



Original instructions



AVANTI

AVANTI SERVICE LIFT
User's Manual
Model Service Lift STINGRAY



ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ CERTIFICADO ◆ CERTIFICAT



Industrie Service

EC type-examination certificate

Certificate no.: EG-MRL 286

Notified body: TÜV SÜD Industrie Service GmbH
Westendstr. 199
80686 München – Germany

**Applicant/
Certificate holder:** Avanti Wind Systems A/S
Rønnevangs Allé 6
3400 Hillerød – Denmark

Date of application: 2016-05-06

Manufacturer: Avanti Wind Systems SL
Poligono Industrial Centrovía
Calle Los Angeles nº88 Nave 1
50198 La Muela (Zaragoza) – Spain

Product: Service lift in Wind Turbine Towers

Type: Stingray L

Test laboratory: TÜV SÜD Industrie Service GmbH
Prüflaboratorium für Produkte der Fördertechnik
Prüfbereich Maschinen der Fördertechnik
Fürstenstr. 70
09130 Chemnitz – Germany

**Date and
number of the test report:** 2016-11-10
EG-MRL 286

EC-Directive: 2006 / 42 / EC

Validity: This certificate is valid until 2021-11-20

Result: The equipment fulfills the safety requirements of the EC-Directive for the respective scope of application stated on pages 1 - 3 of the annex to this EC type-examination certificate.

Date of issue: 2016-11-21

Certification body for lifts and cranes
Identification number: 0036


Achim Janocha



TUV®



Industrie Service

**Annex to the EC type-examination certificate
no. EG-MRL 286 dated 2016-11-21**

1. Scope of application

1.1 Description

The service lift type Stingray L is intended to be used by authorized and instructed personnel in order to gain access to workplaces at a height in a wind turbine tower respectively for the transport of goods/ material.

1.2 Technical Data

Service lift type Stingray L	
Environmental Conditions	Operating Temperature: -15°C to +60°C Survival Temperature: -25°C to +80°C
Travelling Height	max. 160 m
Minimum Distance to Tower parts (tower wall, flange) in between landings (platforms)	min. 200 mm
Deadweight	178 kg
Rated Load	max. 240 kg
Number of Persons	max. 2 Persons
Control system	Pushbutton inside/ outside the load carrying unit (LCU)
Dimensions (LCU)	3061 mm x 960 mm x 614 mm
Distance between guiding wire ropes	1150 mm
Horizontal distance between LCU and platform / fence at the entrance area	min. 50 mm / max. 150 mm
Horizontal distance between LCU and platform	min. 50 mm
Vertical Distance between the fastenings of the guiding wire ropes	max. 30 m
Pretension of guiding wire ropes	max. 10 000 N
Control voltage	24 V
Power supply	400 V / 690 V
Frequency	50 / 60 Hz
Power consumption	1,5 / 1,8 kW
Preliminary fuse	RCD 30 mA
Hoist	M508, Rated speed v = 18 m/min (50 Hz) / v = 21 m/min (60 Hz)
Fall Arrest Device	ASL508, Triggering Speed v = 30 m/min
Traction and safety wire rope	Wire rope 8,4 5xK19S SFC 1960 B sZ, with blue line, diameter 8,4 mm, MBF = 55 kN
Fastening of traction and safety wire rope	With shackle, high tensile, CE, ns 1/2" with WLL = 2t, 6-times factor of safety
Guiding wire ropes	7x19sZ, diameter 12 mm, HDG MBF = 92,3 kN
Interlocking of entrance gates - Identification marking	n/a
Door Type (LCU)	fixed front (1,1m) with top sliding and swinging door

Table 1: Overview Technical Data





Industrie Service

2. Conditions

- 2.1 The EC type-examination is only valid for the service lift type Stingray L.
- 2.2 The assembly and installation of the service lift has to be performed in accordance to the assembly and installation instructions.
- 2.3 All safety devices must be maintained in properly function. All safety information and warning signs have to be maintained permanently legible and visible.
- 2.4 The use of the service lift shall be in compliance with the operating and maintenance instructions.
- 2.5 The control system shall be in compliance with the respective wiring diagram.
- 2.6 The power supply shall be equipped with a Residual Current Device (RCD) with a release current of 30 mA.
- 2.7 One copy of the operating and maintenance instructions must be supplied in the official EU language or languages of the Member State in which the service lift is placed on the market and/or put into service and must be kept at the site of operation.

3. Remarks

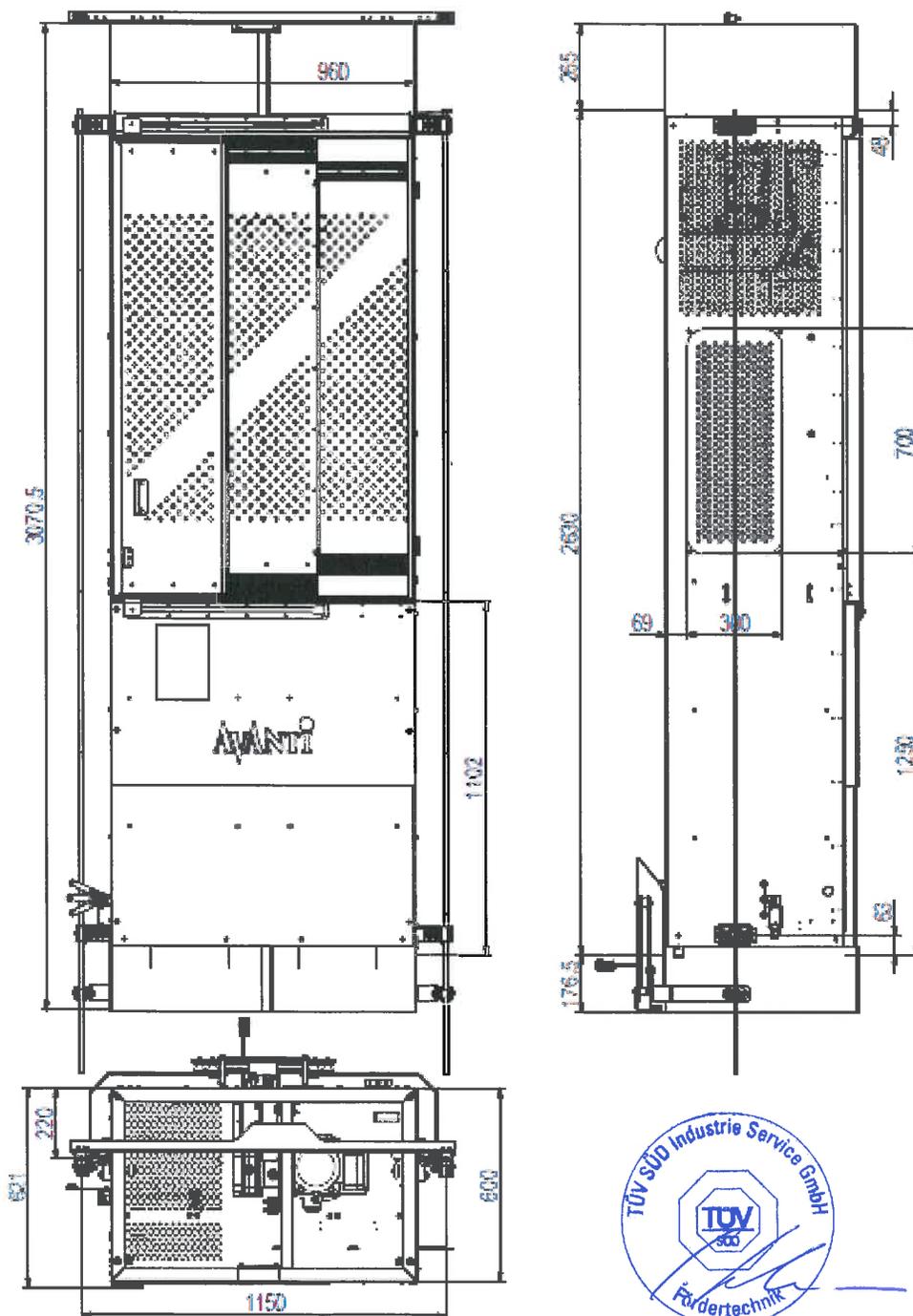
- 3.1 The product must be marked clearly with a reference to the manufacturer and the type designation in order to be able to verify the compliance of the tested product with the serial production.
- 3.2 Modifications to the approved representative model of machinery referred to in Annex IV (Service lift Stingray L) require the examination and acceptance of TÜV SÜD Industrie Service GmbH.
- 3.3 Before expiration of the certificates validity an examination must be requested at the notified body.
- 3.4 The following must be added at least to the technical documents of each machine:
 - The EC type-examination certificate EG-MRL 286 dated 2016-11-21 with annex
 - EC Declaration of Conformity in accordance with 2006/42/EC Annex II, part 1, Section A
 - Original Operating and maintenance instructions, File "A01_SGTF_Manual & guide.pdf", Rev. 07
 - Wiring Diagram "STD Stingray Bucket type / Send 400 VAC 50/60 Hz", Drawing No.: ED00167_R01, respectively
 - Wiring Diagram "STD Stingray Bucket type / Send 690 VAC 50/60 Hz", Drawing No.: ED00168_R01
- 3.5 The EC type-examination is based on the state of the art which is documented by the current valid harmonized standards. Modifications or amendments of these standards or further developments of the state of the art could resolve in a revision.
- 3.6 The EC type-examination certificate may be used only in connection with the pertinent Annex.





Industrie Service

Avanti Service lift Stingray L





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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.

¹⁾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



Reference to written specification/documentation



2.3 Cautions

Use and daily inspection of the service lift shall only be performed by AVANTI or personnel authorised by AVANTI, hired by the employer for the job at hand. Installation and maintenance of the service lift shall only be performed by AVANTI or qualified personnel authorised by AVANTI, hired by the employer for the job at hand. Additionally, these tasks may be performed by qualified personnel authorised by a trainer authorised by AVANTI.

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 PFPE (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 in structural and safety elements. 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 AVANTI or qualified personnel authorised by AVANTI.

All repairs to the traction, braking and supporting systems may only be performed by AVANTI or qualified personnel authorised by AVANTI.

If any supporting parts are repaired or replaced, the operational safety of the system must be tested and verified by AVANTI or qualified personnel authorised by AVANTI.

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 AVANTI or by qualified personnel authorised by AVANTI before first use.

Service lift must be inspected at least once a year by AVANTI or qualified personnel authorised by AVANTI. 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 also 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. Verify with wind farm's responsible the max. wind speed that allows personnel to use the service lift.



Personnel shall be equipped with a wired or wire-less two way communication device connected to a location staffed by authorized personnel.



Avoid injury – follow all instructions!



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



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 AVANTI or personnel authorised by AVANTI holding the relevant training certificates. 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



This manual contains instructions for one version of the Stingray lift:

- *Stingray L CE, top sliding and swinging door version.*



An EC type-examination by a Notified Body according to the Machinery Directive 2006/42/EC was performed.

The product details are described along this manual. The product consists of:

- A service lift, which is formed by: a cabin, a traction system, a fall arrest device, a control system, and safety devices.
- A guiding system along the tower, which is formed by: a pair of steel guiding wire ropes, wire fixes attached to the tower, and guides on the service lift.

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. Unless otherwise agreed with Avanti, 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 AVANTI's recommendations.

If the product is installed in seismic areas, and after an earthquake, the lift must be examined by qualified technicians before use it.

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

- Platform fences.
- Power supply protection.
- An evacuation way (e.g. ladder)

3.4 Technical specifications



A third party approval of the final integration might be required depending on the national regulations.

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.

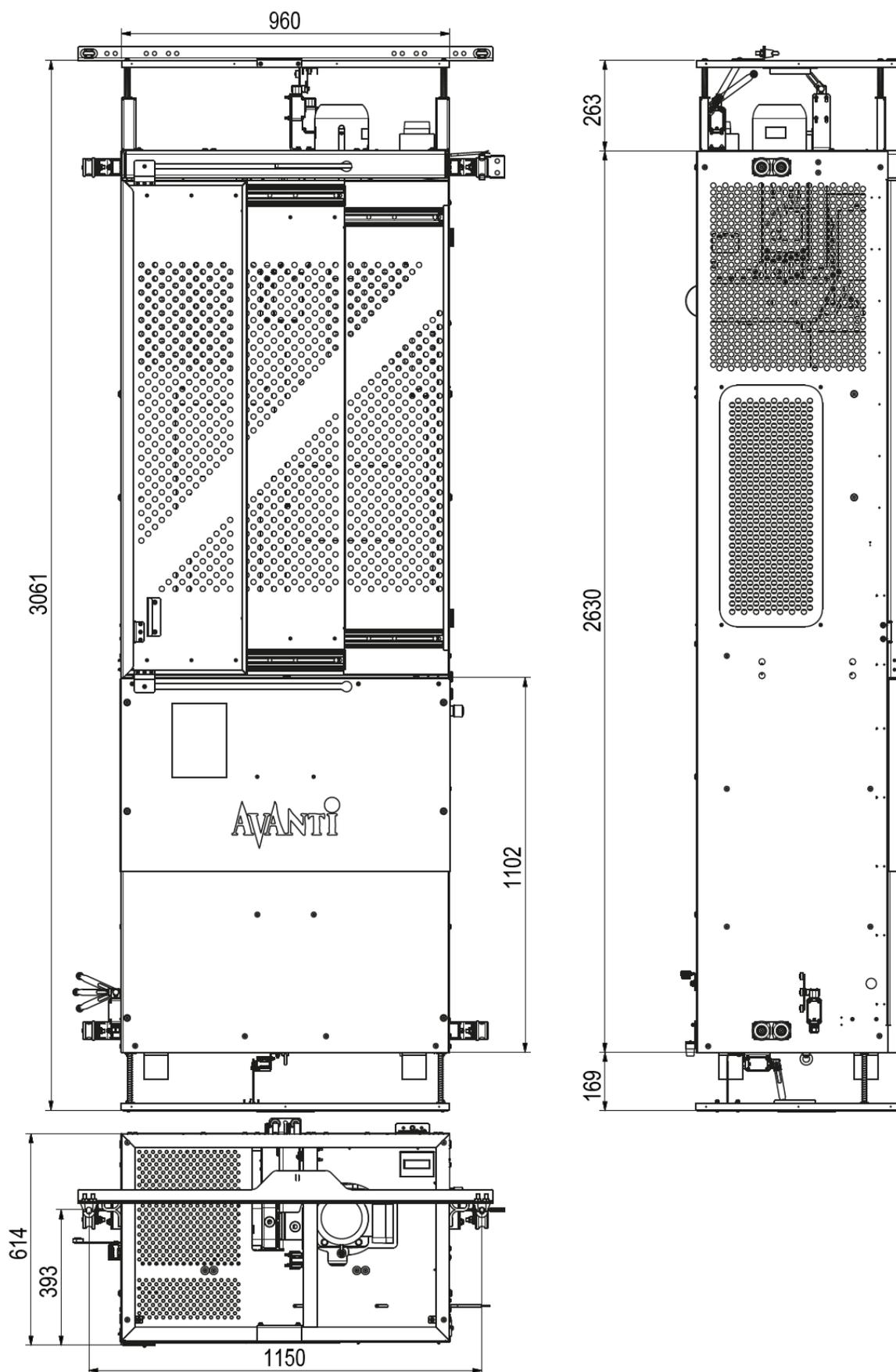
Service lift	STINGRAY L
Main door type	Fixed front (1.1 m) + top sliding and swinging door
Service lift speed	18 m/min ± 10 % (50Hz)
	21 m/min ± 10 % (60Hz)
Rated load	240 kg
Weight of lift (max.)	178 kg
Max. N° persons	2 Persons
Max. travelling height	160 m
Max. noise level	80 dB(A)
Power supply type	400 V (50/60 Hz) 3 Phase + N + PE
	690 V (50/60 Hz) 3 Phase + PE

Operating temperature
-15°C - +60°C.
Survival temperature
-25°C - +80°C.



3.5 Dimensions

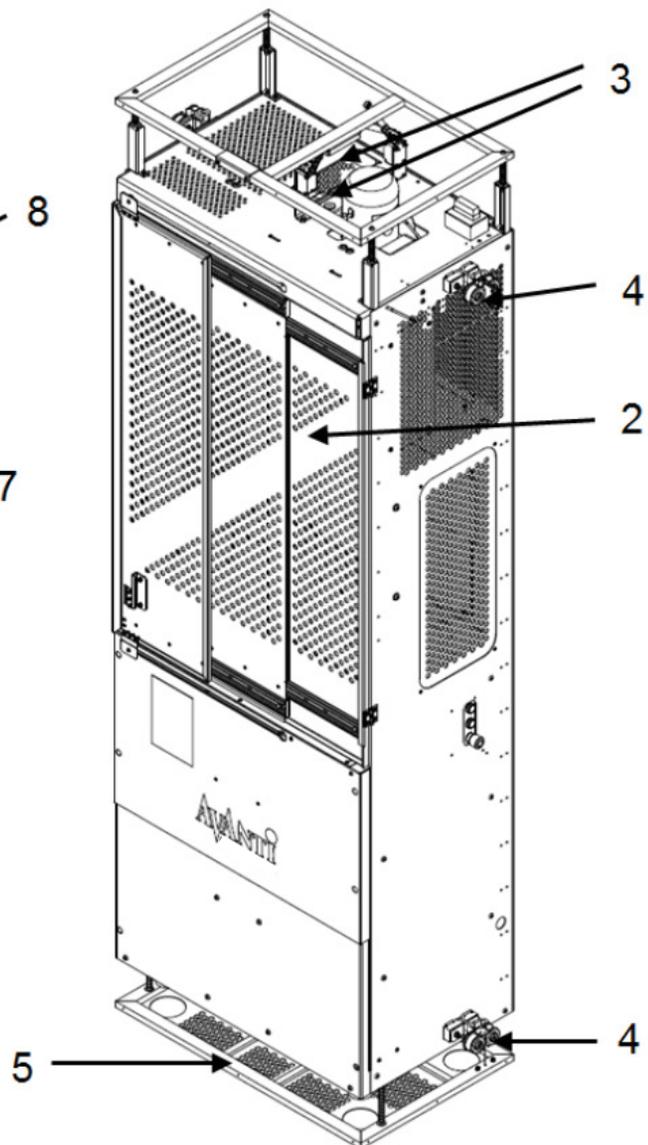
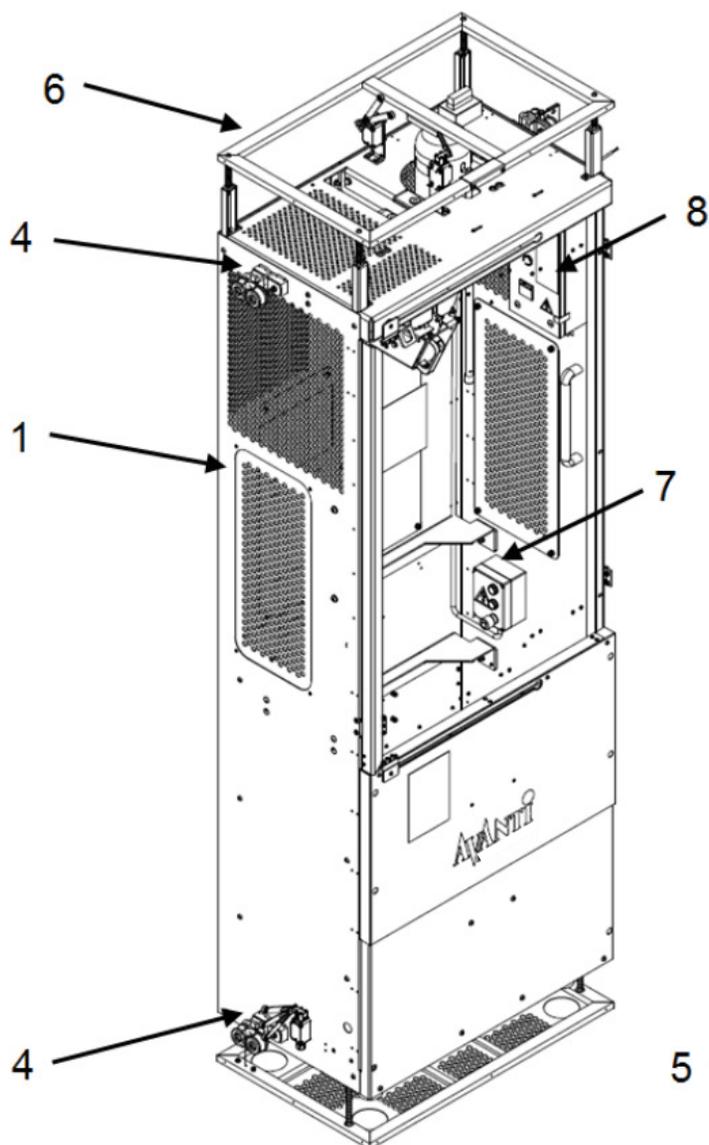
3.5.1 Dimensions of Stingray L





3.6 Components

3.6.1 Components of Stingray L



- 1. Cabin
- 2. Door
- 3. Traction and safety wire ropes
- 4. Wireguides (x4)
- 5. Bottom obstruction device

- 6. Top obstruction device
- 7. User control box (cabin control box)
- 8. Main control box





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
Stingray L CE	M508 / 400V 50Hz	500	18	1.5	4.1	8.4	50
Stingray L CE	M508 / 690V 50Hz	500	18	1.5	2.3	8.4	50
Stingray L CE	M508 / 400V 60Hz	500	21	1.8	4.9	8.4	50
Stingray L CE	M508 / 690V 60Hz	500	21	1.8	2.8	8.4	50

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)
Stingray L CE	ASL 508	500 (1100)	30 (98)	8.4	7 (15.4)

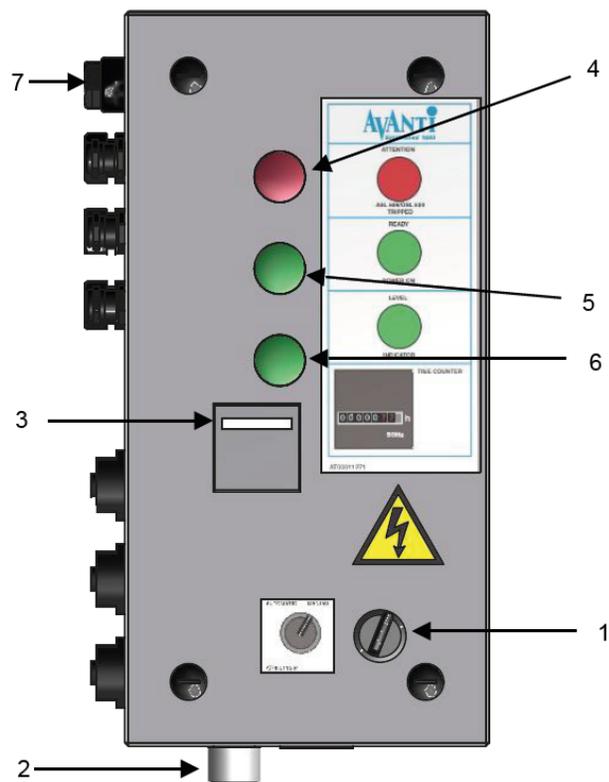
3.6.4 Traction, safety and guiding wire ropes

Service Lift Version	Wire rope type	Wire rope diameter	Surface Treatment	Mark/feature	Min. break resistance	Attached with
Stingray L CE	M508 / ASL 508	8.4 mm, 5x19	HDG	no	55 kN	2 t shackle
Stingray L CE	Guiding wire rope	12 mm	HDG	no	55 kN	2 t shackle

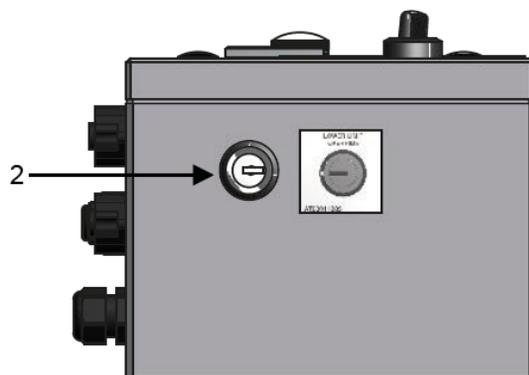




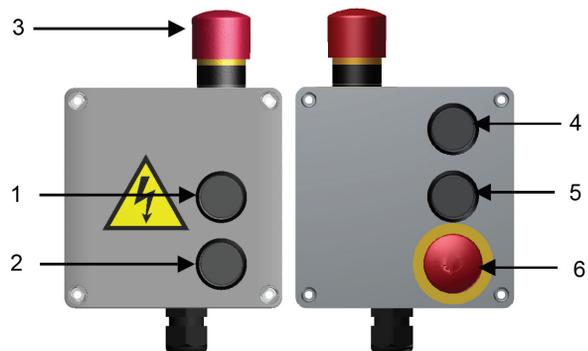
3.6.5 Main control box



- 1.Operation selector (Automatic / manual)
- 2.Shunt key for bottom obstruction switch
- 3.Hour counter
- 4.Fall arrest device light (red)
- 5.Ready light (green)
- 6.Level platform light (green)
- 7.Buzzer (overload and automatic send function)



3.6.6 User control box



1. UP button (internal)
2. DOWN button (internal)
3. Emergency stop button (internal)
4. UP button (external)
5. DOWN button (external)
6. Emergency stop button (external)

The automatic send configuration (activated by the external controls) incorporates a delayed response function and an acoustic buzzer on the main control box. This way, persons next to or inside the cabin are warned of imminent movement of service lift and can act accordingly.

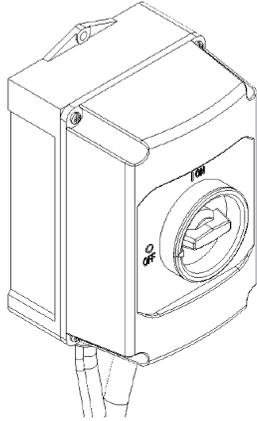
All internal controls are Hold to run. The external controls are single press.



3.6.7 Main switch control box

Disconnect means are mandatory. They shall be supplied by the customer or by Avanti upon agreement.

The following means are available: a main switch control box installed at the bottom platform, or the main plug, located close to the main control box, on the top of the cabin.



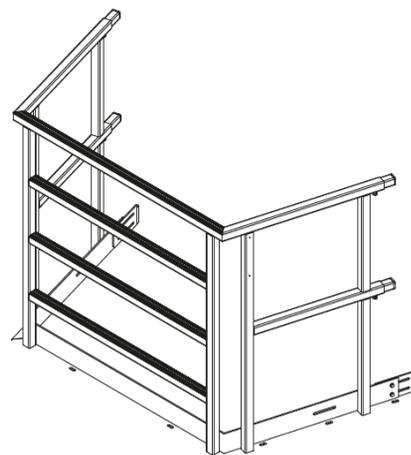
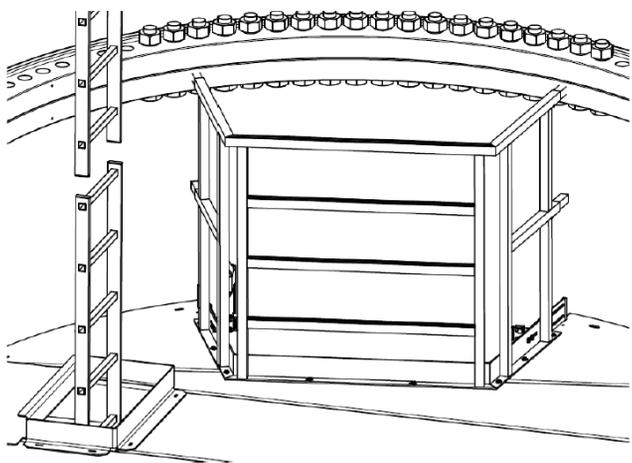
Main switch disconnect

3.7 Platform fences

The platform holes shall be protected with platform fences. The platform fences consist of structures, with or without perforated sheets, of different geometries depending on the platforms where they are installed.

The platform fences shall conform to EN ISO 14122-3.

They are fixed type and do not feature a door. Users shall climb over the front fence to enter or exit the service lift. The front fence features non-slip surfaces.





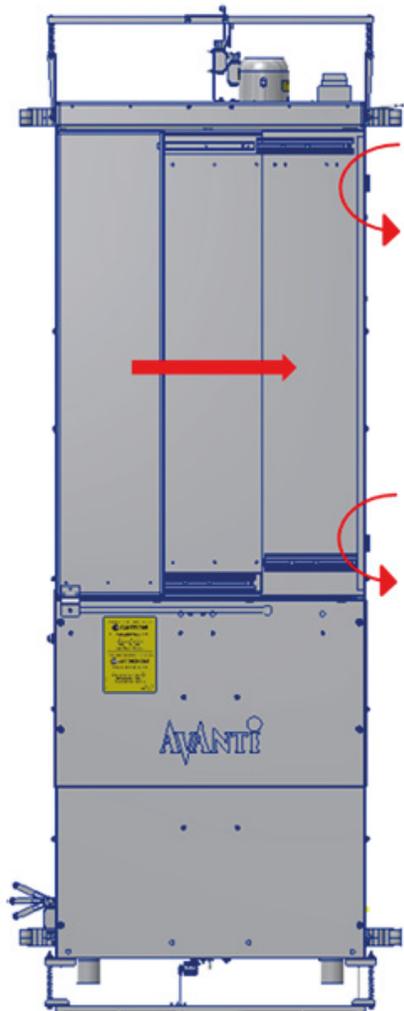
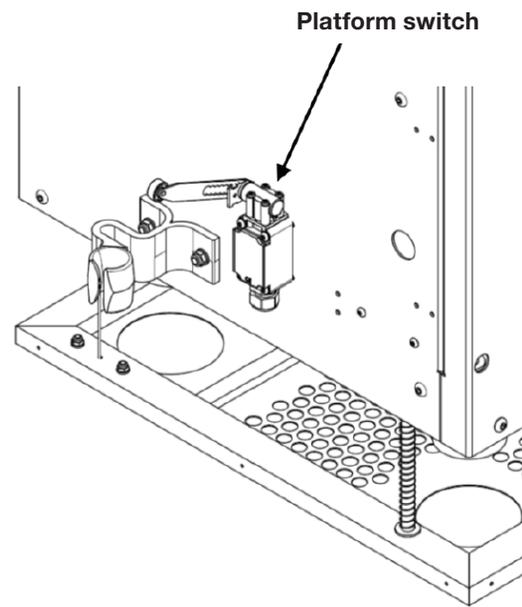
3.8 Service lift door

The service lift door consist of a half door made by three sheets installed on the front (above the 1.1 m. fixed front), and it is a top sliding and swinging door type.

The opening procedure is sliding + swinging the panels. Until the sliding panels are not completely open, user cannot swing (outwards) the main door to get the full clear opening.

The door switch interrupts control if the door is opened. A set of magnets prevents involuntary opening of the door switch during the lift travel. The platform level switch is triggered by the safe zone plates mounted on each of the platform fences.

The level indicator on the main control box will light up when service lift is leveled with a platform. This way user can exit the cabin in a safe way.





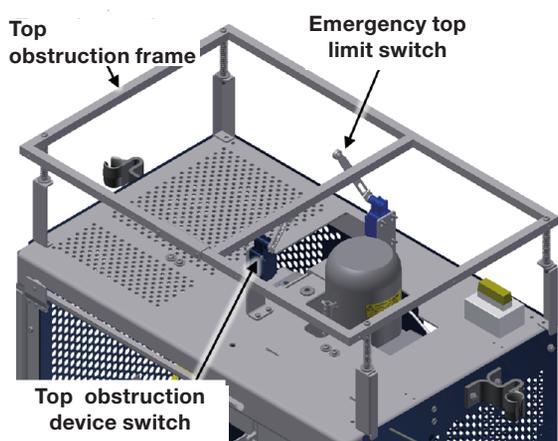
3.9 Emergency top limit switch

At the top of the cabin a top limit switch will stop ascent when activated. Electrical descent will still be possible. A top limit device activating the top limit switch is installed below the traction wire rope fastenings. Emergency top limit switch interrupts the control if the top limit switch fails. Only manual descent is possible.



When the top limit switch is engaged, press the DOWN button until the top limit switch is released

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



3.11 Bottom obstruction device

The bottom obstruction switch stops descent if the service lift:

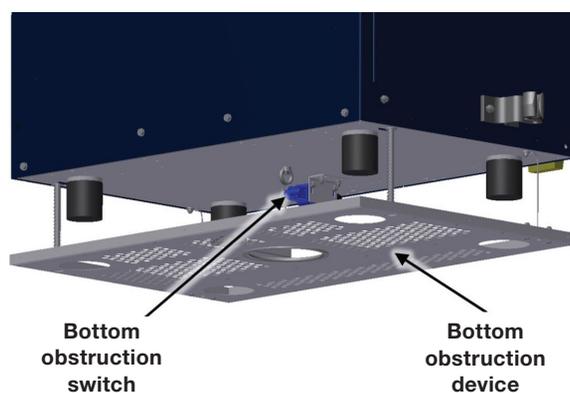
- encounters an obstacle
- touches the ground

Ascent will be possible, for instance to remove the obstacle.

In order to put the service lift on the ground, the functionality of the bottom obstruction device can be bypassed with the bottom obstruction override switch on the main control box. To do so, turn the bottom obstruction override switch while pressing the DOWN button.



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



3.10 Top obstruction device

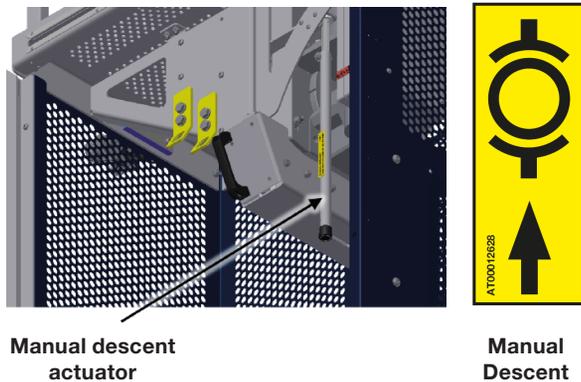
The top obstruction device switch stops ascent if the service lift:

- encounters an obstacle
- touches the top limit device

Descent will be possible, for instance to remove the obstacle.

3.12 Manual descent system

The service lift is provided with an actuator allowing manual release of the electromagnetic motor brake. Push and hold the actuator upwards to release the motor brake. Push up the actuator completely to avoid excessive wear and overheating the electro-mechanic brake. The manual descents shall be of maximum 30 m. Between two consecutive manual descents, the user shall wait minimum 10 minutes for centrifugal brakes to cool down. Once the motor brake is released, the service lift descends with a controlled speed limited by a centrifugal brake installed between the motor shaft and the gear box.



Manual descent actuator

Manual Descent



Every time that a whole tower height manual descent is performed, shall be recorded in the Inspection log sheet (Appendix C of Installation Manual), and the system must be checked by an expert.



During manual descent, the door of the lift shall be kept closed. Do not extend body parts outside the cabin during travel.



Use the walkie-talkie to report about the manual descent. During the manual descent, stop the service lift just before reaching the bottom platform floor. This way, the bottom obstruction device will not get damaged.



The manual descents shall be of maximum 30 m. Between two consecutive manual descents, the user shall wait minimum 10 minutes for centrifugal brakes to cool down. This way, the premature wear of the centrifugal brakes will be prevented. In case of real emergency (risk of death or for the integrity and security of users) a manual descent without intermediate stops can be performed. Then the centrifugal brakes shall be inspected by AVANTI or qualified personnel authorised by AVANTI.

3.13 Fall arrest device

The service lift is equipped with a fall arrest device which will be triggered in case of an overspeed condition. The speed of the safety wire rope passing through the device is continuously monitored, and the jaws are automatically closed in the event of sudden excessive speed.

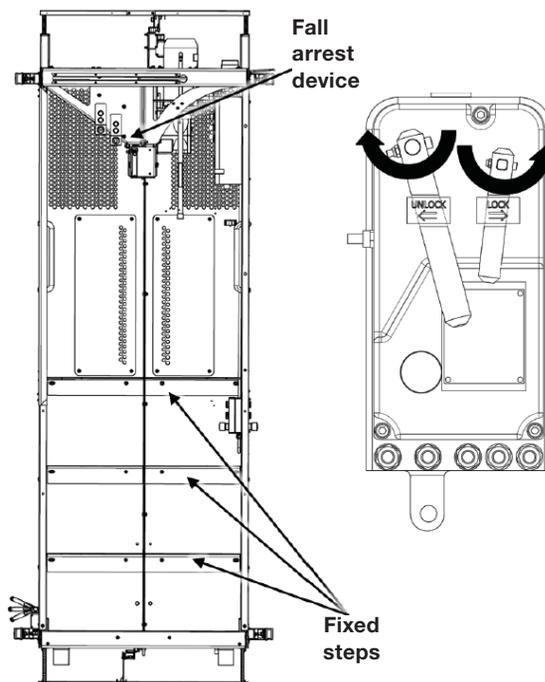


Tightness of safety wire rope must be frequently inspected to ensure full functionality of fall arrest device!

This device protects the service lift against traction wire rope breakages or traction system failures. The fall arrest device can also be engaged or disengaged manually by acting directly on the fall arrest device levers.

The functionality of the fall arrest device must be checked daily before using the service lift (see section 4.1 Daily Inspection).

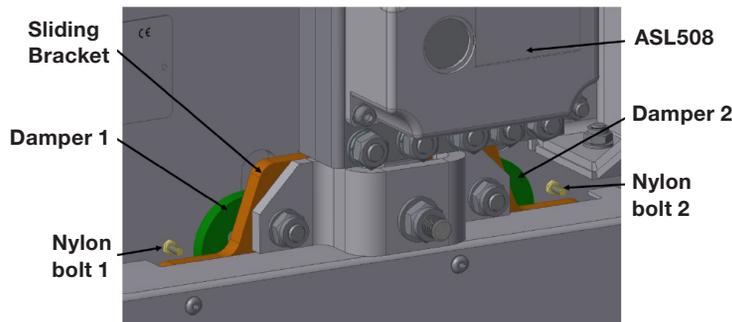
- Fixed steps are provided for access to the fall arrest device levers. The user must observe all safety precautions and check that the lift doors are closed before climbing on it.
- To engage the fall arrest device: Turn the locking lever counter clockwise.
- To release the fall arrest device: Turn the unlocking lever clockwise.



BEFORE CLIMBING on steps, CHECK that required PFPEs are used, doors are closed and personnel is hooked to anchor points inside cabin.



The Stingray L CE features an additional damper unit. It is composed by a sliding bracket and two dampers that deform plastically after a fall has been arrested by the fall arrest device. On the spine, there are 2 nylon bolts in order to check if the sliding bracket has been deployed previously (see section 4.1 Daily Inspection).



The dampers, the sliding bracket and the nylon bolts of the damper unit must be replaced by an expert if:

- There is no gap below the nylon bolts.
- Or the nylon bolts are not fully visible.
- Or the nylon bolts are deformed / broken.
- Or the damper unit shows cracks and/or oxide.

Use the fixed steps to make these checks at sight level.

3.14 Overload limiter

A lifting force limiter is built into the wire rope traction system and will prevent upward travel in the event of overload. In case of overload, the lift's upward travel will be blocked, and a buzzer will sound in the user control box. The buzzer will stop only when the cause of the overload has been removed.

- Reduce the load to below the overload limit.
- Lower the lift until it is free of the obstacle and remove the obstacle before using the lift again



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 control box is designed not to activate the buzzer or stop the lift because of peak loads caused by the cabin swinging.



Attempting to run an overloaded lift is prohibited!



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

3.15 Warning light

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

3.16 Acoustic buzzer

An audible signal is installed with a warning function.

In case of using the external user control box, the operation will provide delay with sound warning the users of the imminent movement, so persons next to or inside the cabin are warned and can act accordingly.

3.17 Anchor points

The service lift is equipped with two anchor points inside the cabin. During operation personnel shall hook themselves up to the anchor points inside the cabin. In case of need of evacuation, the evacuation procedure must be observed.

3.18 Internal light

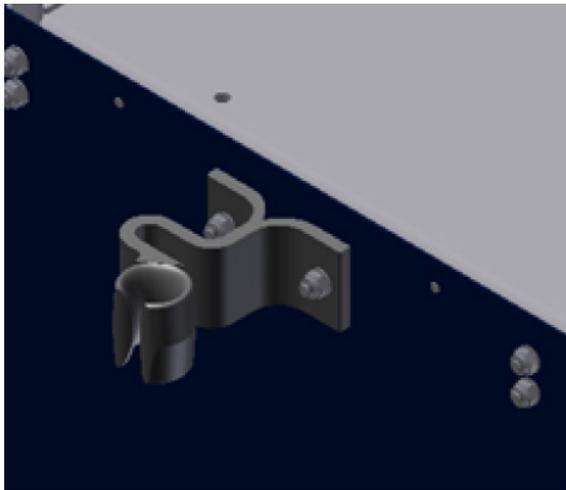
The service lift is equipped with a light inside the cabin. The light is on when the lift is powered. This light is battery packed in order to illuminate inside cabin without electric supply (once charged).



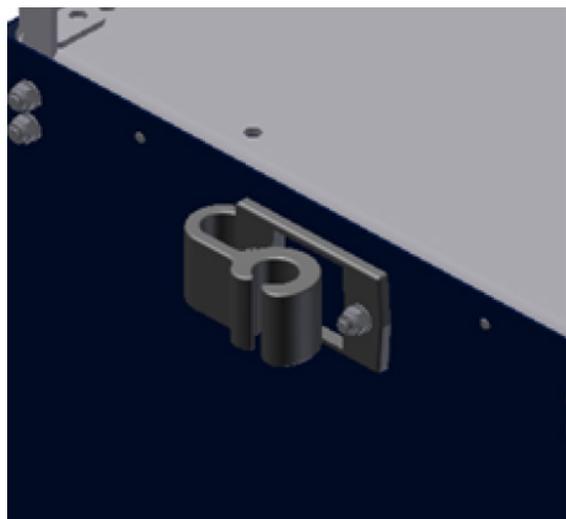
3.19 Guiding system

The service lift is guided along the guiding wire ropes by means of plastic wireguides or roller guides.

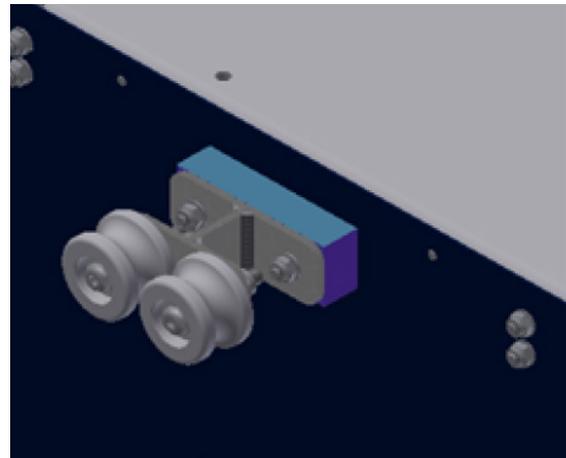
Standard plastic wireguides.



Narrow plastic wireguides



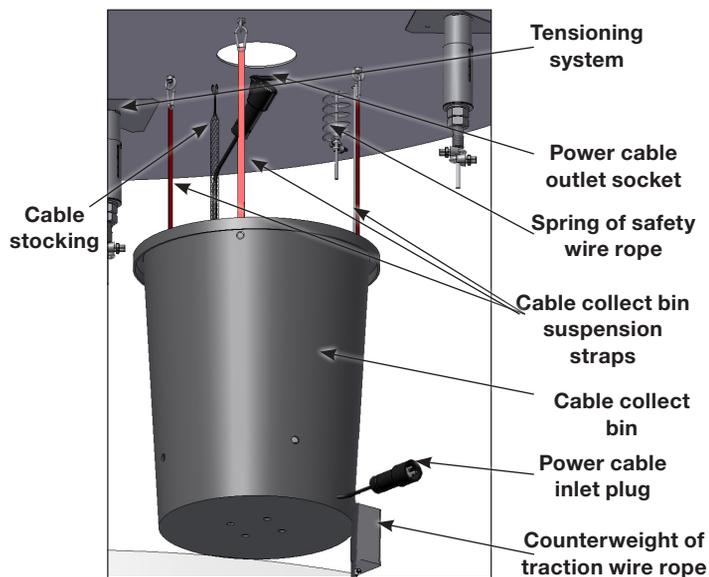
Roller guides



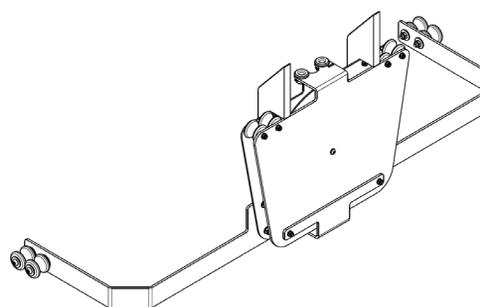
3.20 Control cable management

The service lift can feature two options of control cable management: cable bin and travelling cable pulley.

The control cable coils inside a bin placed under the cabin.

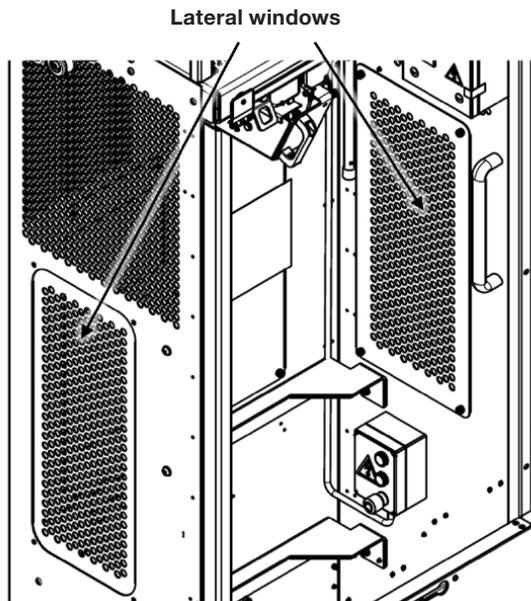


The travelling cable pulley straightens the cable at all possible positions of the service lift. It is installed instead of the cable bin. The travelling cable pulley is included as an optional feature.

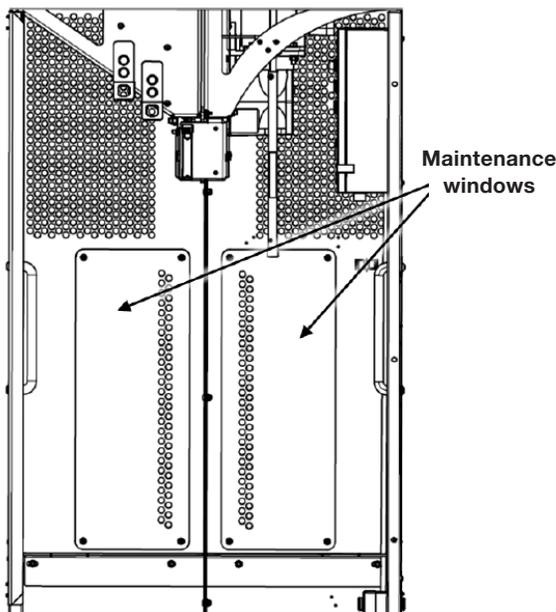


3.21 Maintenance windows

The cabin has two lateral windows that are removable to facilitate maintenance tasks on the tower from inside the lift.



The cabin has also two back windows that are removable to facilitate inspection and maintenance tasks of traction and safety wire ropes from inside the cabin.



These windows shall be used only in special cases such as corrective maintenance and installation of tower components. These windows shall not be used for preventive or normal maintenance tasks.



During maintenance and/or installation tasks through these windows, the emergency stop of cabin control box must be always activated.

3.22 Information signs and documents

The following documents, signs and labels are supplied with the service lift and shall always be available.

Location	Document
Cabin	Serial number palte (including CE mark)
	Manual document inside blue bag
	Quick guide document
	Evacuation guide
	Use of PFPE label sign
	Max. load / No persons label
	Electrical hazard warning label
	Security rules for the elevator use
Main control box	Emergency manual release sticker
	Wiring diagram
Platform fences	Electrical hazard warning label
	Danger zone sticker

4. Instructions for use

4.1 Daily inspection

Travel zone:

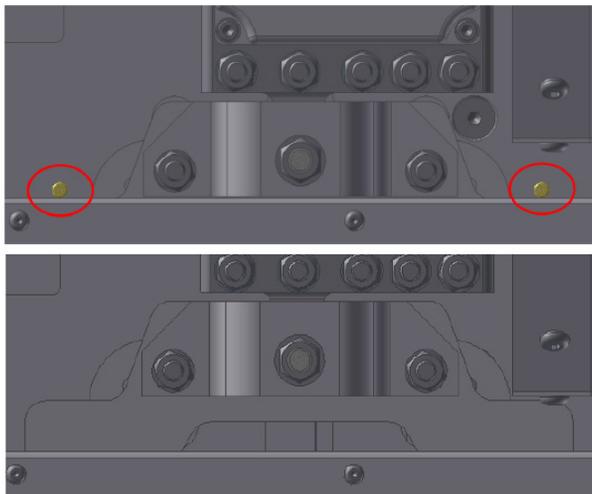
Ensure that there are no obstacles in the travel zone which may obstruct the travel of the service lift.

Service lift:

1. Check that the service lift components are mounted in accordance with the specifications and without any noticeable defects or missing components.
2. Check that the traction and safety wire ropes are not damaged or jammed.
3. Check that the safety devices are in place and working:
 - 3.1 Main switch: Turn the main switch on the bottom platform control box to the OFF position (if installed). The green light must be OFF. The service lift must not run. Turn it ON, the light shall be ON.
 - 3.2 Emergency stop button: Press the emergency stop button on the cabin control box. The service lift should not move UP / DOWN. Release the emergency stop and drive the lift UP approximately 1 meter.
 - 3.3 Service lift door: Slide and swing the door to open. The cabin door should open, the green light must be OFF and the lift must not move UP / DOWN. Close the cabin door.
 - 3.4 Check if the FAD fixing adapter has moved downwards. In such case, DO NOT USE THE LIFT.



Check on the spine if there is gap below the nylon bolts, if they are fully visible and are not deformed / broken, and the damper unit is free of cracks and/or oxide (use the fixed steps to make these checks at sight level). If this is not the case, DO NOT USE THE LIFT.



Activate the fall arrest device by turning the lock lever counter clockwise. 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 turning the unlock lever clockwise. Check visually if centrifugal flyweights are spinning when the lift travels (this operation shall be performed by 2 users).

There is an alternative method to check the FAD functionality, called 'Stomp Test'. The procedure is explained in the 'Stomp-test Instruction' (Ref.I-671).

3.5 Perform a manual descent test for a meter. The service lift should descend.

3.6 Drive the service lift down until the Bottom obstruction device hits the bottom platform. The service lift should stop before the rubber bumpers hit the bottom platform.

3.7 Top obstruction device: activate top stop by pressing it down. The service lift should not ascend until top obstruction device is released.

4. When the service lift is at the top platform, check the wire rope fastenings.

5. Record the hour meter reading in the "Appendix C: Inspection log sheet" of Installation Manual.



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.

Cabin control from outside of the cabin- Automatic:

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

1. Turn the main control box selector to AUTOMATIC. Press the UP button on the control box. The lift should ascend.
2. Press the emergency stop button on the control box. The lift stops.
3. Pull the emergency stop button and press the DOWN button. The service lift should descend until the bottom obstruction device engages.



The daily inspection must be recorded for future reference (filling in the "Protocol Book").

4.2 Prohibited uses



The consequences of not following below 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 personnel from AVANTI or qualified personnel authorised by AVANTI are allowed to perform service on the machine.
- To manipulate switches and safeties.
- To place objects on service lift roof.
- To travel on service lift roof.



4.3 Operation from inside the cabin (manual)

1. Turn the main switch of the bottom platform control box to the ON position (if installed).
2. Enter the service lift, close the bottom fence door, and the cabin door.
3. Turn the the main control box selector to MANUAL (if installed).
4. To go up or down, press and hold the UP or DOWN button as needed.



In the event of traction wire rope breaks or traction hoist fails, evacuate the service lift.

4.4 Operation from outside the cabin (automatic send)



Transportation of people is forbidden if the operation is controlled from outside the service lift.



4.4.1 Bottom platform

1. Turn the main switch ON of the platform control box (if installed).
2. Open the service lift door.
3. Turn the main control box selector to AUTOMATIC.
4. Close the service lift door.
5. Press the external UP button.

4.4.2 Top platform

1. Open the service lift door.
2. Turn the main control box selector to AUTOMATIC.
3. Close the service lift door.
4. Press the external DOWN button.



When the UP or DOWN button of external control box is pressed, the response of the cabin is delayed. During this delay, an acoustic signal will sound. This way, any personnel in the surroundings are warned of the imminent movement of the service lift.



Transportation of people is forbidden if the operation is controlled from the external control box.



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.



4.5 Fall arrest device

If the fall arrest device engages simply disengage it by turning the “Unlock” lever clockwise until the fall arrest device is unlocked.

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 ascending the service lift a few centimetres.
2. Manually open the fall arrest device by turning the “Unlock” lever clockwise until the fall arrest device is unlocked.

In case of power failure and the fall arrest device is locked with the safety wire rope under tension evacuate the lift according to the evacuation procedure.



If fall arrest device has engaged, an expert must verify the safety of the fall arrest device, the wire rope, and wire rope fastenings.



After FAD has engaged, the dampers, the sliding bracket and the nylon bolts of the damper unit must be replaced by an expert. If the FAD fixing adapter has moved downwards, the FAD unit must be replaced by an expert.

4.6 Manual descent

In case of power failure, a manual descent without power can be performed. To do so:

1. Verify that the fall arrest device is unlocked.
2. Check that there are no obstacles or persons in the travel zone.
3. Take the manual descent actuator from its holder and insert it on the lever extension tube.
4. Push the manual descent actuator upwards. Push up the actuator completely. The manual descents shall be of maximum 30 m. Between two consecutive manual descents, the user shall wait minimum 10 minutes for centrifugal brakes to cool down.
5. To stop the manual descent, stop pushing upwards.
6. Every time that a whole tower height manual descent is performed, shall be recorded in the Inspection log sheet (Appendix C of Installation Manual), and the system must be checked by an expert.



During the manual descent, the door and hatches of the lift shall be kept closed.



Use the walkie-talkie to report about the manual descent. During the manual descent, stop the service lift just before reaching the bottom platform floor. This way, the bottom obstruction device will not get damaged.



The manual descents shall be of maximum 30 m. Between two consecutive manual descents, the user shall wait minimum 10 minutes for centrifugal brakes to cool down. This way, the premature wear of the centrifugal brakes will be prevented. In case of real emergency (risk of death or for the integrity and security of users) a manual descent without intermediate stops can be performed. Then the centrifugal brakes shall be inspected by AVANTI or qualified personnel authorised by AVANTI.

4.7 Lateral removable windows

To open the windows:

1. Press the emergency stop button of the cabin control box.
2. Remove the lateral windows from the cabin lateral panels by unscrewing its riveted screws with a Torx screwdriver.

To close the windows:

1. Install the lateral windows by screwing its riveted screws back on the cabin lateral panels with a Torx screwdriver.
2. Press and turn the emergency stop button of the cabin control box.



The lateral removable windows shall only be used by AVANTI or qualified personnel authorised by AVANTI. The lateral removable windows shall only be used for maintenance tasks.

4.8 Cabin maintenance covers

To open the covers:

1. Press the emergency stop button of the cabin control box.
2. Remove the covers from the cabin back panels by unscrewing its riveted screws with a Torx screwdriver.

To close the covers:

1. Install the maintenance covers by screwing its riveted screws on the cabin back panels with a Torx screwdriver.
2. Press and turn the emergency stop button of the cabin control box.



The cabin maintenance covers shall only be used by AVANTI or qualified personnel authorised by AVANTI. The cabin maintenance covers shall only be used for maintenance tasks.



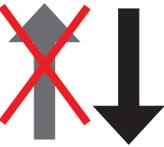
4.9 Troubleshooting

1. All tests and repairs to the electronic components should be performed by **authorised personnel 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 **qualified personnel only!**

Breakdown	Cause	Solution
<p>The service lift will neither go up nor down!</p> 	 DANGER! <i>Attempting to use the lift will jeopardize work safety.</i>	
	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.	a) Perform manual descent until the emergency top limit switch is released. b) Close the door and test the door switch.
	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/off) a) Supply, braking coil or rectifier defective. b) Braking rotor closes.	a) Have an authorized person, repair/replace the supply, braking coil and rectifier. b) Return traction hoist for repair.	

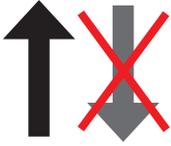
 **DANGER!**
Unplug the power supply before opening the power cabinet.



Breakdown	Cause	Solution
	A9 The main switch is in the OFF position.	Turn the main switch ON.
	A10 The product is stuck on an obstacle below it.	Evacuate the service lift - Inform the supervisor. - Check the bottom obstruction device connection/ function. Replace if necessary.
Service lift goes down but not up 	 <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.
 DANGER! <i>Unplug the power supply before opening the power cabinet.</i>	B2 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.
	B3 A phase is missing	Test fuses and power supply.
	B4 Fault in UP control circuit in control box or traction system	Test and possibly repair connections, wiring and relays.
Motor hums loudly or wire ropes squeak, but the lift can go both up and down.	B5 Service lift is overloaded (buzzer sounds).	Test and/or reduce load until buzzer stops.
	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.





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

 **DANGER!**
Unplug the power supply before opening the power cabinet.



If these steps do not identify the cause and rectify the fault: Consult a qualified electrician or contact the manufacturer.

4.10 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.





Changelog

Version	Date (mm/yyyy)	Description
01.01	12/2016	New user's manual
01.02	10/2018	Updated logo
01.03	02/2019	Updated Manufacturer data









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