



Original instructions



AVANTI

AVANTI SERVICE LIFT
User's Manual
Model Service Lift OCTOPUS L95

CE

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
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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

Cologne, 2019-07-29



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1. 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 Product¹⁾ 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.

* Avanti service lift ("Product")

2. Introduction

2.1 Observations

Only trained people may use this lift.

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.



The pictures and sketches in this manual may not reflect the product aesthetics, colours, arrangement precisely. This has no impact on the function or safety.

2.2 Symbols

Symbol	Signal word	Meaning	Possible injury if not observed
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Safety instructions



DANGER!

IMMEDIATE or possibly imminent danger:

Death or severe injury!



DANGER!

IMMEDIATE or possibly imminent danger of hazardous voltage:

Death or severe injury!



CAUTION!

Potentially hazardous situation:

Light injury or material damage.

Additional instructions



ATTENTION!

Potentially dangerous situation:

Damage to equipment or workplace



IMPORTANT!

Useful tips for optimum working procedure

None

Order



Reference to written specification/documentation

2.3 Cautions

Use and daily inspection of the service lift shall only be performed by 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. Installation and maintenance of the service lift shall only be performed by Certified technicians.

Personnel must be at least 18 years of age. The staff must be familiar with the relevant accident prevention instructions and must have received proper training in these.

Personnel are obliged to read and understand this User's Manual.

Personnel shall wear PPE (safety helmet, full body harness, shock absorber, lanyard and slider) at all times.

A copy of the User's Manual must be handed out to the personnel and must always be available for reference.

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

Self-locking nuts must be used at all times. The screw must extend from the nut by at least half of the thread diameter. The nut may not be used once it has become possible to loosen by hand!

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

All tests/repairs of electrical installations may only be performed by a certified technician.

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

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

Only original fault-free parts may be used.

Use of non-original parts will render the manufacturer's warranty void and any type approval invalid. 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 which are not approved by the manufacturer.

Service lift must be inspected by Certified technicians before first use.

Service lift must be inspected at least once a year by Certified technicians. In case of high operating frequency or severe conditions of use, more frequent inspection is required.

Service lift is designed for a lifetime of 20 years with an operating frequency of approximately 12.5 h/year (250 h in total).

Service lift may not be used by persons who are under the influence of alcohol or drugs which may jeopardize working safety.

The service lift shall not be used in case of fire in the tower.

Service lift shall ONLY be used when the turbine is not generating power.

All wind farm site specific rules must be followed. Service lift shall not be used during inclement weather, including wind speeds over 18 m/s.



Avoid injury – follow all instructions!



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

2.4 Terms and definitions

Terms	Definitions
Certified technician	Person who has received relevant training from Avanti or a qualified instructor associated with the intended work and who holds valid certification (current) for the task in question.
User	Person who has received relevant training associated with using the Avanti service lift and perform the corresponding daily inspections and who holds valid certification (current) for the task in question.
Manual descent (also: descent without electrical power supply)	Action performed to descend the cabin at a controlled speed without electrical power, by releasing the traction system's electromagnetic brake manually.

3. Description

3.1 Purpose

The service lift purpose is to transport persons plus their tools and equipment to the most convenient height for performing work in wind turbine generators (WTG).

Its use is limited to certified technicians. The access to the WTG and consequently to the service lift is controlled and forbidden to public access.

The service lift is used primarily to transport technicians, their tools and spare parts from the bottom platform (or lowest accessible point) to the top platform (or highest accessible point). It is also used to access intermediate platforms where inspection and service of WTG connecting bolts and other equipment is made.

3.2 Scope

- The Octopus service lift system consists of the following subsystems:
- Cabin.
- Traction and fall arrest systems.
- Guiding system.
- Control, safety and power systems (including an interlock system on platform fence doors).
- A rescue pendant control ¹⁾

i ¹⁾ In case of send or send/call configuration, the rescue pendant control will not be available.

Each of the subsystems listed above and their components are described in detail throughout the document.

The system fully complies with essential health and safety requirements of European Machinery directive.

There are two different configurations for working temperature ranges; in particular, there is a standard configuration and a low temperature configuration where traction system and main control box components are chosen specifically.

3.3 Exclusions

The service lift shall not be used outdoor or in potentially explosive atmospheres. The service lift is not designed to carry a person on its top.

The wind turbine manufacturer is responsible of integrating the service lift and ensuring compliance with the essential health and safety requirements as stated on the 2006/42/EC Machinery Directive and the applicable harmonized standards following the manufacturer recommendations.

This will require supply of interface components, including but not limited to:

- Ladder system.
- Brackets for ladder sections.
- Platform fences with doors.
- Power supply protection.

The wind turbine manufacturer shall also provide any additional relevant warning, instruction and / or training specific to the integration of the service lift necessary for its safe and correct installation.



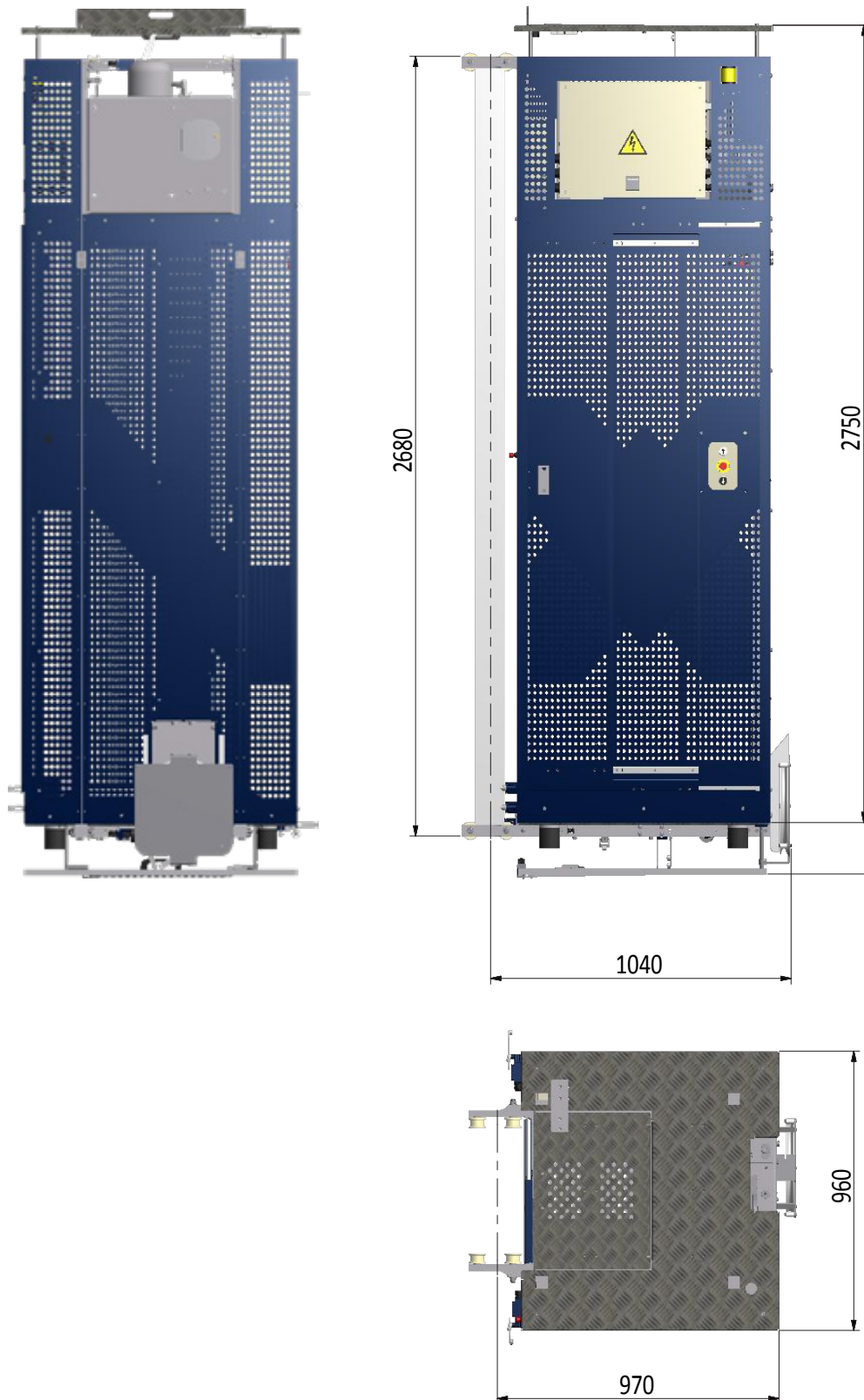
Tower manufacturer's risk assessment shall include a service lift integration study.

3.4 Technical specifications

Service lift	
Main door type	Full sliding door
Main door interlock system	Guard locking
Service lift speed	18 m / min \pm 20 %
Rated load	240kg
Max. n° persons	2 persons
Max. travelling height (L95)	160 m
Operating temp (normal version)	-15°C to +60°C
Survival temperature (normal version)	-25°C to +80°C
Operating temp (Low temp version)	-30°C to +40°C
Max. noise level	80 dB (A)

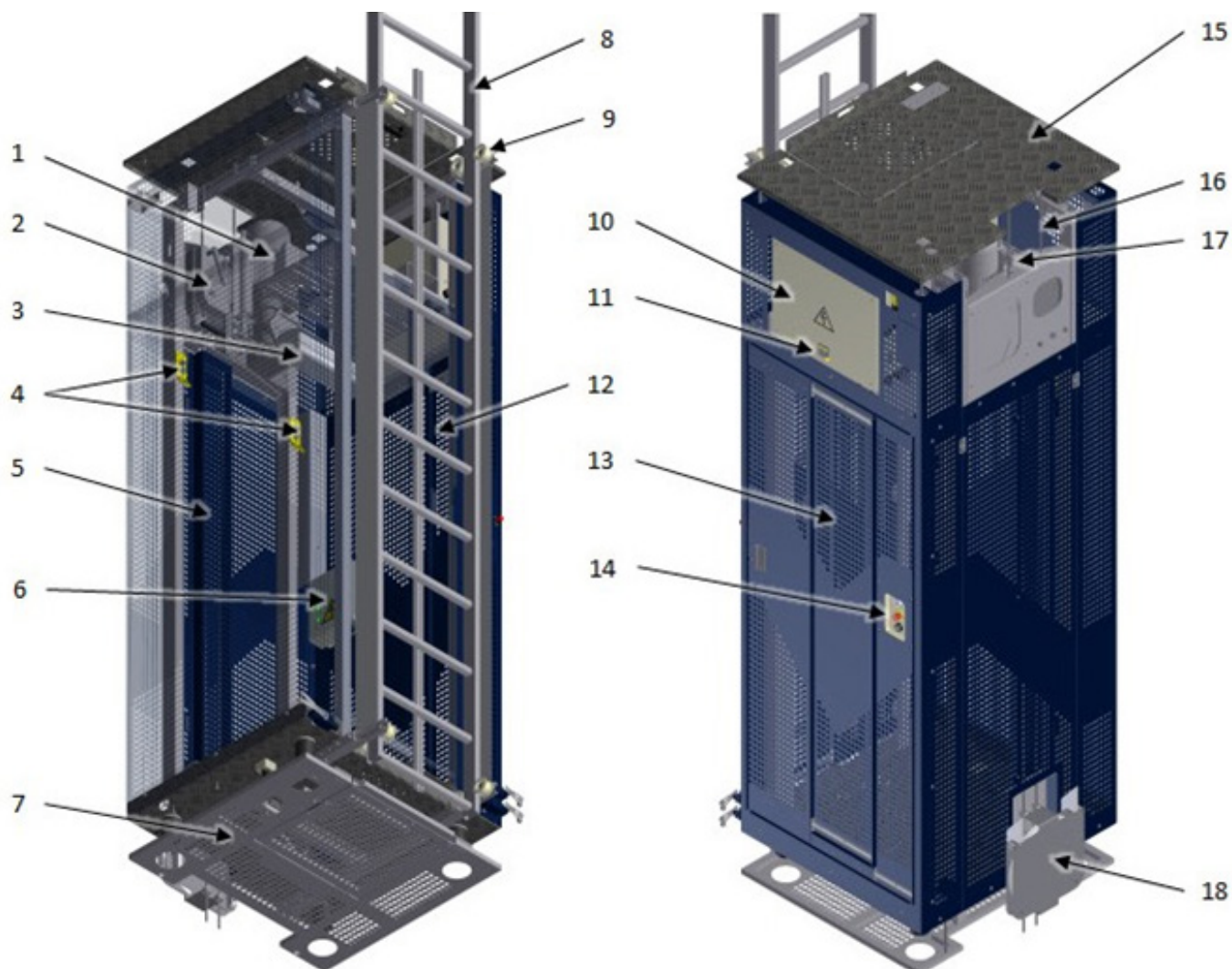


3.5 Dimensions



3.6 Components

3.6.1 Overview



- 1 Traction system
- 2 Fall arrest device
- 3 Cabin light
- 4 Anchor points
- 5 Maintenance cover
- 6 Cabin control box
- 7 Bottom obstruction device
- 8 Guide ladder
- 9 Guiding rollers

- 10 Main control box
- 11 Hour counter
- 12 Ladder access door
- 13 Full sliding door
- 14 External controls
- 15 Top obstruction device
- 16 Safety wire rope
- 17 Traction wire rope
- 18 Travelling cable pulley



Traction system



Fall arrest device



3.6.2 Traction system

Service Lift	Hoist	Lifting capacity	Wire rope speed	Power	Rated current	Traction wire rope Ø	Unit weight approx.
Version	Traction system type	Kg	m/min	kW	A	mm	Kg
Octopus L95	M508 / 400V 50Hz	500	18	1.5	4.1	8.4	50
Octopus L95	M508 / 690V 50Hz	500	18	1.5	2.3	8.4	50
Octopus L95	M508 / 400V 60Hz	500	21	1.8	4.9	8.4	50
Octopus L95	M508 / 480V 60Hz	500	21	1.8	4.1	8.4	50
Octopus L95	M508 / 690V 60Hz	500	21	1.8	2.8	8.4	55

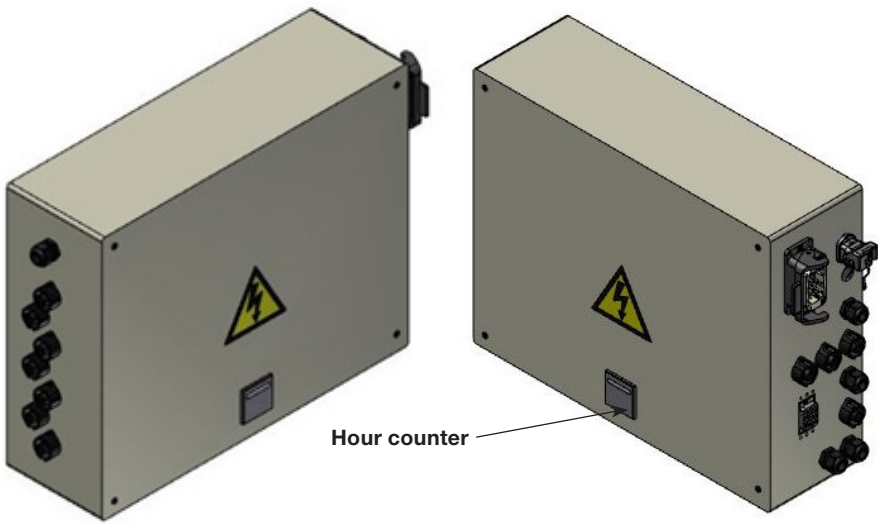
3.6.3 Fall arrest device

Service Lift	Fall arrest device	Lifting capacity	Triggering speed	Safety wire rope Ø	Unit weight approx.
Version	Type	Kg (lbs)	m/min (ft/min)	mm	Kg (lbs)
OctopusL95	ASL 508	500 (1100)	30 (100)	8.4	7 (15.4)
OctopusL95	ASL 508	500 (1100)	40 (130)	8.4	7 (15.4)

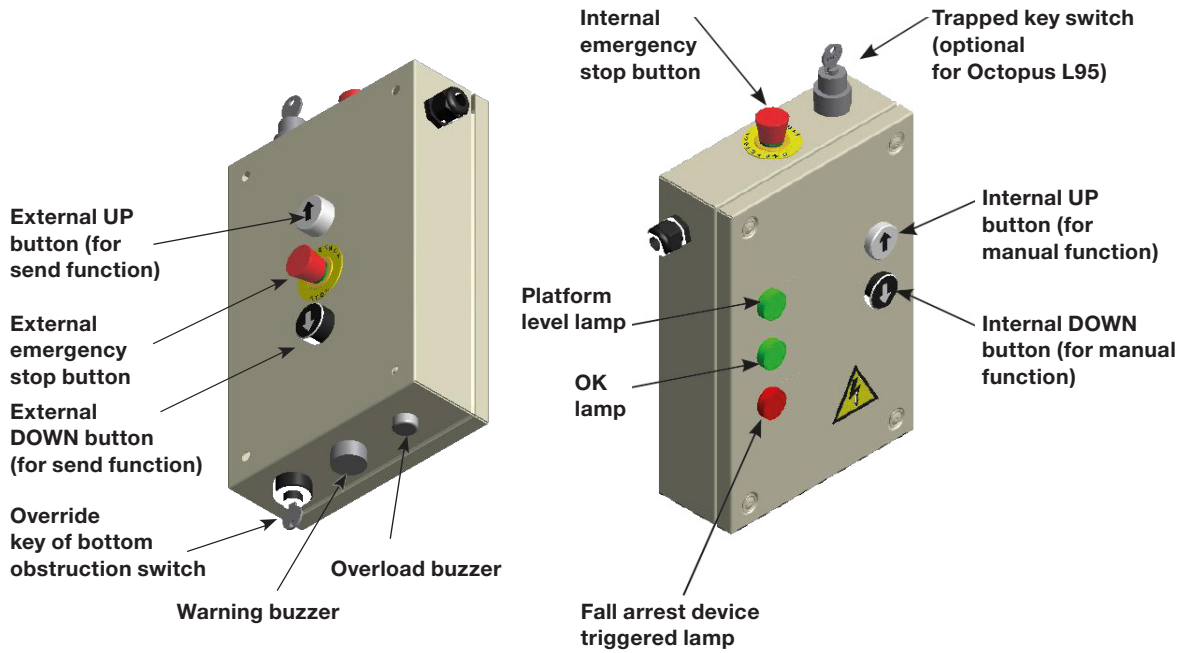
3.6.4 Traction and safety wire ropes

Service Lift Version	Wire rope type	Wire rope diameter	Surface Treatment	Mark/feature	Min. break resistance	Attached with
Octopus L95	M508 / ASL 508	8.4 mm, 5x19	HDG	no	55 kN	2 t shackle

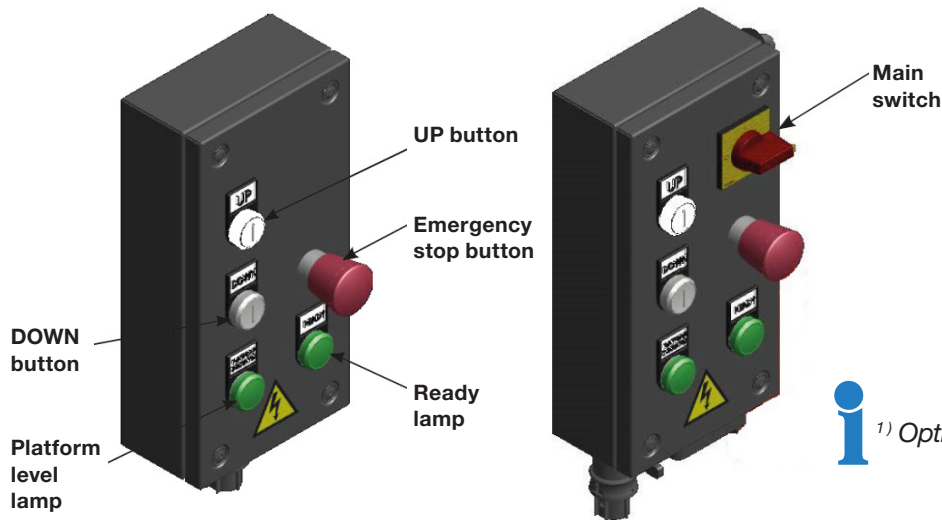
3.6.5 Main control box



3.6.6 Control boxes
3.6.6.1 Cabin control box



3.6.6.2 Platform control boxes ¹⁾



¹⁾ Optional for Octopus L95.

3.6.7 Platform fences

They must conform to EN 14122, be 1,1 m high and be equipped with doors. These must be monitored with a trapped key system that permits fence door to be opened only when service lift is present. Trapped key is attached to cabin by means of a wire rope, preventing loss of key.

Optionally, the platform fences can be equipped with an electrical switch monitoring system, that disables control of the elevator in case one platform fence is open, which is composed by a manual actuated mechanical lock connected to switch cutting power to lift when it is opened, or with a guardlocking system keeping the door locked while the service lift is not at the platform. The door is unlocked when the service lift is at the platform with the lift detection switch activated. The ready light is ON when the door is closed.

During emergency use, for example, power cut, need of evacuation or rescue, the door guard locking switch can be unlocked by acting the mechanical Door Manual Release system from outside the fence, or from inside the fence.

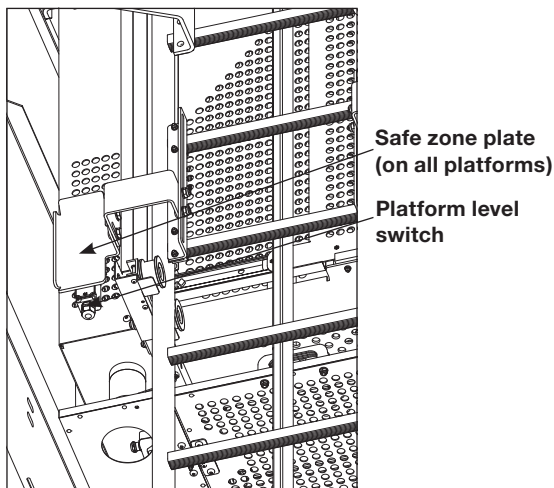
3.6.8 Main service lift door

Main access to the cabin is done through the full sliding door installed on the front.

The full sliding door opening dimensions are 1950 x 500 mm. It features a guard locking system that:

- Prevents service lift to travel if the door is open. This opening condition is monitored by the guard locking switch.
- Permits door to be opened only when service lift is levelled with a platform. This levelling condition is monitored by the platform level switch which is triggered by the safe zone plates.

For the Octopus L95, as an option, the levelling condition can be monitored by a magnetic sensor.



It is possible to manually release guard locking system in order to open main door between platforms for maintenance tasks or installation of WTG parts.



External manual release of guard locking of L95

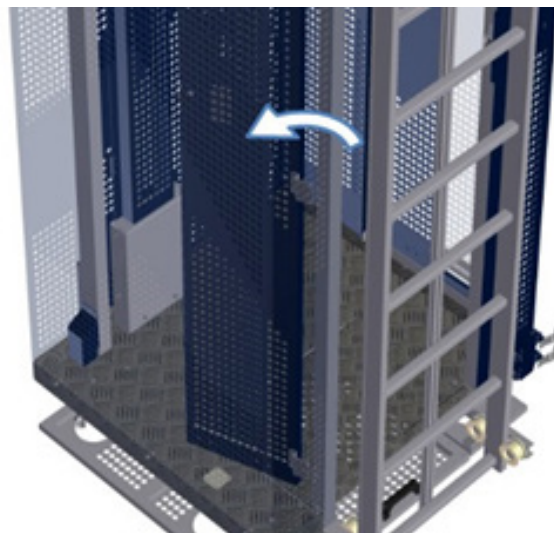


Internal manual release of guard locking of L95

3.6.9 Ladder access door

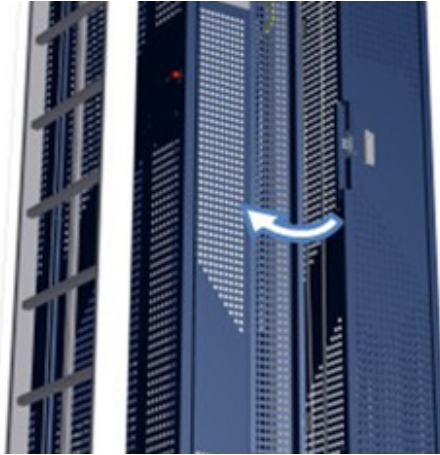
Ladder access door consists of two hinged sheets that fold up when opened, thus optimizing space. In case of evacuation, the ladder access door permits direct access to ladder and ladder rail.

A safety switch interrupts control when door is open.



3.6.10 Maintenance cover

Maintenance cover allows safe and fast inspection of traction and safety wire ropes from inside the cabin while travelling.

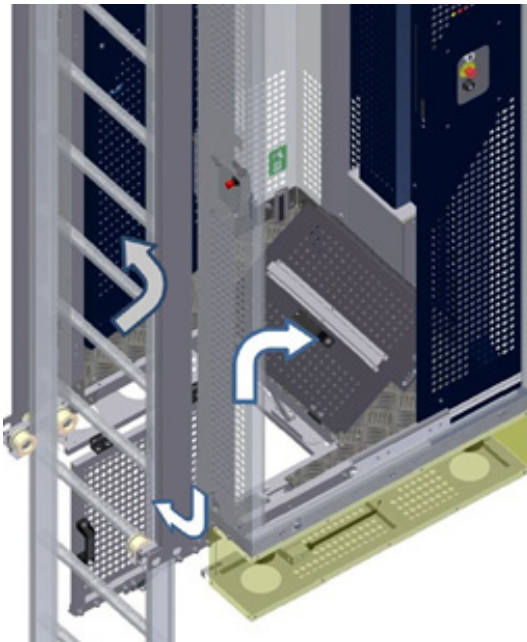


3.6.11 Bottom hatches

Bottom hatches can be opened from both sides, thus allowing egress and ingress from underneath. Bottom cabin hatch opens inwards, and bottom obstruction device hatch opens outwards. Each of them has a safety switch that interrupts control when hatch is opened. Once top hatches and ladder access door are open, clear area is at least 500 x 500 mm, and ladder becomes totally accessible.



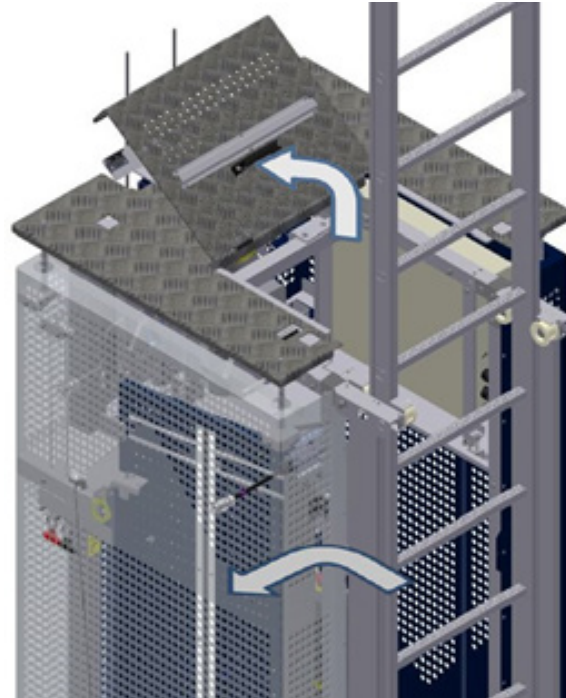
Direct evacuation to ladder is possible at any position along the WTG.



3.6.12 Top hatch

Top hatch can be opened from both sides, thus allowing egress and ingress from above. It has a safety switch that interrupts control when hatch is opened.

Top obstruction device hatch opens outwards. Once top hatches and ladder access door are open, clear area is at least 500 x 500 mm, and ladder becomes totally accessible.



3.6.13 Bottom obstruction device

Bottom obstruction device interrupts descent if:

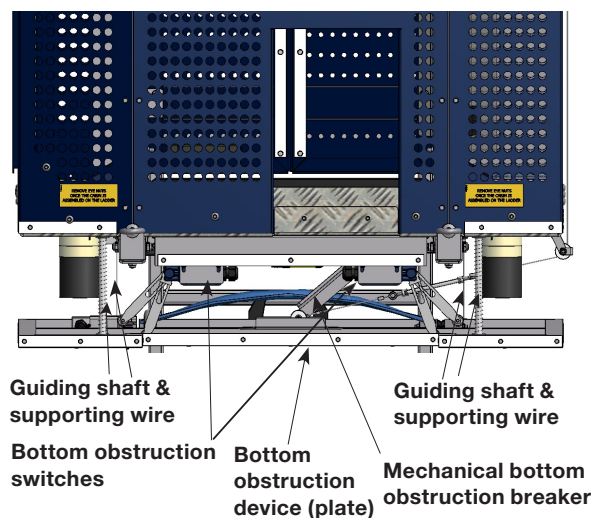
- It encounters an obstacle.
- It reaches the bottom platform.

Ascent will still be possible, for instance to remove the obstacle. In order to put the service lift on the ground, the contact plate functionality can be bypassed with the override bottom obstruction device switch located on the cabin control box. To do so, turn the override bottom obstruction switch key while pressing the down button.



Release the DOWN button as soon as the rubber bumpers hit the floor. Otherwise the service lift or the installation may get damaged.

A mechanical bottom obstruction device switch permits the bottom obstruction device to be still operational during manual descent. Manual descent will be stopped if an obstacle is encountered.



3.6.14 Top obstruction device

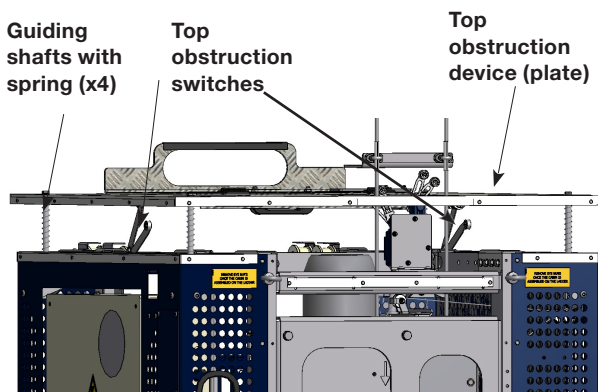
Top obstruction device interrupts ascent if it encounters an obstacle. Descent will still be possible, for instance to remove the obstacle.



When the top obstruction device switches are engaged, press the down button until it disengages.



Do not use the service lift until the top obstruction device switch fault has been rectified.

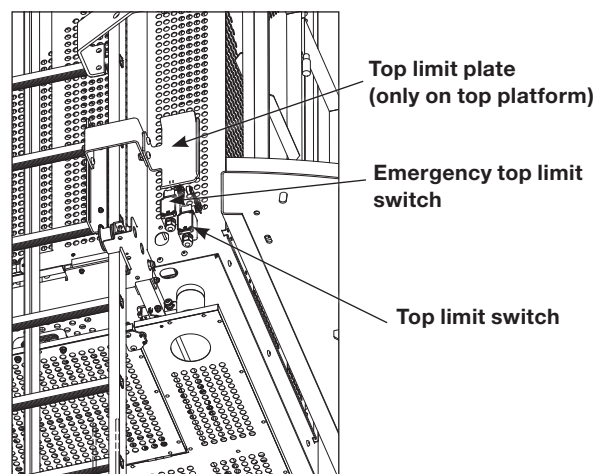


3.6.15 Top limit switch

Top limit switch interrupts ascent if it is triggered by the top plate.

Emergency top limit switch is triggered in case the top limit switch fails to engage. It cuts off power supply, so only manual descent will be possible.

Top limit plate is mounted on the ladder.



In Octopus L95 these switches can be located on the top of the cabin, beside safety and traction wire ropes. The top limit plate will be attached to traction and safety wire ropes.

3.6.16 Manual descent system

The service lift features a manual descent system that can be used in case of emergency.

To activate it, push the manual descent actuator fully upwards. The electromagnetic motor brake is released.

The service lift descends with a controlled speed limited by means of a centrifugal brake installed between the motor shaft and the gear box.

3.6.17 Overload limiter

An overload limiter is built into the traction hoist. In case of an overload, it will prevent the upward travel and a buzzer will sound, until overload condition is eliminated.



Attempting to run in an overloaded lift is prohibited!

Performing a manual descent in case of an overloaded lift is prohibited!

3.6.18 Internal light

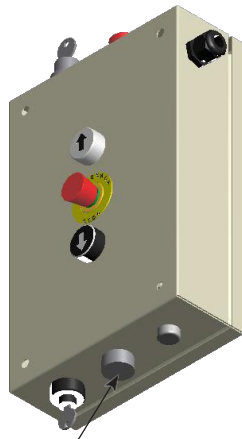
The service lift is equipped with a light inside the cabin. When service lift is connected to power supply, this light illuminates at all times.

The internal light is battery packed in order to illuminate the inside of the cabin in case of a power failure. When fully charged, it will last at least for 30 minutes.

3.6.19 Warning lights and buzzer

A set of warning lights is mounted on the top and on the bottom of the service lift. The flashes warn that the service lift is moving.

A warning buzzer warn that the service lift is moving. The pressure sound of the buzzer is adjustable. To reduce it, user must turn counter clockwise the buzzer. To increase it, user must turn clockwise the buzzer.



Warning buzzer

3.6.20 Anchor points

The service lift features two anchor points inside the cabin.



Each anchor point may only be used by one user simultaneously.

During operation users must hook themselves up to the anchor points inside the cabin, in order to prevent falling risks. In case of need of evacuation, the evacuation procedure will be followed.

3.6.21 Rescue pendant control ¹⁾

Rescue pendant control is only mandatory if rescue route of service lift can be somehow blocked. A blocked rescue route is an event where:

- A person is unconscious inside the service lift, blocking the bottom hatch,
- the rescuer is below service lift, and
- the service lift is stopped halfway through a platform hole, blocking rescue route since platform has no extra hatch.



There shall be one rescue pendant control per WTG; and it shall be stored in the WTG bottom platform. A clearly visible sign shall indicate its exact location.



Note ¹⁾: In case of send or send/call configuration, the rescue pendant control will not be available.

It features three buttons: UP, DOWN and emergency stop button. When necessary, pendant control is plugged to cabin bottom socket. It has a 4 m long cable that permits service lift to be powered up/down that same distance. When plugged, pendant control does not override any safety switch. If any of them is triggered, no running will be possible; including the obstruction device switches. Therefore, there is no risk of moving service lift hitting rescuer. Pendant control overrides cabin control box, and service control box if installed.

3.6.22 Information signs and documents

The manual and quick guide are accessible from inside the cabin. The following documents, signs and labels are supplied with the service lift and shall always be available.

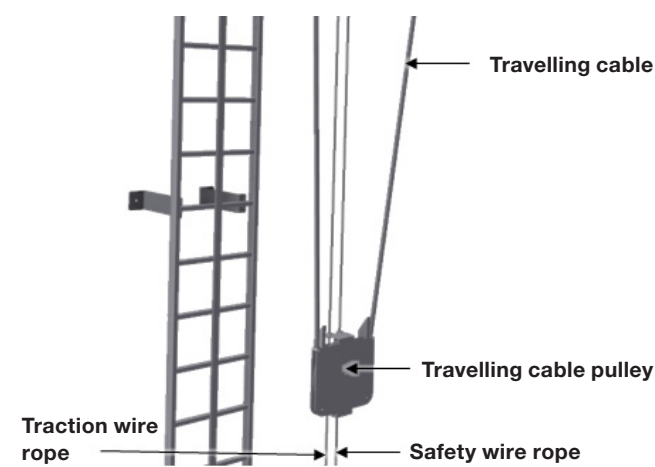
A rescue pendant control ¹⁾ emergency sign shall be present at the bottom platform, clearly indicating storage location of rescue pendant control.

Location	Document
Cabin	Serial number plate
	Manual documents inside blue bag
	Quick guide document
	Use of PPE label sign
	Working load limit / N° persons label
	Manual descent label
	Fall arrest deactivation label
	Fall arrest activation label
	Main door guardlocking labels
	No standing on top prohibition label
	Fasten kit sticker (only in L95)
	For one person only sticker (anchor point)
	Remove eye nuts stickers (only in L95)
	Pull to open sticker (ladder door) (only in L95)
Main control box	Wiring diagram
	Electrical hazard warning label
Bottom platform	Rescue pendant control emergency sign ¹⁾

i Note ¹⁾: In case of send or send/call configuration, the rescue pendant control will not be available.

3.6.23 Travelling cable pulley

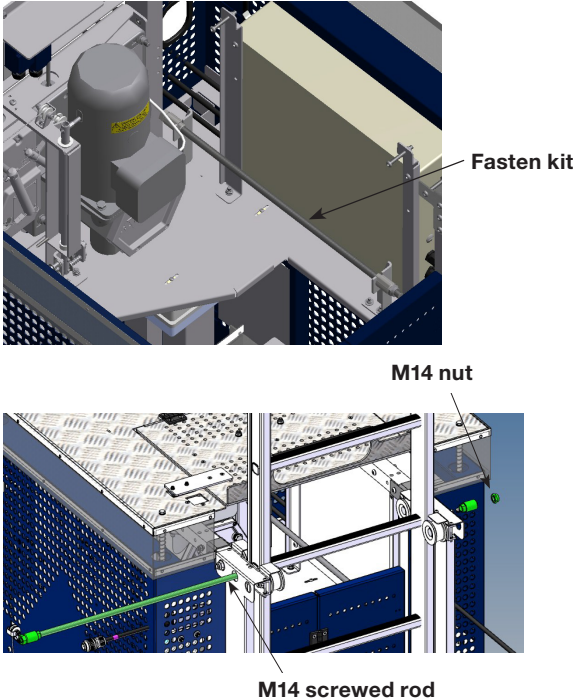
Travelling cable is connected from power supply socket over mid tower's height platform to service lift socket and it is provided with a cable relief on each end. A travelling cable pulley is suspended on the cable and is guided along the traction and safety wire ropes.



The travelling cable pulley straightens the cable at all times.

3.6.24 Fasten kit

The service lift features a special tool, called Fasten kit, for mechanically blocking the lift in order to perform installation/maintenance tasks below the suspended cabin. This kit is located on the cabin's top. It consists in a M14 screwed rod, that must be inserted through a hole of the top rollers assembly and along a rung of the guiding ladder, and finally blocked with a M14 nut.



4. Instructions for use

4.1 Daily inspection



Daily inspection of the service lift shall only be performed by a certified technician. If there is more than one user, the employer shall appoint a supervisor in charge of the daily inspection.

4.1.1 Overall

Visual Inspection:

- a) Check that the cabin has no damages.
- b) Check that the top and bottom obstruction devices are free of damages.
- c) Check that the traction and safety wire rope ropes are correctly fed and guided.
- d) Record the hour meter reading on the service lift log (Appendix A).

4.1.2 Travel zone

- a) Ensure that there are no obstacles within the service lift's operating area which may obstruct the travel of the cabin or cause the cabin to hit the ground.

4.1.3 Control and safety devices

4.1.3.1 Cabin control from inside the cabin

- a) Close the doors. Press the EMERGENCY STOP button.
The lift should remain still when the UP/DOWN button is pressed. To restart, pull the EMERGENCY STOP button.
- b) Test the EMERGENCY top limit switch:
During upward travel, press the switch manually, and the service lift shall stop immediately. Neither upward nor downward travel should now be possible.
- c) Bottom obstruction device. Lower the lift;
It shall stop before the rubber feet of the cabin reach the tower ground level.
- d) Door switch:
Open the door – it shall not be possible to move the lift upwards or downwards.
Place the cabin at a height no corresponding to platform – it shall not be possible to open the door. The door is only able to open by turning the emergency release lever up.
- e) Key switch ON/OFF (if installed):
Turn the key to OFF - it shall not be possible to move the lift upwards or downwards.
- f) Top obstruction device:
activate device by pressing it down. The service lift shall not move up until device is released.



If any faults occur during work,

- stop working,
- if required secure the workplace and
- rectify the fault!



Make sure that nobody is exposed to danger below the service lift, for instance from falling parts.

- g) Fall arrest device. Activate the fall arrest device by pulling down the red locking handle. Press and hold the DOWN button of the cabin control box. The service lift should not descend. Try to perform manual descent. The service lift should not descend. Press and hold the UP button of the cabin control box. The service lift should ascend. Unlock the fall arrest device by pulling down the black unlocking handle.

There is a supplementary method to check the FAD functionality, called 'Stomp Test'. The procedure is explained in the 'Stomp-test Instruction' Appendix.

4.1.3.2 Cabin control from outside of the cabin – Automatic send

The automatic mode function is only available from the control buttons outside of the cabin and shall be checked as follows:

- a) Press the UP button and hold until the warning lights start flashing. The lift should travel upwards.
- b) Press the EMERGENCY STOP button on the control box. The lift stops.
- c) Pull the EMERGENCY STOP button and press the DOWN button and hold until the warning lights start flashing. The service lift should travel downwards until the bottom obstruction device engages.

4.1.3.3 Cabin control from platform control boxes – Call or Send and call configuration

The external mode function is only available from the platform control boxes.

- a) Press and hold the UP button on the control box – the service lift ascends with a delayed response.
- b) Press the emergency stop button on the control box - the service lift stops.
- c) Pull the emergency stop button and press and hold the DOWN button - the service lift descends.

4.2 Prohibited uses



The consequences of not following below STOP prohibitions are extremely hazardous to the physical integrity of the users.

When using the service lift it is prohibited to:

- Use the service lift beyond its intended purpose.
- Operate the service lift without following the safety warnings and operating instructions.
- Overload the service lift
- Try to repair machine components. Only certified technicians are allowed to perform service on the machine.
- To use the ladder while service lift is being used.
- To use the ladder, unless service lift is out of service, or in case of evacuation or rescue.
- To manipulate switches and safeties.
- To place objects on service lift roof.
- To travel on service lift roof.
- To use the emergency manual release of the guard locking of door lift or fence doors during normal use.
- To disattach trapped key from wire rope.
- To have a second trapped key.



4.3 Entry and exit

To ensure safe entry and exit:

- Lower the service lift onto the access platform until the bottom obstruction device is activated and the cabin stops, or: bring the lift to a height corresponding to the correct level for exiting from the wind turbine's platform.
- Open the door and exit/enter the lift through the door.

4.4 Stop/Emergency stop

- Release the Up or Down button; the service lift should stop.
If it does not:
- Push the EMERGENCY STOP button, and all controls should be disabled.

4.5 Operation from inside the cabin

- Close the door.
- The key switch ON/OFF should be ON (if available).
- To go up or down, push and hold the Up or Down button.
- To place the service lift on the floor after the bottom obstruction device has stopped the lift.
 - Turn the override bottom obstruction device switch clockwise and hold.
 - Press the DOWN button until the service lift rests on the floor, then release.

4.6 Operation from outside the cabin (automatic send configuration)

Transportation of people is forbidden if the operation is controlled from outside the cabin

Operation by means of the user control box:

- The key switch ON/OFF should be ON (if available).
- Close the door.
- Press the UP or DOWN button respectively and the cabin starts ascending/descending.



Transportation of people is forbidden if the operation is controlled from outside the cabin



4.7 Operation from platforms (call or send and call configuration)

Transportation of people is forbidden if the operation is controlled from the platforms.

Operation by means of the platform control box:

- Turn the trapped key switch to ON (if available).
- Close the door of the cabin and of the platform fence.
- Press and hold the UP or DOWN button to ascend or descend the cabin.
- Then platform light (green) illuminates, cabin is aligned with a platform and can be opened.



Transportation of people is forbidden if the operation is controlled from the platforms.



Sections 4.6 and 4.7: when actuating the external UP or DOWN buttons, response of cabin is delayed while the warning lights are flashing and the warning buzzer sounds, in order to warn personnel in the surroundings that cabin is going to move.



Before closing the lift door, ensure that your equipment (i.e. lanyards) do not get trapped/ tangled with the closing door and/or with surrounding elements.



To prevent the lanyards from tangling with surrounding elements, keep them properly attached to your body harness.



To prevent the lanyards from tangling with the moving service lift, do not get close to the hoistway.

4.8 Overload limiter

a) In case of an overload, the lift's upward travel should be blocked (L95 versions), and a buzzer should sound in the connection cabinet.



Attempting to run in an overloaded lift is prohibited!

Performing a manual descent in case of an overloaded lift is prohibited!

b) Remove enough of the load to make the buzzer stop and enable upward travel (L95 version).



On entering and starting the lift, the buzzer may sound briefly. This is due to temporary load peaks occurring as the lift takes off.

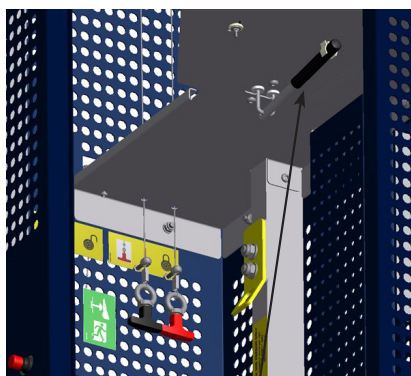
The overload limiter is designed not to activate the buzzer or stop the lift because of peak loads caused by the cabin swinging.



If the problem persists have an a certified technician adjust the overload limiter (Refer to "Regulation of overload limiter" Appendix in Installation and Maintenance Manual).

4.9 Manual descent

If a power failure or an operation fault etc. interrupts the hoist, a manual descent is possible from inside the cabin.



Brake release lever in L95

1. The lever is attached underneath the cabin top. Turn it down.
2. Push the lever upwards the full way. The service lift moves downwards. The built-in mechanical overspeed limiter limits the pace of descent.
3. To stop, simply loosen the lever.
4. After manual descent, the system must be checked by an expert



During manual descent if the bottom obstruction device hits an obstacle, the brake release lever is mechanically disengaged so the further descent is disabled. The system is automatically reset once the obstacle is removed.

4.10 Fall arrest device

To lock the fall arrest device in an emergency:

- Pull down the red handle.

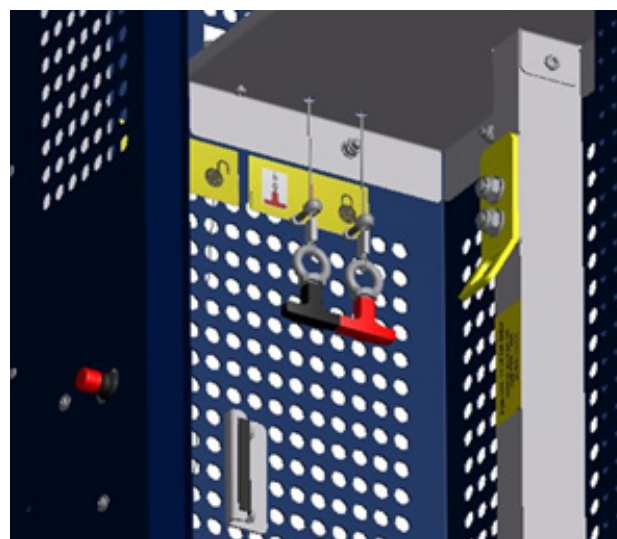
If the fall arrest device engages, simply disengage it from inside the cabin until the fall arrest device is unlocked by:

- Pulling the black handle downwards.
- However, this is not possible if the safety wire rope is under tension. If this is the case:

1. Remove the load on the safety wire rope by pushing the UP button taking the lift upwards a few centimetres.
2. Manually open the fall arrest device until the fall arrest device is unlocked by:

- Pulling the black handle downwards.

In case of no power and the fall arrest device is locked with the safety wire rope under tension evacuate the lift according to the "Evacuation guide".






Pull to UNLOCK (Black)





Pull to LOCK (Red)

4.11 Troubleshooting

1. All tests and repairs to the electronic components should be performed by **certified technicians only!** The wiring diagram is placed in the power cabinet.
2. Repairs to the traction hoist, the fall arrest device and to the system's supporting components should be performed by **certified technicians only!**

Breakdown	Cause	Solution
<p>The service lift will neither go up nor down!</p>  <div>  <p>DANGER!</p> <p>Unplug the power supply before opening the power cabinet.</p> </div>	 <p>DANGER! Attempting to use the lift will jeopardize work safety.</p>	
	A1 The fixed EMERGENCY STOP button has been activated.	Deactivate the button in question by pulling it until it pops out.
	A2 Wire rope loop on traction hoist. Damaged or defective wire rope or wire rope outlet causes problems.	Stop work immediately! Ask the supplier or manufacturer for help.
	A3 The fall arrest device is holding the service lift on the safety wire. a) Lift wire rope breakage b) Hoist failure	a) + b) Evacuate the service lift according to the "Evacuation guide".
	A4 The service lift is stuck on an obstacle.	Carefully remove the obstacle. Test the operational safety of affected tower sections. Inform the supervisor.
	A5 Power failure a) Control not switched on or deactivated. b) Grid voltage interrupted. c) Supply between grid connection and control interrupted.	a) Turn EMERGENCY STOP button to the right until it is released. b) Find the cause and wait for the power to return. c) Test and if necessary repair the supply cable, fuses, and/or wiring from the control box.
	A6 Safety switch is triggered a) EMERGENCY top limit switch was pressed. b) Door switch is not properly closed or is defective. c) Ladder access door switch is activated. d) A top or bottom hatch switch is triggered.	a) Perform manual descent until the emergency top limit switch is released. b) Close the door and test the door switch. c) Close the door. d) Close the hatch.
	A7 Protection switch on overheating a) A phase is missing b) Motor is not cooling c) Voltage too high/low	a) Test/repair fuses, supply and connection. b) Clean the hood. c) Measure voltage and power consumption on the loaded motor. If voltage deviates from specifications, use cable with increased dimensions.
	A8 Brake does not open (no click on on/off) a) Supply, braking coil or rectifier defective. b) Braking rotor closes.	a) Have a certified technician, repair/replace the supply, braking coil and rectifier. b) Return traction hoist for repair.







Breakdown	Cause	Solution
<p>The service lift will neither go up nor down!</p> 	A9 The key switch (if installed) ON/OFF has not been activated.	Turn the key to ON.
	A10 The main switch is in the OFF position.	Turn the main switch ON.
	A11 Rescue pendant control is plugged.	<ul style="list-style-type: none"> - Use rescue pendant control in case of rescue event. - Otherwise, unplug pendant control.
<p>Service lift goes down but not up</p> 	 <i>Irresponsible behaviour jeopardizes system safety!</i> B1 The service lift is stuck on an obstacle.	Carefully move the service lift downwards and remove the obstacle. Test the operational safety of affected platform components. Inform the supervisor.
	B2 Overload - Buzzer sounds in the connection cabinet.	Test and possibly reduce load until buzzer stops.
	B3 Top obstruction switch: a) Top obstruction switch is defective or not connected properly. b) Top obstruction switch is activated.	a) Test the top obstruction switch connection/function. Replace if necessary. b) Move lift down until the top obstruction switch is released.
	B4 A phase is missing	Test fuses and power supply.
	B5 Fault in UP control circuit in control box or traction system	Test and possibly repair connections, wiring and relays.
<p>Motor hums loudly or wire ropes squeak, but the lift can go both up and down.</p>	C1 Wire ropes dirty  WARNING! <i>Further use of lift may result in damage to the wire rope traction.</i>	If possible, immediately replace the traction system and return it for test/repair at AVANTI.



DANGER!

Unplug the power supply before opening the power cabinet.



Breakdown	Cause	Solution
<p>Service lift will go up but not down!</p> 	 <p><i>Irresponsible behaviour jeopardizes system safety!</i></p> <p>D1 The service lift has encountered or is stuck on an obstacle.</p>	Carefully take the service lift up and remove the obstacle. Test the operational safety of affected platform components. Inform the supervisor.
	<p>D2 The fall arrest device is holding the service lift on the wire rope.</p> <p>a) Excessive hoist speed b) Too low release speed on fall arrest device.</p>	a) + b) Take the service lift upwards to relieve the safety wire rope. unlock the fall arrest device by turning the unlocking lever, and test its function.
	 <p><i>A defective fall arrest device will threaten the safety of the service lift!</i></p> <p><i>Replace immediately!</i></p>	Functional test when the lift is back on the ground: Replace the hoist and fall arrest device and return them for testing.
	<p>D3 Fault in down controller circuit on traction system</p>	Insert brake lever into the traction system and lower lift manually. Test, and if necessary have connections, wiring, and relays repaired.
 <p>DANGER!</p> <p><i>Unplug the power supply before opening the power cabinet.</i></p>	<p>D4 Bottom obstruction switch:</p> <p>a) Bottom obstruction switch is defective or not connected properly. b) Bottom obstruction switch is activated.</p>	a) Test the bottom obstruction switch connection/function. Replace if necessary. b) Move lift up until the bottom obstruction switch is released.
	<p>E A lamp is defective</p>	Have an electrician replace it.
	<p>Button lamp not lit although operation is normal.</p>	
	<p>Hoist goes down when up button is pressed and up when down button is pressed.</p>	<p>F Two phases changed in the supply.</p> <p>Have an electrician switch the 2 phases in the plug.</p>
<p>Loud noise and / or smoke coming from hoist motor</p>	<p>G Brake closed or partially closed WARNING ! Damage of hoist brake leading to brake function lost.</p>	<p>Stop work immediately! Call supervisor for advice and potential repair of hoist.</p>



*If these steps do not identify the cause and rectify the fault:
Consult a certified technician or contact the manufacturer.*

4.12 Out of service

1. Securing the service lift:

Bring the service lift all the way down, until the bottom obstruction device stops the cabin.

2. Turn off the main switch to prevent inadvertent operation of the lift:

Turn the main switch to the OFF position.
Power supply is now interrupted. Mark the lift "OUT OF SERVICE". Contact the service technician for repair.

Appendix B: Stomp-test Instruction

Supplementary way to inspect the ASL during Daily Inspection before Operation

Purpose

This instruction is a supplementary part of the Daily Lift Checking to be used by authorized users and Certified technicians. The information describes a recommended and supplementary way of how to check the over speed triggering and arresting function in the Avanti Safety Fall Arrest Device model ASL. Second, the test also documents that the Safety Brake maintains its grip on the Safety Wire after engagement. This extra testing we name the "Stomp-test".

This stomp-test-method is supplementary to the given daily obligation in your manual explaining "to descend the lift, manually engage the FAD (Fall Arrest Device), verification by short no-powerdescent, unloading the FAD again by ascending and observing centrifugal weigh unit through the window during lift use". With the

"Stomp-test" we test the ability of the FAD to trigger in case of over speed and arrest the load.

Tools: None

Measurement Equipment: None

Validity

It is applicable for testing the installed Safety Fall Arrest Device (ASL) on-site. The test must only be performed by trained users/Certified technicians and always with respect of all the relevant safety regulations.

Cautions

Be aware that the instruction only explains the steps of how to execute the "Stomp test" in the lift installation; it doesn't guide any safety precautions and the necessary use of safety equipment.

Therefore, Avanti strongly recommends you to read and understand what the physical work steps in the "Stomp-test" are, and then execute your own Risk and Hazard Assessment according to the valid safety working procedures in your own organisation before starting the test.

1. Test Preparation

The cabin (with 1 person inside) is ascended with a service lift user inside, and the cabin bottom is positioned ("parked") in a height of app. 3 m/10 ft. above the bottom landing floor platform.

2. Test Step

With the cabin in "parked" position app. 3 m/10 ft. above the bottom landing floor, the user starts descending by electrical power using the push down button. When the

cabin starts descending the user executes a hard stomp with one foot in the cabin floor – The hard stomp is executed by lifting one foot, so the lower leg is positioned with a knee angle of 90 degrees – Then immediately after the foot is stomped in the cabin floor –

-The user must make sure to have a solid footing during the foot stomp!

The foot stomp should engage the ASL and arrest the electrical descent of the cabin, the red light (if existing in the control box) should turn "on" and the cabin load should be hanging on the FAD/Safety Wire.

If the ASL doesn't arrest at the first trial, then re-establish the cabin in the position described in the preparation part mentioned above and execute the "Step" once again stomping a little harder.

3. Test Result

If the ASL activates properly after the stomp, the ASL will now hold the cabin on the Safety Wire.

In order to ensure important maintaining grip by the Safety Brake, the user then activates the manual descent function and result shall be a Safety Fall Arrest Device ASL holding the cabin fixed on the Safety Wire (manual descending is not possible).

- If the activated ASL fixes the cabin on the Safety Wire while manual descent is activated, the Safety Fall Arrest Device (ASL) is in good and operational condition.

In order to release the activated ASL push the ascent button up a little before releasing the ASL by the unlocking handle.

- **If the ASL can't activate** after first or second "Stomp-test", or can't fix the cabin in activated position
- User **must** immediately bring the cabin down and park it at the bottom landing platform floor.

- Lock Out the installation from use and contact Avanti for further approach!

- Document the execution of the above described procedure in the Daily Inspection Log Appendix.

Any doubts regarding above instruction, please do not hesitate to contact Avanti's local representative for help.
- www.avanti-online.com



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