

PhantomPark® Subterranean Parking Lifts

Application Guidelines for Subterranean 4 Post Models



AMERICAN
Custom Lifts

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Foreward

1. Foreward

This Application Guidelines for Subterranean Parking Lifts (Guidelines) was developed by ACLIFTS and the descriptions, specifications and guidelines herein are believed to represent the industry's best practices. The Guidelines present recommended safety practices for subterranean parking lifts as well as information for parties engaged in the marketing, purchase, inspection or use of residential subterranean parking lifts. The Guidelines are advisory only and should be regarded as a guide that the user may or may not choose to adopt, modify or reject.

As of this date, there is no recognized equipment standard specific to residential subterranean parking lifts. Therefore, it is the intent of these Guidelines to provide information to the users and operators of various residential parking lift designs with respect to safe application and proper utilization of these lifts. The acceptance or use of these Guidelines is completely voluntary.

2. Scope and Purpose

2.1 Intent

This Application Guideline is intended to specifically apply to Subterranean Residential Parking Lifts which are designed to raise and lower vehicles from one elevation to another within a residence. They are primarily hydraulically or electro-mechanically activated and powered. These lifts are mounted in a stationary position.

2.2 Equipment Not Covered

This Application Guideline does not relate to:

- a) Vehicle Maintenance Lifts as covered by ANSI/ALI ALCTV.
- b) Vehicle Elevators of any type as covered in ANSI/ASME A17.1
- c) Surface-mounted parking lifts not placed within a subterranean pit/vault
- d) Any lift designed to transport personnel
- e) Lifts for handicapped access as described by ANSI/ASME A18

2.3 Purpose

The purpose of this Application Guideline is to provide architects, contractors, designers, sellers, installers, owners, users and governing bodies with a source of information for consideration in design, application, and configuration criteria.

Lift Duty & Code Compliance

3. Lift Duty & Code Compliance

- Parking Lifts are not vehicle elevators and do not meet the requirements of ASME A17.1 – Safety Code for Elevators and Escalators. At no time should these lifts be used to transport people.
- Parking Lifts are not vehicle maintenance lifts and do not meet the requirements of ANSI/ALI ALCTV:2006 – Safety Requirements for Automotive Lifts. Under no circumstances should a person get under the lift without it being safely blocked open per the procedure in the Service Manual.
- Subterranean parking lifts designed to accommodate personal vehicles with normal axle loads and weight distributions for such. Standard parking lifts are not designed to withstand single axle loads greater than 4,000 lbs. at the front edge of the lift or a weight distribution that exceeds more than a 60/40 difference in total vehicle weight from front to back.
- Each state, county, or municipality may have unique codes governing the installation and acceptance of residential parking lifts. Acquaint yourself with the permitting and/or licensing requirements (and expenses) of the local regulatory agencies.
- Residential subterranean parking lifts should meet the applicable portions of the following nationally recognized safety standards:
 - ANSI Z535.4 Standard for Product Safety Signs & Labels
 - ASME A52 Structural Steel Standard
 - AWS B2.1/B2.1M Welding Qualification Standard
 - NFPA/NEC National Electric Code
 - OSHA 29CFR1910 General Industry Safety Regulations
 - ANSI MH29.1 Safety Requirements for Industrial Scissors Lifts
- Unless specifically stated, subterranean parking lifts are not designed to raise loads placed on the canopy.

Terms & Definitions

4. Terms & Definitions

Approach Ramp: An access ramp used to load vehicles on/off of a platform, typically when the carriage comes to rest above the landing elevation.

Authorized Person: Trained or qualified personnel approved or assigned to perform a specific duty or duties.

Capacity: The maximum load which the lift is designed to raise and lower.

Canopy: The upper platform assembly that travels above the uppermost landing when the lift is raised, and lowers into a recess/opening in the upper landing floor when lowered.

Carriage: The lower platform assembly that travels in the guide angles and carries the vehicle between landings.

Constant Pressure Push Button: A push button which, to activate, must remain pressed by the operator in order to perform a desired operation.

Controls: Any electrical device used to initiate or stop lift movement. Normally includes push button stations, control box, limit switches, interlocks, etc.

Control Voltage: The secondary voltage, which typically originates at a transformer and provides power to the control devices.

Cylinder (Ram): A device which converts fluid power into linear force and motion. It consists of a solid ram operating within a cylindrical barrel or casing.

Drift: The distance a lift platform will slowly drop due (usually) to slight internal leaks in a hydraulic system or mechanical slippage of a motor brake.

Enclosure (lift guarding): Structure surrounding the lift operating zone to prevent outside interference with its normal operation and to safe guard personnel.

Flow Control: A hydraulic component that allows a constant volume of fluid to pass through an orifice in a controlled, predictable manner.

Gate: A device that opens and closes manually or automatically to allow access to the lift operating zone. It is normally a swing, sliding, or vertical acting device constructed of rigid material.

Grade Level: Level at which vehicles enter and exit street level.

Hydraulic piping system: The entire system of fluid conductors such as hose, pipe, tubing, etc., utilized to transfer hydraulic fluid between various operating components of a hydraulic system such as pumps, valves, actuators, etc.

Landing: A permanent working surface at a fixed elevation used for loading and/or unloading a vehicle.

Terms & Definitions

Landing interlock: A device to prevent lift movement when a landing door/gate into the lift operating zone is not fully closed, and to prevent the landing door/gate from being opened while the lift is in motion.

Lift Operating Zone: The space directly above and directly beneath the lift's parking surfaces, from the lowermost floor to the uppermost ceiling, as well as the areas immediately surrounding the perimeter of this space.

Limit Switch: An electrical control device by which the position or movement of the lift may be controlled within predetermined limits.

Guide Angles: The structural steel members which guide the carriage throughout its vertical travel.

Mechanical Stop: A means to physically stop travel at a predetermined position.

Momentary Contact Push Button: A push button which is pressed and released by the operator to activate the desired operation.

Operator: An authorized person controlling the movement of the parking lift.

Owner: A person or entity that has possession and control of the parking lift by virtue of title to the equipment.

Platform: The deck surface of the carriage/canopy on which the vehicle is parked.

Pressure Switch: An adjustable pressure sensing switch that, when made, sends an electrical signal to the control circuit to stop the pump/motor.

Primary Voltage: The main electrical power being supplied to run the motor.

Push Button Station: The wall mounted or hand held device used by the operator to control the operation of the equipment.

Qualified Person: A person, who by possession of skill, knowledge, training and experience has demonstrated the ability to address problems related to the lift.

Secondary Voltage: See **Control Voltage**.

Spliced Carriage: Carriage that is in multiple pieces and will be field assembled. This design facilitates ease of installation and handling.

Subterranean Lift Applications

5. Subterranean Lift Applications

5.1 Areas of Use

- **Indoor/Garage** - Most residential vehicle parking applications are under the roof of an attached or detached garage and not exposed to the elements of weather.
- **Outdoor/Driveway** - Some residential vehicle parking applications are outdoor applications requiring a special lift design to accommodate the potential effects of wind, rain, snow & ice, etc..
- **Vehicle Vaults** - A vault application is one where no access to the lift is provided at the lower landing, accessibility to the lift and its components are from the upper landing only. This is common when the primary purpose of the subterranean lift is to provide security for the vehicle.
- **Two Landings** - Most common. Vertical transfer of vehicles is done between two fixed elevations/landings. This is normally between the garage and basement landings, but can also be between the garage and attic landings.
- **Three Landings** - Less common. Vertical transfer of vehicles is done between three fixed elevations/landings. However, most hydraulic control systems do not provide accurate stopping position repeatability under both loaded and unloaded conditions. Again, the application can either have the garage as the uppermost or lowermost landing.

5.2 Types of Use

- **Vehicle Parking** - One of the primary motivations behind the specification and use of subterranean parking lifts is to take advantage of the vertical space available between upper and lower landings to provide additional parking space without expanding the square footage of the home/building to do so – for the storage of cars, trucks, boats, jetskis, ATVs, golf carts, and other recreational vehicles or watercraft.
- **Vehicle Display** - One In addition to expanding vehicle parking space by storing vehicles below or above garage level, many owners choose to raise or lower their prized possessions into enhanced viewing space (special lighting, background, etc.).
- **Vehicle Transport/Motor Court** - When the architectural plan allows, expanded square footage for parking can be provided at elevations below or above the main

Subterranean Lift Applications

garage level, and the subterranean lift is used to transport vehicles between elevations where they are driven off the lift and parked adjacent to the lift operating zone.

- **Vehicle Security** - One primary motivation for installing a subterranean parking lift is to be able to provide a safe and secure parking location below grade for prized vehicles – to better protect them against theft or vandalism, and to prevent unauthorized access to them (as in the case of time-shared properties, etc.).
- **Material Transfer** - Not only can subterranean lifts be used to transport and park vehicles and watercraft, but the lower carriage can also be used as a material lift to transport bulky or heavy items such as boxes, files, furniture, powered tools, Christmas trees, etc. between grade level and attic/basement landings. **NOTE:** Due to potential load instability & falling objects, do not use the top canopy to transfer vehicles or material.

Lift Types & Configurations

6. Lift Types & Configurations

6.1 Hydraulic vs Mechanical

6.1.1 Hydraulic Design

Carriage and canopy platforms are actuated by four vertical hydraulic ram cylinders which raise and lower the lift platforms within four vertical guide angles attached to the building structure. Lifting cylinders are mounted vertically between the lower carriage and upper canopy. The stroke of the cylinders equals the vertical distance between lower and upper landings (i.e. the “travel” of the lift).

6.1.1.1 Advantages

- More structurally stable as vehicle axles roll over the edge of the lift
- 18 inches of refuge space beneath the entire lift – for safety
- Faster standard speeds

6.1.1.2 Disadvantages

- Not as quiet or smooth as mechanical

6.1.2 Mechanical Design

Carriage and canopy platforms are actuated by two rigid chain systems which raise and lower the lift platforms within four vertical guide angles attached to the building structure. Lifting cylinders are mounted vertically between the lower carriage and upper canopy. The stroke of the cylinders equals the vertical distance between lower and upper landings (i.e. the “travel” of the lift).

6.1.2.1 Advantages

- Inherent synchronization, programmability, and accuracy of mechanical actuation
- Variable speeds – with the addition of a variable frequency drive (VFD) option

6.1.2.2 Disadvantages

- Much more expensive (3-4x) than hydraulic.

Lift Types & Configurations

6.2 Fixed vs Telescoping Canopy

6.2.1 Fixed Canopy

Single-stage cylinders are used when the overhead clearance at the upper level (typically the garage ceiling) is equal to, or greater than, the vertical travel distance between the upper and lower landings. Canopy posts are fixed height and field-attached between the carriage and canopy.

6.2.2 Telescoping Canopy

Telescoping cylinders are specified when the overhead clearance at the upper level (typically the garage ceiling) is less than the vertical travel distance between the upper and lower landings. Canopy posts are full height and slide through the lower carriage, canopy is picked up by the carriage via physical stops that are field-located and welded to the posts to ensure that the canopy remains within the allowable overhead clearance. Power unit size increases typically from 5HP standard to 10HP.

6.3 Synchronization

The lift is synchronized to ensure that the four corners of the carriage and canopy are level throughout its vertical travel – regardless of the weight distribution of the load. This synchronization is accomplished using a combination of two methodologies:

- **Hydraulically**
Synchronized by using a highly accurate fluid metering system to keep the four cylinders stroking at the exact same rate.
- **Mechanically (standard)**
Synchronized by a series of chains and sprockets located beneath the lower carriage which physically capture the structure of the carriage and force the four corners to travel together.
- **Electrically**
Synchronized by using feedback from the driving motor(s) and variable frequency drive(s) to control the position at each corner.

Lift Specification Considerations

7. Lift Specification Considerations

- **Vertical Travel** - The difference in elevation between the top surface of the carriage at the bottommost level and the top surface of the carriage at the uppermost level – regardless of whether the unit is pit or surface mounted.
- **Floor-to-Floor Distance** - The distance from one finished floor level to the next finished floor level.
- **Capacity, Size and Type of load** - Capacity not only refers to the weight of the load but also the physical size and configuration of the load. Types of loads are typically: cars, trucks, trailers, motorcycles, large boxes, powered carts, etc. The platform should be sized to handle the largest loads with adequate clearances for entering and leaving the carriage. The capacity should also take in consideration any dead (non-moving) weight such as material added to the parking decks (concrete, brick pavers, etc.), and the weight of any equipment used for loading and unloading objects.
- **Traffic Pattern** - The traffic pattern of vehicles entering and exiting the lift is critical to determining:
 - Necessary clearances between canopy posts
 - The need for a pit (for off-loading at the lower level)
 - The design and layout of lift guarding (doors, gates, enclosures, barriers, etc.)
- **Axle loads** - Consideration must be given to a vehicle's axle weight as it rolls across the edge of the platform when entering & exiting the lift. Standard units assume that maximum disparity in axle weights between front and rear axles is a 60/40 split in total vehicle weight. The manufacturer must be made aware of any axle weights that exceed this.
- **Electrical Considerations** - The following should be considered:
 - The availability of up to 50 amp service for high speed, 230V, 1 phase motors.
 - Severe operating conditions, such as outdoor applications, often require special electrical components.
 - There is considerable field wiring to be done to connect all the peripheral electrical signaling devices to the main motor control panel.

Lift Specification Considerations

- **Operating Considerations** - The following should be considered:
 - Optional vehicle location sensors/devices are available to ensure that the entire vehicle is within the area of the platform prior to raising or lowering the lift.
 - Optional sensors are available to ensure that a vehicle is not parked on the top canopy prior to the lift being raised.
 - Optional lift finishes are available – to better combat the effects of severe operating conditions such as salt water, ice/snow, etc.
 - Optional power unit configurations are available to increase the speed of the lift – should that be a major consideration.
 - Additional security against unauthorized use and operation of the lift.
- **Guarding the Lift Operating Zone** - Personnel safety during lift operation is of utmost importance, and some safety features are sold as standard with every lift. Additional, optional, guards, safeties, and restraints are available to prevent inadvertent contact with a moving lift – on both the operating level, and the level that is outside the operator's direct line of sight. **NOTE** – Any alterations to safety features should insure all features are maintained:
 - **Security Cameras (std).** Security cameras are mounted in the lift operating zone at the level not occupied by the operator. These cameras allow the operator to view the portion of the lift zone that is outside his direct line of sight by watching the monitor mounted adjacent to the pushbutton station.
NOTE – cameras are not required in a shaftway application with no access at lower level.
 - **Audible Alarm (std).** An adjustable audible alarm that sounds off any time the lift is moving, or is left in any position other than the fully raised or fully lowered position, to warn people in the area of lift movement.
 - **Emergency Stop Button (std).** E-Stop stations are mounted in the lift operating zone at the level not occupied by the operator. Pressing this large, red “panic” button removes all power to the lift controls and renders the lift inoperable until the button is manually reset.
 - **Motion Sensors (std).** These sensors are mounted in the lift operating zone at the level not occupied by the operator. Any motion that is detected while the lift is moving automatically disables the operator pushbutton station and stops the lift.

Lift Specification Considerations

- **Doors.** It is common to have doors of access to the lift operating zone at both the operating level to and the non-operating level to prevent incidental contact with the lift. It is required that the status of these doors be monitored, and/or interlocked to prevent entry ingress/egress while the lift is moving.
- **Gates.** The manufacturer can also supply commercial gates, typically at the storage landing, to prevent personnel ingress/egress during lift operation. Gates can be designed to swing, slide, or roll up – depending on the application & architectural features of the floor plan. It is recommended that the status of all gates be monitored, and/or interlocked.
- **Enclosures.** In addition to conventional walls which can be constructed around the lift operating zone to prevent access to the lift, the manufacturer can supply commercial/industrial (typically expanded metal) enclosures as personnel barriers.
- **Status Switches.** Door status switches are recommended for all doors leading into the lift operating zone to prevent operation of the lift if a door is in the “open” status. These switches come in a variety of designs, depending on the style door that they are mounted to.
- **Interlocks.** Door interlocks are also recommended for all doors leading into the lift operating zone to temporarily and automatically place the door into “lock” condition whenever the lift carriage is moving. Interlocks also come in different designs, including some that are available as a combination status switch and interlock.
- **Photo Eye Sensors.** Photo eye sensors can be placed at strategic points around the unprotected/unguarded edges of the lift carriage to detect any interference with people or objects that break the photo eye path. If this path is broken, the lift will immediately be rendered inoperable until the interference is removed.

7.1 Power Unit / Drive Types

- **Hydraulically Driven** - Most subterranean lifts fall into this class because of the overall lower cost to manufacture this type of lifting system. The lift design incorporates four (4) hydraulic rams acting directly on the carriage platform to raise and lower the load. The vertical travel is a 1 to 1 ratio of cylinder stroke to travel. Lowering of the platform is strictly a function of gravity when the holding valve is opened allowing hydraulic fluid to drain back to the reservoir and lowering speed is controlled by a flow control valve.

Lift Specification Considerations

- **Mechanically Driven** - This is the unit of choice for extremely high travel, applications with 3 or more levels of operation where intermediate stops are required, or where accuracy and/or programmability are critical. This system utilizes an electric gear motor with brake. The carriage is raised from beneath by heavy-duty stacking chain(s). Travel is controlled with an electrical limit switch or similar device at each level. Stopping accuracy is normally good in both loaded and unloaded conditions.
- **Sizing a Power Unit** - A lift's power unit should be sized to easily handle its rated working capacity, the lifting speed, and its duty cycle. Include weight of platform-mounted accessories when specifying the rated capacity. Particular attention should be given to hydraulic units operating in abnormally high or low ambient temperatures as oil temperature could affect performance.
- **Locating the Power Unit or Drive** - Hydraulic power units are remotely located in utility rooms/areas to help control noise generated by the single-phase motor, and to improve accessibility for maintenance and repair. Power Units should always be located within 25 feet of the lift, so as not to introduce too much back pressure in the "DOWN" mode when the lift is lowering by gravity under its own weight. **NOTE:** Be aware of any local building codes which may address gasses or fumes in pit areas.

A mechanical chain driven unit cannot have the power unit located remotely but the electrical control panel may be mounted remotely within reasonable proximity of the lift thus reducing costs if the operating area is classified as a hazardous area.

7.2 **Platform Attachments**

Accommodations can usually be made to enhance the performance or appearance of the lift by adding optional features to the carriage and/or canopy. In most cases, any additional weight that these features may add to the overall lifting requirement has been taken into account in the rated lifting capacity. Consult the manufacturer to inquire as to whether or not these may cause the lifting capacity to be de-rated by some amount.

- **Platform "Lip"** - A permanently welded raised lip or flange around the perimeter of the canopy platform to assist in holding/containing loose material added for aesthetics, such as concrete, dirt/sod, gravel, brick pavers, ceramic tile, etc.
- **Platform Stiffeners** - In the event that localized deflection of the canopy deck surface can cause cracking of concrete, tile & grout, etc. which may have been added to the

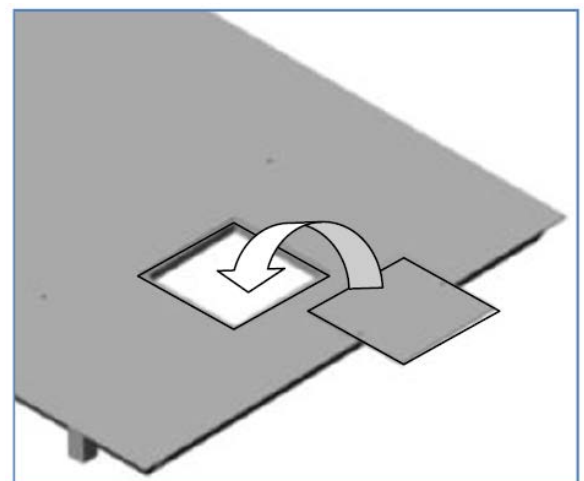
Lift Specification Considerations

canopy surface, often extra structural steel stiffeners are added beneath the deck plate to inhibit deflection.

- **Perimeter Flexible Seals – Canopy Deck** - In wet climates, there may be a concern about water/snow dripping off of vehicles parked on the canopy down to the lower landing. Sealed brushes can be supplied to install around the perimeter of the canopy to produce a weather seal in the $\frac{3}{4}$ " – 1" gap between the lift platform and garage floor opening.
- **Platform "Skin"** - Sometimes sheets of material are attached to the either/both deck surfaces for aesthetics or corrosion/wear resistance, such as stainless steel, aluminum, and wood laminate.
- **Adjustable Wheel Stops – Either/Both Decks** - These heavy duty wheel stops have a rubber non-skid surface that sits on the steel deck parking surface, and houses two (2) industrial grade magnets that also help to hold the wheel stop in place during contact with the vehicle wheels.



- **Maintenance Access Hatch – Canopy Deck** - A maintenance hatch comes standard in the lower carriage deck to be able to access the underside of the lift when the lift is fully lowered. If access to this hatch is limited or removed – as is the case with a vault application where no access to the lift is provided at the lower level – then an additional hatch is placed in the upper canopy deck to be able to access the lower deck from the upper deck/upper landing.



Lift Specification Considerations

Standard Lift Features

8. Standard Lift Features

8.1 Specifications

The following represent the features of a “standard” lift:

General:

- ☐ Travel: Std. Maximum - 18’
- ☐ Load Capacity: 7,000#
- ☐ Overhead: Lift travel + 6”
- ☐ Pit depth: 24-1/2”
- ☐ Two stops
- ☐ Four open sides
- ☐ Two year limited warranty on parts
- ☐ Ten year warranty on structure

Mechanical Equipment:

- ☐ Upper Canopy deck
- ☐ Lower Carriage deck
- ☐ (4) Standoff posts
- ☐ (4) Guide angles
- ☐ (4) #60 roller chains
- ☐ (4) lifting cylinders
- ☐ 230VAC, 60Hz, 23 amp single phase power supply for 5HP motor controller

Standard Safety Devices:

- ☐ Security key switch station
- ☐ Digital security keypad
- ☐ Emergency stop station
- ☐ Lift-in-motion audible alarm
- ☐ Motion detection system
- ☐ Wireless camera system
- ☐ Push and hold operator pushbutton
- ☐ 18” refuge space beneath entire lift

- ☐ Beveled toe guard on top canopy
- ☐ Hydraulic flow control for free-fall control

Controls:

- ☐ Programmable controller
- ☐ Self diagnostic system with digital display
- ☐ Manual lowering valve – in case of power failure

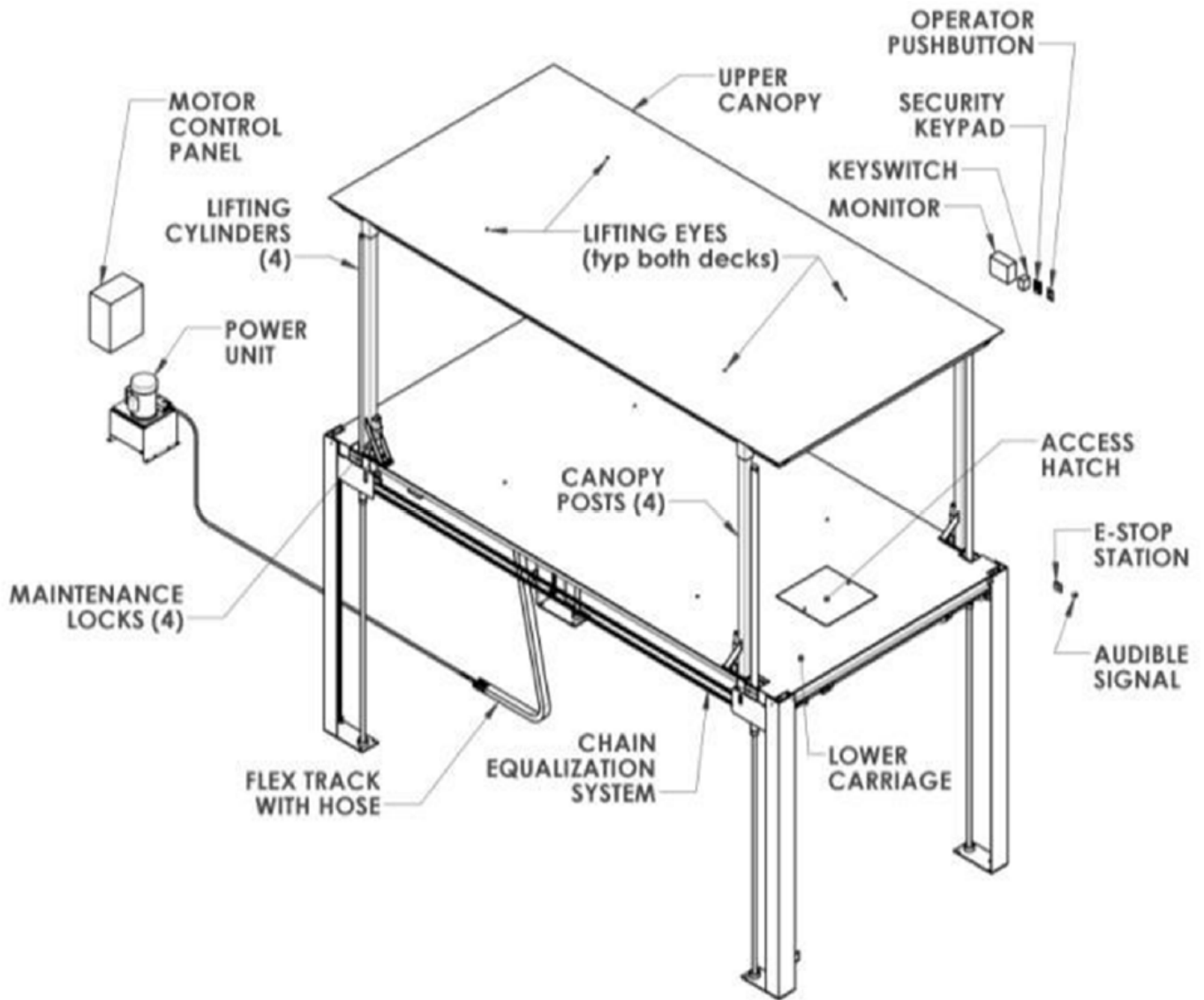
Deck Features:

- ☐ Larger sizes (108”W x 216”L is standard size)

Optional Features:

- ☐ Custom platform sizes
- ☐ 14,000# capacity
- ☐ Ultrasonic position indicator with lights
- ☐ Central Command Center
- ☐ Biometric (fingerprint) security scanner
- ☐ Door status switch
- ☐ Door interlock kit
- ☐ Powder Coat finish
- ☐ Special paint colors
- ☐ Stainless steel deck plate
- ☐ Photo-eye interference detection
- ☐ Vehicle present photo-eye sensor
- ☐ Vehicle present advanced technology sensor
- ☐ Lift-in-motion flashing light
- ☐ Sensing edge for interference detection
- ☐ Pressure-sensing floor mat

Standard Lift Features



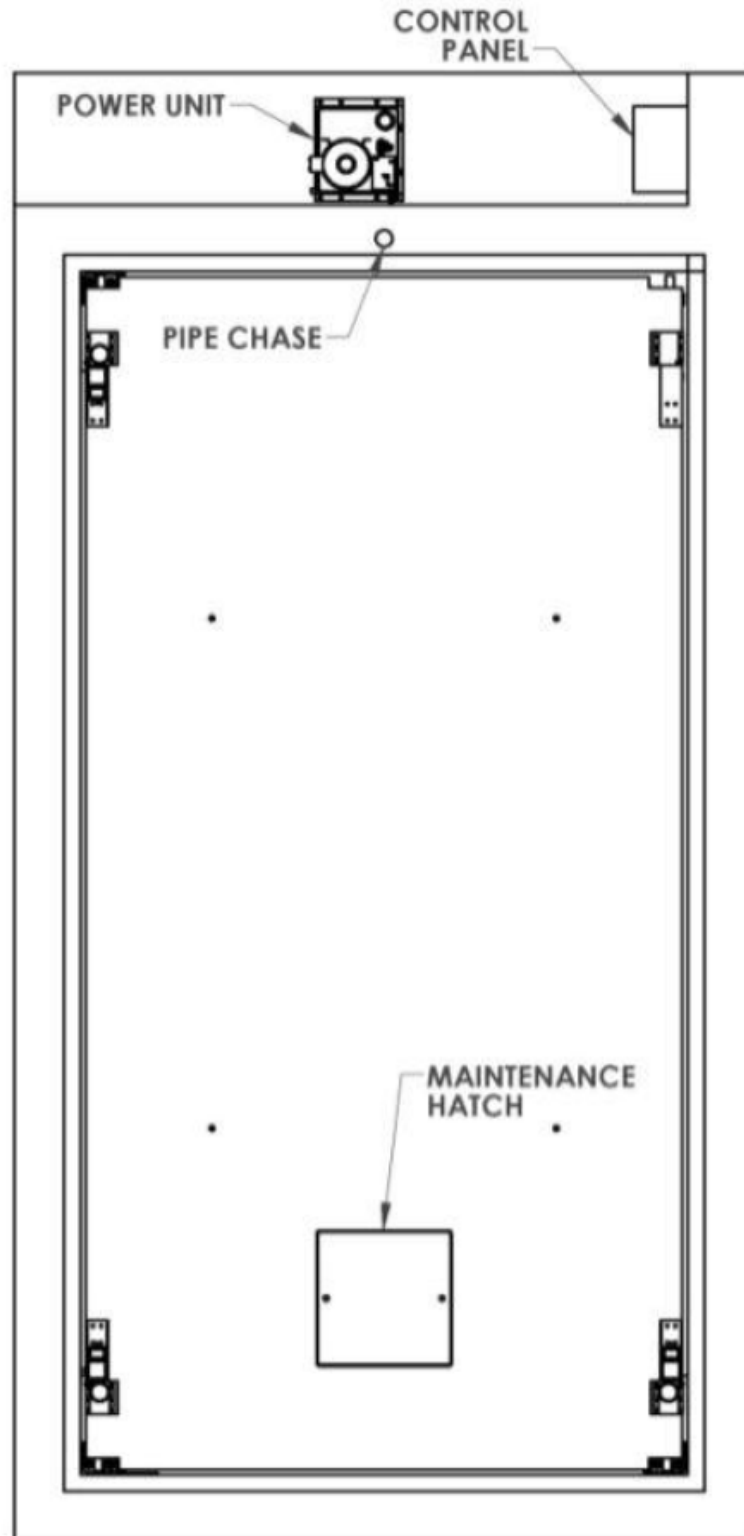
Component Identification

Installation Considerations

9. Installation Considerations

- **Pre-Planning** - Whenever possible, make a pre-installation visit or call someone at the site. Installers must be familiar with everything relative to proper installation of this equipment. Some concerns are listed below, though listing every affecting contingency is impossible. It is the installer's responsibility to check the site for problems and work out solutions with the appropriate people. Some of the areas of concern are:
 - Is the site accessible to large delivery & cartage vehicles?
 - Can the lift components get through the existing doorways & floor openings?
 - How will the unit be raised, set into position, and accessed?
 - Can a chain fall be hooked to an available overhead support?
 - Is there a forklift or other cartage equipment available?
 - Is there adequate building structure to support vertical guides?
 - Look for problem areas such as bracing and overhead interference with ceilings, joists, pipes, etc.
- **Subterranean Pit** - Because the lift guide angles attach to the subterranean pit walls, it is critical that the pit be correct per manufacturer's recommendations and consider the following:
 - Pit floor must be flat and level within $\frac{1}{2}$ " (plus or minus $\frac{1}{4}$ ").
 - Pit walls must be straight and plumb within $\frac{1}{2}$ " (plus $\frac{1}{2}$ " minus zero).
 - Make sure pit is properly squared and vertically aligned with the opening in the garage floor to ensure clearances of at least $\frac{3}{4}$ " between outside perimeter of lift and inside perimeter of floor opening – follow manufacturer's recommendations as shown on the pit drawing.
 - Provide adequate drainage to pit area to prevent pit from filling with water.
 - Run a 3" diameter PVC pipe with long radius sweep elbows to provide a pipe chase for hydraulic hose from the remote power unit.
 - The pit floor should have sufficient strength to withstand the loads as shown on the manufacturer's approval drawing.
 - The total pit depth should be such that it will allow shimming of the lift landing legs to bring the carriage top surface flush with the lower landing.

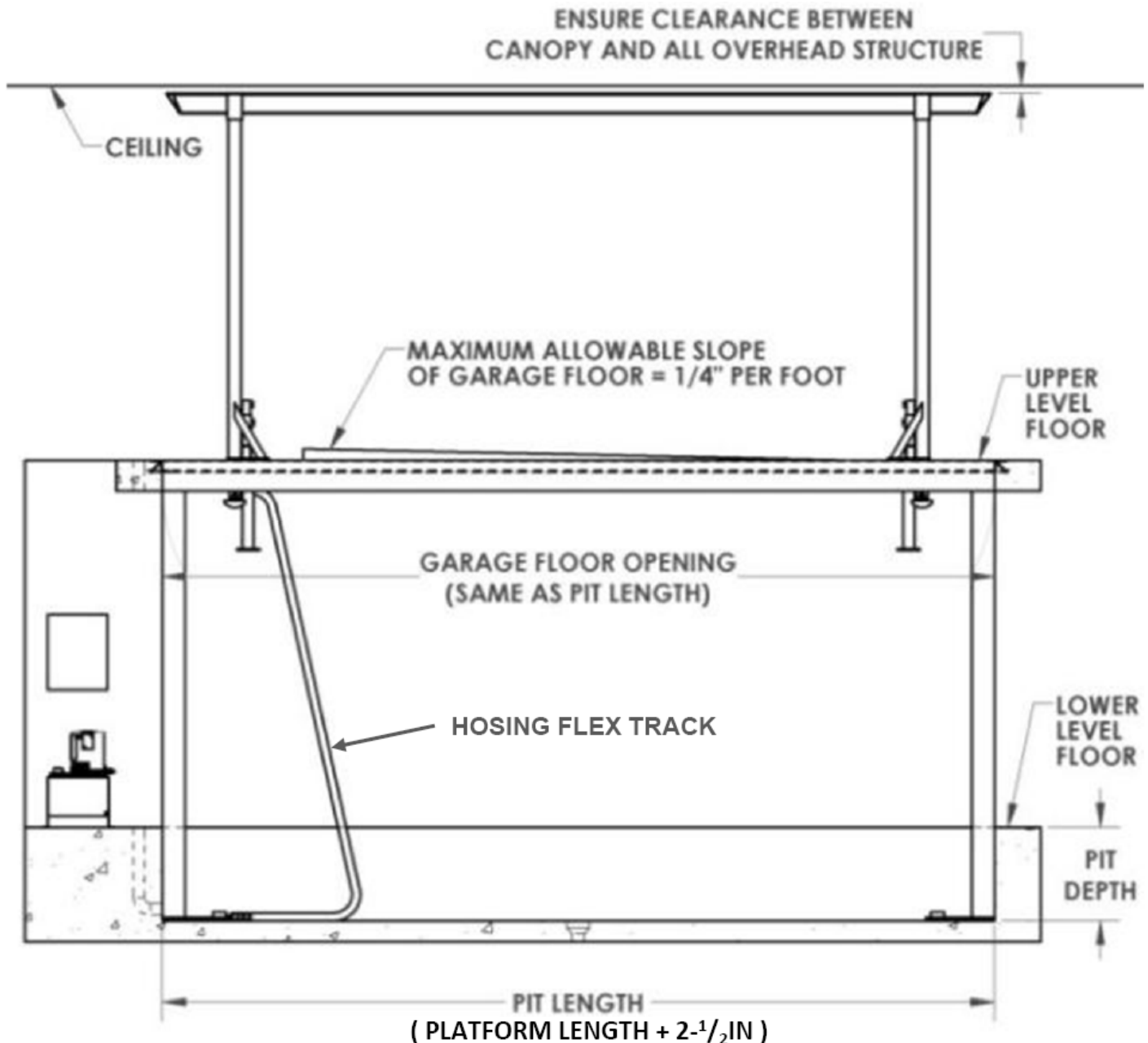
Installation Considerations



Top (Plan) View – Subterranean Pit (Lower Level)

NOTE: Maintenance Access Hatch is placed on the opposite end of the lift from the pipe chase & power unit. Otherwise, hose guidance flex track will block access hole.

Installation Considerations

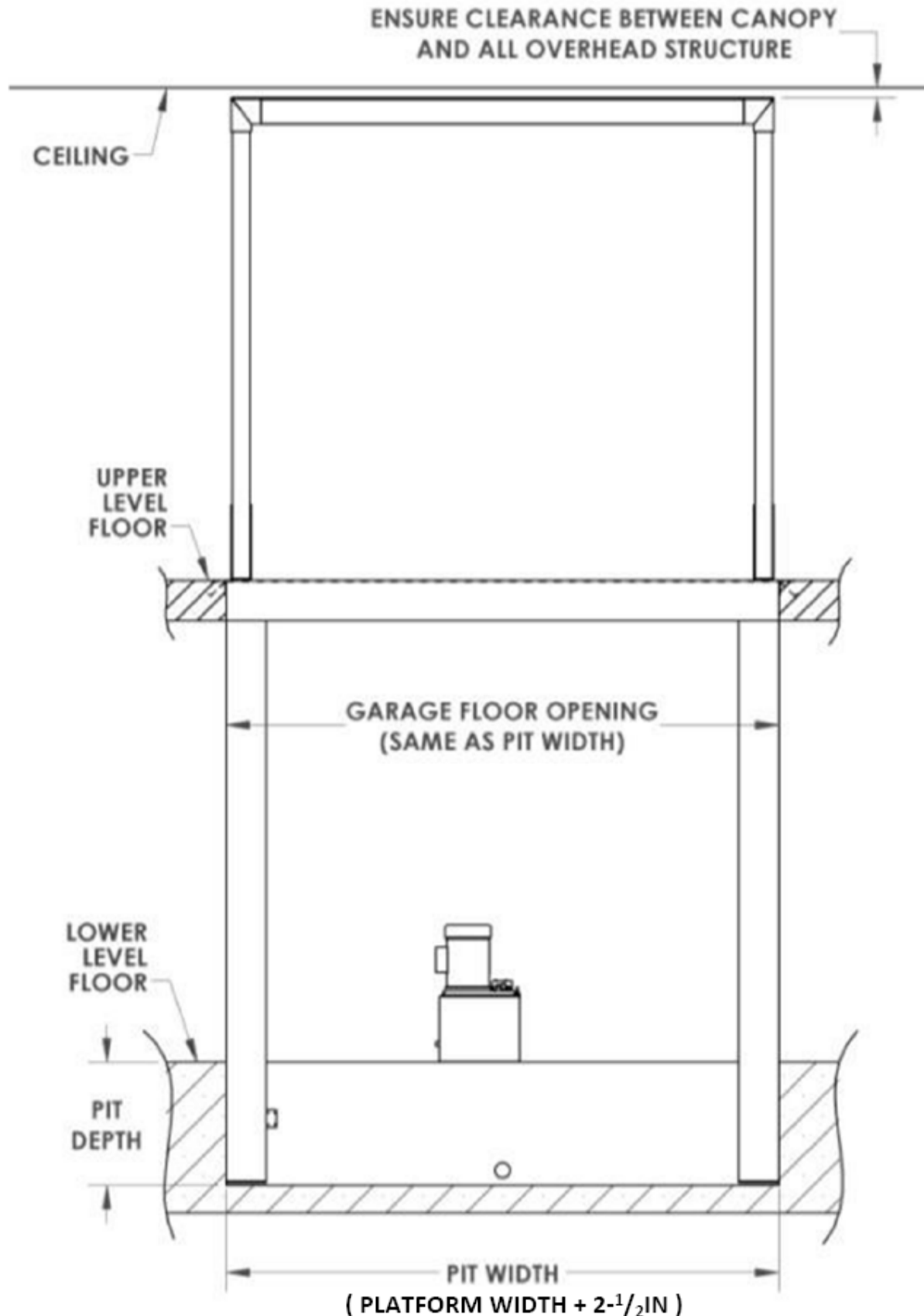


Side (Elevation) View – Subterranean Pit (Lower Level)

NOTES:

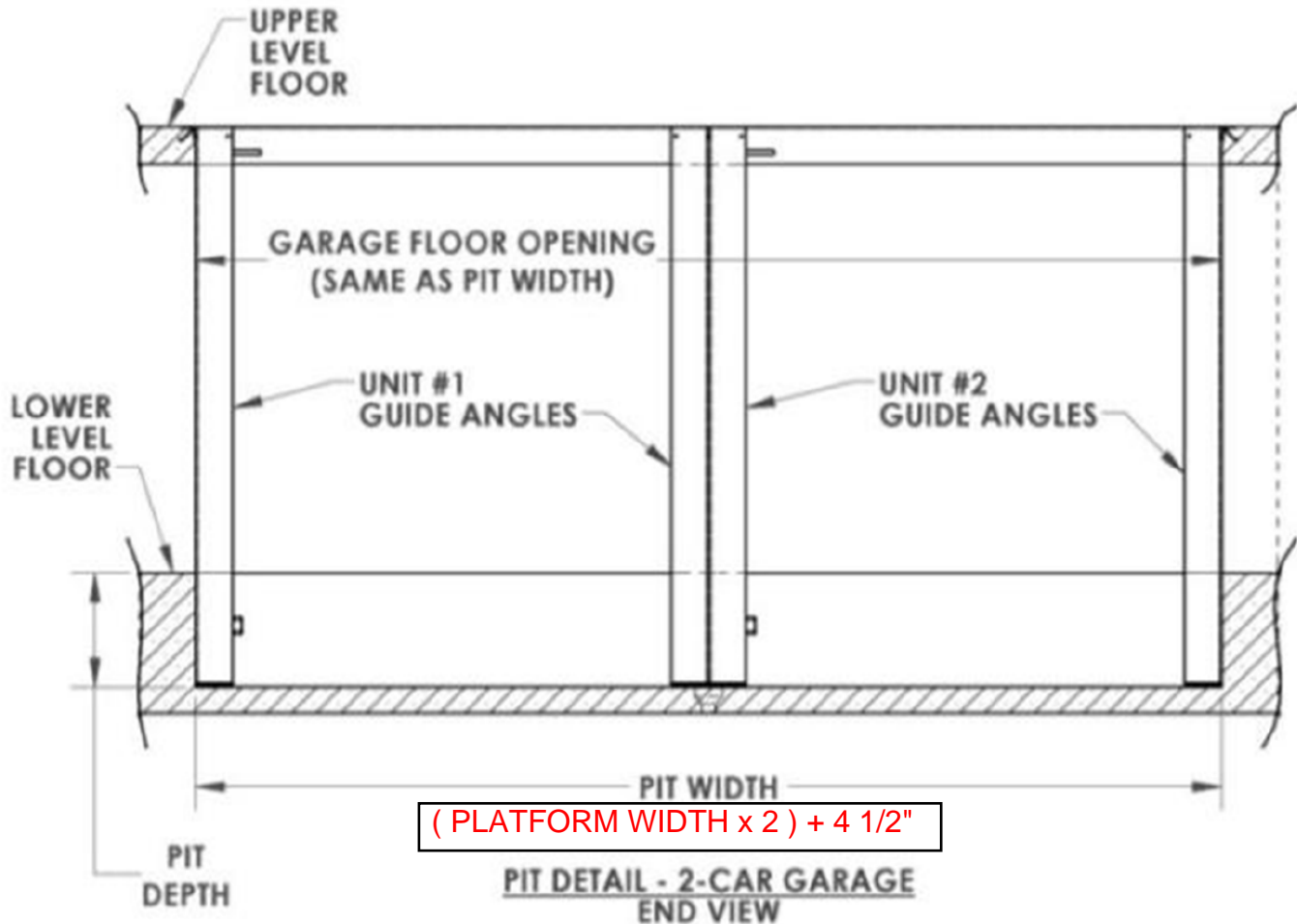
- The pipe chase should be installed on the same end of the lift and oriented in such a way as to accommodate hosing routed to the power unit.
- Install the flexible hose track on the same end of the lift as the pipe chase.

Installation Considerations



End (Elevation) View – Subterranean Pit (Lower Level)

Installation Considerations



End (Elevation) View – Subterranean Pit (Lower Level) Two (2) Vehicle Garage

- **Lift Operating Zone** - Care must be taken to evaluate all architectural features which could impact the installation and performance of the subterranean lift:
 - Verify the construction and integrity of building columns, joists, walls, or mezzanines that will be used to help support the four (4) guide angles.
 - Be sure to take into consideration any other obstructions (pipes, ductwork, ceiling joists/beams, etc.) that may be located around the lift.
- **Vertical Guide Angles** - Because the 4-post subterranean lift is a platform lift (i.e. not a scissors lift), it achieves its lateral stability from the vertical guide angles that are attached to the building structure at each of the four corners of the lift. In order for the lift to perform as designed, it is critical that these guide angles be installed exactly to manufacturer's specifications, and adhere to the following basic requirements:

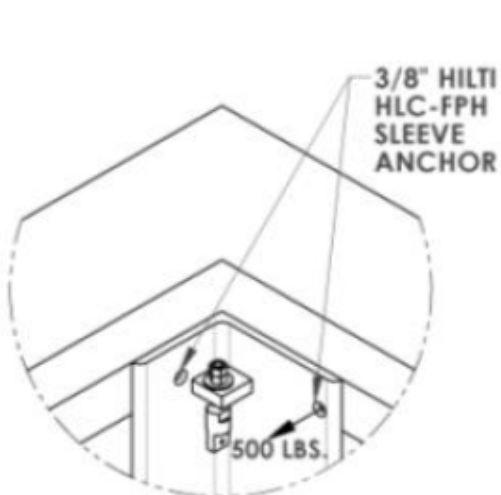
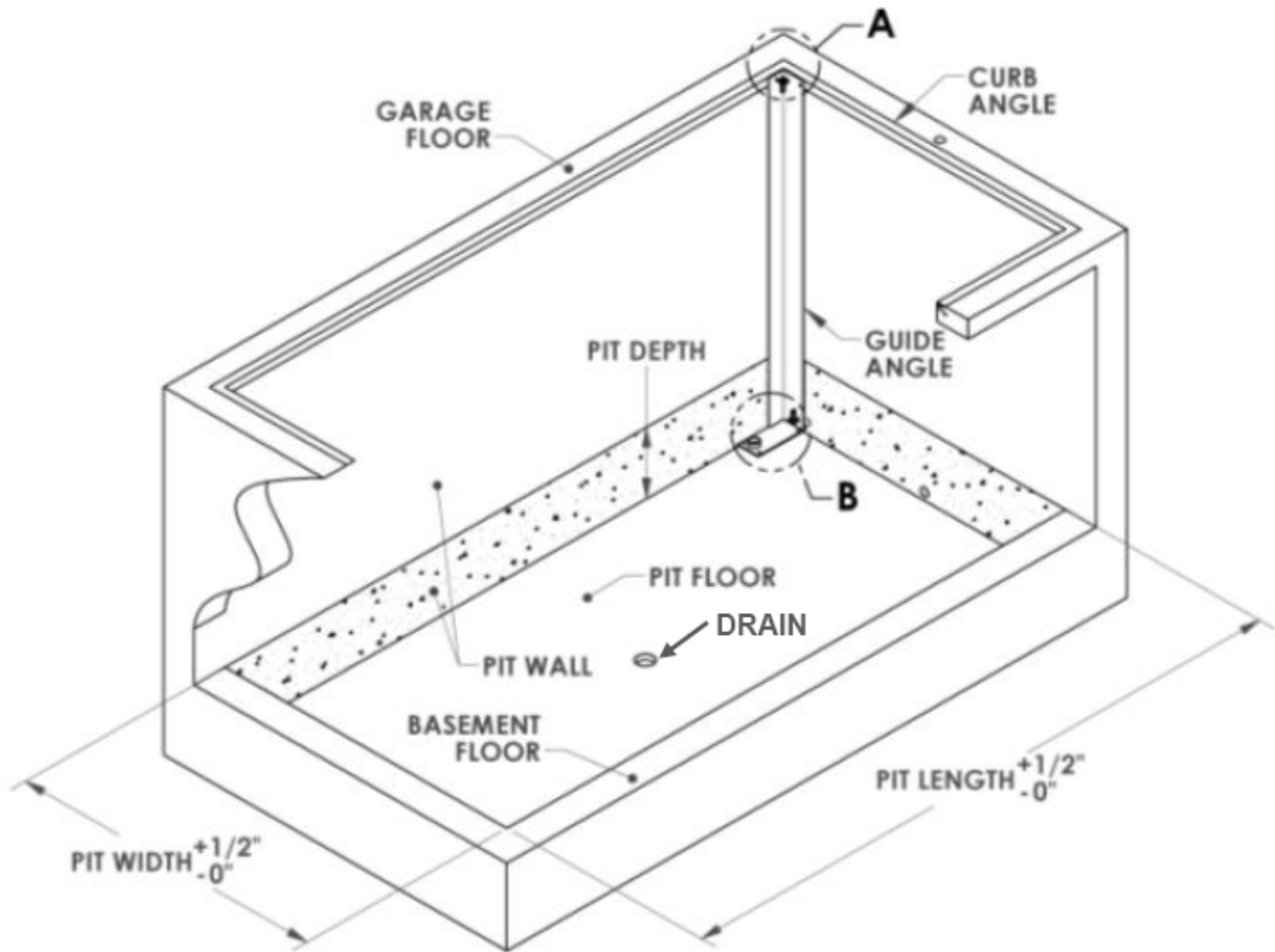
Installation Considerations

- When anchoring the corner guide angles to walls, you must be sure that the walls can support the reaction loads imparted on them (see image that follows).
- Corner guide angles must be straight and plumb within 1/8" for the lift to operate properly.
- Do not modify the guide angles – or any other component of the lift – without expressed written consent from American Custom Lifts.

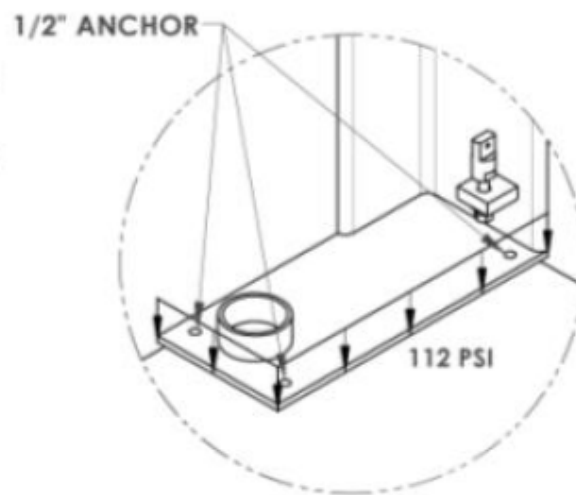
Note: In some areas, seismic calculations may also be required prior to the installation of a subterranean parking lift. Check your local and state requirements for criteria regarding the extent of these calculations and the qualifications required by the engineer who performs them.

- **Utility Room/Area** - It is recommended that an area be dedicated outside the normal living space of the home for the placement of the primary power components of the lift – for security, safety, and maintenance accessibility.
 - It is customary for the power unit to be placed at the lower level (single phase motors are noisy), and adjacent to the lift (within 25 feet).
 - It is customary for the motor control panel to be installed adjacent to the power unit.

Installation Considerations



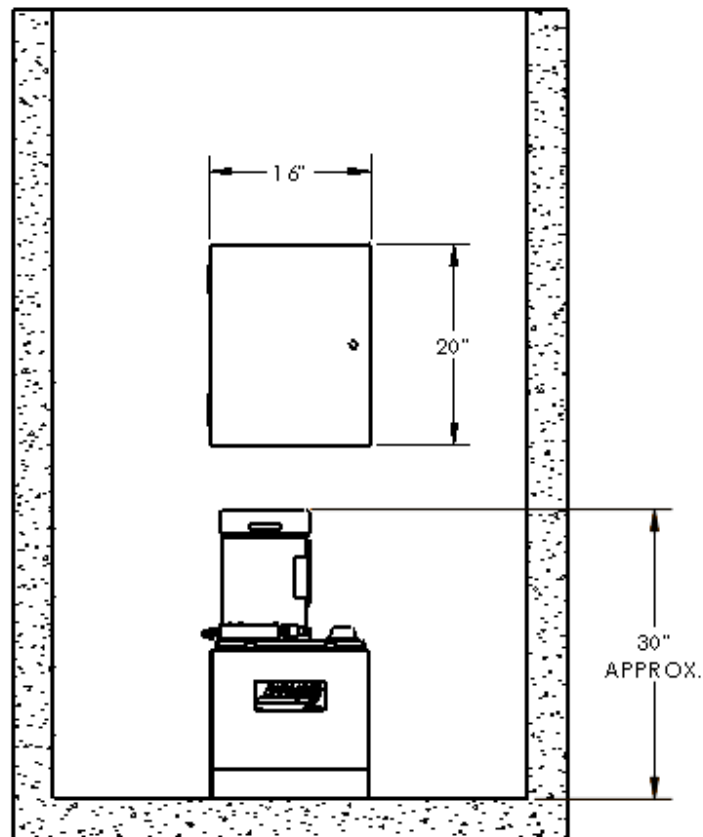
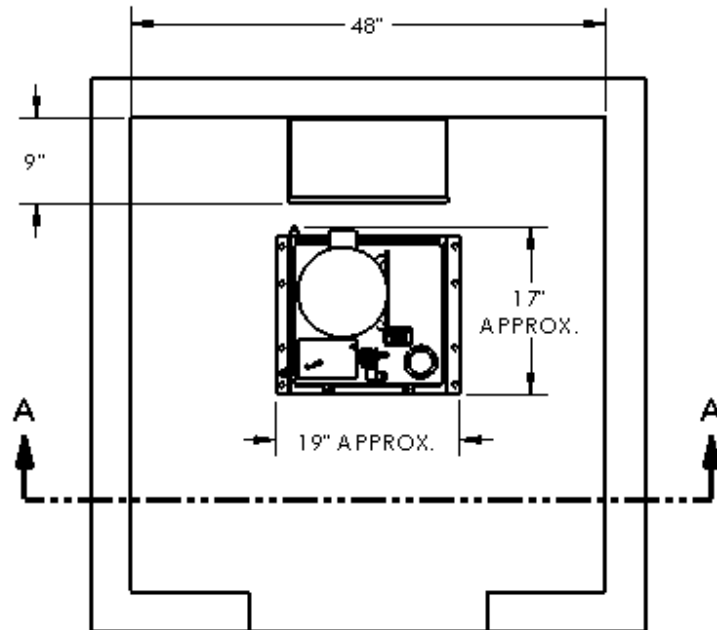
DETAIL A
TYP (4) CORNERS



DETAIL B
TYP (4) CORNERS

Guide Angle Connection Details & Reaction Loads

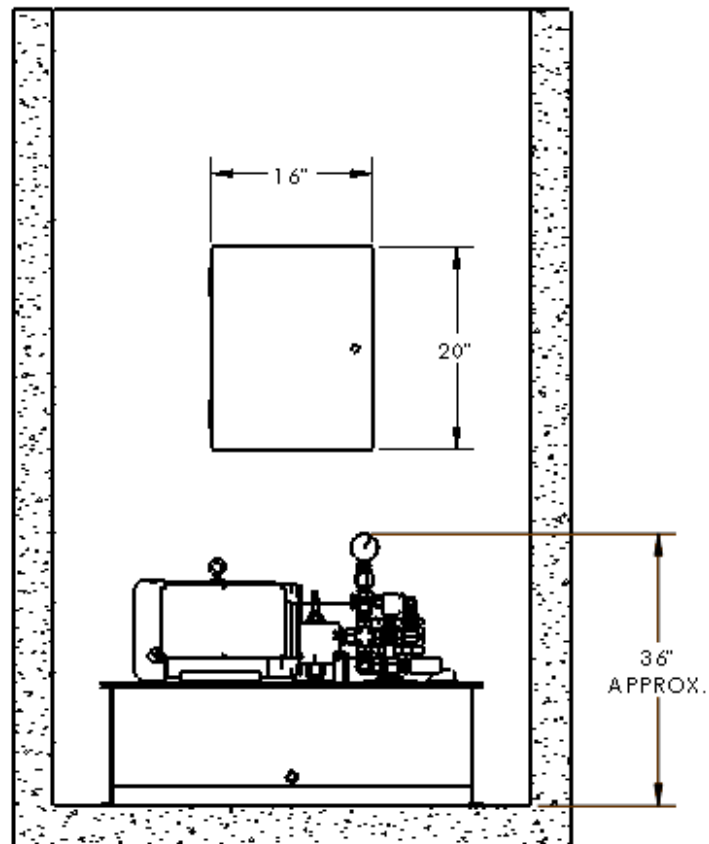
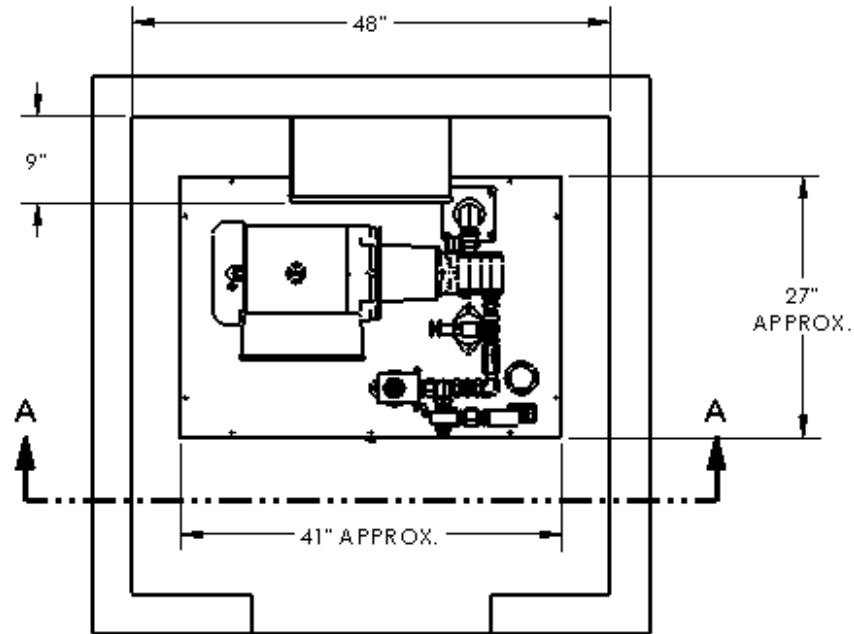
Installation Considerations



SECTION A-A

Motor Control Panel & 5hp Hydraulic Power Unit

Installation Considerations



SECTION A-A

Motor Control Panel & 10hp Hydraulic Power Unit

Installation Considerations

SHIP-LOOSE ELECTRICAL COMPONENTS

Security Keyswitch Station

This station is the primary security device in the control circuit and requires a physical key to turn the control system “On”. This station is wired in the control voltage circuit to prevent unauthorized operation of the lift.



DIMENSIONS: 4" x 4"

LOCATION: Secure location, preferably near lift operating zone

MOUNTING: Wall Mounted – 2 gang box

VOLTAGE: 24VDC

MATERIALS: Screwdriver

Digital Keypad Security Station

This station serves as the secondary security & authorization device and requires a code to be entered to turn the control system “On”. This station is wired in the control voltage circuit to prevent unauthorized operation of the lift. Authorized code times out after 5 minutes and must be re-entered.



DIMENSIONS: 3" x 5"

LOCATION: Secure location, preferably near lift operating zone

MOUNTING: Wall Mounted – 1 gang box

VOLTAGE: 24VDC

MATERIALS: Screwdriver

Operator Pushbutton Station

This station provides the primary means of raising and lowering the lift and should be located adjacent to the lift operating zone and in the vicinity of the security keypad station. The buttons must be pressed and held by the operator during all lift movement – so as to stop the lift by removing finger from button.



DIMENSIONS: 2" x 4"

LOCATION: Adjacent to lift operating zone, in line of sight with lift

MOUNTING: Wall Mounted – 1 gang box

VOLTAGE: 24VDC

MATERIALS: Screwdriver

Installation Considerations

SHIP-LOOSE ELECTRICAL COMPONENTS

Remote Emergency Stop Station

The Emergency Stop “panic” button which, when pushed, removes electrical power from the control circuit and immediately stops lift movement. E-Stop stations can be located at upper or lower level locations, and must be manually reset to continue operation.



DIMENSIONS: 4” x 4”

LOCATION: Adjacent to lift operating zone, out of line of sight of operator (typ. lower level)

MOUNTING: Wall Mounted – 2 gang box

VOLTAGE: 24VDC

MATERIALS: Drill, sheetrock screw anchors

Audible “Lift in Motion” Alarm

An audible and/or visual signaling device which will activate any time the “UP” or “DOWN” push button is pressed to notify anyone in the area that the lift is being operated. It will continue to signal alarm if the platform is left in any position other than the fully raised or fully lowered positions for more than five seconds. Volume is adjustable.



DIMENSIONS: 1-1/2” dia

LOCATION: Adjacent to lift operating zone, out of line of sight of operator (typ. lower level)

MOUNTING: Wall Mounted – 1 gang box

VOLTAGE: 24VDC

MATERIALS: 1 gang blank cover w/1-1/8” hole, “Q” size spade terminals

Wireless Remote Security Cameras

Two (2) wireless, digital cameras are mounted at the lower level to give the operator a complete view of the lift operating zone which is outside his/her line of sight. One (1) monitor is located at the operator station to be able to watch all zones during lift operation.



DIMENSIONS: 8” x 8-1/4” (monitor)

LOCATION: Cameras - Lift operating zone (typ. lower level)
Monitor – adjacent to operator P/B station

MOUNTING: Cameras – Wall Mounted

Monitor – Tabletop, wall, or under-cabinet

POWER: Cameras – 115VAC plug/350mA (wall outlet)

Monitor – 115VAC plug/850mA (wall outlet)

MATERIALS: Drill, sheetrock screw anchors (cameras)

Installation Considerations

SHIP-LOOSE ELECTRICAL COMPONENTS

Motion Detectors

Sensors are mounted above and just outside each unprotected edge of the lift platform to detect motion in the lift operating zone outside the line of sight of the operator. If any motion is detected, an electrical contact opens in the control circuit and the operator will not be able to operate the lift until the timer resets (adjustable).



DIMENSIONS: 3-1/2" dia
LOCATION: Lift operating zone, out of line of sight of operator (typ. lower level)
MOUNTING: Ceiling Mount (kit provided)
VOLTAGE: 24VDC
MATERIALS: Jigsaw, pencil, screwdriver

Central Command Center (optional)

A single stainless steel enclosure that houses all the standard safety components required at the operating level of the lift operating zone: security key switch, digital keypad, security monitor, and UP/DOWN pushbuttons (can also be customized to house other optional components). Looks great – and simplifies installation.



DIMENSIONS: 12" x 18" x 4" elect. box (14" x 20" flanges)
LOCATION: Adjacent to lift operating zone, within line of sight of operator (typ. upper level)
MOUNTING: Wall Mounted – between studs, Nema 1 box with holes for screwing to vertical or horizontal studs
POWER: 115VAC /400mA monitor & wireless receiver
VOLTAGE: 24VDC – other components
MATERIALS: Jigsaw/saw/zall misc 2x4 stud material

Vehicle-Present Sensor – Magnetic (optional)

This state of the art sensor is mounted underneath the canopy and senses when a vehicle is on the canopy. If a vehicle is sensed, the sensor opens a contact in the control circuit and operator will not be able to activate the "UP" button. Requires calibration.



DIMENSIONS: 3/4" x 3"
LOCATION: Beneath canopy deck
MOUNTING: Locate below engine block; run wiring inside flex track to control panel
VOLTAGE: 24VDC
MATERIALS: double-sided tape, or epoxy, or tek-screws

Installation Considerations

SHIP-LOOSE ELECTRICAL COMPONENTS

Lift Interference Detection – Photo Eye (optional)

Each interference detection kit includes a photo-eye sensor and separate reflector. Sensors are mounted too “shoot” along an unprotected edge of the lift platform to detect interference in the lift operating zone outside operator’s line sight. If any interference is detected, an electrical contact opens in the control circuit and the operator will not be able to operate the lift until the obstruction is removed.



DIMENSIONS: Sensor – 1-3/4” x 3”; Reflector – 3” dia
LOCATION: Wall-mounted
MOUNTING: Sensor has 1-1/4” dia bulkhead fitting (wall mounting bracket not included); Reflector has 3/16” dia. hole in center for bolting/screwing
VOLTAGE: 24VDC
MATERIALS: angle/bracket mat’l, drill, blank cover w/hole

Ultrasonic Vehicle Position Indicator (optional)

This simple, electronic device mounts to a wall in front of the lift and can be adjusted to ensure that a vehicle being parked on the lower deck for storage is located completely within the perimeter of the deck so as to prevent damage to the vehicle or the lift as the vehicle is lowered from the upper level to the lower level.



DIMENSIONS: 3” x 5” approx. – Sensor & Display units
LOCATION: Garage wall (upper level) in front of lift
MOUNTING: Sensor: (2) screws (provided)
Display: (2) screws (provided)
POWER: 115VAC plug /20mA (separate from lift circuit) or (4) AA batteries
MATERIALS: Drill, sheetrock screw anchors

Swing Door Status Switches and/or Interlocks (optional)

These are electro/mechanical devices that prevent operation of the vehicle lift when the gates or doors are left open on any level. They also prevent the gates or doors from being opened whenever the lift is in motion.



DIMENSIONS: 1-1/2” x 8” approx.
LOCATION: Door jamb & latching side of swing door
MOUNTING: Face plate: screws into door jamb
Strike: screws into door
POWER: 24VDC – power from control panel to bolt and status switch
MATERIALS: Drill, chisel, hammer

Installation Considerations

SHIP-LOOSE ELECTRICAL COMPONENTS

Overhead Door Status Switches (optional)

These are proximity (non-contact) switches which sense whether an overhead door is in its fully closed position or not, and prevents operation of the vehicle lift if not fully closed (either/both levels).



DIMENSIONS: 3-1/8" x 2-1/8"
LOCATION: Bottom of door and floor
MOUNTING: Switch: screws into door jamb
Striker: screws into door
POWER: 24VDC
MATERIALS: Drill, screws, screw anchors

Biometric (fingerprint) Security Scanner (optional)

This high technology security station can be purchased in lieu of the keypad security station to provide secondary security & authorization protection by requiring the scanning of fingerprints (multiple authorizations available) to turn the control system "On" - and prevent unauthorized operation of the lift. Authorized code times out after 5 minutes and must be re-entered.



DIMENSIONS: 3" x 6"
LOCATION: Secure location, preferably near lift operating zone
MOUNTING: Wall Mounted – 1 gang box
VOLTAGE: 24VDC
MATERIALS: 1 gang blank cover w/ 7/8" dia hole

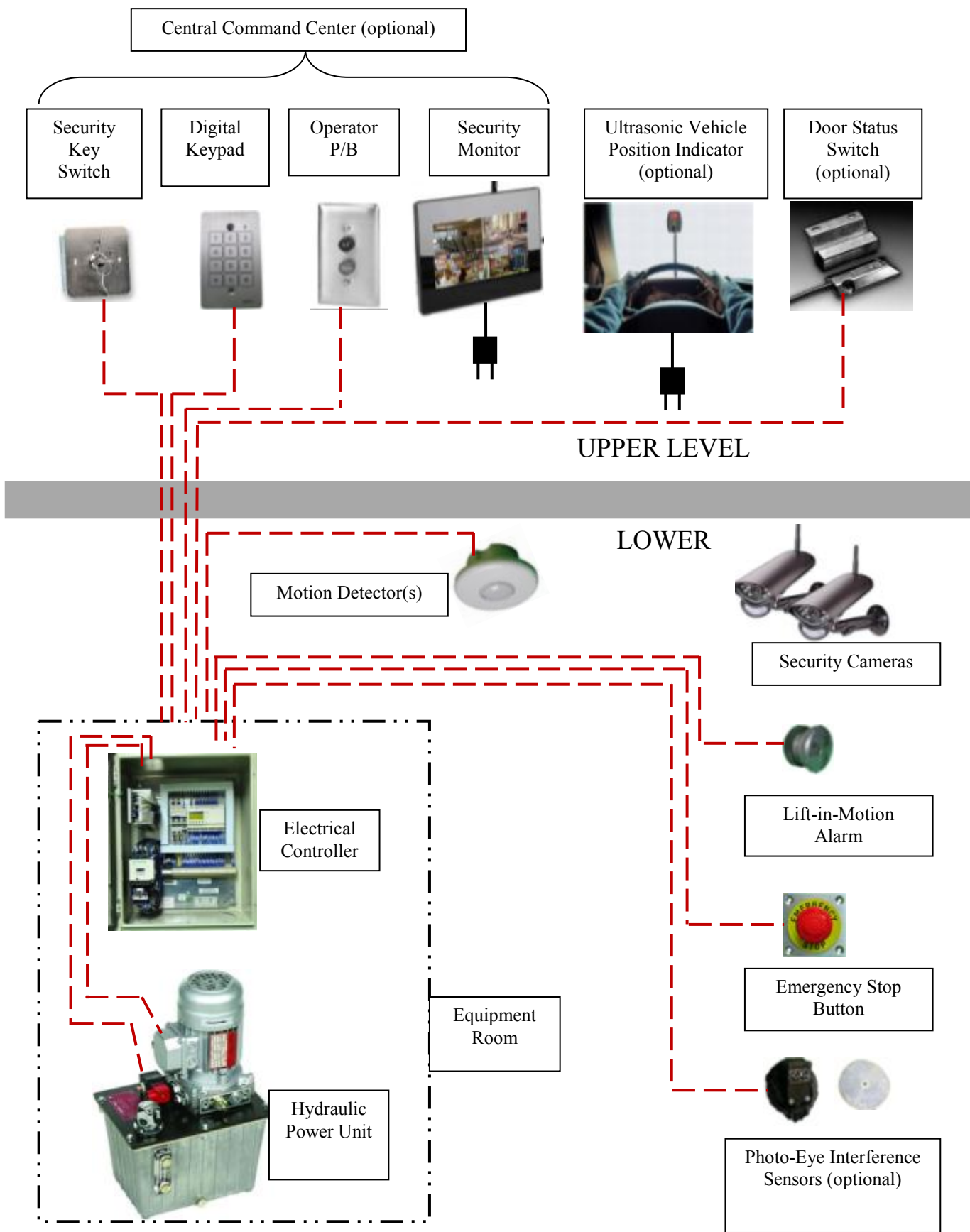
Electrical Junction Box – Pre-Mounted to Lift (optional)

For customers who would like to add their own electrical features to the lift (lights, video screens, etc.) an electrical junction box can be pre-mounted to the underside of the top canopy deck, and provisions made for wiring to be able to be routed inside one of the canopy support posts to the flexible utility track beneath the lift.



Installation Considerations

ELECTRICAL COMPONENT PLAN (Typical)

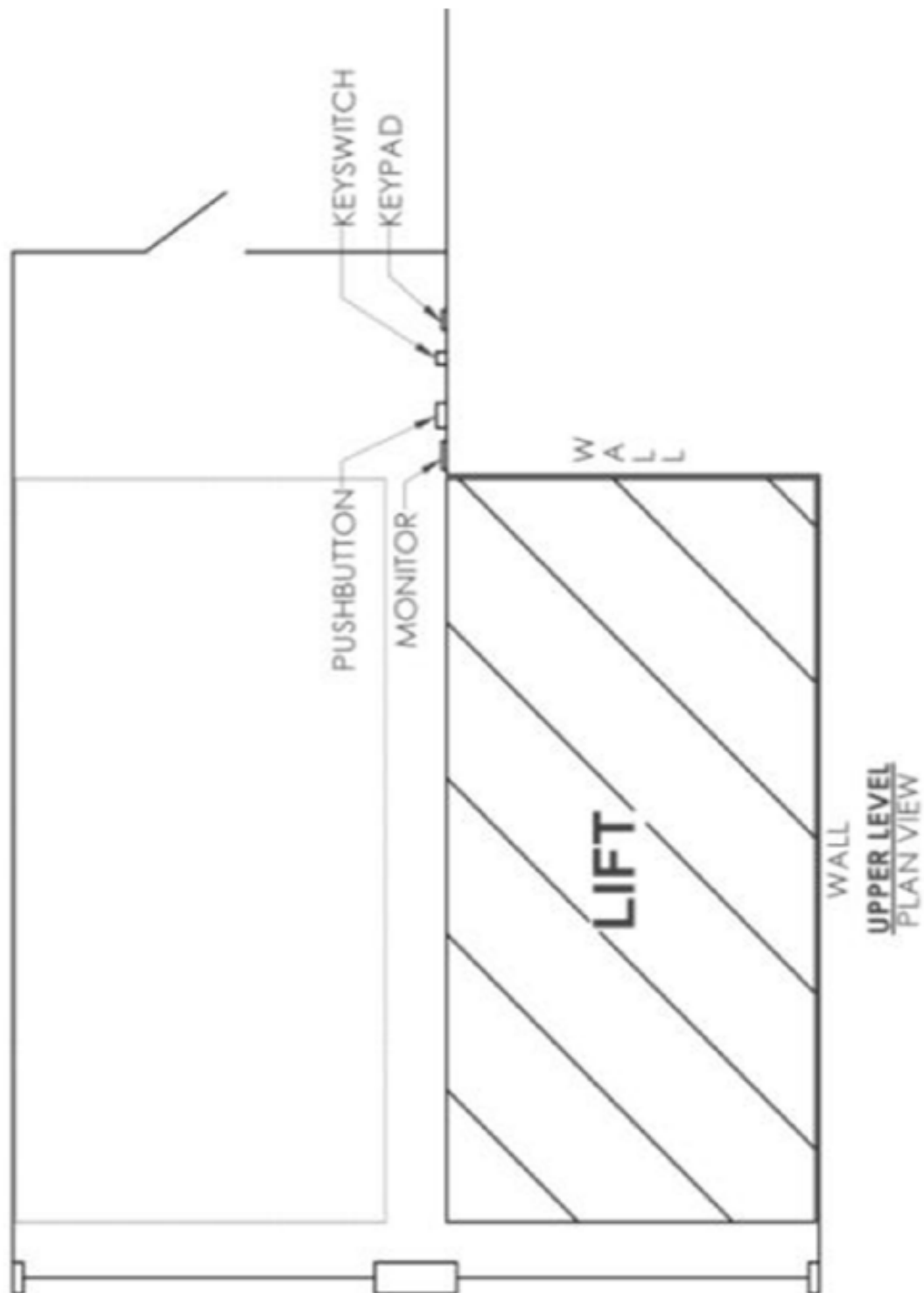


Installation Considerations

9.1 Electrical Installation Notes

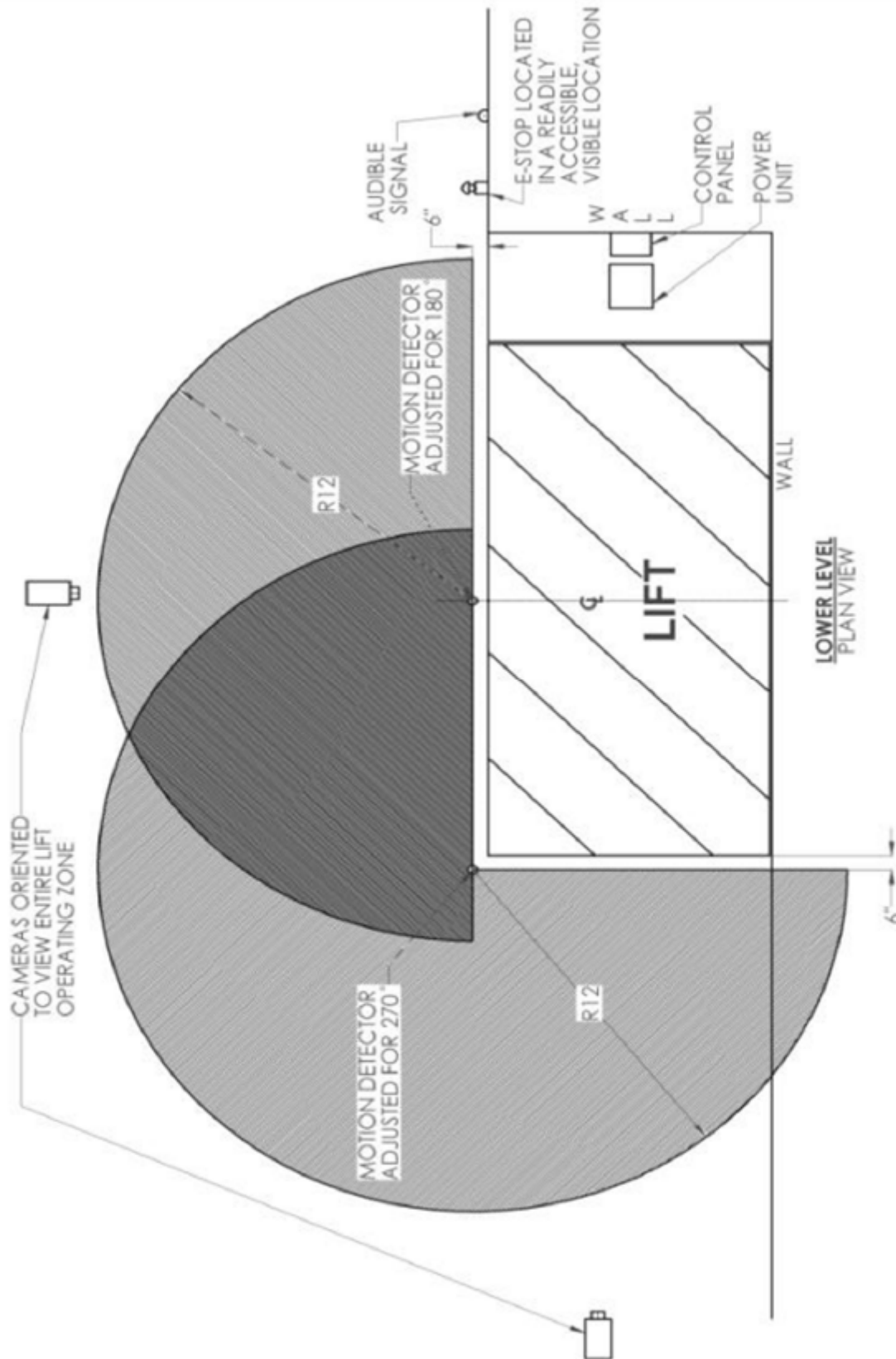
- **Code Compliance** - All electrical work must meet the requirements of all state and local codes. Make sure that only qualified electricians perform all wiring.
- **Control Panel** - The control panel is shipped loose with all internal components pre-wired to terminal strip(s) and all control logic managed by programmable relays.
- **Bi-Level Operation** - If the lift is to be operated from both levels, a duplicate set of electrical control and safety devices must be purchased – to ensure safeguarding of the landing that is out of the line of sight of the operator.
- **Bypassing Devices** - *NEVER* bypass any safety sensor or device.

Installation Considerations



**SAFETY DEVICE & SENSOR LAYOUT –
UPPER LEVEL (Plan View)**

Installation Considerations

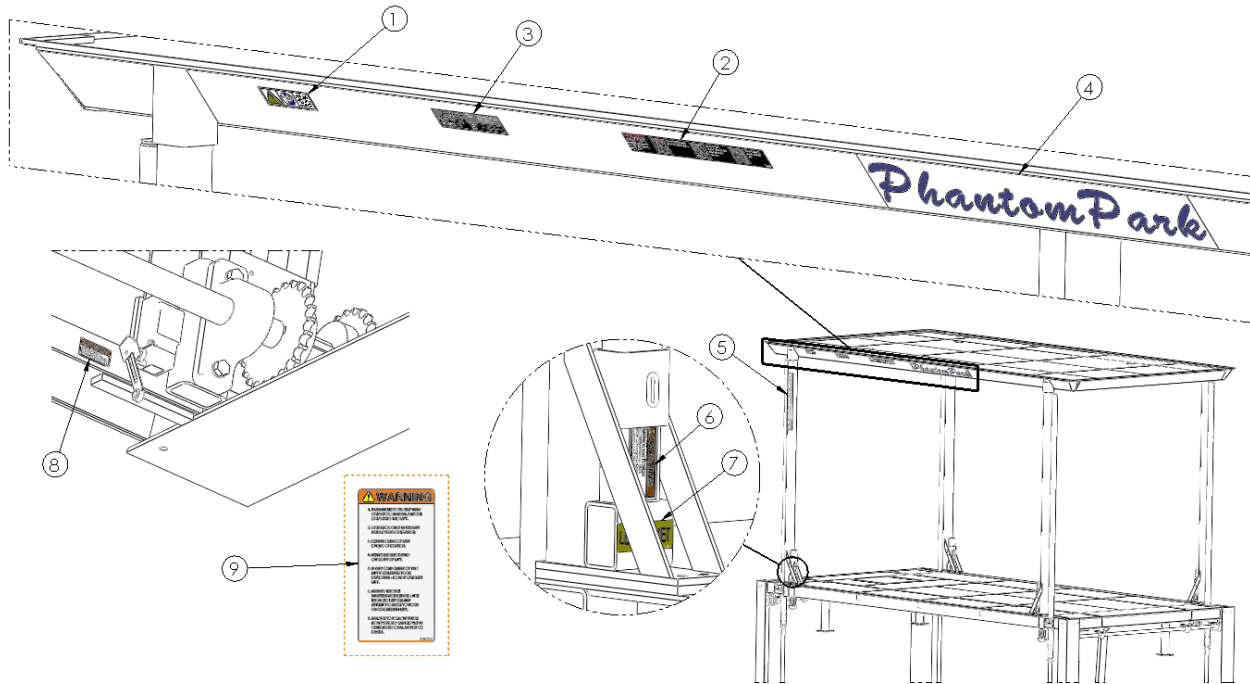


**SAFETY DEVICE & SENSOR LAYOUT –
LOWER LEVEL (Plan View)**

Safety Labels and Features

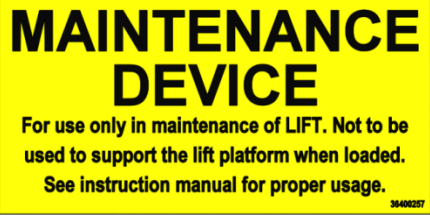


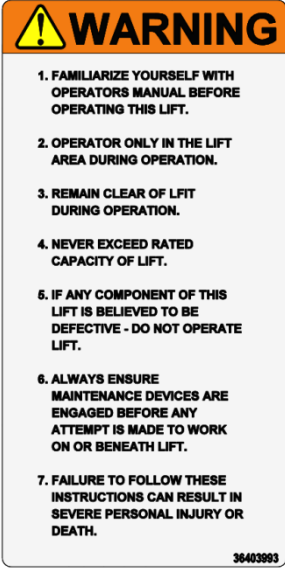


10. Safety Labels and Features

10.1 Labels & Locations



4-Post Subterranean Lift			
Item No.	Qty	Description	Part No.
1	4	Caution! Familiarize Yourself With Operators Manual	36401487
2	4	Danger – Do Not Put Hands or Feet...	36430050
3	1	Serial Number Name plate	36401560
4	4	<i>PhantomPark</i> LOGO	36415050
5	4	ACLifts LOGO	36415060
6	4	Maintenance Device	36400257
7	4	Maintenance Device Socket	36400265
8	1	WARNING! Do Not Tamper	36405695
9	2	Operator Warning Placard (shipped loose)	36403993

Safety Labels and Features

36400257 2" x 4"	
36400265 1 1/2" x 3 3/4"	
36401487 2" x 4"	
36403993 8" x 4" (placard) Field locate adjacent to the lift at each level, ideally in the vicinity of the operator pushbutton station.	
36401560 2" x 8"	
36415050 6" x 40"	

Safety Labels and Features

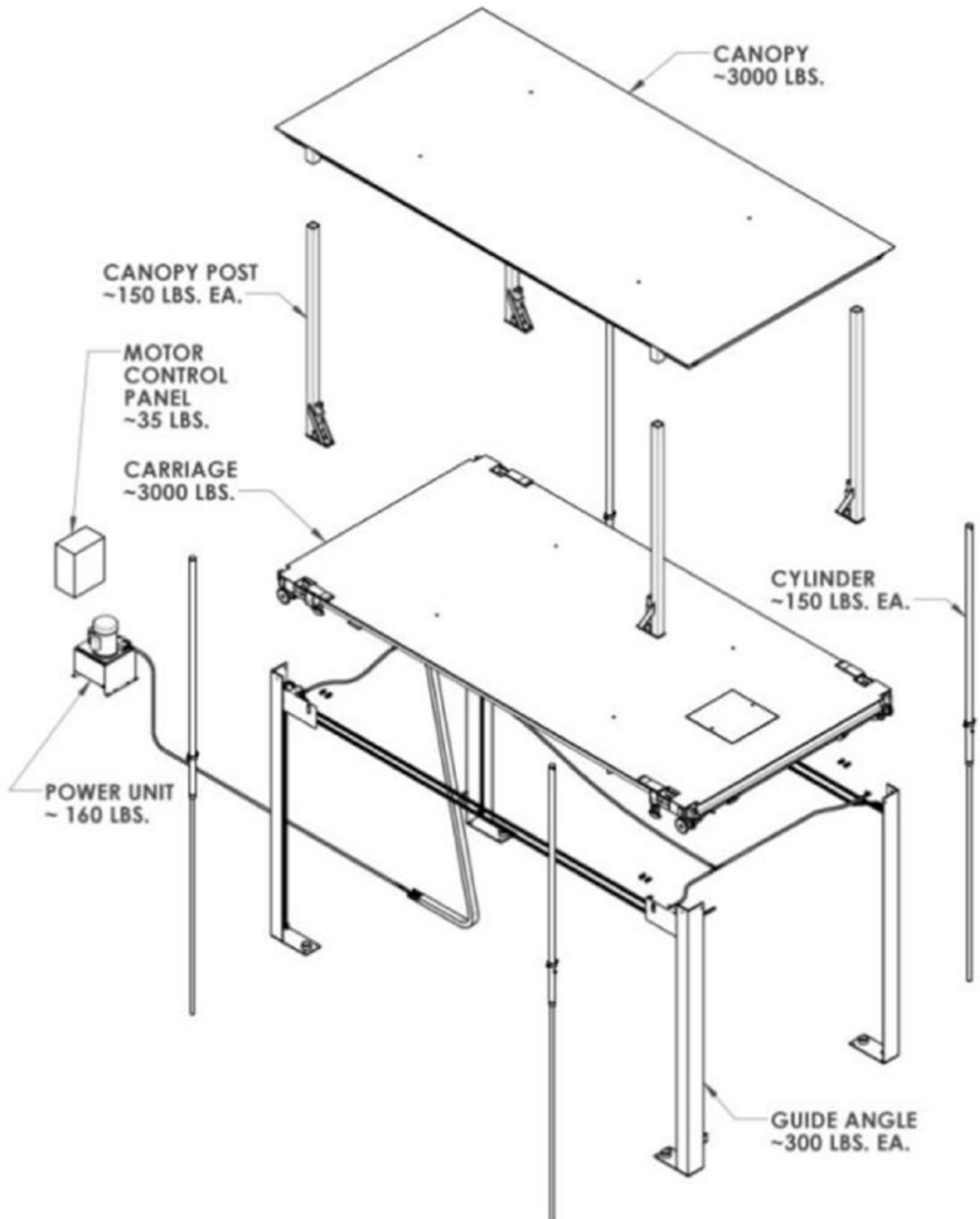
36415060 27" x 4"	
36430050 2" x 17"	
36405695 1" x 2" Located adjacent to all limit switches, status switches, sensing switches and interlocks. Must be visible to the operator.	

10.2 Lift Safety Features (non-electrical)

- **18" Refuge Space Beneath Lift** - A mechanical feature unique to the 4-Post style lifts is a completely clear 18" crawl space beneath the entire lower deck for personnel safety during operation and maintenance.
- **Beveled Toes Guard Protection** - A mechanical feature added to the perimeter of the lift canopy intended to push away, rather than pinch, a shoe which is overhanging a landing by up to 4 inches.
- **Hydraulic Flow Controls** - Each lifting cylinder is equipped with a hydraulic "flow control". The flow control limits the amount of oil leaving the cylinder. In the event of a sudden rupture in a hose, the flow control regulates the descent of the lift.
- **Automatic Re-Pressurization Circuit** - An automatic self-leveling feature where, if the lower carriage is left in the raised position for an extended period of time, switches sense whether the carriage is slowly drifting away from the upper landing (normal in all hydraulic circuits). In order to prevent the possibility that the driver or other passers-by do not notice that that carriage has moved away from the landing – the lift re-levels itself after it drifts down approximately 1-2".

Shipping & Handling

11. Shipping & Handling



Start-up Testing

12. Start-up Testing

Typical Start-up Procedure:

- Close all doors/gates leading into the lift operating zone.
- Run the empty carriage to the upper landing.
- Check that doors at all levels will not open while the lift is running.
- Check to ensure the lift will not operate if any door is open.
- Place a load on the carriage and lower the carriage to the lower landing, then back up again. The carriage should stop at the upper elevation even with the landing – whether loaded or unloaded.
- Allow a loaded carriage to remain at the upper level for 4 hours. Platform should not drift or leak oil.
- Check to ensure the lift operates at the rated speed.
- The parking lift should function smoothly and relatively quietly. If the lift does not function as stated in the Owners Manual, or does not pass these tests, consult the manufacturer before putting the lift into service.
- Check that each of the safety devices delivered with the lift, and described herein, will stop the moving carriage if activated.

Maintenance Schedule

13. MAINTENANCE SCHEDULE

The following is a basic inspection schedule designed to help ensure that your parking lift is operating correctly, and to identify potential problem areas that should be inspected further by a qualified service representative. Lifts installed in more severe environments - outdoors (rain, ice), near the ocean (salt), etc. – may require more frequent inspection of structural & mechanical components:

13.1 Each Month

- Check hydraulic fluid level. Note: With lift fully lowered, fluid level should be approximately 1-1/2" from top of tank. DO NOT OVERFILL.
- Check for hydraulic fluid leaks.
- Check all hydraulic hoses and electrical cords for cracks, abrasions, twisting, etc. Small leaks at connections can be remedied by tightening connections or replacing the faulty component.
- Check all bearings for noise and wear.
- Check overall condition of unit (i.e. bends, breaks, loose or missing screws, metal shavings on floor, etc.).
- Check to be sure that all equalization chains beneath the lower platform are properly engaged with their respective drive sprockets. Call a qualified service technician immediately if chains are broken or have come loose from their designated chain path.

13.2 Every Six (6) Months

- Check quality of hydraulic fluid, replace if discolored (oxidized), cloudy, or otherwise contaminated. DO NOT OVERFILL. Always use clean fluid. Never return fluid from drip pans, pit, etc. back to reservoir. Dispose of and handle used fluid as a hazardous material.
- Check lift cylinder rods for scoring and leaking. Wipe any foreign material from cylinders.
- Check all structural and mechanical components for cracked, or broken welds and any distortion caused by collision, overloading, or other misuse.
- Check the plastic wear pads mounted to the outside of each corner of the lower platform. Call a qualified service technician if there is less than 1/4" of pad material remaining.

Maintenance Schedule

- Grease the shaft bearings located beneath the lower vehicle platform at the front and rear of the lift with light grease.

NOTE: When all above checks have been completed start unit and operate through all functions. Inspect all components for signs of noise, vibration, erratic movement, and any other abnormal behavior.

13.3 Once per year

- Change hydraulic fluid and clean reservoir. Never return fluid from drip pans, pit, etc., back to reservoir. Dispose of and handle used fluid as a hazardous material.
- Replace all filters.
- Tighten all equalization chains located beneath the lower platform per instructions in the Installation and Maintenance manual.