UpRight

MX15/19

SERIES

Work Platforms

European Specifications

⚠ WARNING ⚠

The MX19 Machine has been re-assessed to ensure compliance to the Machinery Directive (2006/42/EC).

The Machine rating has been changed from:

Windspeed rating of 12.5 m/s (Beaufort 6)

To

Windspeed rating of 7 m/s (Beaufort 4)

Please attach to the front cover of your MX19 manual

510328-000

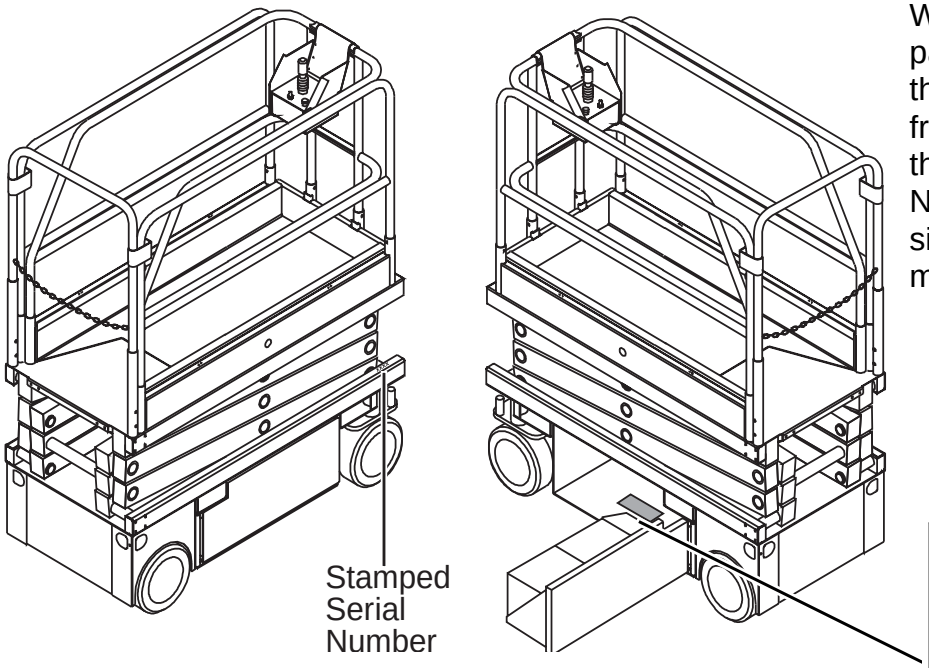
Service & Parts Manual

SERVICE & PARTS MANUAL

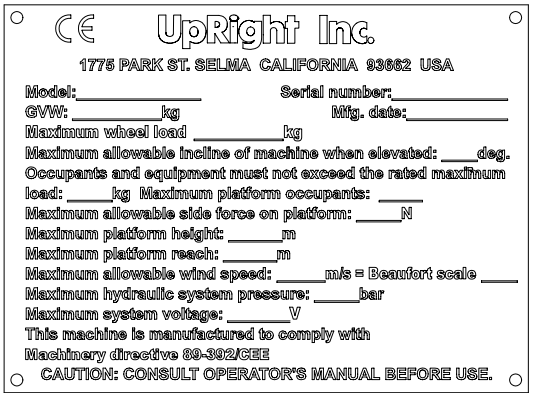
MX15/19

Aerial Work Platforms

Serial Numbers 500000 to Current



When contacting UpRight for service or parts information, be sure to include the MODEL and SERIAL NUMBERS from the equipment nameplate. Should the nameplate be missing, the SERIAL NUMBER is also stamped on the right side scissor rail toward the front of the machine.



UpRight, Inc.
1775 Park Street
Selma, California 93662
TEL: 559/891-5200
FAX: 559/891-9012
PARTS: 1-888-UR-PARTS
PARTS FAX: 559/896-9244

UpRight
Call Toll Free in the U.S.A.
1-800-926-LIFT

UpRight International Support Centre
Innsbruckweg 114
3047 AH Rotterdam
Netherlands
TEL: +31(0)10-238-0000
FAX: +31(0)10-238-0001
Parts Tel: +31(0)10-490-8090
Parts Fax: +31(0)10-490-8099

060569-024
7/00 D

MX15/19 SEVICE AND PARTS MANUAL
PART NUMBER : 503727-000
SERIAL NO. MXB50000

FOREWORD

HOW TO USE THIS MANUAL

This manual is divided into six sections.

SECTION 1 INTRODUCTION

General description and machine specifications.

SECTION 2 OPERATION AND SPECIFICATIONS

Information on how to operate the work platform and how to prepare it for operation.

SECTION 3 MAINTENANCE

Preventative maintenance and service information.

SECTION 4 TROUBLESHOOTING

Causes and solutions to typical problems.

SECTION 5 SCHEMATICS

Schematics and valve block diagram with description and location of components. Large schematic drawings may be located in the back of the manual.

SECTION 6 ILLUSTRATED PARTS BREAKDOWN

Complete parts lists with illustrations. Large parts drawings may be located in the back of the manual.

SPECIAL INFORMATION

⚠ DANGER ⚠

Indicates an imminently hazardous situation which, if not avoided, will result in severe injury or death.

⚠ WARNING ⚠

Indicates a potentially hazardous situation which, if not avoided, could result in severe injury or death.

⚠ CAUTION ⚠

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTE: Gives helpful information.

WORKSHOP PROCEDURES

⚠ CAUTION ⚠

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. Note that this manual does contain warnings and cautions against some specific service methods that could cause personal injury, or could damage a machine or make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by UpRight, might be done, or of the possible hazardous consequences of each conceivable way, nor could UpRight investigate all such ways. Anyone using service procedures or tools, whether or not recommended by UpRight must satisfy themselves thoroughly that neither personal safety nor machine safety will be jeopardized. When in doubt, contact your local distributor or UpRight.

Section 1

INTRODUCTION

1.1 INTRODUCTION

PURPOSE

The purpose of this service and parts manual is to provide instructions and illustrations for the operation and maintenance of the MX15/19 manufactured by UpRight.

SCOPE

The manual includes procedures for proper operation, maintenance, adjustment, and repair of the MX15/19 as well as recommended maintenance schedules and troubleshooting.

1.2 GENERAL DESCRIPTION

The MX15/19 consists of the platform, controller, elevating assembly, power module, control module, and chassis.

⚠ WARNING ⚠

DO NOT use the work platform without guardrails properly assembled and in place.

Figure 1-1: MX15/19 Work Platform

PLATFORM

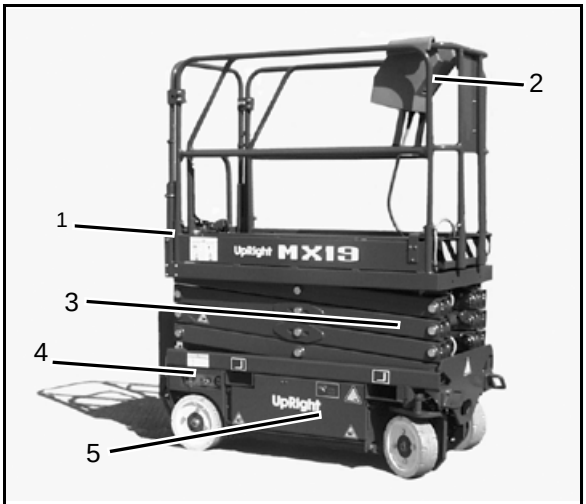
The platform has a reinforced steel floor, 1.11 m (43.75 inch) high guardrails with midrail, 6 inch (152 mm) toeboards, and an entrance gate at the rear of the platform.

PLATFORM CONTROLLER

The platform controller contains the controls to operate the machine. It is located at the front of the platform. A complete explanation of control functions can be found in Section 2.

ELEVATING ASSEMBLY

The platform is raised and lowered by the elevating assembly. The hydraulic pump, driven by an electric motor, powers the cylinder. Solenoid operated valves control raising and lowering.



1.Platform
2.Platform Controller
3.Elevating Assembly
4.Chassis Controls
5.Chassis

CHASSIS

The chassis is a structural frame that supports all the components of the MX15/19 work platform. The platform is raised and lowered using a scissors mechanism. Lift is achieved using a single stage cylinder.

PURPOSE OF EQUIPMENT

The objective of the work platform is to provide a quickly deployable, sel- propelled, variable height work platform to elevate personnel and materials to overhead work areas.

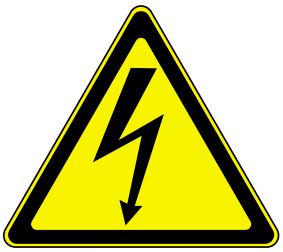
OPERATION MANUAL

WARNING

All personnel shall carefully read, understand and follow all safety rules and operating instructions before operating or performing maintenance on any UpRight aerial work platform.

Safety Rules

Electrocution Hazard



THIS MACHINE IS NOT INSULATED!

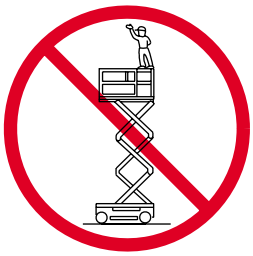
Tip Over Hazard

NEVER elevate the platform or drive the machine while elevated unless the machine is on a firm, level surface.

Collision Hazard

NEVER position the platform without first checking for overhead obstructions or other hazards.

Fall Hazard



NEVER climb, stand, or sit on platform guardrails or midrail.

USE OF THE AERIAL WORK PLATFORM: This aerial work platform is intended to lift persons and his tools as well as the material used for the job. It is designed for repair and assembly jobs and assignments at overhead workplaces (ceilings, cranes, roof structures, buildings etc.). All other uses of the aerial work platform are prohibited!

THIS AERIAL WORK PLATFORM IS NOT INSULATED! For this reason it is imperative to keep a safe distance from live parts of electrical equipment!

Exceeding the specified permissible maximum load **is prohibited!** See “Special Limitations” on page 4 for details.

The use and operation of the aerial work platform as a lifting tool or a crane (lifting of loads from below upwards or from up high on down) **is prohibited!**

NEVER exceed the manual force allowed for this machine. See “Special Limitations” on page 4 for details.

DISTRIBUTE all platform loads evenly on the platform.

NEVER operate the machine without first surveying the work area for surface hazards such as holes, drop-offs, bumps, curbs, or debris and avoiding them.

OPERATE machine only on surfaces capable of supporting wheel loads.

NEVER operate the machine when wind speeds exceed this machine’s wind rating. See “Beaufort Scale” on page 4 for details.

IN CASE OF EMERGENCY push EMERGENCY STOP switch to deactivate all powered functions.

IF ALARM SOUNDS while platform is elevated, STOP, carefully lower platform. Move machine to a firm, level surface.

Climbing up the railing of the platform, standing on or stepping from the platform onto buildings, steel or prefab concrete structures, etc., **is prohibited!**

Dismantling the swing gate or other railing components **is prohibited!** Always make certain that the swing gate is closed and securely locked!

It is prohibited to keep the swing gate in an open position (held open with tie-straps) when the platform is raised!

To extend the height or the range by placing of ladders, scaffolds or similar devices on the platform **is prohibited!**

NEVER perform service on machine while platform is elevated without blocking elevating assembly.

INSPECT the machine thoroughly for cracked welds, loose or missing hardware, hydraulic leaks, loose wire connections, and damaged cables or hoses before using.

VERIFY that all labels are in place and legible before using.

NEVER use a machine that is damaged, not functioning properly, or has damaged or missing labels.

To bypass any safety equipment **is prohibited** and presents a danger for the persons on the aerial work platform and in its working range.

NEVER charge batteries near sparks or open flame. Charging batteries emit explosive hydrogen gas.

Modifications to the aerial work platform **are prohibited** or permissible only at the approval by UpRight.

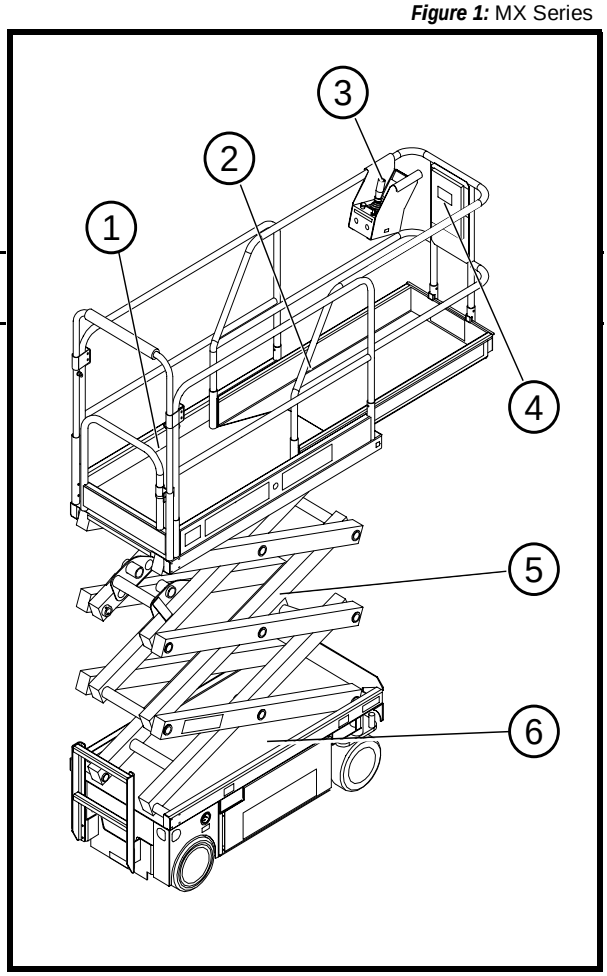
AFTER USE, secure the work platform from unauthorized use by turning both keyswitches off and removing key.

INTRODUCTION

This manual covers the application of the MX Series Self-Propelled Work Platforms. **This manual must be stored on the machine at all times.**

GENERAL DESCRIPTION

Figure 1: MX Series



1. Platform

2. Deck Extension

⚠ WARNING ⚠

***DO NOT** use the maintenance platform without guardrails properly assembled and in place*

3. Platform Controls

4. Manual Case

5. Elevating Assembly

6. Chassis

SPECIAL LIMITATIONS

Travel with the platform raised is limited to creep speed range.

Elevating the platform is limited to firm, level surfaces only.

⚠ DANGER ⚠

The elevating function shall ONLY be used when the work platform is level and on a firm surface.

The work platform is NOT intended to be driven over uneven, rough, or soft terrain.

PLATFORM CAPACITY

The maximum platform capacity for the MX 15 is 250 kg (550 lbs). Two people may occupy the platform indoors, while only one may occupy the platform outdoors.

The maximum platform capacity for the MX 19 is 227 kg (500 lbs). Two people may occupy the platform indoors, while only one may occupy the platform outdoors.

⚠ DANGER ⚠

DO NOT exceed the maximum platform capacity or the platform occupancy limits for this machine.

MANUAL FORCE

Manual force is the force applied by the occupants to objects such as walls or other structures outside the work platform.

The maximum allowable manual force is limited to 200 N (45 lbs.) of force per occupant, with a maximum of 400 N (90 lbs.) for two occupants.

⚠ DANGER ⚠

DO NOT exceed the maximum amount of manual force for this machine.

BEAUFORT SCALE

Never operate the machine when wind speeds exceed 25 km/h (15 mph) [Beaufort scale 4].

BEAUFORT RATING	WIND SPEED				GROUND CONDITIONS
	m/s	km/h	ft/s	mph	
3	3,4~5,4	12,25~19,4	11.5~17.75	7.5~12.0	Papers and thin branches move, flags wave.
4	5,4~8,0	19,4~28,8	17.75~26.25	12.0~18	Dust is raised, paper whirls up, and small branches sway.
5	8,0~10,8	28,8~38,9	26.25~35.5	18~24.25	Shrubs with leaves start swaying. Wave crests are apparent in ponds or swamps.
6	10,8~13,9	38,9~50,0	35.5~45.5	24.5~31	Tree branches move. Power lines whistle. It is difficult to open an umbrella.
7	13,9~17,2	50,0~61,9	45.5~56.5	31.~38.5	Whole trees sway. It is difficult to walk against the wind.

LIFT OVERLOAD ALARM

All models include a feature that alerts the operator when the platform load is exceeded. If the alarm sounds during the lift function, lower the platform and reduce the platform load.

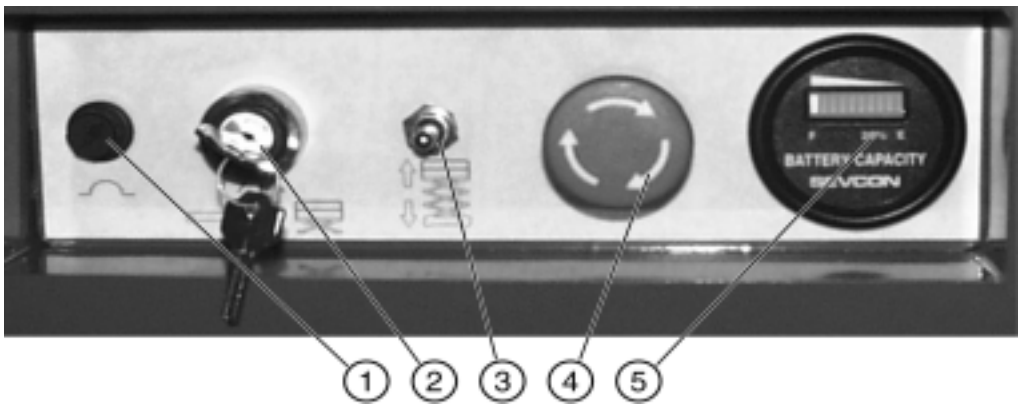
⚠ DANGER ⚠

Never operate the machine with a platform load greater than the rated capacity.

CONTROLS AND INDICATORS

Figure 2: Controls and Indicators

Chassis Controls



1 Circuit Breaker
2. Chassis Key Switch
3. Chassis Lift/Lower Switch
4. Chassis Emergency Stop Button
5. Hour Meter/Voltage Indicator

Platform Controls

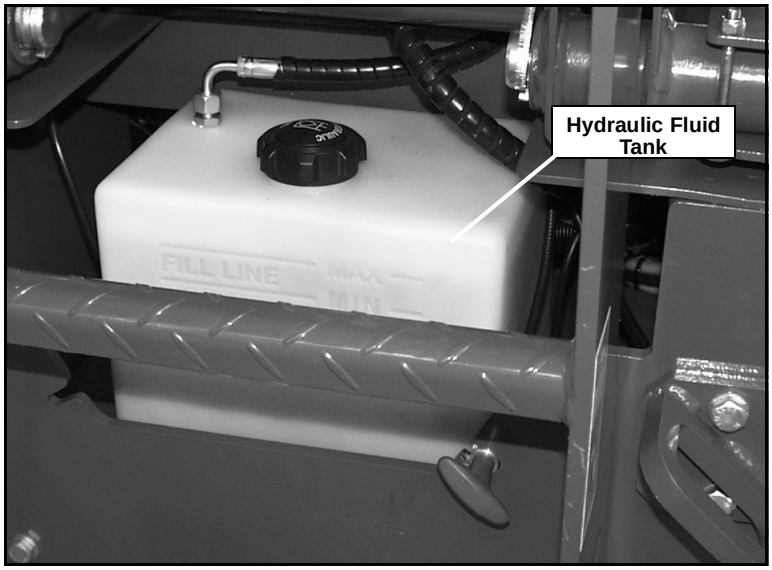
1. Steering Switch
2. Interlock Switch (on front of Control Handle)
3. Control Handle
4. Platform Emergency Stop Switch
5. Lift Drive Selector Switch
6. Horn Button

PRE-OPERATION SAFETY INSPECTION

NOTE: Carefully read, understand and follow all safety rules, operating instructions, labels and National Safety Instructions/Requirements. Perform the following steps each day before use.

1. Open modules and inspect for damage, fluid leaks or missing parts.

Figure 3: Hydraulic Tank



2. Check the level of the hydraulic fluid with the platform fully lowered. The hydraulic reservoir is located at the rear of the machine. The fluid level should be visible through the side of the tank, and must be between the MIN and MAX lines (see Figure 3). Add hydraulic fluid if necessary.
3. Check that fluid level in the batteries is correct (See Battery Maintenance, page 9).
4. Verify that batteries are charged.
5. Check that A.C. extension cord has been disconnected from the plug in the left Chassis
   Module, and that the module doors are closed and locked.
6. Check that all guardrails are in place and all fasteners are properly tightened.
7. Inspect the machine thoroughly for cracked welds and structural damage, loose or missing hardware, hydraulic leaks, damaged control cable, loose wire connections and wheel bolts.

SYSTEM FUNCTION INSPECTION

Refer to Figure 2 for the locations of various controls and indicators.

⚠ WARNING ⚠

***STAND CLEAR** of the work platform while performing the following checks.*

Before operating the work platform, survey the work area for surface hazards such as holes, drop-offs, bumps and debris.

*Check in **ALL** directions, including above the work platform, for obstructions and electrical conductors.*

Protect the control console cable from possible damage while performing checks.

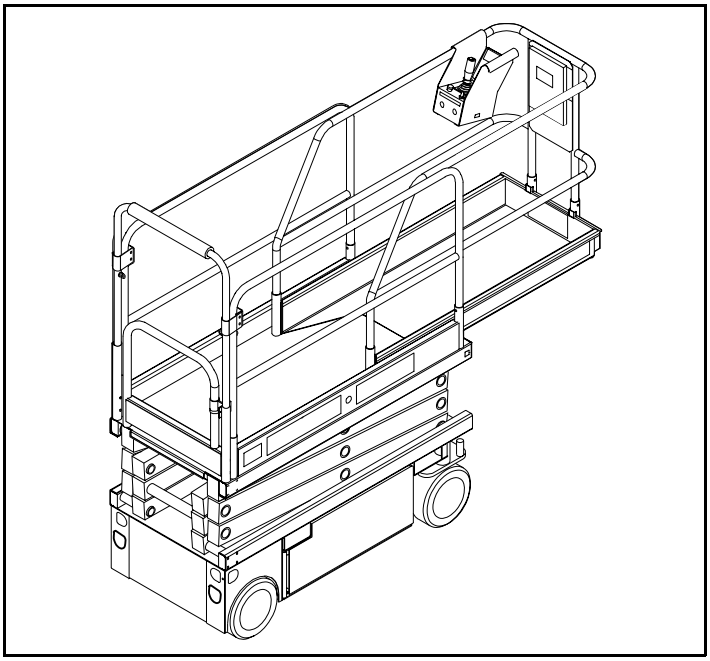
1. Move the machine, if necessary, to an unobstructed area to allow for full elevation.
2. Twist Chassis Emergency Stop Switch to the ON position.
3. Twist Platform Emergency Stop Switch to the ON position.
4. Turn and hold the Chassis Key Switch to CHASSIS. Push the Chassis Lift/Lower Switch to the UP position and raise the platform approximately 2,1 m (7 feet). **BLOCK THE ELEVATING ASSEMBLY AS DESCRIBED ON page 12.**
5. Visually inspect the elevating assembly, lift cylinder, cables, and hoses for cracked welds and structural damage, loose hardware, hydraulic leaks, loose wire connections, and erratic operation. Check for missing or loose parts.
6. Verify that the Depression Mechanism Supports have rotated into position under the machine. **REMOVE THE SCISSOR BRACE AS DESCRIBED ON pag e12.**
7. Turn and hold the Chassis Key Switch to CHASSIS. Push the Chassis Lift/Lower Switch to the UP position and fully elevate the platform. Partially lower the platform by pushing Chassis Lift/Lower Switch to LOWER, and check for proper operation of the audible lowering alarm.
8. Open the Emergency Lowering Valve (see Figure 3) by pulling the knob out to check for proper operation. When the platform is lowered, release the knob.
9. Push the Chassis Emergency Stop Switch to check for proper operation. All machine functions should be disabled. Twist the Chassis Emergency Stop Switch to resume.
10. Turn the Chassis Key Switch to DECK.
11. Check that route is clear of obstacles (persons, obstructions, holes, and drop-offs, bumps and debris), is level, and is capable of supporting the wheel loads.
12. Mount the platform and properly close the entrance.
13. Turn the Drive/Lift Switch to DRIVE. While engaging the Interlock Switch, move the Control Handle to FORWARD, then REVERSE, to check for speed control.
14. Push the Steering Switch RIGHT, then LEFT, to check for steering control.
15. Turn the Drive/Lift Switch to LIFT. Grasp the Control Handle, engaging the Interlock Switch, and push it forward to check platform lift controls. Raise the platform to full elevation.
16. Pull back on the Control Handle. The platform should descend and the audible lowering alarm should sound.
17. Push the Platform Emergency Stop Switch to check for proper operation. All machine functions should be disabled. Pull out the Platform Emergency Stop Switch to resume.

OPERATION

Before operating the work platform, ensure that the Pre-Operation Safety Inspection has been completed and that any deficiencies have been corrected. **Never operate a damaged or malfunctioning machine.** The operator must be thoroughly trained on this machine.

PLATFORM EXTENSION

Figure 4: Platform Extension



1. Mount the platform and properly close the entrance.
2. Depress the foot lever located at the rear of the platform extension. Push the platform extension forward until the pin engages the front stop.
3. To retract the platform extension, depress the foot lever and pull the platform extension toward the rear of the machine until the pin engages the rear stop.

TRAVEL WITH THE PLATFORM LOWERED

1. Check that the route is clear of obstacles (persons, obstructions, holes, drop-offs, bumps, and debris), is level, and is capable of supporting the wheel loads.
2. Verify that the Chassis Key Switch is turned to DECK and Chassis Emergency Stop Switch is ON (pulled out).
3. Mount the platform and properly close the entrance.
4. Check clearances above, below, and to the sides of platform.
5. Pull the Platform Emergency Stop Switch out to the ON position.
6. Turn the Drive/Lift Switch to DRIVE.
7. Engage the Interlock Switch and move the Control Handle to FORWARD or REVERSE to travel in the desired direction. The speed of the machine will vary depending on how far from center the Control Handle is moved.

STEERING

1. Turn the Drive/Lift Switch to DRIVE.
2. While engaging the Interlock Switch, push the Steering Switch to RIGHT or LEFT to turn the wheels in the desired direction. Observe the tires while maneuvering the work platform to ensure proper direction.

NOTE: Steering is not self-centering. Wheels must be returned to the straight ahead position by operating the Steering Switch.

ELEVATING THE PLATFORM

1. Select a firm, level surface.
2. Turn the Drive/Lift Switch to LIFT.
3. While engaging the Interlock Switch, push the Control Handle forward.
4. If the machine is not level the tilt alarm will sound and the machine will not lift or drive. **If the tilt alarm sounds the platform must be lowered and the machine moved to a firm level surface before attempting to re-elevate the platform.**

NOTE: Depression Mechanism supports will deploy automatically as the platform elevates and will retract after the platform has been lowered completely and has been driven.

TRAVEL WITH THE PLATFORM ELEVATED

NOTE: The machine will travel at reduced speed when the platform is elevated.

1. Check that the route is clear of obstacles (persons, obstructions, holes, drop-offs, bumps, and debris), is level, and is capable of supporting the wheel loads.
2. Check clearances above, below, and to the sides of platform.
3. Turn the Drive/Lift Switch to DRIVE.
4. Engage the Interlock Switch and move the Control Handle to FORWARD or REVERSE to travel in the desired direction. The speed of the machine will vary depending on how far from center the Control Handle is moved.
5. If the machine is not level the tilt alarm will sound and the machine will not lift or drive. **If the tilt alarm sounds the platform must be lowered and the machine moved to a firm, level surface before attempting to re-elevate the platform.**

LOWERING THE PLATFORM

1. Turn the Drive/Lift Switch to LIFT.
2. Check around the base of the platform to ensure that no one is in contact with the machine. Engage the Interlock Switch and pull back on the Control Handle to lower the platform.
3. The platform will stop when it reaches the PPE cutout height. Inspect around the machine to ensure no one is in contact with the machine. After a four-second time delay, lower the platform as in step 2.

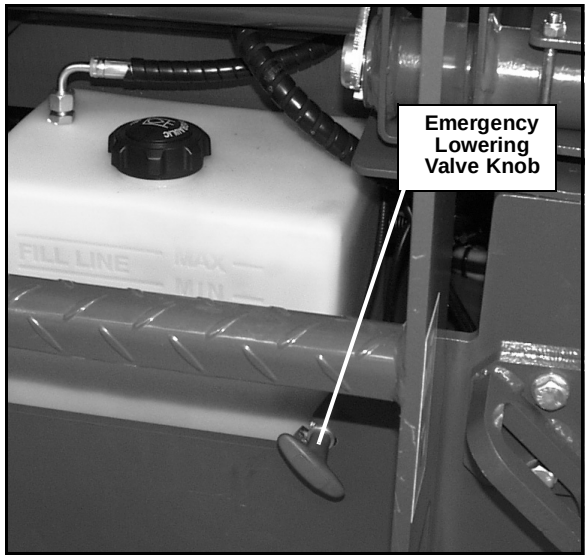
EMERGENCY LOWERING

⚠ WARNING ⚠

If the platform should fail to lower, NEVER climb down the elevating assembly.

Stand clear of the elevating assembly while operating the Emergency Lowering Valve Knob.

Figure 5: Emergency Lowering



The Emergency Lowering Valve Knob is located beside the ladder at the rear of the machine.

1. Open the Emergency Lowering Valve by pulling and holding the knob.
2. To close, release the knob. The platform will not elevate if the Emergency Lowering Valve is open.

⚠ WARNING ⚠

Never tow faster than 0,3 m/sec. (1 ft./sec.).

AFTER USE EACH DAY

1. Ensure that the platform is fully lowered.
2. Park the machine on a firm level surface, preferably under cover, secure against vandals, children and unauthorized operation.
3. Turn the Chassis Key Switch to OFF and remove the key to prevent unauthorized operation.

TRANSPORTING THE WORK PLATFORM

BY CRANE

Secure the straps to Tie Down/Lifting D-Rings only.

BY FORKLIFT

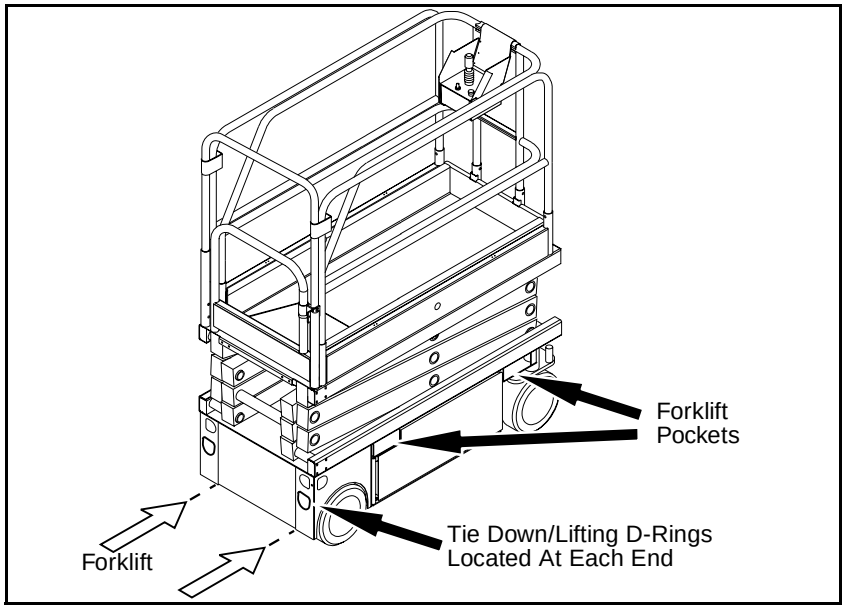
⚠ DANGER ⚠

Forklifting is for transport only.

See specifications for weight of work platform and be certain that forklift is of adequate capacity to lift the work platform.

Both the MX15 and MX19 may be forklifted from the rear end of the machine between the wheels.They may also be forklifted from the side using the forklift pockets shown in the diagram.

Figure 6: Transporting the Work Platform



BY TRUCK

Maneuver the work platform into transport position and chock the wheels. Secure the work platform to the transport vehicle by attaching chains or straps of adequate load capacity to the Tie Down/Lifting D-Rings.

CAUTION

Overtightening of the chains or straps attached to the Tie Down/Lifting D-Rings may result in damage to work platform.

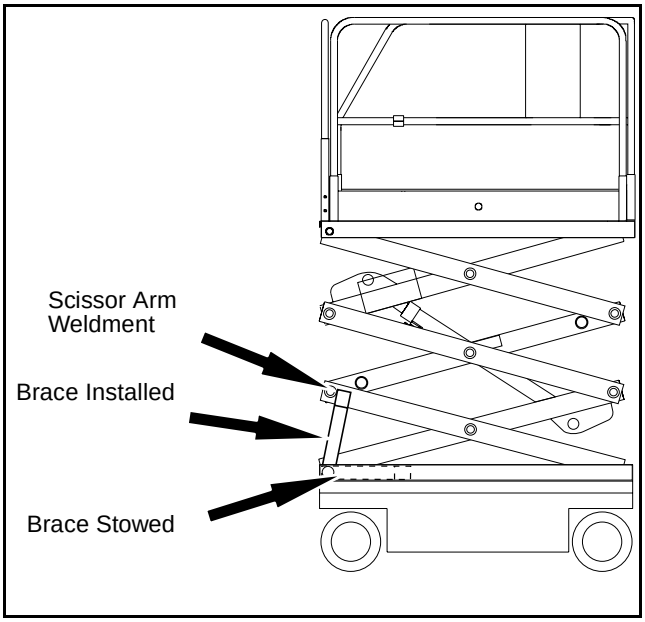
MAINTENANCE

⚠ WARNING ⚠

Never perform service while the platform is elevated without first blocking the elevating assembly.

DO NOT stand in the elevating assembly area while deploying or storing the brace.

Figure 7: Scissor Brace



BLOCKING THE ELEVATING ASSEMBLY

SCISSOR BRACE INSTALLATION

1. Park the work platform on a firm, level surface. Completely unload the platform before installing the Scissor Brace.
2. Verify that the Chassis and Platform Emergency Stop Switches are ON by twisting each button.
3. Turn and hold the Chassis Key Switch to CHASSIS. Push the Chassis Lift/Lower Switch to UP and elevate the platform approximately 2,1 m (7 ft.).
4. Rotate the Scissor Brace to a vertical position.
5. Carefully lower the platform until the end of the Scissor Arm Weldment rests on the Brace.

SCISSOR BRACE STOWAGE

1. While holding the Brace, slowly raise the platform using the Chassis Controls until the end of the Scissor Arm Weldment clears the Scissor Brace.
2. Rotate the Scissor Brace forward to rest on the Chassis.
3. Push the Chassis Lift/Lower Switch to LOWER and completely lower the platform.

BATTERY MAINTENANCE

⚠ WARNING ⚠

Hazard of explosive gas mixture. Keep sparks, flame, and smoking material away from batteries.

Always wear safety glasses when working near batteries.

Battery fluid is highly corrosive. Thoroughly rinse away any spilled fluid with clean water.

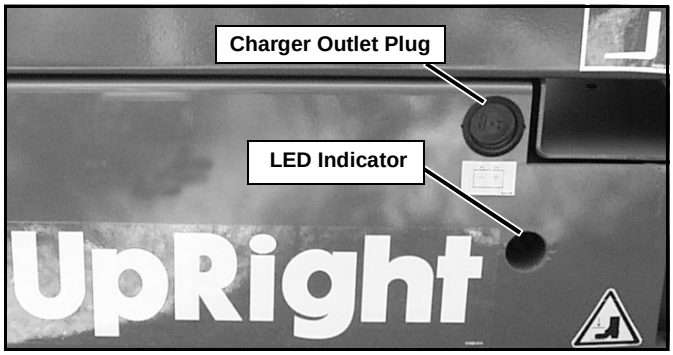
Always replace batteries with UpRight batteries or manufacturer approved replacements weighing 26,3 kg (58 lbs.) each.

- Check the battery fluid level daily, especially if the work platform is being used in a warm, dry climate.
- If electrolyte level is lower than 10 mm ($^3/_8$ in.) above the plates add distilled water only. DO NOT use tap water with high mineral content, as it will shorten battery life.
- Keep the terminals and tops of the batteries clean.
- Refer to the Service Manual to extend battery life and for complete service instructions.

BATTERY CHARGING

Charge the batteries at the end of each work shift or sooner if the batteries have been discharged.

Figure 8: Battery Charger



⚠ WARNING ⚠

Charge the batteries in a well ventilated area.

Do not charge the batteries when the work platform is near a source of sparks or flames.

Permanent damage to the batteries will result if the batteries are not immediately recharged after discharging.

Never leave the battery charger operating for more than two days.

Never disconnect the cables from the batteries when the charger is operating.

Keep the charger dry.

1. Check the battery fluid level. If the battery fluid level is lower than 10 mm ($^3/_8$ in.) above the plates add distilled water only.
2. Connect an appropriate extension cord to charger outlet plug in Left Module Door. Plug the extension cord into a properly grounded outlet of proper voltage and frequency.
3. The charger turns on automatically after a short delay. The LED charge indicator will illuminate. After completion of the charge cycle the LED will blink, indicating that the charger is in a continuing maintenance mode. DO NOT leave the charger plugged in for more than 48 hours, as permanent damage to the batteries may occur.

NOTE: The battery charger circuit must be used with a GFI (Ground Fault Interrupt) outlet.

NOTE: DO NOT operate the machine while the charger is plugged in.

INSPECTION AND MAINTENANCE SCHEDULE

The Complete Inspection consists of periodic visual and operational checks, along with periodic minor adjustments that assure proper performance. Daily inspection will prevent abnormal wear and prolong the life of all systems. The inspection and maintenance schedule should be performed at the specified intervals. Inspection and maintenance shall be performed by personnel who are trained and familiar with mechanical and electrical procedures.

⚠ WARNING ⚠

Before performing preventative maintenance, familiarize yourself with the operation of the machine.

Always block the elevating assembly whenever it is necessary to perform maintenance while the platform is elevated.

The daily preventative maintenance checklist has been designed for machine service and maintenance. Please photocopy the Daily Preventative Maintenance Checklist and use the checklist when inspecting the machine.

DAILY PREVENTATIVE MAINTENANCE CHECKLIST

MAINTENANCE TABLE KEY

INTERVAL

Y = Yes/Acceptable

N = No/Not Acceptable

R = Repaired/Acceptable

PREVENTATIVE MAINTENANCE REPORT

Date: _____

Owner: _____

Model No:_____

Serial No: _____

Serviced By:_____

COMPONENT	INSPECTION OR SERVICES	Y	N	R
Battery	Check electrolyte level.			
	Check battery cable condition.			
Chassis	Check hoses for pinch or rubbing points.			
	Check welds for cracks.			
Control Cable	Check the exterior of the cable for pinching, binding or wear.			
Controller	Check switch operation.			
Drive Motors	Check for operation and leaks.			
Elevating Assembly	Inspect for structural cracks.			
Emergency Lowering System	Operate the emergency lowering valve and check for serviceability.			
Entire Unit	Check for and repair collision damage.			

COMPONENT	INSPECTION OR SERVICES	Y	N	R
Hydraulic Fluid	Check fluid level.			
Hydraulic Pump	Check for hose fitting leaks.			
Hydraulic System	Check for leaks.			
Labels	Check for peeling, missing, or unreadable labels & replace.			
Platform Deck and Rails	Check welds for cracks.			
	Check condition of deck.			
Tires	Check for damage.			

NOTES:

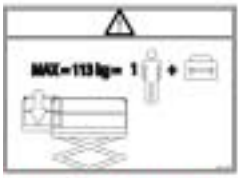
LABELS

These labels shall be present and in good condition before operating the work platform. Be sure to read, understand and follow these labels when operating the work platform.

4. 067195-001

5. 100102-900

11. 503721-000



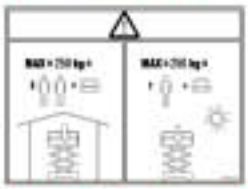
12. 066551-950

13. 101210-000

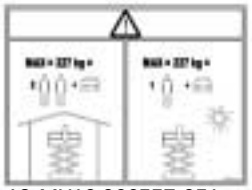
14. 503724-000

16. 503723-000

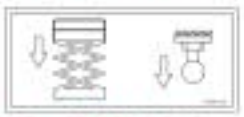
17. 066556-900



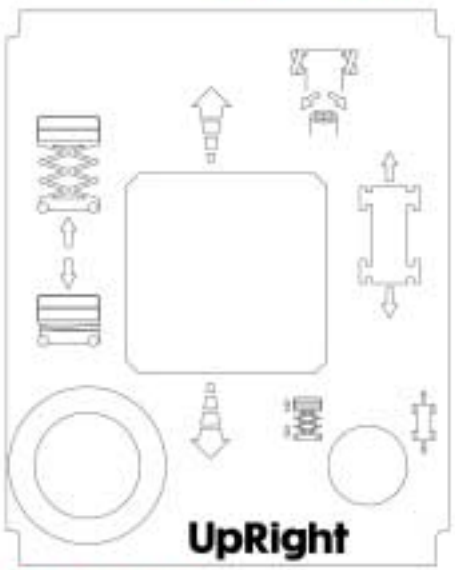
18. MX15 066557-952



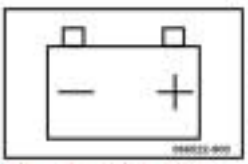
18. MX19 066557-951



19. 005223-906



20. 101222-904



22. 066522-900

23. 014222-903

24. 501453-000

25. 063255-901

26. 010076-901

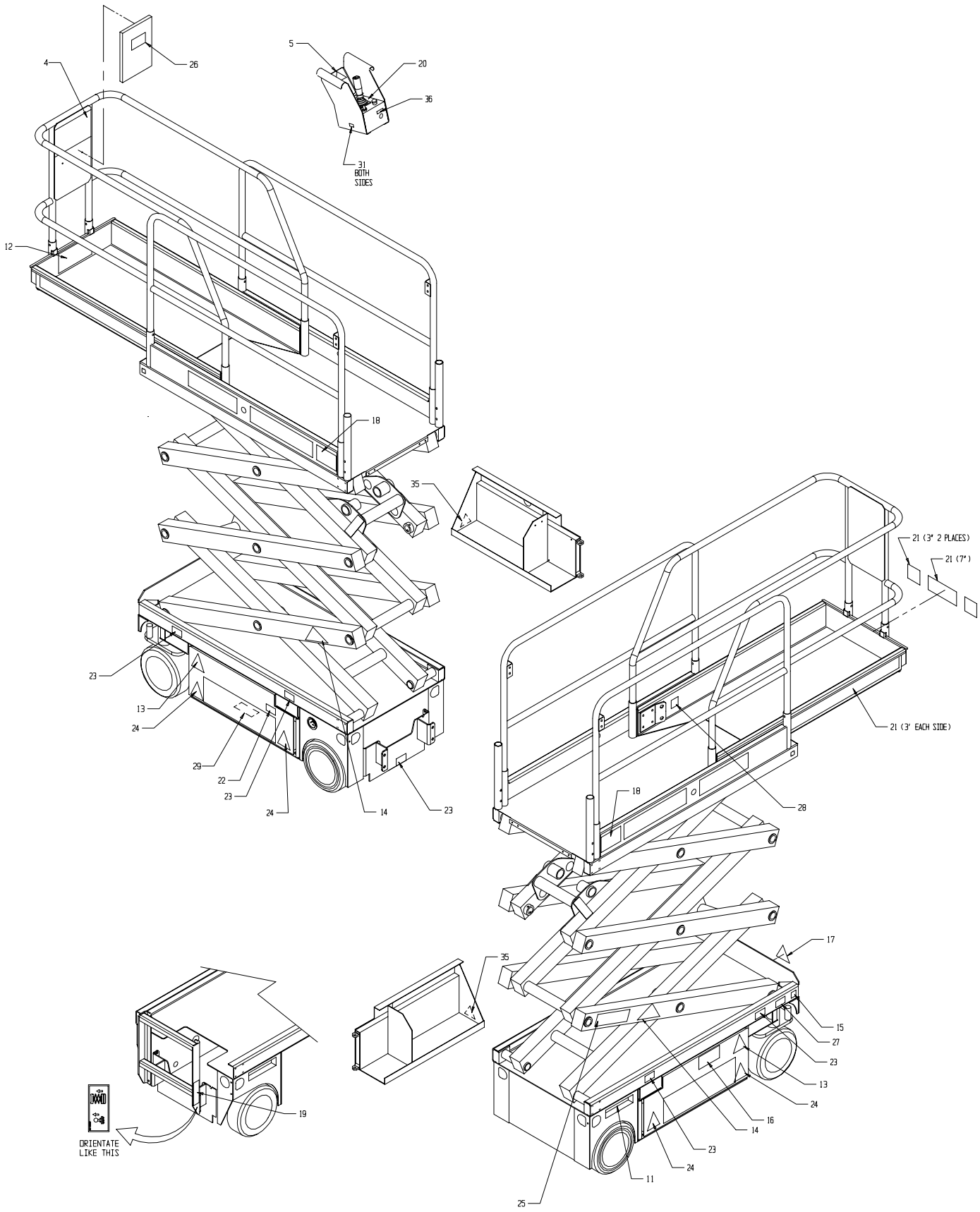
28. 068635-001

29. 503725-000

35. 062562-951

36. 107053-000

Figure 9: Safety Labels Locations



SPECIFICATIONS

ITEM	MX15	MX19
Platform Size (Inside minimum)		
Standard w/Deck	0,57 m x 2,5 m (22.5 in. x 98.5 in.)	0,57 m x 2,5 m (22.5 in. x 98.5 in.)
Maximum Platform Capacity		
Standard w/Deck Extension	250 kg (550 lbs.)	227 kg (500 lbs.)
Maximum Number of Occupants		
Standard w/Deck Extension	2 People indoors/1 person outdoors	2 People indoors/1 person outdoors
on Extension	1 Person	1 Person
Height		
Working Height	6,57 m (21 ft. 7 in.)	7,8 m (25 ft. 6 in.)
Maximum Platform Height	4,57 m (14 ft. 11 in.)	5,8 m (19 ft.)
Maximum Drivable Height	4,57 m (14 ft. 11 in.)	5,8 m (19 ft.)
Dimensions		
Weight	1284 kg (2830 lbs.)	1406 kg (3100 lbs.)
Overall Width	760 mm (30 in.)	760 mm (30 in.)
Overall Height (Lowered)	1,93 m (76 in.)	2,02 m (79.5 in.)
Overall Length (Deck in)	1,60 m (63 in.)	1,60 m (63 in.)
Drive Speed		
Platform Lowered	3,7 km/h (2.3 mph)	3,7 km/h (2.3 mph)
Platform Raised	1,0 km/h (0.62 mph)	1,0 km/h (0.62 mph)
Energy Source	24 V battery pack (4-220 A hour, 6 V batteries, min. wt. 26,3 kg [58 lbs.] each), 4 HP DC electric motor	24 V battery pack (4-220 A hour, 6 V batteries, min. wt. 26,3 kg [58 lbs.] each), 4 HP DC electric motor
System Voltage	24 V DC	24 V DC
Battery Charger	20 A, 240 V AC 50 Hz, Automatic	20 A, 240 V AC 50 Hz, Automatic
Hydraulic Tank Capacity	12,9 L (3.4 US gal.)	12,9 L (3.4 US gal.)
Maximum Hydraulic System Pressure	234 bar (3400 psi)	234 bar (3400 psi)
Hydraulic Fluid		
Normal above 32° F [0° C]	ISO #46	ISO #46
Low Temp. below 32° F [0° C]	ISO #32	ISO #32
below 0° F [-17° C]	ISO #15	ISO #15
Lift System	One Single Stage Lift Cylinder	One Single Stage Lift Cylinder
Drive Control	Motor Control	Motor Control
Control System	Control Handle with Interlock Switch, Rotary Drive/Lift Switch, and Red Mushroom Emergency Stop Switch	Control Handle with Interlock Switch, Rotary Drive/Lift Switch, and Red Mushroom Emergency Stop Switch
Drive System	Dual Front Wheel Hydraulic Motors	Dual Front Wheel Hydraulic Motors
Tires	30,5 cm (12 in.) diameter solid rubber, Non-marking	30,5 cm (12 in.) diameter solid rubber, Non-marking
Turning Radius (inside)	150 mm (6 in.) Inside	150 mm (6 in.) Inside
Maximum Gradeability	25% (14°)	25% (14°)
Wheel Base	1,23 m (48.5 in.)	1,23 m (48.5 in.)
Guardrails	1,10 m (43 in.)	1,10 m (43 in.)
Toeboard	150 mm (6 in.)	150 mm (6 in.)
Noise Level		

*Specifications are subject to change without notice. Hot weather or heavy use may affect performance.

Refer to the Service Manual for complete parts and service information.

The MX15/19 meets or exceeds all applicable CE and GS machinery directive requirements.

Section 3

MAINTENANCE

3.1 INTRODUCTION

Reference: • Section 2 for recommended maintenance intervals.

⚠ WARNING ⚠

Be sure to read, understand and follow all information in the Operation Section of this manual before attempting to operate or perform service on any work platform.

This section contains instructions for the maintenance of the work platform. Procedures for the inspection, adjustment, and repair/removal are included.

Referring to Section 2 will aid in understanding the operation and function of the various components and systems of the work platform, and help in diagnosing and repairing the machine.

WIRE COLOR

Wire color is indicated by color/color. First color refers to insulation color and second color indicates stripe. If second color is not given, there is no stripe.

3.2 DATE CODE IDENTIFICATION ON HOSES

MANULI uses an eight digit code: Day, Month, Year.

i.e.: 02 05 2003, (2nd May 2003).

3.3 SPECIAL TOOLS

The following is a list of special tools which may be required to perform certain maintenance procedures on the work platform.

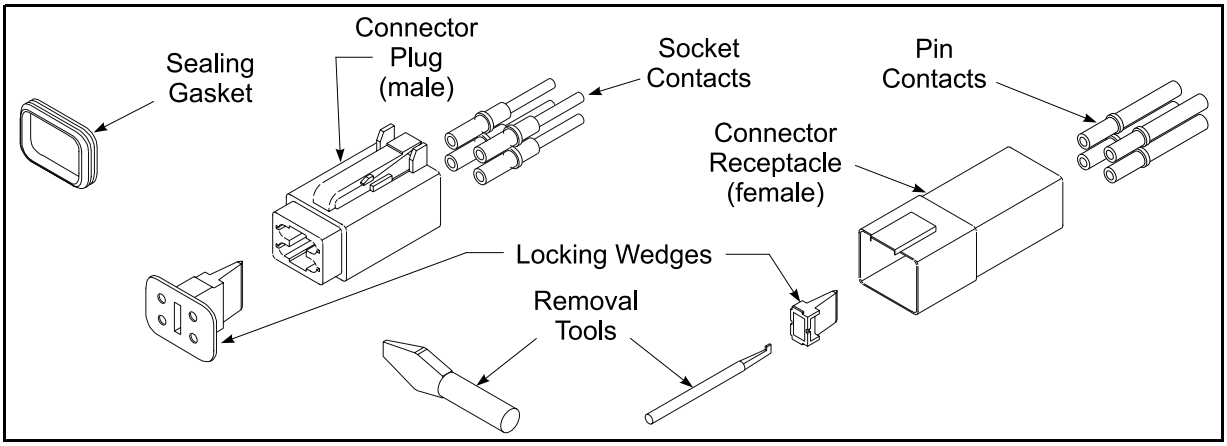
- 0-207 bar (0-3000 psi) Hydraulic Pressure Gauge with Adapter Fittings (UpRight P/N 014124-030)
- 0-344 bar (0-5000 psi) Hydraulic Pressure Gauge with Adapter Fittings (UpRight P/N 063971-000)
- Small UpRight Connector Field Kit (UpRight P/N 030899-000)
- Large UpRight Connector Field Kit (UpRight P/N 030898-000)
- Inclinometer (UpRight P/N 010199-000)

3.4 UPRIGHT CONNECTORS

UpRight connectors are designed so that connector parts, contacts or electrical cables may be replaced without replacing the entire connector.

Figure 3-1: UpRight Connector Kit

Figure 3-2: Plugs and Receptacles, UpRight Connectors



MALE CONNECTOR (PLUG)

1. Disconnect the male connector (plug) from the female connector (receptacle).
2. Using the flat end of the RemovalTool (or flat blade screwdriver), pry the Locking Wedge

from the Male Connector. Care should be taken that the Silicon Gasket is not damaged during this procedure.

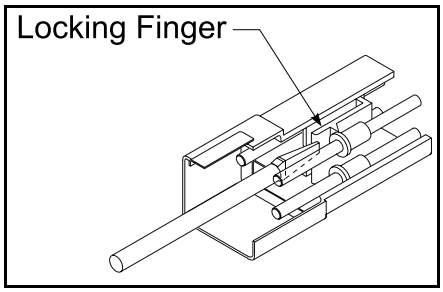
3. Check all parts for damage. Replace all parts which are damaged or worn.
4. Replace or recrimp the wires and contacts. Refer to “Crimping” procedure.

FEMALE CONNECTOR (RECEPTACLE)

1. Disconnect the male connector (plug) from the female connector (receptacle).
2. Using the notched end of the Removal Tool (or a wire hook), pull the Locking Wedge from the Female Connector.
3. Check all parts for damage. Replace all parts which are damaged or worn.
4. Replace or recrimp the wires and contacts. Refer to “Crimping” procedure.

RELEASING LOCKING FINGERS

Figure 3-3: Locking Finger, UpRight Connector



1. The Locking Fingers can be released following the removal of the Locking Wedge of either the male or female connector.
2. Use the removal tool (or flat blade screwdriver) to push the Locking Fingers aside. This will release the grip on the contact.
3. Pull the wire and contact out of the connector.

CRIMPING

1. Strip 6 mm (.25 inch) from the wire.

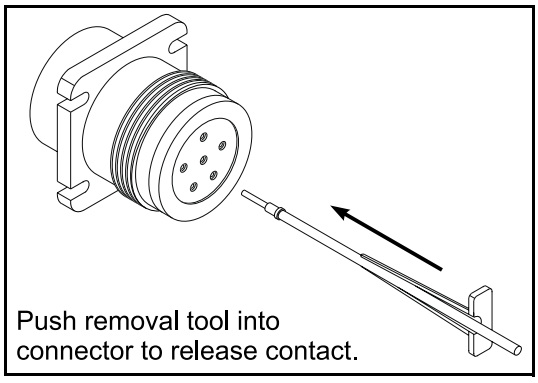
NOTE: Complete crimping instructions are included in each Field Kit.

2. Insert the contact into the crimping tool.
3. Insert the stripped wire into the contact. Copper strands should be visible in the bleed hole of the contact and no copper strands should be loose (outside) of the contact barrel.
4. Completely close the handles of the crimping tool. Release the handles of the crimping tool and remove the crimped contact.
5. Inspect the crimped contact to ensure that all strands are secure in the crimp barrel.

REMOVING CONTACT FROM HEAVY DUTY PLUG

Figure 3-4: Heavy Duty UpRight Connector

1. Slip the removal tool along the wire to be replaced.
2. Push the removal tool into the connector until the contact is released.
3. Pull the wire and contact out of the plug.



3.5 SUPPORTING THE ELEVATING ASSEMBLY

⚠ WARNING ⚠

***NEVER** perform service in the elevating assembly area while the platform is elevated without first blocking the elevating assembly.*

DO NOT stand in the elevating assembly area while deploying or storing the brace.

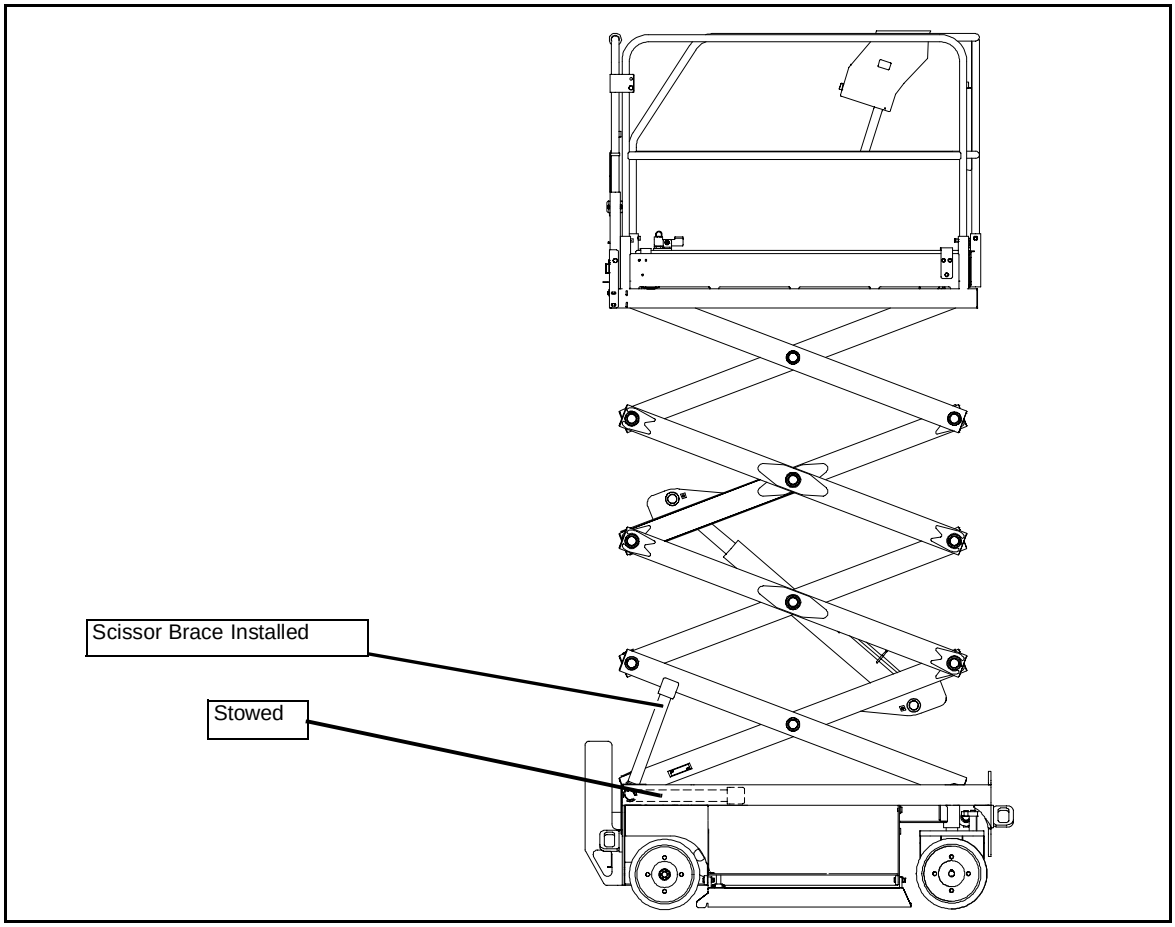
INSTALLING THE BRACE

1. Park the work platform on a firm, level surface.
2. Verify that Chassis and Platform Emergency Stop Switches are ON.
3. Turn and hold the Chassis Key Switch to CHASSIS.
4. Push the Chassis Lift Switch to UP and elevate the platform approximately 2.1 m (7 feet) for the MX15 or 2.7 m (9 feet) for the MX19.
5. Rotate the Scissor Brace towards the rear, holding it perpendicular to the scissor tube.
6. Push the Chassis Lift Switch to the DOWN position and gradually lower the platform until the scissor tube rests on the brace.

REMOVING THE BRACE

1. Turn and hold the Chassis Key Switch to CHASSIS. Push the Chassis Lift Switch to the UP position and gradually raise the platform until the scissor brace clears the scissor tube.
2. Rotate the scissor brace towards the front so that it rests on the chassis.
3. Push the Chassis Lift Switch to the DOWN position, and completely lower the platform.
4. Turn the Chassis Key Switch to DECK.

Figure 3-5: Supporting the Elevating Assembly



3.6 BATTERY MAINTENANCE

⚠ WARNING ⚠

Hazard of explosive gas mixture. Keep sparks, flame, and smoking material away from batteries.

Always wear safety glasses when working near batteries.

Battery posts, terminals, and related accessories contain lead and lead compounds, ***Wash hands after use.***

Battery fluid is highly corrosive. Thoroughly rinse away any spilled fluid with clean water.

⚠ DANGER ⚠

Always replace batteries with UpRight batteries or manufacturer approved replacements weighing 28 kg (62 lbs.) each.

BATTERY INSPECTION AND CLEANING

Check battery fluid level daily, especially if the work platform is being used in a warm, dry climate. If required, add distilled water ONLY. Use of tap water will shorten battery life.

The battery should be inspected regularly for signs of cracks in the case, electrolyte leakage and corrosion of the terminals. Inspect cables for worn spots or breaks in the insulation and for broken cable terminals.

Clean the battery when it shows signs of corrosion at the terminals or when electrolyte has overflowed during charging. Use a baking soda solution to clean the batteries, taking care not to get the solution inside the cells. Rinse thoroughly with clean water. Clean battery and cable contact surfaces to a bright metal finish whenever a cable is removed.

When night air temperatures fall below 18°C (65°F), batteries charged in unheated areas should be placed on charge as soon as possible after use. Under such conditions, a four hour equalization charge once a week in the early afternoon will improve the state of charge and battery life.

BATTERY CHARGING

Charge battery as follows:

1. Check the fluid level. The electrolyte level should be at least 10 mm (3/8 in.) above the battery plates. If it is lower, add distilled water only.
2. Connect the charger plug to a properly grounded outlet of the proper voltage and frequency with an extension cord 1.5 mm² (12 gauge) conductor minimum and15 m (50 ft.) in length maximum].
3. The charger turns on automatically after a short delay. The LED indicator will come on.
4. The charger automatically drops to trickle mode after approximately three hours. The LED charge indicator will blink. Charging may continue for up to 48 hours or until the machine is needed. DO NOT charge for more than 48 hours.

⚠ WARNING ⚠

Charge the battery only in a well-ventilated area.

Do not charge the battery when the work platform is in an area containing sparks or flames.

Permanent damage will result if the battery is not immediately recharged after discharging.

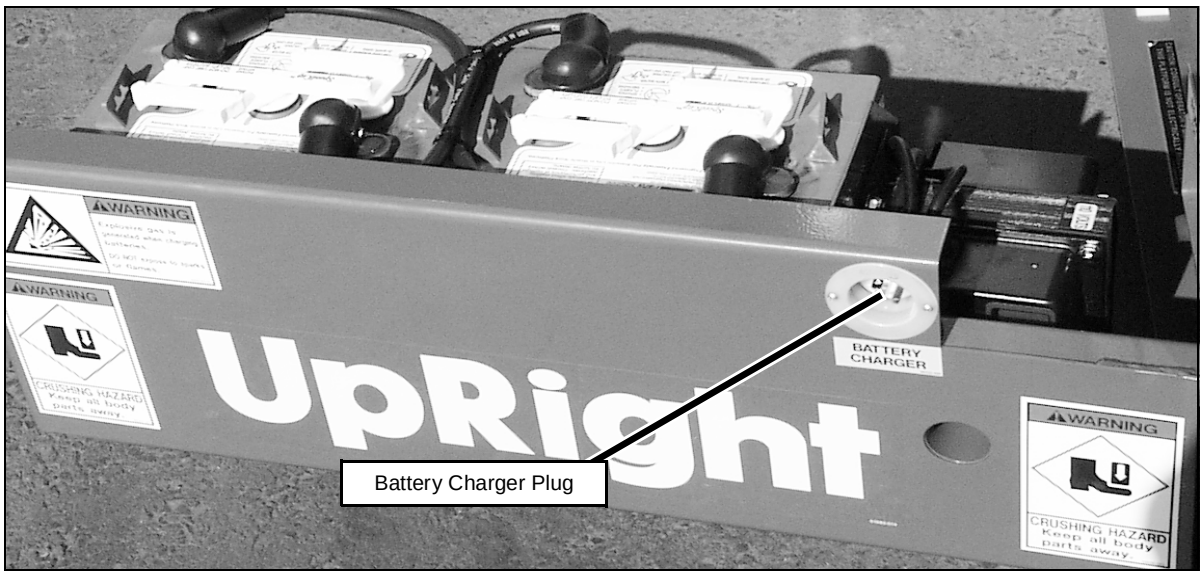
Never leave the charger unattended for more than two days.

Never disconnect the cables from the battery when the charger is operating.

DO NOT operate the machine while the charger is plugged in.

Keep the charger dry.

Figure 3-6: Batteries and Charger



BATTERY CELL EQUALIZATION

The specific gravity of the electrolyte in the battery cells should be equalized monthly. To do this, charge batteries as outlined in Battery Charging. After this initial charge, check the electrolyte level in all cells and add distilled water as necessary. Then, turn the charger on for an additional eight hours.

After equalization, the specific gravity of all cells should be checked with a hydrometer. The temperature corrected specific gravity in this state should be 1.260. If any corrected readings are below 1.230, the batteries containing such cells should be replaced.

Do not check the specific gravity in a cell to which water has just been added. If there is not enough electrolyte in a fully charged cell to obtain a sample for the hydrometer, add water and continue charging for one to two hours to adequately mix the water and electrolyte.

3.7 Switch Adjustments

⚠ WARNING ⚠

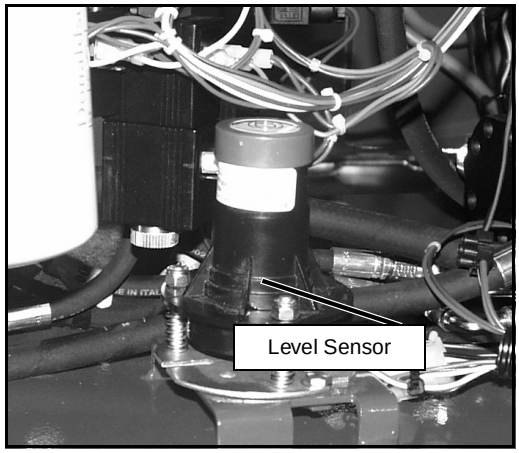
Always use the elevating assembly brace whenever it is necessary to enter the elevating assembly when the platform is elevated.

Level Sensor

Introduction

The Level Sensor has three wires: red-power (24 v in), black-ground, white-output (24 v out).To verify that the sensor is working properly, there is one LED under the sensor that indicates the sensor is off level.

Figure 3-7: Level Sensor



Adjustment

1. Place the machine on a firm level surface ± ¼°.
2. Use the Inclinometer (P/N: 010119-000) to ensure front and rear of chassis is level ± ¼°.
3. Adjust the three leveling locknuts until the bubble is centered in the circle on the attached bubble level.

Test

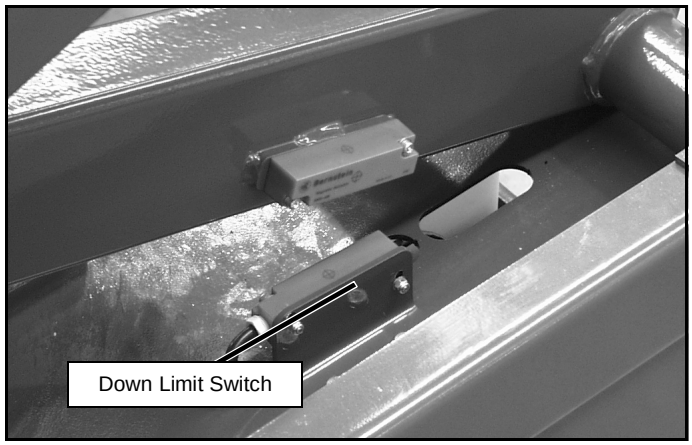
Raise the platform approximately 7 feet, then push the level sensor to the side. The red LED should turn on, and the tilt alarm should sound.

Proximity Switch

Figure 3-8: Down Limit Switch

The Proximity Switch cuts power to the High Speed Circuit and supplies power to the Level Sensor Circuit when the platform is elevated.The switch is located on the left side of the chassis at the rear of the machine.

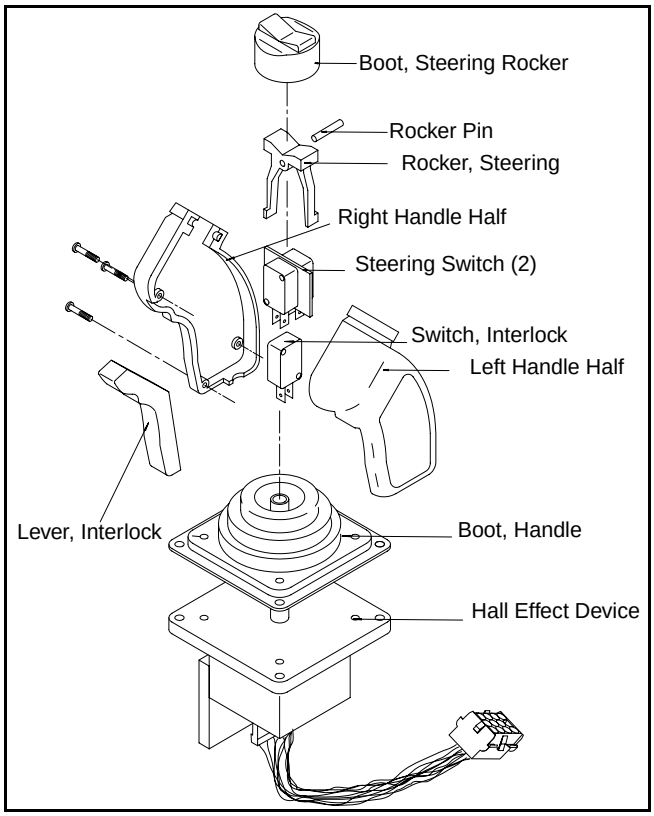
No adjustment of the switch should be necessary.



CONTROL HANDLE

1. Remove the handle if necessary from platform control box.
2. Remove and replace parts as needed. Refer to Section 6 for repair parts numbers.

Figure 3-9: Control Handle



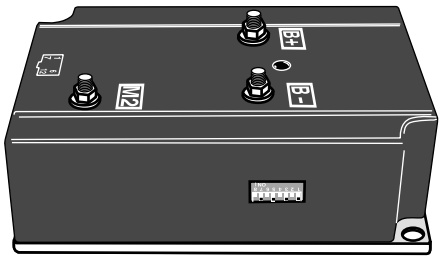
3.8 Motor Controller and I/O Board Dip Switch Settings

NOTE: Before dip switch settings will take effect, power must be disconnected or Emergency Stop switches must be depressed.

Controller

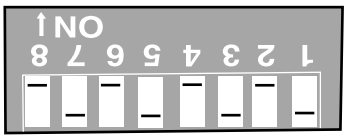
Figure 3-10: Controller

1	2	3	4	5	6	7	8
off	on	off	on	off	on	off	on



The above table shows the default dip switch settings on the controller box when the machine leaves the factory. The following adjustments may be made to these settings:

Switches 3 & 4 determine the elevated “creep” speed. If the machine does not operate at the specified speed at the default settings, use the following table to adjust the dip switch settings.



	3	4
1(slowest)	off	off
2	on	off
3 (default)	off	on
4 (fastest)	on	on

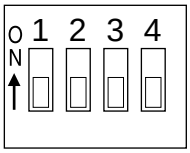
Switches 5 & 6 determine the deceleration time. Switch 5 is for the deceleration rate while the platform is lowered. Switch 6 is for the elevated rate.

Deceleration Speed	5	6
.24 sec.	off	off
1.27 sec.	on	on

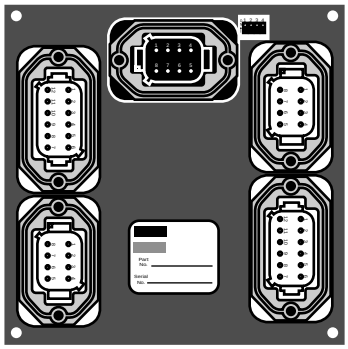
I/O Board

Figure 3-11: I/O Board

1	2	3	4
off	off	off	off



The above table shows the default dip switch settings on the I/O board when the machine leaves the factory. Switches 1 and 2 should not be changed. Switches 3 and 4 work together to determine the optional alarm settings.



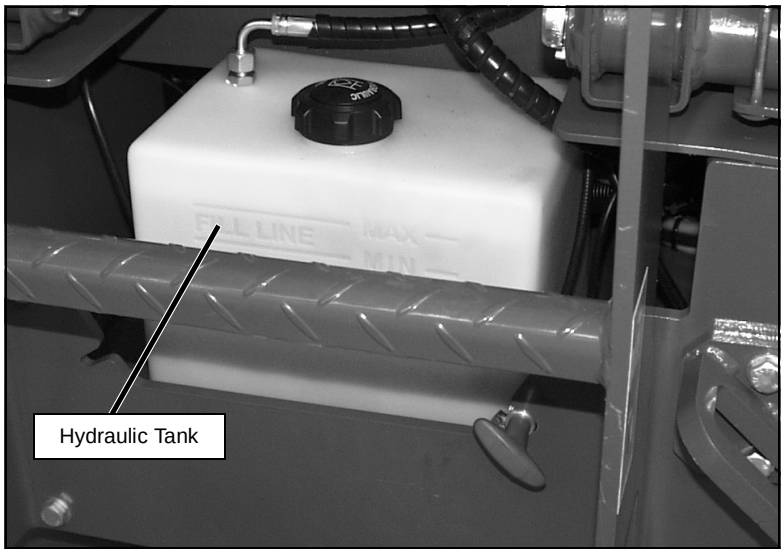
3	4	Result
off	off	Down alarm only
on	off	Down and Reverse alarm
off	on	Drive and Down alarm
on	on	All Motion alarm

3.9 Hydraulic Oil Tank and Filter

Fluid Level

With the platform **fully lowered**, check the oil level through the side of the tank. The level should be between the “max” and “min” lines.

Figure 3-12: Hydraulic Oil Tank



Oil and Filter Replacement

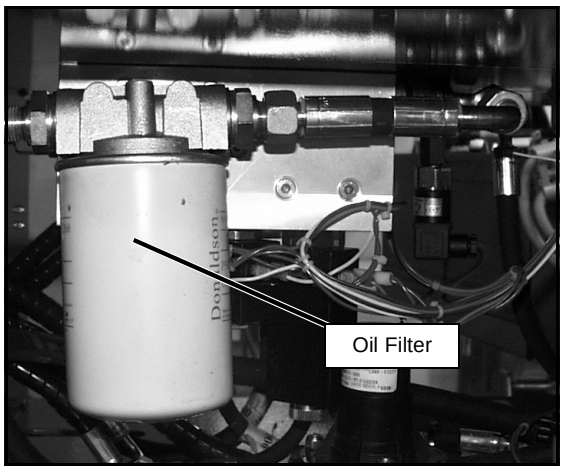
1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.

⚠ CAUTION ⚠

The hydraulic oil may be of sufficient temperature to cause burns. Wear safety gloves and safety glasses when handling hot oil.

2. Provide a suitable container to catch the drained oil. Hydraulic tank has a 12.9 liter (3.4 gal) capacity.
3. Remove the drain plug and allow all oil to drain. Dispose of hydraulic fluid properly--contact your local oil recycler.

Figure 3-13: Hydraulic Oil Filter from left side



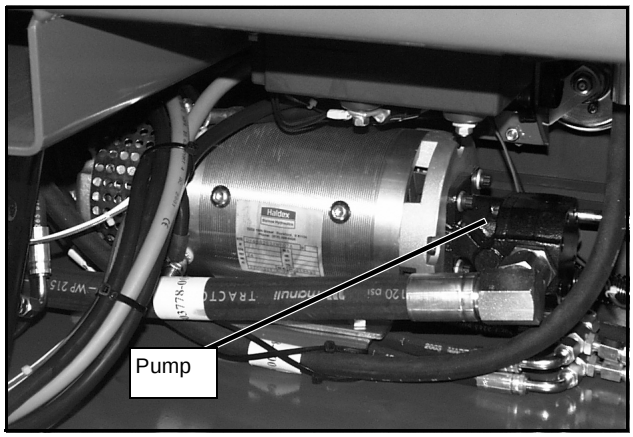
4. Clean magnet on drain plug and reinstall.
5. Unscrew the filter (located beside valve block, easily accessed through the left module) from the filter assembly.
6. Apply a thin film of clean hydraulic oil to the gasket of the replacement filter.
7. Screw the replacement filter onto the filter head until the gasket makes contact, then rotate the filter 3/4 of a turn further.
8. Fill the hydraulic reservoir with hydraulic oil until the oil level is between the minimum and maximum lines on the tank. Do not fill above the maximum line on the tank. Hydraulic tank has a 12.9 liter (3.4 gal) capacity.
9. Operate all machine functions and recheck the fluid level. Add fluid if necessary.

3.10 HYDRAULIC PUMP

REMOVAL

NOTE: If the hydraulic tank has not been drained, plug the hoses to prevent excessive fluid loss.

Figure 3-14: Hydraulic Pump



1. Mark, disconnect, and plug the hose assemblies.
2. Loosen the capscrews and remove the pump assembly from the motor.

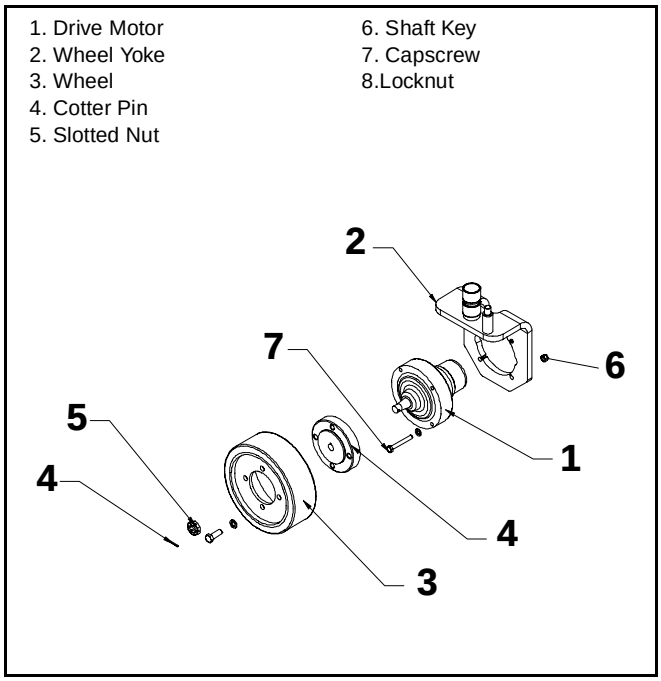
INSTALLATION

1. Lubricate the pump shaft with general purpose grease and attach the pump to the motor with the capscrews.
2. Using a crisscross pattern, torque each capscrew a little at a time until all capscrews are torqued to 27 Nm (20 ft/lbs).
3. Unplug and reconnect the hydraulic hoses.
4. Check the oil level in the hydraulic tank before operating the work platform.

3.11 HYDRAULIC DRIVE MOTORS AND HUBS

REMOVAL

Figure 3-15: Drive Motor Installation



1. Block the rear wheels to prevent the machine from rolling.
2. Use a 1000 kg (1 ton) capacity jack to raise the front of the machine. Place two 1000 kg (1 ton) jack stands under the machine. Remove jack.
3. Remove the cotter pin, slotted nut, wheel, and shaft key.

NOTE: Before disconnecting hoses, thoroughly clean off all outside dirt around fittings. (After disconnecting hoses and before removing from vehicle, IMMEDIATELY plug port holes.)

4. Tag, disconnect, and plug the hose assemblies to prevent foreign material from entering.
5. Remove the locknuts, capscrews, and drive motor.

INSTALLATION

1. Position the drive motor in the wheel yoke and secure with capscrews and locknuts.
2. Install the shaft key, wheel, and slotted nut. Torque the slotted nut to 102 Nm (75 Ft/Lbs). Install a new cotter pin. Do not back-off the nut to install the cotter pin.
3. Remove the plugs from the hose assemblies and connect to the drive motor.
4. Lift the platform with the jack and remove jack stands, then lower the jack and remove. Operate the drive system and check for leaks.

3.12 HYDRAULIC PRESSURE SETTINGS

Check the hydraulic pressures whenever the pump, manifold, or relief valves have been serviced or replaced.

⚠ WARNING ⚠

The hydraulic oil may be of sufficient temperature to cause burns. Wear safety gloves and safety glasses when handling hot oil.

The oil in the hydraulic system is under very high pressure which can easily cause severe cuts. Obtain medical assistance immediately if cut by hydraulic oil.

MAIN RELIEF VALVE

1. Operate the hydraulic system 10-15 minutes to warm the oil.
2. Slowly drive the machine to within 3 inches of a solid, immovable brick wall. Ease the machine forward until the front of the chassis is in solid contact with the wall.
3. Insert a 207 bar (3000 psi) pressure gauge into the test port.
4. Loosen the locknut or remove the cover on the Main Relief Valve and turn the adjusting screw counterclockwise two full turns.
5. Unhook the Platform Controls from the guardrail so that the machine may be operated from the ground. Slowly push the control lever in the direction of the wall.
6. Slowly turn the Main Relief Valve adjusting screw clockwise to increase the pressure until the gauge reads 207 bar (3000 psi) for the MX19, or 172 bar (2500 psi) for the MX15.
7. Tighten locknut or replace Main Relief Valve cover and torque to 8 Nm. (6 ft/lbs.).

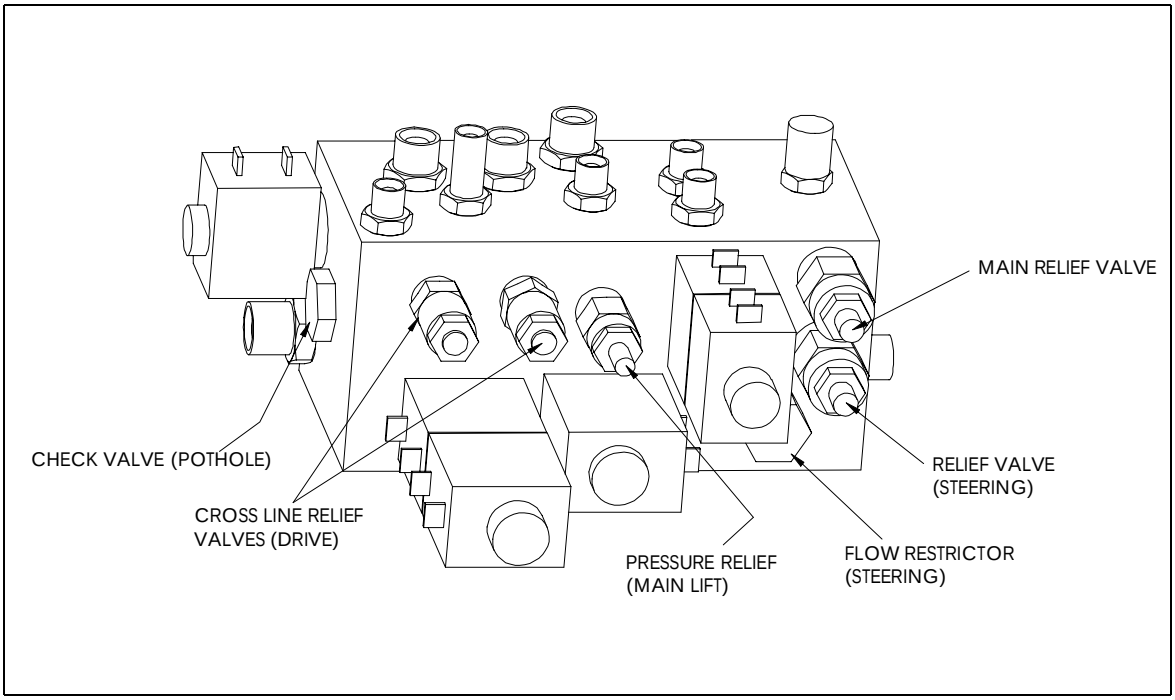
LIFT RELIEF VALVE

1. Operate the hydraulic system 10-15 minutes to warm the oil.
2. Loosen locknut or remove cover on the Lift Relief Valve and turn adjusting screw counter-clockwise two full turns.
3. Place the maximum rated load (see Specifications Table, Section 2) on the platform.
4. Turn and hold the Chassis Key Switch to CHASSIS. Push the Chassis Lift Switch to UP position and hold it there.
5. Slowly turn the Lift Relief Valve adjusting screw clockwise to increase the pressure until the platform just begins to rise.
6. Release the Chassis Lift Switch. Tighten locknut or replace Lift Relief Valve cover and torque to 8 Nm. (6 ft/lbs.).

STEERING RELIEF VALVE

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. Connect a 207 bar (3000 psi) pressure gauge into the test port.
3. Loosen locknut or remove cover on the Steering Relief Valve and turn adjusting screw counterclockwise two full turns.
4. While one person holds the Steering Switch to steer right or left, slowly turn the Steering Relief Valve adjusting screw clockwise to increase the pressure until the gauge reads 82.7 bar (1200 psi).
5. Tighten locknut or replace Steering Relief Valve cover and torque to 8 Nm. (6 ft/lbs.).
6. Remove gauge and replace cap.

Figure 3-16: Hydraulic Manifold Test Ports, from right side



COUNTERBALANCE VALVES

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. Remove test port cap and install the pressure gauge assembly.
3. Lift the work platform and block front wheels off the ground.
4. Loosen the locknuts on Counterbalance Valves.
5. With the Chassis Key Switch on DECK and the Drive/Lift Switch in DRIVE, depress the Interlock Lever and slowly pull the Control Lever to REVERSE to drive the wheels.
6. Adjust the Forward Counterbalance Valve by turning the adjustment screw until the pressure gauge indicates 55 bar (800 psi).
7. Slowly push the Control Lever to FORWARD to drive the wheels.
8. Adjust the Reverse Counterbalance Valve by turning the adjustment screw until the pressure gauge indicates 55 bar (800 psi).
9. Check the settings by slowly moving the Control Lever FORWARD, then REVERSE, checking the gauge to ensure pressures are properly set. Readjust as needed.
10. Tighten locknuts on valves to 8 Nm. (6 ft/lbs.). Remove blocks and lower the work platform to the ground.
11. Remove the gauge from the gauge port and reinstall cap.
12. Check for proper operation of the drive system and brake.

3.13 HYDRAULIC MANIFOLD

It is not necessary to remove the manifold to perform all maintenance procedures. Decide beforehand as to whether or not the manifold should be removed before maintenance procedures begin.

REMOVAL

1. Make sure that the platform is completely lowered.
2. Tag and disconnect the solenoid valve wires.
3. Place a container of adequate capacity (approximately 3.79 L (1gallon)) beneath the valve block to catch the oil.Tag, disconnect, and plug hydraulic hoses.
4. Remove the bolts that hold the manifold to the mounting bracket, being careful not to damage the ground wires.
5. Remove manifold block.

DISASSEMBLY

NOTE: Mark all components as they are removed so as not to confuse their location during assembly. Refer to Figure 3-17 often to aid in disassembly and assembly.

1. Remove coils from solenoid valves.
2. Remove spool valve covers and spool valves.
3. Remove solenoid valves, relief valves, and counterbalance valves.
4. Remove fittings and plugs.

CLEANING AND INSPECTION

1. Wash the manifold in cleaning solvent to remove built up contaminants, then blow out all passages with clean compressed air.
2. Inspect the manifold for cracks, thread damage, and scoring where O-rings seal against internal and external surfaces.
3. Wash and dry each component and check for thread damage, torn or cracked O-rings, and proper operation.
4. Replace parts and O-rings found unserviceable.

ASSEMBLY

NOTE: Lubricate all O-rings before installation to prevent damage to O-rings. Refer to Tabl e3-1 (Page 3-23) for the proper torque values when installing any hydraulic component.

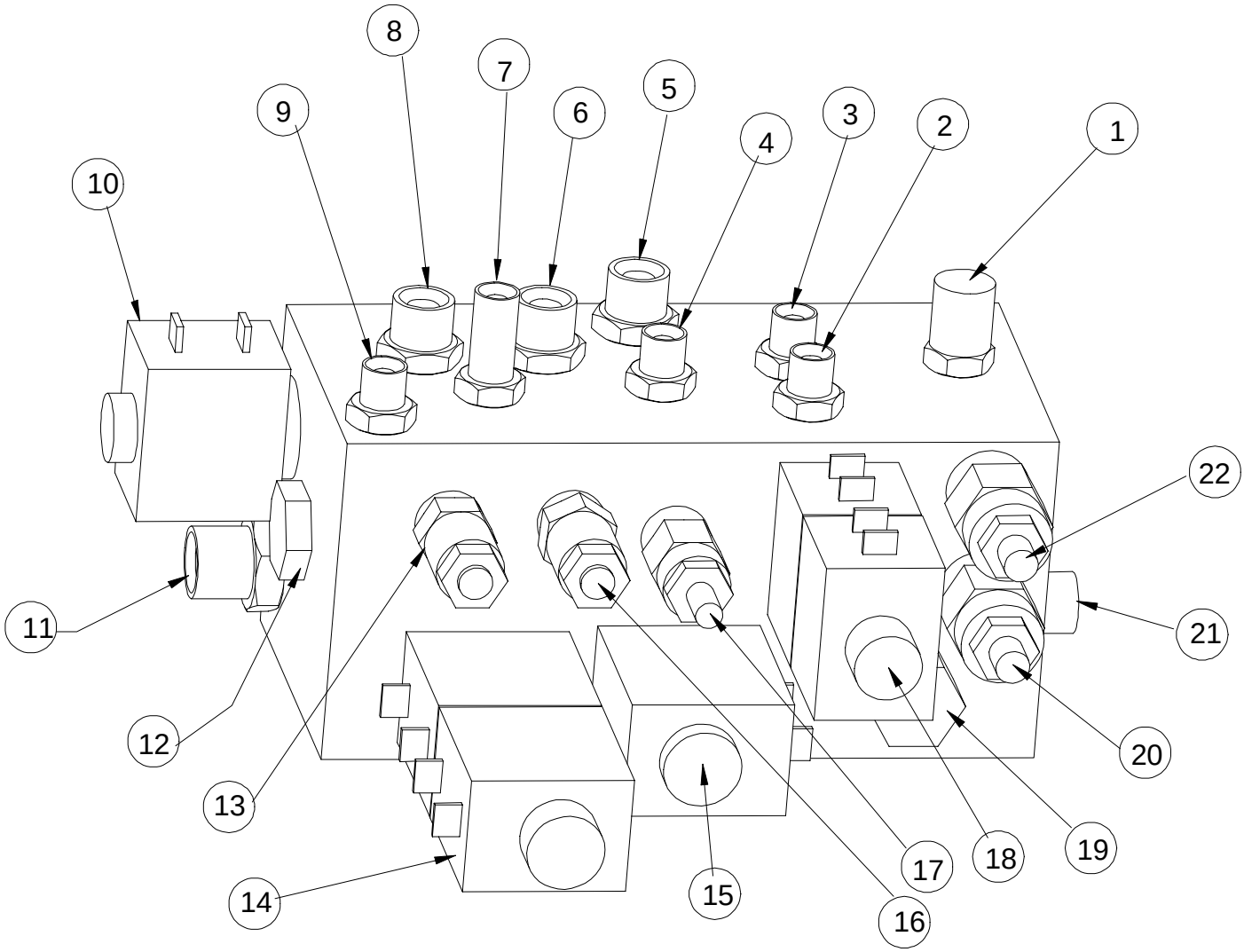
1. Install fittings and plugs.
2. Install counterbalance valves, relief valves, solenoid valves, and spool valves.
3. Install coils on solenoid valves.

INSTALLATION

NOTE: Refer to Table 3-1 on Page 3-23 for the proper torque values when installing any hydraulic component.

1. Attach manifold assembly to mounting brackets with bolts.
2. Connect solenoid leads (as previously tagged).
3. Connect hydraulic hoses. Be certain to tighten hoses to manifold.
4. Operate each hydraulic function and check for proper function and leaks.
5. Check the level of the hydraulic fluid in the tank.
6. Adjust all hydraulic pressures according to instructions on Page 3-12.

Figure 3-17: Hydraulic Manifold



1. TEST PORT (1/4”)
2. FITTING (1/4” - 1/4” MALE/MALE)
3. FITTING (1/4” - 1/4” MALE/MALE)
4. FITTING (1/4” - 1/4” MALE/MALE)
5. FITTING (3/8” - 3/8” MALE/MALE)
6. FITTING (3/8” - 3/8” MALE/MALE)
7. FITTING (1/4” - 1/4” MALE/MALE, BULKHEAD)
8. FITTING (3/8” - 3/8” MALE/MALE)
9. FITTING (1/4” - 1/4” MALE/MALE)
10. SOLENOID VALVE (POTHOLE)
11. FITTING (1/2” - 1/2” MALE/MALE)
12. CHECK VALVE (POTHOLE)
13. CROSS LINE RELIEF VALVE (DRIVE)
14. SOLENOID VALVE (DRIVE))
15. SOLENOID VALVE (DRIVE/LIFT)
16. CROSS LINE RELIEF VALVE (DRIVE)
17. PRESSURE RELIEF (MAIN LIFT)
18. SOLENOID VALVE (STEERING)
19. FLOW RESTRICTOR (STEERING)
20. RELIEF VALVE (STEERING)
21. FITTING (3/8” - 3/8” MALE/MALE)
22. RELIEF VALVE (MAIN)

3.14 STEERING CYLINDER

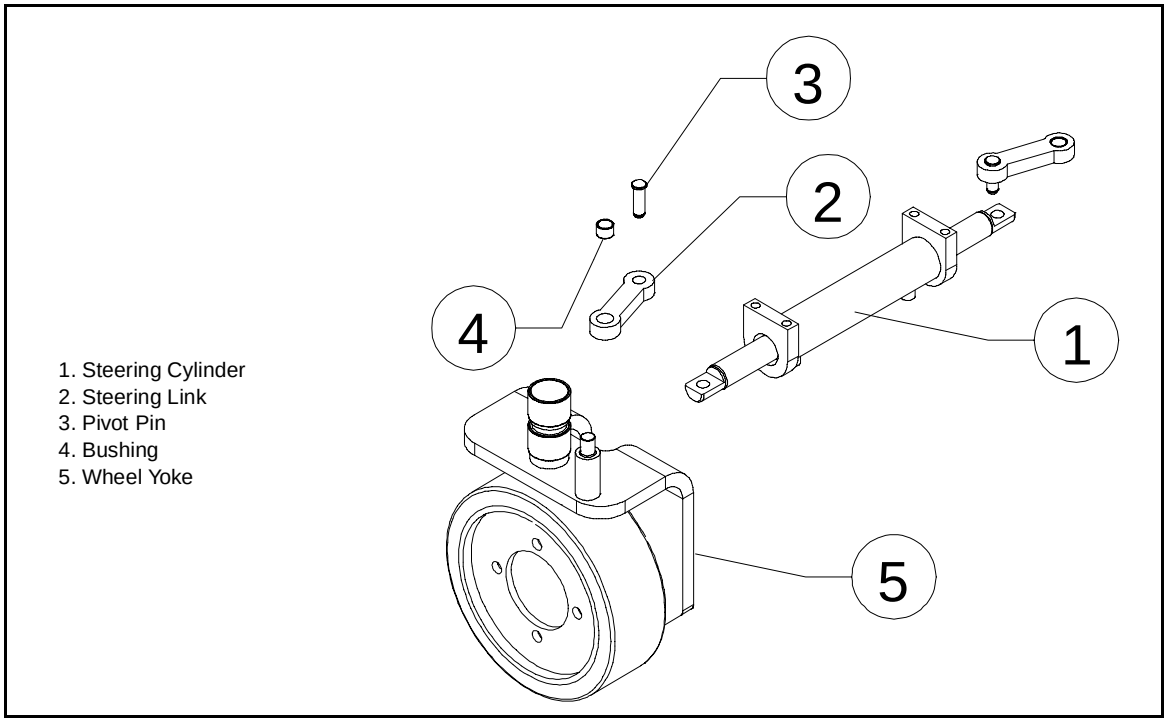
REMOVAL

1. Turn the wheels to the straight position.
2. Elevate the platform and block the elevating assembly with the brace (see “Supporting the Elevating Assembly” on Page 3-4).
3. Tag and disconnect the hose assemblies from the cylinder fittings and immediately cap the openings to prevent foreign material from entering.
4. Remove the retaining rings from the pivot pins.
5. While supporting the cylinder, remove the locknuts, washers, and capscrews. Remove the cylinder.

DISASSEMBLY

1. Unscrew the internal head caps from the barrel, removing one head cap assembly from the rod.
2. Withdraw the other head cap, piston, and shaft assembly from the barrel tube.
3. Remove the snap rings from the piston washers and remove the piston washers, piston, O-ring, and head cap.
4. Remove the rod wiper, U-cup, O-ring, and backup ring from the headcap, and discard the seals.
5. Remove the piston ring and O-ring from the piston, and discard.

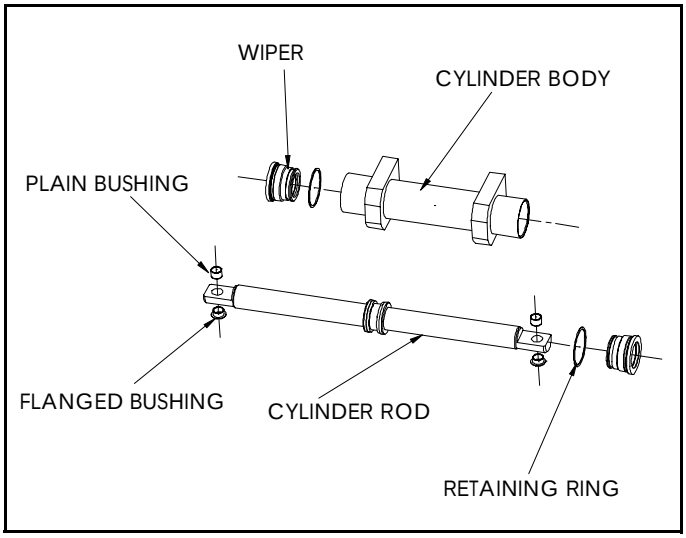
Figure 3-18: Steering Cylinder Installation



CLEANING AND INSPECTION

1. Wash all the metal parts in cleaning solvent and blow dry with filtered compressed air.
2. Inspect all the threaded components for stripped or damaged threads.
3. Check the inside surface of the cylinder barrel for scoring or excessive wear.
4. Check the piston and headcaps for scoring or excessive wear.
5. Inspect the surface of the shaft for scoring or excessive wear.

Figure 3-19: Steering Cylinder Assembly



ASSEMBLY

1. Lubricate and install new rod wiper, U-cup, O-ring, and backup ring on the headcaps.
2. Install one headcap onto the shaft.
3. Install the new piston rings and O-ring on the piston.
4. Lubricate the piston seal with clean hydraulic fluid, and install the shaft assembly in the cylinder barrel.
5. Install the other head cap into the cylinder barrel, and tighten both head caps.

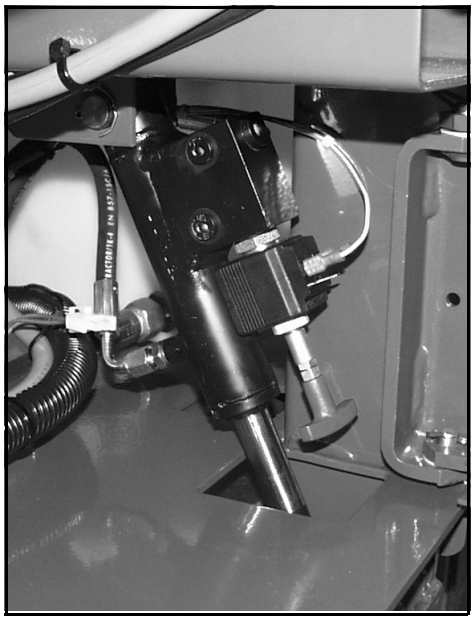
INSTALLATION

1. Position the cylinder assembly in the chassis and secure with capscrews, washers, and locknuts.
2. Insert pivot pins and secure with retaining rings.
3. Connect the hose assemblies to the fittings.
4. Operate the steering circuit several times throughout its entire range of travel to expel trapped air, then check for leaks.

3.15 POTHOLE CYLINDER

REMOVAL

Figure 3-20: Pothole Cylinder



1. Open the module door to access the cylinder.
2. Tag and disconnect the hose assemblies from the cylinder fittings and immediately cap the openings to prevent foreign material from entering.
3. Remove the cotter pins from the pivot pins.
4. While supporting the cylinder, remove pivot pins. Remove the cylinder.

DISASSEMBLY

1. Unscrew the head cap from the barrel, removing the head cap, piston, and shaft assembly from the barrel tube.
2. Unscrew the piston.
3. Remove all rod wipers, U-cups, O-rings, and backup rings from the headcap, and discard.
4. Remove the piston ring and O-ring from the piston, and discard.

CLEANING AND INSPECTION

1. Wash all the metal parts in cleaning solvent and blow dry with filtered compressed air.
2. Inspect all the threaded components for stripped or damaged threads.
3. Check the inside surface of the cylinder barrel for scoring or excessive wear.
4. Check the piston and headcaps for scoring or excessive wear.
5. Inspect the surface of the shaft for scoring or excessive wear.

ASSEMBLY

1. Lubricate and install new rod wiper, U-cup, O-ring, and backup ring on the headcaps.
2. Install the headcap onto the shaft.
3. Install the new piston rings and O-ring on the piston. Re-install the piston.
4. Lubricate the piston seal with clean hydraulic fluid and install the shaft assembly in the cylinder barrel.
5. Install the head cap into the cylinder barrel, and tighten the head caps.

INSTALLATION

1. Position the cylinder assembly in the chassis. Insert the pivot pins and secure with new cotter pins.
2. Connect the hose assemblies to the fittings.
3. Operate the steering circuit several times throughout its entire range of travel to expel trapped air, then check for leaks.

NOTES:

3.16 LIFT CYLINDER

REMOVAL

1. Elevate the platform and install the scissor brace (see “Supporting the Elevating Assembly” on Page 3-4).
2. Provide a suitable container to catch the hydraulic fluid, then disconnect the hydraulic hoses. Immediately plug hoses to prevent foreign material from entering.
3. Remove emergency lowering valve cable and down valve wires from the emergency lowering/down valve.
4. Remove the cable bracket from the lift cylinder.
5. Remove capscrews and locknuts securing lift cylinder pivot pins.
6. Remove lower pivot pin and lower cylinder to rest on chassis.
7. Attach a suitable hoisting device and sling to the cylinder, and remove upper pivot pin.
8. Carefully remove cylinder.

DISASSEMBLY

1. Remove the fittings, orifice, spring, and down valve from the cylinder assembly.
2. Loosen the set screw and unscrew the thread cap. Unscrew the internal head cap and withdraw the rod and piston assembly from the barrel tube.
3. Remove the piston from the rod, and then remove the head cap from the cylinder rod.
4. Remove all O-rings, seals, and wipers from the head cap and cylinder barrel.

CLEANING AND INSPECTION

1. Clean all metal parts in solvent and blow dry with filtered compressed air.
2. Check all threaded parts for stripped or damaged threads.
3. Check the bearing surfaces inside of the head cap, inside of the cylinder barrel, and the rod for signs of scoring or excessive wear.
4. Replace all seals and O-rings.

REASSEMBLY

1. Lubricate and install new O-rings, seals, and wipers in the cylinder barrel and on the head cap.

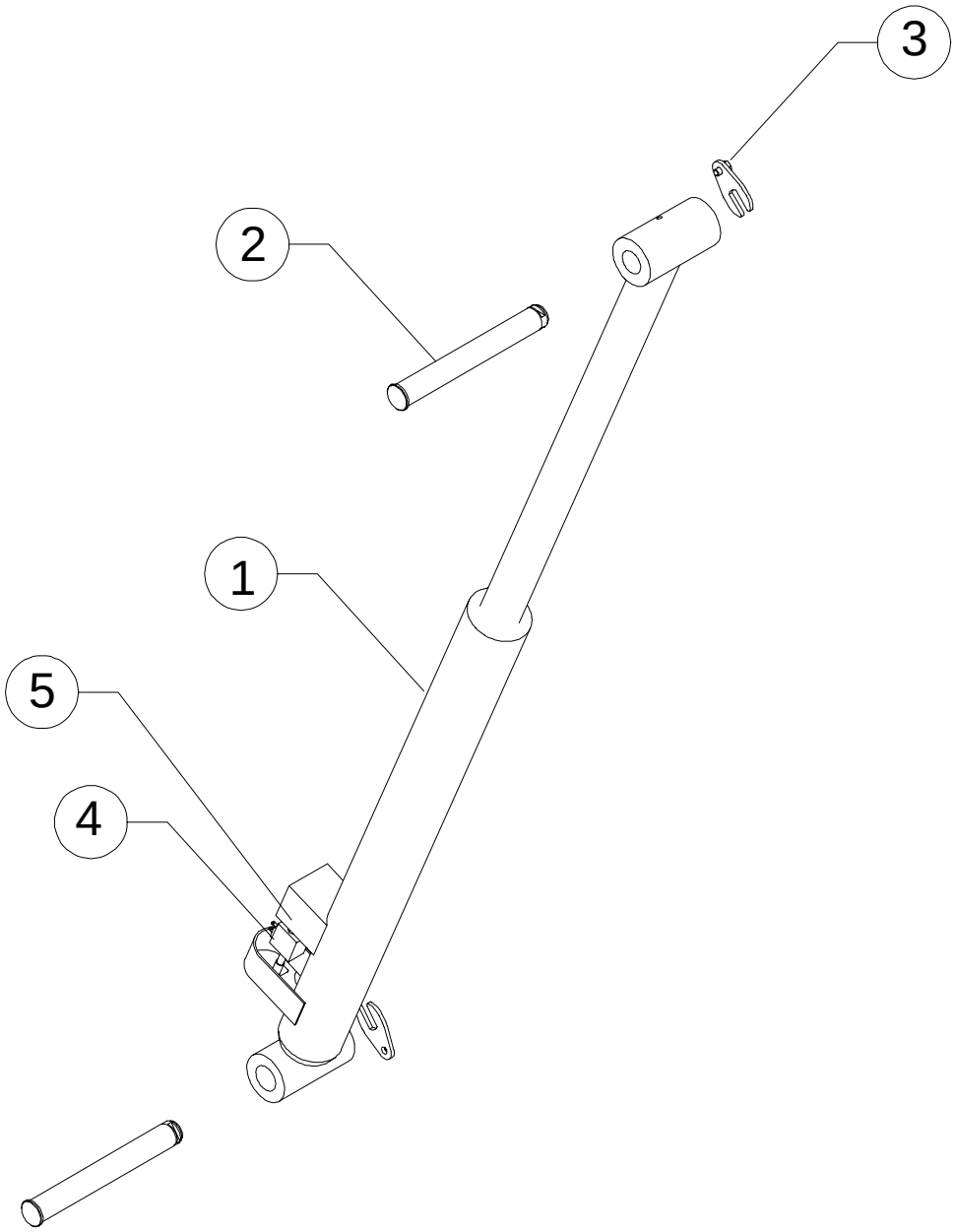
NOTE: Multipurpose lubricant should be used.

2. Install the thread cap, head cap, and piston on the cylinder rod.
3. Lubricate the piston and install the piston/rod assembly in the barrel tube.
4. Install the head cap into the barrel tube.
5. Thread the thread cap onto the barrel tube and tighten. Secure with the set screw.
6. Install the down valve, orifice, spring, and fittings.

INSTALLATION

1. Coat both pivot pins with anti-seize compound.
2. Attach a suitable hoisting device and sling to the cylinder. Carefully position cylinder in the elevating assembly, and install the upper pivot pin.
3. Install the capscrew and locknut.
4. Carefully lift the cylinder and align the lower mount, and install the pivot pin. Install the capscrew and locknut securing the pivot pin.
5. Install the cable bracket. Connect the emergency lowering valve cable and down valve wires.
6. Unplug hydraulic hoses and attach to the cylinder.
7. Replace hydraulic fluid removed from lift cylinder.
8. Test with weight at rated platform load to check system operation. Check for leaks and level of fluid.

Figure 3-21: Lift Cylinder



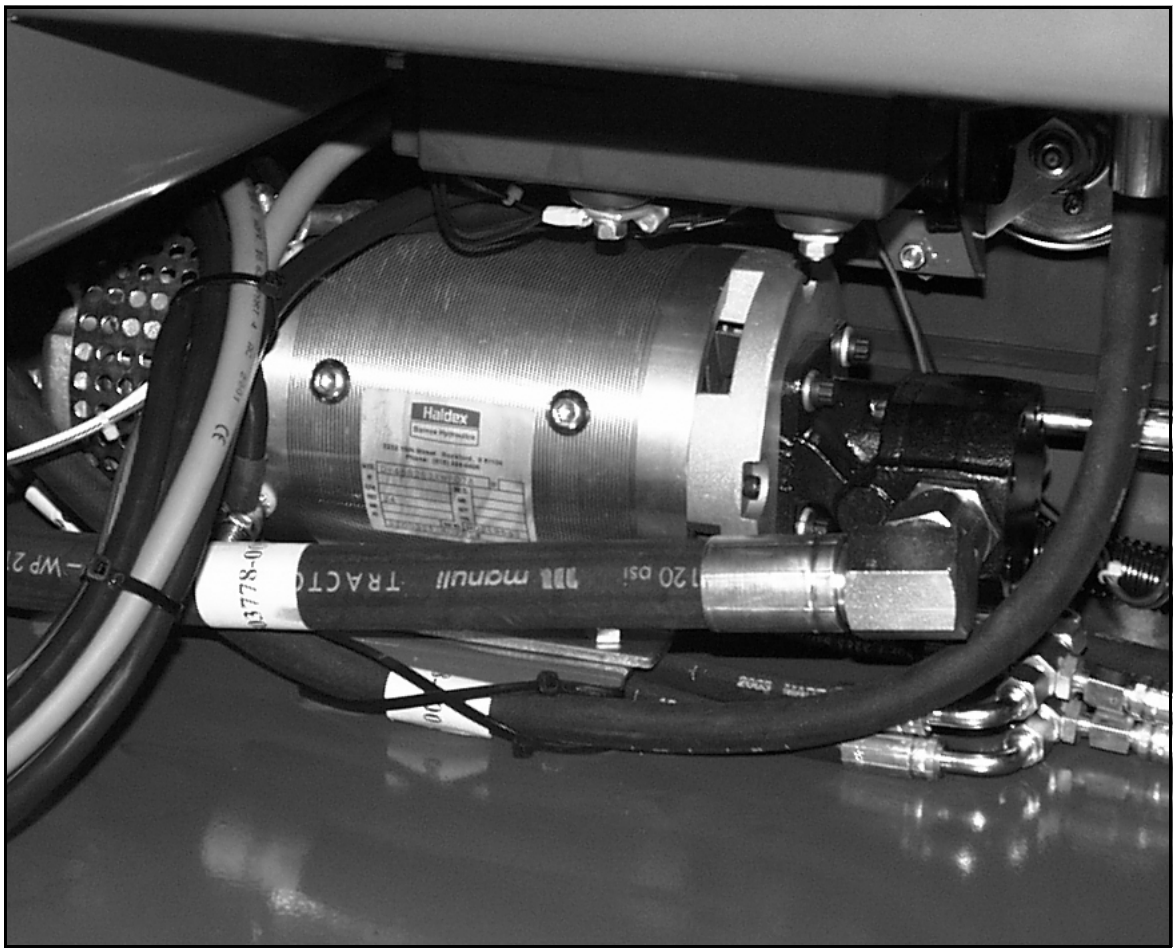
1. Lift Cylinder
2. Pivot Pit
3. Capscrew and Locknut
4. Solenoid
5. Down Orifice

3.17 ELECTRIC MOTOR

TROUBLESHOOTING

1. Read the nameplate to become familiar with the motor, especially the rated voltage.
2. Try to turn the shaft by hand. Keep motor leads separated while doing this. If the shaft turns freely, go to step 3. If the shaft won't turn, proceed to step a.
   a. The shaft could be tight for a number of reasons; this check is to determine if the tightness is of a temporary nature only. Obtain power to produce the nameplate voltage. **Do not make a permanent connection**. First, touch the motor leads quickly to the power supply just long enough to observe if the shaft runs. If it does turn, then hold the motor leads on the power supply for a longer time. If the motor sounds normal, go to step 3. If the motor sounds noisy, it should be replaced with an UpRight spare part.
3. If the motor turned freely, connect an ammeter in the circuit. With rated voltage applied and the shaft running free, the ammeter should read less than 20% of the nameplate full load current. If the motor meets the above conditions, then it can be assumed the original problem is external to the motor.

Figure 3-22: Electric Motor



3.18 TORQUE SPECIFICATIONS

HYDRAULIC COMPONENTS

NOTE: Always lubricate threads with clean hydraulic oil prior to installation.

Use the following values to torque hydraulic components used on UpRight work platforms.

Table 3-1: Torque Specifications for Hydraulic Components

Type: SAE Part Series	Cartridge Poppet		Fittings		Hoses	
	Ft/Lbs	Nm	Ft/Lbs	Nm	In/Lbs	Nm
#4	N/A	N/A	N/A	N/A	135-145	15-16
#6	N/A	N/A	10-20	14-27	215-245	24-28
#8	25-30	34-41	25-30	34-41	430-470	49-53
#10	35-40	47-54	35-40	47-54	680-750	77-85
#12	85-90	115-122	85-90	115-122	950-1050	107-119
#16	130-140	176-190	130-140	176-190	1300-1368	147-155

FASTENERS

This standard applies to the preloading of fasteners measured by installation torque.

NOTE: For other preloading methods or fasteners, consult UpRight Product Support Department.

This general standard applies to all SAE and Metric fasteners unless otherwise specified.

THREAD CONDITION

- For lubed or zinc plated fasteners, use K = .15
- For dry unplated fasteners, use K = .20

TORQUE TABLES

Table 3-2: Torque Specifications for SAE Fasteners

		SAE J429 Grade 5			SAE J429 Grade 8		
	Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
			K=.15	K=.20		K=.15	K=.20
		lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.
Unified Coarse Thread Series	1/4 -20	2,000	75	100	2850	107	143
	5/16 - 18	3,350	157	210	4700	220	305
		lbs.	ft-lbs.	ft-lbs.	lbs.	ft-lbs.	ft-lbs.
	3/8-16	4,950	23	31	6950	32.5	44
	7/16-14	6,800	37	50	9600	53	70
	1/2-13	9,050	57	75	12800	80	107
	9/16-12	11,600	82	109	16400	115	154
	5/8-11	14,500	113	151	20300	159	211
	3/4-10	21,300	200	266	30100	282	376
	7/8-9	29,435	321	430	41550	454	606
	1-8	38,600	483	640	54540	680	900

		SAE J429 Grade 5			SAE J429 Grade 8		
	Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
			K=.15	K=.20		K=.15	K=.20
		lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.
Unified Fine Thread Series	1/4 -28	2,300	85	115	3250	120	163
	5/16-24	3,700	173	230	5200	245	325
		lbs.	ft-lbs.	ft-lbs.	lbs.	ft-lbs.	ft-lbs.
	3/8-24	5,600	26	35	7900	37	50
	7/16-20	7,550	42	55	10700	59	78
	1/2-20	10,200	64	85	14400	90	120
	9/16-18	13,000	92	122	18300	129	172
	5/8-18	16,300	128	170	23000	180	240
	3/4-16	23,800	223	298	33600	315	420
	7/8-14	32,480	355	473	45855	500	668
	1-12	42,270	528	704	59670	745	995

Table 3-3: Torque Specifications for Metric Fasteners, U.S. Customary Units

	8.8 Grade 8.8			10.9 Grade 10.9			12.9 Grade 12.9		
Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
		K = .15	K = .20		K = .15	K = .20		K = .15	K = .20
mm	lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.
3	-	-	-	-	-	-	823	14.6	19.5
3.5	-	-	-	-	-	-	1,109	22.9	30.5
4	-	-	-	-	-	-	1,436	33.9	45.2
5	1,389	41.0	19.5	1,987	58.7	19.5	2,322	68.6	91.2
6	1,966	69.7	28.3	2,813	100.0	28.3	3,287	116.8	155.8
7	2,826	116.8	37.2	4,044	167.3	37.2	4,727	195.6	260.2
		ft-lbs.	ft-lbs.		ft-lbs.	ft-lbs.		ft-lbs.	ft-lbs.
8	3,579	14.1	18.8	5,122	20.1	26.9	5,986	23.6	31.4
10	11,742	27.9	37.2	8,117	39.9	53.3	9,486	46.7	62.3
12	8,244	48.7	64.9	11,797	69.7	92.2	13,787	81.1	108.4
14	11,246	77.4	103.3	16,093	110.6	147.5	18,808	129.1	172.6
16	15,883	125.4	166.7	21,971	173.3	230.9	25,677	202.1	269.2
18	19,424	171.9	229.4	26,869	238.2	317.2	31,401	278.1	371.0
20	2,304	243.4	325.3	34,286	337.8	449.9	40,070	394.6	525.9
22	30,653	331.9	442.5	42,403	458.8	612.2	49,556	536.2	715.4
24	35,711	420.4	562.0	49,400	583.4	778.1	57,733	682.2	909.4
27	46,435	617.3	84.8	64,235	853.4	1138.1	75,069	997.2	1329.8
30	56,753	837.9	1117.4	78,509	1159.4	1545.2	91,751	1354.9	1807.0
33	70,208	1140.3	1520.1	97,121	1576.9	2102.8	113,503	1843.9	2457.5
36	82,651	1464.1	1952.3	114,334	2025.3	2700.9	133,620	2367.6	3156.0

Table 3-4: Torque Specifications for Metric Fasteners, SI Units

	8.8 Grade 8.8			10.9 Grade 10.9			12.9 Grade 12.9		
Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
		K = .15	K = .20		K = .15	K = .20		K = .15	K = .20
mm	N	Nm	Nm	N	Nm	Nm	N	Nm	Nm
3	-	-	-	-	-	-	3,660	1.65	2.2
3.5	-	-	-	-	-	-	4,932	2.59	3.45
4	-	-	-	-	-	-	6,387	3.83	5.11
5	6,177	4.63	2.2	8,840	6.63	2.2	10,330	7.75	10.3
6	8,743	7.87	3.2	12,512	11.3	3.2	14,623	13.2	17.6
7	12,570	13.2	4.2	17,990	18.9	4.2	21,025	22.1	29.4
8	15,921	19.1	25.5	22,784	27.3	36.5	26,626	32	42.6
10	52,230	37.8	50.5	36,105	54.1	72.2	42,195	63.3	84.4
12	36,670	66	88	52,475	94.5	125	61,328	110	147
14	50,025	105	140	71,587	150	200	83,663	175	234
16	70,650	170	226	97,732	235	313	114,218	274	365
18	86,400	233	311	119,520	323	430	139,680	377	503
20	10,250	330	441	152,513	458	610	178,238	535	713
22	136,350	450	600	188,618	622	830	220,433	727	970
24	158,850	570	762	219,743	791	1055	256,808	925	1233
27	206,550	837	115	285,728	1157	1543	333,923	1352	1803
30	252,450	1136	1515	349,223	1572	2095	408,128	1837	2450
33	312,300	1546	2061	432,015	2138	2851	504,885	2500	3332
36	367,650	1985	2647	508,582	2746	3662	594,368	3210	4279

NOTES:

Section 4

TROUBLESHOOTING

4.1 INTRODUCTION

The following section on troubleshooting provides guidelines on the types of problems users may encounter in the field, helps determine the causes of problems, and suggests proper corrective action.

Careful inspection and accurate analysis of the symptoms listed in the Troubleshooting Guide will localize the trouble more quickly than any other method. This manual cannot cover all possible problems that may occur. If a specific problem is not covered in this manual, call our toll free number for service assistance.

Referring to Sections 2 and 5 will aid in understanding the operation and function of the various components and systems and help in diagnosing and repairing the machine.

GENERAL PROCEDURE

Thoroughly study hydraulic and electronic schematics in **Section 5**. Check for loose connections and short circuits. Check/repair/replace each component in the Truth Tables listed under each machine function that does not operate properly.

Use the charts on the following pages to help determine the cause of a fault.

NOTE: Spike protection diodes at components have been left out of the charts for clarity.

⚠ WARNING ⚠

When troubleshooting, ensure that the work platform is on a firm, level surface.

When performing any service that requires the platform to be raised, ensure that the platform is braced as described on page 3-4.

Unplug the machine or disconnect the battery when replacing or testing the continuity of any electrical component.

UPRIGHT EUROPE Tel: +353 1 6209300
FAX: +353 1 6209301

UPRIGHT USA Tel: (1) 559 662 9363
FAX: (1) 559 673 6184

PARTS EUROPE Tel: +353 1 6209300
FAX: +353 1 6209386

4.2 TROUBLESHOOTING

1. *Verify your problem*. Do a full function test from both platform controls and chassis controls and note all functions that are not operating correctly.
2. *Narrow the possible causes of the malfunction*. Use the troubleshooting guide to determine which components are common to all circuits that are not functioning correctly. To aid in troubleshooting, the letters following the component on the table are the same as the component's designation on the schematics.
3. *Identify the problem component*. Test components that are common to all circuits that are not functioning correctly. Remember to check wires and terminals between suspect components. Be sure to check connections to battery negative.
4. *Repair or replace component found to be faulty.*
5. *Verify that repair is complete*. Do a full function test from both the platform and chassis controls to verify that all functions are operating correctly and that the machine is performing according to specifications.

SPECIAL TOOLS

Following is a list of tools which may be required to perform certain maintenance procedures on the MX15/19.

- Flow Meter with Pressure Gauge (UpRight P/N 067040-000)
- 0-1000 psi (0-69 bar) Hydraulic Pressure Gauge with Adapter Fittings (UpRight P/N 014124-010)
- 0-3000 psi (0-207 bar) Hydraulic Pressure Gauge with Adapter Fittings (UpRight P/N 014124-030)
- Adapter Fitting (UpRight P/N 063965-002)
- Inclinometer (UpRight P/N 010119-000)
- Crimping Tool (UpRight P/N 028800-009)
- Terminal Removal Tool (UpRight P/N 028800-006)

ADJUSTMENT PROCEDURES

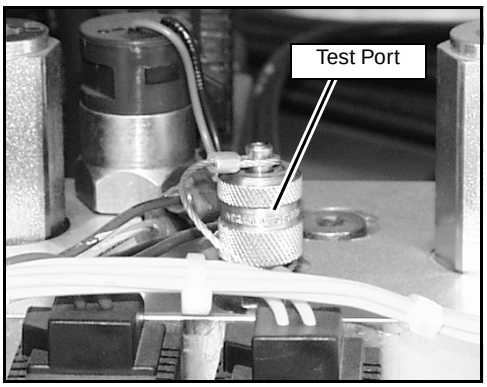
Figure 4-1: Hydraulic Test Port

Hydraulic settings must be checked whenever a component is repaired or replaced.

Remove counterbalance valves and "bench test" them if they are suspect.

Connect a pressure gauge of appropriate range to the test port located on the hydraulic manifold.

NOTE:Correct pressure settings are listed in the hydraulic schematic.



CHECKING PUMP PRESSURES

Remove hose from pump port and connect pressure tester.

4.3 UPRIGHT MOTOR CONTROLLER DIAGNOSTICS

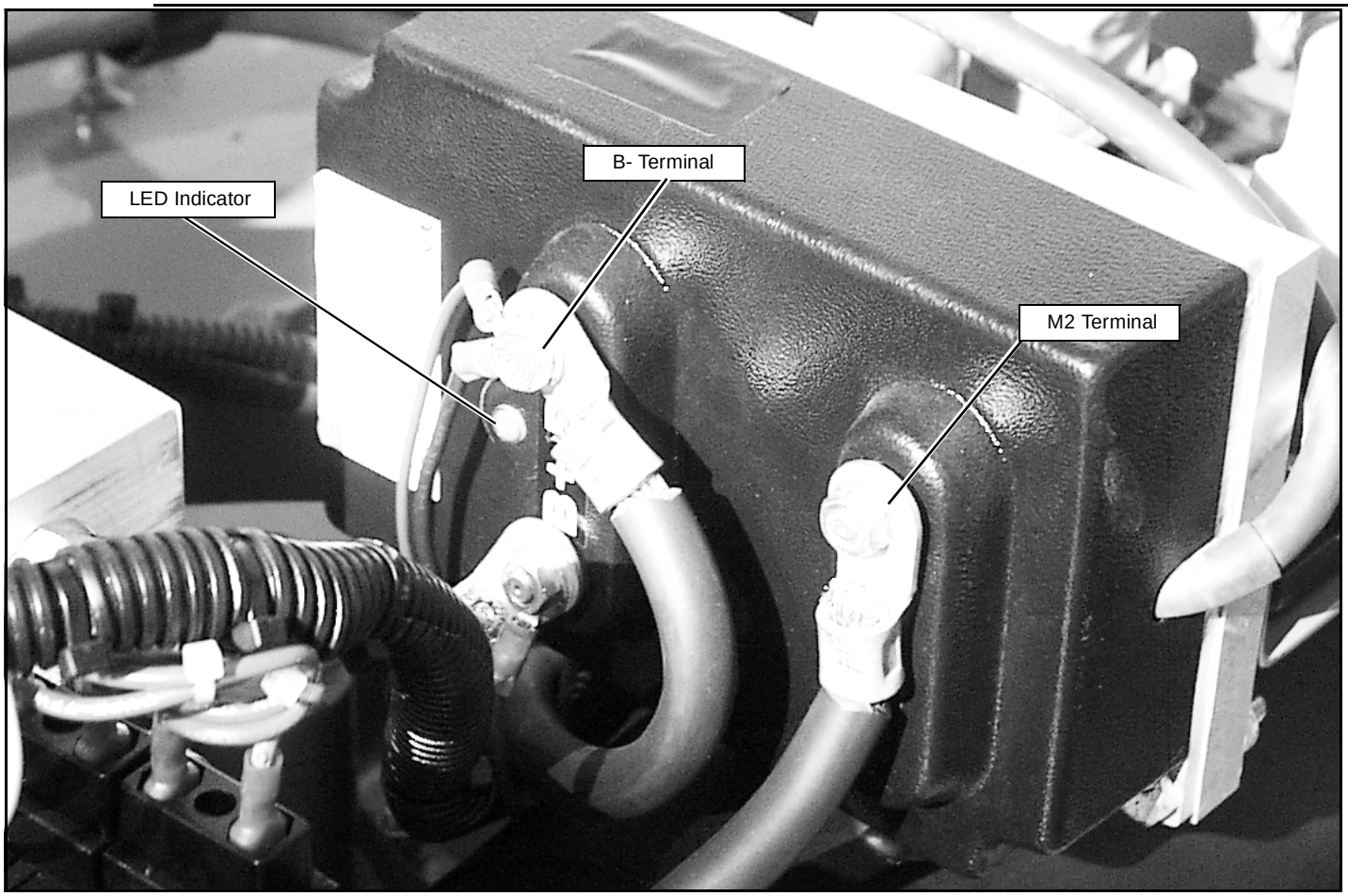
Batteries must be fully chargesd before troubleshooting.

Check/Repair all connections before replacing any components

Table 4-1: LED Fault Codes

FLASH CODE	MEANING	STATUS	CORRECTIVE ACTION
LED on	Power to the controller and the controller is operational.	System is functional.	None.
LED off	No power to the controller, or internal fault in the controller.	Battery cables not connected properly; Failed controller.	Check battery cable connections. Replace the controller.
2 Flash	Procedural fault.	Lift, drive, or steer switch is engaged at startup; Drive/Lift Switch rotated while operating.	Cycle the control handle through neutral to clear fault.
3 Flash	Controller senses B- at the M2 terminal.	Short circuit at the motor; M2 cable in contact with B- cable; Short circuit within controller.	Check cable routing and connections. Test terminals for source of B-. Replace the controller.
4 Flash	Controller senses B+ at the M2 terminal before engaging the motor start relay.	B+ cable routed incorrectly; M2 cable making contact with B+ cable; Motor start relay contacts welded closed.	Check cable routing and connections. Test terminals for source of B+. Replace the motor start relay.
5 Flash	Controller senses open circuit at M2 after engaging the motor start terminal.	Cables loose or not connected; Faulty motor start relay.	Check the cable routing and connections. Check the signal from motor controller to relay. Check/replace the motor start relay.
6 Flash	Faulty signal from control handle or I/O board.	Faulty control handle; Wiring error.	If upper controls are affected, check/replace the control handle. If lower controls are affected, check/replace the I/O board.
7 Flash	Battery voltage below 12V or above 45V.	Dead batteries; Bad cable connections.	Check batteries and cable connections.
8 Flash	Thermal cut-off.	Controller is overheated due to overuse or other failure.	Allow system to cool. Locate and repair other source of overheating.

Figure 4-2: Motor Controller



4.4 MEASURED VOLTAGE AT I/O BOARD

Be sure that both the Platform and Chassis Emergency Stop Switches are pulled out to the ON position.

All voltages are measured between the component and the B- terminal on the Motor Controller.

Table 4-2: I/O Board Troubleshooting Table

CONNECTOR	PIN NUMBER	DESCRIPTION
J1	1	24 Volts = Lift Mode Active / 0 Volts = Lift Mode Inactive
	2	No Connection
	3	24 Volts = Drive Allowed / 0 Volts = Drive Not Allowed
	4	24 Volts from Lower E-Stop / Lower E-Stop Not Depressed
	5	24 Volts from Upper E-Stop / Lower and Upper E-Stops Not Depressed
	6	24 Volts Out to Interlock Lever when Upper Controls Selected & Upper/Lower E-Stops Not Depressed
	7	No Connection
	8	24 Volts = Drive Forward or Lift Up / 0 Volts = Stop Drive Forward or Lift Up
	9	24 Volts = Drive Reverse or Lift Down / 0 Volts = Stop Reverse Drive or Lift Down
	10	Accelerator Input / 20K Pot / 3.5 Volts to 0 Volts, Minimum to Maximum Speed
	11	24 Volts = Steer Left / 0 Volts = Stop Steer Left
	12	24 Volts = Steer Right / 0 Volts = Stop Steer Right.
J2	1	Goes to 0 Volts to Activate Depression Mechanism Extend Solenoid / 24 Volts = Solenoid OFF
	2	No Connection
	3	24 Volt Supply for Solenoids
	4	Goes to 0 Volts to Activate Forward Solenoid / 24 Volts = Solenoid OFF
	5	Goes to 0 Volts to Activate Reverse Solenoid / 24 Volts = Solenoid OFF
	6	Goes to 0 Volts to Activate Lift Up Solenoid / 24 Volts = Solenoid OFF
	7	Goes to 0 Volts to Activate Steer Left Solenoid / 24 Volts = Solenoid OFF
	8	Goes to 0 Volts to Activate Steer Right Solenoid / 24 Volts = Solenoid OFF
J3	1	Goes to 0 Volts to Activate Alarm / 24 Volts = Alarm OFF
	2	24 Volts = Tilt Inactive / 0 Volts = Tilt Active
	3	24 Volt Supply for Alarm, Tilt Sensor, Lift Down and Depression Mechanism Retract Solenoids
	4	24 Volts = Below Height Limit / 0 Volts = Above Height Limit
	5	Goes to 0 Volts to Activate Lift Down Solenoid / 24 Volts = Solenoid OFF
	6	Goes to 0 Volts to Activate Depression Mechanism Solenoid / 24 Volts = Solenoid OFF
	7	24 Volts = High Speed Active / 0 Volts = Low Speed Active
	8	Battery Negative Supply for Tilt Sensor
J4	1	Goes to 0 Volts to Activate Line Contactor / 24 Volts = Line Contactor OFF
	2	Supplies 24 Volts to Upper Control / Lower Control Switch
	3	24 Volts = Lower Control Mode
	4	Supplies 24 Volts to Ground Lift Switch when in Lower Control Mode
	5	24 Volt Supply Output
	6	Goes to 0 Volts to Activate Hour Meter / 24 Volts = Hour Meter Not Activated
	7	24 Volts = Lift Up from Ground Control / 0 Volts = Lift Up OFF
	8	24 Volts = Lift Down from Ground Control / 0 Volts = Lift Down OFF
	9	24 Volt Supply Input from Battery via Lower E-Stop / Lower E-Stop Not Depressed
	10	24 Volts from Upper Control Switch / 24 Volts = Upper Control Mode
	11	Battery Negative Input to I/O Board
	12	24 Volt Supply for Hour Meter and Line Contactor
J5	1	24 Volts power to Pin 1 of SC1000 (Key ON Power)
	2	24 Volts = Command Controller to Drive / 0 Volts = Stop Controller Drive
	3	24 Volts = Command Controller to Steer / 0 Volts = Steer OFF
	4	24 Volts = Command Controller to Lift / 0 Volts = Stop Lift
	5	24 Volts = Command Normal Speed / 0 Volts = Command Speed Cutback
	6	24 Volts = Line Contactor OFF / 0 Volts = Line Contactor ON
	7	24 Volts = No Direction Solenoid Allowed / 0 Volts = Direction Solenoid Allowed to Activate
	8	Accelerator 3.5 Volts to 0 Volts / Minimum to Maximum Speed

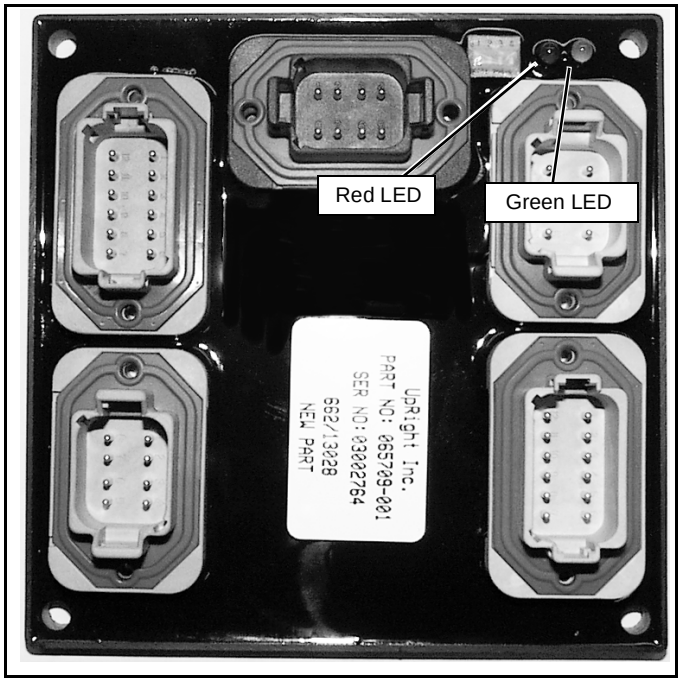
4.5 LED'S AT I/O BOARD

Green LED - Indicates that power is present at the board.

Red LED - Indicates a short in the system. To locate the problem, first cycle the emergency stop switches to clear. With the emergency stop switches on, and the keyswitch on, the green LED should be illuminated. The red LED should be off.

Next, perform all machine functions until the red LED is illuminated. Determine which function activated the red LED and check all components that are active for that function.

Figure 4-3: I/O Board



4.6 ELECTRIC

Table 4-3: Electrical Troubleshooting Table

COMPONENT / FUNCTION	LOWER CONTROLS	UPPER CONTROLS	DRIVE FORWARD	DRIVE REVERSE	HIGH SPEED/CREEP	RAISE PLATFORM	LOWER PLATFORM	STEER LEFT	STEER RIGHT	DEPRESSION MECHANISM EXTEND	DEPRESSION MECHANISM RETRACT	BRAKES	TILT ALARM	DOWN ALARM	BATTERY CHARGE
Alarm--ALM															
Batteries--BAT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Battery Charger--CHG															X
5 AMP Circuit Breaker--F1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
175 AMP Fuse--F2	X	X	X	X	X	X		X	X	X	X				
Hour Meter/Low Voltage indicator--HM															
I/O Board--I/O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Motor Control--MC	X	X	X	X	X	X	X	X	X	X	X	X			
Motor--MOT			X	X	X	X	X	X	X	X	X	X			
Motor Relay--R1			X	X	X	X	X	X	X	X	X	X			
Chassis Emergency Stop Switch--S1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Chassis Lift Switch--S2	X					X	X								
Chassis Key Switch--S3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Lift/Drive Selector Switch--S4		X	X	X		X	X								
Platform Down Switch--S5					X										
Platform Emergency Stop Switch--S6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Interlock Switch--S7		X	X	X	X	X	X	X	X						
Control Handle--S8		X	X	X		X	X								
Height Limit Switch--S9						X									
Steering Switch--S10								X	X						
Tilt Sensor--SNSR	X	X	X	X	X	X		X	X	X	X		X		
Steering Solenoid (right)--SOL1A									X						
Steering Solenoid (left)--SOL1B								X							
Platform Lift Solenoid--SOL2A						X									
Down Solenoid--SOL2B							X								
Depression Mechanism Extension Solenoid--SOL3A										X					
Depression Mechanism Retraction Solenoid--SOL3B											X				
Reverse Solenoid--SOL4A				X											
Forward Solenoid--SOL4B			X												

4.7 HYDRAULIC

Table 4-4: Hydraulic Troubleshooting Table

COMPONENT / FUNCTION	LIFT PLATFORM	LOWER PLATFORM	STEER RIGHT	STEER LEFT	DRIVE FORWARD	DRIVE REVERSE	CREEP	DEPRESSION MECHANISM EXTEND	DEPRESSION MECHANISM RETRACT	BRAKES
Check Valve--CV								X	X	
Steering Cylinder--CYL2			X	X						
Lift Cylinder--CYL1	X									
Depression Mechanism Cylinder--CYL3								X	X	
Brake Cylinder--CYL5										X
Priority Flow Divider--DVDR	X		X	X	X	X	X	X	X	X
Suction Strainer--FL1	X		X	X	X	X	X	X	X	
Return Filter--FL2	X		X	X	X	X	X	X	X	
Drive Motors (2)--MOT					X	X				
Pump--PMP	X		X	X	X	X	X	X	X	
Main Relief Valve--RV3	X				X	X	X	X	X	X
Steering Relief Valve--RV1			X	X						
Lift Relief Valve--RV2	X									
Orofice--OR	X	X								
Tank--TNK										
Steering Right/Left Valve--V1			X	X						
Lift Valve--V2A	X									
Down/Emergency Lowering Valve--V2B		X								
Depression Mechanism Retract Valve--V3B									X	
Depression Mechanism Extend Valve--V3A								X		
Forward/Reverse Valve--V4					X	X				
Counterbalance Valve--V5					X	X	X			X

Section 5

SCHEMATICS

5.1 INTRODUCTION

This section contains electrical and hydraulic power schematics and associated information for maintenance purposes.

The diagrams are to be used in conjunction with the ***Troubleshooting Truth Tables*** in ***Section 4.*** They allow understanding of the makeup and functions of the systems for checking, tracing, and faultfinding during troubleshooting analysis.

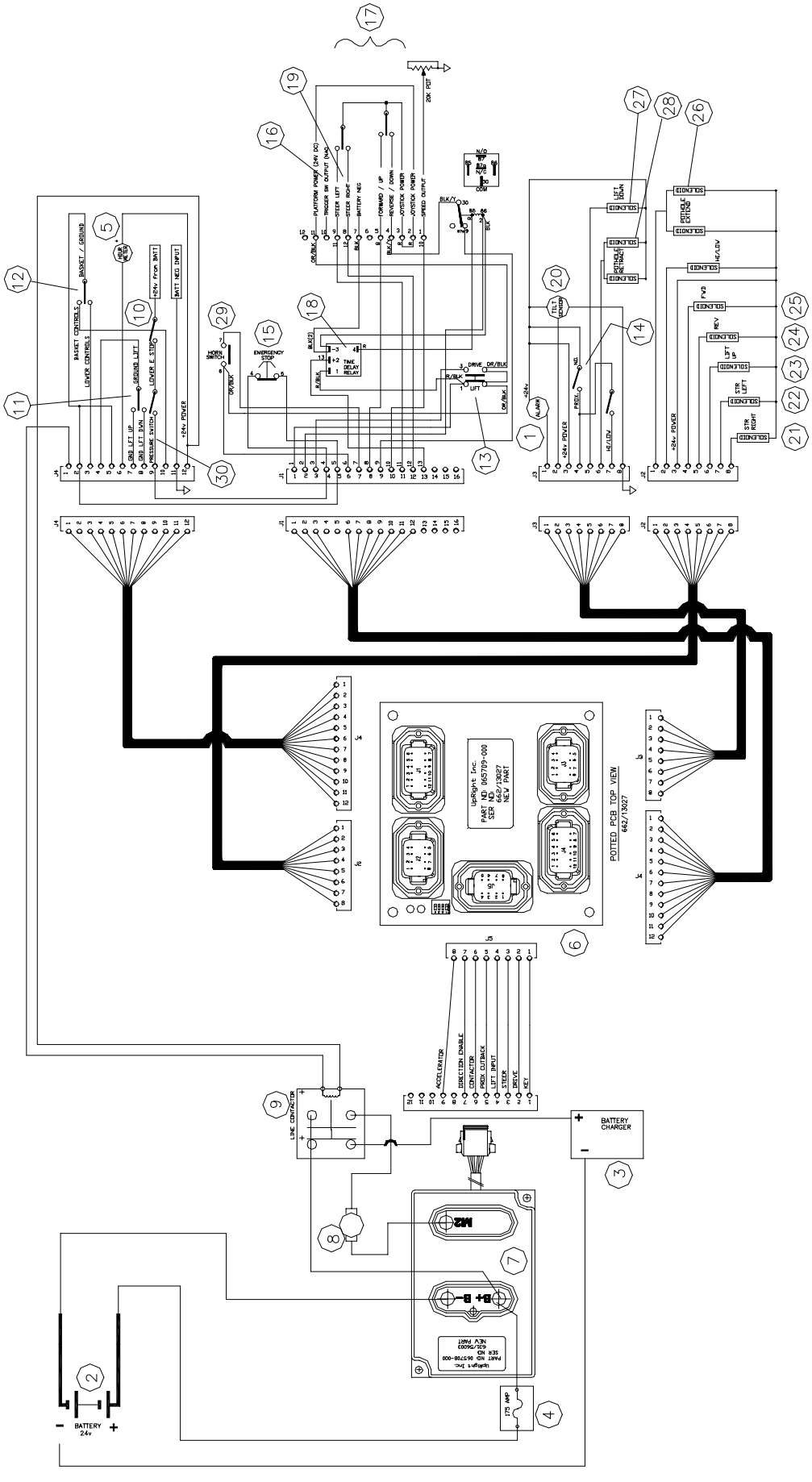
The components that comprise the electrical and hydraulic systems are given a reference designation and are explained as to function and location in the following tables.

CONTENTS

5.2 ELECTRIC - MODEL

Legend: Electrical Schematic, 065616-023

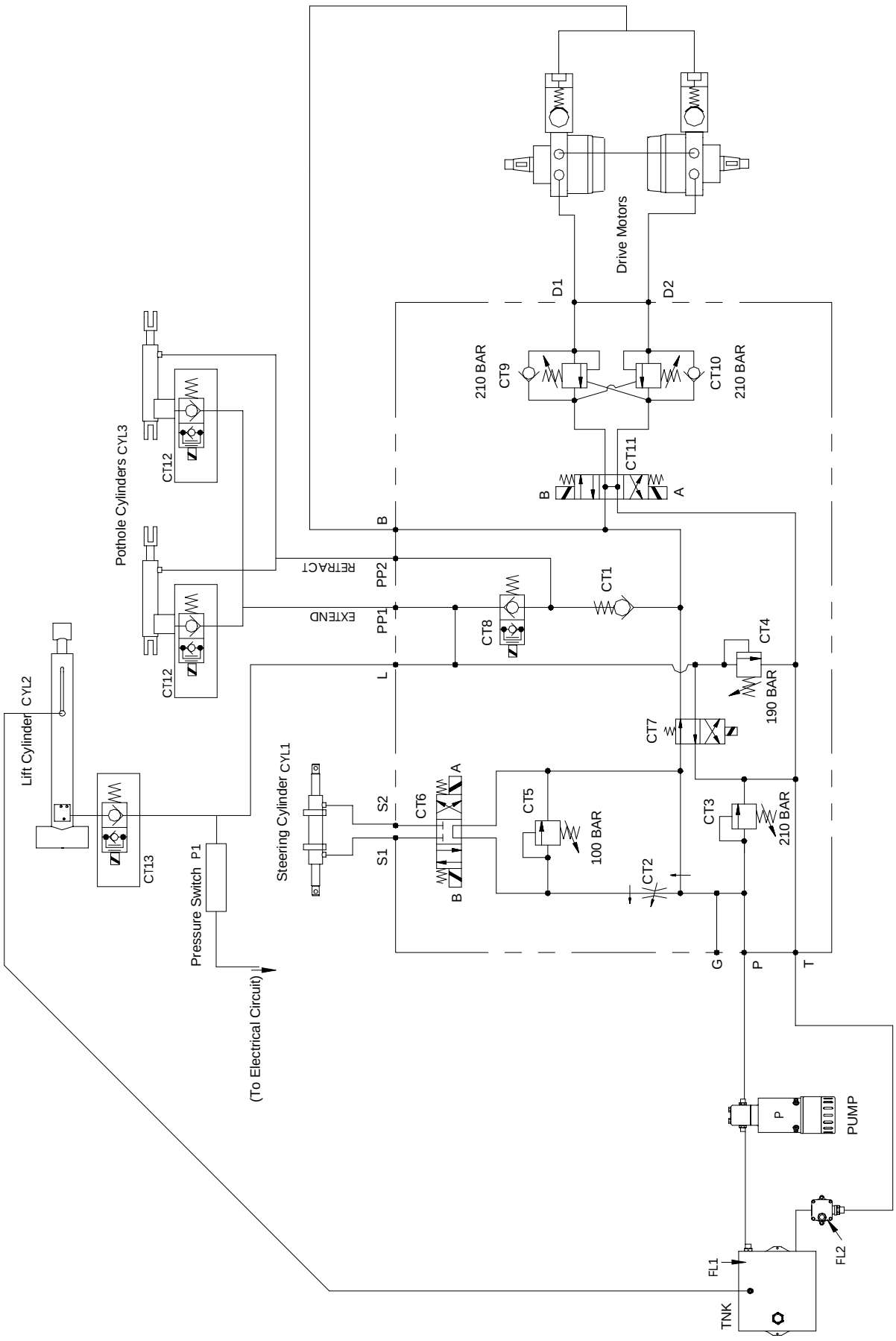
DESIG-NATION	NAME	FUNCTION	LOCATION
1	Alarm	Provides warning sound when slope of machine exceeds 2° side-to-side, or fore and aft and also when deck is lowering.	Control Module
2	Batteries	Provides power to work platform	Power Module
3	Battery Charger	Charges battery	Power Module
4	175 AMP Fuse	Overload protection for electric motor	Chassis Controls
5	Hour Meter/Low Voltage indicator	Shows how many hours the machine has been in use; indicates low battery voltage.	Chassis Controls
6	I/O Board	Connection point for machine function wiring	Control Module
7	Motor Control	Controls the speed of electric motor	Control Module
8	Motor	Provides power to hydraulic pump	Control Module
9	Line Contactor	Controls the speed of the electric motor	Control Module
10	Chassis Emergency Stop Switch	Shuts down all machine functions	Chassis Controls
11	Chassis Lift Switch	Elevates platform	Chassis Controls
12	Chassis Key Switch	Allows some machine functions to be initiated from ground level	Chassis Controls
13	Lift/Drive Selector Switch	Activates lift or drive functions	Platform Controls
14	Proximity Switch	Stops lift assembly at lower limit	Platform Controls
15	Platform Emergency Stop Switch	Shuts down all machine functions	Platform Controls
16	Interlock Switch	Safety mechanism for joystick	Platform Controls
17	PQ Control Handle	Proportionally controls the drive and lift functions	Platform Controls
18	Loading Clearance Lowering Switch	Allows platform to lower completely after stopping at Loading Clearance Height	Platform Controls
19	Platform Steering Switch (2)	Control left and right steering solenoids	Platform Controls
20	Tilt Sensor	Activates tilt alarm and disables all machine functions exceptplatform lower when the machine is more than 2° out of level	Control Module
21	Steering Solenoid (right)	Shifts steering valve to the left	Hydraulic Manifold
22	Steering Solenoid (left)	Shifts steering valve to the right	Hydraulic Manifold
23	Platform Lift Solenoid	Raises platform	Hydraulic Manifold
24	Reverse Solenoid	Shifts forward/reverse valve to reverse	Hydraulic Manifold
25	Forward Solenoid	Shifts forward/reverse vavle to forward	Hyraulic Manifold
26	Depression Mechanism Extension Solenoid	Extends depression mechanism bars	Hydraulic Manifold
27	Down Solenoid	Lowers platform	Lift Cylinder
28	Depression Mechanism Retraction Solenoid	Retracts depression mechanism bars	Depression Mechanism cylinder
29	HORN	Sounds a warning	Platform Controls
30	Pressure Switch	Prevents a lift greater than the Safe Working Load.	Chassis Controls


BASKET / GROUND
LOWER CONTROLS
GROUND LIFT
LOWER E-STOP
GRD LIFT UP
GRD LIFT DWN
PRESSURE SWITCH
+24v from BATT
BATT NEG INPUT
+24v POWER
HORN SWITCH
EMERGENCY STOP
TIME DELAY RELAY
PLATFORM POWER (24V DC)
TRIGGER SW OUTPUT (N/O)
STEER LEFT
STEER RIGHT
BATTERY NEG
FORWARD / UP
REVERSE / DOWN
JOYSTICK POWER
JOYSTICK POWER
SPEED OUTPUT
20K POT
DRIVE
LIFT
TILT SENSOR
PROX
HI/LOW
SOLENOID
FWD
REV
LIFT UP
STR LEFT
STR RIGHT
UpRight Inc.
PART NO. 065709-000
SER NO. 13027
NEW PART
POTTED PCB TOP VIEW
6462/13027
ACCELERATOR
DIRECTION ENABLE
CONTACTOR
PROX CUTBACK
LIFT INPUT
STEER
DRIVE
KEY
LINE CONTACTOR
BATTERY CHARGER
M2
B+ B-
175 AMP
BATTERY
24v

5.3 HYDRAULIC SCHEMATIC

Legend: Hydraulic Schematic, 101180-020

DESIG-NATION	NAME	FUNCTION	LOCATION
CT1	Check Valve	Allows Depression Mechanism to retract in drive mode	Hydraulic Manifold
CYL1	Steering Cylinder	Provides force to turn front wheels	Front of chassis above drive motors
CYL2	Lift Cylinder	Provides force to lift platform	Mounted under upper boom weldment
CYL3	Depression Mecha-nism Cylinder	Extends or retracts DM bar	Front of hydraulic tank
CT2R	Priority Flow Divider	Provides priority oil flow to steering	Hydraulic Manifold
FL1	Suction Strainer	Traps particles in hydraulic tank	Inside hydraulic tank at outlet
FL2	Return Filter	Filters oil returning to tank	Back of hydraulic tank
M	Drive Motors (2)	Provides tractive effort to move platform	Front motor mounts
P	Pump	Provides hydraulic pressure for all functions	On Electric motor at left rear of control module
CT3	Main Relief Valve	Provides pressure protection to pump, limits platform load capacity.	Hydraulic Manifold
CT5	Steering Relief Valve	Provides pressure protection to pump and steering components when steering	Hydraulic Manifold
CT4	Lift Relief Valve	Provides pressure protection to Lift components	Hydraulic Manifold
TNK	Tank	Holds hydraulic oil	Control Module
CT6	Steering Right/Left Valve	Provides directional control for steering	Hydraulic Manifold
CT7	Lift/Drive Valve	Provides oil control for drive or lift functions	Hydraulic Manifold
CT13	Down/Emergency Lowering Valve	Allows oil to return to tank; manually operated for emergency lowering	Lift cylinder
CT8	Pothole mechanism Retract Valve	Provides oil control for DM bar	DM cylinder
CT12	Pothole Mechanism Extend Valve	Provides oil control for DM bar	Hydraulic Manifold
CT11	Forward/Reverse Valve	Provides oil control for drive or lift functions	Hydraulic Manifold
CT9 & CT10	Counterbalance Valve	Prevents machine from running away on slopes; cushions stops	Hydraulic Manifold
B1 & B2	Brake	Provides oil control for drive or lift functions	Rear Wheel
P1	Overload Valve	Prevents machine from running away on slopes; cushions stops	Chassis


Drive Motors
D1
D2
210 BAR
CT9
CT10
210 BAR
CT11
B
A
Pothole Cylinders CYL3
CT12
CT12
B
RETRACT
PP2
EXTEND
PP1
CT1
CT8
L
CT4
190 BAR
CT7
Lift Cylinder CYL2
CT13
Steering Cylinder CYL1
S2
S1
CT6
A
B
CT5
100 BAR
CT3
210 BAR
CT2
Pressure Switch P1
(To Electrical Circuit)
G
P
T
P
PUMP
FL2
FL1
TNK

Section 6

ILLUSTRATED PARTS BREAKDOWN

6.1 INTRODUCTION

This section lists and illustrates the replaceable assemblies and parts of this product, as manufactured by UpRight.

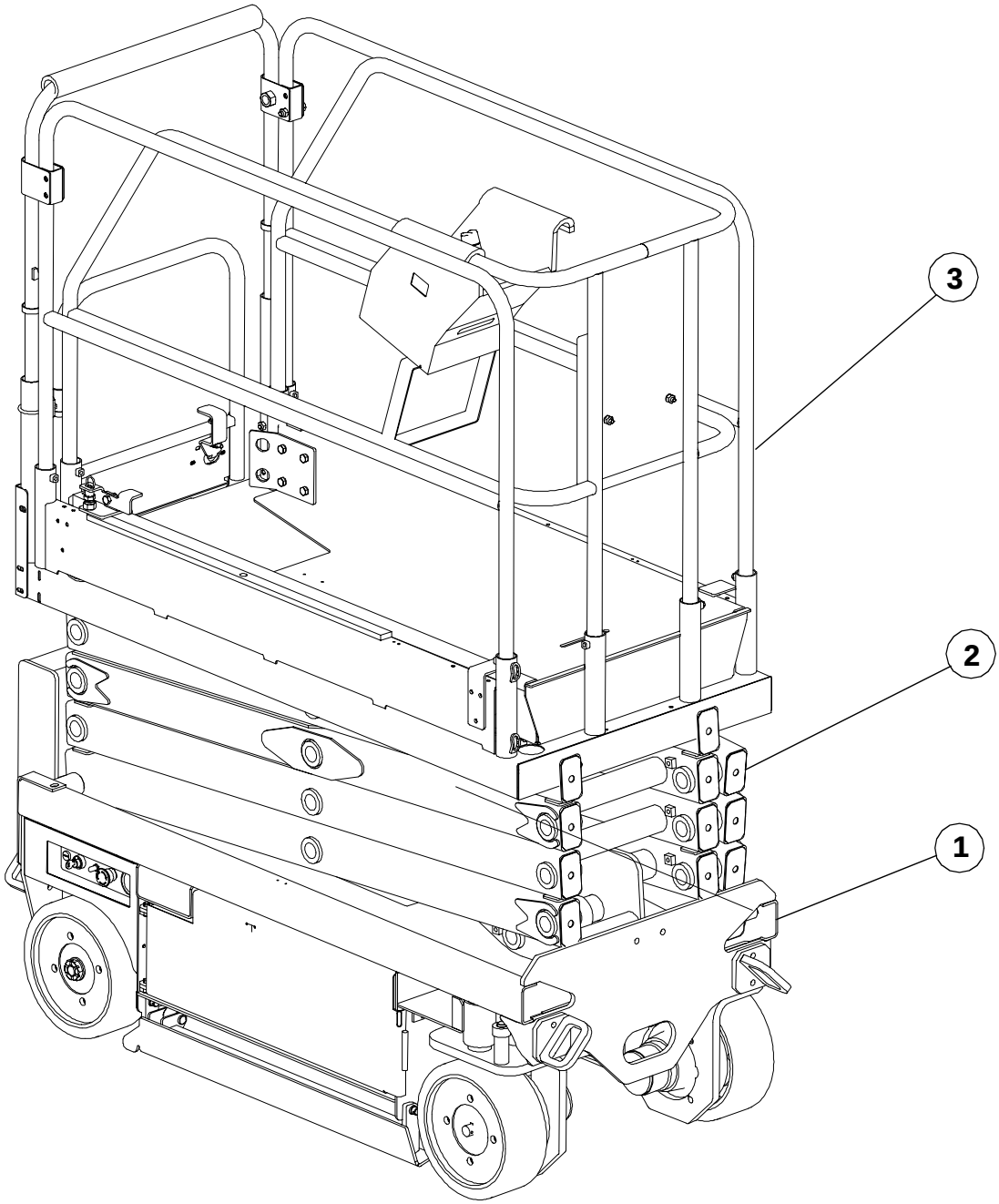
Each parts list contains the component parts for that assembly.

CONTENTS

General Assembly

503500-000

Item	Part	Description	QTY.
1	503501-000	CHASSIS ASSEMBLY	1
2	503502-000	SCISSOR ASSEMBLY	1
3	503503-000	PLATFORM ASSEMBLY	1
4	503507-000	HYDRAULIC ASSEMBLY	1
5	503508-000	ELECTRICAL ASSEMBLY	1



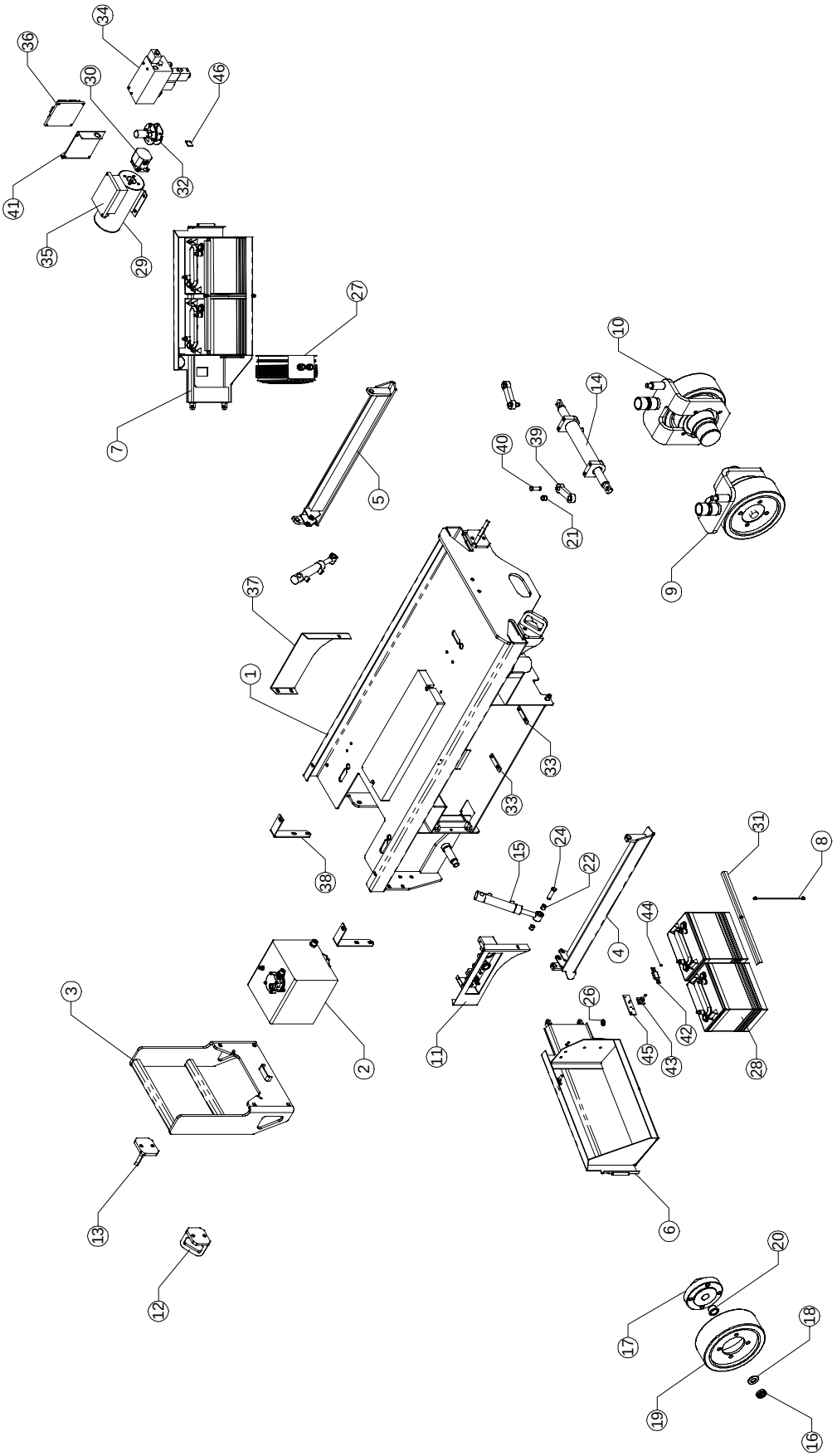
Drawing #

Chassis Assembly

503501-000

1	065620-025	CHASSIS	1
2	503696-000	HYDRAULIC TANK ASSEMBLY	1
3	066307-005	LADDER WELDMENT	1
4	065971-021	POTHOLE BAR (RH)	1
5	065971-020	POTHOLE BAR (LH)	1
6	065650-001	CHASSIS DOOR (RH)	1
7	065657-002	CHASSIS DOOR (LH)	1
8	057082-000	CLAMP BOLT ASSEMBLY	2
9	503511-001	MOTOR MOUNT ASSEMBLY (RH)	1
10	503511-000	MOTOR MOUNT ASSEMBLY (LH)	1
11	503609-001	WHEEL COVER WELDMENT (MAIN PLATE)	1
12	503686-000	TIE DOWN RING	1
13	503686-001	TIE DOWN RING	1
14	503687-000	CYLINDER, HYDRAULIC (STEERING)	1
15	503622-000	CYLINDER, HYDRAULIC (POTHOLE)	2
16	503755-000	CASTLE NUT 1 1/8	2
17	502171-002	WHEEL HUB ADAPTOR (FRONT)	2
18	503677-000	PLAIN WASHER	2
19	503615-001	WHEEL	4
20	057046-001	FLANGED BUSHING	4
21	503673-000	PLAIN BUSHING	6
22	503672-000	PLAIN BUSHING	8
23	011848-019	PIVOT PIN (POTHOLE CYLINDER, BODY END)	2

24	011848-036	PIVOT PIN (POTHOLE CYLINDER, ROD END)	2
25	-	-	-
26	503676-000	DU WASHER	4
27	069199-001	BATTERY CHARGER	1
28	501074-000	BATTERY (6V 220ah , T605)	4
29	101230-000	PUMP MOTOR	1
30	-	PUMP	1
31	502139-001	BATTERY ANGLE	2
32	058912-000	TILT SENSOR SWITCH	1
33	503679-000	SLIDE, BATTERY COMPARTMENT	4
34	503800-000	MANIFOLD, HYDRAULIC	1
35	065708-001	CONTROLER, MOS UNIT (MINIMOS)	1
36	065709-001	I/O BOARD	1
37	503609-000	REAR MUDGUARD (LH)	1
38	503681-000	STOP BRACKET	2
39	503626-001	STEERING LINK PLATE	2
40	501227-002	PIVOT PIN, STEERING CYLINDER	2
41	503757-000	SUPPORT PLATE, PCB	1
42	058921-000	FUSE 160A	1
43	502286-000	FUSE HOLDER	2
44	056066-004	NYLOCK NUT, M4 - 8	1
45	503758-000	ADAPTOR PLATE, FUSE	1
46	503759-000	LATCH SPACER, BATTERY	2


34
36
30
46
41
32
35
29
27
7
5
10
14
40
39
21
9
37
1
33
33
38
24
15
22
31
8
44
4
26
45
43
42
28
11
3
2
13
12
6
20
17
18
19
16

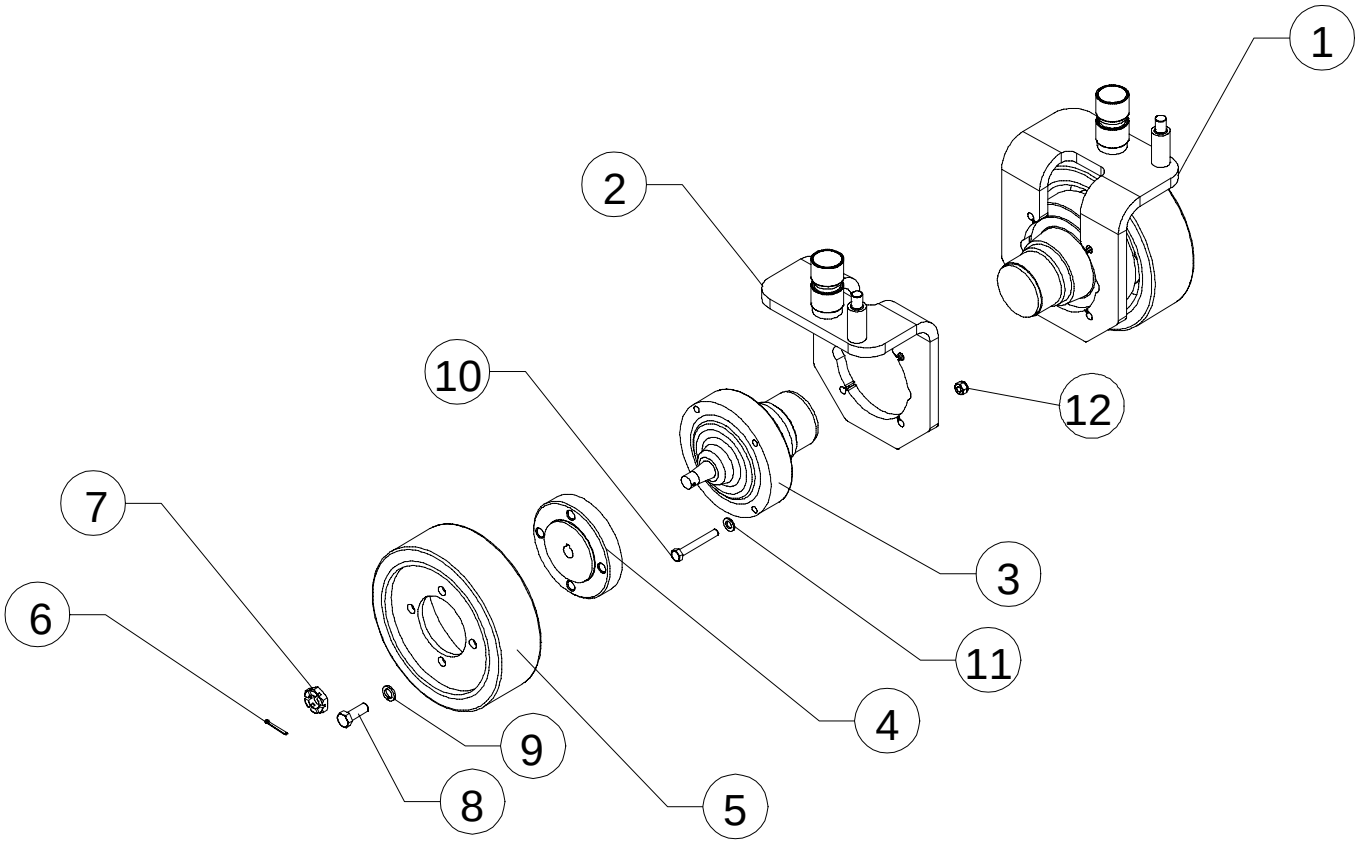
Motor Mount Assembly

503511-000 / -001

1	503511-001	MOTOR MOUNT WELDMENT (RH)	1
2	503511-000	MOTOR MOUNT WELDMENT (LH)	1
3	503678-000	DRIVE MOTOR	2
4	502171-000	WHEEL HUB ADAPTOR	2
5	503615-001	WHEEL	2
6	502152-000	SPLIT PIN	2
7	503755-000	CASTLE NUT	2
8	058495-045	HEX HEAD SCREW (M16 X 45)	8
9	056021-016	SPRING WASHER (M16)	8
10	057052-090	HEX HEAD BOLT (M12 X 90)	8
11	056069-012	WASHER (M12)	8
12	056066-012	NYLOCK NUT (M12)	8

Motor Mount Assembly

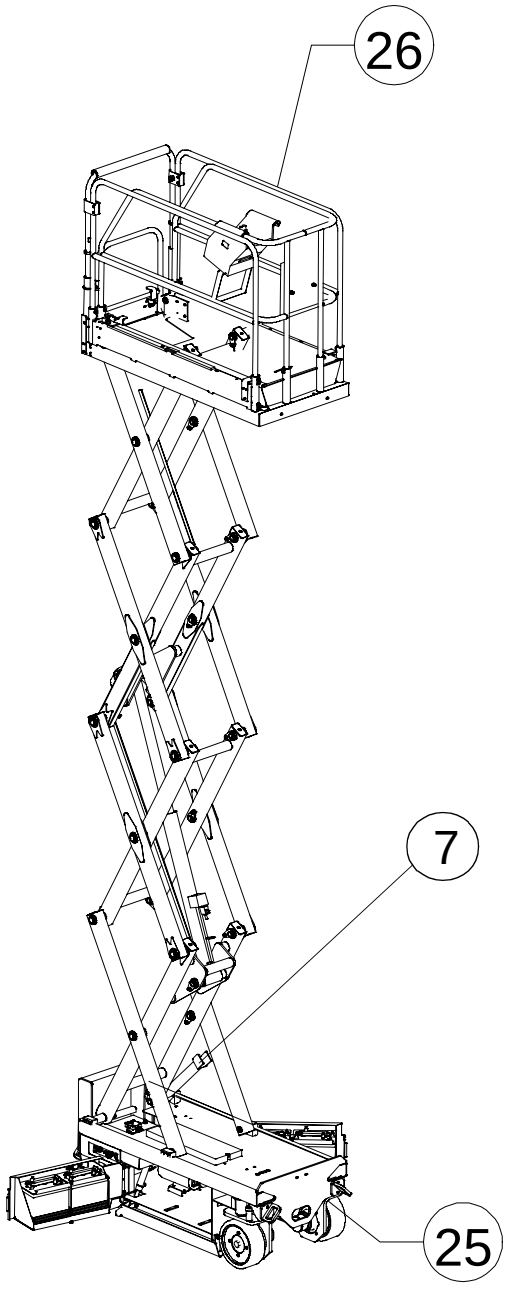
503511-000 / -001

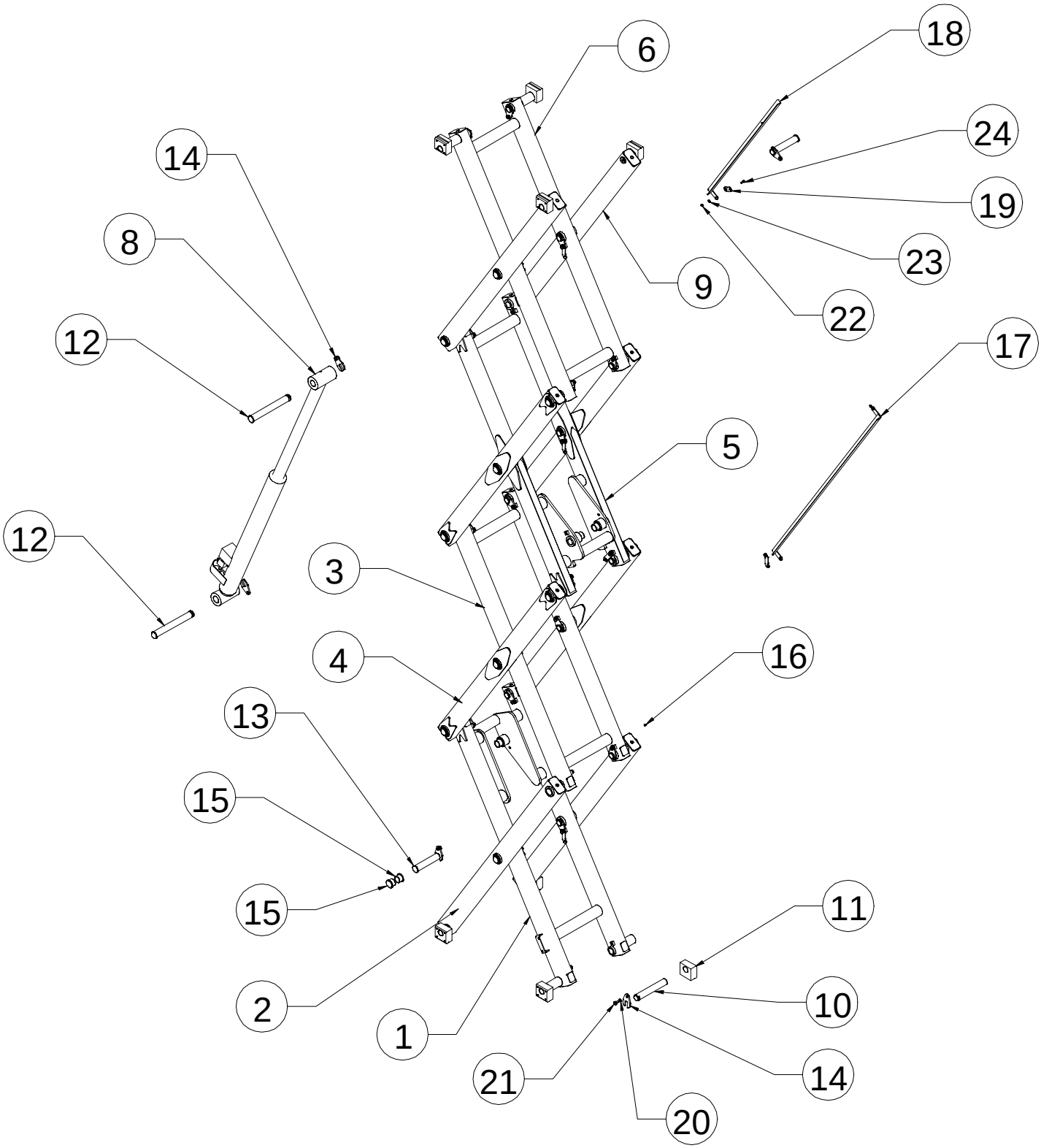


Scissor Assembly

503502-000

Item	Part	Description	QTY.
1	503731-000	INNER ARM WELDMENT	1
2	503736-000	OUTER BEAM (LH)	2
3	503733-000	INNER CENTRE BEAM	1
4	503737-000	OUTER BEAM WELDMENT	4
5	503732-000	INNER BEAM	1
6	503734-000	UPPER BEAM WELDMENT	1
7	503688-000	SCISSOR BRACE	1
8	503795-000	CYLINDER, HYDRAULIC	1
9	503735-000	OUTER BEAM (RH)	2
10	503529-000	PIVOT PIN	4
11	503552-000	SLIOE PAD, THREADED	8
12	503528-001	PIVOT PIN	2
13	503528-000	PIVOT PIN	20
14	502176-000	LOCK PLATE	26
15	057046-000	FLANGED BUSHING	44
16	058819-000	GREASE NIPPLE	12
17	503790-000	CABLE GUIDE, LONG	1
18	503790-001	CABLE GUIDE, SHORT	1
19	503792-000	GUIDE SUPPORT PLATE	6
20	056021-010	SPRING WASHER (M10)	26
21	056060-016	HEX HEAD BOLT (M10 X 16) 8.8	26
22	056066-006	NYLOCK NUT (M6)	2
23	056069-006	WASHER (M6)	2
24	058302-016	SET SCREW (M6 X 16)	2
25	503501-000	CHASSIS ASSEMBLY	1
26	503503-000	PLATFORM ASSEMBLY	1

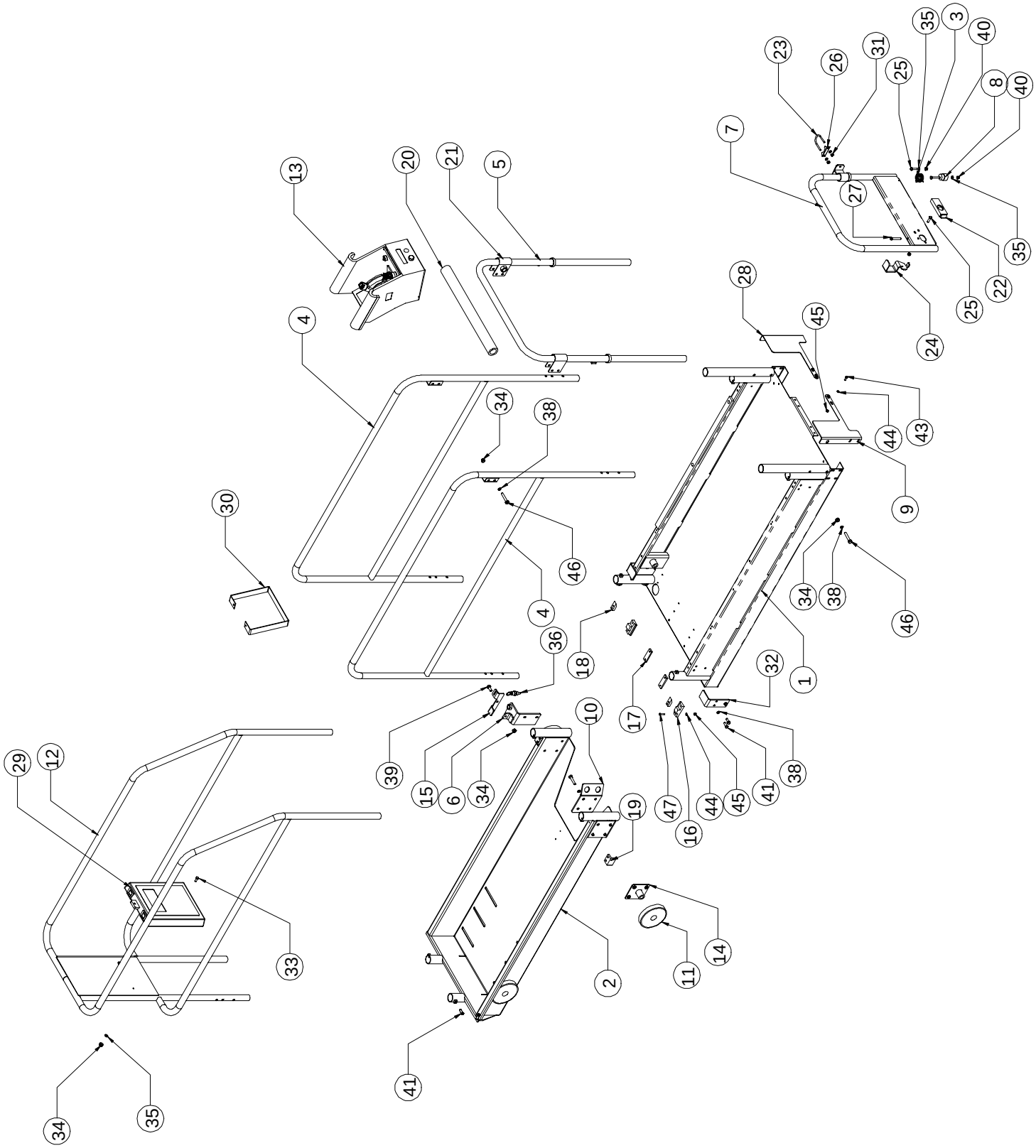



18
6
24
14
19
8
23
9
22
12
17
5
12
3
4
16
13
15
15
11
2
10
1
14
21
20

Platform Assembly

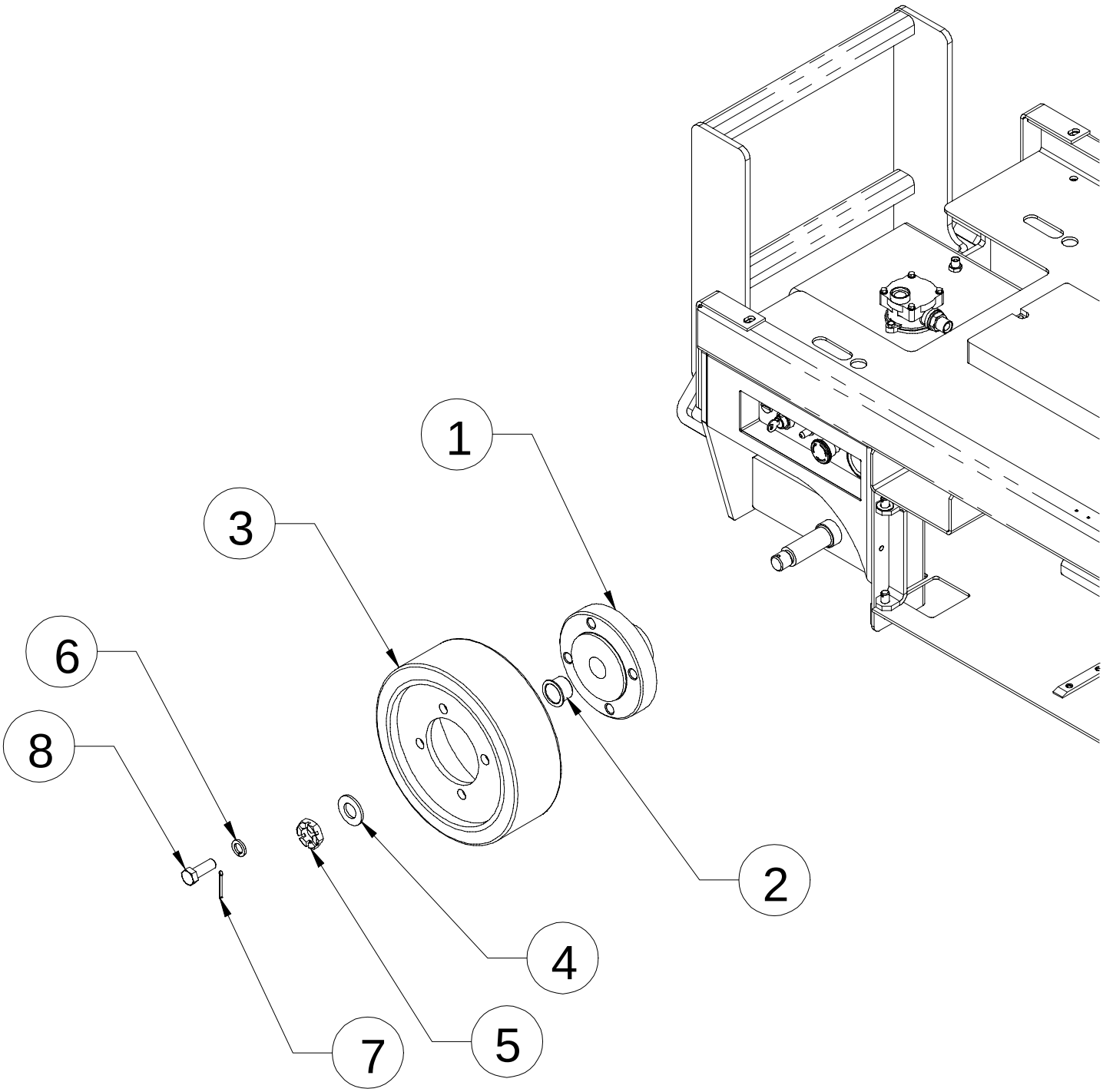
503501-000

Item	Part	Description	QTY.
1	066250-001	PLATFORM WELDMENT	1
2	066251-001	EXTENSION DECK WELDMENT	1
3	502204-000	GATE SPRING	1
4	503643-000	SIDE RAIL WELDMENT	2
5	503646-000	END RAIL WELDMENT	1
6	502145-000	LEVER PIVOT BRACKET WELDMENT	1
7	503650-000	GATE WELDMENT	1
8	502206-000	DOOR PIVOT INSERT	1
9	503658-000	DECK BRACKET (LH)	1
10	502291-000	HARNESS HARDPOINT	1
11	502132-001	ROLLER, EXTENSION DECK	4
12	503640-000	GUARDRAIL WELDMENT	1
13	101188-010	UCB (PLASTIC ENCLOSURE)	1
14	502150-000	ROLLER MOUNT WELDMENT	2
15	502141-000	LEVER BRACKET	1
16	502131-000	EXTENSION DECK GUIDE	2
17	502148-000	WEAR PAD, EXTENSION DECK	2
18	502129-000	ROLLER STOP	2
19	502128-000	WEAR PAD	2
20	500311-001	FOAM TUBING	1
21	503648-000	GATE LATCH WELDMENT	2
22	058251-000	LOCKING LATCH, LADDER	1
23	503765-000	U - BOLT	1
24	503767-000	LATCH ACTUATOR	1
25	056059-030	HEX HEAD BOLT (M8 X 30)	2
26	502235-000	HOUSING, U - BOLT	1
27	056059-055	HEX HEAD BOLT (M8 X 55)	1
28	503658-001	GATE STOP BRACKET (RH)	1
29	010076-000	DOCUMENT BOX	1
30	502164-000	BRACKET, UCB BOTTOM	1
31	502231-000	PIPE CLAMP, GATE HINGE	1
32	503657-000	BRACKET	2
33	058492-020	HEX HEAD SCREW (M8 X 20)	2
34	056066-010	NYLOCK NUT (M10)	5
35	056069-008	WASHER (M8)	5
36	009442-003	PLUNGER ASSY	3
37	056060-050	HEX HEAD BOLT (M10 X 50)	4
38	056021-010	SPRING WASHER (M10)	9
39	058493-025	HEX HEAD SCREW (M10 X 25)	1
40	056066-008	NYLOCK NUT (M8)	3
41	503805-000	HEX HEAD BOLT (3/8” - 16 UNC - 28 X 1”)	5
42	056059-050	HEX HEAD BOLT (M8 X 50)	1
43	058491-016	HEX HEAD BOLT (M6 X 16)	4
44	056069-006	WASHER (M6)	5
45	056066-006	NYLOCK NUT (M6)	5
46	056060-060	HEX HEAD BOLT (M10 X 60)	2
47	501253-025	BUTTON HEAD SCREW (M6 X 25)	1


23
26
31
25
35
3
40
8
40
7
27
35
22
25
24
13
20
21
5
4
28
45
44
43
9
34
38
46
30
4
36
18
17
32
1
34
38
46
10
39
15
6
34
47
16
44
45
41
38
19
29
12
33
2
14
11
41
34
35

Rear Wheel Assembly

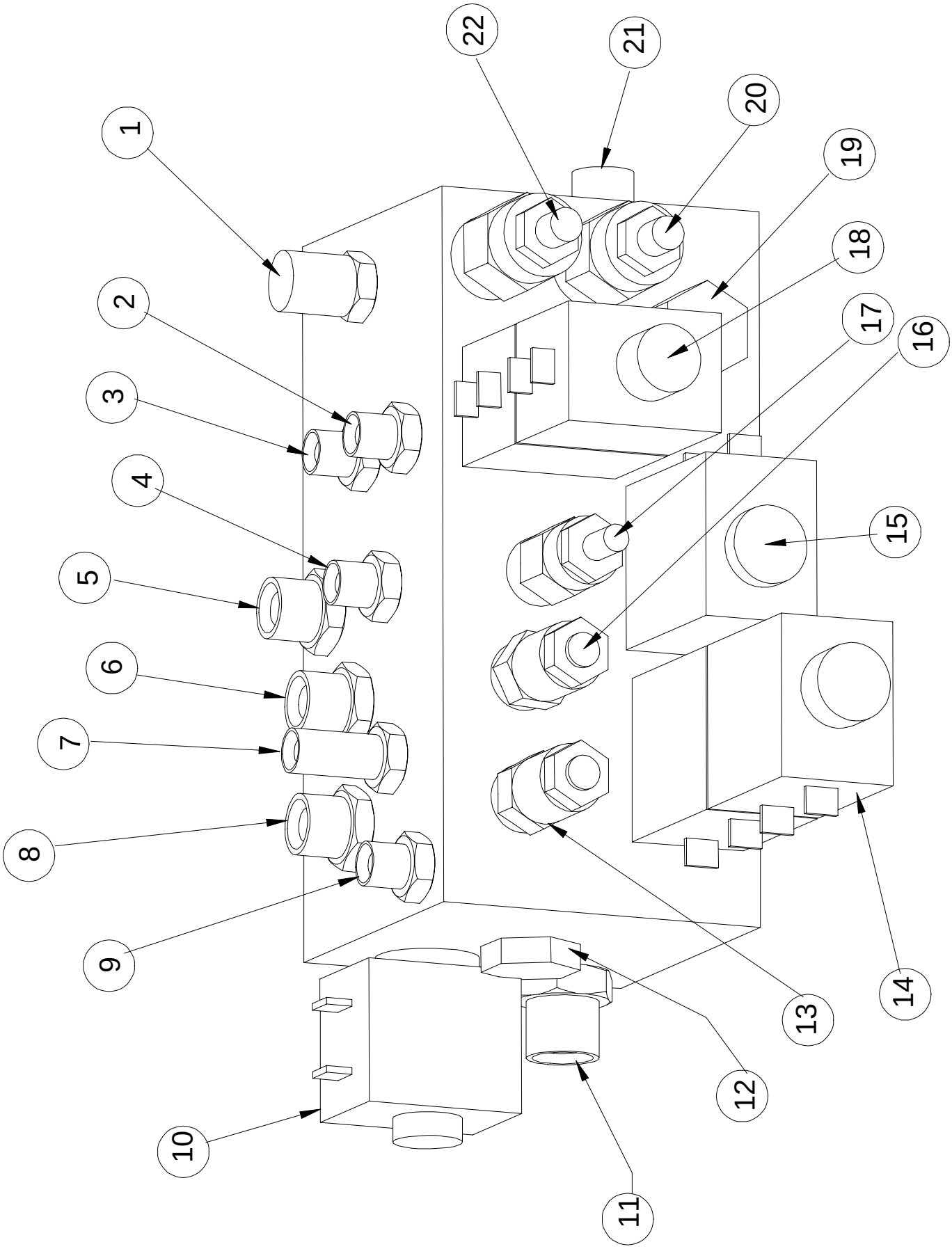
Item	Part	Description	QTY.
1	502171-002	HUB ADAPTOR (WHEEL)	1
2	057046-001	FLANGED BUSHING	1
3	503615-001	WHEEL	1
4	503677-000	PLAIN WASHER	1
5	503755-000	CASTLE NUT	1
6	056021-016	WASHER (M16)	4
7	502152-000	SPLIT PIN	1
8	058495-045	HEX HEAD SCREW (M16 X 45)	4


1
3
6
8
2
4
7
5

Control Valve Assembly

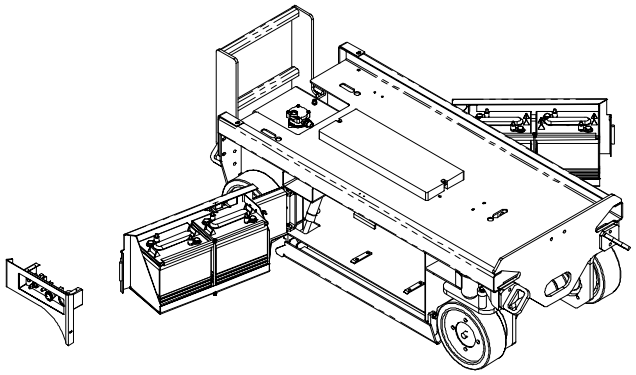
503800-000

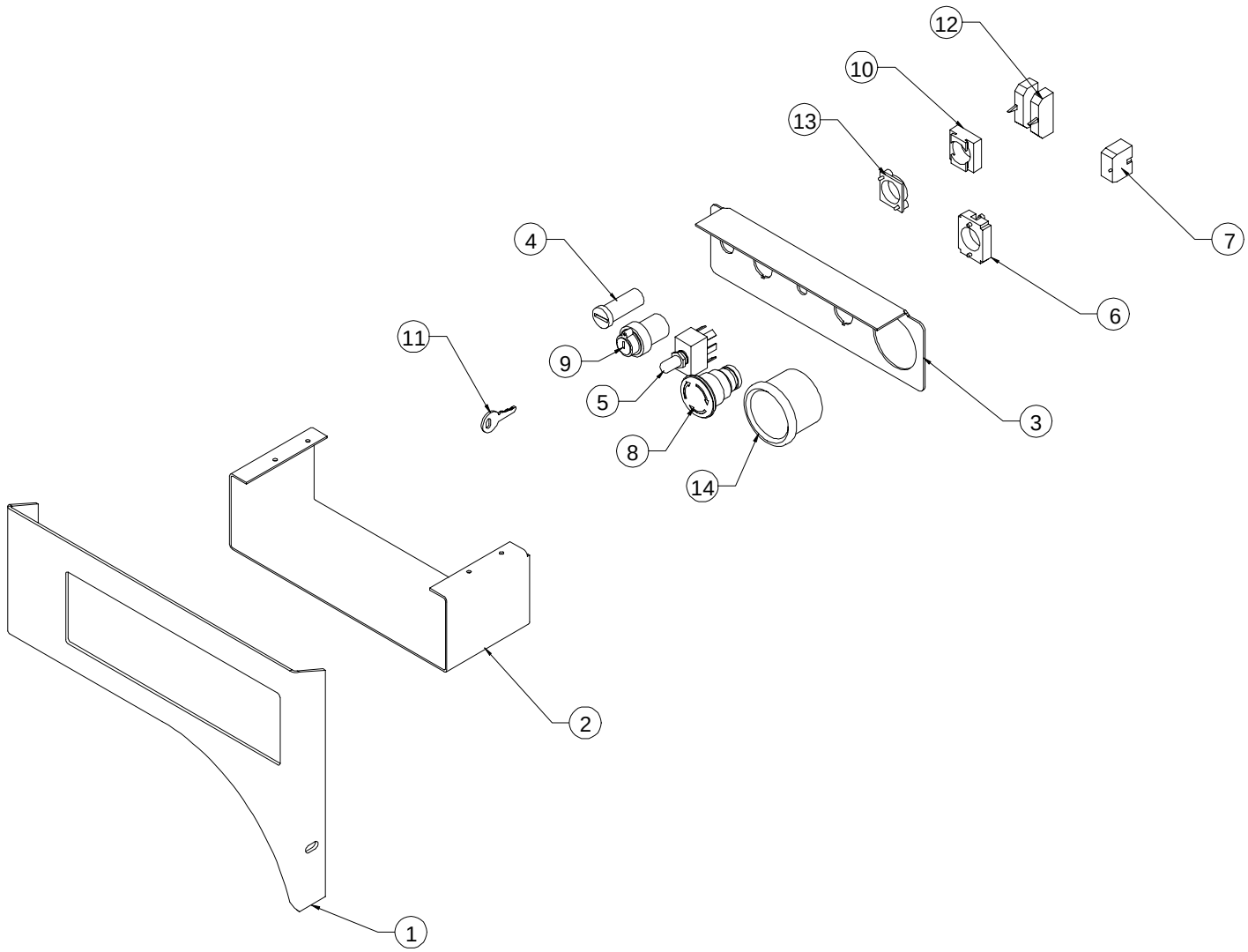
Item	Part	Description	QTY.
1		TEST PORT	1
2	058358-000	FITTING, 1/4” - 1/4” MALE/MALE	1
3	058358-000	FITTING, 1/4” - 1/4” MALE/MALE	1
4	058358-000	FITTING, 1/4” - 1/4” MALE/MALE	1
5	057122-000	FITTING, 3/8” - 3/8” MALE/MALE	1
6	057122-000	FITTING, 3/8” - 3/8” MALE/MALE	1
7	503806-000	FITTING, 1/4” - 1/4” MALE/MALE BULKHEAD	1
8	057122-000	FITTING, 3/8” - 3/8” MALE/MALE	1
9	057358-000	FITTING, 1/4” - 1/4” MALE/MALE	1
10	503801-000	VALVE, SOLENOID (POTHOLE)	1
11	057377-000	FITTING, 1/2” - 1/2” (MALE/MALE)	1
12	503802-000	CHECK VALVE, POTHOLE	1
13	503803-000	CROSS LINE RELIEF VALVE (DRIVE)	1
14	503804-000	VALVE, SOLENOID (DRIVE)	1
15	503805-000	VALVE, SOLENOID (DRIVE/LIFT)	1
16	503803-000	CROSS LINE RELIEF VALVE (DRIVE)	1
17	503807-000	PRESSURE RELIEF (MAIN LIFT)	1
18	503808-000	VALVE, SOLENOID (STEERING)	1
19	503809-000	FLOW RESTRICTOR (STEERING)	1
20	503810-000	RELIEF VALVE (STEERING)	1
21	057122-000	FITTING, 3/8” - 3/8” MALE/MALE	1
22	503810-000	RELIEF VALVE (MAIN RELIEF)	1
23	500303-000	COIL 18V	6


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

Lower Controls Assembly

Item	Part	Description	QTY.
1	503609-001	WHEEL COVER PLATE	1
2	503611-000	BOX, LOWER CONTROLS	1
3	503612-000	PANEL, LOWER CONTROLS	1
4	502245-000	FUSE CARRIER (7A FUSE)	1
5	502279-000	TOGGLE SWITCH	1
6	502248-000	SWITCH MOUNT	1
7	502249-000	SWITCH BLOCK (NC)	1
8	057309-000	EMERGENCY STOP BUTTON	1
9	057310-000	KEY SWITCH	1
10	502246-000	MOUNT, SWITCH BLOCK	1
11	057238-000	KEY	1
12	502244-000	SWITCH BLOCK (NO)	2
13	502247-000	MOUNT, SWITCH	1
14	501522-000	HOUR METER / BATTERY INDICATOR	1

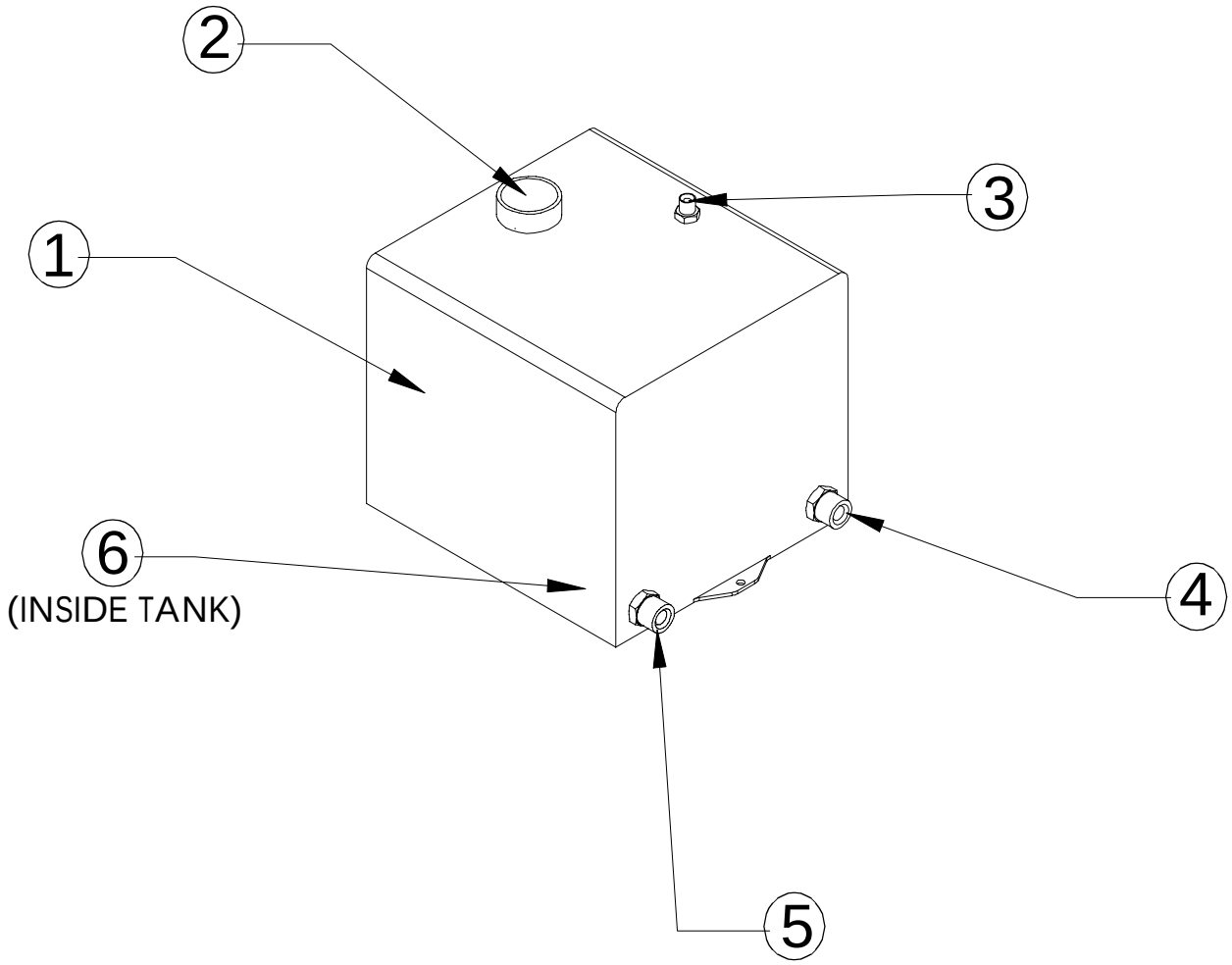




Hydraulic Tank Assembly

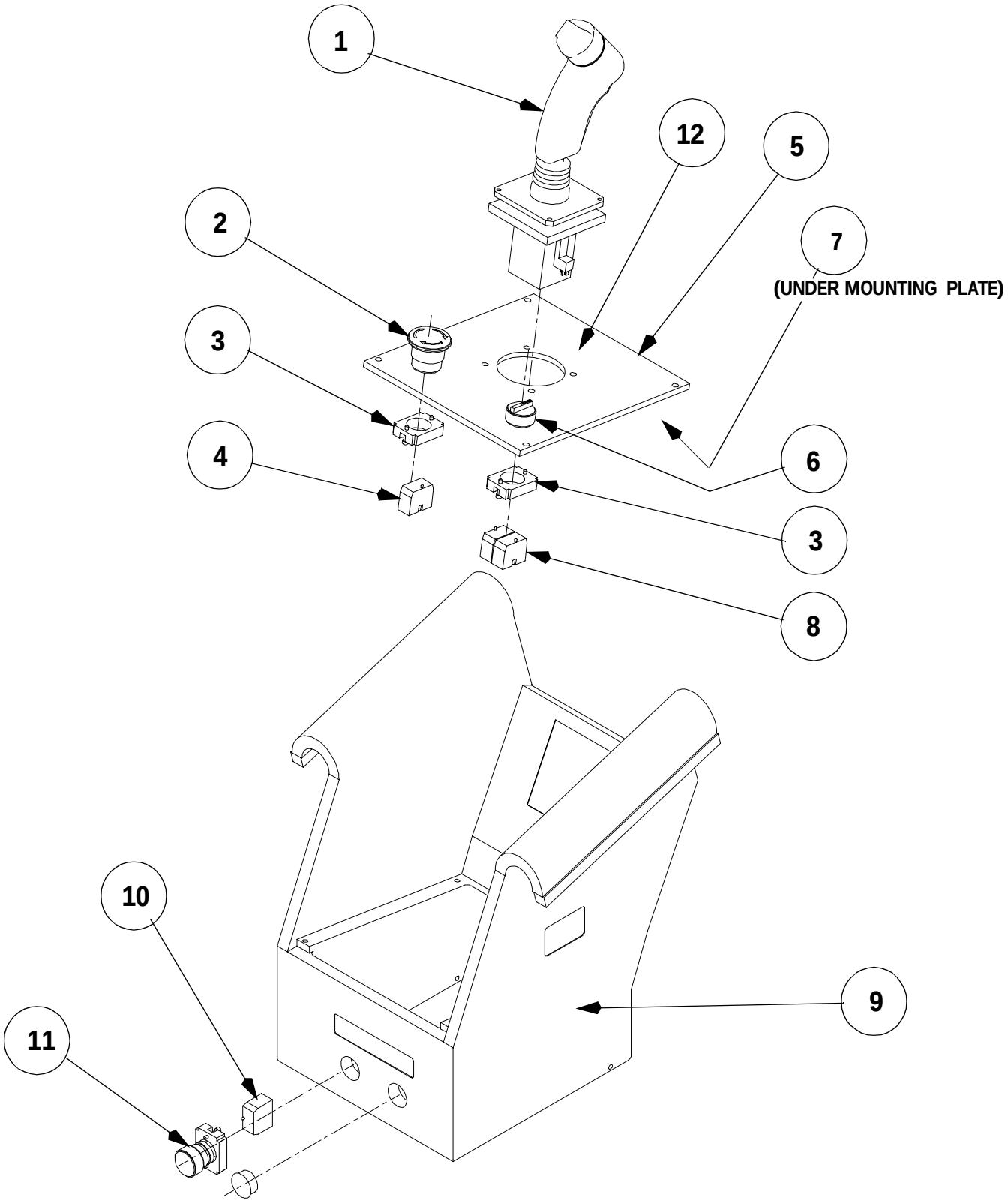
503696-000

Item	Part	Description	QTY.
1	101056-001	HYDRAULIC TANK (TANK ONLY)	1
2	068982-001	FILER CAP	1
3	503787-000	DRAIN LINE RETURN (1/4" NPT - 1/4" BSP M/M)	1
4	503786-000	RETURN LINE ADAPTOR (1/2" NPT - 1/2" BSP M/M)	1
5	503788-000	SUCTION ADAPTOR (3/4" NPT - 3/4" BSP M/M)	1
6	061818-000	SUCTION STRAINER (INSIDE TANK)	1



Upper Controls Assembly

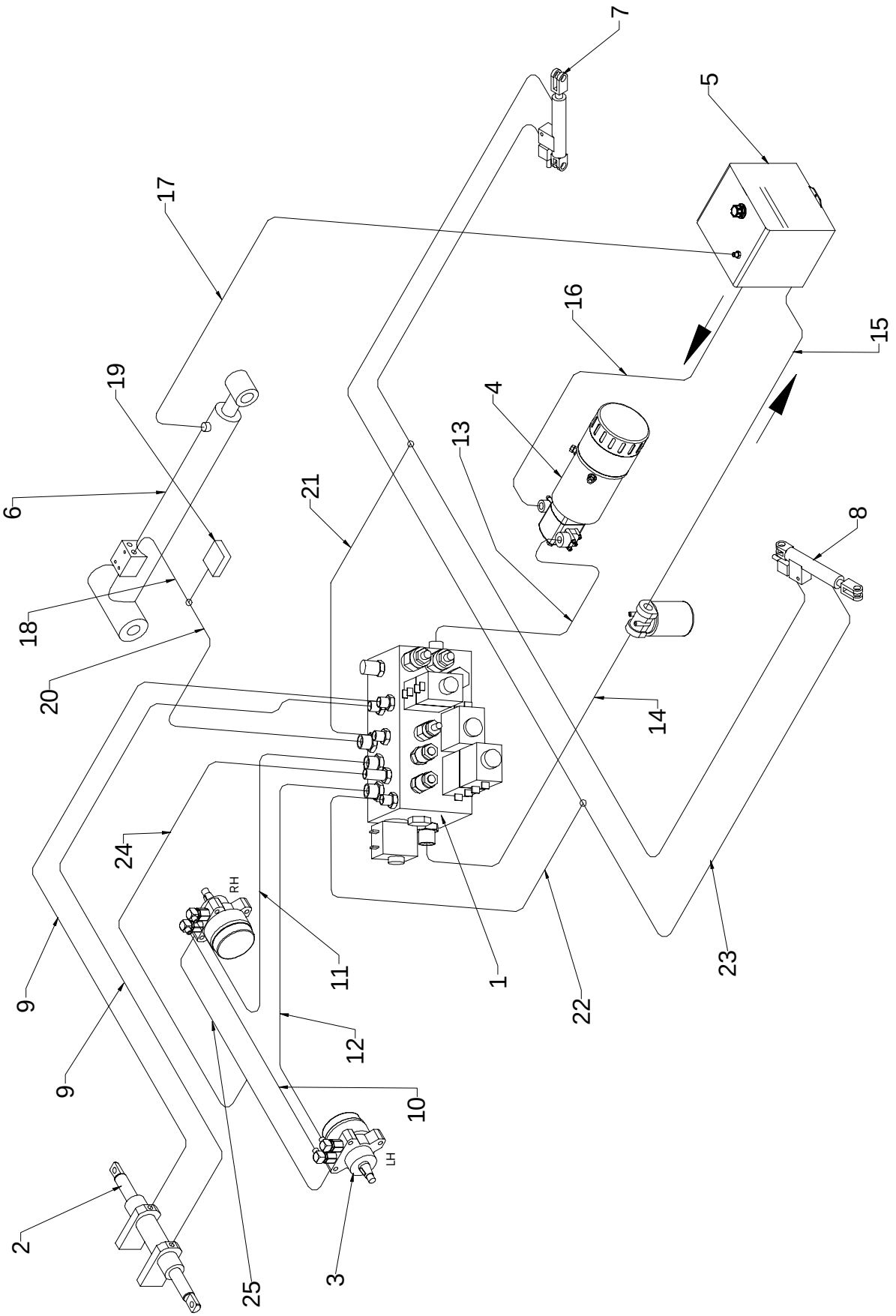
Item	Part	Description	QTY.
1	058804-001	JOYSTICK	1
2	057309-000	EMERGENCY STOP SWITCH	1
3	502248-000	SWITCH MOUNT	2
4	502249-000	N/C SWITCH BLOCK	1
5	502126-000	MOUNTING PLATE	1
6	058807-000	SELECTOR SWITCH, 2 POSITION	1
7	502199-000	RELAY, N/O (5SECOND DECENT DELAY)	1
8	502243-000	SWITCH BLOCK, N/O & N/C (2 POSITION SWITCH)	1
9	101188-010	UPPER CONTROL ENCLOSURE	1
10	502244-000	SWITCH BLOCK, N/O	1
11	502242-000	HORN BUTTON	1
12	101222-904	DECAL, UCB	1


1
12
5
2
7
(UNDER MOUNTING PLATE)
3
4
6
3
8
10
9
11

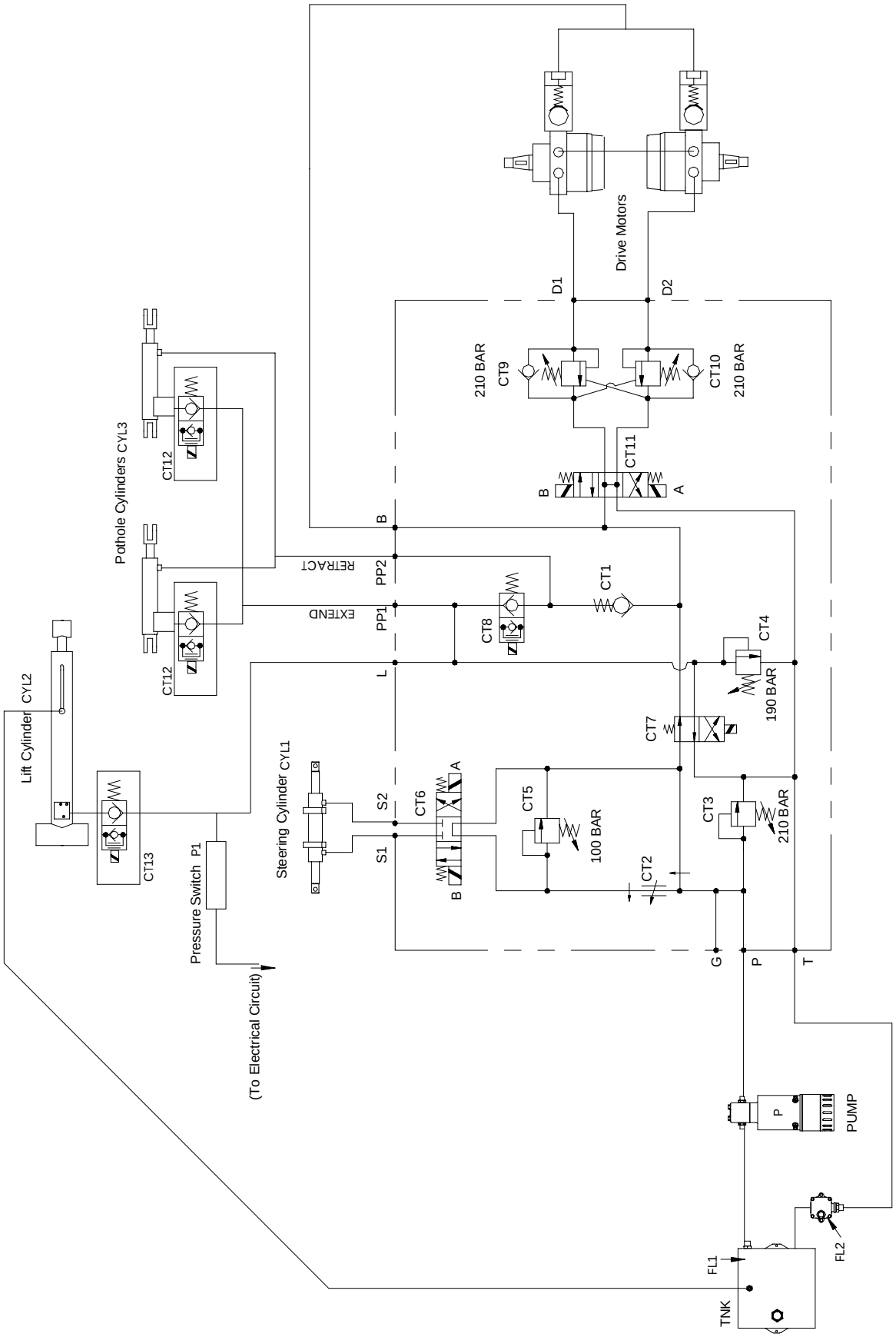
Hydraulic Assembly

503507-000

Item	Part	Description	QTY.
1	503800-000	HYDRAULIC MANIFOLD	1
2	503687-000	HYDRAULIC CYLINDER (STEERING)	1
3	503678-000	DRIVE MOTOR	2
4	101230-000	PUMP MOTOR	1
5	503696-000	HYDRAULIC TANK	1
6	503795-000	HYDRAULIC CYLINDER (MAIN LIFT)	1
7	503622-001	HYDRAULIC CYLINDER (POTHOLE)	1
8	503622-000	HYDRAULIC CYLINDER (POTHOLE)	1
9	503693-000	HOSE, MANIFOLD TO STEERING CYLINDER	2
10	503777-000	HOSE, DRIVE MOTOR TO DRIVE MOTOR	1
11	503776-000	HOSE, MANIFOLD TO DRIVE MOTOR	1
12	503775-000	HOSE, MANIFOLD TO DRIVE MOTOR	1
13	503779-000	HOSE, PUMP TO MANIFOLD	1
14	503780-000	HOSE, MANIFOLD TO FILTER (RETURN)	1
15	503781-000	HOSE, FILTER TO TANK (RETURN)	1
16	503778-000	HOSE, TANK TO PUMP (SUCTION)	1
17	503699-000	HOSE, MAIN LIFT CYLINDR TO TANK (DRAIN)	1
18	503698-000	HOSE, PRESSURE SWITCH TEE TO LIFT CYLINDER	1
19	503698-000	PRESSURE SWITCH	1
20	503697-000	HOSE, MANIFOLD TO PRESSURE SWITCH TEE	1
21	503694-000	HOSE, MANIFOLD TO POTHOLE TEE	1
22	503695-000	HOSE, POTHOLE TEE TO MANIFOLD	1
23	503788-000	HOSE, POTHOLE TEE TO POTHOLE CYLINDER	4
24	503691-000	HOSE, MANIFOLD TO BRAKE TEE	1
25	503692-000	HOSE, BRAKE TEE TO DRIVE MOTORS LH & RH	2


7
5
17
16
15
19
4
13
6
21
8
18
20
14
24
RH
11
1
23
9
22
12
9
10
LH
2
3
25

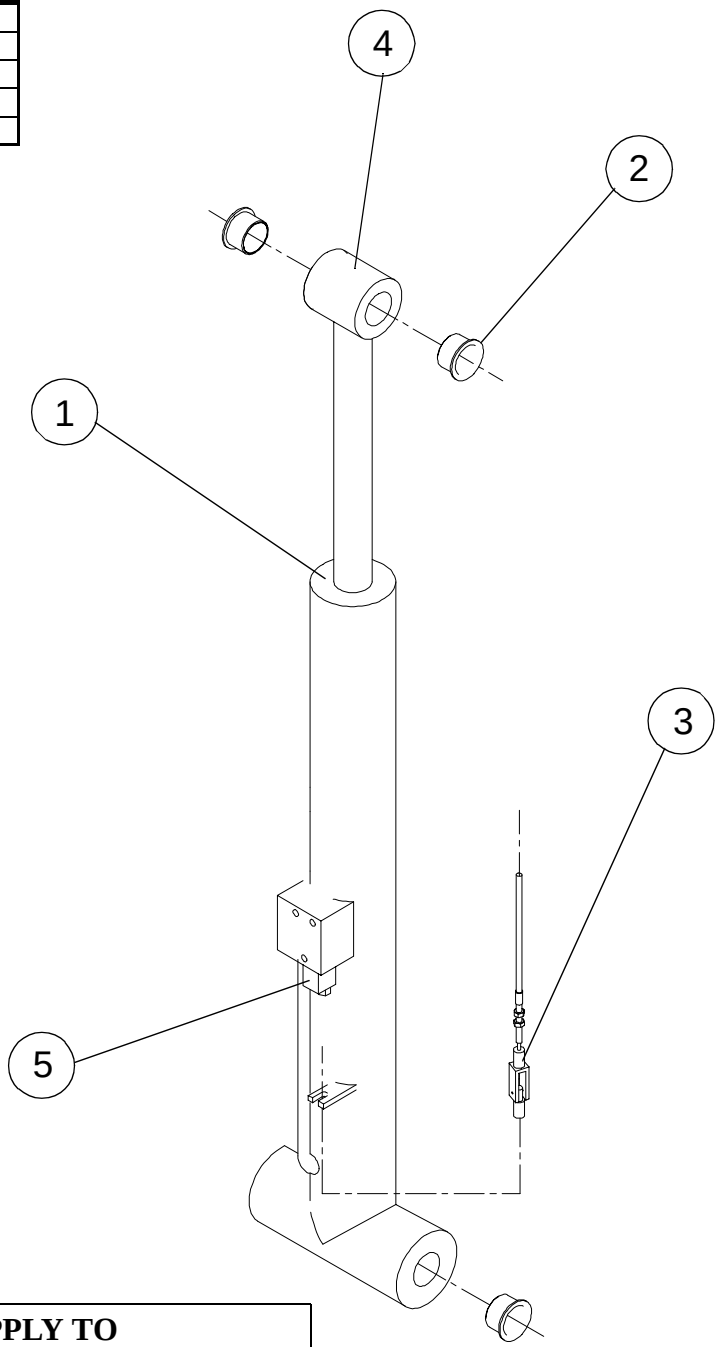
Hydraulic Schematic



Hydraulic Cylinder Assembly (Lift)

503795-000

Item	Part	Description	QTY.
1	503795-010	SEAL KIT	1
2	500079-000	FLANGED BUSHING	4
3	503789-000	EMERGENCY DOWN CABLE ASSY	1
4	057048-000	GREASE NIPPLE (M6)	2
5	503820-000	VALVE, EMERGENCY DOWN	1

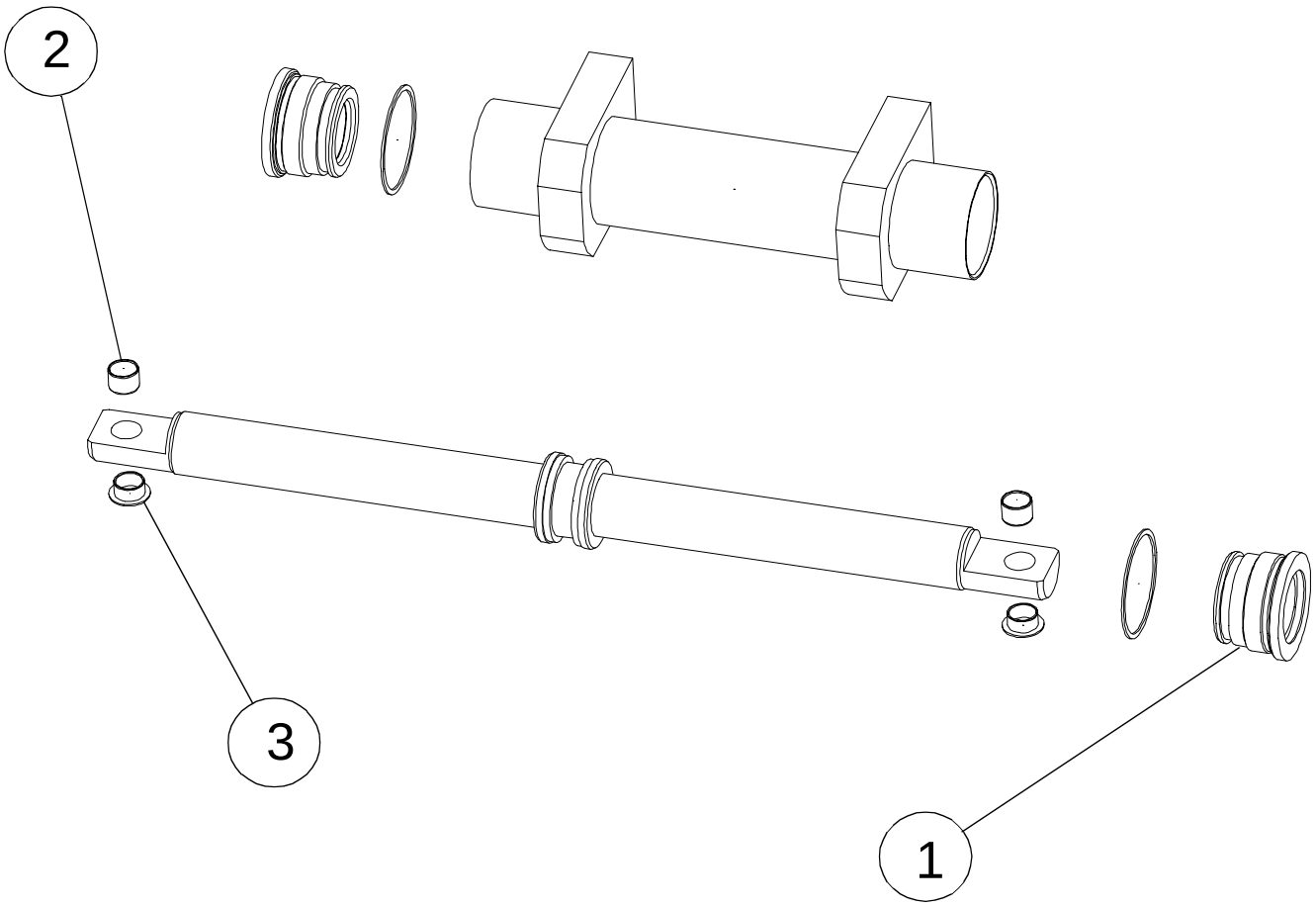


PART NUMBERS NOTED ON THIS PAGE APPLY TO MX19 SERIAL NUMBER MXB50024 ONWARDS.
FOR MACHINES WITH SERIAL NUMBER MXB50000 TO MXB50023 THE FOLLOWING PARTS MUST BE USED
1 X 503557-000 (MAIN LIFT CYLINDER)
1 X 503671-001 (LEVER PLATE, EMERGENCY DOWN ASSY.)
1 X 503671-004 (CABLE BRACKET, EMERGENCY DOWN ASSY.)
4 X M6 X 20mm BUTTON HEAD SCREW
4 X M6 NYLOCK NUT
4 X M6 WASHER

Hydraulic Cylinder Assembly (Steer)

503687-000

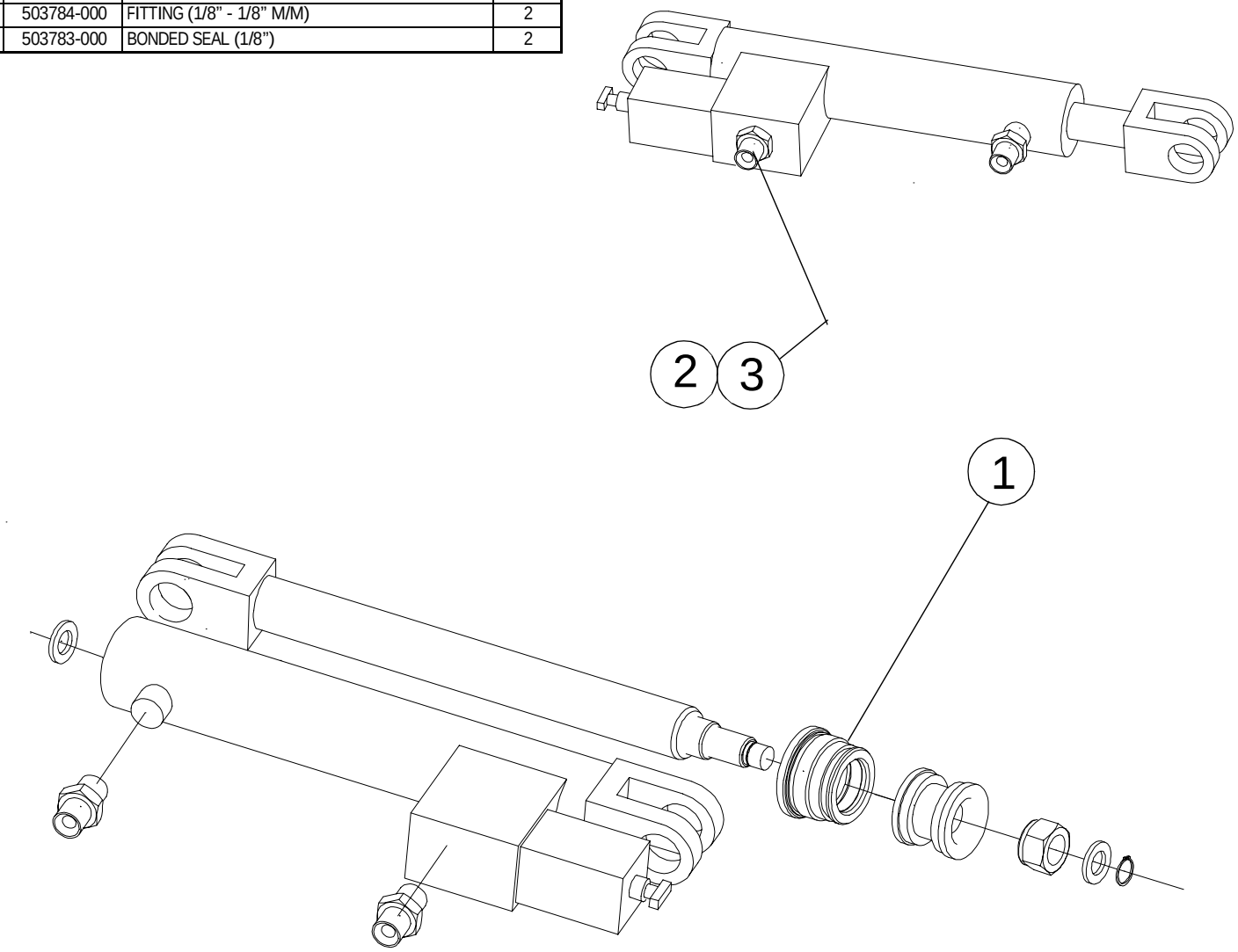
Item	Part	Description	QTY.
1	503687-010	SEAL KIT	1
2	501439-000	BUSHING, PLAIN	2
3	501340-000	BUSHING, FLANGED	2



Hydraulic Cylinder Assembly (Pothole)

503622-000

Item	Part	Description	QTY.
1	503622-010	SEAL KIT	1
2	503784-000	FITTING (1/8" - 1/8" M/M)	2
3	503783-000	BONDED SEAL (1/8")	2

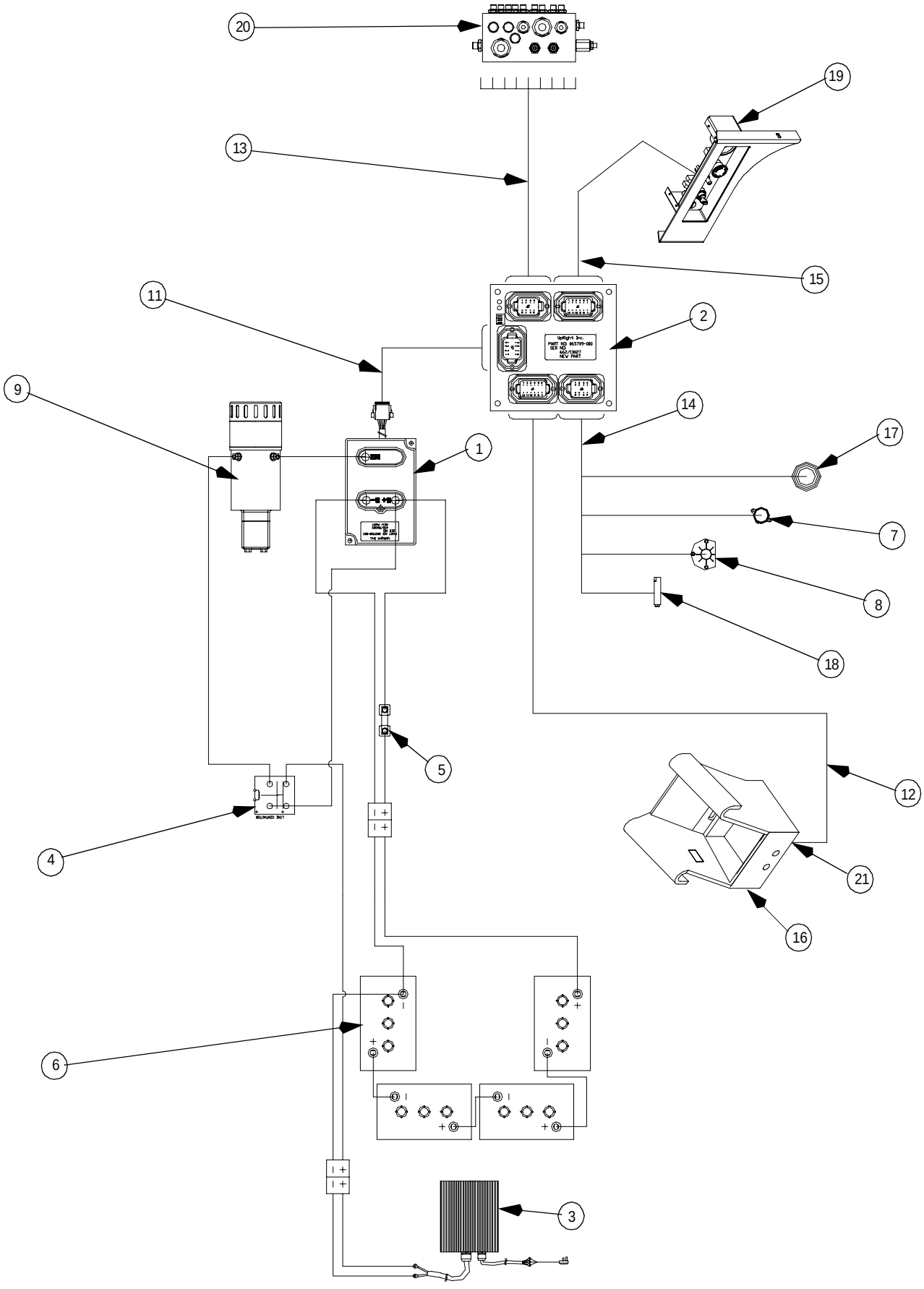


Electrical Assembly

503700-000

Item	Part	Description	QTY.
1	065708-001	MINI MOS UNIT	1
2	065709-001	I/O BOARD	1
3	069199-001	BATTERY CHARGER	1
4	501656-000	LINE CONTACTOR	1
5	058921-000	MAIN FUSE	1
6	501074-000	BATTERIES	4
7	057328-000	ALARM BEEPER	1
8	058912-000	TILT SENSOR	1
9	502230-000	MOTOR PUMP	1
10			
11	502281-000	CABLE, MINI MOS TO I/O BOARD	1

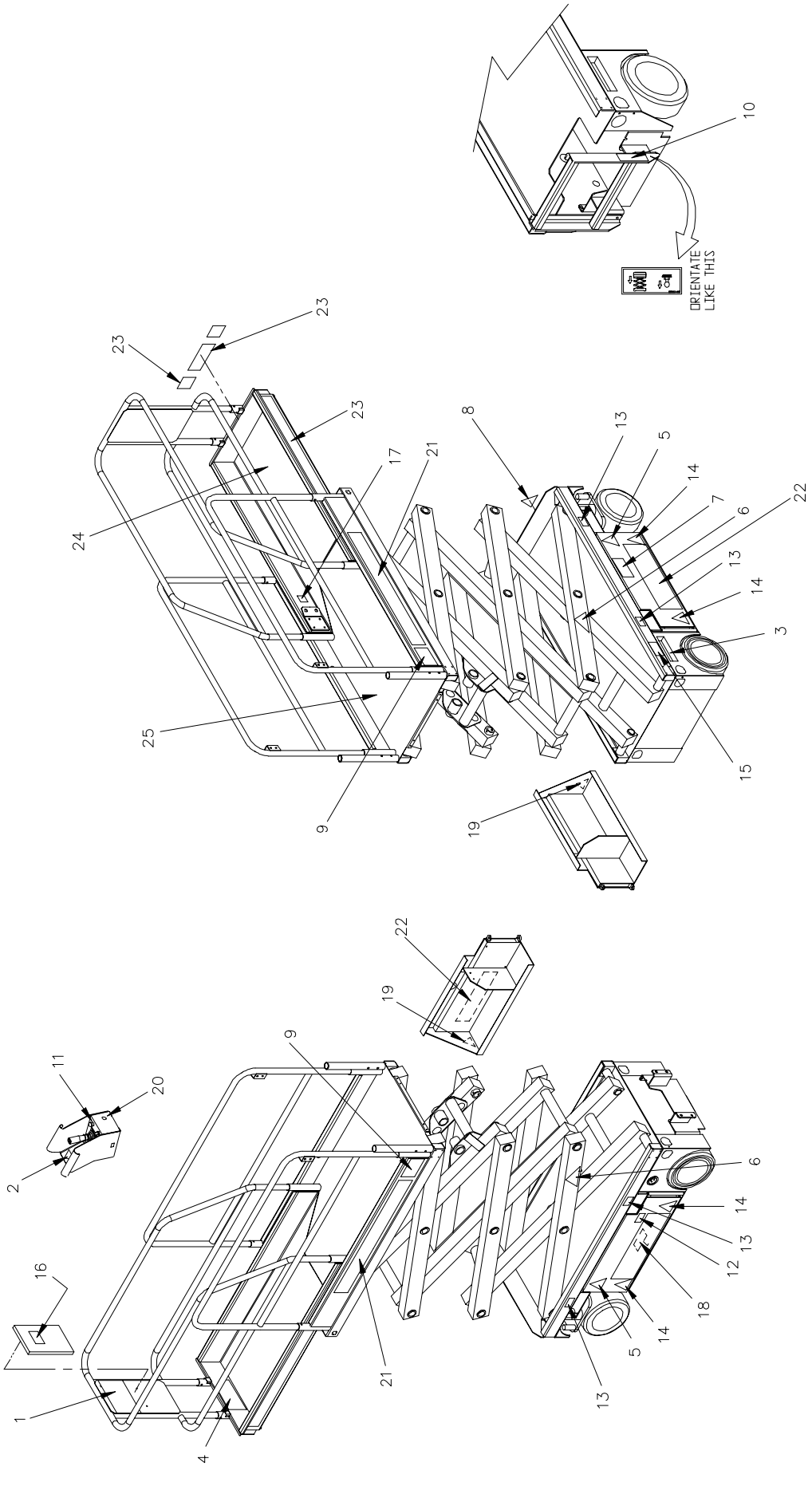
Item	Part	Description	QTY.
12	503701-000	CABLE, MAIN CONTROL CABLE (I/O TO UCB)	1
13	503702-000	CABLE, I/O BOARD TO MANIFOLD BLOCK	1
14	503703-000	CABLE, I/O BOARD TO CHASSIS COMPONANTS	1
15	503704-000	CABLE, I/O BOARD TO LOWER CONTROLS	1
16	101188-010	UPPER CONTROL ENCLOSURE	1
17	057586-000	HORN	1
18	501425-000	PROXIMITY SWITCH	1
19	502014-000	LOWER CONTROL BOX	1
20	502200-000	HYDRAULIC MANIFOLD	1
21	502287-000	PLUG, MAIN HARNESS (UCB END)	1


20
19
13
15
11
2
9
14
1
17
7
8
18
5
12
4
21
16
6
3

Label Kit, European (English)

503720-000

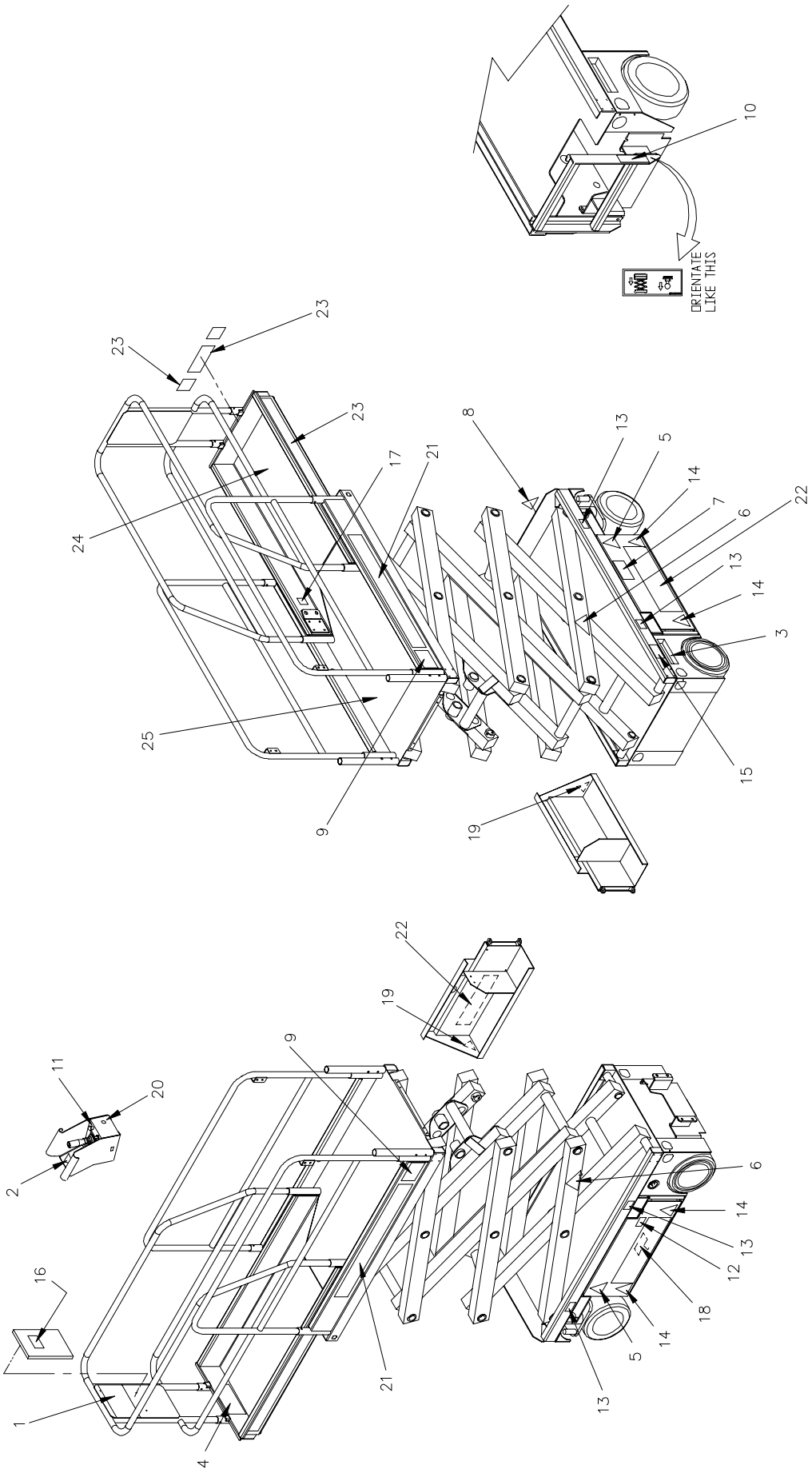
Item	Part	Description	QTY.
1	067195-001	DECAL, HAZZARDS	1
2	100102-900	DECAL, NOT INSULATED	1
3	503721-000	DECAL, LOWER CONTROLS	1
4	066551-950	DECAL, MAX LOAD (EXT DECK)	1
5	101210-000	DECAL, HYDROGEN GAS	2
6	501453-000	DECAL, CRUSHING (HAND)	2
7	503723-000	DECAL, BATTERY DISCONNECT	1
8	066556-900	DECAL, DANGER	1
9	066557-951	DECAL, SAFE WORKING LOAD	2
10	005223-906	DECAL, EMERGANCY DOWN	1
11	101222-904	DECAL, UPPER CONTROLS	1
12	066522-900	DECAL, BATTERY	1
13	014222-903	DECAL, FORKLIFT POINT	4
14	101208-001	DECAL, CRUSHING	4
15	063255-901	DECAL, SCISSOR BRACE	1
16	010076-901	DECAL, DOCUMENTS ENCLOSED	1
17	068635-001	DECAL, SAFETY HARNESS POINT	1
18	503725-000	DECAL, NAMEPLATE	1
19	062562-951	DECAL, BATTERIES ARE BALLAST	2
20	107053-000	DECAL, HORN	1
21	503722-000	DECAL, “MX19” LIVERY	2
22	057696-000	DECAL, “UpRight”	2
23	058881-000	HAZZARD TAPE	
24	502258-000	SAFETY WALK (6”)	4.2M
25	502259-000	SAFETY WALK (12”)	0.6M


10
ORIENTATE LIKE THIS
23
23
23
24
17
21
8
13
5
14
7
6
22
13
14
3
25
9
15
19
22
19
9
11
20
2
6
14
13
12
18
16
14
5
21
13
1
4

Label Kit, German

503720-201

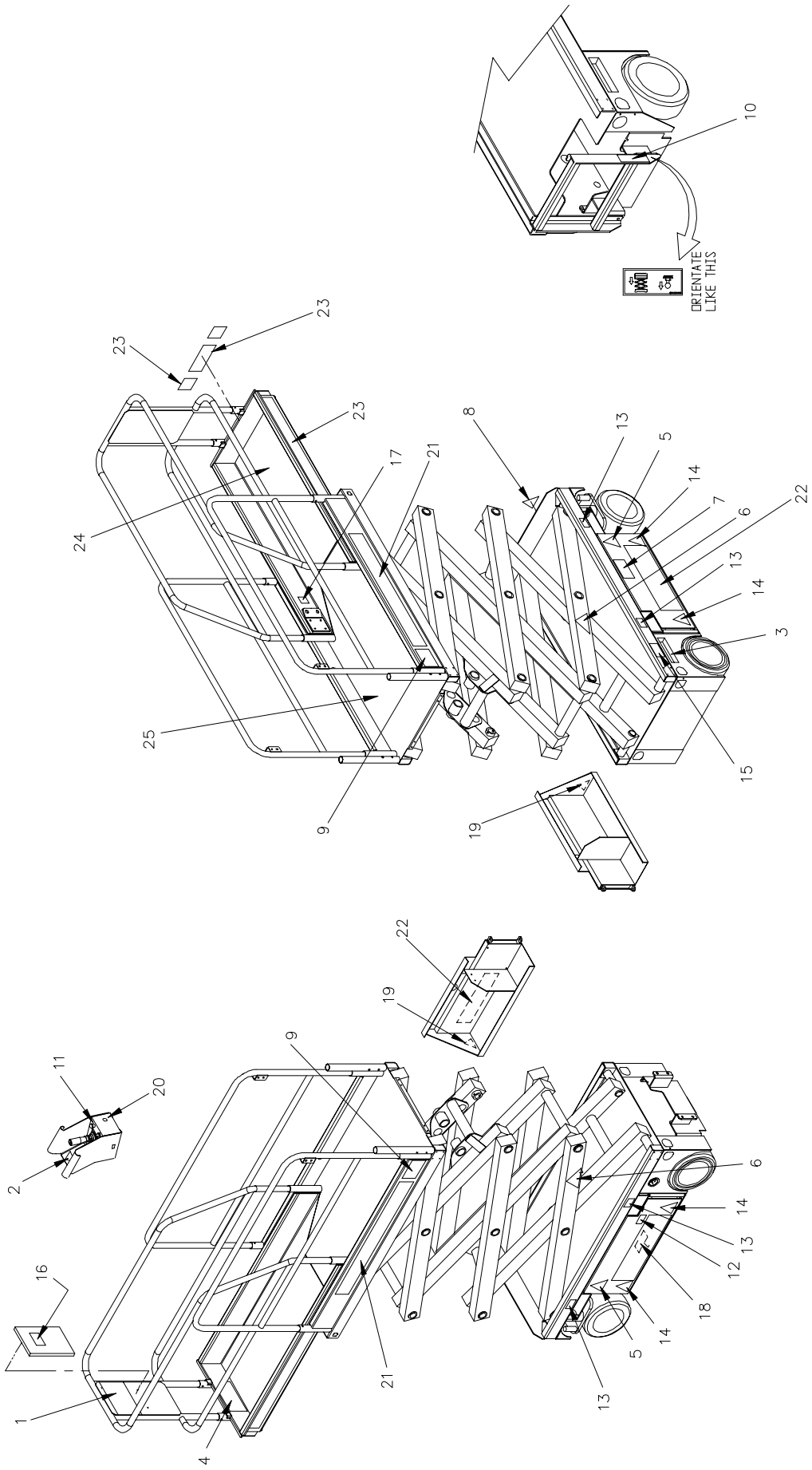
Item	Part	Description	QTY.
1	067195-201	DECAL, HAZZARDS	1
2	100102-900	DECAL, NOT INSULATED	1
3	503721-000	DECAL, LOWER CONTROLS	1
4	066551-950	DECAL, MAX LOAD (EXT DECK)	1
5	101210-000	DECAL, HYDROGEN GAS	2
6	501453-000	DECAL, CRUSHING (HAND)	2
7	503723-000	DECAL, BATTERY DISCONNECT	1
8	066556-900	DECAL, DANGER	1
9	066557-951	DECAL, SAFE WORKING LOAD	2
10	005223-906	DECAL, EMERGANCY DOWN	1
11	101222-904	DECAL, UPPER CONTROLS	1
12	066522-900	DECAL, BATTERY	1
13	014222-903	DECAL, FORKLIFT POINT	4
14	101208-001	DECAL, CRUSHING	4
15	063255-901	DECAL, SCISSOR BRACE	1
16	010076-901	DECAL, DOCUMENTS ENCLOSED	1
17	068635-001	DECAL, SAFETY HARNESS POINT	1
18	503725-000	DECAL, NAMEPLATE	1
19	062562-951	DECAL, BATTERIES ARE BALLAST	2
20	107053-000	DECAL, HORN	1
21	503722-000	DECAL, “MX19” LIVERY	2
22	057696-000	DECAL, “UpRight”	2
23	058881-000	HAZZARD TAPE	
24	502258-000	SAFETY WALK (6”)	4.2M
25	502259-000	SAFETY WALK (12”)	0.6M


ORIENTATE LIKE THIS

Label Kit, French

503720-301-

Item	Part	Description	QTY.
1	067195-301	DECAL, HAZZARDS	1
2	100102-900	DECAL, NOT INSULATED	1
3	503721-000	DECAL, LOWER CONTROLS	1
4	066551-950	DECAL, MAX LOAD (EXT DECK)	1
5	101210-000	DECAL, HYDROGEN GAS	2
6	501453-000	DECAL, CRUSHING (HAND)	2
7	503723-000	DECAL, BATTERY DISCONNECT	1
8	066556-900	DECAL, DANGER	1
9	066557-951	DECAL, SAFE WORKING LOAD	2
10	005223-906	DECAL, EMERGANCY DOWN	1
11	101222-904	DECAL, UPPER CONTROLS	1
12	066522-900	DECAL, BATTERY	1
13	014222-903	DECAL, FORKLIFT POINT	4
14	101208-001	DECAL, CRUSHING	4
15	063255-901	DECAL, SCISSOR BRACE	1
16	010076-901	DECAL, DOCUMENTS ENCLOSED	1
17	068635-001	DECAL, SAFETY HARNESS POINT	1
18	503725-000	DECAL, NAMEPLATE	1
19	062562-951	DECAL, BATTERIES ARE BALLAST	2
20	107053-000	DECAL, HORN	1
21	503722-000	DECAL, “MX19” LIVERY	2
22	057696-000	DECAL, “UpRight”	2
23	058881-000	HAZZARD TAPE	
24	502258-000	SAFETY WALK (6”)	4.2M
25	502259-000	SAFETY WALK (12”)	0.6M


ORIENTATE
LIKE THIS

Local Distributor:

Lokaler Vertiebshändler:

Distributeur local:

El Distribuidor local:

Il Distributore locale:

USA

TEL: +1 (559) 443 6600
FAX: +1 (559) 268 2433

Europe

TEL: +44 (0) 845 1550 058
FAX: +44 (0) 195 2299 948

www.upright.com

PN-