



MSA Corporate Headquarters: P.O. Box 426, Pittsburgh, PA 15230, USA
USA Ph: 1-800-672-2222 Fax: 1-800-967-0398
• **Web Site:** www.msanet.com • **e-mail:** info@msanet.com

MSA Sure-Climb™ Temporary Vertical Cable/Bracket System

Application, Operation, Maintenance & Inspection Instructions Manual
Please read this manual.
This information is vital to your safety.

WARNING

THESE INSTRUCTIONS MUST BE PROVIDED TO THE USER. MANAGEMENT AND USER MUST READ AND UNDERSTAND THESE INSTRUCTIONS; FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.

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Application

The MSA Sure-Climb™ Temporary Vertical Cable/Bracket System is designed to provide fall protection on vertical structures while climbing, descending or while working in a stationary position. The length of the system is normally limited to 200 ft. This system was originally designed for climbing columns during erection of structural steel but has unlimited applications in work areas requiring vertical movement. When installed as a complete unit this system complies to all applicable regulations and standards.

Function

The system consists of a vertical lifeline cable anchored to a energy absorbing steel bracket which is bolted to the structure. The cable is weighted with a profiled lead sleeve. The height of the weight is adjustable to position it near the ground or protected platform.

A stainless steel cable slider (fall arrester) with internal spring-loaded cam can be attached or removed from the cable at any point. It is secured with a compatible carabiner, supplied with the slider, to the frontal attachment point on any approved ladder climbing harness. Once the carabiner is installed, the slider cannot be unintentionally removed from the cable.

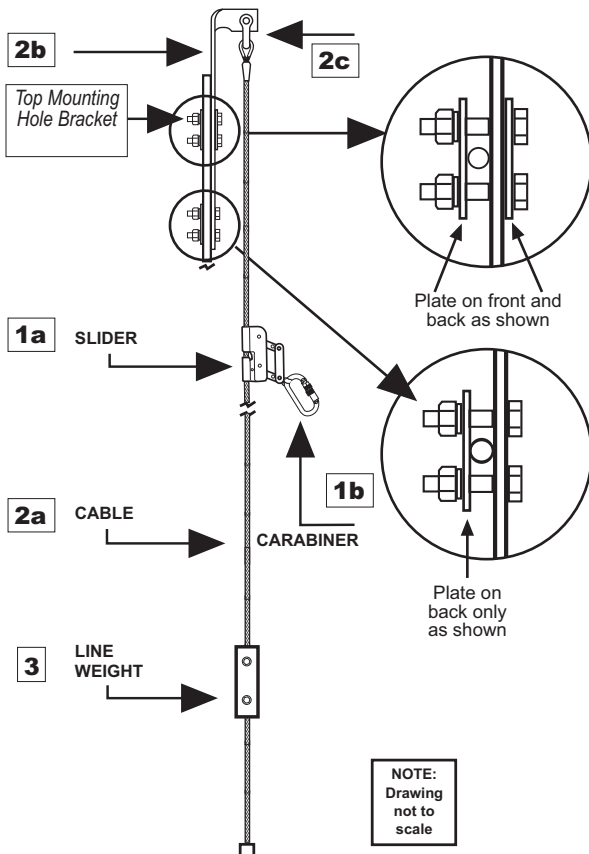
The user is free to climb and descend with full use of the hands. In the event of a fall, the slider will quickly cam on the cable and arrest the fall. Free fall distance is minimized by a close coupled attachment. The anchor bracket will deform during the fall, further reducing impact force on the worker and the structure. An uninjured worker can quickly recover and climb down the structure to safety with complete protection.



Specifications

TEMPORARY VERTICAL CABLE/BACKET SYSTEM SFPLS354

safe working load 310 lbs (140 kg)
 ** maximum arresting force 1200 lb (5.4kN)
 ** maximum slippage of slider 1 1/2 in. (4cm)
 Compliance standard ANSI Z359.1-1992 CSA Z259.2-1979
 Results from tests simulating actual use.



**test results available upon request

Installation

These instructions make the assumption that the system will be attached to the column or structure on the ground before erection.

1. Fit harness according to harness fitting instructions included with harness at time of purchase.
2. Loosen set screws on weight and rest weight against button swage on end of cable.
3. Lay out all cable on ground beside the column or structure by rolling out like a wheel. Protect cable from damage when moving columns.
4. Mount bracket with a minimum of 2 bolts supplied to pre-drilled 9/16 in. holes in steel plate (torque 75 ft-lbs). Bracket must be installed in line with expected impact force.

1. SFPLS350020 SLIDER (FALL ARRESTER) and carabiner SOLD SEPARATELY

- 1a.
 - stainless steel slider (P/N 10040010) fits 5/16 in (8mm) cable only
 - total coupling length 4 in (10cm)
 - dimensions, 3 in (76mm) x 5 1/8 in (130mm) x 3/4 in (19mm)
 - low maintenance, minimal moving parts
- 1b.
 - steel oval auto-locking carabiner (SRCC643)
 - min. breaking strength 5000 lbs (22.2kN)
 - individually proof loaded to 3600 lbs (16kN)
 - total weight of assembly 1.4 lbs (640g)

2. SFPLS351000 CABLE SYSTEM

2a. CABLE

- 7x19, 5/16 in (8mm) galvanized steel cable
- top end, Flemish eye splice and thimble
- bottom end button swaged
- minimum breaking strength 9800 lbs (4450kg)
- weight 17.3 lbs / 100 ft (25.7kg / 100m)

2b. SFPLS350001 CABLE ANCHOR BRACKET

- energy absorbing galvanized steel with mounting hardware
- 30 in (76cm) x 2 in (5cm)
- total weight with mounting hardware 11 lbs (5kg)
- supplied with 1, 4, 5, pre-drilled 9/16 in holes or slotted hole
- (2) 1/2" x 3" Grade 5 fully threaded machine bolts for top mount on top bracket
- (2) 1/2" x 2-1/2" Grade 5 bolts for bottom mount of top bracket

2c. SRI19472 ANCHOR SHACKLE

- 1/2 in (12mm) bolt type with safety pin

3. SFPLS350012 LINE WEIGHT

- cylindrical lead 2 in. (5.0cm) x 9 in. (22.9cm)
- shrink seal cover
- adjustable position on line
- 1/2 in. NC x 1 in. socket set screws (2)

5. Top mounting hole bracket (refer to above drawing) must be used to preserve energy absorbing characteristics of bracket.
6. Install cable on bracket with shackle, ensure safety pin is installed.
7. Ensure weight is not allowed to swing freely when structure is raised into position.
8. Once structure is anchored, adjust height of weight so it rests just above the ground.
9. Tighten set screws to secure weight to line.

⚠ WARNING: IT IS MANDATORY TO USE BRACKET SUPPLIED WITH SYSTEM. BRACKET CANNOT BE ALTERED EXCEPT AS OUTLINED IN "BRACKET MODIFICATION".

Cable Slider/Carabiner

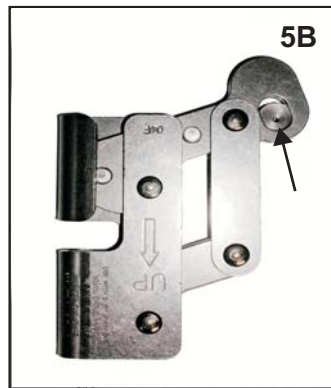
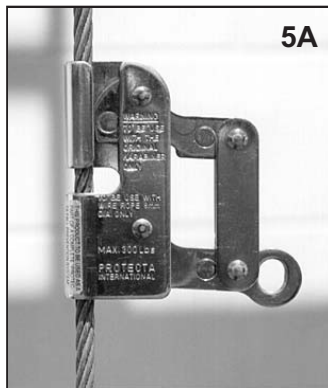
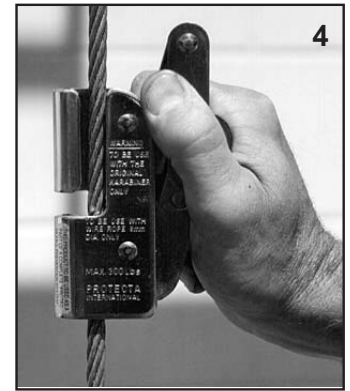
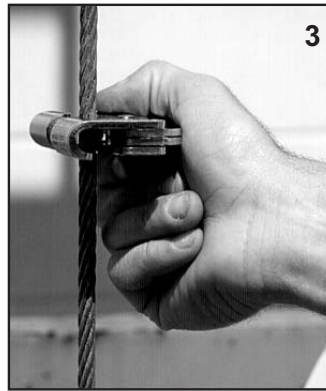
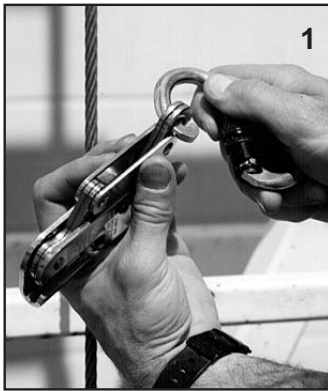
1. Remove carabiner from slider; hold slider in one hand with cams in activated position, open carabiner gate and remove from slider carabiner hole (1). To open auto-locking carabiner, twist sleeve 1/4 turn counterclockwise with thumb and forefinger and hold while depressing gate.

NOTE: This connection is intentionally designed with close tolerances to discourage removal by an untrained person.
2. Collapse slider as shown in (2) to expose cable slot. Check "up arrow" on right side of device to ensure the slider is correctly orientated.
3. Rotate slider 1/4 turn clockwise and insert cable (3).
4. While collapsed, return to upright position (4) and release. The slider will grip the cable as shown (5A) if correctly installed.

⚠ WARNING: THIS DEVICE IS EQUIPPED WITH AN ANTI-UPSIDE DOWN FEATURE (SEE FIGURE 5B). IF SLIDER IS INSTALLED UPSIDE DOWN, IT WILL NOT GRIP THE CABLE WHEN RELEASED AND WILL NOT ARREST A FALL. ALWAYS CHECK PROPER FUNCTIONING OF ANTI-UPSIDE DOWN DISK AND ORIENTATION OF UP ARROW BEFORE RELEASING DEVICE.

5. While supporting slider on cable, install carabiner (6).
6. Turn carabiner over to allow easier connection to the harness (7).
7. Connect carabiner to frontal Dee ring on harness.

⚠ WARNING: CONNECT HARNESS TO SLIDER ONLY WITH CARABINER SUPPLIED. A LONGER COUPLING WILL DRASTICALLY INCREASE THE FORCE APPLIED TO THE SYSTEM IN THE EVENT OF A FALL. DO NOT USE LANYARD!



Bracket Modification

1. When holes in mounting surface exceed 9/16 in., use supplied backing plates as washers next to nuts.
2. Use bolts as supplied or equivalent grade and diameter.
 - 1/2 in NC x length required
 - Grade 5
 - galvanized or zinc/cadmium plated

3. Holes that are field drilled in bracket must be placed below top mounting hole and should be treated with a cold zinc paint or good quality primer paint to prevent rust.
4. Minimum bolt spacing 2-1/4 in. c/c.
5. Bracket can be trimmed no less than 1 in. below bottom hole used for mounting. Use substantial washers on head side of bolts (can use bottom half of trimmed bracket or supplied backing plates).

Operation

1. The structure can be climbed normally. The slider will move up or down the cable with no assistance from the operator.
2. When descending, avoid excessive speed which will cause the slider to engage. This will shock load the bracket.
3. If the slider inadvertently locks on the cable, release it by removing the users weight from the system, collapsing the camming mechanism (fig 2) and moving the cam upwards.
4. Work or climb directly below the anchor point. A fall which originates away from this area may result in a dangerous pendulum type fall (swing fall) and increased fall distance. Contact with the anchoring structure is likely and a serious or fatal injury may result.
5. Ensure the cable does not become wrapped around columns or hung up on the structure. The line weight must be freely suspended from the anchor while the system is in use.
6. When a fall has been sustained, the user must remove his weight from the cable as soon as possible. The user must descend immediately and notify a supervisor of the event. The system is safe to use as fall protection for the descent only.



WARNING: DO NOT HOLD THE CAMMING MECHANISM WHILE THE FALL ARRESTOR IS IN USE.

Inspection

1. The MSA Sure-Climb™ System shall be inspected by the user before installation, and additionally by a competent person other than the user every six months. Inspections must be recorded in the Inspection Checklist.
 - if cable has kinks, broken strands, damaged splices or thimbles. Damaged cable can fail at much lower forces than expected.
 2. When inspection reveals defects, damage, or inadequate maintenance of any component in the system, the component affected shall be removed from service and undergo adequate corrective maintenance before return to service. Removal from service may imply that defects or damage will result in retiring and replacing some components.
 3. Remove from service if:
 - slider label is illegible or absent;
 - there is evidence of defects or damage to hardware elements including cracks, sharp edges, deformation, corrosion, chemical attack, excessive heating, alteration or excessive wear;
 - there is evidence of improper function, improper fit, misuse or alteration of any mechanical component;
 - there are parts missing;
 - the system has been subjected to the forces of arresting a fall;
- Inspections should focus on tampering that may have occurred as well as damage to the cable.
1. Harness should be inspected in accordance with instructions supplied with the product.
 2. Each worker requiring climbing protection should have a dedicated slider/carabiner and be responsible for inspection of that unit. Check slider and carabiner for smooth, clean action. Sticky gate or cams require lubrication or replacement. Replace entire unit if carabiner gate does not close properly or if slider cam is jammed. See Maintenance and Storage for instructions.
 3. Install slider and carabiner. Pull down sharply on slider to ensure camming is effective.
 4. Prior to erection and during climb inspect cable.
 5. Inspect bracket for deformation (indicates excessive force applied). Top of bracket must deflect no more than 1 in. (2.5cm) from the vertical mounting surface.

Maintenance and Storage

1. Maintenance and storage of equipment shall be conducted by the user's organization in accordance with MSA instructions. Unique issues, which may arise due to conditions of use, shall be addressed with MSA.
2. Equipment which is in need of or scheduled for maintenance shall be tagged as "do not use" and removed from service.
3. Store in a clean dry area free from excessive heat, steam, sunlight, harmful fumes and corrosive agents.
4. Periodically lubricate carabiner gate and slider with a light oil. Remove excess to avoid contamination.

Design Statements

- The MSA Sure-Climb™ Temporary Vertical Cable/Bracket System shall comply to and be used with consideration to all government or other applicable regulations and standards.
- MSA Sure-Climb™ Temporary Vertical Cable/ Bracket System components cannot be used for other applications or in conjunction with other fall protection systems. CSA certification does not apply unless equipment is purchased and installed as outlined in these instructions. No additional equipment can be used in the system without written approval of MSA. If the buyer chooses to disregard this warning, the buyer assumes responsibility for the integrity of the entire system.
- Any component that has sustained the force of arresting a fall shall be removed from service. A qualified person shall inspect and recertify the system prior to returning it to active service.
- Although several climbers can use the system to access a work area, the system is designed to be used by a single person at any one time.
- When the system is installed and used in accordance with manufacturer's instructions and the supporting structure is certified by an engineer in writing, the structure (top bracket attachment) must be capable of supporting 2500 lbs considering a 2:1 design factor.
- In the absence of certification by an engineer, the structure must be capable of supporting 5000 lbs (2270kg).*
- A worker who has been incapacitated by an injury or medical condition and who is suspended by the system, hung up in the structure or tied off, must be rescued immediately. The MSA Sure-Climb™ Temporary Vertical Cable/Bracket System is a fall arrest system only. It is the responsibility of the users employer to devise a rescue method that will effectively evacuate a worker. Rescue equipment and trained personnel must be available during climbing on the structure.
- All potential users of this equipment and users management must read and understand the instructions; failure to do so could result in serious injury or death.
- Do not install or store the system near corrosive chemicals, flammable materials, explosives, or other elements that may damage components or injure the operator.
- Do not allow the wire rope to drag through dirt or debris that could cause damage or poor operation.
- Use the system only with an approved ladder climbing harness.
- Correct connection of fall protection system to user should always be visually confirmed by another worker.
- For effective protection, the angle of the climbing surface must not be more than 10 degrees off the vertical (more than 80 degrees and less than 100 degrees). As the climbing angle deviates from the vertical there is more risk that the cam will not engage during the fall or that the user will fall away from (under) the structure. Contact MSA for recommended modifications for non-vertical applications.
- Flemish eye splice on wire rope cable does not significantly reduce the strength of the cable.
- The Sure-Climb™ System is available in lengths up to 200 ft. (61m). Installations on higher structures is possible with special considerations and approval from MSA.
- Deformation in the top bracket is usually caused by a fall. If the bracket is deformed, it will not absorb fall energy according to design specifications and must be replaced.
- Follow instructions for bracket modification carefully. Incorrect modifications may result in failure of the fall arrest system.
- Maximum clearance (MC) required below position of the slider before the fall must be calculated to ensure a fallen worker does not make contact with obstructions or the ground below the working position.
When the system is used according to these instructions:
 $MC = A + B + C + D + E$

MC = height required between fall arrester (slider) and obstruction or ground

A = normal height of fall arrester above feet when worker is in erect position

B = total free fall distance

(fall arrester activation=7 in., free fall=8 in.)

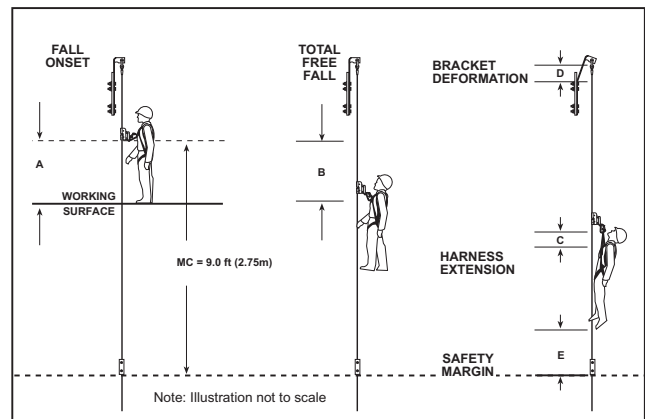
C = harness extension

D = bracket deformation

E = safety margin

$MC = 4.5 \text{ ft} + 1.25 \text{ ft} + 1.0 \text{ ft} + .25 \text{ ft} + 2.0 \text{ ft} = 9.0 \text{ ft}$

* ANSI Z359.1-1992 specifies 3600 lbs (16kN) with certification by an engineer.



Inspection Checklist

Location _____

Date _____

Inspected By _____

Quantity	Part Number	Description					Comments
			Good	Damaged, worn, altered	Missing	Remove from service	
1	SFPLS350020	SC350 Slider # _____					
1	SRCC643	Oval auto-locking carabiner					
2		Compliance labels					
System Length		Cable					
		Flemish eye splice termination					
1	SRI19472	Anchor shackle					
1		Safety pin					
1	SFPLS350012	Line weight					
2	SFPLS350011	Weight set screw					
1		End button swage					
1	SFPLS350001	Cable anchor bracket					
2		Backplate					
4		1/2 in. x 2-1/2 in. bolt					
4		Lock washer					



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WARRANTY

Express Warranty – MSA warrants that the product furnished is free from mechanical defects or faulty workmanship for a period of one (1) year from first use or eighteen (18) months from date of shipment, whichever occurs first, provided it is maintained and used in accordance with MSA's instructions and/or recommendations. Replacement parts and repairs are warranted for ninety (90) days from the date of repair of the product or sale of the replacement part, whichever occurs first. MSA shall be released from all obligations under this warranty in the event repairs or modifications are made by persons other than its own authorized service personnel or if the warranty claim results from misuse of the product. No agent, employee or representative of MSA may bind MSA to any affirmation, representation or modification of the warranty concerning the goods sold under this contract. MSA makes no warranty concerning components or accessories not manufactured by MSA, but will pass on to the Purchaser all warranties of manufacturers of such components. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AND IS STRICTLY LIMITED TO THE TERMS HEREOF. MSA SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Exclusive Remedy - It is expressly agreed that the Purchaser's sole and exclusive remedy for breach of the above warranty, for any tortious conduct of MSA, or for any other cause of action, shall be the repair and/or replacement, at MSA's option, of any equipment or parts thereof, that after examination by MSA are proven to be defective. Replacement equipment and/or parts will be provided at no cost to the Purchaser, F.O.B. Purchaser's named place of destination. Failure of MSA to successfully repair any nonconforming product shall not cause the remedy established hereby to fail of its essential purpose.

Exclusion of Consequential Damages - Purchaser specifically understands and agrees that under no circumstances will MSA be liable to Purchaser for economic, special, incidental, or consequential damages or losses of any kind whatsoever, including but not limited to, loss of anticipated profits and any other loss caused by reason of the non-operation of the goods. This exclusion is applicable to claims for breach of warranty, tortious conduct or any other cause of action against MSA.

For additional information, please contact the Customer Service Department at 1-800-MSA-2222 (1-800-672-2222).