



Product Name: Cable Horizontal Lifeline System

Part #: A60160 (60'), A100160 (100')

Instruction Manual

**Do not throw away these instructions!
 Read and understand these instructions before using equipment!**

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Introduction

Thank you for purchasing a Palmer Safety Fall Protection Cable Horizontal Lifeline System (Cable HLL System). This manual must be read and understood in its entirety, and used as part of an employee training program as required by OSHA or any applicable state agency.

This and any other included instructions must be made available to the user of the equipment. The user must understand how to safely and effectively use the Cable HLL System, and all fall safety equipment used in combination with the Cable HLL System.

User Information	
Date of First Use:	_____
Serial #:	_____
Trainer:	_____
User:	_____

Applicable Safety Standards

When used according to instruction specifications, this product meets or exceeds all applicable OSHA 1926 Subpart M, OSHA 1910, ANSI Z359.6-2016, and ANSI A10.32-2012 standards for fall protection. Applicable standards and regulations depend on the type of work being done, and also might include state-specific regulations. Consult regulatory agencies for more information on fall protection systems and associated components.

Worker Classifications

CAUTION	Understand the following definitions of those who work near or who may be exposed to fall hazards.
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Qualified Person: A person with an accredited degree or certification, and with extensive experience or sufficient professional standing, who is considered proficient in planning and reviewing the conformity of fall protection and rescue systems.

Competent Person: A highly trained and experienced person who is ASSIGNED BY THE EMPLOYER to be responsible for all elements of a fall safety program, including, but not limited to, its regulation, management, and application. A person who is proficient in identifying existing and predictable fall hazards, and who has the authority to stop work in order to eliminate hazards.

Authorized Person: A person who is assigned by their employer to work around or be subject to potential or existing fall hazards.

It is the responsibility of a Qualified or Competent person to supervise the job site and ensure all applicable safety regulations are complied with.



Product Specific Applications



WARNING Use of equipment in unintended applications may result in serious injury or death. Maximum 1 attachment per connection point.



Personal Fall Arrest: The Cable HLL System may be used in Personal Fall Arrest (PFAS) applications. Maximum 2 users per Cable HLL System when working in Fall Arrest. Structure must withstand loads applied in the directions permitted by the system of at least 5,000 lbs. per PFAS in system. Maximum free fall is 6', or up to 12' if used in combination with equipment explicitly certified for such use. Applicable D-ring: Dorsal.



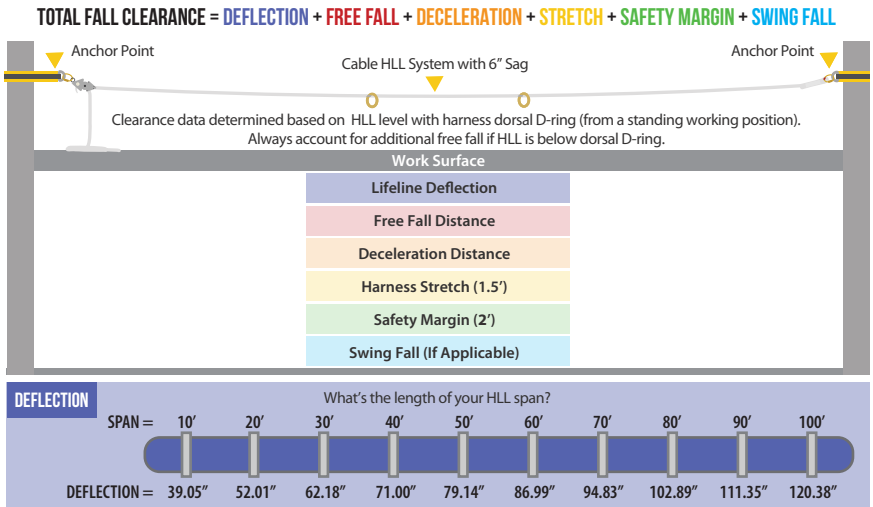
Restraint: The Cable HLL System may be used in Restraint applications. Restraint systems prevent workers from reaching the leading edge of a fall hazard. Maximum 4 users per Cable HLL System when working in Restraint. Always account for fully deployed length of lanyard/SRL. Structure must withstand loads applied in the directions permitted by the system of at least 1,000 lbs. No free fall is permitted. Restraint systems may only be used on surfaces with slopes up to 4/12 (vertical/horizontal). Applicable D-rings: Dorsal, Chest, Side, Shoulder.

For all applications: worker weight capacity range (including all clothing, tools, and equipment) is 130-420 lbs.

Limitations

Fall Clearance: There must be sufficient clearance below the anchorage connector to arrest a fall before the user strikes the ground or an obstruction. When calculating fall clearance, account for a MINIMUM 2' safety factor, deceleration distance, user height, length of lanyard/SRL, harness stretch, lifeline deflection, and all other applicable factors.

Diagram shown is an example fall clearance calculation ONLY.



Compatibility: When making connections with Cable HLL System, eliminate all possibility of roll-out. Roll-out occurs when interference between a hook and the attachment point causes the hook gate to unintentionally open and release. All connections must be selected and deemed compatible with Cable HLL System by a Competent Person. All connector gates must be self-closing and self-locking, and withstand minimum loads of 3,600 lbs. See the following for examples of compatible/incompatible connections:

Connector closed and locked to D-ring. **OK.**



Connector to integral lanyard. **NO.**

Incompatible or irregular application, which may increase risk of roll-out. **NO.**



Connector directly to webbing. **NO.**

Two connectors to same D-ring. **NO.**

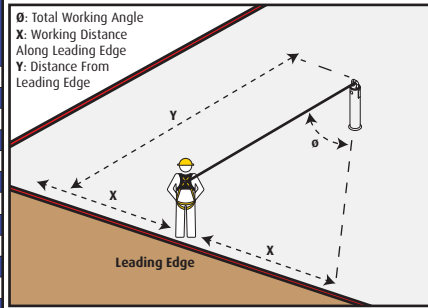


Two or more snap hooks or carabiners connected to each other. **NO.**

Correct Anchorage Positioning:

This chart details allowable working zones required to reduce risk of swing falls and improper side loading. ALWAYS adhere to information specified by chart.

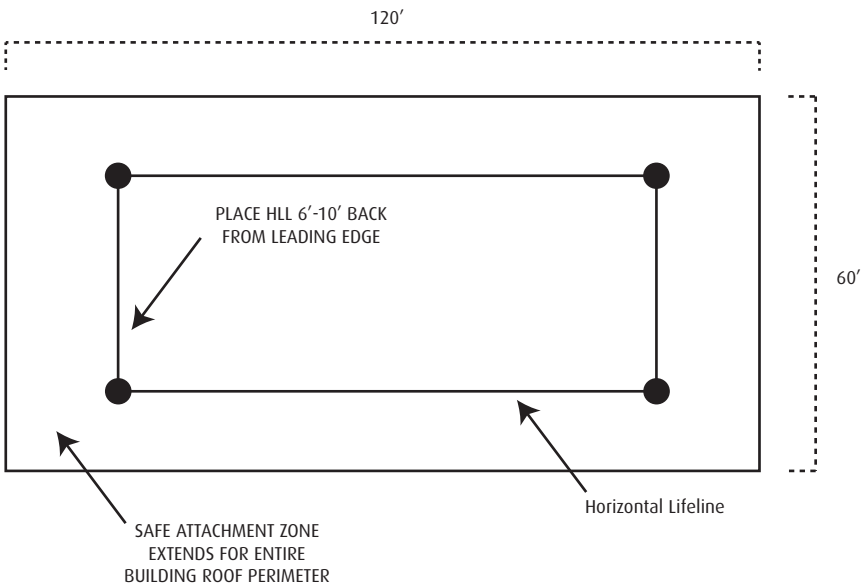
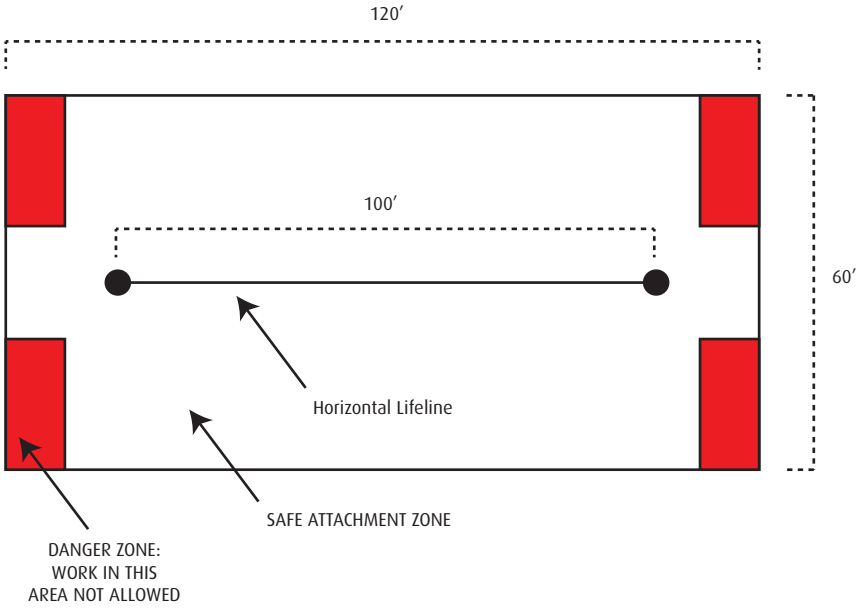
Anchor Distance From Leading Edge (Y)	Working Distance Along Roof Edge (Either Direction) (X)	Working Angle From Perpendicular (θ)
6'	8'	53°
10'	9' - 9"	45°
15'	11' - 7"	38°
20'	13' - 3"	33°
25'	14' - 6"	30°
30'	16'	28°
35'	17' - 2"	26°
40'	18' - 3"	24°
45'	19' - 4"	23°
50'	19' - 10"	21°
55'	21' - 4"	21°
60'	22' - 3"	21°



For example, if the anchorage connector is 6' from the leading edge (Y), the working distance (X) is 8' in each direction from the perpendicular, which translates to a 53° working angle.

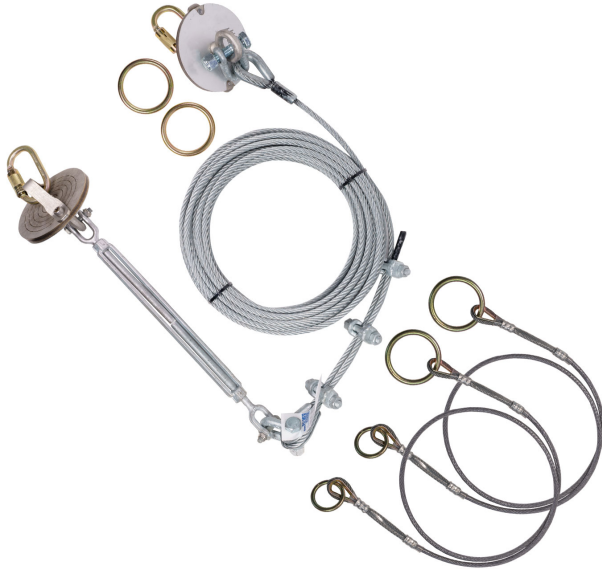
Swing Falls: Prior to installation or use, make considerations for eliminating or minimizing all swing fall hazards. Swing falls occur when the anchor is not directly above the location where a fall occurs. Always work as close to in line with the anchor point as possible. Swing falls significantly increase the likelihood of serious injury or death in the event of a fall.

As shown in following image, there are potential danger zones for swing falls when using a single HLL span. Use multiple HLL spans to expand area of coverage.



Components and Specifications

Components made from some or all of the following: galvanized steel and stainless steel.





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Installation and Use

Prior to installation, plan your system:

1. Ensure selected installation location(s) for Cable HLL System (s) will withstand minimum loads as specified by this instruction manual.
2. ALWAYS make considerations to eliminate or reduce swing fall hazards.
3. Fall clearance for each installation location MUST be calculated by a Competent Person, and MUST be considered in the selection of PFAS equipment.
4. Ensure all components of PFAS are selected and deemed compatible with Cable HLL System by a Competent Person.
5. Ensure entire Cable HLL System design and installation is done under supervision of Competent Person. NEVER judge Cable HLL tension by eye; ALWAYS measure line sag and keep in concordance with sag requirements specified by this instruction manual. NEVER over-tighten cable. Proper sag in cable reduces forces of Fall Arrest.
6. If performing installation at heights over 6', ALWAYS use a complete and independent PFAS until Cable HLL System is fully installed and able to withstand forces of Fall Arrest as specified by this instruction manual. Always maintain 100% tie-off.

Palmer Safety recommends using 3/8" diameter cable. DO NOT use vinyl/plastic coated cable.

MINIMUM 1 Absorber required for systems up to 60'. MINIMUM 2 Absorbers required for systems longer than 60'. Entire Cable HLL System MUST NOT span more than 100'.



Installation:

Tools needed for installation:

• 5/16" (8mm) wrench, 3/4" (19mm) wrench, 19/32" (15mm) wrench, Adjustable wrench, Torque wrench (capable of measuring foot-pounds).

1. Select locations for all anchor points in Cable HLL System. Ensure anchor points meet stated strength requirements. Ensure proper fall clearance exists for entire system.
2. Lay out as much of Cable HLL System as possible prior to attaching it to anchorage connectors.

3. Attach Cable HLL System to anchor point using provided steel shackle. If system is more than 60', attach second Absorber to anchor point at other end of system. Tighten shackle until at least 1 full thread is visible.



4. Make any other necessary attachments to anchorage connectors.

*In the event that a 90° corner is needed, two Cable HLL Systems may be attached to a single anchor point as shown.



5. Adjust turnbuckle(s) to extended position (see below).



CLOSED

EXTENDED



6. Attach one end of turnbuckle to Absorber at one end of system, and tighten until at least 1 full thread is visible.

7. Place wire rope thimble on other end of turnbuckle. Tighten bolt until at least 1 full thread is visible. Attach second steel shackle and thimble to anchor point or Absorber at opposite end of system (second turnbuckle is not used).

Tightening bolts on the Cable HLL System



YES

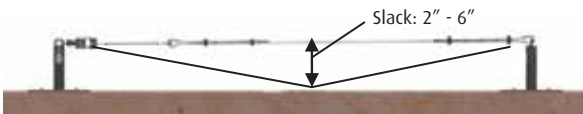


NO

8. Install O-rings on HLL cable. Then, take one end of 3/8" cable and create a loop around the thimble. See Appendix A (pgs. 8-9) for fist grip installation instructions. Repeat on opposite end of system.



9. Tighten turnbuckle evenly on both ends so there is between 2" - 6" of slack measured vertically at midpoint of span. Qualified Person must make final determination regarding sufficient cable slack.





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Appendix A:

Fist Grip: compatible with cable diameters from 3/16" - 5/8".

Efficiency ratings for wire rope end terminations are based upon the catalog breaking strength of wire rope. The efficiency rating of a properly prepared loop or thimble-eye termination for clip sizes 1/8" through 7/8" is 80%, and for 1" through 3 1/2" is 90%.



⚠ WARNING

Prepare wire rope end termination only as instructed.
 DO NOT use vinyl/plastic coated wire rope.
 Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use.

The number of clips shown (see Table 1) is based upon using RRL or RLL wire rope, 6 x 19 or 6 x 37 Class FC or IWRC, IPS or XIP, or XXIP. If Seale construction or similar large outer wire type construction in the 6 x 19 Class is to be used for sizes 1" or larger, add one additional clip. If a pulley (sheave) is used for turning back the wire rope, add one additional clip.

The number of clips shown also applies to rotation-resistant RRL wire rope, 8 x 19 Class IPS, XIP, or XXIP sizes 1 1/2" and smaller; and to rotation-resistant RRL wire rope, 19 x 7 Class IPS, XIP, or XXIP sizes 1 1/2" and smaller. For other classes of wire rope not mentioned above, we recommend contacting Crosby Engineering to ensure the desired efficiency rating. The style of wire rope termination used for any application is the obligation of the user.

1. Refer to Table 1 in following these instructions. Turn back specified amount of rope from thimble or loop. Apply first clip one base width from dead end of rope. Use torque wrench to evenly tighten clip, alternating from one nut to the other until reaching the recommended torque.



FIGURE 1

2. When two clips are required, apply the second clip as near the loop or thimble as possible. Use torque wrench to evenly tighten clip, alternating until reaching the recommended torque. When more than two clips are required, apply the second clip as near the loop or thimble as possible, turn nuts on second clip firmly, but do not tighten.



FIGURE 2

3. When three or more clips are used, space additional clips equally between first two. Take up rope slack, use torque wrench to tighten on each clip evenly, alternating from one nut to the other until reaching recommended torque.



FIGURE 3

4. **O-rings and sliders:** Palmer Safety provides (2) 2½" O-rings that should be applied to the cable lifeline to allow compatible attachment of snap hooks and other connecting devices.

O-rings and sliders must be attached to the lifeline before the system is complete.

For systems with multiple intermediate anchor points or for any other questions, contact Palmer Safety Fall Protection .



Table 1

Clip Size (in.)	Rope Size (in.)	Minimum # of Clips	Amount of Rope to Turn Back (in.)	Torque (ft. lbs.)
3/16	3/16	2	4	30
1/4	1/4	2	4	30
5/16	5/16	2	5	30
3/8	3/8	2	5¼	45
7/16	7/16	2	6½	65
1/2	1/2	3	11	65
9/16	9/16	3	12¾	130
5/8	5/8	3	13½	130
3/4	3/4	3	16	225
7/8	7/8	4	26	225
1	1	5	37	225
11/8	11/8	5	41	360
1¼	1¼	6	55	360
13/8	13/8	6	62	500
1½	1½	7	78	500

If greater number of clips than shown are used, amount of turn-back should be increased proportionately.

Torque values shown are based upon the threads being clean, dry, and free of lubrication.

Maintenance, Cleaning, and Storage

If Cable HLL System fails inspection in any way, immediately remove it from service, and contact Palmer Safety to inquire about its return or repair.

Cleaning after use is important for maintaining the safety and longevity of Cable HLL System. Remove all dirt, corrosives, and contaminants from Cable HLL System before and after each use. If Cable HLL System cannot be cleaned with plain water, use mild soap and water, then rinse and wipe dry. NEVER clean Cable HLL System with corrosive substances.

When not in use, store equipment where it will not be affected by heat, light, excessive moisture, chemicals, or other degrading elements.

Inspection

Prior to EACH use, inspect Cable HLL System for deficiencies, including, but not limited to, corrosion, deformation, pits, burrs, rough surfaces, sharp edges, cracking, rust, paint buildup, excessive heating, alteration, fraying, bird-caging, and missing or illegible labels. IMMEDIATELY remove Cable HLL System from service if defects or damage are found, or if exposed to forces of Fall Arrest.

Ensure that applicable work area is free of all damage, including, but not limited to, debris, rot, rust, decay, cracking, and hazardous materials. Ensure that selected work area will support the application-specific minimum loads set forth in this instruction manual. Work area MUST be stable.

At least every 6 months, a Competent Person other than the user must inspect Cable HLL System. **Competent Person inspections MUST be recorded in inspection log in instruction manual and on equipment inspection grid label. The Competent Person must sign their initials in the box corresponding to the month and year the inspection took place.**

During inspection, consider all applications and hazards Cable HLL System has been subjected to.



Inspection Log

Date of First Use: _____.

Product lifetime is indefinite as long as it passes pre-use and Competent Person inspections. User must inspect prior to EACH use. Competent Person other than user must complete formal inspection at least every 6 months. Competent Person to inspect and initial.

This inspection log must be specific to one Cable HLL System. All inspection records must be made visible and available to all users at all times.

	J	F	M	A	M	J	J	A	S	O	N	D
YR												
YR												
YR												
YR												
YR												

If equipment fails inspection IMMEDIATELY REMOVE FROM SERVICE.

Safety Information



Failure to understand and comply with safety regulations may result in serious injury or death. Regulations included herein are not all-inclusive, are for reference only, and are not intended to replace a Competent Person's judgment or knowledge of federal or state standards.

Do not alter equipment. Do not misuse equipment.

Workplace conditions, including, but not limited to, flame, corrosive chemicals, electrical shock, sharp objects, machinery, abrasive substances, weather conditions, and uneven surfaces, must be assessed by a Competent Person before fall protection equipment is selected.

The analysis of the workplace must anticipate where workers will be performing their duties, the routes they will take to reach their work, and the potential and existing fall hazards they may be exposed to. Fall protection equipment must be chosen by a Competent Person. Selections must account for all potential hazardous workplace conditions. All fall protection equipment should be purchased new and in an unused condition.

Fall protection systems must be selected and installed under the supervision of a Competent Person, and used in a compliant manner. Fall protection systems must be designed in a manner compliant with all federal, state, and safety regulations. Forces applied to anchors must be calculated by a Competent Person.

Unless explicitly stated otherwise, the maximum allowable free fall distance for lanyards must not exceed 6'. No free fall allowed for non-LE SRLs. Class A SRLs must arrest falls within 24"; Class B SRLs must arrest falls within 54".

Harnesses and connectors selected must be compliant with manufacturer's instructions, and must be of compatible size and configuration. Snap hooks, carabiners, and other connectors must be selected and applied in a compatible fashion. All risk of disengagement must be eliminated. All snap hooks and carabiners must be self-locking and self-closing, and must never be connected to each other.

A pre-planned rescue procedure in the case of a fall is required. The rescue plan must be project-specific. The rescue plan must allow for employees to rescue themselves, or provide an alternative means for their prompt rescue. Store rescue equipment in an easily accessible and clearly marked area.

Training of Authorized Persons to correctly erect, disassemble, inspect, maintain, store, and use equipment must be provided by a Competent Person. Training must include the ability to recognize fall hazards, minimize the likelihood of fall hazards, and the correct use of personal fall arrest systems.

NEVER use fall protection equipment of any kind to hang, lift, support, or hoist tools or equipment, unless explicitly certified for such use.

Equipment subjected to forces of fall arrest must immediately be removed from use.

Age, fitness, and health conditions can seriously affect the worker should a fall occur. Consult a doctor if there is any reason to doubt a user's ability to withstand and safely absorb fall arrest forces or perform set-up of equipment. Pregnant women and minors must not use this equipment.

Physical harm may still occur even if fall safety equipment functions correctly. Sustained post-fall suspension may result in serious injury or death. Use trauma relief straps to reduce the effects of suspension trauma.