AVANTI SERVICE LIFT

Model: OCTOPUS L95 HD Service Lift

Installation and maintenance manual

Original instructions

CERTIFICATE

EC Type Examination

EC-Directive 2006/42/EC, Article 12, Section 3b
Machinery

Number of registration: 01/205/0833F/19

Certification body for machinery NB0035
at TÜV Rheinland Industrie Service GmbH
herewith confirms for the company

AVANTI WIND SYSTEMS TECHNOLOGY, S.L.
Calle Angeles (Los), Num. 88
Pol. Industrial Centrovia
50196 Muela (La) - (Zaragosa)
Spain

the close conformity of the product

Service lift inside wind turbine systems

Technical data:

Type:	Octopus L80	Octopus L95	Octopus L95 HD	Octopus XL120
- max. load capacity:	240 kg / 2 persons		350 kg / 2 persons	300 kg / 3 persons
- traction hoist:	M508		M608	
- fall arrest device FAD):	ASL508		ASL608	
- lifting speed:	18 m/min (50 Hz) or 21 m/min (60 Hz)			
- triggering speed of FAD:	30 m/min or 40 m/min			
- protection fences:	1.10 m			
- fence Interlock system:	Trapped-key or guard locking system	Trapped-key, guard locking system or electrical monitoring system	Trapped-key or guard locking system	Trapped-key or guard locking system
- max. distance between rung attachments:	3360 mm	2240 mm	1960 mm (one rung) 2240 mm (two rungs)	1960 mm (one rung) 2240 mm (two rungs)
- net weight:	205 kg	220 kg	233 kg	242 kg (one door) 250 kg (two doors)
- max. total travel height:	160 m	160 m	100 m	160 m
- Optional:		Wind turbine platform call or send/ call function		- 2 sliding doors, right & left - Wind turbine platform call or send/ call function

Modification E to the certificate 01/205/0833E/19 from 2019-02-18 - Change the max. travel height

with the requirements according to annex I of Directive 2006/42/EC about machinery and amending the Directive 95/16/EC of the European Parliament and the Council from May 2006 for adaptation of legal and administration regulations of the member countries regarding safety of machinery.

The verification was proved by EC-type approval test, Test-Report-No. 19_052-1 from 2019-07-20 and is valid only duly considering the requirements mentioned in this document.

This certificate is valid until 2024-07-29

Certification body
Notified under No. 0035
certifier

Dipl.-Ing. Walter Ringhausen

Cologne, 2019-07-29

TÜVRheinland® 0035 Notified Body

TÜV Rheinland Industrie Service GmbH
Alboinstraße 56, 12103 Berlin
Telefon +49 (0)30 75 62 – 1557, Fax +49 (0)30 75 62 – 13 70

TÜVRheinland®
Precisely Right.

Limited warranty

Avanti Wind Systems Technology, S.L. guarantees 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 Product[1)] 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 HEREBY 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.

1)Avanti service lift ("Product")

Avanti Wind Systems Technology, S.L.
Calle Ángeles (Los), Num. 88
Pol. Industrial Centrovía
50198 Muela (La) - (Zaragoza) - Spain
P: +34 976 149524
F: +34 976 149508
E: info@avanti-online.com
www.avanti-online.com

Contact

001

Contents

1 Introduction

1.1 Symbols

DANGER

Immediate or possibly imminent danger. Risk of injury if not observed: Death or severe injury.

WARNING

Potentially hazardous situation. Risk of injury if not observed: Minor injury or material damage.

CAUTION

Hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Useful tips for optimum working procedure. Possible injury if not observed: None.

1.2 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 service lift use and daily inspection and is in possession of a valid (non expired) certificate for the task.
Manual descent (Also manual no-powerdescent)	Action performed to descend the lift at a controlled speed without power supply by manually opening the hoist electromagnetic brake.

1.3 Observations

This lift must only be used by trained people.

Additional copies are available from the manufacturer upon request.

This manual must always be available to the personnel responsible for the installation, maintenance and operation of the service lift.

This manual, including, but not limited to, measurements, procedures, components, descriptions, instructions, recommendations and requirements, is subject to change without prior notice. Please see the manuals section in the Avanti Website for the latest revisions of the manuals.

Any additional cost relate to or arising from any changes in the manuals does not entitle the customer to any form of compensation or other legal remedies.

NOTICE

The pictures and diagrams in this manual may not reflect the exact appearance, colors or layout of the product. This has no impact on its functionality or safety.

1.4 Cautions

CAUTION

Avoid injury — follow all instructions.

Personnel must be of legal age. Personnel must be familiar with the relevant accident prevention instructions and must have received appropriate occupational heath and safety training.

The service lift must not be used by persons who are under the influence of alcohol or drugs and who may jeopardize working safety.

Prior to installation, ensure that:

- Building sections involved will be able to withstand the service lift loads.
- All parts are available and fully functional.
- Travel path is protected by fences at each platform.
- Walking way surfaces are dry and not slippery.

During installation tasks:

- Personnel must wear PPE (safety helmet, full body harness, shock absorber, lanyard and slider) at all times and carry 2 way communication systems depending on local regulation.
- Use a hand winch attachable to the ladder when elevating heavy weights.
- Use a wire rope clamp or grip when lowering wire ropes, in order to avoid the risk of personnel losing the wire rope, and wire rope getting damaged or person being hit. The clamp shall be secured to a platform anchor point. The diameter of the clamps or grips shall match the diameter of the wire ropes.
- Not work at different levels if tasks involve risk of falling objects.

The service lift is designed for a useful life of 20 years with an approximate use frequency of 12.5 h/year (250 h in total).

Installation and maintenance of the service lift must only be performed by certified technicians. The service lift must be inspected by a certified technician before its first use.

The service lift must be inspected at least once a year by a certified technician. In case of high use frequency or severe use conditions, more frequent inspections are required.

If more than one person is entrusted with installation, inspection or maintenance tasks, the employer must appoint a supervisor in charge of the operation.

Use and daily inspection of the service lift must only be performed by persons who have received the relevant training associated with the use and daily inspection of the Avanti service lift and who are in possession of a valid (not expired) certificate for the task.

Before any maintenance task, ensure that walking way surfaces are dry and not slippery.

Before any maintenance operation, check that the service lift is properly out of service.

During maintenance tasks, personnel shall:

- Wear at least the following PPE: fall arrest equipment (when falling height is more than 2 m), hand gloves, helmet, safety glasses and working gear.
- Place cabin at bottom platform and disconnect power supply.
- Use an electricity measuring tool when performing inspection of electrical components.
- Use a hand winch attachable to the ladder when handling big/ heavy loads and shall be performed at least by 2 persons.
- Panel parts shall be removed to facilitate access to confined spaces.
- Use a cable grip when replacing travelling cable.
- Keep cabin doors closed when using a 3-step ladder.

If any damage or faults are found during operation, or if circumstances arise which may jeopardize safety: interrupt the work in progress immediately and notify the supervisor or employer. If required secure workplace.

The service lift must not be used in the event of a fire in the tower.

The service lift must only be used when the turbine is not generating power.

All wind farm regulations must be followed. The service lift must not be used during severe weather, including wind speeds over 18 m/s. The customer must define the maximum allowable wind speed ensuring safe installation.

If any supporting parts are repaired or replaced, the operational safety of the system must be tested and verified by a certified technician.

All test / repairs of electrical installations must only be performed by a certified technician.

All repairs to the traction, braking and supporting systems may only be performed by a certified technician.

Only original fault-free parts must be used. Use of non-original parts renders the manufacturer's warranty void and invalidates any type of approval. No modification, extension or reconstruction of the service lift is allowed without the manufacturer's prior written consent. No warranty is provided against damage resulting from reconstruction or modification of equipment or use of non-original parts that are not approved by the manufacturer.

In case self-locking nuts are used, these nuts must not be used once it has become possible to loosen by hand and in no case should they be reused, but must be replaced.

NOTICE

The owner must verify the need for third-party service lift inspections with the local authority and comply with specified standards.

1.5 WTG Integration requirements

1.5.1 Height and angle

The service lift can be installed in towers up to 100 m high of travel path.

The maximum angle between hoist way and vertical axis is of ±2º.

1.5.2 Liftway clearances

Depending of travel path inclination, gaps may need to be large enough in order to avoid collisions of lift elements with platforms.

The Octopus L95 HD service lift shall have an air gap of at least 60 mm. around it along the tower to avoid collision with tower components. These gaps have considered not only the static position but also considering possible movement of components inside the tower as a consequence of the towers way.

The components subjected to possible movement inside the tower include, but are not limited to, dampers, wireropes, cables, doors, hatches, and travelling cable pulley (if installed).

1.5.3 Power supply

Electrical supply requirements		
Power Supply Type	3 Phase + PE + N	3 Phase + PE
Voltage (50 Hz)	400 V	690 V
Voltage (60 Hz)	400 V	690 V
Protection	Acc. To EN 60204 - 1	

1.5.4 Beam

The top beam must be capable to withstand the reaction loads transmitted by the traction and safety wire ropes.

The required safety factors and load cases for the top beam are according to EN1808 european standards are required, check with the local authority.

1.5.5 Fences

Travel path must be protected by fences at each platform. The platform fences consist of structures, of different geometries depending on the platforms where they are installed.

The platform fences must conform to EN 14122-3. They shall be equipped with a door (sliding and/or swinging) monitored with a trapped key system. Optionally, and apart from the trapped key system, the platform fence doors for the Octopus L95 HD service lift could feature guard locking switch system, or an electrical switch monitoring system.

The first one just allows the user to open the fence door when the service lift cabin is at the platform level. In case of an emergency situation, users can open the fence door by acting the emergency release of the guard locking switch. From the moment the fence door is open, power is removed so the service lift cannot move.

The second system is an electrical switch monitoring system. This interlocking mechanism is comprised of a mechanical locking unit and a switch unit. When the switch is opened, the power is removed so the service lift cannot move. In this case, the fence doors must be self-closing doors, to avoid any user could fall from a platform if the fence door is left open.

1.5.6 Lighting

The platform control boxes shall be properly illuminated (e.g. an illumination of at least 50 lux according to EN 50308).

The loading side of the platform holes shall be properly illuminated.

The landing platform shall be properly illuminated
The tower shall provide emergency lighting in case of power failure (e.g. an illumination of at least 10 lux according to EN 50308).

1.5.7 Other requirements

The WTG manufacturer must provide any other means necessary to ensure the safe use of the service lift according to AVANTI´s recommendations and its own risk assessment for the integration that shall include items which are not under AVANTI´s scope.

NOTICE

A detailed list of integration requirements is available from AVANTI upon request.

2 Transport

2.1 General transport requirements

The transport conditions shall be agreed with the customer. If special transport requirements are needed, the customer must specify them to AVANTI prior to delivery.

3 Installation

3.1 Delivery inspection

Check the delivery against shipping lists and look for transport damages. Should there be any damage, report it to the responsible transport insurance company within 24 hours from the date of arrival of the goods.

Other claims should be made to AVANTI representative within the same period.

3.2 Storage

3.2.1 General storage requirements

The storage conditions shall be agreed with customer. If special storage requirements are needed, customer shall specify them to AVANTI prior to delivery.

3.2.2 Pre installation storage

Before tower erection:

Alternatively, the service lift can be installed on to the ladder before tower erection. With the tower section lying horizontally:

1. Mount safe zone plates, final limit activation plates and rest platforms on ladder.
2. Fit the nuts and bolts to the shackles, and lock with cotter pins.
3. Mount traction and safety wire ropes (Ø8 mm) using the shackles supplied for the top beam at the top of the tower.
4. Attach coiled wire ropes to top beam by means of cable strips to prevent them from moving during transport of tower section.
5. Position service lift on ladder at bottom platform, by means of a crane and the lifting eyes.
6. Mount fixing set for transport to prevent lift from moving during transport of tower section.
7. The tower sections shall be transported to the wind farm.
8. Pre-tension the 8 mm wire ropes by acting manually the motor of the hoist with a wrench, to be able to free the fasten kit after tower erection.
9. After tower erection takes place, follow instructions from chapter “Electrical connections” onwards.

NOTICE

The WTG manufacturer shall provide 3D drawings to ensure that installation of lift on ladder is possible.

3.3 Electrical connections

3.3.1 Power supply

WARNING

Before making any connection, disconnect any power supply to the service lift and the fence interlock system.

WARNING

When plugging the service lift to the power supply, ensure that supply phases are correct!

The power supply must be protected by a fuse and against indirect contacts according to local regulations. Verify that the rated grid and motor voltages are identical.

NOTICE

For CE versions: the electrical connection of the system must be made in accordance with EN 60204-1.

3.3.2 Cable management

3.3.2.1 Travelling cable

Travelling cable pulley is suspended on the cable and is guided along the traction and safety wire ropes.

- Install the junction box on the first platform over mid tower's height.
- Cut the transport strips which hold the cable and connect the cable inlet to the junction box.
- Uncoil the cable to the bottom platform.
- Connect the power cable outlet socket to the service lift inlet plug as described on the travelling cable adjustment.

Travelling cable ajustment:

1. Guide the travelling cable through the travelling cable pulley.
2. Connect the outlet socket of the travelling cable to the inlet plug of the service lift using a cable stocking. Attach the schacle to the eyebolt on the back of the service lift.
3. Attach the travelling cable to the cabin by means of cable ties.

The travelling cable pulley should be adjusted to avoid collision or hits with cabin when lift is resting on buffers. The pulley also should not rest on the platform when the lift is in the bottom platform.

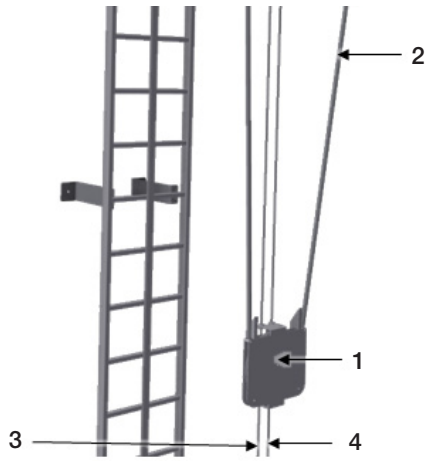


Figure 1: Travelling cable

Travelling cable	
1	Travelling cable pulley
2	Travelling cable
3	Traction wire rope
4	Safety wire rope

3.4 Traction and safety wire ropes

3.4.1 Traction wire rope

3.4.1.1 Traction wire rope in suspension beam

DANGER

Do not pull wire rope over edges.

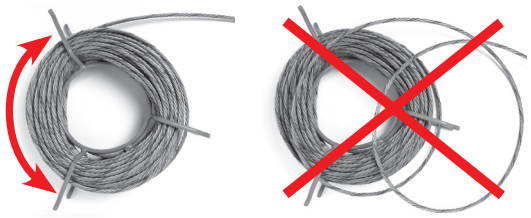
CAUTION

All wire ropes must be evenly uncoiled to prevent looping.

The traction wire rope is attached to the suspension beam on the available hole.

To install the traction wire rope on the suspension beam:

1) Mount the traction wire rope (ø 8 mm) using the shackles supplied for the suspension beam at the top of the tower.
2) Fit the nuts and bolts on the shackles. Lock with cotter pins.
3) Fit the top limit device[1)] on the traction wire rope leaving at least 200 mm between top limit device[1)] and shackle. Adjust the final position during first run so that the service lift is levelled with the top platform when it stops.
4) Uncoil the traction wire rope to the bottom of the tower.



[1)]Described in the top limit device section.

3.4.1.2 Path of traction wire rope through the lift

1) Open the wire ropes maintenance cover inside the cabin.
2) Feed the wire rope through the roof into the traction hoist's wire rope inlet opening.
3) Push the UP button of the cabin control box and feed wire rope through until the traction hoist starts pulling. Ensure that the wire rope can exit without obstruction!
4) Feed the wire rope through the guide bushings of service lift.
5) Feed the wire rope through the guide bushing of the travelling cable pulley.

3.4.1.3 Securing the traction wire rope

WARNING

If the wire rope is not installed in accordance with the stated procedure, it can get damaged, deformed or show other critical defects.

1) Feed the wire rope through the platform hole.
2) Secure the 11 kg counterweight on the traction wire rope at least 600 mm below the bottom platform (See figure below). The remaining wire rope must be coiled and fastened with at least 3 strips. The counterweight and the excess of wire rope shall be able to rotate freely.

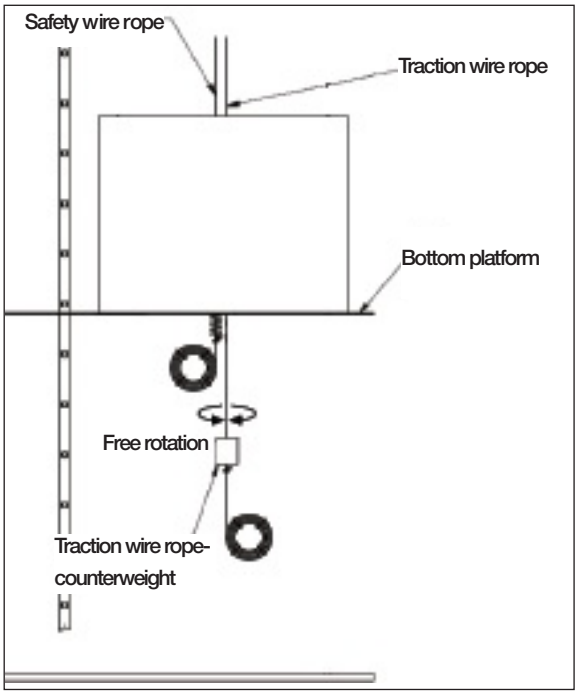


Figure 2: Securing the traction wire rope

3.4.2 Safety wire rope

3.4.2.1 Safety wire rope in suspension beam

The safety wire rope is attached to the suspension beam on the available hole.

To install the safety wire rope on the suspension beam:

1) Mount the safety wire rope (ø 8 mm) using the shackles supplied for the suspension beam at the top of the tower.
2) Fit the nuts and bolts on the shackles. Lock with cotter pins.
3) Uncoil the safety wire rope to the bottom of the tower (follow the same procedure described on 3.4.1.1 for traction wire rope).

3.4.2.2 Path of safety wire rope through the lift

1) Open the maintenance cover on the back of the service lift.
2) Feed the wire rope through the roof into the fall arrest device's wire inlet opening.
3) Pull the wire rope through the fall arrest device while turning the release lever clockwise.
4) Feed the wire rope through the guide bushings of the cabin.
5) Feed the wire rope through the guide bushing of the travelling cable pulley.

3.4.2.3 Safety wire rope tensioner system

The safety wire shall be fastened on the bottom with counterweights (tension of 22 kg) or other system which will produce a tension force of at least 400 N. Some of the systems that could be used are shown in the following images.

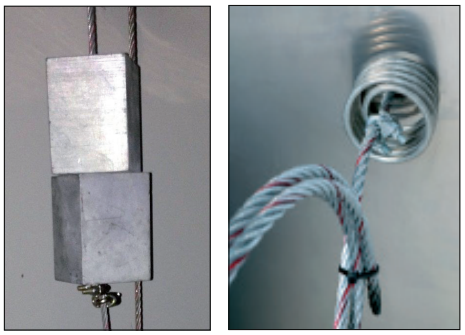


Figure 3: Safety wire rope tensioner system

If the push spring is installed follow this procedure:

1) Feed the safety wire rope through the bottom platform hole.
2) Ascend the service lift 50 cm.
3) Activate the fall arrest device.
4) Perform manual descent so that the weight of the service lift is transmitted to the safety wire rope.
5) Compress the spring to 40 mm and fix with cable ties.
6) Feed the safety wire rope through the compressed spring.
7) Pull the safety wire rope downwards by hand as much as possible.
8) Place and fasten the wire rope grip.
9) Put the cable ties so that the spring decompresses to 55 mm.

If the counterweights are installed follow this procedure:

1) Mount two 11 kg counterweights on the safety wire rope.

2) Secure them by using 2 wire clips.

To install other alternative system, please contact Avanti.

3.5 Guiding system

3.5.1 Guiding ladder

The service lift is guided by ladder. The guiding system function is to safety guide the service lift along the ladder stiles.

The guiding system consists of the guiding ladder and 4 sets of 2 guiding rollers each. The arrangement of the 4 sets is shown in the following figure.

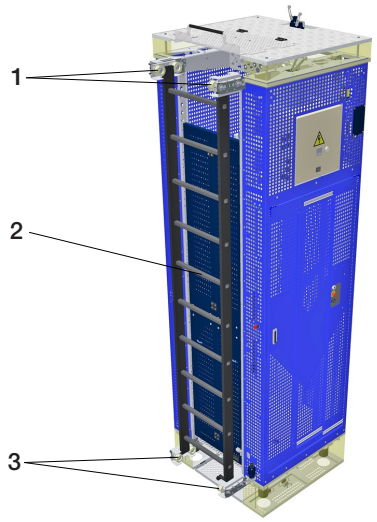


Figure 4: Guiding system

Guiding system	
1	Top guiding rollers
2	Guiding ladder
3	Bottom guiding rollers

Depending on the distance between guiding ladder's anchorages, there will be 2 types of anchorages, attached to two rungs on the ladder, or to one rung on the ladder.

For the Octopus L95 HD service lift, the maximum distance between ladder anchorages has been calculated to 1960 mm. Moreover, the maximum inclination is calculated to 2°, and local inclination changes up to 1°.

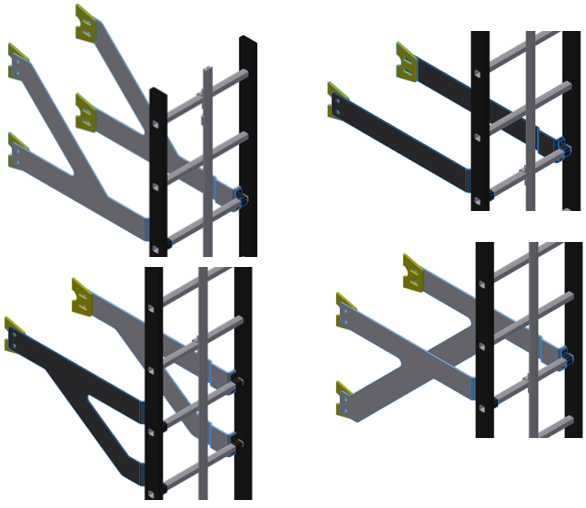


Figure 5: Octopus L95 HD ladder anchorages

CAUTION

A gap of 2 mm is demanded from each side of the fishplate to the ladder.

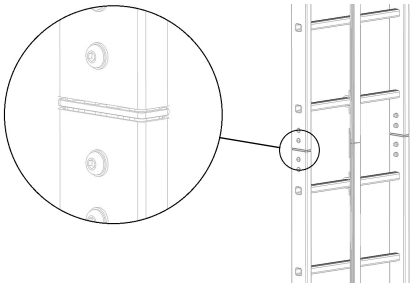


Figure 6: Gap between ladder sections

3.6 Top limit device

The top limit device is adjusted so the top limit switch stops the lift in alignment with the top landing platform.

To make sure not to hit the top beam, place first the top stop limit device about 2800mm from the top platform floor. Measure the distance the lift stops under platform level and readjust the device position according to this value.

3.7 Landing interlock system

3.7.1 Trapped key system

The platform fence door is equipped with a trapped-key lock that keeps the door locked while the service lift is not at the platform. The door can be unlocked using the trapped key in the cabin and opening the lock. The key will remain trapped until the door is closed and locked again.

Trapped key must be properly secured to the cabin with a chain or wire rope.

The trapped key lock must be properly tightened to the platform fence and fully functional.

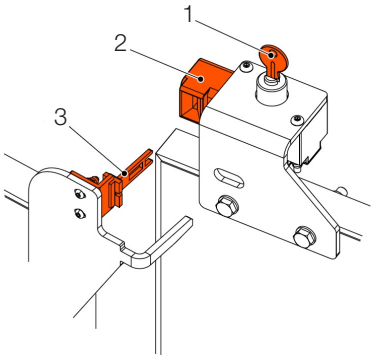


Figure 7: Trapped-key system

Trapped-key system	
1	Key
2	Safety lock
3	Actuator

3.7.2 Guard locking system

The guard locking system blocks the fence door when the service lift is not on the platform.

The service lift detection switch on the platform unlocks the electromechanical locking door switch when detecting the position of the service lift in the platform.

Place and fix correctly the service lift detection switch on the platform so that it activates correctly when the position of the service lift on the platform is appropriate.

The electromechanical locking switch must be properly adjusted and tightened to the platform fence and fully functional.

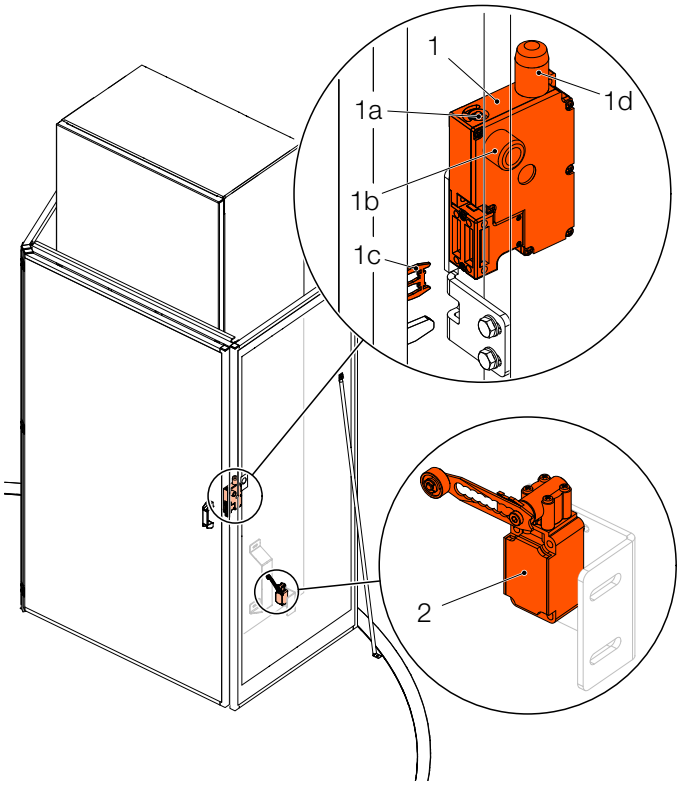


Figure 8: Guard locking system

Guard locking system	
1	Electromechanical locking switch
1a	Manual emergency unlocking (interior of the fence)
1b	Manual emergency unlocking (external of the fence)
1c	Actuator
1d	Opening button (normal use)
2	Service lift detection switch on platform

3.7.3 Safe zone plates

Adjust the final position of the safe zone plate on each platform, so that the service lift floor is levelled with the platform floor when it stops.

3.8 Information signs and warnings

3.8.1 Rescue guide

Place the “Rescue Guide” in a visible place next to the Rescue pendant control on the bottom platform fence.

3.9 Inspection before first use

A certified technician must carry out an inspection before first use following the Annual inspection procedure and filling in the Inspection and maintenance checklist.

NOTICE

Certified technicians must carry out an inspection before first use following the “Inspection and maintenance Checklist” Appendix.

NOTICE

The inspection before first use must be recorded for future reference filling the “Installation and maintenance Log Sheet” Appendix.

3.10 Disassembling

Disassemble in reverse order and dispose of in accordance with local authority regulations.

If the lift is not functional, the operations performed from the lift will have to be carried out using the appropriate mechanical or electrical help and taking all the extra precautions needed in order to perform the job in a safe manner.

The steps to follow may differ from one installation to another depending on the circumstances (such as the overall dismantling tasks – or others- taking place in the wind farm) and means available (cranes, etc.).

4 Maintenance

All the inspections / maintenance operations (periodical or extraordinary) must be logged in the Installation and maintenance Log Sheet.

All inspections and service tasks made to the hoist and fall arrest device must be carried out by certified technicians. The relevant maintenance instructions are provided to each person during the training.

4.1 Recommended planning

Avanti recommends the following maintenance planning:

Frequency	Performed by	Components
Daily	User	Overall / Travel path
		Control and safety devices
		Fall arrest device
Annually	Certified Technician	Overall / Travel path
		Control and safety devices
		Cabin
		Traction hoist
		Fall arrest device
		Overload limiter
		Traction and safety wire ropes
		Guiding system
		Electrical system
		Information signs and documents
		Doors and hatches
		Cabin control box
		Safety switches
		Interlock system
		Platforms
Every two years	Certified Technician	Fall arrest device
Every five years or 50 hours (whatever occurs first)	Certified Technician	Traction hoist
Every 20 years or 250 hours of operation (whatever occurs first)	At Avanti Workshop	Traction hoist
		Fall arrest device

4.2 Alternative planning

Owners who strictly follow the maintenance program and the daily inspections, and can document it could decide with taking over the responsibility as well to provide the following alternative planning:

Frequency	Performed by	Components
Daily	User	Overall / Travel path
		Control and safety devices
		Fall arrest device
Annually	Certified Technician	Overall / Travel path
		Control and safety devices
		Cabin
		Traction hoist
		Fall arrest device
		Overload limiter
		Traction and safety wire ropes
		Guiding system
		Electrical system
		Information signs and documents
		Doors and hatches
		Cabin control box
		Safety switches
		Interlock system
		Platforms
Every ten years or every 125 hours of operation (whatever occurs first)	Certified Technician	Traction hoist
		Fall arrest device
Every 20 years or 250 hours of operation (whatever occurs first)	At Avanti Workshop	Tractionhoist
		Fall arrest device

4.3 Annual maintenance and inspection

CAUTION

A certified technician must carry out the annual inspection following the Inspection and maintenance Checklist

CAUTION

In case of replacement of hoist, Fall Arrest Device and/or 8 mm. wire ropes, the operation/s and the related total hours of use of this/these component/s, must be logged in the Inspection and maintenance Log Sheet Appendix.

Have the entire system tested by a cerified technician at least once a year, especially the traction hoist and the fall arrest device. However, it may be required more frequently depending on use and the conditions of use and operation. The traction hoist and fall arrest device must be inspected according to intervals included in the sections 4.1 or 4.2 tables (see above). Hour counter is found in the main control box.

NOTICE

Owner must ensure that the results of all annual and extraordinary inspections are logged in the Inspection and maintenance Log Sheet Appendix.

4.3.1 Overall

Function/System	Operations
Cabin and Cabin components	Visually check the cabin and its components are assembled correctly and these are free of cracks, dents and disparities. • Cabin structure • Doors, hatches and covers • Internal light • Anchor points • Cabin control boxes • Hoist and Fall arrest device*(See figure 9: Check the FAD fixing adapter has moved downwards. In such case, DO NOT USE THE LIFT).* • Top and bottom obstruction devices • Switches • Warning lights • Guiding system (guiding rollers)
Installation components	Visually check that the WTG installation components are mounted in accordance with the specifications and without any noticeable defects or missing components. • **Platform control boxes** • **Traction and safety wire ropes** • **Guiding system (guiding ladder)** • **Travelling cable pulley** • **Electrical cables and electrical plugs** • **Interlock system**
Travel path	Visually check that there are no obstacles in the travel path which may obstruct the movement of the service lift.
Hour meter	Record the hour meter reading on the*Inspection and maintenance Log Sheet*.

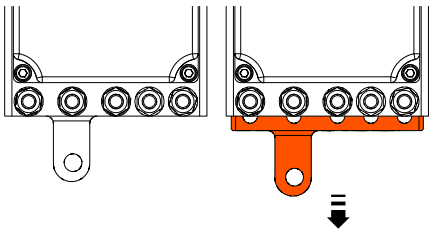


Figure 9: FAD fixing adapter

4.3.2 Control and safety devices

4.3.2.1 Internal cabin control

Function/System	Operations
Internal cabin control and safety devices	1. Inspect the main/user control box is free of dents, cracks and disparities. 2. Inspect the internal buttons of the main/user control box are all fully functional. 3. Inspect the ready light (green) in main/user control box works properly. 4. Inspect the shunt key for bottom obstruction switch is present and it works properly. 5. Inspect the internal control box emergency stop button interrupts lift control when activated. 6. Inspect the bottom obstruction switch interrupts descent when activated. 7. Inspect the top obstruction switch interrupts ascent when activated. 8. Inspect the emergency top limit switch is correctly positioned and works properly. 9. Inspect the platform light (green) lights up when the service lift is at a platform. 10. Inspect the platform switch is correctly positioned and works properly. 11. Inspect the door switch is correctly positioned and works properly. 12. (If provided) Inspect the door guard locking switch is correctly positioned and works properly. 13. Inspect the interior light iluminates properly with and without power supply (emergency function) 14. (If provided) Inspect the warning lights flash during ascent and descent.

4.3.2.2 External cabin control (Automatic Send)

Function/System	Operations
External cabin control (Automatic Send)	1. Inspect the external UP and DOWN buttons of the main/user control box are all fully functional. **External buttons of the main/user control box respond with a delay when actuated and the buzzer from the main/user control box sounds during this delay** 2. Inspect the external control box emergency stop button interrupts lift control when activated.

4.3.3 Cabin

Function/System	Operations
Cabin	1. Inspect the cabin free of cracks, dents and disparities. It is clean and in overall good condition. 2. Inspect the assembling screws of the cabin are all properly mounted and tightened. 3. Inspect the bottom and top obstruction devices compress when pushed and decompress when released. Inspect its guiding shafts are clean and lubricated. 4. Inspect the anchor points are free of cracks, deformities, corrosion and other damages and their screws properly tightened. 5. Inspect the anchor points are installed on the lift structure according to the instructions and its markings are clearly readable. 6. Inspect the door is properly mounted and tightened to the cabin. 7. Inspect the service lift door is fully functional (open and close properly and smoothly). 8. Inspect the service lift door guard locking is fully functional (lock and unlock properly and smoothly). 9. Inspect the guard locking of the door is properly mounted and tightened. 10. Inspect that bottom and top hatches are fully functional (open and close properly). 11. Inspect the cabin light illuminates with a constant light.

4.3.4 Traction hoist

The traction hoist shall be maintained according to maintenance planning (please see sections 4.1 or 4.2). Relevant maintenance instructions are provided to each person during the training. These maintenance inspections must be only carried out by a certified technician.

Function/System	Operations
Traction hoist	1.Inspect the traction hoist is clean, free of damage, dents, cracks or similar. 2.Inspect the hour counter read is less than 245 h since the last overhaul. **If it reads more, Traction hoist device must be overhauled at AVANTI so that a new certificate is issued.** 3.Inspect the current of electrical circuit matches the current described on the service lift data plate. 4.Inspect the 4 fixing bolts, the washers and the nuts are present and they are tightened that there are at least 2 threads of the bolt sticking out past the nut. 5.Inspect the air gap between of the electromagnetic motor brake (between the magnet body and the anchor plate). **Air gap between of the electromagnetic motor brake must be between 0.3 and 0.35 mm.** 6.Inspect there is no trace of oil leak around motor and gearbox. 7.Inspect the manual descent system function works properly when activated. 8.Inspect the traction hoist sounds normal (no abnormal noises or alike) when running.

4.3.5 Fall arrest device

WARNING

If fall arrest device has engaged due to a dynamic fall, a certified technician must verify the safety of the fall arrest device, the wire rope, and wire rope fastenings.

DANGER

After FAD has engaged, if the FAD fixing adapter has moved downwards, the FAD unit must be replaced by a certified technician.

The fall arrest device shall be maintained according to maintenance planning (please see sections 4.1 or 4.2). Relevant maintenance instructions are provided to each person during the training. These maintenance inspections must be only carried out by a certified technician.

Function/System	Operations
Fall arrest device	1. Inspect the fall arrest device is clean, free of cracks, dents and disparities. 2. Inspect the hour counter read is less than 245 h since the last overhaul. **If it reads more, fall arrest device must be overhauled at AVANTI so that a new certificate is issued.** 3. Inspect the fall arrest device is well lubricated 4. Inspect the fall arrest device engages when performing over speed “hand test”. 5. Inspect the fall arrest device locks when the locking lever is actuated and unlocks when the unlocking lever is actuated. 6. Inspect the ASL light (red) of the cabin main/user control box lights up when the fall arrest device is locked.

4.3.6 Cable management

Function/System	Operations
Electrical system	1.Inspect all the electrical cables are free of squeeze marks and their isolations are present and free of damages. 2.Inspect the electrical cables are laid and fixed with cable ties ensuring that there is no slack. 3.Inspect the sealing of the control boxes is in order. 4.Inspect the cable stockings prevent loading on the cable plugs. 5.Inspect all the electrical plugs are correctly mounted and connected and the plugs are free of dents, cracks, disparities and loose screws. 6.(If provided) Inspect the mid tower electrical cable support is properly installed and tightened. 7.(If provided) Inspect the mid tower power cable connector is free of dents, cracks, dispsrities and loose screws.

4.3.6.1 Travelling cable

Function/System	Operations
Travelling cable	1.Inspect the travelling cable pulley is free of damage. 2.Inspect the travelling cable is free of squeeze marks and the isolation of the cable is present and free of damages.

4.3.7 Traction and safety wire ropes

4.3.7.1 Traction wire rope

4.3.7.1.1 Cleaning

Keep always the traction wire rope clean and slightly greasy. Only use mechanical means to clean the dirty wire ropes, i.e. a cloth or a hand brush. Do not use solvents or other detergents.

4.3.7.1.2 Inspection and discard criteria

CAUTION

Rotate the calliper around the wire rope to measure the minimum and maximum wire rope diameter at each measurement point.

CAUTION

Determine and eliminate the cause before installing a new wire rope.

CAUTION

AVANTI recommends to replace the traction and safety wire ropes after 250 hours of operation corresponding with the refurbishment of the traction hoist and fall arrest device. Please check with your local authority regulations if it's mandatory in your case.

Function/System	Operations
Traction wire rope	1. Inspect all the wire ropes along their entire length, paying special attention to the wire rope ends, parts of the wire ropes running over sheaves and wire ropes under frictional wear by external components. -Traction wire rope is clean and slightly greased with a standard multipurpose grease free of disulphite. -Traction wire rope is free of deformations and squeeze marks and there are no wire strands broken. -There is no severe corrosion on the surface or the inside of the traction wire rope. -The traction wire rope is free of heat damages (Evident by blue discolouration). 2.Inspect the traction wire rope is properly mounted according to the manual, with an 11kg. counterweight and the 2 wire rope locks. The traction wire rope is properly coiled up and fixed with 3 cable ties and the counterweight is able to rotate freely. 3.Inspect the traction wire rope diameter is more than 7,6 mm at any point. **In general, measure the diameter of the wire rope at each WTG tower platform, and under the service lift, where the wire rope is less loaded. Specifically, if a wire rope wear is detected, measure on the affected area.** 4.Inspect the top beam is properly mounted and properly tightened to the WTG. If welded, the top beam´s weldings are in good condition and not showing corrosion. 5.Inspect the nuts of the shackles at top beam are locked with a cotter pin. 6.Inspect the length between the top end of each wire rope and its ferrule is equal to or more than 0 mm. 7.***Discard criteria***. Inspect and replace the traction wire rope if one of the following defects is found: -In case there are more than one 4-wire strand break on a wire rope length of 250 mm. -In case there is severe corrosion on the surface or the inside. -In case there is heat damage, evident by the wire rope colour. -In case the wire rope diameter is less than 7,6 mm. -In case there is damage on the wire rope surface. *(See Figure 10: Wire rope damage examples)*

NOTICE

When measuring the diameter of the wire ropes, use a digital calliper with broad measuring faces.

NOTICE

Record any visible change of the condition of the wire ropes on the Inspection and maintenance Log Sheet Appendix., and monitor closely throughout time.

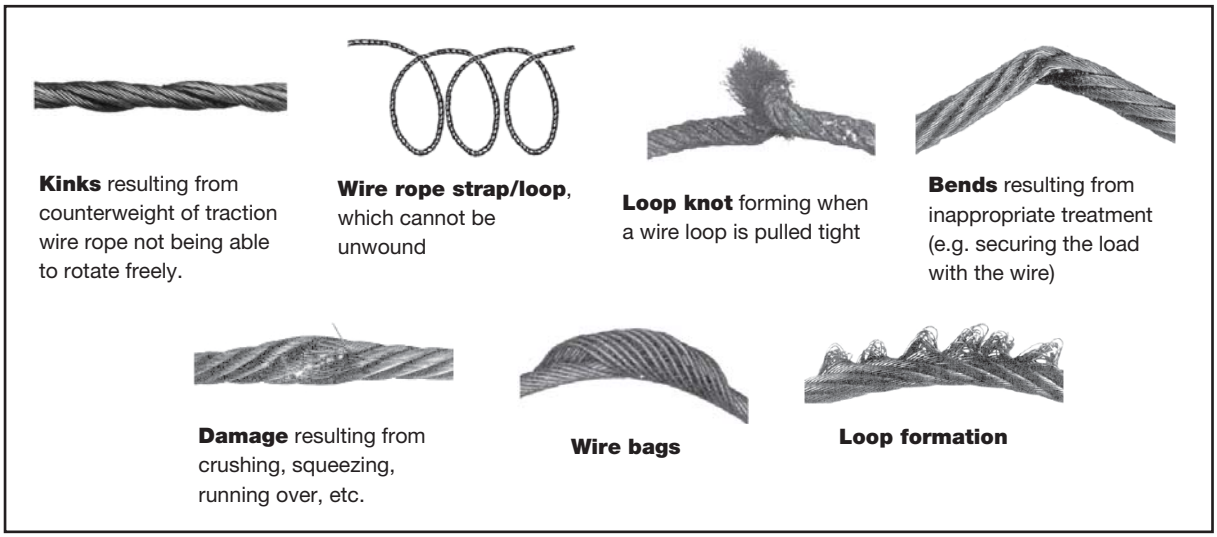


Figure 10: Wire rope damage examples

NOTICE

The discard criteria of the wire ropes should be based on ISO 4309: Cranes - Wire ropes - Care and Maintenance, inspection and discard.

4.3.7.1.3 Lubrication

WARNING

Traction / safety wire ropes are lubricated by supplier and should keep their lubrication during operation. When touched you should find little grease on fingertip. To ensure this, the storage of the wire ropes must be adequate and without any harmful conditions as for example dust, water, etc.

CAUTION

Only use specialised wire rope lubricants. Do not use lubricants based on lithium soap grease or bitumen.
Do not use disulphide-containing lubricants like Molycote ®.
Apply lubricant using a spray can, brush, drip applicator or pressurized device.
Pay special attention to sections of the wire rope where dehydration or denaturation of the lubricant can be seen.
Re-lubricate the wire ropes before they show signs of corrosion or run dry, and taking in mind that:
• A poor lubrication leads to corrosion and to a quick wear of components.
• An excessive lubrication leads to dirt agglomeration on the wire rope surface. As a result, this can lead to quick wear of wire rope, sheaves and drum.
• A correct lubrication keeps the efficiency factor of the wire rope, protects against corrosion, helps to elongate their lifetime significantly and ensures a safe operation.

Function/System	Operations
Traction wire rope lubrication	1. Position the lift at the bottom platform. 2. Open the wire inspection cover. 3. Apply lubricant on the traction wire rope by means of a spray can. 4. While applying the lubricant, use the second hand to place and hold a cloth around the wire rope. This way, the lubricant will be distributed uniformly. 5. While the first user uses the spray can and the cloth, a second user presses and holds the UP button from inside the lift. This way, while the service lift ascends, the lubricant is applied along the complete length of the wire rope. 6. After applying the lubricant, leave the maintenance cover open and carry out a descent back to the bottom platform. 7. While descending, check that the wire rope has been properly and uniformly lubricated. 8. Once the service lift is at the bottom platform, clean off any lubricant accidentally applied on the cabin panels. 9. Finally, close the wire inspection cover.

4.3.7.2 Safety wire rope

4.3.7.2.1 Cleaning

Keep always the safety wire rope clean and slightly greasy. Only use mechanical means to clean the dirty wire ropes, i.e. a cloth or a hand brush. Do not use solvents or other detergents.

4.3.7.2.2 Inspection and discard criteria

CAUTION

Rotate the calliper around the wire rope to measure the minimum and maximum wire rope diameter at each measurement point.

CAUTION

Determine and eliminate the cause before installing a new wire rope.

CAUTION

AVANTI recommends to replace the traction and safety wire ropes after 250 hours of operation corresponding with the refurbishment of the traction hoist and fall arrest device. Please check with your local authority regulations if it's mandatory in your case.

Function/System	Operations
Safety wire rope	1. Inspect all the wire ropes along their entire length, paying special attention to the wire rope ends, parts of the wire ropes running over sheaves and wire ropes under frictional wear by external components. -Safety wire rope is clean and slightly greased with a standard multipurpose grease free of disulphide. -Safety wire rope is free of deformations and squeeze marks and there are no wire strands broken. -There is no severe corrosion on the surface or the inside of the safety wire rope. -The safety wire rope is free of heat damages (Evident by blue discolouration). 3. Inspect the safety wire rope is properly mounted according to the manual. -The compression spring on the safety wire rope is correctly installed and that the wire rope locks are properly fastened. -In case two 11kg counterweight are installed and the 2 wire rope locks. The safety wire rope is properly coiled up and fixed with 3 cable ties and the counterweights are able to rotate freely. 4. Inspect the safety wire rope diameter is more than 7,6 mm at any point. **In general, measure the diameter of the wire rope at each WTG tower platform, and under the service lift, where the wire rope is less loaded. Specifically, if a wire rope wear is detected, measure on the affected area.** 5. Inspect the top beam is properly mounted and properly tightened to the WTG. If welded, the top beam´s weldings are in good condition and not showing corrosion. 6. Inspect the nuts of the shackles at top beam are locked with a cotter pin. 7. Inspect the length between the top end of each wire rope and its ferrule is equal to or more than 0 mm. 8. ***Discard criteria***. Inspect and replace the safety wire rope if one of the following defects is found: - In case there are more than one 4-wire strand break on a wire rope length of 250 mm. - In case there is severe corrosion on the surface or the inside. - In case there is heat damage, evident by the wire rope colour. - In case the wire rope diameter is less than 7,6 mm. - In case there is damage on the wire rope surface. *(See Figure 10: Wire rope damage examples)*

NOTICE

When measuring the diameter of the wire ropes, use a digital calliper with broad measuring faces.

NOTICE

Record any visible change of the condition of the wire ropes on the Inspection and maintenance Log Sheet Appendix., and monitor closely throughout time.

NOTICE

The discard criteria of the wire ropes should be based on ISO 4309: Cranes - Wire ropes - Care and Maintenance, inspection and discard.

4.3.7.2.3 Lubrication

WARNING

Traction / safety wire ropes are lubricated by supplier and should keep their lubrication during operation. When touched you should find little grease on fingertip. To ensure this, the storage of the wire ropes must be adequate and without any harmful conditions as for example dust, water, etc.

CAUTION

Only use specialised wire rope lubricants. Do not use lubricants based on lithium soap grease or bitumen.
Do not use disulphide-containing lubricants like Molycote ®.
Apply lubricant using a spray can, brush, drip applicator or pressurized device.
Pay special attention to sections of the wire rope where dehydration or denaturation of the lubricant can be seen.
Re-lubricate the wire ropes before they show signs of corrosion or run dry, and taking in mind that:
• A poor lubrication leads to corrosion and to a quick wear of components.
• An excessive lubrication leads to dirt agglomeration on the wire rope surface. As a result, this can lead to quick wear of wire rope, sheaves and drum.
• A correct lubrication keeps the efficiency factor of the wire rope, protects against corrosion, helps to elongate their lifetime significantly and ensures a safe operation.

Function/System	Operations
Safety wire rope lubrication	1. Position the lift at the bottom platform. 2. Open the wire inspection cover. 3. Apply lubricant on the safety wire rope by means of a spray can. 4. While applying the lubricant, use the second hand to place and hold a cloth around the wire rope. This way, the lubricant will be distributed uniformly. 5. While the first user uses the spray can and the cloth, a second user presses and holds the UP button from inside the lift. This way, while the service lift ascends, the lubricant is applied along the complete length of the wire rope. 6. After applying the lubricant, leave the maintenance cover open and carry out a descent back to the bottom platform. 7. While descending, check that the wire rope has been properly and uniformly lubricated. 8. Once the service lift is at the bottom platform, clean off any lubricant accidentally applied on the cabin panels. 9. Finally, close the wire inspection cover.

4.3.8 Guiding system

4.3.8.1 Guiding ladder

Function/System	Operations
Guiding ladder	Perform the following inspections and adjust if necessary: 1.Inspect the guiding rollers are properly installed. 2.Inspect that outer surface of guiding rollers is uniform, does not show breaks and is free of damage. 3.Inspect if wear of surface of guiding rollers is not be bigger than 1 mm. 4.Inspect if the outer diameter of guiding rollers is between 48 and 50 mm. 5.Inspect that the guiding ladder is properly installed and its bolts are properly tightened. 6.Inspect that guiding ladder does not show breaks and is free of damage or corrosion. 7.Inspect the ladder stiles and fish plates are free of damage and do not have any bumps nor obstacles.

4.3.9 Top limit device

Function/System	Operations
Top limit device	1.Inspect that the top limit device is properly positioned and it is not damaged, and the bolts and brackets are properly tightened.

4.3.10 Landing interlock system

4.3.10.1 Guard locking

Function/System	Operations
Guard locking system	1. (If provided) Inspect that the guard locking lock is properly tightened, it is damaged free and it functions properly. 2. (If provided) Inspect that the guard locking switch of the platform fence door is properly adjusted and tightened.

4.3.1 ..2 Trapped key system

Function/System	Operations
Trapped key system	1. (If provided) Inspect that the trapped key is properly secured to the cabin with a chain or wire rope. 2. (If provided) Inspect that the trapped key lock is properly tightened to the platform fence and it is fully functional. 3. (If provided) Inspect that the trapped key switch of the user control box is fully functional.

4.3.1 ..3 Safe zone plates

Function/System	Operations
Safe zone plates	1. (If provided) Inspect the safe zone plates are properly positioned and tightened so that the platform switch (S18) is activated at each platform.

4.3.11 Overload check and adjustment

Function/System	Operations
Overload check and adjustment	Test switches and perform overload test as specified in the “Adjustment of the overload detection device” Appendix.

4.3.12 Information signs and documents

Function/System	Operations
Information signs and documents	Verify availability and legibility of all data plates and information signs. Replace missing or illegible plates and signs!

4.4 Repairs

Repairs to traction hoist equipment must ONLY be performed by AVANTI, and only using original spare parts. If the gearbox oil needs to be replaced, use one of the lubricants specified below, corresponding to the temperature range in which the traction hoist equipment is used.

- Amount required: 1,5 l
- Traction hoist: M608
- Oil: Mobil SHC 632.

Each oil has to be verified by AVANTI.

4.5 Ordering spare parts

Only use original parts.
Spare part lists are available from AVANTI. Please indicate lift model when requesting a spare part list.

4.6 Actions to temporarily put the lift out of service

Follow the steps below to put the service lift out of service:

1. Descend the service lift until the bottom obstruction detection device stops the cabin on the bottom platform.
2. Turn off the main switch to interrupt the electrical power supply and avoid unintentional operation of the service lift.
3. Place a sign on the service lift indicating that it is out of service.
4. Record that the service lift has been put out of service in the Appendix: User log sheet and inform the supervisor.

Adjustment of the overload detection device

WARNING

The adjustment of the overload detection device of the service lift shall be carried out only by a certified technician.

Test weights and Avanti's overload adjustment tool shall be available before starting the adjustment or test.

a) Overload setup instruction

Follow the overload setup instruction workflow

NOTICE

One turn of the tool (2) represents a change of approximately 40 kg of the triggering limit of the overload limiter.

b) Overload test instruction

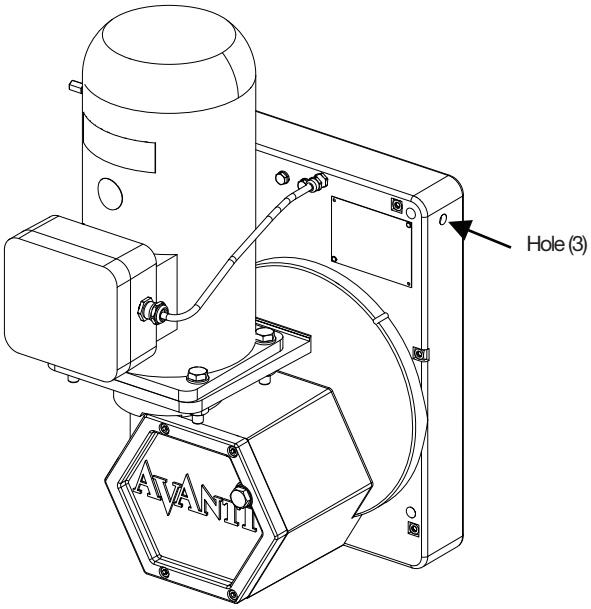
Follow the overload test instruction workflow

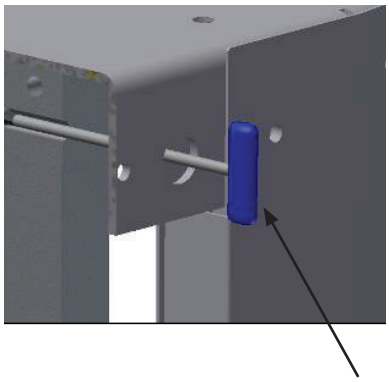
NOTICE

The overload test is part of the annual inspection and may also be performed by 3rd party inspectors following national regulations depending on the country.

NOTICE

Overload detection device adjusting system may be sealed depending on national requirements. Avanti can provide seals upon request.





Overload adjustment tool (2) with security Torx 40

Setup and test loads table

Travel distance (m)	For Octopus L95 HD	
	Setup load (1) (kg)	Test load (5) (kg)
From 41 to 60	395	477
From 61 to 80	405	468
From 81 to 100	410	459

NOTICE

(4) Rated load for Octopus L95 HD = 350 kg.

NOTICE

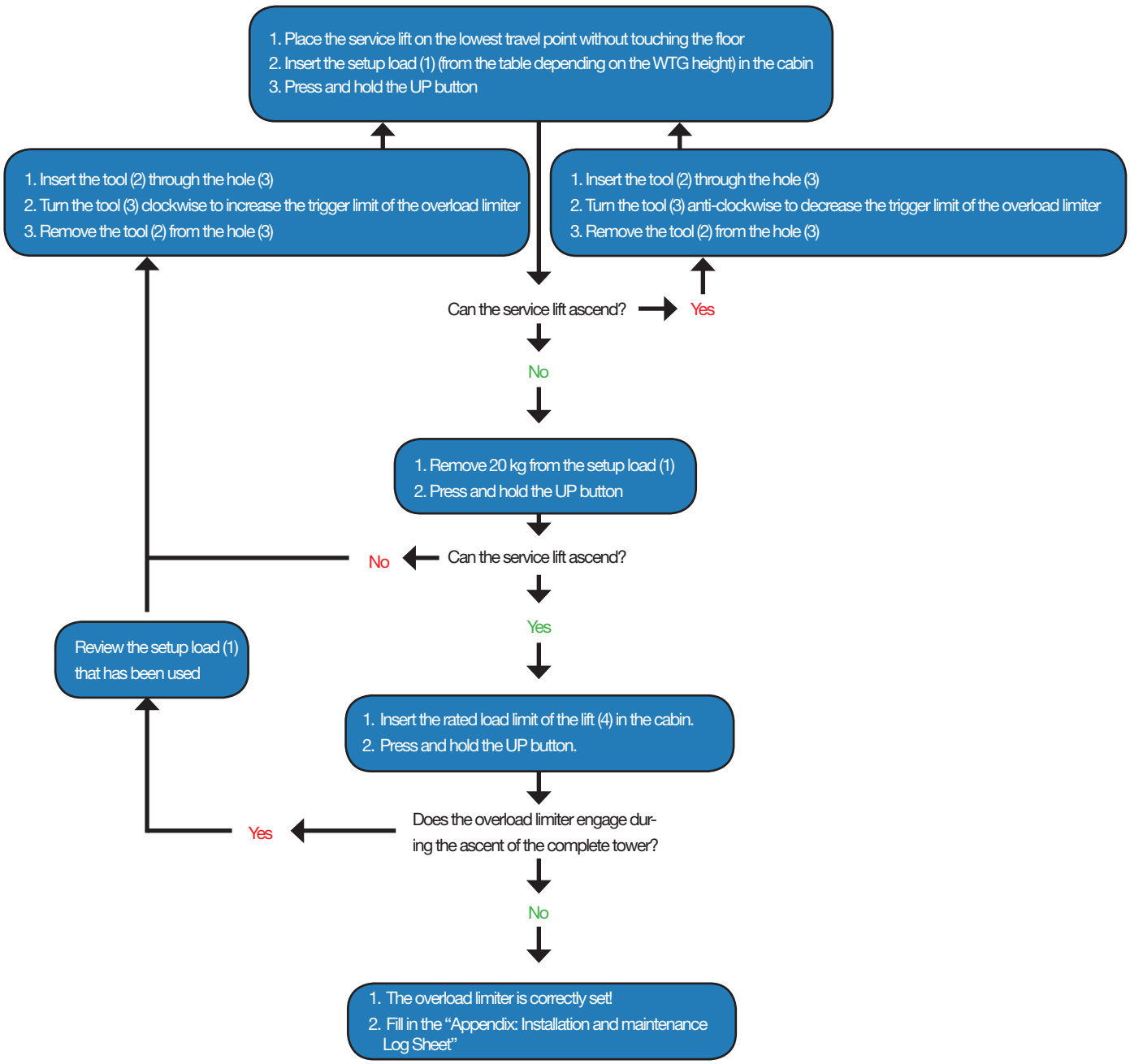
The overload limiter complies with EN 1808 8.3.5.5 [1] since it will trigger before reaching a load of 1,25 times the working load limit of the hoist. In case that a third party inspector requests this test to be done, the load to be introduced in the cabin is as follows.

(5) Overload test load = WLL hoist x 1,25 – Weight of lift, counterweight, traction wire rope and power cable.

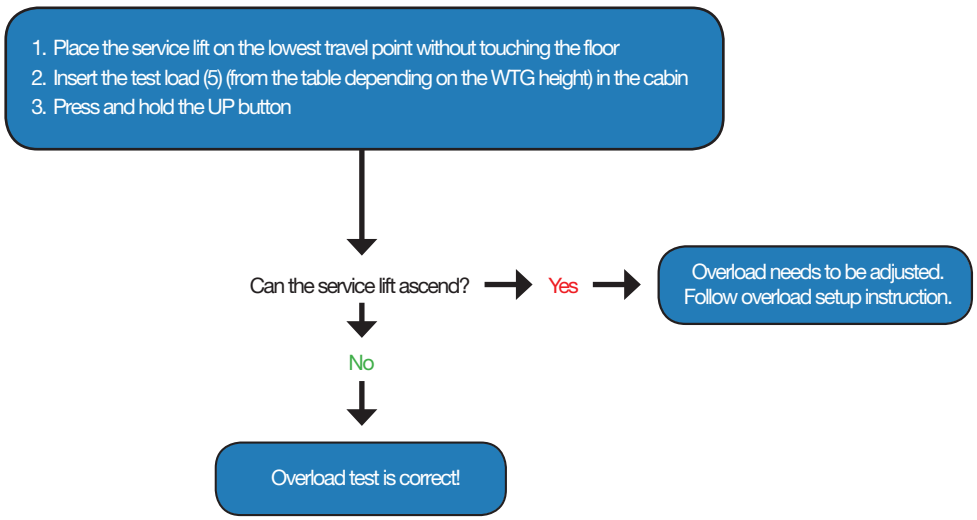
NOTICE

[1] The EN1808 test load is only applicable to CE versions.

• Overload setup instruction workflow



• Overload test instruction workflow



1. Caution

AVANTI LIFT ANCHOR is an anchor point used for protection against falls from heights intended for use with a full body harness approved according to EN 361 or Z359.1:2007 as applicable. Connection to the LIFT ANCHOR is only allowed by using self-closing connectors according to EN 362 or Z359.1:2007 as applicable.

Use in connection with other equipment than specified, may be potentially dangerous. User shall be equipped with a means of limiting the maximum dynamic forces exerted on the user during the arrest of a fall to a maximum of 6kN. In case of doubt, please contact AVANTI.

The maximum load that can be transmitted in service from the anchor device to the structure is 22.2 kN in ±15° vertical direction. The maximum deflection of the anchor point that can occur in service is 10mm.

AVANTI LIFT ANCHOR is tested and approved only to be mounted on AVANTI lifts.

Activities at height are dangerous and may lead to severe injury or even death.

Gaining an adequate apprenticeship in appropriate techniques and methods of protection is important and is your own responsibility.

Users are obliged to read and understand this User Manual. Further they need to be proper equipped and instructed with the use of the necessary fall arrest equipment and emergency procedures in case of injury or sudden illness.

Users going to install AVANTI LIFT ANCHOR need to be familiar with the installation section of this manual. It's essential to the safety, that the user always attach the energy absorber as high as possible above his/her position, to minimize the fall distance most possible in case of a fall.

The position of the anchor point is crucial for fall arrest – the height of the fall, elongation of lanyard and energy absorber or pendulum movement of the user should be considered in order to minimize the risk of impact in obstacles in case of a fall. It's prohibited for the user to do many modifications or use non original Avanti components when assembling AVANTI LIFT ANCHOR.

Re-use of demounted AVANTI LIFT ANCHORS or parts is not allowed. Any changes or other uses beyond this manual are strictly forbidden.

Any changes or other uses beyond this manual are strictly forbidden. This documentation must be kept in the service lift for the purpose of subsequent examinations of the anchor device.

2. Danger

The AVANTI LIFT ANCHOR is for the use of one person only. It is strictly forbidden to carry out work if the person is in unfit mental or physical condition. Climbing and working under the influence of alcohol, drugs or any medication which can interfere with the safety are also much prohibited.

If there are any doubts to the safety of the AVANTI LIFT ANCHOR, or it isn't proper fixed, deform or damaged with cracks or similar incompatible harms it may never be used – Please contact the manufacture immediately. In case of corrosion the anchor immediately needs to be removed.

Observations:
Only to be used by instructed workers! Instructed workers must be aware, instructed and prepared to utilize site rescue plans.

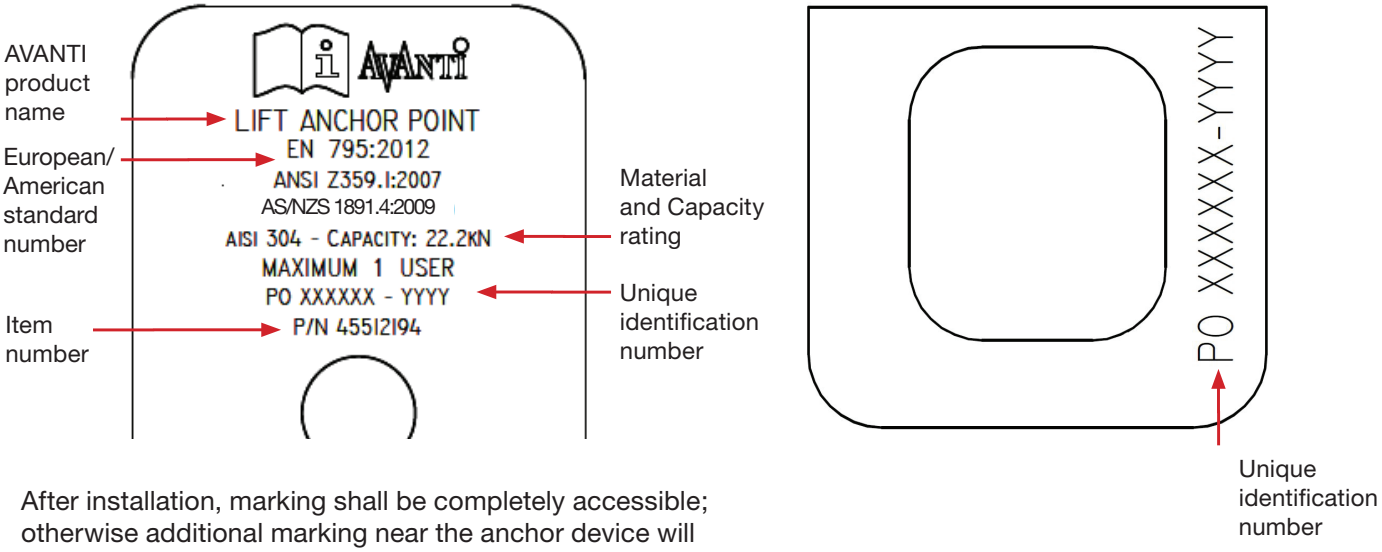
Only to be used for preventing vertical fall!

Only to be used for fall arrest, not to hoist or hang in goods or similar! Before attaching in the ANCHOR the user needs to check it is sitting fixed and screws are sitting tight and proper.

If AVANTI LIFT ANCHOR has arrested a fall it may never be used again. Part must be removed from service immediately.

3. Marking

Marking on Lift Anchor plate:



After installation, marking shall be completely accessible; otherwise additional marking near the anchor device will be necessary.

4. Installation

The installation must be performed by a certified technician following the instructions of this manual.

AVANTI LIFT ANCHOR is tested and approved only to be installed on AVANTI lift. AVANTI LIFT ANCHOR made from AISI 304 Steel has to be screwed with two bolts DIN 933 A2-70 M12 mm, 4 washers DIN 125A A4 and self locking nuts DIN 985 A4 M12. In case of doubt, please contact AVANTI.

Before installing the AVANTI LIFT ANCHOR in heights, assure to be proper secured against fall from height by using relevant fall arrest equipment.

AVANTI LIFT ANCHOR:

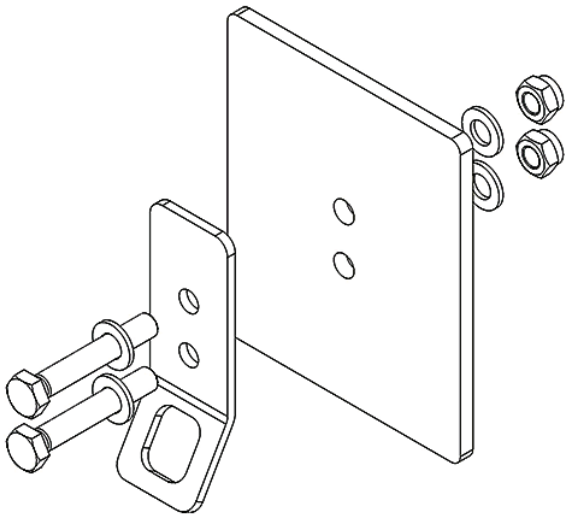
1. Fix the anchor point to the structure using the supplied hardware as shown in the picture below.

2. Torque the nuts with 15 N·m (11 lb·ft).

3. Make sure the Anchor is fully seated and properly tightened.

4. Fill in “Installation form”.

5. Carry out yearly inspection by following the procedure in the section “Inspection”.



5. Inspection

After installation:
An inspection must be carried out by a certified technician following the inspection form in this manual.

Before use:
Each time using the AVANTI LIFT ANCHOR the user inspects the ANCHOR visual and manually by twisting / pulling. Check the parts are properly fixed and free of deformities, damages, cracks or similar unacceptable defects.

Periodical examination:
A periodic examination at least every 12 month is essential for the safety of the AVANTI LIFT ANCHOR. The examination must be performed by a certified technician following the inspection form in this manual.

For the AVANTI LIFT ANCHOR the certified technician only needs to be trained in any metallic component covered by the European/American standard norms for fall arrest equipment.

6. Inspection form

PPE Anchor:	Manufacturer:	Avanti
	Type / Model:	Lift Anchor
	Identification no.:	
Fixing structure:	Lift serial no.:	
	Lift model:	
	Wind farm / WTG no.:	
Installed by:		
Installation company:		

	OK	**not OK**
1. Lift structure does not show any deterioration.		
2. Anchor locking screws are fully inserted and tightened with 15 N·m.		
3. Anchor does not show cracks, deformities, corrosion or other damages.		
4. Anchor installed on the lift structure according to the instructions.		
5. Anchor marking is clearly readable.		

Is the Anchor in good condition to be used?

Yes	No (Replace)

Signature of competent:
Name of competent in capital letters:
Date:

If the AVANTI LIFT ANCHOR is found not OK, it must be removed / replaced by a new AVANTI LIFT ANCHOR!
The result of the periodic examination must be recorded in the Registration form of anchor.

7. Registration form of anchor

Avanti lift Anchor	**Identification no.:**	Avanti Wind System Technology, S.L. Calle Ángeles (Los), Num. 88 Pol. Industrial Centrovía 50198 Muela (La) - (Zaragoza)-Spain P: +34 976 149524

Date of purchase:	**Date first put into service:**

Periodic examination and repair history				
Date	**Reason for entry (per. exam)**	**OK / not OK**	**Inspector**	**Periodic exam next due date**

Changelog

Version	Date [mm/yyyy]	Description
01.01	02/2018	Service Lift Installation and maintenance Manual Model Octopus L95 HD
01.02	10/2018	Added caution in section 3.5.1
02.01	03/2019	EC Certificate updated Manufacturer updated to Avanti Wind Systems Technology, S.L.
03.01	07/2019	EC Certificate updated

AVANTI

www.avanti-online.com