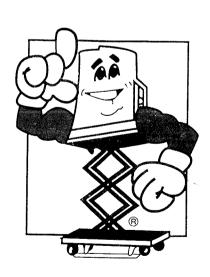
mecNARO 20

Models: 2034, 2034HT, 2042, 2042HT Includes EE Rated Option

Operating, Parts and Maintenance Manual





MAYVILLE ENGINEERING COMPANY AERIAL WORK PLATFORMS A DIVISION OF MAYVILLE ENGINEERING COMPANY, INC. 715 SOUTH STREET MAYVILLE, WISCONSIN 53050

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 mainframe including axles and lift mechanism 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 carry a ninety (90) day warranty from described purchase date and prorated thereafter up to one (1) year. Warranty claims within such warranty period shall be limited to repair or replacement, MEC's option, of the defective part in question and labor to preform 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 Co., 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. Parts other than of MEC manufacture are subject to the original manufacturer's 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.

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AWARNING

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.

Failing to heed all warnings posted on this machine and written in this manual, could cause death, serious injury or property damage.

1. SAFETY

USE OF NOTES, CAUTIONS AND WARNINGS

NOTE - Additional information to further explain instructions.

CAUTION - Failure to follow instruction could cause damage to equipment.

WARNING - Failure to follow instruction could cause death, personal injury and property damage.

DANGER - Failure to follow instruction will cause death, personal injury and property damage.

GENERAL OPERATING RULES, SAFETY AND LIMITATIONS

MEC designs med NARO work platforms to be safe and reliable. They are rugged and maneuverable but must be used only for purposes and ways intended. That is to raise personnel and tools to overhead work areas.

Respect your machine; do not neglect or misuse it.

Inspect 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 condition is uncertain in any way.

Do not exceed the load capacity of platform.

Do not enter or exit platform while 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.

A DANGER

DO NOT operate machine near power lines. Platform and enclosures are not insulated.

Failure to follow this warning will cause death or personal injury.

OPERATOR QUALIFICATIONS

mee NARO 20 is to 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. If a proposed operator or maintenance man fails to understand any segment of this manual, his Supervisor can clarify the misunderstanding through written correspondence or a phone call to:

Mayville Engineering Company Aerial Work Platforms Division of Mayville Engineering Co., Inc. 715 South Street Mayville, Wisconsin 53050 #414-387-4500

SAFETY FEATURES

1. Auto Set Parking Brake

The Automatic Parking Brake is a spring actuated system. The brake is released during drive by hydraulic pressure built up in the drive circuit. A brake valve is used to maintain release during drive. When finished driving, the spring tension will set the parking brake. An orifice is used in the hydraulics control braking function during coast down.

2. Emergency Stop

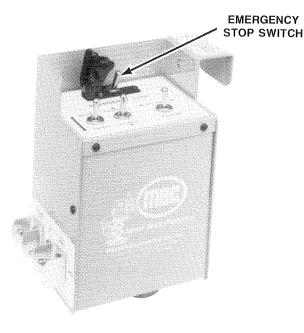
The Emergency Stop is located on the control console. Flip the red cap down and all functions of machine will be de-energized. Flip red cap up and push the toggle switch toward the cap to reactivate circuits (Figure 1).

3. Emergency Down

The Emergency Down control is located at the base. Pull handle on cable to allow platform to descend back to the stowed position. Release handle to stop descent (Figure 2).

4. Automatic Pot Hole Bars

The pot hole bars will rotate down as the platform ascends. If the pot hole bars meet any obstructions that will not allow them to lock into place, the platform will stop raising. Return to stowed position, remove the obstruction and the platform will be able to raise to full extension.



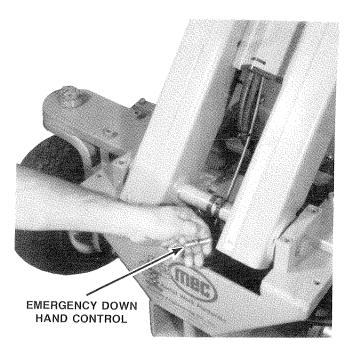


Figure 1. Control Console Emergency Stop Switch.

Figure 2. Emergency Down Control.

AWARNING

MAINTENANCE LOCKS MUST BE INSTALLED when maintaining or servicing machine with platform fully or partially 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. Raise platform as high as necessary to engage maintenance locks.
- 3. Maintenance locks are located at the front and rear of the unit between the inside beam assemblies. With machine raised part way, lift maintenance locks and lower machine so that pivot pins are resting on maintenance locks (Figure 3).

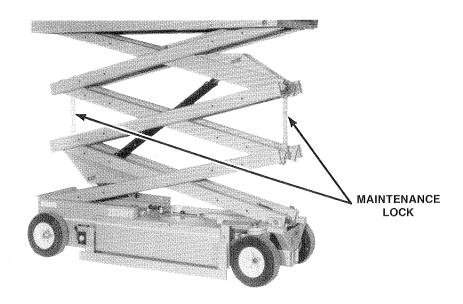


Figure 3. Positioning Maintenance Locks.

WARNING

DO NOT SERVICE EXTENDED OR PARTIALLY EXTENDED MACHINE UNTIL THE ABOVE PROCEDURE IS FOLLOWED.



2. INTRODUCTION

DESCRIPTION

mecNARO Aerial Work Platforms are electrically driven, hydraulically operated units. The platform is raised and lowered by a scissors mechanism. All units are steered by a hydraulic cylinder, which is controlled from the control console on the platform. Emergency lowering and auxiliary lift controls located at the base of the machine.



Figure 4. mecNARO 20 Aerial Work Platforms.

mecNARO SPECIFICATIONS

Through our constant efforts to improve our products, specifications may change without notice.

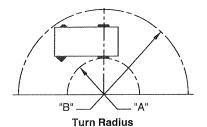
MEASUREMENTS

MODEL NO.	PLAT. HT.	WORK HT.	STOW. HT.��	LIFT CAP.	POWER	O/A LENGTH**	O/A WIDTH	GRND. CLEAR	INSIDE TURN RAD. "A"	OUTSIDE TURN RAD. "B"	APPROX. WT.*	
2034	19' 7" (6.0m)	26' (7.92m)	38" (97cm)	750 lbs. (340kg)	24 vdc Batt.	99.5" (2.50m)	34.5" (.86m)	4" (10.2cm)	64.5" (1.74m)	130* (3.30m)	3300 lbs. (1497kg)	
2034HT	19' 7" (6.0m)	26' (7.92m)	38* (97cm)	750 lbs. (340kg)	24 vdc Batt.	99.5" (2.50cm)	34.5" (.86m)	4* (10.2cm)	64.5" (1.74m)	130" (3.30m)	3350 lbs. (1520kg)	ANNO PERFORMANCE AND ANNO AND
2042	19' 7" (6.0m)	26' (7.92m)	38" (97cm)	1000 lbs. (454.5kg)	24 vdc Batt.	99.5" (2.50m)	42" (1.07m)	4" (10.2cm)	60.5" (1.54m)	134" (3.43m)	3500 lbs. (1588kg)	
2042HT	19' 7" (6.0m)	26' (7.92m)	38* (97cm)	1000 lbs. (454.5kg)	24 vdc Batt.	99.5" (2.50m)	42" (1.07m)	4" (10.2cm)	60.5" (1.54m)	134" (3.43m)	3550 lbs. (1610kg)	

^{*} mecNARO 20 weights include 150 lb. (68kg) skid.

Battery - Replacement battery MUST WEIGH AT LEAST 60 POUNDS to maintain the stability factor of the machine.

Hydraulic Pressure Settings - See Hydraulic schematics pages 46-49. Be sure to identify proper model number.



Hydraulic Reservoir Capacity - 3 gals. - STD. 10W Hydraulic oil, non-detergent.

Lift Time - Standard 45 sec. High Torque - 25 sec.

Descent Time - 35 sec.

Tires on mecNARO machines 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.

Tire Size - Model 2034 16" dia., 5" wide Model 2042 16.5" dia., 6.5" wide (foam filled).

Torque Specs

Hydraulic Valve: Valve to manifold (cartridge) - 12 ft. lbs.

Valve nut to valve - 5 in. lbs.

Hydraulic Drive Motor: 300 ft. lbs. then next slot on castle nut and install cotter pin.

Rear Axle: 140 ft. lbs. then closest slot on castle nut and install cotter pin. Do not back up.

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

ANY BOLT REPLACEMENT SHOULD BE OF THE SAME GRADE OR GREATER THAN ORIGINAL BOLT. ANY QUESTIONS, CALL FACTORY FOR VERIFICATION.



^{**} O/A Length = 104 in. with extending platform option.

^{♦♦} Stow. Ht. with rails on = 79-1/2 in.

3. OPERATION

AWARNING

Before operating this machine, operator MUST carefully read the Safety section at the beginning of this manual. Failure to follow safety precautions may result in death or serious injury.

PRELIMINARY INSTALLATIONS

- 1. Remove all packing materials and inspect for possible damage during shipment. Report any damage immediately to the person delivering the equipment.
- 2. If side railings are not installed, install side railings in sockets on each side of the platform, using rubber mallet, or hammer and block of wood to force fit if necessary. Bolt front and rear rails to the sides with bolts provided. Check that entry gate swings freely. See page 88 for assembly illustration.

NOTE

To install extension platform, refer to the Extension Platform illustrations, pages 90 through 95.

3. Make sure carrying capacity warning decal provided states correct capacity for your machine and install to front rail (Figure 5).

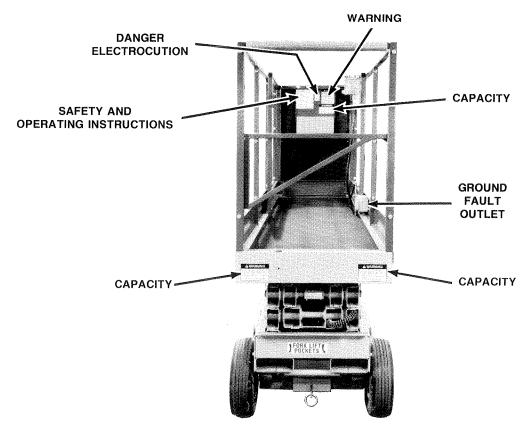


Figure 5. Platform Railings and Warning Decal.

- 4. If not assembled before shipment, connect cable to control console provided and install console on platform railing. Pull emergency stop button up if it has been pushed down or tip flip cap guard up and push the toggle switch toward the cap.
- 5. If wheels have not been installed, install them.
- 6. Check that circuit breaker on lower control station has not been tripped. Reset if necessary (Figure 6).
- 7. Turn **KEY** switch on lower control station to **ON**.
- 8. Flip emergency stop cap up and push the toggle switch toward the cap.
- 9. Check oil level in hydraulic reservoir.
 - a. Inspect machine for hydraulic oil leaks. Do not use the machine until leaks are serviced.
 - b. Using the **UP/DOWN** switch on the lower control station (Figure 6), raise platform high enough to engage maintenance locks.

Move the **UP/DOWN** switch to the **UP** position to raise. To stop platform movement, release the switch

Move the **UP/DOWN** switch to the **DOWN** position to lower. To stop platform movement, release the switch.

A WARNING

MAINTENANCE LOCKS MUST BE INSTALLED when maintaining or servicing machine with platform fully or partially extended.

Working through beams on scissors lifting device creates a hazardous situation which could cause death or personal injury.

FOLLOW MAINTENANCE LOCKS PROCEDURE ON PAGE 4 OF THIS MANUAL.

- c. Lower platform so that maintenance locks are resting on pivot pins. Remove filler cap and check fluid in reservoir. Fill to proper level (Figure 6).
- d. Replace filler cap.
- e. Raise platform slightly and retract maintenance locks.
- 10. Inspect hydraulic system for leaks.

AWARNING

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 and cause serious injury.

If any fluid is injected into your skin, see a doctor at once! Injected fluid must be surgically removed by a doctor familiar with this type of injury or gangrene may result.

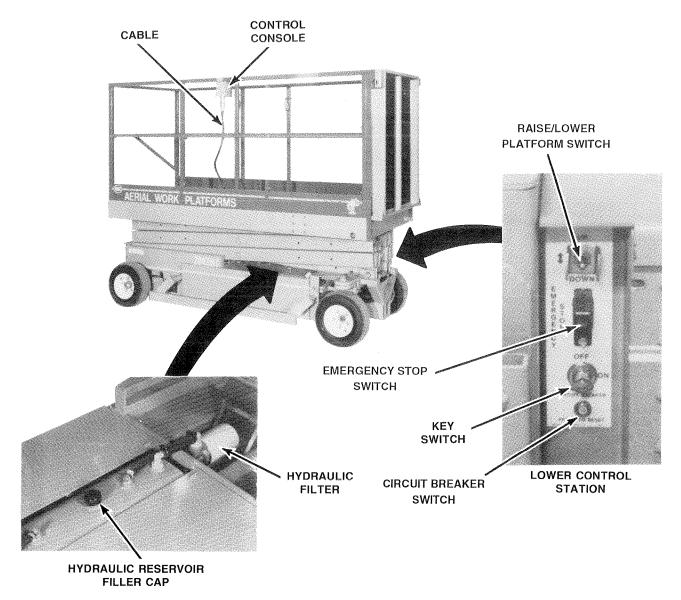


Figure 6. Controls.

CONTROLS IDENTIFICATION

NOTE

Standard and optional controls for all pre 1992 mecNARO models are identified and described below. Not all controls may be on your machine.

1. Lower Control Station (Figure 6):

This station is used for initial start-up of the machine and for raising and lowering the platform.

- a. RUN KEY Switch. When turned to the ON position, this switch supplies electric power to the control switches.
- b. **UP/DOWN Switch.** This toggle switch raises or lowers the platform at the lower control station.

2. Platform Control Consoles (Figure 7):

This console is used to control the machine while walking alongside, and also to control the machine from the platform.

EMERGENCY STOP Switch.

This switch cuts all power to the electrical circuits when it is pushed down. Power will remain off until the switch is reactivated.

FORWARD/REVERSE Drive Switch.

Controls the forward and reverse travel of the machine.

SLOW/FAST Switch.

Controls travel speed.

STEERING Switch.

Controls the direction the machine moves while traveling.

UP/DOWN Switch.

Used to raise and lower the platform.

SECONDARY DRIVE Switch (High Torque Models).

This toggle switch is used at the same time as the **FORWARD/REVERSE Drive** switch for high-speed travel/lift.

POWER/SPEED Switch (High Torque Models).

This toggle switch is used to control the speed the machine can travel and raise the platform. When switched to **POWER**, the machine has more power to climb hills. When switched to **SPEED**, the machine raises the platform at high speed, and the machine travels at its highest speed.

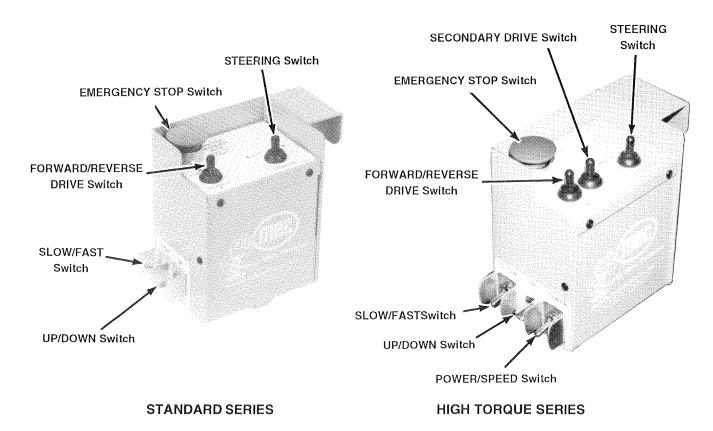


Figure 7. Platform Control Consoles - Pre 1992 Models.

OPERATING INSTRUCTIONS - PRE 1992 MODELS (Figure 7)

- 1. Raise/Lower Platform From Base
 - a. Move the UP/DOWN switch to the UP position to raise. To stop platform movement, release switch.
 - b. Move the UP/DOWN switch to the DOWN position to lower. To stop platform movement, release the switch.
- 2. Move Machine With Control Console
 - a. To travel (forward or reverse):

Move the FORWARD/REVERSE switch in the desired direction.

b. To steer (left or right):

Move the **STEERING** switch in the desired **LEFT** or **RIGHT** direction. Always check area around machine before moving to be sure the area is clear.

- 3. Traveling Speeds (Standard Models)
 - a. Slow speed 1 mph

Position **SLOW/FAST** switch to the **SLOW** position. Move the **FORWARD/REVERSE** switch in the desired direction.

NOTE

The machine will operate in slow speed when the platform is raised above four feet.

b. Normal speed - 2 mph

Position **SLOW/FAST** switch to the **FAST** position. Move the **FORWARD/REVERSE** switch in the desired direction. (Not available if platform is raised above four feet.)

- 4. Traveling Speeds (High Torque Models)
 - a. Slow speed 1 mph

Position SLOW/FAST switch to the SLOW position. Position POWER/SPEED switch to POWER position. Move both the FORWARD/REVERSE switch and the SECONDARY MOTOR switch in the desired direction.

b. Regular speed - 2 mph

Position **SLOW/FAST** switch to the **FAST** position. Move the **POWER/SPEED** switch simultaneously in the desired direction. (Not available if platform is raised above four feet.)

c. High speed - 3 mph

Position SLOW/FAST switch to the FAST position. Position POWER/SPEED switch to SPEED position. Move both the FORWARD/REVERSE switch and the SECONDARY MOTOR switch in the desired direction. (Not available if platform is raised above four feet.)

CONTROLS IDENTIFICATION AND OPERATING INSTRUCTIONS - 1992 AND LATER MODELS

NOTE

Standard and optional controls for all mecNARO 1992 and later models are identified and described below. Not all controls may be on your machine.

1. Lower Control Station (Figure 6):

This station is used for initial start-up of the machine and for raising and lowering the platform.

- a. **RUN KEY Switch.** When turned to the **ON** position, this switch supplies electric power to the control switches
- b. UP/DOWN Switch. This toggle switch raises or lowers the platform at the lower control station.

2. Platform Toggle Switch Type Control Console (Figure 8):

This console is used to control the machine while walking alongside, and also to control the machine from the platform.

EMERGENCY STOP Switch.

The **EMERGENCY STOP** is a toggle switch protected with a flip cap guard. For normal operation, lift the flip cap to its upright position and push the toggle switch toward the cap. This will supply power to the electrical circuit for normal operation. When the flip cap is pushed, it will toggle the switch to the **OFF** position, cutting the supply of power to the normal electrical circuits.

MOTION Switch.

The **MOTION** switch is a two position on/off switch with spring return to the off position. This switch must be toggled and held (either direction) in order to activate either the Drive, Steering, or Lift/Lower function.

Drive Switch (FORWARD/REVERSE).

With the control box in the normal operation location (see decal on the top surface of the rail assembly), toggle the drive switch **FORWARD** to drive forward while holding the **MOTION** switch "on" at the same time. To stop, release (either or both) the **MOTION** and drive switches. For reverse, toggle the **DRIVE** and **MOTION** switches to **REVERSE** and release to stop.

STEERING Switch (LEFT/RIGHT).

With the control box in the normal operating location (see decal on the top surface of the rail assembly), toggle the **STEERING** switch left to turn **LEFT** while holding the **MOTION** switch at the same time. For right turn, toggle the **STEERING** switch to the **RIGHT** while holding the **MOTION** switch. Release the **STEERING** switch to stop turning. The wheels will stay at the angle turned to until turned back to a straight position. The steering function can be operated while stationary or while driving.

UP/DOWN Switch.

While holding the **MOTION** switch in either position, toggle the **UP/DOWN** switch **UP** to raise the platform. To lower the platform, toggle the **UP/DOWN** switch **DOWN** while holding the **MOTION** switch in either position. Release (either or both) to stop.

SPEED CONTROL Switch.

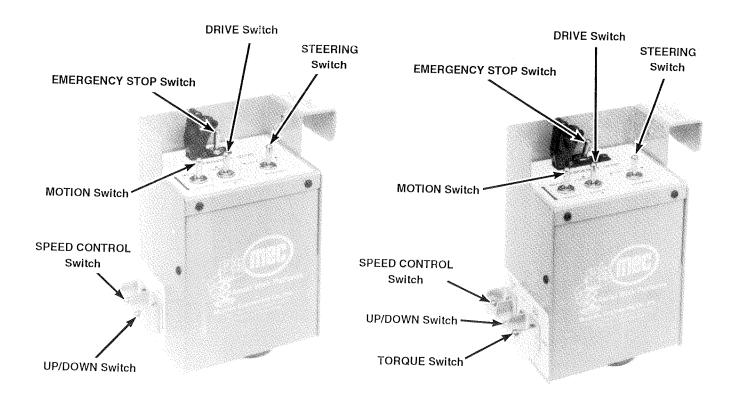
The SPEED CONTROL switch affects both the drive and platform lift/lower functions. Placing this switch in the SLOW DRIVE (down) position will limit travel speed to 1 mph (1/2 mph optional); in the MEDIUM DRIVE (center) position to 2 mph*; in the FAST DRIVE/LIFT (up) position (HT models only) the machine can travel at a speed of 3 mph.** With the SPEED CONTROL in the FAST DRIVE/LIFT (up) position, the platform will raise to full extension in approximately 20 seconds. (This will not allow more lifting capacity, only faster lifting!)

TORQUE ON/OFF Switch (HT Models Only)

The TORQUE ON/OFF switch, depending on the model, in OFF position permits travel at 1-2-3 mph with 10%-15% gradeability and in **ON** position permits travel at 1-2 mph with 20%-25% gradeability. A 3 mph travel speed is only possible with this switch OFF.

* With the platform raised you will be limited to slow speed regardless of the speed control position.

** The TORQUE ON/OFF switch must be in the OFF position to obtain 3 mph.



STANDARD SERIES

HIGH TORQUE SERIES

Figure 8. Platform Toggle Switch Type Control Console - 1992 and Later.

Platform Joystick Control Console (Figure 9)

EMERGENCY STOP

The EMERGENCY STOP is a toggle switch protected by a flip cap guard. For normal operation lift the flip cap to its upright position and push the toggle switch toward the cap. This supplies power to the electrical circuits for normal operation. When the flip cap is pushed, it will toggle the switch to the off position cutting the supply of power to the normal electrical circuits.

Joystick Enable Bar

The enable bar actuates a push button on/off switch which must be held closed while performing a drive or steering function. When pushed in, the motor will run, but no platform motion will occur until the joystick controls are operated.

Joystick Handle

The joystick handle permits control of both drive and steering with the use of one hand.

a. Drive - Forward

Position the control box on the top guard rail in the front right corner of the platform.

Grip the joystick so as to depress the enable bar.

Push the joystick forward to drive forward. As the handle is pushed forward you will feel three notches or steps corresponding to the three travel speeds.

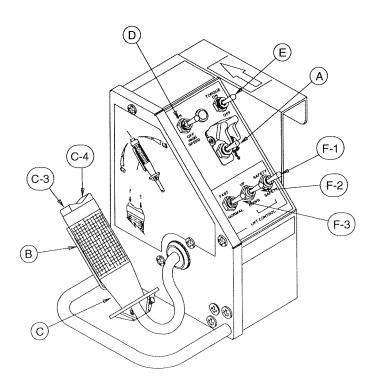
Holding the joystick handle in the first step allows the machine to travel at approximately 1 mph (standard) or 1/2 mph (optional).

NOTE

With the platform elevated, travel speed is limited to slow (1 mph) speed.

Moving to the second step increases travel speed to 2 mph. The TORQUE ON/OFF switch must be in the OFF position.

Continuing on to the third step will only produce a change in drive speed if the HIGH SPEED ON/OFF switch is in the ON position and the TORQUE ON/OFF switch is in the OFF position. This step will then allow the machine to travel at approximately 3 mph.



ART-218

b. Drive - Reverse

To operate the machine in reverse, simply pull back on the joystick handle and follow all the same steps as forward.

c. Steering

While holding the enable bar, press the rocker switch on the top end of the joystick handle to the left or right position as desired. Release the steering rocker switch to stop turning.

NOTE

The wheels will stay at the position turned to until another steering function is initiated. The steering function can be operated while stationary or while driving.

HIGH SPEED ON/OFF Switch (High Torque Models Only)

Turn the **HIGH SPEED ON/OFF** switch to **ON** to allow for travel at 3 mph when the joystick handle is positioned in the third step of either forward or reverse. With the high speed switch in the **OFF** position the third step of the joystick will not change speed.

TORQUE ON/OFF Switch (High Torque Models Only)

The **TORQUE ON/OFF** switch in the **OFF** position permits travel at 1, 2, or 3 mph (**HIGH SPEED ON/OFF** switch **ON**) with 10% - 15% gradeability.

In the **ON** position the **TORQUE ON/OFF** switch enables you to travel at 1 or 2 mph with 20% - 25% gradeability during the drive function. 3 mph travel speed is disabled with **TORQUE ON/OFF** switch in **ON** position.

LIFT CONTROL

a. SAFETY Switch

The **SAFETY** switch is a two position on/off switch with spring return to off position. This switch must be toggled and held (either direction) while activating the **UP/DOWN** switch.

b. UP/DOWN Switch

While holding the **SAFETY** switch in either position, toggle the **UP/DOWN** switch **UP** to raise the platform, or **DOWN** to lower the platform. To stop, release either one or both switches.

c. FAST/NORMAL Switch (High Torque Models Only)

With this switch held in the **NORMAL** position, the platform can be raised from stowed positon to full extension in approximately 37 seconds. With the lift speed switch in the fast position, the platform will raise to full extension in approximately 20 seconds.

NOTE

This will not increase lifting capacity, only the platform lift speed.

EXTENDING PLATFORM

- 1. Fold Down Extending Platform (Figure 10)
 - a. To extend platform
 - (1) Lower the platform deck by lifting lock pin on front right corner and pushing platform forward.
 - (2) Lift lock handles and push rail assembly forward to full extension, lift rear lock handles and lock at full extension.



Do not use extending platform without railings fully extended.

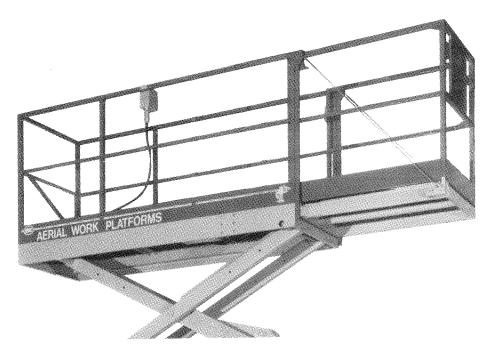


Figure 10. Extending Platform.

- b. To retract platform
 - (1) Lift lock handles and pull rail assembly to stowed position.

NOTE

Rail assembly must be fully retracted and locked before extending platform can be retracted.

- (2) Retract platform deck by pulling support cable.
- 2. Roll Out Extending Platform
 - a. To extend platform
 - (1) Release lock at platform kick panel right side.
 - (2) Push extending platform out to desired position. Platform can be locked in place at 6 inch intervals
 - (3) Lock the platform at the desired position before walking on extended platform.
 - b. To retract platform
 - (1) Release lock.
 - (2) Pull platform in to desired position. Lock platform.

4. MAINTENANCE

INSPECTION AND LUBRICATION

1. Structural Inspection

- a. Check machine for bent structural members. (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 insure a safe operating machine.
- b. Check bushings in scissor beams for broken or cracked welds. Replace beams if bushing welds are cracked or bushings elongated.

2. Lubrication

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.

- a. The mecNARO 20 series scissor lift is almost lubrication free. All pivot pins or rollers come with D.U. bearings which do not require any kind of lubrication.
- b. The only areas that need lubrication are the steering cylinder on both pivot pins and the brake linkage (Figures 11 and 12).

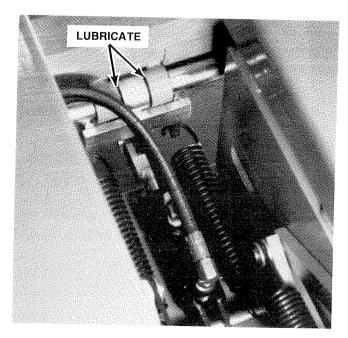


Figure 11. Brake Linkage.

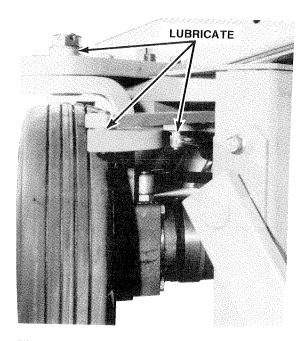


Figure 12. Steering Linkage.

TABLE 1. INSPECTION AND LUBRICATION SCHEDULE.

		TIME IN	TERVAL	
COMPONENT	DAILY	WEEKLY	6 MONTHS	1 YEAR
Battery 1. Check Wiring 2. Check Fluid Level 3. Clean Battery Connections 4. Coat Terminals	X X	X X		
Hydraulic System 1. Check for Leaks 2. Check Fluid Level 3. Inspect Commutator and Brushes 4. Check Hoses 5. Check Fittings 6. Oil Filter (Replace)	X X	X X	X	X
Scissor System 1. Check for Damage	X			
Drive and Lift Mechanism 1. Oil Steering Pivot Points 2. Oil Brake Pivot Points		X X		
Main Frame 1. Check Structure 2. Check Pivot Pins 3. Check All Fasteners	X	х		X
Control System 1. Check Terminal and Plugs 2. Check Cords		X X		
Safety Decals* 1. Check if missing Add if necessary 2. Check if legible Replace if necessary	X X			
Platform 1. Entry Gate 2. Railing Secure in Pockets 3. All Fasteners Secure	X X X			

^{*}See page 56 or 57 for safety decals and locations.

AWARNING

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 machines:

- 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.

Battery

TABLE 2. INSPECTION AND LUBRICATION DAILY LOG.

- 1. Check Wiring
- 2. Check Fluid Level

Hydraulic System

- 1. Check for Leaks
- 2. Check Hoses

Scissor System

- 1. Check for Damage
- 2. Check Snap Rings

Platform

- 1. Entry Gate
- 2. Pivot Bar and Roller
- 3. Railings Secure in Pockets
- 4. Safety Decals

Keep log as follows:

1. Inspect components

2. Check boxes if components OK

or

Make repairs

3. Initial boxes

Key:

B = Battery

H = Hydraulic System

S = Scissor System

P = Platform

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TABLE 3. INSPECTION AND LUBRICATION WEEKLY LOG.

COMPONENT

Check and Initial Every 15 Hours of USE, or Weekly

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^{*} Check every 6 months

SERVICING, REPLACEMENT & ADJUSTMENTS

This section contains three basic maintenance functions:

SERVICING describes items to be checked and serviced when necessary, on a daily basis, or prior to using the unit after it has been out of service for a period of time.

REPLACEMENT describes the proper method for removal and installation of replaceable components in case of failure.

ADJUSTMENT describes any adjustments necessary to ensure proper operation of the unit or adjustments required after the replacement of components, if necessary.

NOTE

CAPSCREW REPLACEMENT: Any capscrew replacement should be of same grade or greater than original. Any questions, call the factory for verification.

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







Batteries

WARNING

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

has much to do with how well your mecNARO 20 functions. Battery wiring and water level should be checked daily. After using continuously for a period of time, it is recommended that the batteries be brought to a full charge as soon as possible. If the batteries are allowed to remain discharged, the lead plates will harden and become sulfated. This will shorten their life as much as over-charging. In this sulfated condition the battery fails to deliver its rated capacity or come up to a full charge. Several long, slow charges and fast discharges are then necessary to correct the sulfation and hardened plates. It is recommended that once a month the batteries be given an equalizing charge of 25% over the regular charge. The equalizing charge must always be given at a low rate to eliminate excessive gassing. Whenever battery temperature reaches 125° F, the charging rate should be reduced or the battery taken off charge and allowed to cool to room temperature.

Do not overfill. When the cells are filled too full, the battery fluid will expand as it becomes warm from charging causing fluid to seep out. Each time this happens, the solution weakens by adding water. Loss of ampere hour capacity will result. Do not run battery dead. Put battery on charge when approximately 80% discharged. (Hydrometer reading of 1.500 at 80° F or 26.6° C.)

AWARNING

NEVER SMOKE OR USE OTHER COMBUSTIBLES NEAR BATTERY. MAKE SURE THERE IS PLENTY OF VENTILATION. HYDROGEN FUMES COULD LEAD TO EXPLOSION.

- a. Charging Batteries. The mecNARO 20 has removable batteries. Be sure to change all when a new power supply is needed.
- b. To Change Batteries (Figure 13)
 - (1) Lower platform completely.
 - (2) Disconnect power supply to the batteries.
 - (3) Push pin down and pull ring and cover forward (Figure 13).
 - (4) Remove cover and front panel.
 - (5) Remove battery hold-down.
 - (6) Remove old batteries.
 - (7) Install new batteries in reverse order.
- c. Checking and Filling Batteries (Every 15 hours of use or when recharging)
 - (1) Lower platform completely.
 - (2) Open battery tray cover.
 - (3) If there is any dirt or corrosion on battery, wash with solution of 5 teaspoons baking soda per quart of warm water.
 - (4) Remove battery caps and check fluid.
 - (5) Fill, if needed, as follows:
 - (a) Before charging, fluid must be above plates in battery.
 - (b) After charging, fill to split ring. Do not overfill.

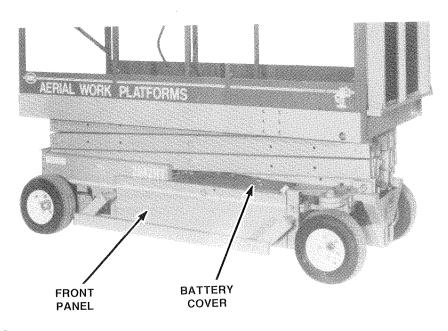


Figure 13. Remove Covers.

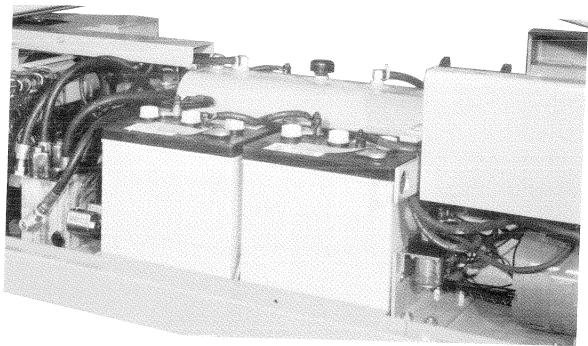


Figure 14. Lift Battery Out.

A CAUTION

Do not overfill. Fluid will expand as it becomes warm from charging and 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 keep fluid up to proper level. When required, water should be added to battery after charging, unless water level is below the top of the plates.

- (6) Coat terminals with petroleum jelly or equivalent coating.
- d. Charging Notes
 - (1) The surrounding temperature has a great effect on the power reserve in a battery.
 - (a) A battery 100% charged at 80° F:
 - -- drops to 65% at 32° F.
 - -- drops to 40% at 0° F.
 - (b) A battery 46% charged at 80° F:
 - -- drops to 32% at 31° F.
 - -- drops to 21% at 0° F.
 - (2) When battery temperature reaches 125° F, battery should be taken off charge and cooled to room temperature or the charging rate should be lowered.
 - (3) Battery should be brought to full charge as soon as possible after continuous use. (Hydrometer reading of 1.265 at 80° F or 26.6° C.)
 - Lead plates in discharged batteries become hardened and sulfated. The battery eventually will not deliver its rated capacity or come up to a full charge. Several long slow charges must be given at low rate to avoid gassing.

e. Charging

AWARNING

Charge battery in an open well ventilated area free of flame, smoking, spark or fire.

- (1) Lower platform completely.
- (2) Open battery tray cover.
- (3) Remove caps, check fluid level and, if needed, fill to cover plates.
- (4) Reinstall caps before charging.
- (5) Plug charger into 120 VAC, 60 Hz power source.
- (6) Turn timer clockwise to ON position.
- (7) Charge until meter reads in finish area or near zero (0). (Charger will turn off automatically when timer runs out.)
- (8) Unplug charger.
- (9) Check that fluid level is up to split rings and reinstall caps.

f. Battery Replacement

- (1) Lower platform completely.
- (2) Disconnect battery supply switch.
- (3) Open battery tray cover.
- (4) Remove nuts from battery hold-down.
- (5) Remove battery cables.
- (6) Remove battery.
- (7) Reverse procedure.

2. Hydraulic System

a. 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 full up and down for six cycles and recheck the reservoir fluid level between each cycle. Fill as required.

b. Spin-On Oil Filter Replacement

The spin-on oil filter in the hydraulic system should be changed yearly. Replace with filter part (#6156) only (Figure 15).

c. Hydraulic Pump Motor Servicing

Common maintenance on DC motors is brush replacement. It is recommended that brushes be checked and replaced if necessary, along with commutator inspection, approximately every six months. The time interval will greatly vary depending on how the machine is being used and the condition of the battery. It is to your advantage to keep the batteries fully charged and in top condition to eliminate service problems in general, and to extend the life of the motor and brushes. (See Battery Servicing.)

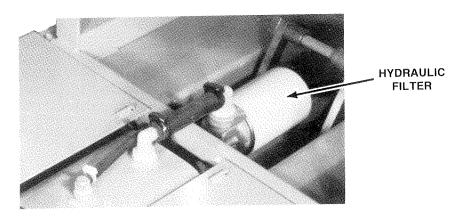


Figure 15. Oil Filter.

d. Check and Fill Hydraulic Reservoir

- (1) Lower platform completely.
- (2) Remove load from platform.
- (3) Raise platform high enough to engage maintenance locks. (See page 4)

A WARNING

MAINTENANCE LOCKS MUST BE INSTALLED when maintaining or servicing machine with platform fully or partially extended.

Working through beams on scissors lifting device creates a hazardous situation which could cause death or personal injury.

FOLLOW MAINTENANCE LOCKS PROCEDURE ON PAGE 4 OF THIS MANUAL.

- (4) Lower platform so that maintenance locks rest on pivot pins.
- (5) Remove filler cap and check fluid in reservoir (Figure 16).
- (6) Fill to proper level.
- (7) Replace cap.
- (8) Raise platform slightly and retract maintenance locks.

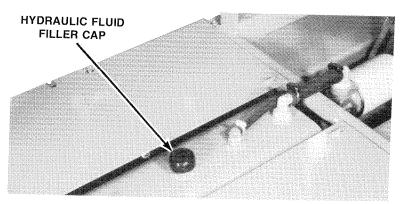


Figure 16. Hydraulic Oil Fill Cap.

e. Hydraulic Pump and Motor Replacement

- (1) Pull battery disconnect.
- (2) Tag and remove wires from motor assembly.
- (3) Remove hydraulic hoses from pump and plug the hoses and ports.

NOTE

In the following step, the high pressure hydraulic line may still be under pressure and fluid will squirt out when line is disconnected. Do not reuse fluid, as it may become contaminated.

(4) Remove bolt holding pump to motor. Remove coupler between pump and motor and keep with the pump.

f. Reassembly

- (1) Put a dab of grease in the tang slot on the motor. This will hold the coupler in place during reassembly.
- (2) Align the coupler slot and the pump tang as the pump is bolted in place.

(3) Reverse steps 3-1 to complete.

g. Hydraulic Valve Adjustments

(1) Operating Pressure Relief - Plumb pressure gauge (0-3000 psi) into primary test port and elevate platform to full extension. Hold switch to UP position long enough to get an accurate reading on gauge. If adjustment is needed, loosen lock nut on relief valve. Set pressure to proper setting for the model you have. See Hydraulic diagram. Turn the adjustment screw in to increase the pressure and out to decrease the pressure. When set, tighten the lock nut and retest.

AWARNING

NEVER SET THE OPERATING PRESSURE OF ANY COMPONENT HIGHER THAN RECOMMENDED.

SETTING PRESSURES HIGHER THAN RECOMMENDED COULD DAMAGE HOSES AND OTHER HYDRAULIC COMPONENTS AND CAUSE DEATH OF PERSONAL INJURY OR PROPERTY DAMAGE.

(2) Steering Pressure Relief - Plumb pressure gauge capable of 3000 psi into the primary test port and energize the steering to full left. Hold switch long enough to get an accurate reading on gauge. Pressure should be set at 1500 psi. If adjustment is needed, loosen lock nut on steering relief valve and set to 1500 psi. Turn the adjustment screw in to increase the pressure and out to decrease the pressure. When set, tighten the lock nut and retest.

(3) Primary Counter Balance Valve - Plumb a pressure gauge capable of 3000 psi into the primary test port. At the lower terminal strip, locate wire #11 going from the terminal strip to the valve manifold. Remove wire #11 and position it so it cannot touch any terminals. Activate the drive switch to FORWARD and take the pressure reading. The pressure should be set at 400 psi. If adjustment is needed, loosen the lock nut and turn in to increase the pressure and out to decrease the pressure. When set, tighten the lock nut and retest.

NOTE

On High torque models this procedure will be performed in the POWER or TORQUE ON mode with both pump motors running.

(4) Secondary Counter Balance Valve (High Torque Models Only) - Plumb a pressure gauge capable of 3000 psi into the secondary test port. Repeat procedure as outlined in step 3 for secondary counter balance valve.

(5) Down Flow Control - The down flow control is adjusted by loosening the lock nut and turning the adjustment bolt in to increase the descent speed of the platform and out to decrease the descent speed. The descent speed should be 35 seconds from full extension to stowed position.

Slow-Speed Switch Adjustment

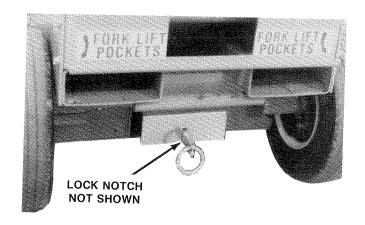
- a. With platform in the stowed position, locate the limit switch at the right hand rear corner under the platform.
- b. Adjust switch forward to compress plunger against the roller extension bar.
- c. Slow-speed valve will then be energized when platform reaches a height of 10-12 inches, allowing machine to travel in slow speed only.

4. Brake Adjustment

NOTE

Adjust brakes so that parking brake holds machine on an incline which it is capable of climbing. The machine is designed to have the brake on whenever it is not being driven.

- a. Position upper control box to be able to energize steering and reach a brake manual release ring. Energize steering and pull up on release ring. Release steering switch (Figures 17 and 18).
- b. Raise rear of machine enough that tires are not touching floor. NOTE: Both rear wheel brakes are independently applied. Both have to be adjusted the same.
- c. Loosen lock nut from brake adjustment bolt (Figure 19). If wheel turns freely, move adjustment bolt toward inside of mounting bracket until wheel becomes tight.
- d. Back off on adjustment bolt until wheel turns with some amount of drag (can be turned with firm grip of one hand).
- e. Retighten adjustment lock nut and check if wheel turns the same. (Do this to both sides.)
- f. Lower machine to floor and test by driving to see if brakes are adjusted correctly. Unit should coast approximately 12-14 inches and then lock in place.



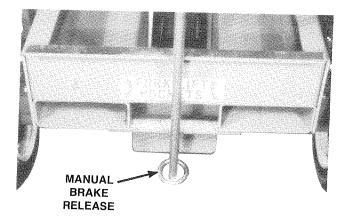


Figure 17. Brake Locked.

Figure 18. Brake Released.

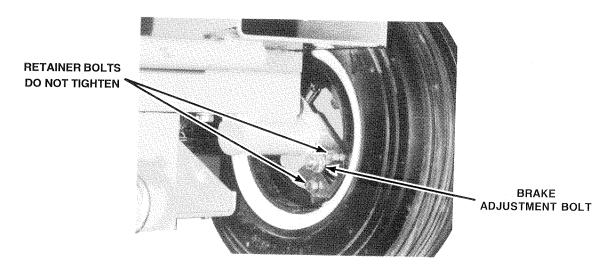


Figure 19. Brake Adjustment.

AWARNING

MAINTENANCE LOCKS MUST BE INSTALLED when maintaining or servicing machine with platform fully or partially extended.

Working through beams on scissors lifting device creates a hazardous situation which could cause death or personal injury.

FOLLOW MAINTENANCE LOCKS PROCEDURE ON PAGE 4 OF THIS MANUAL.

- a. Raise platform.
- b. Engage maintenance locks (page 4).
- c. Lower platform until beam assemblies touch maintenance locks.
- d. Remove cylinder pin retainer plates on both sides of cylinder mounting (top and bottom) (Figure 20).
- e. Wrap a self-tightening strap around center of the cylinder.
- f. With a lifting device apply upward pressure.
- g. Remove low-pressure hose and high-pressure hose from lower end of cylinder. (You will lose approximately 2 quarts of oil.)

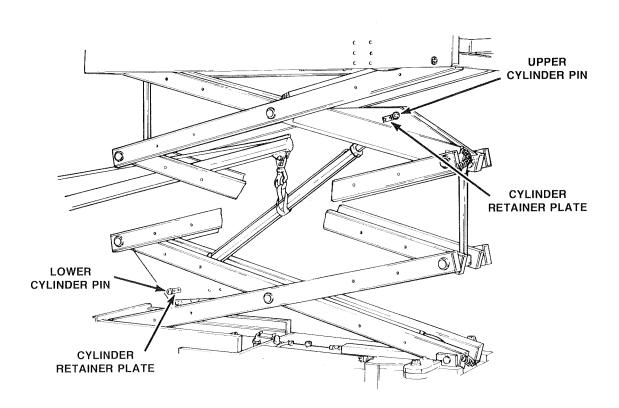


Figure 20. Removing Lift Cylinder Pins and Retainers.

- h. Remove top cylinder pin and bottom cylinder pin.
- i. Raise cylinder up and out of machine.
- j. Replace cylinder and reassemble in reverse order.
- k. Bleed air from system by raising and lowering platform 6 times to full extension.
- Recheck fluid level in down position.

Outer Beams and Inner Beam Assembly Replacement

NOTE

When replacing damaged or worn scissor lift beams, care must be taken to assemble beams so that outer beam washer reinforcements face toward inner beam assemblies (Figure 21).

The outer beams are made with steel of 10 ga. (0.134 in.). Only the lower inside beam weldment is 7 ga. (0.179 in.). Assemble the outer beams as shown (Figure 21).

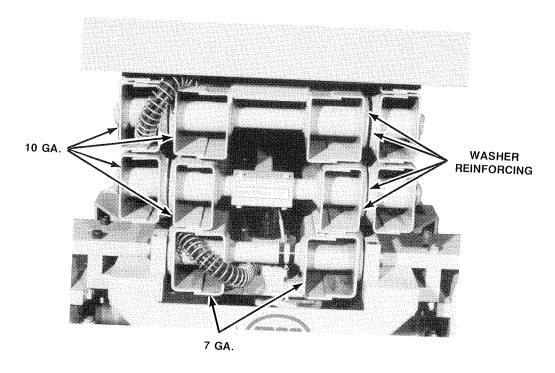


Figure 21. Washer Reinforcing.

Automatic Stabilizer Limit Switches

- a. Front limit switch is located within the lower inner scissors member, above the front axle. (Figure 22)
 - (1) The front limit switch is activated when the platform is below seven (7) feet. The switch is contacting the inside of the lower inner beam member.
 - (2) Check to see that switch roller contacts beam surface. Be sure that switch does not extend far enough to get caught under the beam member.

FRONT LIMIT SWITCH

(3) Loosen adjustment nuts and adjust in or out to get proper operation.

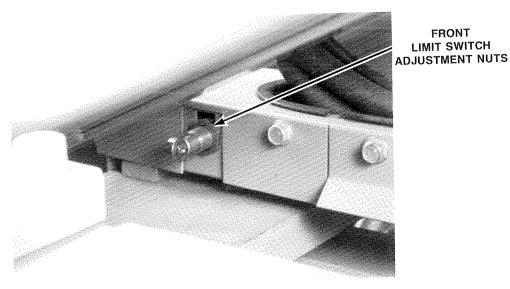


Figure 22. Front Limit Switch Adjustment.

- b. Rear limit switch is located at the base directly in from the left rear wheel. (Figure 23)
 - (1) The rear limit switch is activated when the stabilizer actuator rolls forward and contacts the limit switch when fully forward.
 - (2) Check to see that roller bar activates limit switch.
 - (3) If limit switch is not operating properly, adjust switch by loosening two adjustment nuts and retightening to proper position.

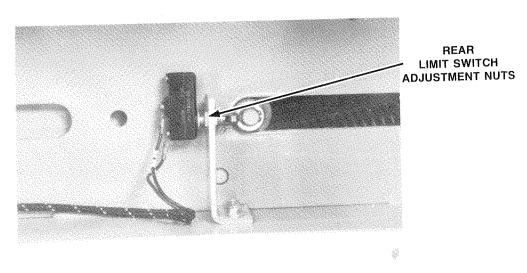


Figure 23. Rear Limit Switch Adjustment.

5. TROUBLESHOOTING

GENERAL TROUBLESHOOTING

- The mecNARO 20 Series is an electric over hydraulic operated unit.
- 2. The first step in troubleshooting or repairing a functional defect is to be sure the electrical side of the system is functioning properly, that all wiring is in good condition and wired correctly, and that all switches, especially limit switches, are in place and functioning properly.
- 3. Electrical diagrams have been provided on pages 38 through 45 in this manual. Be sure to follow the appropriate diagram for your model and vintage.
- 4. The mecNARO 20 Series electrical system is numbered for identification. The numbering system is based on the terminal strip. All wires going through terminal one (1) will be marked as number one (1).
- 5. The switches as shown in the diagrams are seen from the rear of the switch.
- Both the electrical and hydraulic diagrams are drawn with the unit in the stowed position with no functions actuated.
- 7. Hydraulic diagrams have been provided on pages 46 through 49 in this manual.
- 8. The hydraulic diagram has a corresponding picture to aid in identifing the individual valves for servicing.
- 9. All pressures listed in the hydraulic diagrams are taken at the test plug point in the hydraulic system.

A WARNING

MAINTENANCE LOCKS MUST BE INSTALLED when maintaining or servicing machine with platform fully or partially extended.

Working through beams on scissors lifting device creates a hazardous situation which could cause death or personal injury.

FOLLOW MAINTENANCE LOCKS PROCEDURE ON PAGE 4 OF THIS MANUAL.

Refer to appropriate maintenance section for more detailed information regarding any suggested repair or adjustment.

SERVICE HELPS

No LIFT motion (pump motor not operating). Primary pump motor on High Torque Models.

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Dead battery.	1.	Check and charge battery as directed in Maintenance section.
2.	Blown fuses.	1. 2.	Check fuse and replace if necessary. Reset breaker.
3.	KEY switch.	1. 2.	Turn KEY switch to ON position. Replace KEY switch.
4.	Emergency stop switch.	1. 2.	Reset emergency stop switch (both). Replace switch if defective.
5.	UP switch.	1.	Replace UP switch.
	Defective motor contactor.	1.	Replace contactor.
6.	Electrical circuit defective.	1.	Refer to electrical diagram.
		1.	Replace brushes and springs.
<u>8.</u> 9.	Worn brushes. Shorted armature.	1.	Replace motor.

No LIFT motion (pump motor operating). Primary pump motor on High Torque Models.

-			REPAIR PROCEDURES
	POSSIBLE CAUSES		
1.	Pump cavitation A. Hydraulic fluid level low. B. Filter plugged.	1. 1.	Add hydraulic fluid. Drain reservoir and flush system. Refill and replace hydraulic filter.
	C. Suction line fitting loose.	1.	Tighten loose fitting. Use Teflon sealing tape if needed.
	D. Improper fluid for temperature conditions.	1.	Drain reservoir and bleed system. Refill with hydraulic fluid suitable for the temperature.
2.	Defective pump.	1.	Replace pump.
	Defective UP valve or coil.	1.	Replace valve or coil.
3.		1.	Replace valve or coil.
4.	Defective DOWN valve or coil.		
5.	Defective electrical circuitry.	1.	Refer to electrical diagram.
6.	Stabilizer bars not allowed to fully set and lock.	1.	Clear obstruction and allow stabilizers to set and lock.
7.	Defective or misadjusted pressure relief valve.	1.	Replace or readjust pressure relief valve.
8.	Defective hydraulic circuitry.	1.	Refer to hydraulic diagram.

No FAST LIFT (primary pump motor operates, secondary pump motor not operating), High Torque Models only.

			TO THE PROPERTY OF THE PROPERT
	POSSIBLE CAUSES		REPAIR PROCEDURES
1	Defective SECONDARY PUMP switch.	1.	Replace SECONDARY PUMP switch.
2.	Electrical circuit defective.	1.	Refer to electrical diagram.
".	Defective motor contactor.	1.	Replace contactor.
	Worn brushes.	1.	Replace brushes and springs.
<u>-7.</u> 5	Shorted armature.	1.	Replace motor.

No FAST LIFT (pump motor operating). Primary pump motor on High Torque Models.

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Hydraulic fluid level low.	1.	Add fluid (see Maintenance section).
2.	Pump cavitation caused by improper fluid	1.	Drain reservoir and bleed system. Use only
	for temperature.		recommended type fluids (see Maintenance section).
3.	Electrical circuitry defective.	1.	Refer to electrical diagram.
4.	Loose intake hose or filter.	1.	Tighten.
5.	Defective high-speed valve or coil.	1.	Replace high-speed valve or coil.
6.	Defective hydraulic circuitry.	1.	Refer to hydraulic diagram.

Ascent speed slow or erratic.

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Weak battery.	1.	Charge battery (see Maintenance section).
2.	Loose or dirty connections in electrical circuitry.	1.	Perform visual inspection and ensure all connections are secure and clean.
3.	Momentary short in wiring.	1.	Refer to electrical diagram.
4.	Bent structural members.	1.	Replace damaged members as necessary (see visual structural inspection in Maintenance section).
5.	Restriction in hydraulic hose.	1.	Replace defective hydraulic hose.
6.	Defective or jammed seals in hydraulic lift cylinder.	1.	Replace hydraulic cylinder seals or cylinder.
7.	Pump gear or gear cavity worn or damaged.	1.	Replace pump (see Maintenance section).
8.	Worn brushes in motor.	1.	Replace brushes.
9.	Defective high-speed valve or coil.	1.	Replace high-speed valve or coil.
10.	Loose intake hose or oil filter.	1.	Tighten connection or filter.
11.	Defective down valve in manifold or in cylinder.	1.	Replace valve.
12.	Defective emergency down valve.	1.	Replace valve.
13.	Defective pressure relief valve.	1.	Replace valve.
13.	Defective pressure relief valve.	1.	

Descent speed slow.

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Flow control out of adjustment.	1.	Adjust (see Maintenance section).
2.	Defective down valve.	1.	Replace valve.
3.	Obstruction in hydraulic hose.	1.	Replace defective hose.
4.	Friction in structural members.	1. 2.	Check for damaged members and cracked welds (see Maintenance section). Replace damaged structural members. This is to be done by factory authorized personnel only.

Unit will not descend.

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Down signal not applied to down solenoid or solenoids.	1. 2. 3.	Check fuse. Check switch. Check electrical circuitry. Refer to electrical diagram.
2.	Defective down coil or coils.	1.	Replace coil.
3.	Defective down valve or valves.	1.	Replace valve.

Unit creeps down.

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Damaged seal in lift cylinder.	1. 2.	Replace damaged seals. Replace hydraulic cylinder (see Maintenance section).
2.	Defective down valves.	1.	Replace valves.
3.	Defective emergency down valve.	1.	Replace valve.

Drive function inoperative (hydraulic pump not operating).

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Defective electrical circuitry.	1. 2.	Check lift function. If no motion refer to lift section. Refer to electrical diagram.
2	Blown fuse/circuit breaker.	1.	Check and replace fuse. Reset breaker.
3.	Defective FORWARD/REVERSE switch.	1.	Check continuity. Replace switch.
<u>J.</u>	Defective motor contactor (Electric Series).	1.	Replace contactor.
5.	Defective motor.	1.	Repair or replace motor.

Drive function inoperative in either direction (hydraulic pump operating).

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Defective FORWARD/REVERSE switch.	1.	Replace switch.
2.	Defective drive valve or coil.	1.	Replace drive valve or coil.
3.	Defective electrical circuitry.	1.	Refer to electrical diagram.
4.	Low battery (Electric Series).	1.	Charge battery.
5.	Defective hydraulic motor.	1.	Replace drive motor.
6.	Defective brake.	1.	Adjust brake (see Maintenance section).
7.	Defect in hydraulic circuit.	1.	Refer to hydraulic diagram.

High Torque drive function inoperative. (Available only with platform in the stowed position.)

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Platform elevated above 18 inches.	1.	Lower platform to stowed position.
2.	Defective secondary motor switch.	1.	Replace switch.
3.	Defective speed/power or torque switch.	1.	Replace switch.
4.	Defective electrical circuitry.	1.	Refer to electrical diagram.
5.	Defective power valve(s) or coil(s).	1.	Replace valve(s) or coil(s).
6.	Defective secondary drive valve or coil(s).	1.	Replace valve or coil(s).

No motion in one drive direction only.

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Defective forward/reverse valve or coil.	1.	Replace defective valve or solenoid.
2.	Defective electrical circuitry.	1.	Refer to electrical schematic.
3.	Defective FORWARD/REVERSE switch.	1.	Replace switch.

No high speed travel. (Available only with the platform in the stowed position.)

	POSSIBLE CAUSES	REPAIR PROCEDURES		
1.	Slow speed limit switch misadjusted or defect	ctive. 1.	Readjust or replace limit switch.	
2.	Defective slow speed valve(s).	1.	Replace valve(s).	
3.	Defective electrical circuitry.	1.	Refer to electrical diagram.	
4.	Defective SLOW/FAST switch.	1.	Replace switch.	
5.	Platform elevated above 18 inches.	1.	Lower platform to stowed position.	

Machine travels in fast speed when platform is above 18 inches.

	POSSIBLE CAUSES		REPAIR PROCEDURES		
1.	Misadjusted or defective SLOW SPEED switch.	1.	Adjust or replace switch.		
2.	Defective electrical circuitry.	1.	Refer to electrical diagram.		
3.	Defective slow speed valve(s) or coil(s).	1.	Replace valve(s) or coil(s).		

Brake does not release.

	POSSIBLE CAUSES	REPAIR PROCEDURES		
1.	Defective brake valve.	1.	Replace valve.	
2.	Defective brake coil.	1.	Replace coil.	
3.	Defective brake cylinder.	1.	Replace cylinder. Replace seals in cylinder.	
4.	Contamination lodged in brake orifice.	1.	Remove contamination.	
5.	Brake pads misadjusted.	1.	Adjust brake (see Maintanance section).	

Brake does not set.

***************************************	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Contamination lodged in brake orifice.	1.	Remove contamination.
2.	Defective brake valve.	1.	Replace.
3.	Misadjusted brake pads.	1.	Adjust brake (see Maintanance section).
4.	Broken or missing brake spring(s).	1.	Replace brake spring(s).

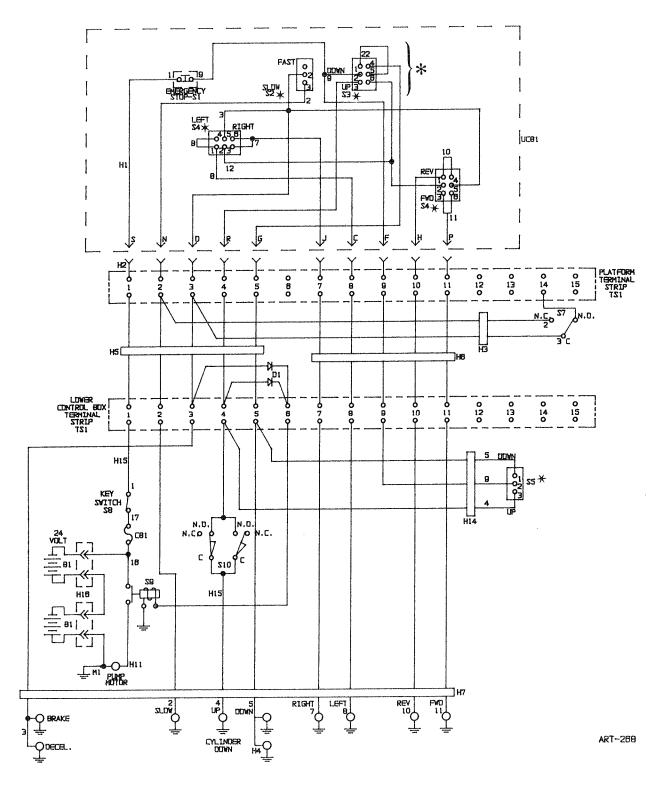
Steering inoperative.

	POSSIBLE CAUSES		REPAIR PROCEDURES
1.	Defective electrical circuitry.	1.	Refer to electrical diagram.
2.	Defective steering valve or coil.	1.	Replace steering valve or coil.
3.	Defective steering cylinder.	1. 2.	Replace steering cylinder. Replace cylinder seals.
4.	Defective steering pressure relief valve.	1.	Replace valve.
5.	Contamination lodged in steering orifice.	1.	Remove contamination.

NOTES

WIRING DIAGRAM

mecNARO 20 (STANDARD SERIES without Motion Switch) Models 2034 & 2042 Pre 1992 Models



^{*} NOTE: Switch wiring as seen from the rear of switch.

Up/Down Switch at Upper Control Box - Contacts Made With Toggle at Keyway Position 1-2, 4-5 - Center Position 1-2, 5-6 - Opposite Keyway 2-3, 5-6

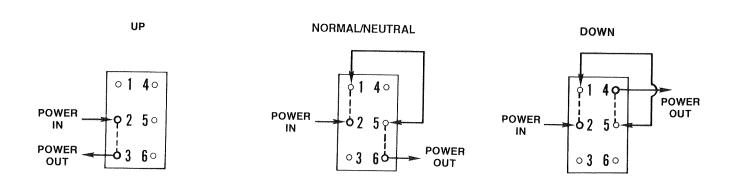
Symbol Identification for **WIRING DIAGRAM**

mecNARO 20 (STANDARD SERIES without Motion Switch) Models 2034 & 2042 Pre 1992 Models

Qty.	Symbo	Description	Part No.
4	B1	Battery, 6V, Deep Cycle (GC2)	5970
1	CB1	Circuit Breaker, 15 Amp	7235
2	D1	Diode Assembly, 3 Amp, 600V (PIV)	6070
1	H1	Harness (w/Cannon End), Control Box	5982
1 Service	H2	Harness (w/Cannon End), Upper Control Repair Kit, Cannon Plug	5983 6318
1	НЗ	Harness, Speed Limit Switch	7070
1	H4	Harness, Cylinder Down Valve	6787
1	H5	Harness, Scissors, Nos. 1-5	6739
1	H6	Harness, Scissors, Nos. 7-11	6740
1	H7	Harness, Valve Manifold	6805
1	H10	Harness, 110V AC Outlet Assy.	6746
1	H11	Cable, Motor	6123
1	H14	Harness, Lower Controls	6764
1	H15	Harness, Power, Ground & Stabilizer Limit Switches	7076
1	H16	Jumper, Battery, 16 in.	7017
2 2	H17	Jumper, Battery, 5 in. Cable Assembly, Connector	6208 6687

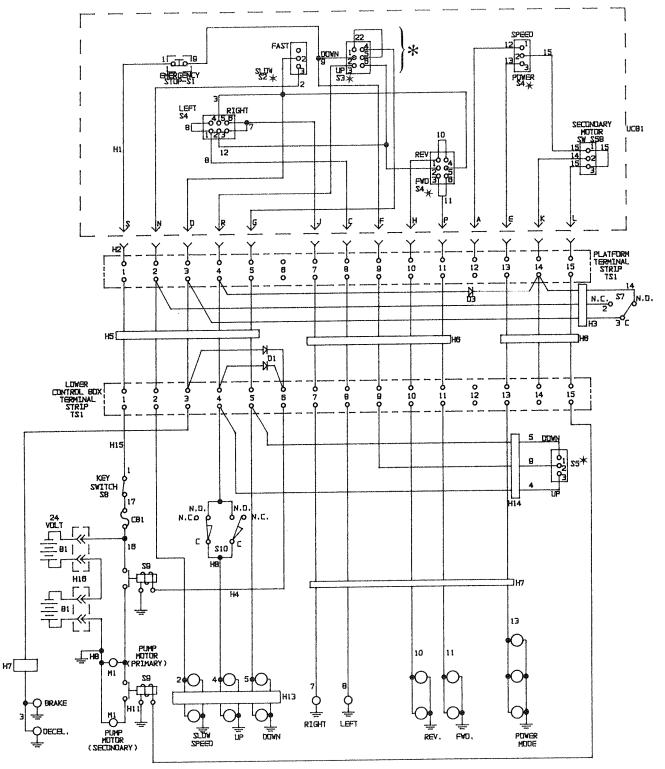
Qty.	Symbol	Description	Part No.
1	M1	Motor, 24V	6194
****	S1	Switch Assy., Emergency Stop	7800
1	S2	Toggle Switch (Fast/Slow)	5630
1	S3	Toggle Switch (Up/Down) (See diagram below)	5979
2	S4	Toggle Switch (Drive/Steer)	5694
1	S5	Toggle Switch (Up/Down - Lower Control)	5230
1	S7	Plunger Switch (Speed Limit)	6715
1 Service	S8	Key Switch (w/Keys) Key Only	5936 6117
1	S9	Contactor, Motor	5967
2	S10	Plunger Switch (Stabilizer Limit)	6016
2	TB1	Toggle Boot	5692
2	TS1	Terminal Strip	5991
1	UCB1	Control Box, Upper	2107

★ Up/Down Switch Diagram (at Upper Control Box)



WIRING DIAGRAM

mecNARO 20 (HIGH TORQUE SERIES without Motion Switch)
Models 2034HT & 2042HT
Pre 1992 Models



^{*}NOTE: Switch wiring as seen from the rear of switch.

ART-269

Up/Down Switch at Upper Control Box - Contacts Made With Toggle at Keyway Position 1-2, 4-5 - Center Position 1-2, 5-6 - Opposite Keyway 2-3, 5-6

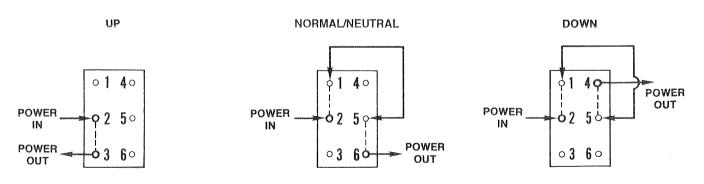
Symbol Identification for WIRING DIAGRAM

mecNARO 20 (HIGH TORQUE SERIES without Motion Switch)
Models 2034HT & 2042HT
Pre 1992 Models

Qty.	Symbol	Description	Part No.
4	B1	Battery, 6V, Deep Cycle (GC2)	5970
1		CB1Circuit Breaker, 15 Amp	7235
2	D1	Diode Assembly, 3 Amp, 600V (PIV)	6070
1	D3	Diode Assembly, 3 Amp, 600V (PIV)	6241
1	H1	Harness (w/Cannon End), Control Box HT Wire Set	5982 6296
1	H2	Harness (w/Cannon End), Upper Control Repair Kit, Cannon Plug	5983
•		(Terminals)	
1	НЗ	Harness, Limit Switch	7070
1	H4	Harness, Cylinder Down Valve	6787
1	H5	Harness, Scissors, No. 1-5	6739
1	H6	Harness, Scissors, Nos. 7-11	6740
1	H7	Harness, Secondary Manifold	6766
1	H8	Harness, Power, Ground & Stabilizer Limit Switches	7076
1	H9	Harness, Scissors, Nos. 13-15	6741
1	H10	Harness, 110V AC Outlet Assy	6746
1	H13	Harness, Primary Manifold	6765
1	H14	Harness, Lower Controls	6764

Qty.	Symbol	Description	Part No.
1	H16	Jumper, Battery, 16 in.	7017
2	H17	Jumper, Battery, 5 in.	6208
2		Cable Assembly, Connector	6687
2	M1	Motor, 24V	6194
	S1	Switch Assy., Emergency Stop	7800
1	S2	Toggle Switch (Fast/Slow)	5630
3		Toggle Boot	5692
1	S3	Toggle Switch (Up/Down) (See diagram below)	5979
2	S4	Toggle Switch (Drive/Steer)	5694
2	S5	Toggle Switch (Up/Down - Lower Control, Secondary Motor)	5230
1	S6	Toggle Switch (Speed/Power)	6234
1	S7	Plunger Switch (Speed Limit)	6715
1	S8	Key Switch (w/Keys)	5936
2		Key Only	5991
2	S9	Contactor, Motor	5967
2	S10	Plunger Switch (Stabilizer Limit)	6016
2	TS1	Terminal Strip	5991
1	UCB1	Control Box, Upper	2107

☆ Up/Down Switch Diagram (at Upper Control Box)

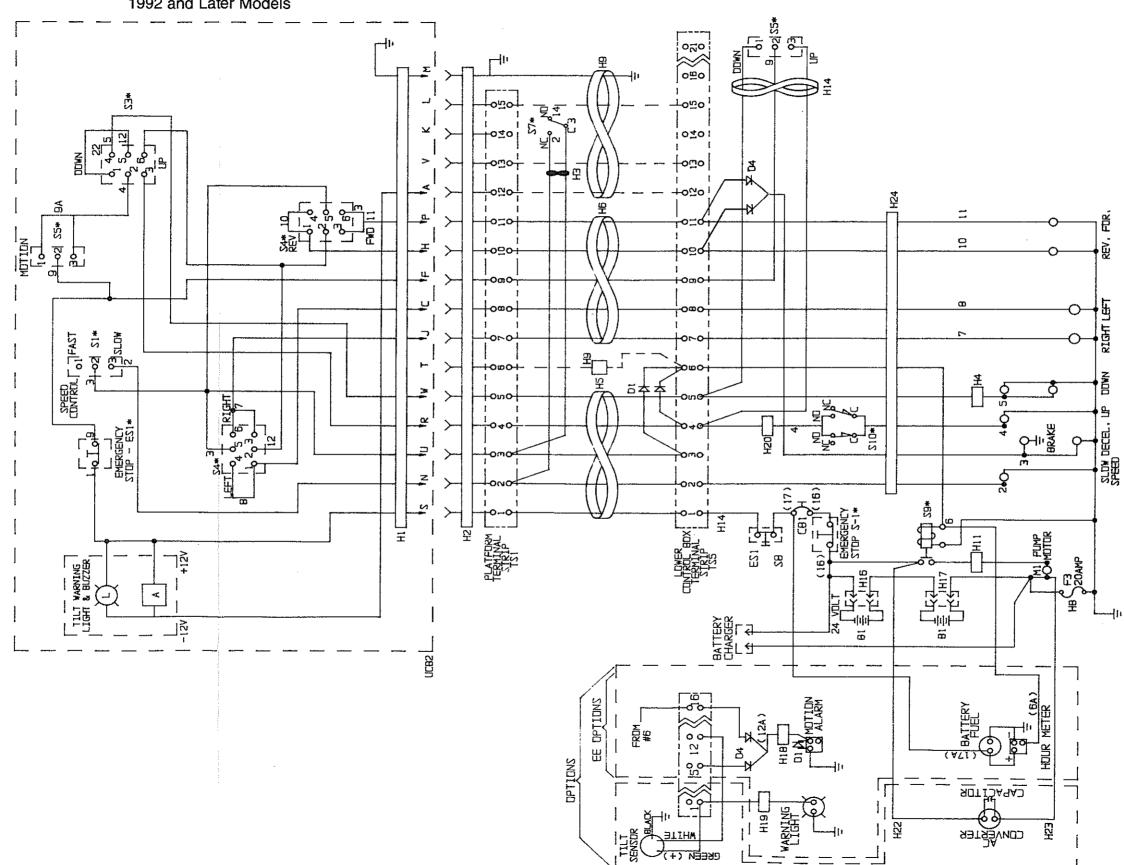


WIRING DIAGRAM

THE NARO 20 (STANDARD & STANDARD EE SERIES)

Models 2034 & 2042

1992 and Later Models



Symbol Identification for **WIRING DIAGRAM**

mecNARO 20 (STANDARD & STANDARD EE SERIES)

Models 2034 & 2042 1992 and Later Models

				rt No.
Qty.	Symbol	Description	Standard	Standard El
4	B1	Battery, 6V, Deep Cycle (GC2)	5970	5970
1	CB1	Circuit Breaker, 15 Amp	7235	7577
2	D1	Diode Assembly, 3 Amp, 600V (PIV)	6070	6070
	ES1	Emergency Stop Assembly		
1	F3	Fuse. 20 Amp	7275	7275
1	H1	Harness , Control Box w/Connector	7657*	7657
1	H2	Harness Upper Control Cord w/Connector	7656*	7656
1	НЗ	Harness, Speed Limit Switch	7070	7070
1	H4	Harness, Lift Cylinder Down Valve	6787	6787
1	H5	Harness, Base to Platform, Nos. 1-5	6739	6739
1	H6	Harness, Base to Platform, Nos. 7-11	6740	6740
1	H8	Harness, Ground		7588
1	H9	Harness, Base to Platform, Nos. 6, 12, 15	6741	6741
1	H14	Harness, Lower Controls	6764	6764
1	H16	Cable, Battery Jumper Awg 2-23 in.	7017	7613
1	H20	Harness, Power, Ground & Stabilizer Switches	7912	7603
1	H24	Harness, Manifold, Standard	6805	6805
1	M1	Motor, 24VDC Permanent Magnet	6194	7169
3	S1	Switch - SP, ST Toggle	5630	5630
2		Switch Guard Emergency Stop	7622	7622
1	S3	Switch - DP, DT, 2-Way Interlock, SR Toggle	5979	5979
2	S4 _.	Switch - DP, DT, SR Toggle	5694	5694
2	S5	Switch - SP, DT, SR Toggle	5230	5230
1	S7	Switch - Speed Limit - Plunger	6715	6715
1	S8	Switch - Key w/2 Keys	5936	5936
	Serv.	Key - Only	6117	6117
1	S9	Contactor - Motor Run	5967	5967
2	S10	Switch - Stabilizer Limit, w/Roller	6016	7583
1	TS1	Terminal Strip	5991	5991
1	TS5	Terminal Strip	6947	6947
	UCB2	Upper Control Box (Also see pages 82, 83, or 84)	4940	4940

^{*} Part Numbers shown are for standard machines built after 1-1-92. For machines built before that date, order part no. 5983 for Harness H2 and part no. 5982 for Harness H1.

Key:
SP = Single Pole
DT = Double Throw
SR = Spring Return
ST = Single Throw
DP = Double Pole

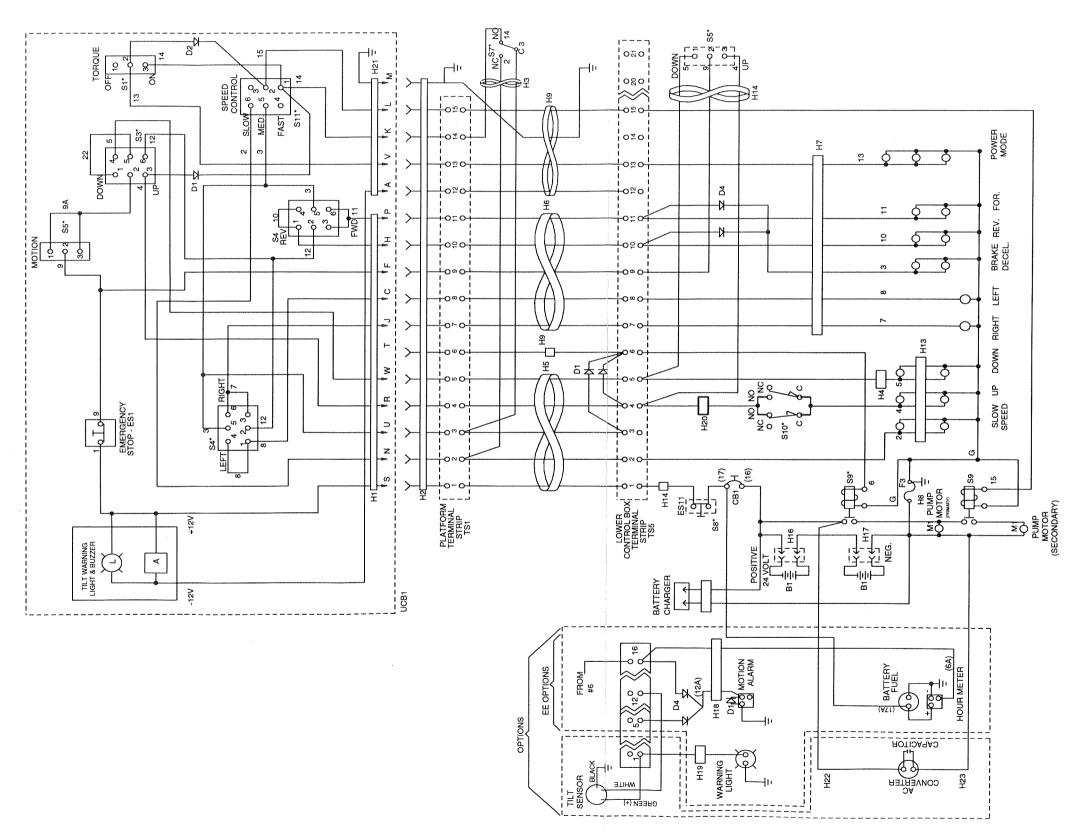
OPTIONS

			Pai	rt No.
Qty.	Symbol	Description	Standard	Standard EE
1	AC	AC Converter	7103	N/A
1	A 1	Alarm - Tilt Warning	7553	7553
1	BC	Battery Charger (Also see page 62)	6995	6995
1	BF	Battery Fuel Gauge	7099	7099
1	CA	Ceramic Capacitor .1 MF	7130	N/A
1	D1	Diode, Motion Alarm	6070	Not Used
1	D4	Diode, Dual	6946	6946
1	HM	Hour Meter	6857	7590
2	H11	Cable Assembly, Connector	6687	7615
1		Harness, 110VAC Outlet Assembly	6746	6746
2	H17	Jumper - Battery 8.5M Awg #2	6208	7614
1	H18	Harness - Battery Fuel Gauge, Motion Alarm, Hour Meter	7604	7604
1	H19	Harness - Warning Light	4914	4914
1	H22	Harness - AC Converter Red	7114	N/A
1	H23	Harness - AC Converter Black	7113	N/A
1	L1	Indicator Light - Tilt Warning	6906	6906
1	MA	Motion Alarm	7102	7630
1	TS2	Tilt Sensor 4-1/2° 1 Second Delay	7552	7552
1	WL	Warning Light	7105	7595

Troubleshooting 43

WIRING DIAGRAM

mecNARO 20 (HIGH TORQUE & HIGH TORQUE EE SERIES) Models 2034HT & 2042HT 1992 and Later Models



ART-120

Symbol Identification for WIRING DIAGRAM

mecNARO 20 (HIGH TORQUE & HIGH TORQUE EE SERIES) Models 2034HT & 2042HT 1992 and Later

	•		Pa	rt No.
Qty.	Symbol	Description	Hi-Torque	Hi-Torque EE
4	B1	Battery, 6V, Deep Cycle (GC2)	5970	5970
1	CB1	Circuit Breaker	7235	7577
3	D1	Diode Assembly, 3 Amp, 600V (PIV)	6070	6070
1	D2	Diode , 3 Amp 600V (PIV)	6241	6241
	ES1	Emergency Stop Assembly		
1	F3	Fuse. 20 Amp	7275	7275
1	H1	Harness , Control Box w/Connector	7657*	7657
1	H2	Harness Upper Control Cord w/Connector	7656*	7656
1	H3	Harness, Speed Limit Switch	7070	7070
1	H4	Harness, Lift Cylinder Down Valve	6787	6787
1	H5	Harness, Base to Platform Nos. 1-5	6739	6739
1	H6	Harness, Base to Platform Nos. 7-11	6740	6740
1	H7	Harness, Secondary Manifold	676 8 5	6766
1	H8	Harness, Ground		7588
1	H9	Harness, Base to Platform Nos. 6, 12-15	6741	6741
1	H13	Harness, Primary Manifold	676₽√₀	6765
1	H14	Harness, Lower Controls	6764	6764
1	H16	Cable - Battery Jumper Awg 2-23 in.	7017	7613
1	H20	Harness, Power, Ground & Stabilizer Switches	7076	7603
1	H21	Harness, HT Wire Set	7658*	7658
1	M1	Motor, 24VDC Permanent Magnet	6194	7169
3	S1	Switch - SP, ST Toggle	5630	5630
2		Switch Guard Emergency Stop	7622	7622
1	S3	Switch - DP, DT, 2-Way Interlock, SR Toggle	5979	5979
2	S4	Switch - DP, DT, SR Toggle	5694	5694
2	S5	Switch - SP, DT, SR Toggle	5230	5230
1	S7	Switch - Speed Limit - Plunger	6715	6715
1	S8	Switch - Key w/2 Keys	5936	5936
	Serv.	Key - Only	6117	6117
2	S9	Contactor - Motor Run	5967	5967
2	S10	Switch - Stabilizer Limit, w/Roller	6016	7583
1	S11	Switch - DP - 3-Position Toggle	7633	7633
1	TS1	Terminal Strip	5991	5991
	UCB1	Upper Control Box (Also see pages 82, 83, or 84)	4920	4920

^{*} Part Numbers shown are for standard machines built after 1-1-92. For machines built before that date, order part no. 5983 for Harness H2, part no. 5982 for Harness H1, and part no. 6296 for H21.

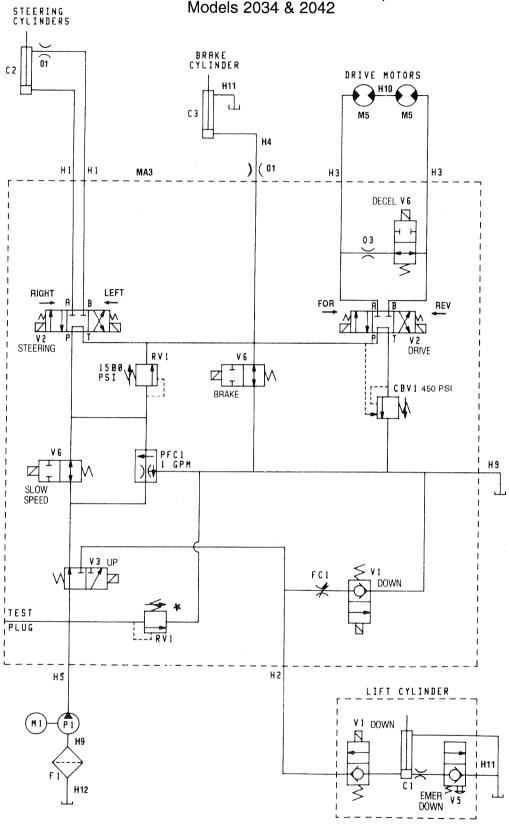
Key:
SP = Single Pole
DT = Double Throw
SR = Spring Return
ST = Single Throw
DP = Double Pole

OPTIONS

			Pai	t No.
Qty.	Symbol	Description	Standard	Standard EE
1	AC	AC Converter	7103	N/A
1	A 1	Alarm - Tilt Warning	6906	6906
1	ВС	Battery Charger (Also see page 62)	6995	6995
1	BF	Battery Fuel Gauge	7099	7099
1	CA	Ceramic Capacitor .1 MF	7130	N/A
1	D1	Diode, Motion Alarm	6070	Not Used
1	D4	Diode, Dual	6946	6946
1	НМ	Hour Meter	6857	7590
2	H11	Cable Assembly, Connector	6687	7615
1		Harness, 110VAC Outlet Assembly	6746	6746
2	H17	Jumper - Battery 8.5M Awg #2	6208	7614
2		Cable Assembly w/Connector	6687	7615
1	H18	Harness - Battery Fuel Gauge, Motion Alarm, Hour Meter	7604	7604
1	H19	Harness - Warning Light	4914	4914
1	H22	Harness - AC Converter Red	7114	N/A
1	H23	Harness - AC Converter Black	7113	N/A
1	L1	Indicator Light - Tilt Warning	7553	7553
1	MA	Motion Alarm	7102	7630
1	TS2	Tilt Sensor 4-1/2° 1 Second Delay	7552	7552
1	WL	Warning Light	7105	4913

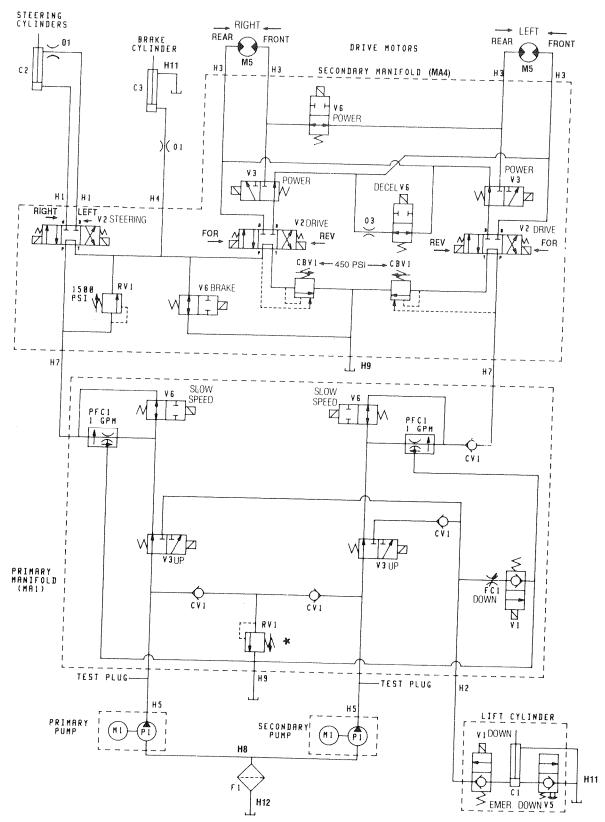
Troubleshooting 45

HYDRAULIC SCHEMATIC mecNARO 20 (STANDARD SERIES) Models 2034 & 2042



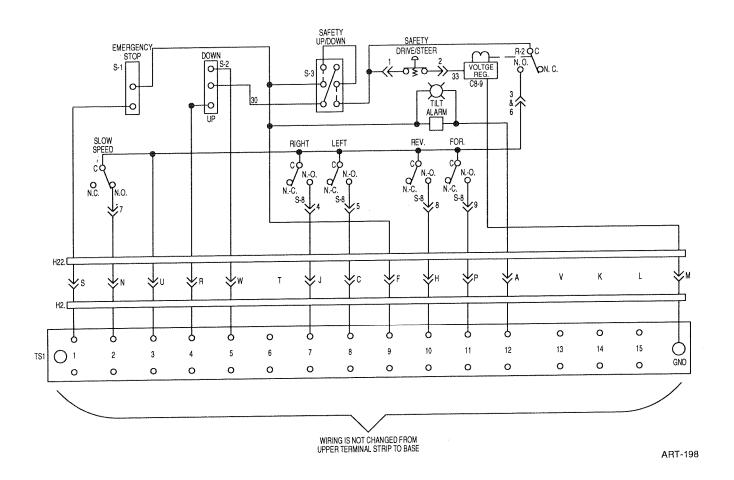
NOTE: Refer to symbol chart for setting Relief Valve.

HYDRAULIC SCHEMATIC **MecNARO 20 (HIGH TORQUE SERIES) Models 2034HT & 2042HT

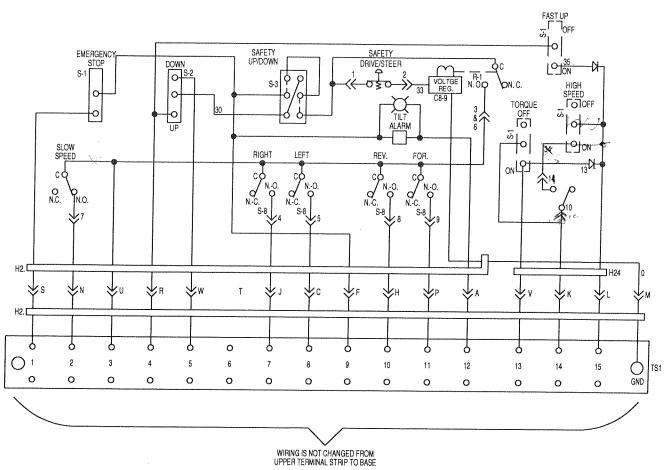


^{*} NOTE: Refer to symbol chart for setting Relief Valve.

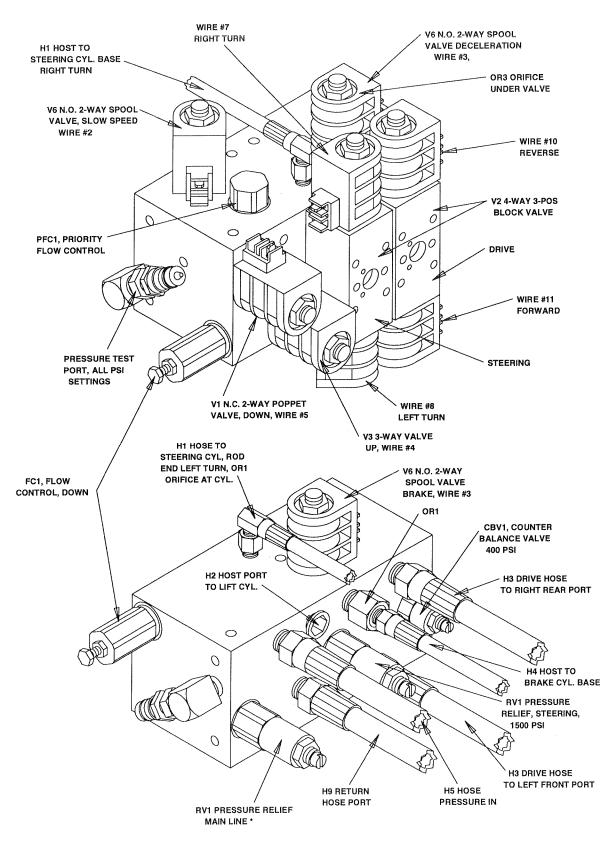
WIRING DIAGRAM **MECNARO 20 (STANDARD SERIES) JOYSTICK CONTROL BOX



WIRING DIAGRAM **MecNARO 20 (HIGH TORQUE SERIES) JOYSTICK CONTROL BOX



2 VIEWS OF MANIFOLD mecNARO 20 (STANDARD SERIES)



^{*} NOTE: Refer to symbol chart for setting Relief Valve.

Symbol Identification for **MANIFOLD**

mecNARO 20 (STANDARD SERIES)

Qty.	Symbo	Description	Part No.	Qty.	Symbol	Description	Part No
1	C1	Lift Cylinder	6871	1	МАЗ	Primary Manifold	3239
Service		Seal Kit	7078	1	O1	Orifice, Fitting Assembly .036	6107
1	C2	Steering Cylinder Barrel Weldment	2838	1	О3	Orifice, Fitting (Brass) Hole .0	
1		Cylinder Head	2484 2493	1	P1	Hydraulic Pump	6994
1		Piston	2494	1	PFC1	Priority Flow Control	
1		Cylinder Rod	2837	•	1101	1.0 GPM (Std.)	5954
1		Internal Retaining Ring	6337	1		Priority Flow Control	3934
1		Nut, 1/2-20 Lock	6338			.5 GPM (Special)	6189
Service		Seal Kit	5947	Service		"O" Ring Kit	5475
1	СЗ	Brake Cylinder	2483	2	RV1*	Relief Valve	6316
1		Barrel Weldment	2485	Service		"O" Ring Kit	5475
1		Cylinder Head	2493	2	V1	2-Way N.C. Valve	
1		Piston Cylinder Red	2494	Service		"O" Ring Kit	5475
1		Cylinder Rod Internal Retaining Ring	2504 6337			Valve Only	6973
1		Nut, 1/2-20 Lock	6338	t		Coil Only 24 VDC	6163
Service		Seal Kit	5947	*******************************		NOTE: Lift Cylinder Coil Only	7833
1	CBV1	Counterbalance Valve	6712	- 2	V2	4-Way 3-Position Valve	7976
Service	001,	"O" Ring Kit	6806	Service		Spring and "O" Ring Kit	6161
1	F1	Filter Element	6156	- <u>+</u>		Coil Only 24 VDC	6163
1	FC1	Flow Control		_ 1	V3	3-Way 2-Position Valve	
Service	101	"O" Ring Kit	5963 5475	Service		"O" Ring Kit	5476
2	H1	Hose, Steering				Valve Only Coil Only 24 VDC	6976
·	H2		7066	_ <u> </u>	V5		6163
1		Hose, Lift	7005	Service	VS	Manual Pull - Emergency Dowr "O" Ring Kit	
2 Portaine	НЗ	Hose, Drive	7006		VC		5475
Service		Seal Kit	6675	3 - Service		2-Way N.O. (Spool Valve) "O" Ring Kit	Pa 4 mm pa
1	H4	Hose, Brake	6722	-		Valve Only	5475 6975
1	H5	Hose	7067	†		Coil Only 24 VDC	6163
2	H9	Return/Suction Hose	6225				
1	H10	Hose, Crossover, 34"	5996	•			
1		Hose, Crossover, 42"	7082				
25 ft.	H11	Return Line, 5/16 I.D. Fuel L	ine 6458	-			
1	H12	Hose, Tank to Filter	7058			*P-1'-/ \/ I	
1	M1	24 VDC Motor	6194	•		*Relief Valve Pressure Relief	Lift
2	M5	Drive Motor, Model 2034	6987P	Model			apacity
ervice		Seal Kit	6815	2034			50 lbs.
2		Drive Motor, Model 2042	7037P	2034 H7	Г		50 lbs.
ervice		Seal Kit	6815	2042			
				<u> </u>		2,250 PSI 1,0	000 lbs.

Service = Service Uses t = 10 Total Coils

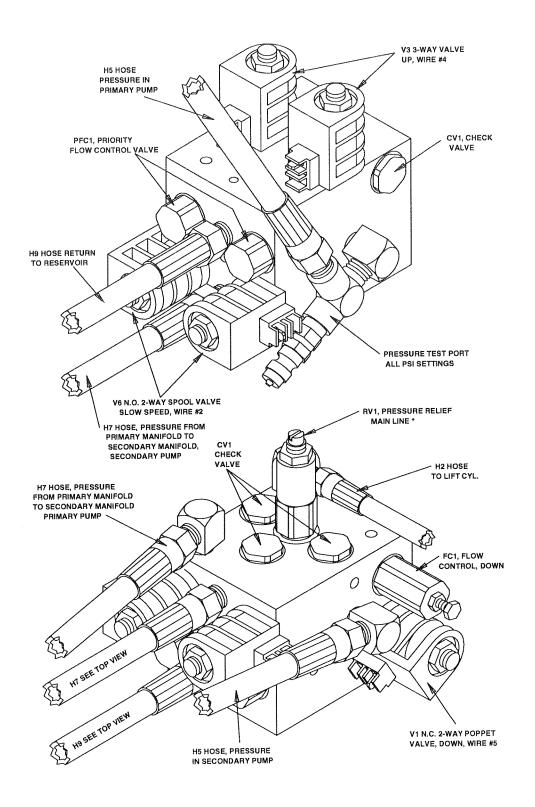
2,250 PSI

2042 HT

Part No. 3239

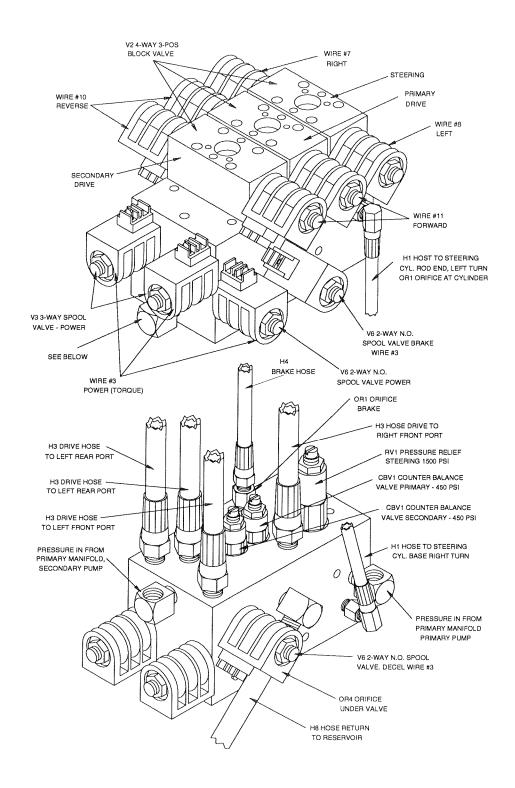
1,000 lbs.

2 VIEWS PRIMARY MANIFOLD mecNARO 20 (HIGH TORQUE SERIES)



^{*} NOTE: Refer to symbol chart for setting Relief Valve.

2 VIEWS SECONDARY MANIFOLD mecNARO 20 (HIGH TORQUE SERIES)



^{*} NOTE: Refer to symbol chart for setting Relief Valve.

Symbol Identification for MANIFOLD mecNARO 20 (HIGH TORQUE SERIES)

1 Service	C1	Lift Cylinder	6871	4			
Service				1	MA1	Primary Manifold	3595
		Seal Kit	7078	1	MA4	Secondary Manifold	3480
1	C2	Steering Cylinder	2838	2	01	Orifice, Fitting Assembly .036	6107
1		Barrel Weldment Cylinder Head	2484 2493	1	04	Orifice, Fitting (Brass) .062	2975
1		Piston	2494	2	P1	Hydraulic Pump	6994
1		Cylinder Rod	2837	2	PFC1	Priority Flow Control	
1		Internal Retaining Ring	6337	<i>چ</i>	PFOI	1.0 GPM (Std.)	5954
1		Nut, 1/2-20 Lock	6338			Priority Flow Control .5 GPM (Special)	6189
Service	n	Seal Kit	5947	_ Service		"O" Ring Kit	5475
1	СЗ	Brake Cylinder	2483	2	RV1*	Relief Valve	6316
1		Barrel Weldment	2485	Service	1.1 A 1	"O" Ring Kit	5475
1		Cylinder Head	2493	2	V1	2-Way N.C. Valve	<u> </u>
1		Piston Cylinder Rod	2494 2504	Service	VI	"O" Ring Kit	5475
1		Internal Retaining Ring	6337			Valve Only	6973
1		Nut, 1/2-20 Lock	6338	†		Coil Only 24 VDC	6163
Service		Seal Kit	5947	***************************************	100 T FAMILY 10 TO	NOTE: Lift Cylinder Coil Only	7833
2	CBV1	Counterbalance Valve	6712	3	V2	4-Way 3-Position Valve	7976
Service		"O" Ring Kit	6806	Service		Spring and "O" Ring Kit	6161
4	CV1	Check Valve	5434	+		Coil Only 24 VDC	6163
Service	~	"O" Ring Kit	5475	4 — Candoo	V3	3-Way 2-Position Valve	E 476
1	F1	Filter Element	6156	Service		"O" Ring Kit Valve Only	5476 6976
1	FC1	Flow Control	5963	t		Coil Only 24 VDC	6163
Service		"O" Ring Kit	5475	1	V5	Manual Pull - Emergency Down	n 5435
2	H1	Hose, Steering	7066	Service		"O" Ring Kit	5475
1	H2	Hose, Lift	7005	5	V6	2-Way N.O. (Spool Valve)	
4	НЗ	Hose, Drive	7006	Service		"O" Ring Kit	5475
Service		Seal Kit Swivel Fitting	6675			Valve Only	6975
11	H4	Hose, Brake	6722	<u></u>		Coil Only 24 VDC	6163
2	H5	Hose, Pump to Manifold	7067				
2	H7	Hose, Manifold to Manifold	6429				
2	H8	Hose, Suction	6225				
2	H9	Hose, Return	5995			*Relief Valve	
25 ft.	H11	Return Line, 5/16 I.D. Fuel Lin	ne 6458		~1	Pressure Release	Lift
1	H12	Hose, Tank to Filter	7058	- Mode			Capacity
2	M1	24 VDC Motor	6194	- 2034 _ 2034	•		750 lbs. 750 lbs.
2	M5	Drive Motor (Hydraulic)		2041		MALE TO THE TAXABLE PARTY OF TAXABLE PARTY O	,000 lbs.
		Model 2034 HT	6987P	2042			,000 lbs.
		Seal Kit	6815	***************************************			
Service		Dubin Makes (Herdiner He)					
Service 2		Drive Motor (Hydraulic) Model 2042 HT	7037P				

t = 17 Total Coils

NOTES

6. PARTS CATALOG

IMPORTANT REPLACEMENT PART NOTES

1. Bolts

ANY BOLT REPLACEMENT SHOULD BE OF THE SAME GRADE OR GREATER THAN ORIGINAL BOLT. ANY QUESTIONS, CALL FACTORY FOR VERIFICATION.

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

Grade 2



Grade 5



Grade 8



2. Battery

Replacement battery MUST WEIGH AT LEAST 60 POUNDS to maintain the stability factor of the machine.

3. Tires

Tires on mecNARO machines must be replaced with manufacturer's replacement tires to maintain stability factor of the machine.

TIRES ON MEC AERIAL WORK
PLATFORM MACHINES MUST BE
REPLACED WITH MANUFACTURER'S
REPLACEMENT TIRES LUG NUTS TO BE
TORQUED TO 75-85 FT. LBS. AND
CHECKED WEEKLY

679

4. Decals

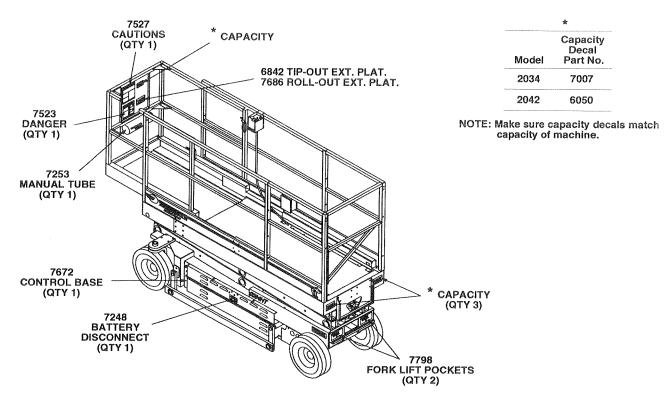
All decals are furnished at no charge. Refer to the following part numbers when requesting decals. See next page for proper location of specific safety decals.

Part No.	Description	Side Railing Decals
4685	2034 & 2034 HT Decal Kit	7257
4686	Replaced by 4685 Decal Kit	7258
4687	2042 & 2042 HT Decal Kit	7259
4688	Replaced by 4687 Decal Kit	

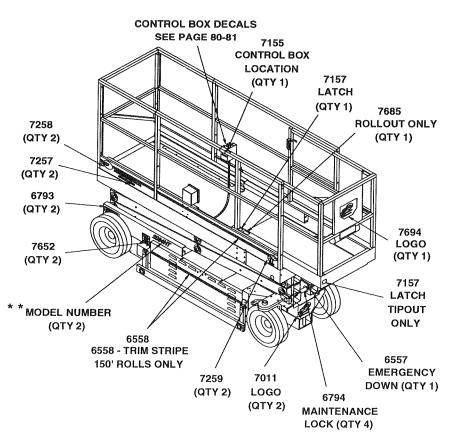
NOTE

When servicing machine check to see if decals shown in diagram are in place and legible. If not, they must be added or replaced.

DECAL LOCATIONS mecNARO 20 SERIES



OPERATIONAL/SAFETY DECAL KITS



Decal Kit Part No.
4685
4685
4687
4687

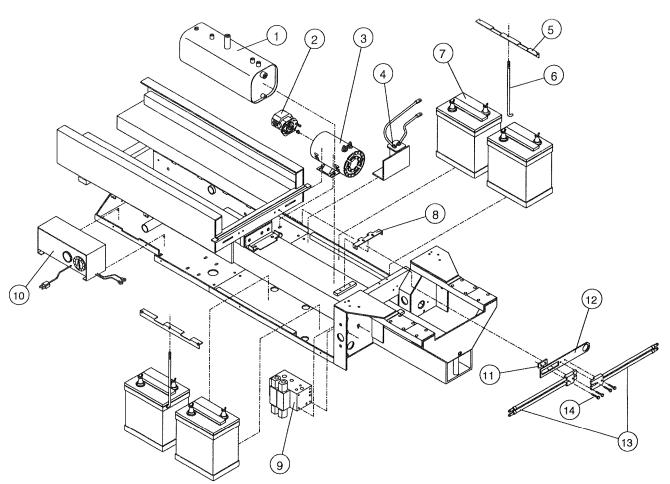
Trim & Logos not included

	* *
	Model No. Decal
Model	Part No.
2034	6996
2034HT	6997
2042	6998
2042HT	6999
~~~	

ART 185-1

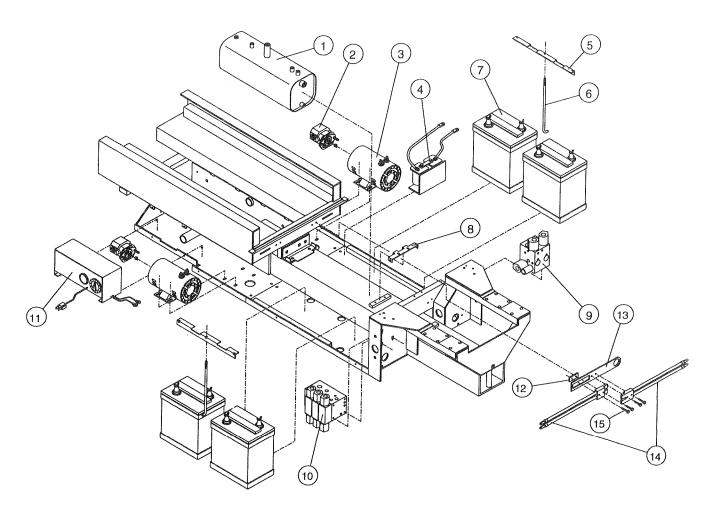
### ATTACHING PARTS TO MACHINE BASE

mecNARO 20 (STANDARD SERIES)



Item	Qty.	2034 Part No.	2042 Part No.	Description
1	1	4719	4719	Reservoir (See detail page 60)
2	1	6994	6994	Pump - Hydraulic
Serv.		6314	6314	Coupler (Barnes Pump) Check manufacturer
3	1	6194	6194	Motor 24VDC
Serv.		4041	4041	Brush & Spring Kit (Leeson) Check manufacturer
Serv.		5856	5856	Bearing (6203)
Serv.		6371	6371	Armature (Leeson) Check manufacturer
4	1			Contactor Assembly (See detail page 61)
5	2	4528	4528	Holddown Bar - Battery
6	2	4566	4566	Rod Holddown - Battery
	2	6431	6431	Washer - Battery Holddown 1/4 Flat
	2	6110	6110	Nut - Wing Battery Holddown 1/4-20
7	4	5970	5970	Battery - 6 Volt - Deep Cycle
8	1	4602	4602	Bracket - Reservoir - Holddown
9	1		***	Manifold Assembly Std. (See detail page 50)
10	1	6995	6995	Charger 24V 60Hz 120VAC (See detail page 62)
11	1	4591	4591	Mounting Bracket - Disconnect
12	1	4592	4592	Slide Bracket - Disconnect
13	2	6687	6687	Connector/Cable Assembly
14	4	6029	6029	Bolt 1/4-20 x 1-1/2 Grade 5

# ATTACHING PARTS TO MACHINE BASE mecNARO 20 (HIGH TORQUE SERIES)

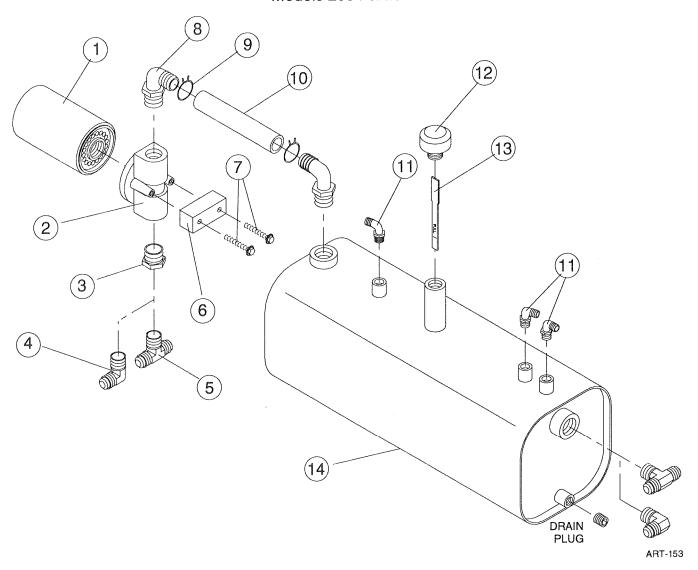


ART-151

Item	Qty.	2034HT Part No.	2042HT Part No.	Description
1	1	4719	4719	Reservoir (See detail page 60)
2	2	6994	6994	Pump - Hydraulic
Serv.		6314	6314	Coupler (Barnes Pump) Check manufacturer
3	2	6194	6194	Motor 24VDC
Serv.		4041	4041	Brush & Spring Kit (Leeson) Check manufacturer
Serv.		5856	5856	Bearing (6203)
Serv.		6371	6371	Armature (Leeson) Check manufacturer
4	4		900	Contactor Assembly (See detail page 61)
5	2	4528	4528	Holddown Bar - Battery
6	2	4566	4566	Rod Holddown - Battery
	2	6431	6431	Washer - Battery Holddown 1/4 Flat
	2	6110	6110	Nut - Wing Battery Holddown 1/4-20
7	4	5970	5970	Battery - 6 Volt Deep Cycle
8	1	4602	4602	Bracket - Reservoir - Holddown
9	1			Manifold Assembly Primary HT (See detail page 52)
10	1			Manifold Assembly Secondary HT (See detail page 54)
11	1	6995	6995	Charger 24V 60 Hz 120 VAC (See detail page 62)
12	1	4591	4591	Mounting Bracket - Disconnect
13	1	4592	4592	Slide Bracket - Disconnect
14	2	6687	6687	Connector/Cable Assembly
15	4	6029	6029	Bolt 1/4-20 x 1-1/2 Grade 5

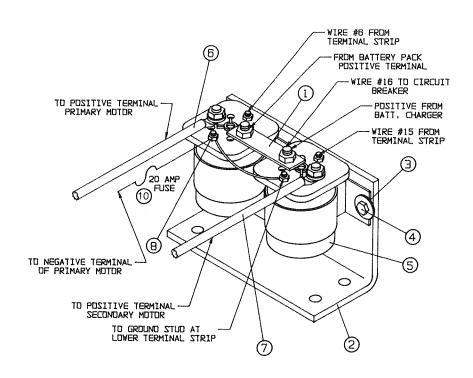
### **RESERVOIR TANK & FILTER**

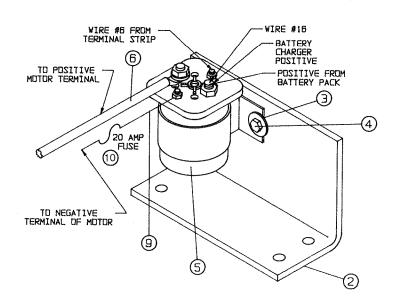
mecNARO 20 SERIES Models 2034 & 2042



Item	Qty.	Standard Part No.	Hi-Torque Part No.	Description	
-1	4	6156	6156	Filter - Hydraulic Oil - Spin On	
2	1	6714	6714	Filter Head	
3	1	6752	6752	Fitting - Reducer - 3/4 x 1/2 NPT	
4	2	6510	***	Fitting - Elbow 1/2 x 1/2 NPT Brass	
5	2		6719	Fitting - Tee 1/2 x 1/2 x 1/2 NPT Brass	
6	1	4510	4510	Spacer - Block	
7	2	7069	7069	Bolt 1/4 x 20 x 1-3/4 - Hex Head	
8	2	6866	6866	Fitting - Elbow 3/4 NPT - Nylon	
9	2	6960	6960	Clamp - Hose 3/4	
10	1	7058	7058	Hose - Low Pressure 3/4 ID	
11	3	6727	6727	Fitting - Brass Elbow - 5/16 x 1/4 Bayonet	
12	1	6284	6284	Breather Cap 1/2"	
13	1	2882	2882	Gauge - Fluid	
14	1	4605	4605	Reservoir	

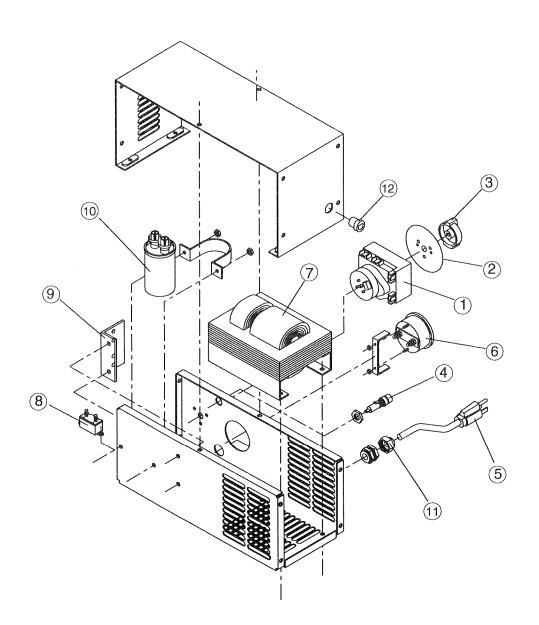
## CONTACTOR mecNARO 20 SERIES





	Q	ity.			
Item	Standard	High Torque	Part No.	Description	
1	*	1	3199	Jumper Contactor	
2	1	1	4564	Mounting Bracket	
3	2	3	4773	Washer	
4	2	3	5385	Screw, Self-Tapping 8-32 x 3/8	
5	1	2	5967	Contactor - 24 VDC	
6	1	1	6123	Motor Cable	
7	-	1	6207	#2 Motor Jumper	
8	-	1	7076	Harness (Not shown completely)	
9	1	-	7912	Harness (Not shown completely)	
10	Serv.	Serv.	7275	Fuse - 20 Amp	

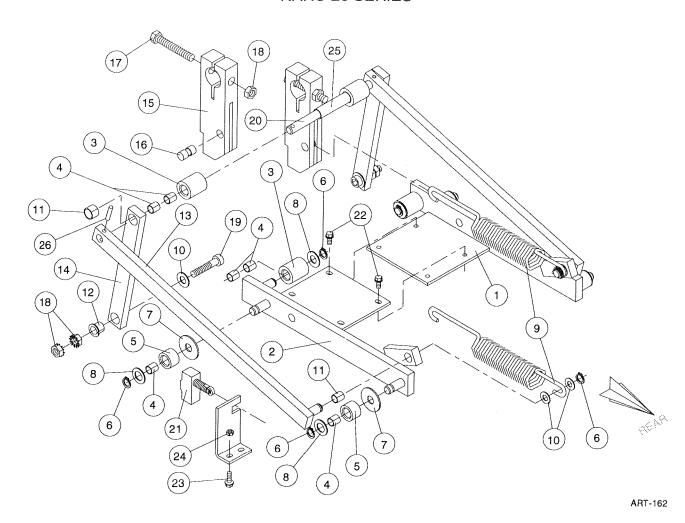
# CHARGER mecNARO 20 SERIES



Item	Qty.	Part No.	Description
		6995	Charger 24V 60 Hz 120VAC
1		5642	Timer
2		5643	Timer Dial Plate
3		5556	Knob Timer
4		6527	Fuse Holder
•		6526	Fuse - 15 Amp
5		5649	Cord Assembly - AC Input
6		5554	Ammeter
7		6157	Transformer
8		6522	Circuit Breaker - DC
9		5553	Rectifier - Diode Assembly
10		6158	Condenser
11		7594	AC Strain Relief
12		6033	DC Strain Relief

### POT HOLE BAR ACTUATOR

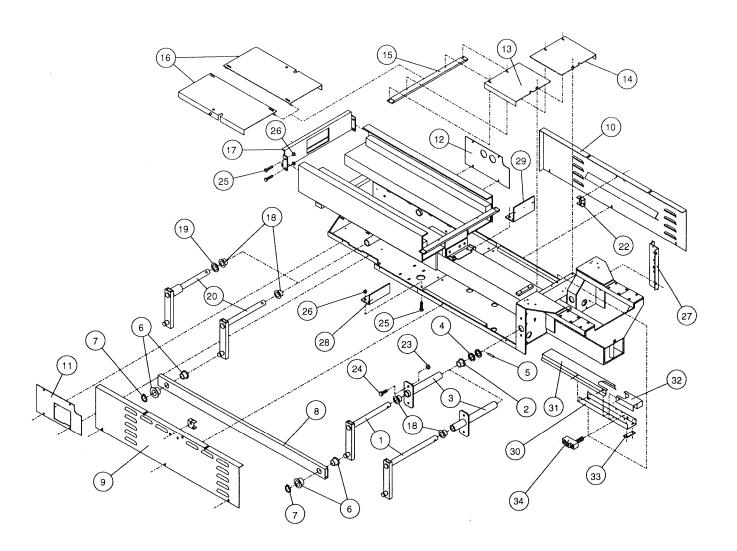
mecNARO 20 SERIES



Item	Qty.	Part No.	Description
1	1	4547	R.H. Slide Bar w/Rollers
2	1	4548	L/H. Slide Bar w/Rollers
3	4	4541	Roller w/Bearing
4	Serv.	6700	Bearing DU08 DU10
5	4	4542	Roller w/Bearing
6	8	5736	Ring - Retaining - Ext. 1/2 Shaft
7	4	4674	Washer
8	6	7031	Bushing - Washer
9	2	4655	Spring - Retractor
10	6	5216	Washer - Flat 1/2
11	4	7013	Bearing 08DU08
12	2	7014	Bearing - Flanged 08DU08
13	2	4665	Actuator Bar
14	2	4553	Bar w/Bearings
15	2	4546	Actuating Bar
16	2	4643	Pin - Spring Retaining
17	2	6435	Bolt - 1/2-13 x 2-1/2
18	6	5033	Nut, Hex Keps 1/2-13
19	2	7043	Bolt Socket Head 1/2-13 2-1/2
20	1	4667	Pin - Actuator Bar
21	1	6016	Switch - Fast-Slow-Limit
22	4	6455	Bolt - 1/4-20 x 1/2
23	2	5723	Bolt - 1/4-20 x 3/4
24	2	5276	Nut - Hex 1/4-20
25	1	4551	Spacer - Tube
26	2	100-8096	Pin - Expansion

### **PANELS & OUTRIGGER**

mecNARO 20 SERIES



### **PANELS & OUTRIGGER**

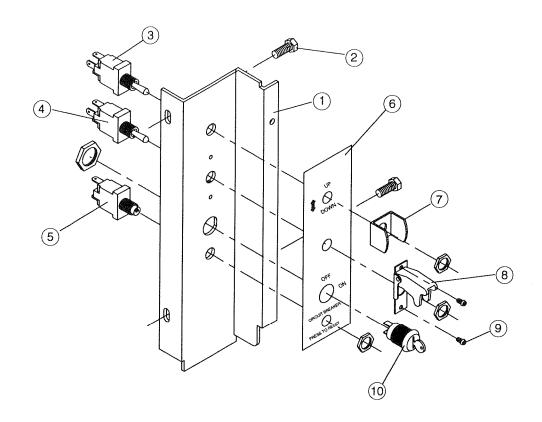
### mecNARO SERIES

		2034	2042	
ltem	Qty.	Part No.	Part No.	Description
1	2	4597	4612	Outrigger Bar Weldment Front
2	2	4791	4791	Bearing Nyliner Flanged
3	2	4616	4617	Outrigger Pivot Tube Weldment
4	4	4775	4775	Washer
5	2	6061	6061	Expanpin .375 x 1.50
6	8	7015	7015	Bearing Nyliner Flanged
7	4	5919	5919	Ring Retaining 7/8 Shaft Extension
8	2	4639	4639	Outrigger Tube - Bottom
9	1	4661	4661	Panel - Side Weldment R.H.
10	1	4662	4662	Panel - Side Weldment L.H.
11	1	4657	4657	Side Cover Rear R.H.
12	1	4658	4658	Side Cover Rear L.H.
13	1	4653	4653	Front Cover R.H.
14	1	4654	4654	Front Cover L.H.
15	1	4638	4638	Front Cover Mounting Bar
16	2	4672	4672	Sliding Cover Battery
17	1	4635	4635	Rear Panel & Step
18	6	5898	5898	Bearing Nyliner Flanged
19	2		4707	Washer
20	1	4703	4614	Outrigger Bar Weldment & Rear R.H.
21	1	4704	4613	Outrigger - Bar Weldment Rear L.H. (Not shown)
22	2	4824	4824	Latch - Assembly Cove
23	4	5033	5033	Nut - Keps 1/2-13 Grade 5
24	4	5202	5202	Bolt - Cap 1/2-13-1 Grade 5
25	12	6433	6433	Bolt - Hex Flange 3/8-16-1 Grade 5
26	12	5039	5039	Nut - Keps 3/8-16 Grade 5
27	1			Switch Panel Assembly (See detail page 66)
28	1	4565	4565	Battery Stop Bracket
29	1	4564	4564	Mounting Bracket - Contactor (See page 61)
30	1	4642	4642	Hose Tray
31	1	4640	4640	Hose Cover Rear Upper
32	1	4641	4641	Hose Cover Front
33	1	4652	4652	Spacer - Hose Tray
34	1	6016	6016	Limit Switch

### **SWITCH PANEL**

mecNARO 20

Models 2034, 2042 Standard Series Models 2034, 2042 High Torque Series Models 2034, 2042 Standard EE Series Models 2034, 2042 High Torque EE Series

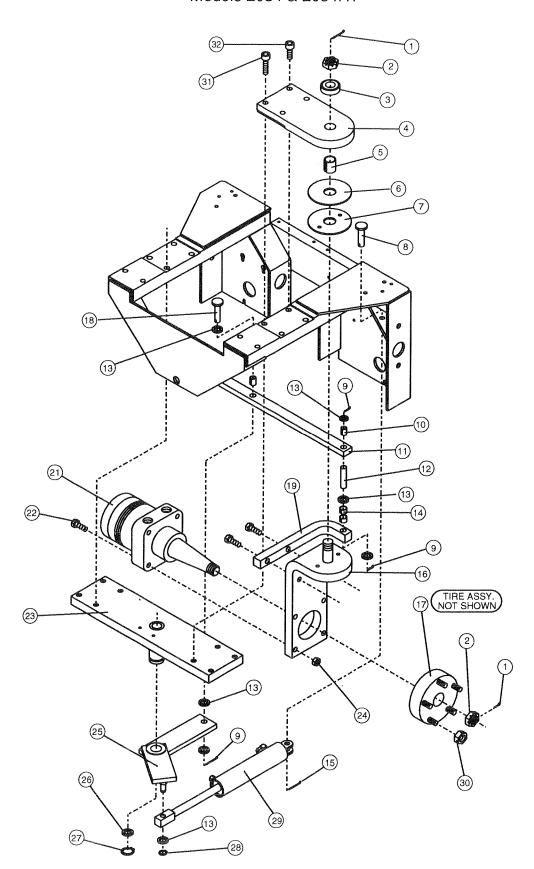


			EE Series		
Item	Qty.	Part No.	Part No.	Description	
1	1	4603	4911	Switch Panel - Lower	
2	2	6455	6455	Bolt - 1/4-20 x 1/2 Taptite Grade 5	
3	1	5230	5230	Switch - Toggle	
4	1	5630	5630	Switch - Toggle	
5	1	7235	7577	Circuit Breaker - 15 Amp	
6	1	7672	7629	Decal - Control Base	
7	1	1313	1313	Guard - Switch	
8	1	7622	7622	Switch Guard - Emergency Stop	
9	2	7792	7792	Screw - 8-32 x 3/8 Pan Head	
10	1	5936	N/A	Switch - Key (w/2 Keys)	
Serv.		6117	N/A	Key - Only	
	1	6764	6764	Harness - Lower Control (Not shown)	

### **NOTES**

### FRONT END STEERING

mecNARO 20 (STANDARD EE & HIGH TORQUE EE SERIES) Models 2034 & 2034HT



### FRONT END STEERING

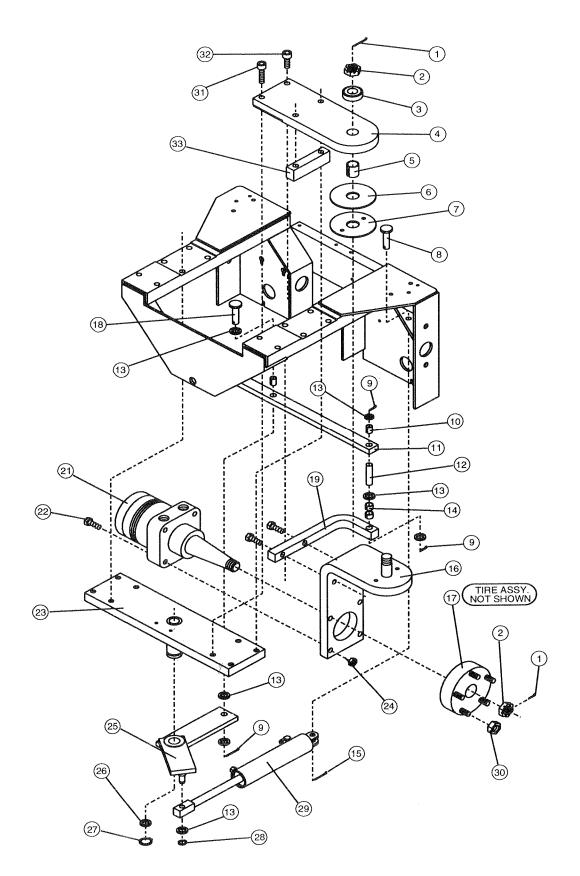
### mecNARO 20 (STANDARD EE & HIGH TORQUE EE SERIES) Models 2034 & 2034HT

Item	Qty.	Part No.	Description
1	4	5787	Pin - Cotter 1/8 x 1-1/2
2	4	6986	Nut - Drive Motor
3	2	7008	Bearing Thrust
4	2	4706	Pivot Plate w/Bearing
5	2	6543	DU Bearing 16DU16
6	2	4726	Washer - Backup
7	2	4725*	Washer - Thrust
8	1	5710	Pin - Clevis 1/2 x 1-1/4
. 9	5	5920	Pin - Cotter 1/8 x 1
10	3	6700	DU Bearing 08DU10
11	1	4705	Steering Bar - Short
12	2	4636	Pin - Outer Steering
13	9	5216	Washer - Flat 1/2 Grade 5
14	4	7013	DU Bearing 08DU08
15	1	6808	Hair Pin Cotter 3/8 Shaft
16	2	4621	Motor Bracket Weldment
17	2	4492	Front Hub Assembly
Serv.		4951	Tire Assembly Standard (See detail page 72)
Serv.		4952	Tire Assembly Non-Marking (See detail page 72)
18	1	4637	Pin - Center Steering
19	2	4516	Steering Arm
20	4	5215	Bolt - Cap Hex 1/2-13 x 1.75 Grade 5
21	2	6987P	Wheel Motor Jr
Serv.		7128	Key - Wheel Motor to Hub
22	8	7018	Bolt Hex Cap 1/2-13 x 3 Grade 5
23	1	4586	Lower Plate Weldment Narrow
24	8	5033	Nut - Keps 1/2-13 Grade 5
25	1	4517	Steering Bracket Weldment
26	1	5901	Washer - Cam Thrust
27	1	5918	Ring Retaining 1" Shaft Extension
28	1	5736	Ring Retaining 1/2" Shaft Extension
29	1	3722	Steering Cylinder (See detail page 73)
30	10	6677	Nut Wheel Lug 1/2-20
31	2	5916	Bolt Socket Head 1/2-13 x 4 Grade 5
32	6	7030	Bolt Socket Head 1/2 x 13 x 3.25 Grade 5

^{*} NOTE: Earlier Models only had one hole in washer Teflon thrust - then use Part Number 4715

### FRONT END STEERING

mecNARO 20 (STANDARD EE & HIGH TORQUE EE SERIES) Models 2042 & 2042HT



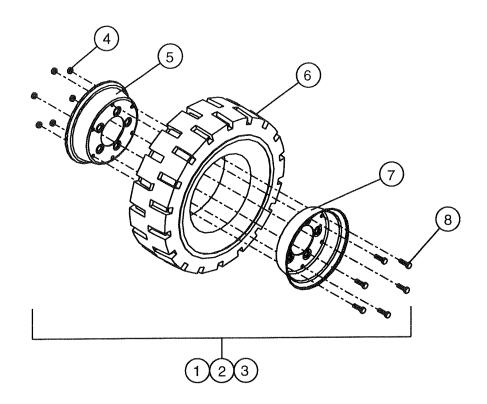
#### FRONT END STEERING

#### mecNARO 20 (STANDARD EE & HIGH TORQUE EE SERIES) Models 2042 & 2042HT

Item	Qty.	Part No.	Description
1	4	5787	Pin - Cotter 1/8 x 1-1/2
2	4	6986	Nut - Drive Motor
3	2	7008	Bearing Thrust
4	2	4574	Pivot Plate w/Beraing
5	2	6543	DU Bearing 16DU16
6	2	4726	Washer - Backup
7	2	4725*	Washer - Thrust
8	1	5710	Pin - Clevis 1/2 x 1-1/4
9	5	5920	Pin - Cotter 1/8 x 1
10	3	6700	DU Bearing 08DU10
11	1	4572	Steering Bar Wide
12	2	4636	Pin - Outer Steering
13	9	5216	Washer - Flat 1/2 Grade 5
14	4	7013	DU Bearing 08DU08
15	1	6808	Hair Pin Cotter 3/8 Shaft
16	2	4622	Motor Bracket Weldment Wide
17	2	4492	Front Hub Assembly
Serv.		7033	Tire Assembly Foam Filled (See detail page 72)
18	1	4637	Pin - Center Steering
19	2	4664	Steering Arm Wide
20	4	5215	Bolt - Cap Hex 1/2-13 x 1.75 Grade 5
21	2	7037P	Wheel Motor 42"
Serv.		7128	Key - Wheel Motor to Hub
22	8	7018	Bolt Hex Cap 1/2-13 x 3 Grade 5
23	1	4587	Lower Plate Weldment Wide
24	8	5033	Nut - Keps 1/2-13 Grade 5
25	1	4517	Steering Bracket Weldment
26	1	5901	Washer - Cam Thrust
27	1	5918	Ring Retaining 1" Shaft Extension
28	1	5736	Ring Retaining 1/2" Shaft Extension
29	1	3722	Steering Cylinder (See detail page 73)
30	10	6677	Nut - Wheel Lug 1/2-20
31	2	5916	Bolt Socket Head 1/2-13 x 4 Grade 5
32	6	7030	Bolt Socket Head 1/2-13 x 3.25 Grade 5
33	2	4575	Spacer Front Axle

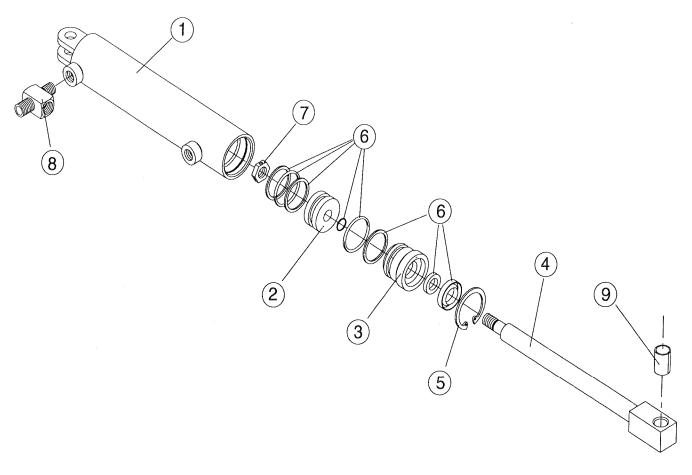
^{*} NOTE: Earlier Models only had one hole in washer Teflon thrust - then use Part Number 4715

# TIRE & RIM mecNARO 20 SERIES



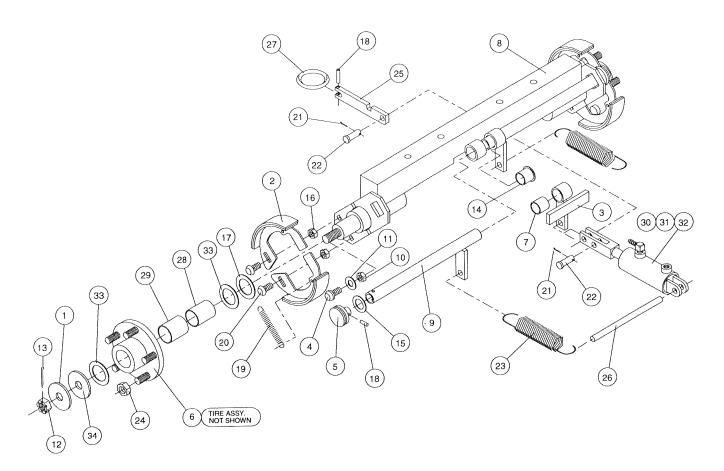
		2034	2042		
Item	Qty.	Part No.	Part No.	Description	
1	2	4951		Tire & Rim Assembly Standard	
2	Option	4952		Tire & Rim Assembly Non-Marking	
3	2		7033	Tire & Rim Assembly Foam Filled	
4	6	7782		Nut - 3/8-24	
	6	7783		Lockwasher 3/8	
5	1	4948		Rim - Outer	
6	1	7704		Tire - Solid Rubber 16 x 4 x 8 Standard	
•	Option	7705		Tire - Solid Rubber 16 x 4 x 8 Non-Marking	
7	1	4950	*	Rim - Inner	
8	6	7781		Bolt - 3/8-24 x 3/4	

# STEERING CYLINDER **MARO 20 SERIES

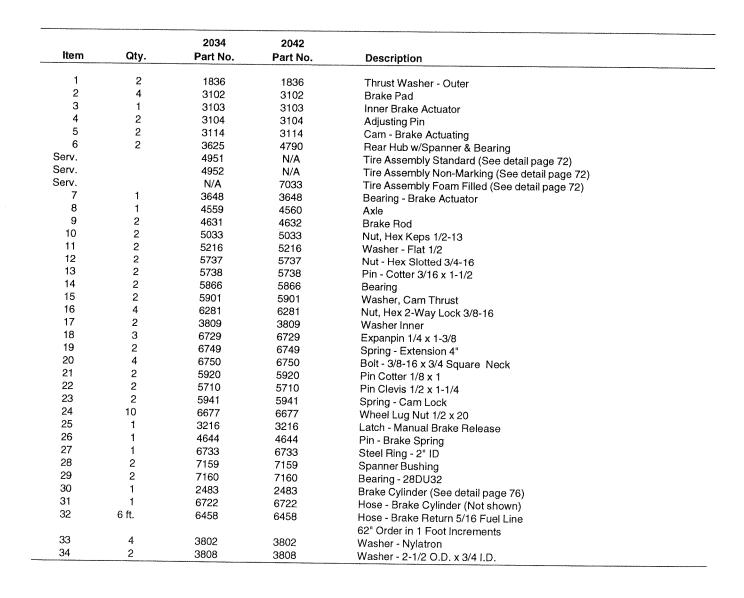


Item	Qty.	Part No.	Description	
		3722	Steering Assembly	
1	1	3719	Cylinder - Steering	
2	1	2494	Piston	
3	1	2493	Head	
4	1	2837	Rod - Steering Cylinder w/Bearing	
5	1	6337	Ring Retaining - Internal	
6	1	5947	Seal Kit	
7	1	6338	Nut - Hex Locking 2-Way 1/2-20	
8	1	5106	Fitting - Elbow, Street 1/4	
9	1	7019	Bearing - 08DU12 - 1/2-3/4	

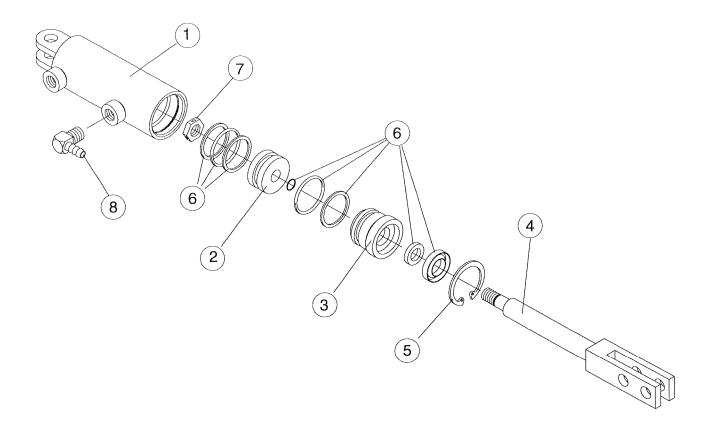
# REAR AXLE mecNARO 20 SERIES



### REAR AXLE mecNARO 20 SERIES



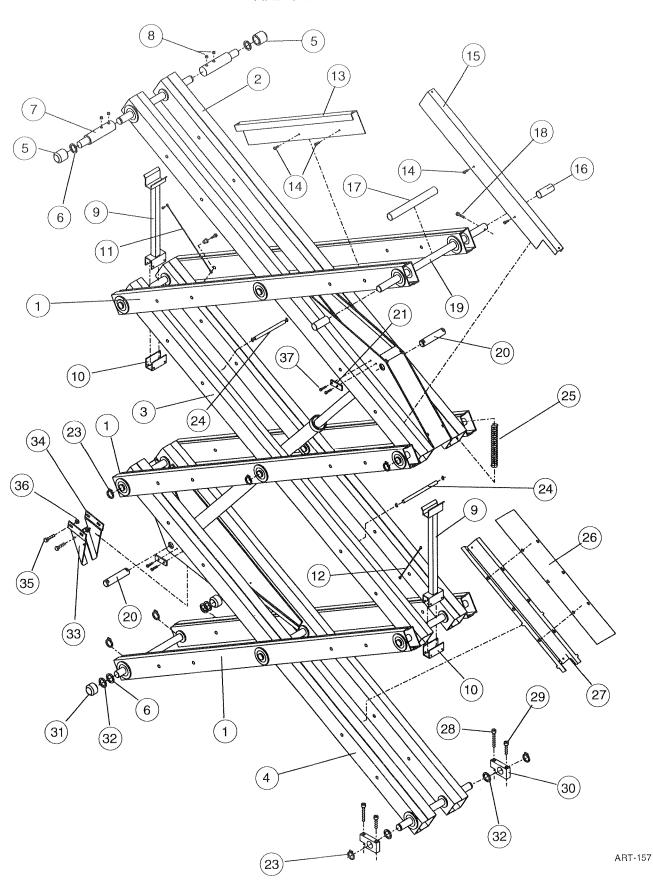
# BRAKE CYLINDER mecNARO 20 SERIES



Item	Qty.	Part No.	Description
		2483	Brake Cylinder Assembly
1	1	2485	Cylinder - Brake
2	1	2494	Piston
3	1	2493	Head
4	1	2504	Rod - Brake Cylinder w/Bearing
5	1	6337	Ring Retaining - Internal
6	1	5947	Seal Kit
7	1	6338	Nut - Hex Locking 2-Way 1/2-20
8	1	6727	Fitting - 90 Degree Elbow Bayonet 5/16

### NOTES

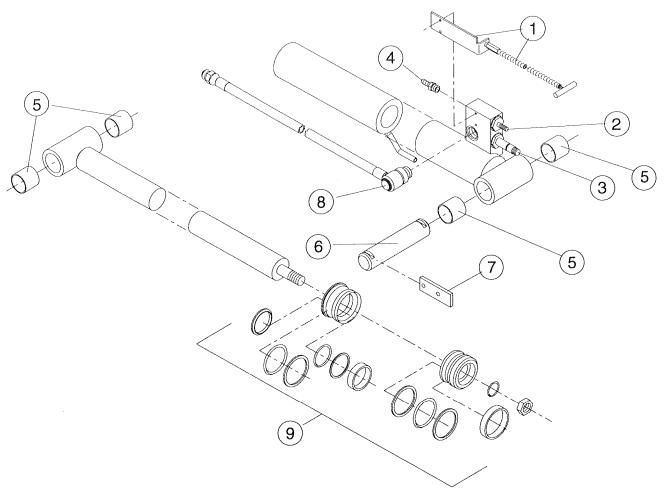
### SCISSORS mecNARO 20 SERIES



# SCISSORS Mec NARO 20 SERIES

Item	Qty.	2034 Part No.	2042 Part No.	Description
1	6	4412	4412	Outer Beam w/Bearings
Serv.	ŭ	6984	6984	Bearing 22DU26 6 per Beam
2	1	4417	4417	Upper Inner Beam Weldment
3	1	4419	4419	Center Inner Beam Weldment
4	1	4418	4418	Lower Inner Beam Weldment
5	2	4424	4424	Roller - Platform w/Bearing
Serv.	-	7074	7074	Bearing 22DU16 2 per Roller
6	4	4677	4677	Spacer - Washer
7	2	4497	4496	Roller Extension Tube
8	4	6713	6713	Set Screw 1/2-13 x 1/2 Grade 5
9	2	4531	4531	Maintenance Lock
10	2	4529	4529	
11	1	4812	4812	Lower Bracket - Maintenance Lock
12	i	4788	4788	Cable Assembly - Maintenance Lock Rear
12.	2	7054	7054	Cable Assembly - Maintenance Lock Front
	2	5204	7054 5204	Retaining Nut - 5/16-18
13	1	4627		Bolt, Cap Hex - 5/16-18 x 1
14	4	7241	4627	Control Cord Guard - Short
15	1	4626	7241	Bolt - 1/4 x 3/4 Self Drilling
16	2	4645	4626	Control Cord Guard - Long
17	1	4646	4673	Spacer Tube - Ends
18	1	5417	4646 5417	Spacer Tube - Center
19	1	4498		Bolt, Cap Hex Head 3/8-16 x 1.25
20	2	4421	4499	Connecting Pin - Platform
21	4	4423	4421	Cylinder Pin
22	1	4423 4764	4423	Cylinder Pin - Retainer
23	18	6875	4764	Cylinder - Lift w/Bearings (See page 80)
24	2		6875	Retaining Ring HD 1-3/8 Shaft
2.4	4	3218 7164	3218	Pin Maintenance Rest
25	4		7164	Hose Clamp 5/16 ID
26	1	3353	3353	Spring Protective
27	1	4648	4648	Cover - Hose Tray
28	2	4647	4647	Hose Tray
29		5916	5916	Bolt SKT HD 1/2-13 x 4
30	2 2	7043	7043	Bolt SKT HD 1/2-13 x 2-1/2
Serv.	2	4625	4625	Mounting Blocks w/Bearing
31	0	7074	7074	Bearing 22DU16
	2	4490	4490	Roller - Base w/Bearing
Serv.	4	7196	7196	Bearing 22DU28
32	4	4678	4678	Spacer
33	1	4619	4619	Outrigger Act. Bracket - R.H.
34	1	4618	4618	Outrigger Act. Bracket - L.H.
35	4	6750	6750	Bolt Round HD 3/8-16 x 3/4
36	4	5039	5039	Nut - Hex - Keps 3/8-16
Serv.		6455	6455	Bolt 1/4-20 x 1/2
Serv.		5723	5723	Bolt 1/4-20 x 3/4

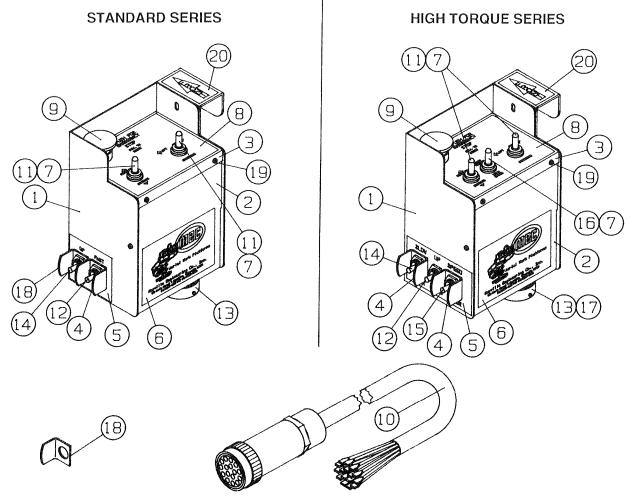
# LIFT CYLINDER mecNARO 20 SERIES



ART-172

Item	Qty.	Part No.	Description	
1	1	4679	Emergency Down Assembly	
2	1	5435	Valve, Manual Pull	
Serv.	·	5475	Seal Kit (2-Way Valve)	
3	1	6973	Valve N.C. Poppet 2-Way	
Serv.		5475	Seal Kit (2-Way Valve)	
4	1	6459	Fitting - Bayonet NPTF 5/16 x 1/4	
5	4	7196	Bearing 22DU28	
6	1	4421	Pin - Cylinder	
7	2	4423	Retainer - Cylinder Pin	
8	1	7005	Hose - Lift	
Serv.	·	6675	Seal Kit - Swivel Hose	
9		7078	Seal Kit - 2-1/2 Cylinder	
J	1	4764	Lift Cylinder w/Bearings	

# control boxes mecNARO 20 SERIES Pre 1992 Models



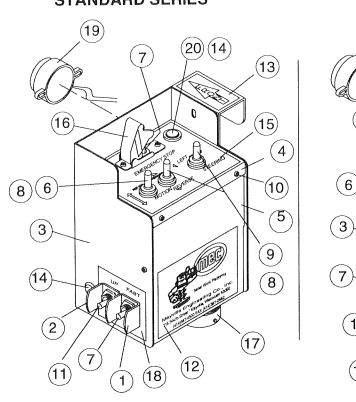
Item	Qty.	Standard Part No.	High Torque Part No.	Description
		2107		Control Box Assembly (Standard Series)
			2992	Control Box Assembly (High Torque Series)
1	1	2089	2318	Wrapper Weldment
2	1	2095	2095	Panel, Front & Bottom
3	1	2094	2991	Cover
4	2	1313	1313	Switch Guard
5	1	6572	6575	Decal - Control Box Side
6	1	6839	6839	Decal - Control Box Front
7	3	5692	5692	Boot - Toggle
8	1	6573	6574	Decal - Control Box Top
9	1	7800	7800	Switch - Emergency Stop
10	1	5983	5983	Harness - Upper Control Cord
11	2	5694	5694	Switch - DP, DT, SR Toggle
12	1	5979	5979	Switch - DP, DT, SR 2-Way Interlock Toggle
13	1	5982	5982	Harness - Control Box w/Connector
14	1	5630	5630	Switch - SP, ST Toggle
15	1	N/A	6234	Switch - SP, DT 2-Position Toggle
16	1	N/A	5230	Switch - SP, DT, SR Toggle
17	1	N/A	6296	Harness - Hi-Torque Wire Set
18	1	4171	N/A	Switch Guard - End
19	8	5978	5978	Screw - 6-32 x 1/4
20	1	7156	7156	Decal - Front Arrow

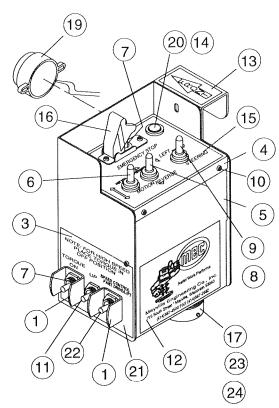
#### CONTROL BOXES WITH MOTION SWITCH

mecNARO 20 SERIES 1992 and Later Models

#### STANDARD SERIES

#### **HIGH TORQUE SERIES**

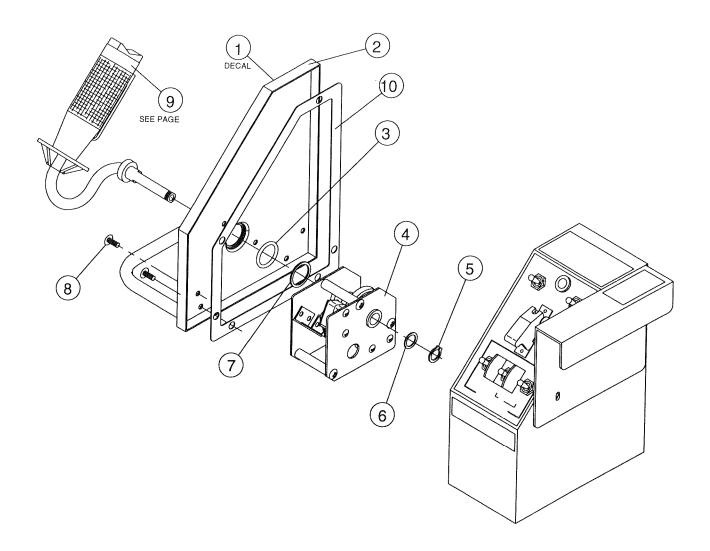




	G	ity.		
Item	Standard	High Torque	Part No.	Description
			4940	Control Box Assembly with Motion Switch (Standard Series)
			4920	Control Box Assembly with Motion Switch (High Torque Series)
4	1	2	1313	Switch Guard
2	1	0	4171	Switch Guard End
3	1	1	4268	Wrapper Weldment w/Hook
4	1	1	4269	Cover Panel
5	1	1	4271	Front & Bottom Panel
6	1	1	5230	Switch - SP, DT, SR - Toggle
7	2	2	5630	Switch - SP, ST Toggle
8	3	3	5692	Toggle Boot
9	2	2	5694	Switch - DP, DT, SR Toggle
10	10	10	5978	Screw - 6-32 x .250 Taptite
11	1	1	5979	Switch - DP, DT 2-Way Interlock SR
12	1	1	6839	Decal - Logo - Aerial Platforms
13	i	1	7156	Decal - Front Arrow
14	1	•	7579	Hole Plug
15	1	1	7620	Decal - Control Box Top
16	1	i	7622	Emergency Stop Flip Cap
17	1	1	7657	Harness - Control Box w/Cannon Plug
18	1	0	7659	Decal - Control Box Side
19	Option	Option	7553	Alarm - Tilt Sensor
20	Option	Option	7806	Light - Indicator Tilt Sensor
21	0	1	7621	Decal - Control Box Side
22	0	1	7633	Switch
23	0	1	7658	Wire Set - Control Box High Torque
24	0	2	6241	Diode - 3 Amp 600 P.I.V.
25	1	1	5926	Bolt - 1/4 x 3/8 Ground (Not shown)
26	1	1	5276	Nut - 1/4 x 20 Ground (Not shown)

#### JOYSTICK CONTROLLER ASSEMBLY

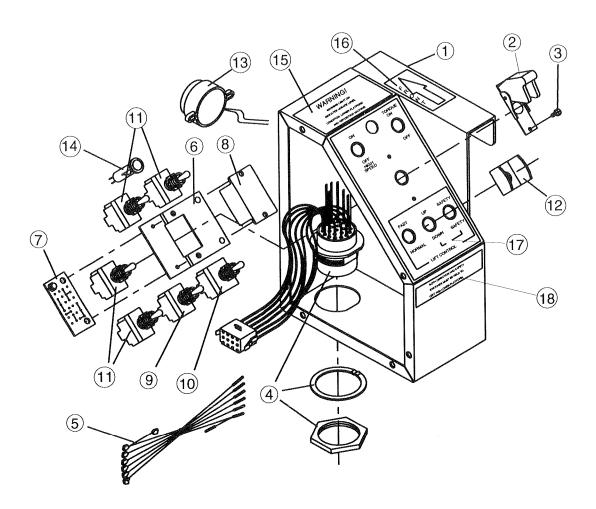
mecNARO 20 SERIES



Item	Qty.	Part No.	Description	
1	1	7828	Decal - Directions	-
2	1	3772	Cover Weldment - Joystick	
3	1	7882	O-Ring 7/8 I.D. x 1.25 O.D.	
4			Cam Assembly (See page 86)	
5	1	5736	Ring Retaining Ext. 1/2 Shaft	
6	1	3771	Washer - Retaining	
7	1	3768	Washer - O-Ring Spacer	
8	9	7888	Screw - Truss HD Machine 10-32	
9			Handle Control (See page 85)	
10	1	7875	Gasket	

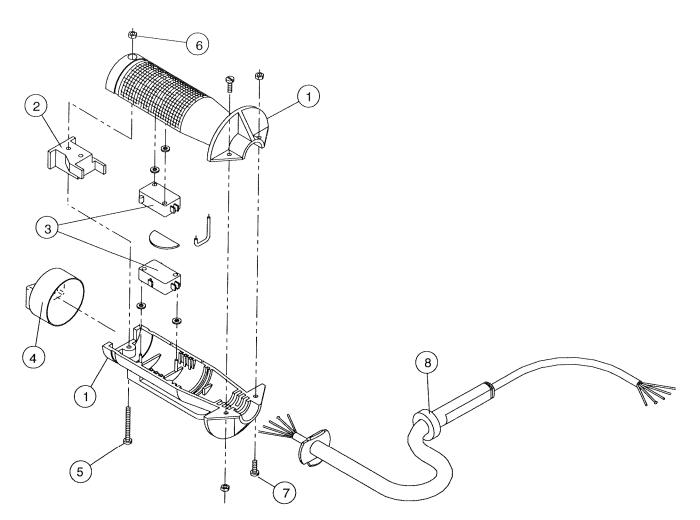
### JOYSTICK CONTROLLER CONTROL BOX

mecNARO 20 SERIES



Item	Qty.	Standard Part No.	High Torque Part No.	Description
	4	3773	3773	Control Box Weldment
1	i 4	7622	7622	Switch Guard Emergency Stop
2	6	5978	5978	Screw 6-32 x 1/4
3	1	7826	7826	Wire Harness with Connector
4	1	N/A	7926	Wire Harness High Torque
5	1	3769	3769	Bracket - Relay & Circuit Board
6 7	1	7831	7831	Circuit Board
8	1	7835	7835	Relay 24 Volt
9	1	5230	5230	Switch - Toggle
10	1	5979	5979	Switch - Toggle - Interlock
11	4	N/A	5630	Switch - Toggle - High Torque
11	1	5630	N/A	Switch - Toggle - Standard
12	1	1313	1313	Switch Guard
13	Option	7553	7553	Alarm - Tilt Sensor
14	Option	7806	7806	Light - Indicator
15	Option	7827	7827	Decal - Warning Light
16	1	7156	7156	Decal - Front Indicator
17	1	7824	7824	Decal - Controls
18	1	7895	7895	Decal - Lift Directions

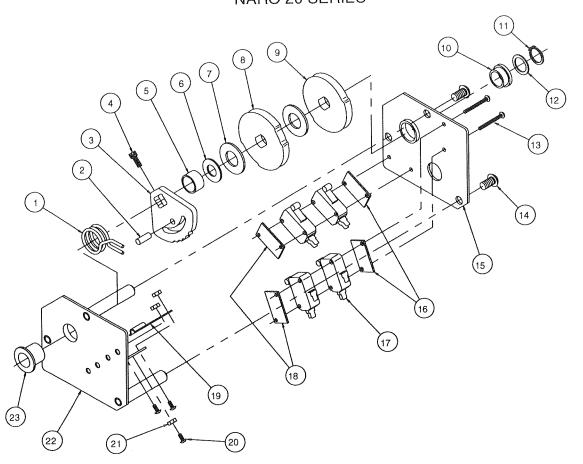
#### JOYSTICK ASSEMBLY mecNARO 20 SERIES



ART-188
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Item	Qty.	Part No.	Description
1	1	8067	Handle - Both Halves - Includes Switch
2	1	8068	Switch Lever - Rocker
3	2	8069	Switch
4	1	8070	Boot
5	1	8071	Screw - M3 x 30
6	3	8072	Nut - M3
7	2	8073	Screw - M3 x 10
8	1	3780	Arm - Weldment

# JOYSTICK CONTROLLER CAM AND SWITCH ASSEMBLY mecNARO 20 SERIES

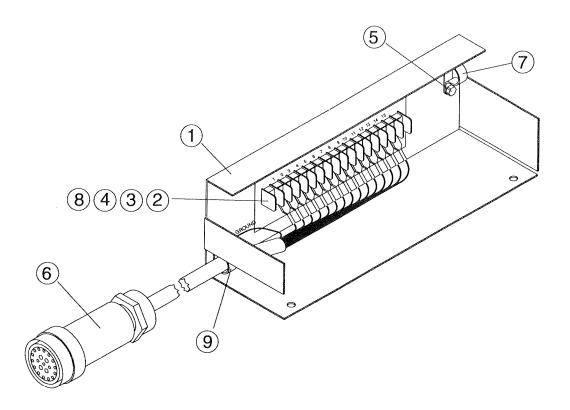


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	G	ty.		
item	Standard	High Torque	Part No.	Description
***************************************				Outline Torrion
1	1	1	7815	Spring - Torsion
2	1	1	7918	Pin - Spring
3	1	1	3751	Bracket - Centering
4	1	1	7887	Screw Cap 6-32 x 1
5	1	1	3763	Spacer Step
6	1	1	7881	Washer - Spring
7	2	2	5216	Washer - Flat
8	1	1	3781	Cam - Speed Control
9	·	i	3782	Cam - Directional
10	1	· i	7818	Bearing - Bronze Flanged
11	4	i i	5736	Ring - Retaining
	1	1	3771	Washer - Retaining
12	1	1	7884	Screw Machine 4-40 x 1
13	4	2	7888	Screw Truss HD 10-32
14	3	ى 1	3759	Plate Bottom - Cam Assembly
15	1	1	3764	Plate Spacer
16	2	2	7834	Switch Limit Micro
17	3	4		Plate Strap
18	2	2	3765	Spring Speed Level
19	1	1	3770	Screw Machine 4-40 x 1/4
20	3	3	7885	
21	3	3	7886	Nut - Hex 4-40
22	1	1	3766	Plate Top - Cam Assembly
23	1	1	7819	Bearing - Bronze Flanged

### PLATFORM TERMINAL BOX ASSEMBLY

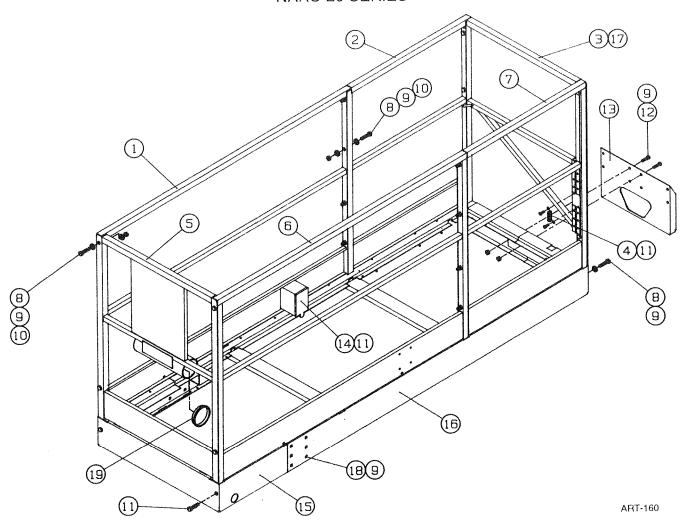




Item	Qty.	Part No.	Description	
1	1	3214	Terminal Cover	
2	1	5991	Terminal Block	
3	1	7817	Strip Backing	
4	1	5363	Screw 6-32 x 1	
		5364	Nut 6-32	
5	1	6455	Bolt 1/4-20 Self Tapping	
6	1	7656	Control Harness 1992 & Later	
		5983	Control Harness Pre 1992	
7	1	7794	Cable Clamp .562 Dia.	
8 .	1	7139	Tab Adapter Male 1/4 inch	
9	. 1	7042	Cable Clamp 1.0 Dia.	

#### STANDARD PLATFORM

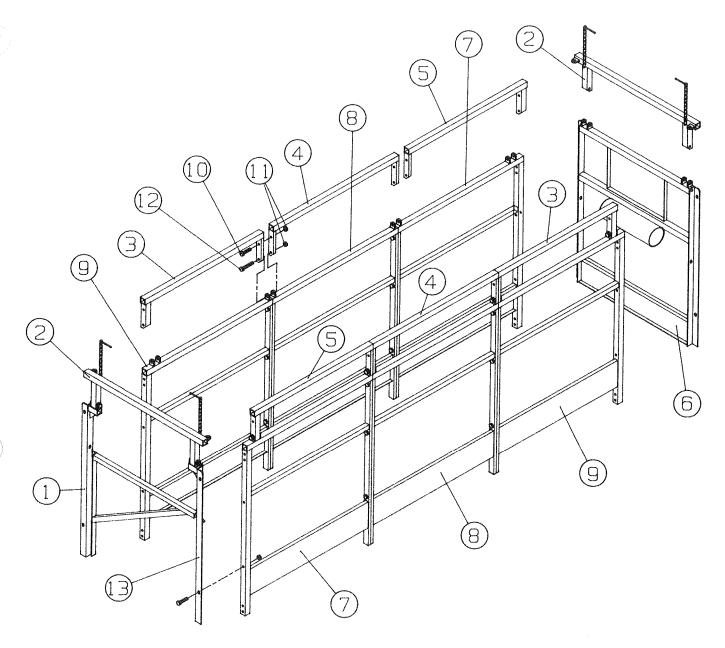
mecNARO 20 SERIES



		2034	2042	
Item	Qty.	Part No.	Part No.	Description
1	1	4875	4875	Side Rail R.H. Front
2	1	4873	4873	Side Rail R.H. Rear
3	1	4471	4472	Rear Gate Weldment
4	1	7153	7153	Spring - Platform Gate
Serv.		4802	4802	Spring Kit Rear Gate w/Bolts
5	1	4467	4466	Front Rail w/Manual Tube
Serv.		11323	11323	Manual Tube Assembly (Includes Caps)
19	1	3788	3788	Manual Tube Caps Assembly
6	1	4876	4876	Side Rail L.H. Front
7	1	4874	4874	Side Rail L.H. Rear
8	18	6434	6434	Bolt - Cap 3/8-16 x 2 Grade 5
9	36	5039	5039	Nut - 3/8-16
10	32	5355	5355	Washer - Flat
11	8	6455	6455	Bolt - 1/4-20 x 1/2 Grade 5
12	8	6432	6432	Bolt - Hex Flange - 3/8-16 x 3/4 Grade 5
13	1	4899	4899	Rear Step
14	1	6746	6746	110 Outlet w/Harness
Serv.		7261	7261	Receptacle Box AC
Serv.		7262	7262	Cover - Receptacle Box
Serv.		7263	7263	Receptacle, Duplex G.F.
15	1	4483	4484	Front Platform Weldment
16	1	4485	4486	Rear Platform Weldment
	1	6990	6991	Floor Board
17	1	7048	7050	Cover Rail Pad
18	12	6750	6750	Bolt Carriage 3/8-16 x 3/4

#### STANDARD PLATFORM FOLD DOWN RAILING

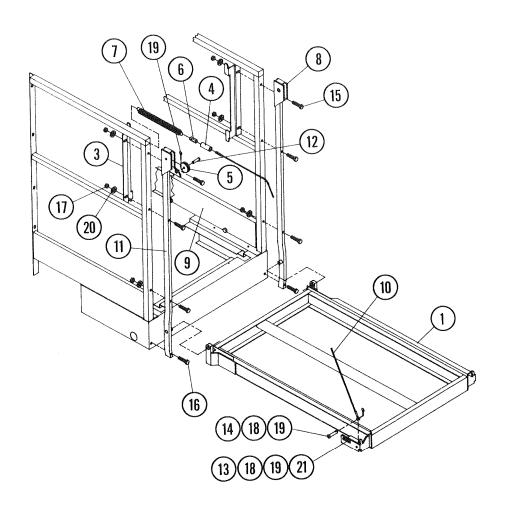
mecNARO 20 SERIES



Ita wa	Other	2034	2042	<b>.</b>
Item	Qty.	Part No.	Part No.	Description
1	1	4745	4748	Rear Gate Left Weldment
2	2	4746	4749	Rail Weldment Fold Down
3	2	4754	4754	Rail End Weldment Fold Down
4	2	3548	3548	Rail Center Weldment Fold Down
5	2	4753	4753	Rail End Weldment Fold Down
6	1	4742	4739	Front Rail Weldment w/Manual Tube
7	2	4751	4751	Side Rail End Weldment
8	2	3525	3525	Side Rail Center Weldment
9	2	4752	4752	Side Rail End Weldment
10	4	7123	7123	Bolt Hex Head 5/16-18 x 1-3/4
11	16	7120	7120	Nut Hex 2-Way Lock 5/16-18
12	12	7119	7119	Bolt Hex Head 5/16-18 x 2-1/4
13	1	4783	4783	Folding Rail Post R.H.

### **EXTENSION PLATFORM WELDMENT**

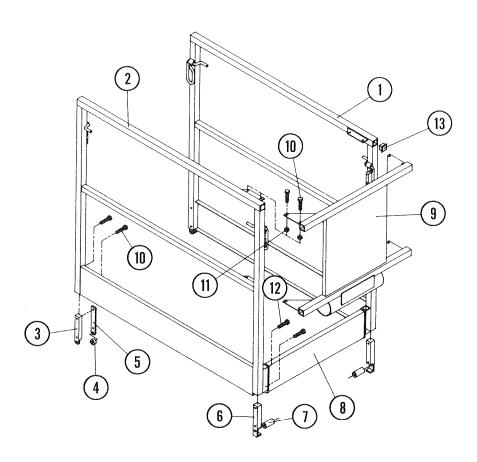
mecNARO 20 SERIES



14	Qty.	2034 Part No.	2042 Part No.	Description
Item	Giy.	faitito.	1 411111	
1	1	4442	4443	Extending Platform Weldment
2	1	6992	6993	Platform Floor Board (Not shown)
3	2	3344	3344	Stop Bracket
4	2	3343	3343	Attaching Block - Cable
5	2	2747	2747	Pulley
6	2	3366	3366	Spring Connecting Pin (Hex)
7	2	7023	7023	Spring - Retracting
8	1	3316	3316	L.H. Pulley Bracket & Bar Weldment
9	2	4462	4462	Inner Kick Panel
10	2	6821	6821	Cable Assembly
11	1	3317	3317	R.H. Pulley Bracket & Bar Weldment
12	3	6450	6450	Clevis Pin - 5/16 x 1-1/4
13	1	6962	6962	Latch Pin - 5/16 x 3-1/2
14	2	7163	7163	Clevis Pin - 5/16 x 3
15	6	6777	6777	Bolt - 3/8-16 x 3-1/4
16	16	6434	6434	Bolt - 3/8-16 x 2
17	20	5039	5039	Nut - Keps Lock 3/8-16
18	2	5217	5217	Washer - Flat - 5/16
19	2	5920	5920	Cotter Pin - 1/8 x 1
20	32	5355	5355	Washer - Flat - 3/8
21	1	3597	3597	Bushing - Latch Pin

#### **EXTENSION PLATFORM RAILING**

mecNARO 20 SERIES

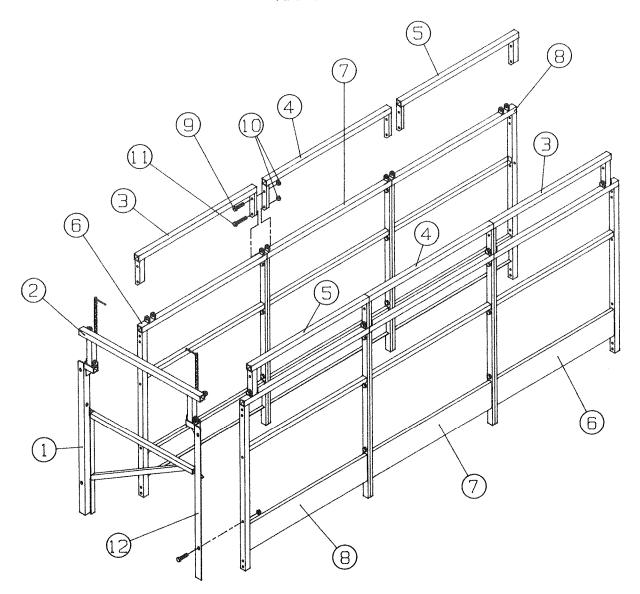


		2034	2042		
Item	Qty.	Part No.	Part No.	Description	
	Serv.	4712	4714	Extension Platform & Railing Kit	
1	1	3339	3339	R.H. Side Rail Weldment	
2	1	3340	3340	L.H. Side Rail Weldment	
3	2	3302	3302	Bracket - Siding Rail (Outer)	
4	2	3291	3291	Rear Roller	
5	2	3301	3301	Bracket - Siding Rail (Inner)	
6	2	3319	3319	Guide Bracket - Siding Rail (Front)	
7	2	3318	3318	Front Roller	
8	1	4453	4452	Front Kick Panel	
9	1	4448	4449	Front Rail Weldment w/ Manual Tube	
10	12	5723	5723	Bolt - 1/4-20 x 3/4"	
11	8	5276	5276	Keps Nut (Lock) - 1/4-20	
12	4	6831	6831	Bolt - 1/4-20 x 2"	
13	2	6823	6823	Caplug 1-1/4" Square Tubing	

### STANDARD PLATFORM FOLD DOWN RAILING

For Use with Extension Platform

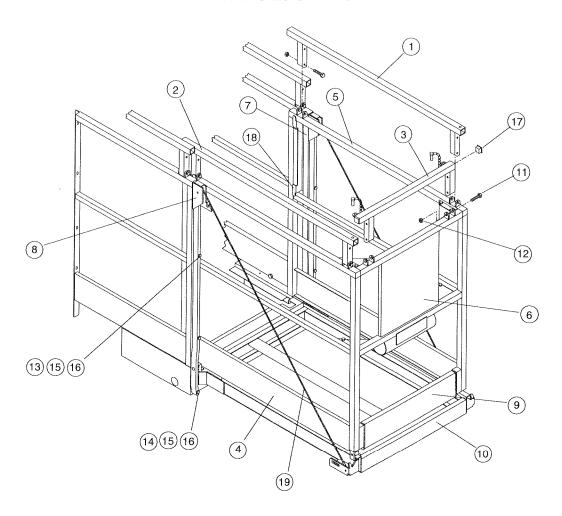
mecNARO 20 SERIES



Item	Qty.	2034 Part No.	2042 Part No.	Description
1	4	4745	4748	Rear Gate Left Weldment
2	1	4746	4749	Rear Rail Weldment Fold Down
3	2	4754	4754	Rail End Weldment Fold Down
4	2	3548	3548	Rail Center Weldment Fold Down
5	2	4753	4753	Rail End Weldment Fold Down
6	2	4752	4752	Side Rail End Weldment
7	2	3525	3525	Side Rail Center Weldment
8	2	4751	4751	Side Rail End Weldment
9	16	7119	7119	Bolt Hex Head 5/16-18 x 1-3/4
10	20	7120	7120	Nut Hex Head 2-Way Lock 5/16-18
11	4	7123	7123	Bolt Hex Head 5/16-18 x 2-1/4
12	1	4783	4783	Folding Rail Post R.H.

### EXTENSION PLATFORM FOLD DOWN RAILING

mecNARO 20 SERIES



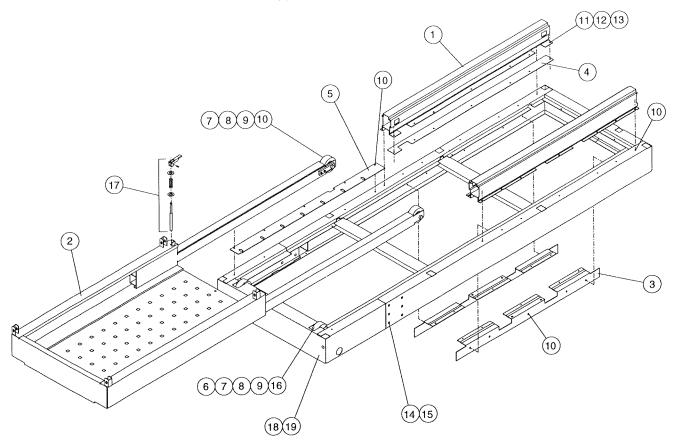
ART-179

Item	Qty.	2034 Part No.	2042 Part No.	Description
1	1	3555	3555	Rail Weldment L.H. Fold Down
2	1	3556	3556	Rail Weldment R.H. Fold Down
3	1	4743	4740	Rail Weldment Front Fold Down
4	1	3543	3543	Side Rail Weldment R.H.
5	1	3542	3542	Side Rail Weldment L.H.
6	1	4756	4757	Front Rail Weldment w/Manual Tube
7	1	3522	3522	Pulley Bracket & Bar Weldment L.H.
8	1	3521	3521	Pulley Bracket & Bar Weldment R.H.
9	1	4453	4452	Front Kick Panel Weldment
10	1	4758	4759	Extend Platform Weldment
11	12	7119	7119	Bolt - 5/16-18 x 2-1/4
12	12	7120	7120	Nut - 5/16-18
13	6	6777	6777	Bolt - 3/8-16 x 3-1/4
14	10	6434	6434	Bolt - 3/8-16 x 2
15	20	5355	5355	Washer - Flat - 3/8
16	16	5039	5039	Nut - 3/8-16
17	6	6823	6823	Caplug - 1-1/4 Square
18	2	3517	3517	Stop Bracket
19	2	7118	7118	Retractor Cable
	2	7023	7023	Spring - Retractor

All other Fasteners see page 90.

### ROLLOUT EXTENSION PLATFORM

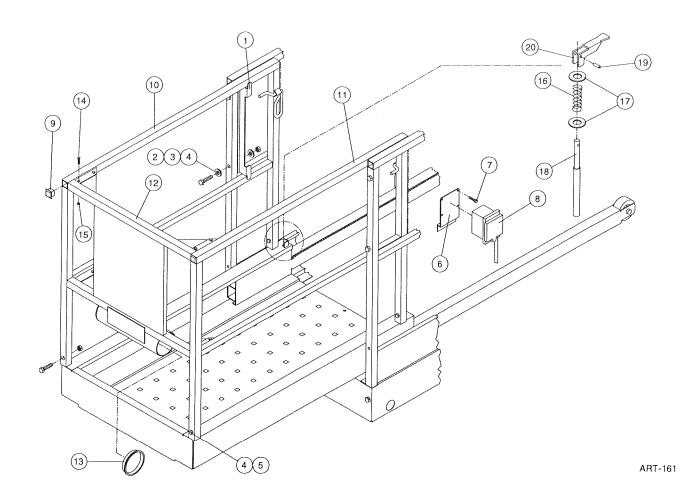
mecNARO 20 SERIES



ART-159

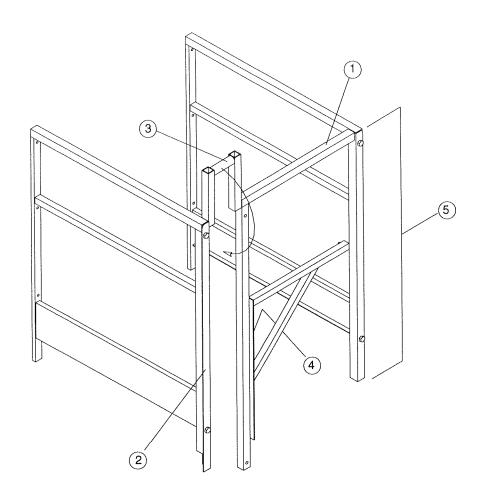
Item	Qty.	2034 Part No.	2042 Part No.	Description
1	2	4848	4848	Roller Track Weldment
2	1	4830	4959	Extend Platform Weldment Rollout
3	2	4841	4841	Lower Mounting Angle
4	2	4904	4904	Shim - Roller Track
5	1	4846	4846	Lock Plate
6	,	11337	11337	Roller Pivot Weldment - Platform
7	4	7465	7465	Roller - 3-1/4" Diameter
8	2	4842	4842	Roller Pivot Weldment
9	1	5432	5432	Grease Fitting
10	8	5723	5723	Bolt - Hex Head 1/4-20 x 3/4 Self Tapping
11	14	6029	6029	Bolt - Hex Head 1/4-10 x 1-1/2
12	24	5217	5217	Washer - Flat 5/16
13	8	5276	5276	Nut - 1/4-20
14	12	6750	6750	Bolt - Carriage 3/8-16 x 1
15	12	5039	5039	Nut - 3/8-16
16	14	6455	6455	Bolt - Hex Head 1/4-20 x 1/2 Self Tapping
17	1	0400	J . W	Platform Lock Assembly (See Rail Assembly, page 95)
18	1	4856	4962	Platform Front Weldment Rollout
19	1	6990	6991	Floor Board - Main Platform

# ROLLOUT EXTENSION PLATFORM RAILING **mec*NARO 20 SERIES**



Item	Qty.	2034 Part No.	2042 Part No.	Description
1	2	3344	3344	Stop Bracket
2	14	6434	6434	Bolt - 3/8-16 x 2 Grade 5
3	18	5355	5355	Washer - Flat 3/8
4	16	5039	5039	Nut - 3/8-16
5	4	5756	5756	Bolt - 3/8-16 x 1-1/2
6	1	4900	4900	Outlet Mounting Bracket
7	6	6455	6455	Bolt - 1/4-20 x 1/2
8	1	7649	7649	110 VAC Cord Kit w/Outlet Box
Serv.		7261	7261	Receptacle Box - GFI
Serv.		7262	7262	Receptacle Cover - GFI
Serv.		7263	7273	Receptacle - Duplex GFI
9	4	6823	6823	Caplug 1-1/4 Square
10	1	4853	4853	Extend Platform Side Rail R.H.
11	1	4854	4854	Extend Platform Side Rail L.H.
12	1	4448	4449	Front Rail Weldment Extend Platform w/Manual Tube
Serv.		11323	11323	Manual Tube Assembly (Includes Caps)
13	1	3788	3788	Manual Tube Caps Assembly
14	8	5723	5723	Bolt - 1/4-20 x 3/4
15	8	5276	5276	Nut - 1/4-20
16	1	7408	7408	Spring - Deck Lock
17	2	11410	11410	Washer - Spring Retainer
18	1	4855	4855	Lock Pin Rollout Platform
19	1	1008096	1008096	Roll - Pin 3/16" x 3/4"
20	1	10476	10476	Lock Lever

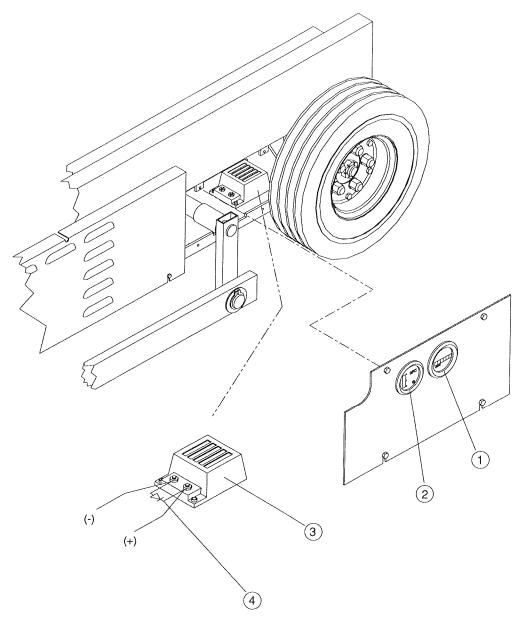
# **DRYWALL GATE**mecNARO 20 SERIES



item	Qty.	2034 Part No.	2042 Part No.	Description
		4771	4772	Drywall Kit Field Conversion
1	1	4727	4728	Rear Gate Weldment
2	1	3590	3590	Rail Post
3	1	3589	3589	Pivot Gate Weldment
J	2	3588	3588	Compression Washer
	2	6349	6349	Locknut 1/2-13
	4	6823	6823	Caplug 1-1/4 Square
4	1	7153	7153	Gate Spring
•	2	6455	6455	Bolt - 1/4-20 x 1/2 Self Tapping
	Serv.	4802	4802	Gate Spring Kit

#### **OPTIONS**

# HOUR METER, BATTERY INDICATOR & MOTION ALARM mee NARO 20 SERIES

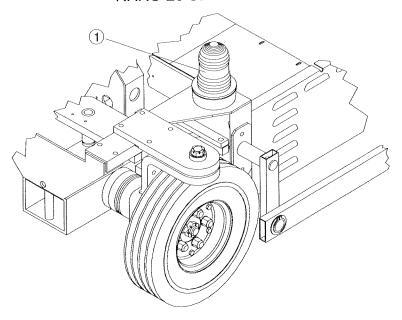


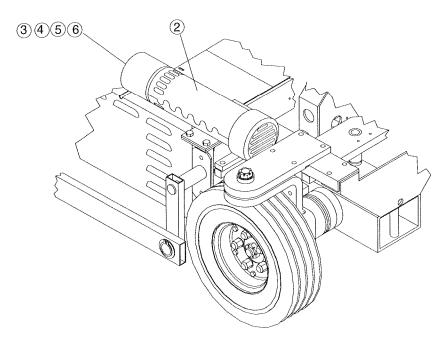
Item	Qty.	Part No.	Description
1	1	6857	Hour Meter
2	1	7099	Battery Fuel Gauge
	1 or 2	7115	Hole Plug (Not shown)
3	1	7102	Motion Alarm 12-48V
	1	6241	Diode 6 Amp 1000P.I.V. at Terminal Strip
4	1	6070	Diode 3 Amp 600 P.I.V. Banded End Toward Positive

#### **OPTIONS**

#### **WARNING LIGHT & DC-AC CONVERTER**

mecNARO 20 SERIES

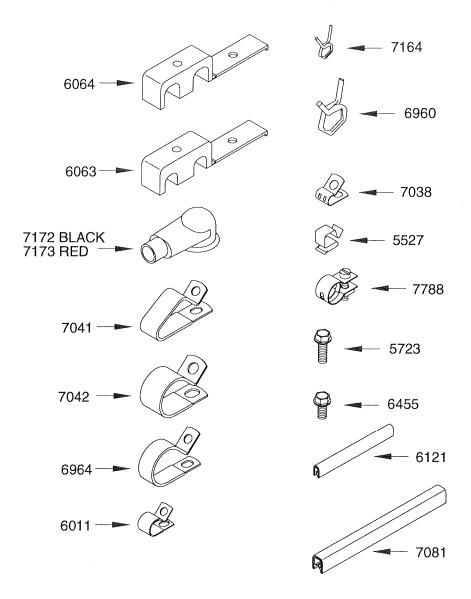




Item	Qty.	Part No.	Description
1	1	7105	Warning Light 24V Amber
2	1	7103	DC-AC Converter 24VIN - 800 Watt Out
3	1	7110	Terminal Boot Red
3	1	7112	Cable Positive Red
4	1	7111	Cable Negative Black
4	1	7109	Terminal Boot Black
5	1	7130	Ceramic Capacitor 0.1 Micro Farad
6	1	4724	Mounting Plate
О	1	5005	Nut 5/16-18
	4	5204	Bolt 5/16-18 x 1"
	2	7116	Bolt 5/16-18 x 1-1/4"

# ACCESSORIES CLAMPS, FASTENERS & TRIM

mecNARO 20 SERIES



Item	Qty.	Part No.	Description
		6064	Clamp - Double 5/8"
		6063	Clamp - Double 1/2"
		7172	Terminal Insulator Boot Black
		7173	Terminal Insulator Boot Red
		7041	Clamp - Double 5/8" Steel/Vinyl 5/8" Wide
		7042	Clamp - 1" Steel/Vinyl 3/4" Wide
		6964	Clamp - 1" Steel/Vinyl 1/2" Wide
		6011	Clamp - 3/8" Steel/Vinyl 1/2" Wide
		7164	Clamp - 1/2" Diameter
		6960	Clamp - 3/4" Diameter
		7038	Clamp - 1/4" Steel Grip Tite Cable
		7788	Clamp - 5/8" Steel to 1/2"
		5723	Bolt - 1/4-20 x 3/4" Self Tapper
		6455	Bolt - 1/4-20 x 1/2" Self Tapper
		6121	Trim - 1/4" Edge - Per Foot/Even Feet Only
		7081	Trim - 1/2" Edge - Per Foot/Even Feet Only

