AVANTI FALL PROTECTION SYSTEM

User's Manual and Installation Instructions

AVANTI Fall Protection System

User‘s Manual and Installation Instructions

Only trained people may use this fall protection system.

This manual must be available to staff at all times during installation, maintenance and operation. Additional copies are available from the manufacturer upon request. This manual, including, but not limited to, measurements, procedures, components, descriptions, instructions, recommendations and requirements, is subject to change without prior notice. Please check Avanti website/manuals for the latest revisions of the manuals. Any additional cost related to or arising from any changes in the manuals does not entitle Customer to any form of compensation or other legal remedies.

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Limited Warranty

Avanti Wind Systems Technology, S.L. warrants that commencing from the date of shipment to the Customer, and continuing for a period of the longer of 365 days thereafter, or the period set forth in the standard AVANTI warranty, the Fall Protection System ("Product") described in this Manual will be free from defects in material and workmanship under normal use and service when installed and operated in accordance with the provisions of this manual.

This warranty is made only to the original user of the Product. The sole and exclusive remedy and the entire liability of AVANTI under this limited warranty, shall be, at the option of AVANTI, a replacement of the Product (including incidental and freight charges paid by the customer) with a similar new or reconditioned Product of equivalent value, or a refund of the purchase price if the Product is returned to AVANTI, freight and insurance prepaid. The obligations of AVANTI are expressly conditioned upon return of the Product in strict accordance with the return procedures of AVANTI.

This warranty does not apply if the Product (i) has been altered without the authorization of AVANTI or its authorized representative; (ii) has not been installed, operated, repaired, or maintained in accordance with this Manual or other instructions from AVANTI; (iii) has been subjected to abuse, neglect, casualty, or negligence; (iv) has been furnished by AVANTI to Customer without charge; or (v) has been sold on an "AS-IS" basis.

Except as specifically set forth in this Limited Warranty, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, SATISFACTORY QUALITY, COURSE OF DEALING, LAW, USAGE OR TRADE PRACTICE ARE HERBY EXCLUDED TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW AND ARE EXPRESSLY DISCLAIMED BY AVANTI. IF, PURSUANT TO ANY APPLICABLE LAW, TO THE EXTENT AN IMPLIED WARRANTY CANNOT BE EXCLUDED AS PROVIDED IN THIS LIMITED WARRANTY, ANY IMPLIED WARRANTY IS LIMITED IN TIME TO THE SAME DURATION AS THE EXPRESS WARRANTY PERIOD SET FORTH ABOVE. BECAUSE SOME STATES DO NOT PERMIT LIMITATIONS ON THE DURATION OF IMPLIED WARRANTIES, THIS MAY NOT APPLY TO A GIVEN CUSTOMER. THIS LIMITED WARRANTY GIVES CUSTOMER SPECIFIC LEGAL RIGHTS, AND CUSTOMER MAY HAVE OTHER LEGAL RIGHTS UNDER APPLICABLE LAWS. This disclaimer shall apply even if the express warranty fails of its essential purpose.

In any cases of dispute the English original shall be taken as authoritative.

Regulations

Fall protection system Runner System 2000/2002 tested according to standards ANSI/ASSE A14.3-08 and CAN/CSA Z259.2.1-98 .

Fall protection system Eagle Ds tested according to standards ANSI/ASSE A14.3-08 and CAN/CSA Z259.2.4-2015 .

Terms and definitions

Terms	Definitions
Certified technician	Person who has gone through the relevant training associated with the scheduled task from Avanti or from a certified trainer and is in possession of a valid (non expired) certificate for the task.
User	Person who has gone through the relevant training associated with the Avanti fall protection system use and daily inspection and is in possession of a valid (non expired) certificate for the task.

1 Caution

a) A certified technician is familiar with and is trained within the AVANTI Fall Protection System, and the following standards: CAN/CSA Z259.2.1-98, CAN/CSA Z259.2.4-2015, ANSI/ASSE Z359.12-09, ANSI/ASSE Z359.13-13, ANSI/ASSE A14.3-08, CAN/CSA Z259.12-11 and CAN/CSA Z259.11-05. A certified technician has succesfully participated in the AVANTI Fall Protection course and is considered competent. A user is familiar with the correct usage of the AVANTI Fall Protection System and has had an introduction to personal protection equipment.

b) Assembly, maintenance and testing of the Fall Protection System may only be performed by a certified technician.

c) Users are obliged to read and understand this User's Manual.

d) A copy of the User's Manual must be handed out to the fall protection users and must be available for reference.

e) If more than one person is trusted with one of the above tasks, the employer shall appoint a supervisor in charge of operation.

f) If the Fall Protection System is re-sold outside the original country of destination the reseller shall provide instructions for use, for maintenance, for periodic examination and for repair in the language of the country in which the product is to be used.

g) Please insure the ladder system with the Fall Protecting System is capable of supporting: for USA: not less than 5000 lb (22,6kN) static load, for Canada: not less than 27 kN.

h) Always remove the runner from the rail when not in use; the runner is not intended to be parked on the rail when freely suspended.

i) The system is only to be operated by users being properly trained in daily inspections, working at heights and practical operation of the system.

j) For optimal operation, enhanced safety and better climbing ergonomics; the climber is recommended to maintain a minimum distance of 4" (10 cm) from torso to ladder during regular climb. A good climbing position is easily obtained by leaning the upper back against the tower.

k) The weight of the user including clothing and equipment shall be between 45 and 115 kg (for Shock Absorber Pack class E4), or 90 and 136 kg (for Shock Absorber Pack class E6).

2 Danger

a) The Fall Protection System may not be used by persons under influence of alcohol or drugs that may jeopardize working safety.

b) Only certified technicians may use the system.

c) Owner must ensure that a rescue plan that deals with any emergencies that could arise during work is in place and that the users are familiar with this.

d) If any damage or faults are found during operation, or in case of circumstances which may jeopardize safety:
- Immediately stop the work in progress
- Contact the authority responsible e.g. the turbine owner or the site foreman.

e) No warranty is provided against damage resulting from reconstruction or modification of equipment or use of non-original parts which are not approved by the manufacturer.

f) The Fall Protection System may not be used outside its limitations, or for any purpose other than for which it is intended.

g) The AVANTI fall protection runner should be treated as personal protection equipment.

h) Keep a distance of 20 feet (6 meters) between each user during ascent and descent.

i) In the first two meters the user may not be protected against hitting the ground. Take precautions.

j) Prior to initial use a certified technician must inspect the system.

k) Clean off any oil, grease, or residue on the rail.

l) If oil, grease, chemicals or residue has leaked onto the shock absorber or in any kind been in contact with the webbing, have AVANTI replace the shock absorber.

m) After 5 years of use replace the shock absorber. Date of manufacture is printed on the shock absorber label.

n) Operation temperature -22 / +140 Fahrenheit(-30 / +60 Celcius).

o) In connection with the Fall Protection System only full body harnesses approved according to EN 361, ANSI Z359.1 and CSA Z259.10 may be used.

p) The complete Fall Protection System has been manufactured and tested according to applicable parts of ANSI/ASSE A14.3-08 and CAN/CSA Z259.2.1-98 and CAN/CSA Z259.2.4-2015.

q) Ladders supplied by AVANTI comply with the requirements of EN 131, EN ISO 14122 and ANSI 14.3

r) The Avanti supplied Carabiner is tested according to CAN/CSA Z259.2.1-98, CAN/CSA Z259.2.4-2015, ANSI Z359.12-2009 and EN 362 requirements.

s) All the FPS parts have been especially developed and tested for AVANTI´s FPS. Thus, they shall not be used as part of other Fall Protection Systems.

t) These instructions must be kept together with the Fall Protection System.

u) Whenever using the AVANTI Fall Protection System it's very important to always make sure that it is connected by the D-ring marked "A" in the front of the full body harness complying with the demands for climbing in vertical fall arrest safety systems on ladders. This infomation shall be described in the user manual from your harness supplier.

v) It is necessary to use alternative fall protection when stepping on or off the ladder. The runner must not be disconnected from the rail before establishing alternative fall protection.
The runner must always be attached to the D-ring marked "A" in the harness before connecting or disconnecting it to the rail.

w) When working or resting at the ladder it's essential that the user utilizes alternative safety. The AVANTI Fall Protection System is only tested as fall arrest safety when ascending or descending the ladder.

x) Don't ever twist the shock absorber, it may cause the system to fail.

Owner must verify the need for 3rd party fall protection device inspections with the local authority and comply with the standards specified.

3 Description of Equipment

3.1 Purpose

The Fall Protection Devices in this User's Manual served the following purposes:

- The Fall Protection System is intended for use during ascent and descent on stationary ladders installed in towers, pylons, well shafts, manholes, etc.
- The Fall Protection System is a safety device traveling on a rail which prevents free fall during climbing.
- The fall protection safety rail is designed for permanent installation in one place.
- The Fall Protection System can be mounted on different shapes and brands of ladders, as long as approval is issued by AVANTI according to section 10.

The Fall Protection System is not designed for:

- Securing horizontally.
- Securing Equipment.
- The FPS shall never be used for work positioning or for securing equipment. If work positioning at the ladder is required, a separate dedicated and approved work positioning equipment shall be used.

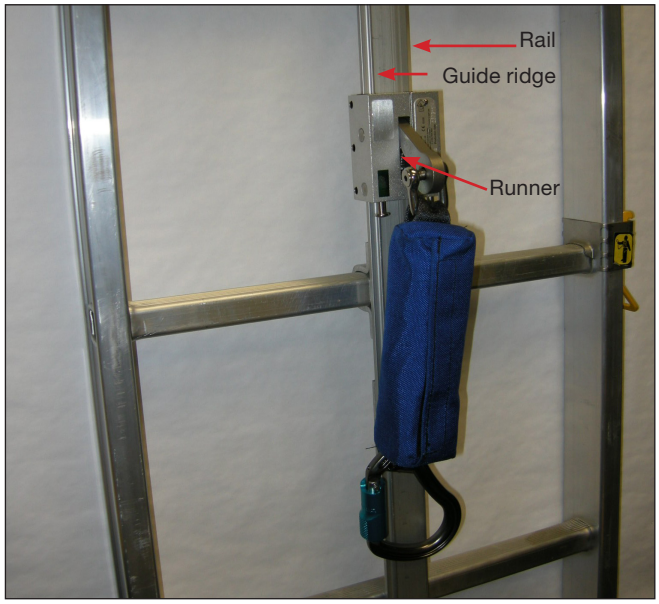
3.2 Function

a) The user attaches the runner to the designated D-ring marked “A” in the front of his full body harness by means of the integrated shock absorber and the carabiner. (In case of two D-rings marqued “A” in the front of full body harness, both rings act toguether like an only point of attachment, do not individually).

b) Before starting to climb, the user clicks the runner on the safety rail and checks its locking.

c) When climbing, the runner glides along the safety rail. In case that the user experiences a fall, the runner will lock on the safety rail and arrest the person falling.

3.3 Component overview:



Rail and runner on ladder

Runner 2000/2002 with shock absorber pack and carabiner.

Eagle^{DS} runner with shock absorber pack and carabiner.

4 Daily Inspection

1) Before any use the runner must be checked for visual damage, wear and tear, and other defects, according to the appropriate “Daily inspection checklist” Appendix.
2) During ascent look for visible damage and loose parts along with loose bolts on ladder, rail or joints.

3) Equipment with defects or equipment that leaves doubt concerning safe use must be checked by a certified technician.

STOP if the runner looks defective / or parts are missing, do not use it.

If the FPS has blocked a fall or has been put out of service because of doubts, it may only be put back to service after an inspection by a certified technician is performed. The certified technician shall confirm in writing that the FPS is found in safe condition to be used again.

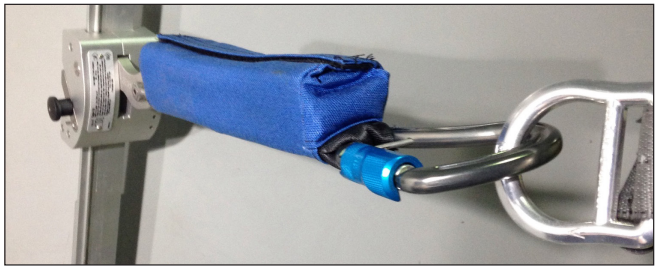
5 Instructions for Use

DANGER!

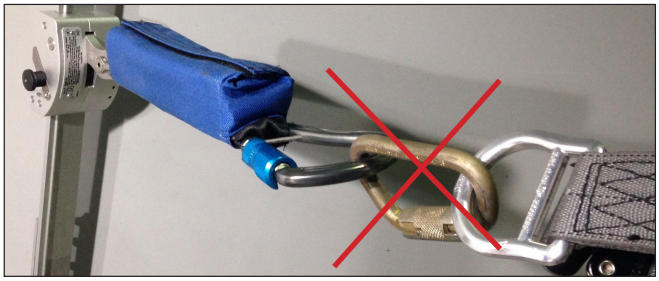
- The runner, the shock absorber pack, and the carabiner comprise a safety system. Never adapt, extend, or in any way change this system.
- The arrow on the runner must point upward – otherwise it will not block a fall.

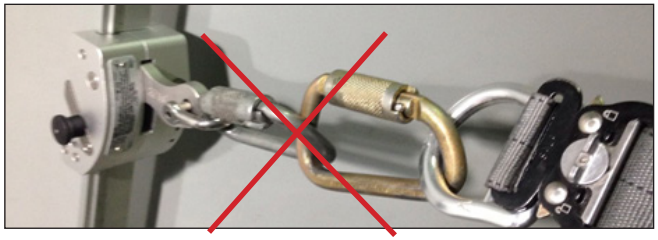
The Avanti fall arresters could be lubricated with a high performance grease, for instance HTS+PTFE ABSOBON (Würth) or ISOFLEX TOPAS L32 N (Klüber), for cold conditions. Any grease to be used in Avanti fall arresters must be verified and approved by Avanti.

Correct mounting



Incorrect mounting





5.1 Instructions for use of Runner 2000/2002

5.1.1 Attaching the Runner 2000/2002 to the safety rail

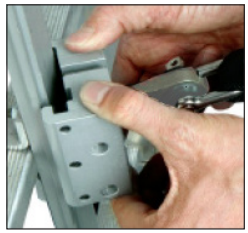
STOP

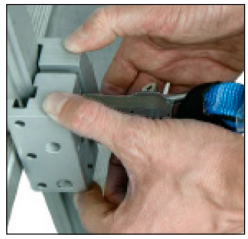
Before using the runner, make sure that you are wearing an approved full body harness, and that it is properly adjusted to a snug fit (it should not be used if loose). Before attaching the runner to the rail, ensure that you are in a safe area (ground level) or attached to an alternative fall protection.

Before attaching the runner to the rail, ensure that it is attached to the D-ring marked “A” of the full body harness in order to avoid dropping it.

The carabiner shall only be connected to the D-ring marked “A” of the full body harness located on the front side of the user and located at the chest height.

The D-ring marked “A” shall comply with the demands for climbing in vertical fall arrest safety systems on ladders (see the user´s manual of the full body harness). When attaching the carabiner, ensure that the shock absorber is not twisted between the runner and the carabiner. A twisted shock absorber may cause the FPS to fail.





a) Place the runner on the safety rail ensuring that the arrow on the plate of the runner points upwards. Otherwise, the runner will not arrest a fall.

b) Open the runner by pressing the left bottom pin and pulling apart both body sides of the runner simultaneously.

c) While lifting the lever, tilt the runner so the runner is parallel and close to the safety rail.

d) Push together the two body parts of the runner until the left bottom pin pops out. You will hear a click sound.

e) Make sure the runner is locked correctly by pulling the lever downwards and confirming that the runner locks on the rail.

f) Climb the ladder keeping a distance of minimum 10 cm between torso and ladder. This distance guarantees an optimal operation, enhanced safety and better climbing ergonomics.

g) During ascent or descent, keep a minimum distance of 6 meters between each user.

STOP

If the full body harness becomes loose during ascent or descent, it should be correctly adjusted again from a secured position.

STOP

Each rail section shall only be used by one user at a time, since having more users using the same rail section simultaneously would jeopardise its structural resistance.

Engaging the release mechanism of the runner during ascent or descent can jeopardise the function of the braking mechanism.

The FPS is only approved as a fall arrest safety when ascending or descending the ladder. Thus, the FPS shall never be used for work positioning or for securing equipment. If work positioning at the ladder is required, a separate dedicated and approved work positioning equipment shall be used.

5.1.2 Releasing the Runner 2000/2002 from the safety rail

a) Before stepping in or stepping off the ladder, attach alternative fall protection.

STOP Before releasing the runner from the rail, ensure that you are in a safe area (ground level) or attached to an alternative fall protection.
Before releasing the runner from the rail, ensure that the runner is without load and that there is no risk of falling.
Before releasing the runner from the rail, ensure that it is attached to the D-ring marked "A" of the body harness in order to avoid dropping it.

b) Release the runner from the rail by pressing the left bottom pin and pulling the runner body parts apart simultaneously.

c) Remove the runner from the rail. It is not intended to be parked on the rail. The runner is personal and shall be in reach in case of an emergency.

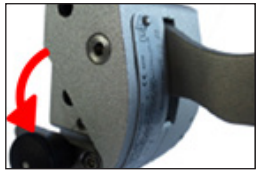
STOP If any damages or faults are found during operation, or any other circumstance which may jeopardise safety: immediately stop the work in progress, and contact the site responsible, e.g. the turbine owner or the site foreman.

5.2 Instructions for use of Eagle^{DS} Runner

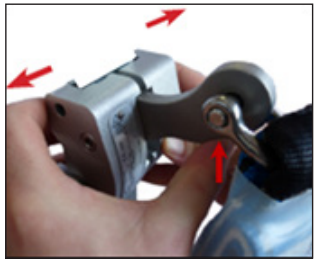
STOP The cautions listed previously for Runner 2000/2002 are equally applicable to Eagle^{DS} Runner. Follow them closely.

5.2.1 Attaching the Eagle^{DS} Runner to the safety rail

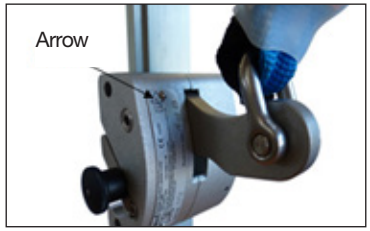
a) Pull out the plunger and rotate the locking lever downwards (see images below).

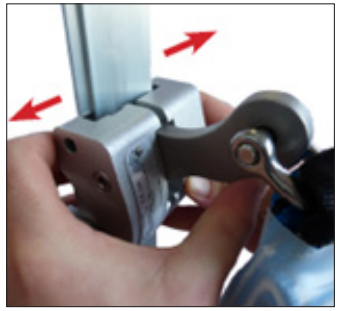


b) Open the runner by pressing the right button and pulling apart both body sides of the runner simultaneously.

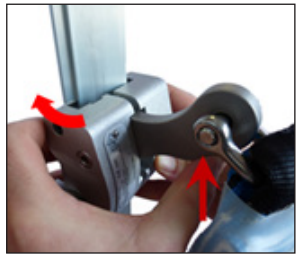


c) Place the runner on the safety rail ensuring that the arrow on the plate of the runner points upwards.

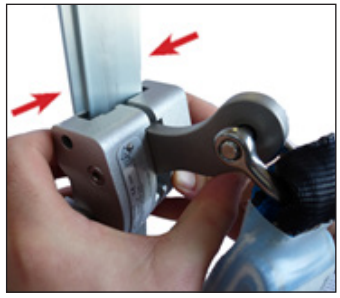




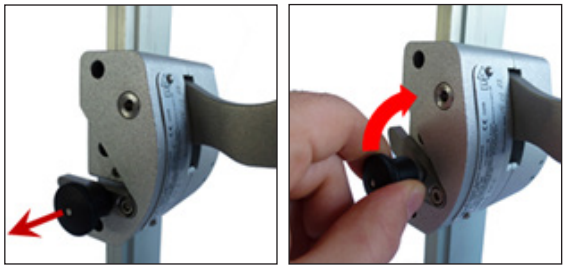
d) While lifting the lever, tilt the runner so the runner is parallel and close to the safety rail.



e) Push together the two body parts of the runner until the push button pops out and you hear a click.



f) Pull out the plunger and rotate the locking lever upwards (see images below).



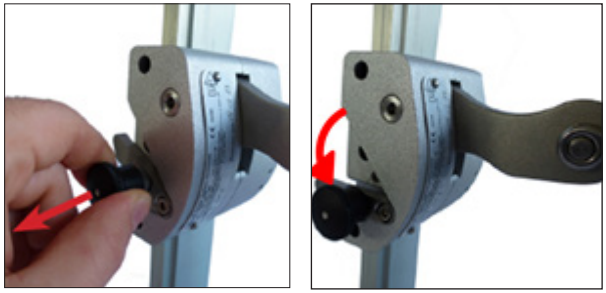
g) Make sure that the runner is locked correctly by pulling the lever downwards and confirming that the runner locks on the rail.

h) Climb the ladder keeping a distance of minimum 10 cm between torso and ladder. This distance guarantees an optimal operation, enhanced safety and better climbing ergonomics.

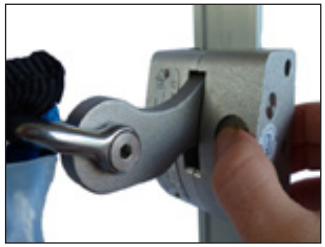
i) During ascent or descent, keep a minimum distance of 6 meters between each user.

5.2.2 Releasing the Eagle^{DS} Runner from the safety rail

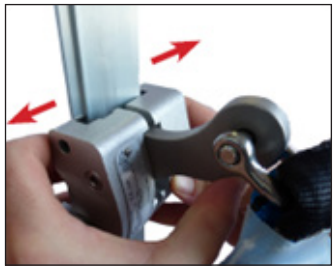
a) Pull out the plunger and rotate the lever downwards to the horizontal position (see images below).



b) Press and hold the push button.



c) Open the runner by pressing the push button and by pulling apart both body sides of the runner simultaneously (see image below).



d) Remove the runner from the safety rail.

Caution!
The locking lever is only to be used when locking or unlocking/releasing the runner. In all other situations the locking lever shall be kept in locked position fixed with the plunger locked in the runner body.

Before detaching assure you are in a safe area or secured by another fall protection device.

DANGER!

- If the fall protection System has blocked a fall take the ladder and runner out of use. Contact a certified technician so they can inspect the affected ladder/rail and the runner.

- Whenever using the AVANTI Fall Protection System it is very important to always make sure that the harness is connected by the D-ring marked “A” complying with the demands for climbing vertical fall arrest safety systems on ladders. This information shall be described in the user manual from your harness supplier.

- To ensure safety it is very important that the runner is attached to the correct D-ring marked “A” in the front of the full body harness before connecting to or disconnecting from the the ladder/fall arrest system. This way the user can’t drop the runner. Only connect or disconnect the runner from the rail while standing on a safe support or adequately tied-off with secondary fall protection system.

- When working or resting at the ladder it is essential that the user uses a secondary fall protection system. The AVANTI Fall Protection System is only approved a fall arrest safety when ascending or descending the ladder. Thus, the FPS shall never be used for work positioning or for securing equipment. If work positioning at the ladder is required, a separate dedicated and approved work positioning equipment shall be used.

WARNING!

- The fall arrester shall be attached to no more than one personal fall-arrest system.

- Use is not suitable when the user is positioned on an unstable surface, fine-grain material, or particulate.

6 Maintenance

a) Keep all parts free of oil, grease, paint and chemicals.
b) Never place liquids or sharp objects in the vicinity of the Fall Protection System as these may damage the equipment.
c) The shock absorber pack can be cleaned using a weak detergent-solution and a soft brush. Subsequently, rinse with clean water.
d) If the system gets wet let the shock absorber pack air-dry naturally. Do not use any kind of heating.
e) Store runner out of direct sunlight and protected from heat and dust.

At minimum, every 12 months, the Fall Protection System should be inspected by an AVANTI certified technician.

7 Annual Inspection

Once a year a certified technician must inspect the fall protection system according to ANSI Z359.2-2007. If the Annual tests are not performed this will void the warranty and AVANTI will renounce all liability and claims that may appear. AVANTI conducts Fall Protection Courses on a regular basis. If interested, contact AVANTI.

The annual inspection may only be conducted by a certified technician or representative from Avanti.

The annual inspection shall be carried out following the inspection procedure (see section 11). During the inspection, the “Inspection Before Initial Use Report” Appendix and the “Inspection log sheet” Appendix shall be filled in for future reference.

8 Ordering Spare Parts

When parts are found to be missing, stop working - the system must be taken out of use!
Rail and ladder: Contact a certified technician and let him/her replace/repair the missing parts and conduct a Fall Protection System inspection.
Runner: Contact AVANTI and let them replace/repair the missing parts and conduct a runner inspection.

9 Marking

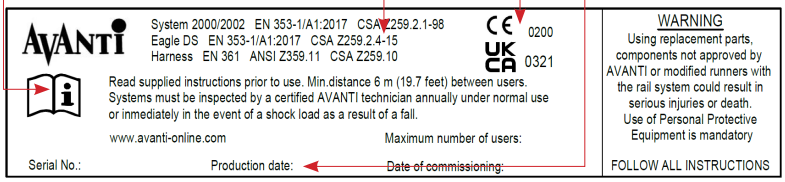
Upward direction when runner is attached to rail
Read instructions before use
Runner production no.
AVANTI product name

Runner rating plate (with Shock absorber pack class E6)

Runner rating plate (with Shock absorber pack class E4)

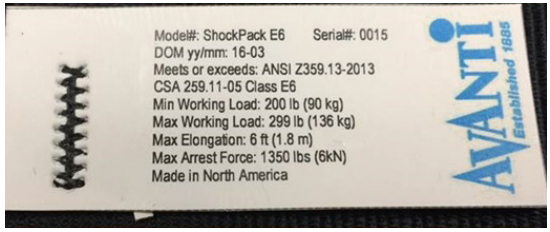
12

EEC-notified body no.
Standard no.
Production batch no.
Read instructions before use



Rail rating plate

Shock absorber pack label (class E4)



Shock absorber pack label (class E6)

Note: (Applies only to back side)
1. Black text including serial No.
2. Text height 5mm
3. Serial No. same as front side

10 Fitting Instructions

The certified technician or representative of Avanti, shall be in charge of the FPS installation. The certified technician shall take full responsibility for the installation and shall guarantee that it is done in accordance to these instructions.

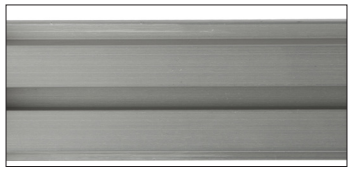
The installation designer/manufacturer is responsible for integrating the FPS to the ladder system and guaranteeing compliance to the requirements established by the standards EN 353-1 and ISO 14122-4, and the applicable harmonised standards, according to Avanti's recommendations.

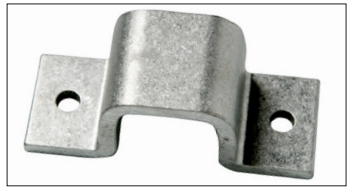
The design and calculation of the ladder system installation components (brackets, anchors, structure fixing points, etc.) is the responsibility of the installation designer/manufacturer and the maximum number of users allowed[1)] must be considered.

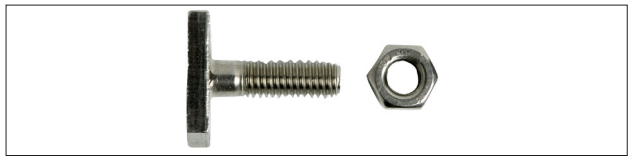
Must also provide any additional relevant warning, instruction and/or training specific to the integration and use of the FPS that is necessary for its safe and correct use, analyzing the influence of other usage conditions and installation components out of AVANTI scope of supply.

[1)]The owner/manufacturer of the wind turbine tower is responsible for marking the maximum number of users allowed on the safety rail rating plate.

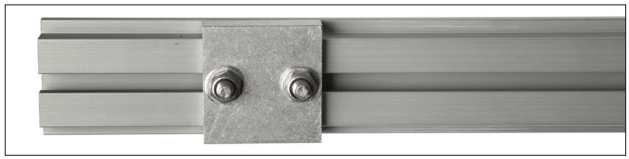
a) The FPS shall only be installed with original system parts.
b) All FPS elements shall be checked on site, even if the ladders are supplied with the rails already fitted.
c) The vibrations and torsional stress are absorbed by the ladder joints, not by the safety rail.
d) Ensure that the ladder intended for mounting the FPS complies with the requirements of EN 131, EN ISO 14122 and ANSI 14.3. The internal rung width shall be minimum 340 mm (all AVANTI ladders meet this requirement).
e) The ladders with rung geometries different to AVANTI's may call for special rung fittings. Prior to installation, these ladders shall be calculated, tested and approved by AVANTI.
f) Before installing the rail system, ensure that all parts are present. Refer to the parts list supplied with the FPS.
g) The ladders shall be installed vertically with a maximum inclination of 5°. In North America ladders shall never be installed in a negative climb.
For other installation conditions, please contact Avanti.
h) The parts of the safety rail system to be installed are shown below.

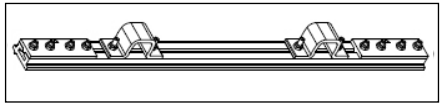

Safety rail section (backside)


Rung fitting


Hammerhead bolt with self-locking nut

Fish joint connector


Sample of rail-stop to be used at top and bottom of the rail installation


Flange connection kit

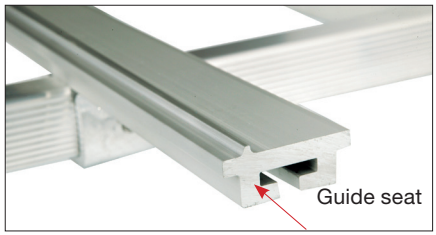

Runner 2000/2002 with shock absorber pack and carabiner.


Eagle[DS] Runner with shock absorber pack and carabiner.

Installation of the rail system on the ladder

a) Place the safety rail on the center and front side (the climber´s side) of the ladder.

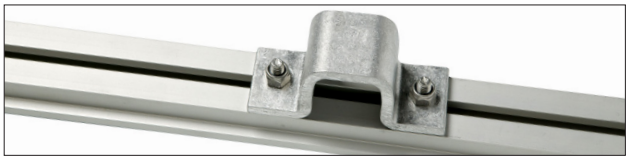
b) Place the safety rail so that the guide seat is situated on the left side.



The guide seat is meant to prevent incorrect orientation of the runner. The guide seat must be situated on the left side.

c) Fix the safety rail to the ladder by means of the rung fittings.

d) Mount the rung fittings using hammerhead screws and self-locking nuts, and following the instructions below.



A rung fitting mounted on the rail

i. For each rail section, mount a rung fitting on the first (lowest) rung of the ladder that is reached by the rail section.

ii. For each rail section, mount a rung fitting on the last (highest) rung of the ladder that is reached by the rail section. This is also necessary even if the second or third last rung of the ladder are mounted with a rung fitting.

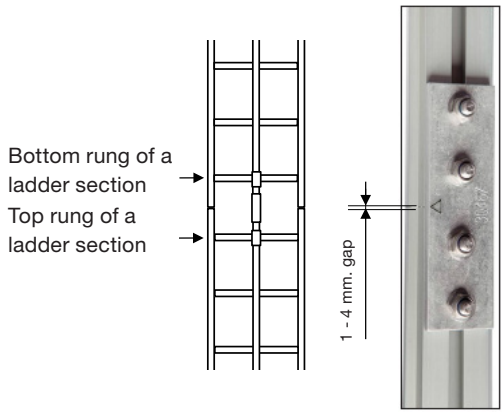
iii.For each rail section, mount a rung fitting at least every third rung, never-leaving more than 2 consecutive rungs without a rung fitting.

iv. For each rail section, mount at least 4 rung fittings to the ladder. When-rail section is connected to another rail section, the fish joint can be also considered as a rung fitting connection.

e) Use a fish-joint to join 2 consecutive safety rail sections.

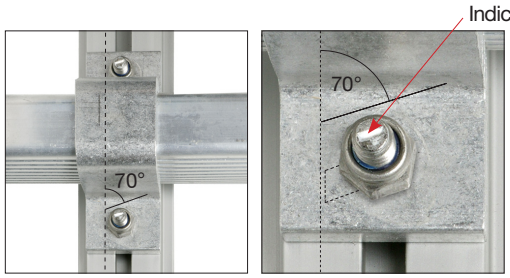
f) Use 4 screws to mount each fish-joint.

g) Leave a gap between 2 consecutive safety rail sections of at least 1 mm and maximum 4 mm.



h) Place the hammerhead screws with the indicator marks in an angle of 70°.

i) Tighten all the self-locking nuts to 8 Nm and ensure that they sit with the 70° angle.



Angle of the indicator marks and of the self-locking nuts

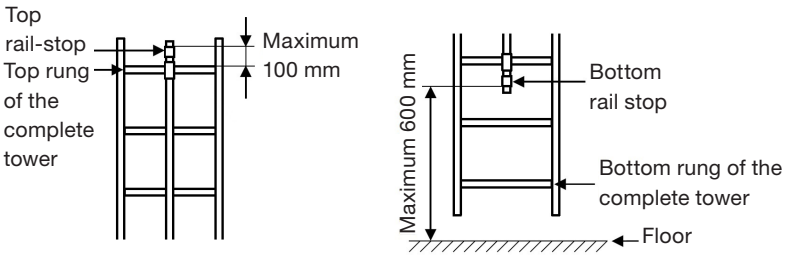
j) Use the supplied self-locking nuts at all times.

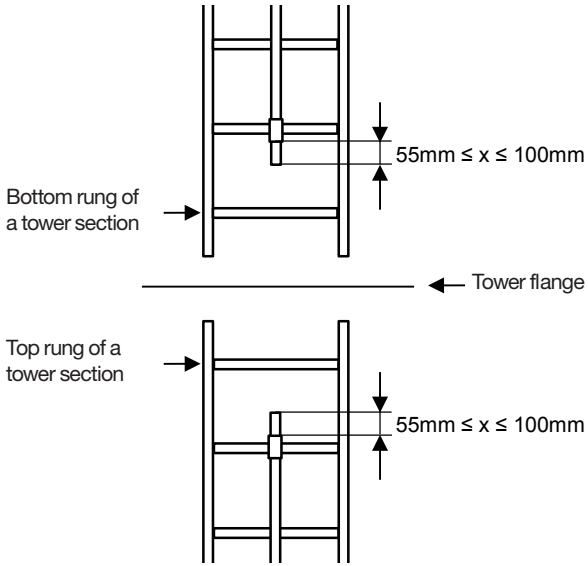
k)Ensure that each screw extends from the nut by at least half of the thread diameter, or by at least 2 threads (apply the most restrictive requirement).

A rail-stop shall be installed at the top and bottom of the rail, and at any provisional point where the runner can unintentionally run off the rail.

l) Mount the top and bottom rail-stops on the safety rail, at the highest and lowest travel points respectively.

m) The distance between top rung and the top end of the safety rail shall not exceed 100 mm. The distance between the bottom end of the safety rail and the ladder bottom/floor level shall not exceed 600 mm.





Length limits of the top and bottom ends of the safety rail

n) During the erection phase of the wind turbine tower sections (i.e. when the tower sections are being connected vertically), a top rail-stop shall be mounted on the safety rail at the highest point of each tower section. This way, the technicians will be able to use the FPS during this phase.

o) If the safety rail and the ladder are installed in a wind turbine tower section before the tower is erected, their final position shall be adjusted during the tower erection.

Safety rail at the tower flange connections

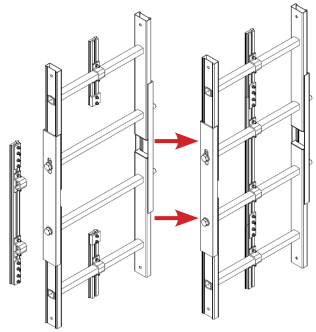
a) A rung fitting shall be mounted on the penultimate top and penultimate bottom ladder-rung of each tower section (i.e. at tower flange connection).

b) The top end of the safety rail of each tower section shall end minimum 55 mm and maximum 100 mm above the second top rung fitting.

c) The bottom end of the safety rail of each tower section shall end minimum 55 mm and maximum 100 mm below the rung fitting.

d) The safety rails of two consecutive tower sections shall be connected by means of a flange connection kit.

e) The distance between the safety rails of two consecutive tower sections shall be equal or less than the length of the flange connection kit.



Flange connection kit

The detailed installation procedure of the flange connection kit is available upon request to AVANTI.

11 Inspection Before Initial Use

Before the first use, a certified technician or representative of Avanti shall inspect the FPS.
The inspection before the first use shall be carried out following the inspection procedure. During the inspection, the “Inspection Before Initial Use Report” Appendix and the “Inspection log sheet” Appendix shall be filled in for future reference.

Ladder rungs:

a) Ensure that no dents, holes, or cracks have any influence on the rung stability.
b) The dents shall not exceed 10 mm in diameter or be more than 1 mm deep.
c) If dents are found on the rung edges or corners, the step stability can no longer be guaranteed. In such case, replace the ladder section.

Ladder stiles:

a) Ensure that no dents, holes, or cracks have any influence on the stiles´ stability.
b) The dents shall not exceed 20 mm in diameter or be more than 1 mm deep.
c) If dents are found on the stile edges or corners, the stile stability can no longer be guaranteed. In such case, replace the ladder section.

Flange connection kits:

a) The distance between the rungs at tower flange connection shall be minimum 255 mm and maximum 300 mm.

Ladder ends:

a) On the top and bottom ends of the complete ladder system, a protection guard (such as the AVANTI rubber feet or end cap) shall be put in place on the stiles.

Safety rail:

a) Ensure that the safety rail sections are mounted according to the installation instructions of this manual.
b) Ensure that no sharp rail ends are present.
c) Check the legibility of the product marking. If marking is not present, a certified technician or representative of Avanti shall replace them.
d) During the erection of the wind turbine towers, top and bottom railstops shall be mounted on each individual tower section.
e) Ensure that top and bottom rail-stops are mounted.

Fish-joints:

a) Ensure that the fish-joints are mounted with 4 hammerhead screws.
b) Ensure that the gap between consecutive safety rails is minimum 1mm and maximum 4 mm.
c) Ensure that the indicator mark of each hammerhead screw and the self-locking nuts are at an angle of 70º.
d) Make sure that all hammerhead screws and self-locking nuts of the rail system are present and torqued to 8 Nm.

Circular inspection sticker

a) Ensure that the sticker is present and that the due date has not expired.

Appendix A: Avanti Shock Absorber Pack

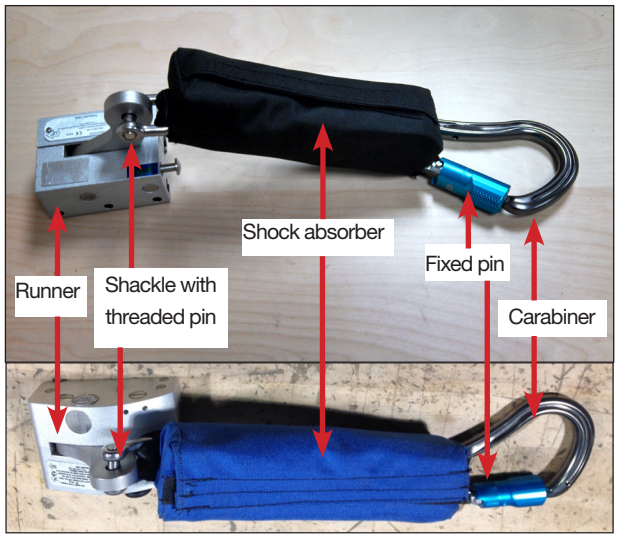
Intended Purpose of Device:
The intended purpose of this device is to assist with the initial impact caused by a fall. It will absorb some of the energy of a fall instead of transferring it all to the user of the fall protection system.

Hazard Warnings:
Please read and follow all instructions before use.
The device is to be inspected before use and must be recertified on an annual basis. If the device shows any sign of damage or past deployment, device is to be destroyed and then replaced with a new unit. Failure to inspect and replace a damaged unit could potentially result in injury to a user during a fall.

WARNING!
If a fall occurs or an inspection reveals an unsafe condition, the device is to be taken out of service until a certified technician determines whether it is safe for use or should be destroyed.

Instructions for use:
The AVANTI shock absorber pack is to be attached between a shackle and a carabineer. The shackle is also to be attached to a runner (Fig 1).

Fig 1



The shackle is to be threaded through one end of the shock absorber pack and securely closed with the threaded shackle pin.
The carabine is to be threaded through the other end of the shock absorber and secured in place with a permanently fixed pin.
In the event that there is a fall and the shock absorber pack deploys, the shock absorber pack will elongate up to 4 feet (1.2 m)(X_{max}) (shock absorber class E4) or up to 6 feet (1.8 m) (Xmax) (shock absorber class E6) and absorb some of the energy of the fall for the user. If a shock absorber is elongated or deployed to any length other than the originally non-deployed length, it must be replaced and is no longer capable of functioning (Fig 2).
The manufacturer's published value of average arrest force (F_{avg}) is 690 lbs / 550 lbs (shock absorber class E4) or 1135 lbs (shock absorber class E6).

Fig 2

Maintenance:
The AVANTI Shock absorber pack is to be inspected prior to each use. Abrasions, rips, or any other sign of external damage must result in replacement.
Please see the warning below.
If the AVANTI shock absorber pack is elongated or deployed at any length other than the original length shown in Fig.1 than the device must be destroyed and replaced.
The AVANTI shock absorber pack is considered part of an assembly including a runner and a carabiner. This assembly is to be returned to AVANTI for inspection annually.

Appendix B: Inspection before initial use report

Type of AVANTI Runner:	**Runner 2000/2002**	**User´s name:**	
Standards:	**ANSI A14.3-2008, CAN/CSA Z259.2.1-98.**	**Phone:**	
Tower (WEA-No.):		**Name of inspector:**	
Date of inspection:		**Date of next inspection:**	

			OK	NOK	COMMENTS
1	**Ladder system**				
1.1	Rungs	Are dents less than 10 mm in diameter or 1 mm deep?			
		Are the rung ends fixed tight to the stiles?			
		Are the rungs free of cracks?			
1.2	Stiles	Are dents less than 20 mm in diameter or 1 mm deep?			
		Are the stile ends free of dents?			
		Are the stiles free of cracks?			
1.3	Flange connection kits	Is the distance between the rungs of consecutive ladder sections at tower flange between 255 and 300 mm?			
1.4	Ladder ends	Are the AVANTI rubber feet or end caps mounted?			
1.5	General	Is the ladder system free of dirt (oil, corrosion, paint, etc.)?			
2	**Safety rail system**		**OK**	**NOK**	**COMMENTS**
2.1	Safety rail sections	Are the safety rail sections mounted on the front side?			
		Is the guide seat of each safety rail section placed on the left side?			
		Are the ends of each safety rail section free of sharp edges?			
2.2	Rung fitting	Is there a rung fitting on the first (lowest) rung of the ladder that is reached by the rail section?			
		Is there a rung fitting on the last (highest) rung of the ladder that is reached by the rail section?			
		Is there a rung fitting on at least every third rung of each ladder section?			
		Is each rung fitting free of damages?			
2.3	Fish-joints	Is each fish-joint mounted with 4 hammerhead screws?			
		Are all the indicator marks of the hammerhead screws and the self-locking nuts at an angle of 70°?			
2.4	General	Is the safety rail system free of dirt (oil, corrosion, paint, etc.)?			
		Is the safety rail system free of damages?			
3	**Others**		**OK**	**NOK**	**COMMENTS**
3.1	Resting platforms	Are the resting platforms in place and fixed properly?			
3.2	Screws	Are all the screws in place and torqued properly?			
3.3	Labels and markings	Are all the labels and markings legible?			
		Is the safety rail rating plate placed on the safety rail backside?			
4	**Runner system**		**OK**	**NOK**	**COMMENTS**
4.1	-	Is the runner approved for use?			
5	**Final assessment**		**OK**	**NOK**	**COMMENTS**
5.1	-	Is the FPS approved for use?			

This inspection shall be carried out before the first use and at least every 12 months by AVANTI or by a certified technician. This checklist and the Inspection log sheet shall be filled in and filed for future reference.	Inspector´s Signature:

Appendix B: Inspection before initial use report

Type of AVANTI Runner:	**Runner 2000/2002**	**User´s name:**	
Standards:	**ANSI A14.3-2008, CAN/CSA Z259.2.1-98.**	**Phone:**	
Tower (WEA-No.):		**Name of inspector:**	
Date of inspection:		**Date of next inspection:**	

			OK	NOK	COMMENTS
1	**Ladder system**				
1.1	Rungs	Are dents less than 10 mm in diameter or 1 mm deep?			
		Are the rung ends fixed tight to the stiles?			
		Are the rungs free of cracks?			
1.2	Stiles	Are dents less than 20 mm in diameter or 1 mm deep?			
		Are the stile ends free of dents?			
		Are the stiles free of cracks?			
1.3	Flange connection kits	Is the distance between the rungs of consecutive ladder sections at tower flange between 255 and 300 mm?			
1.4	Ladder ends	Are the AVANTI rubber feet or end caps mounted?			
1.5	General	Is the ladder system free of dirt (oil, corrosion, paint, etc.)?			
2	**Safety rail system**		**OK**	**NOK**	**COMMENTS**
2.1	Safety rail sections	Are the safety rail sections mounted on the front side?			
		Is the guide seat of each safety rail section placed on the left side?			
		Are the ends of each safety rail section free of sharp edges?			
2.2	Rung fitting	Is there a rung fitting on the first (lowest) rung of the ladder that is reached by the rail section?			
		Is there a rung fitting on the last (highest) rung of the ladder that is reached by the rail section?			
		Is there a rung fitting on at least every third rung of each ladder section?			
		Is each rung fitting free of damages?			
2.3	Fish-joints	Is each fish-joint mounted with 4 hammerhead screws?			
		Are all the indicator marks of the hammerhead screws and the self-locking nuts at an angle of 70°?			
2.4	General	Is the safety rail system free of dirt (oil, corrosion, paint, etc.)?			
		Is the safety rail system free of damages?			
3	**Others**		**OK**	**NOK**	**COMMENTS**
3.1	Resting platforms	Are the resting platforms in place and fixed properly?			
3.2	Screws	Are all the screws in place and torqued properly?			
3.3	Labels and markings	Are all the labels and markings legible?			
		Is the safety rail rating plate placed on the safety rail backside?			
4	**Runner system**		**OK**	**NOK**	**COMMENTS**
4.1	-	Is the runner approved for use?			
5	**Final assessment**		**OK**	**NOK**	**COMMENTS**
5.1	-	Is the FPS approved for use?			

This inspection shall be carried out before the first use and at least every 12 months by AVANTI or by a certified technician. This checklist and the Inspection log sheet shall be filled in and filed for future reference.	Inspector´s Signature:

Appendix B: Inspection before initial use report

Type of AVANTI Runner:	**Runner Eagle^{DS}**	**User´s name:**	
Standards:	**ANSI A14.3-2008, CAN/CSA Z259.2.4-2015.**	**Phone:**	
Tower (WEA-No.):		**Name of inspector:**	
Date of inspection:		**Date of next inspection:**	

			OK	NOK	COMMENTS
1	**Ladder system**				
1.1	Rungs	Are dents less than 10 mm in diameter or 1 mm deep?			
		Are the rung ends fixed tight to the stiles?			
		Are the rungs free of cracks?			
1.2	Stiles	Are dents less than 20 mm in diameter or 1 mm deep?			
		Are the stile ends free of dents?			
		Are the stiles free of cracks?			
1.3	Flange connection kits	Is the distance between the rungs of consecutive ladder sections at tower flange between 255 and 300 mm?			
1.4	Ladder ends	Are the AVANTI rubber feet or end caps mounted?			
1.5	General	Is the ladder system free of dirt (oil, corrosion, paint, etc.)?			
2	**Safety rail system**		**OK**	**NOK**	**COMMENTS**
2.1	Safety rail sections	Are the safety rail sections mounted on the front side?			
		Is the guide seat of each safety rail section placed on the left side?			
		Are the ends of each safety rail section free of sharp edges?			
2.2	Rung fitting	Is there a rung fitting on the first (lowest) rung of the ladder that is reached by the rail section?			
		Is there a rung fitting on the last (highest) rung of the ladder that is reached by the rail section?			
		Is there a rung fitting on at least every third rung of each ladder section?			
		Is each rung fitting free of damages?			
2.3	Fish-joints	Is each fish-joint mounted with 4 hammerhead screws?			
		Are all the indicator marks of the hammerhead screws and the self-locking nuts at an angle of 70°?			
2.4	General	Is the safety rail system free of dirt (oil, corrosion, paint, etc.)?			
		Is the safety rail system free of damages?			
3	**Others**		**OK**	**NOK**	**COMMENTS**
3.1	Resting platforms	Are the resting platforms in place and fixed properly?			
3.2	Screws	Are all the screws in place and torqued properly?			
3.3	Labels and markings	Are all the labels and markings legible?			
		Is the safety rail rating plate placed on the safety rail backside?			
4	**Runner system**		**OK**	**NOK**	**COMMENTS**
4.1	-	Is the runner approved for use?			
5	**Final assessment**		**OK**	**NOK**	**COMMENTS**
5.1	-	Is the FPS approved for use?			

This inspection shall be carried out before the first use and at least every 12 months by AVANTI or by a certified technician. This checklist and the Inspection log sheet shall be filled in and filed for future reference.	Inspector´s Signature:

Appendix B: Inspection before initial use report

Type of AVANTI Runner:	**Runner Eagle^{DS}**	**User´s name:**	
Standards:	**ANSI A14.3-2008, CAN/CSA Z259.2.4-2015.**	**Phone:**	
Tower (WEA-No.):		**Name of inspector:**	
Date of inspection:		**Date of next inspection:**	

1	**Ladder system**		**OK**	**NOK**	**COMMENTS**
1.1	Rungs	Are dents less than 10 mm in diameter or 1 mm deep?			
		Are the rung ends fixed tight to the stiles?			
		Are the rungs free of cracks?			
1.2	Stiles	Are dents less than 20 mm in diameter or 1 mm deep?			
		Are the stile ends free of dents?			
		Are the stiles free of cracks?			
1.3	Flange connection kits	Is the distance between the rungs of consecutive ladder sections at tower flange between 255 and 300 mm?			
1.4	Ladder ends	Are the AVANTI rubber feet or end caps mounted?			
1.5	General	Is the ladder system free of dirt (oil, corrosion, paint, etc.)?			
2	**Safety rail system**		**OK**	**NOK**	**COMMENTS**
2.1	Safety rail sections	Are the safety rail sections mounted on the front side?			
		Is the guide seat of each safety rail section placed on the left side?			
		Are the ends of each safety rail section free of sharp edges?			
2.2	Rung fitting	Is there a rung fitting on the first (lowest) rung of the ladder that is reached by the rail section?			
		Is there a rung fitting on the last (highest) rung of the ladder that is reached by the rail section?			
		Is there a rung fitting on at least every third rung of each ladder section?			
		Is each rung fitting free of damages?			
2.3	Fish-joints	Is each fish-joint mounted with 4 hammerhead screws?			
		Are all the indicator marks of the hammerhead screws and the self-locking nuts at an angle of 70°?			
2.4	General	Is the safety rail system free of dirt (oil, corrosion, paint, etc.)?			
		Is the safety rail system free of damages?			
3	**Others**		**OK**	**NOK**	**COMMENTS**
3.1	Resting platforms	Are the resting platforms in place and fixed properly?			
3.2	Screws	Are all the screws in place and torqued properly?			
3.3	Labels and markings	Are all the labels and markings legible?			
		Is the safety rail rating plate placed on the safety rail backside?			
4	**Runner system**		**OK**	**NOK**	**COMMENTS**
4.1	-	Is the runner approved for use?			
5	**Final assessment**		**OK**	**NOK**	**COMMENTS**
5.1	-	Is the FPS approved for use?			

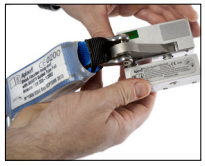
This inspection shall be carried out before the first use and at least every 12 months by AVANTI or by a certified technician. This checklist and the Inspection log sheet shall be filled in and filed for future reference.	Inspector´s Signature:

Appendix C: Daily inspection checklist of Runner 2000/2002

	ISSUE DESCRIPTION	PASS	FAIL
1	Is the runner's body free of corrosion, deformation and other damages? (See Fig. 1)		
	COMMENTS		
2	Is the brake lever free of corrosion, deformation and other damages? (See Fig. 2)		
	COMMENTS		
3	Is the middle plate tightly attached by the 4 fixed rivets? (See Fig. 3)		
	COMMENTS		
4	Is the middle plate free of deformation? (See Fig. 3)		
	COMMENTS		
5	Is the aluminium serial plate tightly attached by the 2 fixed rivets? (See Fig. 4)		
	COMMENTS		
6	Are the synthetic guides tightly seated and without bruises and marks? (See Fig. 5)		
	COMMENTS		
7	Is the blank aluminium plate present and sitting tight? (See Fig. 6)		
	COMMENTS		
8	Does the shock absorber show a normal shape? Are the absorber and the cover free of cuts, burns, seams and visible signs of wear? (See Fig. 7)		
	COMMENTS		

	ISSUE DESCRIPTION	PASS	FAIL
9	Is the carabiner free of marks, deformities, wear and traces of corrosion? (See Fig. 8)		
	COMMENTS		
10	Is the return spring and articulation of the carabiner opening, closing and locking properly? (See Fig. 9)		
	COMMENTS		
11	Does the black strap of the shock absorber cover the carabiner end completely? (See Fig. 10)		
	COMMENTS		
12	Does the runner close and open easily without friction or resistance? (See Fig. 11)		
	COMMENTS		
13	Does the brake lever move up and down smoothly? (See Fig. 12)		
	COMMENTS		
14	Is the spring securely attached? Is it retracting the lever automatically? (See Fig. 12)		
	COMMENTS		
15	Is the shackle securely attached and free from marks, deformities, wear and traces of corrosion? (See Fig. 13)		
	COMMENTS		
16	Does the runner slide smoothly along the rail? (See Fig. 13)		
	COMMENTS		
17	Is the circular inspection sticker present? Has the due date for annual inspection not expired? (See Fig. 12)		
	COMMENTS		

VISUAL TEST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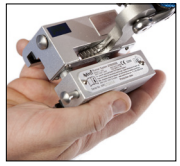
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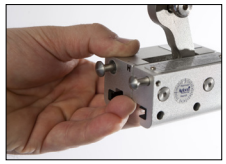
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Appendix D: Daily inspection checklist of Eagle^{DS} Runner

	ISSUE DESCRIPTION	PASS	FAIL
1	Is the runner´s body free of corrosion, deformation and other damages? (See Fig. 1)		
	COMMENTS		
2	Is the brake lever free of corrosion, deformation and other damages? (See Fig. 2)		
	COMMENTS		
3	Does the locking lever lock and unlock correctly? (See Fig. 3)		
	COMMENTS		
4	Does the push button move up and down correctly? (See Fig. 4)		
	COMMENTS		
5	Is the aluminium serial plate tightly attached by the 2 fixed rivets? (See Fig. 5)		
	COMMENTS		
6	Are the 6 rollers tightly placed and free of bruises and marks? (See Fig. 6)		
	COMMENTS		
7	Is the circular inspection sticker present? Has the due date for annual inspection not expired? (See Fig. 4)		
	COMMENTS		
8	Does the shock absorber show a normal shape? Are the absorber and the cover free of cuts, burns, seams and visible signs of wear? (See Fig. 7)		
	COMMENTS		

	ISSUE DESCRIPTION	PASS	FAIL
9	Is the carabiner free of marks, deformities, wear and traces of corrosion? (See Fig. 8)		
	COMMENTS		
10	Is the return spring and articulation of the carabiner opening, closing and locking properly? (See Fig. 9)		
	COMMENTS		
11	Does the black strap of the shock absorber cover the carabiner end completely? (See Fig. 10)		
	COMMENTS		
12	Are the elastic locking pins correctly positioned and do not protrude from the runner‘s body? (See Fig. 6)		
	COMMENTS		
13	Does the runner close and open easily without friction or resistance? (See Fig. 11)		
	COMMENTS		
14	Is the shackle tightly attached and free of marks, deformities, wear and traces of corrosion? (See Fig. 12)		
	COMMENTS		
15	Does the runner slide smoothly along the rail? (See Fig. 13)		
	COMMENTS		
16	Do the torsion springs work properly (i.e. the lever can be moved up and down smoothly)? (See Fig. 12) Are they securely attached? (See Fig. 14)		
	COMMENTS		

VISUAL TEST


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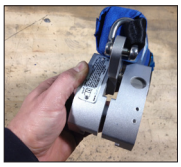
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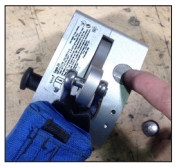
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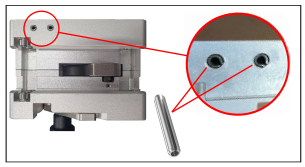
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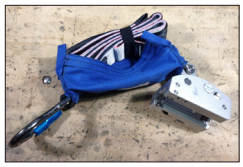
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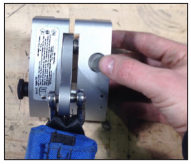
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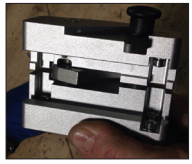
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Appendix E: Inspection log sheet

Runner model: (Runner 2000/2002 or EagleDS runner)	Installation address:	Avanti Wind Systems Technology, S.L. Calle Angeles (Los), Num. 88 Pol. Industrial Centrovía 50198 Muela (La) - (Zaragoza) - Spain P: +34 976 149524 F: +34 976 149508 www.avanti-online.com

Date of purchase:	Date first put into service:

Periodic examination and repair history

Date	Identification no.:	Reason for entry (per. examination)	OK / not OK	Inspector	Periodic examination next due date

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