



AFF6000, AFF7000

**VERTICAL WIRE**

LIFELINE

USER INSTRUCTION MANUAL  
&  
TECHNICAL INFORMATION



MUST BE READ AND UNDERSTOOD PRIOR TO INSTALLATION



### **Disclaimer**

The information provided in this User Instruction is based on the technical data that KStrong obtained under laboratory conditions and believes to be reliable. KStrong does not guarantee results and takes no liability or obligation in connection with this information. Since conditions of end-use are beyond our control, it is the user's responsibility to determine the hazard levels and the use of proper personal protective equipment. Persons having technical expertise should undertake evaluation under their specific end-use conditions, at their discretion and risk. Please ensure that this information is only to check that the product selected is suitable for the intended use. Any product that is damaged, torn, worn, or punctured should be discontinued from usage immediately.

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## Know Your System

### AFF6000 & AFF7000 Vertical Anchorage Lifeline System

KStrong Vertical Life Line Systems have been designed to ensure the user is safe whilst ascending or descending ladders that are fixed to high rise structures, telecom towers, wind towers etc. KStrong has two systems that can easily installed on a range of ladders. The AFF6000 which is supplied without a shock absorber and the AFF7000 with a built in shock absorber. Each system consists of a stainless steel rope grab (depending on the chosen system) that moves along with the user on a vertical lifeline. The rope grab is connected to the attachment element of the user's harness. In the event of a fall, while the user is going up or down the ladder, the rope grab automatically locks against the wire rope thereby preventing the person from falling down. Not only does it restrict the fall of the user, it also reduces the impact force of the fall that would be imparted to the body of the user and structure.

Certified to EN353-1:2014+A1:2017. The systems are certified by Sira for ATEX to comply with use in potentially explosive atmosphere (as per Potentially Explosive Atmospheres Directive 94/9/EC) and conforms to Norms EN 13463-1: 2009 and EN 13463-5: 2003. The system is certified to be intrinsically safe, hence is an ideal choice for use in Industries like Petroleum/ Petrochemical Plants without fear of causing explosion due to any spark.


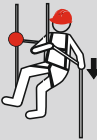




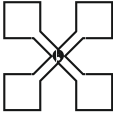
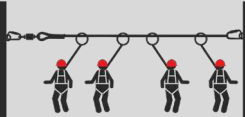




**AFF6000**

**AFF7000**

# VERTICAL ANCHORAGE LINE SYSTEM

## Standards

Standards		Description
EN 353-1		Guided type fall arresters including a rigid anchor line
EN 353-2		Guided type fall arresters including a flexible anchor line
EN 795 Type A		Anchor device requiring the fixing of one or more structural anchors
EN 795 Type B		Anchor device not requiring the fixing of one or more structural anchors
EN 795 Type C		Anchor devices using a horizontal flexible anchor line
EN 795 Type D		Anchor devices using a horizontal rigid anchor line
EN 795 Type E		Deadweight anchoring device
CEN/TS 16415:2013		Personal fall protection equipment - Anchor devices - recommendations for anchor devices for use by more than one person simultaneously
 II 2G Ex h IIc T6 Gb EN 80079-36:2016 EN 80079-37:2016		The ATEX directives are two EU directives describing the minimum safety requirements for workplaces and equipment used in explosive atmospheres

## Must be Read Prior to Use

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- Prior to use, ensure all operating procedures have been read and properly understood.
- This fall arrest system is only to be used by competent persons who have experience and training in the safe use of the system and associated equipment.
- Ensure all local workplace OH&S requirements are identified and understood.
- A risk assessment with a safe work method procedure must be completed and approved by management prior to work commencing.
- The system requires periodic inspection and maintenance by the manufacturer or their authorized representative as per EN365 of the PPE Regulation 2016.
- The system **MUST NOT** be used if the service date is overdue.
- A rescue plan must be formulated and ready for implementation prior to using any fall arrest system.
- Authorisation to access any risk area must be obtained from the person in control of the workplace.
- Only approved full body harness, lanyard and PPE certified either EN, ANSI or AS/NZS Standards is to be used with this system.
- Visually inspect the system for damage prior to use. The system must not be used if there is any deterioration or deformation of components or the structure to which the system is attached.
- If the safety system is damaged or has arrested a fall, discontinue use until it has been fully inspected and recertified by the manufacturer or their authorized representative.
- Ensure all fixings, fittings and components are securely attached. Any tightening, adjustment or replacement of components must be carried out by a competent person.
- Users must not be allowed to work alone in fall arrest situations in case emergency rescue assistance or first aid is required.
- All applicable EN Standards, Local OHS Acts & Regulations, and Codes of Practice & Guidelines must be read and obeyed when using this safety system.

## Instructions for Periodic Examinations

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- As per EN 365 of PPE Regulation 2016, it is necessary to carry out regular periodic examinations. The safety of the users depends upon the continued efficiency and durability of the equipment.
- The personal protective equipment shall be examined at least every 12 months.
- For corrosive/harsh environments, every 6 months (more frequent inspection may be required).
- The periodic examination can only be carried out by the manufacturer or his authorized representative.
- The comments should be included in the check card of the equipment. After the periodic examination, the next due date for periodic examination will be determined.
- During periodic inspection, it is necessary to check the legibility of the equipment marking.
- To check metals for sharp edge, burs, corrosion, bent profile distortion and opening & closing or such mechanisms for which that is intended for.

## Remove from Service

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- In case that it has been used to arrest a fall, the equipment must be withdrawn from use.
- Labels have been removed, are missing or illegible
- Excessive abrasive wear has occurred
- Broken fibres, tears, cuts, snags and splinters are present
- Deterioration or stretching has occurred
- Parts and mechanisms are not moving freely or are corroded
- There is excessive contamination not removed by approved cleaning methods

# VERTICAL ANCHORAGE LINE SYSTEM

## Job Safety Analysis

Before commencing the job, it is recommended that the service technician / installer completes a JSA form, to identify hazards at site and to decide the correct PPE they need to mitigate the hazard. Refer to the example below.

Section 1 Job details					
JSA title	Project name		Work order or PID No.		
	Principal contractor				
Location / address				Date/s of activity	
Prepared by		Date prepared		Signature	

Permits required				Isolations required	
<input type="checkbox"/> Confined Space	<input type="checkbox"/> High risk work rescue plan	<input type="checkbox"/> High voltage access	<input type="checkbox"/> Roof Access	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Hydraulic
<input type="checkbox"/> Work at height	<input type="checkbox"/> Excavation and trenching	<input type="checkbox"/> Energized work	<input type="checkbox"/> Other (please specify)	<input type="checkbox"/> Electrical	<input type="checkbox"/> Pneumatic
<input type="checkbox"/> Penetrating	<input type="checkbox"/> Grid mesh, flooring and guard rail removal	<input type="checkbox"/> Hot work		<b>Site access required</b>	<input type="checkbox"/> YES <input type="checkbox"/> NO

### Section 2-Common hazards (Each Hazard identified below must be assessed)

Chemicals/hazardous substances		High-risk activities	
Name of chemicals or hazardous substance <input type="checkbox"/> SDS available		<input type="checkbox"/> Confined space	<input type="checkbox"/> Work at heights
		<input type="checkbox"/> Hot Work	<input type="checkbox"/> Excavation, trenching or penetrations
Energy sources		<input type="checkbox"/> Construction work	<input type="checkbox"/> Scaffolding
<input type="checkbox"/> Electricity	<input type="checkbox"/> Pressure	<input type="checkbox"/> Demolition	<input type="checkbox"/> Structural alterations
<input type="checkbox"/> Gas / Fuel	<input type="checkbox"/> Water	Work location	
Plant and equipment		<input type="checkbox"/> Sun	<input type="checkbox"/> Working over, in or near water
<input type="checkbox"/> Fixed Plant	<input type="checkbox"/> Mobile Plant	<input type="checkbox"/> Plants, Animals or Insects	<input type="checkbox"/> Contaminated / Flammable atmosphere
<input type="checkbox"/> Vehicles / boats	<input type="checkbox"/> Hand Tools	<input type="checkbox"/> Slips, trips and falls	<input type="checkbox"/> Work occurring in other areas
Manual tasks		<input type="checkbox"/> Biological hazards	<input type="checkbox"/> Fire
<input type="checkbox"/> Repetitive tasks	<input type="checkbox"/> Heavy Lifting	People	
<input type="checkbox"/> Awkward posture	<input type="checkbox"/> Sustained posture	<input type="checkbox"/> Remote or isolated work	<input type="checkbox"/> Contractors
Facilities / built environment		<input type="checkbox"/> Fatigue	<input type="checkbox"/> Visitors / land owners / public
<input type="checkbox"/> Buildings and fixtures	<input type="checkbox"/> On/in or adjacent to roadways	<input type="checkbox"/> Competency or training required	<input type="checkbox"/> License required
<input type="checkbox"/> Open pits, trenches or tunnels	<input type="checkbox"/> Asbestos/ lead	Environment and water quality	
<input type="checkbox"/> Overhead objects or services	<input type="checkbox"/> Underground objects or services	<input type="checkbox"/> Erosion & sediment control	<input type="checkbox"/> Waste/ discharge
<input type="checkbox"/> Lighting	<input type="checkbox"/> Noise	<input type="checkbox"/> Emissions (or air pollution)	<input type="checkbox"/> Flora/ fauna/ weed management
<input type="checkbox"/> On or near pressurized gas distribution mains or piping	<input type="checkbox"/> On or near chemical. fuel or refrigerant lines	<input type="checkbox"/> Release to drains/waterways	<input type="checkbox"/> Water quality





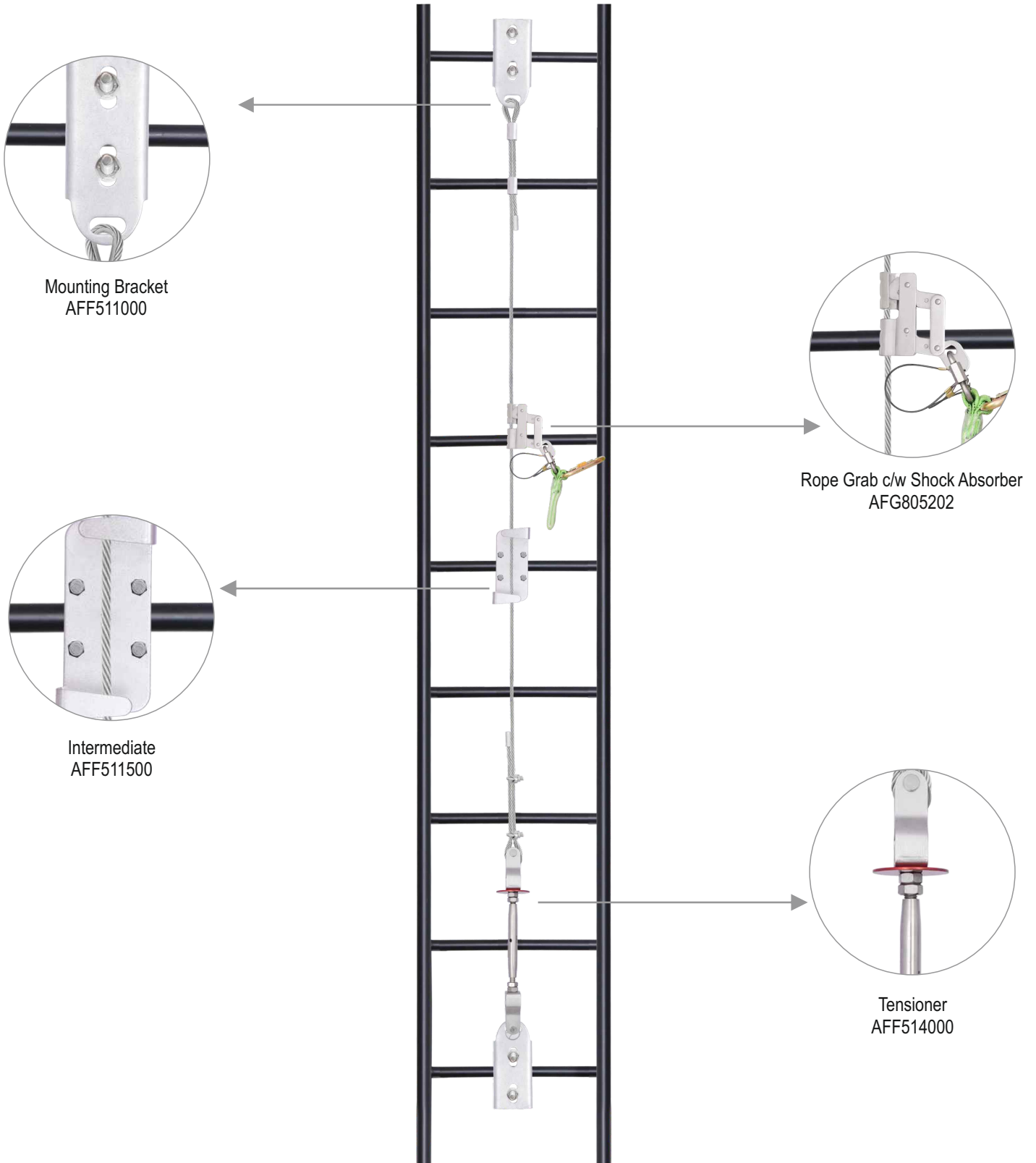
# VERTICAL ANCHORAGE LINE SYSTEM

## AFF6000 Fall Arrest System Components

Certified EN 353-1:2014+A1:2017, the AFF6000 Fall Arrest System is an integrated solution to arrest the fall of a user when climbing up and down a ladder.

The Vertical Life Line is made of Stainless Steel Wire Rope and is maintained in the rigid position by use of 2 mounting brackets - one at the top and other at the bottom.

A Stainless Steel Rope Grab moves up and down on the Anchorage Line accompanying the user who is connected to it with the help of a small Shock Absorbing Lanyard.



# VERTICAL ANCHORAGE LINE SYSTEM

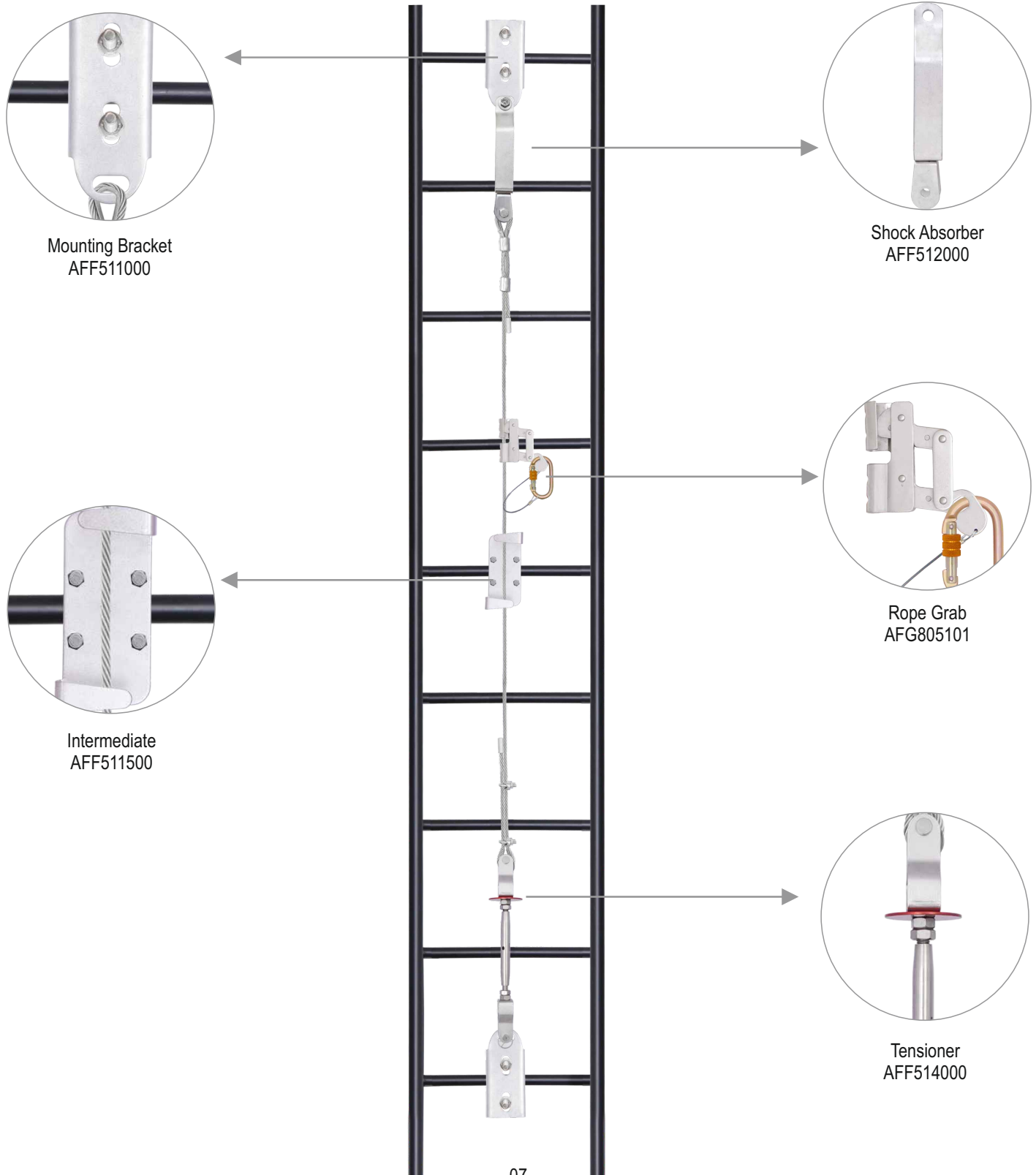
## AFF7000 Fall Arrest System Components

Certified to EN 353-1:2014+A1:2017 the AFF7000 Fall Arrest system is an integrated solution to arrest the fall of a user when climbing up and down a ladder.

The unique feature of this Stainless Steel Shock Absorber at the top of the line which offers a distinct advantage over the textile absorber used in other lines in term of UV degradation and resistance to harsh climate conditions.

The Vertical Line is made of Stainless Steel Wire Rope and is maintained in the rigid position by the use of 2 mounting brackets.

The Stainless Steel Rope Grab is directly connected to the Harness of the user without any additional lanyard



# VERTICAL ANCHORAGE LINE SYSTEM

## Component Chart

The chart below shows all the components of the Vertical Lifeline Systems with their appropriate product codes and quantity required in a system.

### TECHNICAL SNAPSHOT

Component	Code	Qty. Required
<b>Mounting Brackets</b>		
Mounting Bracket	AFF511000	2 sets
Mounting Bracket (Double Rung)	AFF513700	2 sets
Point Anchor(eye)	AFA9351AE	2 sets
<b>Shock Absorber</b>		
Shock Absorber	AFF512000	1 no.
<b>Cable Termination</b>		
Cable Extremity	AFF12001	1 no.
Set of U Bolt & Thimbles	AFF513000	1 set.
Wire End Cap	AFF513100	1 no. (as required)
<b>Wire Rope</b>		
Wire Rope (7X19 )	AFF518XXX(S)	Length of system
Wire Rope (7X19 ) loop with thimbles and ferrule at one end	AFF518XXXSL	Length of system
Wire Rope (7X19 Swage and D Shackle	AF518XXX	Length of system
<b>Rope Grab</b>		
Rope Grab	AFG805101	As per number of users
Rope Grab c/w Textile Shock Absorber	AFG805102	As per number of users

# VERTICAL ANCHORAGE LINE SYSTEM

## Intermediate

Intermediate	AFF511500	Space every 10m up to 30m, 30m and above, space every 5m
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Intermediate Pulley Type	AFF512002	Space every 10m
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## Tensioner

Tensioner (Both Side Eye)	AFF514000	1 no.
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Tension (Swageless)	AFF114100(SL)	1 no.
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Tension (Swaging)	AFF114100	1 no.
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## Extension Arm

Arm Extension Stainless Steel	AFF516600	1 no. (as required)
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Arm Extension Alloy Steel	AFF516600(SS)	1 no. (as required)
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## Accessory

ID Tag	AFF115100V	1 no. (as required)
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End Cap	AFF513100	1 no. (as required)
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## Recommended PPE

While working on a roof the user can select from a range of PPE to work safely with either lanyards, rope lines or SRL's in conjunction with a full body harness.



Energy Absorbing Webbing Lanyard  
AFL408612



Work Positioning Lanyard with Grip Adjuster  
AFL405111



Rope Line with Shock Absorber  
AFA951201



Twin Micron  
AFS550028D

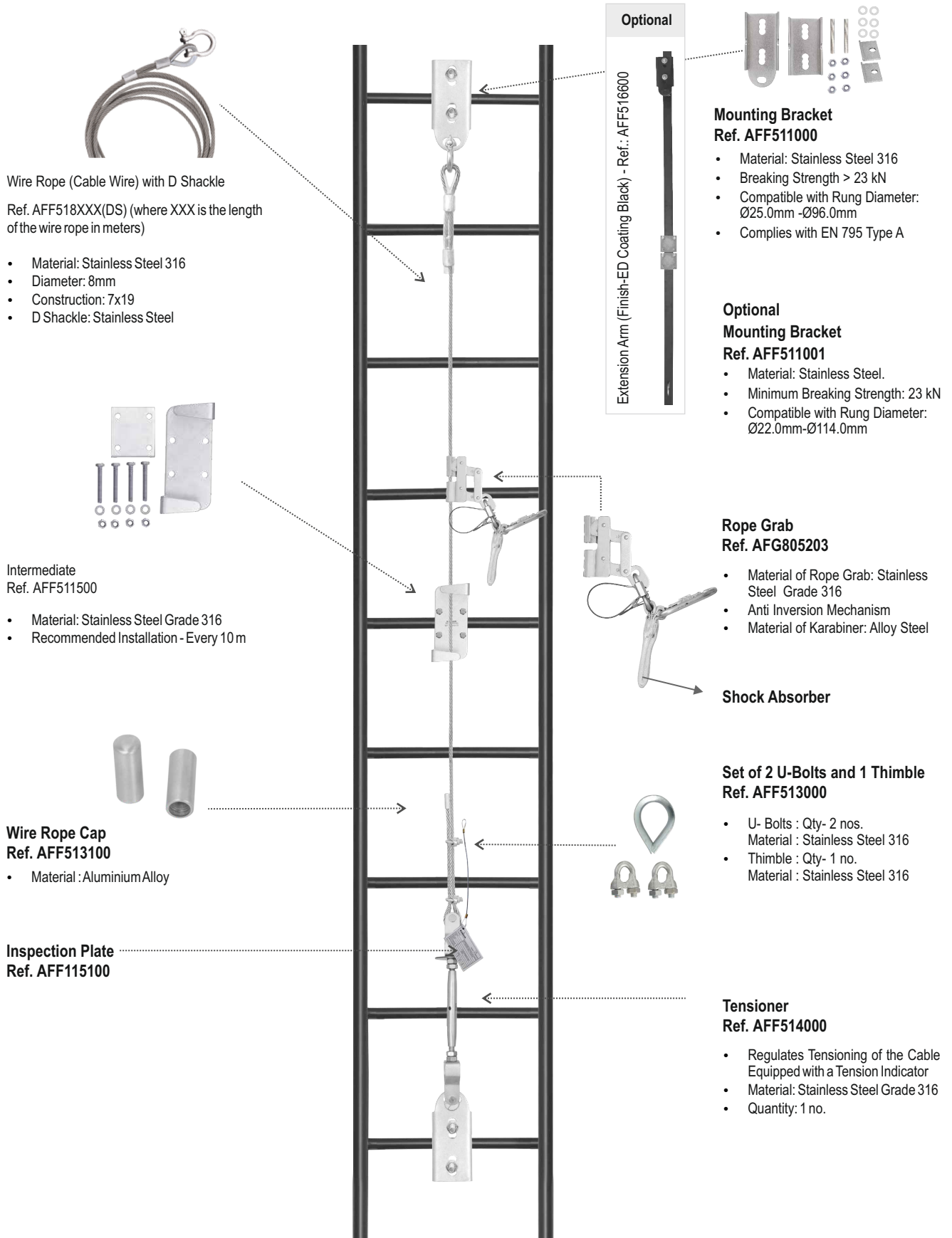


Full Body Roofers Harness  
AFH300203

# VERTICAL ANCHORAGE LINE SYSTEM

## Vertical Lifeline and with Rope Grab with textile Shock Pack - AFF6000

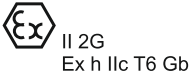
Conforms to: EN353-1:2014 + A1:2017



# VERTICAL ANCHORAGE LINE SYSTEM

## Vertical Lifeline with In Built Shock Absorber - AFF7000

Conforms to: EN353-1:2014 + A1:2017



### Shock Absorber Ref. AFF512000

- Material: Stainless Steel 316
- Limits the impact of force in the event of fall to less than 6 kN



### Wire Rope (Cable Wire)

Ref. AFF518XXX (Where XXX is the Length of the wire rope in meters)

- Material: Stainless Steel 316
- Diameter: 8mm
- Construction: 7x19

ALSO AVAILABLE

Wire rope without loop Ref. AFF518XXX(S)

### Intermediate Ref. AFF511500

- Material: Stainless Steel 316
- Recommended Installation- Every 10 m

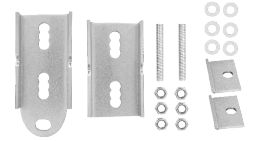
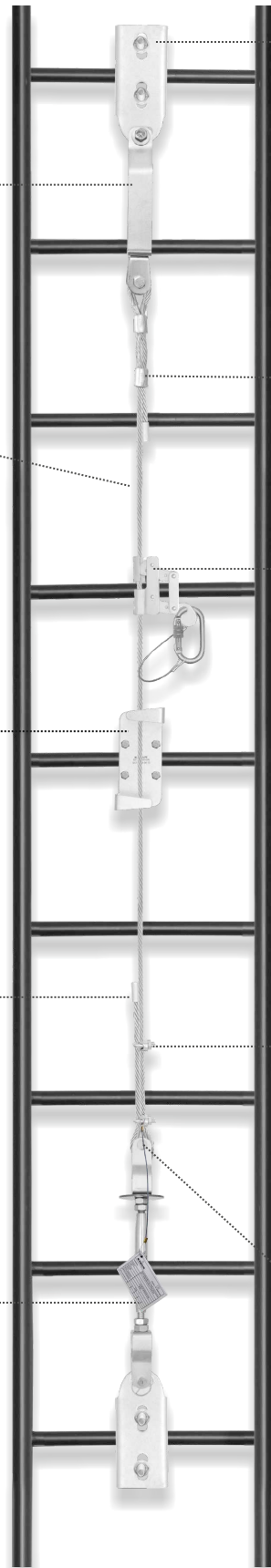


### Wire Rope Cap Ref. AFF513100

- Material: Aluminium Alloy



### Inspection Plate Ref. AFF115100



### Mounting Bracket\* Ref. AFF511000

- Material: Stainless Steel 316
- Breaking Strength > 23 kN
- Complies with EN 795 Type A

### Wire Crimping Assembly



### Rope Grab Ref. AFG805101

- Material of Rope Grab: Stainless Steel 316
- Material of Karabiner: Alloy Steel
- Anti Inversion Mechanism



### Set of 2 U-Bolts & 1 Thimble Ref. AFF513000

- U-Bolts: Qty - 2 nos.  
Material: Stainless Steel 316
- Thimble: Qty - 1 no.  
Material: Stainless Steel 316

### Tensioner Ref. AFF514000

- Regulates Tensioning of the Cable. Equipped with a Tension Indicator
- Material: Stainless Steel 316
- Quantity: 1 no.



# VERTICAL ANCHORAGE LINE SYSTEM

## Mounting Brackets

The retrofit design of the brackets allows simple and easy installation to attach to the ladder rungs or to the side members. Provides top & bottom attachment points to install the vertical line.



Mounting Bracket  
AFF511000



Mounting Bracket  
AFF511000(16)



Mounting Bracket  
Double Rung  
AFF513700



Anchor Eye  
AFA9351AE

### TECHNICAL SNAPSHOT

	Mounting Bracket AFF511000	Mounting Bracket AFF511000(16)	Mounting Bracket Double Rung AFF513700	Anchor Eye AFA9351AE
Application	Mounting brackets are used to install the anchorage line on the ladder. It can be installed on any ladder rung. Suit ladder rung diameter: 25mm to 96mmwith	Mounting brackets are used to install the anchorage line on the ladder. It can be installed on any ladder rung. Suit ladder rung diameter: 16mm to 96mm	Mounting brackets are used to install the anchorage line on the ladder. It is installed on two rungs. Suit ladder rung Diameter: Ø18.0mm to Ø36.0mm.	The anchor eye can be bolted to the existing steel frame.
Material	Stainless Steel Grade 316 Also available in Alloy Steel CED Coated	Stainless Steel Grade 316 Also available in Alloy Steel CED Coated	Stainless Steel Grade 316 Also available in Alloy Steel CED Coated	Stainless Steel Grade 316
Weight	3.26 kgs	2.7 kgs	1.5 kgs	0.4 kg
Conforms to	EN 353-1:2014+A14:2017	EN 353-1:2014+A14:2017	EN 353-1:2014+A14:2017	EN 353-1:2014+A14:2017

## Shock Absorber

In the event of a fall, the rope grab locks against the wire rope anchorage line, which results in the shock absorber reducing the forces applied to the user. By adding a Shock Absorber to the system (mounted at top of system) will ensure the maximum force applied to the user is less than 6 kN. The shock absorber also protects the receiving structure from heavy impact force generated as a result of fall.



### TECHNICAL SNAPSHOT

Shock Absorber	AFF512000
Application	Shock absorber is provided to reduce the impact force in the event of a fall. The fall indicator warns about any fall or overloading on the system.
Material	Stainless Steel Grade 316
Weight	1.24 kgs
Vital Test Compliance	Static Strength : 15 kN for 3 minutes
Conforms to	EN 353-1:2014+A1:2017



# VERTICAL ANCHORAGE LINE SYSTEM

## Wire Rope

### Stainless Steel Cable

#### TECHNICAL SNAPSHOT

Wire Rope	AFF518XXX(S)	AFF51810SL(XXX)
Design	7x19	7x19
Application	Stainless steel cable for vertical life line system	Stainless steel cable for vertical life line system
Size	8mm	8mm
Material	Stainless Steel Grade 316	Stainless Steel Grade 316
MBS	39 kN	39 kN
Weight	0.0256 kg per meter	0.030 kg per meter
Conforms to	EN 12385-4 + A1:2008	EN 795 Type C:2012 and TS16415 & AS/NZS 5532:2013



Wire Rope  
AFF518XXX(S)



Wire Rope (with one end having swagged loops)  
AFF51810SL(XXX)

### Cable Termination

Is the process of fixing wire to fittings in a secure method. By using either U-bolts and thimbles or wire crimping assembly allows the tensioner or shock absorber to be attached in the vertical system.



Set of U-Bolt & Thimbles  
AFF513000



Wire Crimping Assembly  
AFF513801



Wire Rope Cap  
AFF513100

#### TECHNICAL SNAPSHOT

Cable Termination	Set of U-Bolt & Thimble AFF513000	Wire Crimping Assembly AFF513801	Wire Rope Cap AFF513100
Application	Termination of stainless steel cable for vertical lifeline system	Swagged termination of stainless steel wire cable for vertical lifeline system	The caps provide a neat and safe finish by reducing sharp ends caused by loose wire threads suitable for 8mm wire rope
Material	Stainless Steel Grade 316	Stainless Steel Grade 316 and Aluminum	Aluminum
Weight	Thimble : 0.02 kg U-Bolt : 0.07 kg	Thimble : 0.020 kg End Cap : 0.005 kg Ferrules : 0.014 kg	0.005 kg

# VERTICAL ANCHORAGE LINE SYSTEM

## Rope Grab

The Rope Grab is the fall arrest device that slides through the cable while the user is ascending or descending. It locks automatically in case of a fall. It has a gravity locking mechanism to ensure that it cannot be fitted to the cable in the wrong direction.

The rope grab is designed that accidental disengagement of the rope grab from the system is not possible. It can only be removed once the karabiner connecting the rope grab to the user is taken out of the eye of the rope grab.



Rope Grab  
AFG805101



Rope Grab-Textile  
Shock Absorber  
AFG805102

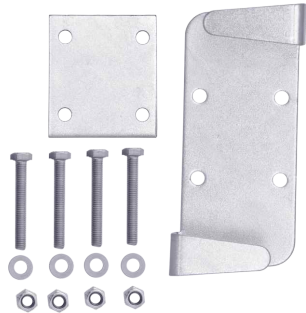
### TECHNICAL SNAPSHOT

	Rope Grab AFG805101	Rope Grab-Textile shock absorber AFG805102
Application	To be used as part of the AFF7000 to climbing up & down	To be used as part of the AFF6000 system to climb up or down
Material	Stainless Steel Grade 316	Rope Grab: Stainless Steel Grade 316 Shock Absorber: Polyester Webbing
Weight	0.64 kg	0.818 kg
Vital Test Compliance	Static Strength: 15 kN for 3 minutes	Static Strength: 15 kN for 3 minutes
Conforms to	EN 353-2:2002 & ANSI Z359.1, EN 353-1:2014+A1:2017	EN 353-2:2002 & ANSI Z359.1, EN 353-1:2014+A1:2017

# VERTICAL ANCHORAGE LINE SYSTEM

## Intermediate

The Intermediates are installed at regular intervals along the length of the line to maintain alignment over long spans and preventing the wire rope from deflections / vibrations caused by usage or heavy winds.



Intermediate  
AFF511500



Intermediate Wheel Type  
AFF512002

### TECHNICAL SNAPSHOT

	Intermediate AFF511500	Intermediate Wheel Type AFF512002
Application	Install every 10m for up to 30 m length; Install every 5m for above 30 m length	Install every 10m
Material	Stainless Steel Grade 316 Also available in Alloy Steel CED Coated	Stainless Steel Grade 316 Also available in Alloy Steel CED Coated
Weight	0.625 kg	0.590 kg
Conforms to	EN 353-1:2014+A1:2017	EN 353-1:2014+A1:2017

## Tensioner

It is used to regulate the tension in the vertical cable line by simply rotating the central drum of the Tensioner. The tensioner is easily adjusted preventing unintentional rotation of tensioner due to vibrations. Equipped with a tension force indicator to ensuring the correct tension is applied. The tensioner is installed at the lower side of the Vertical Life Line between the end of the wire rope and the bottom mounting bracket.



Tensioner with Eye on Both Ends  
AFF514000

### TECHNICAL SNAPSHOT

Tensioner	Tensioner with Eye on Both Ends AFF514000
Application	The tension device is an interconnection between the cable and shock absorber with cable length adjustment feature.
Size	14 mm
Material	Stainless Steel Grade 316
Weight	1.08 kgs
Test Compliance	Static Strength: 15 kN for 3 minutes
Conforms to	EN 353-1:2014+A1:2017

# VERTICAL ANCHORAGE LINE SYSTEM

## Extension Arm: AFF516600

Ladder Extension Arm is a basic and effective tool used to provide additional support for assisting workers while transitioning from a ladder to a raised working surface. Simple designed to be bolted to the upper ladder rungs. Suits 22mm - 44mm rung diameters.



Extension Arm  
AFF516600



Stainless Steel  
AFF516600SS



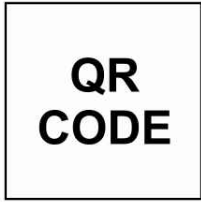

### TECHNICAL SNAPSHOT

Extension Arm	AFF516600	AFF516600SS
Application	Used to extend the life line over the landing platform	Used to extend the life line over the landing platform
Material	High Tensile Steel ED Coated Black	Stainless Steel Grade 316
Weight	13.75 kgs	13.21 kgs
Vital Test Compliance	Static Strength : 12kN for 3 minutes	Static Strength : 12kN for 3 minutes
Conforms to	EN 795:2012 Type A	EN 795:2012 Type A

# VERTICAL ANCHORAGE LINE SYSTEM

## Inspection Plate: AFF115100V

The Inspection Plate is installed on the tensioner side of the system for identification, traceability and maintenance of inspection records. At time of installation the relevant details are recorded on the ID tag. The next inspection dates are also recorded on the month and year on the back of the ID plate. The label is provided with a protective aluminum frame with a poly carbonate sheet for UV protection. It is installed on the pin ring of the tensioner. The label is equipped with a dynamic QR code and an RFID tag that are linked to the Compass inspection software.

			
<b>KStrong Vertical Lifelines</b>			
	AFF6000	Vertical Lifeline on Stainless steel Cable EN353-1:2014	
	AFF7000	Vertical Lifeline on Stainless steel Cable EN353-1:2014	
	AFF8000	Vertical Lifeline on Aluminum rail EN353-1:2014	
	AFF9000	Vertical Lifeline on Aluminum rail EN353-1:2014	
Date of Installation			
No. of users	1		
UID			
Line No.			
<a href="mailto:customercare@kstrong.com">customercare@kstrong.com</a>		<a href="http://www.kstrong.com/asia">www.kstrong.com/asia</a>	



Engineering Calculation  
Predict forces  
extremity / deflection in cable





Max. fall arrest force : 6 kN  
Max. fall arrest distance : 1 mtr.



# VERTICAL ANCHORAGE LINE SYSTEM

## General Description of Parts

The installation of the system shall be carried out only by trained personnel authorized by KStrong, and should not be carried out by the user. The installation steps given below are a brief indication of the procedure, only for the purpose of information to the user. KStrong does not take any responsibility for consequences of installation of the system if it is carried out against an authorized written recommendation by KStrong. It is necessary to ensure the safety of the installer at all stages of installation through use of correct PPE. It is also important to use correct tools as recommended by KStrong for installation.

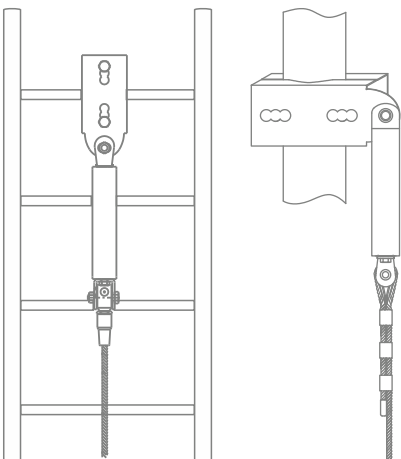
## Pre-Installation Inspection of the Receiving Structure

The receiving structure on which the system is to be installed should be strong enough to hold an impact load of more than 18 kN. KStrong shall not be held responsible in any failure arising out of the failure of the structure. It is hence essential to calculate the strength of the receiving structure before the installation. If there is any doubt a competent person or a qualified structural engineer may study the drawings or visit the site and verify the adequacy of strength of the receiving structure.

## TYPES of Mounting Brackets

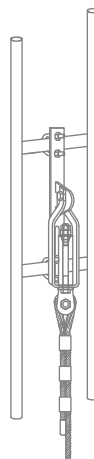
### AFF511000 Mounting Bracket

Suitable for both ladder rungs or vertical poles (>120mm Dia)



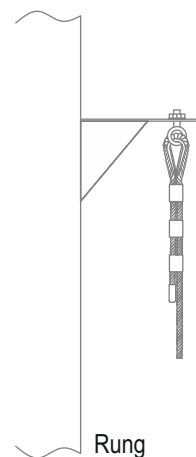
### AFF513700 Mounting Bracket suits Twin Rungs

The brackets are installed between two ladder rungs with a diameter between 18mm - 36mm. The maximum distance allowed between two rungs is 350 mm.



### AFA9351AE Eye Bolt suits Steel Bracket

Some structures have brackets welded for fall protection. In such cases an anchor eye may be used as the mounting bracket, the eye bolt.



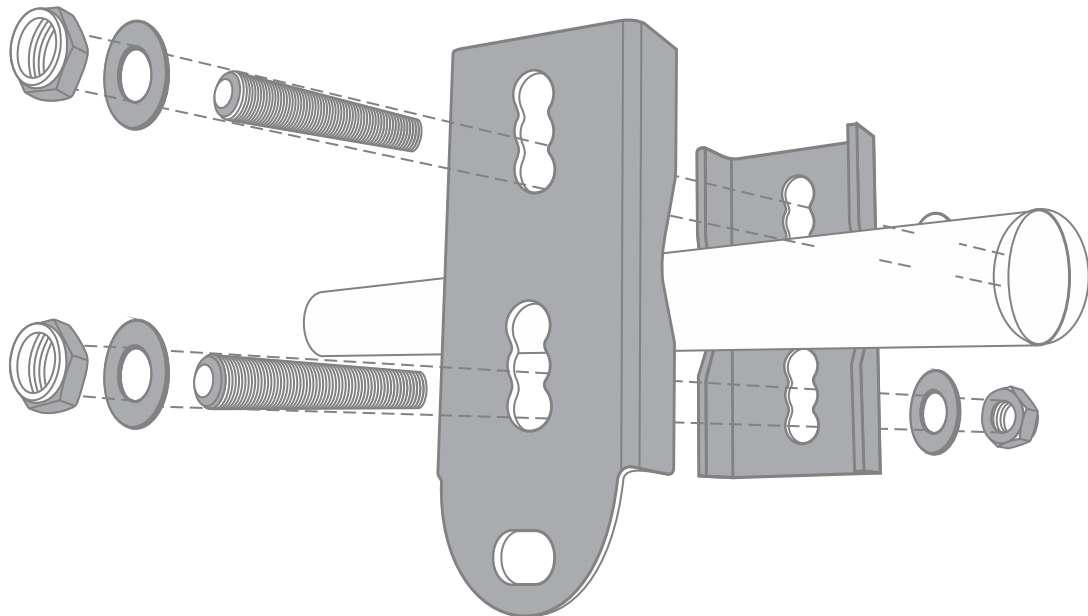
## Installation of AFF511000 Mounting Bracket






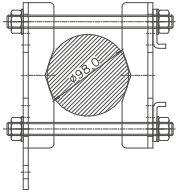
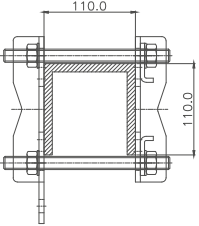
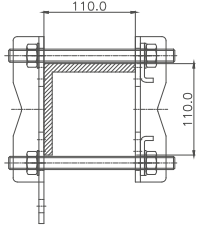
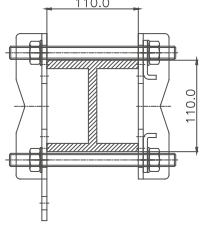
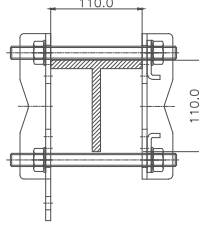
### AFF511000 Mounting Bracket for Single Rungs

The system is installed in the following sequence:

Installation of the AFF511000 Mounting Bracket on the Upper Ladder Rung:

The mounting bracket can be installed on a single ladder rung by bolting the two channel grips over the ladder rung. The drawings below illustrate the position of the channel grips for different sections.



COMPATIBLE SUPPORT SECTION					
PROCESS					

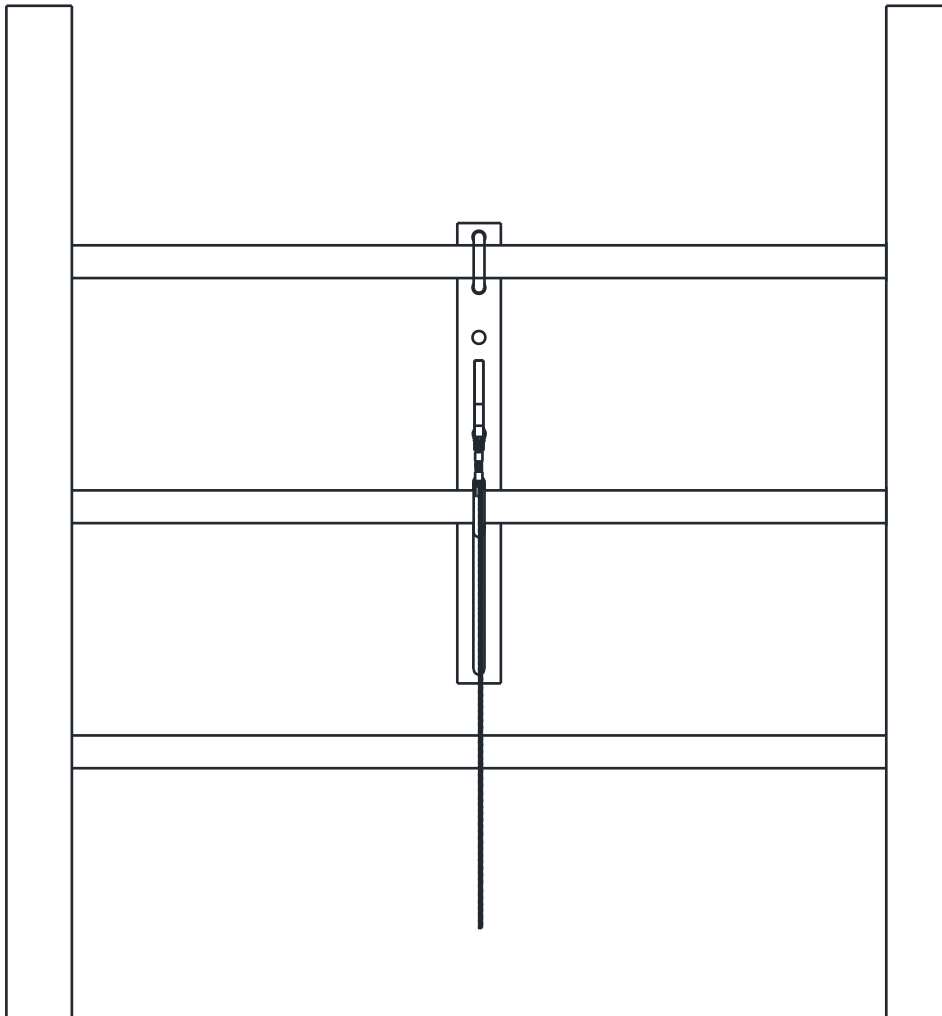


## AFF513700 Mounting Bracket Double Rung Installation

Installation of the AFF513700 Mounting Bracket on the Upper Ladder Rungs:

The mounting bracket can be installed on a two ladder rungs by bolting the two U bolts over the ladder rung. The drawings below illustrate the position of the U bolts.

FRONT VIEW



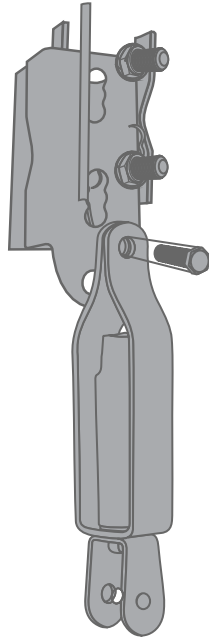
SIDE VIEW



## Installation of Shock Absorber

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- Insert the top plates of the shock absorber in the anchorage eye of the top mounting bracket, inserting the fastener so as to pass through the mounting bracket and the top plates of the shock absorber. Ensure that the shock absorber is fitted with red arrow on label pointing downwards.
- Connect the end extremity to energy absorber by inserting the spacers and the fastener through the eye of shock absorber and the cable extremity.

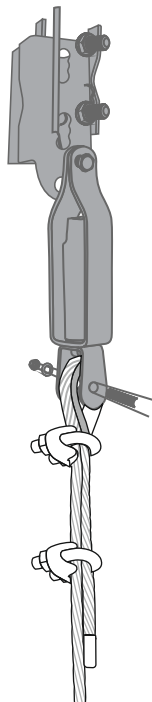


## Attaching the Wire Cable to Shock Absorber:

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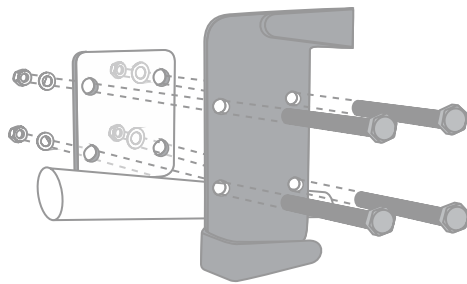
Insert the wire cable eyelet in to the housing of the shock absorber eye .

Insert the locking pin and tighten nut on opposite side to secure.

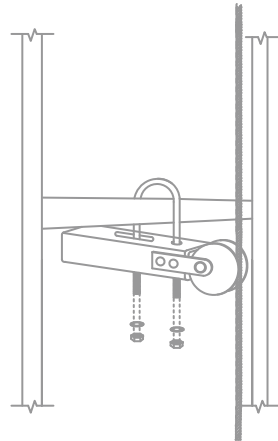


## Installation of the Intermediate AFF511500

Place the fisher plate of the intermediate on the back of the ladder rung. Fasten the intermediate plate with the fisher plate with the help of the given fasteners. Ensure that the cable is in between the two arms of the intermediate. It is recommended to install an intermediate at an interval of every 10 m length of the cable.



AFF511500



AFF512002

## Installation of the Tensioner

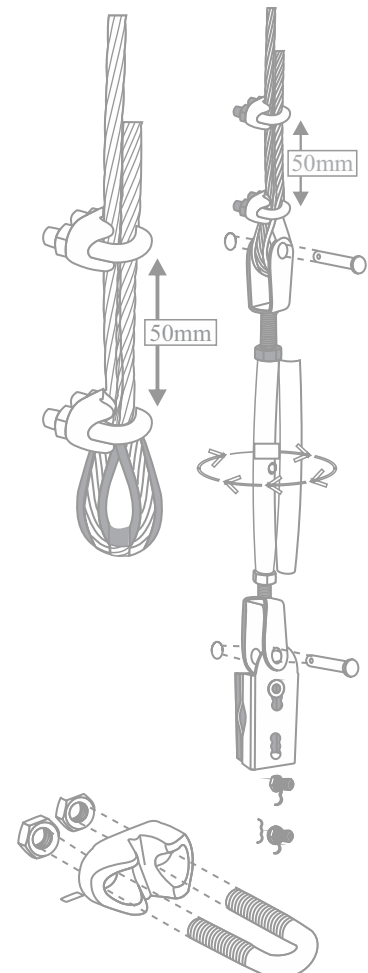
- The tensioner is installed at the lower end of the system.
- Open the threads of extension rod of the tensioner from both ends. Ensure that 75% of the thread is open.
- Insert the eye of tensioner to the mounting bracket at the lower ladder rung.
- Insert the stainless steel locking pin so as to pass through the eye of the tensioner and the mounting brackets.
- Insert the pin ring in the locking pin to lock it.

### FIX THE TENSIONER TO THE WIRE ROPE:

- Fix the thimble (part of Ref AFF513000) to the eye of the tensioner by the given fastener.
- Loop the cable across the thimble and ensure at least 300 mm of the cable is overlapping.
- Next, fasten the stainless steel U bolts (part of Ref AFF513000) approximately 50 mm apart.
- If the cable is in excess make a loop and tie the loop with cable ties.
- If it is necessary to cut the cable, insert aluminum cap in the free end of wire rope and crimp it.

### PROVIDING TENSION TO THE WIRE ROPE:

- Open both the chuck nuts and hold the tensioner eye.
- Insert a steel rod in the housing of the tensioner and rotate the tensioner in anti clock wise direction.
- Rotate it until reasonable tension is achieved in the cable and the tension indicator disc is free to rotate.
- Tighten both the chuck nuts.

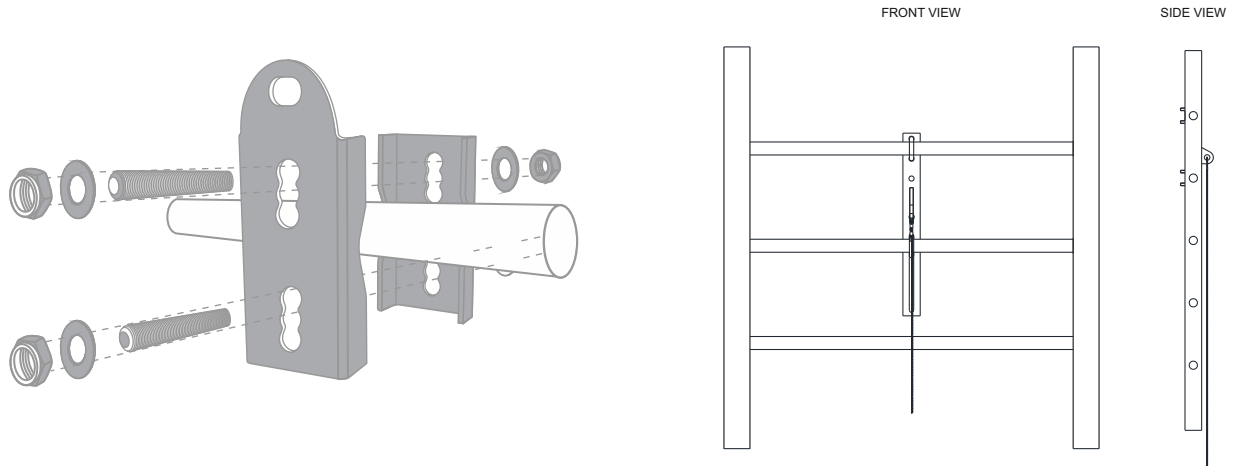


Suitable cable termination may be selected according to the site condition, U-bolts and thimbles are only allowed at bottom termination according to EN 353.1:2014

# VERTICAL ANCHORAGE LINE SYSTEM

## Installation of the Bottom Mounting Bracket AFF511000 and AFF513700

Install the bottom mounting bracket in the same way as the top mounting bracket.



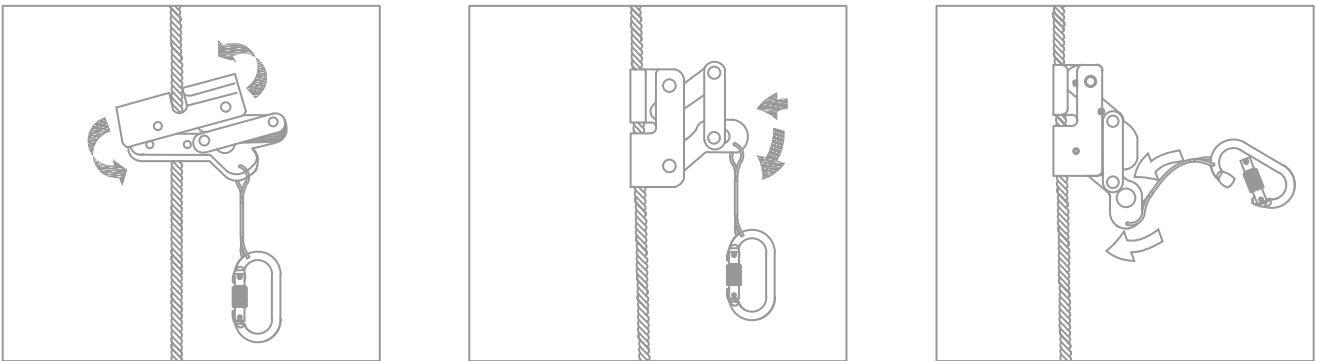
**Note:** The mounting brackets can be installed on single and double rungs.

## Installation of the Rope Grab

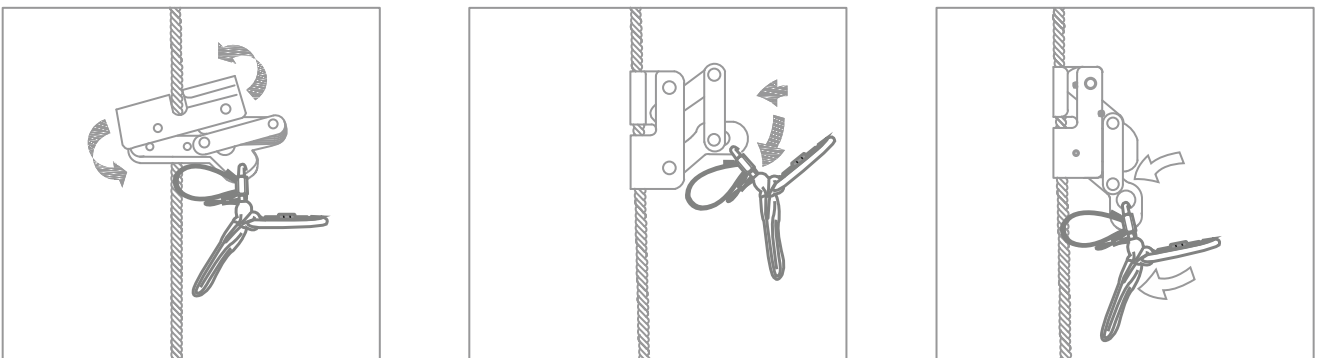
AFF805101, AFG805102 and AFG805103 - Hold the Rope Grab as shown in the figure.

Push the rope grab through the cable and rotate it counter clockwise. Ensure the arrow on rope grab points up wards. Insert the karabiner in the eye of the rope grab. Connect the other end of the shock absorbing lanyard to the harness of the user by the other karabiner.

### AFG805101



### AFG805102



# VERTICAL ANCHORAGE LINE SYSTEM

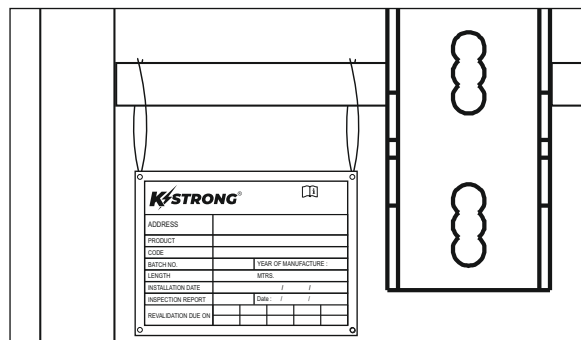
## Connect the Harness to the Rope Grab

Check the harness that all the straps are connected and buckles are secured and the harness has been adjusted to give it a snug fit. Connect the rope grab to the front attachment point of the full body harness with the help of the karabiner of the connecting lanyard. Ensure that the gate of the karabiner is closed and locked properly.



## Installation of the Identification Plate

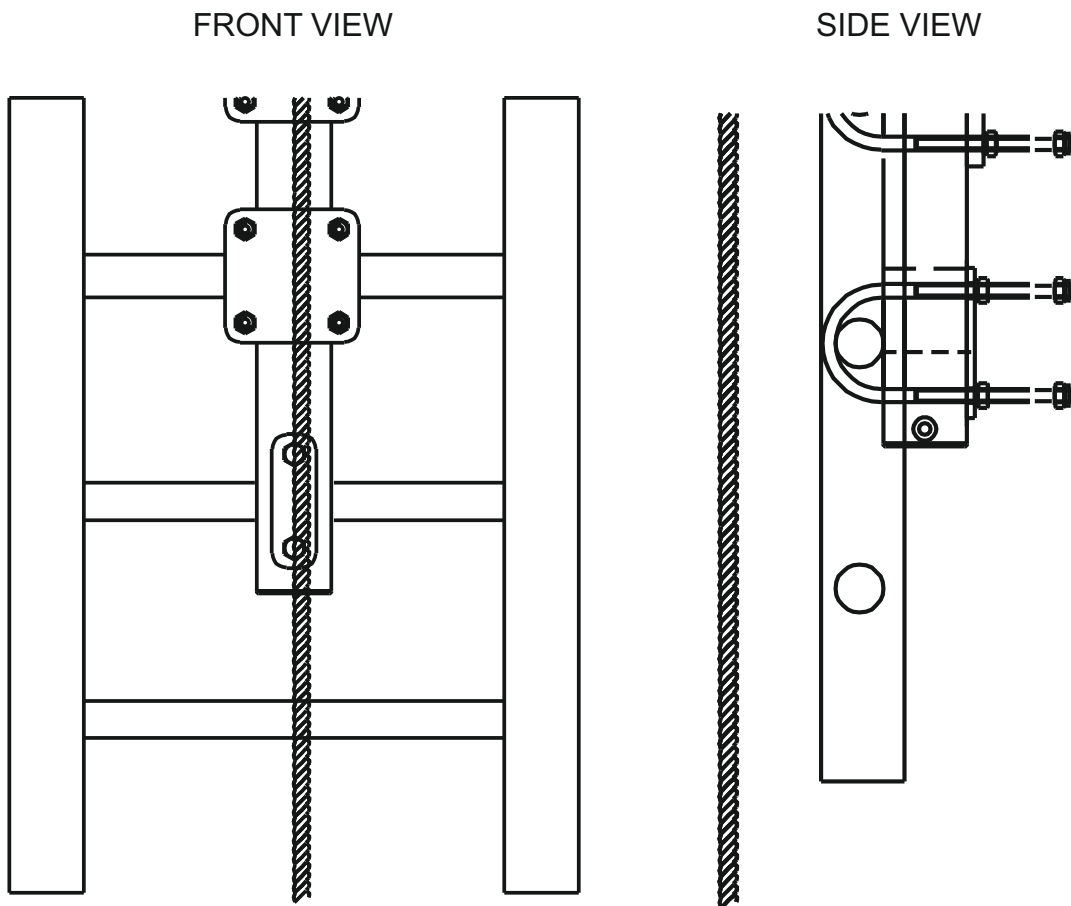
Fasten identification plate on to the lower rung of the ladder by two cable ties.



## Installation of Optional Components

### Installation of the Extension Arm

- If the system has been provided with the extension arm, this shall be installed in place of upper mounting bracket.
  - The extension arm is provided pre-installed with the mounting bracket for the upper end of the system.
- **Follow the Simple Steps For Easy Installation-Top Rung**
  - Hold the extension arm against the upper last three rungs of the ladder.
  - Hold the fisher plate in front of the extension arm.
  - Insert the given U- bolts through the rung in to the fisher plate. Tighten the nuts of the U-bolts
  - Repeat the exercise for the second rung from the top.
  - On the third rung of the ladder, from the top Insert the given U-bolt through the ladder rung in to the slot so as to pass through the extension arm tighten the nuts of the U-bolt.



## Recommended Torque

CHART							
Bolt size	M6	M8	M10	M12	M14	M16	M10 Standing Seam
Recommended Torque:	17 Nm	30 Nm	45 Nm	50 Nm	56 Nm	70 Nm	26 Nm

## Pre-Use Checks and Precautions

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### Post Installation Inspection

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- Once installed, it is important to inspect the complete line by moving the entire length of life line
- It is mandatory for the Site Inspector/Supervisor and the actual users of the system to perform a thorough check of the system before carrying out work. KStrong conducts a brief training for all concerned personnel on the subject of pre-use inspection of the system as per a defined guideline after the system has been installed by KStrong personnel. The following points are considered for the pre-use check.

### Checking the Receiving Structure

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If the ladder or the receiving structure of ladder found weak do not climb

### Checking the System

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- Clean the system from dust/dirt. Check for any mechanical defects.
- Check for wear and tear in all components or unusual bending or deformation.
- Check for any modifications done by the user.
- Check for any missing component.
- Check for any damages that may have been caused due to welding while maintenance of other equipment.
- Check the identification plate. The system needs to be put out of service if the label is not legible or missing.

### Checking the Cable

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- See that there is sufficient tension on the cable by gently pulling the cable by hand. If the cable is too loose, check whether they are properly passing through the Intermediates. If not, place them in the intermediates.
- Check the condition of the cable. Report if strands are found broken.

### Checking the Rope Grab

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- Check the movement of the rope grab and its grip before climbing. Check the spring of the rope grab, it should move freely.
- Check for excessive wear and tear in the jaws of the rope grab. The karabiner is connected to the rope grab through a sling.

### Check the Shock Absorber

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- Check the bolt of the energy absorber. If the energy absorber is deployed, the red marking on would be visible. In case the energy absorber is deployed, put the system out of use.

## Precautions Need to be Considered for Safe Use of the System

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The following points and precautions needs to be considered for safe use of the system

- The life line is for the purpose of fall protection while working on a horizontal plane at height. A back up fall arrest system is required when transitioning on and off the life line system while working at height.
- The user should not suspend himself on the rope grab. The intended use of a rope grab is fall protection and not a work positioning device.
- Never disengage the fall arresting lanyard and the carriage body from the life line while working at height.
- Avoid using grease to lubricate the system. If any fall is reported put the system out of use. Contact the manufacturer for repairs and re-validation.
- Only certified full body harness with proper attachment anchorage points should be worn while using the system.
- Do not alter or misuse this equipment. Always take the advice from KStrong personnel while using this equipment in combination with components or subsystems other than those described in this manual. Usage of certain component/sub system may interfere with the proper functioning of this equipment and the system may not deliver or work as per its intended use. In such case KStrong may not be held responsible for any malfunction.
- The lifelines must be kept free from dust, grease, etc. by periodic cleaning. The system can be cleaned by a soft dry cloth.

## Hazards

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Hazards existing in immediate environment may require additional precautions to limit the possibility of injury to the user or damage to the equipment. Hazards may include but are not limited to, extreme temperatures, caustic chemicals, corrosive environments, high voltage power lines, explosive or toxic gases, moving machinery, sharp edges, high velocity winds, etc.

Do not expose the equipment to any hazard which it is not designed to withstand. Consult the manufacturer if in doubt.

## Rescue Plan

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It is recommended to ensure that the user shall have a rescue plan and means to execute it while using this equipment. The rescue plan needs to be project specific. The employees must be trained in self-rescue or alternative means shall be provided for prompt rescue in an event of a fall.

It is recommended to work in a pair to ensure that in an event of a fall your partner may help in rescue.

## Annual Inspection & Revalidation

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According to the requirement of EN365, every PPE needs to be inspected at least once in a year. The Kstrong Compass software maintains the data of the system for at least 20 years and reminds the client whenever the inspection is due. The KStrong Inspection Team is trained to perform the inspection and provide a certificate each year at a nominal cost. The client may at any given moment of time extract the status of any of the lifeline installed anywhere in the world from the KStrong data base.

## Environment

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To protect the environment, KStrong follows a 100% paperless process. Unless specifically required KStrong avoids printing its reports and make it available to the client digitally.



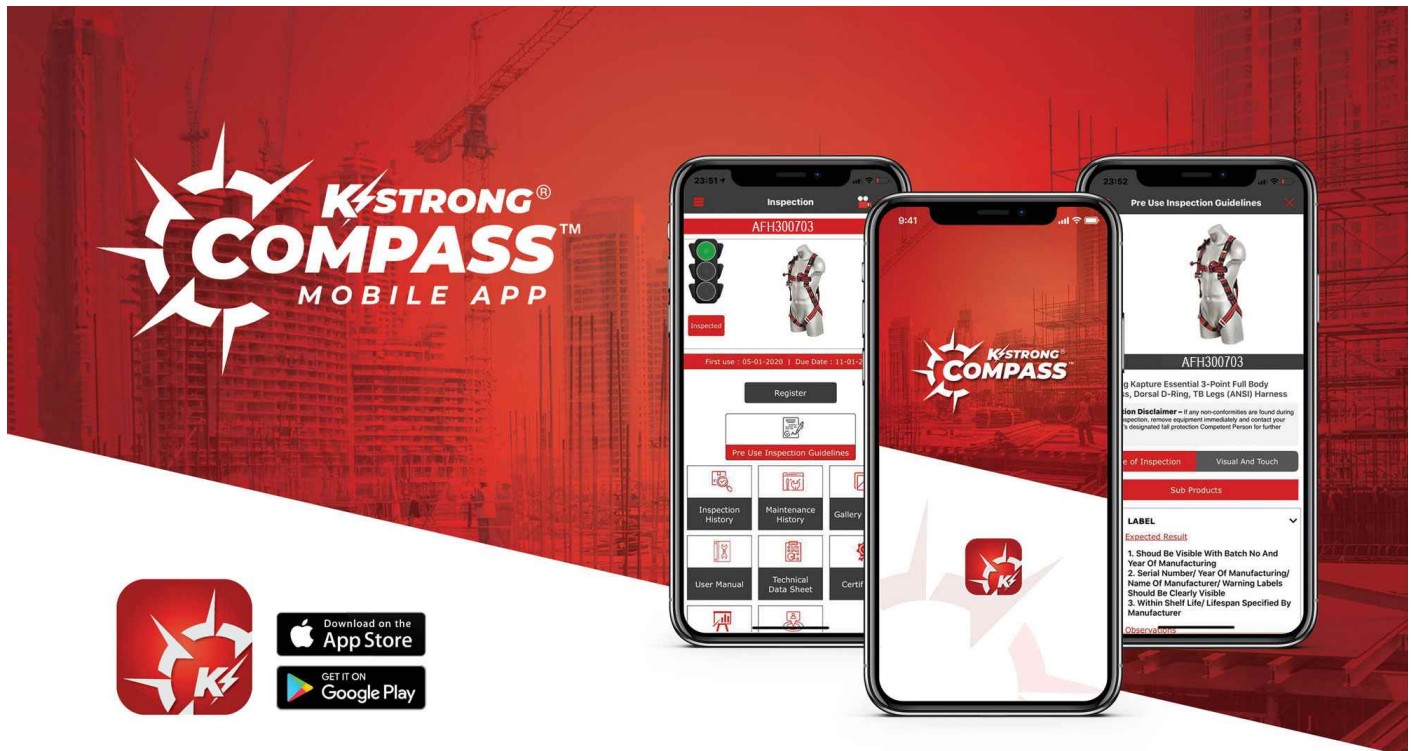
# VERTICAL ANCHORAGE LINE SYSTEM

## Inspection Use and Maintenance

### PPE Inspection and Revalidation

Fall Protection Equipment is a life saving product. As per the EN 365 of PPE Regulations 425/2016, it is mandatory to have a 'Competent Authority' to inspect the Fall Protection Equipment at least once annually

KStrong COMPASS Inspection software helps taking care of the equipment



- Cloud based online as well as off line software
- Captures geo coordinates where the system is installed
- RFID / Bar code compliant
- Generates report in real time
- Reminds user of items due for inspection
- Captures images of components
- User customizable
- Can be integrated to client software
- Reports can be shared with multiple recipients in real time

### Infrastructure

- Good quality equipment complying with international standards
- 100% backward integrated manufacturing
- Qualified engineering team
- Sophisticated test equipment
- Precise engineering software to understand the client requirement to provide a safe & optimum solution
- Technical marketing team capable of understanding the client requirement & present the solution using engineering drawings (Auto CAD) & calculations
- Force predictions on the system in an event of a fall and a testing facility to validate the force calculations

## Warranty

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The system is produced with extreme precision. Should there arise a manufacturing defect within a period of 1 year of supply, KStrong stands to repair the components or replace if necessary.

Warranty does not cover:

- Deficiency arising out of misuse of equipment
- Malfunction due to faulty installation/wrong usage of product
- This equipment is not user maintainable. The warranty stands void if an attempt is made to repair or open the equipment.

KStrong does not provide a product functioning warranty; the warranty stands for the workmanship of the products only.

- KStrong systems are made of stainless steel grade 316, ED Coated Steel or Aluminum and are highly resistant to corrosion.
- KStrong systems are thus further warrantied for 20 years (15 years for Marine Environment) they are inspected once annually according to the requirements of EN365.

# VERTICAL ANCHORAGE LINE SYSTEM

## Tools Required



RING SPANNER



DOUBLE END SPANNER



SOCKET SET



TENSIONER TIGHTENING TOOL



CRIMPING PLIER



BOLT CUTTER



ALLEN KEY

## Machines



CORDLESS DRILL MACHINE



HAMMER DRILL MACHINE



CORDLESS IMPACT WRENCH



HYDRA JAWS  
LIFELINE TESTING



SWAGING TOOL

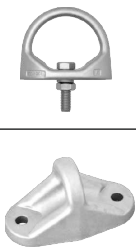


HYDRAULIC CRIMPING HEAD









POWER BIRD RIVETING MACHINE

## Anchors



# VERTICAL ANCHORAGE LINE SYSTEM

## Measuring Tools

					
TAPE	DETECTOR	DIGITAL TORQUE WRENCH	DISTANCE METER	LASER TOOL	VERNIER

## Consumables, Miscellaneous Tools

						
DUST PUMP	HOLE SAW CUTTER	HOT AIR GUN	SETTING TOOL	PAINT BRUSH	DRILL BIT	IMPACT DRILL
						
BLOWER	CHEMICAL APPLICATOR					

WRENCH SIZE					
Hex Bolt	6	8	10	12	16
Wrench Size	10	13	16	19	24
Socket Size	10	13	16	19	24

ALLEN KEY SIZE				
Allen Bolt Size	6	8	10	12
Allen Key Size	4	6	8	10
Allen Grub Screw Key Size	3	4	5	6

## Torque Chart (Maximum torque for standard bolts)

CHART							
Bolt size	M6	M8	M10	M12	M14	M16	M10 Standing Seam
Recommended Torque:	17 Nm	30 Nm	45 Nm	50 Nm	56 Nm	70 Nm	26 Nm

## Proof Loading Proof

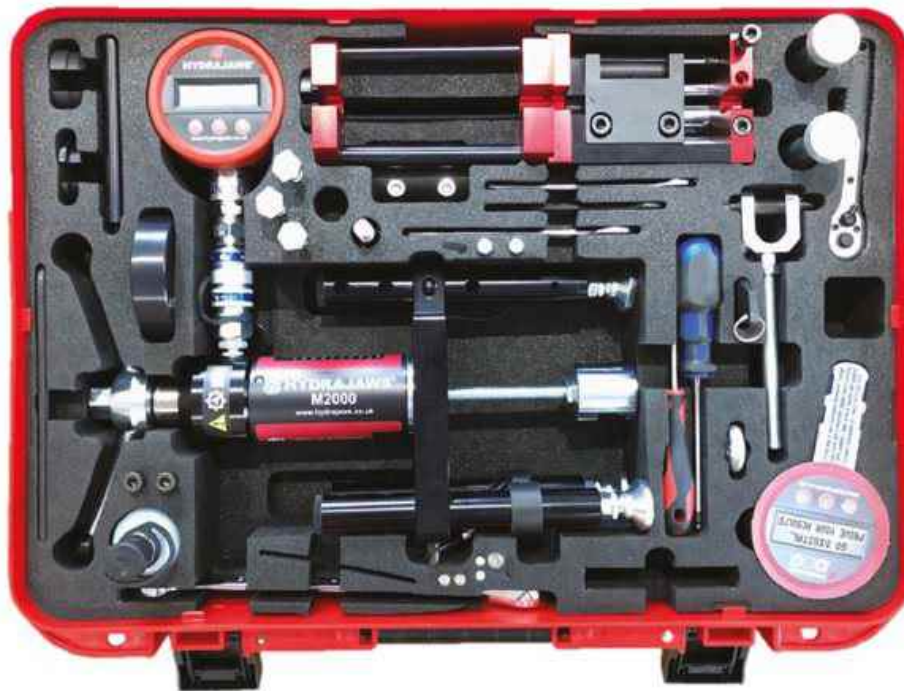
### Process of Proof Loading of Horizontal and Vertical Life Lines

#### Proof loading of roof post (Non Destructive)

- Post installation at least 10% of the posts should be proof loaded by a load testing device .The posts should be subjected to a static load of 1.0 kN for a period of 1 minute in accordance with EN 795 (4.4.1.1).The permanent deflection as a result of proof loading should not be greater than 10 mm after the load is released

#### Proof loading of termination(Non Destructive)

- Each cable end termination should be proof loaded by a load testing device, to a static force of 6 kN.The force is held for 1 minute. The proof loading ensures that the end cable terminations are robust and will not release the cable in an event of a fall.



HYDRA JAWS LIFELINE TESTING

# VERTICAL ANCHORAGE LINE SYSTEM

## Inspection Log

EQUIPMENT RECORD				
Product				
Model & type/Identification		Trade Name		Identification number
Manufacturer		Address		Tel, Email
Year of manufacture		Purchase Date		Date first put into use
Other relevant information (eg. document number)				
PERIODIC EXAMINATION AND REPAIR HISTORY				
Date	Reason for entry (periodic examination or repair)	Defects noted, repairs carried out and other relevant information	Name and signature of competent person	Periodic examination next due date





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USA

South America

Asia

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