Vasari

INSPIRED PARKING

PLANNING GUIDE

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1. FOREWORD

This Application Guidelines for Subterranean Parking Lifts (Guidelines) was developed by Autoquip 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. They were developed with the sole intent of offering information to parties engaged in the marketing, purchase or use of these lifts.

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.

3. LIFT DUTY & CODE COMPLIANCE

3.1 Parking Lifts are not vehicle elevators and do not meet the requirements of ASME A17.1 – *Safety Code for Elevators and Escalators*. As such, with the standard controls system, these lifts are not used to transport people.

3.2 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.

3.3 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.

3.4 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.

3.5 Residential subterranean parking lifts should meet the <u>applicable</u> portions of the following nationally recognized safety standards:

a)	ANSI Z535.4	Standard for Product Safety Signs & Labels
b)	ASME A52	Structural Steel Standard
c)	AWS B2.1/B2.1M	Welding Qualification Standard
d)	NFPA/NEC	National Electric Code
e)	OSHA 29CFR1910	General Industry Safety Regulations
f)	ANSI MH29.1	Safety Requirements for Industrial Scissors Lifts

3.6 Residential subterranean parking lifts' system control panel is designed, manufactured and labeled per Canadian and US standards (cULus) as defined by Underwriters' Laboratories. All other electrical devices are UL and CSA approved and labeled.

3.7 Subterranean parking lifts are designed to raise loads placed on the lower platform and, only when specifically rated, on the canopy.

4. Terms & Definitions

Approach Ramp: An access ramp used to load vehicles on/off of a platform, typically when the platform comes to rest at the lower landing elevation if not pit mounted.

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 comes to rest in 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.

Command Center: The standard operator console which consists of a flush mounted enclosure with polished stainless steel cover to be inserted between wall studs and contains all standard operator controls and an LCD monitor for the camera system.

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 panel, limit switches, sensors/detectors, 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 descend over time 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 a fixed orifice thus causing the lit to descend 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.

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 weldments located at each corner of the lift which guide the carriage throughout its complete 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.

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 from the main disconnect being supplied to the control panel to run the motor.

Push Button Station: The wall mounted or handheld device used by the operator to control the operation of the lift.

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/Canopy: A Carriage and/or Canopy that is manufactured and shipped in multiple pieces for field assembly due to shipping and/or handling constraints either enroute or at the installation site .

Velocity Fuse: A hydraulic valve, which in the event of a sudden loss of hydraulic system pressure, will lock the oil in the cylinder and prevent the cylinder from retracting & therein prevent the lift from lowering.

5. SUBTERRANEAN LIFT APPLICATIONS

5.1 AREAS OF USE

5.1.1 **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.

5.1.2 **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..

5.1.3 **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.

5.1.4 **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.

5.1.5 **Three Landings**. Less common. Vertical transfer of vehicles is done between three fixed elevations/landings. However, most hydraulic control systems do not provide an accurate or repeatable stopping position at the middle elevation under both loaded and unloaded conditions. Therefore, mechanical lift actuation is recommended/preferred for applications with 3 or more landings.

5.2 TYPES OF USE

5.2.1 **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, jet-skis, ATVs, golf carts, and other recreational vehicles or watercraft.

5.2.2 **Vehicle Display**. 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.).

5.2.3 **Vehicle Transport/Motor Court.** When the architectural plan allows, expanded square footage for parking can be provided at elevations below or above the main 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.

5.2.4 **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.).

5.2.5 **Material Transfer.** Not only can subterranean lifts be used to transport and park vehicles and watercraft, but the platform 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.

6. LIFT DESIGN & CONFIGURATIONS

6.1 Four Post, Hydraulic Style – Fixed Canopy & Telescoping Canopy

6.1.1 **Design Approach.** The carriage and canopy 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 carriage and 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 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.

6.1.1.2 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 carriage, the 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.

6.1.1.3 Synchronization. The lifting cylinders are mechanically synchronized to ensure that the four corners of the lift travel at the same pace and thereby keep the lift level throughout its vertical travel – regardless of the weight distribution of the load. This synchronization is accomplished using a series of chains and sprockets located beneath the carriage which physically capture the structure of the carriage and force the four corners to travel together.

6.1.2 **Advantages.** The advantages of the 4-post hydraulic design are:

1) cylinders are accessed easily from above the platform
2) more structurally stable as vehicle axles roll over the edge of the lift
3) 18" of refuge space beneath entire lift for access & personnel safety
4) faster standard speeds – because of the vertically mounted cylinders
5) no lift component weight over 4,000 lbs – and can accommodate travels from 7 to 19 feet with little variation in overall lift weight, and
6) lower component stresses in the structure of the lift assembly.

6.1.3 **Disadvantages**. The disadvantages of the 4-post design are:

1) Requires structural support from the surrounding building (i.e. is not free-standing), and
2) Slightly more expensive to install because of the multiple ship-loose components of the lift.
3) Typically not adequate for applications with more than two landings.

7. LIFT SPECIFICATION CONSIDERATIONS

7.1 **Floor-to-Floor Distance**. The distance from one finished floor level to the next finished floor level.

7.2 **Vertical Travel**. The change in elevation between the top surface of the carriage deck when it is in a fully lowered position and when it is in a fully raised position. Can be equal to or less than the floor-to-floor distance.

7.3 **Type and Capacity of load.** Types of loads are typically: cars, trucks, trailers, motorcycles, large boxes, powered carts, etc. Capacity refers to three different categories of load accommodation: Lifting capacity, Edge load capacity, and Dimensional capacity. These can each be described further as:

7.3.1 **Lifting Capacity**. As mentioned earlier, the lifting capacity is the total, maximum load (measured In pounds) which the lift is designed to raise and lower. This total load is made up of two types of loads being lifted:

7.3.1.1 Live Load. The live, or dynamic, load is the weight of the load that is being wheeled on to and off the lift, usually the vehicles being parked and transported – either one two vehicles at a time. Can include the weight of a fork truck or powered pallet jack for transferred loads that are not passenger vehicles.

7.3.1.2 Dead Load. The dead, or static, load is weight that gets added to the weight of either, or both, platforms that does not get removed with vehicle transfer. Examples would be the weight of concrete, tile, sod, or flooring that is added in the field.

7.3.2 **Edge Load Capacity**. Edge loads are loads imposed on either, or both platform ends or sides during transfer of the vehicle between the stationary lift and the surrounding landing surface. These must be estimated to ensure that these localized, or point loads are within the design limitations of the edges of the lift structure.

7.3.2.1 Rolling/Axle Load. This is total weight per axle that is moving across any edge of either platform and, when calculating maximum allowable loading, includes an "impact factor" for the wheeled loads. Standard lift designs assume that the 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 weight disparities that exceed this.

7.3.2.2 Static Load. These are non-moving localized loads that are placed near any edge of either platform. These are less common than axle loads but must be considered when applicable to ensure that the platform and lift structure is designed to handle an eccentric load placed so near an edge.

7.3.3 **Dimensional Capacity.** Could also be described as the lift's "envelope" of dimensions that is required to manage the largest foreseeable vehicle size that must be accommodated by the lift platforms, and the vertical distance between those platforms.

7.3.3.1 Width. Minimum and maximum catalogue platform widths are based on industry averages of passenger vehicle widths, and allow for adequate clearance between the overall width of the vehicle and the inside distance between platform canopy posts.

7.3.3.2 Length. Minimum and maximum catalogue platform lengths are also based on industry averages of passenger vehicle lengths. Optional parking aids are available to help drivers stop the vehicle completely within the footprint length of the platform. Overhanging the platform footprint must be prevented to avoid vehicle damage.

7.3.3.3 Height. A standard catalog vertical distance between the top of the carriage and the bottom of the canopy is approximately 88 inches. The manufacturer needs to aware of any vehicles to be parked on the carriage whose height exceeds this amount.

7.3.3.4 Overhead Clearance. It is important to ensure an adequate overhead clearance for a completely raised canopy, especially if the canopy will have a vehicle on it when it is raised. This vertical distance is measured from grade or street level to the underside of the lowest overhead building member or architectural feature that is within the path of the moving lift.

7.3.3.5 Split Platforms. Sometimes there are shipping, material handling, or installation site constraints that drive the need to ship the lift platforms split in half down their length for field assembly

7.4 **Traffic Pattern.** The traffic pattern of vehicles entering and exiting the lift are critical to determining a number of key design parameters:

7.4.1 **Pit/Ramp Requirements.** If a vehicle is to be driven off the carriage at the lower landing, a stable surface must be provided to do that: either pit-mount the carriage or place an appropriately high approach ramp in front of (or behind) the carriage.

7.4.2 **Canopy Post Spacing.** If the vehicle is to be driven off the side of the lift carriage at the lower elevation, there must be adequate clearance between the front and rear canopy posts to accommodate that.

7.4.3 **Lift Zone Barriers/Guarding.** Lift zone safety is of utmost importance and any "non-operating" edge of the lift (any edge that a vehicle does not cross in the fully lowered position) should be guarded against inadvertent contact of a moving carriage by standers-by (walls, enclosure panels, doors/gates, etc.)

7.5 **Electrical Considerations**. The following should be considered:

7.5.1 **Fused Disconnect**. The installer is responsible for providing a lockable, fused disconnect panel for primary power coming into the building to power the lift system.

7.5.2 **Primary Electrical Service**. The availability of up to 50-amp service for high speed, 230V-1phase motors.

7.5.3 **Severe Conditions**. Severe operating conditions, such as outdoor applications, often require special electrical components.

7.5.4 **Field Wiring**. There is considerable field wiring to be done to connect all the peripheral electrical signaling devices to the main motor control panel.

7.6 **Optional Enhancements**. The following standard options should be considered as potential safety and performance enhancements as driven by the application:

7.6.1 **Vehicle Location Sensor**. Helps to ensure that the entire vehicle is within the carriage footprint prior to raising or lowering the lift.

7.6.2 **Vehicle Present Sensor**. Helps to ensure that a vehicle is not parked on the top canopy prior to the lift being raised.

7.6.3 **Biometric Security Device**. Can be incorporated to provide a secondary authorization to be able to use and operate the lift.

7.6.4 **Paint.** Special coatings and finishes are available to better combat the effects of severe operating conditions such as salt water, ice/snow, etc.

7.6.5 **Optional Power Units.** Designs are available to increase the speed of the lift should that be critical/required.

7.7 **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. Optional guards, safeties, and restraints are also available to prevent inadvertent contact with a moving lift – on both the operating level, and any level that is outside the operator's direct line of sight:

7.7.1 **Security Camera (std)**. A security camera is provided to mount in the lift operating zone at the level not occupied by the operator. The camera allows the operator to view that portion of the lift zone that is outside his or her direct line of sight by watching the video monitor mounted in the Command Center console.

7.7.2 **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 lift operating zone.

7.7.3 **Emergency Stop Button (std)**. An E-Stop station comes pre-mounted in the Command Center console for use at the operating level. Stand-alone stations can also be purchased for mounting 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.

7.7.4 **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.

7.7.5 **Doors.** It is common for doors, usually fire-rated swing doors and/or overhead garage doors, to be provided by the general contractor, to enter the lift operating zone at both the operating level and the non-operating level. It is recommended that the status of these doors be monitored and interlocked to prevent personnel ingress/egress while the lift is moving.

7.7.6 **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 interlocked.

7.7.7 **Lift Enclosure Panels.** 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) enclosure panels as personnel barriers.

7.7.8 **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.

7.7.9 **Interlocks.** Door interlocks are also recommended for all doors leading into the lift operating zone to place the door temporarily and automatically into "lock" condition whenever the lift moving. Interlocks also come in different designs, including some that are available as a combination status switch and interlock – for either swing or overhead doors.

7.7.10 **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.

7.7.11 **Sensing Edge** Linear rubber sensors can be placed around the perimeter of the canopy and/or platform edges of the lift to detect any interference with people or objects that come in contact with the sensing edge. If this occurs, the lift motion will stop and or reverse lowering.

7.8 **Power Unit/Drive Types**. These fall into two primary categories:

7.8.1 Hydraulically Driven **(std)**. All 4-Post subterranean lifts utilize a remote hydraulic power unit (HPU) with motor and pump to send pressurized oil to the four (4) vertically mounted ram cylinders which extend to raise the lift and load. The lift is lowered at a controlled speed by opening a valve at the HPU and allowing gravity and the weight of the lift to retract the cylinders and push oil back to the reservoir through flow control valves.

7.8.1.1 Sizing a Power Unit. A lift's power unit should be sized to easily handle its rated lifting capacity, lifting speed, and duty cycle. Include the 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.

7.8.1.2 Locating a Power Unit. 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 gases or fumes in pit areas.

7.8.2 Mechanically Driven **(optional)**. This is the drive 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. The carriage is raised from beneath by four (4) synchronized gearmotors riding on four (4) sets of heavy-duty, vertically mounted static roller chains. Travel is controlled with an electrical limit switch or similar device at each level. Stopping accuracy is repeatable in both loaded and unloaded conditions.

7.9 **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 live-load (vehicle) capacity to be de-rated by some amount (See Para. 7.3.1 above).

7.9.1 **Maintenance Access Hatch (std).** A 24" square maintenance hatch is placed in both upper and lower platforms 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.

7.9.2 **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. Lip height is specified at time of order.

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

7.9.4 **Perimeter Flexible Seal brush – Canopy Deck.** In some applications, there may be a concern about leaves or debris at the upper level falling through the perimeter floor opening around the canopy - down to the lower landing. Sealed brushes can be supplied to install around the perimeter of the canopy to cover the ¾" – 1" gap between the lift canopy and the garage floor opening.

7.9.5 **Perimeter Gutter and Drain Design.** In wet climates, there may be a concern about water/snow dripping off of vehicles parked on the canopy down to the lower landing. The lift can be designed to accommodate a gutter and drainage system under the 1" gap between the lift platform and garage floor opening. This requires oversizing of the canopy and creates a gap for traffic crossing from the upper floor opening to the lift platform when raised.

7.9.6 **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.

7.9.7 **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.

8. STANDARD FEATURES and OPTIONS

8.1 **Standard Features**.

General:

- Travel: Maximum of 18’ (telescoping)
- Speed: 6.5 FPM
- 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 & Lower Platforms
  - 108”W x 216”L Standard size
  - 120”W x 252”L Max Standard size
- (4) Standoff posts
- (4) Guide angles
- (4) synchronization chains
- (4) lifting cylinders
- 230VAC, 60Hz, 23 amp/50 amp single phase power supply (depends on horsepower)

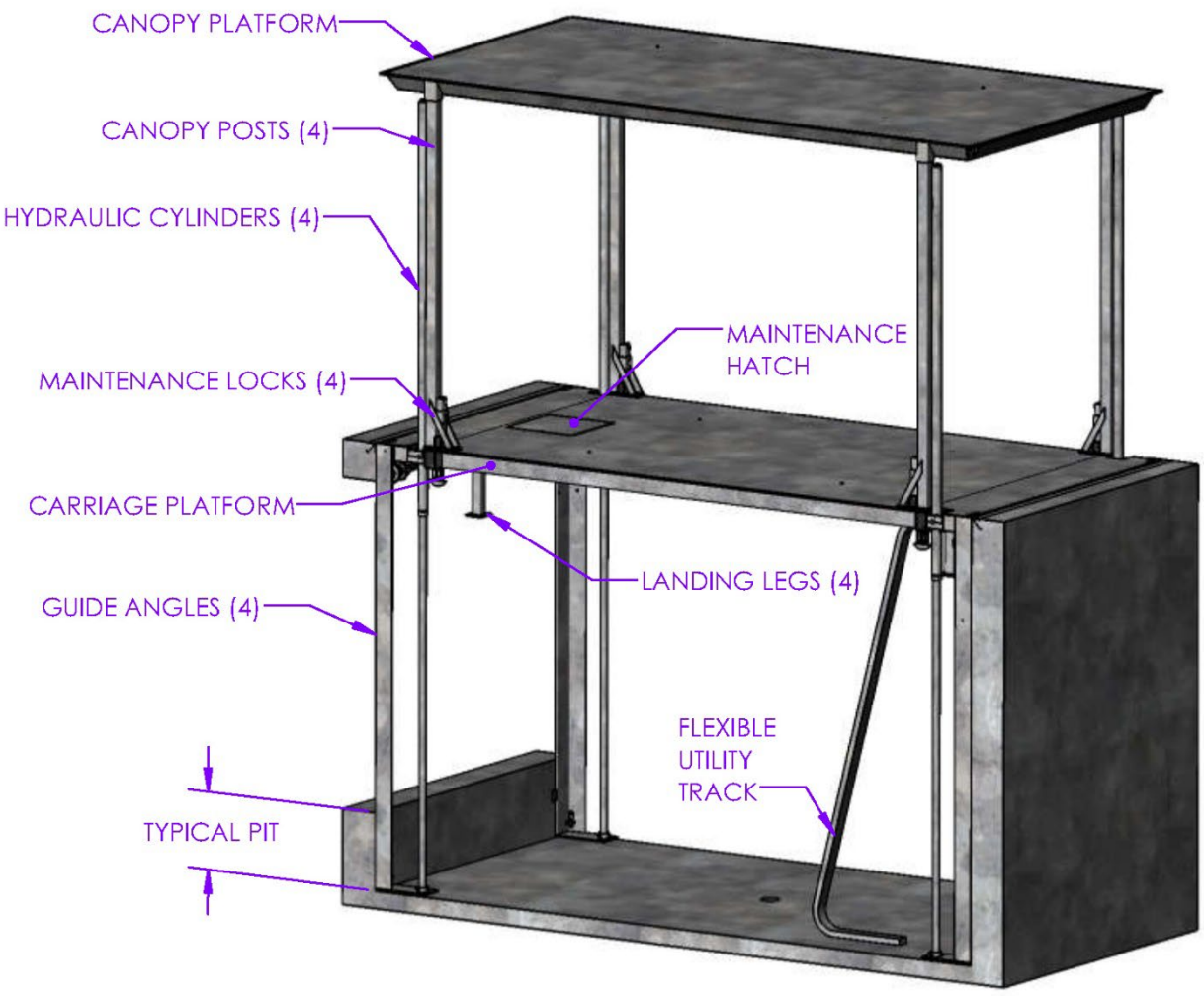
Standard Security & Safety Devices:

- Command Center Console
  - Emergency stop
  - Security key switch
  - Digital security keypad
- Lift-in-motion audible alarm
- Motion detection system
- Camera system
- 18” refuge space beneath entire lift
- Beveled toe guard on top canopy
- Hydraulic flow control valves to prevent free-fall
- “Press and Hold” Operator pushbuttons (at Command Center)
- Motor Control Panel
- Manual lowering valve – in case of power failure

8.2 Standard Options

- Custom platform sizes
- 14,000# (2-vehicle) capacity
- Ultrasonic position indicator with lights
- Biometric (fingerprint) security scanner
- Door status switch
- Door interlock kit
- Powder Coat finish
- Special paint colors
- Stainless steel deck plate”/skin”
- Photo-eye interference detection
- Vehicle present photo-eye sensor
- Vehicle present magnetic sensor
- Lift-in-motion flashing light
- Sensing edge for interference detection
- Pressure-sensing floor mat
- Perimeter Brush system – debris protection
- Perimeter “Gutter” system – to catch and direct water from grade level
- Carriage and/or Canopy Lip for custom flooring, concrete, landscaping, etc

Component Identification



NOTE: ON TELESCOPING MODELS, CANOPY POSTS EXTEND THROUGH CARRIAGE PLATFORM AND REST ON PIT FLOOR.

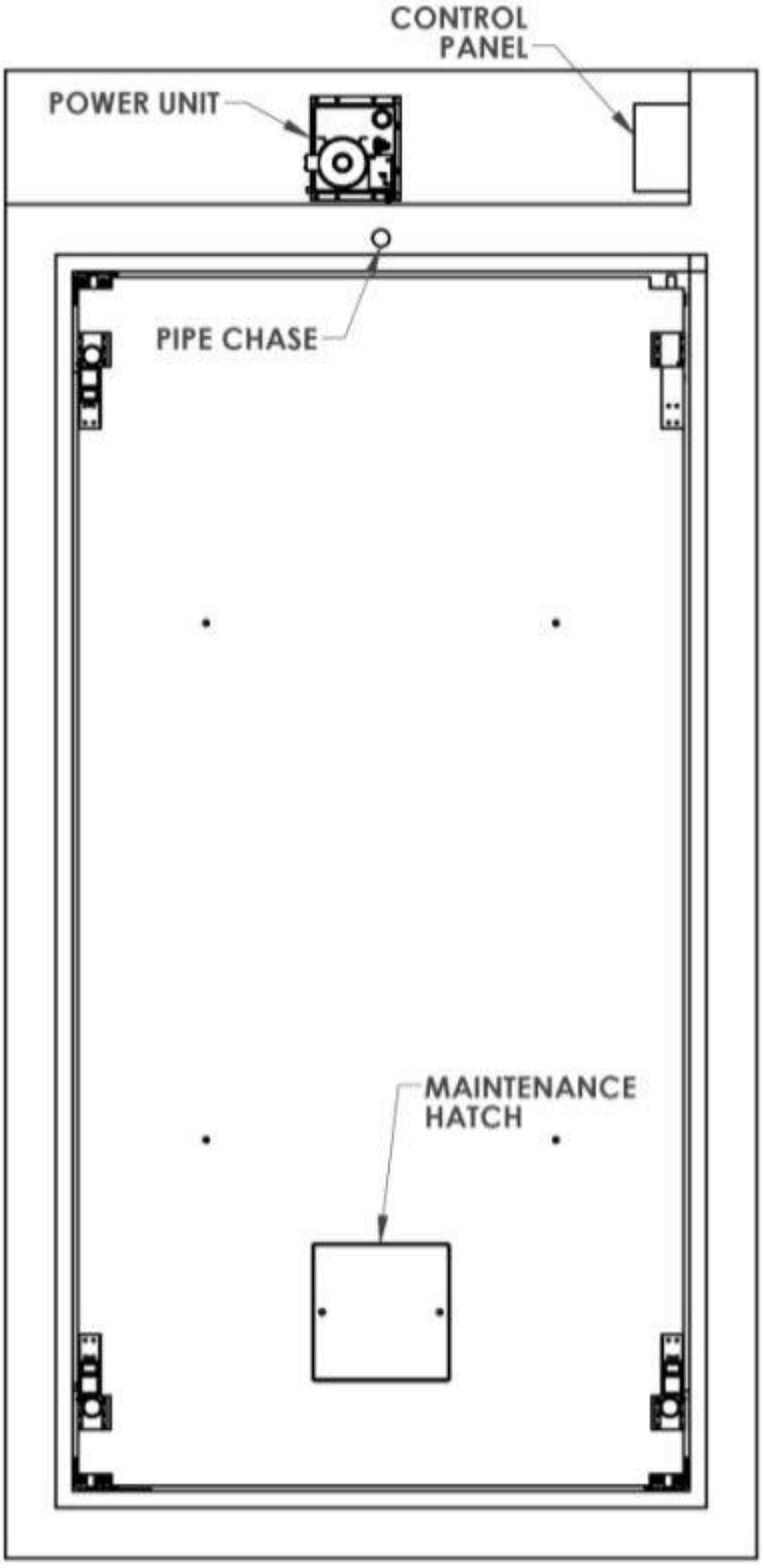
9. INSTALLATION CONSIDERATIONS

9.1 **Pre-Planning**. Whenever possible, make a pre-installation visit or call someone who is 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:

a) Is the site accessible to large delivery & cartage vehicles?
b) Can the lift components get through the existing doorways & floor openings?
c) How will the unit be raised, set into position, and accessed?
d) Can a chain fall be hooked to an available overhead support?
e) Is there a forklift or other cartage equipment available?
f) Is there adequate building structure to support vertical guides?
g) Look for problem areas such as bracing and overhead interference with ceilings, joists, pipes, etc.

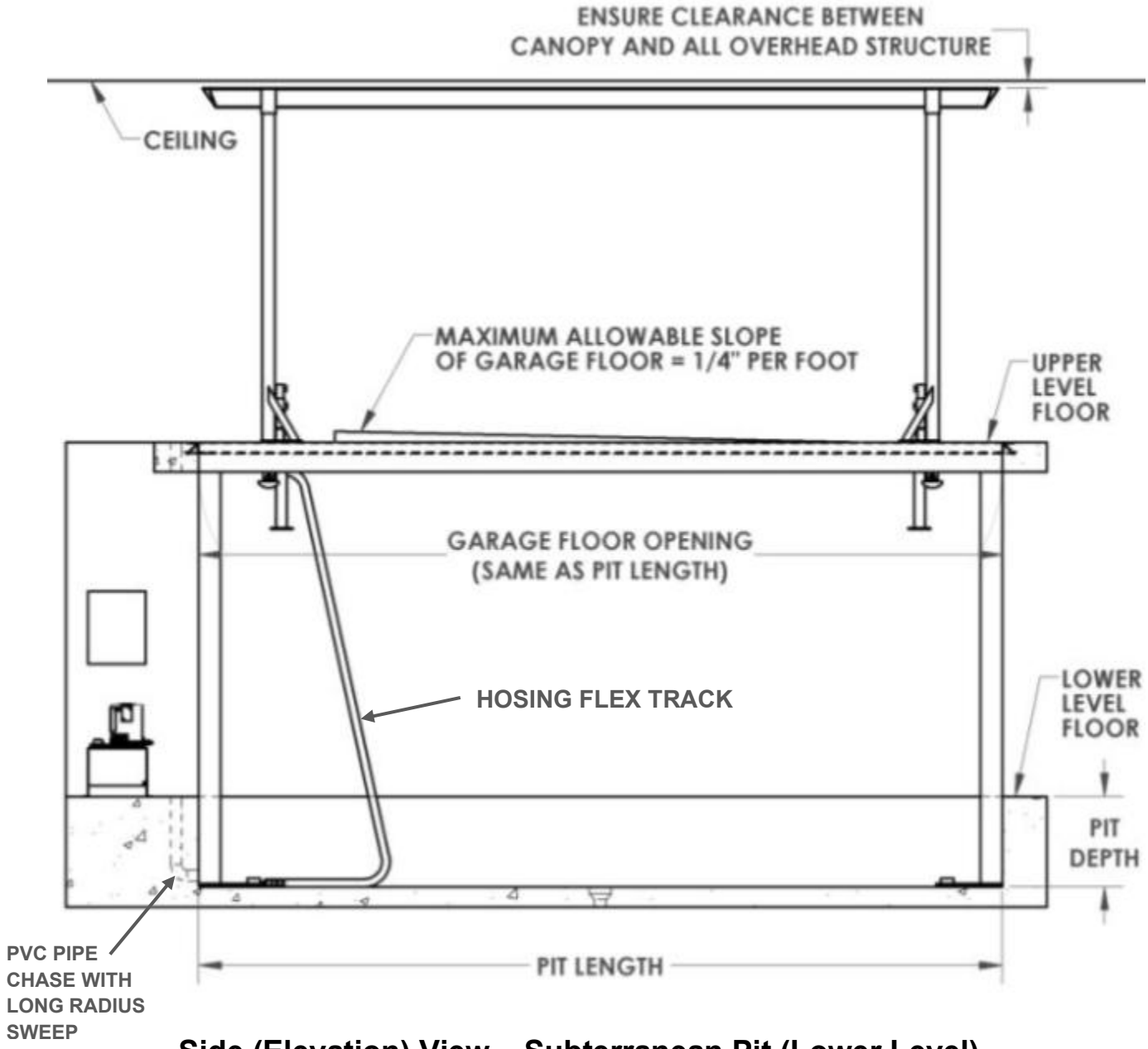
9.2 **Subterranean Pit**. Because the lift guide angles attach to the subterranean pit walls, it is critical that the pit be correct per manufacturer's recommendations and consider the following:

9.2.1 Pit floor must be flat and level within ½" (plus or minus ¼").
9.2.2 Pit walls must be straight and plumb within ½" (plus or minus ¼').
9.2.3 Make sure pit is properly squared and vertically aligned with the opening in the garage floor to ensure clearances of at least ¾" between outside perimeter of lift and inside perimeter of floor opening – follow manufacturer's recommendations as shown on the pit drawing.
9.2.4 Provide adequate drainage to pit area to prevent pit from filling with water.
9.2.5 Run a 3" diameter PVC pipe with long radius sweep elbows to provide a pipe chase for hydraulic hose from the remote power unit.
9.2.6 The pit floor should have sufficient strength to withstand the loads as shown on the manufacturer's approval drawing.
9.2.7 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.



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.

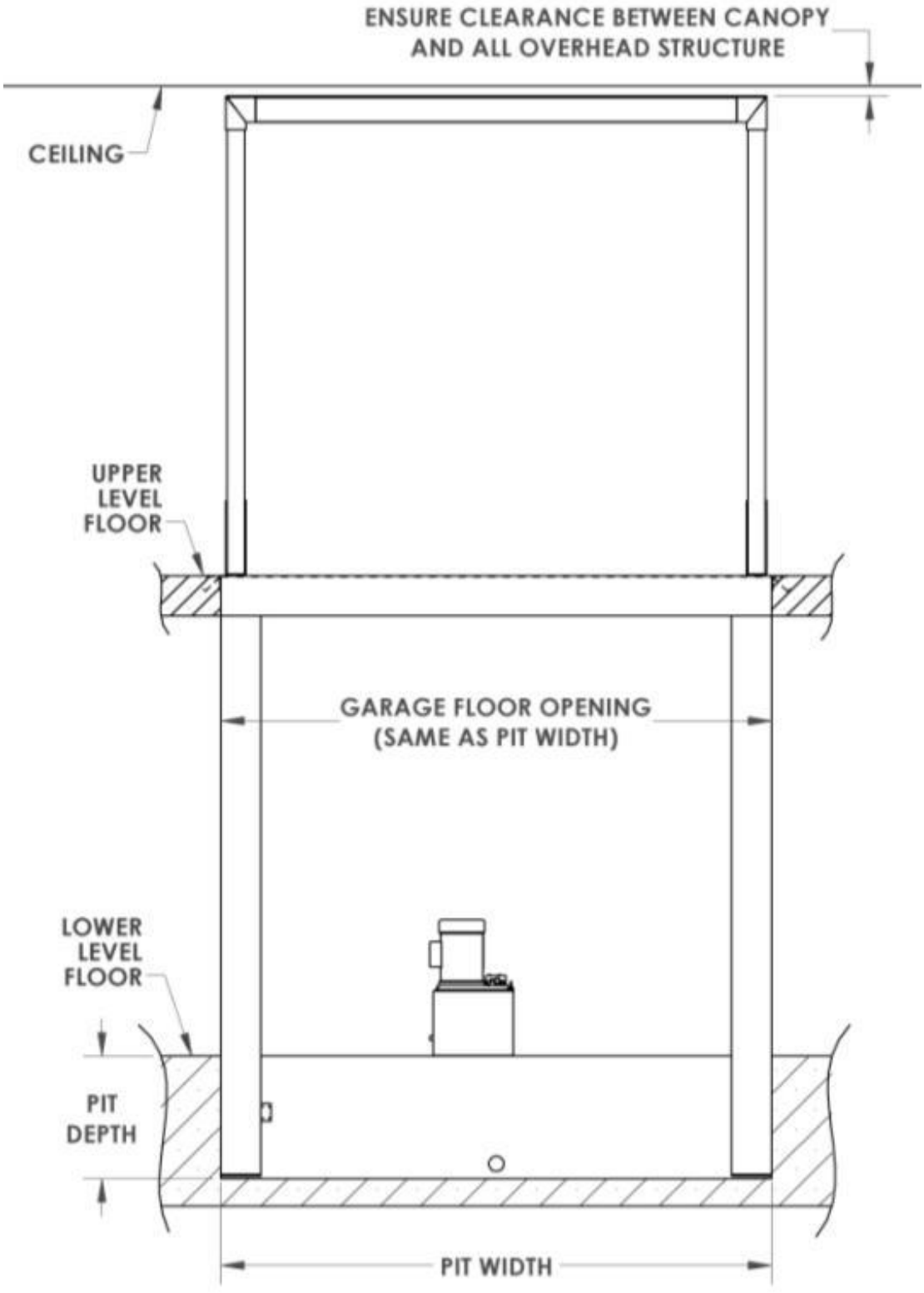


Side (Elevation) View – Subterranean Pit (Lower Level)

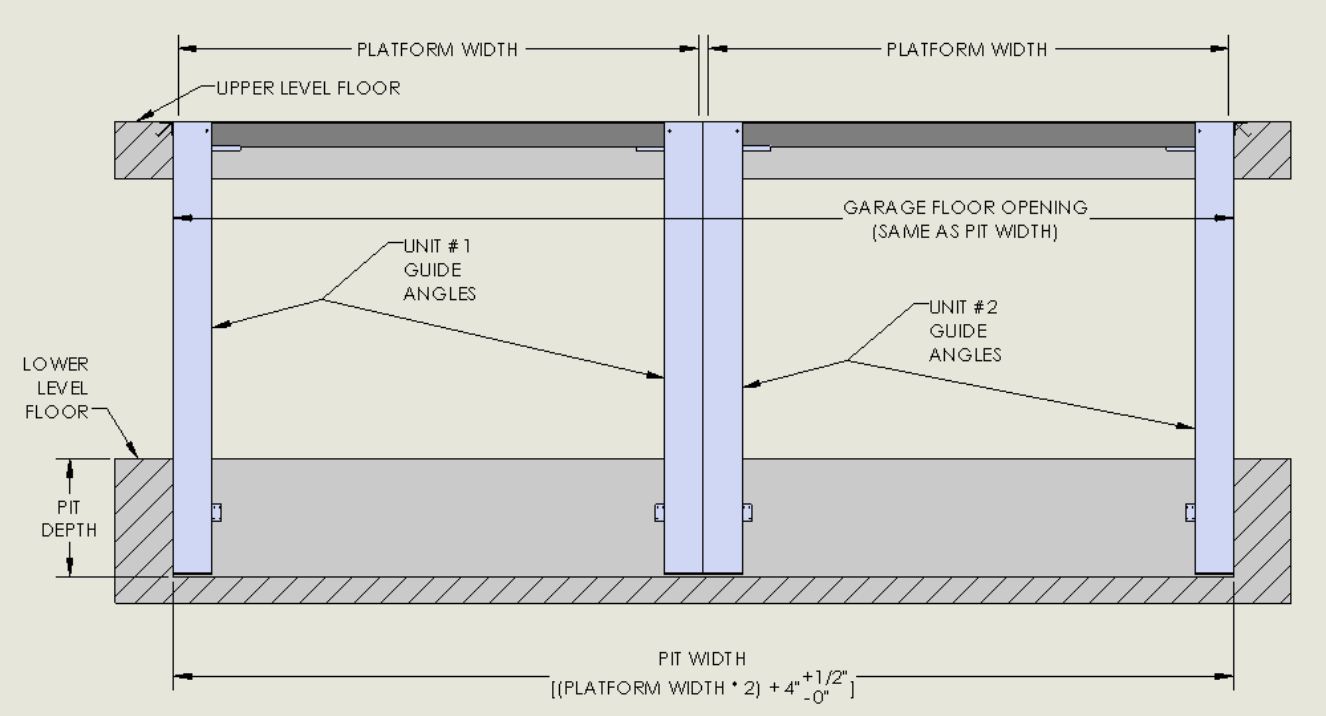
NOTES:

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

b) Install the flexible hose track on the same end of the lift as the pipe chase.



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



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

9.3 **Lift Operating Zone.** Care must be taken to evaluate all architectural features which could impact the installation and performance of the subterranean lift:

9.3.1 Verify the construction and integrity of building columns, joists, walls, or mezzanines that will be used to help support the four (4) guide angles.

9.3.2 Be sure to take into consideration any other obstructions (pipes, ductwork, ceiling joists/beams, etc.) that may be located around the lift.

9.3.3 What types and how many doors are leading into the operating zone?

9.4 **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:

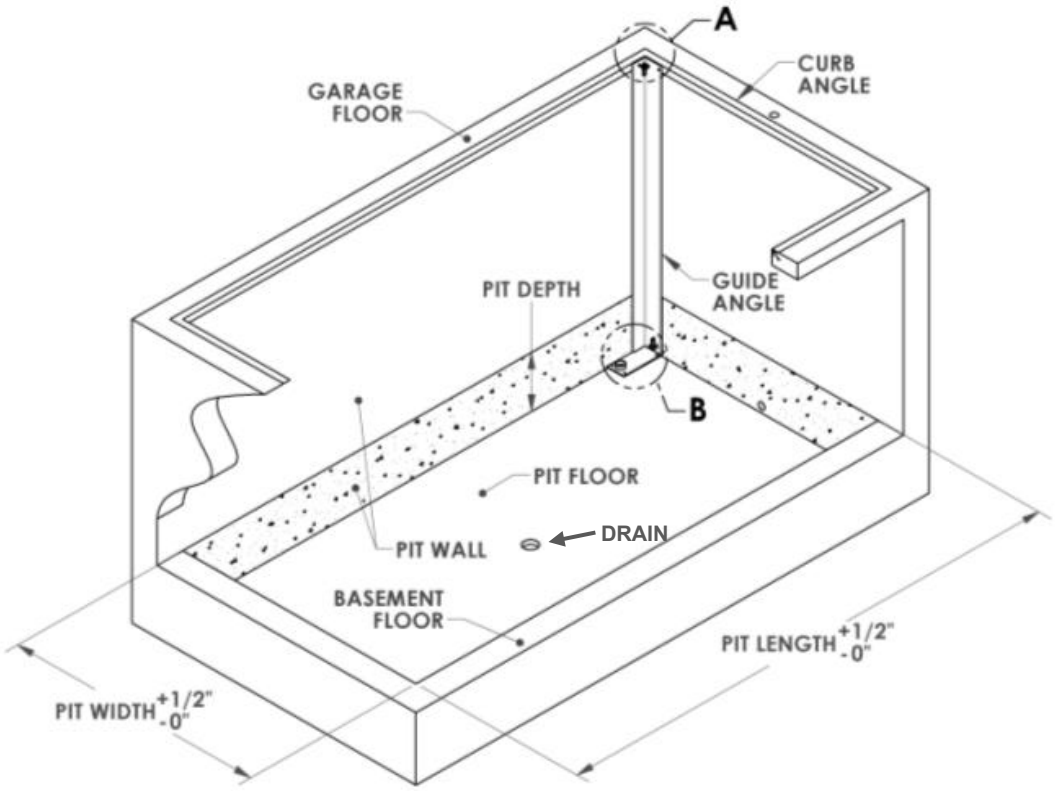
9.4.1 When anchoring the corner guide angles to walls, you must be sure that the walls can support the reaction loads imparted on them (see image that follows).

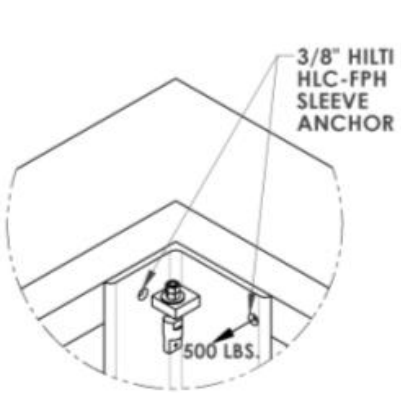
9.4.2 Corner guide angles must be straight and plumb within 1/8” for the lift to operate properly.

9.4.3 Do not modify the guide angles – or any other component of the lift – without expressed written consent from the Manufacturer.

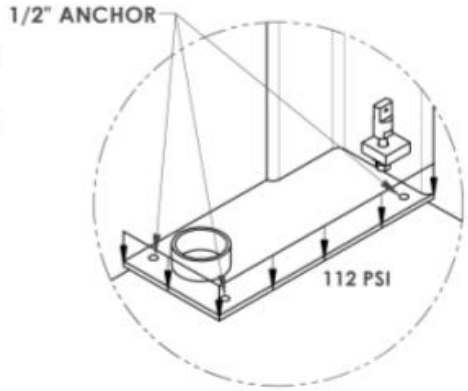
9.4.4 Note: In some areas, seismic calculations may also be required prior to the installation of a subterranean parking lift. Check your local and state requirements for criteria regarding the extent of these calculations and the qualifications required by the engineer who performs them.

Guide Angle Connection Details & Reaction Loads





DETAIL A
TYP (4) CORNERS



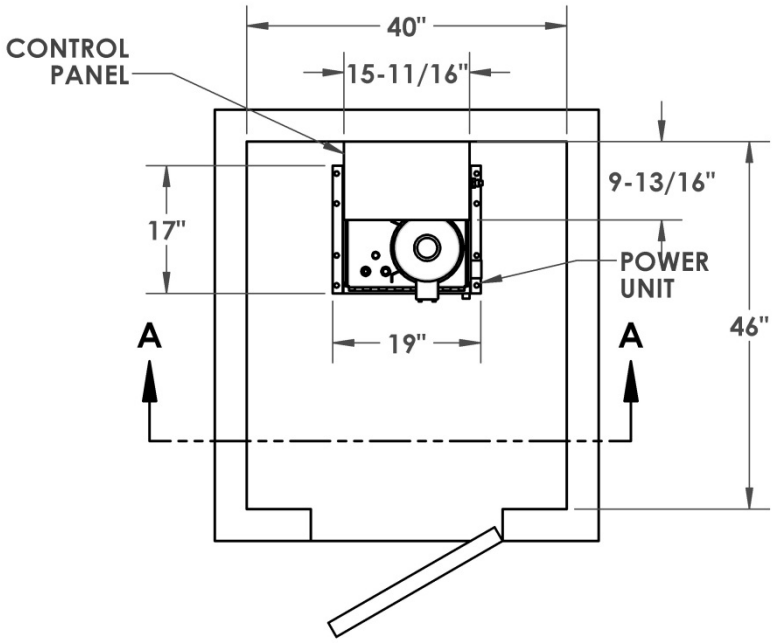
DETAIL B
TYP (4) CORNERS

9.5 **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.

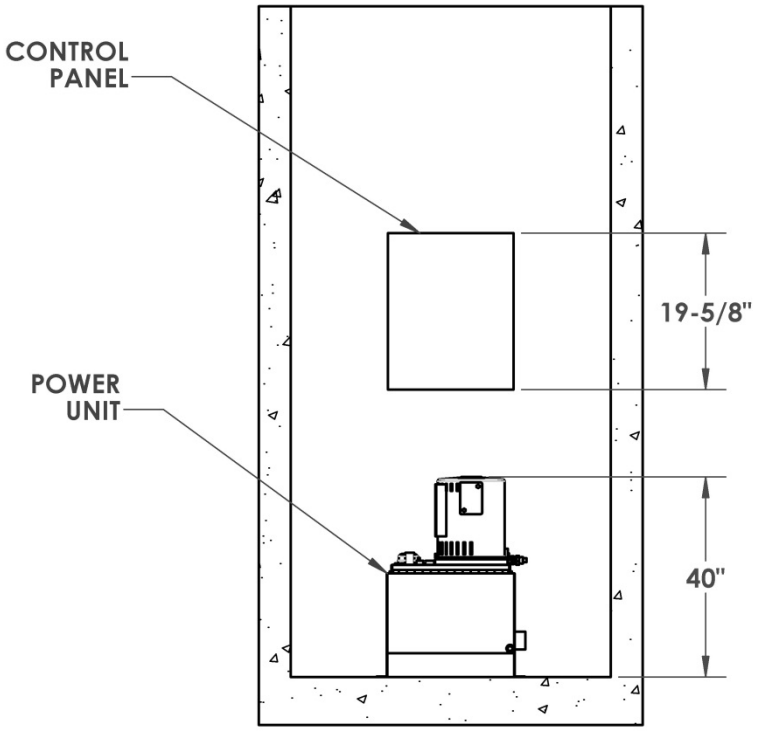
9.5.1 **Remote Power Unit**. It is customary for the power unit to be placed at the lower level (single phase motors are noisy), and adjacent to the lift (within 25 feet).

9.5.2 **Motor Control Panel**. It is customary for the motor control panel to be installed within 10 feet of the remote power unit.

9.5.3 **Fused Disconnect Panel**. It is customary for the fused disconnect panel (provided by others) to be installed within 10 feet of the motor control panel.



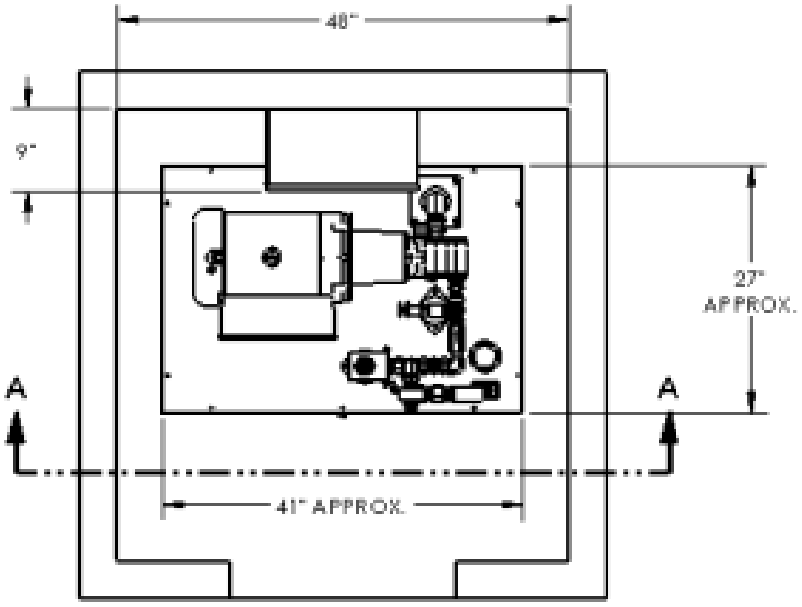
PLAN VIEW - UTILITY ROOM LAYOUT
ALL DIMENSION ARE APPROXIMATE

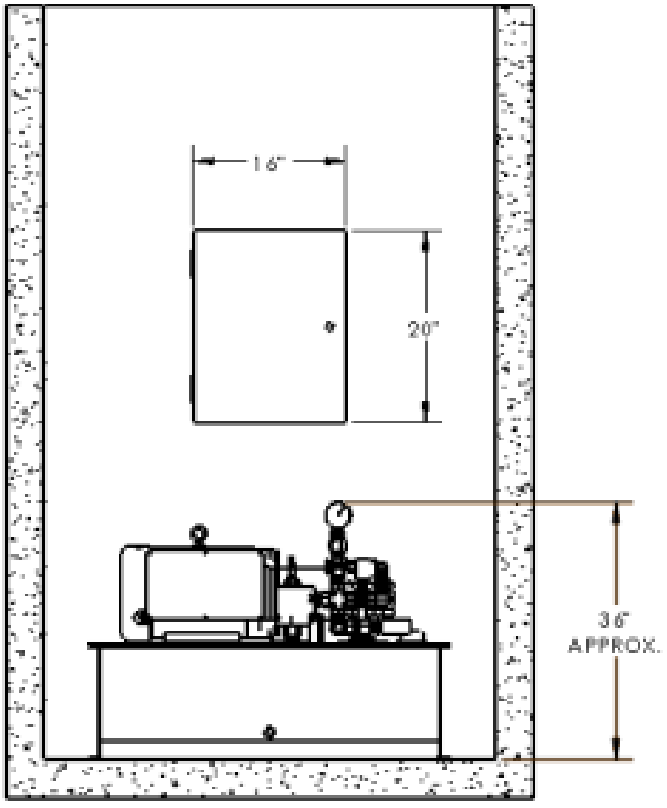


ELEVATION VIEW - UTILITY ROOM LAYOUT
ALL DIMENSIONS ARE APPROXIMATE

SECTION A-A

Motor Control Panel & Hydraulic 5HP Power Unit
(Standard for VL4 Models)





SECTION A-A

Motor Control Panel & Hydraulic 10HP Power Unit
(Standard for VLT Models)

9.6 **Standard Electrical Safeties/Controls.** Listed here are the basic performance and installation specifications for each of the standard, ship-loose electrical safeties and controls to aid in the planning for these devices. Each component has its own technical data/manual that is shipped loose and found in the packet with the lift installation and service manual and overall electrical schematic. Contact Autoquip if more exhaustive technical data is required for any of these components.

9.6.1 **Operator Command Center.** This is the standard operator console which consists of a flush mounted, polished stainless steel enclosure to be inserted between standard wall studs. The console requires 115 volt power supply for an internal duplex outlet (for the pre-mounted LCD monitor), and contains the following operator-interface devices pre-mounted and ready for field wiring. Includes a wireless remote (as shown at top of panel) for monitor setup.

9.6.1.1 Key Switch Station – on/off Authorization Control. This manual, electrical key switch 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.

9.6.1.2 Digital Security Keypad – Authorization Control. This digital keypad is a keyless, 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. Codes may be changed as necessary.

9.6.1.3 Constant Pressure (Push and Hold) Operator Pushbuttons. This style of control station requires that the operator depress the UP or DOWN button throughout the lift's travel, bringing the lift to an immediate stop whenever the button is released for safety, interference, or any other operational concern.

9.6.1.4 Emergency Stop "Panic" Button Station. One E-stop station is mounted to the Command Center and, when pushed, removes electrical power from the control circuit and immediately stops lift movement. Must be manually reset before lift operation can resume.

9.6.1.5 LCD Monitor Screen (and remote Camera) – to Watch Lift Area During Operation. A digital security camera is shipped loose to be field mounted the lift area which is outside the operator's direct line of sight to aid in the recognition of potential interferences during lift movement. (115VAC; wall outlet)

9.6.1.6 Audible "Lift in Motion" Alarm. An audible An audible 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. (1.5" diameter; 24VDC)

9.6.1.7 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). (3.5" diameter; 24VDC)

9.7 **Optional Ship-Loose Electrical Components.** Listed here are the basic performance and installation specifications for each of the optional, ship-loose electrical safeties and controls to aid in the planning for these devices. Each component has its own technical data/manual that is shipped loose and found in the packet with the lift installation and service manual and overall electrical schematic. Contact Autoquip if more exhaustive technical data is required for any of these components.

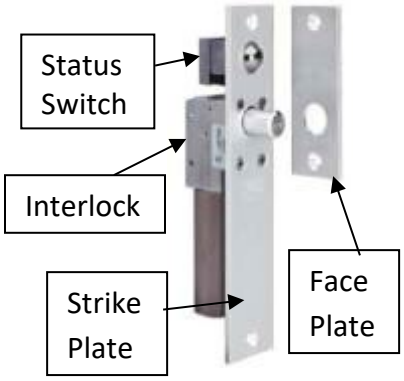
9.7.1 **Remote Emergency Stop Station.** Additional, ship-loose E-Stop stations can be purchased to be wall-mounted adjacent to the lift zone in areas outside the operator's direct line of sight to be pressed by standers-by if a concern or problem with lift operation occurs. If pressed, must be manually reset to continue operation. (4"x4"; 24VDC)

9.7.2 **Vehicle-Present Sensor.** This magnetic sensor is mounted underneath the canopy and placed to sense the vehicle's engine block located above the canopy. If a vehicle is sensed, the sensor opens a contact in the control circuit and the operator will not be able to activate the "UP" button. Requires calibration. (3/4" x 3"; 24VDC)

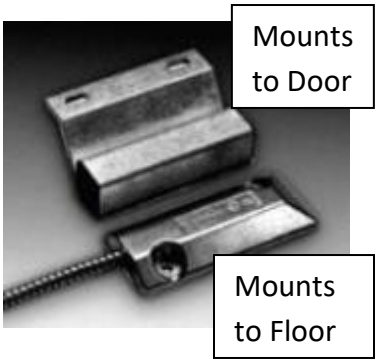
9.7.3 **Lift Interference – Photo Eye Detection.** This kit includes a photo-eye sensor and separate reflector. Sensors are wall-mounted (mounting brackets not included) to "shoot" along an unprotected edge of the lift platform to detect interference in the lift operating zone outside operator's line 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. (3" dia; 24VDC)

9.7.4 **Ultrasonic Vehicle Position Indicator.** 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 carriage for storage is located completely within the footprint of the carriage so as to prevent damage to the vehicle or the lift as the vehicle is lowered from the upper level to the lower level. Requires calibration.
(5”x5”; 115VAC plug or four (4) AA batteries)

9.7.5 **Swing Door Status Switches and Interlocks.** Door status switches prevent operation of the vehicle lift when the doors/gates are left open on any level. Interlocks prevent the doors/gates from being opened whenever the lift is in motion. Interlocks fail to the “open” position in the event of a power failure. Face plate screws into door jamb, strike plate screws into door (1.5”x8”; 24VDC)



9.7.6 **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). (3-1/8”x2-1/8”; 24VDC)



9.7.7 **Biometric (fingerprint) Security Scanner.** This high technology security station is wall-mounted to provide secondary security & authorization protection by requiring the scanning of fingerprints (multiple authorizations available) to turn the control system “On”. Authorized code times out after 5 minutes and must be re-entered. (3”x6”; 24VDC)

9.7.8 **Electrical Junction Box – Pre-Mounted to Lift.** 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.

9.7.9 **Lift-in-Motion Flashing Light(s).** Ship-loose alarms which can be placed in the lift area(s) to provide standers-by a visual warning that the lift is moving and to stand clear to prevent inadvertent contact with the equipment. (size varies by light type; 24VDC)

9.7.10 **Interference Detection / Sensing Edge**. Mounted beneath the perimeter of the canopy platform in lieu of beveled toe guards. Rubber leading edges that contain a pressure switch which, when contacting an obstruction, activates the switch and stops – or reverses – the downward motion of the lift.

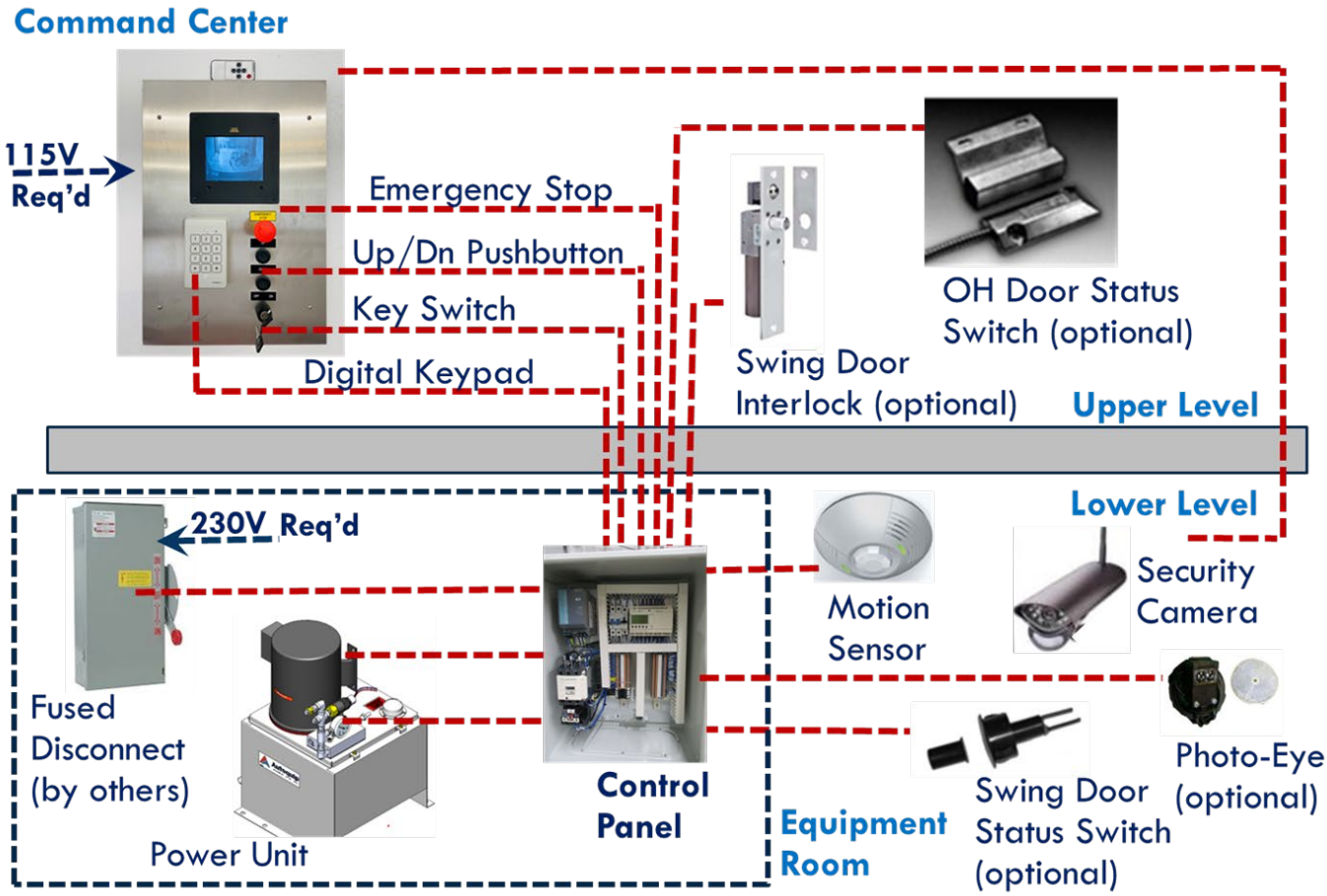
9.8 Electrical Installation Notes.

9.8.1 **Code Compliance.** All electrical work must meet the requirements of all state and local codes, make sure that only qualified electricians perform all wiring.

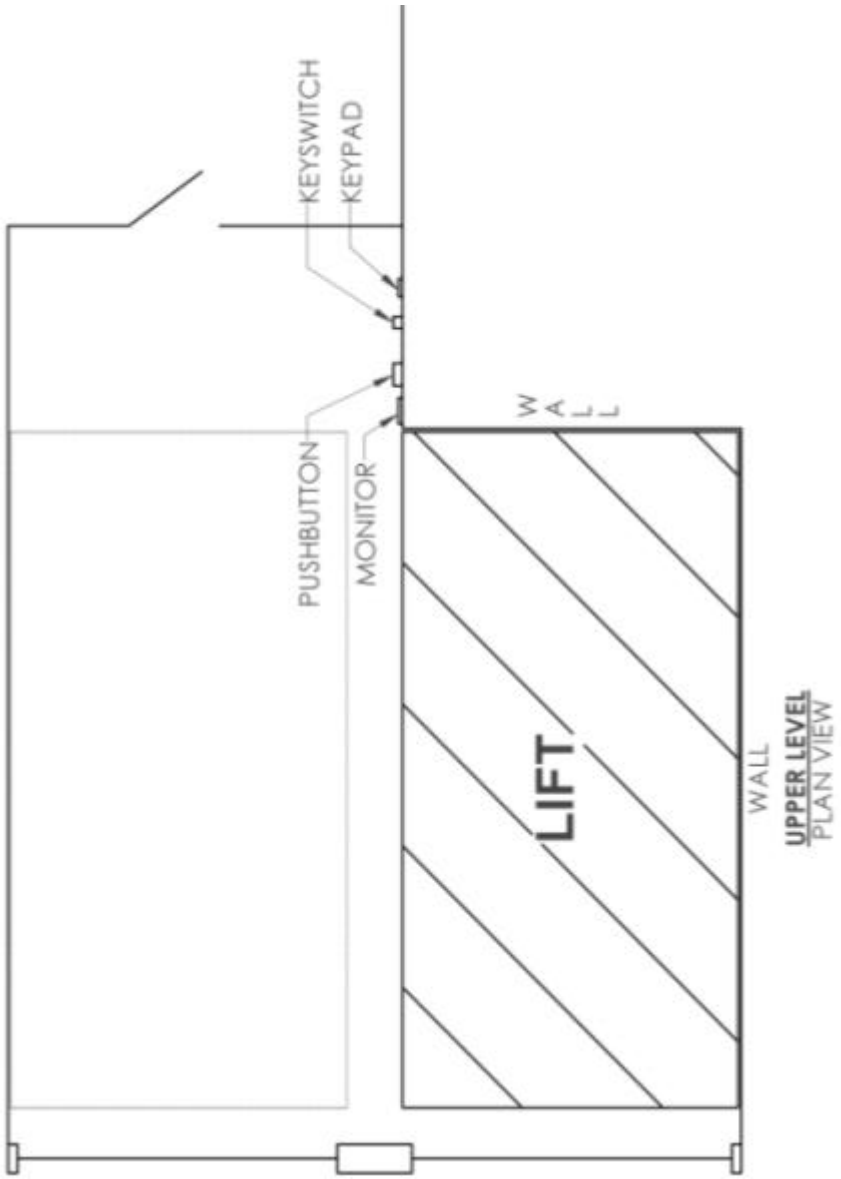
9.8.2 **Control Panel**. The control panel is shipped loose with all internal components pre-wired to terminal strip(s) and all control logic managed by programmable relays.

9.8.3 **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.

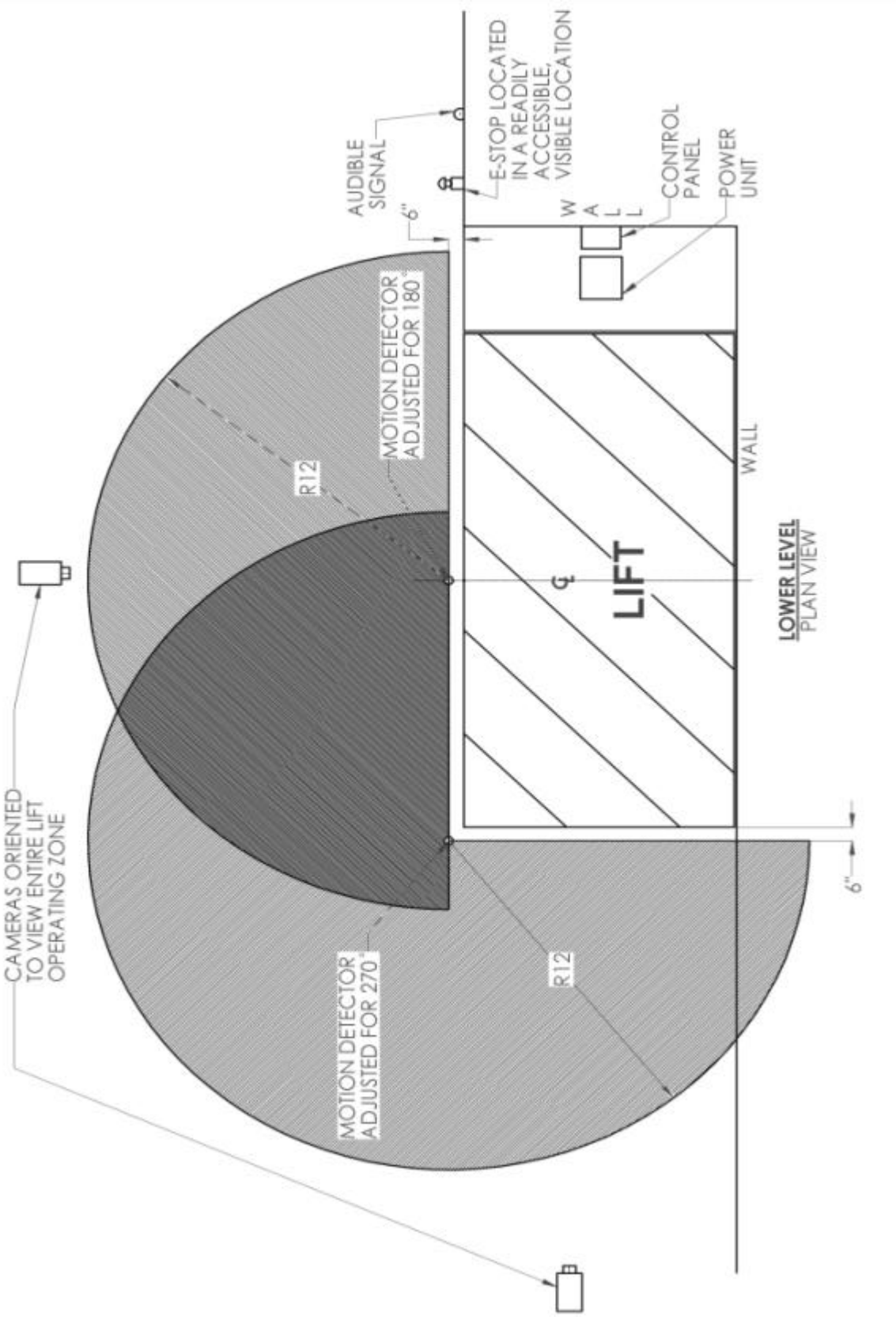
9.8.4 **Bypassing Devices**. Never bypass any safety sensor or device.



Electrical Components – General Arrangement



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

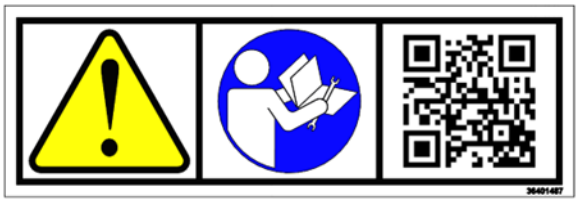


SAFETY DEVICE & SENSOR LAYOUT –

10. SAFETY LABELS & FEATURES

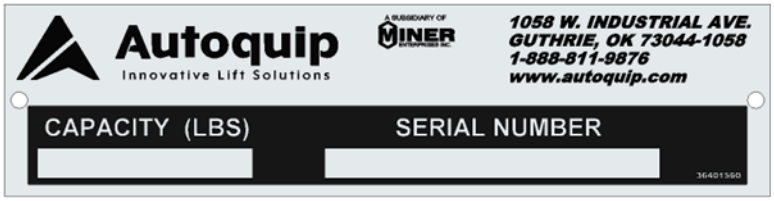
10.1 Safety Labels

10.1.1 CAUTION – Familiarize Yourself with Operators Manual Before Operating Lift (Label #1)



10.1.2 DANGER – General Purpose Safety Label (Label #2)

10.1.3 Serial Number Plate (Label #3)



10.1.4 Vasari Brand Label (Label #4)

10.1.5 Lift Capacity Label (Label #5)

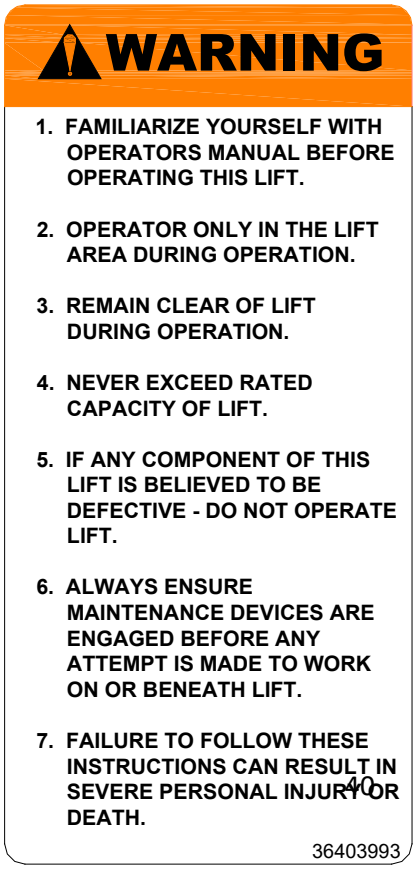
10.1.6 Maintenance Device Label (Label #6)

10.1.7 Maintenance Device Placement (Socket) Label (Label #7)

10.1.8 WARNING – Do Not Tamper or Interfere with This Device (Label #8)

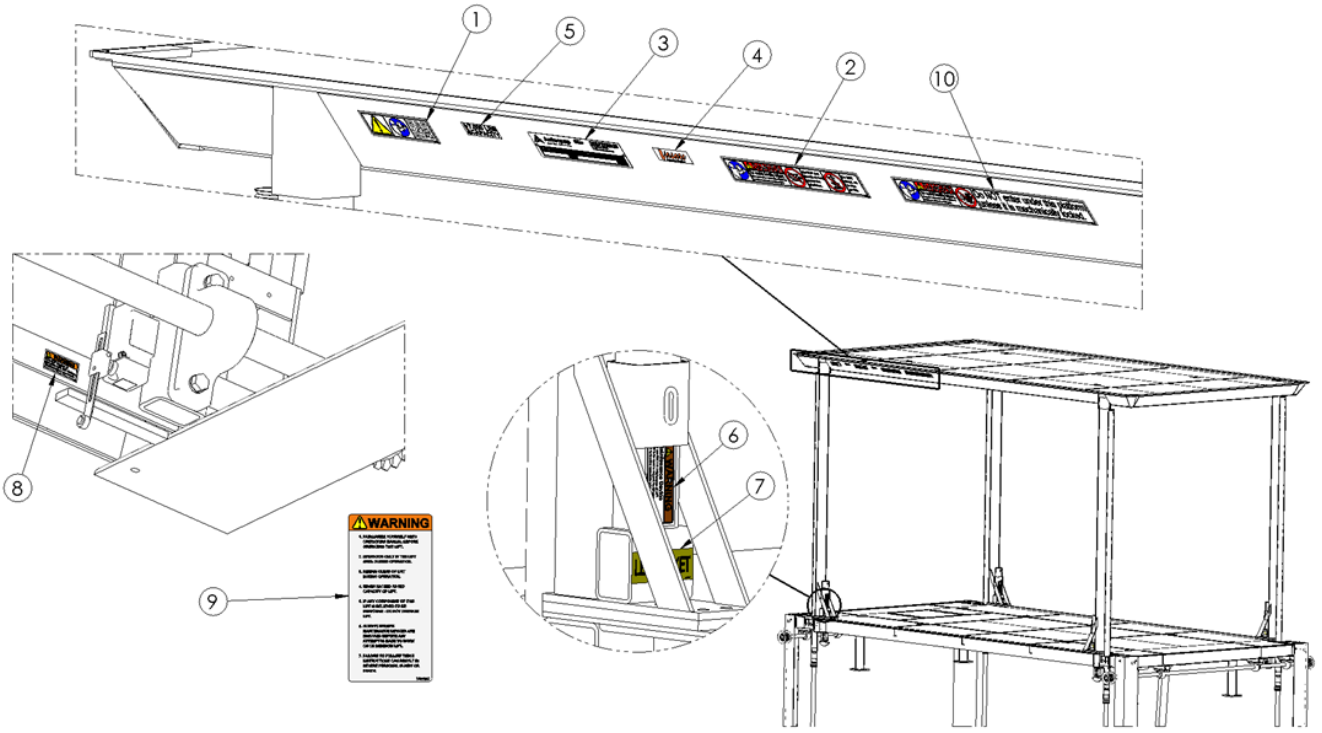
Field-locate & apply one "WARNING – Do Not Tamper" label adjacent to (within 6"-12") each sensing device (limit switches, door status switches, door interlocks, etc.) in a location that is visible to the operator.

10.1.9 Warning – General Purpose Safety Label (Label #9)



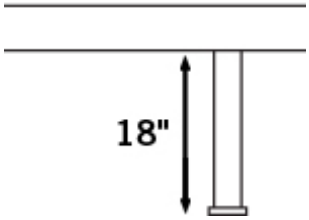
Field-locate & apply this decal adjacent to the operator Command Center Console

10.1.10 Danger – Do Not Stand Beneath an Unblocked, Raised Lift (Label #10)

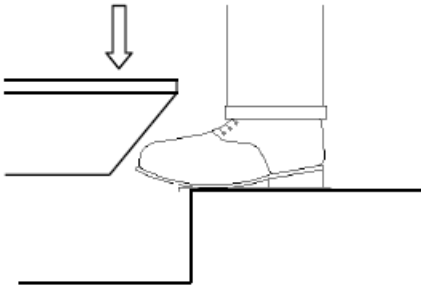


Label Placement Diagram

10.2 Lift Safety Features (non-electrical)

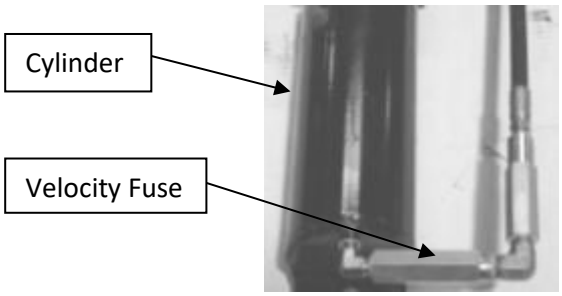


10.2.1 18" Refuge Space beneath Lift. A mechanical feature unique to the 4-Post style lifts is a completely clear 18" crawl space beneath the entire lower deck for personnel safety during operation and maintenance.



10.2.2 Beveled Toes Guard Protection. A mechanical feature added to the perimeter of the lift platform intended to push away, rather than pinch, a shoe which is overhanging a landing by up to 4 inches.

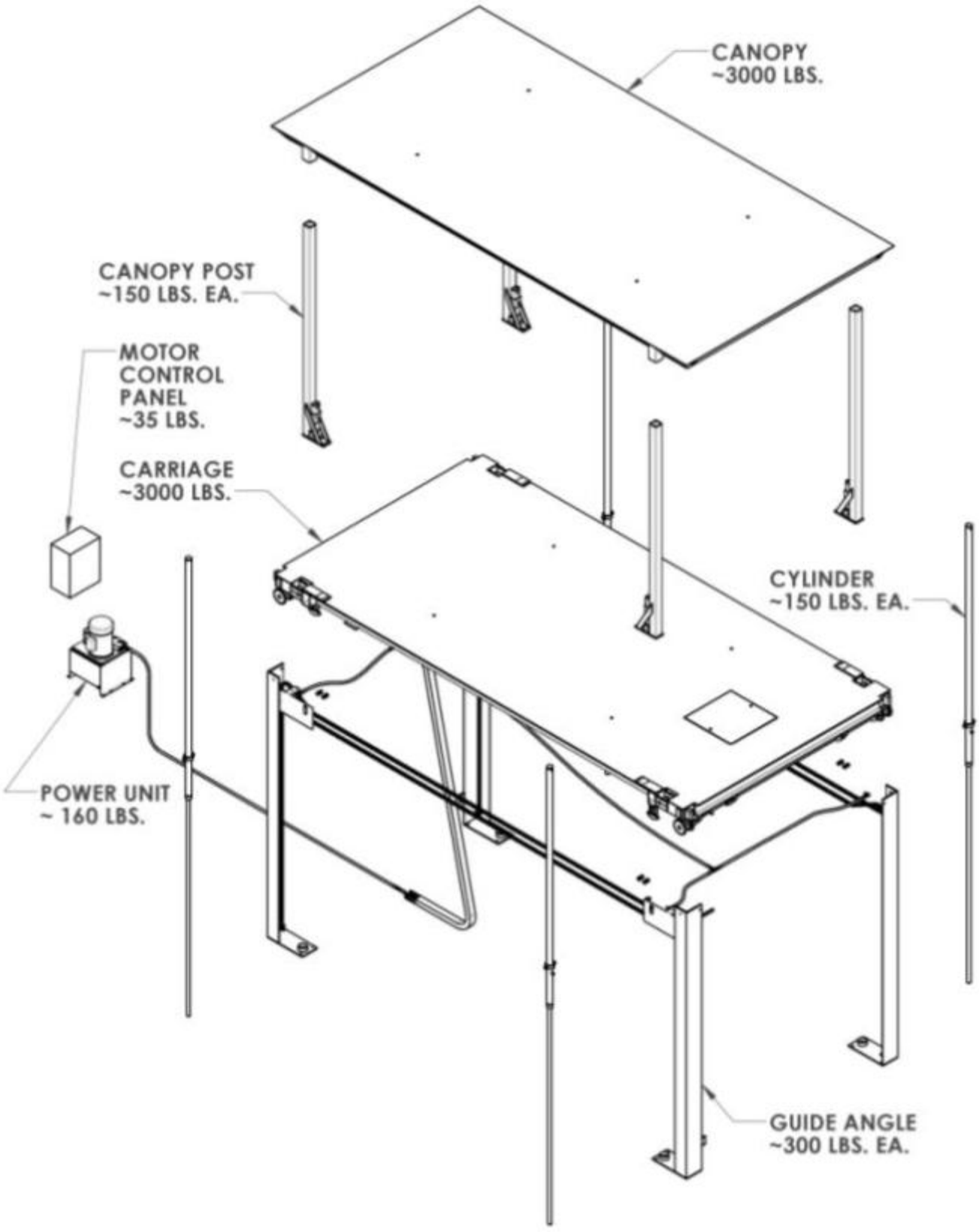
10.2.3 Hydraulic Velocity Fuses.
Each lifting cylinder is equipped with a hydraulic "fuse" which senses the flow of oil. In the event of a sudden rupture in the hydraulic circuit, the fuse senses the abnormally high velocity of oil and automatically closes off the flow of oil coming from the cylinder, thereby arresting/stopping the fall of the lift.



10.3 Automatic Re-Pressurization Circuit (Telescoping Canopy Models Only). An automatic self-leveling feature where, if the 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".

11. SHIPPING & HANDLING

11.1 Typical Component Weights:



12. START-UP TESTING

12.1 Typical Start-up Procedure:

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

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

a) Check hydraulic fluid level. Note: With lift fully lowered, fluid level should be approximately 1-1/2" from top of tank. DO NOT OVERFILL
b) Check for hydraulic fluid leaks; Small leaks at connections can be remedied by tightening connections or replacing the faulty component.
c) Check all hydraulic hoses and electrical cords for cracks, abrasions, twisting, etc.
d) Check all bearings for noise and wear.
e) Check overall condition of unit (i.e. bends, breaks, loose or missing screws, metal shavings on floor, etc.).

f) 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 Months

a) 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.
b) Check lift cylinder rods for scoring and leaking. Wipe any foreign material from cylinders.
c) Check all structural and mechanical components for cracked, or broken welds and any distortion caused by collision, overloading, or other misuse.
d) 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.
e) 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

a) 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.
b) Replace all filters.
c) Raise lift platform approximately 24 inches. Note exact distance from floor level to top of platform (round off to nearest 1/16 inch). Leave idle for 15 minutes. Check distance again. If any movement is measured, call a qualified service technician to make repairs as required.
d) Tension all equalization chains located beneath the lower platform per instructions in the Installation and Maintenance manual.

LIMITED WARRANTY STATEMENT

The user is solely responsible for using this Equipment in a safe manner and observing all of the safety guidelines provided in the Owner's Manual and on the warning labels provided with the lift. If you are unable to locate either the manual or the warning labels, please contact Autoquip or access www.vasari-lifts.com for replacement downloads or information.

Autoquip Corp expressly warrants that this product will be free from defects in material and workmanship under normal, intended use for a period of Two (2) Years for all electrical, mechanical, and hydraulic components, parts or devices, and warrants the structure of the lift against breakage or failure for a period of Ten (10) Years. This warranty includes parts and labor for the first year of the warranty period, parts only thereafter. The warranty period begins from the date of shipment. When making a claim, immediately send the dealer who sold you the unit a notice of your claim. All claims must be received within the warranty time period. The maximum liability of Autoquip under this Limited Warranty is limited to the purchase price of the Equipment.

This warranty shall not apply to any VASARI lift or parts of VASARI lift that have been damaged or broken in transit/shipping, or due directly or indirectly to misuse, abuse, vehicle impact, negligence, faulty installation, fire, floods, acts of God, accidents, or that have been used in a manner contrary to the manufacturer's limitations or recommendations as stated in the Manual, or that have been repaired, altered or modified in any manner outside of Autoquip Corp's manufacturing facility or which have not been expressly authorized by Autoquip.

Autoquip Corp makes no warranty or representation with respect to the compliance of any Equipment with state or local safety or product standard codes, and any failure to comply with such codes shall not be considered a defect of material or workmanship under this warranty. Autoquip Corp shall not be liable for any direct or consequential damages resulting from such noncompliance.

Autoquip Corp's obligation under this warranty is limited to the replacement or repair of defective components at its factory or another location at Autoquip Corp's discretion at no cost to the owner. This is owner's sole remedy. Replacement parts will be warranted for the remainder of the Equipment Warranty period or ninety (90) days, whichever is longer. Except as stated herein, Autoquip Corp will not be liable for any loss, injury, or damage to persons or property, nor for direct, indirect, or consequential damage of any kind, resulting from failure or defective operation of said Equipment. All parts used to replace defective material must be genuine Autoquip parts in order to be covered by this Limited Warranty.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so those limitations may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Vasari
INSPIRED PARKING

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sales@autoquip.com