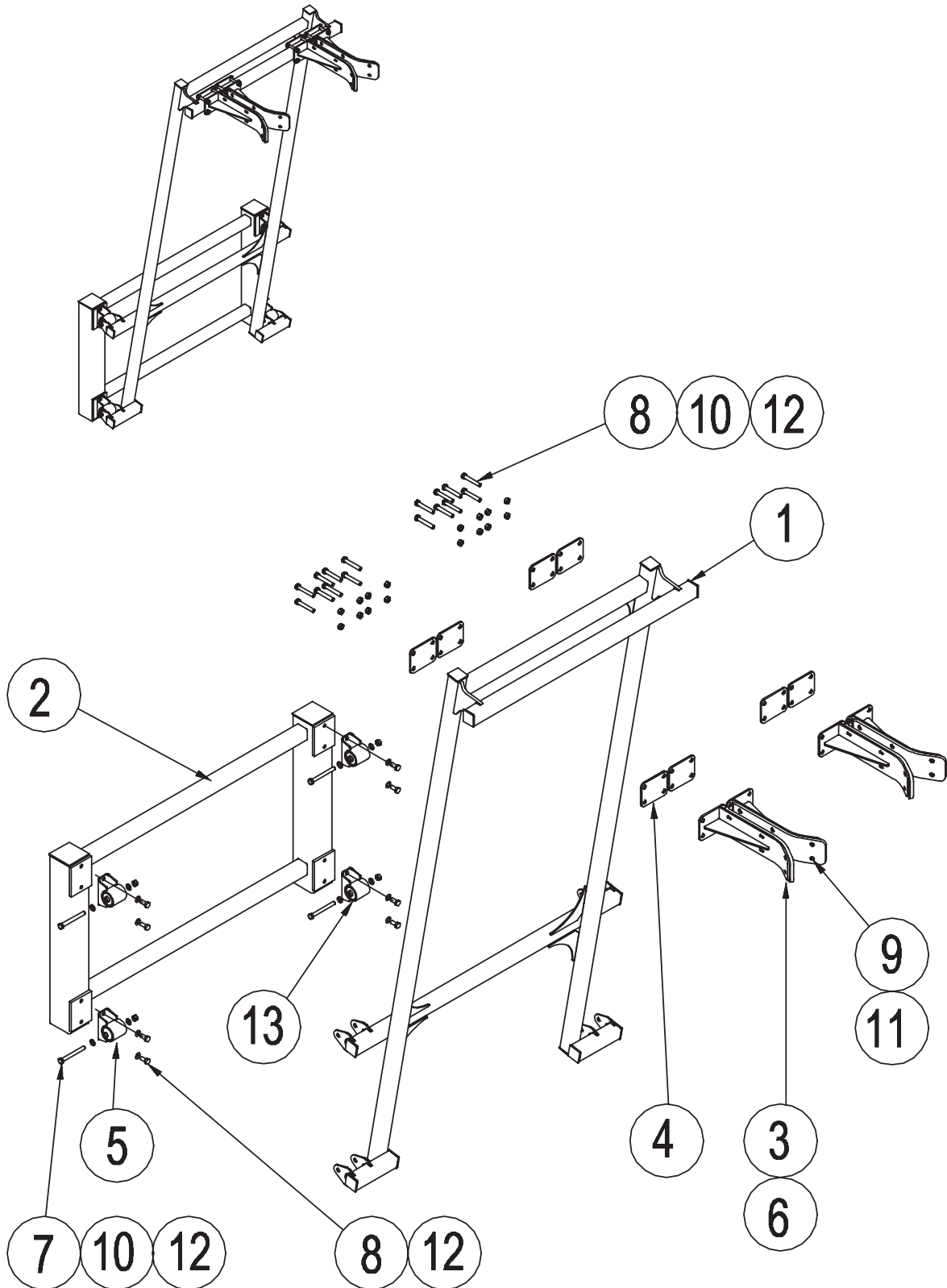
## Section 4-4 Portal Assembly

Item	Part No.	Part Name	Qty		
1	PS-22630	MOUNTING FRAME	1		
2	PS-22635	FRAME INNER	1		
3	PS-22620-99	LOWER ISOLATOR BRACKET	2		
4	PS-22620-98	UPPER ISOLATOR BRACKET	2		
5	PS-21930-10	ISOLATOR	10		
6A	PS-22626-99	HANDRAILS OUTER (opp.hands)	2		
6B	PS-22626-98	HANDRAILS INNER (opp.hands)	2		
7	PS-22620-06	ISOLATOR PIN 310lg x 1/2"BMS	2		
8	PS-22620-07	ISOLATOR PIN 225lg x 1/2"BMS	2		
9	CPS-M12X25	BOLT-M12 x 25	36		
10	CPS-M12X20	BOLT-M12 x 20	24		
11	CPS-1/2"NN	NYLOC NUT-1/2UNC	8		
12	CPS-W008ZP	WASHER-FLAT-1/2"	8		
13	CPS-M12WH	WASHER-M12	40		

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-5 Handrail Restraint Assembly



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



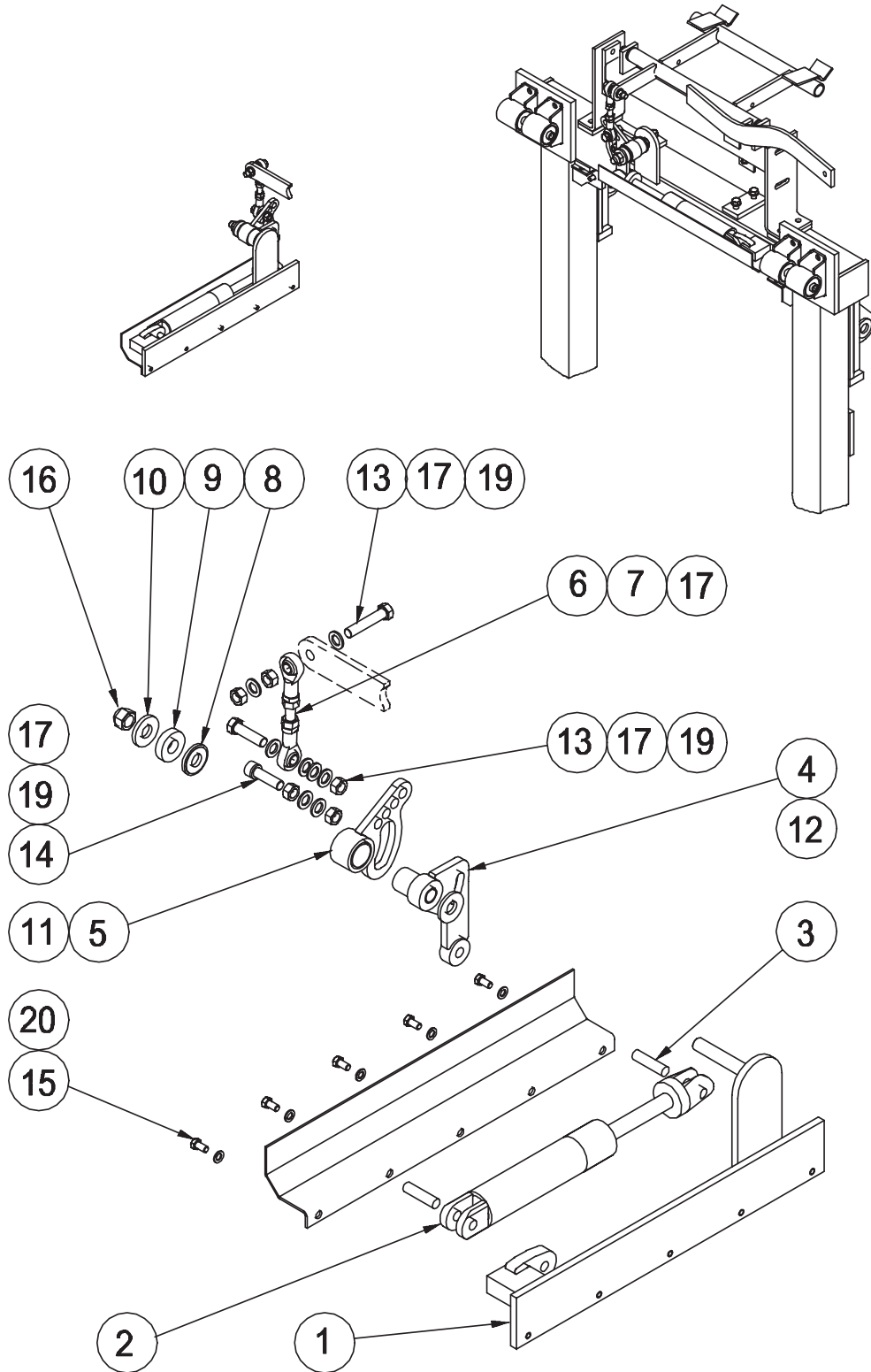
## Section 4-5 Handrail Restraint Assembly

Item	Part No.	Part Name	Qty		
1	PS-22655	HANDRAIL RESTRAINT ARM	1		
2	PS-22654	RESTRAINT MOUNTING FRAME	1		
3	PS-22656	RESTRAINT PLATES (2 sets)	2		
4	PS-22656-01	CLAMP PLATES	8		
5	PS-21930-10	ISOLATOR BRACKET	4		
6	PS-22656-04	BELT-RUBBER (12thk Cut to suit)	4		
7	PS-M12X75ZP	BOLT-M12 x 100	4		
8	PS-M12X75ZP	BOLT-M12 x 75	16		
9	CPS-M6X20	BOLT-PAN Hd.-M6 x 20	24		
10	CPS-M12ZP	NUT-M12	16		
11	CPSM6NN	NUT-NYLOC-M6	24		
12	CPSM12WH	WASHER-HARDENED-M12	16		
13	PS-S229	ISOLATOR BUSH	4		

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-6 Hydraulic Latch Assembly



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-6 Hydraulic Latch Assembly

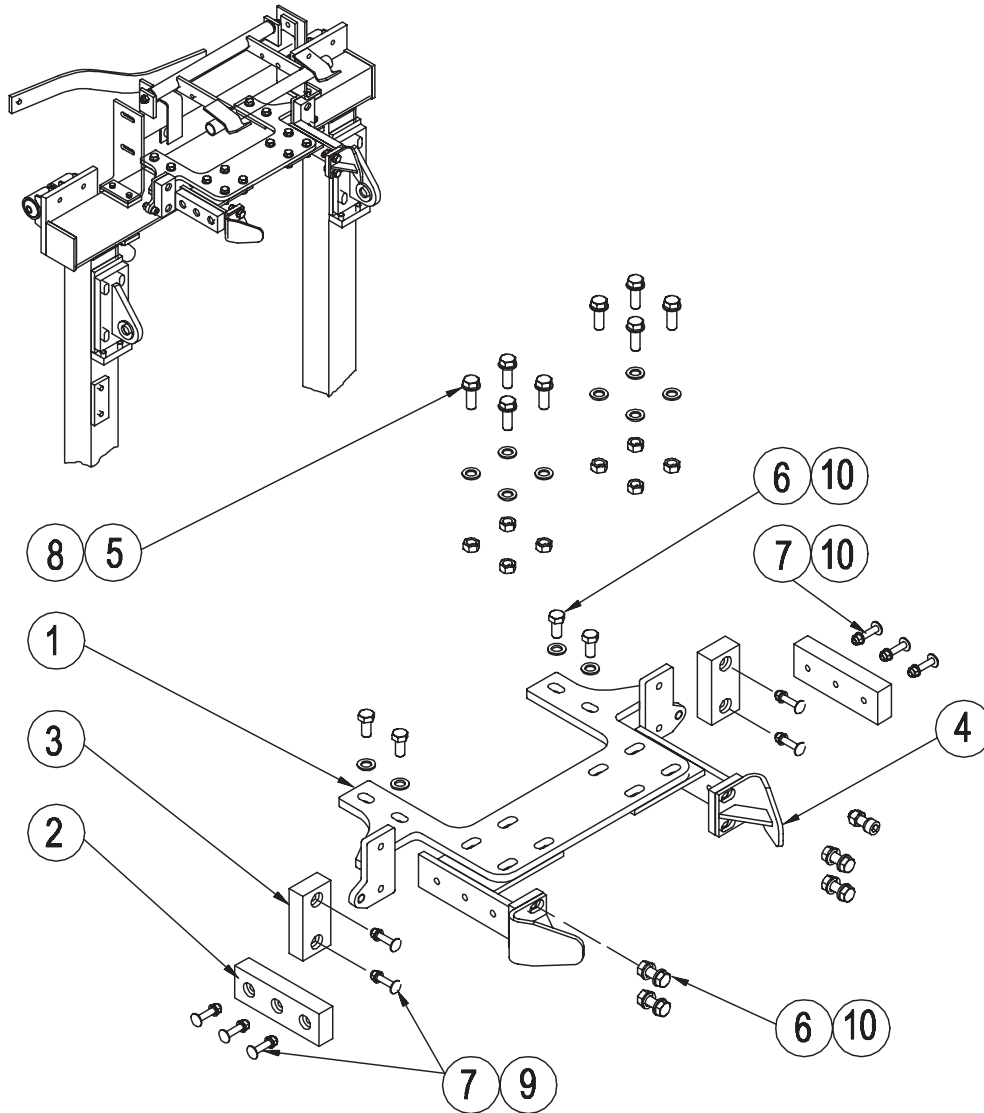
Item	Part No.	Part Name	Qty		
1	PS-22690	LATCH ACTUATOR BASE	1		
2	MAC-REF	CYLINDER GSN 1.5" x 4"	1	-	supplied by Liebherr
3	MAC-REF	PIN	2	-	
4	PS-22691-99	LEVER BRACKET	1		
5	PS-22691-98	SECTOR BRACKET	1		
6	CPS-M12ROD	ROD-M12 Threaded Rod x 100Lg	1		
7	PS-SKF-S112C	ROD END(SKF S112 C Fem. course M12)	2		
8	PS-22691-09	SPACER-40 x 5Thk-Nylon	1		
9	PS-22691-10	SPRING-40 x 10Thk-Rubber	1		
10	PS-22691-11	WASHER-40 x 5 Thk	1		
11	PS-22691-04	BUSH-NYLON-35.3OD x 30.8ID x 30Lg	1		
12	PS-22691-03	BUSH-NYLON-20.3OD x 16.8ID x 50Lg	1		
13	CPS-M12X50ZP	BOLT-M12 x 50	2		
14	CPS-M12X40ZP	BOLT-SOCKET Hd.-M12 x 40	1		
15	CPS-M8X15ZP	BOLT-M8 x 15	5		
16	CPS-M16NN	NUT-NYLOC-M16	1		
17	CPS-M12NZP	NUT-M12	6		
18	CPS-M8XNZP	NUT-M8	5		
19	CPS-M12WH	WASHER-M12	8		
20	CPS-M8WH	WASHER-M8	5		



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-7 Stair Bumper Assembly

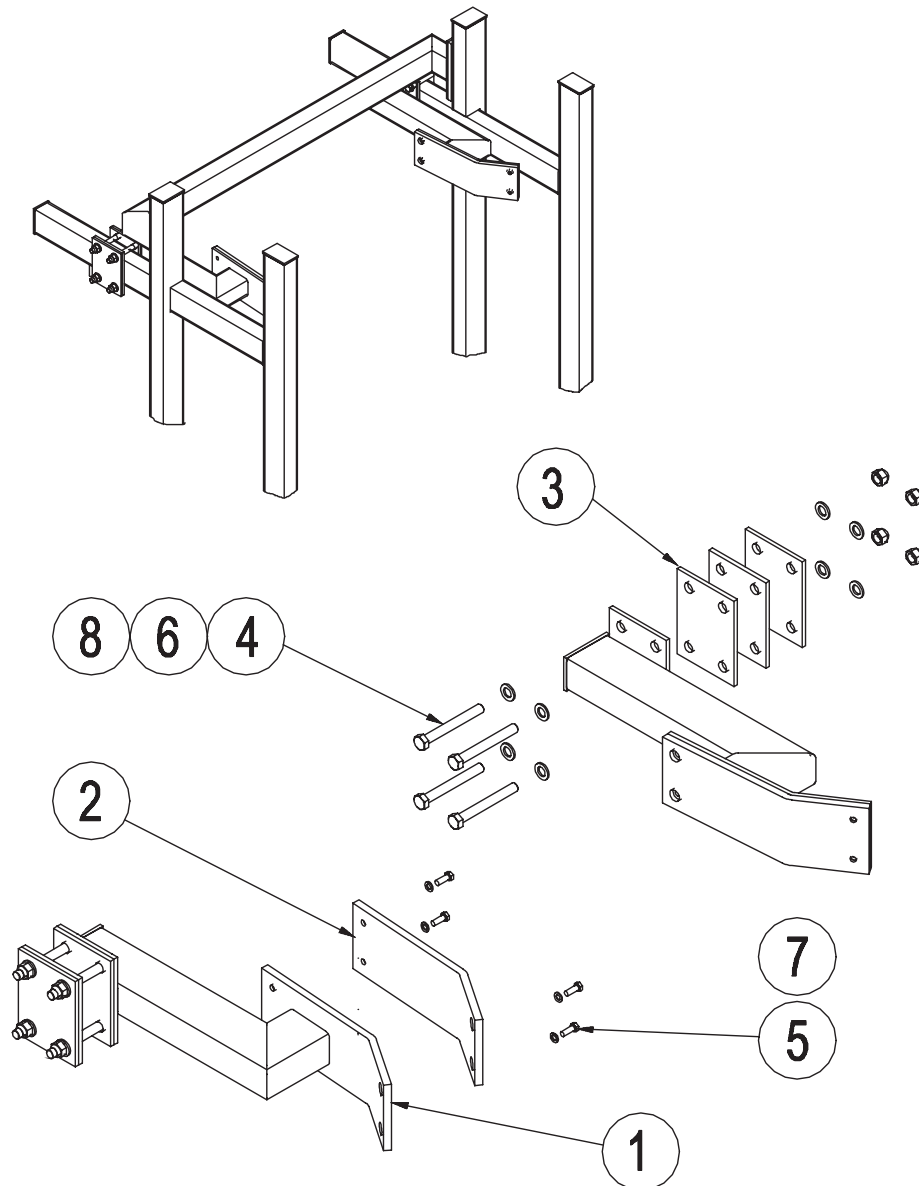


Item	Part No.	Part Name	Qty		
1	PS-22650	BUMPER MOUNTING FABRICATION	1		
2	PS-22650-10	SIDE BUMPER BLOCK-Large	2		
3	PS-22650-11	SIDE BUMPER BLOCK-Small	2		
4	PS-22650-97	ENTRY GUIDE	2		
5	CPS-M12X25ZP	BOLT-M12 x 40	8		
6	CPS-M12X20	BOLT-M12 x 20	8		
7	CPS-M12X45	BOLT-M8 x 45 (Machined to suit)	10		
8	PS-M12NZP	NUT-M12	12		
9	PS-M8NZP	NUT-M8	10		
10	CPS-M12WH	WASHER-HARDENED-M12	16		

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-8 Pad Assembly



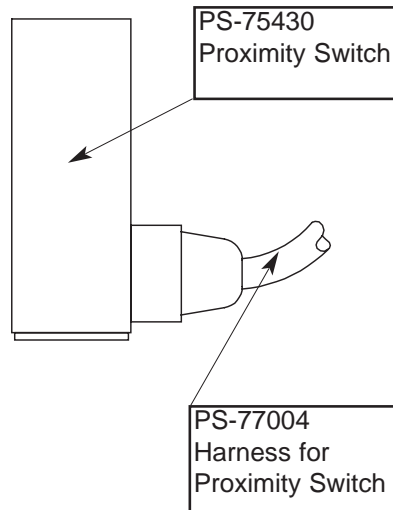
Item	Part No.	Part Name	Qty		
1	PS-22628	MOUNTING	2		
2	PS-22766-97	PAD	2		
3	PS-22606 98	FLANGE PLATE	8		
4	CPS-M12X100ZP	BOLT-M12 x 100	8		
5	CPS-M6X25ZP	BOLT-M6 x 25 Pan Hd screw	8		
6	CPS-M12NZZP	NUT-M12	16		
7	CPS-M6NZZP	NUT-M6	8		
8	CPS-M12WH	WASHER-HARDENED-M12	8		

# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)

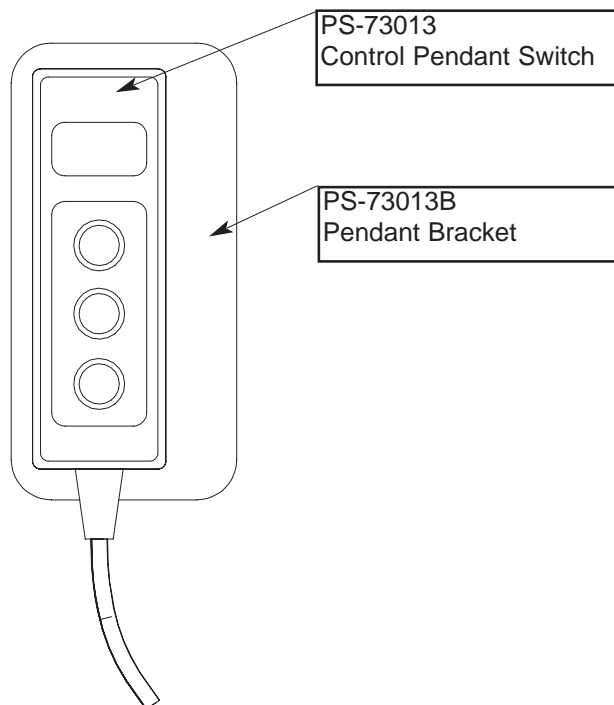


## Section 4-9 Electrical Controls

### Proximity Switch Assembly Mounted on Fixed Landing



### Control Pendant Switch Mounted on Handrail



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-9 Electrical Controls

Item	Part No.	Part Name	Qty		
16	PS-73013	SWITCH-PENDANT	1		

### Pendant Switch

PS-73013

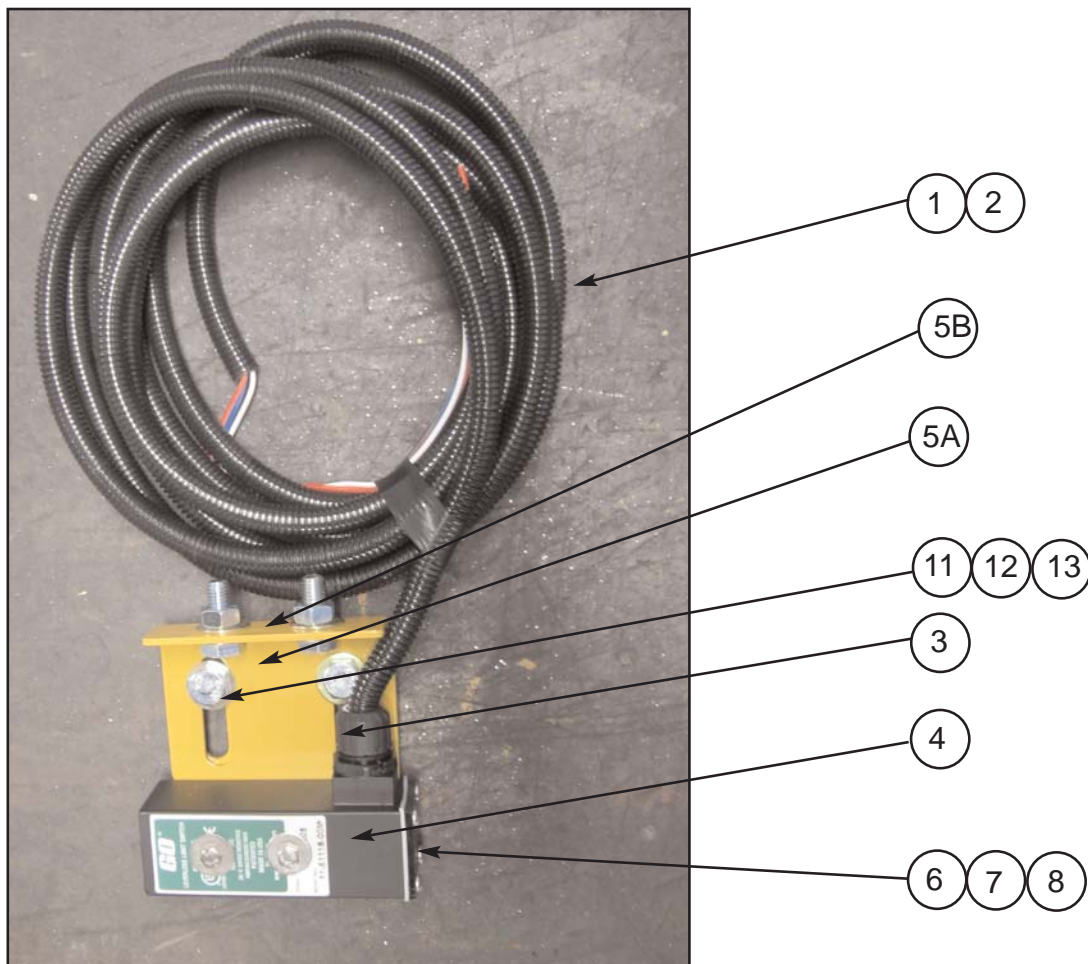


# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-9 Electrical Controls Parts List

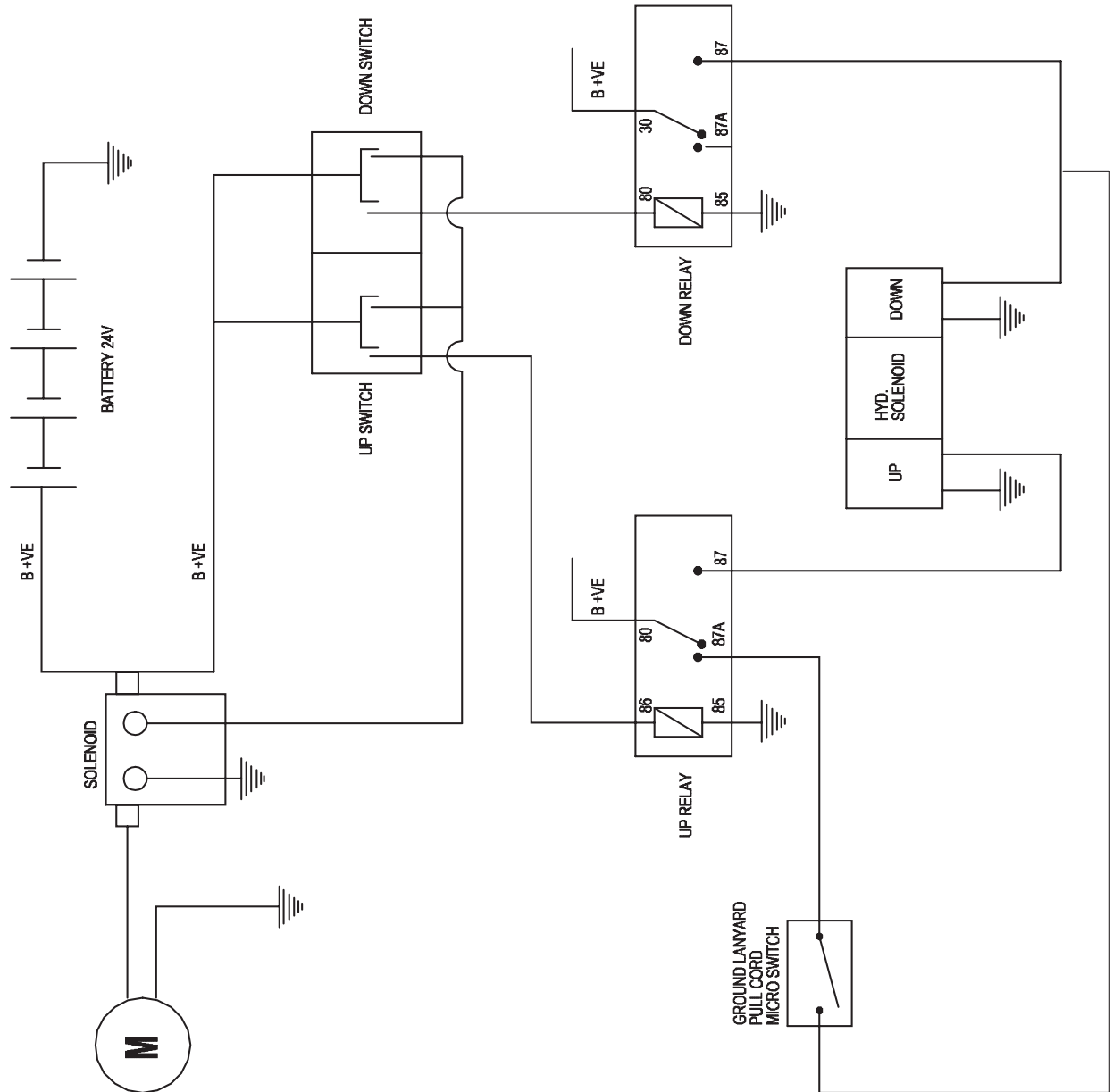
Item	Part No.	Part Name	Qty		
1	CPS-GOSWHARNESS 6M	GO-SWITCH-HARNESS 6M	1		
2	CPS-NC12	HARNESS FLEX-NC12 - 5.8M	5.8m		
3	CPS-CAB12M20	SEALING GLAND	1		
4	PS-75430	SWITCH-MAGNETIC	1		
5A	PS-75430-A	BRACKET-MOUNTING-PROX.SWITCH	1		
5B	PS-75430-B	BRKT-MTG-PROX.SWITCH R/ANGLE	1		
6	CPS-3/16"x2"S/S	SCREW-M3/16" x 2 -S/S	2		
7	CPS-BSW3/16" NUT S/S	NUT-M3/16"S/S	2		
8	CPS-WS/S316"x 1/2"	WASHER-M3/16" x 1/2"OD S/S	2		
9A	CPS-WASHER S/S 3/16"X3/4"	WASHER-3/16" x 3/4"OD S/S	2		
9B	CPS-WS/S SPRING3/16"	SPRINGWASHER 3/16" S/S	2		
10	CPS-M10X25ZP 10.9	BOLT-M10 x 25	2		
11	CPS-W006ZP	WASHER-FLAT-M10	8		
12	CPS-M10NZP	NUT-M10-1.5	4		



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



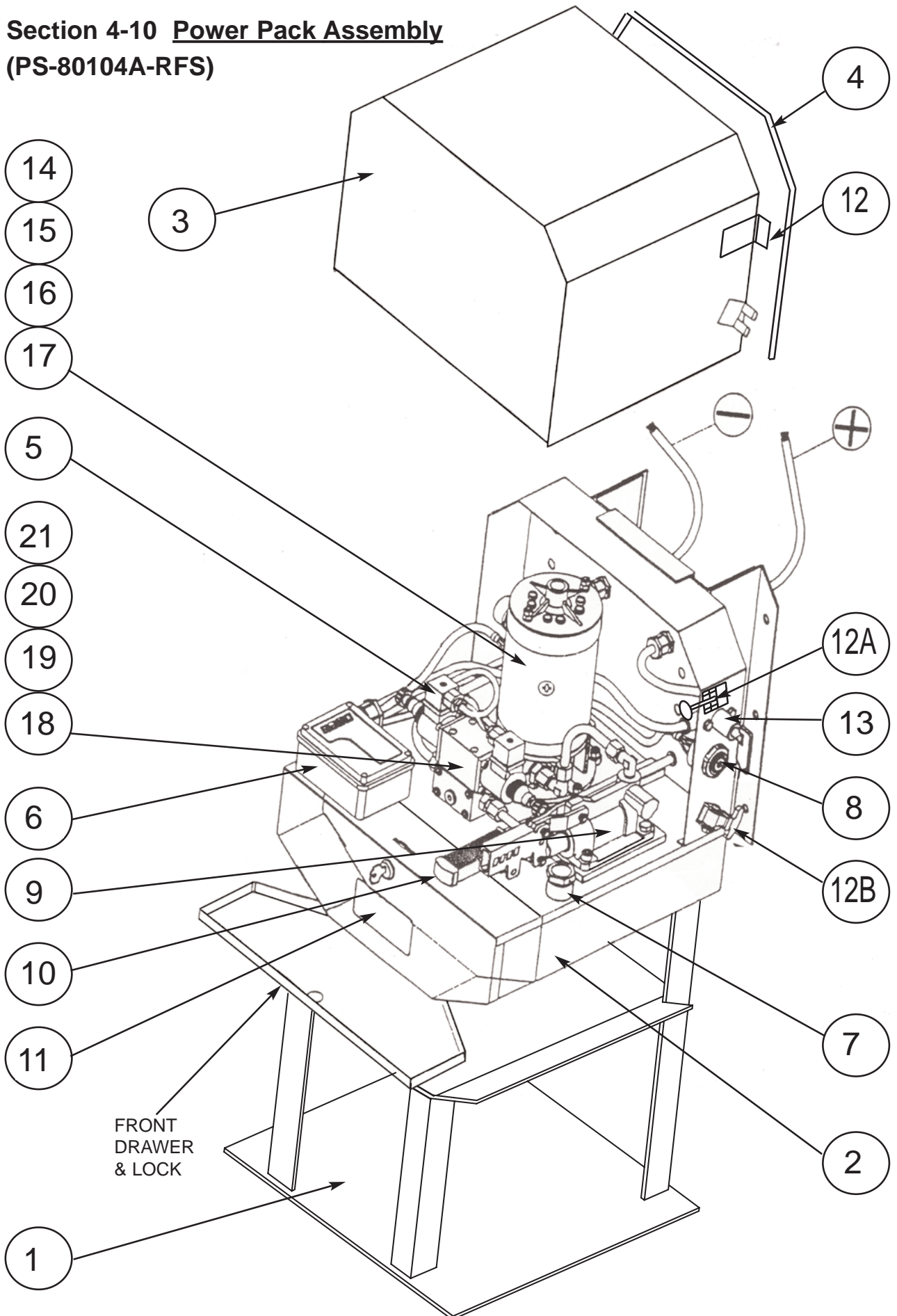
## Section 4-9 Electrical Diagram



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-10 Power Pack Assembly (PS-80104A-RFS)



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-10 Power Pack Assembly

See Drawing Page 33

Item	Part No.	Part Name	Qty		
1	PS-21613	MOUNTING FRAME	1		
2	PS-149.101.002	TANK ASSEMBLY-OIL	1		
3	PS-147.690.149	COVER-TOP	1		
4	PS-147.020.121	SEAL	1		
5	PS-149.115.624	24V SOLENOID VALVE	1		
6	PS-149.160.20017	JUNCTION BOX	1		
7	PS-509.005.015	CAP/BREATHER DIPSTICK	1		
8	PS-147.182.301	ALARM	1		
9	PS-106.014.180	PUMP-HAND	1		
10	PS-106.00.185	LEVER-HAND-PUMP	1		
11	PS-41022	POWERSTEP STICKER	1		
12	PS-30113-1A	LATCH-CLAMP	2		
12A	PS-30113-1	LATCH-OVERCENTER-ST/ST	2		
12B	PS-550.004.180	LATCH-RUBBER	2		
13	PS-122-011-322	SWITCH-ISOLATOR	1		
14	PS-149.011.90K	24V ELECTRIC MOTOR &PUMP	1		
15	PS-147.481.311	ELECTRIC MOTOR(with solenoid start)	1		(includes It. 16)
16	PS-82402	24V ELECTRIC MOTOR SOLENOID	1		
17	PS-149.200.20312	GEAR PUMP	1		
18	PS-500.017.055	BELL HOUSING WITH RELIEF VALVE	1		
19	PS-149.115.61	SUB-PLATE	1		
20	PS-541.003.126	PICK UP TUBE	1		
21	PS-118.064	PICK UP FILTER	1		
22	PS-82493	BATTERY-TERMINALS	2		
23	PS-73013	PENDANT SWITCH	1		

### NOTE

Item 14 Part No PS-149-011-90K Complete Motor & Pump Assembly includes items 15.16.17.18.20 & 21



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)

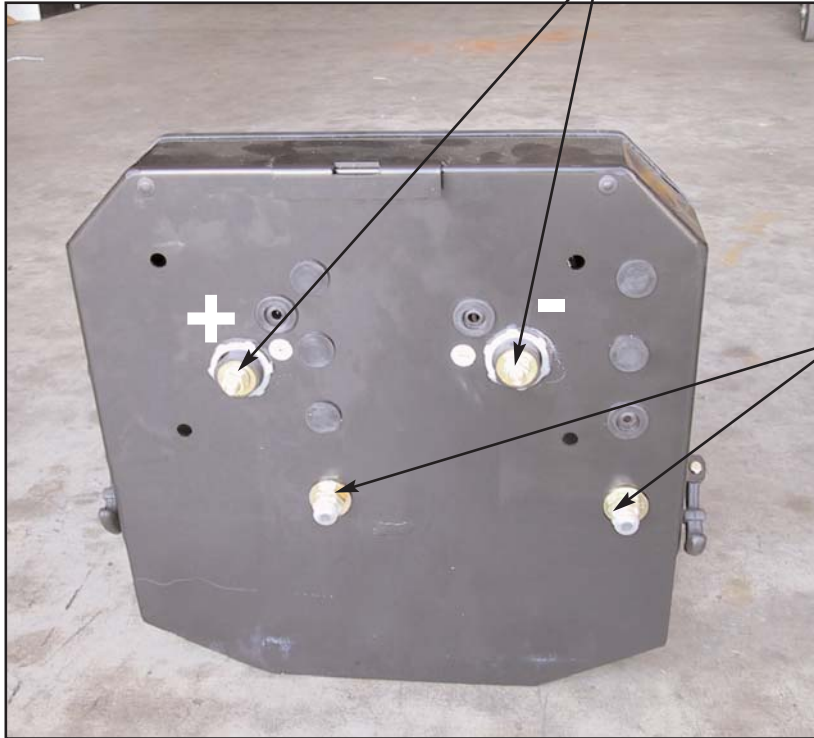


## Section 4-10 Power Pack Assembly (PS-80104A-RFS)

See Drawing Page 33

### Battery terminals

PS-82493



Hydraulic Hose Connections  
9/16" JIC Fitting

### Top Cover (PS-147.690.149)



# LIGHT STAIRWAY LIEBHERR 996 (M.A.C.)



## Section 4-11 Hydraulic Layout

