Original

AVANTI SERVICE LIFT

User's Manual and Installation Manual

Model SHARK

CERTIFICATE

EC-Type Test Approval

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

Number of registration: 01/205/0509B/10

TÜV CERT - certification body for machinery NB0035
at TÜV Rheinland Industrie Service GmbH
herewith confirms for the company

AVANTI WIND SYSTEMS A/S
Høgevej 19
DK- 3400 Hillerød
Denmark

the close conformity of the product

Service lift inside wind turbine systems

Technical data:

Type	:	Shark M	Shark L	Shark XL
max. load capacity:		240 kg	320 kg	320 kg
traction hoist	:	X402 or M500 L502P	X402P or M500 or L502P	X402P or M500 or L502P
speed	:	18 m/min	18 m/min	18 m/min
dead weight	:	90 kg	110 kg	120 kg

more combinations see Annex
Modification B: Supplement of a new hoist and a new safety break and taking into account the requirements of the Guide to application of Machinery Directive 2006/42/EC 2nd.

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.: 10_057 from 2010-07-19 and is valid only duly considering the requirements mentioned in this document. The examination was realized on site in Zaragoza, Spain.

This certificate is valid until **2015-07-22**

TÜV Rheinland Group Notified Body ÜTV 1 0035 Industrie Service

TÜV CERT authority
Certified according to No. 0035

Cologne, 2010-07-22

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Only trained people may use this lift.
This manual must be available to staff at all times during installation and operation.
Additional copies are available from the manufacturer upon request.
All measurements are indicative only and subject to change without notice.

Contents

Installation manual

1. Limited Warranty

Avanti Wind Systems A/S 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 Avanti service lift ("Product") described in this Manual will be free from defects in material and workmanship under normal use and service when installed and operated in accordance with the provisions of this Manual.

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

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

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

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

2. Explanation of symbols used in this manual

Symbol	Signal word	Meaning	Possible injury if not observed
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			
	**Warning!**	Potentially dangerous situation:	Damage to equipment or workplace
	**Important!**	Useful tips for optimum working procedure	None
Order			
		Reference to written specification/documentation	

3. Cautions

CAUTION!
Avoid injury – follow all instructions!

a) Installation and/or maintenance and/or operation of the service lift and its suspension may be performed only by qualified personnel, hired by the employer for the job at hand.

b) The 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.

c) Personnel is obliged to read and understand this User's Manual.

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

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

DANGER!

f) Whenever installation, ascending, and/or descending involves a danger of falling, all personnel inside the danger area must wear personal protective equipment which will prevent them from falling by means of a safety system secured to the building.

g) Only fault-free suspension devices, cabin components, traction hoist equipment, fall arrest device, original traction hoist wires and stopping devices may be used.

h) Electrical connection of the system must be made in accordance with EN 60204-1.

i) Prior to mounting, all parts must be tested to ensure their completeness and full functionality.

j) Self-locking nuts must be used at all times, and the following must always be observed:
- 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!

k) Prior to mounting the suspension system, ensure that the building sections involved will be able to carry the load.

DANGER!
Do not use the lift in case of fire.

l) If any damage or faults are found during operation, or if circumstances arises which may jeopardize safety:
– Immediately interrupt the work in progress and notify the supervisor or employer!

m) All tests/repairs of electrical installations may only be performed by qualified electricians.

n) All repairs to the traction hoist, fall arrest device and the system's supporting parts may be performed only by qualified fitters.

o) If any supporting parts are repaired or replaced, the operational safety of the system must be tested and verified by an expert.

p) Use of non-original parts, in particular use of wires other than the prescribed original traction hoist wire will render the manufacturer's warranty void and the CE approval invalid.

q) No modification, extension or reconstruction of the service lift is allowed without the manufacturer's prior written consent.

r) 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.

s) Before using the lift an inspection by the authorised security organisation must be carried out.

t) The lift must be inspected at least once a year by an expert that has been trained by AVANTI. The traction hoist and saftey break must be overhauled at an authorised workshop and furnished with a new certificate for every 250 hours of operation.

u) The service lift may not be used by person under the influence of alcohol or drugs that may jeopardize working safety.

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

CAUTION!
The service lift may only be used after the owner and Avanti had verified the maximum wind speed that will allow a safe use of the service lift. Maximum wind speed limits depend on WTG design.

4. Description of equipment

4.1 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 one specific tower.

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.

4.2 Function

The service lift uses a traction hoist for ascending and descending on a wire secured to the building.

A fall arrest device secure the service lift to a separate safety wire.

Upward and downward travel is controlled from inside the service lift in manual mode, from the remote control transmitter in remote mode (optional), or from the outside in the automatic mode (optional).

A overload limiter prevents upward travel in the event of an overload of the traction hoist.

Two guide wires on either side of the service lift prevent the lift from swivelling/tilting.

4.3 Service lift models

This User's Manual and Installation Manual describe the following models:

- SHARK M sliding door
  with 240 kg lifting capacity
- SHARK L sliding/double door/4-door
  with 240/320 kg lifting capacity
- SHARK XL sliding door
  with 320 kg lifting capacity.

4.4 Temperature

Operating temperature
-15ºC - +60ºC.

Survival temperature
-25ºC - +80ºC.

Low temperature kit is also available.
Operational temperature for low temperature kit
-25ºC - +40ºC.

4.5 Accesories

In order to fulfil the essential health and safety requirements from the regulations the design of the wind turbine and its components shall complement the safety systems supplied on the service lift making the ensemble safe as a whole.
A detailed evaluation of compliance to the EHSR and a risk assessment shall be completed. Avanti shall verify the compliance to such requirements prior to installation. Systems that may be considered to complement the service lifts are:

4.5.1 Fences & guards

The service lift hole must be adequately protected to prevent people from falling or being injured by the movement of the service lift. The fences and guards design shall comply with the relevant standards and local regulations.

4.5.2 Safety system for landing access doors

The service lift hole must be adequately protected to prevent risk of falling. When the service lift is not at the landing, access doors shall not be able to open. Such function may be achieved by using interlock systems on access doors linked to the position of the service lift.

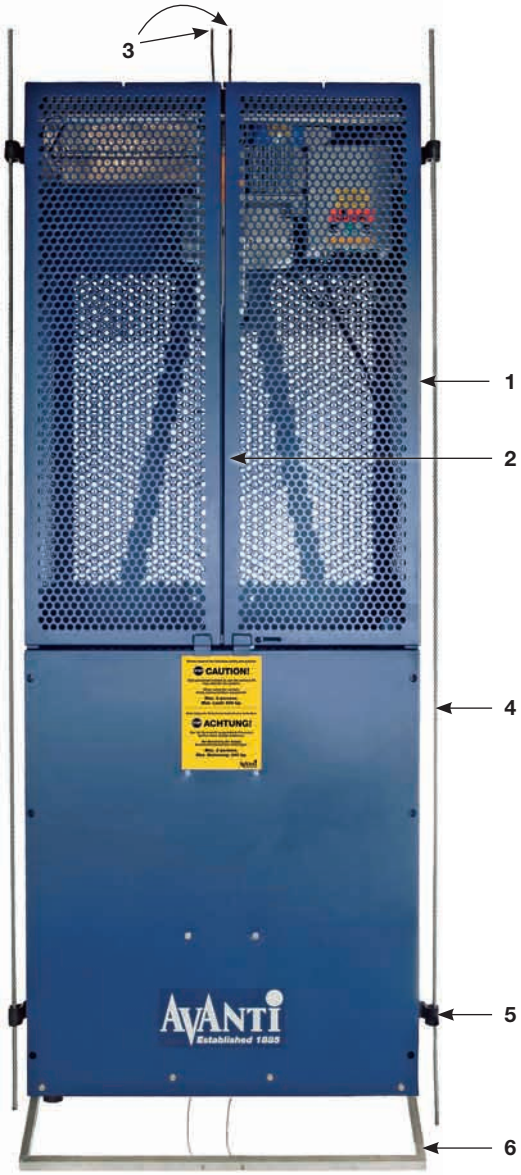
4.6 Components

4.6.1 Cabin overview

Fig. 1a SHARK L sliding door

1 Cabin
2 Sliding door
3 Drive and safety wires
4 Guide wire
5 Wire guides
6 Bottom safety stop

Fig. 1b SHARK L double door



1 Cabin
2 Double door
3 Drive and safety wires
4 Guide wire
5 Wire guides
6 Bottom safety stop

Fig. 1c SHARK L 4-door version

1 Cabin
2 4 door
3 Drive and safety wires
4 Guide wire
5 Wire guides
6 Bottom safety stop

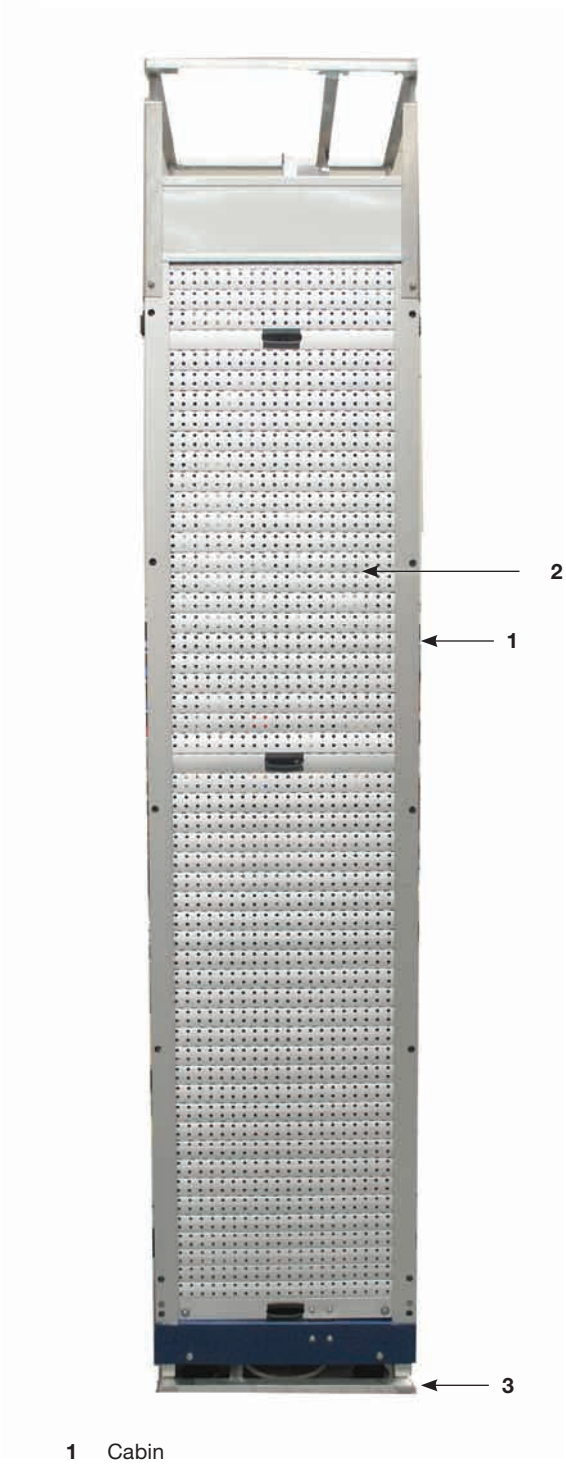
Fig. 1d SHARK M sliding door

1 Cabin
2 Sliding door
3 Drive and safety wires
4 Guide wire
5 Wire guides
6 Bottom safety stop

Fig. 1e SHARK L Half roller door

1 Cabin
2 Roller door
3 Drive and safety wires
4 Guide Wire
5 Wire guides
6 Bottom safety stop

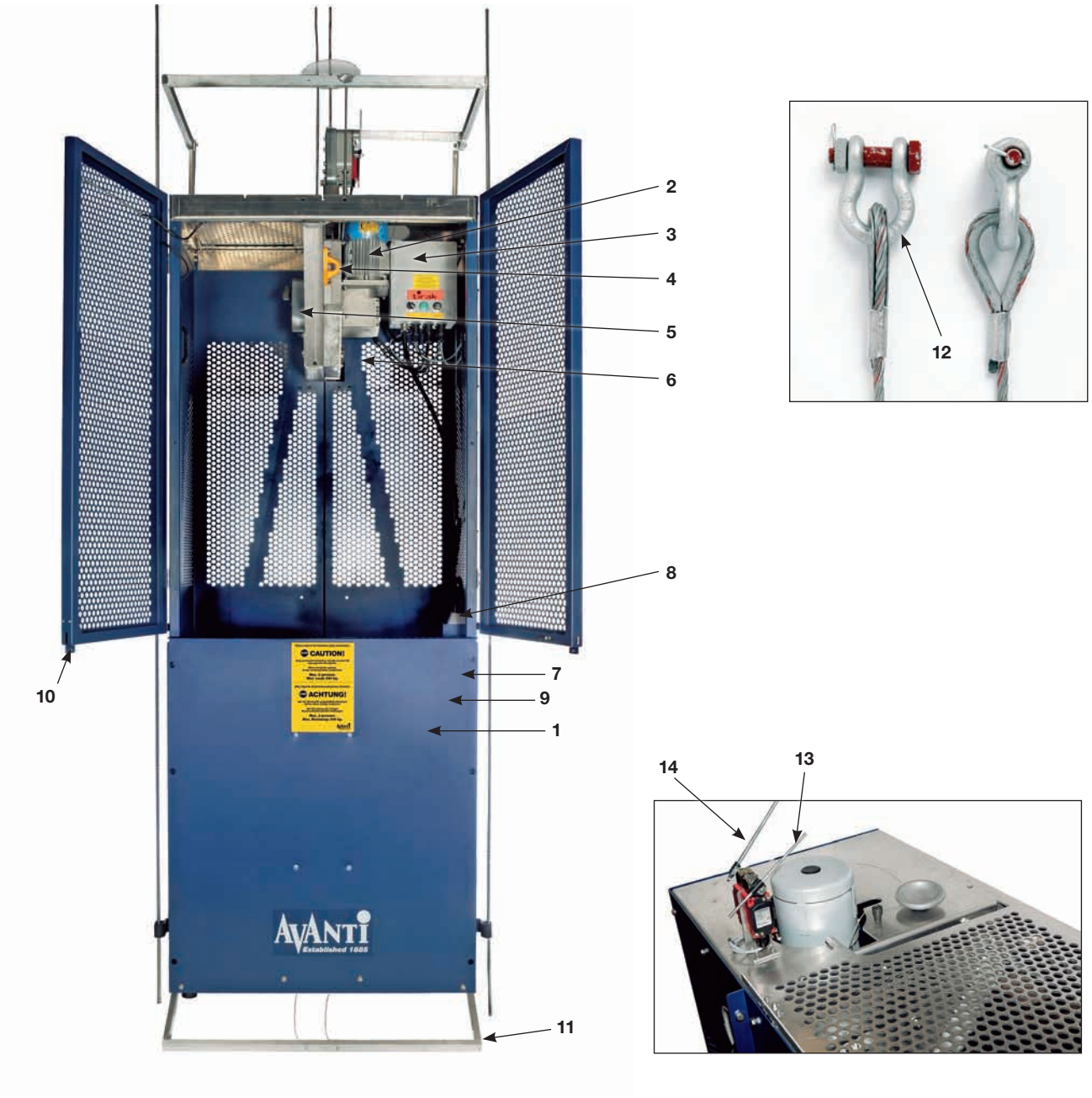
Fig. 1f SHARK M Roller door



1 Cabin
2 Roller door
3 Bottom safety stop

4.6.2 Cabin with fall arrest device, traction hoist, electrical control box and pendant control

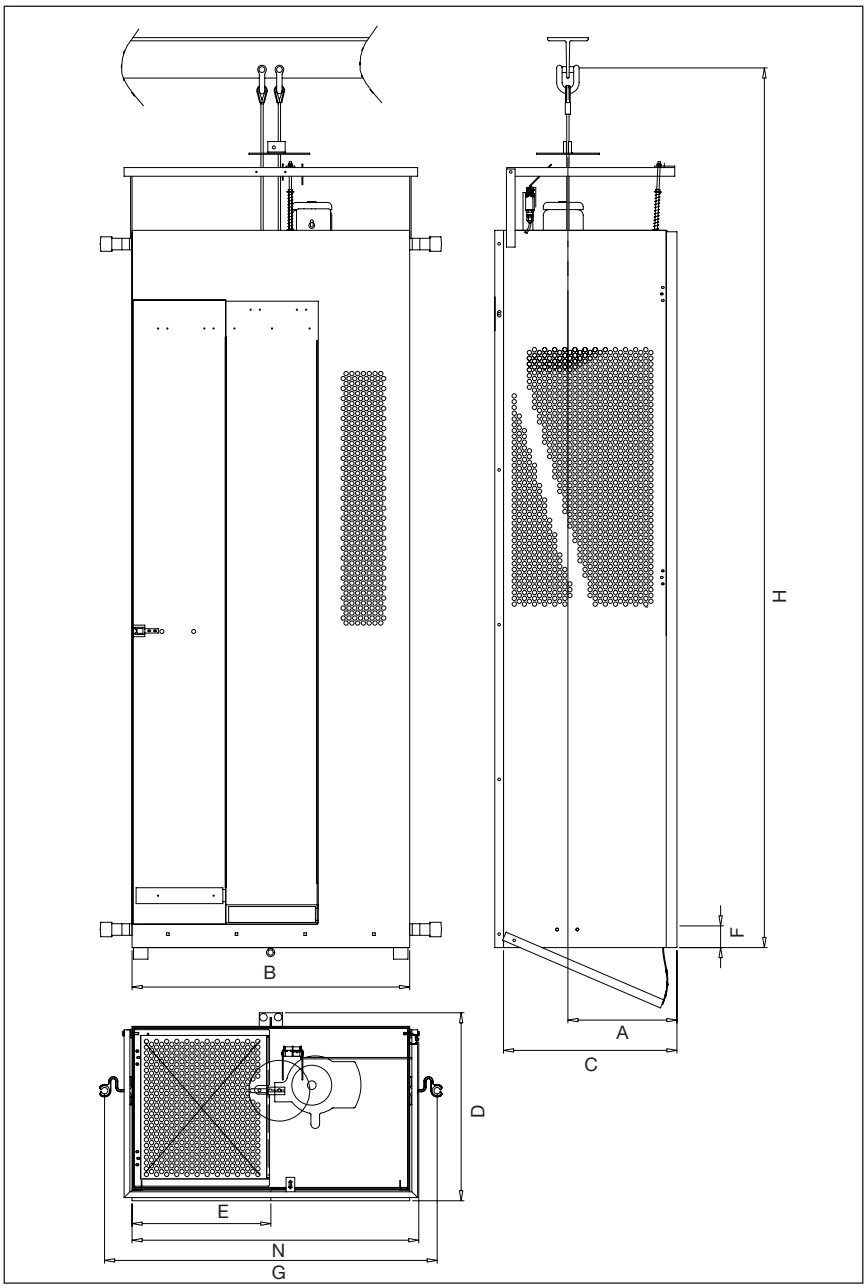
Fig. 2



1 Cabin
2 Traction hoist
3 Electrical control box
4 Anchor point
5 Fall arrest device
6 Cable connection (behind the lift)
7 EMERGENCY STOP button fixed (Inside cabin optional)
8 Pendant control
9 Override automatic operation switch (optional)
10 Door stop switch
11 Bottom safety stop
12 Shackle
13 EMERGENCY limit stop switch
14 Operation limit stop switch

4.6.3 Technical data for the service lift M, L and XL

Fig. 3a Dimensions, sliding door



Shark M lifting capacity:
- Motor X402P 240 kg
- Motor M500 240 kg
  (max 1 person)

Shark L lifting capacity:
- Motor X402P 240 kg
- Motor M500 240 kg
  (max 2 person)
- Motor L502P 320 kg
- Motor M500 320 kg
  (max 2 person)

Shark XL lifting capacity:
- Motor X402P 240 kg
- Motor M500 240 kg
  (max 2 person)
- Motor L502P 320 kg
- Motor M500 320 kg
  (max 3 person)

Weight of lift:
M: kg 90
L: kg 110
XL: kg 120

The weight of the power supply cable should be added to the weight of the lift (approx. 0.23 kg per m).

Standing height:
Under spine: 1980 mm
Under traction hoist: 2100 mm

Sliding door opening:
M: 500 mm
X - XL: 550 mm

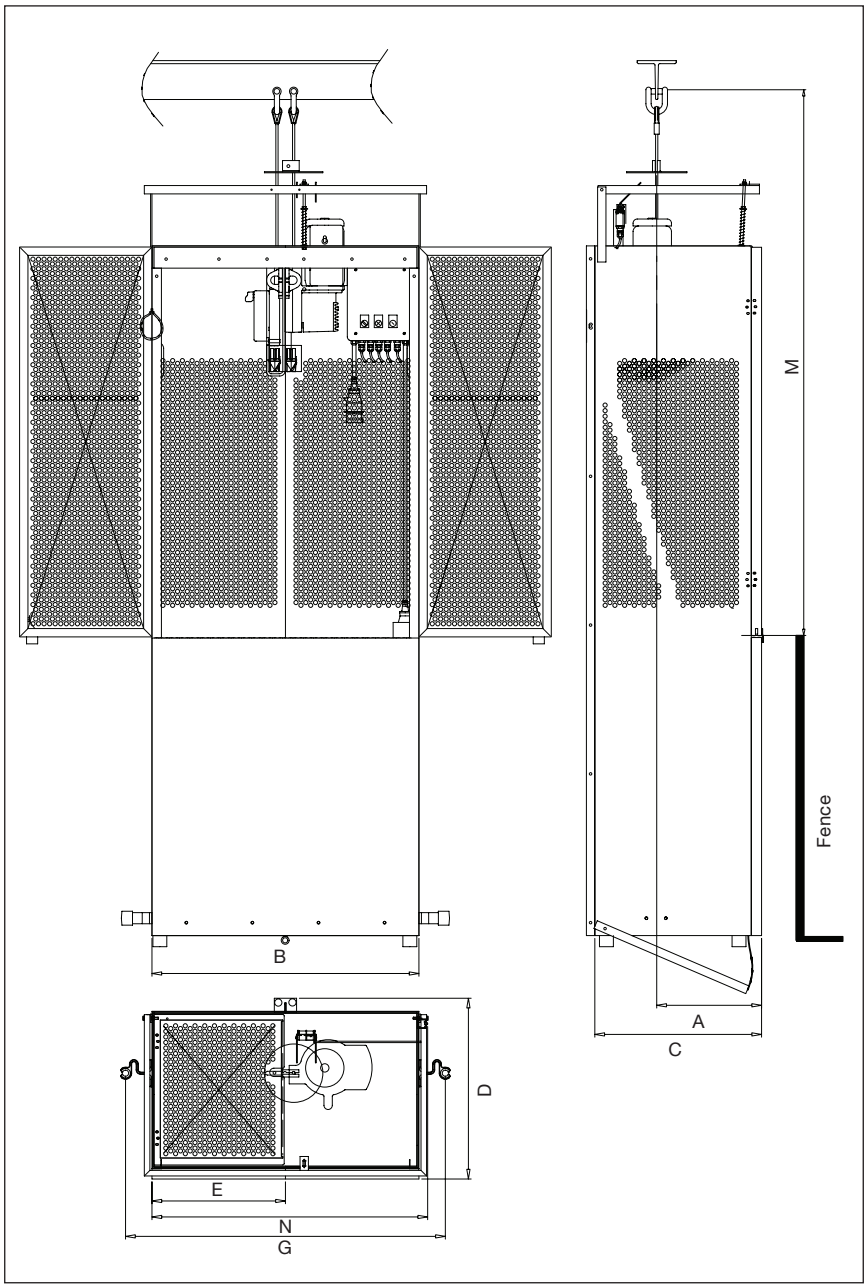
Noise level emitted: max. 75 dB(A).

Dimensions in mm:

Shark	A	B	C	D	E	F	G[1)]	N	H
M	380	600	600	650	400	75	790/660	630	3000
L	380	960	600	650	475	75	1150/1020	990	3000
XL	480	960	800	850	475	75	1150/1020	990	3000

1) Standard wire guide/narrow wire guide. (Details p. 52)

Fig. 3b Dimensions, double door



Lifting capacity:

- Motor X402P 240 kg
- Motor M500 240 kg **(max 2 persons)**
- Motor L502P 320 kg
- Motor M500 320 kg **(max 3 persons)**

Weight of lift:
L: kg 115
XL: kg 125

The weight of the power supply cable should be added to the weight of the lift (approx. 0.23 kg per m).

Standing height:
Under spine: 1980 mm
Under traction hoist: 2100 mm

Dimensions in mm:

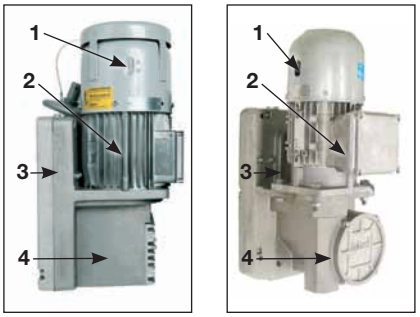
Shark	A	B	C	D	E	G[1)]	M	N
L	380	960	600	650	475	1150/1020	1900	990

1) Standard wire guide/narrow wire guide. (Details p. 52)

4.6.4 Drive system, fall arrest device and controls

Fig. 4 Traction hoist

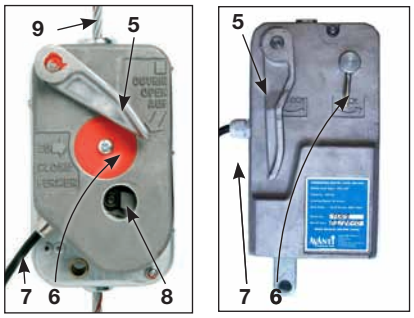
Tirak **M500**



1 Insertion point for brake lever
2 Motor
3 Wire traction w/overload protection
4 Drive system/ gearbox

Fig. 5 Fall arrest device

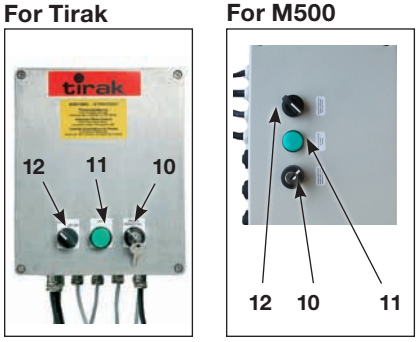
BSO **OSL500**



5 Control handle/ brake lever
6 Fall arrest device stop button
7 Connection cable
8 Window
9 Wire

Fig. 6 Electrical control box

For Tirak **For M500**



10 Overide bottom limit stop switch
11 Ready lamp
12 HAND/AUTOM

Fig. 7 a Pendant control

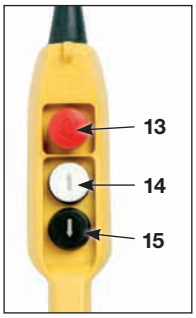


Fig. 7 b Remote control

13 EMERGENCY STOP button
14 UP
15 DOWN

Table 1. Traction hoist

Hoist	Lifting capacity	Wire speed	Effect	Rated current	Traction hoist wire Ø	Unit weight approx.	Measures/dimensions a	b	c
Traction hoist type	Kg	m/min	kW	A	mm	Kg	mm	mm	mm
X402P/400V	400	18	1.5	3.5	8.3	35	485	250	250
X402P/690V	400	18	1.5	2.0	8.3	35	485	250	250
L502P/400V	500	18	1.5	3.5	8.3	35	485	250	250
L502P/690V	500	18	1.5	2.0	8.3	35	485	250	250
M500/400V	500	18	1.5	4.5	8.3	39	447	244	279
M500/690V	500	18	1.5	3	8.3	39	447	244	279

Table 2. Fall arrest device

Fall arrest device	Lifting capacity	To max. wire speed	Traction hoist wire Ø	Unit weight approx.	Measures/dimensions a	b	c
Fall arrest type	kg	m/min	mm	kg	mm	mm	mm
BSO 504 E	400	18	8.3	4.7	214	121	131
BSO 1004 E [1)]	500	18	8.3	4.7	251	140	131
OSL500	500	18	8.3	7	269	176	101

[1)] Motor L502P must be installed with BSO 1004 E

Table 3. Drive wire, safety wire and guide wire

Wire type	Wire diameter	Surface treatment	Mark/ feature	Min. break resistance	Attached with	Anchoring	Tighten to
X402P / BSO504 E L502P / BSO1004 E	8mm, 4x26 or 5x19	galvanised	1 red string / cord	55 kN	2 t shackle, Form C	-	-
Guide Wire	12mm	galvanised	-	55 kN	Shackle,2t	Min. every 35m	2 to 4 kN
M500 / OSL500	8.3mm, 5x19	galvanised	none	51.5 kN	2 t shackle, Form C	-	-

4.7 Cabin safety devices

4.7.1 Electromagnetic motor brake

Electromagnetic spring-loaded brake which engages automatically
– on releasing the up/down push button and
– following a power failure.

4.7.2 EMERGENCY STOP

When the red EMERGENCY STOP (pendant control) switch is pushed in an emergency, all control is interrupted. After remedying the fault, control is reactivated by turning the switch clockwise, until it pops out again.

4.7.3 EMERGENCY STOP fixed (optional)

Only in service lifts with AUTOMATIC function installed. A backup switch to the pendant control EMERGENCY STOP switch is situated on one of the side panels inside the lift. For function, see above (Fig. 9).

4.7.4 Automatic operation switch

A switch situated inside the pendant control holder. It prevents the lift from being controlled from the inside when the control is in automatic mode.

4.7.5 Overload limiter

The overload limiter is built into the wire traction system and will prevent upward travel in the event of an overload. A warning signal (buzzer) is triggered 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 or
- The service lift encounters an obstacle during upward travel.

Operator intervention:
- Reduce the load to below the overload limit, or
- lower the lift until it is free of the obstacle and remove the obstacle before using the lift again.

4.7.6 Fall arrest device

Hoistable personal transportation means must be equipped with 2 fall arrest devices which will prevent the load from falling.

Fall arrest device Type BSO + OSL
The Fall arrest device BSO + OSL fall arrest devices are opened manually (Fig. 8).

The speed of the safety wire
passing through the device is continuously monitored, and the jaws automatically close in the event of sudden excessive speed.
This protects the lift from
a) Lifting wire breaks and
b) Hoist failures.

The fall arrest device can also be engaged manually in an emergency by pressing the Emergency stop button. The window is used to monitor the centrifugal force mechanism's function during operation. **For information on required intervention when the fall arrest device engages.**

Fig. 8
Fall arrest device
BSO **OSL500**

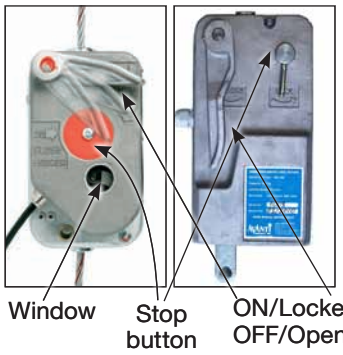


Fig. 9
Emergency stop and bottom stop switch

4.7.7 Drop down safety beam (Optional)

This device can be installed in sliding door lifts and it protects against accidental fall when the door is opened while working between platforms. The beam remains in closed position by means of a latch. The beam is opened by actuating on the latch and lifting up slightly the beam. (Fig. 9c)

See in 4.6.10.1 Guard locking switch how to open the sliding door between platforms.

Fig. 9a **Fig. 9b** **Fig. 9c**

4.7.8 Yellow flash (Optional)

An optional set of flashes can be mounted on the top and at the base of the lift. The flashes indicate when the lift is in movement (Fig 9a).

4.7.9 Emergency light (Optional)

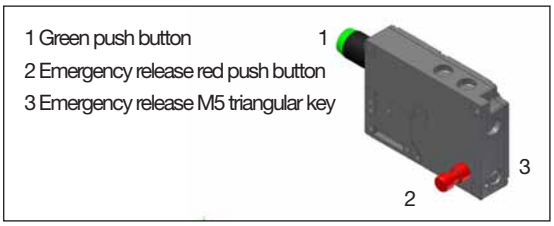
An emergency light can be installed to illuminate inside the lift with and without electric supply.
The operation modes can be selected

by means of a switch. (Fig .9b)

4.7.10 Door stop switch
4.7.10.1 Sliding door:
Sliding door is closed by pushing the actuator into the door guard locking switch. (Fig .15) The switch is unlocked by pushing the green button if the cabin is located at a height corresponding to a platform. In case of an emergency evacuation between platforms, the interlock is unlocked by pushing its emergency release red button from outside the cabin as well as using a M5 triangular key from inside the cabin.
4.7.10.2 Double door:
A switch (Fig. 12) will interrupt control if the door is not closed properly.
4.7.10.3 Half roller door:
A switch will interrupt control if the door is not closed properly.

4.7.11 Trapped-Key interlock system (Optional):
Control is interrupted by turning the trapped-key switch to OFF and then the key is able to be taken out. The key allows the user to open the platform fence doors. See the Trapped-Key Interlock System Manual for further information.

Fig. 15



4.7.12 Limit stop switch
4.7.12.1 Top limit stop switch
At the top of the cabin frame a top limit stop switch will stop upward travel when activated (Fig. 10). Downward travel will still be possible. A top stop disc which activates the top stop switch is installed below the lifting wire attachment. (Fig. 5 section 2 of the installation manual)

ATTENTION!
When the top limit stop switch is engaged, activate the DOWN switch until the top limit stop switch is released.

4.7.12.2 EMERGENCY top limit stop switch
Deactivates control if the top limit stop switch fails (Fig. 10). Manual downward travel is possible.

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

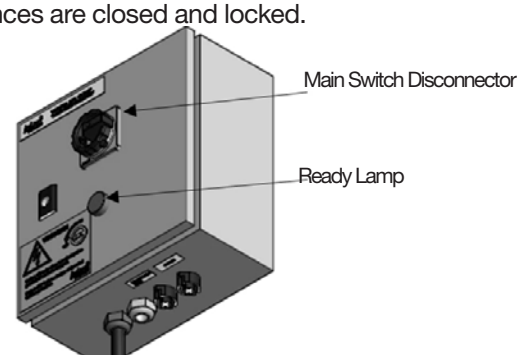
4.7.12.3 Bottom safety stop
The bottom safety stop switch (Fig. 11a or Fig. 11b which shows an optional configuration) stops downward travel if the service lift
encounters an obstacle or touches the ground. Upward travel will be possible, for instance to remove the obstacle. In order to put the service lift on the ground, the contact plate's operation can be bypassed with the key switch in the control box. If it is possible to enter underneath the service lift a double button safety stop must be installed.(See part 1 of the installation manual).
4.7.12.4 Top safety stop (Optional)
The top safety stop switch stops upward travel if the lift:
- Type 1: encounters an obstacle (fig. 13).
- Type 2: Besides, the switch works as top limit stop switch. A top stop end bar is installed bellow the guiding wire attachment and activates the top safety stop. In this case the top stop end bar replaces the top stop disc. (fig. 14)

Downward travel will be possible, for instance to remove the obstacle.

4.8 Safety devices for fences with door
Safety devices for fences include devices to prevent people to access to the service lift area unless the service lift was in a safety condition of accessibility. Besides, the device guarantees the service lift doesn't move any moment the protected fence doors were open. There are two types of safety devices for fences:

4.8.1 Guard Locking System
The Guard Locking System uses a system of security locking switches installed on the fences. Another position switch detects the right position of the service lift on the protected platform.

The service lift cannot operate until all the protected fences are closed and locked.



The fences remain closed and locked until the service lift is stopped and properly positioned on the platform, actuating the position switch of the platform. In this position, the guard locking can be unlocked while pressing the green light button.

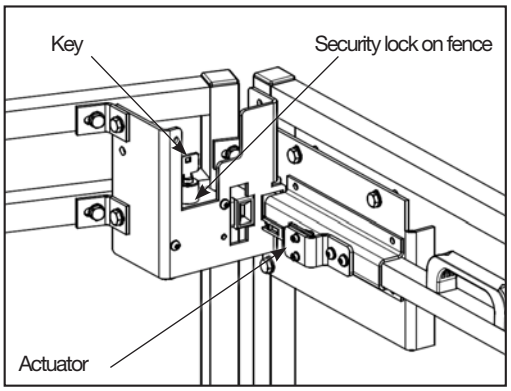
The interlock control box has a main switch. Turn the switch to the OFF position to cut the power to the service lift. The main switch must be set to OFF when the lift is not in use, when leaving the wind turbine and while the wind turbine is running. It must be set to OFF before starting an electrical generator.

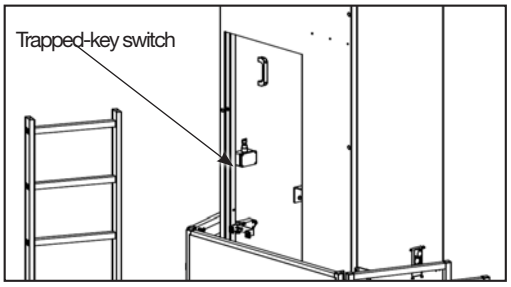
Consult the AVANTI Guard Locking System Manual for further information.

4.8.2 Trapped-key Interlock System

The Trapped-key Interlock System uses a system of security locks installed on the fences. These locks can be opened by using a key placed into the lift.
The key also activates the On/Off general switch placed into the service lift cabin. The key is linked to the lift by means of a wire rope, and can not be detached from it except using cutting tools.
The key cannot be taken out from the On/Off general switch in the lift, unless it is in Off position, and therefore, the lift is stopped. In the same way, the key cannot be taken out from the fence lock unless the fence door is closed, and the door actuator is put into the door lock.
The fences remain closed and locked until the service lift is stopped on the platform, and the key is transferred from the lift cabin to the fence lock.

Consult the AVANTI Trapped-key Interlock System Manual for further information.





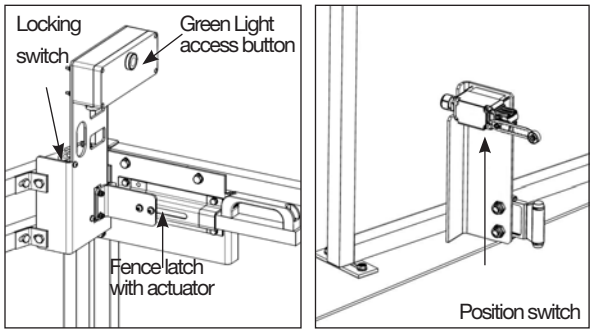


Fig. 10

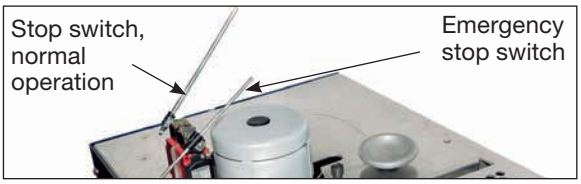


Fig. 11a

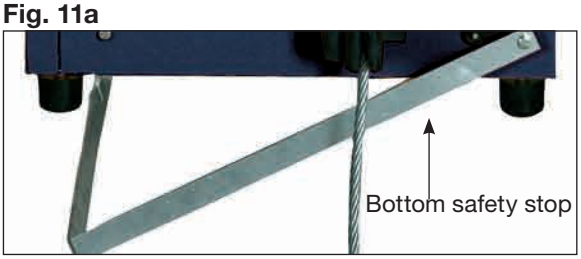


Fig. 11b

Fig. 12

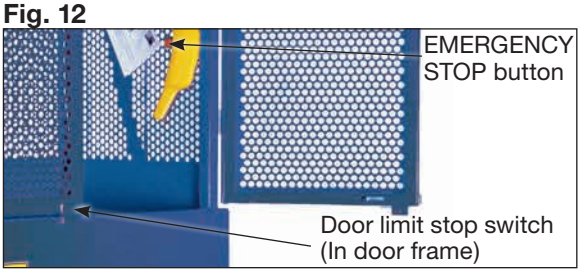
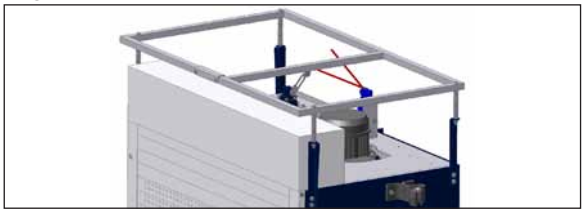


Fig. 13

Fig. 14



5. Daily inspection by the supervisor

If a safety device for fence doors is installed (see chapter 4.7 of the User's manual), every platform fence door must be closed to be able to drive the cabin.

5.1 Service lift

a) Before each operation, ensure that the traction hoist, the Fall arrest device and all auxiliary components (stoppers, wire guide wheels, etc.) are mounted in accordance with the specifications and without any noticeable defects.

b) Check whether the drive, and safety wires are fed correctly around the two wire guide wheels.

c) Wire ends (of 3 m or more in length) must be coiled separately at the floor and tied with strips in at least 3 places.

d) Check lifting capacity: (see the rating plate or section 4.5.3) – the extra load (persons and materials!) must not exceed the maximum rated lifting capacity.

5.2 Operating area

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

b) Ensure that all relevant and required protection measures below the cabin are in place. Such measures could include pent roofs or barriers to protect the staff from falling objects.

5.3 Control function

a) Close the doors. Press the EMERGENCY STOP button. The lift should remain still when the UP/ DOWN button is pressed. To restart, turn the EMERGENCY STOP button clockwise. If a FIXED EMERGENCY STOP button is installed (Fig. 9) test as above.

b) Test the top limit stop switch:
During upward travel, press the switch manually, and the service lift should stop immediately. Pressing the limit stop switch should enable the lift to travel down again.

c) Test the EMERGENCY top limit stop switch:
During upward travel, press the switch manually, and the service lift should stop immediately. Neither upward nor downward travel should now be possible.

d) Bottom safety stop. Lower the lift;
it should stop before the rubber feet of the cabin reach the tower ground level. When the "bypass switch" is activated, it should be possible to lower the lift all the way to the ground.

e) Door stop switch:
Open the door - it should not be possible to move the lift upwards or downwards.
Sliding door service lift: Move the cabin at a height no corresponding to a platform - it should not be possible to open the door. The door will be only able to be opened by pushing the emergency release red button from outside the cabin as well as using a M5 triangular key from inside the cabin.

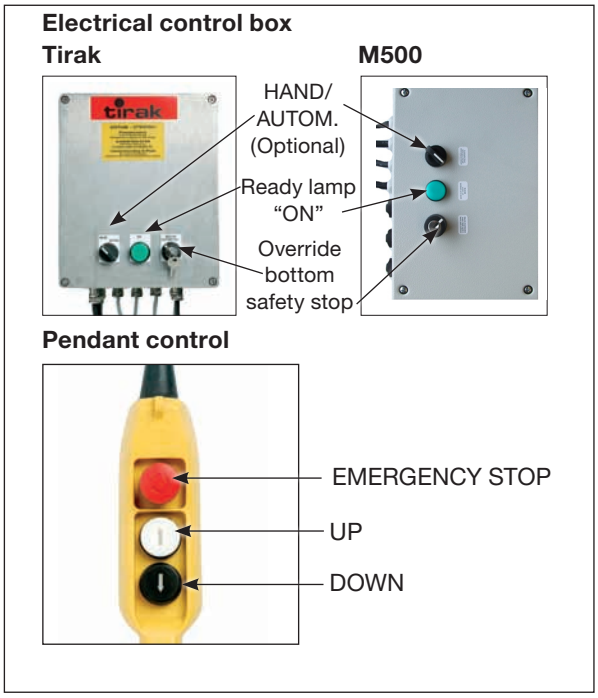
f) If the optional AUTOMATIC function is installed. Set the HAND/AUTOM. selector to AUTOM. When holding the handle, the lift should remain still when the UP or DOWN buttons are activated.

g) If the Trapped-Key interlock system is installed. Turn the trapped-key switch to OFF - it should be not possible to move the lift upwards or downwards. See the Trapped-Key Interlock System Manual for further information.

Warning! *If any faults occur during work,*
- stop working,
- if required secure the workplace and
- rectify the fault!

DANGER!
Make sure that nobody is exposed to danger below the service lift, for instance from falling parts. Suitable measures: Pent roof or barriers.

Fig. 13

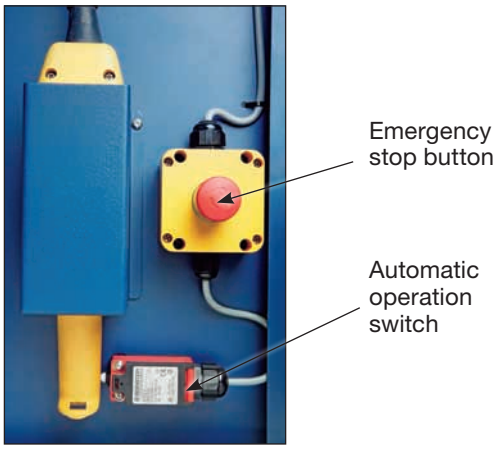


5.4 Automatic operation test

Perform this inspection only if the AUTOMATIC function is installed.

a) Press EMERGENCY STOP button on the pendant control. Turn the HAND/AUTOM. switch on the electrical control box to the right to activate automatic operation.
b) Deactivate the EMERGENCY STOP button by turning the button clockwise. (Check the EMERGENCY STOP button fixed is deactivated.) The service lift should stand still.
c) DO NOT try to activate the “automatic operation” switch.
d) If the trapped-Key interlock system is installed, turn the trapped-key switch to ON. With the doors closed, press the UP and DOWN buttons. Neither upward nor downward travel should be possible (Switch in pendant control holder blocks the operation).
e) Press the EMERGENCY STOP button on the pendant control.
f) Place the pendant control in its holder so it is operational from the outside.
g) Leave the cabin and close the door.
h) Deactivate the EMERGENCY STOP button. The service lift should stand still.
i) Press the UP button. The lift should travel upwards.
j) Press the EMERGENCY STOP button. The lift stops.
k) Turn the EMERGENCY STOP button clockwise and press the DOWN button. The service lift should travel downwards until the EMERGENCY STOP bottom stops the service lift.

Fig. 13b



l) Remove the pendant control from holder.
m) Return the HAND/AUTOM. button to HAND.
n) Check that the UP and DOWN buttons work again.

5.5 Remote operation test

Perform this inspection only if the remote control function is installed.

a) Set the electrical control box switch HAND/AUTOM to AUTOM (fig 7 a).
b) On top of the remote operation receiver switch the device on (fig 7 b).
c) Press the up arrow on the remote operation transmitter. The service lift should ascend.
d) Press the down arrow on the remote operation transmitter. The service lift should descend.
e) Once the test is complete, switch the remote operation function off.

5.6 Fall arrest device

a) Engage the **Fall arrest device** by pressing the fall arrest device stop button - the handle should jump to the “ON” position (Fig. 8 section 4.7).
b) Reopen the fall arrest device by pressing down on the lever – the lever must engage.
c) During operation, regularly monitor the centrifugal force regulator relay’s rotation by looking through the window.

5.7 Wires and suspension

a) During operation: Check the **lifting and safety wires** for free passage through hoist and fall arrest device.
b) When the lift is at the top landing, inspect the **wire attachment** and all the building sections that suspend the lift.

6. Operation - lift transport

If a safety device for fence doors is installed (see chapter 4.7 of the User's manual), every platform fence door must be closed to be able to operate the cabin. **Transportation of people in AUTOM. mode is forbidden.**

6.1 Entry and exit

To ensure safe entry and exit:

a) Lower the service lift onto the access platform until the contact plate 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.

b) Open the door and exit/enter the lift through the door/over the cabin railing.

6.2 Stop/EMERGENCY STOP

a) Release the UP/DOWN push button; the service lift should stop
If it does not:

b) Push the EMERGENCY STOP switch, and all controls should be disabled. Open the door and enter/exit the lift through the door/over the cabin railing.

6.3 Normal operation

a) Close the door

b) Turn the red EMERGENCY STOP switch on the pendant control clockwise and the switch should pop out. Do likewise with the EMERGENCY STOP fixed on the cabin (Fig. 9)

c) To go up or down, push and hold the UP or DOWN button . If the trapped-key interlock system is installed, the trapped-key switch should be ON in order to drive the lift.

d) To place the service lift on the floor after the bottom safety stop has stopped the lift.

-Turn the override bottom safety stop switch (fig. 6 section 4.6.4) clockwise and hold.
-Press the DOWN button until the service lift rests on the floor, then release.

6.4 Automatic operation

Only in service lifts with the AUTOMATIC function installed.
a) If the trapped-key interlock system is installed, the trapped-key switch should be ON in order to drive the lift.

b) Press the EMERGENCY STOP switch on the pendant control.

Turn the HAN/AUTOM switch on the power cabinet to activate the automatic operation.

c) Put the pendant control inside the holder. It should engage the automatic operation switch (fig.13b).
d)Close the door

e)Turn the EMERGENCY STOP switch on the pendant control clockwise and the switch should pop out.

f)Press the UP or DOWN button respectively and the cabin starts ascending/descending.

6.5 Remote operation

a) Set the electrical control box switch to AUTOM (fig.6).

b) On top of the remote operation receiver switch the device on (fig.7b).

c) For ascending press the up arrow on remote operation transmitter.

d) For descending press the down arrow on remote operation transmitter.

e) Once the operation is complete, switch the remote operation function off.

6.6 Overload limiter

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

DANGER!
Attempting to go up in an overloaded lift is prohibited!

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

WARNING!
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.
If the problem persists have an AVANTI expert adjust the overload limiter (Appendix A).

7. Manual operation (EMERGENCY)

If a power failure or an operation fault etc. interrupts the lift, a manual EMERGENCY descent is possible.

7.1 EMERGENCY descent

a) Open the manhole by pushing the lid in the roof and operate the lift from above.
b) On top of the lift insert the lever into the break lever hole in front of the traction hoist (Fig. 14 (1)).
c) Pull the lever upwards. The service lift moves downwards. The built-in centrifugal force brake limits the pace of descent.
d) To stop, simply loosen the leaver.
e) After use, replace the lever in roof hole.

For emergency situation only

Fig. 14a Tirak

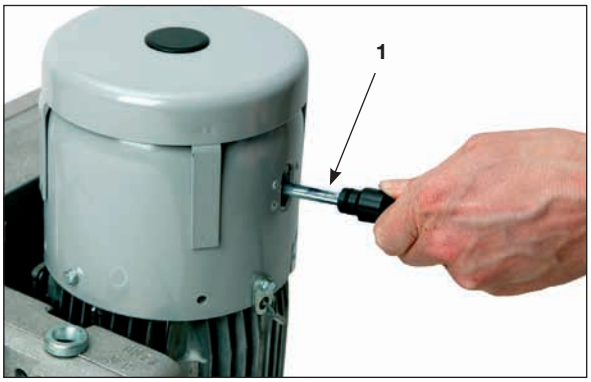


Fig. 14b M500

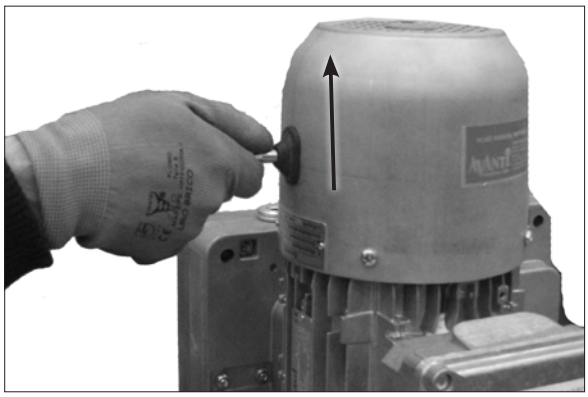
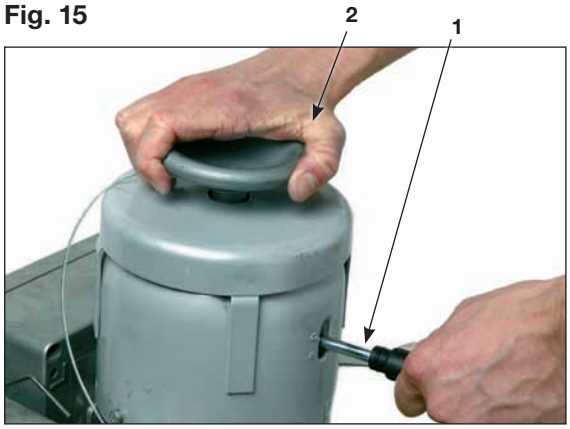


Fig. 15



7.2 Manual ascent for Tirak only

It is not possible for the M500 to manually ascend.

With the brake open, the service lift can be pulled upwards using the hand wheel (Fig. 15).

a) Remove the rubber cap.
b) Mount the hand wheel [2] on the motor shaft and turn it counter clockwise with the brake [1] open.
c) After use, retract the hand wheel and lever from the traction hoist and replace them in the roof holes. Replace the rubber cap.

8. What to do if the fall arrest device engages

If the fall arrest device engages simply disengage by pushing down the lever (Fig. 16A) until it click. However this is not possible if the service lift is hanging on the wire - if so, see below.

DANGER!
In the event of lift wire breaks or hoist fails, evacuate personnel from the service lift.

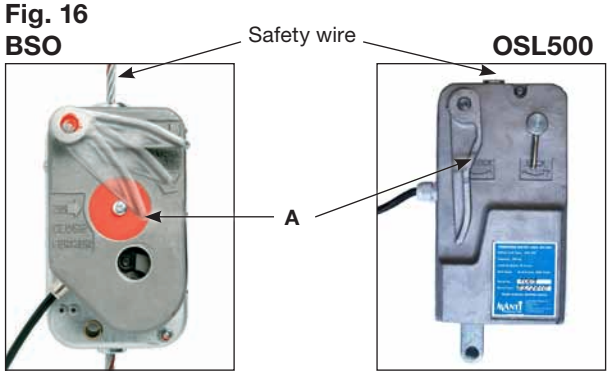
The safety wire suspension and the attachment between the fall arrest device and the service lift are exposed to dynamic loads when a fall is blocked.

If the **fall arrest device has locked** and the service lift is hanging on the wire, ascending is blocked. Do as follows:

a) Remove the load on the safety wire by taking the service lift upwards a few centimeters by pushing the UP button.
   – In the event of a power failure, evacuate the lift.

b) Manually open the fall arrest device by pressing down the leaver (Fig. 16A) until it disengage. On ground level perform test as specified in section 5. e) of the Installation Manual section and 5.6 of the User's Manual before resuming normal operation.

Fig. 16
BSO



ATTENTION!
When the service lift has returned to ground level, test the fall arrest device function

CAUTION!
Replace any defective fall arrest device components and return them for repair to the manufacturer.

CAUTION!
In case of no power and the fall arrest device is locked with the safety wire under tension evacuate the lift according to the evacuation procedure.

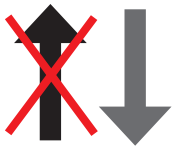
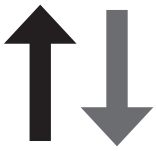
DANGER!
Avoid serious injuries:

9. Repair in the event of breakdown

1. All tests and repairs to the electronic components should be performed by an **authorised electrician only!** The power chart is placed in the traction hoist's power cabinet.

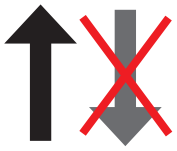
2. Repairs to the traction hoist, the fall arrest device and to the system's supporting components should be performed by **qualified fitters only!**

Breakdown	Cause	Solution
The service lift will **neither go up nor down!** 	**DANGER!** *Attempting to use the lift will jeopardize work safety*	
	A1 The fixed EMERGENCY STOP button has been activated.	Deactivate the button in question by turning it clockwise until it pops out.
	A2 Wire loop on traction hoist. Damaged or defective wire or wire outlet causes problems.	**Stop work immediately!** Ask the supplier or manufacturer for help.
	A3 The fall arrest device aligning device is holding the service lift on the safety wire. a) Lift wire breakage b) Hoist failure	a) + b) Evacuate the service lift and follow the directions in section 8
	A4 The service lift is stuck on an obstacle.	Carefully remove the obstacle. Test the operational safety of affected building sections. Inform the supervisor.
DANGER! *Unplug the power supply before opening the power cabinet.*	**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 switch clockwise until it is released b) Find the cause and wait for the power to return c)Test and if necessary repair the supply cable, guide wires, fuses, and/or wiring from the control box
	A6 Limit stop switch functions a) EMERGENCY limit stop switch was pressed. **b) Door limit stop switch blocks** or is defective.	a) Manually take the lift down until the limit stop switch is released. b) Close the doors and test the limit stop 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 on/off) a) Supply, braking coil or rectifier defective. b) Braking rotor closes.	a) Have an electrician test, repair/replace the supply, braking coil and rectifier. b) Return traction hoist for repair.

Breakdown	Cause	Solution
The service lift will **neither go up nor down** 	**A8 The HAND/AUTOM.** switch is on AUTOM.	Turn the HAND/AUTOM. switch back to HAND.
	A9 The Trapped-key Interlock System for fences is installed. The Cabin switch of the system is in Off position.	Turn On the trapped-key switch. Consult the AVANTI Trapped-key Interlock System Manual for further information.
	A10 The Guard Locking System for fences is installed. The general On/Off switch of the Guard Locking System Control Box at the bottom platform is Off.	Turn On the general On/Off switch of the Guard Locking System Control Box at the bottom platform. Consult the AVANTI Guard Locking System Manual for further information.
	A11 The Guard Locking System for fences is installed. At least one of the protected fences is open.	Close all the protected fence doors. Consult the AVANTI Guard Locking System Manual for further information.
Service lift goes **down but not up** 	 **DANGER!** *Irresponsible behaviour jeopardizes system safety!* **B1 The service lift is stuck on an obstacle.**	Carefully move the service lift downwards and remove the obstacle. **Test the operational safety of affected platform components. Inform the supervisor.**
	B2 Overload - Buzzer sounds in the connection cabinet.	Test and possibly reduce load until buzzer stops.
	B3 Limit stop UP: a) Limit stop defective or not connected. b) Operation limit stop was **activated.**	a) Test the limit stop connection/function. Replace if necessary. b) Move lift down until the limit stop switch is released.
	B4 A phase is missing	Test fuses and power supply.
	B5 Fault in UP control circuit in control box or traction hoist	Test and possibly repair connections, wiring and relays.
Motor hums loudly or wire ropes squeak,  but the lift can go both up and down.	**C1 Overheating**	For descriptions of individual causes and how to rectify faults
	C2 Wire ropes dirty **WARNING!** *Further use of lift may result in damage to the wire traction.*	If possible, immediately replace the traction hoist and return it for test/repair at AVANTI.

DANGER!

Unplug the power supply before opening the power cabinet.

Breakdown	Cause	Solution
Service lift will **go up but not down!** 	**DANGER!** *Irresponsible behaviour jeopardizes system safety!*	
	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. 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. Open the fall arrest device by pressing the handle, and test its function! **Functional test when the lift is back on the ground: Replace the hoist and fall arrest device and return them for testing.**
	DANGER! *A defective fall arrest device will threaten the safety of the service lift! Replace immediately!*	
	D3 Fault in down controller circuit on traction hoist	Pull the lever upwards. The service lift moves downwards. (See details in section 7) Test, and if necessary have connections, wiring, and relays repaired. 
Green lamp not lit although operation is normal	**E The lamp is defective**	Have an electrician replace the bulb.
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 two phases in the plug

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.

10. Out of service

a) **Securing the service lift:**
Bring the service lift all the way down, until the contact plate switch stops the cabin.

b) **Disconnect the lift to prevent inadvertent operation:**
Mark the lift “OUT OF SERVICE” and padlock as necessary.
Contact the service technician for repair.

11. Removing wires for replacement

CAUTION!
Wear protective gloves when handling wires.

11.1 Parking the service lift

Lower the lift until bottom safety stop engages.

11.2 Wire ends

Beneath the access platform:
a) Loosen and uncoil all coiled and secured wire ends.
b) Remove the weight and the tightening spring.

11.3 Removing the lifting wire

a) Turn the “override bottom limit stop switch” key to the right and push the DOWN button until the cabin rests on the platform.
b) After having removed the drive wire counter weight turn the DOWN button. The wire now exits the traction hoist at the top.
c) From above the traction hoist remove the wire by hand.

11.4 Removing the safety wire

a) Keep the fall arrest device open and manually pull out the wire.
b) Pull out the wire on top of the lift.

12. Maintenance

Time (Performance)	Component
Daily: (Supervisor)	**Attachment components traction hoist Control box Fall arrest device**
Annually: (Expert)	**Wires Electrical cable**
Annually: (Expert)	**Entire system**
Annually, however at least every 250 hours of operation: (Expert)	**Traction hoist Fall arrest device**

12.1 Yearly inspection

Have the entire system, especially the traction hoist and the fall arrest device tested by an AVANTI trained expert at least once annually however more frequently if required depending on use and the conditions of use and operation.
The traction hoist and fall arrest device must be overhauled at an authorised workshop and furnished with new certificate for every 250 hours of operation. (Time counter is found in the power cabinet (Fig. 20 section 12.1.5).

ATTENTION!
If fall arrest device has engaged, an expert must verify the safety of the fall arrest device, the wire, and wire attachment.

The tower owner must ensure that the results of all annual and extraordinary testing are logged (Appendix B).

12.1.1 Traction hoist

The traction hoist is largely maintenance free. Clean only when very dirty. During cleaning always ensure sufficient air supply.

Annual test:
a) Ensure that no visual defects have appeared.
b) Test emergency descent function
(See Users's Manual section 7.1)

12.1.2 Fall arrest device

The fall arrest device is largely maintenance free. Clean only when very dirty. Keep free from dirt and lubricate often (See table 4, section 12.1). Using too much oil will not harm the equipment or the gripping function.

Annual test:
a) Test the fall arrest device stop button.
b) Test the fall arrest device stop button reset.
c) Release safety wire bottom attachment in tower and Perform wire acceleration test by hand.

12.1.3 Service lift

Annual test:
Inspect the service lift as specified in section 5 of the User Manual.

12.1.4 Suspension/Wires/Cables

Always keep the wires clean and slightly greasy. Use ordinary universal lubricating grease, however, do **not** use bisulphide-containing lubricants like Molycote®.

Annual test:
a) Check and replace the respective wire(s) if one of the following defects are found:
- **8 wire strand breaks** or more on a wire length corresponding to 30 times the wire diameter (Fig. 17).
- Severe **corrosion** on the surface or inside.
- **Heat damage,** evident by the wire colour.
- **Reduction of the wire diameter** by 5% or more compare to the nominal wire diameter (Fig. 18)
- **Damage on the wire surface** – See fig. 19 for most common examples of wire damage.

These examples do not, however, replace the relevant provisions laid down by **ISO 4309!**

b) Check and ensure all wires are mounted at the top and ground level in accordance with the mounting instructions (See Installation Manual section 2.1, 2.3, and 2.6).

c) Power cables
Check and replace the supply and control cables if the cable jacket or cable connections are damaged.

d) Wire guide wheels
Ensure wires are led round the guide wheels in accordance with the fitting instructions (See Installation Manual section 2.5).

Fig. 17
Wire strand breaks

Fig. 18 Wire diameter

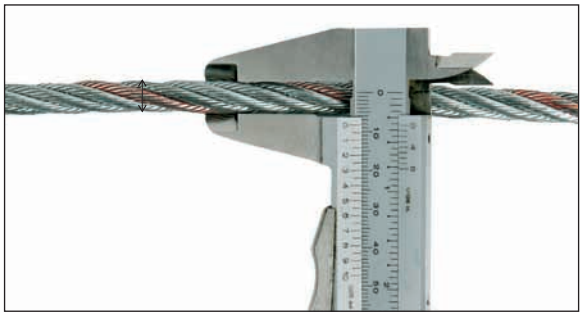
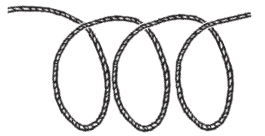


Fig. 19



Wire strap/loop, which cannot be unwound

Loop knot forming when a wire loop is pulled tight

Bends resulting from inappropriate treatment (e.g. securing the load with the wire)

Damage resulting from crushing, squeezing, running over, etc.

Wire bags

Loop formation

Table 4

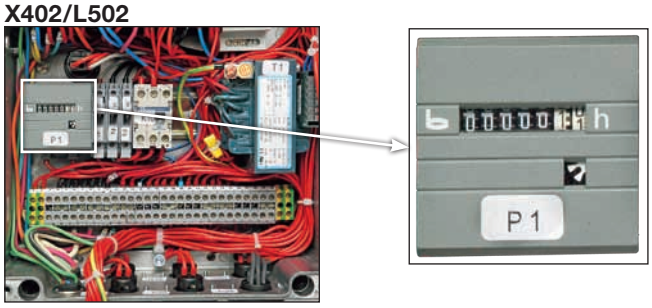
Temperature range	-15°C to 80°C	-35°C to 40°C
API specification	Synthetic oil	
	CLPPG or	CLPPG or
	PGLP ISO VG 460[1)]	PGLP ISO VG 100
Oil specification	Klübersynth GH6 460	Klübersynth GH6 100
[1)] Standard filling	Use of other synthetic oil only with approval by AVANTI.	

12.1.5 Overload limiter/information signs

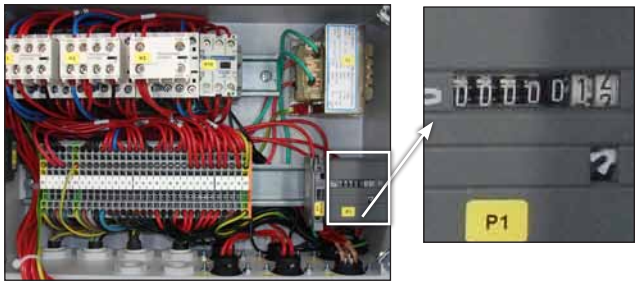
Annual test:
Test switches as specified in section 5.3 and 5.4 of the User's Manual.
Perform overload test as specified in the Installation Guide.
Verify completeness and legibility of all rating plates and information signs. Replace missing or illegible plates and signs!

Fig. 20

X402/L502



M500



12.2 Repairs

Repairs to traction hoist equipment may ONLY be performed by the manufacturer or a hoist service centre, and only using original spare parts.

If the gearbox oil needs to be replaced, use one of the lubricants specified in the following table, corresponding to the temperature range in which the traction hoist equipment is used.
Amount required:
traction hoist X402P: 1.4 l.
traction hoist L502P: 1.4 l.
traction hoist M500: 1.4 l.
See table 4.

13. Ordering spare parts

13.1 Wire/ropes

In addition to the item number and name of the spare part, always state the traction hoist type, wire diameter and production number!

13.2 Motor and brake

In addition to the item number and name of the spare part, always state the motor type and the type and coil voltage of the brake!

13.3 Electric control

When ordering spare parts or making requests, always state the electricity category and wiring chart number. See the rating plate on the connection cabinet. There is a wiring chart in the connection cabinet and in the motor terminal box.

13.4 Fall arrest device

In addition to the item number and name of the spare part, always state the fall arrest device type, the wire diameter and lift serial no.

A spare parts list is available from the supplier or directly from AVANTI.

13.5 Rating plate/information signs

Verify the completeness and legibility of all rating plates/information signs (see Fig. 21). Replace missing or illegible plates/signs!

Rating plate on the service lift Spine

Information signs

Operating instructions inside the lift

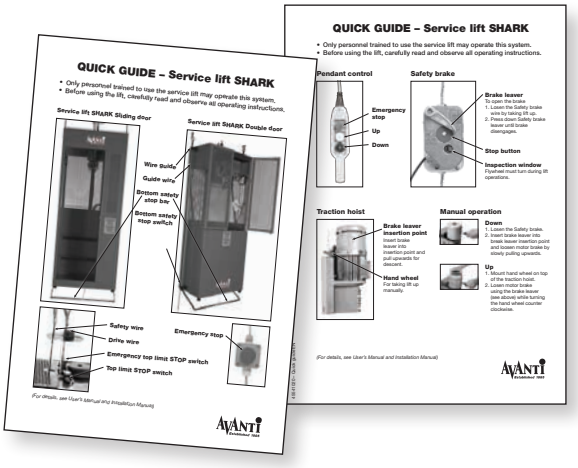


Fig. 21

14. Transport and storage

Depending on agreed transport and storage conditions with customer, the following methods are standard ways for the transport of the cabin with the installation accessories:

- Land transport: Rear support over pallet.
  Non stackable.

- Sea transport: Package using wooden box and plastic shrink on a pallet.
  Non stackable.

Installation Manual

Please familiarise yourself with these instructions and the User Manual (Model SHARK) before installing the service lift. Ensure that all specified parts are present before commencing installation.

No warranty is provided against damage and injury resulting from not following this "User's Manual and Installation Manual" i.e. reconstruction or modification of equipment or use of non-original parts which are not approved by the manufacturer.

1. Assembling the SHARK cabin

Assemble the SHARK service lift close to its final place of installation. Assemble both versions, sliding doors and double doors, as follows:

Installation holes have been pre-drilled. Bolts, nuts etc can be found in the plastic bags supplied.

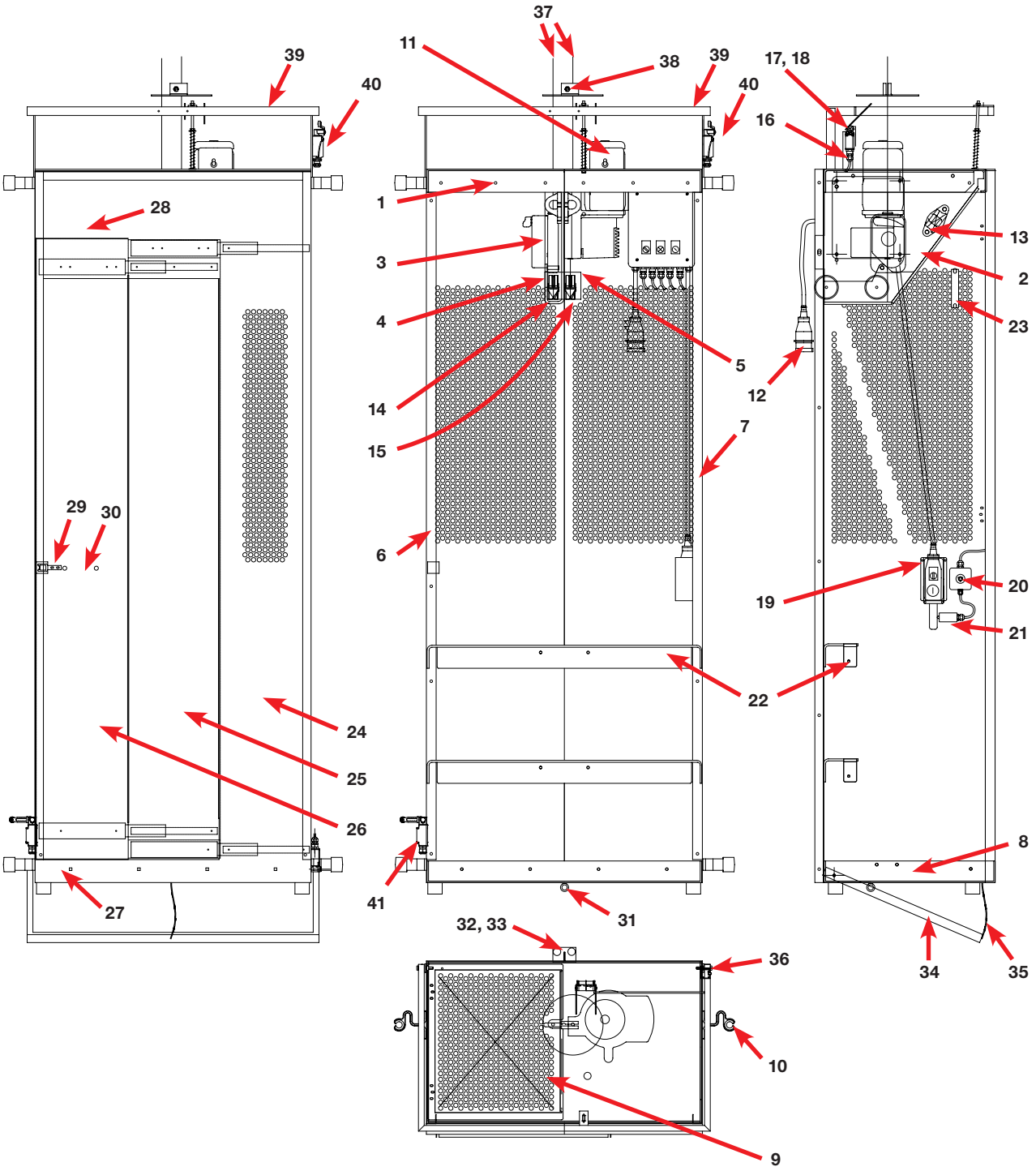
1. Assemble the right, left and bottoms sections with the cabin resting on its back.
2. Mount the roof spine and then slide the roof into position and fit to the cabin.
3. Fit the wire guides.
4. Mount the traction hoist and fall arrest device to the spine.
5. Attach the cabin front.
6. Mount the 4 bottom rubber feet to the bottom of the cabin.
7. Mount the operation limit stop switch and emergency limit stop switch on the roof using the contact bracket.
8. Attach the bottom safety stop beam including the wires that hold the bottom safety stop beam.
9. Bring the cabin to its upright position.
10. Mount the doors on the cabin. On the Double door version - remember to install the ground wire at the top hinge.
11. Mount the steps and handle inside the cabin.
12. Feed the power cable through the rear hole and fit the socket to the back using the strips.
13. Mount the bottom safety stop switch and adjust. Connect the switch cables to the power cabinet according to the colour code. All wires are secured using strips (max 200mm between strips).

All bolts and nuts are stainless steel.

DANGER!
If it is possible to enter underneath the service lift a double button safety stop must be fitted.

1.1 Part list - Shark L/XL Sliding door

Fig. 1



1.1 Part list - Shark L/XL Sliding door

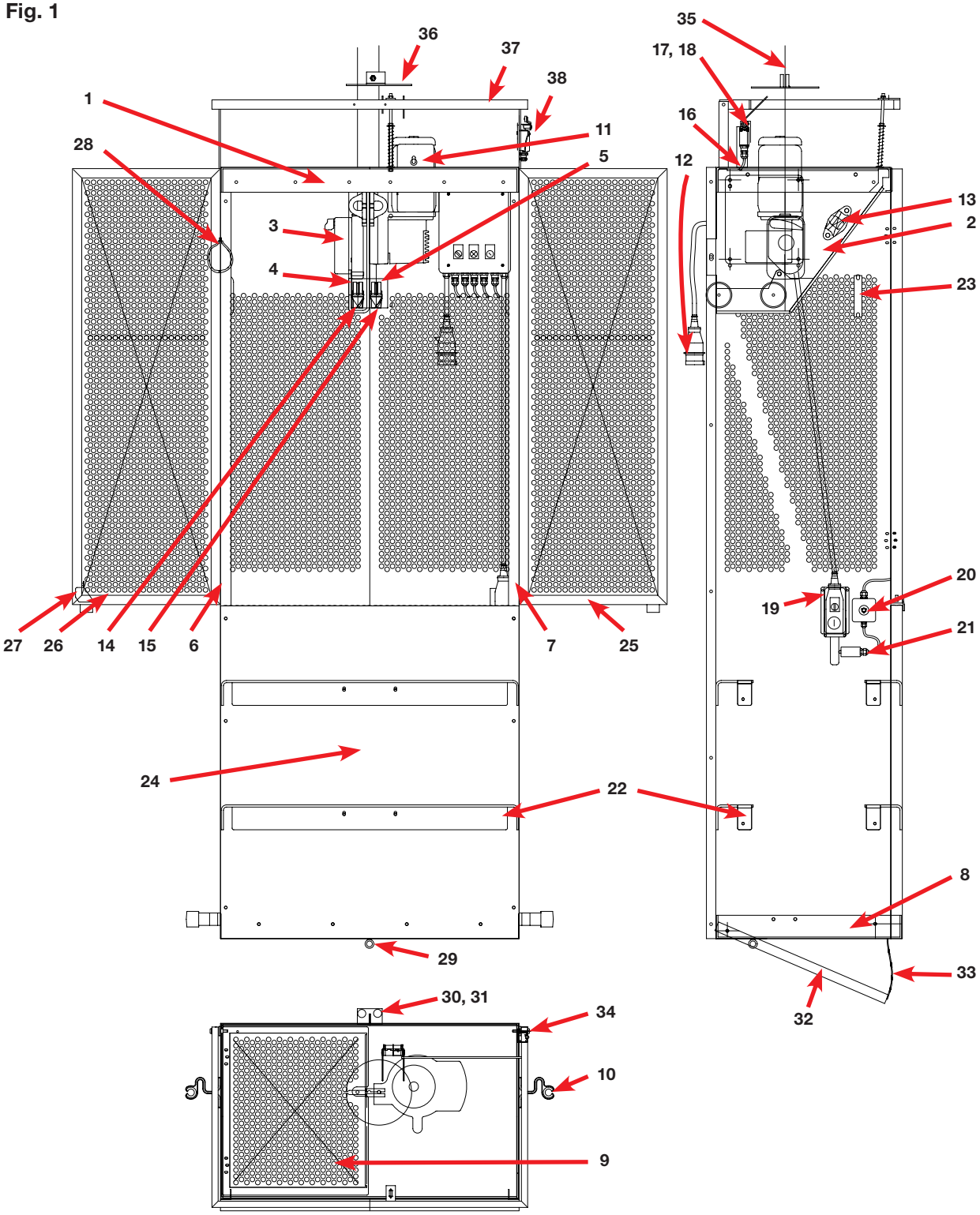
Pos.	Item no.	Part description	Qty	Reference
6	45303105 / 45303180	Cabin, right: Shark L / Shark XL	1	
7	45303106 / 45303181	Cabin, left: Shark L / Shark XL	1	
8	45303111 / 45303178	Bottom: Shark L / Shark XL	1	
9	45303117	Hatch (Shark)	1	
10	45511002	Wire guide	4	Install. fig. 14
12	45502004/45502045	Plug 690V/Plug 400V	1	
13	45512004/47870006	Anchor point, yellow/Spine Anchor	2	
16	45303119	Bracket for top switches	1	
17	45502035	Top stop swich (S1)	1	Manual fig. 10
18	45502036	Emergency top stop switch (S13)	1	Manual fig. 10
19	45303118	Pendant control holder (Shark)	1	Manual fig. 13b
20	45502038	Emergency stop box	1	Manual fig. 13b
21		Automatic operation switch		
22	45303116	Step (Shark)	3	
23	45512009	Handle for cabin, black	2	
24	45303113	Front for Shark sliding door	1	
25	45303114	Center door for Shark L w/slide	1	
26	45303115	Right door for Shark L w/slide		
27	45303125	Guide 1 for sliding door, Shark L, bottom	1	
28	45303126	Guide 2 for sliding door, Shark L, top	1	
29	45502217/45502218	Sliding door limit stop switch, left/right	1	
41	45502219	Platform position switch	1	
30	45303421	Sliding door handle - Interlock	1	
31	79999562	Eye nut, M8, FZV	1	
32	45303123	Angle for wirebush	1	
33	45512006	Guide for wirebush	2	
34	45303128	Bottom stop bar (Shark)	1	
35	45512064	Wire Ø2.3mm, coated	0.62	
36	45502031	Bottom limit stop switch	1	
37		Safety wire / Drive wire ø8	2	
		Guide wire Ø12mm	2	
	45512005	Shackle, 2 tonnes	2	Manual fig. 13
	45303100	Tripod	2	Install. fig. 8a
	45512060	Threaded rod, M16, FZV, L=330mm	2	Install. fig. 8a
	45515001	Push spring for safety wire	1	Install. fig. 12
	45512011	Counterweight 11 kg for drive wire	1	Install. fig. 12
	45512001	Cable bucket	1	
		Rubber cable 4G1.5/5G1.5/5G2.5	1	
		Connector 690V/Connector 400V	1	
	45512003	Cable suspension	1	Install. Fig 9
	45512056	Snap hook, Galv. L=70mm	1	Install. Fig 9
	45511001	Wire fix	10	Install. fig. 14
	45512010	Bracket for wire fix 70	10	Install. fig. 14

1.1 Part list - Shark L/XL Sliding door

Pos	Part no.	Part description	Qty	Reference
38	45303101	Top stop disc	1	Manual fig. 2
	45541020	Quick-guide, English	1	Manual fig. 21
	45541022	Quick-guide, Spanish	1	
	45541031	Label lift EN/ES 240 kg	1	Manual fig. 21
	45541007	Wall label UK/DE	1	
	45541025	Warning sign - hook on to anchor point	1	
	45541027	Serial number plate Shark lift	1	Manual fig. 21
	45512023	Counterweight 31 kg	1	
	45541009	Label lift EN/ES 320 kg	1	
	Driving system X402P/L502P-BSO504E/BSO1004E			
1	45303112 / 45303175	Top: Shark L / Shark XL	1	
2	45303107 / 45303177	Spine: Shark L / Shark XL	1	
3		fall arrest device BSO 504E/BSO 1004E.	1	
4	45303121 / 45303176	Guard small for Spine: Shark L / Shark XL	1	
5	45303120 / 45303179	Guard large for Spine: Shark L / Shark XL	1	
11		Traction hoist, X402P/L502P	1	
14	45570001	Roller 1 for spine (Shark)	2	
15	45547002	Roller 2 for spine (Shark)	2	
	Driving system M500-OSL500			
2	45303397	Spine M500 Shark L	1	
1	45303398	Top M500 Shark L	1	
11	45408001	M500 690V CE	1	
	35412013	Rollers Assy M500 Shark L	1	
	45303400	Cover spine M500 Shark L	1	
3	45108043	OSL500	1	
	45303401	Bracket OSL500 Shark L	1	
	45303402	Support OSL500 Shark L	1	
	Optional			
	45511006	Click on wire fix		
	45511007	Click on wire guide		
	35499287	Roller wire guide	4	Manual fig. 14
	45502142	Remote control transmitter	1	Manual fig. 9
	45502140	Remote control receiver	1	Manual fig. 9
	45502001/55020011	Safety light top	1	
	45502002	Safety light bottom	1	
	35499074/35499075	Drop down safety beam Standard/Reverse	1	
	35499010 / 35499021	Double button stop: Shark L / Shark XL	1	
39	35499012/35499022	Top safety stop: Shark L/XL	1	
40	45512174	Top safety stop Switch	1	
	45502146	Emergency light	1	

1.2 Part list - Shark L/XL Double door

Fig. 1



1.2 Part list - Shark L/XL Double door

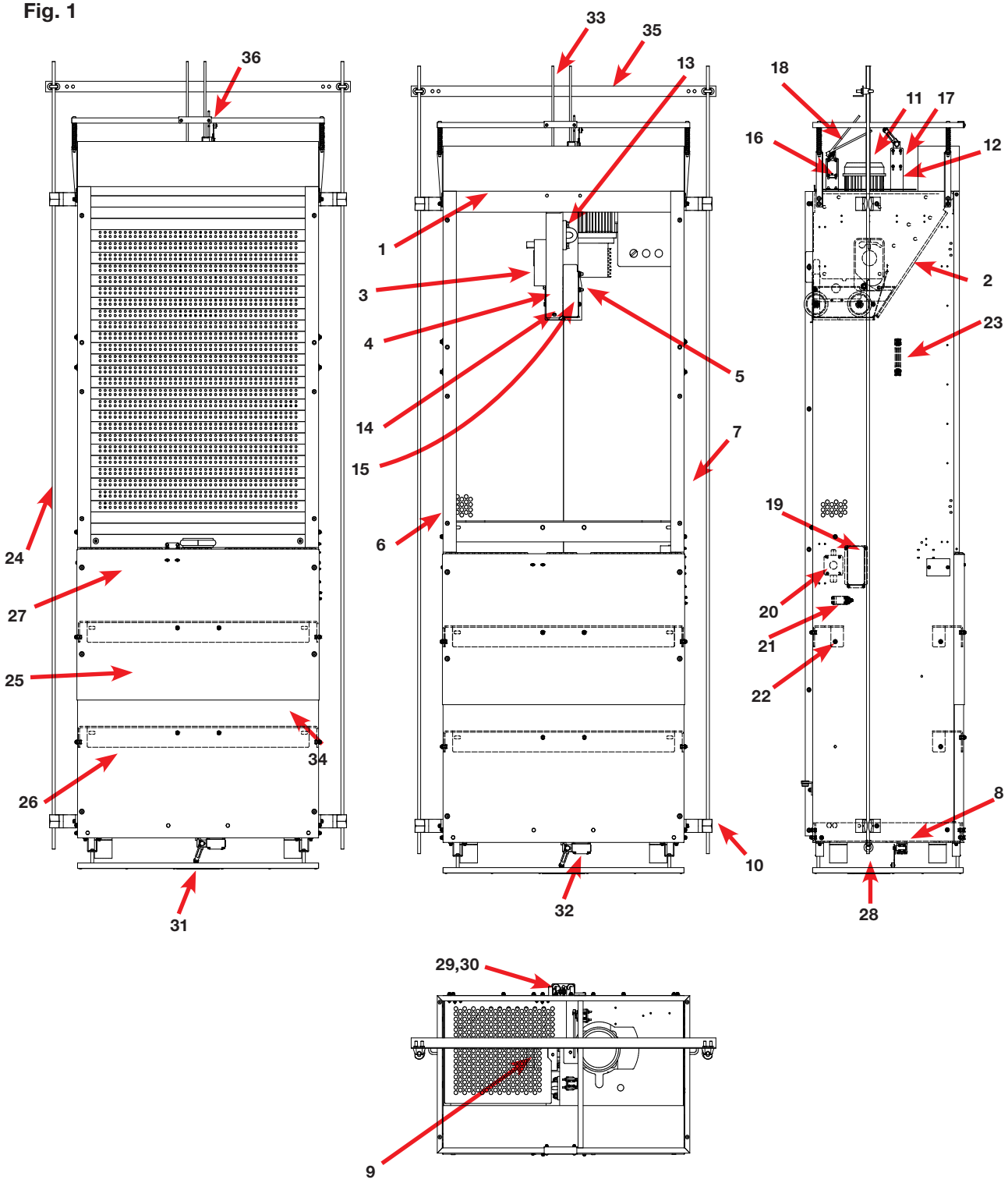
Pos	Part no.	Part description	Qty	Reference
6	45303105 / 45303180	Cabin, right: Shark L / Shark XL	1	
7	45303106 / 45303181	Cabin, left: Shark L / Shark XL	1	
8	45303111 / 45303178	Bottom: Shark L / Shark XL	1	
9	45303117	Hatch (Shark)	1	
10	45511002	Wire guide	4	Install. fig. 14
12	45502004/45502045	Plug 690V/Plug 400V	1	
13	45512004/47870006	Anchor point, yellow/Spine Anchor	1	
16	45303119	Bracket for top switches	1	
17	45502035	Top stop swich (S1)	1	Manual fig. 10
18	45502036	Emergency top stop switch (S13)	1	Manual fig. 10
19	45303118	Pendant control holder (Shark)	1	Manual fig. 13b
20	45502038	Emergency stop BOX	1	Manual fig. 13b
21		Automatic operation switch	1	
22	45303116	Step (Shark)	4	
23	45512009	Handle for cabin, black	2	
24	45303108	Front for Shark double door	1	
25	45303109	Double door right	1	
26	45303110	Double door left	1	
27	45502033	Double door limit stop switch	1	
28	45502007	Cable 1,5Q Flex yellow/green	0.55	
29	79999562	Eye nut, M8, FZV	1	
30	45303123	Angle for wirebush	1	
31	45512006	Guide for wirebush	2	
	45512023	Counterweight 31 kg		
	45541009	Label lift EN/ES 320 kg		
32	45303128	Bottom stop bar, (Shark)	1	
33	45512064	Wire Ø2.3mm, coated	0.62	
34	45502031	Bottom limit stop swich	1	
35		Safety wire / Drive wire ø8	2	
		Guide wire Ø12mm	2	
	45512005	Shackle, 2 tonnes	2	Manual fig. 13
	45303100	Tripod	2	Install. fig. 8a
	45512060	Threaded rod, M16, FZV, L=330mm	2	Install. fig. 8a
	45515001	Push spring for safety wire	1	Install. fig. 12
	45512011	Counterweight 11 kg for drive wire	1	Install. fig. 12
	45512001	Cable bucket	1	
		Rubber cable 4G1.5/5G1.5/5G2.5	1	
		Connector 690V/Connector 400V	1	
	45512003	Cable suspension	1	Install. fig 9
	45512056	Snap hook, Galv. L=70mm	1	Install. fig 9
	45511001	Wire fix	10	Install. fig. 14

1.2 Part list - Shark L/XL Double door

Pos	Part no.	Part description	Qty	Reference
	45512010	Bracket for wire fix 70	10	Install. fig. 14
36	45303101	Top stop disc	1	Manual fig. 2
	45541020	Quick-guide, English	1	Manual fig. 21
	45541022	Quick-guide, Spanish	1	
	45541031	Label lift EN/ES 240 kg	1	Manual fig. 21
	45541007	Wall label UK/DE	1	Manual fig. 21
	45541027	Serial number plate Shark lift	1	Manual fig. 21
	Driving system X402P/L502P-BSO504E/BSO1004E			
1	45303112 / 45303175	Top: Shark L / Shark XL	1	
2	45303107 / 45303177	Spine: Shark L / Shark XL	2	
3		fall arrest device BSO 504E/BSO 1004E.	3	
4	45303121 / 45303176	Guard small for Spine: Shark L / Shark XL	4	
5	45303120 / 45303179	Guard large for Spine: Shark L / Shark XL	5	
11		Traction hoist, X402P/L502P	11	
14	45570001	Roller 1 for spine (Shark)	14	
15	45547002	Roller 2 for spine (Shark)	15	
	Driving system M500-OSL500			
2	45303397	Spine M500 Shark L	2	
1	45303398	Top M500 Shark L	1	
11	45408001	M500 690V CE	11	
	35412013	Rollers Assy M500 Shark L		
	45303400	Cover spine M500 Shark L		
3	45108043	OSL500	3	
	45303401	Bracket OSL500 Shark L		
	45303402	Support OSL500 Shark L		
	Optional			
	45511006	Click on wire fix		
	45511007	Click on wire guide		
	35499287	Roller wire guide	4	Manual fig. 14
	45502142	Remote control transmitter	1	Manual fig. 9
	45502140	Remote control receiver	1	Manual fig. 9
	45502001	Safety light top	2	
	45502002	Safety light bottom	2	
	35499011	Safety bar for sliding door	1	
	35499010 / 35499021	Double button stop: Shark L / Shark XL		
37	35499012/35499022	Top safety stop premounted	1	
38	45512174	Top safety stop Switch	1	
	45502146	Emergency light	1	

1.3 Part list - Shark L/XL Half Roller door

Fig. 1



1.3 Part list - Shark L/XL Half Roller door

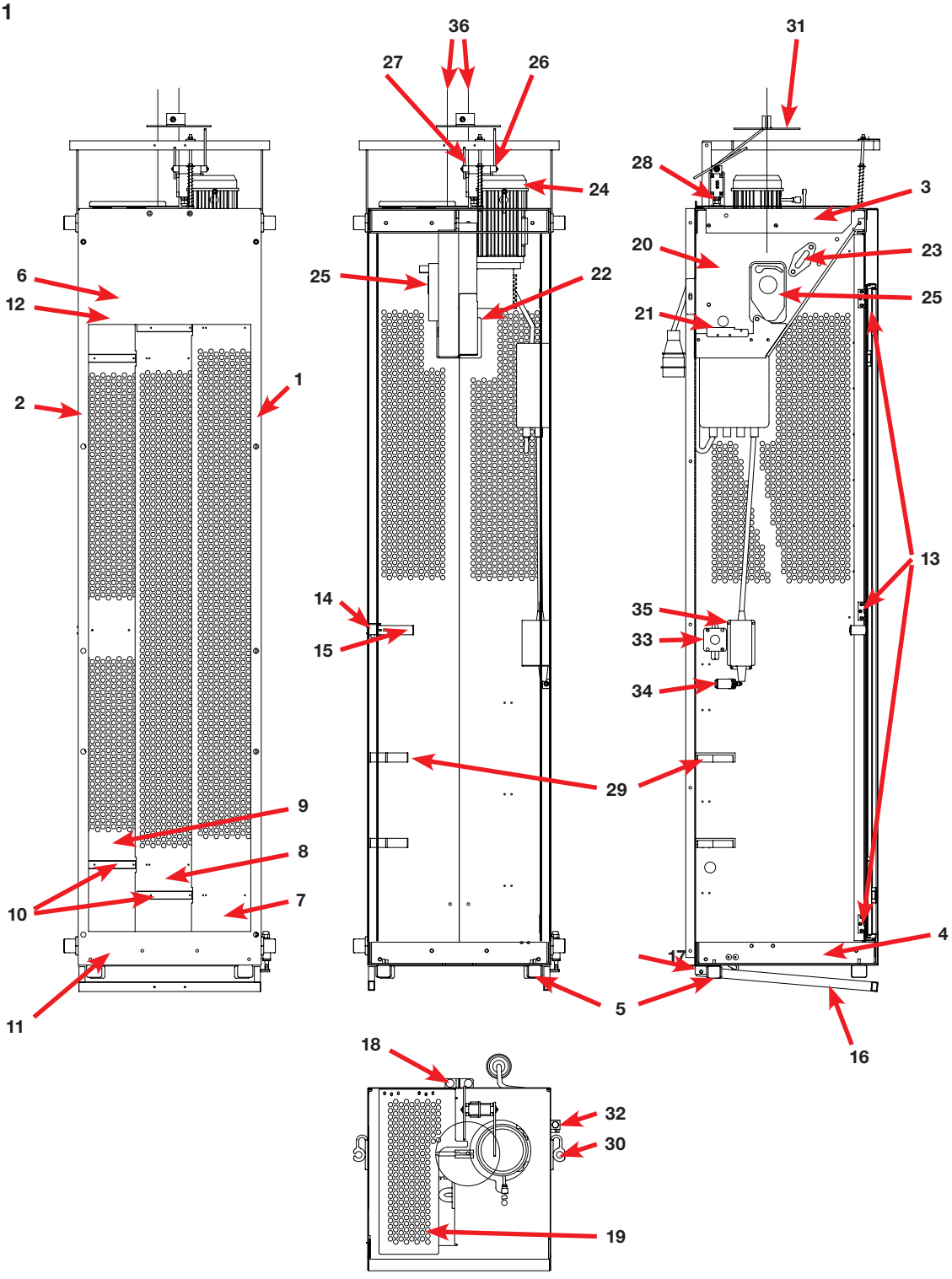
Pos	Part no.	Part description	Qty	Reference
6	45303105 / 45303180	Cabin, right: Shark L / Shark XL	1	
7	45303106 / 45303181	Cabin, left: Shark L / Shark XL	1	
8	45303111 / 45303178	Bottom: Shark L / Shark XL	1	
9	45303321	Hatch for half roller door	1	
10	45511002	Wire guide	4	Install. fig. 14
	45502004/45502045	Plug 690V/Plug 400V	1	
12	45303369	Top stop switch bracket	1	
13	45512004/47870006	Anchor point, yellow/Spine Anchor	1	
16	45303119	Bracket for top switches	1	
17	45502194	Top stop swich (S1)	1	
18	45502036	Emergency top stop switch (S13)	1	Manual fig. 10
19	45303118	Pendant control holder (Shark)	1	Manual fig. 13b
20	45502038	Emergency stop BOX	1	Manual fig. 13b
21		Automatic operation switch	1	
22	45303116	Step (Shark)	4	
23	45512009	Handle for cabin, black	2	
24	35499272	Set half roller door	1	
25	45303156	Front fence top	1	
26	45303157	Front fence bottom	1	
27	45502150	Switch for half roller door	1	
28	79999562	Eye nut, M8, FZV	1	
29	45303123	Angle for wirebush	1	
30	45512006	Guide for wirebush	2	
31	35499294/35499317	Bottom stop full cover Shark L/Shark XL	1	
32	45502170	Bottom limit stop switch	1	
33		Safety wire / Drive wire ø8	2	
34		Guide wire Ø12mm	2	
	45512023	Counterweight 31 kg		
	45541009	Label lift EN/ES 320 kg		
	45512005	Shackle, 2 tonnes	2	Manual fig. 13
	45303100	Tripod	2	Install. fig. 8a
	45512060	Threaded rod, M16, FZV, L=330mm	2	Install. fig. 8a
	45515001	Push spring for safety wire	1	Install. fig. 12
	45512011	Counterweight 11 kg for drive wire	1	Install. fig. 12
	45512001	Cable bucket	1	
		Rubber cable 4G1.5/5G1.5/5G2.5	1	
		Connector 690V/Connector 400V	1	

1.3 Part list - Shark L/XL Half Roller door

Pos	Part no.	Part description	Qty	Reference
	45512003	Cable suspension	1	Install. fig 9
	45512056	Snap hook, Galv. L=70mm	1	Install. fig 9
	45511001	Wire fix	10	Install. fig. 14
	45512010	Bracket for wire fix 70	10	Install. fig. 14
	45541020	Quick-guide, English	1	Manual fig. 21
	45541022	Quick-guide, Spanish	1	
	45541031	Label lift EN/ES 240 kg	1	Manual fig. 21
	45541007	Wall label UK/DE	1	Manual fig. 21
	45541027	Serial number plate Shark lift	1	Manual fig. 21
	Driving system X402P/L502P-BSO504E/BSO1004E			
1	45303112 / 45303175	Top: Shark L / Shark XL	1	
2	45303107 / 45303177	Spine: Shark L / Shark XL	2	
3		fall arrest device BSO 504E/BSO 1004E.	3	
4	45303121 / 45303176	Guard small for Spine: Shark L / Shark XL	4	
5	45303120 / 45303179	Guard large for Spine: Shark L / Shark XL	5	
11		Traction hoist, X402P/L502P	11	
14	45570001	Roller 1 for spine (Shark)	14	
15	45547002	Roller 2 for spine (Shark)	15	
	Driving system M500-OSL500			
2	45303397	Spine M500 Shark L	2	
1	45303398	Top M500 Shark L	1	
11	45408001	M500 690V CE	11	
	35412013	Rollers Assy M500 Shark L		
	45303400	Cover spine M500 Shark L		
3	45108043	OSL500	3	
	45303401	Bracket OSL500 Shark L		
	45303402	Support OSL500 Shark L		
	Optional			
	45511006	Click on wire fix		
	45511007	Click on wire guide		
	45502142	Remote control transmitter	1	Manual fig. 9
	45502140	Remote control receiver	1	Manual fig. 9
	45502001	Safety light top	2	
	45502002	Safety light bottom	2	
	35499011	Safety bar for sliding door	1	
	35499010 / 35499021	Double button stop: Shark L / Shark XL		
	35499287	Roller wire guide		Manual fig. 14
35	35499296	Top limit stop for top floating stop Shark L/XL	1	
36	35499295/35499318	Top floating stop premounted Shark L/Shark XL	1	

1.4 Parts list - SHARK M

Fig. 1



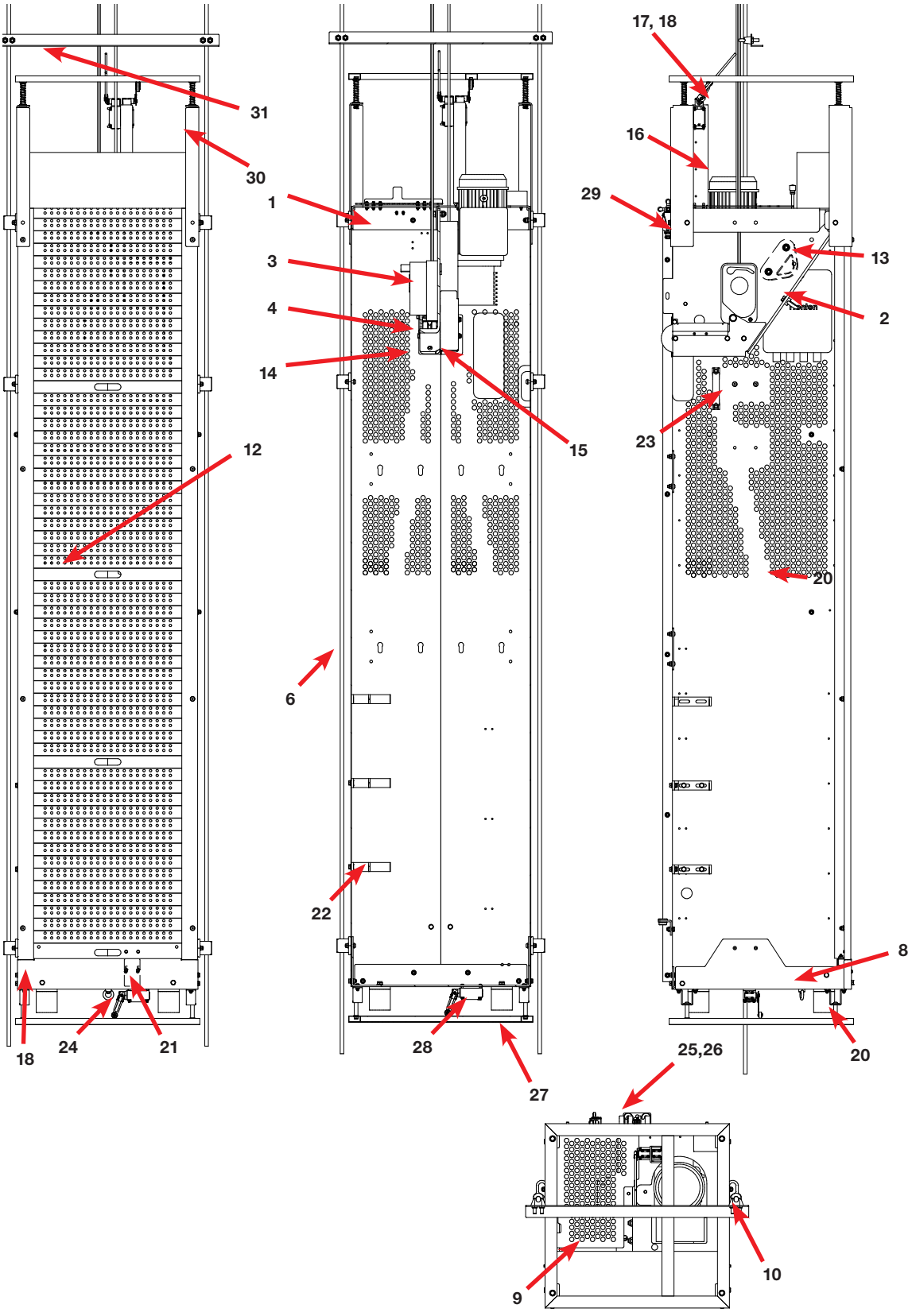
1.4 Parts list - SHARK M

Pos.	Item no.	Part description	Qty	Reference
1	45303300	Cabin right (Shark M)	1	
2	45303301	Cabin left (Shark M)	1	
3	45303312	Top (Shark M)	1	
4	45303306	Bottom (Shark M)	1	
5	45512007	Landing rubber feet	4	
6	45303305	Sliding door fixture (Shark M)	1	
7	45303302	Sliding door w. hinge (SharkM)	1	
8	45303303	Sliding door middle (Shark M)	1	
9	45303304	Sliding door extreme (Shark M)	1	
10	45303314	Slide for Sliding door	4	
11	45303307	Bottom door guide (Shark M)	1	
12	45303308	Top door guide (Shark M)	1	
13	45512008	Hinge for double door	3	
14	45502037	Sliding door limit stop swich, Shark L,S19.3,3500mm	1	
15	45303124	Sliding door handle,Shark L	1	
16	45303310	Bottom stop (Shark M)	1	
17	45303311	Bottom stop holder(Shark M)	1	
18	45512006	Guide bush for pulling wire	2	
19	45303057	Hatch for Shark M	1	
20	45303107	Spine for Shark L	1	
21	45303121	Small cover for spine, Shark L	1	
22	45303120	Large cover for spine, Shark L	1	
23	45512004/47870006	Anchor point, yellow/Spine Anchor	1	
24		Traction hoist, X402 / M500	1	
25		fall arrest device BSO504E / OSL 500	1	
26	45502040	Top stop switch, Shark M,(S1)	1	
27	45502041	Emergency top stop switch, Shark M,(S13)	1	
28	45303119	Bracket for limit stop switch	1	
29	45303005	Step for Shark L	2	
30	45511003	Wire guide, low	4	

1.4 Parts list - SHARK M

Pos.	Item no.	Part description	Qty	Reference
31	45303101	Top stop disc	1	
32	45502034	Bottom limit stop switch Shark L,1S2,3000mm	1	
33	45502038	Emergency stop box	1	
34		“automatic operation” switch	1	
35	45303118	Cover for pendant control	1	
36		Motor/safety wire Ø8mm	2	
		Guide wire Ø12mm,78m	2	
	45502004	Female connector 690V	2	
	45502026	Insulated terminal 1,5Q, black	1	
	45512001	Cable collect bin	1	
		Rubber cable 4G1,5 78m 3 phases + ground 690V	1	
	45541019	Quick guide multiple language	1	
	45512060	Threaded rod,M16x330mm FZV	2	
	45515001	Safety wire push spring	1	
	45303100	Tripod	2	
	45512005	Shackle 2T	4	
	45512011	Motor wire contra weight,11kg	1	
	45540005	CE conformaty declaration	1	
	45541020	Quick guide UK	1	
	45541022	Quick guide ES	1	
	45541008	Wall label UK/ES	1	
	45541025	Label Use Fall Protection	1	
	Optional			
	45511006	Click on wire fix		
	45511007	Click on wire guide		
	45502142	Remote control transmitter	1	Manual fig. 9
	45502140	Remote control receiver	1	Manual fig. 9
	45502001	Safety light top	2	
	45502002	Safety light bottom	2	
	35499010	Double button stop		

1.5 Parts list - SHARK M roller door



1.5 Parts list - SHARK M roller door

Pos	Part no.	Part description	Qty	Reference
1	45303326	Top Shark M roller door	1	
2	45303107	Spine	1	
3		fall arrest device BSO 504E/BSO 1004E/ OSL500. 1	1	
4	45303121	Guard small for Spine (Shark)	1	
5	45303120	Guard large for Spine (Shark)	1	
6	45303331	Cabin right Shark M GE	1	
7	45303332	Cabin left Shark M GE	1	
8	45303327	Bottom Shark M roller door	1	
9	45303325	Top hatch Shark M roller door	1	
10	45511002 / 45511003	Wire guide long / Wire guide narrow	4	Install. fig. 14
11		Traction hoist, X402P/L502P/M500 1	1	
12	45512188	Roller door (Shark M)	1	
13	47870006	Spine Anchor	1	
14	45570001	Roller 1 for spine (Shark)	2	
15	45547002	Roller 2 for spine (Shark)	2	
16	45303340	Top stop switch bracket roller door	1	
17	45502165	Top stop switch S1	1	
18	45502166	Top limit switch S13	1	Manual fig. 10
19	45303333	Door switch bottom protection	1	Manual fig. 13b
20	45512183	Landing rubber feet 70x70	1	Manual fig. 13b
21	45502162	Roller door switch	1	
22	45303005	Step	4	
23	45512009	Handle for cabin, black	2	
24	79999562	Eye nut, M8, FZV 1	1	
25	45303123	Angle for wirebush 1	1	
26	45512006	Guide for wirebush 2	1	
27	35499281	Bottom safety stop premounted Shark M	1	
28	45502164	Bottom limit switch S2	1	
29	45502163	Hatch switch	1	
38	45303101	Top stop disc		

1.5 Parts list - SHARK M roller door

Pos	Part no.	Part description	Qty	Reference
		Safety wire / Drive wire ø8		
		Guide wire Ø12mm		
	45512005	Shackle, 2 tonnes		
	45303100	Tripod		
	45512060	Threaded rod, M16, FZV, L=330mm		
	45515001	Push spring for safety wire		
	45512011	Contra weight 11 kg for drive wire		
	45512001	Cable bucket		
		Rubber cable 4G1.5 /5G1.5		
		Connector 690V/Connector 400V		
	45512003	Cable suspension		
	45512056	Snap hook, Galv. L=70mm		
	45511001	Wire fix		
	45541020	Quick-guide, English		
	45541022	Quick-guide, Spanish		
	45541031	Label lift EN		
	45541007	Wall label UK/DE		
	45541025	Warning sign - hook on to anchor point		
	45541027	Serial number plate Shark lift		
	Optional			
	45511006	Click on wire fix		
	45511007	Click on wire guide		
	45502142	Remote control transmitter		
	45502140	Remote control receiver		
	45502001	Safety light top		
	45502002	Safety light bottom		
	45502146	Lift emergency light		
30	35499280	Top safety stop premoun. Shark M		
31	35499285	Top stop end Shark M		

2. Fitting the wires

2.1 Tower top

Wire lengths depend on the tower height and should be specified when ordering. The coils are marked with their length; check for accuracy prior to mounting. Do not pull wire over any edges. Uncoil correctly (Fig. 5a).

Warning!
Do not pull wire over edges.

Important!
Place all wire coils on the top platform when tower is raised or use the tower mounting crane to place the wires on the top platform before nacelle is mounted. (It may also be possible to use the internal tower crane to hoist wires).

1) Mount the Ø12 mm guide wire and the Ø8 mm drive and safety wires using the shackles supplied for the suspension beam at the top of the tower, with the guide wire outermost on either side.
2) Fit the nuts and bolts. Lock with cotters.
3) Fit the top stop disc on the suspension wire leaving at least 200mm between disc and shackle (See Fig. 5).
4) Feed all wires to the bottom of the tower (See Fig. 5).

Fig. 5

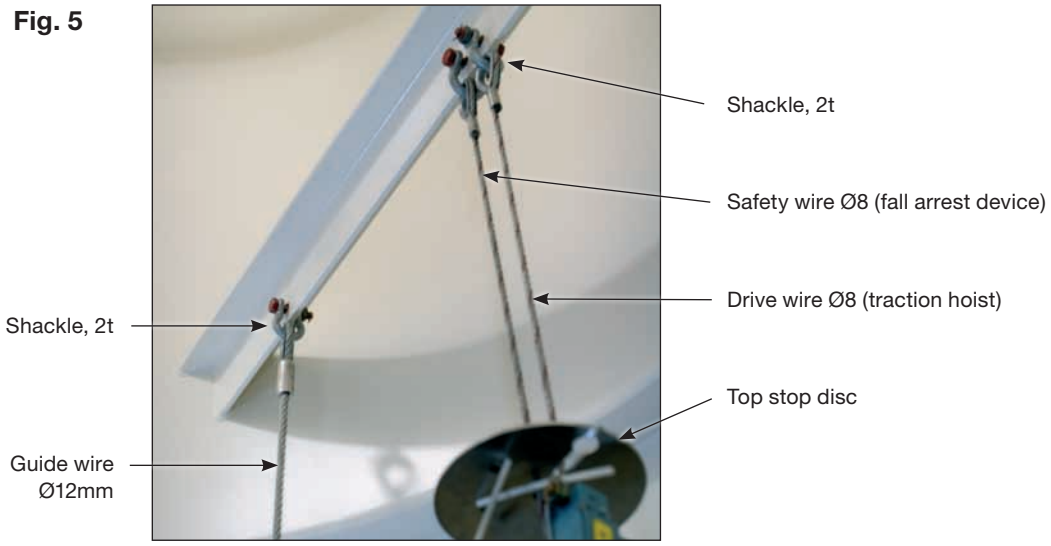
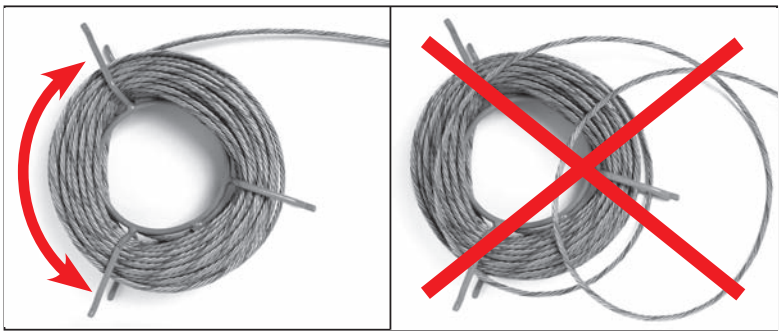


Fig. 5a

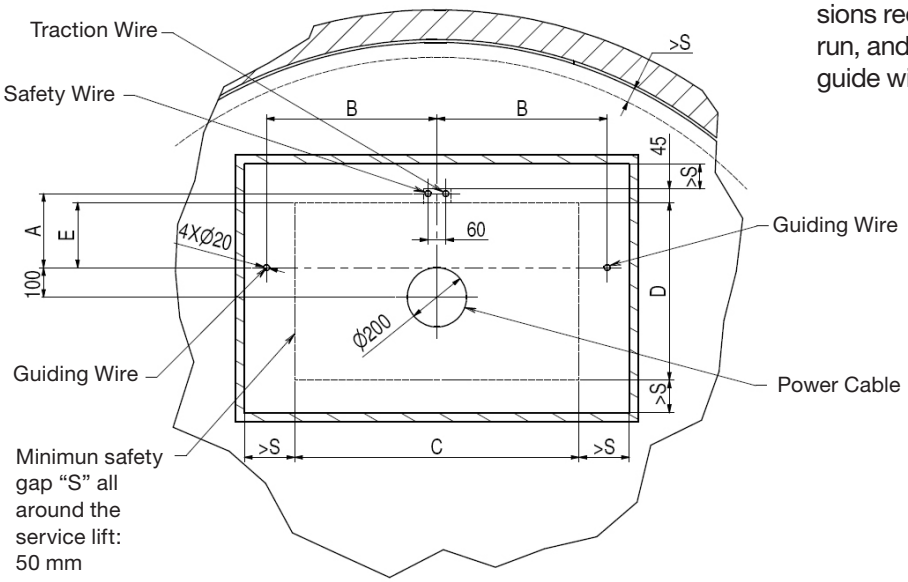


IMPORTANT!
All wires are evenly uncoiled as shown in Fig. 5a to prevent looping.

2.2 Wire positioning measurements

Holes in the base platform in the tower for wire bushing are positioned as outlined below.

Fig. 6



Minimum shaft clearance dimensions required for the service lift to run, and distance between the guide wires.

Dimensions:

Shark	A	B[1)]	C	D	E	S
M	250	395/330	600	600	220	50
L	250	575/510	960	600	220	50
XL	350	575/510	960	800	320	50

The holes are positioned with a tolerance of +/-5 mm. Holes with diameter Ø200 mm are fitted with rubber edging.

Warning!
Ensure that no obstacles are in the way of the service lift.

DANGER!
Ensure that lift evacuation to the tower ladder is possible.

2.3 Securing the guide wire - ground level

IMPORTANT:
Before feeding the guide wires through the platform, fit the correct number of wire fixes on the wire and feed through the wire guides. The wire fixes are fitted during the first run.

Feed the guide wire through the 2 Ø60mm holes in the platform. Underneath the platform the guide wires are fastened and tightened using one of the following three methods.

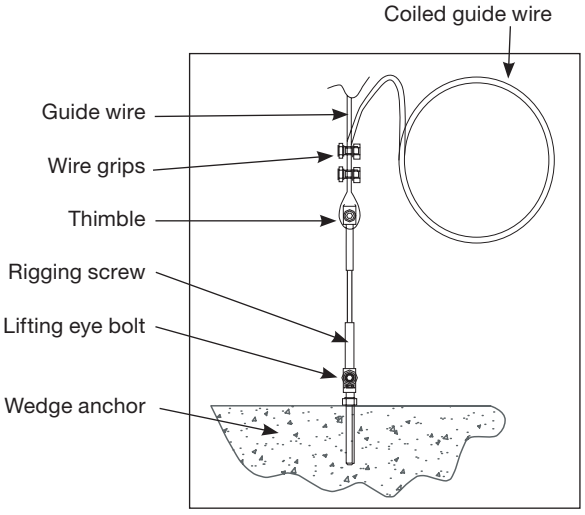
Fig. 7 Wire fix

2.3.1 Method 1: Wedge anchor

Mount wire as shown in Fig. 8 following procedure below.

1) Drill 2 Ø16x75mm holes in the floor underneath the 2 Ø60mm holes in the platform.
2) Fasten the wedge anchors in the holes and mount an M16 lifting eyebolt.
3) After loosening the rigging screw as much as possible, fasten the rigging screw to the eyebolt in one end and the wire using wire grips in the other.
4) Tighten the wire as described in section 2.3.4.
5) Excess wire is coiled and hung by means of wire strips. Use at least 3 strips.
6) Mount the second wire.

Fig. 8 Method 1: Wedge anchor



2.3.2 Method 2: Tripod

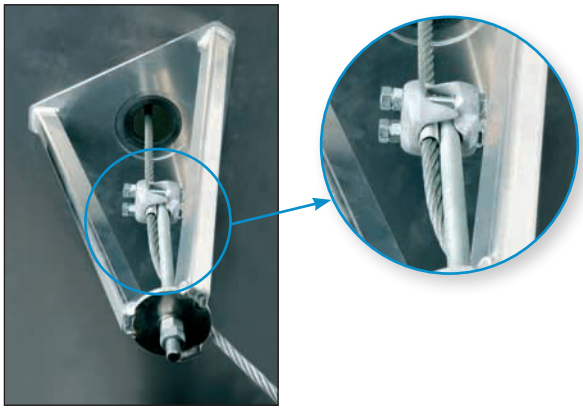
Pull the guide wire through the platform and fasten with the tripod (See Fig. 8a.)

1) After feeding the guide wire through the platform continue feeding the wire through the tripod and the Ø16 mm x 1.5 mm aluminium tube.
2) Lock the aluminium tube, the wire, and the treated rod using a wire locking device. Make sure the tube is placed so no contact is made between the wire and treated rod. (See Fig 8a).
3) Tighten the bolts to 75 Nm
4) Mount the second wire.

ATTENTION!
Check the distance between the wires so that the wire fix and wires are in the centre of the wire guides (See Fig. 6 section 2.2).

ATTENTION!
Tighten the wire locking device after the first run.

Fig. 8a Method 2: Tripod



2.3.3 Method 3: Steel beam

There may be a steel beam beneath the platform intended for lift mounting. If so, use rigging screws as described in method 2.3.1 for mounting the guide wire to the steel beam.

2.3.4 Tensioning the guide wires Ø12 mm

Tighten the wires by hand and mark with a water-resistant marker. Measure the distance to the floor.

- For 60 m long wires, stretch the wire 40 mm.
- For 80 m long wires, stretch the wire 50 mm.
- For 100 m long wires, stretch the wire 60 mm.

For each additional 20 m, stretch the wire by a further 10 mm.

After some time it may be necessary to stretch 60 m wire by another 5mm and longer wire by a further 7-10 mm (all wires stretches after some time).

ATTENTION!
This will tighten the wires to approximately 2000-4000 N.

2.4 Electrical connections

Connections

2.4.1 Power supply

DANGER!

The electrical connection of the traction hoist must be made in accordance with EN 60204-1.

The power supply must be protected by a fuse and an earth leak circuit breaker (30mA).

Disconnect the main power supply before handling power units.

Verify that the rated grid and motor voltages are identical.
The three-phase motor is normally supplied in a star connection configuration:

400 V,	3 phases + t 0 + gnd.	I = 3.5 A	1.5 kW
690 V,	3 phases + gnd.	I = 2.0 A	1.5 kW

Control voltage: 230 V / 240 V
Necessary equipment to comply with EN60204-1 can be supplied by Avanti as an option.

2.4.2 Supply cable

a) The length of the cable depends on the height of the tower and the positioning of the power outlet. The cable length is determined prior to ordering. The power cable is marked with its length; check for accuracy before installing.

b) Minimum cross-sectional dimension of the supply cable. Important with increased distance between grid connection, generator, and traction hoist, respectively:

Table 3	For cable lengths up to...
	190 m
1 hoist	**1.5**
	Cable-cross sectional dimension [mm2]

c) Use heavy rubber cable ducts for fastening live wire to service lift.

d) An installed generator will have to provide at least 2.5 times the output of the traction hoist.

Fig. 9
Cable suspension

Fig. 9b
Power cabinet **Tirak** M500

2.4.3 Power connection

a) Push the EMERGENCY STOP button

b) Check that the various stop switch cables and fall arrest device cable are connected to the power cabinet according to colour code.

c) Place or hang the cable collect bin underneath the Ø200 mm hole in the platform.

d) If possible hang the bucket in the full length of the webbing. Keep the webbing as long as possible (Fig. 9c).

e) Cut the transport strips and tape which hold the wire inside the bin and connect the cable suspension (Fig. 9) to the eyebolt underneath the service lift floor.

f) Connect the socket to the lift plug on the back of the lift.

g) Connect the power cable plug to the grid: 400V / 3Ph + 0 + gnd. / 50 Hz
680V / 3Ph + gnd. / 50 Hz Pre-fuse: 16 A.

h) Turn the EMERGENCY STOP button (Fig. 10 and Fig. 10a) clockwise to deactivate.

i) The power is turned on and the green indicator on the electrical control box lit. In order for the service lift to be operational the door must be locked and the HAND/AUTOM switch must be in HAND mode.

The wiring diagram is found in the electrical control box.

Fig. 9c
Cable collect bin

Fig. 10

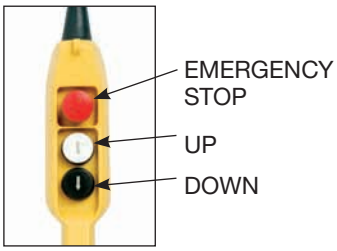
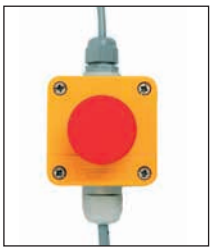


Fig. 10a



Important:
If the traction hoist does not start, two phases in the supply connection might have been switched around the phase protection relay. Remedy: Have an electrician check the phase lay.

2.5 Installation of drive and safety wire in lift

CAUTION!
Wear protective gloves when handling wires.

2.5.1 Drive wire installation

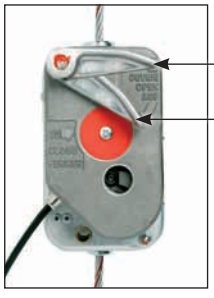
a) Remove protection guard above rollers
b) Feed the wire through the roof into the traction hoist's wire inlet opening. (Right side seen from front of lift).
c) Push the UP button on the pendant control and feed wire through until the traction hoist starts pulling. Ensure that the wire can exit without obstruction!
d) Continue feeding the wire underneath (round) the front guide wheel, over the back guide wheel, and through the back panel.
e) Let the lift wire pass through until it is slightly tightened.
f) Replace roller protection guard.
g) Feed wire through platform floor.

2.5.2 Safety wire installation

a) Remove protection guard above rollers.
b) Open the fall arrest device by pushing down the lever until it engages/clicks (Fig. 16 Appendix A). Feed the safety wire through the roof hole above the fall arrest device and continue by feeding through the fall arrest device.
c) Like the lifting wire, continue feeding the wire underneath (round) the front guide wheel, over the back guide wheel, and through the back panel.
d) On the back of the lift pull the safety wire to tighten it.
e) Replace roller protection guard.
f) Feed wire through platform floor.

Fig. 11

BSO

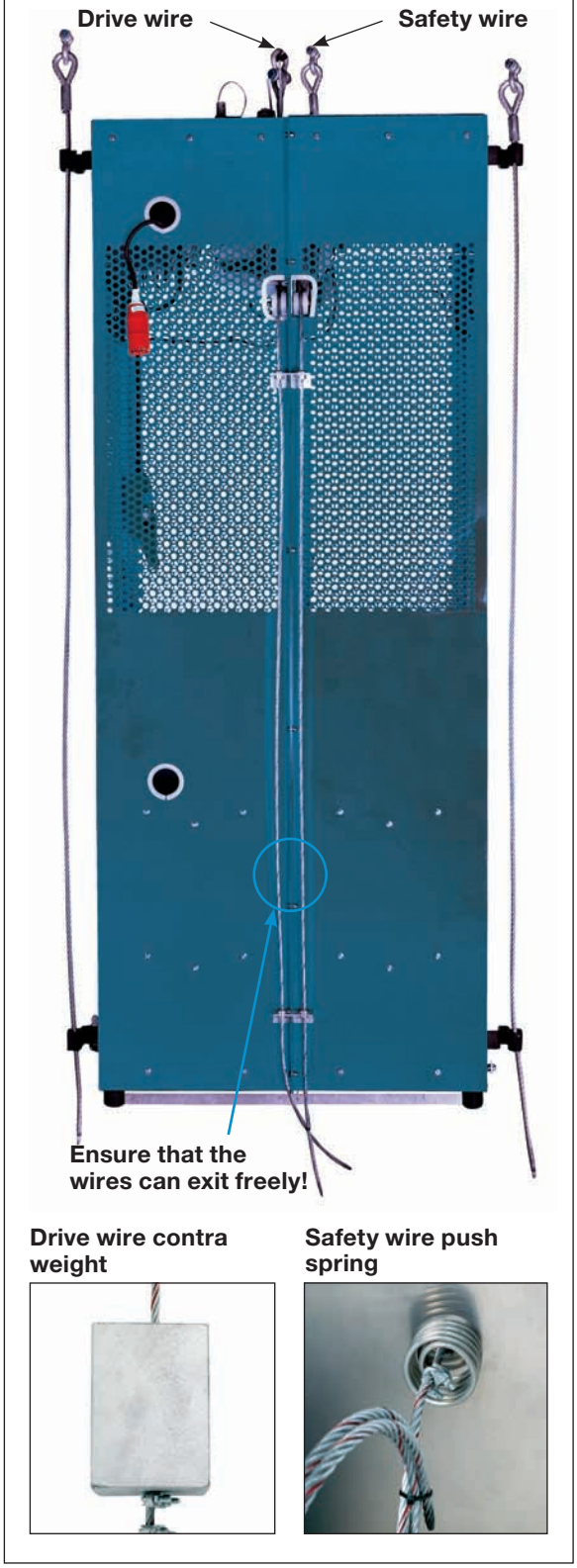


ON/Locked

OFF/Open

M500

Fig. 12 Back side



2.6 Securing the drive and safety wire

The drive wire is fastened as described in point 2.6.1 below and the safety wire is fastened in one of three ways described in point 2.6.2, 2.6.3 and 2.6.4.

IMPORTANT!
Before fastening the safety wire carry out the fall arrest device test (See Installation Manual section).

2.6.1 Drive wire contra weight

An 11 kg weight is mounted approximately 300mm below the floor on the drive wire. Excess wire is coiled with at least 3 strips (See Fig. 13).

CAUTION!
DO NOT fix the traction wire below the bottom platform.
The traction wire MUST be hanging freely so it can rotate.

Fig. 13 Drive wire contra weight

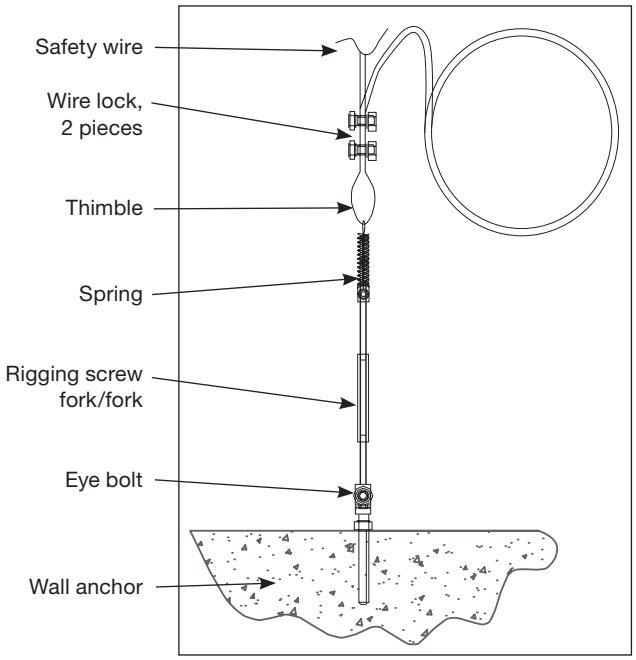
2.6.2 Safety wire method 1: Wedge anchor with spring

As in point 2.3.1 above the wire is fastened using a rigging screw **with spring** (See Fig. 13a). Mounting the safety wire without the spring will cause the fall arrest device to block frequently. Excess wire is coiled with at least 3 strips.

- At a wire length of 60 m, tighten the rigging screw so the wire stretches 9 mm.
- At a wire length of 100 m, tighten the rigging screw so the wire stretches 15 mm.

This will tighten the wire to approximately 400-500 N (40-50 kg).

Fig. 13a Safety wire method 1: Wedge anchor with spring. Left wire on lift viewed from the front



2.6.3 Safety wire method 2: Push spring

Underneath the platform the wire is fed through the two holes at each end of the push spring. The wire is then tightened as much as possible before being fastened with the wire locking device. If prior to mounting the spring was held tight by strips, cut them loose. If properly tightened, this will stretch the spring by approximately 15 mm (See Fig. 13b).

Fig. 13b Safety wire method 2: Push spring

2.6.4 Safety wire method 3: Steel beam with spring

There may be a steel beam beneath the platform intended for lift mounting. If so, use wire screws as described in method 2.6.2 for mounting the safety wire to the steel beam.

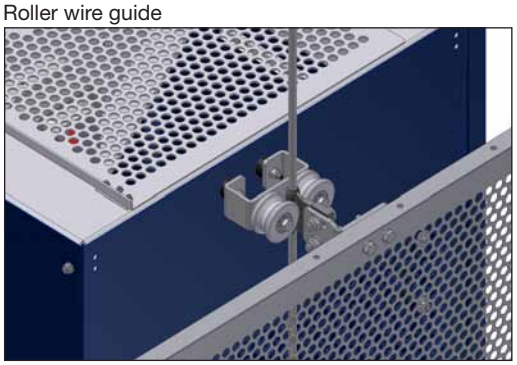
2.7 Wire fix alignment

Having mounted the service lift, the wires, and the power, the wire fix fittings are adjusted during the initial ascent.

a) Perform the tests prescribed in section 5 of the User's Manual.
b) Install wires as shown in Fig. 14.

Fig. 14

Roller wire guide



By means of the oblong holes in the wire fix fittings, adjust the fittings so that the two parts pass each other easily, when the lift passes.

Clic-on wire guide

Clic-on wire fix

Standard wire guide

Narrow wire guide

CAUTION!
Wire fixe must be mounted on guide wires on all platforms with max. 30 m between each wire fix.

ATTENTION!
During the first run make sure the power cable untwists evenly.

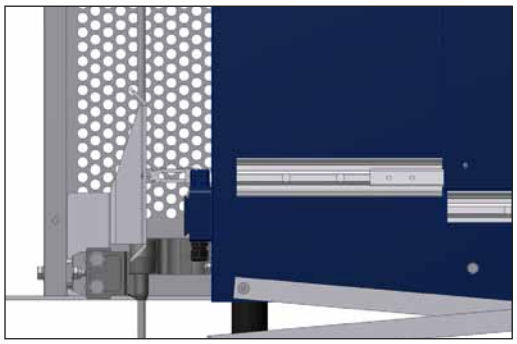
ATTENTION!
If tripods are used for guide wire fixing tighten the wire locking device after the first run.

2.8 Adjustment of the safe-zone plates (Full open door lifts)

The service lift door should be able to be opened whenever the cabin is in alignment with the platform (tolerance ± 100 mm).

The safe-zone plate is adjusted in relation to the platform position switch fixed on the cabin (see Fig. 15).

Fig. 15



2.9 Adjustment of top stop disc

The top stop disc is adjusted so the top limit stop switch stops the lift in alignment with the top landing platform, however at least 200 mm before contact with the wire thimble.

The emergency limit stop switch is a backup. It is adjusted so it stops the lift in case the operation limit stop switch fails.

The emergency limit stop shuts off the control, just like an emergency stop. If the emergency limit stop is activated, lowering can only be done manually as described in the User's Manual. Manual lowering will activate the lift again.

3. Danger zone! sticker

Mount the "Danger Zone" sticker in the tower behind the lift and the yellow marking ribbon on the floor. Make sure the wall and platform are clean and dry before attaching the sticker and ribbon.

DANGER!

Make sure that nobody is exposed to danger below the service lift, for instance from falling parts.
Suitable measures: Pent roof or barriers.

The service lift is now ready for use.

Prior to use, however, carry out the inspection specified in Installation Guide section 5!

4. Disassembling

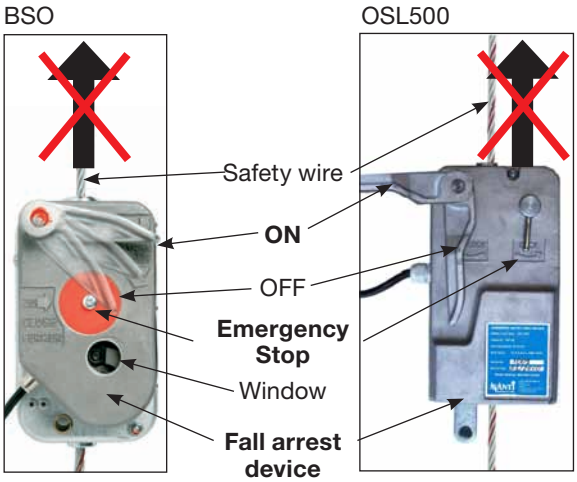
Disassemble in reverse order and dispose of in accordance with local authority regulations.

5. Inspection before initial use

An officially recognised expert must:

a) Inspect the lift as specified in section 12.1 of the User's Manual.
b) Carry out a test run with the maximum rated load.
c) Overload test: The test load depends on the lift motor. Load the cabin as follows:
Motor L402P: load kg 320 (125% of lifting capacity + weight of power cable). Motor L502P: load kg 420. When an attempt is made to start the lift, the platform should stop, and the buzzer in the connection cabinet should sound.
– If not, see Appendix A: "Adjusting instructions for overload limiter" .
d) The guide, drive and safety wires as well as the top and bottom wire fastenings must be tested at full length as part of the initial test run.

Fig. 15



e) Testing of the **fall arrest device:**

Important!
Before testing, the tightening spring beneath the access platform must be removed. Remember to secure it again after testing!

DANGER!
If the fall arrest device is engaged, it must not be possible to pull the safety wire upwards!

1) Engage the fall arrest device by pressing the stop button – the handle should jump to the "ON" position (Fig. 15).
Should it nevertheless be possible to pull the safety wire upwards, the fall arrest device must be replaced and sent to the supplier for testing.
2) Reopen the fall arrest device by pressing down on the lever. On top of the lift, pull up the safety wire with a quick jerk – the fall arrest device should now engage automatically; if it does not, replace it and return to the supplier for testing.

f) If guide wires are mounted using the tripod, tighten the tripod wire locking device.

The results from this test must be recorded in writing and saved for later reference (Appendix B).

Appendix A:
Regulation of overload limiter

CAUTION!
Avoid injuriy by strictly following the instructions!

a) Verification and/or adjustment of the overload device on the service lift can only be done by a qualified person, who must have been instructed by AVANTI to perform this task.
b) Verification and/or adjustment must be performed under the supervision of the site foreman or another person authorised by the manufacturer.
c) One copy of this instruction must be provided to the personnel and always be available.
d) Alterations/modifications of the service lift other than those necessary for adjusting the overload device are not allowed, unless the manufacturer has agreed in writing.
e) AVANTI assumes no liability for damage due to retrofitting/alterations to equipment or where non-original spare parts are used, which have not been approved by the company in writing, especially the prescribed traction hoist wire rope.
f) The manufacturer of the service lift assumes no liability for damage due to retrofitting or alterations to equipment or where non-original spare parts are used, which have not been approved by the company in writing. In the event of violation, the CE certification approval becomes invalid.
g) The result of the verification/adjustment of the overload device must be written down in the "Test report of annual inspection" and signed by the supervisor. If only adjusting takes place (no annual inspection) simply fill in point 6.9 and sign.

1 Purpose of this instruction

It is possible that the overload limited inside the traction hoist of the service lift stops upwards travel even through the service lift is not overloaded.

1) With older hoists you may need an allen key size 6.

Where other causes can be excluded by following the instructions of section 2.2, the overload limiter must be adjusted according to section 3.2.

2 Adjusting instruction

2.1 Preparation

Required tools/material:
- Allen keys, size 2 and 4 [1] - X402P & L502
- **Security TX40** - M500
- Ballast for applying the **test load;**
Note! Before driving to the service lift make sure that the service lift can be loaded with the **permissible test load,** i.e. "safe working load" + weight of power cable + 25%.

IMPORTANT!
Before leaving for the tower make sure you bring the required test load of 300-400kg.

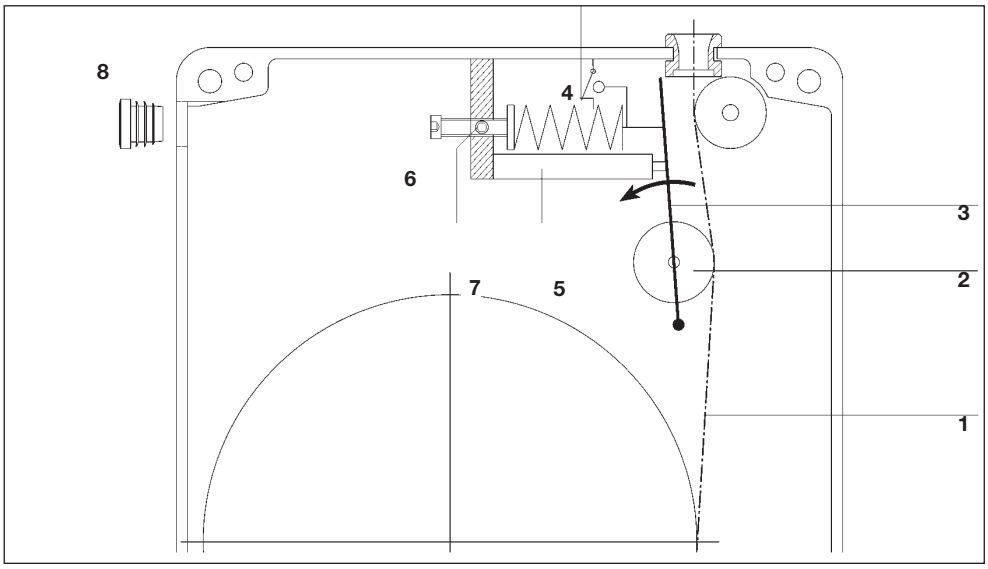
We recommend:
- weighing personnel who may climb into the lift during the test procedure,
and
- bringing adequate **weighed ballast** (sandbags or similar).

2.2 Exclusion of other causes

Before modifying the overload limiter settings **check if the upwards travel stopping is caused by other reasons:**
a) If the cage is guided by wire ropes or ladder: Check for **obstructions** on the **guiding** device(s) and remove them.
b) Check that the **wire rope moves freely at the diverter** or similar:
- Is the rope blocked/pinched at any point?
- Do the pulleys freely rotate? (Check with the service lift set to ground with no load on the ropes, or by a person from outside the cage, when going up and down.)
c) When starting, does the **primary brake open?** You can hear the "click" sound or feel a mechanical shock when putting your hand on the motor fan cover.

In the cases b) or c) **have the problem corrected/repaired by a qualified person.**

Fig. 16



3 Overload limiter

a) Place the service lift on the lowest travel point
b) Apply the Setup load + 20 Kg from the table depending on the tower height.
c) Push the UP button. If the lift can go up modify the adjustment of the overload system until it is no longer possible to go UP following the procedure below:
1. Loosen the set screw (7) in the casing cover with an Allen key (size 2)
2. Remove the cap (8). Place an Allen key (size 41, 150 mm long) into the adjusting screw (6)
3. Turn the adjusting screw (6) clockwise, until the test load can be lifted.
4.Gradually reduce the trigger point of the limit switch (4) by means of the adjusting screw (6), until the test load can no longer be lifted: 1) Turn the adjusting screw by 1/4 turn anticlock wise to reduce the trigger point; 2) Press the UP-button
d) Apply Setup load. Push the UP button and verify the lift can go up. If not, return to b) until the lift is able to go UP with Setup load but is not able to go UP with Setup load + 20 Kg
e) Apply **Lift WLL** and verify that it can perform the travel to the top without triggering the overload limit. If it is not possible verify loads used and return to b), otherwise continue with f)
f) Go back to the lowest point and apply **Overload test load.**
g) Press the UP button and verify the overload is triggered. If it is not triggered verify test loads and return to b), otherwise continue with h)
h) Tighten the set screw (7).
i) Remove the tools.
j) Insert the cap (8) into the casing hole.
k) Fill in the “Annual inspection test report” check point 6.9 and sign.

OVERLOAD TABLE

LOAD CAPACITY = 240 Kg

LIFT WLL	240	Kg
CABIN WEIGHT	110	Kg
CABLE AND WIRE ROPE	0,45	Kg/m
HOIST WLL	400	Kg

WTG HEIGHT (m)	SETUP LOAD (KG)	OVERLOAD TEST LOAD (KG)
67	290	370
78	295	370
100	305	370

LOAD CAPACITY = 320 Kg

LIFT WLL	320	Kg
CABIN WEIGHT	120	Kg
CABLE AND WIRE ROPE	0,51	Kg/m
HOIST WLL	500	Kg

WTG HEIGHT (m)	SETUP LOAD (KG)	OVERLOAD TEST LOAD (KG)
67	374	485
78	380	485
100	391	485

SETUP LOAD = WLL Lift + WTG height x Wire rope linear weight + Tolerance Overload device < 1,25 x (WLL Hoist - CABIN WEIGHT)
OVERLOAD TEST LOAD[1] = WLL Hoist x 1,25 - CABIN WEIGHT - TOLERANCE OVERLOAD device

NOTE 1: Acc. To EN1808 8.3.5.5
Tolerance overload device = 20 Kg

Appendix B:
Safety measures when using AVANTI SHARK lifts

General: The Service Lift/Work Cage is only to be used by personnel who has received instructions in operating the Lift/Cage in all predictable situations. These instructions can only be given by a person with the proper knowledge e.g Avanti Trainer or Trainer approved by Avanti.
The following precautions and procedures are to be followed during operation of, and if the Lift/Cage stops and the manual emergency descend cannot be performed.

Operating the Lift/Cage: Anyone going in the Lift/Cage must at all times wear PPE (safety helmet, full body harness, shock absorber, lanyard and fall protection system on the ladder)

EVACUATION of personnel from the Lift/Cage is only necessary in very extreme situations. If necessary Avanti recommends the following procedures:

1. User(s) attaches shock absorber to the yellow anchor point(s) inside the cabin and open the door. (See Fig.1)

2. User(s) climbs on the ladder and establishes suitable safety with the shock absorber in the ladder area.(See Fig.2)

3. After safe anchoring in the ladder area, user(s) releases his anchor in the Cabin/Cage. (See Fig.3)

4.User(s) climbs to the other side of the ladder with proper safety technique and attaches runner/slider to the present fall protection system on the ladder. (See Fig.4)

5. User(s) can now climb safely up or down the ladder (See Fig.5)


Fig. 1


Fig. 2


Fig. 3


Fig. 4


Fig. 5

RESCUE of personnel from the Lift/Cage is only necessary in very extreme situations. If necessary Avanti recommends the following procedures:

1. User is on the work side of the ladder with attached runner/slider to the present fall protections system on the ladder at the same level as the Service lift/Work Cage.

2. User attaches suitable safety with one of the shock absorber hook in the ladder area. After safe anchoring to the ladder area, the runner is released from the Safety Rail. (See Fig 1)

3. User climbs to the other side of the ladder using the proper safety technique, opens the door (See Fig 2-3) and attaches the other shock absorber hook to the yellow point inside the Lift/Cage. (See Fig 4)

4. Check that the person to rescue is conscious or unconscious. (See Fig 5)

5. User transfers to the Lift/Cage with proper safety technique. When user is safe inside the cabin release his anchor from Safety ladder. (See Fig 6)


Fig. 1


Fig. 2


Fig. 3


Fig. 4


Fig. 5


Fig. 6

The way to proceed and what to do in case of evacuation or rescue are unique and here described in general terms so do not depend on the type of Shark that you have as it does not depend on the type of door. Consequently, we have chosen the most representative photos of the model as an example

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