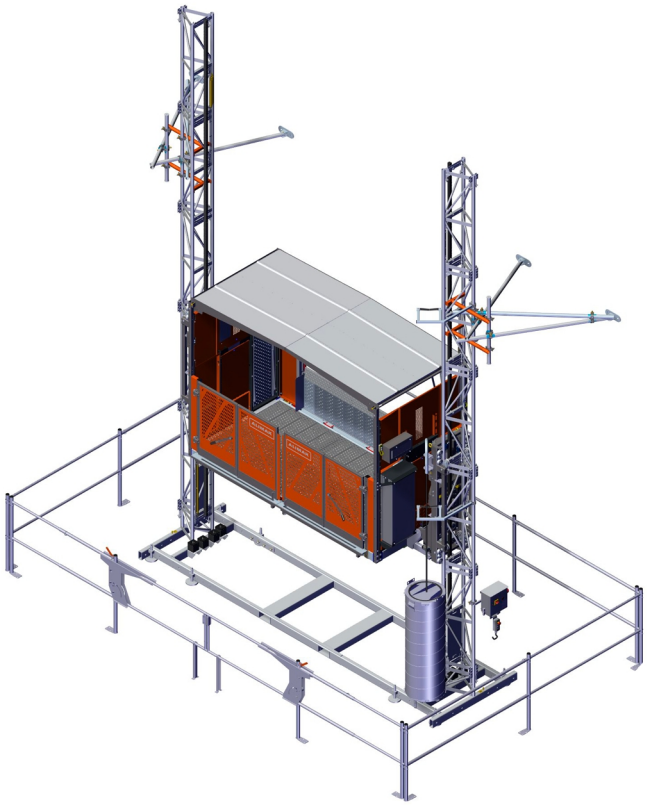
Alimak Manufacturing SL

2037001350 (EN)

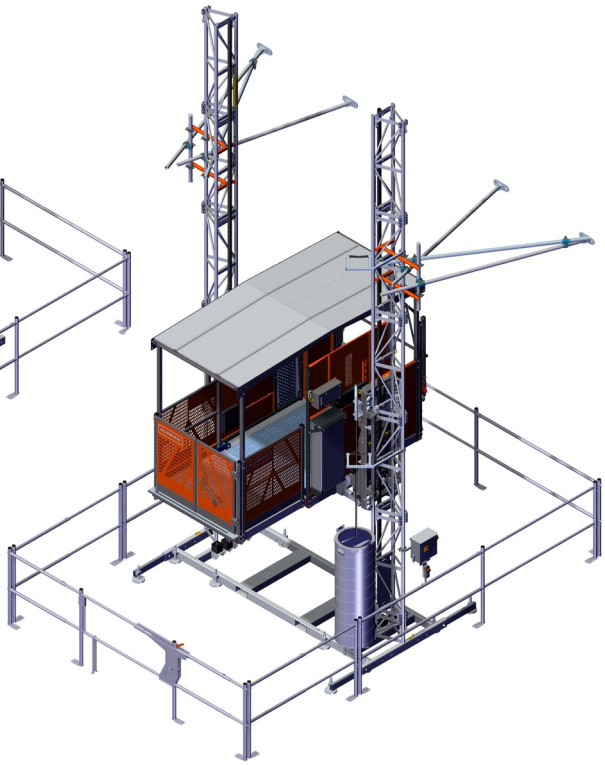
Revision 01.01 (31/07/2024)

ALIMAK VECTIO 350 20-32 and VECTIO 350 20-32D LIFTING TRANSPORTATION SYSTEM

Installation and Maintenance manual



ALIMAK VECTIO 350 20-32



ALIMAK VECTIO 350 20-32D

VEC-001B

Original instructions

CERTIFICATO DI ESAME CE DEL TIPO
EC TYPE EXAMINATION CERTIFICATE

Visto l'esito delle verifiche condotte in conformità con:
On the basis of our verifications carried out according to;

Allegato IX della Direttiva 2006/42/CE
Annex IX of the Directive 2006/42/EC

Si dichiara che il prodotto:
We declare that the product:

Montacarichi da Cantiere (MH) / Piattaforma di Trasporto (TP)
Material Hoist / Transport Platform

Marca / *Trade Mark* **Alimak**
Modello / *Model* **VECTIO 350 20**

Fabbricato da:
Manufactured by:

ALIMAK MANUFACTURING SL
POLIGONO INDUSTRIAL CENTROVIA
CALLE LOS ÁNGELES Nº 88 NAVE 1
50198 - LA MUELA (ZARAGOZA) - SPAIN

Soddisfa le disposizioni della:
Meets the requirements of the:

Direttiva 2006/42/CE
Directive 2006/42/EC

Norma di riferimento:
Reference standard:

EN 12158-1:2021 (MH)
EN 16719:2018 (TP)

Riferimento pratica IMQ
IMQ Reference

A2501-00381

Questo certificato è emesso da IMQ in qualità di Organismo Notificato per la Direttiva 2006/42/CE - Numero identificativo 0051
This certificate is issued by IMQ as Notified Body for the Directive 2006/42/EC - Identification number 0051.

Questo documento è composto da **4** pagine comprendenti 1 allegato | *This document is composed of* **4** *pages including 1 annex*

2025-02-17	2012-10-18	2029-03-31	Sostituisce e annulla il precedente del *This Certificate cancels and replaces the previous one*
Emissione corrente *Current issue*	Prima emissione *First issue*	Data di scadenza *Expiry date*	2024-09-26

IMQ

ALIMAK VECTIO 350 20-32 and VECTIO 350 20-32D LIFTING TRANSPORTATION SYSTEM

EN-AL-03-00-0001-03B

Limited Warranty

Consult the warranty requirements in the general terms and conditions.

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Contents

1 Introduction

1.1 Symbols

EN-AL-04-02-0001-01

DANGER

Immediate or potentially imminent danger.
Failure to observe may result in injuries or damages:
- Death or serious injury.

WARNING

Potentially hazardous situation.
Failure to observe may result in injuries or damages:
- Moderate injury or material damage.

CAUTION

Dangerous situation.
Failure to observe may result in injuries or damages:
- Minor or moderate injury.

NOTICE

Useful tips for an optimum work process.
Failure to observe may result in injuries or damages:
- None.

1.2 Terms and definitions

EN-AL-04-04-0001-02

Terms	Definitions
Owner	Owner of the lifting transportation system and responsible for its application, operation and compliance with occupational health and safety regulations. The owner must have adequate technical expertise with regards to the applicable emergency and safety systems and components, and is responsible for training the operator on the lifting transportation system model to be operated. This training must be carried out in an area free of obstructions, under the direction of a qualified person and for sufficient time to determine that the operator demonstrates proficiency in the knowledge and operation of the lifting transportation system. The owner must have technical expertise to understand the basic mechanical/electrical parameters of the lifting transportation system. The owner is responsible for planning the installation of the product, as well as daily work and periodic inspections and maintenance.
Owner	Given that the owner has direct control over the accessibility and use of the lifting transportation system, in accordance with the recommendations of these instructions, it is their responsibility to decide whether to use the lifting transportation system or not.
Operator	Person authorised by the owner to operate the lifting transportation system. The owner must ensure that the operator has received the relevant training associated with the use and the work instructions before operating the lifting transportation system. Only personnel properly trained and instructed may operate the lifting transportation system. The operator must be fully familiarised with the emergency systems and components and be able to carry out the inspections prior to use. The operator must have knowledge of the handling and distribution of loads.
Installation technician and maintenance technician	Persons authorised by the owner to install and maintain the lifting transportation system. The owner must ensure that the installation technician and the maintenance technician have received the relevant training associated with installation, inspection and maintenance in accordance with the instructions in the manual and the manufacturer's recommendations. An authorised person is allowed to access restricted areas for maintenance, inspection and rescue operations. The person that carries out the service and inspection must have adequate technical expertise to understand the product in terms of construction and functionality for use and maintenance, configuration parameters and mechanical and electrical components. The persons responsible for the service must also be fully trained with regards to the emergency and safety systems and components.

1.3 Observations

EN-AL-04-01-0001-02

Only persons who have received the required familiarisation are authorised to use the lifting transportation system in accordance with the instructions in this manual.

Only the revision version of the manual supplied with the product is valid except with written authorisation from the manufacturer.

This manual must always be available to the personnel responsible for the installation, maintenance and operation of the lifting transportation system.

Additional copies may be requested from the manufacturer.

The contents of this manual (processes, components, descriptions, instructions, recommendations, requirements, etc.) are subject to change without prior notice.

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

NOTICE

The pictures and diagrams in this manual may not reflect the exact appearance, colours or layout of the Product. This does not have any impact on the Product's functionality or safety.

1.4 Cautions

EN-AL-04-03-0001-03

CAUTION

Risk of accident. Follow all of the instructions in order to prevent injuries.

1.4.1 Cautions about personnel

- Should be of legal age.
- Should be familiar with the accident prevention instructions and receive adequate training in terms of occupational health and safety.
- Must not use the lifting transportation system under the influence of alcohol or drugs that might compromise safety at the workplace.
- Must wear the personal protective equipment required for the specific application and that complyi with current regulations.
- Only maintenance technicians are authorised to check the functional safety of the system in the case of repair or replacement of any component.
- Only maintenance technicians are authorised to check/ repair electrical installations, the drive system, the overspeed safety device and safety devices.

1.4.2 Cautions about use

CAUTION

Stop working immediately and inform the supervisor in case any damages or malfunctions occur during operation or in case circumstances arise that could jeopardise safety.

- Only persons with relevant familiarisation associated with using and performing daily inspections on the Alimak lifting transportation system are authorised to use and perform daily inspections on the lifting transportation system.
- Check that all the lifting transportation system components are available and fully functional.
- Observe the procedures for handling and lifting loads.
- Ensure on site that the reaction forces of the system are transferred safely to the foundation and ties.
- Do not place objects or stand under the lifting transportation system.
- Place the load so that it is stable on the platform and does not exceed the maximum load capacity.
- In low light conditions, illuminate the work area to ensure sufficient visibility.
- Do not use the lifting transportation system in adverse weather conditions, including wind speeds of more than 20 m/s, except where other more restrictive speeds are defined.

1.4.3 Cautions about installation and maintenance

- Inspect the lifting transportation system according to the planning established in the Installation and maintenance manual.
- Increase the frequency of inspections in the case of high frequency of operation or severe conditions of use.
- Switch off the electrical power supply for the lifting transportation system before carrying out any maintenance work.
- Sign and inform about the prohibition of use during maintenance tasks.
- Do not carry out installation and/or maintenance tasks in adverse weather conditions, including wind speeds of more than 12.5 m/s, except where other more restrictive speeds are defined.

1.4.4 Cautions about lifting transportation system parts

- Only use original Alimak parts.
- Use of non-original parts renders the manufacturer's warranty void and invalidates any type of approval.
- No warranty is provided against damage resulting from reconstruction or modification of equipment or use of non-original parts that are not approved by the manufacturer.
- No modification, extension or reconstruction of the lifting transportation system is permitted without the manufacturer's prior written consent.

NOTICE

The owner must check the need for third-party lifting transportation system inspections with local authorities and comply with any specified standards.

2 My Alimak - Digital information

2.1 My Alimak - Digital information

EN-AL-05-06-0001-03

My Alimak offers Digital connectivity for owners of Alimak Group products.

All the information of the machine is accessible in one portal from anywhere at anytime.

To access My Alimak scan one of QR codes available on the machine:

- Rating plate
- Platform electric panel

Figure 1 : My Alimak – Digital information access QR code

My Alimak – Digital information access QR code	
1	My Alimak – Digital information access QR code

The QR code allows access to the following information:

BIM models:

Alimak's BIM Gallery contains 3D models with key embedded information about the machine. The BIM models can be configured to your needs i.e. platform size and lifting height and connection to a building and/or structure.

Alicalc:

Advanced tool for calculating mechanical forces in a more specific way.

Spare parts:

Catalogue with all genuine spare parts is available.

Aliguide:

All the information needed for installation, maintenance, and use is accessible from portable devices with interlinked navigation.

3 Transport

3.1 General transport requirements

EN-AL-08-01-0002-03B

WARNING

It is only permitted to move the machine safely using the lifting points indicated for this purpose.

DANGER

Risk of breakage. Do not use lifting points other than those indicated for this purpose, as they may not be sized for the required loads.

Transport the system on a suitable vehicle in accordance with the dimensional and weight characteristics of the lifting transportation system.

Lifting transportation system	Alimak VECTIO 350 20-32	Alimak VECTIO 350 20-32D
Empty weight	2300 kg	2400 kg

Check that the installation site is accessible for the vehicle transporting the lifting transportation system.

Both loading/unloading operations and the positioning of the base unit can be carried out with a forklift or crane. There are specific accessories and procedures. [Refer to section *Installation of the base unit, see on page 22*].

Check that the lifting transportation system is correctly positioned and secured for transport.

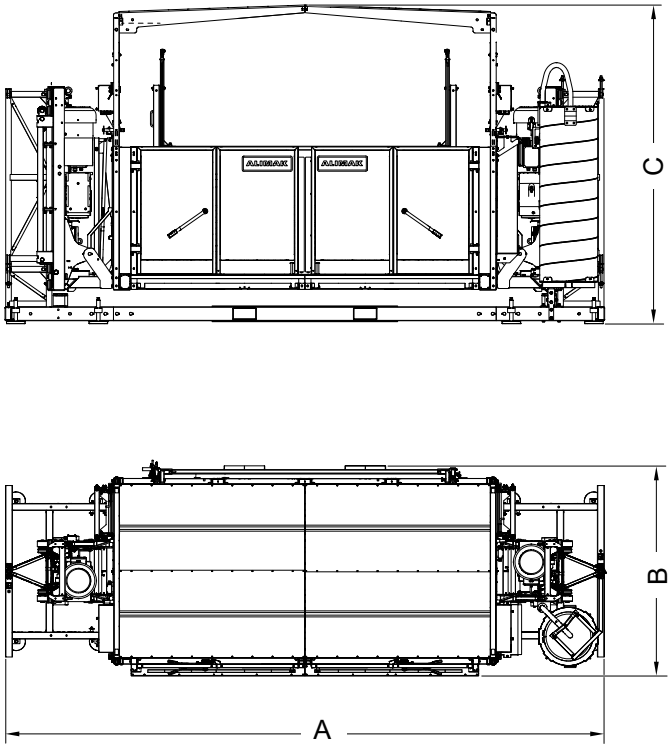


Figure 2 : General dimensions VECTIO 350 20-32

General dimensions VECTIO 350 20-32	
A	5200 mm
B	1900 mm
C	2900 mm (2500 mm without FOPS)[1)]

NOTICE

[1)] If necessary, FOPS can be removed for the transport of the lifting transportation system.

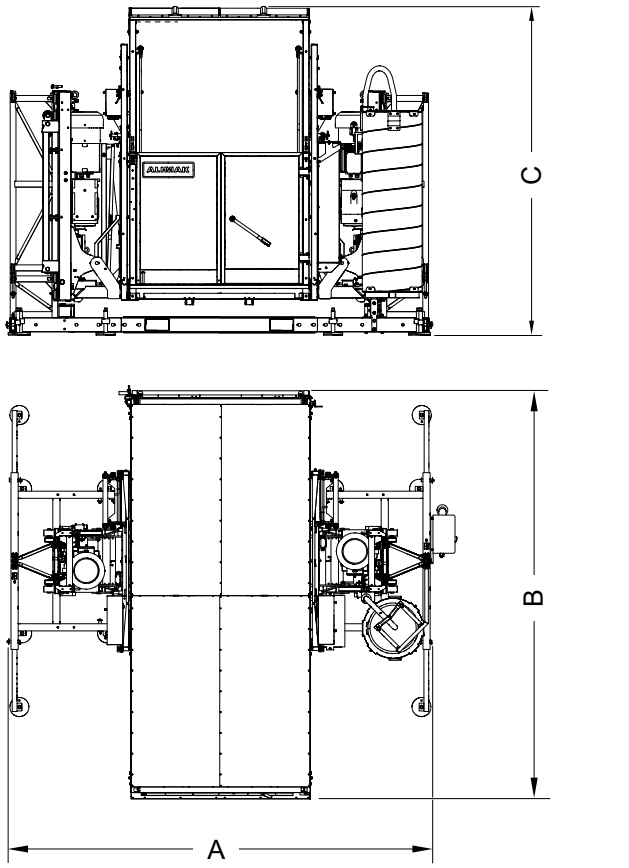


Figure 3 : General dimensions VECTIO 350 20-32D

General dimensions VECTIO 350 20-32D	
A	3550 mm
B	3500 mm (2350 mm with the platform folded)[2)]
C	2900 mm (2500 mm without FOPS)[3)]

NOTICE

[2)]Only for VECTIO 350 20-32D, the platform can be folded for easy transport, fully assembled with railings, gates, and ramps [Refer to section Folding and unfolding of the platform (only for VECTIO 350 20-32D), see on page 23].

NOTICE

[3)]If necessary, FOPS can be removed for the transport of the lifting transportation system.

3.2 Delivery inspection

EN-AL-10-13-0001-01

Check that the delivered materials correspond to those specified in the order and that they are in good condition. In the event of damage to the goods caused during transport, inform the company responsible for managing the transport within 24 hours of the delivery date.

For any other type of complaint, contact Alimak within 24 hours of the delivery date.

4 Requirements prior to installation

4.1 General

EN-AL-10-14-0001-02

WARNING

The installation site must comply with the local safety regulations and have permission from the local authorities for installation of the lifting transportation system.

- Check that all of the requirements prior to installation described in this section are met.
- Both the lifting transportation system and the necessary elements in the installation (masts, landing doors, etc.) must be in good condition and must have passed all maintenance and checks required in each case.
- In case of conflict between the manual and local regulations, the most restrictive requirement will always take precedence.
- Contact Alimak if the required application is not covered by this manual.
- Depending on the local regulations, third-party approval of the installation may be necessary.

4.2 Electrical power supply

EN-AL-10-03-0001-03B

WARNING

The length of the cable limits the lifting height of the lifting transportation system. The lifting height is indicated on an informative sign.

If the necessary lifting height is higher than that indicated, contact Alimak for assistance.

The characteristics of the power supply to the lifting transportation system must comply with the specifications in the following table:

Lifting transportation system		Alimak VECTIO 350 20-32	Alimak VECTIO 350 20-32D
No. of motors/type		2/electric	2/electric
Power		14.6 / 18 kW	14.6 / 18 kW
Rated current		28.6 / 37.4 A	28.6 / 37.4 A
Electrical consumption		20 / 26 kVA	20 / 26 kVA
Electrical power supply		400 V / 50 Hz 3 Phases + N + PE	400 V / 50 Hz 3 Phases + N + PE
Fuse		40 A	40 A
Power and control cable	Lifting height H ≤ 70 m	4G6 + 12x1 mm^2 4G6 + 1x2.5 + 12x1 mm^2	4G6 + 12x1 mm^2 4G6 + 1x2.5 + 12x1 mm^2
	Lifting height H ≤ 100 m	4G10 + 12x1.5 mm^2 4G10 + 1x2.5 + 12x1 mm^2	4G10 + 12x1.5 mm^2 4G10 + 1x2.5 + 12x1 mm^2
Control circuit electrical power supply		230 V	230 V
Power cable from the supply line to the base electric panel - up to 50 m		5G16 mm^2	5G16 mm^2

NOTICE

If using an auxiliary generator, the electrical consumption during start-up may be up to 6 times more than the nominal consumption.

4.3 Ground compression

EN-AL-10-11-0003-03B

WARNING

The installation site must comply with the local safety regulations and have permission from the local authorities for installation of the lifting transportation system.

Before installing the lifting transportation system, check that the ground on which the base frame is located has the capacity to withstand the forces generated and has good drainage.

If necessary, use ground plates to distribute the load [Refer to figures *Support point base dimensions VECTIO 350 20-32, see on page 10* and *Support point base dimensions VECTIO 350 20-32D, see on page 10*].

Total load on the base frame		Maximum force per support point (kg)		Ground pressure
Installation height (m)	Total weight (kg)	Pv1	Pv2	kN/m²
0	6050	660	850	420
15	7170	830	960	470
30	8290	1010	1060	520
45	9410	1200	1150	590
60	10530	1410	1230	690
75	11660	1630	1290	800
90	12780	1860	1340	910
100	13520	2020	1360	990
105	13900	2110	1370	1030

NOTICE

Within this maximum mast height, it is not necessary to install additional supports on the base frame below the mast.

In case of installations with higher maximum mast heights, contact Alimak for assistance.

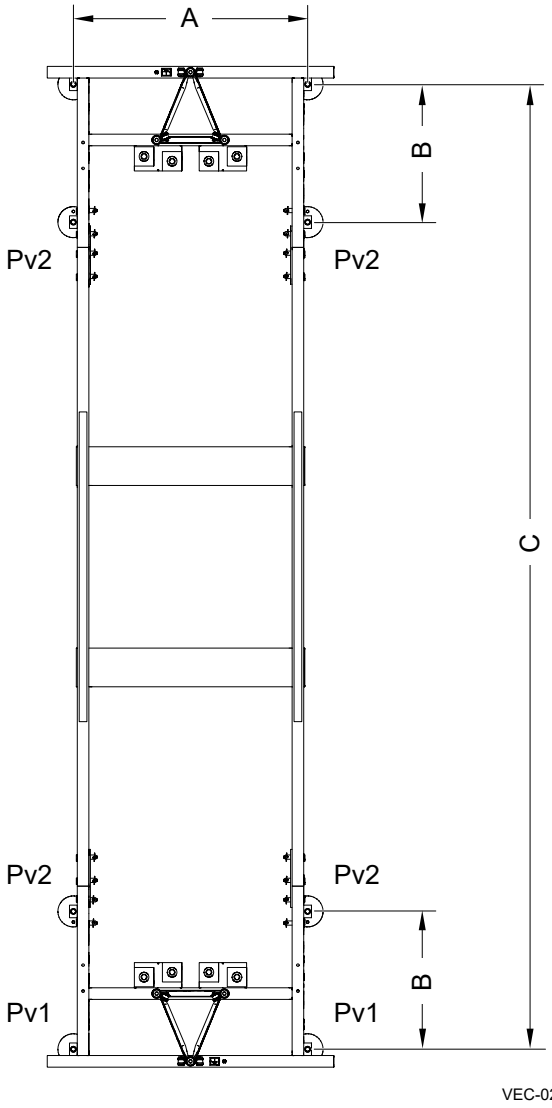


Figure 4 : Support point base dimensions VECTIO 350 20-32

Support point base dimensions VECTIO 350 20-32	
A	1210 mm
B	712 mm
C	4985 mm

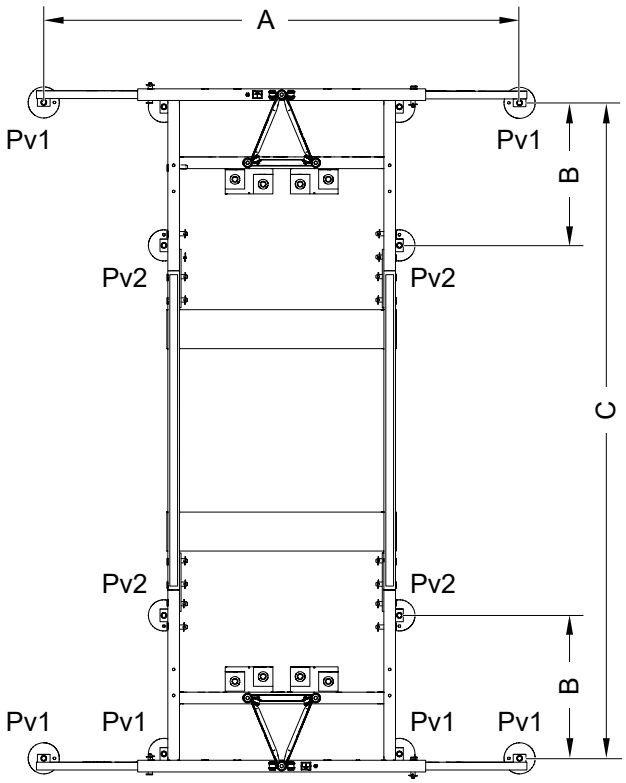


Figure 5 : Support point base dimensions VECTIO 350 20-32D

Support point base dimensions VECTIO 350 20-32D	
A	1210 mm
B	712 mm
C	3325 mm
D	2445 mm

NOTICE

The maximum force reached in support Pv1' is as high as in support Pv1. When the total force is calculated, forces from Pv1 are considered and Pv1' are disregarded because they do not occur at the same time at all the points.

4.4 Configuration of gates to the lifting transportation system

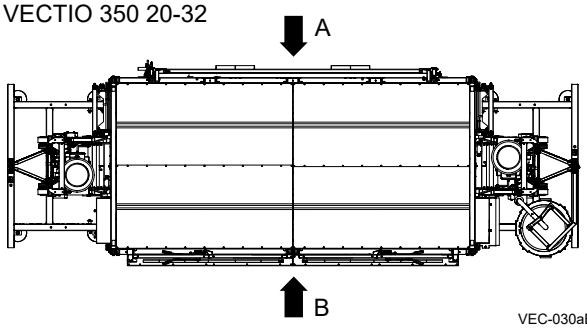
EN-AL-10-11-0004-03B

The safety system on the platform gates prevents the lifting transportation system from starting if the gate is not closed and stops it if the gate is open.

Lifting transportation system must install one entrance gate and one exit gate.

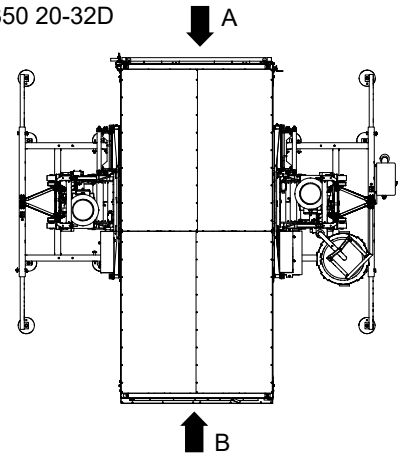
The entrance and exit gates can be installed on the sides (A or B) of the platform.

VECTIO 350 20-32



Gate type	Side of the lifting transportation system	Installation options for gates to the lifting transportation system
EXIT GATE	A	3, 4, 5 or 6
ENTRANCE GATE	B	1

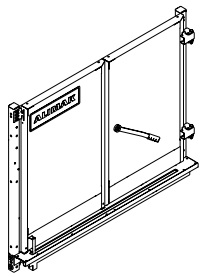
VECTIO 350 20-32D



Gate type	Side of the lifting transportation system	Installation options for gates to the lifting transportation system
EXIT GATE	A	3 or 4
ENTRANCE GATE	B	1 or 2

ENTRANCE GATE

1



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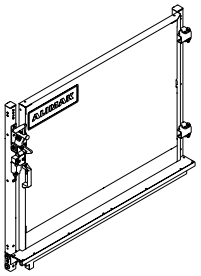
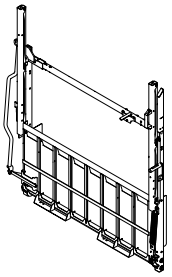


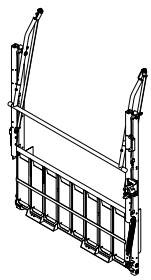
EXIT GATE

4



EXIT GATE

5



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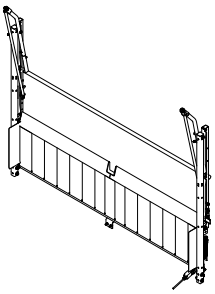

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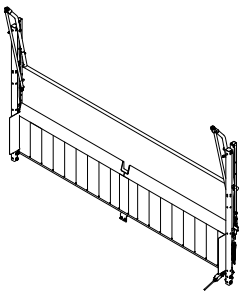


Figure 6 : Configuration of gates to the lifting transportation system

Configuration of gates to the lifting transportation system			
1	Bifolding gate	4	Exit ramp horizontal (1500 mm)
2	Flap gate	5	Exit ramp horizontal (2610 mm)
3	Exit ramp vertical (1500 mm)	6	Exit ramp horizontal (3300 mm)

4.5 Mast ties

EN-AL-10-03-0002-03B

WARNING

Risk of breakage. Do not exceed the maximum distance between ties [Refer to figure Distance between ties, see on page 13].

WARNING

The operator is responsible for guaranteeing that the structure can safely bear the forces transmitted by the ties [Refer to section Forces on ties, see on page 17].

WARNING

The height of the lifting transportation system must be appropriate to the height of the installation.

WARNING

Using the lifting transportation system without ties is not permitted.

4.5.1 Distance between ties

EN-AL-10-17-0001-03B

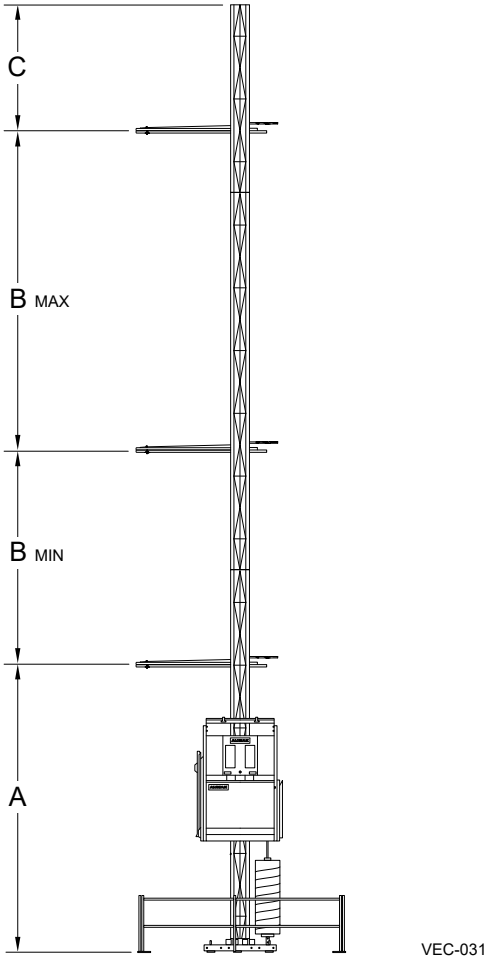


Figure 7 : Distance between ties

Distance between ties	
A	Height of first tie (max. 6 m / min. 3 m)
B	Distance between ties (max. 7.5 m / min. 3 m)
C	Overhung mast height (max. 4.5 m)

4.5.2 Types of ties

EN-AL-10-17-0007-02

- Side tie structure

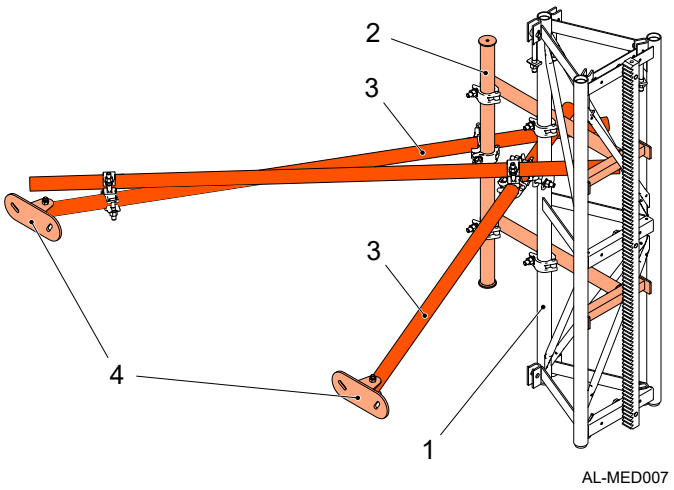


Figure 8 : Side tie structure

Side tie structure	
1	Mast
2	Tie frame
3	Side tie tubes
4	Wall brackets (only for facade assembly)

- Rear tie structure

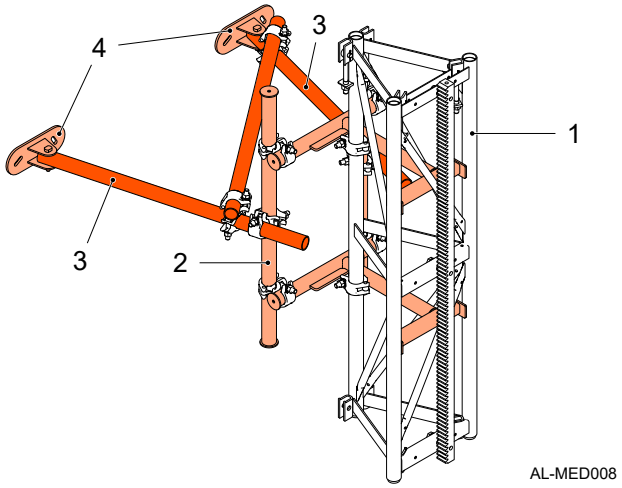


Figure 9 : Rear tie structure

Rear tie structure	
1	Mast
2	Rear tie frame
3	Rear tie tubes
4	Wall brackets (only for facade assembly)

4.5.3 Tie frames

EN-AL-10-17-0008-02

The tie frames allow the connection between the tie tubes and the mast.

The tie frames consist of two frames that are installed on the mast and are connected via one or several dropdown tubes.

There are different types of tie frames according to the orientation of the tie and the available space.

Depending on the height at which the tie must be installed, there are two possible configurations, one where the two frames are fixed to the same mast section and one where each frame is located in a different mast section.

NOTICE

Always fix the wall tie tubes to the dropdown tube in the area between the two tubes that form the tie frame [Refer to figure Tie position to the tie frame, see on page 14].

NOTICE

Regardless of the chosen configuration, the height at which the mast frame is fixed is defined by distance A [Refer to figure Tie position to the tie frame, see on page 14].

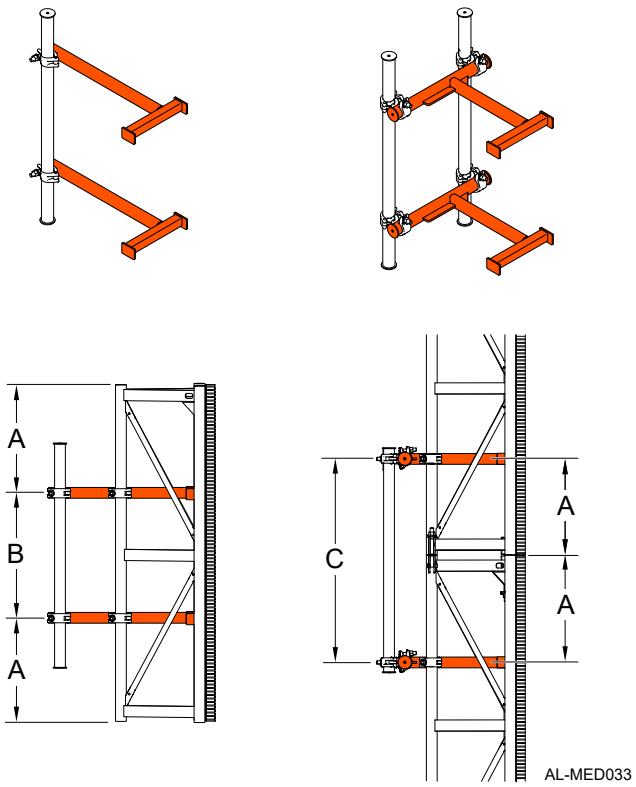


Figure 10 : Tie position to the tie frame

Tie position to the tie frame	
A	440 mm
B	520 mm
C	880 mm

4.5.4 Tie tubes

EN-AL-10-17-0002-02

WARNING

All wall ties are formed by Ø48.3 x 3.2 S355 tubes and Ø48.3 clamps in accordance with standard EN74 type B.

WARNING

Never skip the installation of the tie brace.

The tie tube structures are made of round tubes and clamps.

The arrangement of the tubes is designed to minimise mast movement and obtain adequate resistance.

The forces are transmitted via the tubes as axial forces, therefore they are susceptible to collapse due to buckling.

The clamps transmit the forces between the tubes. The must be manufactured in accordance with standard EN74B.

NOTICE

If using tubes that are longer than 4000 mm, a tube resistance check must be carried out.

NOTICE

In case of reaction forces greater than 12 kN, the slip on the tubes must be checked.

4.5.4.1 Side tie tube structure

EN-AL-10-17-0003-02

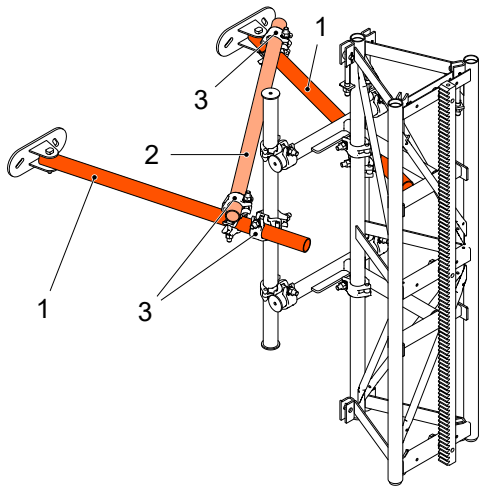


Figure 11 : Side tie tube structure

Side tie tube structure	
1	Tie tubes
2	Tie brace
3	Swivel clamp EN74 type B

NOTICE

It is recommended to install a bolt on the end of the tubes to prevent the clamp from detaching due to slipping [Refer to figure Slipping stop bolt, see on page 15].

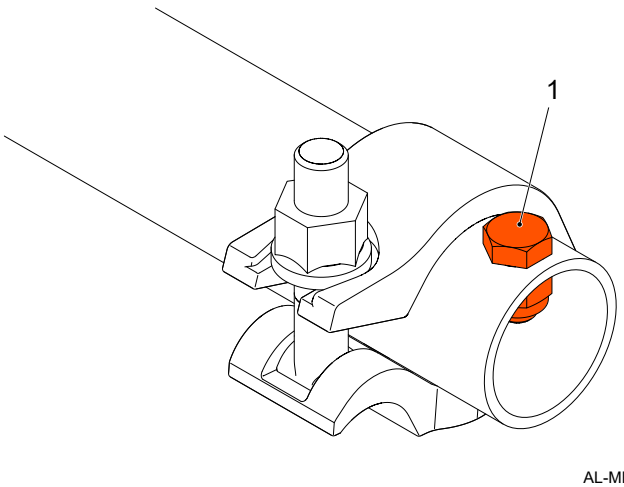


Figure 12 : Slipping stop bolt

Slipping stop bolt	
1	Slipping stop bolt

4.5.4.2 Rear tie tube structure

EN-AL-10-17-0004-02

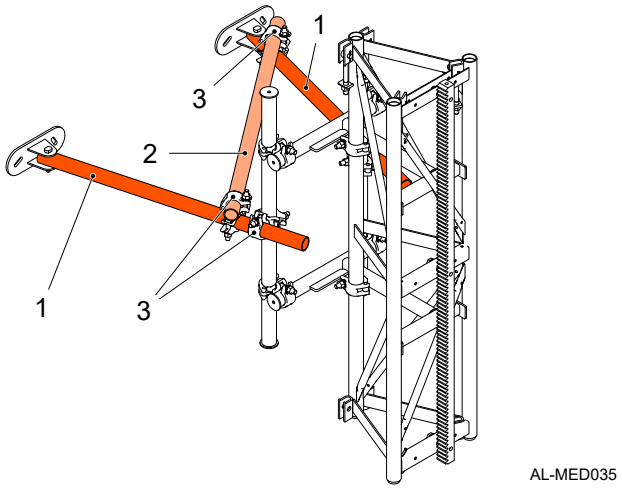


Figure 13 : Rear tie tube structure

Rear tie tube structure	
1	Tie tubes
2	Tie brace
3	Swivel clamp EN74 type B

4.5.5 Ties to the support structure

EN-AL-10-07-0002-03B

WARNING

The owner is responsible for checking that the support structure can withstand the forces of the hoist under all conditions. [Refer to section Forces on ties, see on page 17].

The mast must always be anchored to an adjacent support structure.

The most common is a wall or scaffolding, but it can also be anchored to other types of structure.

4.5.5.1 Wall brackets

EN-AL-10-07-0006-02

WARNING

Always install the wall brackets in horizontal position [Refer to figure Wall brackets, see on page 16].

The wall brackets connect the tie tubes to a wall that acts as a support structure.

The connection is made via a high-resistance pin, which in addition to transmitting the forces, acts as a rotation point to ensure that these forces are only axial in the tube.

The pin also limits the tightening distance so as not to deform the tube.

They have a compact design that allows them to be installed in reduced spaces.

The fixing is via two specific wall tie bolts[1)].

NOTICE

[1)] The specific wall fixing bolts must have sufficient mechanical resistance to withstand the force exerted on wall ties.

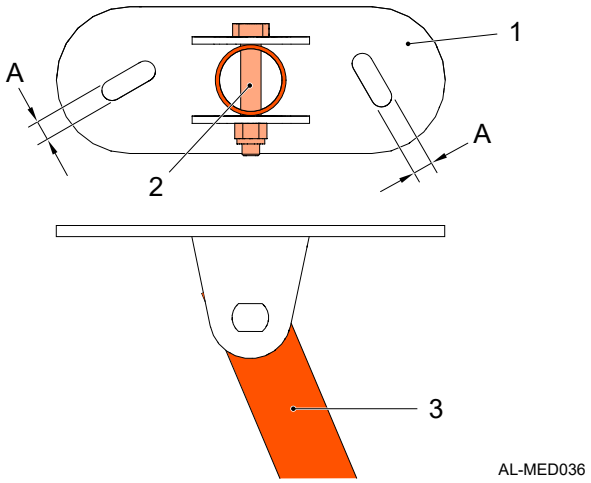


Figure 14 : Wall brackets

Wall brackets	
1	Wall bracket
2	Pin
3	Tie tube
A	14 mm

4.5.5.2 Ties to scaffolding

EN-AL-07-06-0001-02

WARNING

It is recommended to anchor the mast to areas of the scaffolding where it is fixed to the wall.

The mast should be anchored to standard scaffolding (Ø48.3 tubular structure), using swivel clamps EN74B.

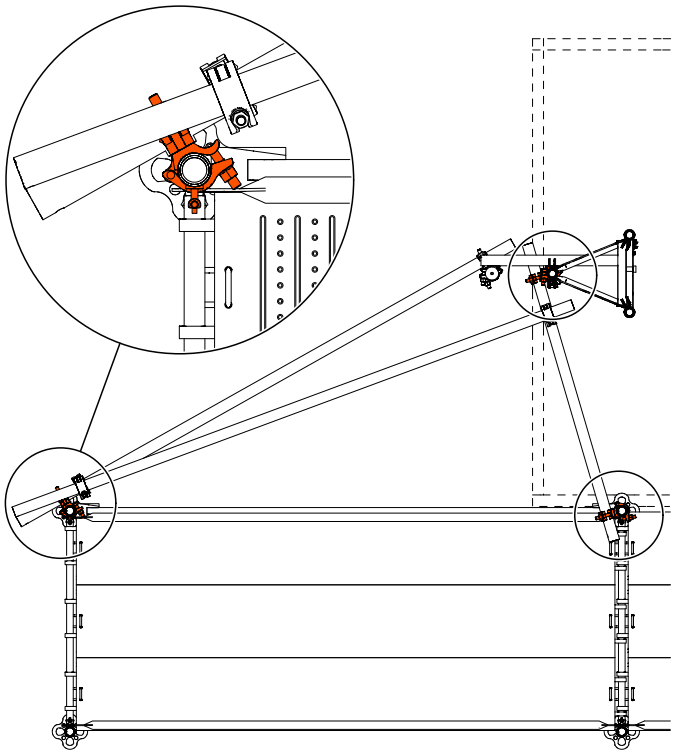


Figure 15 : Ties to scaffolding

4.5.5.3 Fixing ties to other types of structure

EN-AL-07-09-0001-02

To fix the mast to structures other than buildings or scaffolding, for example, to a steel structure, anchoring systems other than wall ties can be used.

Bolted connection plates can be used for steel structures, provided the anchoring system is assessed and designed by a qualified technician and guarantees sufficient mechanical resistance to bear the forces to which it will be subjected by the installation of the lifting transportation system [Refer to section *Forces on ties, see on page 17*].

NOTICE

If necessary, contact Alimak for assistance [Refer to section Special installations, see on page 17].

4.5.6 Special installations

EN-AL-10-17-0005-02

Contact Alimak if installing ties not described in this manual [Refer to section *Installation of the mast ties, see on page 29*], in particular:

- Tie distances other than those described
- Tie structure other than those described
- Installation of ties that are longer than the standard ties provided.

4.5.7 Forces on ties

EN-AL-07-02-0001-03B

WARNING

Check that the dimensional proportionality of the tie is met (L/B ≤ 2) before proceeding to calculate the forces [Refer to section Forces on ties in working conditions, see on page 17].

4.5.7.1 Forces on ties in working conditions

EN-AL-07-03-0002-03B

Calculate and check the forces generated in working conditions before installing the lifting transportation system.

To calculate the forces on the ties, the most unfavourable conditions, loads, dynamic effects and wind speed must be taken into account.

Dimensions and forces:

L = Distance between the support structure and the centre of the mast.

B = Distance between the tie points on the support structure.

C = Distance between the centre of the mast and the first tie point on the support structure.

Rx and Ry: Forces on the centre of the mast [Refer to table *Maximum forces on the centre of the mast in working conditions, see on page 18*].

P1 and P2: Maximum traction/compression forces on the ties.

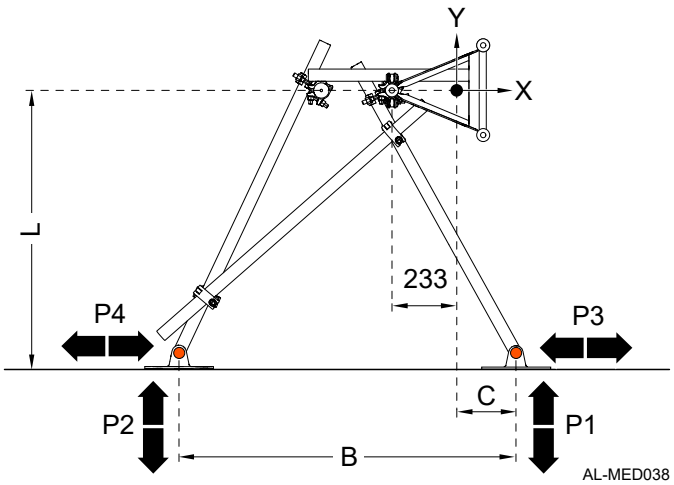
P3 and P4: Maximum shear force on the tie points.

Checking the tie dimensional ratio:

So that the forces generated by the transport system are not excessively high, the following dimensional ratio must not be exceeded:

L/B ≤ 2

- **Side tie structure**



$$P_1 = \pm \left[R_x \left(\frac{L}{B} \right) + R_y \left(\frac{(B-C)}{B} \right) \right]$$

$$P_2 = \pm \left[R_x \left(\frac{L}{B} \right) + R_y \left(\frac{C}{B} \right) \right]$$

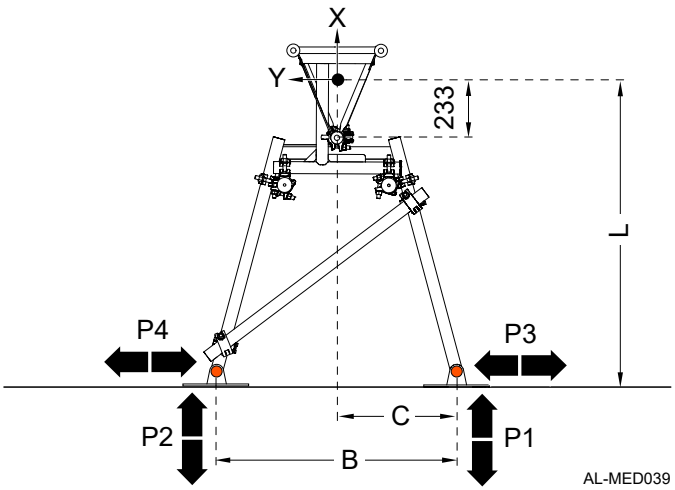
$$P_3 = P_4 = R_x$$

Figure 16 : Forces on side tie structure

NOTICE

All dimensions are in mm and all forces in kN.

- **Rear tie structure**



$$P_1 = \pm \left[R_x \left(\frac{(B-C)}{B} \right) + R_y \left(\frac{L}{B} \right) \right]$$

$$P_2 = \pm \left[R_x \left(\frac{C}{B} \right) + R_y \left(\frac{L}{B} \right) \right]$$

$$P_3 = P_4 = R_y$$

Figure 17 : Forces on rear tie structure

NOTICE

All dimensions are in mm and all forces in kN.

WARNING

If necessary, contact Alimak for assistance.

Maximum forces on the centre of the mast in working conditions			
Tie configuration		R_x (kN)	R_y (kN)
Maximum tie distance (m)	Minimum tie distance (m)		
7.5	7.5	3.9	3.2
7.5	6	4.5	3.6
7.5	4.5	5.4	4.3
7.5	3	7.5	5.6
6	6	4.5	3.6
6	4.5	5.4	4.3
6	3	7.5	5.6
4.5	4.5	5.4	4.3
3	3	7.5	5.6

NOTICE

The distance between the first tie and the ground is not taken into account when selecting the corresponding maximum forces on the centre of the mast.

4.5.7.2 Forces on ties on an out-of-service lifting transportation system

EN-AL-07-08-0001-03

WARNING

If the wind speed for working conditions is exceeded, the lifting transportation system must be placed at the stop on the bottom level.

The forces on ties in out-of-service lifting transportation system conditions are less than in working conditions.

Using the lifting transportation system with a maximum height of 100 m is authorised in regions A / B, C and D, in accordance with the Wind Region Map (Europe) described in standard ISO 4302:2016, Cranes – Wind load assessment.

NOTICE

The owner is responsible for applying the correct wind region. Local weather conditions can produce deviations and make it necessary to apply a different wind region.

NOTICE

Contact Alimak if using the lifting transportation system outside of the areas for which it is authorised.

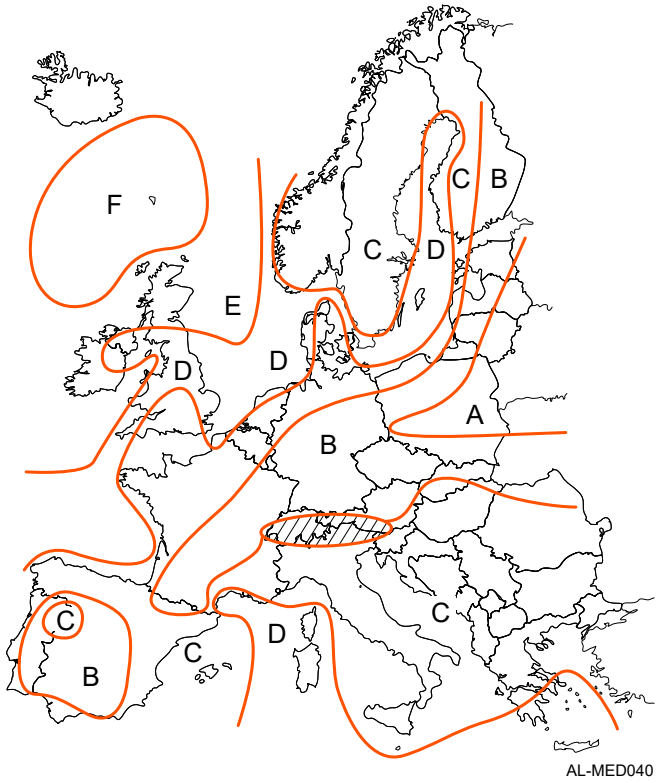


Figure 18 : Wind Region Map (Europe)

Wind Region Map (Europe)	
A	24 m/s
B	24 m/s
C	28 m/s
D	32 m/s
E	36 m/s

4.5.8 Installation data

EN-AL-07-15-0004-03B

Complete the installation data in the following diagrams [Refer to section *Forces on ties, see on page 17*].

Keep this information as part of the manual for each installation.

4.5.8.1 Installation of ties

EN-AL-10-09-0002-03

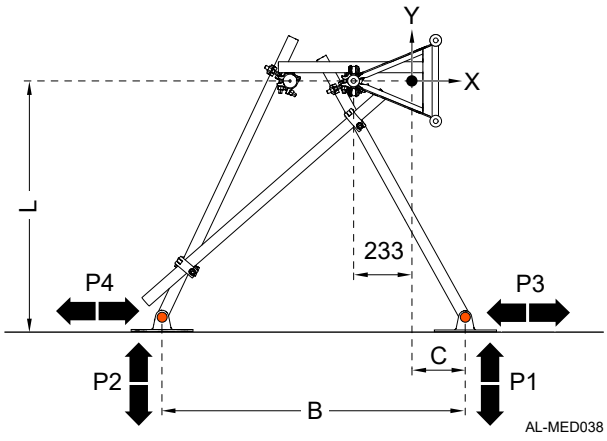


Figure 19 : Installation of side ties

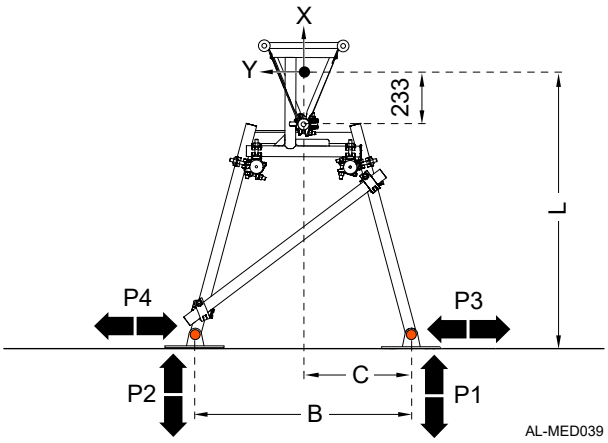


Figure 21 : Installation of rear ties

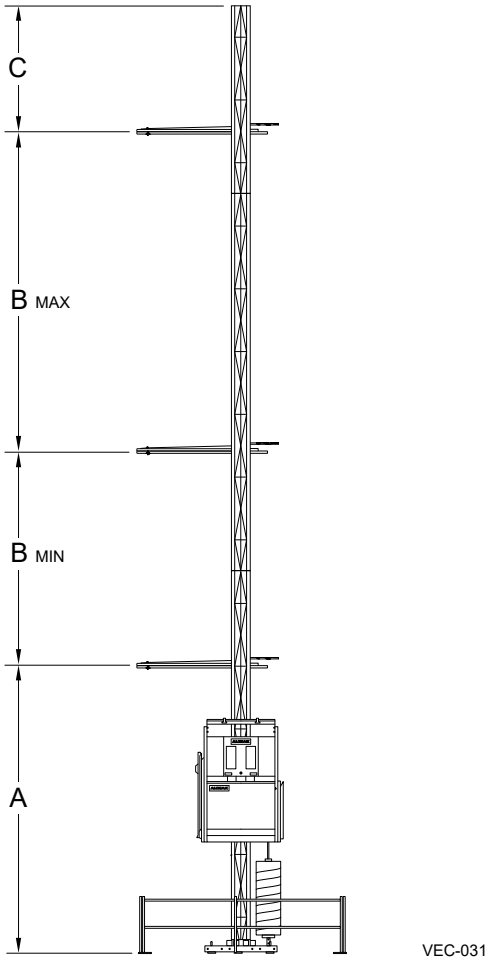


Figure 20 : Distance between ties

	Date	Location	Distance between ties (m)			Distances (mm)			Forces on ties (kN)				Signature
			B (min.)	B (max.)	C (≤3)	L	B	C	P1	P2	P3	P4	
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													

4.6 Minimum distances for the lifting transportation system

EN-AL-07-15-0005-03

DANGER

The installation of the lifting transportation system must comply with standard EN 12159, with any other applicable local regulations taking precedence if they are more restrictive.

4.6.1 Full height doors

EN-AL-07-15-0006-03

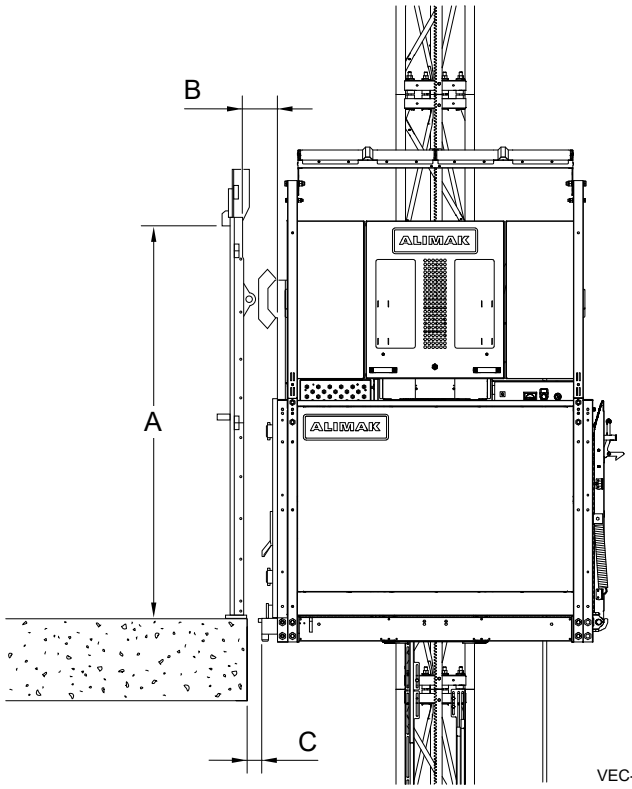


Figure 22 : Distances from the lifting transportation system to the full height doors

Distances from the lifting transportation system to the full height doors	
A	2000 mm
B	max. 150 mm
C	max. 50 mm

4.6.2 Reduced height doors

EN-AL-07-15-0007-03

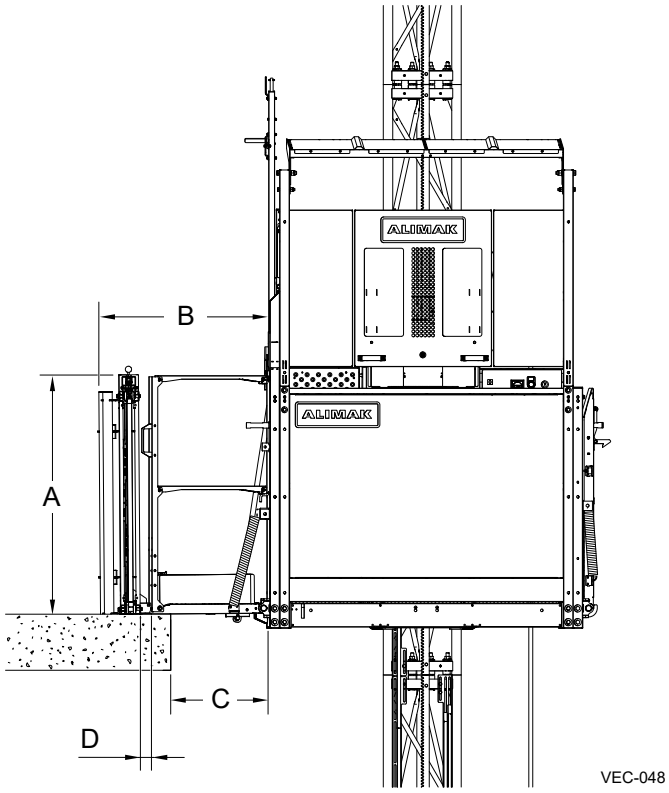


Figure 23 : Reduced height doors

Reduced height doors	
A	1100 mm
B	min. 500 mm
C	min. 400 mm
D	max. 150 mm

5 Installation and inspection

5.1 Installation of the base unit

5.1.1 Unloading and positioning the base unit

EN-AL-11-01-0001-03

WARNING

To reduce the risk of electrical shock, the base unit has a grounding point [Refer to figure Assembly of tools for moving the base unit with a forklift, see on page 22].

Unload and position the base unit using a crane or forklift. There are specific procedures and tools for each case.

5.1.1.1 Moving the base unit with a forklift

EN-AL-11-01-0029-03B

The base frame features an anti-tipping system that allows the base unit to be moved safely with a forklift. [Refer to figure *Anti-tipping system for moving the base unit with a forklift, see on page 22*].

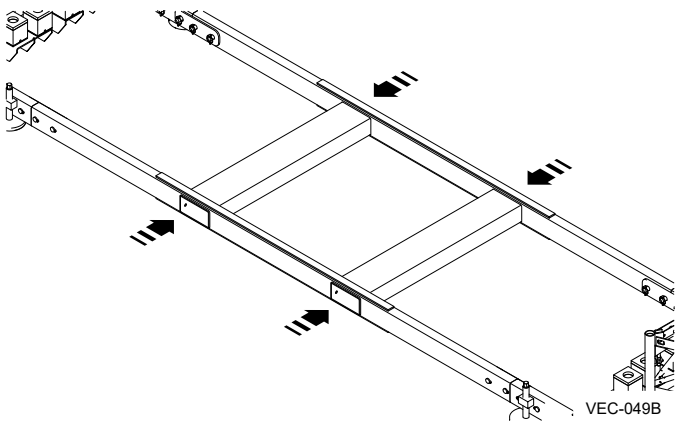


Figure 24 : Anti-tipping system for moving the base unit with a forklift

Anti-tipping system for moving the base unit with a forklift	
1	Base frame
2	Anti-tipping system

5.1.1.2 Tool for moving the base unit with a crane

EN-AL-11-01-0003-03B

WARNING

It is prohibited to place any load on the platform during transport and positioning operations of the base unit.

The lifting device for moving the base unit with a crane allows the base unit to be lifted and transported with a crane.

It must be installed on both base unit masts.

The installation is carried out using the mast captive screws, as for the installation of a mast section.

For the installation, it may be necessary to fold the FOPS and open the mast railing. [Refer to sections *Falling Object Protection System (FOPS)1), see on page 25* and *Mast railing, see on page 26*].

The lifting rings and the allowable angle of the pulling ropes or chains are specified in the lifting device manual.

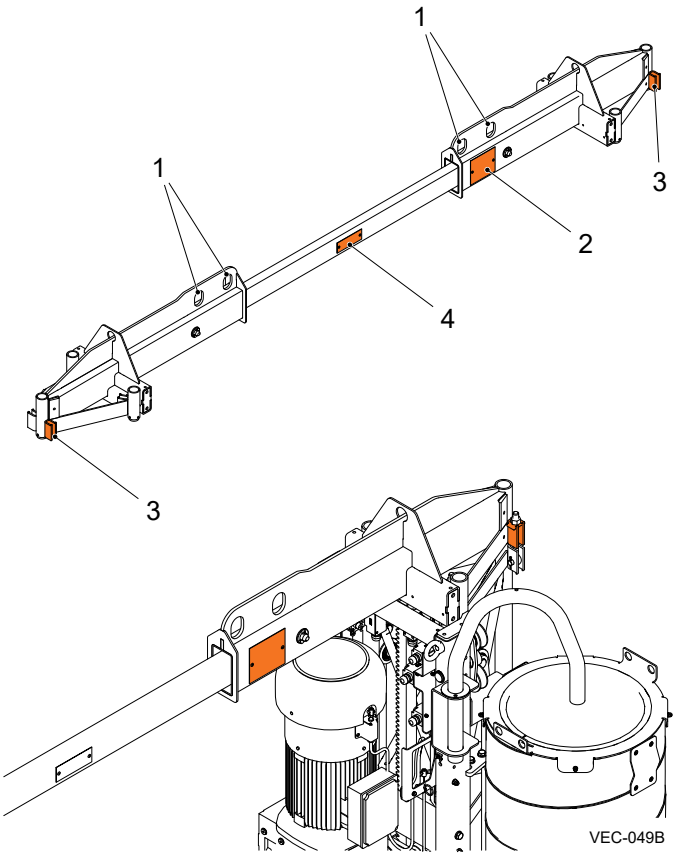


Figure 25 : Lifting device

Lifting device	
1	Lifting ring
2	Use of lifting device data plate
3	Mast fixings (4x on each mast)
4	Rating plate

5.1.1.3 Levelling the lifting transportation system

EN-AL-11-01-0004-03

Adjust the adjustable base plates of the base frame until the assembly height is reached and the mast is level[1)].

NOTICE

[1)] Use a level that is at least one metre long on the rack to check the mast is level.

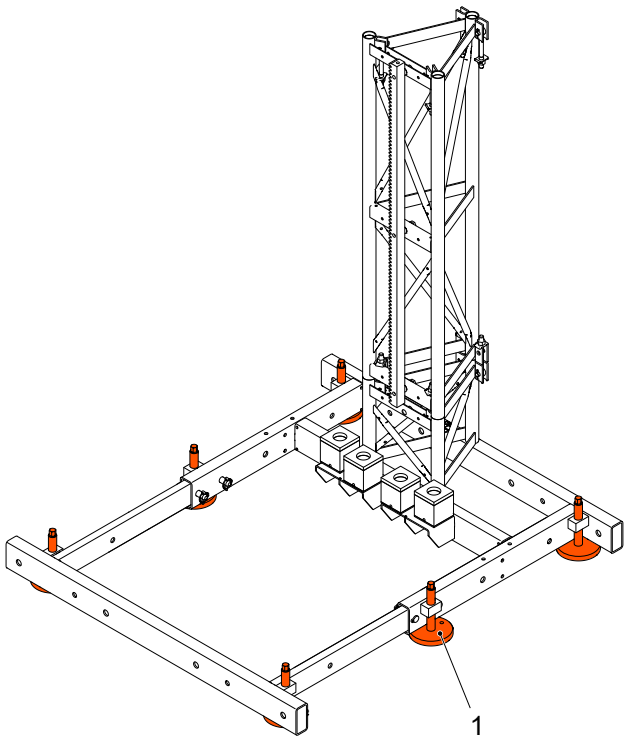


Figure 26 : Adjustable base plates

Adjustable base plates	
1	Adjustable base plate

5.1.1.4 Folding and unfolding of the platform (only for VECTIO 350 20-32D)

EN-AL-11-01-0030-03B

Only for VECTIO 350 20-32D, the platform can be folded for easy transport, fully assembled with railings, gates, and ramps.

Before folding or unfolding the platform, the fixing screws must be removed.

Once the folding or unfolding of the platform has been completed, the fixing screws must be reassembled [Refer to figure *Folding and unfolding of the platform, see on page 22*].

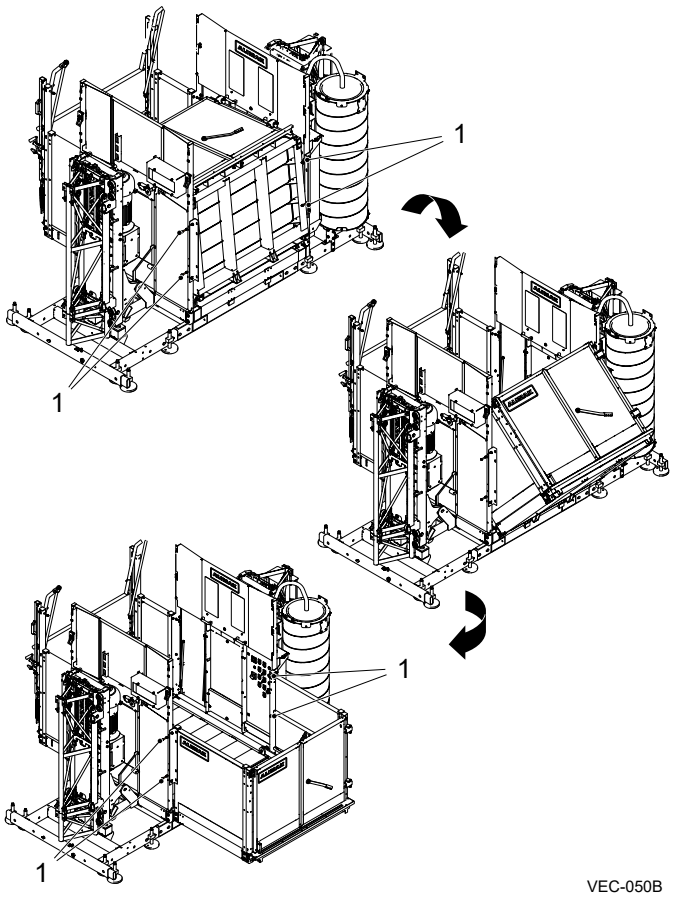


Figure 27 : Folding and unfolding of the platform

Folding and unfolding of the platform	
1	Fixing screws

5.1.1.5 Checking and adjusting the cams on the bottom section of the mast

EN-AL-11-01-0006-03

WARNING

The lifting transportation system stop may differ in TP Mode or MH Mode due to the difference in speed.

When adjusted correctly, the platform should stop at the height of the bottom landing without actuating the emergency bottom limit switch.

Otherwise, the height of the cams must be adjusted [Refer to figure *Checking and adjusting the cams on the bottom section of the mast, see on page 23*].

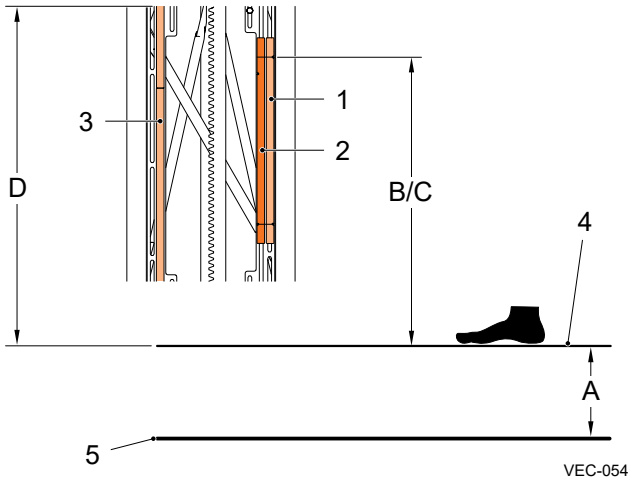


Figure 28 : Checking and adjusting the cams on the bottom section of the mast

Checking and adjusting the cams on the bottom section of the mast	
1	Bottom limit cam
2	Emergency bottom limit cam
3	2 m zone cam
4	Bottom stop level
5	Ground level
A	min. 455 mm
B	1420 mm (bottom limit)
C	1420 mm (emergency bottom limit)
D	3720 mm (2 m zone cam)

5.1.1.6 Connection of the electric panels

EN-AL-11-01-0007-03B

1. Connect the power supply connector to the base electric panel [Refer to figure *Base electric panel, see on page 24*].
2. Turn the main switch on the base electric panel to the ON position.
3. Turn the disconnector on the platform electric panel to the ON position [Refer to figure *Platform electric panel, see on page 24*].
4. Turn the Mode of use selector on the platform electric panel to the TP Mode position[1)].

NOTICE

[1)]The lifting transportation system can be controlled from the platform electric panel during the assembly and disassembly processes.

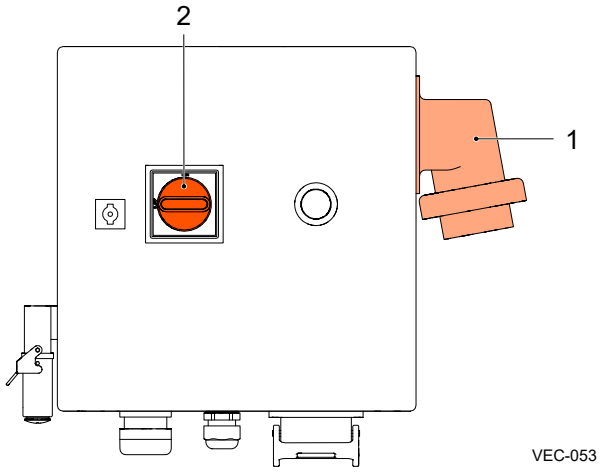


Figure 29 : Base electric panel

Base electric panel	
1	Electrical power supply connector (63A)
2	Main switch with padlock lock

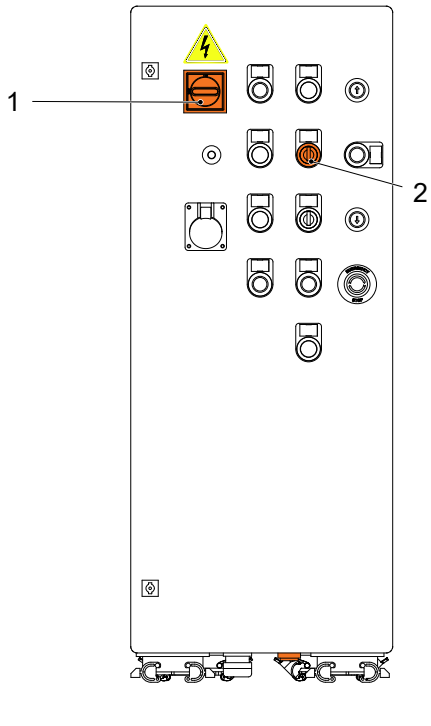


Figure 30 : Platform electric panel

Platform electric panel	
1	Disconnector with padlock lock
2	Mode of use selector (MH / TP / Smart)

5.2 Installation of the mast

5.2.1 General installation conditions

EN-AL-11-01-0008-03

WARNING

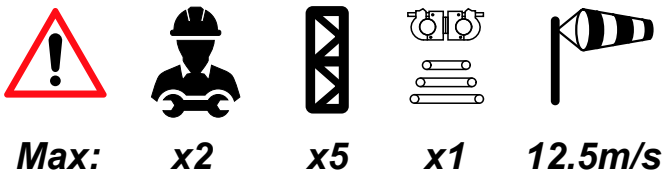
During the installation of the mast, it is important to plan the load so that it is minimal and does not exceed the maximum overhung mast height.

Maximum 2 persons on the platform.

Only load the number of mast sections needed to reach the next tie (maximum of 5 mast sections).

Only load the material needed for installation of the next tie.

WARNING



AL-MED056

WARNING

Do not carry out installation work on the lifting transportation system in adverse weather conditions, including wind conditions of more than 12.5 m/s, except where other more restrictive conditions are defined.

5.2.2 Preparation prior to the lifting transportation system

EN-AL-11-01-0009-03

WARNING

Risk of injuries. Only use the removable parts of the lifting transportation system for maintenance tasks or for installation of the mast.

Various parts of the lifting transportation system can be removed and allow installation and maintenance tasks to be carried out from inside the lifting transportation system.

The removable parts of the lifting transportation system that involve a risk of injury are equipped with a safety switch, which prevents the movement of the lifting transportation system if they are open or removed.

NOTICE

Remove or open the removable parts on the lifting transportation system that are essential for the installation and maintenance tasks to be carried out.

5.2.2.1 Folding step

EN-AL-11-01-0010-02

A folding step facilitates the task of positioning the mast sections and accessing their connecting bolts.

To deploy the step, it must be unlocked with an 8 mm triangular key.

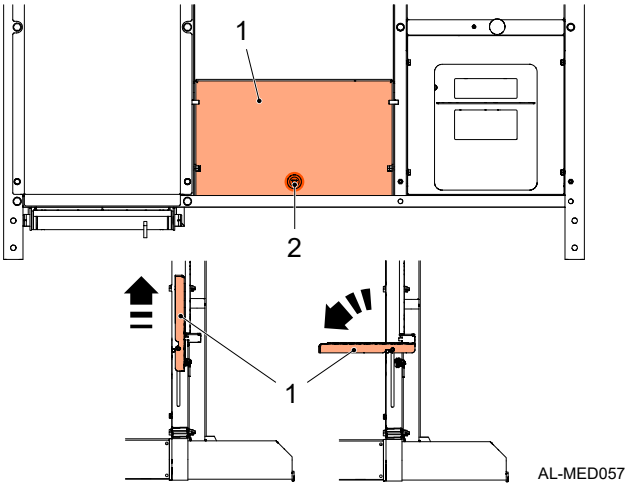


Figure 31 : Folding step

Folding step	
1	Folding step
2	Latch (8 mm triangular key)

5.2.2.2 Falling Object Protection System (FOPS)[1)]

EN-AL-11-01-0011-03B

WARNING

Risk of injuries. Check that nobody inside the lifting transportation system is exposed to dangers due to objects falling from higher levels if the FOPS is folded.

The platform are equipped with two cantilever FOPS that protects persons on the platform against falling objects and weather conditions. These two FOPS are connected with bolts that need to be removed before starting the folding process.

To fold the FOPS, the fixing bolts (x2) found on both sides must be removed. The fixing bolts must be reassembled once the FOPS is lowered to prevent it from unfolding due to the wind.

Once the FOPS has been folded, in most cases the FOPS should be removed from the platform to provide accessibilty to the mast zones and gates.

NOTICE

[1)] Installing FOPS is mandatory for TP or Smart modes of use.

Dismantling or folding the FOPS is only allowed in MH use mode and for installation and maintenance works.

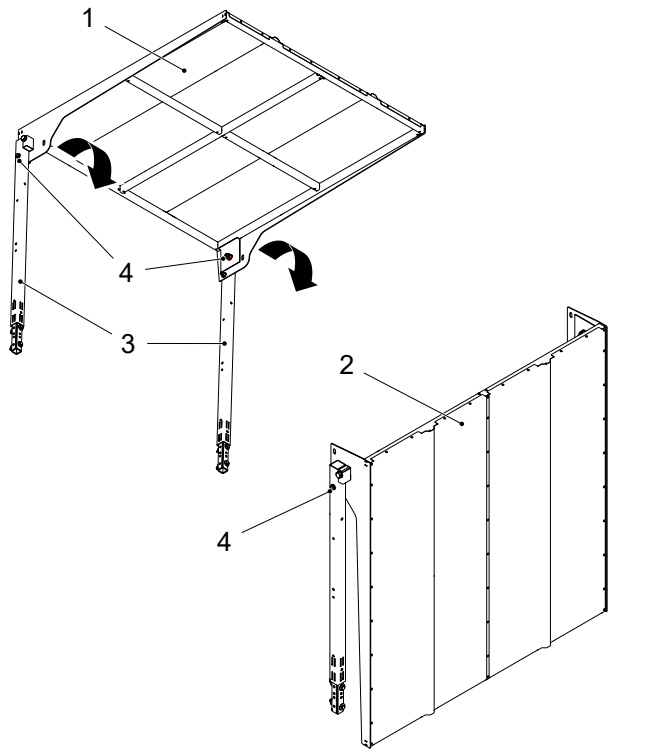


Figure 32 : Folding the FOPS

Folding the FOPS	
1	Falling Object Protection System (FOPS) deployed
2	Falling Object Protection System (FOPS) folded
3	Fixing pillars
4	Fixing screw

5.2.2.3 Mast railing

EN-AL-11-01-0012-03

The mast railing can only be opened when the lifting transportation system is not moving.

NOTICE

The mast railing is locked with a latch. To unlock it, an 8 mm triangle key is required.

Pull out from the two handles and fold it by turning it down until it reaches the stop.

5.2.2.4 Side railing

EN-AL-11-01-0013-03

WARNING

Risk of injuries. Always use the anchor point on the platform structure when opening the railing to fix the safety protective equipment for the technician.

The side railing features bolts in order to be dismantled and to increase the space available for installation and/or to access the erection ramp.

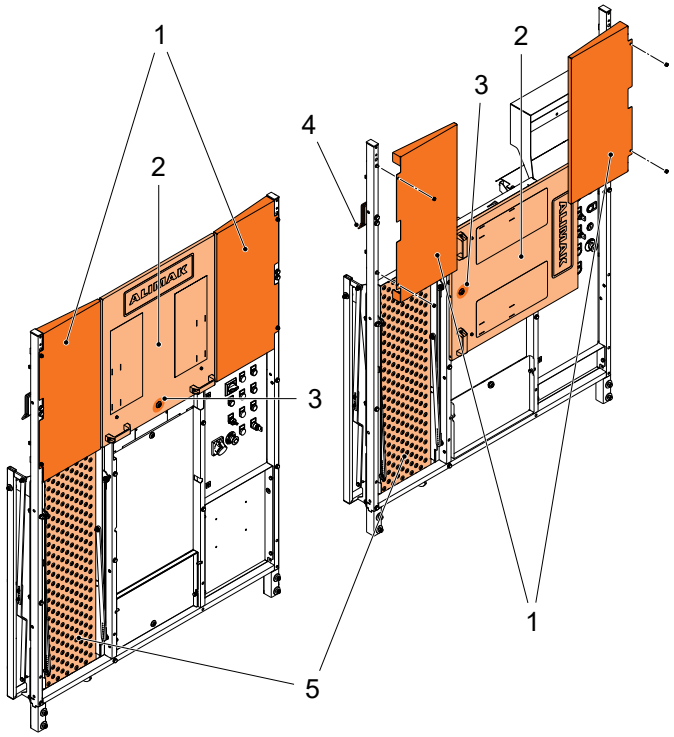


Figure 33 : Mast railing and side railing

Mast railing and side railing	
1	Side railing
2	Mast railing
3	Mast railing latch (8 mm triangle key)
4	Anchor point
5	Erection ramp

5.2.2.5 Erection ramp

EN-AL-11-01-0014-03

WARNING

Risk of injuries. Always use the anchor point on the erection ramp structure to fix the protective safety equipment for the technician.

The erection ramp is specifically designed to facilitate safe assembly of the ties and mast.

The erection ramp is equipped with a horizontal opening safety bar system.

The erection ramp features a latch that keeps it in the closed position while the platform is moving.

Only one person can stand on the ramp.

Maximum permitted load on the erection ramp is 150 kg.

NOTICE

The erection ramp is equipped with a switch that prevents the lifting transportation system from moving if the erection ramp is open.

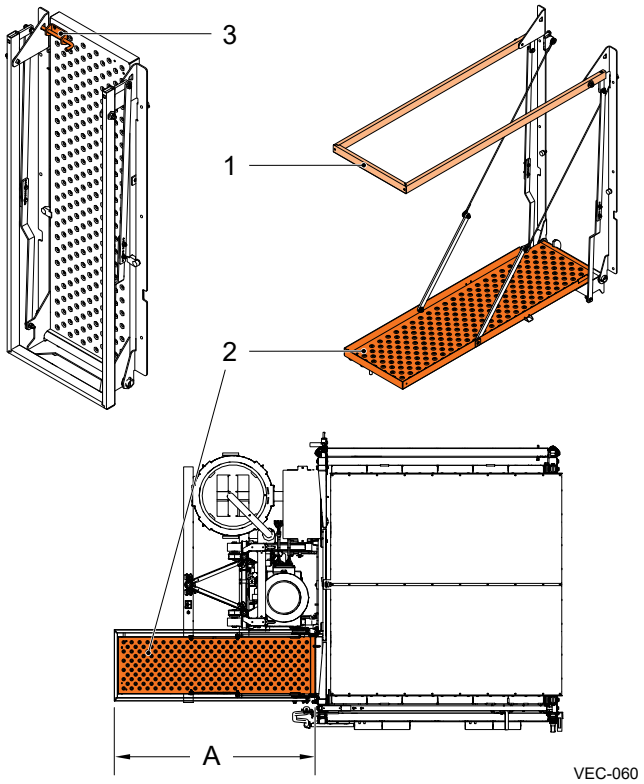


Figure 34 : Erection ramp

Erection ramp	
1	Horizontal safety bar
2	Erection ramp
3	Lock
A	Erection ramp length: 1300 mm

5.2.2.6 Erection crane

EN-AL-11-01-0015-03

WARNING

Risk of breakage. Consider the weight of optional accessories installed as part of the rated load.

An erection crane installed in the upper part of the drive unit, facilitates handling of the mast section during assembly and disassembly.

A limit switch connected to the platform electric panel monitors its position [Refer to section *Platform electric panel, see on page 24*].

The erection crane bracket is mounted on the same side as the erection ramp.

The weight of the crane is 35 kg and it has a maximum charging capacity of 80 kg.

- **Installation of the erection crane**

  1. Install the erection crane bracket at the top of the drive unit [Refer to figure *Erection crane, see on page 27*].
  2. Connect the limit switch of the erection crane to the platform electric panel.
  3. Insert the erection crane into the bracket, keeping the guide pin aligned with the slot [Refer to figure *Insertion of the erection crane into the bracket, see on page 27*].
  4. To dismantle the erection crane, proceed in reverse order to that described for installation.

NOTICE

It is not necessary to remove the crane bracket for normal use of the machine.

It is only necessary to lock the position of the swivel part using the captive locking pin [Refer to figure Erection crane, see on page 27].

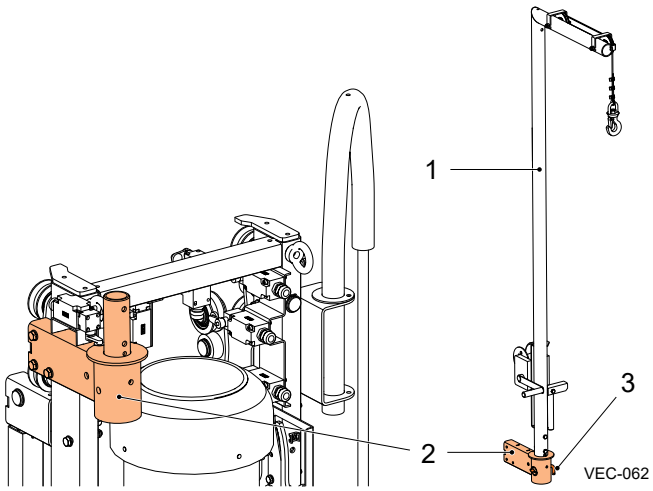


Figure 35 : Erection crane

Erection crane	
1	Erection crane
2	Erection crane bracket
3	Locking pin

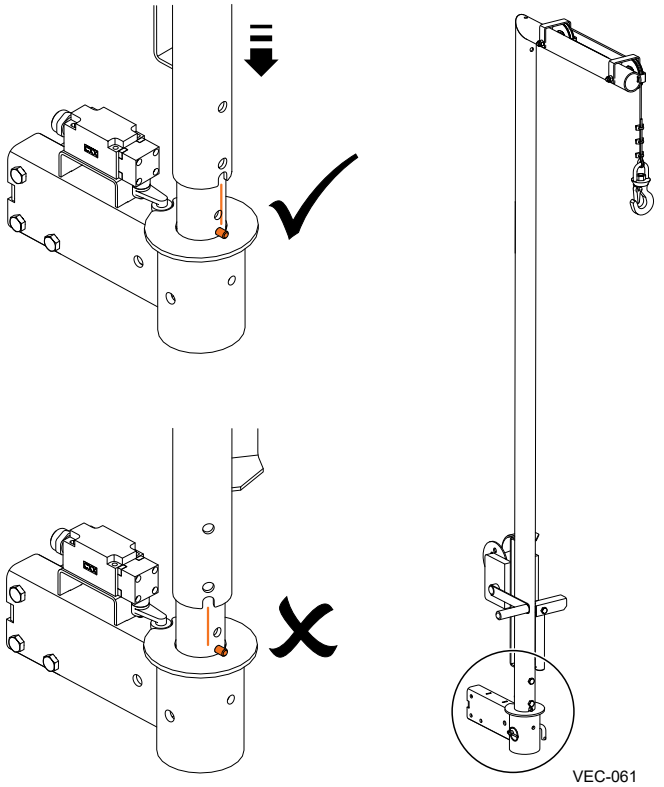


Figure 36 : Insertion of the erection crane into the bracket

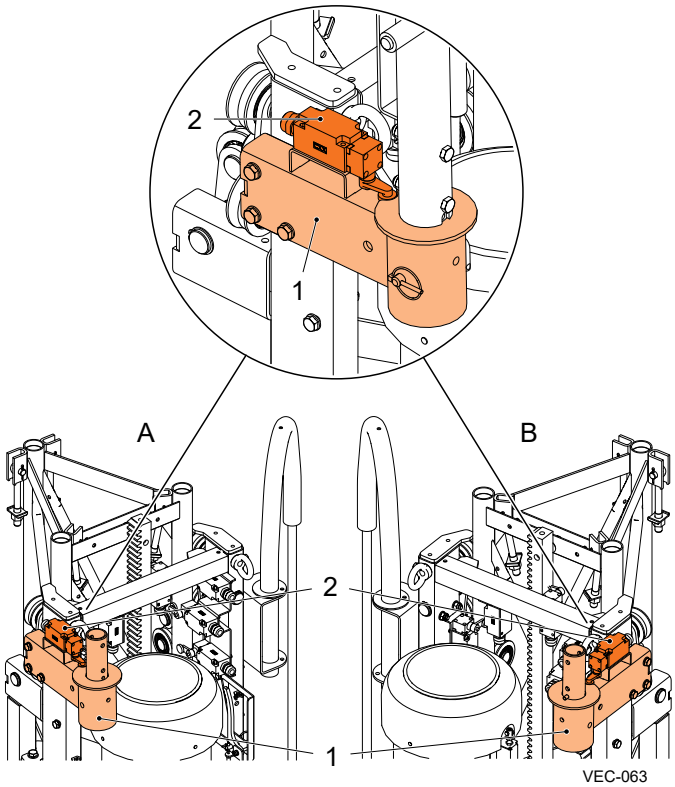


Figure 37 : Limit switch

Limit switch	
1	Erection crane bracket
2	Limit switch
A	Assembly with erection ramp on the left side
B	Assembly with erection ramp on the right side

5.2.3 Mast section connection

EN-AL-11-01-0016-03

DANGER

Danger of death or serious injury. The incorrect torque on the mast section fixing bolts may cause failure of the mast connections and, as a result, the lifting transportation system to fall.

WARNING

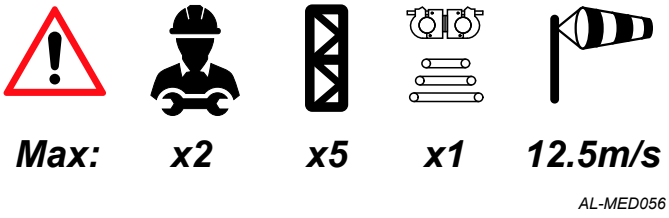
Fit the safety washer correctly to prevent the mast from detaching in case of loss of the tightening torque.

If the washer is missing, the bolt must be changed before continuing with the installation [Refer to figure Installation of the mast, see on page 29].

WARNING

For assemblies with the help of a tower crane, the installation of sets of up to 4 mast sections is possible.

WARNING



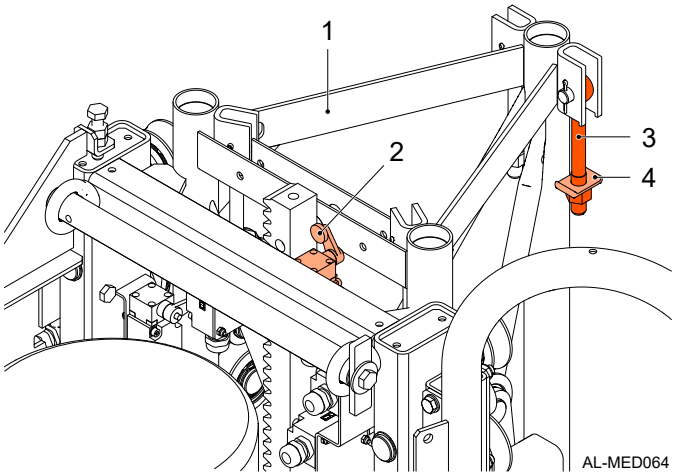
1. Before starting, check that the machine is in TP Mode.
2. Load the mast sections necessary to reach the next tie into the lifting transportation system.
3. Press and hold the UP button on the platform electric panel to ascend the lifting transportation system.

   Observe the rack presence detection switch through the perforated area in the platform.
4. Stop the ascent when the mast detection limit switch is close to the end of the last mast section.
5. To position and bolt the mast, it is recommended to open the mast railing, folding step and erection ramp.

   In the event of manual assembly, use the erection crane to lift the mast.
6. Check all bolts are correctly tightened, moving in a circle until a complete turn has been completed, obtaining the correct torque[1)].
7. Repeat the process described above from stage 2 to stage 6, until the mast installation has been completed.

NOTICE

[1)]Tighten the four M16 fixing bolts (10.9) with a tightening torque of 80 N·m.



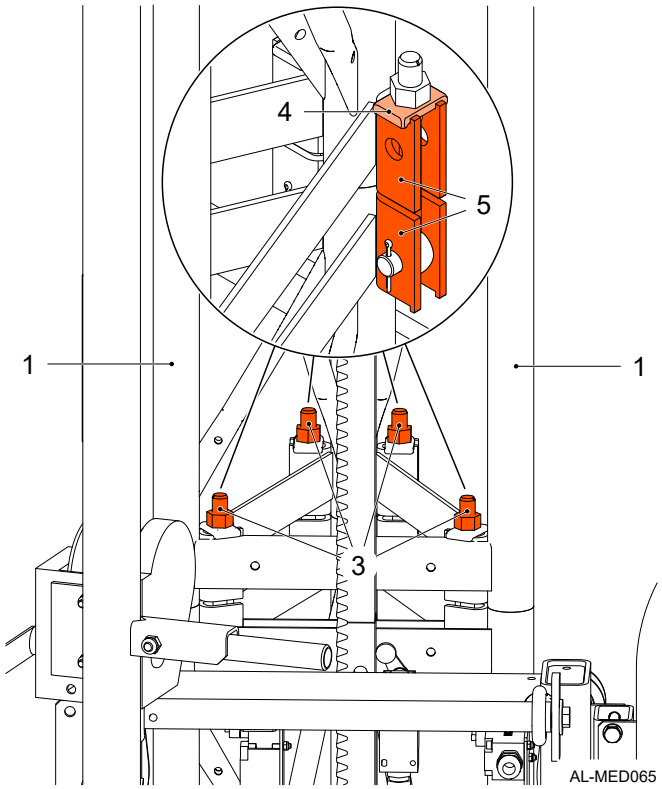


Figure 38 : Installation of the mast

Installation of the mast	
1	Mast
2	Rack presence switch
3	Fixing bolt (4x)
4	Safety washer (4x)
5	Fixing plates

5.2.4 Installation of the mast ties

EN-AL-11-01-0017-02

WARNING

Always use EN74B flanges and apply a min. tightening torque of 50 Nm.

Once the mast installation is complete, install the first tie [Refer to figure *Distance between ties, see on page 13*].

Check that the mast is level vertically.

Install the mast ties at the distances established in the assembly planning.

1. Fix the wall brackets (only for facade assembly).
2. Fix the mast tie frames [Refer to section *Tie frames, see on page 14*].
3. Fix the two tie tubes to the wall brackets (only for facade assembly).
4. Fix the set of two tie tubes to the tie frame with swivel clamps.
5. Fix the two tie tubes and the brace tube that joins them with swivel clamps [Refer to section *Brace tube, see on page 30*].

NOTICE

Always fix the tie tubes to the dropdown tube in the area between the two tubes that form the tie frame [Refer to figure Tie position to the tie frame, see on page 14].

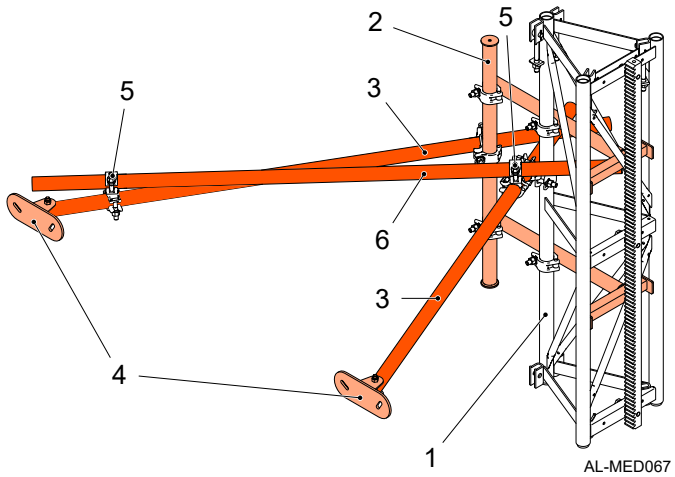


Figure 39 : Installation of the mast ties (side tie structure)

Installation of the mast ties (side tie structure)	
1	Mast
2	Tie frame
3	Side tie tubes
4	Wall brackets (only for facade assembly)
5	Swivel clamp EN74 type B
6	Brace tube

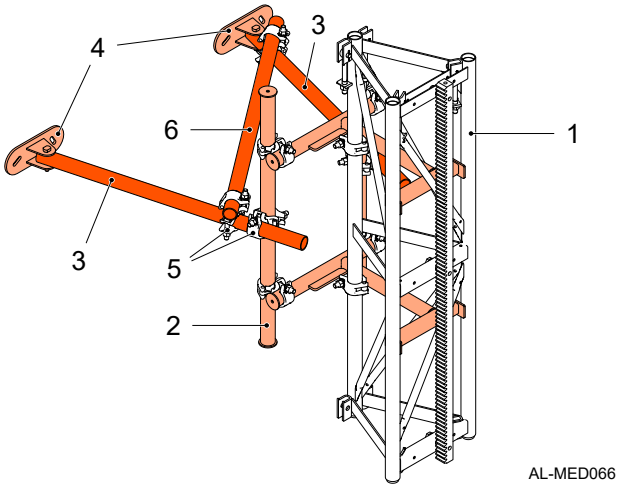


Figure 40 : Installation of the mast ties (rear tie structure)

Installation of the mast ties (rear tie structure)	
1	Mast
2	Rear tie frame
3	Rear tie tubes
4	Wall brackets (only for facade assembly)
5	Swivel clamp EN74 type B
6	Brace tube

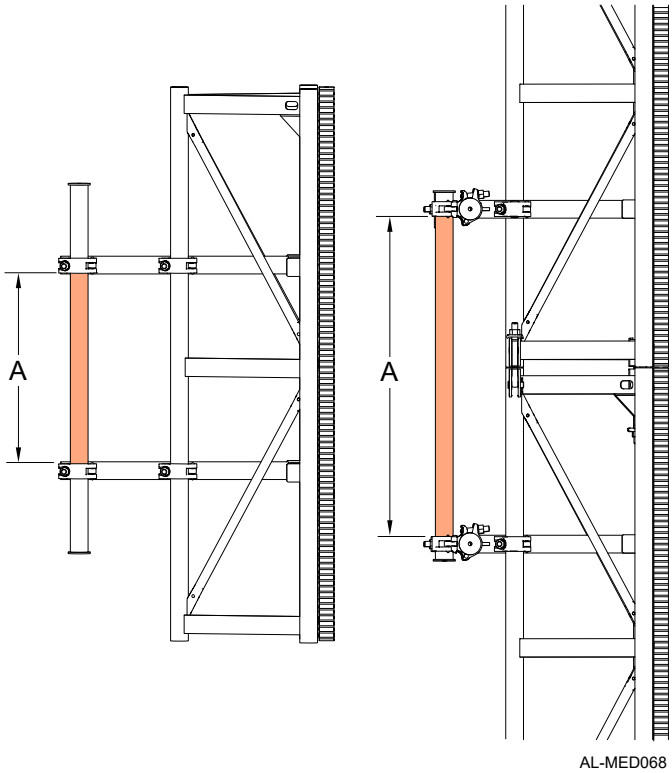


Figure 41 : Area permitted for ties

Area permitted for ties	
A	Area permitted for ties

5.2.5 Brace tube

EN-AL-11-01-0018-02

The brace tube provides appropriate resistance and rigidity for the ties to the wall.

Minimise distances d1 and d2 as much as possible [Refer to figure *Brace tube fixing, see on page 30*] between the swivel clamps and fixing clamps of the brace tube for the ties to the wall.

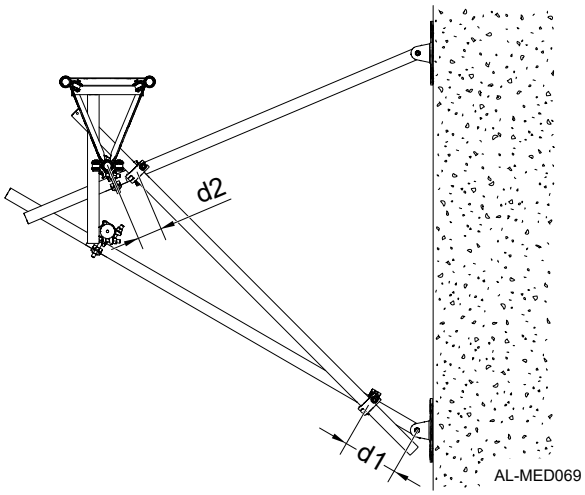


Figure 42 : Brace tube fixing

5.2.6 Cable guiding system

EN-AL-11-01-0019-03B

WARNING

Install the cable guides at the distances described. In areas with wind speeds exceeding 12.5 m/s, reduce the distance to 4.5 m.

WARNING

Lubricate the cable management system [Refer to appendix Greasing the lifting transportation system, see on page 46 and appendix Lubricants, see on page 46].

WARNING

Apply a minimum tightening torque of 50 Nm to the cable guide clamp.

1. Fix the first cable guide with a clamp to the rear mast tube at a height of 3 metres from the ground [Refer to figure *Cable guiding system, see on page 31*].
2. Fix the second and third cable guides with a clamp to the mast every 3 metres above the first cable guide.
3. Fix the rest of the cable guides with a clamp to the mast every 6 metres.

NOTICE

Position the cable guides so that the cable bracket passes as close as possible to the joint between the rubber parts.

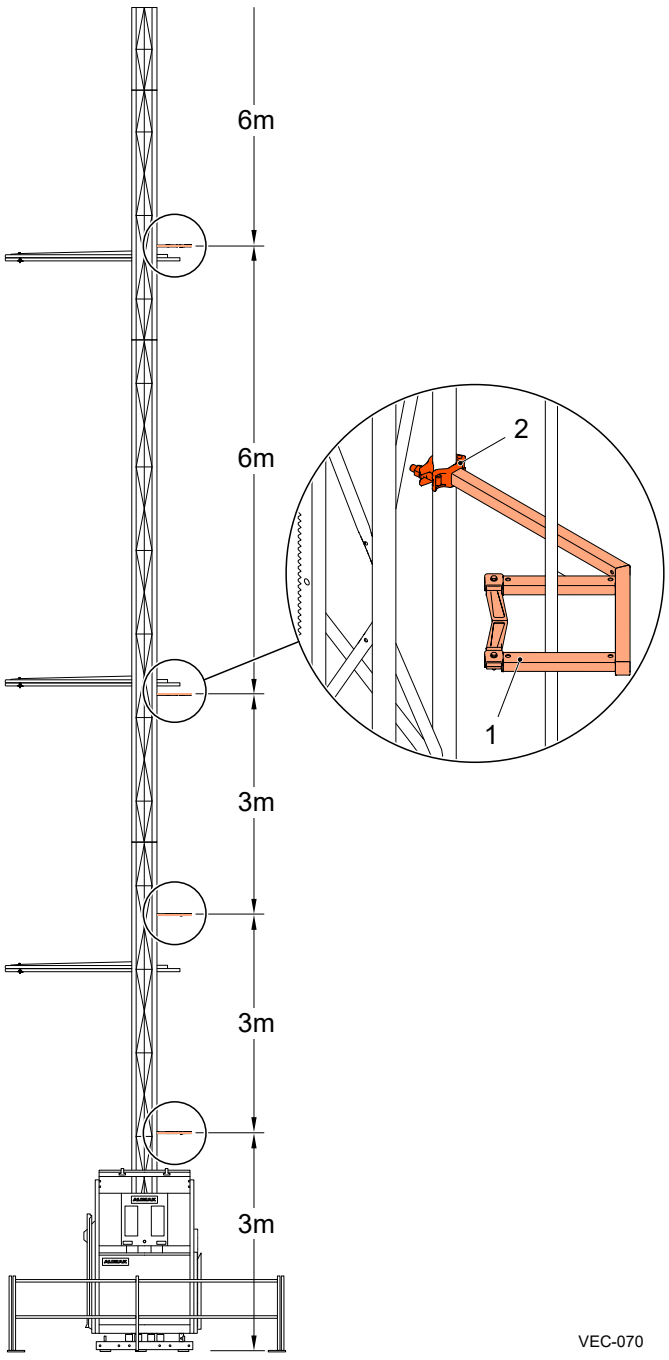


Figure 43 : Cable guiding system

Cable guiding system	
1	Cable guide
2	Clamp

5.2.7 Installation and adjustment of the top limit and emergency limit cams

5.2.7.1 Installation of the cam bracket

EN-AL-11-01-0020-02

To assemble the cams, a bracket must be installed on the mast.

This bracket can be mounted on the left or right side, depending on the cams to be installed.

Two assemblies are possible, which will depend on the height at which the cams must be installed: assembly on the same section or between two mast sections [Refer to figure *Installation of the cam bracket, see on page 31*].

M8x50 bolts are used to fix the bracket to the mast. It is recommended to install them with the head on the inside to prevent interference with the mast section bolts during assembly. The tightening torque must not exceed 12 Nm.

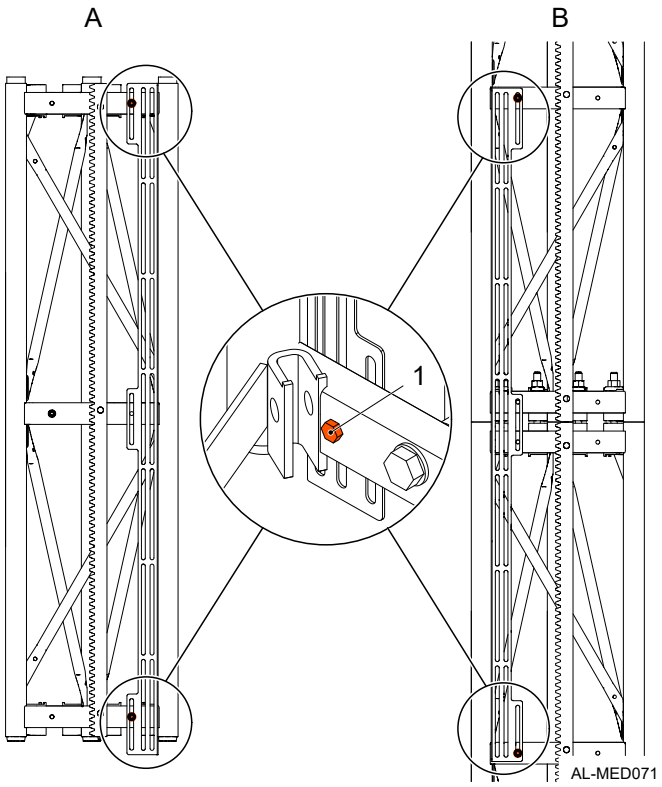


Figure 44 : Installation of the cam bracket

Installation of the cam bracket	
1	Installation of the cam bracket fixing bolt
A	Installation of the cam bracket on the same mast section
B	Installation of the cam bracket between two mast sections

5.2.7.2 Installation and adjustment of top limit, emergency top limit and landing cams

EN-AL-11-01-0021-03B

Install the top limit and emergency top limit cams on the last mast section.

Adjust the cams without exceeding the maximum permitted height of the mast and respecting the dimensions indicated for the installation of the top limit and emergency top limit cams [Refer to figure *Top limit, emergency top limit and landing cams, see on page 32*].

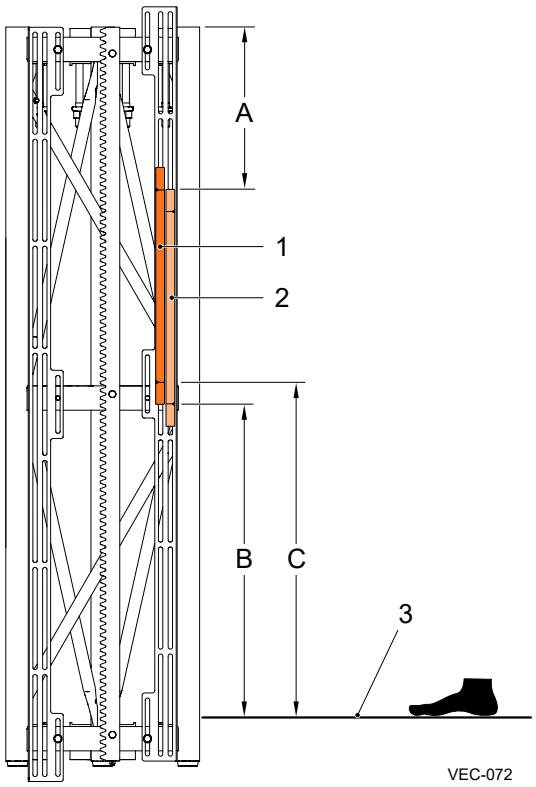


Figure 45 : Top limit and emergency top limit cams

Top limit and emergency top limit cams	
1	Emergency top limit cam
2	Top limit cam
3	Top stop level
A	min. 780 mm from the top end of the mast
B	1600 mm
C	1640 mm

NOTICE

It is mandatory to install the top limit cam and emergency top limit cam on both masts.

5.3 Access to different landing levels

5.3.1 Upper landing doors

EN-AL-11-01-0022-03

Install the upper landing doors on the ledges of the structure or scaffolding [Refer to figures *Reduced height sliding landing door, see on page 33*, *Reduced height sliding Celer landing door, see on page 34* and *Reduced height folding landing door, see on page 35*].

5.3.1.1 Reduced height sliding landing door

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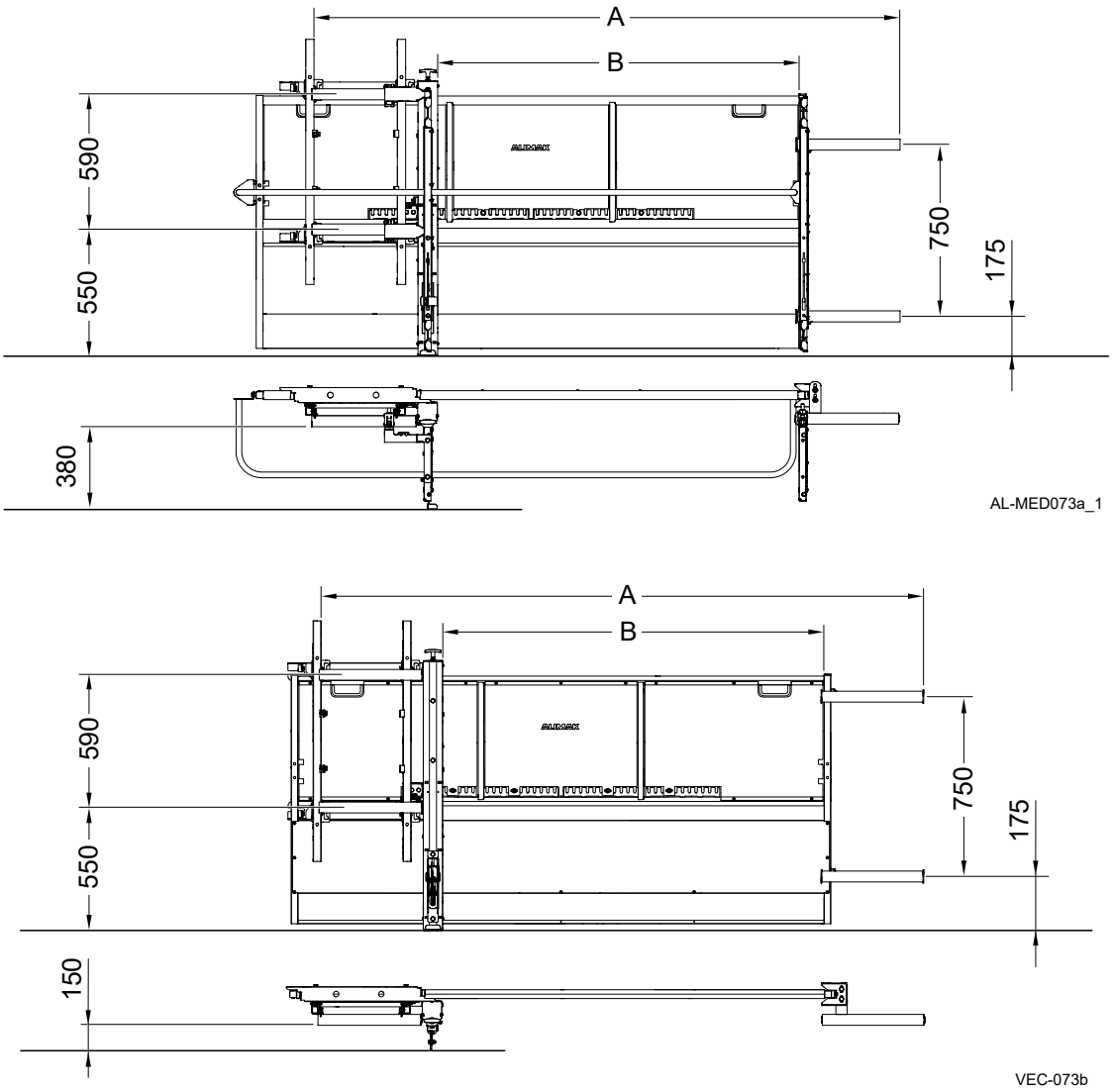
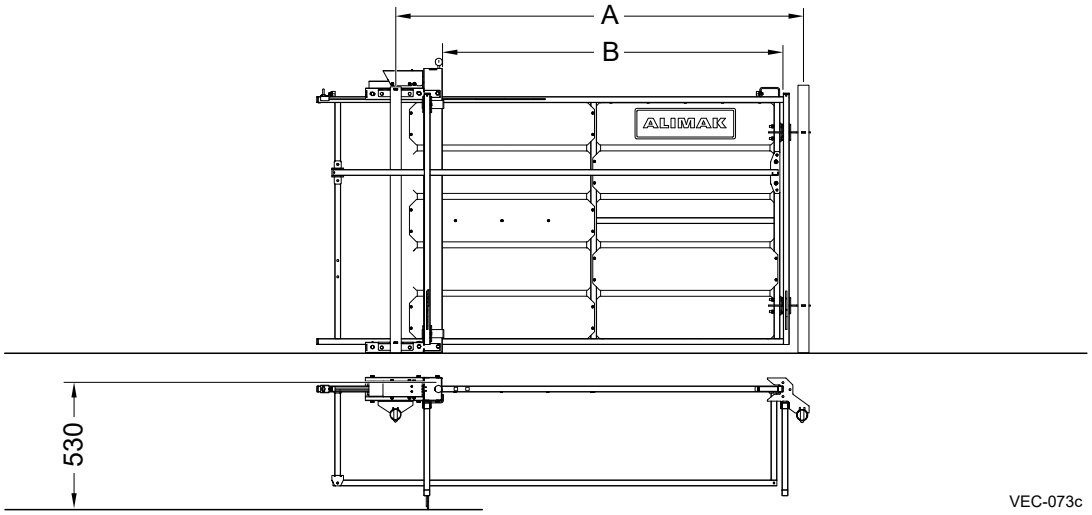


Figure 46 : Reduced height sliding landing door

Reduced height sliding landing door	
A	Opening + 950
B	Opening = 1500

5.3.1.2 Reduced height sliding Celer landing door

EN-AL-11-01-0025-03B



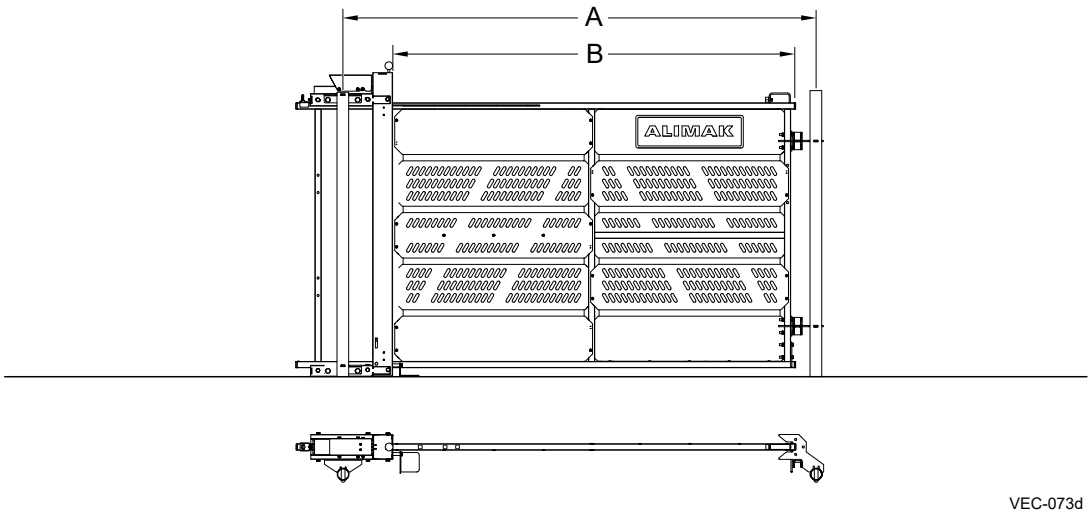
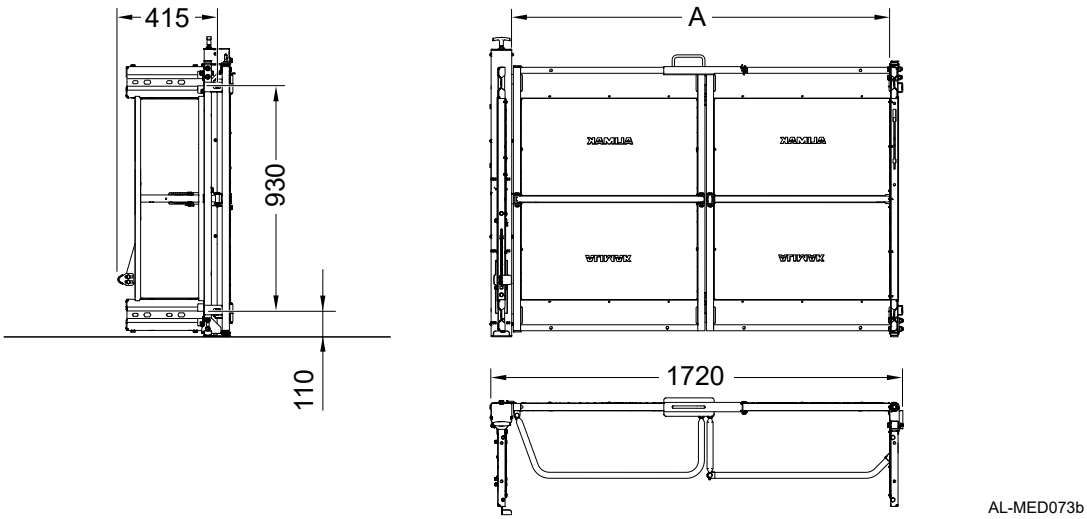


Figure 47 : Reduced height sliding Celer landing door

Reduced height sliding Celer landing door	
A	Opening + 400 mm
B	Opening = 1500 mm (Vectio 350 20-32 and Vectio 350 20-32D) Opening = 1350 / 1500 mm (Vectio 350 20-32 twin assembly)

5.3.1.3 Reduced height folding landing door

EN-AL-11-01-0024-03



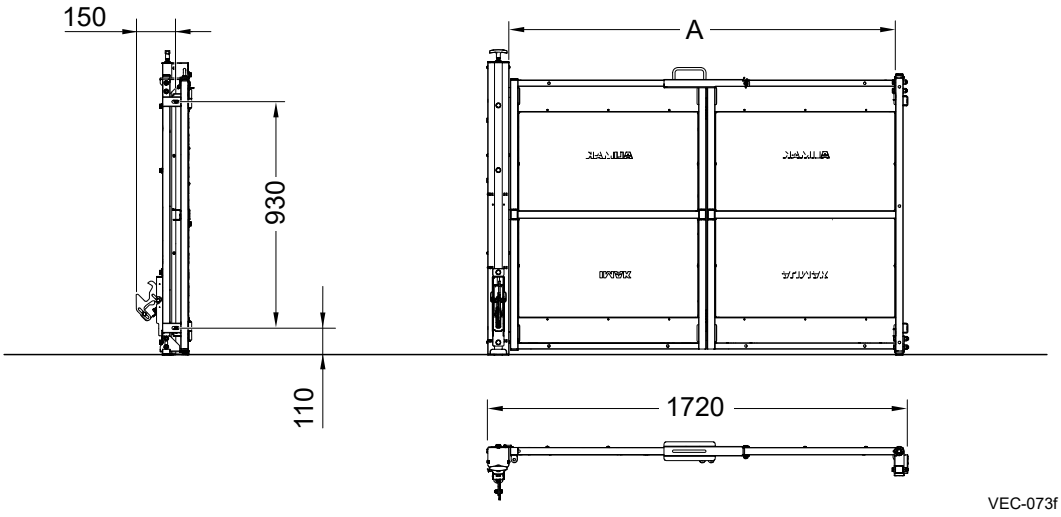


Figure 48 : Reduced height folding landing door

Reduced height folding landing door	
A	Opening = 1570

5.3.2 Landing cam

EN-AL-11-01-0025-02

WARNING

Danger of death or serious injury. The landing cam must never be installed if the landing door is not installed.

Once the landing door installation is complete, a landing cam must be installed so that the lifting transportation system stops at an upper level.

To install the landing cam, it may be necessary to install a cam bracket [Refer to figure *Installation of the cam bracket, see on page 31*].

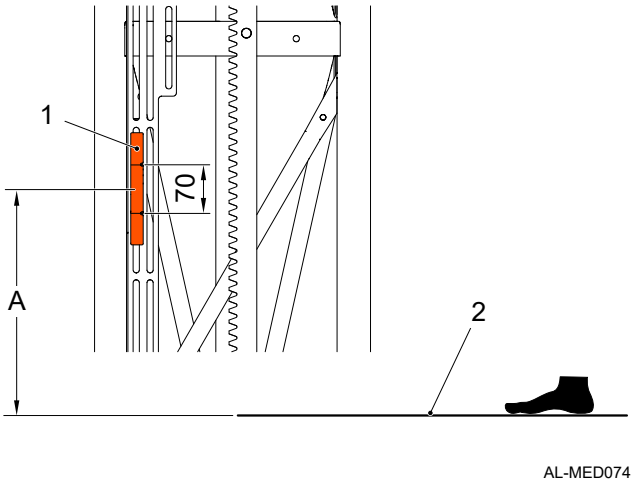


Figure 49 : Landing cam

Landing cam	
1	Landing cam
2	Stop level
A	1555 mm

5.3.3 Electrical connections

EN-AL-11-01-0026-03

1. Connect the connector for the door electric switch to the control panel on each installation level [Refer to figure *Connection of the door electric switch, see on page 36*].

NOTICE

Depending on the installation, it may be necessary to install cable runs of different lengths.

2. Remove the blind connector from the base electric panel and connect the connector for the control panel of the level immediately above [Refer to figure *Base electric panel connection, see on page 36*].
3. Connect the blind connector to the control panel of the last upper level installed and check the operation of the door's electric switch.

   The door's electric switch interrupts the lifting transportation system control when the door is open.
4. Install the rest of the doors on the different levels of the installation.
5. Guide and fix the power and control cable from the control panel located on the previous level.
6. Connect the power and control cable to the control panel of the upper level.
7. Connect the blind connector to the control panel of the last upper level installed.

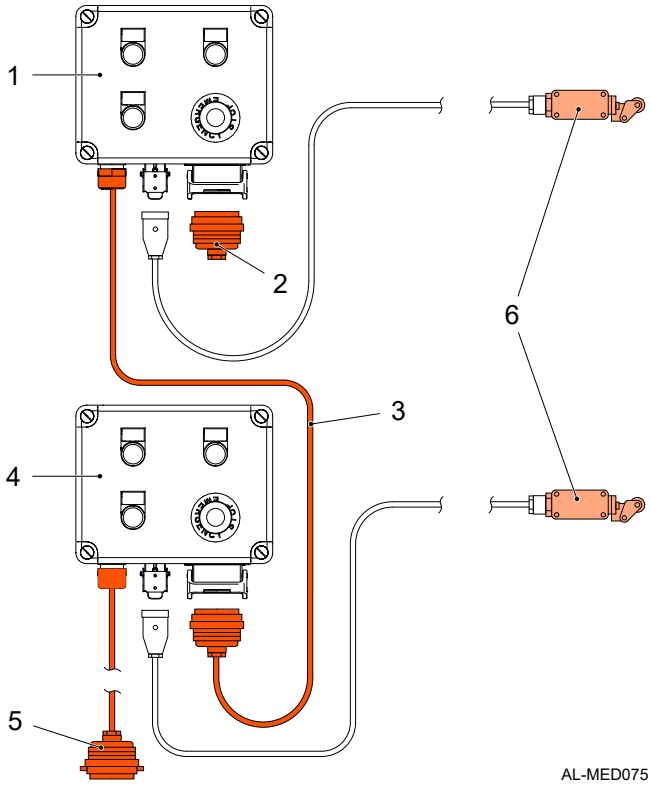


Figure 50 : Connection of the door electric switch

Connection of the door electric switch	
1	Upper level control panel
2	Blind connector
3	Connection cable to the control panel of the level immediately below
4	Lower level control panel
5	Connection cable to the base frame control panel
6	Door electric switch

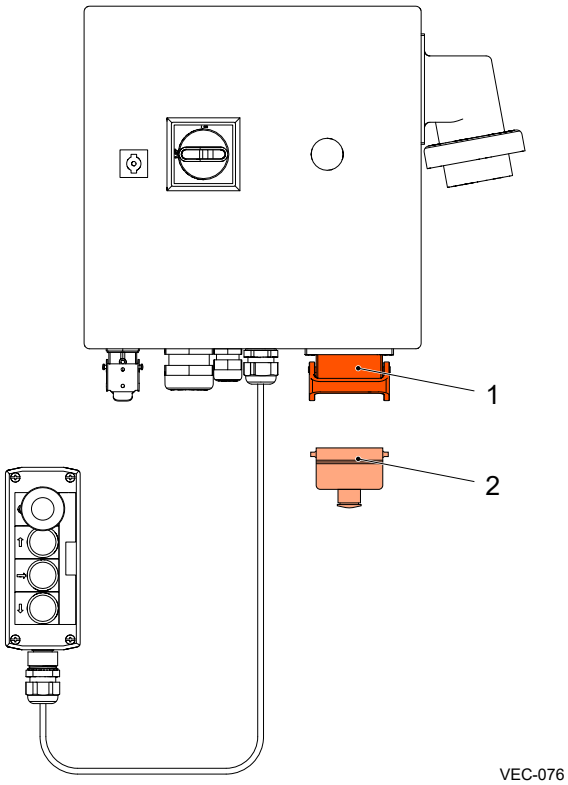


Figure 51 : Base electric panel connection

Base electric panel connection	
1	Landing control panel connector
2	Blind connector

5.4 Checks prior to commissioning

EN-AL-11-01-0027-03

Before commissioning, check that the following parts of the lifting transportation system are present, in good condition and operate correctly:

- Ties.
- Mast fixing.
- Bottom and top limit switch.
- Emergency bottom and top limit switch.
- Controls and emergency-stop button in TP Mode.
- Controls and emergency-stop button in MH Mode.
- Controls and emergency-stop button in Smart Mode.
- Cable and cable guiding system.
- Uncoiling and coiling the cable in the cable collect bin.
- Overspeed safety device.

Once the checks prior to commissioning have been carried out:

- Lubricate the rack.
- Restore all of the protections that were removed for installation (folding FOPS and mast railings).

NOTICE

If necessary, consult the Operator manual for information on using the lifting transportation system.

NOTICE

Depending on the local regulations, it may be necessary to carry out additional checks prior to commissioning.

5.5 Disassembly

EN-AL-11-01-0028-03

WARNING

Do not exceed the maximum permitted load during the process to disassemble the lifting transportation system [Refer to section General specifications, in the Operator manual].

WARNING

Do not carry out disassembly work on the lifting transportation system in adverse weather conditions, including wind speeds of more than 12.5 m/s, except where other more restrictive conditions are defined.

WARNING

Do not remove the upper tie unless the mast sections above the tie have already been removed and there is no load on the lifting transportation system.

WARNING

Check that no alterations have occurred in the installation and that the first tie is correctly installed.

1. Check the correct condition of the different connections and the operation of the safety devices before removing the lifting transportation system.
2. Turn the Mode of use selector on the platform electric panel to the TP Mode position [Refer to figure *Platform electric panel, see on page 24*].
3. Ascend the lifting transportation system to the top level, remove the enclosure door and the activation cam for the enclosure door interlocking system.
4. Remove the mast sections above the last tie[1)].
5. Descend the lifting transportation system to the bottom level and unload the mast sections.
6. Ascend the lifting transportation system to the top level. Once the upper mast sections have been removed, remove the upper tie.
7. Repeat steps 3 to 6 until all of the mast sections have been removed and the lifting transportation system is located on the bottom level.

8. Turn the main switch on the base electric panel [Refer to figure *Base electric panel, see on page 24*] and the platform electric panel [Refer to figure *Platform electric panel, see on page 24*] to the OFF position.
9. Disconnect the electrical power supply connector.
10. Store the cables and electrical components correctly.

NOTICE

[1] If there is a tower crane available on site, it is possible to remove up to four mast sections and lower them with the crane to the bottom level, where they can be removed more easily.

6 Maintenance

EN-AL-13-01-0001-03

WARNING

Turn the Mode of use selector on the platform electric panel to the TP Mode position before carrying out any maintenance work.

If a maintenance task cannot be completed, turn off the power to the lifting transportation system, lock the main switch and place a sign indicating “Maintenance in progress”.

This manual does not exhaustively describe operations, general use tools, general safety protocols, nor does it specify the inspection and maintenance sequence of the lifting transportation system.

Only maintenance technicians are authorised to carry out maintenance on the lifting transportation system following the installation and maintenance checklist.

The maintenance instructions for the lifting transportation system are part of the familiarization procedure.

Depending on the conditions of use and operation of the lifting transportation system or according to local regulations, inspections may be required more frequently than established in the maintenance planning.

NOTICE

Record the results of the maintenance inspections and repairs carried out on the lifting transportation system in the appendix: Installation and maintenance log.

6.1 Maintenance planning

EN-AL-11-01-0001-03B

Frequency	Carried out by	Function / System
Monthly or every 40 operating hours (whichever occurs first)	Maintenance technician	Racks and pinions (grease)
		Informative signs and documentation
		Overspeed safety device (inspection)
		Drive system
		Guiding system
		Electromagnetic motor brake (braking distance)
		Cable management system
		Mechanical locking systems
Every 2 months or 120 operating hours (whichever occurs first)	Maintenance technician	Mast, ties and adjacent structures
		Emergency limit switch and emergency limit cams
		Doors and enclosures
		Base frame
		Indicator lights, connectors and acoustic buzzer
		Rack and pinions (wear)
Every 3 months or 400 operating hours (whichever occurs first)	Maintenance technician	Guiding system (wear)
		Motor
		Electromagnetic motor brake (wear)
		Grease
		Electric panels
		Overload system
		Platform levelling system
Every 6 months or 600 operating hours (whichever occurs first)	Maintenance technician	Overspeed safety device (check)

Frequency	Carried out by	Function / System
Annually or every 1000 operating hours (whichever occurs first)	Maintenance technician	Electrical system
		Corrosion, damage and wear
Annually	Maintenance technician	General inspection
Every 2 years or 2000 operating hours (whichever occurs first)	Maintenance technician	Drive system (lubricant replacement)
Every 8 years	Maintenance technician	Overspeed safety device (replacement)

6.1.1 Monthly or every 40 operating hours (whichever occurs first)

EN-AL-13-01-0003-03B

Function / System	Operations
Racks and pinions (grease)	**1.** Visually check if the rack and pinions are dirty or have metal shavings and grease [Refer to appendix *Greasing the lifting transportation system, see on page 46*]. **The rack and pinions must be clean and without metal shavings.** **Clean and spread lubricant along the rack during the down movement of the lifting transportation system.**
Informative signs and documentation	**1.** Visually check the condition of the documentation, signs and stickers included with the lifting transportation system. **The documentation, signs and stickers included with the lifting transportation system should always be available, in good condition and legible.**
Overspeed safety device (inspection)	**1.** Consult the operator if the overspeed safety device has activated or has been observed to produce any unusual noise since the last revision.
Drive system	**1.** Check for lubricant leaks in the gear box. **If necessary, fill with lubricant and replace the seals.**
Guiding system	**1.** Check the guide roller fixing clips. **The guide roller fixing clips must be correctly installed and in good condition.**
Electromagnetic motor brake (braking distance)	**1.** Check that the lifting transportation system stops within the specified limits [Refer to appendix *Electromagnetic motor brake check, see on page 49*]. **The lifting transportation system must stop within the specified limits.**
Cable management system	**1.** Visually check the cable management system **The cable guides must be securely fixed and positioned to correctly guide the cable.** **The cable must not have any damage on the insulating cover, indentations, compression marks or heat marks.** **The rubber tabs of the cable guides must not have cracks or any other damage.** **Clean the cable collect bin.**
Mechanical and electromechanical locking systems	**1.** Check the mechanical and electromechanical locking systems on threshold ramps, doors and enclosures. **The components of the mechanical and electromechanical locking systems on threshold ramps, doors and enclosures must not have dents, cracks, corrosion or any other damage.**

6.1.2 Every 2 months or 120 operating hours (whichever occurs first)

EN-AL-13-01-0004-03

Function / System	Operations
Mast, ties and adjacent structures	**1.** Visually check the condition of the mast sections. **The mast sections must not have dents, cracks, corrosion or any other damage.** **2.** Check that the mast connection system is tightly fastened and in good condition. **The mast connection system must be tightly fastened and in good condition.** **3.** Check the fixing of the mast to the base frame. **The mast must be correctly fixed to the base frame.** **4.** Visually check the condition of the ties. **The ties must not have dents, cracks, corrosion or any other damage.** **5.** Check that the tie bolts are tightly fastened. **The bolts must be tightly fastened.** **6.** Visually check that no scaffolding element or adjacent structure interferes with the lifting transportation system's travel path. **The lifting transportation system's travel path must be free of obstacles.**
Emergency limit switch and emergency limit cams	**1.** Descend the lifting transportation system to the bottom level (bottom limit switch activated) and check the fixing of the emergency bottom limit switch and the emergency bottom limit cam. **The emergency bottom limit switch and the emergency bottom limit cam must be fixed correctly.** **2.** Connect the drop control station and turn the Mode of use selector on the platform electric panel to TP Mode. **3.** Press and hold the TEST button on the drop test control station to descend the lifting transportation system without reaching the activation speed of the overspeed safety device and until the emergency bottom limit switch comes into contact with the emergency bottom limit cam. **The lifting transportation system ready indicator light (green) should turn off.** **4.** Disconnect the drop control station. **5.** Press the UP button on the platform electric panel. **The platform should not ascend.** **6.** Turn and hold the Bypass selector on the platform electric panel in Bypass Mode. **The lifting transportation system ready indicator light (green) should turn on.** **7.** Press the UP button on the platform electric panel to ascend the platform a few centimetres until the emergency bottom limit switch is deactivated. **Once the emergency bottom limit switch has been deactivated, the lifting transportation system can be used.** **8.** Turn the Mode of use selector on the platform electric panel to TP Mode. **9.** Ascend the platform until the top limit switch comes into contact with the top limit cam and check the fixing of the emergency top limit cam. **The emergency top limit cam must be correctly fixed.**
Doors and enclosures	**1.** Check that the bolts on the door guide rollers are tightly fastened. **The bolts must be tightly fastened.** **2.** Check the condition of the door guide rollers. **The door guide rollers must be adjusted and in good condition.** **3.** Check the sliding gate stops. **The sliding gate stops must be correctly fixed and in good condition.**
Base frame	**1.** Check the buffers on the base frame. **The buffers on the base frame must be correctly fixed and in good condition.** **2.** Check that the adjustable base plates on the base frame are in contact with the ground. **The adjustable base plates on the base frame must be in contact with the ground.**

Function / System	Operations
Indicator lights, connectors and acoustic buzzer	**1.** Visually check the condition of the components installed in the platform electric panel and that they work correctly. **The components installed in the platform electric panel (indicator lights, connectors and acoustic buzzer) must be in good condition, correctly installed and work correctly.**
Rack and pinions (wear)	**1.** Check drive pinion and rack wear [Refer to appendix *Drive pinion and rack wear measurement, see on page 54*].

6.1.3 Every 3 months or 400 operating hours (whichever occurs first)

EN-AL-13-01-0005-03B

Function / System	Operations
Guiding system (wear)	**1.** Check the guide roller bearings. **The guide roller bearings must be in good condition.** **2.** Check guide roller wear [Refer to appendix *Guiding system wear measurement, see on page 55*]. **3.** Check mast wear [Refer to appendix *Guiding system wear measurement, see on page 55*].
Motor	**1.** Visually check the motor cover and fan. **The protective fan cover must be in good condition.** **The fan must not have any damage and must rotate with the shaft.** **The motor cover and fan must be free of dirt. If necessary, clean any dirt from the motor cover and fan.**
Electromagnetic motor brake (wear)	**1.** Check the electromagnetic motor brake [Refer to section instructions for checking and adjusting in the appendix *Electromagnetic motor brake check, see on page 49*].
Grease	**1.** Grease the lifting transportation system components [Refer to appendix *Greasing the lifting transportation system, see on page 46*].
Electric panels	**1.** Visually check the condition of the electric panels. **The electric panels must be correctly secured and must not have dents, cracks, corrosion or any other damage.**
Overload system	**1.** Carry out an overload test on the lifting transportation system [Refer to appendix *Overload system test and adjustment, see on page 56*].
Platform levelling system	**1.** Check the platform levelling system **When the platform is correctly adjusted, it should stop at any height with the platform level to within 2°.** **If the platform is not correctly adjusted, adjust the levelling system [Refer to appendix *Platform levelling adjustment, see on page 59*].**

6.1.4 Every 6 months or 600 operating hours (whichever occurs first)

EN-AL-13-01-0006-03B

Function / System	Operations
Overspeed safety device (check)	**1.** Carry out a test on the overspeed safety device [Refer to appendix *Overspeed safety device, see on page 51*].

6.1.5 Annually or every 1000 operating hours (whichever occurs first)

EN-AL-13-01-0007-02

Function / System	Operations
Electrical system	**1.** Check the electrical cables, elements for securing cables and electrical connections. **The electrical cables must not have any damage on the insulating cover.** **The elements for securing cables and electrical connections must be in good condition and installed correctly.**
Corrosion, damage and wear	**1.** Visually check the condition of the machine components and look for any areas of wear and/or excessive corrosion.

6.1.6 Annually

EN-AL-13-01-0008-02

Function / System	Operations
General inspection	**1.** Contact Alimak to carry out a general inspection of the lifting transportation system.

6.1.7 Every 2 years or 2000 operating hours (whichever occurs first)

EN-AL-13-01-0009-03B

Function / System	Operations
Drive system (lubricant replacement)	**1.** Change the oil in the gear box of the lifting transportation system[1)] [Refer to appendix *Greasing the lifting transportation system, see on page 46*].

NOTICE

[1)]Do not spill lubricant on the overspeed safety device, as this may reduce the effectiveness of the device or even render it unusable.

6.1.8 Every 8 years

EN-AL-13-01-0010-02

Function / System	Operations
Overspeed safety device (replacement)	**1.** Contact Alimak to replace the overspeed safety device of the lifting transportation system.

7 Storage / Dismantling and recycling

7.1 Maintenance in the event of long-term storage

EN-AL-14-01-0001-02

The following precautions must be taken when storing the lifting transportation system outdoors for a period of more than 6 months (reduced to 3 months if stored in places with constant temperatures below zero or where there is a high level of atmospheric humidity).

7.1.1 General

EN-AL-14-01-0001-02

- Protect the lifting transportation system from rain and do not expose it to the sun.
- Avoid covering it completely with plastic or tarps, as this will cause moisture to accumulate due to condensation.

7.1.2 Mechanical equipment

EN-AL-14-01-0003-03B

- Fill the gear box with the oil defined in the table of recommended lubricants [Refer to appendix *Greasing the lifting transportation system, see on page 46*] for maximum protection against rust.
- Apply Tectyl 506 Multi-Purpose Rust Preventive to all metal springs, axles, rollers and pinions.
- Visually check the surface treatment and paint and repair any damage detected.

7.1.3 Electrical equipment

EN-AL-14-01-0004-02

- Store the electric panels and all other electrical components in such a way that water and dust cannot enter.
- Open the switches and apply WD-40 silicone-free contact cleaner to the inside.
- Visually check the surface treatment and paint and repair any damage detected.

7.1.4 Commissioning after long-term storage

EN-AL-14-01-0004-03B

- Replace the oil[1)] in the gear box and fill it to the operating level of the lifting transportation system.

NOTICE

[1)]Always use new oil.

Do not use used oil as although oil may appear clean, it may contain condensed water.

- Remove all protective coatings against rust and lubricate according to the manufacturer's instructions [Refer to appendix *Greasing the lifting transportation system, see on page 46*].

7.1.5 Lubricants with silicone content

EN-AL-14-01-0004-02

Silicone is a very efficient lubricant provided it is applied to the correct places and components. However, when it comes into contact with electrical devices, the effect is disastrous. The silicone molecules are converted to glass due to the heat from the contact arc and glass is a very good insulator. A small amount of silicone can ruin the entire contents of any electric panel. Replacing components only offers a short-term repair, as once the silicone has entered an electric panel, the only effective solution is to replace the entire electric panel and all of its components.

From a sample of four (4) different brands of contact cleaners available in the US, for example, just one (1) did not contain silicone. Our advice, therefore, is to avoid spray lubricants of any kind in control boxes. The silicone-free contact cleaner spray WD-40 is recommended for external electrical components, such as connectors or limit switches.

7.2 Environmentally friendly dismantling and recycling

7.2.1 General

EN-AL-14-01-0008-02

Once the lifting transportation system reaches the end of its useful life, it must be decommissioned and recycled in the most environmentally friendly way possible.

7.2.2 Dismantling the lifting transportation system

EN-AL-14-01-0009-02

Contact the local authorities for information on how to correctly decommission the lifting transportation system. Make sure it is dismantled and recycled correctly to prevent any environmental and health problems.

Appendix

Greasing the lifting transportation system

EN-AL-12-04-0001-03B

Frequency	Function / system	Reference	Vol.	Operations
Monthly or every 40 operating hours (whichever occurs first)	Drive system	[Refer to table *Recommended lubricants, see on page 46*]	N/A	Check the lubricant level and top up if necessary.
	Rack	Alilube Part No. 3001396-201	N/A	Apply lubricant to the rack during the descent and suspend use of the lifting transportation system for 2-3 hours to allow the lubricant spray to solidify.
	Cable[1)], cable collect bin, cable bracket and cable guides	Ali-low-fric compound Part No. 9052045-000	N/A	Apply lubricant to the contact and sliding surfaces. Apply lubricant to the inside of the cable collect bin.
	Drive unit sliding guides	Spray lubricant	N/A	Apply lubricant to the contact and sliding surfaces.
	Mechanical interlocking systems and hinges	Lubricant	N/A	Apply lubricant to the contact and sliding surfaces.
	Enclosure doors	Lubricant	N/A	Apply lubricant to the contact and sliding surfaces.
	Electromagnetic brake release cable	Lubricant	N/A	Apply lubricant to prevent water from entering.
Every 2 years or 2000 operating hours (whichever occurs first)	Gear box oil change	[Refer to table *Recommended lubricants, see on page 46*]	VECTIO 350 20-32 VECTIO 350 20-32D: 11.5 l.	Replace the gear box oil (VG 220/VG 320 fully synthetic[2)])

CAUTION

[1)]Risk of accident. Only apply lubricant to the cable from a safe position and while the lifting transportation system is ascending.

CAUTION

[2)]For unspecified temperatures or uses, contact Alimak for assistance

Recommended lubricants[3)]

Lubricant type	Ambient temperature
Mineral oil	ISO VG 220 (-10ºC / 40ºC)
	ISO VG 100 (-15ºC / 25ºC)
Synthetic oil (polyglycol)	ISO VG 220 (-25ºC / 80ºC)
Biodegradable oil	ISO VG 220 (-5ºC / 40ºC)
Food grade oil	ISO VG 220 (-25ºC / 40ºC)

NOTICE

[3)]Do not use lubricants other than those specified without prior verification and authorisation from Alimak.

The use of lubricants other than those specified without prior verification and authorisation from Alimak does not guarantee the correct operation of the drive system and voids the manufacturer's warranty.

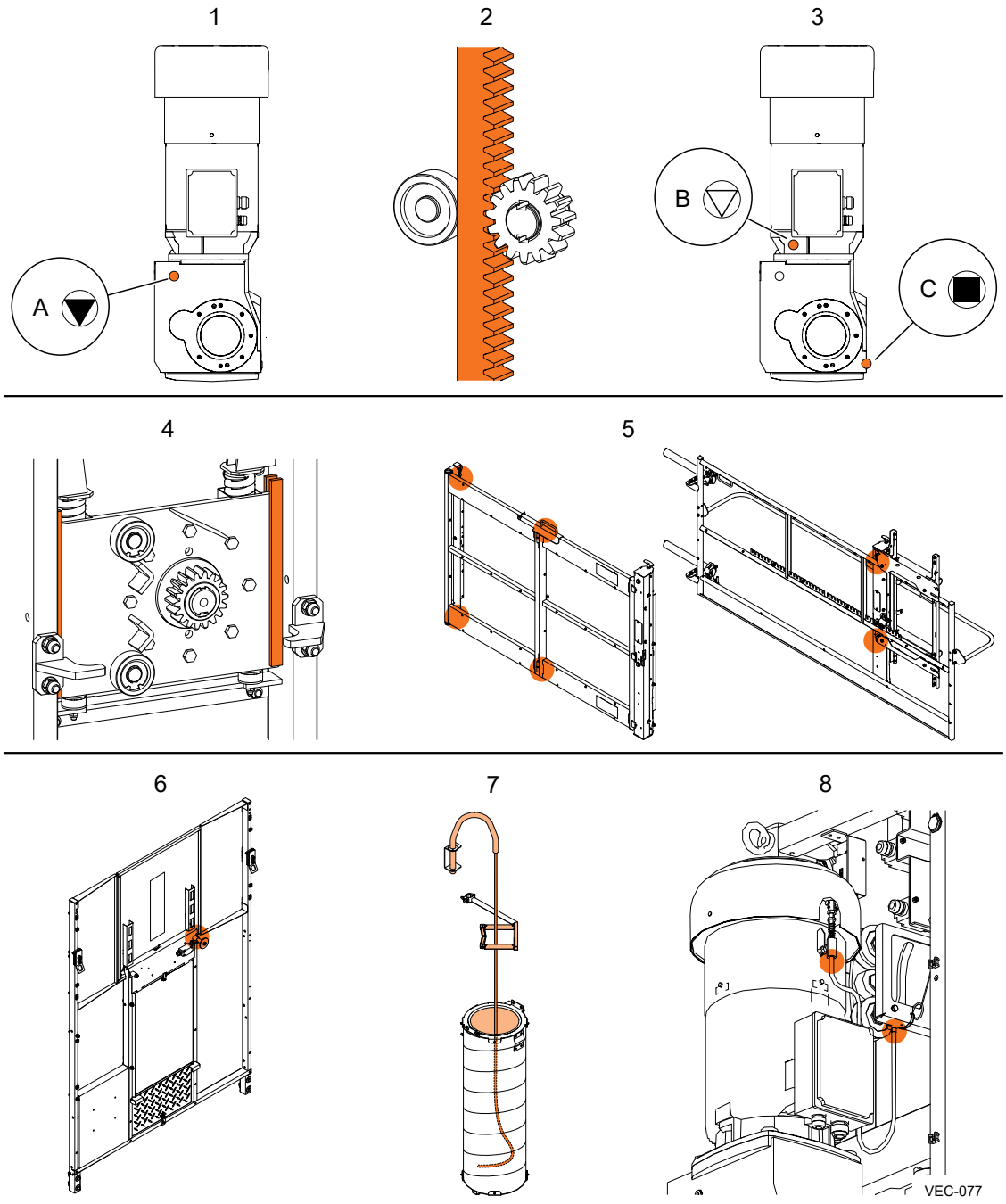


Figure 52 : Greasing the lifting transportation system

Greasing the lifting transportation system			
1	Drive system	7	Cable, cable collect bin, cable bracket and cable guides
2	Rack	8	Electromagnetic brake release cable
3	Gear box oil change	A	Oil level
4	Drive system sliding guides	B	Filling / Vent
5	Enclosure doors	C	Drain
6	Mast railing rotation axis		

Lifting transportation system stop level

EN-AL-12-04-0002-02

If the distance between the stopping positions of the unloaded lifting transportation system and the fully loaded lifting transportation system exceeds 50 mm, a maintenance technician must check the electromagnetic motor brake.

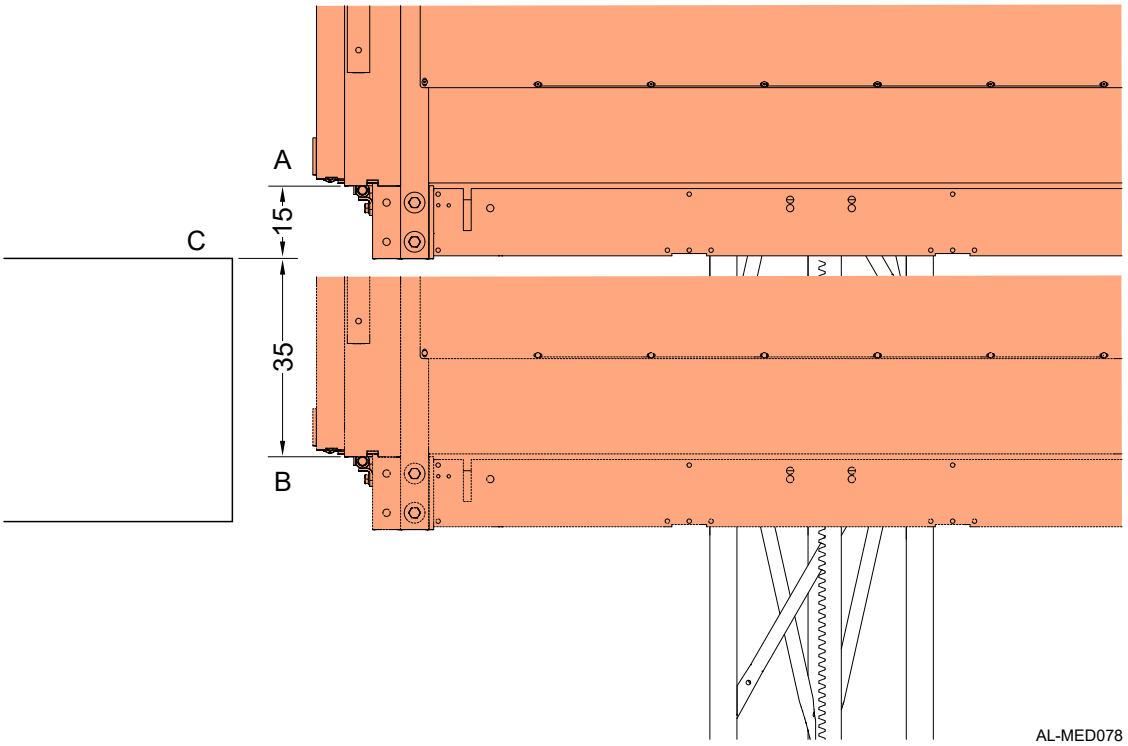


Figure 53 : Lifting transportation system stop level

Lifting transportation system stop level	
A	Stopping the unloaded lifting transportation system
B	Stopping the fully loaded lifting transportation system
C	Stop level in the installation

Electromagnetic motor brake check

EN-AL-12-04-0003-03

Instruction for checking and adjustment

WARNING

Risk of injuries. Disconnect the brake and completely unload the lifting transportation system before carrying out any check or adjustment of the electromagnetic motor brake.

Descend the lifting transportation system until it comes into contact with the buffers located on the base frame before carrying out any check or adjustment of the electromagnetic motor brake.

The electromagnetic motor brake is maintenance-free.

It is not necessary to carry out any adjustment of the air gap until the useful life of the electromagnetic brake disc comes to an end and it must be replaced.

Check the condition of the electromagnetic brake disc (wear) every 3 months or 400 operating hours (whichever occurs first):

1. Turn the main switch on the base electric panel to the OFF position and lock it [Refer to figure *Base electric panel, see on page 24*].

   The lifting transportation system ready indicator light (green) should turn off.

2. Pull the electromagnetic motor brake release lever to descend the lifting transportation system until it comes into contact with the buffers located on the base frame. [Refer to section Drive system, in the Operator manual].

   The lifting transportation system should stop when it comes into contact with the buffers located on the base frame.

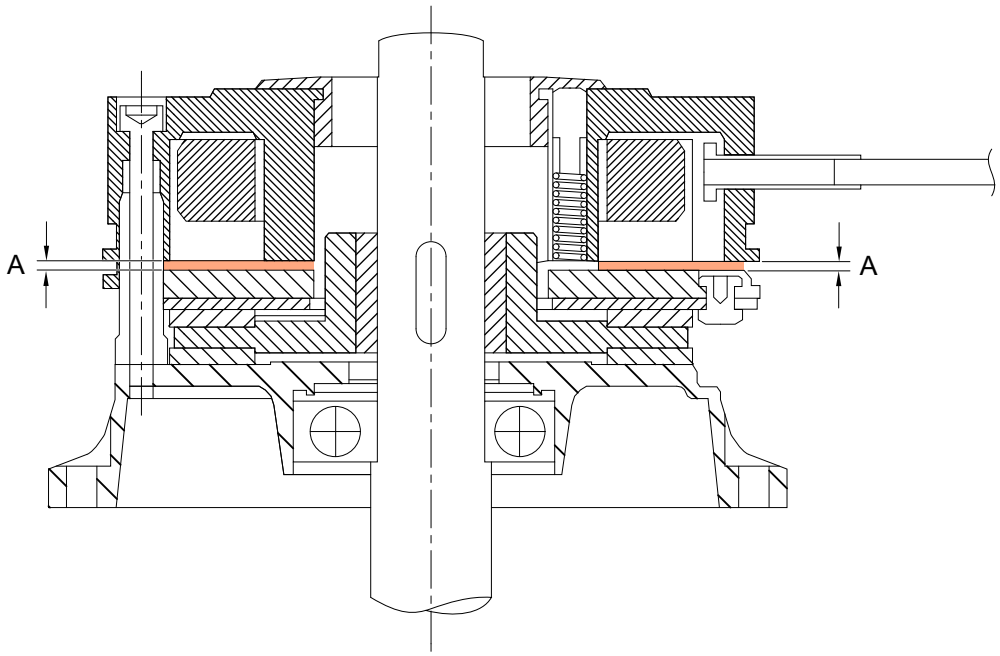
3. Remove the protective cover from the fan and then remove the fan.
4. Remove the protective cover from the electromagnetic brake.
5. Insert the thickness gauges at three different points 120° apart close to the adjustment bolts to check the electromagnetic brake air gap [Refer to table and figure *Electromagnetic brake air gap, see on page 49*]. The 0.35 mm thickness gauge should enter, and the 0.9 mm thickness gauge should not enter.

   a. **The 0.35 mm thickness gauge should enter, and the 0.9 mm thickness gauge should not enter.**

   b. **Otherwise, replace the electomagnetic brake disc.**

6. Install the fan and the protective cover of the fan.

Under normal operating conditions, if the emergency bottom limit switch is activated when the lifting transportation system stops in the base position, the brake disc must be replaced.



AL-MED079

Figure 54 : Electromagnetic brake air gap

0.35 < A < 0.45 mm	New brake
0.45 < A ≤ 0.9 mm	Brake in correct operating condition
A ≥ 0.9 mm	The brake disc must be replaced

Electromagnetic brake air gap

A	Electromagnetic brake air gap

Overspeed safety device

EN-AL-12-04-0004-03B

1. *Operation of the overspeed safety device*

WARNING

The overspeed safety device is configured by the manufacturer to the correct operating speed.

It is prohibited to modify the factory setting of the safety device.

WARNING

If the overspeed safety device is activated, check what has caused the activation.

The problem that caused the activation must be resolved before resetting the overspeed safety device.

If serious faults are detected, contact Alimak for assistance.

1. When the maximum descent speed is exceeded, the overspeed device is activated.
2. The brake disc starts to rotate, reducing the speed until the lifting transportation system stops descending.
3. The disc rotation also drives the cam that activates the overspeed safety device switch, which disconnects the power to the lifting transportation system.

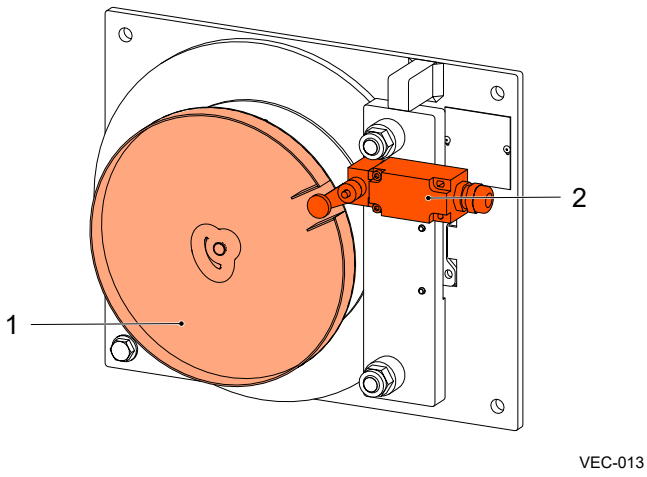


Figure 55 : Operation of the overspeed safety device

Operation of the overspeed safety device	
1	Switch activation cam
2	Overspeed safety device switch
3	Brake disc

2. *Overspeed safety device test*

WARNING

Only maintenance technicians are authorised to check the overspeed safety device.

Perform a test of the overspeed safety device with a full load for each new installation.

Perform a test of the overspeed safety device at least twice a year or according to local regulations.

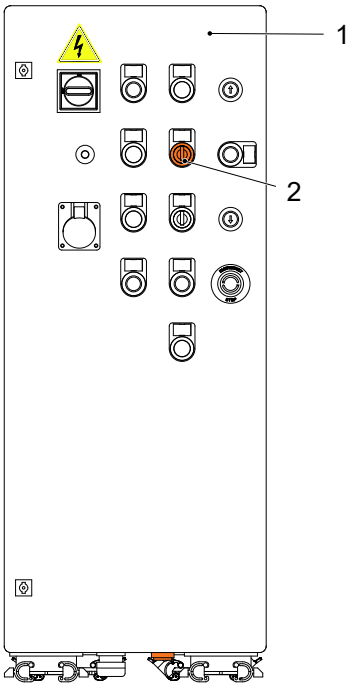
WARNING

Check there are no persons or objects below the lifting transportation system before performing the overspeed safety device test.

WARNING

If the overspeed safety device is not activated, immediately release the TEST button on the drop test control station. Contact Alimak for assistance.

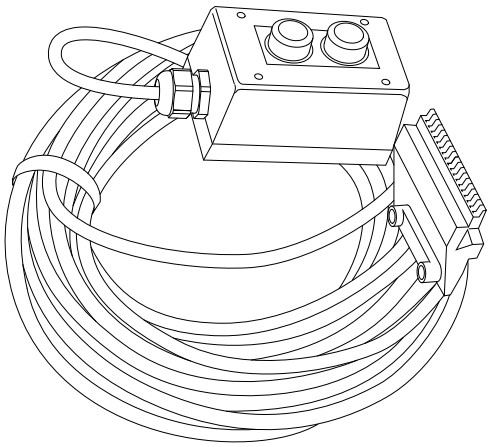
Function / system	Operations
Overspeed safety device test	**1.** Introduce the rated load into the lifting transportation system, distributed evenly for the overspeed safety device test. **2.** Connect the drop test control station inside the platform electric panel. **3.** Turn the Mode of use selector on the platform electric panel to the TP Mode position. **4.** Press and hold the UP button on the drop test control station until the lifting transportation system ascends approx. 5 m. **5.** Press and hold the TEST button on the drop test control station. **The lifting transportation system should descend and the overspeed safety device should activate when the activation speed is reached.** **The lifting transportation system should stop and the overspeed safety device should hold the load.** **6.** Reset the overspeed safety device [Refer to section *Overspeed safety device reset, see on page 53*]. **7.** Visually check that no structural part or component is damaged.



VEC-082B

Figure 56 : Platform electric panel

Platform electric panel	
1	Platform electric panel
2	Mode of use selector (MH / TP / Smart)



AL-MED080

Figure 57 : Drop test control station

3. *Overspeed safety device reset*

WARNING

Check what caused the activation of the overspeed safety device.

The problem that caused the activation must be resolved before resetting the overspeed safety device.

If serious faults are detected, contact Alimak for assistance.

Function / system	Operations
Overspeed safety device reset	**1.** Connect the drop test control station inside the platform electric panel. **2.** Turn the Mode of use selector on the platform electric panel to the TP Mode position. **3.** Press and hold the UP button on the drop test control station until the lifting transportation system ascends approx. 0.5 m and the overspeed safety device is deactivated. **4.** Press and hold the TEST button on the drop test control station in order to descend the lifting transportation system until it comes into contact with the buffers on the base frame, without reaching the activation speed of the overspeed safety device. **5.** Unscrew the eyebolt on the overspeed safety device and turn the activation cam until the switch for restoring the power supply is released [Refer to figure *Overspeed safety device reset, see on page 53*]. **6.** Screw the eyebolt back in and open it. **7.** Disconnect the drop test control station inside the platform electric panel.

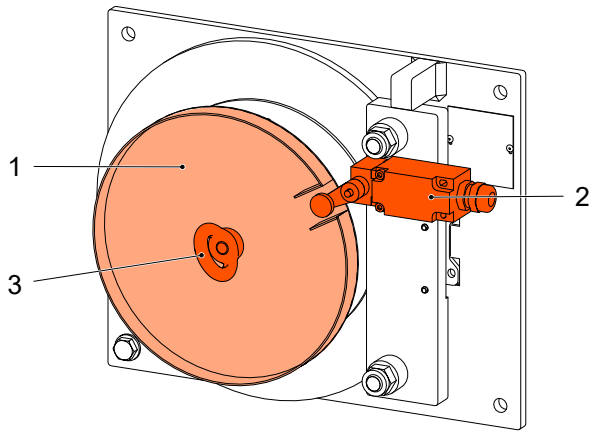


Figure 58 : Overspeed safety device reset

Overspeed safety device reset	
1	Switch activation cam
2	Overspeed safety device switch
3	Eyebolt

Component wear measurement

EN-AL-12-04-0005-02

1. Drive pinion and rack wear measurement

Function / system	Operations
Drive pinion	Measure the drive pinion wear with a caliper [Refer to figure *Drive pinion wear measurement, see on page 54*] and repeat the measurement at three points on the drive pinion 120º apart. **a. The chordal distance between teeth must be less than 37.8 mm and greater than 36.5 mm.** **b. Otherwise, replace the drive pinion.**
Rack	Measure the wear on the rack with a Ø8 calibrated roller and a caliper [Refer to figure *Rack wear measurement, see on page 54*]. **a. The distance between the rack base and the calibrated roller must be less than 39.9 mm and greater than 38.2 mm.** **b. Otherwise, replace the rack.**

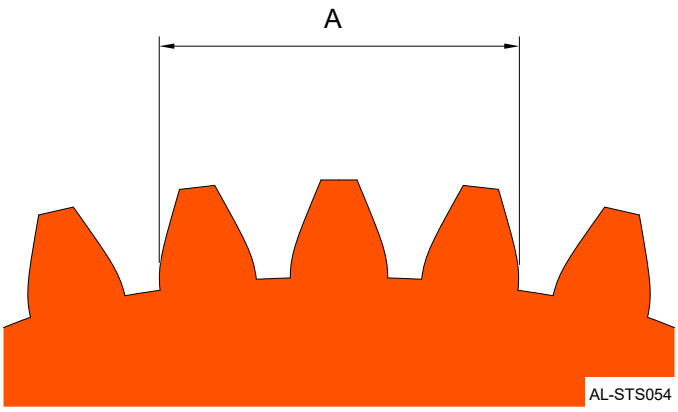


Figure 59 : Drive pinion wear measurement

Drive pinion wear measurement	
A	min. 36.5 mm / max. 37.8 mm

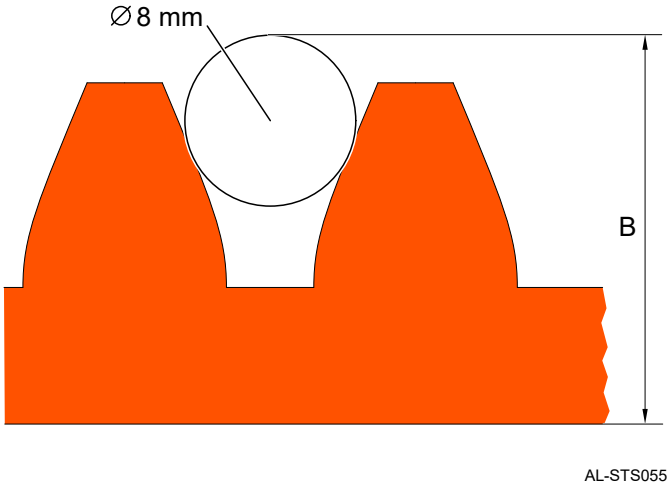


Figure 60 : Rack wear measurement

Rack wear measurement	
B	min. 38.2 mm / max. 39.9 mm

2. Guiding system wear measurement

Function / system	Operations
Mast tubes	**1.** Visually check the condition of the mast sections. **The mast sections must have uniform wear and must not have dents, cracks, corrosion or any other damage.** **2.** Measure the wear on the mast tubes [Refer to figure *Mast tube wear measurement, see on page 55*]. **a. The external diameter of the mast tubes must be greater than 47.3 mm.** **b. Otherwise, replace the mast section.**
Guide rollers	**1.** Visually check the guide rollers. **The guide rollers must have uniform wear and must not be damaged.** **2.** Measure the guide roller wear with a caliper. **a. The external diameter of the guide rollers must be within the values established by the manufacturer [Refer to figure *Guide roller wear measurement, see on page 55*].** **b. Otherwise, replace the guide rollers.**

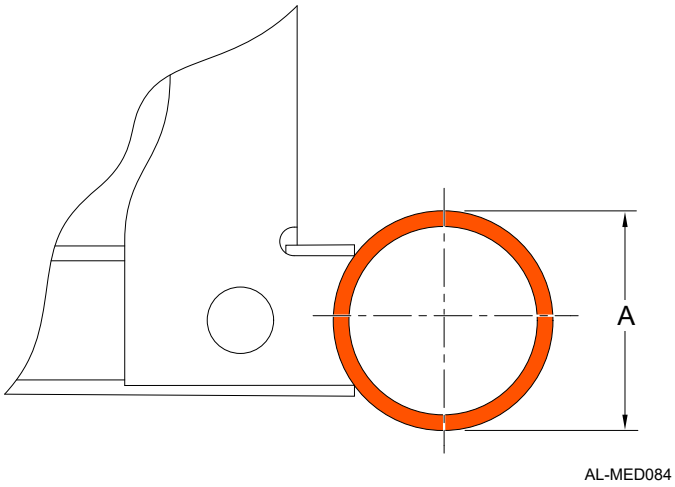


Figure 61 : Mast tube wear measurement

Mast tube wear measurement	
A	min. 47.3 mm

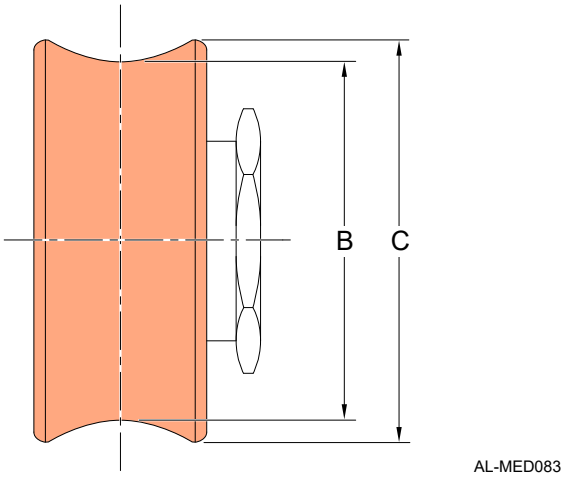


Figure 62 : Guide roller wear measurement

Guide roller wear measurement	
B	min. 67.5 mm
C	min. B + 4 mm

Overload system test and adjustment

EN-AL-12-05-0001-03B

1. Overload system test

Function / system	Operations
Overload system test	**1.** Descend the lifting transportation system until the bottom limit switch comes into contact with the bottom limit cam. **The lifting transportation system should stop.** **2.** Introduce and evenly distribute the rated load in the lifting transportation system: • 2000 kg (VECTIO 350 20-32) • 2000 kg (VECTIO 350 20-32D) **The overload indicator light (red) should not turn on and the acoustic buzzer that warns of overload should not sound.** **3.** Introduce and evenly distribute the load to test the overload system in the lifting transportation system: • 2400 kg (VECTIO 350 20-32) • 2400 kg (VECTIO 350 20-32D) **The overload indicator light (red) should turn on and the acoustic buzzer that warns of overload should sound[1].** **4.** Press and hold the UP button. **The lifting transportation system should not ascend.**

NOTICE

[1] If the overload indicator light does not turn on and the acoustic buzzer does not sound, carry out the process to adjust the overload detection device [Refer to section Overload system adjustment, see on page 57].

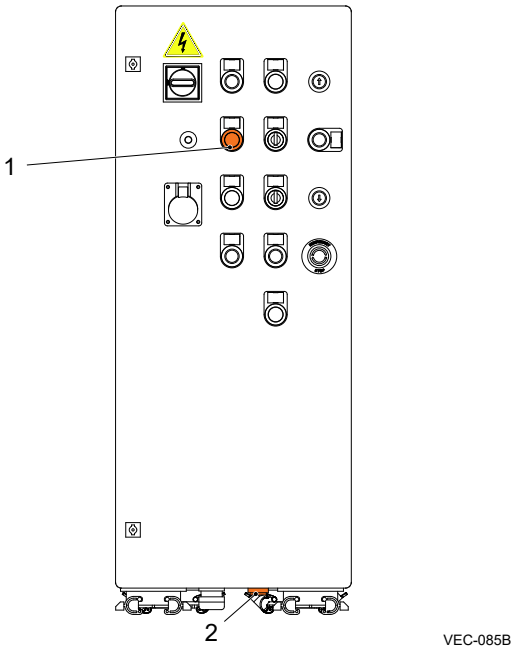


Figure 63 : Platform electric panel

Platform electric panel	
1	Overload indicator light (red)
2	Acoustic warning buzzer

2. Overload system adjustment

Function / system	Operations
Overload system adjustment	**1.** Check that the drive system sliding guides are correctly greased [Refer to appendix *Greasing the lifting transportation system, see on page 46*]. **2.** Introduce and evenly distribute the rated load in the lifting transportation system: • 2000 kg (VECTIO 350 20-32) • 2000 kg (VECTIO 350 20-32D) **3.** Loosen the overload cam and move it so that it does not activate the overload detection device switch [Refer to figure *Overload detection device switch and cam, see on page 58*]. **4.** With the rated load plus the weight of one person (approx. 80 kg), adjust the overload cam to the activation position of the overload detection device switch. **The overload indicator light (red) should turn on and the acoustic buzzer that warns of overload should sound.** **5.** Fix the overload cam and tighten the lock nut[1)]. **6.** Remove the load from the lifting transportation system. **The overload indicator light (red) should turn off and the acoustic buzzer that warns of overload should stop sounding.** **7.** Introduce and evenly distribute the rated load again in the lifting transportation system: • 2000 kg (VECTIO 350 20-32) • 2000 kg (VECTIO 350 20-32D) **8.** Press and hold the UP button and then the DOWN button. **The lifting transportation system should ascend and descend.** **9.** Add and evenly distribute 20% of the rated load in the lifting transportation system: • Add 400 kg (VECTIO 350 20-32) • Add 400 kg (VECTIO 350 20-32D) **The overload indicator light (red) should turn on and the acoustic buzzer that warns of overload should sound.** **10.** Press and hold the UP button. **a.** **The lifting transportation system should not ascend. The overload detection device is correctly adjusted.** **b.** **Otherwise, repeat the process described for adjusting the overload system from the beginning.**

NOTICE

[1)]Loosen the overload cam by 1+1/2 turns before tightening the lock nut for the VECTIO 350 20-32 and VECTIO 350 20-32D models.

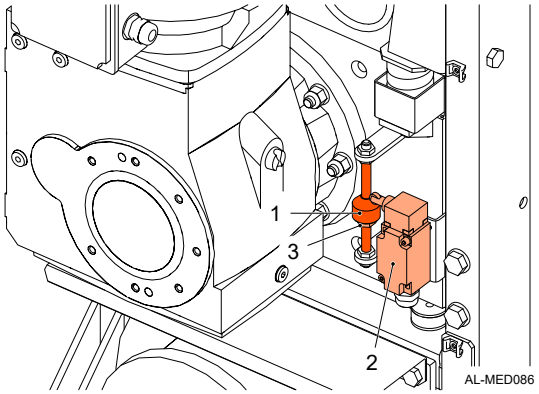


Figure 64 : Overload detection device switch and cam

Overload detection device switch and cam	
1	Overload detection device cam
2	Overload detection device switch
3	Lock nut

Platform levelling adjustment

EN-AL-12-05-0006-03B

The platform levelling system regulates the speed of the drive systems to level the platform within a range of ±2º during ascent and descent.

If the platform levelling system detects a maximum platform inclination of 4º, the overrun levelling limit switch [Refer to figure *Platform levelling system, see on page 59*] is activated and the lifting transport system stops, therefore only manual descent is possible.

When all the limits of any other levelling control system are, for any reason, exceeded, the adapter, by design, mechanically limits the inclination of the platform to a max of 6°.

In case of platform inclination of less than 4º, the operator can level the platform as follows:

1. Place a spirit level in the middle of the platform.
2. Press and hold the Stop button (Drive Unit 1) or the Stop button (Drive Unit 2) on the platform electric panel [Refer to section Platform electric panel, in the Operator's manual] depending on the drive unit that must be held stopped for levelling.
3. Press and hold the UP button or the DOWN button on the platform electric panel [Refer to section Platform electric panel, in the Operator's manual] until the platform is in a horizontal position.

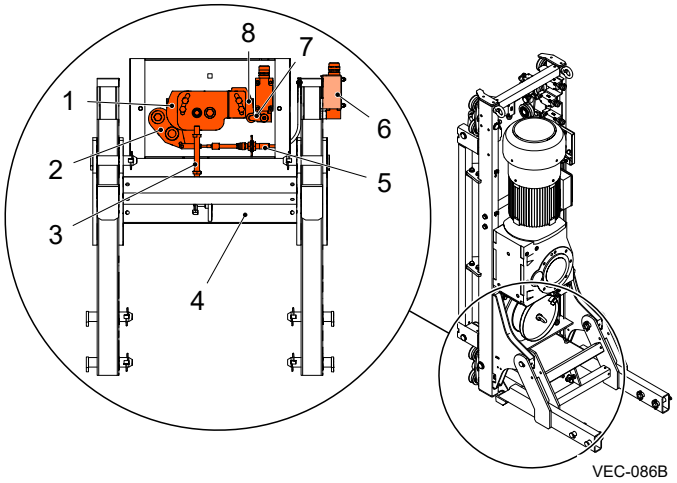
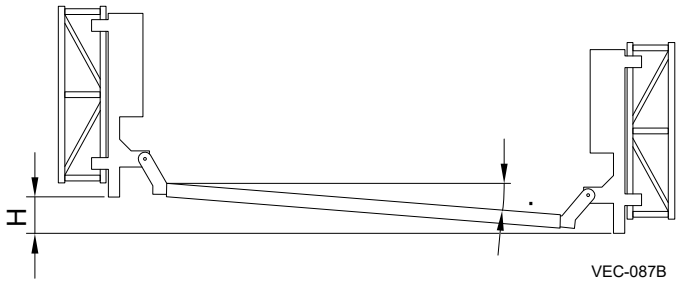


Figure 65 : Platform levelling system

Platform levelling system	
1	Blocking brake release cam
2	Blocking brake release lever
3	Levelling bar
4	Adapters
5	Connection cable to the brake release lever
6	Overrun levelling limit switch
7	Levelling limit switch
8	Levelling cam
9	Electromagnetic motor brake release lever

1. Check and adjustment of the overrun levelling control system

Function / system	Operations
Check and adjustment of the overrun levelling control system	**1.** Ascend the platform approximately 2 m from the base. **2.** Check with a spirit level that the platform is perfectly levelled. If it is not, level the platform using the brake release levers. **3.** Mark the position of one drive unit on the mast pipe. **4.** Under this mark, make new marks corresponding to the maximum height difference between the two drive units, according to the values in the platform inclination table [Refer to figure *Platform inclination, see on page 60*]. **5.** Descent the drive unit to the second mark and observe the behaviour of the brake release lever and the ready light. **Within the last 25mm the ready light should turn off because of the activation of the overrun limit switch. (To check this the safety line must be close at all points, mast railing, erection ramp, gates…). If it is not, adjust the overrun levelling limit switch.** **When the line is reached the brake release lever should be blocked by the cam, the brake close and unable to be activated again.** **If it is not, adjust the blocking brake lever cam.** **6.** Once this drive unit has been and adjusted, proceed in the same way with the other drive unit.



Lifting transportation system	Alimak VECTIO 350 20-32	Alimak VECTIO 350 20-32D
Max height difference allowed H (mm)	260	145
Max inclination allowed brake release lever (α)	4°	4°

Figure 66 : Platform inclination

1.1 Adjustment of the overrun levelling limit switch

Function / system	Operations
Adjustment of the overrun levelling limit switch	With the platform uneven and the distance specified for each model. **1.** Release the fixing screws of the switch installed in the drive unit in higher position. **2.** Adjust the position overrun limit switch, from a deactivated state move forward slowly until the switch is activated. **3.** Tighten the fixing screws.

1.2 Adjustment of the blocking brake release cam

Function / system	Operations
Adjustment of the blocking brake release cam	With the platform uneven, the distance specified for each model and the release brake lever not activated **1.** Release the fixing screws of the blocking brake release cam in the drive unit in lower position. **2.** Adjust the position blocking brake release cam, move the cam towards the blocking brake release lever until they are in contact. **3.** Tighten the fixing screws.

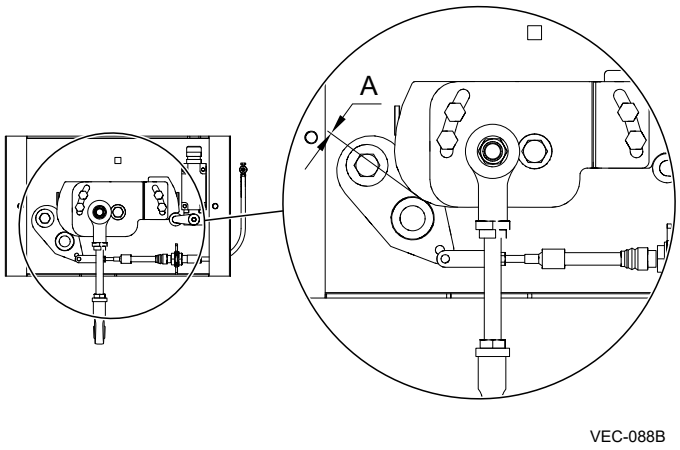
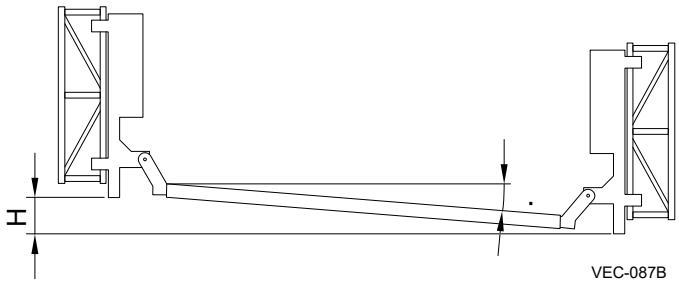


Figure 67 : Blocking brake release cam adjustment distance

Blocking brake release cam adjustment distance	
A	0 mm

2. Check and adjustment of the levelling control system

Function / system	Operations
Check and adjustment of the levelling control system	**1.** Ascend the platform approximately 2 m from the base. **2.** Check with a spirit level that the platform is perfectly levelled, if it is not, level the platform using the brake release levers or the stop drive unit buttons. **3.** Check gap B between levelling cam and the levelling switch in both drive units. **Gap should be 1 mm.** **If it is not, adjust the levelling limit switch.** **4.** Mark the position of one drive unit on the mast pipe. **5.** Under this mark, make new marks in corresponding to the maximum height difference between the two drive units, according to the values in the platform inclination table [Refer to figure *Platform inclination, see on page 62*]. **6.** Descent the drive unit 25mm lower second mark, therefore the levelling limit switch is activated. **7.** Ascend/descend the platform approximately 1m, the platform should be levelled with ±2°. **8.** Once this drive unit has been checked and adjusted, proceed in the same way with the other drive unit.



Lifting transportation system	Alimak VECTIO 350 20-32	Alimak VECTIO 350 20-32D
Max height difference allowed H (mm) TP	±130	±70
Max inclination allowed brake release lever (α)	±2°	±2°

Figure 68 : Platform inclination

2.1 Adjustment of the levelling limit switch

Function / system	Operations
Adjustment of the levelling limit switch	With the platform perfectly levelled. **1.** Release the fixing screws of the levelling. **2.** Adjust the position levelling cam, move the cam towards the lever until there is a gap of 1mm between the cam and levelling limit switch. **3.** Tighten the fixing screws.

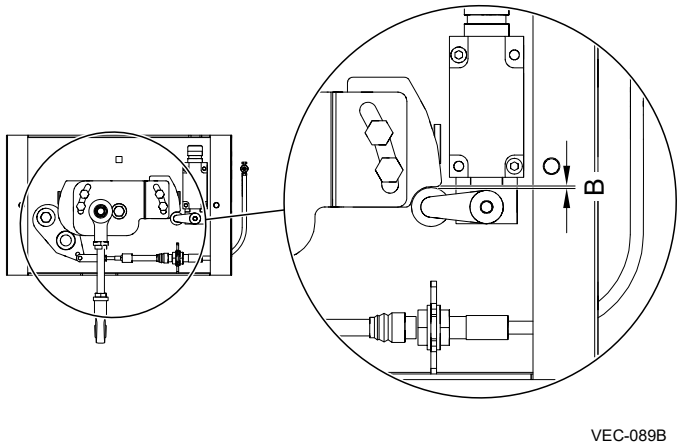


Figure 69 : Levelling cam adjustment distance

Levelling cam adjustment distance	
B	1 mm

Dynamic and static test report for the lifting transportation system

EN-AL-12-03-0001-02

- Dynamic and static test according to the Machinery Directive, before putting the lifting transportation system into service.
- Dynamic and static capacity and mechanical stability test of the lifting transportation system.

The following tests were performed successfully:

1. Static test

- Before the static test, visually check that the lifting transportation system is not damaged.
- Subject the lifting transportation system to a force that corresponds to the maximum working load multiplied by the static test coefficient (1.25).
- Release the lifting transportation system from the load to which it was subjected for the static test and visually check that no damage has occurred.

Static test load	
Observation	

2. Dynamic test

- Check the correct operation of the lifting transportation system in all of its possible configurations, applying a force that corresponds to the maximum working load multiplied by the dynamic test coefficient (1.10).

Dynamic test load	
Observation	
Person responsible	
Date	
Location	

Installation and maintenance checklist

EN-AL-12-06-0003-03B

Installation information			
Date:		**Serial no. of the lifting transportation system:**	
Name of the installation technician or maintenance technician:		**Serial no. of the drive system:**	
Hour counter reading:		**Serial no. of the overspeed safety device:**	
Installation address:			

Installation and maintenance checklist			
6.1.1 Monthly or every 40 operating hours (whichever occurs first)	**OK**	**NOK**	**Incidents and comments**
Racks and pinions (grease)			
Informative signs and documentation			
Overspeed safety device (inspection)			
Drive system			
Guiding system			
Electromagnetic motor brake (braking distance)			
Cable management system			
Mechanical and electromechanical locking systems			
6.1.2 Every 2 months or 120 operating hours (whichever occurs first)	**OK**	**NOK**	**Incidents and comments**
Mast, ties and adjacent structures			
Emergency limit switch and emergency limit cams			
Doors and enclosures			
Base frame			
Indicator lights, connectors and acoustic buzzer			
Rack and pinions (wear)			
6.1.3 Every 3 months or 400 operating hours (whichever occurs first)	**OK**	**NOK**	**Incidents and comments**
Guiding system (wear)			
Motor			
Electromagnetic motor brake (wear)			
Grease			
Electric panels			
Overload system			
Platform levelling system			
6.1.4 Every 6 months or 600 operating hours (whichever occurs first)	**OK**	**NOK**	**Incidents and comments**
Overspeed safety device (check)			

NOTICE

Write the result of the verification in the OK or NOK field:

OK: Result of the verification approved.

NOK: Result of the verification not approved.

Installation and maintenance checklist			
6.1.5 Annually or every 1000 operating hours (whichever occurs first)	**OK**	**NOK**	**Incidents and comments**
Electrical system			
Corrosion, damage and wear			
6.1.6 Annually	**OK**	**NOK**	**Incidents and comments**
General inspection			
6.1.7 Every 2 years or 2000 operating hours (whichever occurs first)	**OK**	**NOK**	**Incidents and comments**
Drive system (lubricant replacement)			
6.1.8 Every 8 years	**OK**	**NOK**	**Incidents and comments**
Overspeed safety device (replacement)			

Result of the installation and maintenance inspection	**OK**	**NOK**	**Incidents and comments**
The lifting transportation system is suitable for use			

Name of the installation technician or maintenance technician (in capital letters):	
Signature:	

NOTICE

Write the result of the verification in the OK or NOK field:

OK: Result of the verification approved

NOK: Result of the verification not approved

Installation and maintenance log

EN-AL-12-01-0002-02

CAUTION

Extraordinary inspections are required in case the Installation and maintenance log is lost.

Record the results of the maintenance inspections and repairs carried out on the lifting transportation system on the pages of the Installation and maintenance log.

The Installation and maintenance log must be available to the competent authorities.

If necessary, request additional pages for the Installation and maintenance log from the manufacturer. Contact Alimak for assistance.

Date and time	Inspection type	General result		Hour counter	Incidents and comments	Name (in capitals)	Signature
		OK	NOK				

NOTICE

Record the type of inspection carried out on the lifting transportation system in the Inspection type box as applicable:

P: planned

R: repair

NOTICE

Record the results of the maintenance inspections and repairs carried out on the lifting transportation system in OK or NOK box:

OK: results of the maintenance inspections and repairs carried out on the lifting transportation system approved

NOK: results of the maintenance inspections and repairs carried out on the lifting transportation system not approved

Date and time	Inspection type	General result		Hour counter	Incidents and comments	Name (in capitals)	Signature
		OK	NOK				

NOTICE

Record the type of inspection carried out on the lifting transportation system in the Inspection type box as applicable:

P: planned

R: repair

NOTICE

Record the results of the maintenance inspections and repairs carried out on the lifting transportation system in OK or NOK box:

OK: results of the maintenance inspections and repairs carried out on the lifting transportation system approved

NOK: results of the maintenance inspections and repairs carried out on the lifting transportation system not approved

Date and time	Inspection type	General result		Hour counter	Incidents and comments	Name (in capitals)	Signature
		OK	NOK				

NOTICE

Record the type of inspection carried out on the lifting transportation system in the Inspection type box as applicable:

P: planned

R: repair

NOTICE

Record the results of the maintenance inspections and repairs carried out on the lifting transportation system in OK or NOK box:

OK: results of the maintenance inspections and repairs carried out on the lifting transportation system approved

NOK: results of the maintenance inspections and repairs carried out on the lifting transportation system not approved

Date and time	Inspection type	General result		Hour counter	Incidents and comments	Name (in capitals)	Signature
		OK	NOK				

NOTICE

Record the type of inspection carried out on the lifting transportation system in the Inspection type box as applicable:

P: planned

R: repair

NOTICE

Record the results of the maintenance inspections and repairs carried out on the lifting transportation system in OK or NOK box:

OK: results of the maintenance inspections and repairs carried out on the lifting transportation system approved

NOK: results of the maintenance inspections and repairs carried out on the lifting transportation system not approved

Change log

EN-AL-02-00-0002-03B

Revision	Date [month/year]	Description
01.01	07/2024	ALIMAK VECTIO 350 20-32 and VECTIO 350 20-32D lifting transportation system installation and maintenance manual (EC certification draft)

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