



Original instructions



AVANTI

AVANTI SERVICE LIFT

User's manual

Model SWP L02 CE-AECO



Date of publication:
2nd Edition: June 2019
Revision 1: 17/06/2019

This manual covers products with Serial numbers from A2-L0001

AT00010431 SWP L02 CE-AECO Ed.02 Rev.01 – Language: ENGLISH



CERTIFICATE

EC Type Examination

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

Number of registration: 01/205/0950/19

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

AVANTI WIND SYSTEMS TECHNOLOGY, S.L.

Calle Angeles (Los), Num. 88
Pol. Industrial Centrovía
50196 Muela (La) - (Zaragosa)
Spain

the close conformity of the product

Service lift inside wind turbine systems

Technical data:

Type:	SWP L01	SWP L02	SWP XL01	SWP XL02
- max. load capacity:	240 kg / 2 persons		320 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			
- net weight:	190 kg		220 kg	
- cabin doors:	Roller-door		Sliding-door	
- max. travelling height:	140 m			
- optional:	<div>- Cabin external send function</div> <div>- Wind turbine platform send / call function</div> <div>- high (2.4 m) and low (1.1 m) fences</div>			

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_006-1 from 2019-01-19 and is valid only duly considering the requirements mentioned in this document. The examination was realized on site in Cologne.

This certificate is valid until 2024-02-04

Cologne, 2019-02-04



Certification body
Notified under No. 0035
certifier

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TÜVRheinland®
Precisely Right.



AECO certificate for SWP L02:



UL LLC

Presents this

AECO CERTIFICATE

Certificate Number: **201712154787904922**

Date: 2017-12-15

To

**AVANTI WIND SYSTEMS A/S
Rønnevangs Allé 6
3400 HILLEROED DENMARK**

For certification in accordance with the ASME A17.7-2007 / CSA B44.7-07 (Reaffirmed 2012)
of the following Elevator Subsystem:

Turbine Service Lift

(See addendum for details)

Effective from: December 15, 2017 Until December 15, 2020

Muhammad Asad

Issued by: Muhammad Asad
AECO Certification Services

Lenworth E. Grant

Reviewed by: Lenworth E. Grant
AECO Certification Services

Gregory DeLaFuentes

Reviewed by: Gregory DeLaFuentes, PE
AECO Certification Services

Please look for the UL Classification Mark and Certificate Number on the product



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Manufacturer:

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Contents

	Page
1. Limited warranty	7
2. Introduction	8
2.1 Observations	8
2.2 Symbols	8
2.3 Cautions	9
3. Description	10
3.1 Purpose	10
3.2 Scope	10
3.3 Exclusions	10
3.4 Technical specifications	10
3.5 Dimensions	11
3.6 Components	12
3.6.1 Components of SWP L02	12
3.6.2 Traction system	13
3.6.3 Fall arrest device	13
3.6.4 Traction, safety and guiding wire ropes	13
3.6.5 Main control box of SWP L02	14
3.6.6 Service-lift operating panel	14
3.6.7 Platform operating panel	14
3.6.8 Main switch	15
3.6.9 Trapped key switch	15
3.6.10 Electromagnetic motor brake	15
3.6.11 Emergency stop button	15
3.6.12 Overload limiter	15
3.6.13 Manual descent	15
3.6.14 Fall arrest device	15
3.6.15 Warning lights	15
3.6.16 Service Lift Doors	15
3.6.17 Obstruction switches	16
3.6.18 Light with emergency function	16
3.6.19 Wire inspection cover	16
3.6.20 Anchor points	16
3.6.21 Information signs and documents	16
3.6.22 Rollers guiding system	17
3.6.23 Slack rope sensor	17
3.6.24 Control cable management	17
4. Instructions for use	18
4.1 Daily inspection	18
4.2 Prohibited uses	20
4.3 Entry and exit	20
4.4 Stop/Emergency stop	20
4.5 Operation from inside the cabin	20
4.6 Operation from outside the cabin	20
4.7 Overload limiter	21
4.8 Manual descent	21
4.9 Fall arrest device	21
4.10 Foldable steps and handles	21
4.11 After use instructions	22
4.12 Troubleshooting	22
4.13 Out of service	23
APPENDIX A: DAILY INSPECTION LOG	24



Ed.Rev	Notes
01.01	Updated Certificate and Manufacturer data
02.01	Manufacturer updated. Certificate updated.

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. All measurements are indicative only and subject to change without prior notice.



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



VERSION!

Differentiation between CE versions and AECO version.



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 Service Manual.

Personnel shall wear PFPE (safety helmet, full body harness, shock absorber, lanyard and slider) at all times, when using the lift.

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

If more than one person is entrusted with service 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 AVANTI or certified technicians. All repairs to the traction, braking and supporting systems may only be performed by AVANTI or certified technicians.

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

Service lift must be inspected by AVANTI or by certified technician before first use.

Service lift must be inspected at least once a year or after 60 hours of use (whichever occurs first) by AVANTI or certified technicians. Service lift is designed for a lifetime of 20 years with an operating frequency of approximately 60 hours/year for the first year and the 10 hours/year for the rest of the years (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 25 m/s (55.5 mph), electric storms, hurricanes, temperature out of lift's operating range (-25°C to +60°C), and any other that jeopardize safe operation.

Personnel shall be equipped with a wired or wireless two way communication device, that shall be connected to a location staffed by authorised personnel. Personnel shall be equipped with portable lights of minimum 200 lx 1) (i.e. headlamps).



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.



¹⁾ Optional for CE versions. Mandatory for AECO version.

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 carrying out the corresponding daily inspections and who holds valid certification (current) for the task in question.
Manual descent (also: descent without electrical power)	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 described in this User's Manual serves the following purposes:

- Transportation of staff and material inside wind turbine systems, lattice towers for wind turbines, and telecommunication towers.
- Transportation for mounting, inspection and repairs.

The service lift may be used to transport two persons plus their tools and equipment to the most convenient height for performing work on the tower.

The service lift is designed for permanent installation in Wind Turbine Generator towers.

3.2 Scope

The system consists of a service lift, its guiding system along the tower, its traction and safety wire ropes made in steel, power supply system and the protective fences at landings including their interlock system. The system details are described along this manual.

The service lift consists of a cabin made in aluminium, a traction system, a fall arrest device, a control system and safety devices.

The guiding system consists of a set of guiding wire ropes made in steel, the attachments to the tower and the guides of the car.

The protective fences consist of structures with rails and/or covered with sheet of different materials and geometries depending on the landings where they are installed.

They shall comply with the relevant regulations which may include EN14122-3, OSHA 1926.502 Maximum evacuation distance from the point of emergency exit to the accessible means of evacuation shall be no more than 1 m.

The system as whole meets the essential health and safety requirements as required by the European Machinery directive 2006/42, as well as ASME A17.7-2007/CSA B44.7-07.

3.3 Exclusions

The lift is not designed for use

- in silos,
- at drilling sites,
- as a permanently installed facade lift,
- as a crane lift,
- in environments with explosion hazards.

3.4 Technical specifications

Operating temperature:

-25°C to +60°C (-13°F to +140°F).

Survival temperature:

-40°C to +80°C (-40°F to +176°F)

Low temperature kit is also available:

Operating temperature:

-30°C to +40°C (-22°F to +104°F).

Survival temperature:

-40°C to +60°C (-40°F to +140°F).

Lifting capacity: SWP L02 240 kg (max 2 persons)

Weight of lift: SWP L02 190 kg

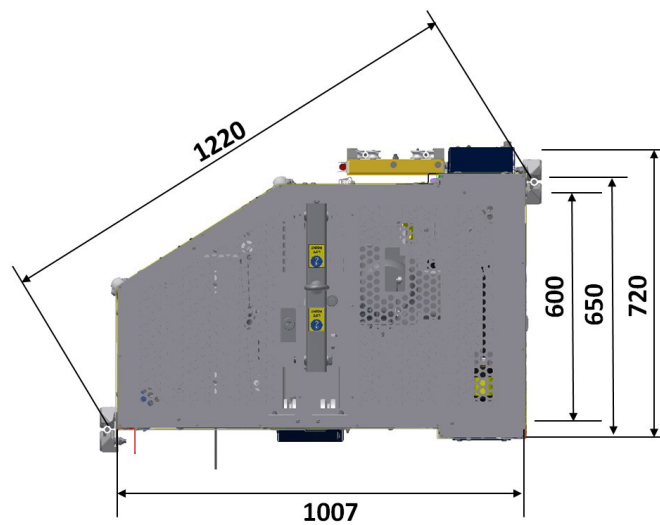
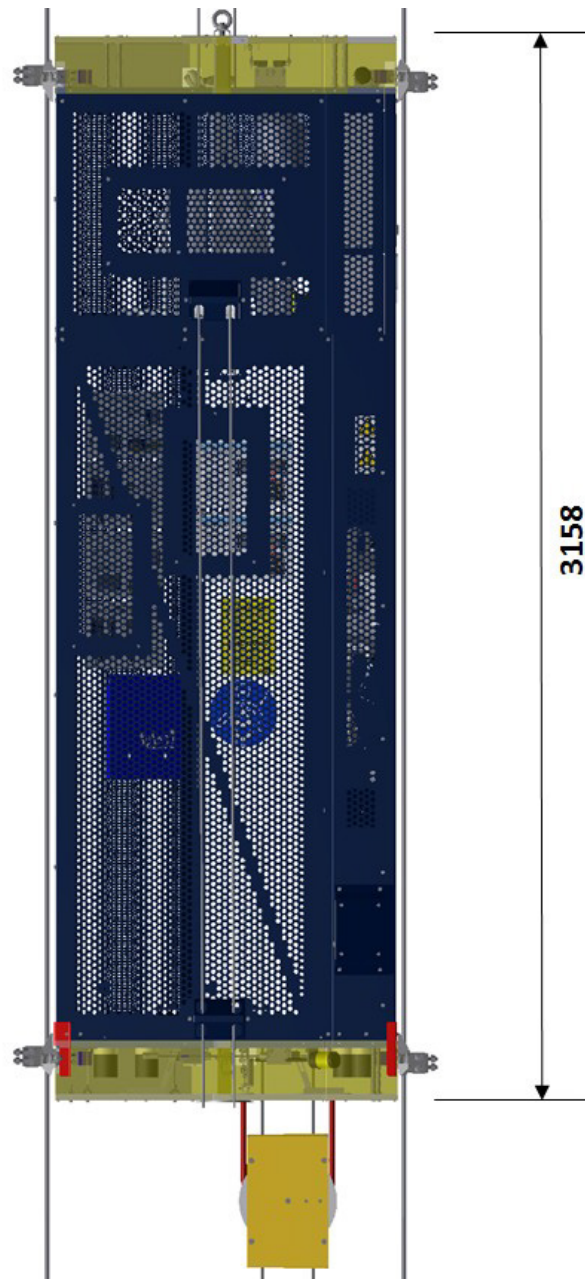
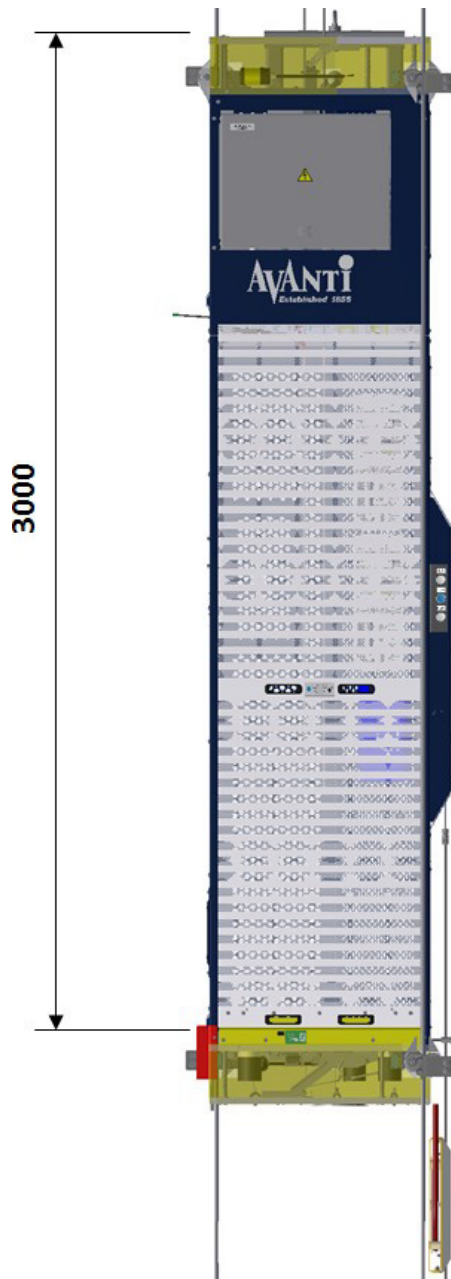
Door opening: 600 x 2100 mm

The maximum noise level of the service lift is 80 dB(A).



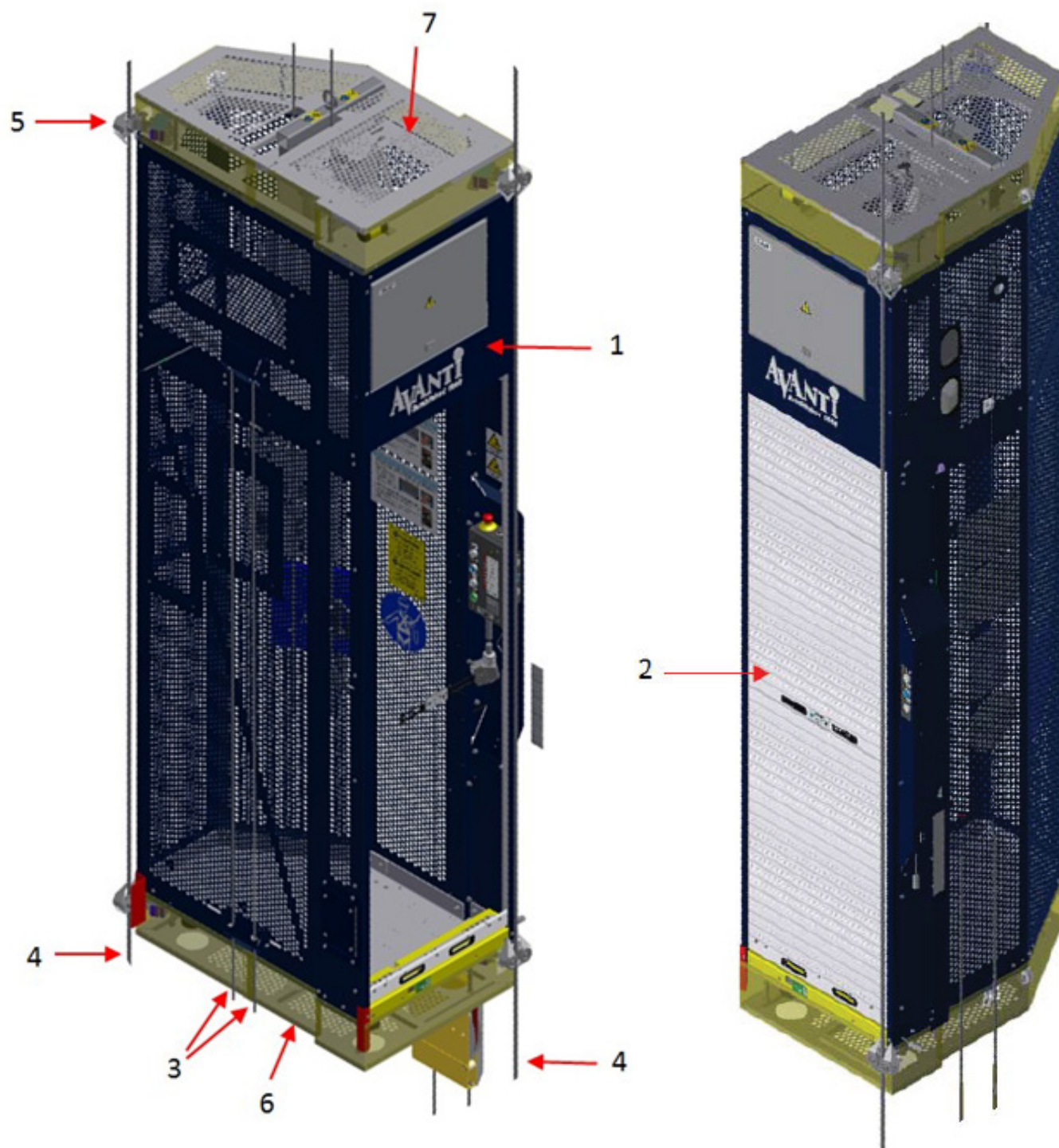
3.5 Dimensions

3.5.1 Dimensions of SWP L02



3.6 Components

3.6.1 Components of SWP L02



- 1 Cabin
- 2 Door
- 3 Traction and safety wire ropes
- 4 Guiding wire rope
- 5 Wire rope guides
- 6 Bottom obstruction device
- 7 Top obstruction device

Traction system



Fall arrest device



3.6.3 Traction system

Lift	Hoist	Lifting capacity	Power supply	Wire rope speed	Effect	Rated current	Traction wire rope Ø	Unit weight approx.
Model	Type	Kg (lbs)	Voltage/ Frequency	m/min (ft/min)	kW	A	mm	Kg (lbs)
SWP L02 CE	M508	500 (1100)	690V/50Hz	18 (60)	1.5	2.3	8.4	40 (88.2)
SWP L02 CE	M508	500 (1100)	690V/60Hz	21 (70)	1.5	2.8	8.4	40 (88.2)
SWP L02 AECO	M508	500 (1000)	480V/60Hz	21 (70)	1.8	4.1	8.4	40 (88.2)
SWP L02 AECO	M508	500 (1000)	400V/60Hz	21 (70)	1.8	4.9	8.4	40 (88.2)

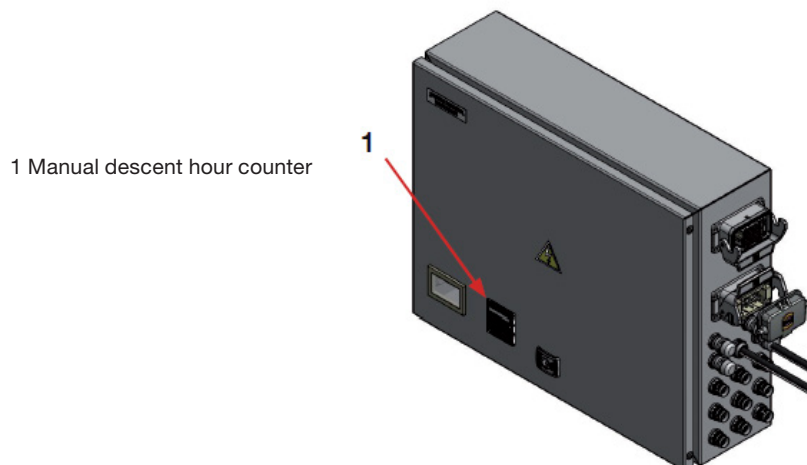
3.6.4 Fall arrest device

Lift	Fall arrest device	Lifting capacity	Triggering speed	Safety wire rope Ø	Unit weight approx.
Model	Type	Kg (lbs)	m/min	mm	Kg (lbs)
SWP L02 CE / AECO	ASL 508	500 (1100)	30	8.4	7 (15.4)
SWP L02 CE / AECO	ASL 508	500 (1100)	40	8.4	7 (15.4)

3.6.5 Traction, safety and guiding wire ropes

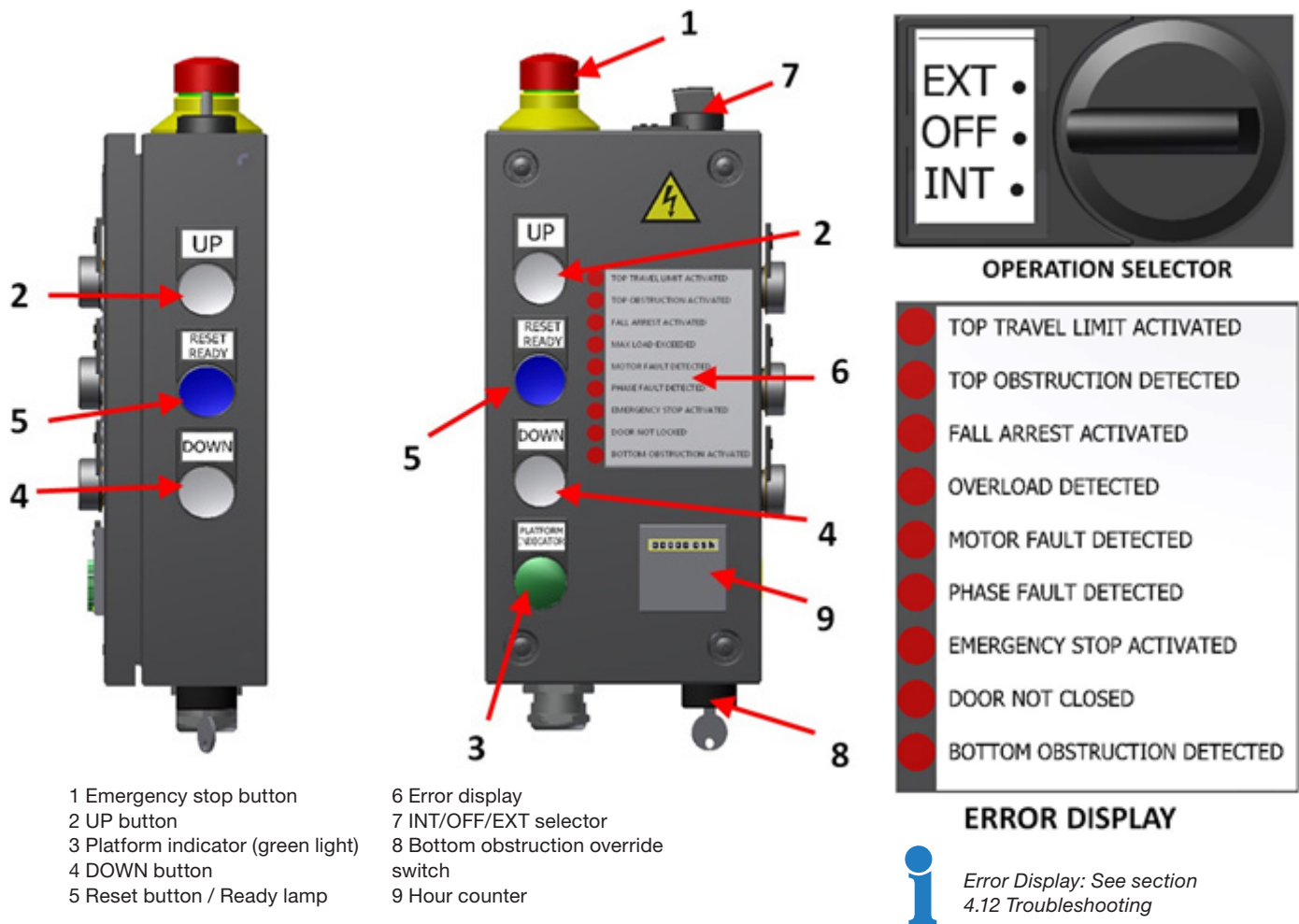
Lift model	Wire rope type	Wire rope diameter	Surface Treatment	Mark/ feature	Min. break resistance	Attached with
SWP L02 CE & AECO	M508 / ASL 508	8.4 mm, 5x19	HDG	no	55 kN	2 t shackle
ALL	Guiding wire rope	12 mm	HDG	no	55 kN	2 t shackle

3.6.5 Main control box of SWP L02





3.6.6 Service-lift operating panel



3.6.7 Main switch panel



1 Main switch

3.6.8 Main switch

Power supply is interrupted by turning the main switch of the bottom platform operating panel or of the main switch panel (see section 3.6.7), to OFF position.

3.6.9 Trapped key

The trapped key is placed inside the cabin, attached to cabin by means of a retractable wire rope, preventing loss or disattachment of key and ensuring the interlock function. Opening the lift door and inserting/turning the trapped key in the interlock of a landing gate allows the gate to be opened and prevents the lift from riding up or down. To release the trapped key from the interlock, close the gate and turn the trapped key.

3.6.10 Electromagnetic motor brake

The hoist integrates an electromagnetic spring-loaded brake which engages automatically

- on releasing the UP/DOWN control buttons
- following a power failure.

3.6.11 Emergency stop button

When a red emergency stop button is pushed in an emergency, all control is interrupted and the 'Emergency Stop Activated' light on the Error Display is turned ON. After remedying the fault, control is reactivated by pulling the button, until it pops out again and pressing a reset button.

3.6.12 Overload limiter

The overload limiter is built into the wire rope traction system and will prevent any travel in the event of an overload. The 'Overload Detected' light on the Error Display is turned ON which will stop only when the cause of the overload has been removed.

Possible reasons for activation of the limiter:

- The service lift is overloaded.

Operator intervention:

- Reduce the load to below the overload limit.

3.6.13 Manual descent

The hoist is delivered with a lever that allows manual release of the electromagnetic motor brake. Once the motor brake is released, the motor speed is controlled by a mechanical overspeed limiter installed between the motor shaft and the gear box. Manual descent speed is approximately 30% higher than nominal speed. During manual descent and no power supply, the bottom obstruction device is still operational by means of the emergency bottom obstruction breaker.

A manual descent hour counter installed in the main control box allows monitoring operating time of centrifugal brake. Centrifugal brake excessive wear can drive to an uncontrolled descent speed during a manual descent. So this hour counter allows preventive maintenance of the centrifugal brake.



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

3.6.14 Fall arrest device

Service lift is equipped with a fall arrest device which will prevent the load from falling in case of a traction system failure or a traction wire rope breaking. The fall arrest device can be unlocked manually from inside the cabin. The speed of the safety wire rope passing through the device is continuously monitored, and the jaws automatically close in the event of sudden excessive speed.

Tension of safety wire rope must be frequently checked, as it fully affects functionality of fall arrest device!

This protects the lift in case of:

- a) Traction wire rope breaks and
- b) Hoist failures

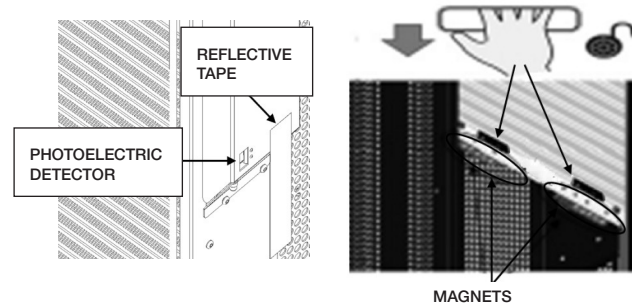
The fall arrest device can also be engaged manually in an emergency by pushing upwards the red locking lever (see point 4.9).

3.6.15 Warning lights

Warning lights are mounted on the top and at the base of the lift. The lights are flashing when the lift is in movement. They start flashing 5 seconds before the service lift starts travelling during normal internal and external operation, or in case of emergency descent.

3.6.16 Service lift doors

The roller door is closed by pulling down using the oval door handles while observing that the actuator engages with the door guard locking switch. Magnets at the bottom of the roller door helps to keep the roller door closed.



When the cabin is located at a platform, and the photoelectric detector is activated by the level reflective tape, the door guard locking switch is automatically unlocked and the roller door can be opened by the user. The green "Platform Indicator" light in the operating panel is turned ON to indicate that the cabin is at a platform and the roller door is allowed to open.

In an emergency use (for example power cut, need of evacuation, rescue) the door guard locking switch can be unlocked by pushing Door Manual Release from inside or outside the cabin.



3.6.17 Obstruction switches

3.6.17.1 Top obstruction switch

At the top of the cabin a top obstruction switch will stop upward travel when activated and the 'Top Obstruction Detected' light on the Error Display is turned ON. Downward travel will still be possible. A top limit device which activates the top obstruction switch is installed below the traction wire rope attachment.



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

3.6.17.2 Emergency top limit switch

The emergency top limit switch acts a backup of the top obstruction switch. If the top obstruction switch fails to engage against the top limit device, the emergency top limit switch is activated, the 'Top Travel Limit Activated' light on the Error Display is turned ON and interrupts control. The service lift will not be able to ascend nor descend. Manual descent is possible to disengage the top obstruction switch or to descend to bottom platform.



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

3.6.17.3 Bottom obstruction switches

The service lift features two bottom obstruction switches (S2.1 and S2.2). These switches stop downward travel if the service lift

- encounters an obstacle or
- touches the ground.

When activated, the 'Bottom Obstruction Detected' light on the Error Display is turned ON. Upward travel will be possible, for instance to remove the obstacle. In order to put the service lift on the ground, the bottom obstruction switches can be bypassed with the bottom obstruction override switch, which is activated by inserting/turning the override key located below the service-lift operating panel in the service lift (see section 3.6.6). The user must turn and hold the key, while is pressing the DOWN button of the service-lift operating panel, until the service lift reaches the ground.

3.6.18 Light with emergency function

An emergency light is installed to illuminate inside the lift with and without electric supply.

The cabin light features a motion detector, that turns On the light when it detects any movement. After 1 minute, if no more movements are detected, the light turns OFF automatically. To turn the light on again, the user must do some movement to get detected.

3.6.19 Wire inspection cover

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

3.6.20 Anchor points

The service lift is equipped with three anchor points. During operation personnel must hook to the anchor point.

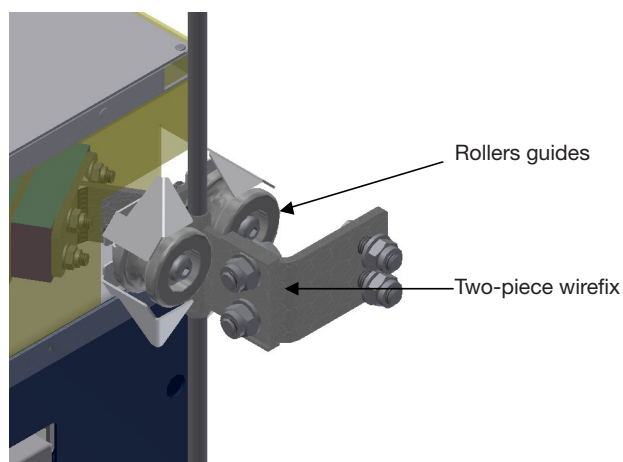
3.6.21 Information signs and documents

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

Location	Document
Inside blue bag	Manual
Cabin	Quick guide document
	Evacuation guide
	Serial number plate
	Use of PFPE label sign
	Working load limit / N° persons label
	Manual descent label
	Fall arrest deactivation label
	Fall arrest activation label
	Door guard locking label
	Location of anchor points sticker
	Emergency manual release sticker
	Number of persons on anchor point sticker
Main control box	Wiring diagram
	Electrical hazard warning label

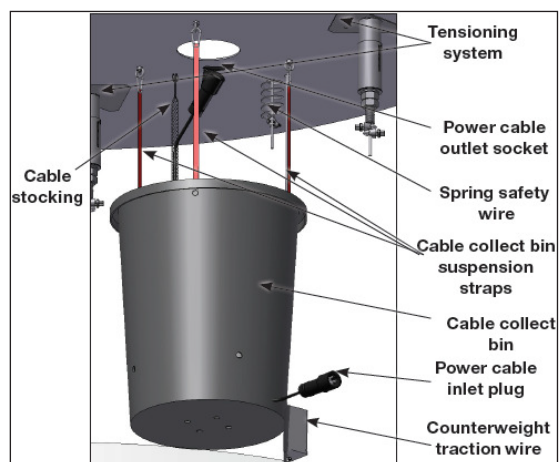
3.6.22 Rollers guiding system

The service lift is guided along the guiding wire ropes by means of roller guides. These roller guides have damping parts that allow them to adapt to deviations on the trajectory of the guiding wire ropes.



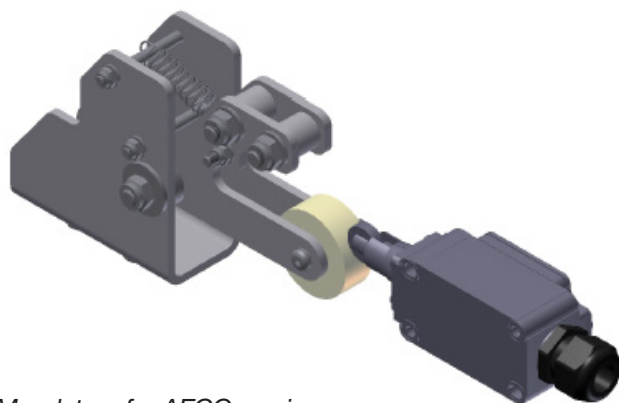
3.6.24 Control cable management

If the service lift features the automatic send configuration, the control cable coils inside a bin placed under the cabin



3.6.23 Slack rope sensor ¹⁾

Installed on the top of the service lift, over the traction system, when engaged it will remove power from service lift. It detects slack traction wire rope.



¹⁾ Mandatory for AECO versions.



4. Instructions for use

4.1 Daily inspection

Pre-use inspection must be conducted EVERY day lift is operated by a person authorised by Avanti. The result shall be recorded in the "Daily inspection log sheet" (appendix A).



Daily inspection of the service lift shall only be performed by personnel authorised by AVANTI. 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:

- Check that the cabin has no damages.
- Check that the top and bottom obstruction devices are free of damages.
- Check that the traction and safety wire ropes are correctly fed and guided.
- Record the hour meter reading in the "Daily inspection log sheet" (appendix A).

4.1.2 Travel zone

Ensure that there are no obstacles within the service lift's operating area which may obstruct the travel of the cabin. The result of the inspection shall be recorded in the "Daily inspection log sheet" (appendix A).

4.1.3 Control and safety devices



Remember that there is a 5 seconds delay together with visual warning (flashing lights) before any operation of the cabin, either manual or automatic.



Top and bottom flashing lights will also work during manual descent even in case of no power!

4.1.3.1 Cabin control from inside the cabin

- Close the doors. Press the EMERGENCY STOP button.

An emergency light shall turn on in the error display. The lift should remain still when the UP/DOWN button is pressed. To restart, pull the EMERGENCY STOP button and press the reset button. The result of the test shall be recorded in the "Daily inspection log sheet" (appendix A).

- Test the EMERGENCY top limit switch:

Place the cabin in a suitable position and press the switch (by hand or using some implement). The corresponding light shall turn on in the error display. Check neither upward nor downward travel is possible. Release the switch lever to normal position and press reset button. The result of the test shall be recorded in the "Daily inspection log sheet" (appendix A).

- Bottom obstruction device:

Place the cabin in a suitable position and activate the bottom obstruction device by pressing it up. The corresponding light shall turn on in the error display. Check downwards travel is not possible (upwards travel is still possible). Press reset again to allow lift operation and descend lift to bottom platform. It shall stop before the rubber feet of the cabin reach the tower ground level. The result of the test shall be recorded in the "Daily inspection log sheet" (appendix A).



At top and bottom platform the top and bottom obstruction devices work as a travel limit switch together with the photoelectric level detector, in such a way that neither the error light shall lit up nor will be necessary to press reset button.



If an obstacle is detected while passing any other platform it will work in the same way: the lift will stop but alarm is not shown nor reset will be necessary.

- Door switch:

Open the door – it shall not be possible to move the lift upwards or downwards. The failure condition shall be shown by an emergency light in the error display.

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 (from inside) or by pushing the release red button (from outside). The result of the test shall be recorded in the "Daily inspection log sheet" (appendix A).



e) Operation selector INT/OFF/EXT:

Turn the selector to OFF – it shall not be possible to move the lift upwards or downwards. The result of the test shall be recorded in the “Daily inspection log sheet” (appendix A).

f) Top obstruction device:

Place the cabin in a suitable position and activate the top obstruction device by pressing it down. The service lift shall not move up until device is released and lift operation restarted by pressing the reset button (downwards travel is still possible). The device activation is shown by a light in the error display. The result of the test shall be recorded in the “Daily inspection log sheet” (appendix A).

g) Fall arrest device:

Activate the fall arrest device by pushing up the red locking lever. The corresponding light shall be turned on in the error display. Press and hold the DOWN button of the service-lift operating panel. 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 service-lift operating panel. The service lift should ascend. Unlock the fall arrest device by pushing up the black unlocking lever. After pressing reset button both up and down operation shall be allowed. Finally, to check the FAD functionality, perform the ‘Stomp Test’. The procedure is explained in the ‘Stomp test Instruction’. The result of the test shall be recorded in the “Daily inspection log sheet” (appendix A).



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.

h) Slack rope sensor ¹⁾:

Activate the slack rope sensor by manually pulling traction wire rope. The downward travel shall not be possible.



¹⁾ Mandatory for AECO versions.

4.1.3.2 Cabin operation from outside of the cabin – Automatic Send function

The automatic mode function is only available from the control buttons outside of the cabin and shall be checked as follows (one technician inside the cabin/one technician outside):

- Turn the operation selector to EXT. Press the external UP button on the service-lift operating panel. The lift should travel upwards.
- Press the EMERGENCY STOP button on the service-lift operating panel inside the cabin. The lift stops.
- Pull the EMERGENCY STOP button, push reset button (inside the cabin) and then press the external DOWN button. The service lift should travel downwards until the bottom obstruction device engages.
- The result of the test shall be recorded in the “Daily inspection log sheet” (appendix A).

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 more than its rated load.
- Try to repair machine components. Only personnel from AVANTI or competent persons certified by AVANTI are allowed to perform service on the machine.
- To manipulate switches and safeties.
- To place objects on service lift roof.
- To descent on service lift roof.



4.3 Entry and exit

To ensure safe entry and exit:

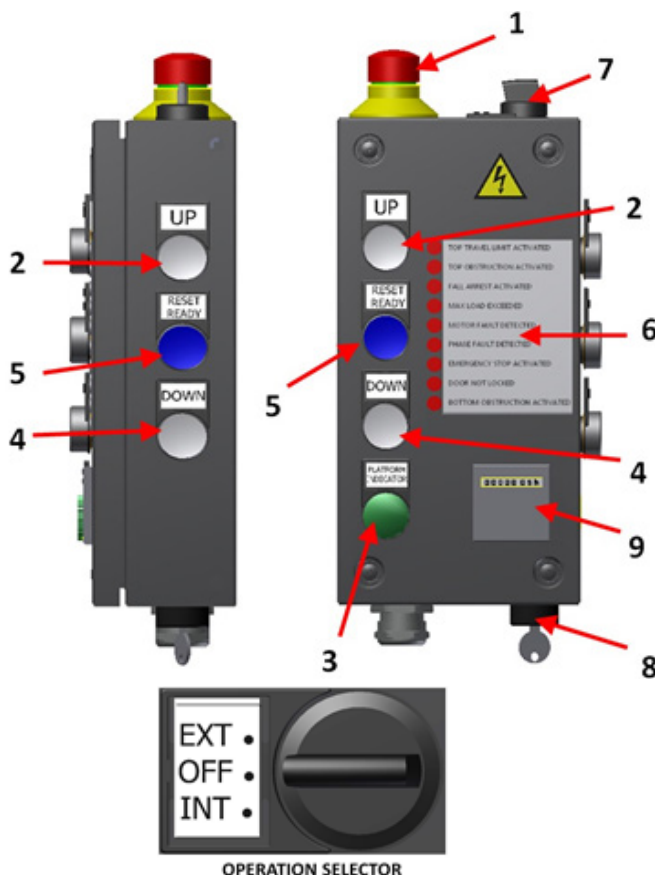
- Lower the service lift onto the access platform until the bottom obstruction device is activated and the cabin stops, or: bring the lift to a height corresponding to the correct level for exiting from the wind turbine's platform.
- Open the door and exit/enter the lift through the door.

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 operation selector shall be INT
- Press the reset button
- 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 external operating panel:

- The operation selector shall be EXT
- Close the door.
- Press the reset button
- Press the UP or DOWN button respectively and the cabin starts ascending/descending.



4.5, 4.6, 4.7: When actuating UP or DOWN buttons, response of cabin is delayed for 5 seconds while the warning lights are flashing, 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.

- Emergency stop button
- UP button
- Platform indicator (green light)
- DOWN button
- Reset button / Ready lamp
- Error display
- INT/OFF/EXT selector
- Bottom obstruction override switch
- Hour counter

4.7 Overload limiter

a) In case of an overload, the lift's upward or downward travel is blocked, and the Overload Detected light in the error display of the service-lift operating panel is on.



Attempting to run in an overloaded lift is prohibited!

- b) To enable upward or downward travel remove load from the lift until the error light OFF.
c) Press the RESET button.



On entering and starting the lift, the light may be turned on. This is due to temporary load peaks occurring as the lift takes off.

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



If the error display light is still ON and the lift blocked, have an AVANTI expert adjust the overload limiter.

4.8 Manual descent

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



1. The lever is attached underneath the cabin top. Turn it down.
2. Push and hold up the lever completely to avoid wear of the brake lining. The service lift moves downwards. Manual descent speed is approximately 30% higher than nominal speed. The built-in mechanical overspeed limiter limits the pace of descent. During the descent, the warning lights will flash.
3. To stop, simply loosen the lever.



After performing a manual descent, record the manual descent hour counter reading in the appropriate Inspection Appendix (user should remark reason and approx descent distance) and inform the supervisor.



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.

4.9 Fall arrest device

To lock the fall arrest device in an emergency, push the red lever upwards. After the fall arrest device engages, simply disengage it from inside the cabin until the fall arrest device is unlocked by pushing the black lever upwards. 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 moving the lift upwards a few centimetres.
2. Manually disengage the fall arrest device by pushing up the black lever.

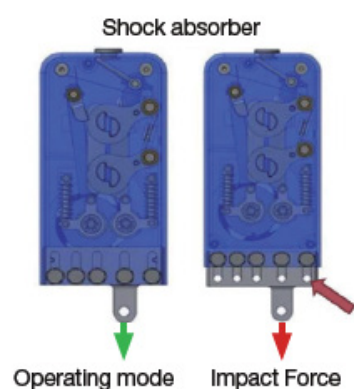
In case of no power and the fall arrest device is locked with the safety wire rope under tension, evacuate the lift according to the "Evacuation guide".



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



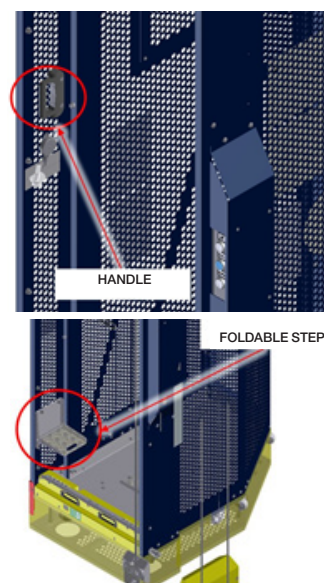
After fall arrest device has engaged, if the shock absorber has moved downwards, the fall arrest device unit must be replaced by a certified technician.



Shock absorber deployed, unit has been through a fall. Avanti must be contacted and unit should be replaced.

4.10 Foldable steps and handles

Due to the high position of the operating levers in the top of the cabin, foldable steps have been included in the cabin, to allow the users to reach them. These steps are manufactured with anti-slip surface. In order to ensure the user's stability, handles have been added in the cabin.



4.11 After use instructions













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

2. Leave main switch ON but turn off power at turbine control panel in bottom of tower or in top of turbine if leaving by helicopter –power supply is now interrupted.







4.12 Troubleshooting

The service-lift operating panel features an Error Display panel (see section 3.6.6). This display indicates that a safety switch has been activated or an error has happened. Below, the user can

find the troubleshooting related to each error light. If the troubleshooting does not solve the problem, call AVANTI or qualified technician by AVANTI.

Error display light turned ON	Solution
 TOP TRAVEL LIMIT ACTIVATED  The service lift will neither go up nor down!	<ol style="list-style-type: none"> 1. Perform manual descent until the top travel limit switch is released, and error light is turned off. 2. Push the Reset button. 3. If error light is still ON, call AVANTI or qualified technician by AVANTI.
 TOP OBSTRUCTION DETECTED  Service lift will go down but not up!	<ol style="list-style-type: none"> 1. Descent electrically by pushing and holding the DOWN button until the top obstruction switch is released, and error light is turned off. 2. Remove the obstacle. 3. Push the Reset button. 4. If error light is still ON, call AVANTI or qualified technician by AVANTI.
 FALL ARRESTER ACTIVATED  Service lift will go up but not down!	<ol style="list-style-type: none"> 1. Ascent electrically a few centimeters by pushing and holding the UP button, then push up the fall arrest device black unlocking lever until the fall arrester switch is released, and error light is turned off. 2. Push the Reset button. 3. If error light is still ON, call AVANTI or qualified technician by AVANTI. <p><i>Note: this error light is not ON if other safety (such as the door lock switch, or an emergency light...) is also engaged.</i></p>
 OVERLOAD DETECTED  The service lift will neither go up nor down!	<ol style="list-style-type: none"> 1. Check and possibly reduce load until error light is turned off. 2. Push the Reset button. 3. If error light is still ON, call AVANTI or qualified technician by AVANTI. <p><i>Note: this error light is not ON if other safety (such as the door lock switch, or an emergency light...) is also engaged</i></p>
 MOTOR FAULT DETECTED  The service lift will neither go up nor down!	<ol style="list-style-type: none"> 1. Evacuate the service lift, following the Evacuation Guide, and call AVANTI or qualified technician by AVANTI.
 PHASE FAULT DETECTED  The service lift will neither go up nor down!	<ol style="list-style-type: none"> 1. Change the Operation selector from INT or EXT to OFF. Then turn it again into INT or EXT. 2. Push the Reset button. 3. If error light is still ON, evacuate the service lift, following the Evacuation Guide or perform manual descent, and call AVANTI or qualified technician by AVANTI.



Error display light turned ON	Solution
 EMERGENCY STOP ACTIVATED  The service lift will neither go up nor down!	<ol style="list-style-type: none">1. Identify the emergency button activated and ensure that it's safe to resume operation. In such case, deactivate the button in question by pulling it until it pops out, and error light is turned off.2. Push the Reset button.3. If error light is still ON, call AVANTI or qualified technician by AVANTI.
 DOOR NOT CLOSED  The service lift will neither go up nor down!	<ol style="list-style-type: none">1. Close properly the door, and check the functionality of the internal manual release lever and the external release button of the door interlock until error light is turned off.2. Push the Reset button (just in case the service lift is out of platform level).3. If error light is still ON, call AVANTI or qualified technician by AVANTI.
 BOTTOM OBSTRUCTION DETECTED  Service lift will go up but not down!	<ol style="list-style-type: none">1. Ascent electrically by pushing and holding the UP button until the bottom obstruction switch is released, and error light is turned off.2. Remove the obstacle.3. Push the Reset button.4. If error light is still ON, call AVANTI or qualified technician by AVANTI.

4.13 Out of service

1. Securing the service lift:

Depending on Error display lights, if possible, bring the service lift all the way down, until the bottom obstruction device stops the cabin. If it is not possible to move the service lift, evacuate the cabin following the Evacuation Guide instructions.

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.



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