

Operation and Safety Manual for

Model 2033ES Aerial Work Platform



Aerial Work Platforms

8789
Revision 3
6/99

Limited Owner Warranty

Mayville Engineering Company, Inc. (MEC) warrants its equipment to the original purchaser against defects in material and/or workmanship under normal use and service for one (1) year from date of registered sale or date the unit left the factory if not registered. MEC further warrants the structural weldments of the main frame and scissor arms as defined in MEC's current Warranty Policy & Procedures, to be free from defects in material or workmanship for five (5) years from date of registered sale or date unit left the factory if not registered. Excluded from such warranty is the battery(s) which carries a ninety (90) day warranty from described purchased date and prorated thereafter up to one (1) year. Warranty claims within such warranty period shall be limited to repair or replacement, at MEC's option, of the defective part in question and labor to perform the necessary repair or replacement based on MEC's then current flat rate, provided the defective part in question is shipped prepaid to MEC and is found upon inspection by MEC to be defective in material and/or workmanship. Mayville Engineering Company, Inc. shall not be liable for any consequential, incidental or contingent damages whatsoever. Use of other than factory authorized parts, misuse, improper maintenance or modification of the equipment voids this warranty. The foregoing warranty is exclusive and in lieu of all other warranties, express or implied. All such other warranties, including implied warranties of merchantability and of fitness for a particular purpose, are hereby excluded. No Dealer, Sales Representative, or other person purporting to act on behalf of MEC is authorized to alter the terms of this warranty, or in any manner assume on behalf of MEC any liability or obligation which exceeds MEC's obligations under this warranty.

Foreword

The purpose of this manual is to provide users with the operating procedures essential for the promotion of proper machine operation for its intended purpose. It is important to over stress proper machine usage. All information in this manual should be **READ** and **UNDERSTOOD** before any attempt is made to operate the machine. **YOUR OPERATING MANUAL IS YOUR MOST IMPORTANT TOOL** - keep it with the machine. **REMEMBER THAT ANY EQUIPMENT IS ONLY AS SAFE AS THE OPERATOR.**

BECAUSE THE MANUFACTURER HAS NO DIRECT CONTROL OVER MACHINE APPLICATION AND OPERATION, PROPER SAFETY PRACTICES ARE THE RESPONSIBILITY OF THE USER AND ALL OPERATING PERSONNEL.

ALL INSTRUCTIONS IN THIS MANUAL ARE BASED ON THE USE OF THE MACHINE UNDER PROPER OPERATING CONDITIONS, WITH NO DEVIATION FROM THE ORIGINAL DESIGN. ANY ALTERATION AND/OR MODIFICATION OF THE MACHINE IS STRICTLY FORBIDDEN WITHOUT EXPRESS WRITTEN APPROVAL FROM MAYVILLE ENGINEERING COMPANY, INC.

All procedures herein are based on the use of the machine under proper operating conditions, with no deviations from original design intent as per ANSI regulations.

Read and Comply

The ownership, use, service and/or maintenance of this machine is subject to various federal, state and local laws and regulations. It is the responsibility of the owner/user to be knowledgeable of these laws and regulations and comply with them. The owner/user/operator must be familiar with Sections 6, 7, 8, 9 and 10 of ANSI A92.6 Standard. These sections contain the responsibilities of the owners, users, operators, lessors and lessees concerning safety, training, inspection, maintenance, application and operation.



WARNING

Any modification of this machine without the express written consent of Mayville Engineering Co. (MEC) is prohibited. Do not replace any component or part with anything other than the original replacement parts without the Mayville Engineering Company's (MEC) consent.

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WARNING

DO NOT PERFORM PRELIMINARY INSTALLATIONS, OPERATE, SERVICE, REPLACE, ADJUST OR MAINTAIN EQUIPMENT ON THIS MACHINE UNTIL YOU HAVE *THOROUGHLY* READ AND UNDERSTOOD THE SAFETY SECTION OF THIS MANUAL, AND HAVE READ AND UNDERSTOOD ALL THE SECTIONS OF THIS MANUAL THAT APPLY TO THE JOB YOU ARE DOING ON THIS MACHINE.

FAILURE TO COMPLY WITH ALL WARNINGS POSTED ON THIS MACHINE AND WRITTEN IN THIS MANUAL COULD CAUSE DEATH, SERIOUS INJURY OR PROPERTY DAMAGE.

Fall Protection Notice

The **Guardrail** System around the perimeter of the platform is the **fall protection system** for self-propelled elevating work platforms per the American National Standards Institute ANSI/SIAA92.6 Standard. It is **prohibited** to use an Aerial Work Platform manufactured by Mayville Engineering Company, Inc. with any portion, or all, of the guardrails **removed**.

Lanyard anchorage points on this type of equipment are not required to conform to the applicable ANSI/SIA Standard.

However, if anchorage points for lanyard attachments are required by site authorities, or other regulations, the anchorage points on all equipment manufactured by Mayville Engineering Company, Inc. are recommended to be used for **work positioning restraints** of personnel only. Lanyard lengths are to be determined by operator/owner to restrict the operator to the confines within the **Guardrail** System.



WARNING

Use of fall arrest systems attached to anchorage points on mobile equipment may cause machine to tip resulting in serious injury or death.



WARNING

- ✚ Failure to comply with **Safety Precautions** could result in death or serious injury.
- ✚ Shut off all power, making the machine inoperative before making any adjustments, performing maintenance, or replacing components.
- ✚ Platform should be in the fully stowed position if possible, or maintenance locks should be in place.
- ✚ Hydraulic pressures should be relieved before loosening or replacing components.
- ✚ Do not replace any component or part with anything other than original MEC replacement parts without the manufacturers consent.
- ✚ Remove all rings, watches, and jewelry before performing any maintenance.
- ✚ Restrain long hair, and do not wear loose clothing or neckties which could become caught or entangled in the equipment.
- ✚ Observe and obey all warnings and cautions on machines and in manuals.
- ✚ Keep oil, grease, water, etc. wiped from all standing surfaces and hand holds.
- ✚ Use only approved, non flammable cleaning solvents.
- ✚ Altering or disabling safety devices is **strictly** prohibited.

NOTES

CHAPTER 1 SAFETY

Following are definitions of labeling you might encounter on aerial platforms.

CAUTION

CAUTION - Hazards or unsafe practices which **COULD** result in minor personal injury or product damage.

WARNING

WARNING - Hazards or unsafe practices which **COULD** result in severe personal injury or death.

DANGER

DANGER - Immediate hazards which **WILL** result in severe personal injury or death.

GENERAL OPERATING RULES, SAFETY AND LIMITATIONS

MEC designs the 2033ES work platforms to be safe and reliable. They are rugged and maneuverable, but must be used only for purposes and in ways intended. **That is to raise personnel, tools, and necessary equipment to overhead work areas.**

- The owner/user/operator of the machine should not accept operation responsibility until this manual has been read and operation of the machine, under the supervision of an experienced and qualified operator, has been completed. Owner/user/operator must be familiar with sections 6, 7, 8, 9 and 10 of ANSI A92.6-1990. These sections contain the responsibilities of the owner, users, operators, lessors and lessees concerning safety, training, inspection, maintenance, application and/or operation. If there is a question on application and/or operation, Mayville Engineering Co., Inc. should be consulted.
- Respect your machine; **do not** neglect or misuse it.
- Inspect your machine before using. **Do not** use machine if it is not working properly in any way.
- Check job site for unsafe working conditions. **Do not** operate on uneven or soft terrain. **Do not** raise platform if machine is on an incline.
- Use machine only for purposes for which it was designed.
- Never take chances. **Do not** use machine if your physical or mental capabilities are limited due to illness or tiredness, or if you are taking over the counter or prescription drugs which might impair or limit your mental or physical capabilities.
- **Do not** exceed the load capacity of the platform.

- **Do not** smoke while charging the batteries.
- **Do not** enter or exit platform while machine is in motion.
- An operator of any type of work platform is subject to certain hazards that cannot be protected by mechanical means. It is therefore essential that operators be competent, careful, physically and mentally fit and thoroughly trained in safe operation of this machine.
- It is imperative that MAYVILLE ENGINEERING be notified immediately of any incident involving a MEC product. Even if no injury or property damage is evident, the factory should be contacted by telephone and provided with all necessary details. It should be noted that failure to notify the Manufacturer of an incident involving a MEC product within 48 hours of such an occurrence may void any warranty consideration on that particular machine.

DANGER

DO NOT OPERATE MACHINE NEAR POWER LINES. THE PLATFORM AND ENCLOSURES ARE NOT INSULATED.

FAILURE TO FOLLOW THIS WARNING WILL CAUSE DEATH OR PERSONAL INJURY.

OPERATOR QUALIFICATIONS

All MEC aerial work platforms must be operated and maintained by qualified personnel only!

To qualify for operation and maintenance of this unit, an individual must read and thoroughly understand this manual and undergo training by a competent instructor. If a proposed operator or maintenance person fails to understand any segment of this manual, his or her supervisor can clarify the misunderstanding through written correspondence or a phone call to:

Mayville Engineering Co., Inc.
Aerial Work Platforms
210 Corporate Drive
Beaver Dam, WI 53916
Phone: 920-887-2518
FAX: 920-887-2480

SAFETY FEATURES

Automatic Parking Brake

The Automatic Parking Brake is a spring-actuated, normally-ON system. The brake is released during the drive cycle by hydraulic pressure built up in the drive circuit. A brake valve is used to maintain release during drive. When finished driving, an orifice is employed to control the braking function during deceleration.

Emergency Stop

The Emergency Stop is a plunger type switch and is located in two places - on the upper control box assembly (Figure 1-1) on the platform and on the lower control panel (Figure 1-2) on the side of machine. The Emergency Stop is actuated by depressing the red cap which de-energizes power supplied to the control electrical circuits. To reactivate the circuits, turn the red cap approximately a quarter-turn clockwise until the cap "pops" back out. Another means to effect an emergency stop is to pull out the BATTERY DISCONNECT (Figure 4-5) which removes all power to the circuits.

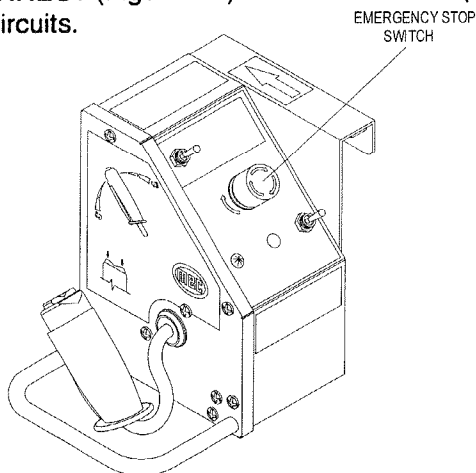


Figure 1-1. Emergency Stop - Upper Control Box Assembly

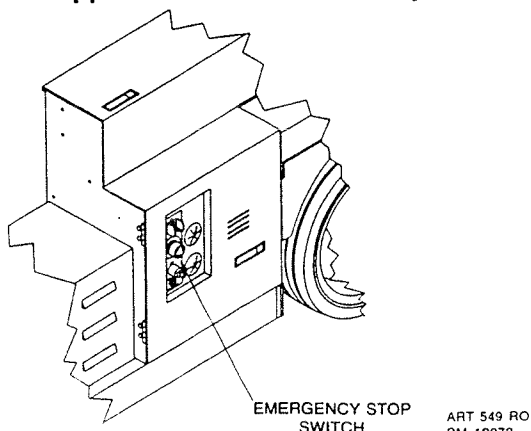


Figure 1-2. Emergency Stop - Lower Control Panel

Emergency Down (Figure 1-3)

The Emergency Down controls, which are accessible by a person on the ground, are used to lower the raised platform if the platform will not respond to inputs by the operator at the upper control box assembly. The Emergency Down controls are located on the main cylinder and on the base in front of the left rear wheel. Both controls must be actuated to lower the platform. Pull controls to allow platform to slowly descend to the stowed position.

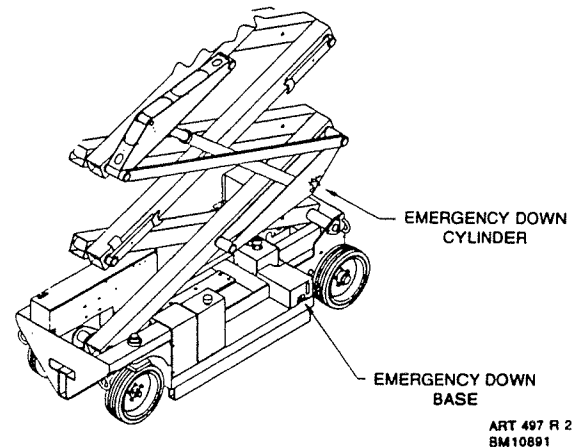


Figure 1-3. Emergency Down Control

Speed Limit Switch

This switch is a standard safety feature that will limit driving speed of the machine when the platform is raised above approximately 7 feet. The Speed Limit switch (Figure 1-4) is located in the base, near the rear axle.

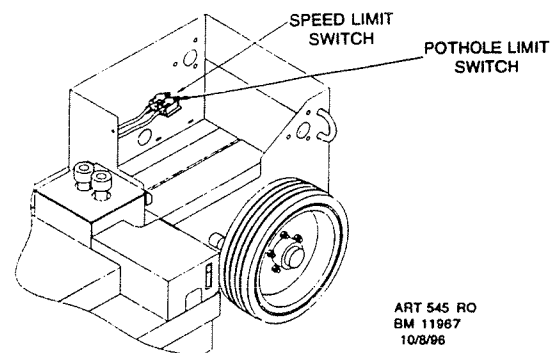


Figure 1-4. Speed Limit Switch

Automatic Pothole Protection

Pothole bars are a MEC original safety feature established in 1982. The concealed Pothole Protection system with positive lock is a standard feature of this unit. MEC Pothole Protection helps prevent tip-overs if a machine with the platform elevated is accidentally driven into some type of depression, opening or hole in the surface on which it is used.

The pothole bars (Figure 1-5) are located under each side of the base. The bars rotate downward 90 degrees to a vertical position as the platform raises. If either pothole bar encounters any obstruction that will not allow the bars to lock into place, stabilizer switches will not be actuated and the platform will not drive or in some machines will not lift. A stabilizer switch is mounted on one actuator lever of each bar and one is mounted beneath the beams.

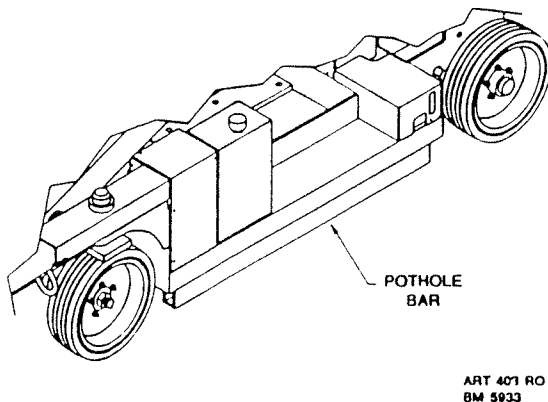


Figure 1-5. Pothole Bars

If the pothole bars cannot be fully deployed and the platform will not drive/lift, lower the platform to the stowed position. Remove any obstruction and/or reposition the machine to a location clear of any pothole or depression. The pothole bars should deploy and the platform should drive/lift. Pothole bar operation can be tested by placing a 2 X 4 under the bars and raising the platform. Platform movement will cease when the platform reaches about 7 feet.

MAINTENANCE LOCKS INSTALLATION



WARNING

MAINTENANCE LOCKS MUST BE INSTALLED WHEN MAINTAINING OR SERVICING MACHINE WITH PLATFORM EXTENDED.

WORKING THROUGH BEAMS ON SCISSORS LIFTING DEVICE CREATES A HAZARDOUS SITUATION WHICH COULD CAUSE DEATH OR PERSONAL INJURY.

FOLLOW MAINTENANCE LOCKS PROCEDURE!

1. Remove load from platform.
2. Place upper control box assembly at right front corner of platform floor and use box controls to raise platform until a space of approximately 1-1/2 to 2 feet exists between ends of scissor beam pivot pins.
3. Pull release pin ring on rear maintenance lock (Figure 1-6) and allow lock to swing down to vertical position so notched end of lock is directly above pivot pin collar.
4. Pull release pin ring on front maintenance lock and swing lock up to vertical position so notched end of lock is directly below pivot pin collar.
5. While holding front lock in position, slowly lower platform using upper control box assembly until both locks fully engage pivot pin collars and weight of platform and scissor beams rests completely on both maintenance locks.

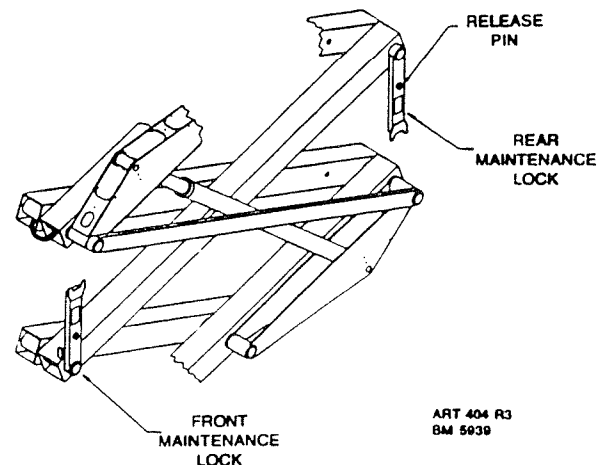


Figure 1-6. Maintenance Locks

MAINTENANCE LOCKS STOWAGE

1. Using lower control panel, raise platform approximately 2 to 3 inches - just far enough that each maintenance lock will clear pivot pin collars.
2. Pull release pin ring on each maintenance lock and swing lock up parallel with scissor beam. Align release pin with receiving hole in beam and release ring so pin engages beam.
3. Lower platform to stowed position.

CHAPTER 2 INTRODUCTION

PRODUCT DESCRIPTION

The MEC 2033ES Aerial Work Platform (Figure 2-1) is a two-wheel drive, self propelled, electric-over-hydraulic-operated unit designed for use on hard, level surfaces such as concrete, asphalt or wood. **The purpose of this unit is to raise personnel, tools, and necessary equipment to overhead work areas.**

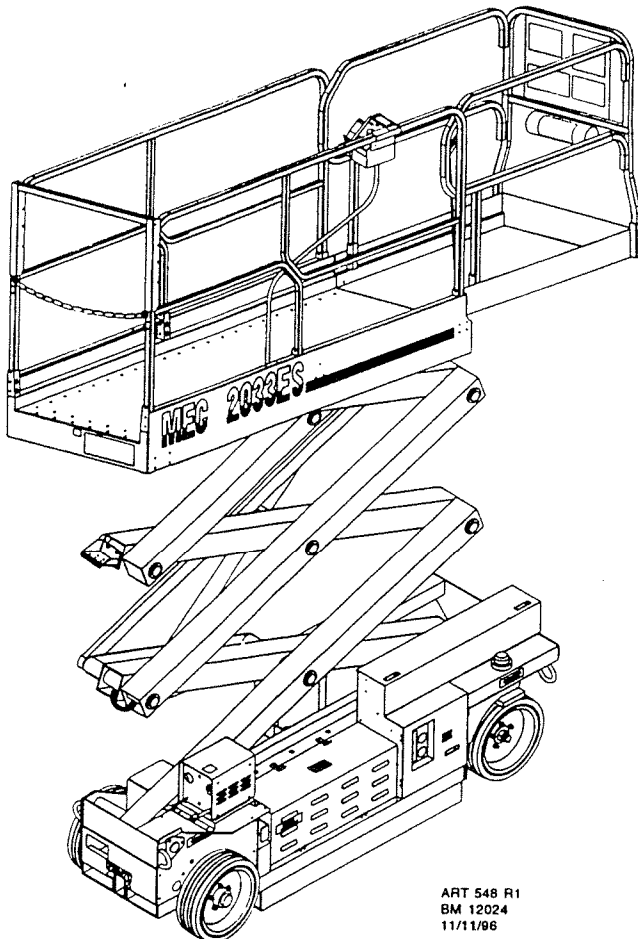


Figure 2-1. 2033ES Aerial Work Platform

The platform is raised and lowered by a hydraulic cylinder within a single beam scissors mechanism up to 20 feet. All units are steered by a hydraulic cylinder, which is controlled from the upper control box on the platform. Auxiliary lift controls are located at the lower control panel on the side of the unit.

A standard feature of the 2033ES, the torque increase feature, is used to improve drive when traveling up inclines. A standard, moveable, sheet-loading rear entrance raises to allow 4-foot-wide material to be loaded and unloaded.

Available options include a tilt sensor, which signals with a warning light and buzzer when the platform is in an out-of-level condition, and a DC/AC converter, which converts DC current to 110V AC current to power small tools and appliances. The converter is On/Off power activated and uses ground fault to protect operator. Other options are a battery charge indicator, which is a meter that shows the approximate amount of charge left in the batteries and an hour meter, which reflects the number of hours the unit has been operated.

EQUIPMENT LITERATURE

The unit is shipped with the following literature, which is inserted in the manual tube located on the front rail of the platform.

- Material Safety Data Sheet (P/N 6535)
- 2033ES Operating and Safety Manual (P/N 8789)
- ANSI/SIA Manual of Responsibilities (P/N 7822)
- Battery Charger Operating Inst. (P/N 5545C)
- Dealer Pre-delivery Inspection Form (P/N 7197)
- Warranty Registration Card (P/N 5524)
- EMI Safety Manual (P/N 7004)

Replacement literature can be ordered by contacting the factory. To help us serve you, please be prepared to provide the complete publication name and part number (P/N).

PRE-DELIVERY DEALER INSPECTION

Preliminary Unpacking Instructions

1. Maintenance locks must be engaged prior to inspecting or servicing the unit and when platform is extended.
2. Remove all packing materials and inspect unit for damage during shipment. If any damage is found, please note it on the freight bill and report it to the shipper.
3. Every machine is fully assembled when shipped from the factory. All fluids are included, the levels must be checked and added as required before initial use. Perform the Walk-A-Round check as

described in chapter 4, checking for any possible operation deficiencies. Have any such deficiencies corrected before using the machine. During the check, record any missing or incorrectly located Safety Decals. Order and install before use. All Safety Decals must be affixed to the unit in its proper location. See decal layout (Figure 4-8).

4. Check each item in Table 4-1 as inspection is performed. If any item is found to be "N/O", make the necessary correction and check the "R/P" box. (see KEY in Table 4-1).
5. Push in the Battery Disconnect to reenergize the system for operation.
6. Reset both EMERGENCY STOP switches (Figures 1-1 and 1-2).
7. Press Circuit Breaker on lower panel to reset in case breaker has been tripped.

NOTE

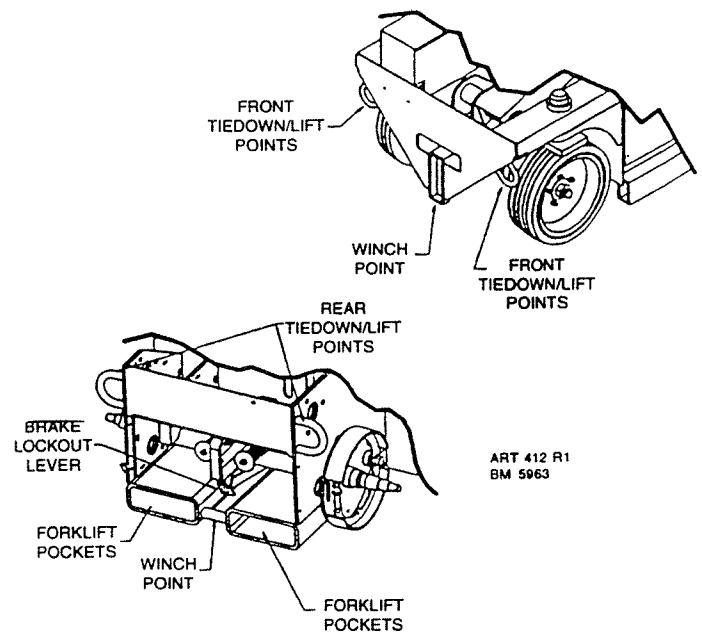
File Warranty Claim according to Policies and Procedures which are listed in Publication #5638.

LOADING AND UNLOADING

1. Common sense and planning must be applied to control the movement of the machine when lifting it with a crane
2. Transport vehicle must be parked on a level surface.
3. Transport vehicle must be secured to prevent rolling while machine is being loaded.
4. Vehicle capacity, loading equipment and surfaces must be capable of supporting machine weight and meet ANSI/OSHA Standards. The platform of the machine must remain fully lowered during all loading and transport procedures.
5. The unit may be fork-lifted from the side. The operator shall watch balance points and the length of the forks to ensure that they reach the full width of the unit.
6. The machine must be secured to the transport vehicle with chains or straps of ample load capacity. (Refer to Figure 2-2)

TRANSPORTING THE UNIT (FIGURE 2-2)

1. The MEC 2033ES Aerial Work Platform may be towed, from the winch point, up to 1,000 ft. at a speed no greater than 5 m.p.h..
2. To tow the unit, the Brake Lockout Lever must be raised when energizing a drive function and held until locked. If a drive function doesn't work, the two compression springs must be loosened by backing off the retaining bolts.
3. The Tiedown/Crane Loops are provided to secure the unit during transportation while on trailers or truck beds. The loops can be used to crane the unit to elevated levels. The equipment used for either of these two functions shall meet applicable State and Federal D.O.T. Regulations, and applicable ANSI/OSHA Standards.



**Figure 2-2. Transporting the Unit,
Rear View - Front View Similar**

PARKING AND STORING

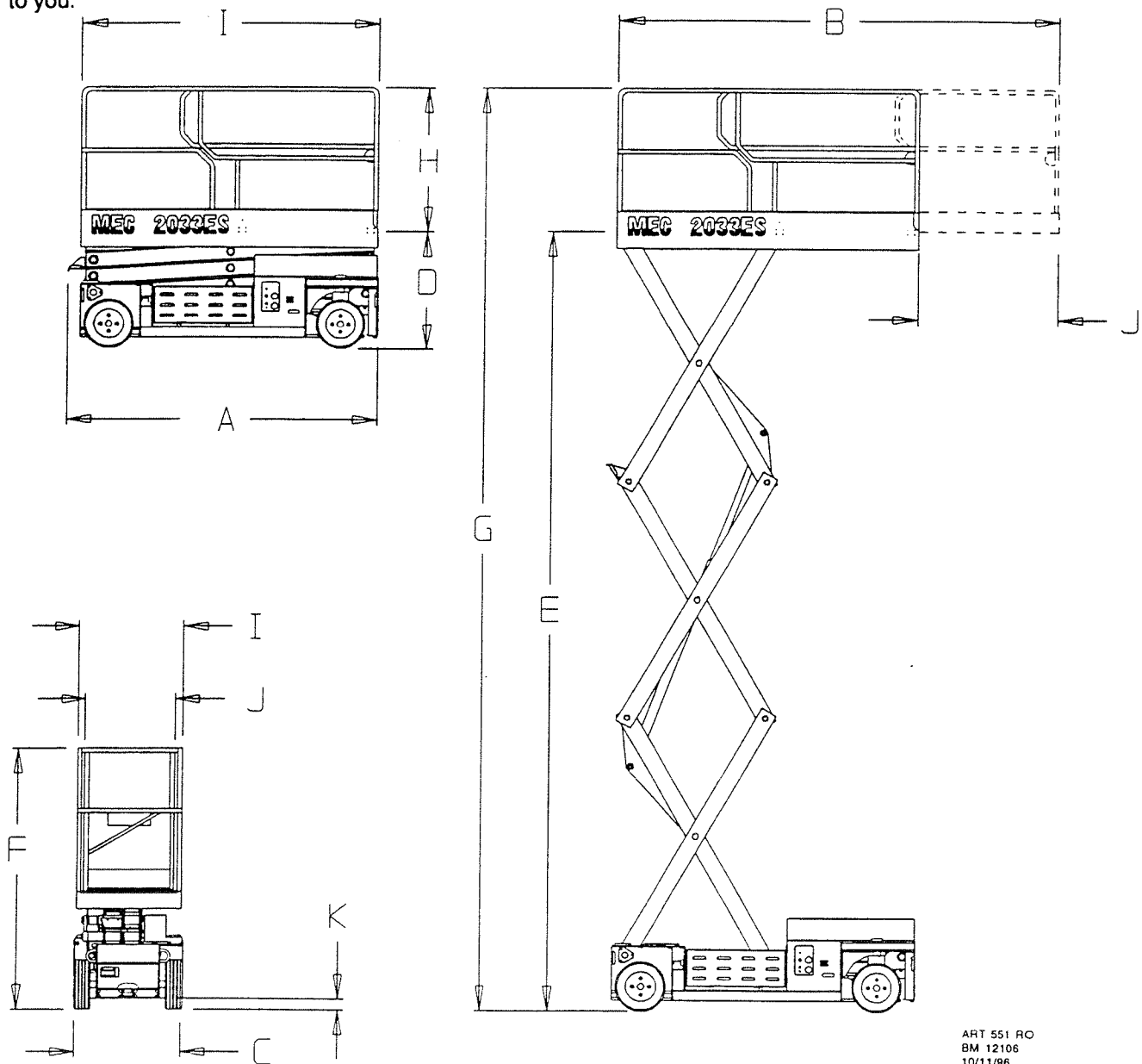
Park and stow the machine as follows:

1. Drive the machine to a reasonably well protected and well ventilated area.
2. Ensure the platform is fully lowered.
3. Position the EMERGENCY STOP switch to the OFF position.

4. If necessary, cover the caution and warning decals and the control box so they will be protected from a hostile environment.
5. Chock at least 2 wheels when parking the machine for an extended period of time.
6. Turn the POWER SELECTOR switch to OFF and remove the key to disable the machine from unauthorized use.

SPECIFICATIONS

Important dimensional, capacity and capability information is provided for your information. The illustration below contains letter callouts which correspond to letters in the far right side of **Table 2-1. Measurements**, on the next page, to permit you to clearly identify selected, significant dimensional data that you might require. Because we constantly strive to improve our products, we may make changes to these specifications without issuing a notice to you.



ART 551 RO
BM 12106
10/11/96

Figure 2-3. 2033ES Specification Attribute Identities

Table 2-1. Measurement

Length	Extended Platform Stowed		95" (2.41m)	A
	Extended Platform at Full Extension		137" (3.48m)	B
Width	Overall		33" (0.84m)	C
	Platform		32" (0.81m)	
	Clearance on each Side for Maintenance		16" (0.41m)/Side	
Height	Platform	Stowed	36.8" (0.93m)	D
		Full Extension	19' 10" (6.05m)	E
		To Top of Rails	78.5" (1.99m) 80.0" (2.03m)	F
		Clearance required at Full Extension	22' 2" (6.76m) 23' 7" (7.19m)	G
		NOTE: Add 7" When Sheet Loading with Gate Extended.		
	Rails		42" (1.07m)	H
Kick Panel		6.0" (0.15m)		
Work Space	Main Platform		27.3" (0.69m) x 90.5" (2.30m) = 17.1 sq. ft. (1.59 sq. m)	I
	Extended Platform		26" (.66m) x 42" (1.07m) = 7.6 sq.ft. (0.70m)	J
Entrance Opening	Normal Operation		29" (0.74m) x 40.7" (1.6m)	
	Sheet Loading Operation		29" (0.74m) x 47.7" (1.9m)	
Lift Capacity			750 lbs. (340 kg) total, not to exceed 300 lbs. (136.08 kg) on the Extended Platform	
Ground Clearance	Platform in Stowed Position		3.4" (8.64cm)	K
	Platform Elevated		0.75" (1.91 cm)	
Weight			3395 lbs. (1543 kg)	
Turning Radius	Inside (A)		0"	
	Outside (B)		88" (2.24m)	
Center of Gravity	Stowed Position		21.29"	
	Fully Extended		88.57"	

Table 2-2. Speed

Lift	From Base	38 seconds (fixed speed)
	From Platform	38 sec. to 5 min. (proportional speed)
Lower		38 seconds (fixed speed)
Drive	Platform below 7 feet	0 to 2.27 MPH (proportional speed)
	Platform above 7 feet	0 to 0.75 MPH (proportional speed))

Table 2-3. Electrical

Batteries (24 VDC)		4 @ 6V Deep Cycle Golf Cart Battery 10.25" L x 7" W x 11.25" H BCI Group Size GC2 105 minutes @ 75 amps draw 218 amp hours @ 20 hour rating
	NOTE Replacement battery MUST WEIGH AT LEAST 60 POUNDS to maintain the stability factor of the machine.	
Charger	Input	110 VAC, 60 Hz, 5.6 amp
	Output	24 VDC, 15 amps tapering, timed shutoff
Electric Motor		24 VDC, 2 hp @ 82 amps, 3000 RPM Continuous Duty

Table 2-4. Hydraulic

Hydraulic Reservoir Capacity		3 gallons (see Table 4-2)
Hydraulic Filter		10 micron cartridge (P/N 6156)
Hydraulic Pressure Settings	Main Line	2750 PSI
	Lift	2200 PSI
	Steering	800 PSI
	Counterbalance	450 PSI

Table 2-5. Tires

Tire Size	16" diameter x 5" wide
-----------	------------------------




NOTE

Tires on the MEC2033ES must be replaced with manufacturer's replacement tires to maintain stability factor of the machine. LUG NUTS TO BE TORQUED TO 75-85 FT. LBS. AND CHECKED WEEKLY.

Table 2-6. Torque Specifications

Hydraulic Valve	Valve to Manifold (cartridge)	12 ft. lbs.
	Valve Nut to Valve	15 in. lbs.
Hydraulic Drive Motor		300 ft. lbs., then tighten to next slot on castle nut and install cotter pin.
Rear Axle		Tighten to take play out of bearings, and then tighten to next cotter pin slot. Do not overtighten.

Table 2-7. Bolt Torque

			
Bolts	Grade 2	Grade 5	Grade 8
1/4-20	49 in. lbs.	76 in. lbs.	9 ft. lbs.
5/16-18	8 ft. lbs.	13 ft. lbs.	18 ft. lbs.
3/8-16	15 ft. lbs.	23 ft. lbs.	33 ft. lbs.
7/16-14	24 ft. lbs.	37 ft. lbs.	52 ft. lbs.
1/2-13	37 ft. lbs.	57 ft. lbs.	80 ft. lbs.

Grade markings for bolts grades 2, 5 and 8 are based on SAE J429. Markings may be raised or depressed (manufacturer's option).

NOTE

Any bolt replacement should be of the same grade or greater than original bolt. Any questions, call factory for verification.

Floor Loading Pressure

In certain field applications there is a need to specify the weight and rated work load of a machine in terms of "**Floor Loading Pressure**". There are two basic measurements on this subject that must be considered: **Local Concentrated Pressure** and **Overall Uniform Pressure**.

Local Concentrated Pressure

This measurement is of concern in conditions where the floor surface (i.e. tile floor) on which the machine is being used needs to be protected from indentations or breaking due to high pressure being exerted on a relatively small area. This pressure is extremely high, especially for solid or monofilled tires, since the harder the tire the smaller the footprint.

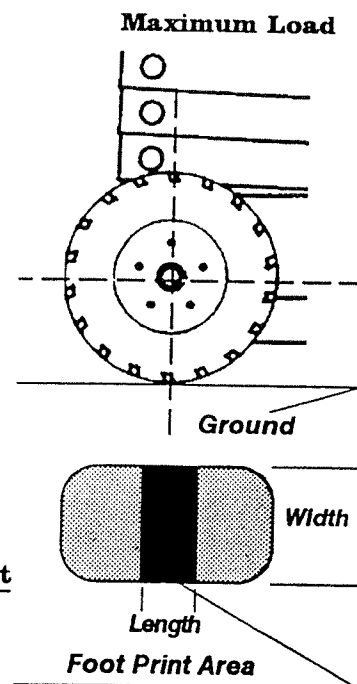
Local concentrated pressure is based on:

- (1) The maximum load exerted on one tire of the machine
- (2) The actual measured footprint area of the particular tire

$$\text{Foot Print} = \text{Length} \times \text{Width}$$

$$\text{PSI} = \frac{[\text{GVW} + \text{Rated Load}]}{4 \text{ (Tires)}} \div \text{Foot Print}$$

$$\text{PSF} = \text{PSI} \times 144$$



Overall Uniform Pressure

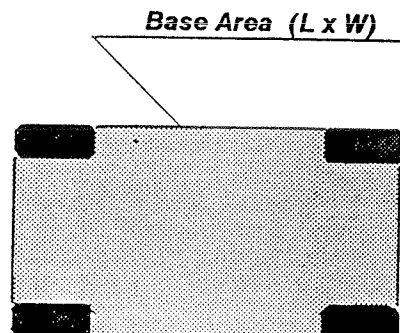
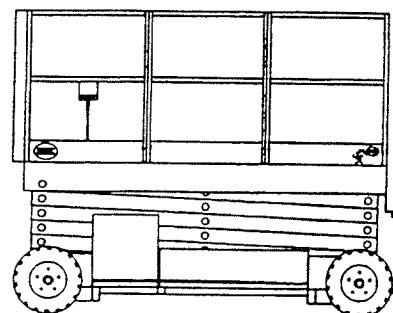
This pressure is of concern in conditions where the machine(s) is being used on a beam supported floor or surface. The machine's **overall uniform pressure** requires checking to ensure it does not exceed the maximum allowable pressure the floor can support. Maximum allowable pressure is determined by the architect or structural engineer, and therefore, cannot be exceeded for reasons of public safety.

Overall Uniform Pressure is calculated based on:

- (1) Combined load of machines GVW plus rated load
- (2) Machine's base area. The base area is defined as the area of the base or the area drawn by lines to the outside of the tires as projected onto the ground; whichever is greater.

$$\text{PSI} = \frac{\text{GVW} + \text{Rated Loaded}}{\text{Base Area}}$$

$$\text{PSF} = \text{PSI} \times 144$$



NOTES

CHAPTER 3 OPERATION

This chapter provides identification of all controls and indicators on the MEC 2033ES aerial work platform and provides specific instructions on how to operate the unit.

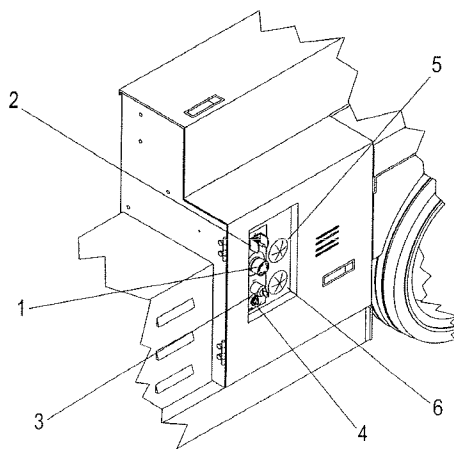
CONTROLS AND INDICATORS

All controls and indicators provided on the unit are identified by a number and pointed out in an illustration in this chapter. The name and a description of each control and indicator are provided after the number.

Lower Control Panel Controls and Indicators (Figure 3-1)

The lower control panel is located at the front right hand corner of the base just behind the right front wheel. The panel is used for initial start-up of the unit and during performance of the daily walk-a-round checks before operating the machine.

- | | |
|-----------------------------|---|
| 1. EMERGENCY STOP Switch | Press red cap of switch to activate. All electrical power is turned off and all hydraulic power is shut down. To reset switch, turn red cap of switch approximately a 1/4 turn clockwise until the cap "pops" out. |
| 2. UP/DOWN Switch | Controls movement of platform. UP position energizes hydraulic system to raise platform. DOWN position energizes hydraulic system to lower platform. Switch will return to center or neutral position when released. Rates of lift and descent are fixed at 38 seconds to fully extend platform or to lower platform from full extension. |
| 3. BASE/PLATFORM/OFF Switch | Controls electrical power to the switches and controls circuits. BASE/PLATFORM position allows flow of electrical power. OFF position breaks the electrical circuit to stop power flow. |



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Figure 3-1. Lower Control Panel Controls and Indicators

- | | |
|-----------------------------|--|
| 4. CIRCUIT BREAKER Switch | Provides circuit protection to engine electrical system. When pushed in, electrical power will flow. When "tripped" (switch sticking out), circuit is interrupted. |
| 5. Operation Hour Meter | Optional meter records number of hours the unit has been operated. |
| 6. Battery Charge Indicator | Optional indicator shows the approximate amount of electrical charge contained in the batteries. |

Upper Control Box Controls and Indicators (Figure 3-2)

The control box is located on the right hand platform rail and is the primary station used during normal operation of the unit. This set of controls may be used while the operator is walking along the side of the unit or while on the platform. This set is also used during performance of the daily walk-a-round checks. The control box can be removed by twisting the cannon plug on the box bottom counterclockwise. The box can be secured to prevent unauthorized use of the machine at the job site.

- | | |
|--------------------------|--|
| 1. TILT WARNING Light | Optional light illuminates if unit is not level and platform is being raised. |
| 2. Tilt Alarm | Optional alarm sounds if unit is not level and platform is being raised. |
| 3. TORQUE ON/OFF Switch | ON position provides more power for driving, particularly for going up an incline (up to 20% gradeability). Ground speed is limited to 1-1/2 mph with TORQUE ON. Normal power in OFF position. |
| 4. EMERGENCY STOP Switch | Press red cap of switch to activate. All electrical power is turned off and all hydraulic power is shut down. To reset switch, turn red cap of switch approximately 1/4 turn clockwise until the cap "pops" out. |

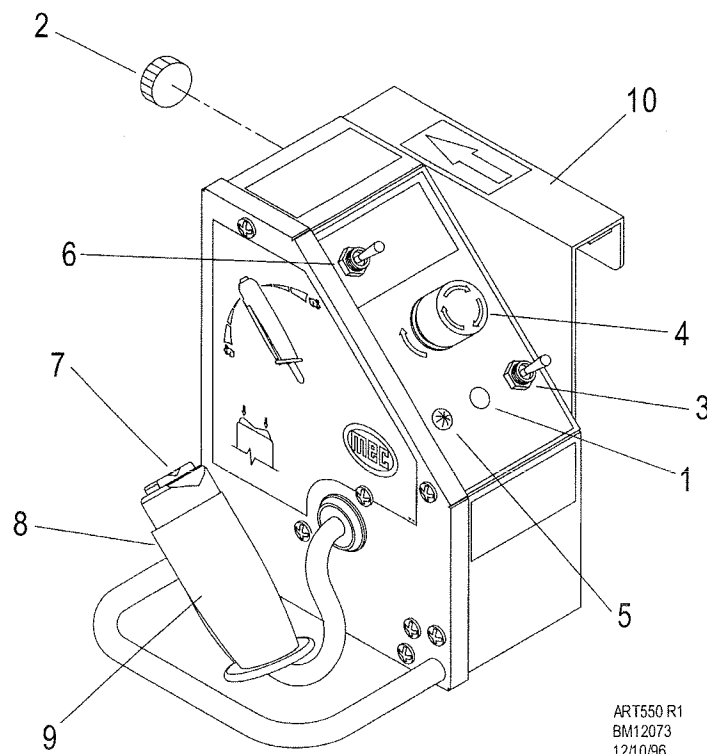


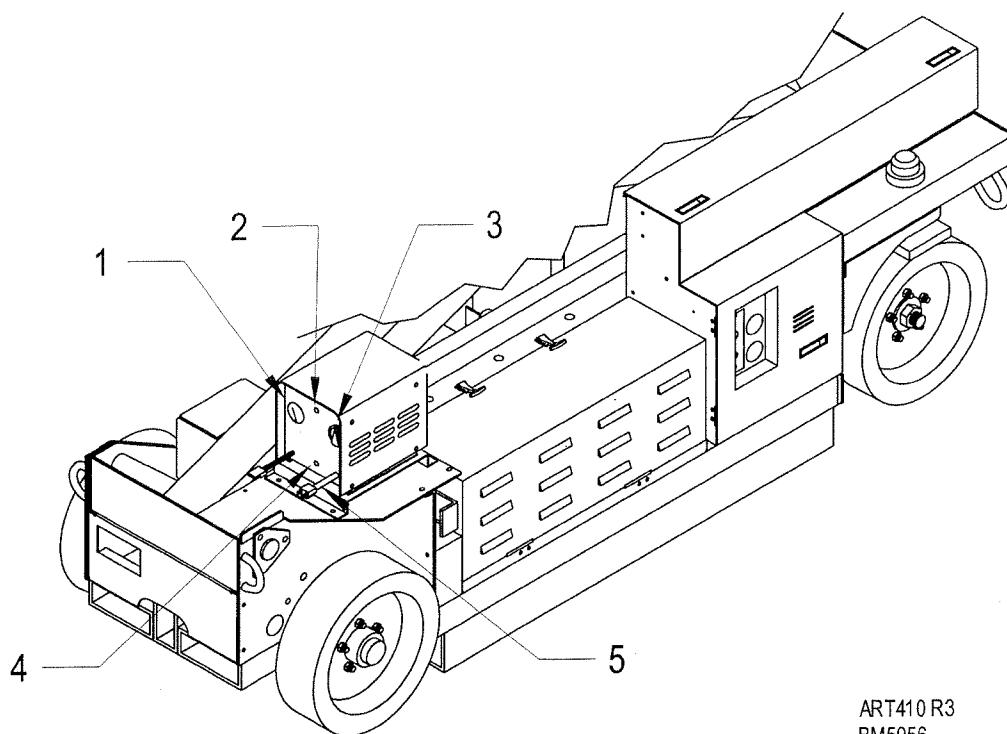
Figure 3-2. Upper Control Box Controls and Indicators

- | | |
|------------------------------------|--|
| 5. HORN Button | Option - Press button to sound horn. Release button to stop horn sounding. |
| 6. MODE SELECT Switch | LIFT position allows joystick control handle to raise or lower platform. DRIVE position allows joystick control handle to control steering and propulsion of unit, such as moving the unit to another location. |
| 7. Steering Thumb Switch | Controls steering angle of front wheels. Front wheels turn left when LEFT side of rocker switch is pressed. Front wheels turn right when RIGHT side of rocker switch is pressed. Switch will return to neutral position when released. Wheels will remain in the position attained until switch is pressed to move them to a different position. |
| 8. Enable Bar | Must be pressed to activate control capabilities of the joystick. If bar is released, movement of the unit (drive mode) will cease or movement of the platform (lift mode) will cease. |
| 9. Joystick Control Handle - DRIVE | Controls direction of movement with MODE SELECT switch in DRIVE position. Depressing enable bar and moving handle toward front of unit causes unit to move forward. Depressing enable bar and moving handle toward rear of unit causes the unit to move backwards. Handle returns to center or neutral position when released. Ground speed is proportional - the further the handle is moved away from center or neutral position, the faster the unit moves. |
| Joystick Control Handle - LIFT | Controls movement of platform with MODE SELECT switch in LIFT position. UP position energizes hydraulic system to raise platform. DOWN position energizes hydraulic system to lower platform. Switch will return to center or neutral position when released. Rate of lift is proportional - the further back the handle is moved from center or neutral position, the faster the rate of lift. The rate of descent is fixed - the platform lowers at the same rate regardless of handle position. |

Battery Charger Controls and Indicators (Figure 3-3)

The battery charger controls and indicators are located in the face of the battery charger assembly at the right rear corner of the unit.

- | | |
|-----------------------------|--|
| 1. Timer Switch | Controls amount of time during which charging of batteries will take place. Settings range from 1 hour to 16 hours. (Not used on automatic chargers.) |
| 2. Pilot Light | Illuminates when timer switch is turned ON and stays until timer switch moves to OFF position. For automatic chargers, light illuminates when charging has begun. Light turns off when charging is complete. |
| 3. Charge Rate Ampere Meter | Indicates the rate of charge to the batteries in amperes. |
| 4. Circuit Breaker | Provides charging system protection from electrical shorts. |
| 5. Input AC Power Plug | Power cable from source of charging electricity connects at this point of input to the charger. See appropriate voltage requirements on your charger. |



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Figure 3-3. Battery Charger Controls

EQUIPMENT OPERATION

WARNING

BEFORE OPERATING THIS MACHINE, OPERATOR MUST CAREFULLY READ CHAPTER 1, SAFETY, AT THE BEGINNING OF THIS MANUAL. FAILURE TO FOLLOW SAFETY PRECAUTIONS THEREIN MAY RESULT IN DEATH OR SERIOUS INJURY.

DO NOT OPERATE MACHINE IF LIFT, DRIVE OR STEER CONTROLS DO NOT RETURN TO NEUTRAL POSITION OR MALFUNCTION IN ANY OTHER WAY.

DO NOT OPERATE MACHINE FROM LOWER CONTROL PANEL WITH PERSONNEL ON THE PLATFORM EXCEPT IN AN EMERGENCY.

START UP

1. Perform Daily Walk-A-Round Inspection. (See Chapter 4)

2. At end of Walk-A-Round Inspection the base key switch will be in the platform position and the operator will be on the platform. If you are intending to operate the unit from the Platform, follow the upper control box instructions as outlined on pages 3-2 and 3-3.

3. If you intend to operate the unit from the Base, dismount the platform and proceed to the lower control panel.

4. Switch the key switch to the Base position and operate the controls as instructed on pages 3-1 and 3-2.

SHUT DOWN

1. Lower the unit to its stowed position.

2. Locate the unit in an area that is out of the way and has access to 110V outlet if charging is needed. Dismount unit.

3. Turn key switch to off position and remove key for security.

4. If charging is needed, charge batteries as outlined starting on page 3-5.

BATTERIES

**WARNING**

NEVER SMOKE OR USE OTHER COMBUSTIBLES NEAR BATTERY OR WHILE SERVICING BATTERY OR OTHER COMPONENTS. PROVIDE PLENTY OF VENTILATION AS PRESENCE OF HYDROGEN FUMES COULD LEAD TO EXPLOSION.

The Model 2033ES units are equipped with 4 heavy duty, deep cycle batteries. Battery care and maintenance depends upon the frequency of their use.

Battery wiring and water level should be checked daily. Check and fill batteries after every 15 hours of use or when recharging. Do not overfill batteries. Do not allow batteries to remain discharged. Do not run batteries dead. Put battery on charge when approximately 80% discharged. This is measured as a hydrometer reading of 1.155 at 80° F (26.6° C).

The following paragraphs contain notes and procedures for checking and filling batteries and charging batteries.

Checking and Filling Batteries**CAUTION**

DO NOT OVERFILL. When battery cells are filled too full, battery fluid will expand as it warms from charging and will seep out of the battery. When water is then added, the solution is weakened and a loss of ampere hour capacity results.

NEVER add acid to battery. The solution is at its proper strength when the battery is manufactured. Use distilled water and maintain proper fluid level. When required, add water to battery **AFTER** charging, unless water level is below the top of the plates.

Check and fill batteries, after every 15 hours of use or when recharging, as follows:

1. Release latches (1, Figure 3-4) and pivot battery tray cover (2) open.
2. If there is any dirt or corrosion on battery, wash with a solution of 5 teaspoons baking soda per quart of warm water.

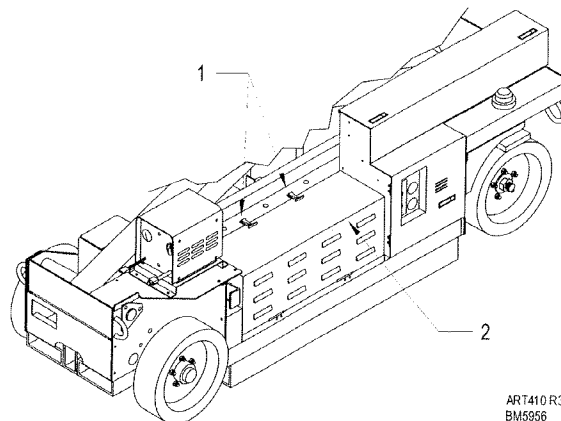


Figure 3-4. Battery Tray Cover

Remove battery caps and check fluid.

4. Fill, as needed, as follows:
 - a. **Before** charging, fluid must be above plates in battery.
 - b. **After** charging, fill to split ring. **Do not overfill.**
5. Coat terminals with petroleum jelly or equivalent coating.

Charging Batteries**WARNING**

NEVER SMOKE OR USE OTHER COMBUSTIBLES NEAR BATTERY OR WHILE SERVICING BATTERY OR OTHER COMPONENTS. PROVIDE PLENTY OF VENTILATION AS PRESENCE OF HYDROGEN FUMES COULD LEAD TO EXPLOSION.

1. Release latches (1, Figure 3-4) and pivot battery tray cover (2) open.
2. Remove battery caps, check fluid level and fill, if needed, to top of plates only.
3. Reinstall battery caps before charging.
4. Turn timer switch (1, Figure 3-3) to OFF position.
5. Connect extension cord plug to 115V AC receptacle.
6. Insert input AC power plug (5) of charger into receptacle of extension cord.

7. Turn timer switch (1) to ON position for a 16 hour charging period or to a lesser amount of time as desired. Pilot light (2) will illuminate and charge rate ampere meter (3) will indicate a charge rate. Charger will turn off automatically when timer runs out.

8. When charging is complete, place timer switch (1) in OFF position and disconnect power cable from input AC power plug (5).

9. Remove battery caps, check fluid level and fill if needed, to split ring and reinstall caps.

DRIVING UNIT FORWARD AND BACKWARD AT UPPER CONTROL BOX ASSEMBLY

NOTE

A "time-out" will occur if the enable bar on the joystick is depressed for more than 20 seconds without actuating any other controls. Releasing the enable bar and joystick for one second and depressing bar and moving joystick again will reactivate the control system.

1. Place MODE SELECT switch (6, Figure 3-2) in DRIVE position.

NOTE

Machine will move at a speed of less than 1 mph when the platform is raised above approximately 7 feet. Maximum ground speed with platform raised less than seven feet is 2.27 mph.

2. Grasp joystick control grip (9) making sure enable bar (8) is depressed. Pivot joystick forward to move forward. Pivot joystick back to move backwards. Movement of joystick away from neutral or center position increases speed. Releasing the enable bar or joystick control grip will stop movement of unit.

3. If ascending a grade and more power is needed, place TORQUE ON/OFF switch (3) in ON position.

4. As needed, depress and hold left side of STEER switch (7) to turn left or depress and hold right side of STEER switch to turn right. Wheels must be straightened after a turn by depressing STEER switch to opposite position. Wheels will not straighten by themselves after a turn is completed. Joystick enable

bar must be depressed to obtain steering action. Steering may be performed while moving joystick in a forward or reverse position.

OPERATING PLATFORM AT UPPER CONTROL BOX ASSEMBLY



CAUTION

If tilt alarm horn sounds and/or tilt alarm light illuminates when platform is raised, lower platform completely and reposition machine so it is level.

NOTE

A "time-out" will occur if the enable bar on the joystick is depressed for more than 5 seconds without actuating any other controls. Releasing the enable bar and joystick for 1 second and depressing bar and moving joystick again will reactivate the control system.

1. Place MODE SELECT switch (6, Figure 3-2) in LIFT position.

2. Grasp joystick control grip (9) making sure enable bar (8) is depressed. Pivot joystick rearward to raise platform. Pivot joystick forward to lower platform. Movement of joystick away from neutral or center position increases speed of lift but rate of descent is not affected by joystick position. Releasing the enable bar or joystick control grip will stop movement of unit.

OPERATING PLATFORM AT LOWER CONTROL PANEL



CAUTION

If tilt alarm horn sounds and/or tilt alarm light illuminates when platform is raised, lower platform completely and reposition machine so it is level.

1. Move and hold UP/DOWN switch (2, Figure 3-1) to UP position to raise platform. To stop movement, release switch.

2. Move and hold UP/DOWN switch (2) to DOWN position to lower platform. To stop movement, release switch.

EXTENDING EXTENDED PLATFORM

**WARNING**

BEFORE OPERATING UNIT FROM PLATFORM:

- EXTENDED PLATFORM MUST BE LOCKED IN PLACE.
- SHEET LOADING REAR GATE MUST BE LOWERED AND LOCKED IN PLACE.
- SWINGING REAR MIDGATE/CHAIN MUST BE CLOSED.

FAILURE TO COMPLY WITH THESE REQUIREMENTS COULD CAUSE DEATH, PERSONAL INJURY OR PROPERTY DAMAGE.

ALWAYS USE "THREE POINT CONTACT" WHEN ENTERING OR EXITING THE PLATFORM (3 OUT OF 4 ARMS AND LEGS ARE IN CONTACT WITH THE MACHINE AT ALL TIMES DURING MOUNT AND DISMOUNT).

1. With your right hand, squeeze handle and hold (Figure 3-5) so pin disengages from locking holes in platform.

NOTE

Platform extends up to 42" and locking holes are spaced at 6" intervals to provide maximum flexibility.

2. With your left hand, grasp rail and push platform out to desired position.
3. Release handle so lock pin securely engages one of the locking holes in platform.

RETRACTING EXTENDED PLATFORM

**WARNING**

BEFORE OPERATING UNIT FROM PLATFORM:

- EXTENDED PLATFORM MUST BE LOCKED IN PLACE.
- SHEET LOADING REAR GATE MUST BE LOWERED AND LOCKED IN PLACE.
- SWINGING REAR MIDGATE/CHAIN MUST BE CLOSED.

FAILURE TO COMPLY WITH THESE REQUIREMENTS COULD CAUSE DEATH, PERSONAL INJURY OR PROPERTY DAMAGE.

ALWAYS USE "THREE POINT CONTACT" WHEN ENTERING OR EXITING THE PLATFORM (3 OUT OF 4 ARMS AND LEGS ARE IN CONTACT WITH THE MACHINE AT ALL TIMES DURING MOUNT AND DISMOUNT).

1. With your right hand, squeeze handle and hold (Figure 3-5) so pin disengages from locking holes in platform.
2. With your left hand, grasp rail and push platform out to desired position.
3. Release handle so lock pin securely engages one of the locking holes in platform.

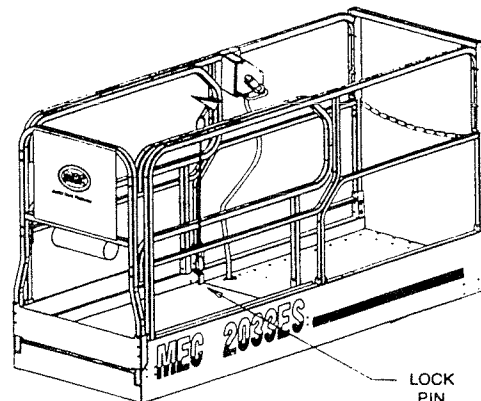


Figure 3-5. Platform Lock Pins

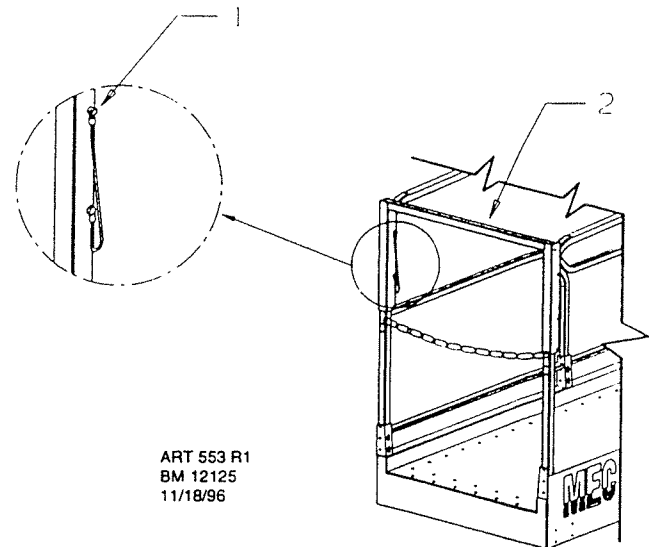
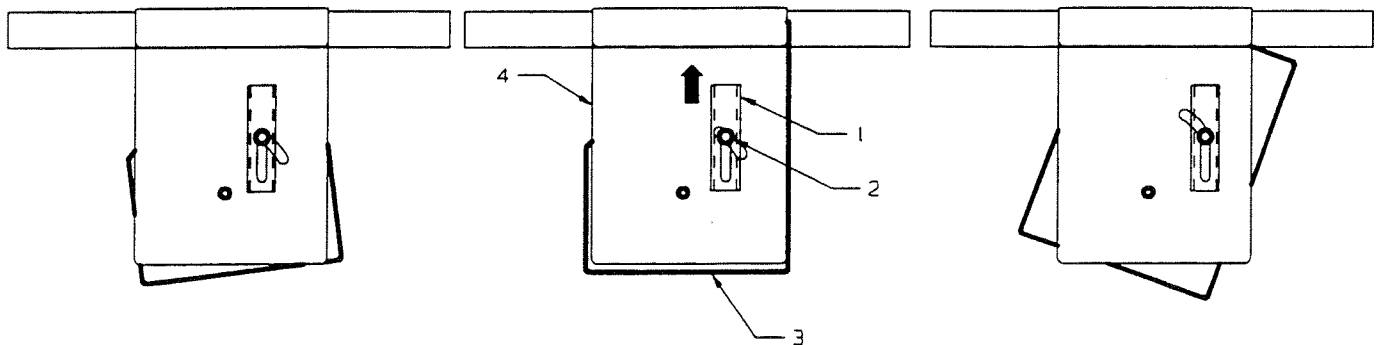
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SHEET LOADING (DRYWALL) GATE OPERATION**To Raise Gate**

1. Pull out lock pins (1, Figure 3-6) located on rear gate rail.
2. Slide upper section of gate (2) all the way up and align lock pins with rail holes.
3. Insert lock pins into rail holes.

To Lower Gate

1. Pull out lock pins (1, Figure 3-6) located on rear gate rail.
2. Slide upper section of gate (2) all the way down and align lock pins with rail holes.
3. Insert lock pins into rail holes.

**Figure 3-6. Sheet Loading Gate****ADJUSTABLE CONTROL BOX****Figure 3-7. Adjustable Control Box, Left to Right: Totally back, Centered, and Totally Forward**

1. LOCK BRACKET - Move bracket upward, in direction of the arrow, to LOCK Control Box onto railing.
2. THUMBSCREW (Not Shown) - Loosen thumb-screw to allow Lock Bracket to move, and to position the Control Box to the desired angle. Tighten screw to secure Control Box.

3. CONTROL BOX - In this view in its centered position.
4. CONTROL BOX HOLDER BRACKET - This allows the Control Box to be placed securely on the railing. The angled slot also allows the Control Box to be positioned to the operator's preference.

CHAPTER 4 OPERATOR MAINTENANCE

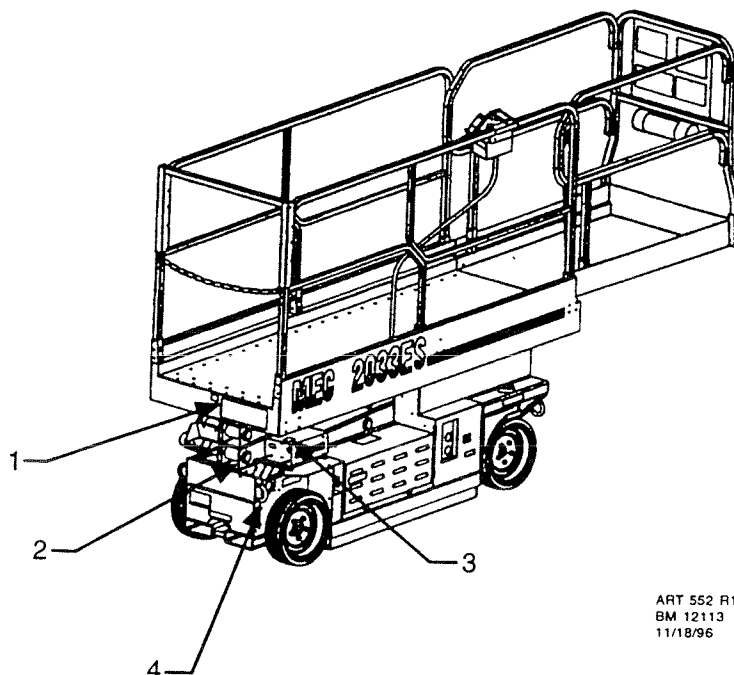
This chapter contains information for the operator about specific use of the equipment. Preventive maintenance information is presented first in a Walk-A-Round Check for MEC 2033ES aerial platform unit. Next, a schedule of operator level maintenance tasks is presented, followed by instructions for those operator tasks. Last, a schedule of maintenance activities, some of which should be performed by your dealer, is provided.

MEC 2033ES AERIAL WORK PLATFORM WALK-A-ROUND INSPECTION

The Walk-A-Round Check shall be performed by the operator prior to using the unit for the first time of the day or by a new operator even if the unit has been used during any part of the day. The Walk-A-Round Check is critical to ensuring the safe operation of the platform.

When performing the Walk-A-Round Check, visually inspect for obvious damage to the specific part of the unit including corroded, loose or missing fasteners; broken or leaking hydraulic lines; and worn, broken or frayed insulation on power cables. Also check for corroded, cracked, abraded or bent structural membranes (beams, frame, platform, etc.). A machine which has been overloaded will have bent structural membranes and fatigued pivot pins. Begin the check standing at the center of the rear of the unit. The number of the check in the listing matches a corresponding number in an illustration to help the operator understand and locate the check to be performed.

1. Capacity Decal on Rear of Platform (Figure 4-1) - Check that one decal is in place on rear edge of platform floor and is intact and legible.
2. Broken Welds on Scissor Pivot Collars - Check for broken welds on scissors where each pivot pin collar is attached.
3. Battery Charger Warning Label - Check that decal is in place on top of battery charger case and is legible.
4. Tiedown Ring - Check for broken welds and secure attachment.



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Figure 4-1. Walk-a-round Checks 1 Thru 4

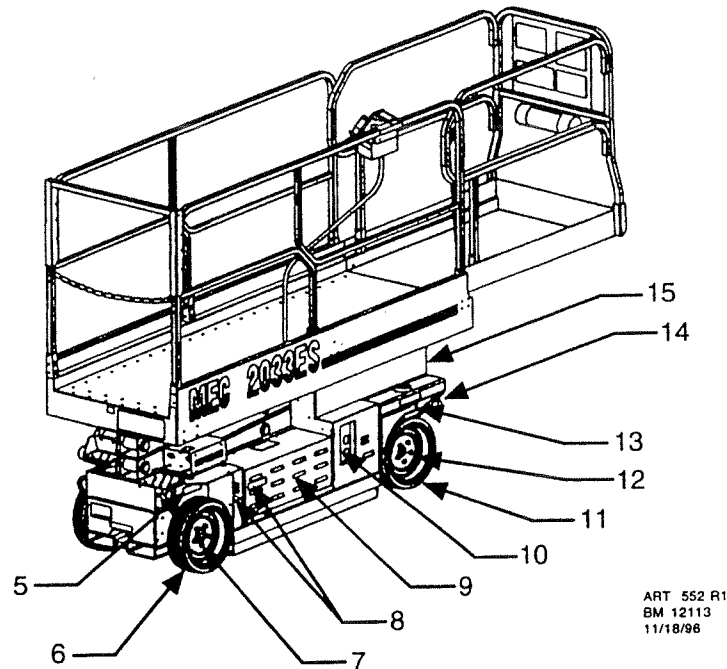


Figure 4-2. Walk-a-round Checks 5 Thru 15

5. Tire replacement and Lug Nut Torque Decal on Frame (Figure 4-2) - Check that decal is in place on frame above tire and is legible.
6. Tire Condition - Check for excessive wear and damage to tire.
7. Wheel Condition - Check wheel for bent rim and loose or missing lug nuts. **Weekly** - Torque nuts to 75-85 ft. lbs. (102-115 N•M).
8. Battery Disconnect - Connected and handle inside tube. Decal in place and legible on battery access panel.
9. Battery Water Level - **Weekly** - Water should be up to the split ring. Use only distilled water.
10. Lower Control Panel - Check for obvious damage to switches, indicators and guards. Check that three decals are in place on the control box and legible.
 - A. Check operation of BASE CONTROLS.
 - B. Turn key switch to BASE position.
 - C. Toggle and hold the UP/DOWN switch in UP position to raise platform a few feet. Release switch.
 - D. Press Emergency Stop. Toggle the UP/DOWN switch both up and down. No platform movement should occur.
 - E. Turn red cap of Emergency Stop switch 1/4 turn clockwise until cap "pops" out.
 - F. Toggle and hold the UP/DOWN switch in DOWN position to lower platform to stowed position. Release switch.
 - G. Turn key switch to platform position.
11. Tire Condition - Check for excessive wear and damage to tire.
12. Wheel Condition - Check wheel for bent rim and loose or missing lug nuts. **Weekly** - Torque nuts to 75-85 ft. lbs. (102-115 N•M).
13. Tire replacement and Lug Nut Torque Decal on Frame - Check that decal is in place on frame above tire and is legible.
14. Tiedown Ring - Check for broken welds and secure attachment.
15. Broken Welds on Scissor Pivot Collars - Check for broken welds on scissors where each pivot pin collar is attached.

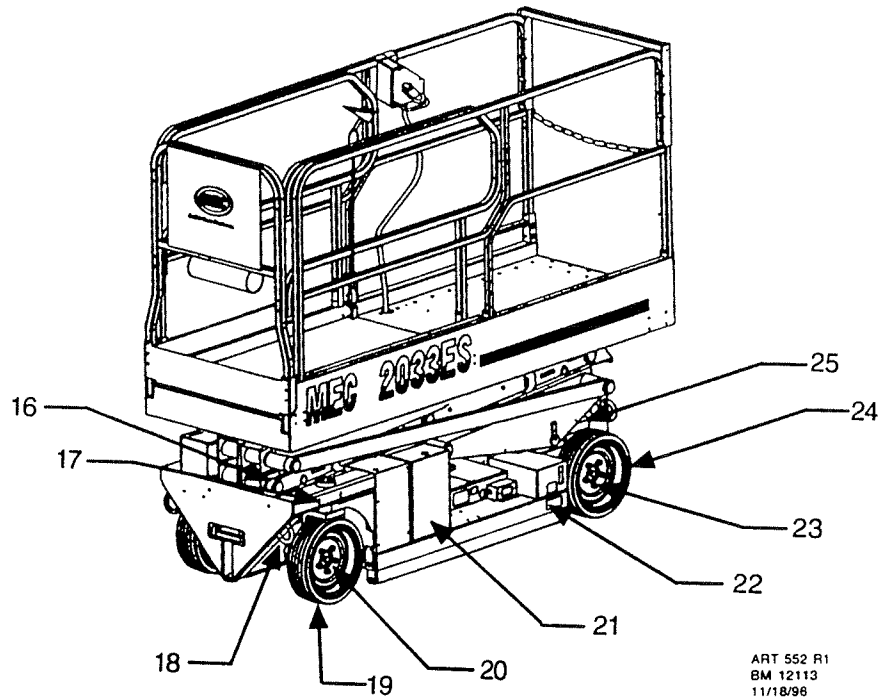
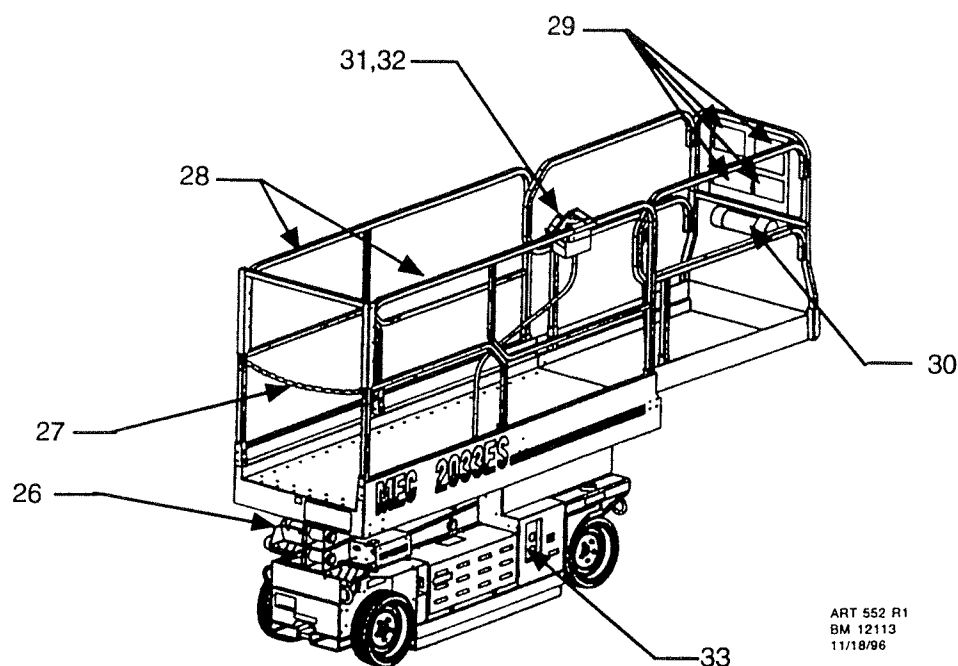


Figure 4-3. Walk-a-round Checks 16 Thru 25

16. Maintenance Lock (Figure 4-3) - Check lock for secure attachment to pivot pin with retaining ring and is not bent. Check receiver for damage. Check that decal is in place on side of lock and is legible. Check that storage pin is in place on lock and securely holds lock in stowed position.
17. Tire replacement and Lug Nut Torque Decal on Frame - Check that decal is in place on frame above tire and is legible.
18. Tiedown Ring - Check for broken welds and secure attachment.
19. Tire Condition - Check for excessive wear and damage to tire.
20. Wheel Condition - Check wheel for bent rim and loose or missing lug nuts. **Weekly** - Torque nuts to 75-85 ft. lbs. (102-115 N•M).
21. Hydraulic Fluid Level - **Weekly** - Fluid should be visible inside the sight gauge on side of tank.
22. Emergency Down Decal - Check that emergency down decal is in place on frame in front of left rear tire and below EMERGENCY DOWN control and is legible.
23. Wheel Condition - Check wheel for bent rim and loose or missing lug nuts. **Weekly** - Torque nuts to 75-85 ft. lbs. (102-115 N•M).
24. Tire Condition - Check for excessive wear and damage to tire.
25. Tire replacement and Lug Nut Torque Decal on Frame - Check that decal is in place on frame above tire and is legible.



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Figure 4-4. Walk-a-round Checks 26 Thru 33

26. Maintenance Lock (Figure 4-4) - Check lock for secure attachment to pivot pin with retaining ring and is not bent. Check receiver for damage. Check that decal is in place on side of lock and is legible. Check that storage pin is in place on lock and securely holds lock in stowed position.
27. Rear Gate - Check rear gate for loose or missing fasteners and obvious damage. Check that latch is secure and operates properly.

Mount platform.

28. Platform Railings - Check all railings for secure and proper installation and obvious damage. Check that top rail is not bent.
29. Decals on Panel on Front Rail - Check that four decals are in place on panel of front platform railing and all four are intact and legible.
30. Manual Tube - Check that all documents listed in Chapter 2 are in tube on front railing.
31. Upper Control Box Assembly - Check for obvious damage to switches, indicators and guards. Check that four decals are in place on the control box and are legible.
32. Test upper control box assembly controls and indicators:
 - a. Steer left and right.
 - b. Drive forward/reverse at various speeds with TORQUE OFF.
 - c. Operate brakes on a grade.
 - d. Drive forward/reverse at various speeds with TORQUE ON.
 - e. Raise platform 10 - 15 feet high. Drive forward to check fast drive speed cutout with platform raised.



WARNING

ALL PIVOT AREAS OF SCISSORS AND LIFT CYLINDER MUST BE CHECKED FOR WEAR. A LOUD SCRAPING NOISE MEANS THE D.U. BEARINGS ARE DAMAGED AND NEED REPLACING. FAILURE TO DO SO WILL RESULT IN EXTENSIVE DAMAGE TO STRUCTURAL MEMBERS AND BUSHINGS WHICH WOULD CREATE A HAZARDOUS CONDITION AND COULD RESULT IN INJURY OR DEATH TO PERSONNEL.

- f. Raise platform to full extension at various speeds.
 - g. Lower platform to stowed position.
 - h. While slowly driving forward or backward, press EMERGENCY STOP. Unit will stop quickly and completely.
33. Turn red cap of EMERGENCY STOP switch 1/4 turn clockwise until cap "pops" out.

INSPECTION AND LUBRICATION

Structural Inspection

NOTE

Refer to Table 4-1, Quarterly Inspection Schedule located in this section.

Check machine for bent structural membranes (beams, main frame, platform, pivot pins, etc.). Machines which have been overloaded could have bent members and fatigued pivot pins. Replace all bent members and pins to ensure a safe operating machine.

Check bushings in scissor beams for broken or cracked welds. Replace beams if bushing welds are cracked or if bushings are elongated.



WARNING

NEVER INSPECT HYDRAULIC HOSES WITH HANDS. ESCAPING FLUIDS UNDER PRESSURE CAN CAUSE SERIOUS INJURY. USE A PIECE OF CARDBOARD OR OTHER MATERIAL TO INSPECT FOR LEAKS. ESCAPING FLUID UNDER PRESSURE CAN BE INVISIBLE AND CAN PENETRATE THE SKIN, CAUSING SERIOUS INJURY.

IF ANY FLUID IS INJECTED INTO SKIN, SEEK MEDICAL ATTENTION IMMEDIATELY!

Table 4-1. Quarterly Inspection Schedule

KEY: OK - Legible, Operational And/Or Physically Correct
 N/O - Not Legible, Operational And/Or Physically Correct
 R/P - Repairs Made To Unit Or Corrected

OK N/O R/P				OK N/O R/P			
Visual Inspection - Decals: *Quantities Listed []				Railings			
Capacity: Rear of Platform [1], Front Rail [1]				Rails In Place / Not Damaged			
Operations and Safety: Front Rail [2]				Top Rail Not Bent			
Control Box [3]				Rear Gate In Place / Closes Freely			
Lower Control Station [1]				Rear Step In Place: Base & Platform			
Emergency Disconnect [1 or 2]				Proper Safety & Operational Manual With Unit			
Emergency Down [2]				Functions			
Tire Replacement [1]				Steer: Left / Right			
Battery Replacement				Drive: Forward / Reverse			
Battery Charging [1]				Speeds: Slow / Fast			
Electrical Hazard [1]				Hi Torque / Hi Speed			
Maintenance Locks [4]				Fast Speed Cutout When Platform Is Raised			
Operational And Visual Inspection				Emergency Down Functions Properly			
Any Structural Damage				Platform Raises To Full Extension			
Check Hydraulic Oil Level				Brakes Operational			
Battery Water				Emergency Stop Working Correctly			
Inspect For Any Leaks				Pothole Protection Operational			

* See Figure 4-8 for decal location.

Comments: _____

Signature / Inspectors: _____ Date: _____

Signature / Inspectors: _____ Date: _____

Signature / Inspectors: _____ Date: _____

Reproduce form as needed. Save completed forms for future reference.

LUBRICATION

The MEC 2033ES is almost lubrication free. Pivot points within the scissors frame feature self-lubricating bearings. All other lubrication maintenance is performed annually or semiannually. Refer to Table 4-2, Lubrication Chart for schedule.

The Quarterly Inspection Schedule Checklist is also used to examine the unit after periods of storage, exposure to extremes of heat, cold, moisture, dust, etc. Use it to inspect units after a change in environmental conditions, i.e., winter, summer or geographical location.

Table 4-2. Lubrication Chart

		WEEKLY	SEMIANNUALLY	ANNUALLY
RAILS	Sheet Gate Slide Area		LIGHT GREASE	
SCISSORS	Platform Slides (4)		LIGHT GREASE	
	Base Slide		LIGHT GREASE	
STEERING PIVOTS	King Pins			BEARING GREASE
	Sprocket Pivots			90W GEAR OIL
REAR AXLE	Rear Hubs			BEARING GREASE
BATTERIES	Battery Water	DISTILLED WATER		
HYDRAULICS	Hydraulic Oil			STANDARD 10W NON-DETERGENT HYDRAULIC OIL
	Hydraulic Oil Filter			10 MICRON SPIN-ON (P/N 6156)

HYDRAULIC SYSTEM BLEEDING

The hydraulic system is self-bleeding. After the system has been drained, such as during the replacement of a hydraulic system component, actuate the platform completely up and down for six cycles and recheck the reservoir fluid level between each cycle. Fill as required.

HYDRAULIC PUMP MOTOR SERVICING

Brush replacement is the most common maintenance required on DC motors. Brushes should be checked and replaced, if necessary (1/4" minimum length), along with commutator inspection, approximately every six months. Time spans will vary depending on how the machine is used and the condition of the batteries. It is highly recommended to keep batteries fully charged

and in top condition to eliminate service problems in general, and to extend the life of the motor and brushes. Also, refer to Batteries section in Chapter 3.

CHECK AND FILL HYDRAULIC RESERVOIR**NOTE**

An accurate fluid level reading can be taken only if platform is fully down.

1. Lower platform all the way.
2. Check hydraulic fluid level by looking at fluid level in sight gauge on hydraulic reservoir. Fluid should be clearly visible in gauge. If fluid is not visible, add fluid.
3. Remove filler cap by turning counterclockwise.
4. Fill to desired level on sight gauge.
5. Replace filler cap.

BATTERY REPLACEMENT

⚠ WARNING

ELECTRIC SERIES MACHINES SPECIAL MAINTENANCE CONCERNS

- TO MINIMIZE THE RISK OF FIRE, ELECTRIC SHOCK OR EXPLOSION, THE FOLLOWING MAINTENANCE PROCEDURES AND INSPECTIONS ARE PARTICULARLY IMPORTANT FOR ELECTRICALLY POWERED UNITS:

1. KEEP MACHINE CLEAR OF LUBRICANTS AND OTHER COMBUSTIBLE MATERIAL.

2. INSPECT WIRING REGULARLY FOR FRAYED OR DETERIORATED INSULATION. IMMEDIATELY REPLACE OR REPAIR A WIRE HARNESS OR INDIVIDUAL WIRE THAT HAS FRAYED OR DETERIORATED INSULATION.

3. CHECK BRAKES AT THE RECOMMENDED INTERVALS, AND MAKE ADJUSTMENTS WHEN REQUIRED.

- NEVER SMOKE OR USE OTHER COMBUSTIBLES NEAR BATTERY OR WHILE SERVICING BATTERY OR OTHER COMPONENTS. PROVIDE PLENTY OF VENTILATION AS PRESENCE OF HYDROGEN FUMES COULD LEAD TO AN EXPLOSION.

1. Install maintenance locks per procedure contained in Chapter 1.

2. Place Key switch (3, Figure 3-1) in the OFF position.

3. Pull BATTERY DISCONNECT (1, Figure 4-5) handle to remove batteries from all electrical circuits.

4. Unhook T-straps (2) and pivot battery access panel (3) out and down until panel rests on floor.

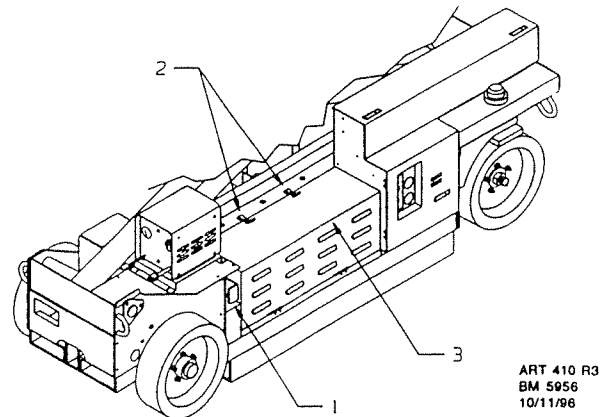


Figure 4-5. Battery Access Panel

5. Slide panel to the left or toward rear of unit and remove panel.

6. Note and record battery (1, Figure 4-6) positions and battery cable (2) connections by drawing a sketch and/or tagging all items to ensure proper installation of new batteries.

7. Disconnect all battery cables (2).

8. Loosen wing nuts (3) until hold down angle (4) can be pulled away from batteries and pivoted down.

9. Remove old batteries (1).

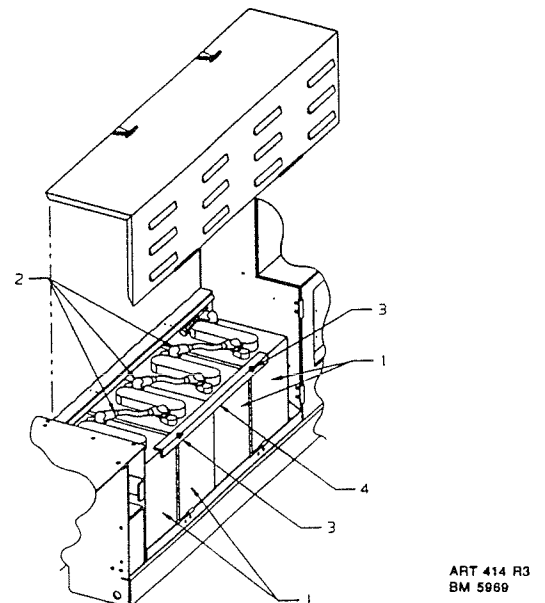


Figure 4-6. Battery Replacement

10. Install new batteries (1) in proper locations referring to sketch and/or tags installed in step 6.
11. Swing hold down angle (4) up and locate on front top corner of batteries. Tighten wing nuts (3).
12. Securely connect all battery cables (2) to proper terminals referring to sketch and/or tags installed in step 6.
13. Coat all battery terminals with petroleum jelly or equivalent coating.
14. Position battery access panel (3, Figure 4-5) by batteries so pins will engage hinge holes. Slide panel to right.
15. Pivot battery access panel (3) up over batteries and engage T-straps (2).
16. Push BATTERY DISCONNECT (1) handle to connect unit electrical circuits to batteries.

CHARGING BATTERIES

Surrounding temperature has a considerable effect on the power reserve in a battery.

A battery 100% charged at 80° F (26.6° C):
 --drops to 65% at 32° F (0° C)
 --drops to 40% at 0° F (-32° C)

A battery 46% charged at 80° F (26.6° C):
 --drops to 32% at 31° F (-1° C)
 --drops to 21% at 0° F (-32° C)

Whenever the battery temperature reaches 125° F (93° C), the charging rate should be reduced or the battery taken off charge and cooled to room temperature.

Monthly equalizing charges of 25% over the regular charge are recommended. The equalizing charge must be delivered at a low rate to eliminate excessive gassing.

Bring batteries to a full charge as soon as possible after a period of continual use. A full charge is measured by a hydrometer reading of 1.265 at 80° F (26.6° C).

Lead plates in discharged batteries will harden and become sulfated, which will shorten battery life as much

as overcharging. Sulfated batteries fail to deliver rated capacity or fully charge.

Several long, slow charges (at a low rate to avoid gassing) and fast discharges are then necessary to correct the sulfation and hardened plates.

Do not overcharge battery as this causes the battery to boil dry.

SPIN-ON OIL FILTER REPLACEMENT

The spin-on oil filter (Figure 4-7) in the hydraulic system should be changed yearly. Replace with filter part number 6156 only.

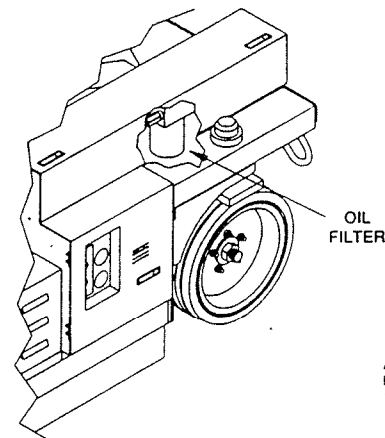


Figure 4-7. Spin-on Oil Filter

SERVICE HELPS

If unit is not functioning, check the following items BEFORE calling a service technician:

1. Battery disconnect is pushed in.
2. Key switch is turned to base or platform.
3. Circuit breaker is reset.
4. Emergency stop switch is ON (either on lower control panel or upper control box).
5. 20 Amp ground fuse is operational.
6. Enable bar is being held in.

DECAL REPLACEMENT

Decals are installed in various locations on the machine. Each decal contains either a precautionary comment or helpful information for the user. If any

decal listed in Table 4-1 is not legible or is missing, the machine is considered not operational and must not be used until the decal is replaced. Any needed decal can be identified by referring to Figure 4-8 and the legend below and obtained from your local MEC dealer.

Legend for Figure 4-8

<u>Index</u>		<u>Part</u>		<u>Index</u>		<u>Part</u>	
<u>No.</u>	<u>Qty.</u>	<u>No.</u>	<u>Description</u>	<u>No.</u>	<u>Qty.</u>	<u>No.</u>	<u>Description</u>
1.	1	7523	Caution-Elect/T.O. Hazard	13.	1	-----	Serial Number Plate
2.	1	8767	Lock Warning	14.	1	8598	Emergency Down Procedure
3.	1	7253	Manual Case	15.	1	8599	Emergency Down Procedure
4.	1	7527	Caution	16.	1	8503	Keep Clear
5.	2	8768	750 lb Capacity	17.	2	6794	Maintenance
6.	2	8765	Model Number 2033ES	18.	1	6057	Platform Stops Short
7.	1	8788	Control Base	19.	1	7155	Control Box
8.	1	8520	Warning-Battery Replacement	20.	1	8811	MEC Oval
9.	1	8475	Battery Disconnect	21.	2	7982	Safety Stripe, Keep Clear
10.	1	6556	Fork Pockets	22.	2	8619	Made in USA
11.	1	8779	Battery Charger	23.	1	8603	Warning-Disconnect Battery
12.	2	8519	Warning-Tire Replacement	24.	2	8402	Rail Stripe

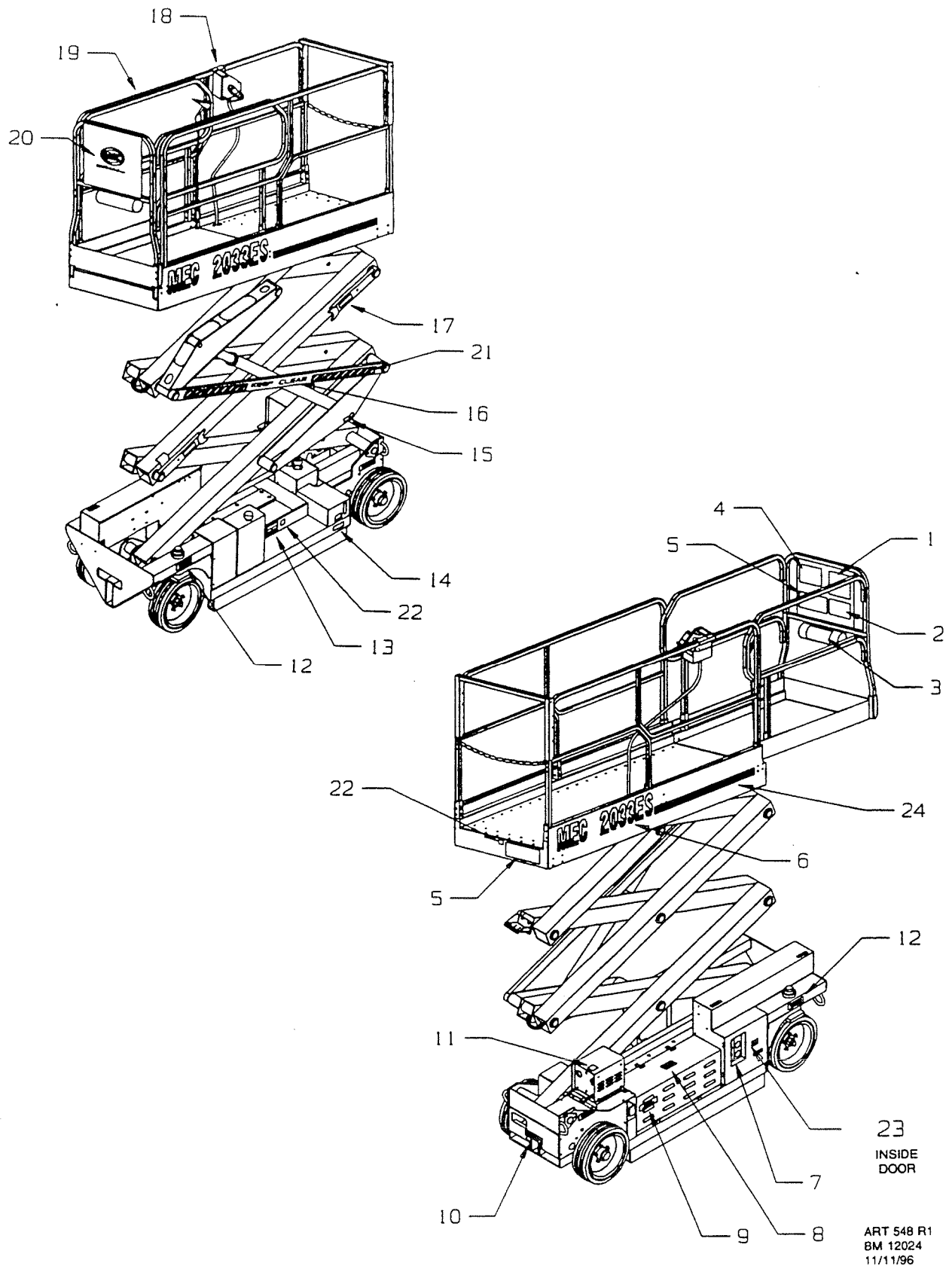


Figure 4-8. 2033ES Decal Locations

Major Alterations Repairs Record

Signature

Date

Model: _____

Performed by: _____

Repair/
Alteration

Date: _____

Approved by: _____

Part numbers included:

--

Description of Repair / Alteration:

--

Results / Conclusions:

--

Reproduce form as needed. Save completed forms for future reference.

Examination/Test Record

Signature

Date

Model: _____

Performed by: _____

Examination/
Test

Date: _____

Approved by: _____

Description of Examination / Test:

--

Results / Conclusions:

--

Reproduce form as needed. Save completed forms for future reference.

NOTES



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