

**MOHAWK MP-24 SERIES
MOBILE COLUMN LIFT
SPECIFICATIONS
15" & 22" FORK MODEL**

1. GENERAL DESCRIPTION

- 1.1 The purpose of these specifications is to define a mobile wheel contact lifting system to elevate large buses, trucks, passenger cars, and other vehicles for the purpose of inspection, maintenance, servicing, and cleaning.
- 1.2 A lifting system shall consist of at least one main lifting column and one secondary column. It shall be possible to form a variety of lifting system configurations using any combination of main and secondary column pairs. All column pairs shall be numerically consecutive. For example, columns 1 and 2 are a pair and columns 3 and 4 are a pair. A set of four may consist of columns 1, 2, 3 & 4. A set of eight may consist of columns 1, 2, 3, 4, 5, 6, 7 & 8. The control system shall allow the flexibility of breaking up sets to be used as sets of two in geographically separate areas or combining sets to create a set of up to eight without modifying the electrical system.
- 1.3 The lift system shall be approved and certified by the ALI (Automotive Lift Institute) certification program for automotive lifts and shall meet the requirements inherent in the testing of the program, including mechanical as well as electrical testing to ANSI ALI/ALCTV-2006 Standard for Construction of Automotive Lifts and UL-201 Standard for Garage Equipment. Proof of certification as well as testing report showing testing at the certified capacity of the lift must be submitted with bid at the time of bid. ETL is an ALI sponsored independent nationally recognized testing laboratory (NRTL) approved by OSHA. (ETL, an independent NRTL, administers the ALI certification program.)
- 1.4 The lift system shall be designed to permit combining multiple sets without modifications to the electrical or mechanical configuration of the lifting columns. The lift system shall be designed as to be able to handle up to 8 columns in a lifting system (or 192,000 lbs.), with the possibility of operating one column, one pair or all of the columns together.
- 1.5 Control cables shall be disconnected from control boxes at both ends of the cable. Mobile lift systems with control cables "hardwired" into the control box shall not be acceptable due to the difficulty in replacement and loss of operating flexibility.



Mohawk MP-24 Series
with 15" & 22" Forks

- 1.6 Control cables shall attach to the columns in an open-ended daisy chain fashion. The opening of the cable loop shall provide access to vehicle entry into the lifting zone without having to drive over cables. Systems that incorporate a closed loop cable system that encourage the operators to drive over control cables are not acceptable.
- 1.7 Columns shall be structurally designed as to have motor and hydraulic pump assemblies positioned at the bottom of the column to promote greater stability while moving the column. Lift systems with motors mounted on the top of the column shall not be accepted due to their inherent top-heaviness and possibility of tipping while moving.
- 1.8 Each column shall be equipped with a 2 ½ HP TEFC motor of North American Manufacturer. The motor shall be available in 208/230/440/460/480 or 575 VAC, 3 Phase, 60 HZ. (Note: Only 440-480/575 VAC is available for 8 column units) Motor bearings shall be sealed for life and pre-lubricated for a minimum of 5 years use.
 - 1.8.1 The motors shall be available in 208-230 VAC, Single Phase, 60 Hz as an option.
- 1.9 The floor pressure requirements for each column shall not be greater than 70 psi to ensure stability. Lifts which, when loaded, have weight on the wheels are not acceptable.
- 1.10 The lift shall be suitable for indoor use on any level service that meets the loading requirements stated above.
- 1.11 The lift maintenance shall be limited to monthly and yearly visual checks to insure that the hydraulic fluid levels are correct and that lift safety systems are functioning properly.

2. LIFTING CAPACITY

- 2.1 When specified with 15 inch long lifting forks: Each lifting column shall have a nominal rated capacity of 24,000 lbs. per column; 48,000 lbs. per pair, or 96,000 lbs. per set of four; or 144,000 lbs. per set of six columns; or 192,000 lbs. per set of eight columns. One pair of columns, rated at 48,000 lbs, must be capable of lifting the heavy rear ends of customer's heaviest vehicle axle. Vehicles weighing more than 48,000 lb on the rear axle require an additional pair of columns, or heavier rated columns.
- 2.2 When specified with 22 inch long lifting forks: Each lifting column shall have a nominal rated capacity of 22,000 lbs. per column; 44,000 lbs. per pair, or 88,000 lbs. per set of four; or 132,000 lbs. per set of six columns; or 176,000 lbs. per set of eight columns. One pair of columns, rated at 44,000 lbs, must be capable of lifting the heavy rear ends of customer's heaviest vehicle axle. Vehicles weighing more than 44,000 lb on the rear axle require an additional pair of columns, or heavier rated columns.

2.3 Combinations of 15 inch and 22 inch long lifting fork columns shall be available. For example, a four column lift may consist of two front columns with 15 inch long lifting forks (rated 48,000 lbs each) and two rear columns with 22 inch long lifting forks (rated 44,000 lbs each) for a system that is rated 92,000 lbs total. Various other combinations are available.

3. LIFTING HEIGHT

3.1 The lifting height of each fork shall be no less than 67 inches as measured from the ground to the bottom of the lifting fork (stroke).

4. LIFTING SPEED

4.1 The lifting speed shall not be less than 26 inches per minute either in the ascent or descent mode. This equates to 155 seconds for a full stroke.

5. CONSTRUCTION

5.1 Upright frame shall be constructed of 1 inch thick by 7 1/4 wide, high strength R34 fork lift mast channels to ensure structural integrity and provide a smooth lift guidance system. Forks shall be braced at a minimum of 3 times along the length of the post to resist channel spreading/bowing when loaded. Formed steel and I-beam construction columns shall not be acceptable as they do not afford the required strength and rigidity.

5.2 The base shall be of a rectangular design with square rear corners, which contact the garage floor when raising a vehicle, so as to provide maximum rigidity, stability and balance during lifting operation. Lifts which, when loaded, have weight loaded on the wheels are not acceptable. Lifts which, when loaded, have weight loaded on small 12" x 12" area column bases only are not acceptable.

5.3 Columns shall have multiple covers to allow access to the mechanical lock mechanism, the sensing connection to the carriage, and rear access to the hydraulic lines at the cylinder.

5.4 To Promote Horizontal and Lateral Stability Individual Column Dimensions Should Measure:

5.5.1 Base width - 57 inches

5.5.2 Base length – 61 1/2 inches (from outside of pallet jack to end of column “feet”)

5.5.3 Column Height with carriage in low position – 108 1/2 inches max

5.5.4 Column Height with carriage in high position - 142 1/4 inches max

5.6 Lifting Carriage:

- 5.6.1 Lifting carriage shall ride on maintenance free, double sealed, self lubricating steel barrel-type bearing rollers. Nylon rollers or sliding blocks shall not be accepted because they have a higher coefficients of friction resulting in a higher working pressures for the hydraulic system, and thus, shorter life expectancy on the power units. Ball-type bearings shall not be accepted because their axial load ratings are not as high as barrel-type bearings. Each carriage shall incorporate 8 channel bearings.
- 5.6.2 Side load slide blocks shall be provided on the carriages to resist offset loading of the columns. These slide blocks must be accessible and replaceable from outside of the column without having to remove the carriage. Any carriage design that requires removal of the carriage to replace the lifting slide blocks is not acceptable.
- 5.6.3 The distance between the wheel contact forks shall be hand adjustable from 11 1/2 inches to 28 inches. Wheel contact forks shall freely accept tire sizes between R10 and R22.5 inclusively, thereby accommodating vehicles with up to 53 inch diameter tires (Hemmitt Tires) and 24 inch rims. Wheel reducer sleeves (sleeve adaptors) shall not be acceptable as they may slip off of the lifting forks causing a vehicle to fall.
- 5.6.4 Standard fork length shall be no less than 15 inches, to accommodate flotation tires.
 - 5.6.4.1 Alternately 22 inch long lifting forks are available to support dual inside and outside tires on dual wheeled axles or to accommodate super single tires. If 22 inch fork length is required, column capacity is reduced from 24,000 lbs. to 22,000 lbs.
- 5.6.5 Forks shall be wedge shaped with an angle not to exceed 35 degrees. This enables the forks to be adjusted closer and support the hub in the case of a flat tire. Forks with angles exceeding 35 degrees are not acceptable, due to difficulty of positioning the columns.
- 5.6.6 The clearance between the lifting column and the back of fork shall be no less than 9 inches, for operating a single column when lowering onto a jack stand.
- 5.6.7 Carriage shall have 1/8 inch minimum clearance from the floor when in the low position, to facilitate moving the column when power is cut-off.

6. PALLET JACK MECHANISM

- 6.1 The lifting columns shall be easily moved by one small person using a pallet jack system with two spring loaded front wheels consisting of at least 6 inch diameter aluminum core with polyurethane tread and straight bearings and dual 6 5/8 diameter thermo set resin coated steering wheels at the rear of the jack. The rise of the pallet jack shall be 1 ½ inches minimum. Smaller wheels, single rear wheels, solid steel or plastic wheels that do not allow easy column movement and will not be considered due to difficulty moving columns over floor expansion seams, cracks, or debris on shop floor.
- 6.2 The pallet jack mechanism shall have an OSHA approved loop type handle and shall be raised and lowered using a three position lever with raise, lower, and neutral position. T-bar handles are not acceptable since they do not facilitate proper handling of the mobile column.
- 6.3 Pallet jack mechanism shall have an overload valve that will automatically lower the jack if the operator attempts to raise a vehicle with the pallet jack in the raised position. The overload valve shall be set and sealed at the factory and adjustable in the field if necessary.
- 6.4 The pallet jack mechanism shall be rated for a minimum of 5,000 lbs. Yet the pressure relief setting will cause the column to lower to the floor if 500lbs. of pressure is applied to the lift's columns.
- 6.5 The two front wheels shall be spring loaded and shall retract when the lift column are loaded. This retraction shall cause the columns to bear on the floor thru steel plates, resulting in evenly dispersed low compression forces on the floor, not line loads at wheels. Non-retractable wheels that support the lifted load are not acceptable.

7. CONTROLS

- 7.1 The various functions of the mobile lifting system shall be controlled from the control panels on the columns.
 - 7.1.1 All columns and all functions shall be clearly labeled in easy to understand English and not symbolic functions.
- 7.2 Lifting system shall be operable from any of the columns.
 - 7.2.1 Each Secondary Control Column Panel shall include:
 - 7.2.1.1 A NEMA 4/4X rated (more stringent than NEMA 12) control enclosure
 - 7.2.1.2 A green pilot light to indicate that the power is turned on.
 - 7.2.1.3 A red pilot light to indicate a fault in the lift operating system.

- 7.2.1.4 A transformer to convert incoming supply voltage to 110V which is supplied to the PLC (programmable logic controller). Transformers shall have primary and secondary fuse protection. Transformers shall not be located outside of control enclosure. Any design that locates the transformer outside of the control enclosures is not acceptable, if the lift's controls can be exposed to water.
- 7.2.1.5 A spring loaded three position operational selector switch for selecting ALL, PAIR, or SINGLE operation.
- 7.2.1.6 Two push buttons for UP and DOWN operation.
- 7.2.1.7 One push button for PARK operation to allow load to sit on the mechanical safety locks.
- 7.2.1.8 One push button for RESET operation to re-establish a level condition in the post system.
- 7.2.1.9 A PLC to monitor the proper operation of the lift and provide motion control. The PLC shall supply 24VDC to the control circuit. All buttons will only have 24V to them preventing any operator shock.
- 7.2.1.10 Green LED lights on PLC to show presence of inputs and outputs and to aid in fault trouble shooting.
- 7.2.1.11 Adjustable setting and automatic resetting overload relay to protect the motor in the event of an overload.
- 7.2.1.12 Circuit breaker to protect the wires in the event of a short circuit.
- 7.2.1.13 A red mushroom palm-type emergency stop button to allow immediate manual shut down of the entire lifting system.
- 7.2.1.14 Two connection receptacles for control cables coming to and from control panel.

7.2.2 Each Main panel shall include:

- 7.2.2.1 All items as specified in the Secondary panels and the following additional items.
- 7.2.2.2 A power contactor which controls distribution of power to all lifting columns after lift setup and cable connections are made.
- 7.2.2.3 A disconnect switch to control source power. Switch shall be capable of being locked in the off position for operator safety.
- 7.2.2.4 A phase loss and phase reverse relay to assure proper presence phasing of the supply power.
- 7.2.2.5 A transformer to convert incoming supply voltage to 24VAC which is supplied to the lift safety logic circuit which determines proper lift operation and proper cable connections.
- 7.2.2.6 One power receptacle for incoming power cable.
- 7.2.2.7 Dust covers to protect electrical and connections when not in use.

7.3 It shall be possible to form a set of lifts using any combination of main and secondary column pairs. All column pairs shall be numerically consecutive. For example, columns 1 and 2 are a pair and columns 3 and 4 are a pair. A set of four may consist of columns 1, 2, 3, and 4. The control system shall allow the flexibility of breaking up sets to be used as sets of two in

geographically separate areas or combining sets to create a set of up to eight without modifying the electrical system.

- 7.4 Individual operation of each column shall be achieved by simultaneously turning and holding the spring loaded operation mode selector switch to the SINGLE position and pressing the UP or DOWN button on that column. Lifts that use operation mode selector switches that are not spring loaded shall not be accepted due to the possibility of inadvertent switching by other operators in the shop.
- 7.5 Paired column operation shall be achieved by simultaneously turning and holding the spring loaded operation mode selector switch on either of the two columns on the axle to the PAIR position and pressing the UP or DOWN button on the column. Lifts that require a complicated sequence of pressing reference buttons on multiple columns shall not be accepted.
- 7.6 Paired or individual operation shall be permitted at any time during the lifting cycle. It shall be possible to switch from SINGLE, PAIR, or ALL operation in any order regardless of the height position of the lifting carriage.
- 7.7 The control system shall utilize an off the shelf Siemens brand PLC (programmable logic controller) to ensure proper operation of the lift. The PLC shall have LED lights to indicate inputs and outputs to facilitate trouble shooting. Printed and dedicated circuit boards, impossible to obtain from any company except the OEM manufacturer will not be accepted.
- 7.8 All wiring within electrical enclosures shall be numbered to assist in trouble shooting. Units with un-numbered wires are not acceptable.
- 7.9 At 220V, 3 phase, the lift system shall not draw more than 22 Amps per pair of columns, 44 Amps for a set of 4 columns, 66 Amps for a set of 6 columns.
- 7.10 A power cable of type SOW, 6 gauge minimum wire with a minimum of 25 feet shall be supplied. Cable shall have a female plug end that can be connected to any of the main columns.
- 7.11 One communication control cable shall be supplied per column. These cables shall have female plugs on both ends. Cables shall be safety OSHA yellow. Mobile lift systems with control cables “hardwired” into the control box shall not be acceptable due to the difficulty in replacement and loss of operating flexibility.
- 7.12 Level and height sensing of each column shall be achieved by use of a NEMA 4 potentiometer or linear transducer. Height sensing by use of a proximity sensor or other means that use a chain or timing belt linkage system shall not be acceptable due to the susceptibility of failure and mis-adjustment of these systems.

- 7.13 Male connection ports for power entry and communication cable entry shall be equipped with snap-shut covers to prevent dirt, dust and water entry.
- 7.14 Communication between columns must take place via OSHA safety colored yellow communication cables. Due to static electricity and/or vehicle emergency band radio signals, columns that communicate via "wireless" system are not acceptable.

8. DRIVE MECHANISM

- 8.1 The drive mechanism shall be hydraulic drive and shall permit lifting without any pulsation, jerks, or unsteady lifting. Lifting shall be smooth.
- 8.2 Hydraulic system shall comprise an electrically-powered pump, internal flow control valves, one full speed down valve, one half speed down valve, and a fluid reservoir. Working pressure at full load shall not exceed 3000 psi.
- 8.3 Hydraulic power unit shall be from a U.S.A. manufacturer.
- 8.4 Hydraulic lifting cylinder shall be piston type. Cylinder casing shall be mounted on the column base and the barrel shall be enclosed in the carriage to protect it from debris and damage. Chrome hydraulic cylinder rod shall be 2 1/2 inch diameter minimum. Piston diameter shall be 3 1/2 inch diameter minimum. Barrel outside diameter shall be 4 1/8 inch diameter minimum.
- 8.5 If necessary, the removal and re-installation of the lifting cylinder shall take place in less than 30 minutes per column. Due to the extensive amount of time and costs involved in repairing screw drives, screw drive systems are not acceptable.
- 8.6 Stainless steel hydraulic tubing with a minimum burst rating of 5:1 shall be used to contain pressurized hydraulic fluid. Rubber hydraulic hoses are not acceptable.
- 8.7 The hydraulic unit shall be equipped with dual lowering and lifting valve systems for smooth operation and equalization. Lifts with column pairs that come to a complete start or stop in normal operation (due to unevenly loaded vehicles) are not acceptable.
- 8.8 Each hydraulic cylinder shall be equipped with a velocity fuse to prevent decent in the event of a major leak. Velocity fuses shall be a fitting type that is easily replaceable. Velocity fuses must be fabricated by a North American manufacturer that specializes and has several years in experience in fabricating these safety valves.

8.9 Cylinder rods shall be chrome plated for low abrasion conditions, seal life, and to prevent slip-stick problems.

9. SAFETY DEVICES

- 9.1 Each column shall have an automatic multi-position mechanical locking system. This system shall incorporate a spring loaded latch that will automatically engage whether the lift is in operation or not. The column shall have a minimum of 19 lock positions beginning at the lifting height of 12 inches and spaced every 3 inches for the entire stroke of 67 inches. This safety device shall be totally independent from the lifting drive system. Systems that utilize non-load bearing “safety nuts” shall not be approved since they are integrated with the lifting drive itself.
- 9.2 The mechanical locking system shall be braced to the post by plates so that the load is distributed throughout the whole section of the post. Any system that uses a flat plate that loads into a sheet metal column back is not acceptable.
- 9.3 The mechanical lock shall be released by an electric pull solenoid when the lift is lowering. Pull solenoid shall incorporate a spring when releasing lock to allow electric solenoid locks to “seat” when energized whether lock is free or not.
- 9.4 Each lock shall have a manual pull type override lever to allow the lock to be manually released so that a vehicle may be lowered in the event of a power outage. This lever shall be easily accessible without disassembling any lift components. In an electrical blackout, lifts that take a single person more than 15 minutes to lower, or require special tools or cranks are not acceptable.
- 9.5 The lift shall incorporate a PARK button that allows the loaded carriages to be fully lowered on the mechanical locks, removing pressure from the hydraulic systems. Any design that has mechanical locks, which does not allow the load to be lowered onto the locks is not acceptable.
- 9.6 The lifting system shall incorporate multiple redundant safety systems. The lift shall support the vehicle in the event of a mechanical failure, motor failure, hydraulic failure or loss of electrical service by consisting of electrical, mechanical and hydraulic safety systems.
- 9.7 Motive UP and DOWN push buttons shall be of a type requiring pressure be maintained on the buttons by the operator in order to operate the lifts.
- 9.8 Thermal overload protection relays shall be provided to protect the motors against overload.
- 9.9 Cable hooks shall be provided and made of steel construction to provide convenient and safe storage of cable when the lift is not in operation.

- 9.10 A pilot light on all control boxes shall indicate when the system is powered.
- 9.11 A phase relay shall be provided to automatically deactivate the system in event of a phase loss or reversal in the power supply.
- 9.12 A safety logic circuit will be incorporated into the electrical system to ensure that the lift shall not operate (power up) unless all the control cables are located properly and all the emergency stop buttons are released.
- 9.13 A motion control system shall monitor the up and down motion of the lifting carriages and correct any difference of +/- ½ inch in the travel height of the carriages. If the difference in speed cannot be corrected, the system shall fault and stop all the columns when the difference between any lifting carriages becomes greater than 2 inches.
- 9.14 A red fault light shall indicate when the system is in the fault mode and shall provide easy to understand indication as to which fault may have occurred. Lift faults shall be clear and easy to understand and listed in the user manual.
- 9.15 Each control whether it is designated as a main or secondary column control panel shall have a mushroom type emergency stop switch which stops the movement of all of the columns. The emergency stop switch must be palm operated and shall require clockwise motion in order to be released. These emergency stop switches shall directly cut power to the lift system and shall not be an input to a secondary controller such as a PLC or PC. The emergency stop buttons shall not “double” as reset buttons.
- 9.16 All control voltage shall be no greater than 24 volts.
- 9.17 In the event of a power outage, emergency manual lowering of posts shall be made possible by the use of manual lowering valves at each pump and manual lock release levers. Lift shall be able to be lowered without the use of tools and accomplished by one technician in less than 15 minutes.

10. WARRANTY

- 10.1 Manufacturer shall provide a minimum warranty of:
- 10.1.1 Three years on defective structural parts.
 - 10.1.2 Two years on the hydraulic pump unit (including motor)
 - 10.1.3 Two years on the hydraulic cylinder.
 - 10.1.4 One year on electrical components.

11. AVAILABLE OPTIONS

11.0 The following is a list of optional accessories available for the Mohawk's Mobile column lifts. These options are available for the 15 inch long fork models only, unless specifically stated otherwise.



Certified Accessory for Mohawk MP-24 Series lifts with 15" Forks.

11.1 Chassis Lifting Beams. In order to raise a framed vehicle by the vehicle's frame or jacking points (i.e. school buses) a chassis lifting beam option shall be available. Chassis lifting beams shall contact each pair of lifting columns, supported by lifting forks, and allow a vehicle to be lifted from horizontally sliding contact pads to accommodate a variety of vehicles. Chassis lifting beam is rated 35,000 lbs. This option shall be approved and certified by the ALI (Automotive Lift Institute) certification program for automotive lifts and shall meet the requirements inherent in the testing of the program, including mechanical testing to ANSI ALI/ALCTV-2006 Standard for Construction of Automotive Lifts.



Certified Accessory for Mohawk MP-24 Series lifts with 15" & 22" Forks.

11.2 All column pairs shall be equipped with a plug-in receptacle to accept a pendant control. Optional Pendant control shall consist of the controls: "Up", "Down" and "Park". This option shall be approved and certified by the ALI (Automotive Lift Institute) certification program for automotive lifts and shall meet the requirements inherent in the testing of the program, including mechanical as well as electrical testing to ANSI ALI/ALCTV-2006 Standard for Construction of Automotive Lifts and UL-201 Standard for Garage Equipment. This accessory is available for both the 15 inch and 22 inch long fork models.



Listed Product

11.3 Mohawk Models #MJS-4775-18, rated 18,000 lbs, and #MJS-4775-24, rated 24,000 lbs, jack stands shall be available accessories for use with this lift. These are stand-alone accessories that are available for use with all of Mohawk's lift models. These stands shall include the following features:

- Jack stand shall be tested by an independent nationally recognized testing laboratory (NRTL) to comply with the newest requirements of ASME PALD standard for portable automotive lifting devices.
- Support pad shall be 6 inch diameter with rubber surface. Optional 6 inch diameter steel yoke pads shall also be available. Pads shall be interchangeable.
- Pad shall be supported with a minimum of 2 1/2 diameter ACME threaded rod with a minimum of 8 inches of adjustment.
- Center section tube shall be 3 1/2 inch outer diameter and 2 3/4 inner diameter minimum.
- Center section tube shall be spring loaded to assist in height adjustment.
- Center section tube shall be supported by base section tube with a 1 inch minimum diameter hitch pin. Hitch pin and mating cotter pin shall be attached to jack stand with retaining chains to prevent loss.
- Holes in center and base section tubes shall be provided to accommodate jack heights of 45 inch to 75 inch by 3 inch increments.

- Base section tube shall be 4 1/2 inch outer diameter and 3 3/4 inner diameter minimum.
- Base section tube shall be reinforced with three 4 inch x 4 inch x 1/4 inch minimum angles.
- Wheels shall be a minimum of 4 inch diameter and spread 17 1/2 inches (center to center) for stability during movement.
- Handle shall have an ergonomic shape with rubber hand grip. No straight handles or T-bar handles shall be accepted.



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11.4 An optional weight gauge shall be available. This weight gauge shall be attachable to a dedicated pressure port of the hydraulic system of each column. This weight gauge shall be specifically calibrated to indicate the weight that is supported at the column it is connected to. The weight gauge will clearly show the lift operator the weight being raised by each specific column that the gauge is attached to. To calculate total vehicle weight, a weight gauge must be attached to each operating column. The weight gauge, when added to the column, will clearly and easily show weight with no modification to the existing lift. This accessory is available for both the 15 inch and 22 inch long fork models.