



CITY OF AUSTIN, TEXAS
Purchasing Office
INVITATION FOR BID (IFB)
OFFER SHEET

SOLICITATION NO: MEA0004

DATE ISSUED: January 04, 2016

REQUISITION NO.: RQM 15120800137

COMMODITY CODE: 91013

FOR CONTRACTUAL AND TECHNICAL ISSUES CONTACT THE FOLLOWING AUTHORIZED CONTACT PERSON:

Maria Andrade

Buyer II

Phone: (512) 972-9424

E-Mail: Maria.Andrade@austinenergy.com

COMMODITY/SERVICE DESCRIPTION: ALIMAK ELEVATOR PREVENTATIVE & CORRECTIVE MAINTENANCE

PRE-BID CONFERENCE TIME AND DATE: 1:30 P.M. ON Jan 11, 2016

LOCATION: SANDHILL ENERGY CENTER, 1101 FALLWELL LANE, AUSTIN, TX 78617

BID DUE PRIOR TO: 2:00 P.M. ON JAN 19, 2016

BID OPENING TIME AND DATE: 2:15 P.M. ON JAN 19, 2016

LOCATION: MUNICIPAL BUILDING, 124 W 8th STREET RM 308, AUSTIN, TEXAS 78701

LIVE BID OPENING ONLINE:

For information on how to attend the Bid Opening online, please select this link:

<http://www.austintexas.gov/department/bid-opening-webinars>

When submitting a sealed Offer and/or Compliance Plan, use the proper address for the type of service desired, as shown below:

Address for US Mail (Only)	Address for Fedex, UPS, Hand Delivery or Courier Service
City of Austin	City of Austin, Municipal Building
Purchasing Office-Response Enclosed for Solicitation # MEA0004	Purchasing Office-Response Enclosed for Solicitation # MEA0004
P.O. Box 1088	124 W 8 th Street, Rm 308
Austin, Texas 78767-8845	Austin, Texas 78701
	Reception Phone: (512) 974-2500

NOTE: Offers must be received and time stamped in the Purchasing Office prior to the Due Date and Time. It is the responsibility of the Offeror to ensure that their Offer arrives at the receptionist's desk in the Purchasing Office prior to the time and date indicated. Arrival at the City's mailroom, mail terminal, or post office box will not constitute the Offer arriving on time. See Section 0200 for additional solicitation instructions.

All Offers (including Compliance Plans) that are not submitted in a sealed envelope or container will not be considered.

The Vendor agrees, if this Offer is accepted within 120 calendar days after the Due Date, to fully comply in strict accordance with the Solicitation, specifications and provisions attached thereto for the amounts shown on the accompanying Offer.

SUBMIT 1 ORIGINAL, _2_ COPIES, AND 1 ELECTRONIC COPY OF YOUR RESPONSE

*****SIGNATURE FOR SUBMITTAL REQUIRED ON PAGE 3 OF THIS DOCUMENT*****

This solicitation is comprised of the following required sections. Please ensure to carefully read each section including those incorporated by reference. By signing this document, you are agreeing to all the items contained herein and will be bound to all terms.

SECTION NO.	TITLE	PAGES
0100	STANDARD PURCHASE DEFINITIONS	*
0200	STANDARD SOLICITATION INSTRUCTIONS	*
0300	STANDARD PURCHASE TERMS AND CONDITIONS	*
0400	SUPPLEMENTAL PURCHASE PROVISIONS	6
0500	SPECIFICATION	6
ATT1	ATTACHMENT A SHEC Contractor Work Requirements	8
ATT2	ATTACHMENT B OEM MAINTENANCE MANUAL	32
ATT3	ATTACHMENT C OEM Alimak Hek Technical Description Manual	36
ATT4	ATTACHMENT D SHEC PREVENTATIVE MAINTENANCE SCHEDULE	2
0600	BID SHEET – Must be completed and returned with Offer	2
0605	LOCAL BUSINESS PRESENCE IDENTIFICATION FORM – Complete & return	2
0700	REFERENCE SHEET – Complete and return if required	2
0800	NON-DISCRIMINATION CERTIFICATION	*
0805	NON-SUSPENSION OR DEBARMENT CERTIFICATION	*
0835	NONRESIDENT BIDDER PROVISIONS – Complete & return	1

*** Documents are hereby incorporated into this Solicitation by reference, with the same force and effect as if they were incorporated in full text. The full text versions of these Sections are available, on the Internet at the following online address:**

http://www.austintexas.gov/financeonline/vendor_connection/index.cfm#STANDARDBIDDOCUMENTS

If you do not have access to the Internet, you may obtain a copy of these Sections from the City of Austin Purchasing Office located in the Municipal Building, 124 West 8th Street, Room #308 Austin, Texas 78701; phone (512) 974-2500. Please have the Solicitation number available so that the staff can select the proper documents. These documents can be mailed, expressed mailed, or faxed to you.

The undersigned, by his/her signature, represents that he/she is submitting a binding offer and is authorized to bind the respondent to fully comply with the solicitation document contained herein. The Respondent, by submitting and signing below, acknowledges that he/she has received and read the entire document packet sections defined above including all documents incorporated by reference, and agrees to be bound by the terms therein.

Company Name: _____

Company Address: _____

City, State, Zip: _____

Federal Tax ID No. _____

Printed Name of Officer or Authorized Representative: _____

Title: _____

Signature of Officer or Authorized Representative: _____

Date: _____

Email Address: _____

Phone Number: _____

*** Completed Bid Sheet, section 0600 must be submitted with this Offer Sheet to be considered for award**

Section 0605: Local Business Presence Identification

A firm (Offeror or Subcontractor) is considered to have a Local Business Presence if the firm is headquartered in the Austin Corporate City Limits, or has a branch office located in the Austin Corporate City Limits in operation for the last five (5) years, currently employs residents of the City of Austin, Texas, and will use employees that reside in the City of Austin, Texas, to support this Contract. The City defines headquarters as the administrative center where most of the important functions and full responsibility for managing and coordinating the business activities of the firm are located. The City defines branch office as a smaller, remotely located office that is separate from a firm's headquarters that offers the services requested and required under this solicitation.

OFFEROR MUST SUBMIT THE FOLLOWING INFORMATION FOR EACH LOCAL BUSINESS (INCLUDING THE OFFEROR, IF APPLICABLE) TO BE CONSIDERED FOR LOCAL PRESENCE.

NOTE: ALL FIRMS MUST BE IDENTIFIED ON THE MBE/WBE COMPLIANCE PLAN OR NO GOALS UTILIZATION PLAN (REFERENCE SECTION 0900).

USE ADDITIONAL PAGES AS NECESSARY

OFFEROR:

Name of Local Firm		
Physical Address		
Is your headquarters located in the Corporate City Limits? (circle one)	Yes	No
or		
Has your branch office been located in the Corporate City Limits for the last 5 years?		
Will your business be providing additional economic development opportunities created by the contract award? (e.g., hiring, or employing residents of the City of Austin or increasing tax revenue?)	Yes	No

SUBCONTRACTOR(S):

Name of Local Firm		
Physical Address		
Is your headquarters located in the Corporate City Limits? (circle one)	Yes	No
or		
Has your branch office been located in the Corporate City Limits for the last 5 years	Yes	No

Will your business be providing additional economic development opportunities created by the contract award? (e.g., hiring, or employing residents of the City of Austin or increasing tax revenue?)	Yes	No

SUBCONTRACTOR(S):

Name of Local Firm		
Physical Address		
Is your headquarters located in the Corporate City Limits? (circle one)	Yes	No
or		
Has your branch office been located in the Corporate City Limits for the last 5 years	Yes	No
Will your business be providing additional economic development opportunities created by the contract award? (e.g., hiring, or employing residents of the City of Austin or increasing tax revenue?)	Yes	No

Section 0700: Reference Sheet

The Offeror shall furnish, with the Offer, the following information, for at least five recent customers to whom products and/or services have been provided that are similar to those required by this Solicitation.

Responding Company Name _____

1. Company's Name _____
Name and Title of Contact _____
Present Address _____
City, State, Zip Code _____
Telephone Number (____)_____ Fax Number (____)_____
Email Address _____

2. Company's Name _____
Name and Title of Contact _____
Present Address _____
City, State, Zip Code _____
Telephone Number (____)_____ Fax Number (____)_____
Email Address _____

3. Company's Name _____
Name and Title of Contact _____
Present Address _____
City, State, Zip Code _____
Telephone Number (____)_____ Fax Number (____)_____
Email Address _____

4. Company's Name _____
Name and Title of Contact _____
Present Address _____
City, State, Zip Code _____
Telephone Number (____)_____ Fax Number (____)_____
Email Address _____

5. Company's Name _____
Name and Title of Contact _____
Present Address _____
City, State, Zip Code _____
Telephone Number (____)_____ Fax Number (____)_____
Email Address _____

Section 0835: Non-Resident Bidder Provisions

Company Name _____

- A. Bidder must answer the following questions in accordance with Vernon's Texas Statutes and Codes Annotated Government Code 2252.002, as amended:

Is the Bidder that is making and submitting this Bid a "Resident Bidder" or a "non-resident Bidder"?

Answer: _____

- (1) Texas Resident Bidder- A Bidder whose principle place of business is in Texas and includes a Contractor whose ultimate parent company or majority owner has its principal place of business in Texas.
- (2) Nonresident Bidder- A Bidder who is not a Texas Resident Bidder.

- B. If the Bidder id a "Nonresident Bidder" does the state, in which the Nonresident Bidder's principal place of business is located, have a law requiring a Nonresident Bidder of that state to bid a certain amount or percentage under the Bid of a Resident Bidder of that state in order for the nonresident Bidder of that state to be awarded a Contract on such bid in said state?

Answer: _____ Which State: _____

- C. If the answer to Question B is "yes", then what amount or percentage must a Texas Resident Bidder bid under the bid price of a Resident Bidder of that state in order to be awarded a Contract on such bid in said state?

Answer: _____

**CITY OF AUSTIN
PURCHASING OFFICE
SUPPLEMENTAL PURCHASE PROVISIONS
IFB MEA0004**

The following Supplemental Purchasing Provisions apply to this solicitation:

1. **EXPLANATIONS OR CLARIFICATIONS:** (reference paragraph 5 in Section 0200)

All requests for explanations or clarifications must be submitted in writing to the Purchasing Office by 8:00 a.m. on January 13, 2016. Submissions may be made via email to Maria.andrade@austinenergy.com

2. **INSURANCE:** Insurance is required for this solicitation.

A. **General Requirements:** See Section 0300, Standard Purchase Terms and Conditions, paragraph 32, entitled Insurance, for general insurance requirements.

- i. The Contractor shall provide a Certificate of Insurance as verification of coverages required below to the City at the below address prior to contract execution and within 14 calendar days after written request from the City. Failure to provide the required Certificate of Insurance may subject the Offer to disqualification from consideration for award
- ii. The Contractor shall not commence work until the required insurance is obtained and until such insurance has been reviewed by the City. Approval of insurance by the City shall not relieve or decrease the liability of the Contractor hereunder and shall not be construed to be a limitation of liability on the part of the Contractor.
- iii. The Contractor must also forward a Certificate of Insurance to the City whenever a previously identified policy period has expired, or an extension option or holdover period is exercised, as verification of continuing coverage.
- iv. The Certificate of Insurance, and updates, shall be mailed to the following address:

City of Austin Purchasing Office
P. O. Box 1088
Austin, Texas 78767

B. **Specific Coverage Requirements:** The Contractor shall at a minimum carry insurance in the types and amounts indicated below for the duration of the Contract, including extension options and hold over periods, and during any warranty period. These insurance coverages are required minimums and are not intended to limit the responsibility or liability of the Contractor.

- i. **Worker's Compensation and Employers' Liability Insurance:** Coverage shall be consistent with statutory benefits outlined in the Texas Worker's Compensation Act (Section 401). The minimum policy limits for Employer's Liability are \$100,000 bodily injury each accident, \$500,000 bodily injury by disease policy limit and \$100,000 bodily injury by disease each employee.
 - (1) The Contractor's policy shall apply to the State of Texas and include these endorsements in favor of the City of Austin:
 - (a) Waiver of Subrogation, Form WC420304, or equivalent coverage
 - (b) Thirty (30) days Notice of Cancellation, Form WC420601, or equivalent coverage
- ii. **Commercial General Liability Insurance:** The minimum bodily injury and property damage per occurrence are \$500,000 for coverages A (Bodily Injury and Property Damage) and B (Personal and Advertising Injury).
 - (1) The policy shall contain the following provisions:
 - (a) Contractual liability coverage for liability assumed under the Contract and all other Contracts related to the project.
 - (b) Contractor/Subcontracted Work.
 - (c) Products/Completed Operations Liability for the duration of the warranty period.
 - (d) If the project involves digging or drilling provisions must be included that provide Explosion, Collapse, and/or Underground Coverage.
 - (2) The policy shall also include these endorsements in favor of the City of Austin:
 - (a) Waiver of Subrogation, Endorsement CG 2404, or equivalent coverage

**CITY OF AUSTIN
PURCHASING OFFICE
SUPPLEMENTAL PURCHASE PROVISIONS
IFB MEA0004**

- (b) Thirty (30) days Notice of Cancellation, Endorsement CG 0205, or equivalent coverage
 - (c) The City of Austin listed as an additional insured, Endorsement CG 2010, or equivalent coverage
 - iii. **Business Automobile Liability Insurance:** The Contractor shall provide coverage for all owned, non-owned and hired vehicles with a minimum combined single limit of \$500,000 per occurrence for bodily injury and property damage. Alternate acceptable limits are \$250,000 bodily injury per person, \$500,000 bodily injury per occurrence and at least \$100,000 property damage liability per accident.
 - (1) The policy shall include these endorsements in favor of the City of Austin:
 - (a) Waiver of Subrogation, Endorsement CA0444, or equivalent coverage
 - (b) Thirty (30) days Notice of Cancellation, Endorsement CA0244, or equivalent coverage
 - (c) The City of Austin listed as an additional insured, Endorsement CA2048, or equivalent coverage.
 - C. **Endorsements:** The specific insurance coverage endorsements specified above, or their equivalents must be provided. In the event that endorsements, which are the equivalent of the required coverage, are proposed to be substituted for the required coverage, copies of the equivalent endorsements must be provided for the City's review and approval.
3. **TERM OF CONTRACT:**
- A. The Contract shall be in effect for an initial term of 24 months and may be extended thereafter for up to 3 additional 12 month periods, subject to the approval of the Contractor and the City Purchasing Officer or his designee.
 - B. Upon expiration of the initial term or period of extension, the Contractor agrees to hold over under the terms and conditions of this agreement for such a period of time as is reasonably necessary to resolicit and/or complete the project (not to exceed 120 days unless mutually agreed on in writing).
 - C. Upon written notice to the Contractor from the City's Purchasing Officer or his designee and acceptance of the Contractor, the term of this contract shall be extended on the same terms and conditions for an additional period as indicated in paragraph A above.
 - D. Prices are firm and fixed for the first 24 months. Thereafter, price changes are subject to the Economic Price Adjustment provisions of this Contract.
4. **QUANTITIES:** The quantities listed herein are annual estimates for the period of the Contract. The City reserves the right to purchase more or less of these quantities as may be required during the Contract term. Quantities will be as needed and specified by the City for each order. Unless specified in the solicitation, there are no minimum order quantities.
5. **INVOICES and PAYMENT:** (reference paragraphs 12 and 13 in Section 0300)
- A. Invoices shall contain a unique invoice number and the information required in Section 0300, paragraph 12, entitled "Invoices." Invoices received without all required information cannot be processed and will be returned to the vendor.

Invoices shall be mailed to the contact at the address listed below:

	City of Austin
Department	Austin Energy

**CITY OF AUSTIN
PURCHASING OFFICE
SUPPLEMENTAL PURCHASE PROVISIONS
IFB MEA0004**

Attn:	Tiana Craddock, Program System Engineer
Address	Sand Hill Energy Center (SHEC) 1101 Fallwell Lane
City, State Zip Code	Del Valle, TX 78617

- B. The Contractor agrees to accept payment by either credit card, check or Electronic Funds Transfer (EFT) for all goods and/or services provided under the Contract. The Contractor shall factor the cost of processing credit card payments into the Offer. There shall be no additional charges, surcharges, or penalties to the City for payments made by credit card.

6. HAZARDOUS MATERIALS:

- A. If this Solicitation involves hazardous materials, the Offeror shall furnish with the Offer Material Safety Data Sheets (MSDS), (OSHA Form 20), on all chemicals and hazardous materials specifying the generic and trade name of product, product specification, and full hazard information including receiving and storage hazards. Instructions, special equipment needed for handling, information on approved containers, and instructions for the disposal of the material are also required.
- B. Failure to submit the MSDS as part of the Offer may subject the Offer to disqualification from consideration for award.
- C. The MSDS, instructions and information required in paragraph "A" must be included with each shipment under the contract.

7. NON-SOLICITATION:

- A. During the term of the Contract, and for a period of six (6) months following termination of the Contract, the Contractor, its affiliate, or its agent shall not hire, employ, or solicit for employment or consulting services, a City employee employed in a technical job classification in a City department that engages or uses the services of a Contractor employee.
- B. During the term of the Contract, and for a period of six (6) months following termination of the Contract, a department that engages the services of the Contractor or uses the services of a Contractor employee will not hire a Contractor employee while the employee is performing work under a Contract with the City unless the City first obtains the Contractor's approval.

8. WORKFORCE SECURITY CLEARANCE AND IDENTIFICATION (ID):

- A. Contractors are required to obtain a certified criminal background report with fingerprinting (referred to as the "report") for all persons performing on the contract, including all Contractor, Subcontractor, and Supplier personnel (for convenience referred to as "Contractor's personnel").
- B. The report may be obtained by reporting to one of the below governmental entities, submitting to fingerprinting and requesting the report [requestors may anticipate a two-week delay for State reports and up to a four to six week delay for receipt of a Federal report.].
- i. Texas Department of Public Safety for any person currently residing in the State of Texas and having a valid Texas driver's license or photo ID card;

**CITY OF AUSTIN
PURCHASING OFFICE
SUPPLEMENTAL PURCHASE PROVISIONS
IFB MEA0004**

- ii. The appropriate governmental agency from either the U.S. state or foreign nation in which the person resides and holds either a valid U.S. state-issued or foreign national driver's license or photo ID card; or
 - iii. A Federal Agency. A current Federal security clearance obtained from and certified by a Federal agency may be substituted.
- C. Contractor shall obtain the reports at least 30 days prior to any onsite work commencement. Contractor also shall attach to each report the project name, Contractor's personnel name(s), current address(es), and a copy of the U.S. state-issued or foreign national driver's license or photo ID card.
- D. Contractor shall provide the City a Certified Criminal Background Report affirming that Contractor has conducted required security screening of Contractor's personnel to determine those appropriate for execution of the work and for presence on the City's property. A list of all Contractor Personnel requiring access to the City's site shall be attached to the affidavit.
- E. Upon receipt by the City of Contractor's affidavit described in (D) above and the list of the Contractor's personnel, the City will provide each of Contractor's personnel a contractor ID badge that is required for access to City property that shall be worn at all times by Contractor's personnel during the execution of the work.
- F. The City reserves the right to deny an ID badge to any Contractor personnel for reasonable cause, including failure of a Criminal History background check. The City will notify the Contractor of any such denial no more than twenty (20) days after receipt of the Contractor's reports. Where denial of access by a particular person may cause the Contractor to be unable to perform any portion of the work of the contract, the Contractor shall so notify the City's Contract Manager, in writing, within ten (10) calendar days of the receipt of notification of denial.
- G. Contractor's personnel will be required to wear the ID badge at all times while on the work site. Failure to wear or produce the ID badge may be cause for removal of an individual from the work site, without regard to Contractor's schedule. Lost ID badges shall be reported to the City's Contract Manager. Contractor shall reimburse the City for all costs incurred in providing additional ID badges to Contractor Personnel.
- H. ID badges to enter and/or work on the City property may be revoked by the City at any time. ID badges must be returned to the City at the time of project completion and acceptance or upon removal of an individual from the work site.
- I. Contractor is not required to obtain reports for delivery personnel, including but not limited to FedEx, UPS, Roadway, or other materials delivery persons, however all delivery personnel must present company/employer-issued photo ID and be accompanied by at least one of Contractor's personnel at all times while at the work site.
- J. The Contractor shall retain the reports and make them available for audit by the City during regular business hours (reference paragraph 17 in Section 0300, entitled Right to Audit).

9. **ECONOMIC PRICE ADJUSTMENT:**

- A. **Price Adjustments:** Prices shown in this Contract shall remain firm for the first 24 months of the Contract. After that, in recognition of the potential for fluctuation of the Contractor's cost, a price adjustment (increase or decrease) may be requested by either the City or the Contractor on the anniversary date of the Contract or as may otherwise be specified herein. The percentage change between the contract price and the requested price shall not exceed the percentage change between the specified index in effect on the date the solicitation closed and the most recent, non-preliminary data at the time the price adjustment is requested. The requested price adjustment shall not exceed twenty percent (20%) for any single line item and in no event shall the total amount of the contract be

**CITY OF AUSTIN
PURCHASING OFFICE
SUPPLEMENTAL PURCHASE PROVISIONS
IFB MEA0004**

automatically adjusted as a result of the change in one or more line items made pursuant to this provision. Prices for products or services unaffected by verifiable cost trends shall not be subject to adjustment.

- B. **Effective Date:** Approved price adjustments will go into effect on the first day of the upcoming renewal period or anniversary date of contract award and remain in effect until contract expiration unless changed by subsequent amendment.
- C. **Adjustments:** A request for price adjustment must be made in writing and submitted to the other Party prior to the yearly anniversary date of the Contract; adjustments may only be considered at that time unless otherwise specified herein. Requested adjustments must be solely for the purpose of accommodating changes in the Contractor's direct costs. Contractor shall provide an updated price listing once agreed to adjustment(s) have been approved by the parties.
- D. **Indexes:** In most cases an index from the Bureau of Labor Statistics (www.BLS.gov) will be utilized; however, if there is more appropriate, industry recognized standard then that index may be selected.
- i. The following definitions apply:
 - (1) **Base Period:** Month and year of the original contracted price (the solicitation close date).
 - (2) **Base Price:** Initial price quoted, proposed and/or contracted per unit of measure.
 - (3) **Adjusted Price:** Base Price after it has been adjusted in accordance with the applicable index change and instructions provided.
 - (4) **Change Factor:** The multiplier utilized to adjust the Base Price to the Adjusted Price.
 - (5) **Weight %:** The percent of the Base Price subject to adjustment based on an index change.
 - ii. **Adjustment-Request Review:** Each adjustment-request received will be reviewed and compared to changes in the index(es) identified below. Where applicable:
 - (1) Utilize final Compilation data instead of Preliminary data
 - (2) If the referenced index is no longer available shift up to the next higher category index.
 - iii. **Index Identification:** Complete table as they may apply.

Weight % or \$ of Base Price: 100	
Database Name: Wages and Salaries for Private Industry Workers	
Series ID: CIU2020000430000A	
<input checked="" type="checkbox"/> Not Seasonally Adjusted	<input type="checkbox"/> Seasonally Adjusted
Geographical Area: n/a	
Description of Series ID: Occupation – Installation, maintenance, and repair	
This Index shall apply to the following items of the Bid Sheet / Cost Proposal: All	

- E. **Calculation:** Price adjustment will be calculated as follows:

Single Index: Adjust the Base Price by the same factor calculated for the index change.

Index at time of calculation
Divided by index on solicitation close date
Equals Change Factor
Multiplied by the Base Rate

**CITY OF AUSTIN
PURCHASING OFFICE
SUPPLEMENTAL PURCHASE PROVISIONS
IFB MEA0004**

Equals the Adjusted Price

F. If the requested adjustment is not supported by the referenced index, the City, as its sole discretion, may consider approving an adjustment on fully documented market increases.

10. **WORKING ON OR NEAR ENERGIZED EQUIPMENT – ARC FLASH PROTECTION (reference Section 0300 Paragraph 11. Compliance With Health, Safety, and Environmental Regulations)**: Contractor's employees shall wear at all times the proper personal protective equipment and clothing required for the head, face, torso, arms, hands, and lower body that provides a minimum Arc Thermal Protection Value (ATPV) of 12 calories per square centimeter (cal/cm²) when working on or near energized electrical equipment, or greater, if required by the NFPA Standard 70E and/or Article 410 of the NESC for the work being performed.
11. **CONTRACT AWARD**: This Contract shall be awarded in an annual amount not to exceed the Total Bid (reference Section 0600) plus a contingency amount not to exceed \$3,500.
14. **CONTRACT ADMINISTRATOR**: The following person is designated as the Contract Administrator and will act as the contact point between the City and the Contractor during the term of the Contract:

Michelle Casanova, MBA, Austin Energy

Office Phone: 512/505-3747, Email: michelle.casanova@austinenergy.com

*Note: The above listed Contract Administrator is NOT the authorized Contact Person for purposes of the **NON-COLLUSION, NON-CONFLICT OF INTEREST, AND ANTI-LOBBYING Provision** of this Section; and therefore, contact with the Contract Manager is prohibited during the no contact period.

**CITY OF AUSTIN
PURCHASING OFFICE
SOLICITATION NUMBER MEA0004**

**SCOPE OF WORK
FOR
AUSTIN ENERGY SERVICE SPECIFICATIONS
FOR PREVENTATIVE MAINTENANCE AND CORRECTIVE REPAIR SERVICES
OF THE SHEC ALIMAK HEK RACK AND PINION ELEVATOR**

1.0 PURPOSE

The City of Austin, dba Austin Energy (AE), seeks to establish a service agreement through this Invitation for Bid (IFB) with a Contractor to conduct preventative maintenance and corrective repair services on an Alimak Hek rack and pinion hoist SE – 400 DOL elevator. This external elevator provides access to the upper level of Unit 5A Heat Recovery Steam Generator (HRSG) at AE's Sand Hill Energy Center (SHEC).

2.0 BACKGROUND

Austin Energy is a department within the City of Austin and is the nation's 8th largest publicly owned electric utility. AE's service area covers over 437 Square miles, and includes all of Austin and Travis County, as well as 15 square miles of Williamson County. AE's mission is to deliver clean, affordable, reliable energy and excellent customer service.

Sand Hill Energy Center (SHEC) is AE's newest and most efficient power plant. Its thoughtful design and construction methods ensure that every aspect of the plant contributes to the City of Austin's environmental goals. The SHEC consists of 270 MW of peaking units. Units 1-4 came online in 2001, generating 180 MW. Two additional units totaling 90 MW were added in 2010. A 300 MW combined cycle unit was completed in 2004; it is expandable to 500 MW with the addition of a second gas turbine.

3.0 CONTRACTOR QUALIFICATIONS

- 3.1 Contractor shall be a registered Vendor with the Texas Department of Licensing and Regulation (TDLR) in accordance with the Texas Health & Safety Code, chapter 754, Subchapter B, Section 754.0171, and should provide documentation of all suspensions, violations, or investigations by the TDLR within the last five years as an attachment in response to this solicitation.
- 3.2 Contractor shall have a minimum of five (5) years continuous experience in providing elevator maintenance service for construction site rack and pinion elevators.
- 3.3 Contractor shall provide five (5) commercial references for similar work and types of systems as outlined in this Scope of Work.

4.0 CONTRACTOR REQUIREMENTS

- 4.1 Contractor must own or have access to all equipment and tools necessary to complete the preventative maintenance and corrective repair services specified in this solicitation.
- 4.2 Contractor's personnel to be assigned to work under a resulting Contract must have a minimum of three (3) years' experience working with critical mechanical, electrical, electronic, and microprocessor elements of elevators.
- 4.3 Contractor must be available twenty-four (24) hours per day, three hundred and sixty-five (365) days a year with labor, materials, and equipment necessary to respond to emergency situations involving the Alimak Hek elevator.
- 4.4 AE reserves the right to ask the Contractor to furnish certification papers and documentation of the assigned personnel's qualifications. Contractor may replace personnel assigned under this Contract only with equally classified and qualified personnel.

5.0 CONTACTOR RESPONSIBILITIES

- 5.1 Contractor shall ensure that all personnel assigned to work under a resulting contract comply with the SHEC Contractor Work Requirements, see Attachment A.
- 5.2 Contractor shall ensure that all employees and representatives accessing any AE worksite undergoes a workforce security clearance check, as outlined in (Section 0400, part 8).
- 5.3 Contractor's shall ensure that all employees and representatives accessing any AE worksite shall wear a standard company uniform, safety shoes, and have company issued photo identification clearly displayed while conducting services on any AE worksite. Uniforms shall be clean, consistent in appearance, and have the Contractor's name or logo clearly displayed.
- 5.4 Contractor shall ensure that all personnel assigned to work under a resulting Contract attend an AE-facilitated mandatory safety orientation prior to starting work. This can be arranged by contacting the SHEC Administrator at (512) 972-9401.
- 5.5 The Contractor shall maintain the Alimak Hek elevator as in accordance with all federal, state, and local codes. These include, but are not limited to:
 - 5.5.1 American National Standards Institute (ANSI) Safety Code A17.1, or the latest ANSI revision referring to elevator and escalator equipment maintenance and inspection.
 - 5.5.2 American Disabilities Act (ADA).
 - 5.5.3 American Society of Mechanical Engineers (ASME) A17.1 - Safety Code for Elevators and Escalators.
 - 5.5.4 ASME A17.3 - Safety Code for Existing Elevators and Escalators.
 - 5.5.5 National Fire Protection Association (NFPA) Supplement 4- Life Safety Code Handbook.
 - 5.5.6 Underwriters Laboratories (UL) Standard 1 04 - Elevator Door Locking Devices and Contacts.
- 5.6 The Contractor shall perform all steps necessary to protect persons and property from risk of harm due to a problem with an elevator.
- 5.7 In the event of conflict between this Scope of Work, the Manufacturer's Literature (Attachments B and C) or any applicable codes, the more stringent terms or revisions shall apply unless otherwise notified in writing by the City.

6.0 AUSTIN ENERGY RESPONSIBILITIES

- 6.1 AE will provide Contractor and Contractor's employees access to the specified worksites during standard and nonstandard hours of operation as necessary to complete required work.
- 6.2 AE reserves the right to ask the Contractor to furnish certification papers and documentation of the assigned personnel's qualifications. Contractor may replace personnel assigned under this Contract only with equally classified and qualified personnel.

7.0 SINGLE POINT OF CONTACT (SPOC)

- 7.1 Contractor shall provide a Single Point of Contact (SPOC), who speaks English, is skilled, knowledgeable, and has experience with providing maintenance services to construction site rack and pinion elevators as listed in this Scope of Work. The SPOC shall serve as the main point of contact for all service requests and scheduling.
- 7.2 The SPOC shall have full responsibility for the obligations to be performed under this Contract. If a designee is utilized, the designee shall be equally as qualified as the SPOC.
- 7.3 The SPOC shall not be a working technician or mechanic.

8.0 SCOPE OF WORK

Contractor shall provide preventative maintenance and corrective repair to the Alimak Hek rack and pinion SE – 400 DOL elevator per the SHEC Preventative Maintenance Schedule (See Attachment D) and the OEM requirements and guidelines (See Attachments B and C), City of Austin/AE requirements, and all applicable state regulations. The Contractor shall provide the specified unit bid prices to include all services, labor, material, travel expenses, and replacement parts necessary to complete required services in the attached Bid Sheet under Section 0600.

8.1 PREVENTATIVE MAINTENANCE

- 8.1.1 The Contractor shall perform all preventative maintenance listed in section E of the Alimak Hek Maintenance Manual (Attachment B) at the frequencies identified and prescribed in the SHEC Preventative Maintenance Schedule (Attachment D).
- 8.1.2 Standard work hours under this contract shall be defined as the hours from 7:00 a.m. to 5:30 p.m., Monday through Friday, with the exception of City-observed holidays. All preventative maintenance services shall be scheduled with the AE/SHEC Project Manager or owner's designee and shall be completed within standard work hours unless otherwise approved in advance by the AE/SHEC Project Manager or owner's designee.
- 8.1.3 Contractor shall provide preventative maintenance to the Alimak Hek elevator per the SHEC Preventative Maintenance Schedule (Attachment D) and OEM Manuals (Attachments B and C), and shall replace parts, change oil, or conduct other preventative maintenance service as required.
- 8.1.4 Contractor shall replace all worn, failed, or broken parts. All replacement parts shall be identical, of equal quality and design, or superior to the parts replaced. Replacement parts may be new or reconditioned.
- 8.1.5 Contractor shall be responsible for all replacement parts, including OEM and proprietary parts, as required by this Contract. If during the term of the Contract, certain elevator or escalator components become obsolete and new OEM parts may not be available, the Contractor may

provide rebuilt OEM parts or use new parts of another manufacturer with prior written approval from the AE/SHEC Project Manager or owner's designee. In all cases, rebuilt or reconditioned parts must be equal in quality, operation, and performance to original parts and free from defects.

- 8.1.6 Service technicians shall upon arrival and departure from the premises sign in at the SHEC Administrator's desk and report to the AE/SHEC Project Manager or owner's designee.
- 8.1.7 Upon completion of all routine maintenance under this Contract, the service technician shall certify that the work was done by reporting findings to the AE/SHEC Project Manager or owner's designee.
- 8.1.8 Payment may be withheld on any unit if scheduled maintenance is not performed, logged incorrectly, illegible, or certification is not submitted as specified.
- 8.1.9 Contractor shall maintain and keep current the State required Maintenance Control Plan book for the Alimak Hek elevator. This book will be kept and maintained at the SHEC Administrator's desk.
 - 8.1.9.1 Contractor shall provide a detailed list of services and replaced parts/components that were applied at each preventative maintenance service with the invoice for payment. Invoices without the required information will be sent back to the Contractor for revision.
 - 8.1.9.2 Contractor shall dispose of all worn or defective parts, oils, and solvents in accordance with all applicable laws, rules, and regulations.
 - 8.1.9.3 Contractor shall handle, transport, and dispose of worn or defective parts, oils, solvents, waste, or hazardous materials in such a manner as to ensure the highest level of safety to the environment and public health at no additional cost to the City.
 - 8.1.9.4 The Contractor shall not store worn or defective parts on City premises.
 - 8.1.9.5 The Contractor shall remove all materials from City premises as soon as each job is completed.
 - 8.1.9.6 Failure of the Contractor to perform all of the service obligations required under this Contract may result in contract termination by the City.
- 8.1.10 The service unit rate for preventative maintenance services shall include labor, parts, and consumables, including oil and grease.
- 8.1.11 Any parts which must be replaced, outside of parts required for preventative maintenance, shall be quoted to Austin Energy in writing and submitted separately as corrective repair issues on an as needed basis.
- 8.1.12 Material mark-up shall be capped at 20% of Contractor cost and shall include freight, shipping, and handling costs.
- 8.1.13 The Contractor shall, as part of the Preventative Maintenance Services, identify, schedule, and ensure completion of all inspections, tests, and operating permits required for compliance. The Contractor shall obtain the necessary information required to determine when inspections, tests, and operating permits are required and shall conduct a full load test once a year as specified in section E of the OEM Maintenance Manual (Attachment B) and the SHEC Preventative Maintenance Schedule (Attachment D).

- 8.1.14 Inspections include required State inspections; weighted, un-weighted, annual, or periodic inspections; those inspections requiring coordination with third parties; and any other inspections required to operate elevators in a safe and lawful manner.
- 8.1.15 The Contractor shall develop a plan within 30 days of the start date of this Contract outlining procedures, requirements, deadlines, and approximate dates for all inspections and tests for approval by the AE/SHEC Project Manager or owner's designee.
- 8.1.16 The Contractor shall keep a log of all inspections and tests and submit a copy of the log, as well as any corrective measures made in response to scheduled inspections and tests, to the AE/SHEC Project Manager or owner's designee in a quarterly report.
- 8.1.17 The AE/SHEC Project Manager or owner's designee shall have the right of inspection during or after any of this work and shall notify the Contractor within thirty (30) calendar days of receipt of the Contractor's certified statement of any noted discrepancies. The Contractor shall correct any discrepancies within ten (10) working days.

8.2 CORRECTIVE REPAIRS

- 8.2.1 The Contractor shall perform corrective repair services on the Alimak Hek elevator when specifically requested by the AE/SHEC Project Manager or owner's designee. All corrective repair services shall be conducted during scheduled standard working hours of 7:00 a.m. to 5:30 p.m., Monday through Friday, with the exception of City-observed holidays, unless approved in advance by the AE/SHEC Project Manager or owner's designee.
- 8.2.2 Contractor shall provide prices for corrective repair service labor rates on the Bid Sheet included as Section 0600 of this solicitation.
- 8.2.3 There is no guarantee of corrective repair work through a resulting Contract.
- 8.2.4 AE reserves the right to perform any of this work with other vendors.
- 8.2.5 Any corrective repair work performed under a resulting Contract will be scheduled through the Contractor's SPOC.
- 8.2.6 The Contractor is responsible for inspecting the work site prior to providing a written quote and estimated timeline for completing the requested corrective repair services.
 - 8.2.6.1 Submission of the written quote will be evidence that the Contractor is familiar with the nature and extent of the work and any local conditions that may, in any manner, affect the scope of work, including any equipment, materials and labor required for the job.
 - 8.2.6.2 Contractor's written quote will clearly itemize the hourly service unit rate for the specified job, plus materials, equipment/tool rentals, subcontractors and any other costs necessary. All charges to the City shall be in accordance with Section 0600, Bid Sheet.
- 8.2.7 The Contractor shall respond to AE corrective repair service calls, have a service technician on site, and provide a quote and estimated timeline for the corrective repair within **72** hours of the service call. In the case that the Contractor fails to respond within the allotted time, the City may choose to engage other parties to respond to the corrective repair service requested.
- 8.2.8 Contractor shall commence work only after receipt of a written Work Release from the AE/SHEC Project Manager or owner's designee.
- 8.2.9 Any work completed prior to the receipt of a written Work Release is conducted at the Contractor's risk.
- 8.2.10 The City and AE are under no obligation to pay for unauthorized work.

- 8.2.11 The Contractor shall make every effort to complete corrective repairs within 72 hours of identifying the problem(s). If corrective repairs cannot be made within this designated time frame, the Contractor shall notify the AE/SHEC Project Manager or owner's designee in writing with the schedule for completing the repairs.
- 8.2.12 AE shall compensate the Contractor on a time and materials basis **or** firm fixed price for authorized work.
- 8.2.13 Items repaired that stop working within sixty (60) days of the original work being accepted by AE shall be corrected by Contractor at no additional parts/equipment/labor costs to AE.

8.2.11.1 Time and Materials Compensation

- 8.2.11.1.1 The Contractor shall provide a Time and Materials Rate Sheet in conjunction with what is specified in section 8.2.
- 8.2.11.1.2 AE shall pay labor rates for each craft category participating in the work and authorized expenses as shown in Time and Materials Rate Sheet provided by the Contractor. Personnel and craft categories utilized by the Contractor but not included in Time and Materials Rate Sheet, shall not be billed unless approved by the AE/SHEC Project Manager or owner's designee in writing prior to work completion. Overtime for Contractor's Clerical/Administrative personnel shall be approved in writing by the AE/SHEC Project Manager or owner's designee on a Work Release prior to initiation of work authorized by the Work Release.

8.3 QUALITY CONTROL/QUALITY ASSURANCE

- 8.3.1 Contractor shall provide both preventative maintenance and corrective repair services in a professional manner with quality performance for desired outcomes.
- 8.3.2 The Contractor shall implement and maintain a written Quality Control Plan to ensure proper preventative maintenance and inspections scheduled for all equipment covered under a resulting contract. The intent of the Quality Control Plan is to ensure that the maintenance of covered equipment adheres to the scope of work and all subsequent clarifications. The Contractor shall submit the Quality Control Plan to the AE/SHEC Power Project Manager or owner's designee within 30 days of the Contract start date.

8.4 CONTRACTOR CLOSE OUT

- 8.4.1 Thirty (30) days prior to the expiration of any agreement awarded from this solicitation, the Contractor shall inspect and test the Alimak Hek elevator in accordance with accepted inspection and test procedures, and provide the AE/SHEC Project Manager or owner's designee with a detailed report of the elevators disposition and repair needed.



**Sand Hill Energy Center
Contractor Work Requirements**

TABLE OF CONTENTS

SHEC Contacts.....1

General1

Emergencies2

Safety2

 Codes and Standards.....2

 Safety Orientation2

 Personal Protective Equipment.....3

 Specific Safety Rules3

 Respiratory Protection.....4

 Confined Spaces.....4

 Equipment Operators4

 Material Safety Data Sheets4

Environmental and Waste Issues4

 Spills and Stains.....5

 Waste Management.....5

 Recycling5

 Materials Usage Logs.....6

Work Practices6

 Work Hours.....6

 Housekeeping.....6

 Damage to Existing Property6

Utilities / Facilities.....6

 Compressed Air6

 Electrical Power6

 Water.....7

 Facilities.....7

Roadways and Parking.....7

Storage and Temporary Buildings7

Communication.....7

Elevators8

Mail, Messages and Telephones.....8

Deliveries.....8

Schedule8

SHEC CONTACTS

NAME	TITLE	PHONE
Lee Lewis	Plant Manager	512-972-9409
John Lalande	Plant Operations Superintendent	512-972-9456
Tim Youts	Plant Maintenance Superintendent	512-505-3720
Craig Smith	Plant Engineer	512-322-6477
Jake Spelman	Plant Environmental Health & Safety Coordinator	512-972-9450
Cheryl Martinets	Plant Administrative Assistant	512-972-9401
Daryl Fisher	Plant Stores Specialist	512-505-7595
Sam Garcia	AE Corporate Safety Specialist	512-482-5374
Plant Control Room (Staffed 24-7-365)		512-972-9451

GENERAL

The Contractor shall comply with the requirements of this document unless otherwise directed in the body of the specification or contract to which it is attached. The Contractor shall comply with all plant rules and regulations including, but not limited to, the following:

- SHEC's access is via Fallwell Lane.
- Contractors shall sign in daily at the main office.
- All Contractor site office trailers shall be clearly marked and identified with the Contractor's company name.
- City Ordinance prohibits smoking in buildings and only allows smoking in designated areas.
SHEC designated smoking areas:
 - 1) In front of the Administration Building
 - 2) A temporary smoking area may be designated on a case-by-case basis for extended projects, pending approval of Plant Management.

Smoking areas shall be kept clean at all times.

- There will be **NO** spitting on floors, in drains, in sinks, through gratings, or in trash cans.
- Alcohol, drugs, and firearms are **strictly forbidden** at the plant.
- Contractors shall provide all tools and supplies necessary to successfully complete the contracted job. Contractors **shall not** borrow any Austin Energy (AE) tools, equipment, vehicles, supplies, or personal protective equipment unless specifically allowed in the work contract or approved by the Plant O&M Superintendent.

EMERGENCIES

In the event that an emergency situation arises, the SHEC control room should be contacted **immediately**. Any calls that have been made directly to Police, Fire Department, EMS, etc. shall be reported to the control room for coordination with Plant Security.

The control room will alert emergency personnel by contacting 911 and then use the plant two way radios and mass notification announcing system to announce the nature of the emergency as well as instructions. Three assembly areas have been established in case an evacuation is necessary. The primary assembly area is at the main gate. The secondary assembly area is the alternate entrance gate located at the north east corner of the plant property. The third assembly area is the area just west of Unit 4, near the south end of the switchyard. Do not leave the assembly areas until an "all clear" has been given and all employees have been accounted for.

SAFETY

AE has Safety staff available by appointment or immediate contact by pager. *If any AE staff believes there is a safety violation, they are authorized to stop the Contractor's work at any time.* If any plant employee observes contractor employees working in situations of imminent danger, work will be ceased until the AE Project Manager and the Contractor can meet to alleviate the hazardous condition(s). Such work stoppage shall not relieve the contractor of any contract commitments, nor be a valid cause for a change order.

Codes and Standards

The Contractor shall comply with all federal, state and local laws, and all standards, rules, administrative agency regulations and orders issued pursuant to such laws and regulations, including, but not limited to, the following:

- Occupational Safety and Health Administration (OSHA) Code of Federal Regulations, (CFR) title 29, U.S. Department of Labor
- NFPA 70E, National Electric Code 2012
- Environmental Protection Agency (EPA)
- Texas Commission on Environmental Quality (TCEQ)
- Texas Department of Health (TDH)

Safety Orientation

Every Contractor employee shall attend a plant-specific safety orientation before they will be allowed to work. This orientation will take 30-45 minutes. To schedule safety orientations, Contractor shall contact the AE Project Manager who will arrange a time with the plant. This orientation is required of all Contractor personnel on an annual basis.

The Contractor, if necessary for the safety orientation, shall supply a language interpreter. All contract employees must have a valid social security number or work permit.

All Contractors will be issued either an AE Contractor Badge or an SHEC Visitor Badge, depending on the duration of the job. Contractor/visitor badges must be worn in a visible location at all times while on site for the duration of the job. If a Contractor is found on the job without a badge he/she may be asked to leave the site.

Any Contractor employee injured in the course of his/her work shall immediately report the injury to the AE Project Manager and Plant personnel. The Contractor shall provide a copy of their written accident reports, including his/her written investigation report, to the Plant Safety Specialist within 24 hours of the incident.

Personal Protective Equipment

Contractor shall insure that all employees wear, at a minimum, hard hats, steel toe safety boots and safety glasses with side shields or goggles for personal protective equipment (PPE). Additional PPE requirements are as follows:

- Hard hats may be of any style and color except RED and ORANGE. The Owner reserves these colors for emergencies and visitors. The hard hats shall comply with ANSI Z89.1, Class A,B,C under OSHA 29 CFR 1910.135.
- Steel toe safety boots/shoes can be of any manufacture and shall comply with ANSI 41-1991 under OSHA 29 CFR 1910.136.
- Safety glasses (prescription or non-prescription) shall comply with the appropriate ANSI standard for the job being performed. (Welding, Cutting Grinding, General Use) under OSHA 29 CFR 1910.133. Flash glasses shall be worn in designated areas.
- Hearing protection shall be provided and used when working in noisy areas or on/near an operating unit (to include gas turbines). The protection factor of 25 NRR or greater shall be attained, under OSHA 29 CFR 1910.95.
- The Contractor shall supply and insure that employees have the correct type and style of gloves for the job they are performing.
- All personnel shall wear 100% cotton clothing including long pants appropriate shirts, etc. No shorts will be allowed.
- Safety Harnesses and fall protection must be used in compliance with OSHA 29 CFR 1926.502.
- If *ANY* work introduces a potential Arc Flash hazard, the Contractor must contact the AE project manager so that an Energized Electrical Work Permit can be completed, identifying Arc Rated PPE per the NFPA 70e (2012) Standard for Electrical Safety in the Workplace.

Specific Safety Rules

The Contractor shall at all times adhere to Plant Safety rules for Lock-Out/Tag-Out (LOTO), confined space entry (CSE), and electrical safety work practices. Some of the site safety rules *exceed those required by OSHA*, and the Contractor may contact the AE Project Manager to find out what is expected under the Plant Safety Program. All other rules, as they apply, will also be adhered to at all times (e.g., fall protection, respiratory protection, arc-flash protection, scaffolding, trenching, etc.)

All equipment worked on will be properly locked out as per plant safety rules. All LOTO clearances shall be put in place by plant personnel. The Contractor shall work with plant operations to review the LOTO and insure that equipment is safely secured prior to starting work. The Contractor is responsible for providing his own lock and adding it to the lockbox related to the LOTO clearance. Under no circumstance shall the Contractor lock out equipment that is not included in a plant LOTO. The Contractor is required to sign on the plant LOTO and follow all plant LOTO rules and procedures. The Contractor can request that other pieces of equipment be locked out to make the work area safe.

Respiratory Protection

The Contractor shall provide documentation of employee participation in a Respiratory Training Program that meets OSHA requirements if employees are to work in an atmosphere which will require the use of a respirator. The Contractor is responsible for selecting and providing the correct respirator for the atmosphere in which work is to be performed.

If a Self-Contained Breathing Apparatus (SCBA) is to be worn, the Contractor shall provide documentation of the employee's training with this device in addition to his documentation of OSHA-certified respirator training.

All documentation shall be provided to the AE Project Manager who will file originals and forward copies to the Plant Safety Specialist.

Confined Spaces

The Contractor shall have an OSHA compliant Confined Space Entry Program. A copy of this program, and employee training certifications, shall be delivered to the AE Project Manager prior to beginning work in a confined space. The Contractor shall be responsible for air monitoring for their employees. The site will provide a Subject Matter Expert (SME) to assist in hazard evaluations prior to entry into a confined space. Plant personnel may periodically monitor atmospheric conditions in the confined space(s) where Contract Personnel are working. Plant personnel shall stop Contractor work in a confined space when atmospheric conditions or any other hazards are identified which were not addressed in the Entry Permit for that space. Work will not be allowed to resume until the hazardous condition(s) has been resolved to the satisfaction of Plant personnel.

Equipment Operators

The Contractor shall provide documentation certifying that all of their equipment operators have been properly trained for the piece of equipment they are operating. This includes but is not limited to, fork lift operators, mobile crane operators, overhead crane operators, etc. This documentation shall be provided to the AE Project Manager who will forward it to the Plant Safety Specialist.

Material Safety Data Sheets

The Contractor shall provide MSDS for all project chemical products prior to being brought on site. These sheets shall be given to the AE Project Manager who will forward to the Plant EHS Coordinator.

ENVIRONMENTAL AND WASTE ISSUES

AE has Environmental staff available by appointment or immediate contact by phone. *If any AE personnel observe a potential environmental violation, they are authorized to stop the Contractor's work at any time.* If any plant employee observes contractor employees working in situations of imminent danger, work will cease until the AE Project Manager and the Contractor can meet to alleviate the hazardous condition(s). Such work stoppage shall not relieve the contractor of any contract commitments, nor be a valid cause for a change order. Specific environmental and waste requirements are as follows:

Spills and Stains

- If **ANY** amount of oil or other chemical is spilled onsite, the Contractor must notify the EHS Coordinator or Shift Supervisor immediately. Stop work for large spills, or any spills near drains.
- The Contractor is responsible for cleaning up and containing any spills and/or stains related to contractor activities, including leaky hydraulic equipment or vehicle engines, oil/fuel spills, paint/solvent spills, other chemical spills, etc. Do not bring leaky equipment onsite.
- SHEC can provide a limited amount of spill cleanup materials and waste drums. Drums must be labeled immediately. Contact the EHS Coordinator with any questions.

Waste Management

- All waste generated onsite must be managed by the Plant. No waste shall be left in unauthorized storage containers or disposal areas. All unused/new materials shall be taken with the Contractor upon completion of their work unless otherwise approved by Plant Management.
- Collection and disposal of large volumes of Contractor-generated trash shall be the responsibility of the Contractor and must be coordinated through the Plant EHS Coordinator prior to the start of the job without additional cost to AE.
- Waste collection containers shall be properly and clearly labeled to ensure proper hazard notification and segregation of hazardous materials from non-hazardous materials.
- Liquid waste must be kept separate from solid waste (e.g., used oil and oily rags shall be collected in separate drums). “Used Oil” drums and “Oily Rags” drums shall be clearly labeled, and should be stored in metal, 55-gallon drums which are staged on proper containment.
- Small volumes of domestic and non-hazardous trash may be disposed of in the existing, 30-yd Plant Trash roll-off box (located in the NE area of the Laydown Yard) with approval of the Plant EHS Coordinator and/or the Project Manager. SHEC may provide labeled trash drums, but as soon as they are full the Contractor is responsible for emptying the **contents of the drums** in the Plant Trash roll-off. Drums must be kept for re-use.
- Contractors **may not** take any waste offsite. Certain exceptions *may* apply (e.g., special recycling), but must be approved by the EHS Coordinator in advance.

Recycling

The Contractor shall participate in plant recycling efforts as much as possible. A map showing all waste and recycling collection locations can be provided at the Plant Contractor Orientation. Specific waste disposal and recycling information can be obtained from the Plant EHS Coordinator.

The Plant has separate containers designated for recycling the following:

- **Cardboard** – Bright green, 8-yd dumpster near road at NE corner of the Laydown Yard.
- **Scrap metal** – Tan, 20-yd roll-off box under shelter structure, north of the Laydown Yard.
- **Raw wood** (unpainted/unstained lumber/pallets/crates, **with no hardware larger than nails**) – Olive green, 40-yd roll-off in the NE area of the Laydown Yard, east of Plant Trash roll-off.

Additionally, spent aerosol cans or spray cans must be collected separately from all other wastes for further processing by the Plant. Do not put spray cans in any other waste containers. Contact the EHS Coordinator with any questions.

Materials Usage Logs

Upon job completion the contractor must complete logs (provided by AE) recording the duration of and the materials used for the following activities:

- **Painting**—application methods, types/volumes of paint, thinner used.
- **Welding**—methods, types/amounts of welding rods used.
- **Torch Cutting**—amount of acetylene used.
- **Blasting**—type/amount of blast media used.
- **Combustion-powered equipment** (e.g., portable work lights, compressors, welding machines, generators, etc.)—types/volumes of fuel used.

Please contact the Plant EHS Coordinator with any questions or concerns regarding existing or potential Environmental and Waste issues.

WORK PRACTICES

Work Hours

Normal plant working hours are Monday through Friday, 7:30 a.m. until 4:00 p.m. If a Contractor plans to work hours other than these, the AE Project Manager shall be notified in advance. This request will be forwarded to Plant Management for approval.

Housekeeping

The Contractor shall be responsible for daily cleaning of their work areas. Prior to the end of each work day all trash shall be placed in proper receptacles and all areas swept and picked up.

Damage to Existing Property

The Contractor shall take all precautions to protect existing buildings, grounds and equipment from damage of whatever nature arising from the Contractor's operations at the site. If damage is incurred, the Contractor shall make all necessary repairs or replacements without additional cost to the owner.

All areas of the station site assigned to the Contractor for their use shall be left clean. All grassy/dirt areas used for lay down and/or parking shall be left smooth and re-seeded as necessary prior to demobilization.

UTILITIES / FACILITIES

Compressed Air

Contractors shall provide their own compressors, hoses, connections and safety clips necessary to supply compressed air.

Electrical Power

Both 120V and 480V power is available upon request. Plant staff requires three (3) working days notice to route and connect power to a single point for the Contractor's use. Request for electrical connection shall be made through the AE Project Manager. Plant staff will also disconnect this service at the end of the contract, following the same procedure.

Water

Service (non-potable) water is available at various locations around the plant. The Contractor shall be responsible for connecting and routing necessary extensions. The Contractor shall provide all hoses/pipes, as needed for their use, and shall remove these upon project completion.

Facilities

The Contractor shall provide the following for his/her employees:

- Drinking water
- Temporary toilets
- Break & eating areas (including microwaves, refrigerators, other appliances as needed)

Exceptions to these requirements may be made on a case-by-case basis for small projects, but Project Managers must obtain approval in advance from Plant Management in order for the exception to be granted.

ROADWAYS AND PARKING

Parking space is in short supply. Passenger cars and light trucks **ONLY** will be allowed in the designated parking lot. All heavy trucks and equipment will have parking assigned prior to arrival.

The Contractor shall only use roads and parking areas within the plant area as assigned by the AE Project Manager. The Contractor shall thoroughly investigate all existing entry, exit, and roadways to ensure there is adequate accessibility.

The Contractor shall make all their employees aware of the **12 mph** maximum speed limit within the Plant.

STORAGE AND TEMPORARY BUILDINGS

All storage and temporary buildings/office trailers required by Contractors shall be erected/placed by the Contractor at their own expense, with approval of the AE Project Manager, and shall be removed without cost to AE at the termination of their usefulness or termination of the job.

Outdoor space for storage of materials (lay down area) may be available to the Contractor in a location, agreed upon between Plant personnel and AE Project Manager. If assigned, this area will be kept clean and in an orderly fashion. The Contractor, prior to departure from the worksite, shall remove all excess materials from the site.

Small quantities of product requiring secondary containment may be accommodated at Plant locations with approval of the Project Manager, the Plant EHS Coordinator and/or Plant Management. In general, however, the provision and maintenance of secondary containment for stored products shall be the Contractor's responsibility.

COMMUNICATION

Lines of communication shall be maintained at all times. The Contractor shall make all requests through the AE Project Manager who in turn will contact the appropriate Plant personnel.

ELEVATORS

There is one elevator located on the Unit 5A Heat Recovery Steam Generator (HRSG) stair tower. This elevator provides personnel access to the top level of the HRSG. Contractors shall only use this elevator with prior permission from their plant contact.

This elevator is for personnel and light hand tools **ONLY**. There is a strict **two-passenger limit** that must be followed at all times. Contractors needing to lift or move materials shall provide their own lifting devices and associated equipment (forklift, crane, tugger, straps, cables, etc.).

MAIL, MESSAGES, AND TELEPHONES

SHEC has phones and a fax machine in the front office that may be used by small Contractors and short duration jobs. Contractor mail, messages, and faxes received at the administrative office will be placed in location designated by the Plant Administrative Assistant. If the Contractor requires phone/fax services other than this or if on site for more than 30 days, the Contractor shall provide for their own services. There is a limited supply of phone/fax lines available on site. Requests for use of these lines shall be made through the AE Project Manager and Southwestern Bell Telephone.

DELIVERIES

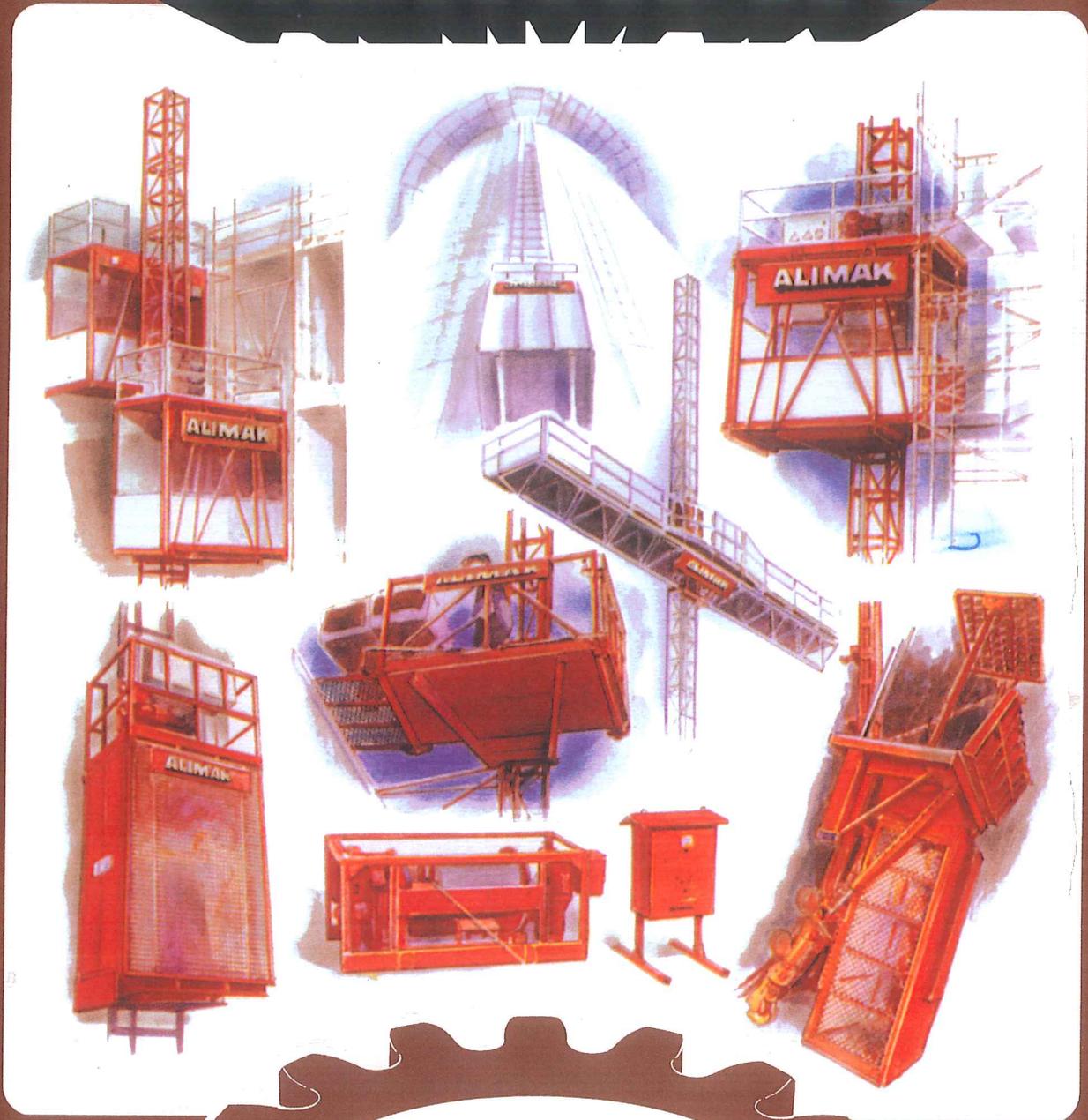
All Contractor deliveries to the Plant shall be coordinated in advance with the Plant Stores Specialist and shall be properly addressed with Contractor contact name on labeling. Deliveries not handled in this way may be refused by the Plant and returned to Sender. Contractor shall provide the Plant Stores Specialist with contact information which shall be utilized in notifying the Contractor of the arrival of a delivery. Contractors shall pick up deliveries within 24 hours of notification. Sand Hill has limited indoor warehouse storage space, and consequently small items received will be stored indoors only if space allows and for no more than 24 hours. All large items received will be stored outside. The Plant will receive and unload deliveries, but takes no further responsibility for storage and protection of these items.

SCHEDULE

The Contractor shall submit a proposed work schedule to the AE Project Manager who will then get approval from the Plant personnel. Schedules with durations longer than two (2) weeks shall be submitted at least two (2) weeks before the Contractor moves on site. Work schedules of less than two (2) weeks shall be submitted at least one (1) week before moving onto the site.

The schedule shall show expected mobilization and demobilization dates and projected dates for all tasks concerned in the project. Updated schedules shall be made and submitted to AE Project Manager as necessary.

ALIMAK



Maintenance Manual for
Alimak SE-series
Industrial Lifts

*Read and understand
this Manual
before operating
or servicing
this equipment.*

**Maintenance Manual for
Alimak SE-series
Industrial Lifts**

This manual is only applicable if the manufacturing number indicated below corresponds to the manufacturing number stamped on the identification sign of the equipment. Where there is a conflict contact your ALIMAK representative.

YOUR LIFT HAS:

Manufacturing No.:

Year:

Part No. 9097 714 - 1 06
2004 - 05 - 22

FOREWORD

This product is designed and manufactured to meet strict quality and safety standards. This manual is intended to provide advice and instructions to the operator and qualified service personnel so that they can safely control the situations which can occur when the product is used, and can carry out the required service and maintenance on the product.

This manual shall always be available in the box on the machine intended for this purpose.

Potential risk for user or equipment is indicated in the following way in this book:



DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT: Information with these headings indicates the possibility of damage to the equipment.



WARNING!

The equipment should not be operated if Maintenance Manual is missing.

Misuse of this equipment could result in personal injury or property damage.

Photographs and drawings are illustrative only and do not necessarily show the design of the products on the market at any given point in time. The products must be used in conformity with applicable practice and safety regulations. Specifications of the products and equipment presented herein are subject to change without notice.

CONTENTS

IMPORTANT SAFETY INSTRUCTIONS

C

OPERATING INSTRUCTIONS

D

SERVICE AND MAINTENANCE

E

ELECTRIC TROUBLESHOOTING

F

Appendix:

CHECK LIST

TIGHTENING TORQUE

IMPORTANT SAFETY INSTRUCTIONS

C 0

Safety instructions C 1

Important Safety Instructions

General

Over the years serious accidents have occurred during the erection and dismantling of rack and pinion lifts and construction hoists. Common to these accidents has been the "human factor", i.e. non adherence to proper safety procedures and common sense.

This document affects those personnel involved in the erection, dismantling and servicing of such equipment.

Some examples:

Leaning over the safety railing on the car roof while the lift is moving upwards can cause you to be struck by a tie or a cable guide.

Incomplete installation of mast bolts can cause separation of the mast sections, leading to the fall of the car with subsequent loss of life or serious injuries.

Not following the correct mast tie schedules.

Avoid the risk of accidents by carefully studying these instructions regularly. Think clearly. Do not rush the work and always check to make certain that the work is being done properly. SAFETY FIRST!

Safety instructions

Local safety regulations

- All local regulations shall apply.

Weather conditions – installation outdoors

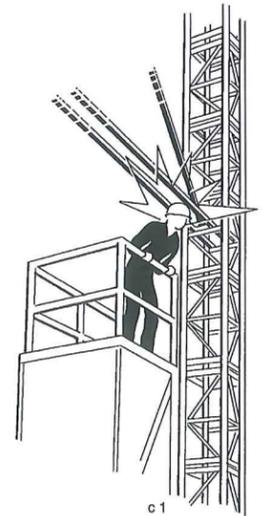
- Lifts must not be erected or dismantled in wind speeds exceeding 15 m/sec. (**33 mph**) or as governed by local regulations where more stringent.

Preparation

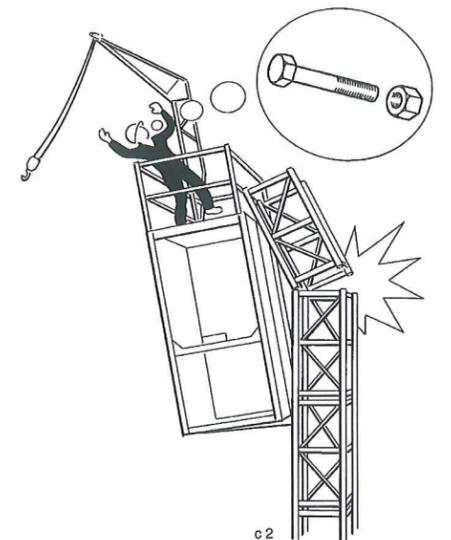
- The Maintenance Manual and Installation Manual are to be carefully studied before work begins.
- The site of erection/dismantling must be made secure from falling objects by barricading or roping off the area.
- No admittance to the lift car during erection or dismantling by unauthorized personnel.

Safety equipment and protective clothing

- Prescribed safety equipment and clothing such as hard hat, safety shoes, safety harness, etc. shall be used.
- Loose fitting clothes such as scarves must not be used as they might become entangled in moving parts.

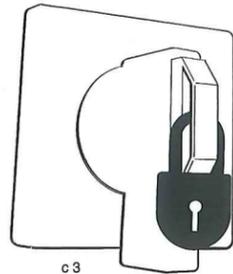


c 1

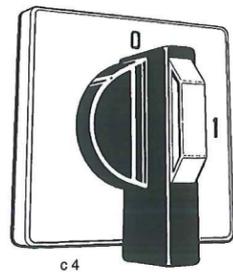


c 2

These diagrams are only typical



Always lock the main "ON/OFF" switch with a padlock to prevent unintentional operation while service/inspection work is carried out.



The main "ON/OFF" switch must be in the "OFF" position before the panel door can be opened.

General

- Read all Warning and Instruction Signs.
- Keep the work area clean. Any oil spillage must be removed immediately to avoid the risk of slipping.
- Never climb on the mast.
- During erection, dismantling or hoistway inspection, the lift must always be operated from the car roof. When working from the car roof take precautions to avoid being struck by mast ties, cable guides, landings, structure openings, etc. while lift is moving.
- When the control equipment on the car roof is to be left on temporarily during installation / dismantling or service, the main switch in the control panel of the lift car must be switched off and locked in order to ensure no accidental moving of the car.
- Before carrying out any service work, the "Normal/ Inspection" switch in the electric cabinet on lift car must be placed in the "Inspection" position. This is very important especially for lifts with "Auto return" or similar remote control function.
- The lift shall under no circumstances be driven if there is a person inside the base enclosure, on the mast or a tie.
- **Complete each item of work before starting a new one or taking a break. This is especially important when bolting or unbolting mast sections and ties.**

Mast and mast tie

- The maximum tie distance and mast overhang indicated in the applicable Installation drawing or Manual, must be adhered to.
- Bolted joints shall always be tightened to the required torque as prescribed.
- If any structural damage or severe corrosion is seen on such items as mast sections or mast ties, the lift must be immediately taken out of service and the extent of the damage be determined and corrective action taken before the lift is put into service again.
- Arrange scaffolding, working platform or similar methods if the structure cannot be safely reached for the installation of ties. Local safety regulations shall apply.

Electrical power

- Work performed on electrical equipment must be carried out by competent personnel, trained for such work. The power supply must be switched off and locked before work is performed.

Accessible areas adjacent to hoistway

- Scaffolding, platforms and other accessible areas located closer than 0.5 m (1 ft. 8 in.) must be provided with 2.5 m (8 ft.) high enclosures or in accordance with local regulations.

Authorization of lift personnel

- A routine that guarantees continuous product training (Authorization), that was done during the lift installation, must be set and maintained by a responsible person. Contact Alimak or an Alimak representative, if this training is required.

Illumination

- Adequate lighting (minimum 50 lux) shall be provided to illuminate the site for the full travelling height of travel of the lift. (By customer!)

Lightning strike

- The lift shall be earthed (grounded) so that the charge from a lightning strike is connected to earth.

Working under the lift car

- When working under the lift car, always secure the car mechanically, by safe means (i.e. a 95 x 95 mm (4 x 4 in.) wooden plank). The lift's main disconnect switch must always be turned off and padlocked.

Spare parts

- Unauthorized spare parts are not to be used. Only "Alimak Genuine Spare Parts" are to be installed.

Exchange of safety components

- Detailed inspection and control of these components shall be done per separate instructions and before the lift is put into operation.

Inspection after major modifications or accidents

- Inspection and testing should be carried out after major modifications or after an accident to make certain that the lift operates properly.

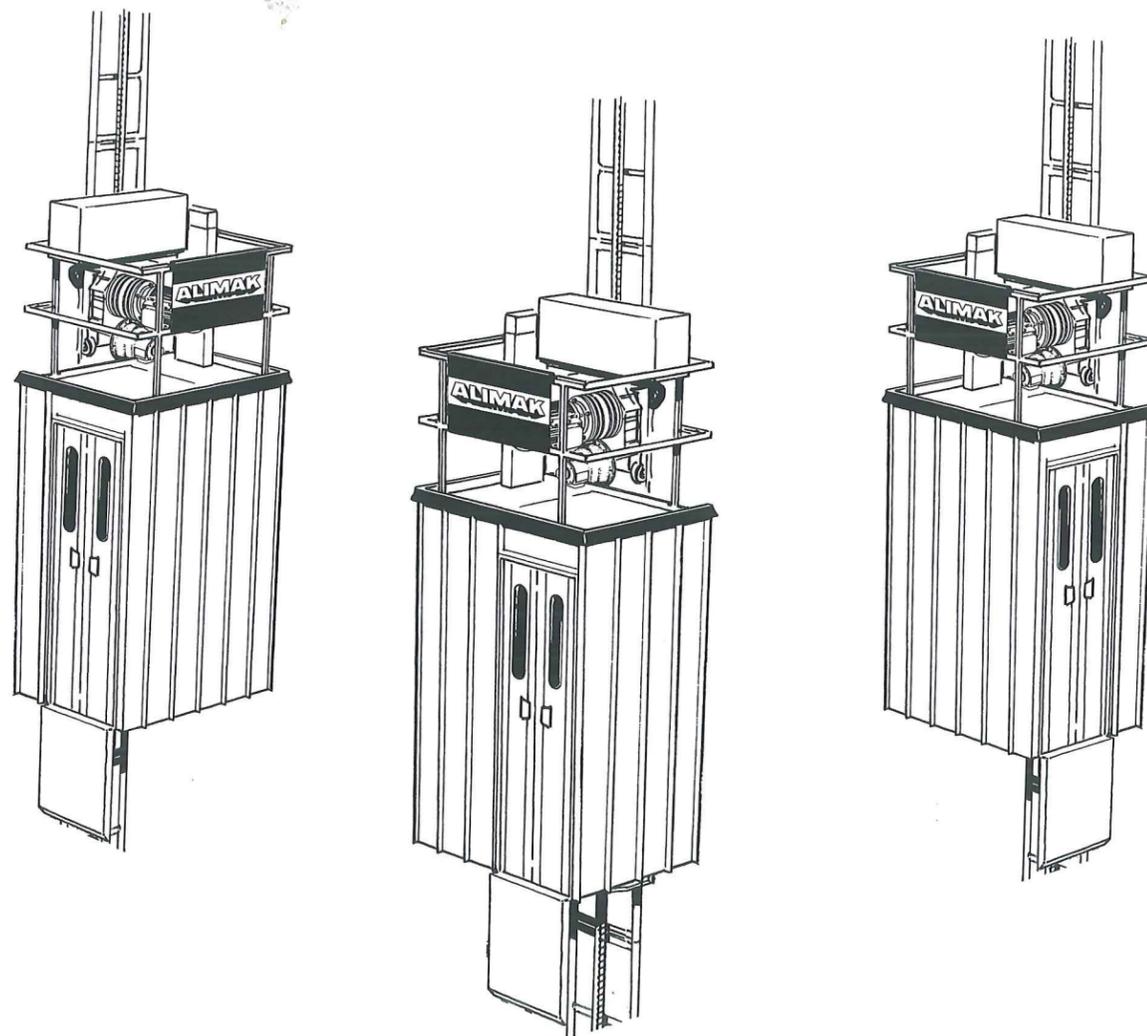
When servicing a lift with both A and B door

- Always check that the lift is driven to a landing level which allows exiting of the car without interference of the electric panel door.

Instruction for use D 1
Operating instructions D 2
If the lift does not start..... D 3
If the lift suddenly stops D 4
Evacuating of passengers D 6
If the lift has been driven
onto the lower final limit cam..... D 9
ALC collective control system D 10
Securing the position of
the lift car before service work..... D 12
Crane for ease handling of heavy items..... D 14

Instructions for use

Instructions to the user/operator on how the equipment is to be handled are presented below. These instructions will also be found on a plate in the car.



SAFETY INSTRUCTIONS

For your safety

Do not attempt to operate use or service this equipment before reading the Operator's Manual supplied with this unit.

Misuse of this equipment could result in personal injury or property damage.

The equipment should not be operated if the Operator's Manual is missing.

Safety Inspections

Note that the operator/user is responsible for ensuring that regular safety inspections are performed.

See additional instructions at ground landing – if the lift/elevator is installed outdoors.

9097 326 - 101

SAFETY INSTRUCTIONS

Wind Speed

Lift installed outdoors must not be used when wind speed exceeds 20 m/sec. (for USA and Canada 40 mph).

Storms, earthquakes

In case of storms, tornados, hurricanes or earthquakes, all vital parts of the lift must be inspected and tested by an expert or authorized local inspector prior to use of the lift.

Lift/Elevator Shaft

Lifts with open, unguarded shafts may not be used before the lift and counterweight area (if applicable) is visually inspected and found acceptable.

Icing

Where icing can take place, the lift should be parked at the ground landing upon completion of work. If the mast or power cable are covered with ice, remove ice before using lift.

9057 295 - 101

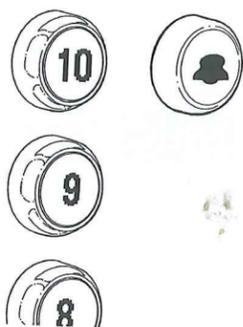
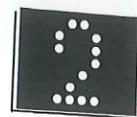
Note that the operator/user is responsible for ensuring that Regular Safety Inspections are performed.

Authorization of Lift personnel

During installation of the lift, the personnel responsible for the lift's operation shall be properly trained. These personnel shall be trained to rescue in emergency situations and in evidence of this, they shall be given and sign for the key to perform these activities.

Don't forget

- When a lift is installed where unauthorized and/or unsupervised persons, may try to use the lift, the lift must be locked out of service.
- This lift is not intended to be loaded by a forklift, which can cause overloading of the lift car.
- The lift mast must not be used as a cable ladder or for installation of light fittings or other equipment, that is not part of the equipment.



Operating instructions

1. Switch on the main ON/OFF switch at the ground landing.
Note: The main switch must be padlocked in "ON" position in public places to prevent unauthorized people switch it off. (This is NOT required according to ASME 17.1)
2. Make sure that the maximum permissible load, according to the information on the load plates in the lift, is not exceeded.
3. Close the landing doors and the lift car doors fully.
4. This lift has an automatic floor call system.
Press the button for required landing. The lift car will automatically stop at the selected landing.

Overload sensing system ...

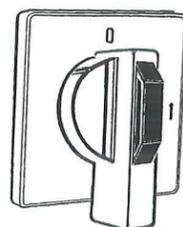
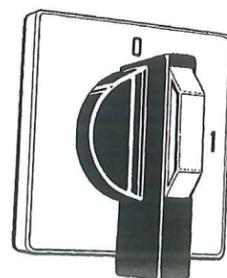
... type OSS with load cells

When the rated load is exceeded a red light is lit and the control circuit will be switched off to prevent the use of the lift.



... type with proximity switch

When the rated load is exceeded a red light is lit and the control circuit will be switched off to prevent the use of the lift.



WARNING ! Hazardous voltage

The lift has a separate power feed for lighting.
Both main switches on the electrical cabinet must be placed in position "0" to ensure that there is no power in the cabinet when the cabinet door is opened.
Can cause severe personal injury or death.

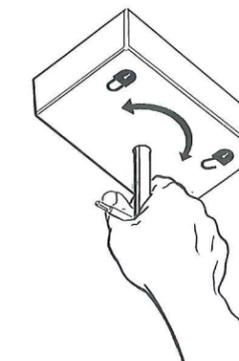


Regular Safety Inspection every 2nd month

1. Check that the main switches, emergency stop switch, limit switches and door interlocking switches are working.
Make test runs with each one of the switches in Off-position. The lift must not start. Be sure to check only one switch at a time.
2. Check all mechanical interlocks by making test runs and at the same time try to open the doors.
The lift must not start. Be sure to check only one switch at the time.
3. Check the condition and function of all springs on all cable guides where applicable.

When carrying out service and inspection work

When it is necessary to operate the lift from the car roof, in order to carry out service and inspection work, the switch in the electric cabinet in the lift car shall be set in the "Inspection" position. The switch then breaks the self-holding function of the control system and the landing control circuits. This means that the lift will stop as soon as the push-button is released and that the lift can *only* be operated from the roof of the car.



The trap door must be kept locked when not used

If the lift does not start – check:

- that the roof trapdoor and car doors are fully closed.
- that all the landing doors are fully closed.
- that the main ON/OFF switches at the ground landing and on car is in the "ON" position and that the lift is supplied with electric power.
- that no "Emergency Stop Button" is in the depressed position.
- that the final limit switch on the machinery or safety plate is in its closed position. If the final limit switch is activated – see heading "Electrical safety limit override operation".
- that no circuit breaker for control power has tripped out.
- that the switch NORM / INSP is in the "Normal" position.

If the lift still does not start, see the instructions in the section "Electric troubleshooting".

D 4



If the lift suddenly stops

It is possible that the lift could suddenly stop, usually due to loss of power.

If the lift has stopped between landings use the appropriate instruction below:

General

- Push the alarm button and wait for help from authorized lift personnel.

Use of emergency lowering device

A manual brake release lever is located inside the car.

- Pull the brake release lever downwards and keep it down to allow the car to slide down to the next lower landing.

IMPORTANT: Always lower lever to its most bottom position to prevent overheating of motor brake.

Release the lever if power suddenly comes back and the lift starts.

- The car will **STOP AUTOMATICALLY** due to the cam on the mast at the next lower landing. Car and landing door can be opened according to the instructions, listed below.

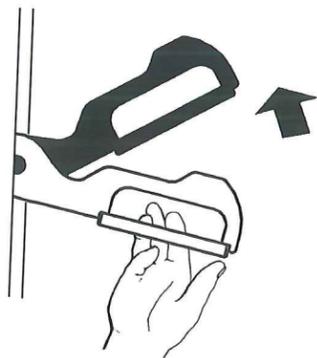
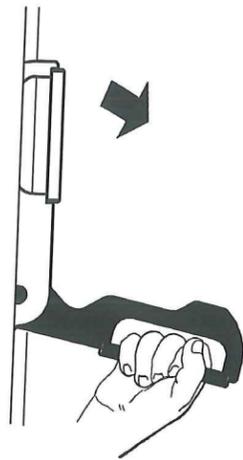
Check that the emergency lowering device is fully reset after operation.



CAUTION !

Recoil hazard

Always use the handle as illustrated.
Can cause severe personal injury.



- If sliding of the car is not possible – stay in the car and call for assistance.



DANGER !

Falling hazard

Do not leave the car – wait for assistance.
Will cause severe personal injury or death.

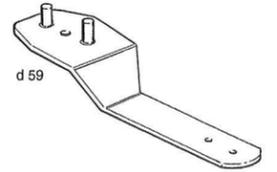


d 34

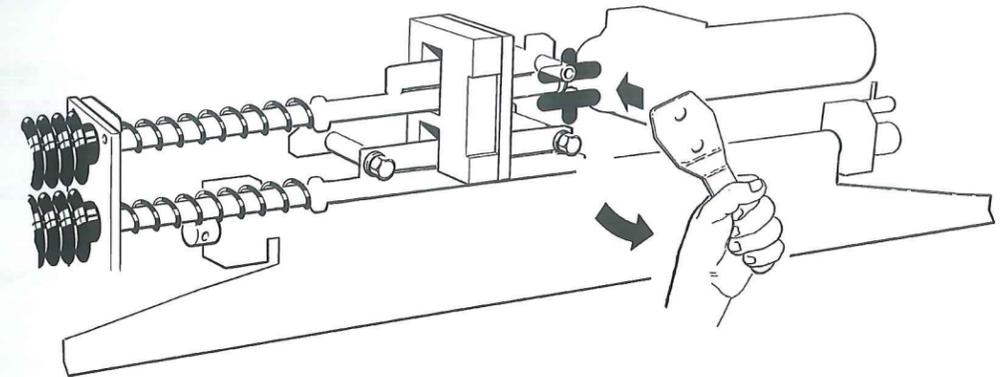
D 5

In the event of a power loss, the car door can be opened in an emergency, using the following procedures:

- Remove the cover plate (= release tool) above the car door.
- Insert the door lock release tool with one pin in the tube of the interlocking shaft and the other in the slot of the cover. Turn the tool approximately 30° to unlock.
- Hold the tool in this position and open the car and landing doors.



Note: car and landing door cannot be opened until the car is level with the landing.



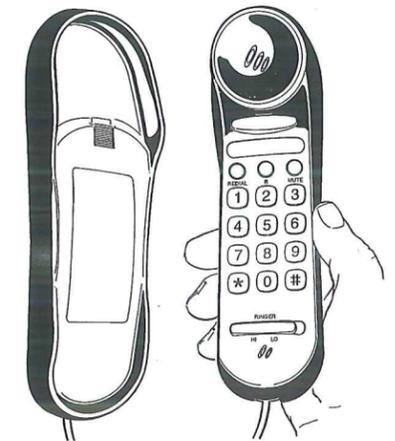
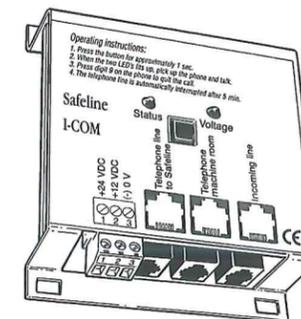
- Reinstall the cover plate/tool after its use.

Voice communication base to car

Equipment required to fulfill code EN 81.1, amendment A2.

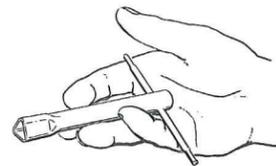
(See other national regulations to determine if applicable)

- Press the button on the intercom unit for approximately 1 sec.



- When the two LED's lights, pick up the phone and talk to the passengers inside the car.
- Press digit 9 on the phone to end the call.

The communication is automatically interrupted after 5 minutes.

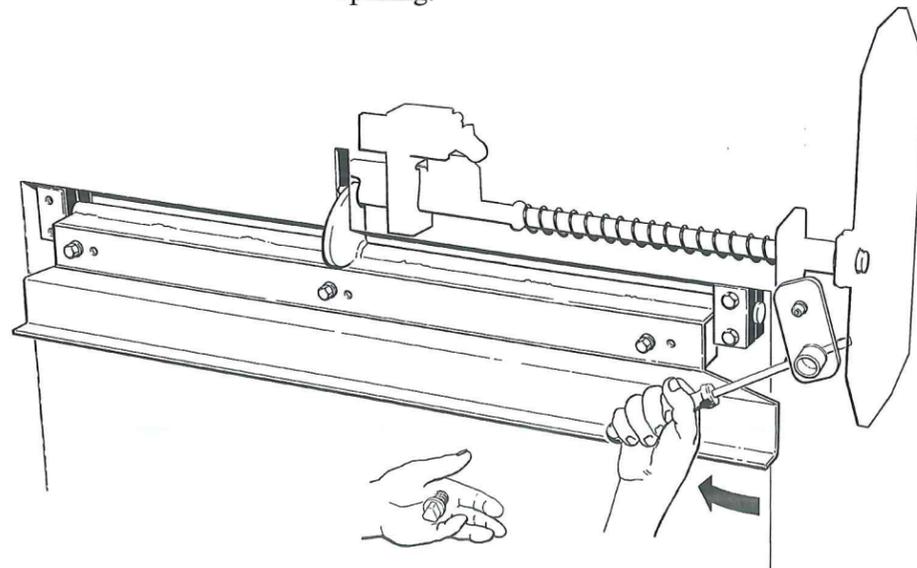


Evacuating passengers from the lift car

(Should only be performed by trained personnel)

There is NO power to the lift;

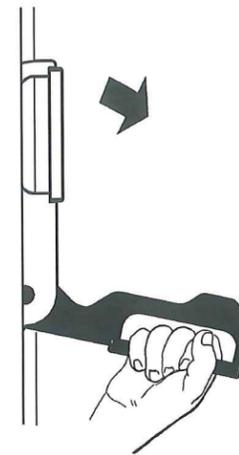
1. Equip yourself with a flashlight in the event the hoistway is not illuminated, and the key for emergency opening of the landing doors.
2. Turn off the power at the main panel and lock it in the "OFF" position. Hang up a sign with text stating "The Lift is shut down and is being worked on", or other signs dictated by regulations.
3. Locate the position of the lift in the hoistway.
4. Check that the passengers can be evacuated through a predetermined landing door, and if so, open the door in the following manner:
 - Remove the threaded plug in front of the interlock cam with the special key.
 - Insert a screw driver in the hole and push towards the door to release the interlock mechanism.
 - Open the door.
 - Do not forget to close and lock the hole for emergency opening.



Practice the above procedure so that you are familiar with it, should it ever be necessary to perform this procedure.

If the passengers cannot be evacuated because of an extreme height differential:

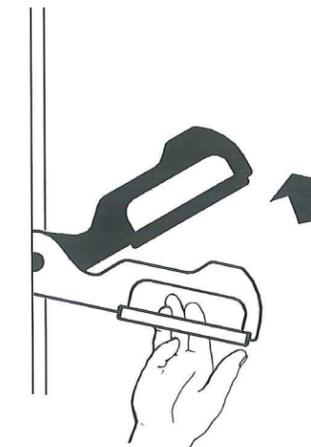
5. Climb down to the top of the car roof using a ladder. Approved safety harness shall be used.
6. Open the trapdoor on the roof and climb down inside the car.
7. Slide the car down to the nearest landing using the emergency lowering device (according to previous instructions).



CAUTION !

Recoil hazard

Always use the handle as illustrated.
Can cause severe personal injury.



Note:

Only use your fingertips to keep lever in its bottom most position.

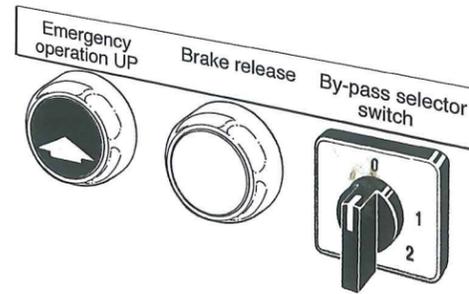
If the car cannot slide down due to tripped safety device

8. Try to release the safety device according to separate instructions in this manual.

If the car still cannot slide down – evacuate the passengers through the trapdoor

9. Evacuate the passengers through the trapdoor on the roof of the car and the ladder used to make entry to the car roof.

Approved safety harness shall be used for the passengers.



Push-buttons and selector switch inside the base panel

Note:

The "Brake Release" push-button is only to be used when performing a Drop Test. See instructions on page E15.

There is power to the lift;

Equipment required to fulfill code EN 81.1, amendment A2.

Bypass of the safety circuit for running in the upwards direction

1. Turn the selector switch inside the D-panel to position "2", and maintain it in this position. Simultaneously press the "Up" push-button. *The car will now start to move upwards.*
2. Run the car to the next upper landing by means of the selector switch and the "Up" push-button. Stop the car by releasing either the "Up" push-button or the selector switch.

If the landing level cannot be recognized from the ground landing;

- Run the car above the intended landing level.
- Use the voice communication equipment to instruct passengers inside the car how to use the emergency lowering device to reach the correct landing level.

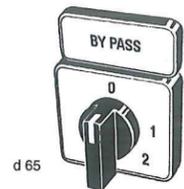
If this does not work – run the lift to the top landing for unloading. At the top landing the lift car will stop automatically due to the limit cam on the mast.

If the lift has been driven against the lower final limit cam

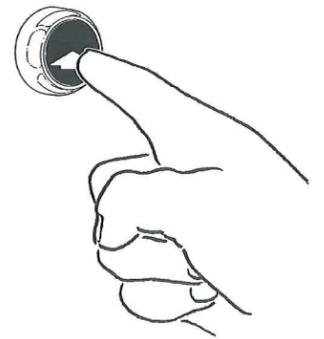
Bypass of the safety circuit for running in the upwards direction

This function is used to drive the lift up to the nearest landing and is only to be used if the lift has driven onto the final limit switch at the bottom landing because of worn brake disc(s), or if the safety device has been activated during a drop test.

If the safety device has activated during normal operation; the motor's brake(s), gearbox(es), pinion(s), racks, guide rollers and counter rollers must be examined by a trained serviceman, before the safety limit of the lift can be overridden.



d 65



Operation from the car roof;

- Turn the NORM / INSP switch to "Inspection".
- Turn the BY PASS switch to position "2" and hold it in this position.
- Press the button marked with up arrow and the lift will proceed in the up direction.

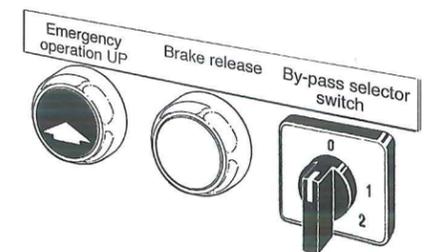
NOTE: *Only drive the lift for short distances using this method.*

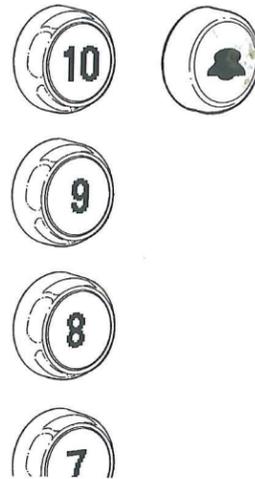
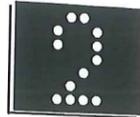
- The bypass switch is spring loaded to return automatically to position "1", which will prevent the lift from being operated.
- Return the NORM / INSP switch to "Normal" upon completion of this function.

Equipment required to fulfill code EN 81.1, amendment A2.

Operation from the base enclosure control panel;

- Turn the selector switch inside the base panel to position "2", and maintain it in this position. Simultaneously press the "Up" push-button. *The car will now start to move upwards.*
- Run the car off the final limit cam by means of the selector switch and the "Up" push button. Stop the car by releasing either the "Up" push-button or the selector switch. *Only run the car for short distances using this method.*





ALC collective control system

Note: The following information regarding the Alimak collective floor call system named ALC, does not apply to direct driven, relay controlled SE Lifts.

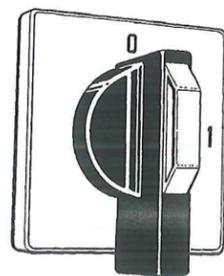
The lift can be operated from inside the car by destination push-buttons and also from the landings. Each landing is provided with two call buttons; one for each direction of travel.

This system receives all destination orders from inside the car, as well as calls from the landings. The information is memorized and processed within the system. During the travel the lift will automatically stop at all floors, which have been addressed.

On every landing there is one I/O-card with two external illuminated Call buttons; one for each direction of travel.

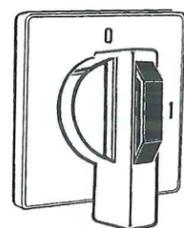


The I/O-cards are connected to a six wire communication circuit that terminates in a base CPU (Central Processor Unit) inside the base panel. The information is transmitted from the base CPU to the lift CPU (main unit) by way of a two wire communication circuit in the trailing cable.



WARNING !
Hazardous voltage

The lift has a separate power feed for lighting.
Both main switches on the electrical cabinet must be placed in position "0" to ensure that there is no power in the cabinet when the cabinet door is opened.
Can cause severe personal injury or death.



Information and fault indications on displays

Fault indications

A lift equipped with the ALIMAK ALC control system and landing level display on the lift electrical panel has access to a fault indication system. Faults indicated at the display are the following:

- Safety circuit open
- Door circuit open with lift between landings
- Fault in door closing sequence
- Overload
- Lift in Inspection or in Programming mode
- Lift does not start within start time/ fault on pulse encoder
- Fault in landing sensors
- Fault in control circuit

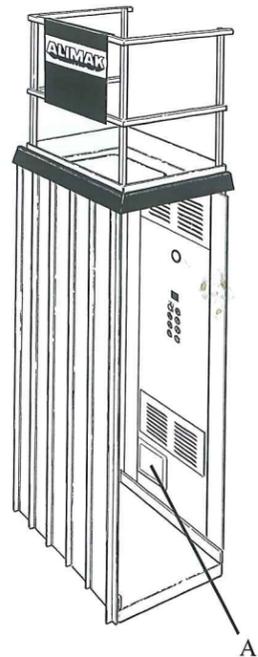


Information

- Door(s) open
- Calibration drive
- Closed landing



See separate manual P/N 9081257-sub. for detailed ALC programming instructions.



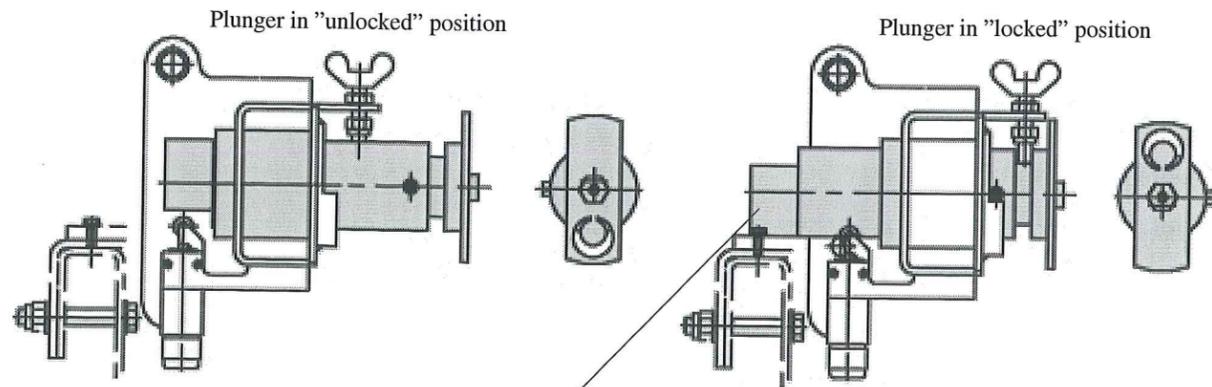
Securing the position of the lift car before performing inspection and service work

Equipment required to fulfill code EN 81.1, amendment A2.

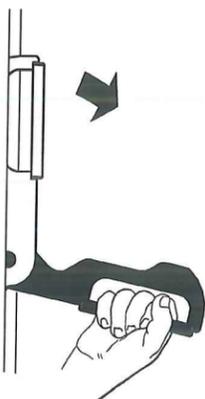
1. Run the lift in "INSP." mode with the push-buttons on the car roof, to a position 2 cm (1 in.) above the fixed service position – with the car supporting device at the 2nd landing.

It is preferable to make a mark on the guide rail/mast and something suitable on the car to simplify locating the car in its proper service position.

2. Turn the main switch on car roof to "Off"-position to prevent unintentional operation.
3. Climb down into the car and dismantle the cover (A).
4. Loosen the winged bolt thereby fixing the plunger in its "unlocked" position.
5. Push the plunger to its innermost "locked"-position and turn it clockwise 180° to ensure that the eccentric plunger's lowest located surface will be turned downwards. Secure the position with the winged bolt.



This eccentric section will unload the plunger when it is turned from its unlocked position.



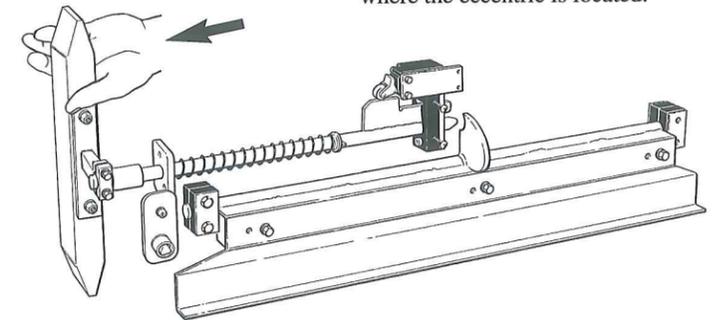
6. Lower the car with the emergency lowering device onto the car supporting device installed on the guide rail/mast. Leave the emergency lowering lever in its down position during the entire service operation.
7. Reset the lowering lever after service operation is finished (brakes reapplied).

8. Turn and pull out the plunger to it's normal "unlocked" position.
9. Secure the position of the plunger with the winged bolt and reinstall the cover.
10. Turn inspection switch in its "NORM." position and the main switch to its "ON" position.



A pictogram on the plunger shows where the eccentric is located.

Entrance from the car roof to the landing is possible by manually unlocking the landing door according to this figure.



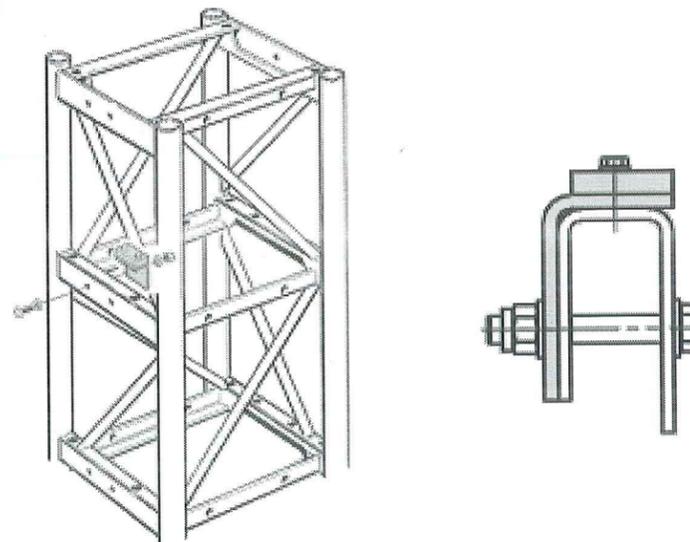
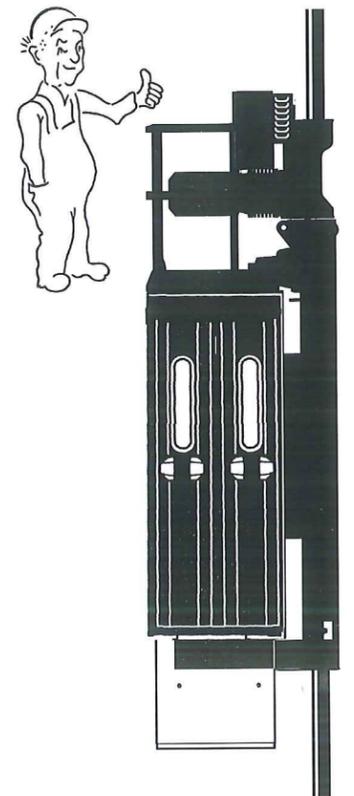
Car supporting device on the guide rail/mast

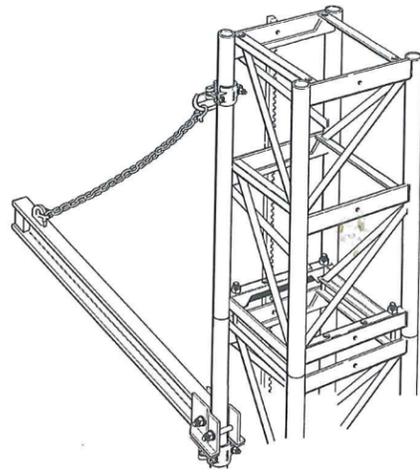
Determine suitable service position at the 2nd landing (= 1st landing above the bottom landing).

It is preferable to have the car roof level as close to the landing level as possible to ease entrance and loading / unloading of heavy weight components from / to car roof.

Car supporting device is installed in pre-drilled holes on the guide rail/mast in accordance to the following specifications.

Note! The supporting device must be installed on the intermediate frame on the A50 and FE mast sections due to the lattice work.





Crane intended for ease of handling of heavy items such as electric motor and gear box on car roof

Optional equipment

The crane is attached to one of the mast tubes with two tube couplers.

Jib radius 900 mm (2' - 11 1/2'') for car sizes up to 1040 x 1560 mm.

Jib radius 1550 mm (5' - 1'') for larger cars.

Allowable maximum load applied on the outermost part of the jib is 400 kg (880 lbs.)

Note: As an alternative, the use of a hand chain hoist or similar equipment can be used, attached to the mast on the horizontal mast frame where the rack is bolted.

Max. load 400 kg.

Service and maintenance	E 1
Adjustment and wear limits	E 5
Drop test	E 13
Resetting the safety device	E 17
Lubrication diagram	E 18

Service and maintenance

In order to avoid unnecessary breakdowns, those responsible for the service and maintenance of this equipment must regularly ensure that all scheduled maintenance work is carried out at the recommended intervals according to the maintenance program below.

Adjustments and replacement as a result of inspection, must be carried out by trained/authorized service personnel. Only ALIMAK Genuine Spare Parts must be used.



WARNING !

Unintended operation.

Always put the lift's "Normal / Inspection" switch in Inspection position before carrying out any service work.

When leaving the car without having completed the service work or to carry out service, the main switch must be switched off, locked and tagged.

Failure to follow this warning can cause death or personal injury.

Service intervals

Intervals based on operating time shall be followed in the first instance. If the lift is used only periodically, the first applicable interval to be reached shall be followed.

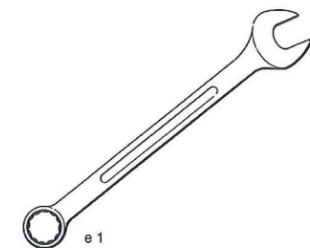
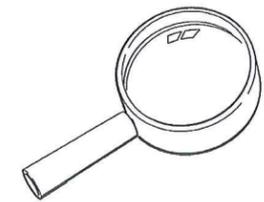
Checklist

Checklist, with room for notes on maintenance executed, will be found at the end of this manual. Use it!

Service and maintenance schedule

See the appendix at the end of this manual for tightening torques.

Interval	Part	Instructions
40 operating hours or at least every 2nd month	1. Sign plates/ instruction manuals	Check that all signs are in position according to the spare parts manual, and that they are legible. Check also that the documentation according to the documentation box is available.
	2. Safety device	Check with the user/users if the safety device has been tripping without cause or if noise can be heard from the device during operation. For further details, see the instructions for checking wear on the safety device under the heading "Adjustment and wear limits".
	3. Gear box	Check the oil level and refill, if necessary. Leaking seals shall be replaced by trained/authorized service personnel.
	4. Counter roller(s) at the rear of the machinery plate and safety hooks and guide rollers on the lift car frame.	Check that all screw joints are properly tightened.



Interval	Part	Instructions
	5. Attachment of gear box	Check that all screw joints are properly tightened.
	6. Electric motor motor control and brakes	Check that the car stops within acceptable limits, specified later in this chapter.
	7. Main switches and emergency stop switches	Check that all main switches and emergency stop switches are working. Make test runs with each one of the switches in "Off"-position.
	8. Control	Check that the operation of the control system is correct.
	9. Brake lining and brake torque	Check the play between the electro-magnet armature and the rotating brake disc according to instructions later in this chapter. See also the special instruction for checking the brake torque with a spring balance.
	10. Lift cable(s)	Check the cable for wear and to ensure that no kinks occur. Check also the attachment of the cable in the cable support arm on the lift car and the fixture in the lift mast – where a cable guiding device and trolley are furnished.
	11. Cable basket, where applicable	Clean the cable basket. If the cable guiding device is of a type for power and control cables which has been taped together, check the tape and, if necessary, reinforce it along the entire length of the cable.
	12. Electrical interlocks	Check all electrical interlocks by making test runs with: a) Car entrance door open. c) With car trap door open. b) Car exit door open. d) Each landing door open. The lift must not start. Be sure to check only ONE switch at a time.
	13. Mechanical interlocks	Check all mechanical interlocks by making test runs and at the same time try to open the doors. Car and landing doors must remain locked until the car stops at the landing.
	14. Car floor and roof	Clean the car floor and roof.
	15. Lubricating	See the instructions in the "Lubrication diagram". Also check rack for possible damages, misalignment and attachment, when lubricating.
120 operating hours or at least every 6 months	20. Rack	Retorque rack bolts to 195 Nm (144 lbf x ft) after 120 hours of initial operation and then once a year.
	21. Lift mast	Check by striking them that all screw joints of all racks and mast joints are properly tightened. Also check the screw joints for attaching the mast in the base frame.
	22. Mast ties	Check that all screw joints in all mast ties are properly tightened. Also check attachment to structure.
	23. Limit switches and cams, and final limit switch with associated cams	Check attachment and function. Check function by making test runs. Loosen the attachment of the Up and Down limit switches from the machinery plate (alternatively make jumpers for these switches in the electrical panel) and check the final limit switch correspondingly.
	24. Cable guides	Check the cable guides with regard to attachment, function and installation in the mast in relation to the cable support arm on the lift car.
	25. Cable trolley, where applicable	Check that the cable trolley does not come in contact with the buffer frame at the ground landing and that the trolley is parallel to the mast tubes. Check the function, attachment and wear on the guide and cable rollers and that the cable wheel on the trolley runs smoothly. See also special instruction for checking the trolleys guide roller play.

Interval	Part	Instructions
	26. Base slab/pit	Remove all debris, which may have fallen on/into the base (or pit).
	27. Buffers for lift	Check that the buffers are in position and in a proper condition.
	28. Doors on car and enclosures	Check the function, attachment and wear on the doors.
	29. Signal equipment and lighting	Check the function of the alarm signal, lighting and, where applicable, voice communication system.
	30. Emergency lighting	Switch off the main ON/OFF switch on the car roof and check to ensure that the emergency light functions. Switch on the main ON/OFF switch and check that the LED on the battery charger is lighted.
	31. Rack and pinion	Check the wear on the rack and pinion according to the instructions under the heading "Adjustment and wear limits".
	32. Enclosures	Check that there is nothing in the vicinity of the landing which can be used as a ladder or can reduce the correct height of the enclosure in any way. Point out any infringements and risks of injuries to the site manager.
	33. Scaffolding adjacent to lift	Check that the distance from the lift car to landings, scaffolding, balconies, windows or any other location where persons may find themselves, are not less than regulations dictate. Point out any infringements and risks of injuries to the site manager.
	34. Guide rollers and roller assemblies	Check wear and bearing play of the lift car guide rollers. Adjustment and replacement, when required shall be carried out by trained/authorized service personnel.
	35. Safety device	Test the safety device according to the instructions under the heading "Drop test".
	36. Emergency lowering	Check by test that the emergency lowering device works properly and that the handle is fully reset after operation.
	37. Electric motor(s)	If necessary, clean the cooling flanges of the electric motor(s).
	38. Lubricating	See the instructions in the "Lubrication diagram".
1000 operating hours or at least once a year	50. Electric wiring	Check all wires, sealing glands and connections.
	51. Motor overload protector	Check that the motor overload protector is set with the rated current on the data plate for the electric motor.
	53. Deformations/mechanical damage	Inspect the equipment visually in its entirety for deformation/mechanical damage to mast tubes/beams, diagonal ties in the mast sections, mast ties, doors, protective rails, floors, etc. This inspection and any actions which may be necessary after the inspection must be performed by trained/authorized service personnel.
	53. Corrosion, damage and wear	Inspect the equipment in its entirety for corrosion and wear on loadbearing and force-absorbing components by the aid of an ultrasonic thickness measuring instrument. This inspection and any actions which may need to be taken after the inspection must be performed by trained/authorized service personnel.
	54. Lift mast/guide rail	Check that all screw joints of all racks and mast joints are properly tightened. Also check the screw joints for attaching the mast in the base.
	55. Centrifugal brake	Inspect centrifugal brake and brake lining according to the instructions under heading adjustment and wear limits; "Centrifugal brake".

E 4

Interval	Part	Instructions															
2000 operating hours or at least every 2 year	58. Pinion and counter roller on drive unit	Dismount and lift out the motor/gear unit from the machinery plate to be able to make a precise check of the pinion and its counter roller. Dismantling is not necessary if enough clearance is available between the machinery and the building structure.															
	59. Lubricating	See the instructions in the "Lubrication diagram".															
	60. Centrifugal brake	Dismantle the brake motor from the centrifugal brake and inspect the brake hub with linings. See the instructions in the under heading "Centrifugal brake".															
Every 4th year or according to sign on the safety device	61. Corrosion protection devices	Replace the corrosion protection devices which are located inside the electrical panels according to the following: <table border="0" style="margin-left: 20px;"> <tr> <td>Main panel (M-panel)</td> <td>2 pcs.</td> <td>P/N 3002 301-105</td> </tr> <tr> <td>Car top control panel (VFC)</td> <td>2 pcs.</td> <td>P/N 3002 301-105</td> </tr> <tr> <td>Car top control panel (DOL)</td> <td>1 pcs.</td> <td>P/N 3002 301-101</td> </tr> <tr> <td>Base panel (B-panel)</td> <td>1 pcs.</td> <td>P/N 3002 301-105</td> </tr> <tr> <td>Landing control stations</td> <td>1 pcs.</td> <td>P/N 3002 301-101</td> </tr> </table>	Main panel (M-panel)	2 pcs.	P/N 3002 301-105	Car top control panel (VFC)	2 pcs.	P/N 3002 301-105	Car top control panel (DOL)	1 pcs.	P/N 3002 301-101	Base panel (B-panel)	1 pcs.	P/N 3002 301-105	Landing control stations	1 pcs.	P/N 3002 301-101
	Main panel (M-panel)	2 pcs.	P/N 3002 301-105														
	Car top control panel (VFC)	2 pcs.	P/N 3002 301-105														
	Car top control panel (DOL)	1 pcs.	P/N 3002 301-101														
	Base panel (B-panel)	1 pcs.	P/N 3002 301-105														
	Landing control stations	1 pcs.	P/N 3002 301-101														
62. Safety device	Replace the complete safety device.																

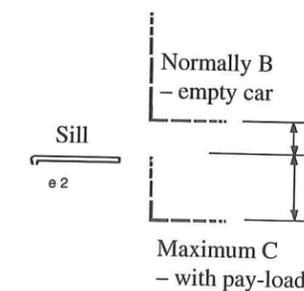
E 5

Adjustment and wear limits

Car stopping position

If the distance between actual stopping positions empty/fully loaded car exceeds value A indicated below, the motor control and brake must be checked by trained/authorized service personnel.

Lift type	A	B	C
with direct started el. motor DOL	110 mm (4.3")	40 mm (1.57")	70 mm (2.75")
with VFC operated el. motor(s)	35 mm (1.38")	15 mm (.59")	20 mm (.79")



Checking brake torque

Motor and gear disassembled from mast and car

This test is carried out by means of a ratchet spanner, a 19 mm socket and a spring scale.

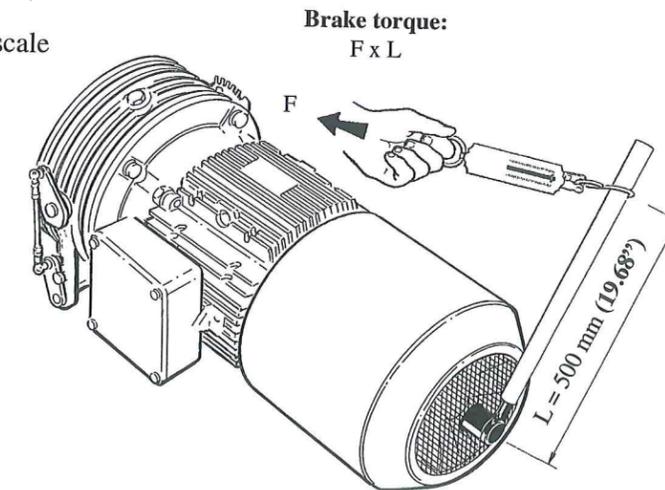
- Fit the ratchet spanner and a tube section according to figure.
- Pull down and read value on the spring scale when the brake starts to slide.

The electromagnetic disc brake shall have indicated torque $\pm 15\%$.

If indicated brake torques are not achieved, call for trained/ authorized personnel.

Motor power	F	Brake torque
4.8 / 7.0 kW	24 kp (54 lbf.)	120 Nm (89 lbf. x ft)
7.5 / 8.8 kW	34 kp (76.5 lbf.)	170 Nm (125 lbf. x ft)
11 / 13 kW	34 kp (76.5 lbf.)	170 Nm (125 lbf. x ft)
11 / 13 kW*	26 kp (58.5 lbf.)	130 Nm (96 lbf. x ft)

*with spec. EN approved brake



Inspection of friction disc and electromagnet Motor brake type Binder



WARNING!

Unintended operation

Bring the car down to rest on the buffer springs.
Switch off, lock and tag the main switch before
inspection can take place.

Can cause severe bodily injury or death.

Check air gap by the aid of a feeler gauge

Replace the lining

The lining must be replaced before the air-gap exceeds maxi-
mum (B) mm. Nominal value (A) mm.

Attachment bolts (6 pcs) tightening torque: 25 Nm (18.5 lbf x ft.)

Motor size	Nominal air gap A	Maximum air gap B	Air gap C	Nominal coil resistance D
7.0 kW	0.35 mm (.014")	1.2 mm (.05")	1.5 mm (.06")	≈ 190 Ohm
8.8 kW	0.35 mm (.014")	1.5 mm (.06")	1.7 mm (.067")	≈ 130 Ohm
13 kW	0.35 mm (.014")	1.5 mm (.06")	1.7 mm (.067")	≈ 130 Ohm
13 kW*	0.30 mm (.012")	1.1 mm (.043")	1.5 mm (.06")	≈ 70 Ohm

*with spec. EN approved brake

Hand release mechanism

Check air gap (C) for hand release mechanism according to sketch.

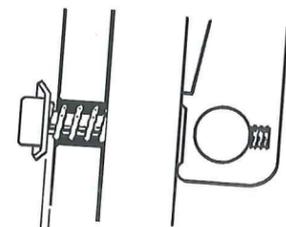
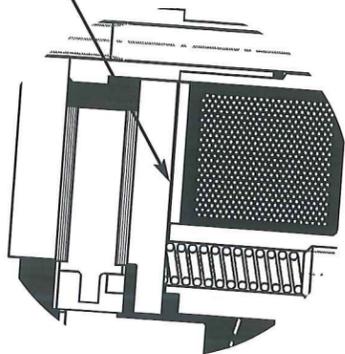
If the brake cannot be electrically released, check:

- that the rectifier is in order and energized.
- that the brake contactor is in order.
- the voltage to the magnet coil (nominal 102V DC).
- the resistance of the coil (nom. approximately D Ohm, see table).

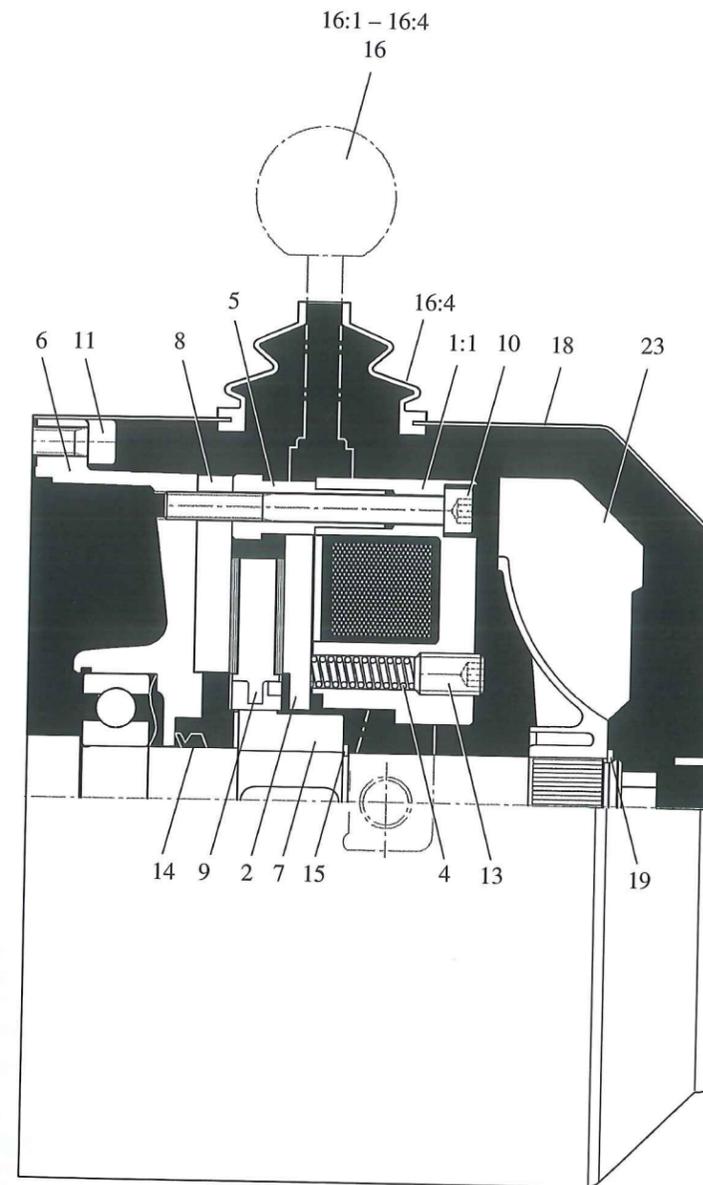
Replace electromagnet housing with coil if the coil is defective.

IMPORTANT: Do NOT replace the brake's rectifier of the type with booster function with a common rectifier type.

Air gap A / B between magnet housing and armature



Air gap C
Hand release mechanism

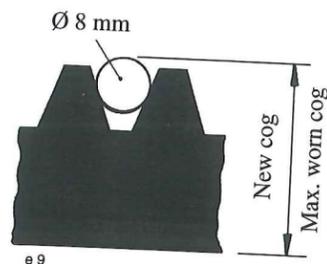
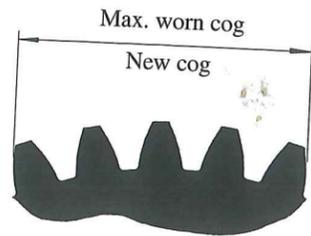
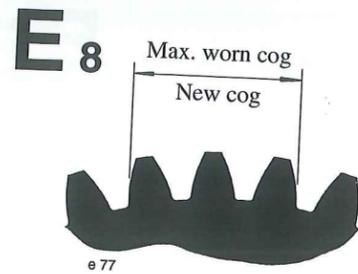


- | | | |
|----------------------|-------------------|---------------------|
| 1:1 Magnet housing | 8 Brake disc | 16 Hand release |
| 1:2 Coil | 9 Friction disc | 16:1 Lever |
| 2 Armature | 10 Fixing bolt | 16:2 Disc |
| 3 | 11 Cap head bolt | 16:3 Cap head bolt |
| 4 Compression spring | 12 | 16:4 Rubber bellows |
| 5 Sleeve | 13 Set screw | 18 Fan screen |
| 6 Flange | 14 Sealing ring | 19 Retaining ring |
| 7 Hub | 15 Retaining ring | 23 Fan |

IMPORTANT:

Wearing of armature and fixed brake disc (added together) must not exceed the maximum allowable air gap reduced with the indicated nominal air gap, A (= 0.85 mm or 1.15 mm alternately depending on the brake size).

If so, the whole brake must be exchanged.



Pinion

Check the wear with a sliding caliper.

Pinion dia. 115 mm (4.53")

New cog = 38.5 mm (1.51")

Max. worn out cog = 37.1 mm (1.46")

Pinion dia. 200 mm (7.87")

New cog = 69.2 mm (2.72")

Max. worn out cog = 67.4 mm (2.65")

The counter roller for the pinion must be changed when the pinion is replaced.

Rack

Measure with a dia. 8 mm (.31") gauge rod and sliding caliper.

New cog = 39.9 mm (1.57")

Max. worn out cog = 38.2 mm (1.50")

Mast tubes

Check of wear and corrosion of the mast sections is carried out by means of ultrasonic equipment, Part No. 3001991-301. The bottom mast section must be thoroughly checked.

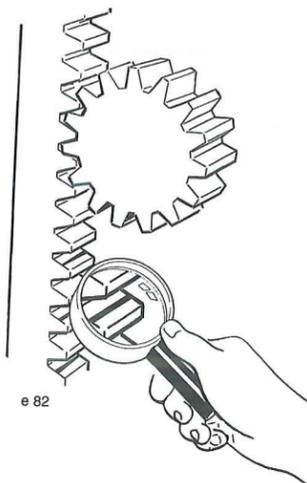
New mast tubes (t) = 4.2 mm nom. (.165")

Max. worn out mast tubes (t) = 3.1 mm (.122") – approximately 25% reduction of wall thickness.

Check the wear of the rack and adjust the drive unit guide rollers according to the following:

Wearing on the rack

- Mast side
-  Drive unit inclined away from the mast. (Not acceptable)
 -  Drive unit running correct on the mast. (Good)
 -  Drive unit inclined towards the mast. (Acceptable – but higher noise level.)



Guide & counter rollers

Nodular iron or polyurethane guide roller dia. 100 mm;

New roller = dia. 100 mm (3.94")

Max. worn out roller = 98 mm (3.86")

Synthetic plastic material counter roller dia. 120 mm;

New roller = dia. 120 mm (4.72")

Max. worn out roller = 119 mm (4.68")

Steel counter roller dia. 72 mm;

New roller = dia. 72 mm (2.83")

Max. worn out roller = 71 mm (2.79")

Note that the wear on the roller face must be equal all around.

Adjustment of guide rollers

IMPORTANT: Rollers must only be adjusted when there is no load in the car

The following adjustments are carried out by freeing the attaching bolt/nut of the roller and rotating the eccentric shaft with the tool provided until the correct setting is attained. Then retighten the bolt.

Support rollers

- Adjust the upper support rollers so that the car structure is parallel to the front edge of the mast frame.
- Adjust the *lower* support rollers so that the frame is parallel to the mast tubes in the vertical plane.

Side rollers

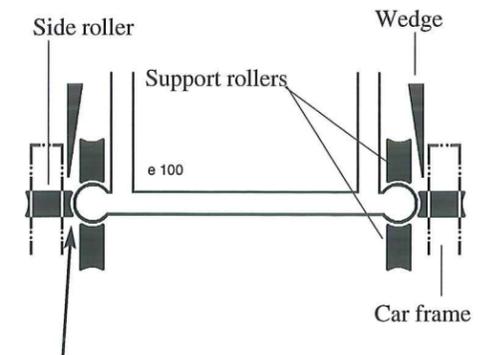
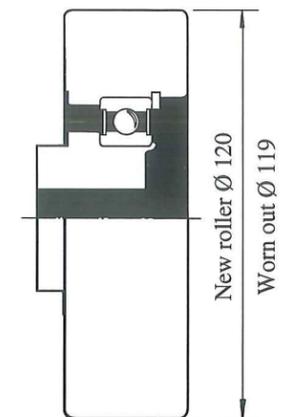
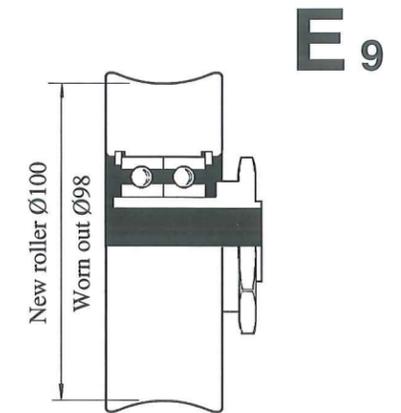
The side rollers must be adjusted when they are level with a horizontal frame of the mast and always adjusted in pairs.

- Loosen the side guide rollers and center the car frame between the mast tubes using wedges as shown.
- Single roller:**
 - Adjust both side rollers with air gap 0.7 mm (.027") and lock them in this position.

With a roller assembly:

- Push bottom roller of the assembly against the mast tubes and adjust the air gap between the top roller and mast tube to 0.7 mm (.027") and lock the assembly in this position.

IMPORTANT: The side rollers must NOT be adjusted closer than 0.7 mm (.027"). Only occasional contact between roller and mast tube is allowed during operation.



Air gap 0.7 mm (.027") must be done on both side rollers **AT THE SAME TIME** and be adjusted with the side rollers in level with one horizontal mast frame.

IMPORTANT !

It is of utmost importance that the guide rollers, be retightened to the correct torque after adjustment. Please see requirements at the end of this manual.

Centrifugal brake



WARNING!

Unintended operation

Bring the car down to rest on the buffer springs. Switch off, lock and tag the main switch before inspection can take place.

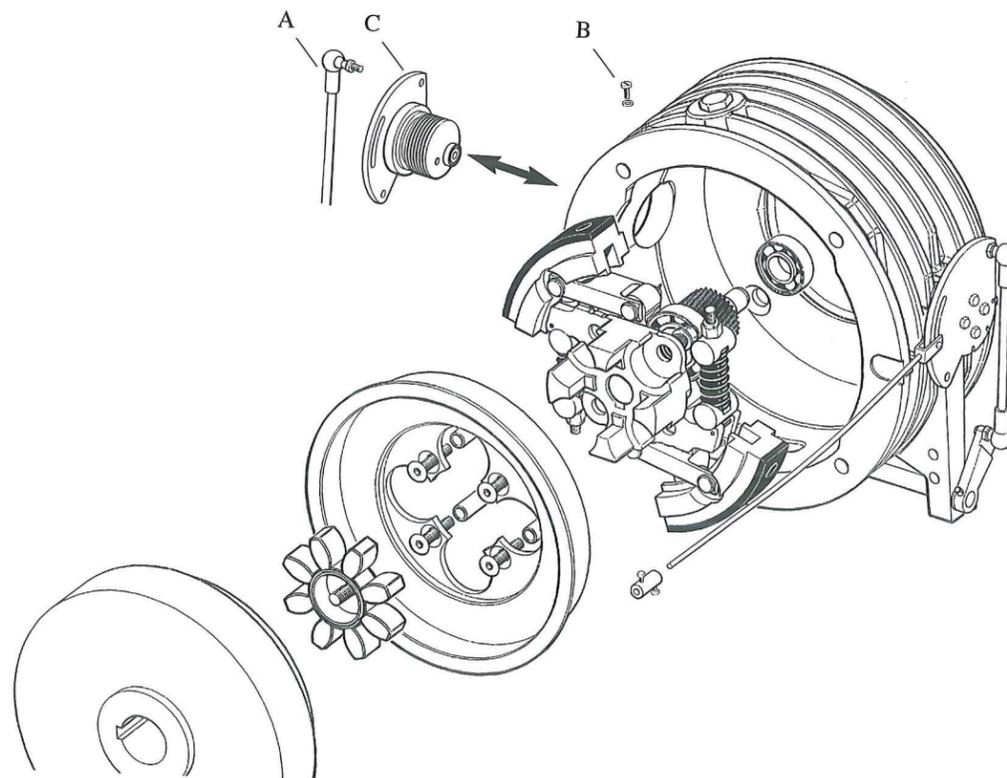
Can cause severe bodily injury or death.

Inspection of brake and brake lining

1. Disconnect the flexible ball joint (A) from the control device on the side where the Teleflex wire from the car release lever is located.
2. Loosen the vertical bolt (B) on the brake housing, which locks the control device axially.
3. Remove (pull out) the whole control device (C).
4. Inspect the brake lining through the seat (hole) for the control device.

Replace the brake linings when they are worn down to 3 mm (.12") thickness.

5. Turn the control device on the opposite (right) side to check that the lock ring disengages from the brake hub.
6. Lubricate the control device with Aeroshell Grease 6 when reassembling.



Every 2nd year

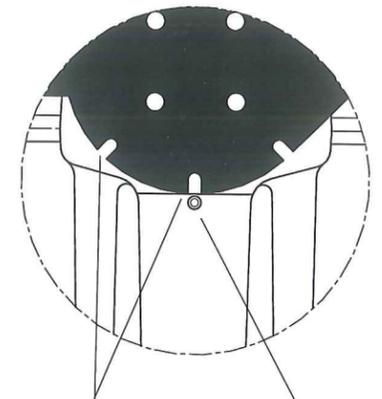
1. Dismantle the brake motor from the centrifugal brake on the gearbox.
2. Clean and grease the brake hub with Aeroshell Grease 6, avoiding any contamination of the brake lining.

Also check and replace the brake linings when they are worn down to 3 mm (.12"). Reinstall and check that the brake hub is free to move.

Synchronizing of centrifugal brake and motor brake

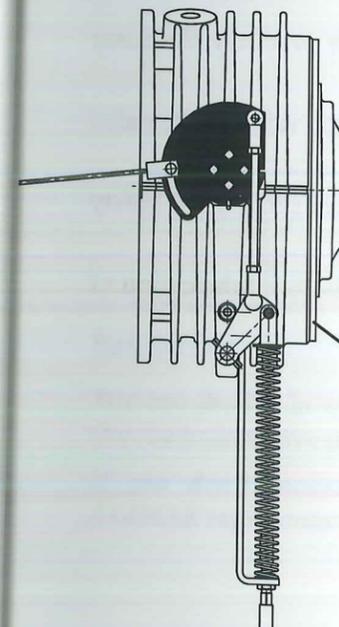
1. Disassemble the Teleflex wire from the control device on the centrifugal brake.
2. Turn the control device into position "3" in clockwise direction and leave it in this position.
3. Push the motor brake release lever into "fully released position" and tighten the motor brake release wire.
4. Reset the control device to position "1" and reassemble the Teleflex wire.

The pull wire is now slack between the centrifugal- and motor brake.

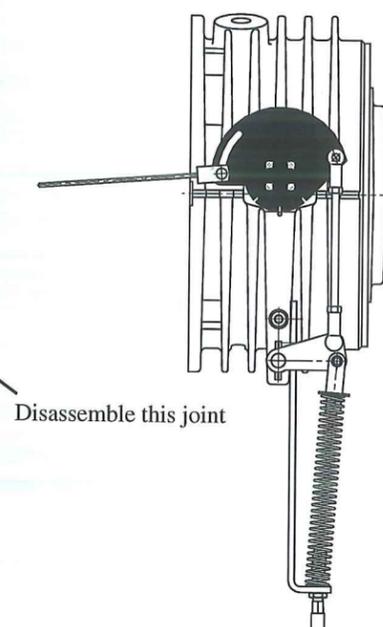


Marks on control disc and the corresponding pin on brake housing

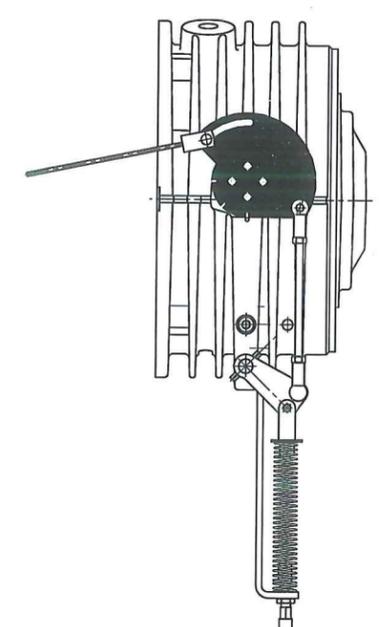
Position "1"
Locked centrifugal brake



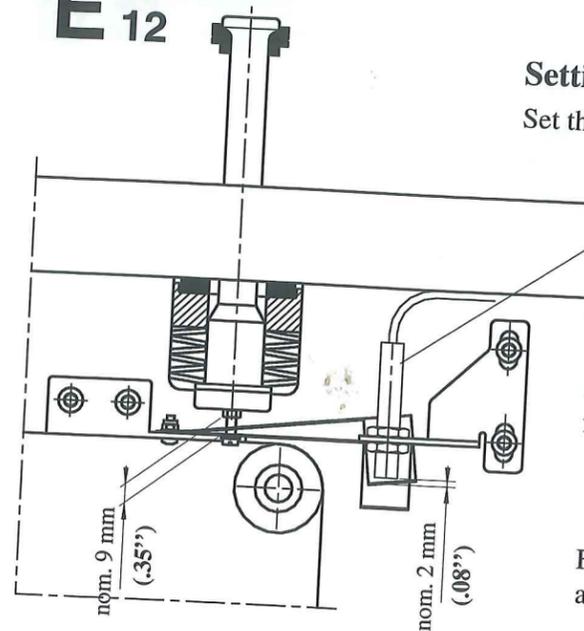
Position "2"
Engaged centrifugal brake.



Position "3"
Engaged centrifugal brake and motor brake released.



E 12

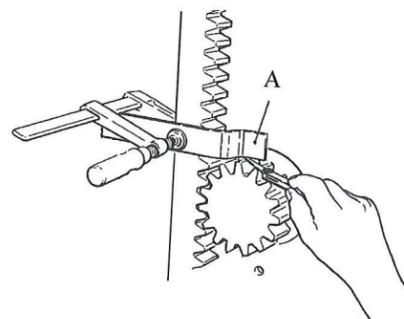


Setting of overload sensing system

Set the proximity switch axially, to trip at full load in car.

Proximity switch located below car floor, and adapted for fixed bolted machinery is adjusted in the same manner.

For Overload Sensing System (OSS 5) with load cells and amplifier – see separate manual PN 9081467-1XX.



Measuring the radial play of the rotating shaft on the safety device

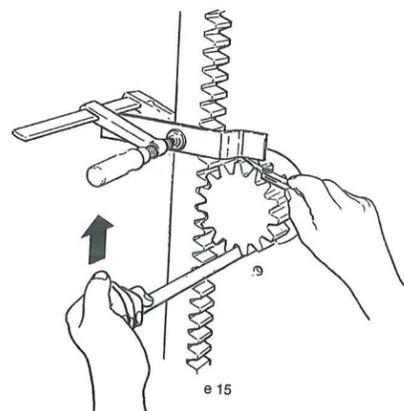
1. Position a support (A) on the rack using a C-clamp – approximately 1 mm (.039") above the safety device pinion.
2. Measure the play with a feeler gauge.

3. Lift the pinion by the aid of the cranking lever from the hoist tool kit or some other suitable tool and measure the play again.

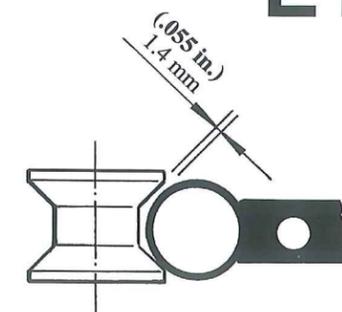
Note that the pinion must remain in precisely the same position during both measurements.

4. The difference between the two measured values is the radial play of the safety device shaft.
5. If the radial play is greater than 0.6 mm (.024"), the safety device must be replaced.

IMPORTANT! Test has to be done before lubrication of the safety device.



E 13



Cable trolley guide rollers

Adjust the cable trolley so that the cable wheel is parallel to the mast / guide rail and that a play of 1.4 mm (.055 in.) is obtained between roller and mast tube / guide rail flange at one side of the cable trolley, when corresponding rollers on the other side of the trolley *are in close contact*.

Adjustment is made by turning the eccentric shafts of the rollers until the correct play is obtained whereupon the attachment bolts are tightened.

Drop test

To be carried out by trained service personnel

A drop test must be carried out at installation and in accordance with local safety regulations. Thereafter a drop test must be carried out at least every 6 months without load and once a year with full load.



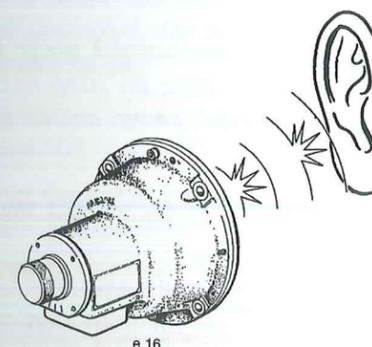
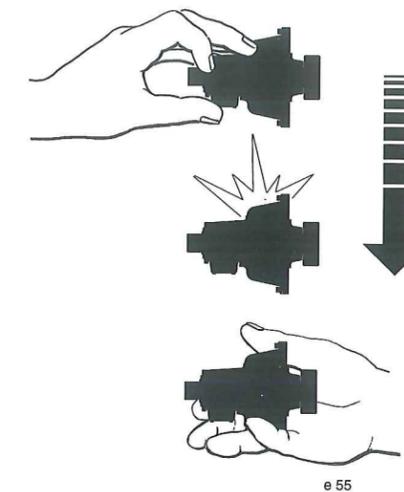
DANGER!

Brake malfunction hazard

No one is allowed in the lift car during a drop test.

Will cause severe bodily injury or death.

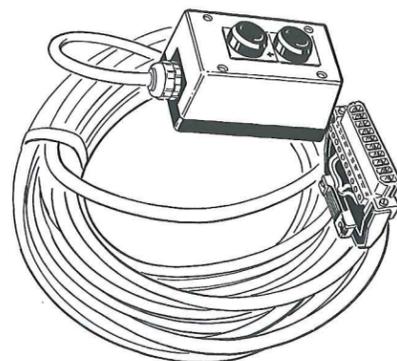
If the safety device begins to trip or if noise occurs in the safety device during operation, the lift must be taken out of operation immediately and the local ALIMAK representative notified for action.



Before test

Test run the lift in upward and downward direction to ensure that the brakes have sufficient brake torque.

If you don't succeed with the drop test, contact nearest ALIMAK representative.



Remote drop test equipment at ground landing connected on terminal inside the car electrical panel

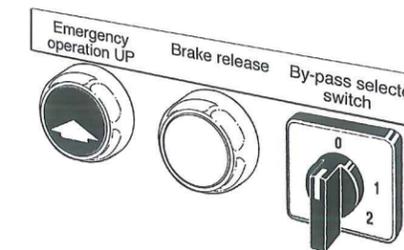
Drop test cable with remote control connected to terminal inside the car electrical panel

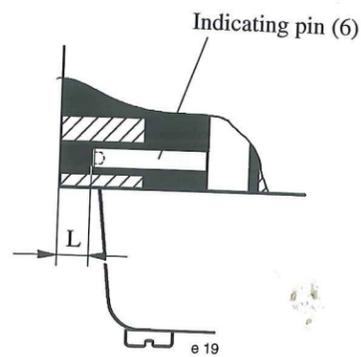
1. Set the NORM / INSP switch in the electric cabinet in the lift car to the "Inspection" position.
2. Connect the ALIMAK drop test cable to the terminal block marked "Drop test" in the electric cabinet on the car.
3. Attach the cable to the car adjacent to the electric cabinet and lower the pushbutton box to the bottom landing. At the same time, check that the cable is suspended in such a way that it cannot be crushed or be obstructed when the drop test is carried out.
4. Load the car with full load. Switch on the main ON / OFF switch and run the car from the ground level up approximately 10 meters (33 feet) by means of the Up button on the push-button box on the testing cable.
5. Press the button on the drop test push-button box marked with "TEST" and maintain it in the depressed position. This releases the motor brake(s) and the lift car will drop until it reaches the tripping speed and the safety device is activated.
Release the push-button immediately if the safety device does not function and stop the lift – at least 3 meters (10 feet) above the ground level. The brake(s) are applied when the push-button is released.
If so, start the test from item 4 again.
6. When the safety device has been activated. Run the car approximately 20 cm (8") upwards with the drop test device to release the mechanism of the safety device.
Then run the car down to the normal lower landing by inching in small increments using the drop test procedure previous described. Be careful so as not to activate the safety device again.
7. Remove the test cable and *then* try to start the car in the upward direction.
The switch in the safety device shall, when the safety device has been activated, prevents the lift from starting when the test cable has been removed.
In other words, it must **NOT** be possible to start the lift.
8. Reset the safety device according to instructions further in this chapter.
9. Reset the NORM / INSP switch in the electric cabinet to the "Normal" position.

Drop test with remote control inside the lift's base electrical panel

Equipment required to fulfill code EN 81.1, amendment A2.

1. Load the car with full load and run the car from the ground level up approximately 10 meters (33 feet) by means of the selector switch and the Up-button inside the D-panel and the following procedures;
 - Turn the selector to position "2", and maintain it in this position. Simultaneously press the "Up" push-button.
The car will now start to move upwards.
 - Stop the car by releasing either the "UP" push-button or the selector switch.
2. Turn the selector switch to position "2", and maintain it in this position. Simultaneously press the "Brake release" push-button. This releases the motor brake(s) and the lift car will drop until it reaches the tripping speed and the safety device is activated. The brake(s) are applied when the push-button is released.
Release the push-button immediately if the safety device does not function and stop the lift – at least 3 meters (10 feet) above the ground level.
If so, start the test from item 1 again.
3. When the safety device has been activated. Run the car approximately 20 cm (8") upwards to release the mechanism of the safety device by means of previous listed procedures.
Take the car down to the normal lower landing by inching in small increments using the drop test procedure previous described. Be careful so as not to activate the safety device again.
4. Reset the lift to normal mode by turning the selector switch to position "0".
5. Try to run the car in upwards direction. This must **NOT** be possible.
The switch in the safety device shall, when the safety device has been activated, prevents the lift from starting.
In other words, it must **NOT** be possible to start the lift.
6. Reset the safety device according to instructions further in this chapter.





Note: the indicating pin (6) is made of a stop screw with internal hexagon grip.

Pay attention to this when using a sliding caliper for measuring.

Calculating the safety device stopping distance

The safety device stopping distance can be measured between the end face of the safety device and the end of the indicating pin – measure "L", see figure.

Safety device type GF:

Multiply measure "L" with factor 188.5.

Safety device type GFD:

Multiply measure "L" with factor 314.2.

IMPORTANT: The safety device must be exchanged if dimension "L" exceeds the value stated on the safety's sign.

Resetting the safety device

To be carried out by trained service personnel.

If the safety device trips during normal operation, a careful check must be made of the motor brake(s), transmissions, pinion, rack and all guide and counter rollers by trained/ authorized service personnel, before the safety device can be reset.

The cause of the tripping must be determined and rectified.

The safety device may be reset after a drop test, prior to performing the above checks.

Exchange intervals, see sign on safety device!



WARNING!

Falling hazard

Never reset the safety device above ground landing.

Can cause severe injury or death.

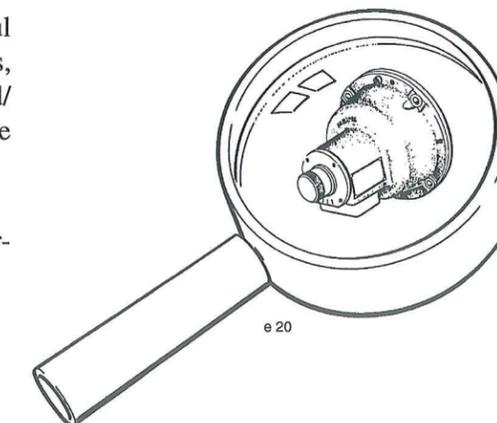
Resetting

1. Switch off the car main ON/OFF switch.
2. Remove the screws (1) and remove the cover (2).
3. Remove the screws (3).
4. Use the sleeve (5) and the cranking lever (4) to back off the nut (7) until the end of the pin (6) is flush with the end surface of the safety device. (The internal switch is now reset).
5. Reinstall the screws (3), the cover (2) and the screws (1).
6. Remove the protective cover (9).
7. Tighten the screw (8) by hand as far as possible and then a further 30° by the aid of the sleeve and the cranking lever (4) – in the direction indicated by the arrow on the cover.
8. Reinstall the protective cover (9).
9. Switch on the car main ON/OFF switch and run the car up about 20 cm (approximately 8") on the lift mast to release the centrifugal weight of the safety device.

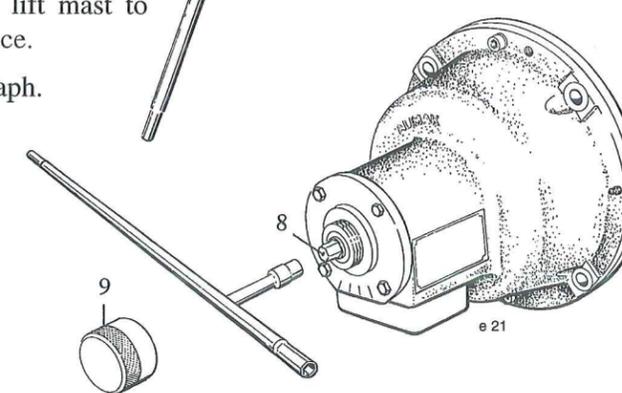
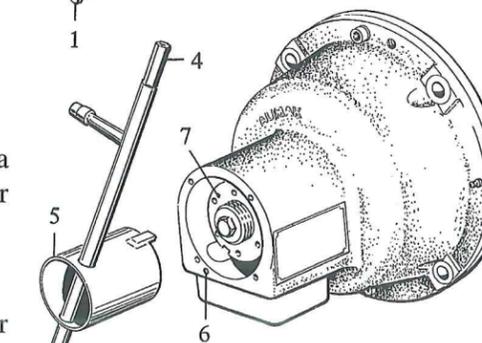
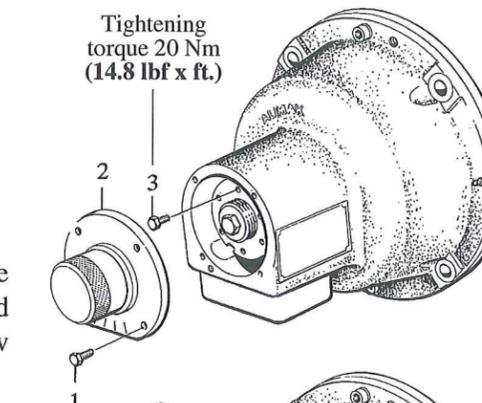
Note: In case of drop testing – omit this paragraph.

10. Make a test run.

From a safety point of view the safety device must never be dismantled more than is necessary to reset it as described above. For this reason the safety device is sealed.



Tightening torque 20 Nm (14.8 lbf x ft.)



Lubrication diagram

INTERVAL	POS.	LUBRICATING POINT	LUBRICANT	VOLUME	INSTRUCTIONS
40 operating hours or at least every 2nd month	1	Gear box	Alioil Tropic		Check the oil level and refill – if necessary.
	2	Rack	Alilube Part No. 3001396-201		Lubricate during lowering. Take lift out of operation for 2–3 hours to permit the spray to congeal.
	3	Autom. lubricator for rack – where applicable. Safety device	Alirack grease Part No. 9063930-000 Shell Retinax LX2 or equivalent		Check grease level and refill – if necessary. Grease nipple.
120 operating hours or at least every 6 months	4	Cable guiding device <i>Note:</i> Do not grease the hybrid trailing power cable.	Ali-low-fric compound Part No. 9052045-000		Grease slide surfaces on trolley and car cable and car cable bracket. Do not mast tubes / guides – the cable trolley may get stuck.
	5	Landings doors, interlocks and ramps	Aeroshell Grease 6		Grease bearings and slide surfaces.
	6	Car doors, gate interlocks and ramps.	Aeroshell Grease 6		Grease slide surfaces and bearings/hinges.
	7	Centrifugal brake linkage and control cable.	Spray can with multipurpose oil type CRC 5-56 or equivalent		Lubricate bearings and slide surfaces. Use the spray can's additional extension tube to apply the oil inside the control cable's external hose.
2000 operating hours or at least every 2 years		Roof trapdoor and electric cabinet hinges.	See above		
	10	Gear box	Alioil Tropic Part No. 9041980-000	2.9 lit. (.77 US gal)	Change oil.

The lubricating oil grades indicated above have been used when the equipment is delivered from the factory. Only oil recommended by ALIMAK shall be used. If for some reason this is not possible, please contact ALIMAK or ALIMAK Representative for advice. If changing to other oil, the gear box and air filter must first be carefully cleaned.



WARNING!

Lubricant harmful in contact with skin and lungs.

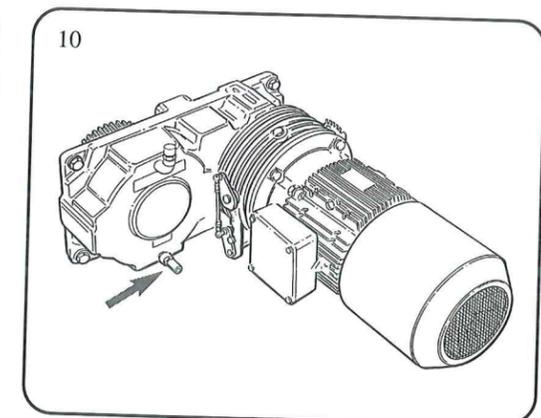
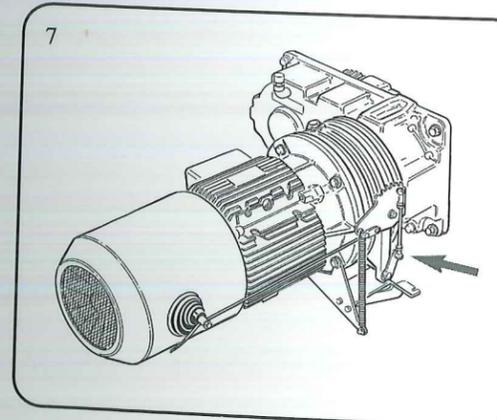
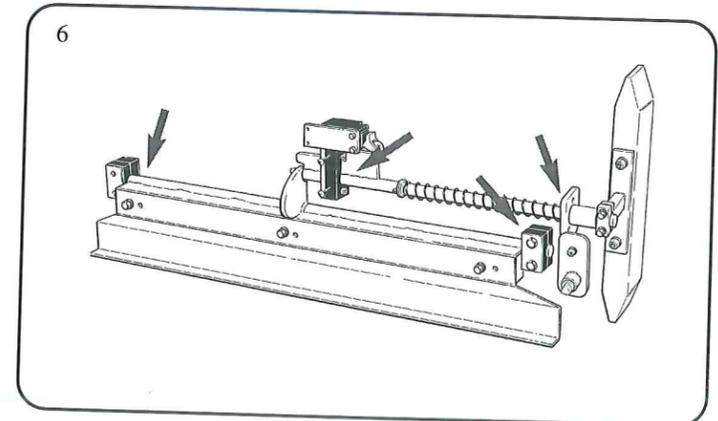
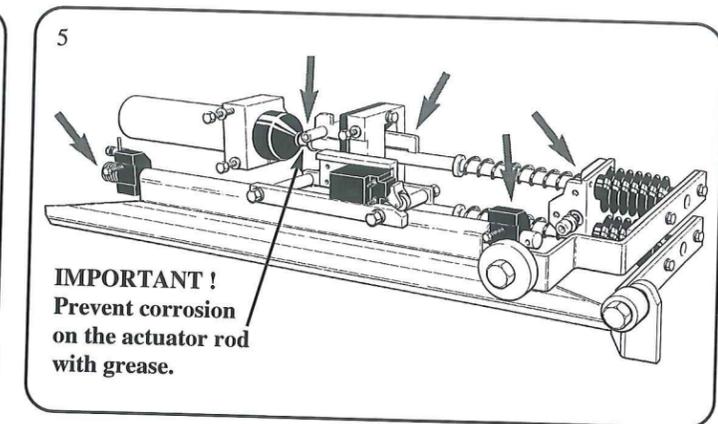
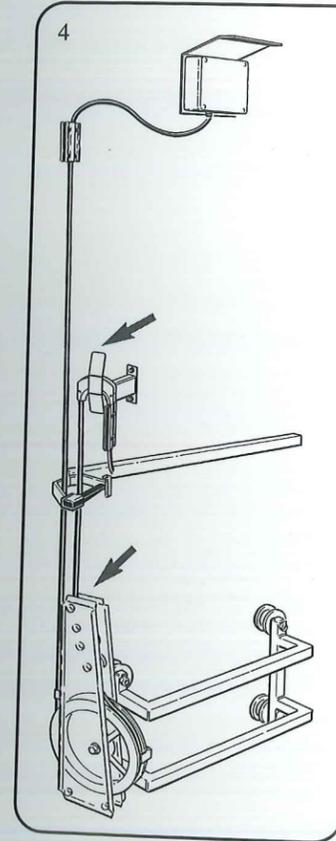
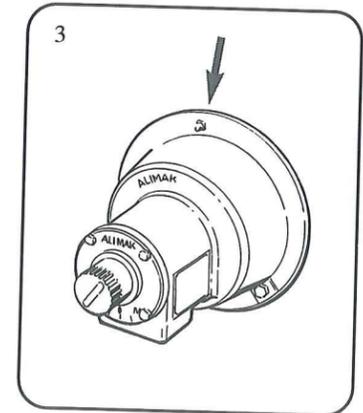
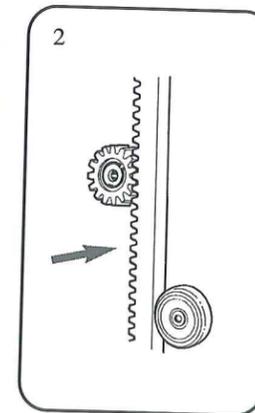
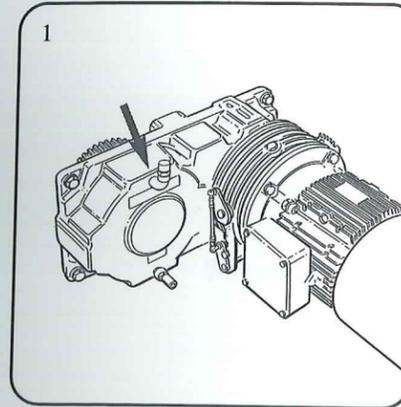
Always use protective gloves and dust mask.
Possible risks of irreversible effects.
See applicable MSDS (Material Safety Data Sheet).
Web site: www.alimak.com



WARNING!

Falling hazard.

Always use a fall arresting device if there is a need to climb above the safety railing to reach the rack or other items to lubricate or inspect. Remember to switch off and lock out the car main ON/OFF switch if you intend to do so. Can cause severe injury or death.



Electric troubleshooting..... F 1

Electric troubleshooting

Advice concerning procedures for troubleshooting

All forms of troubleshooting require adapting the procedure to the function and structure of the equipment in question and to other conditions which may be local in nature. For example, the erection site, maintenance, previous operational disturbances, etc.

The main principles for all forms of troubleshooting in electric systems are presented below. Troubleshooting is carried out with the aid of a test lamp or voltmeter. We recommend a voltmeter – preferably a universal instrument – for rapid and reliable troubleshooting.



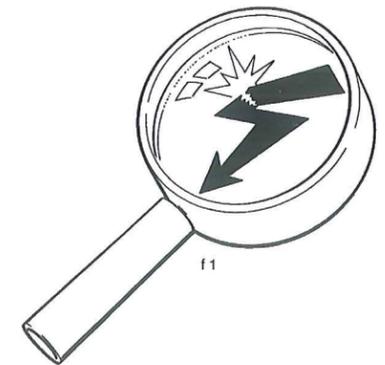
WARNING!

Hazardous voltage

Only authorized electricians or authorized service personnel can carry out work on the electrical equipment.

Can cause severe injury or death.

1. Use the circuit diagram. This diagram is located in a box intended for this purpose in the car. This shows how the electric equipment should function, and how it is built and connected.
 - 1a. Check that the stopping circuit is not broken, in other words that thermal relays and phase failure relays have not been actuated and that the limit switches for the safety device, roof trapdoors etc. have their contacts closed. Make sure that stop buttons, including buttons on landings, are not in the depressed position. When the stopping circuit is unbroken, the main contactor, shall be in the "ON" position.
 - 1b. Check that the normal and final terminal switches for "Up" and "Down" respectively function are as intended.
2. Connect the voltmeter/test lamp between the zero terminal and the terminal as indicated on the circuit diagram, and check that power is supplied where it should be supplied. Go through each terminal, one by one, and work methodically so that the circuits which function correctly can be eliminated and the fault can be localized.
3. Begin at the bottom landing by checking that power is supplied on all three phases of the incoming main voltage.
4. Check that the outgoing lift cable(s) receives power when the main switch is switched on.
5. Now begin troubleshooting in the lift car by checking that the power reaches the car.



f1



f4

6. Check in the equipment cabinet to ensure that power occurs on all three phases of the incoming cable from the ground landing.
7. Check that the "Up" and "Down" pulses from the push-buttons and control devices reach the electric cabinet in the car in the intended manner.
8. Make a trial run and check that the coil on the relevant contactor (Up, Down) receives power and that it is actuated.

Check also that the brake contactor is actuated and that the brake coil is energized so that the brake releases.

9. If the fault does not occur in the lift operating system but in its lighting or signal system, carry out faulttracing in a manner similar to that described above, in other words check the circuits methodically one by one until you have narrowed down the fault and localized it.

Experience shows that certain fault causes have symptoms which, in turn, may indicate the cause and the probable location of the fault:

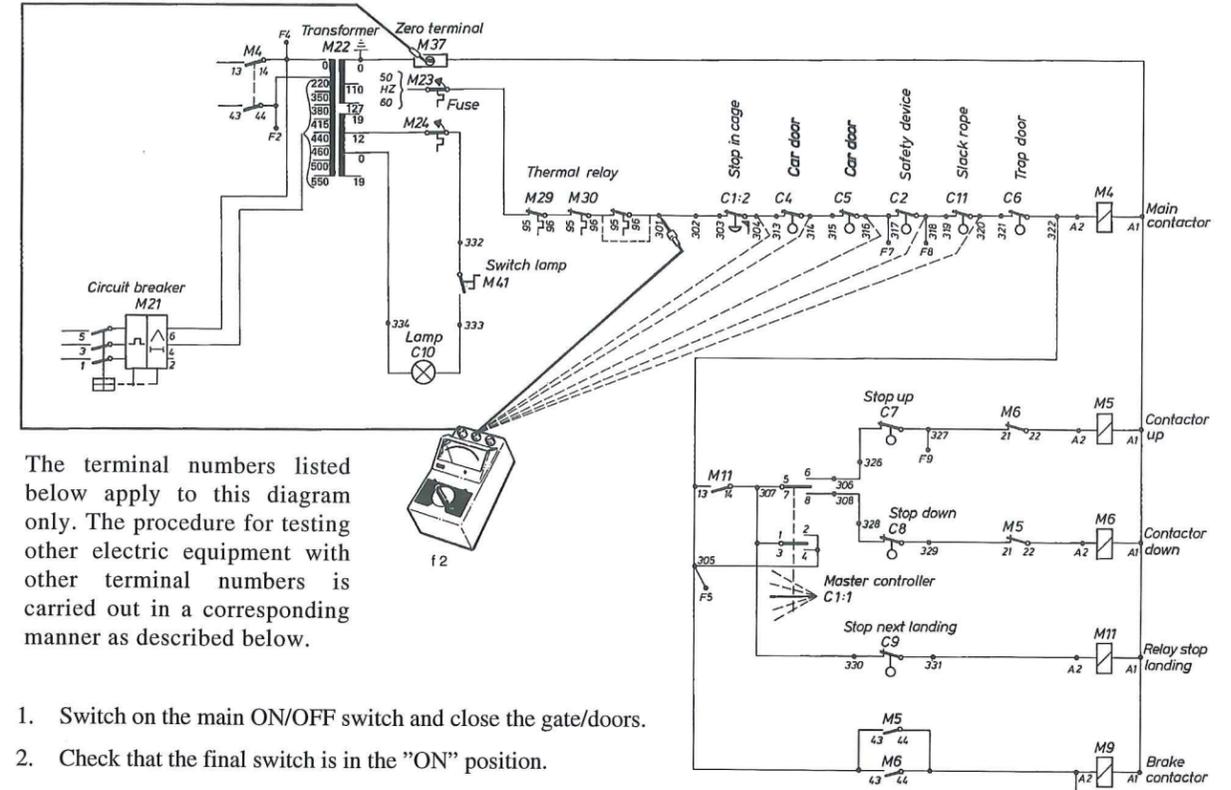
Example:

Symptom	Probable cause	Probable fault location
a) Control fuses blow immediately.	Short-circuit, equipment grounded.	Damaged control cable, damaged push-button, limit switch etc. located "outside", usually on landing.
b) Fuse blows after a short time.	Equipment partially grounded, overload.	Damp or water in limit switch, connection box, door lock, etc due to damaged electric installation. Improperly connected new equipment.
c) Lift stops or cannot be started.	Limit switch in stopping circuit has tripped/been actuated, blown fuse.	Stop push-button depressed, door open, thermal relay actuated due to overload or careless operation, open trapdoor, * switch in safety device actuated, power failure from supplying network. See also a) and b) above.
d) Lift does not come when called for.	Broken stopping circuit.	Door not fully closed, emergency stop button depressed.
e) Lift stops and can be restarted, but then stops again.	Switch actuated in the stopping circuit.	Door switch too close to the cam.

* The switch is set the factory and may not be adjusted.

Example:

Main principles for electric troubleshooting in stop circuit – control voltage 230V, 50/60Hz.



The terminal numbers listed below apply to this diagram only. The procedure for testing other electric equipment with other terminal numbers is carried out in a corresponding manner as described below.

1. Switch on the main ON/OFF switch and close the gate/doors.
2. Check that the final switch is in the "ON" position.
3. Obtain the circuit diagrams and lists which are kept in the cabinet used for this purpose in the lift car.
4. Then test with a voltmeter or test lamp between the zero terminal and the terminals in the electric cabinet as described below:

Test	Result	Conclusion	
Between the zero terminal and last terminal in stopping circuit.	no reaction	fault located in stopping circuit	
Terminal 322 according to diagram in example above.			
Then test each terminal in the stopping circuit systematically, beginning from the transformer.			
between zero terminal and terminal 301	reaction		the circuit is intact to and incl. terminal 301
between zero terminal and terminal 304	reaction		the circuit is intact to and incl. terminal 304
between zero terminal and terminal 314	reaction	the circuit is intact to and incl. terminal 314	
between zero terminal and terminal 316	reaction	the circuit is intact to and incl. terminal 316	
between zero terminal and terminal 318	reaction	the circuit is intact to and incl. terminal 318	
between zero terminal and terminal 320	no reaction	the circuit is not intact to and incl. terminal 320	

Reason

- a foreign object between the switch and the cam.
- unbalanced counterweight wire ropes.
- a loosened wire rope.

Action

Check the mechanical function and connection of the switch. Adjust the counterweight wire ropes, if necessary.

Probable fault location: element C11. The diagram indicates that C11 is a slack rope switch, located on the car roof.

Inspection	Item	Date							Remark	Taken care of date
		/	/	/	/	/	/	/		
	32									
	33									
	34									
	35									
	36									
	37									
	38									
	39									
	40									
	41									
	42									
	43									
	44									
	45									
	50									
	51									
	52									
	53									
	54									
	55									
	56									
	57									
	58									
	59									
	60									
	61									
	62									
	63									

Place	Date /	Year 20	Signature
-------	-----------	------------	-----------

Tightening torque

Recommendations according to the chart on the following page apply in general except for:

ALIMAK Mast bolt, dim. 1" UNC galv.

- Torque : 300 Nm (220 lbf · ft)
- Spanner size : 1 1/2"

ALIMAK Scaffold clamp Ø 76 mm galv.

- Torque : 150 Nm (110 lbf · ft)
- Spanner size : 28 mm

ALIMAK Scaffold clamp Ø 76 mm galv.

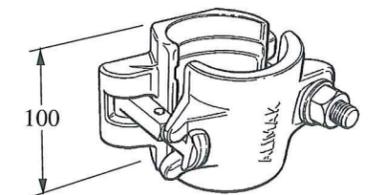
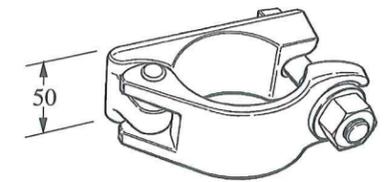
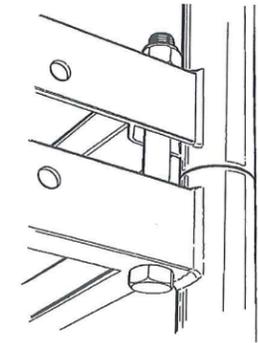
- Torque : 220 Nm (163 lbf · ft)
- Spanner size : 24 or 27 mm

Recommended torques

The chart applies to galvanized bolts and nuts of strength class 8.8 – dry surface.

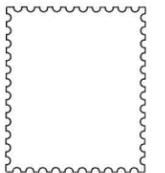
Dimension	Spanner size	Galvanized steel Torque		(Stainless steel) Torque	
		Nm	lbf · ft	Nm	lbf · ft
M 6	10 mm	10	7	3.5	2.5
M 8	13 mm	24	18	8	6
M 10	17 mm	47	35	16	12
M 12	19 mm	81	60	28	20.5
M 14	22 mm	128	95	44	32.5
M 16	24 mm	198	146	67.5	50
M 20	30 mm	386	285	132	97.5
M 24	36 mm	668	493	228.5	168.5
1/4" UNC	7/16"	11	8	4	3
3/8" UNC	9/16"	39	29	13.5	10
1/2" UNC	3/4"	94	69	32	24
5/8" UNC	15/16"	186	137	64	47
3/4" UNC	1 1/8"	327	241	112	82.5
1" UNC	1 1/2"	783	577	268	198
1 1/4" UNC	1 7/8"	1549	1142	530	391

Appendix



Additional copies...

...can be ordered using the ordering form below.



**ALIMAK AB
Technical Document Dept.
P.O. Box 720
SE-931 27 Skellefteå
SWEDEN**

Send

..... pcs Technical Description Part No.
..... pcs Data sheet No.
..... pcs Operator's Manual Part No.
..... pcs Installation Manual Part No.
..... pcs Spare Parts Manual Part No.

*** To**

Company:
Dept./Name:
Address:
.....
Country:

* Kindly state the invoicing address if other than customer.

CONTENTS
TECHNICAL DESCRIPTION

A

TECHNICAL DATA & SPECIFICATIONS

B

IMPORTANT SAFETY INSTRUCTIONS

C

OPERATING INSTRUCTIONS

D

SERVICE AND MAINTENANCE

E

ELECTRIC TROUBLESHOOTING

F

FOUNDATION

G

LIFT MAST AND TIES

H

PREPARATION BEFORE INSTALLATION

I

See Maintenance Manual for chapters C, D, E and F.

Photographs and drawings are illustrative only and do not necessarily show the design of the products on the market at any given point in time. The products must be used in conformity with applicable practice and safety regulations. Specifications of the products and equipment presented herein are subject to change without notice.

A
B

ALIMAK AB IS ISO 9001 CERTIFIED

The Certificate is valid for:

design, manufacture and service related to construction hoists, mast climbing work platforms, permanently installed service lifts and elevators and equipment for shaft drilling and enlarging.

TECHNICAL DESCRIPTION

A₀

Technical description.....	A 1
Control systems.....	A 10
Safety equipment	A 12
Special purpose lifts.....	A 18

Technical description

General

The Alimak SE-lifts are personnel lifts in several sizes designed specifically to operate in cramped or confined industrial areas.

To maximize use on such sites and provide flexibility for installation, the car doors can be positioned on any of the three sides away from the mast.

The lift can be bolted directly to any existing concrete floor with a pit enclosure provided, complete with access stairway, if required.

Most components are anodized extruded aluminium profiles or hot-dip galvanized steel in order to withstand the rigours of industrial environments. If further protection is called for, Alimak also offers surface treatments such as epoxy or polyurethane coatings.

The Alimak SE-lifts are particularly suitable outdoors for attachment to steel structures, container cranes, etc. Installation drawings, tie forces and vertical loads can all be rapidly provided by the company's CAD computer system.

During installation of the lift, the personnel responsible for the lift's operation shall be properly trained. These personnel shall be trained to rescue in emergency situations and as evidence of this, they shall be given and sign for, the key to perform these activities.

IMPORTANT:

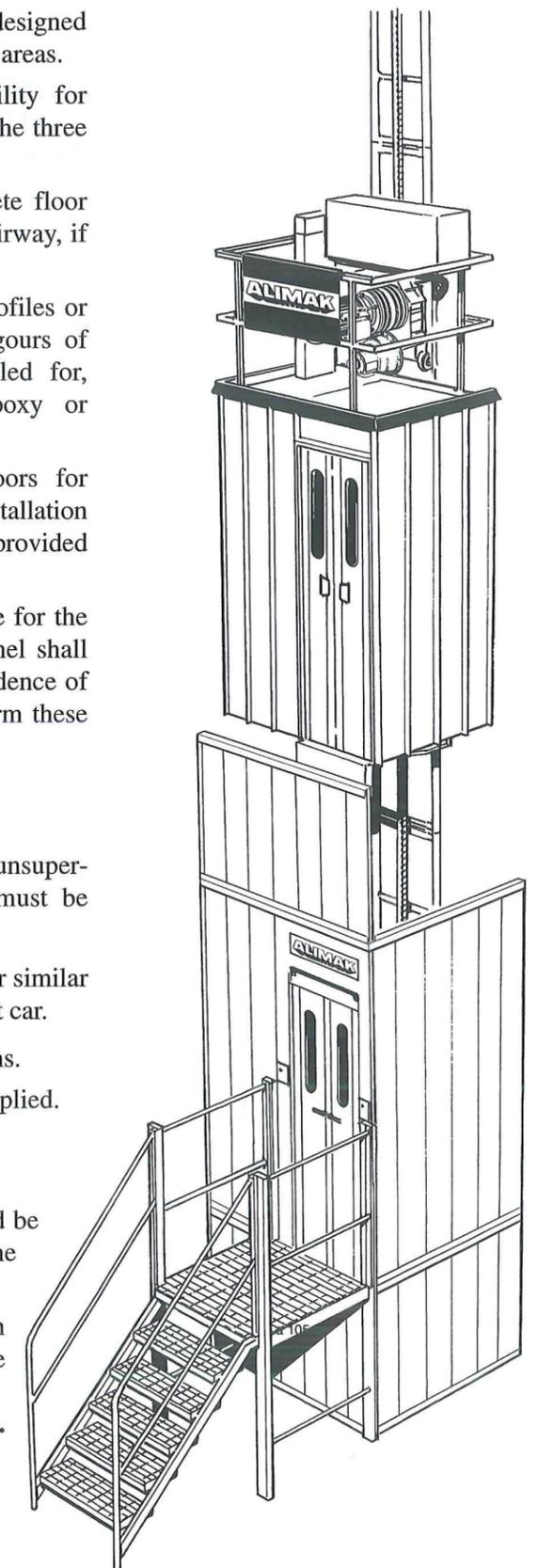
- When a lift is installed where unauthorized and/or unsupervised persons, may try to use the lift, the lift must be locked out of service.
 - This lift is not intended to be loaded with forklift* or similar equipment, which could cause overloading of the lift car.
 - This lift is not intended for use in hazardous locations.
- * Special lifts intended for such purposes can be supplied.

Landing enclosure

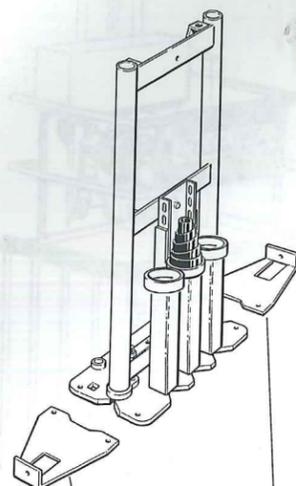
According to the regulations, a safety space (pit) should be available below the bottom landing. This pit contains the bottom car buffers.

The pit can either be constructed of extruded aluminium panels and located above ground, or made of concrete and located below ground (by customer).

The depth of the pit is 1100 mm or 1200 mm (3 ft. 7 in. or 3 ft. 11 in.) depending on local regulations.



Bottom guide rail support type A

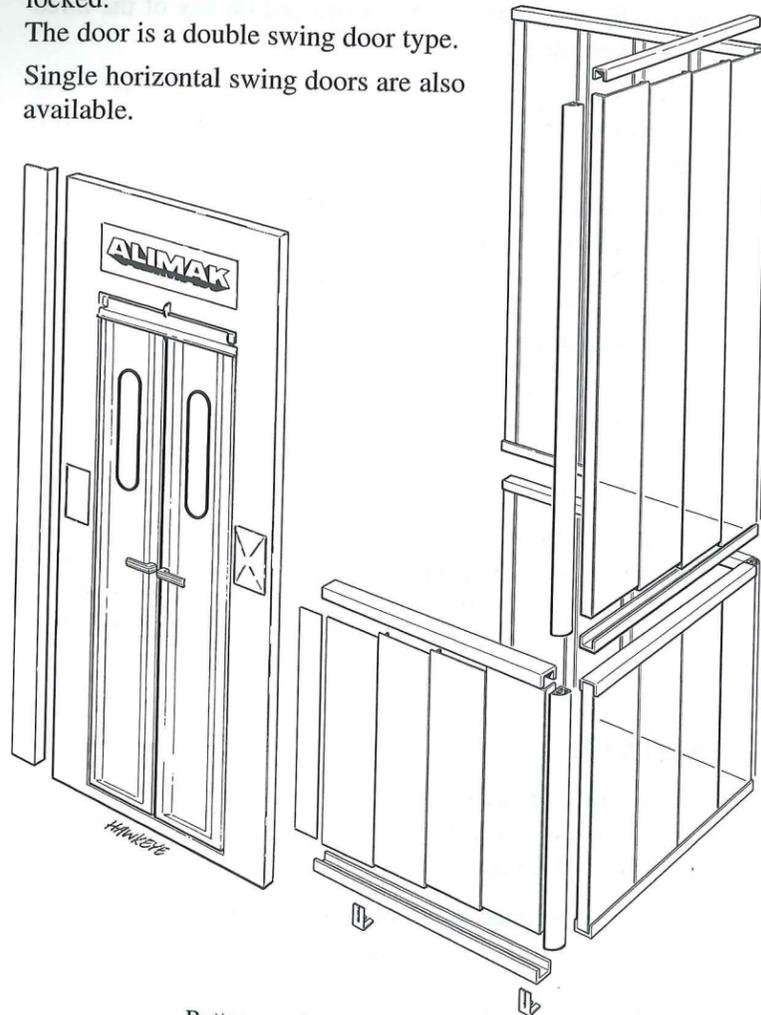


Support elements for ground landing enclosure

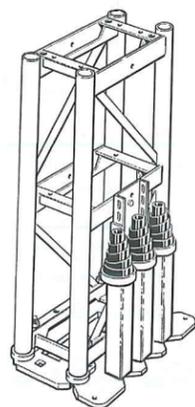
The landing enclosure of extruded aluminium panels can be provided with one or two landing doors, which are mechanically and electrically interlocked. The mechanical interlock makes it impossible to open the landing door unless the car is at that landing. The approved interlocking system prevents the car from moving unless the door is closed and locked.

The door is a double swing door type.

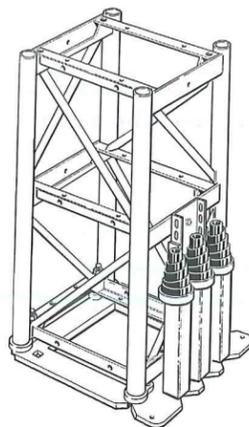
Single horizontal swing doors are also available.



Bottom mast support type FE



Bottom mast support type A50



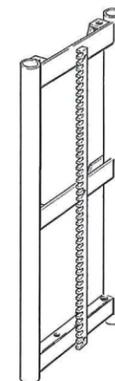
Lift tower and base frame

The lift tower is assembled from 1508 mm (4 ft. 11 3/8 in.) long sections of four different types.

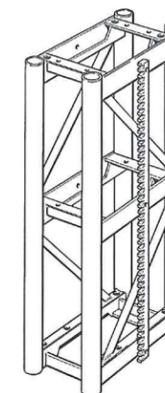
Tube guide rail type A is made from two 76 mm (3 in.) dia. x 4.2 mm (11/64 in.) wall thickness tubes. The sections are bolted together with two 1"UNC 8.8 galvanized bolts and lock nuts.

Guide rail type A must be tied at approx. 1.5 m (5 ft.) intervals.

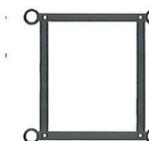
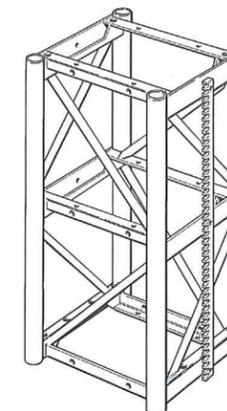
Tube guide rail type A



Rectangular tube mast section type FE



Square tube mast section type A50



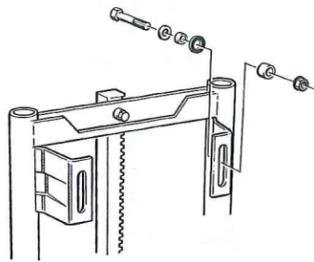
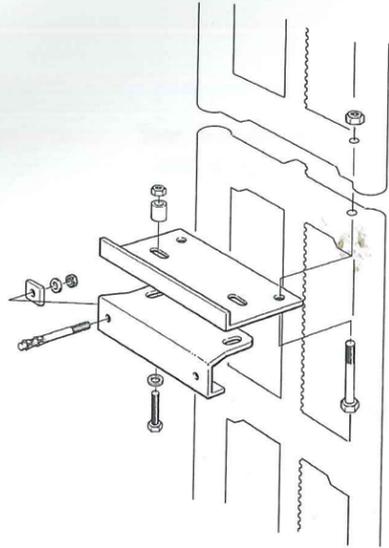
The rack for both mast types has module 5 teeth and is fabricated from 40 x 40 mm (1 9/16 x 1 9/16 in.) material.

The mast tube ends and the fixing points for the rack are all machined after galvanizing and before assembly.

The bottom section is bolted to a base plate, which incorporates a frame with 3 buffer positions. According to the size of the lift either one, two or three buffers are used.

For applications involving long tie distances or overhang it is possible to use a heavier mast section such as rectangular or square tube mast section type FE or A50.

A₄



Ties for tube guide rail type A – for lifting heights up to 50 meter (165 ft.)

The tie consists of a plate at each guide rail joint bolted to the end frame. The plate has slotted holes to allow for a distance between the face of the supporting structure and the centre of the tubes of 190 – 240 mm (7 1/2 – 9 1/2 in.).

The tie plate can be fixed either to the top frame of one guide rail or to the bottom frame of the next section below, allowing a tie incremental change of 210 mm (8 1/4 in.).

A channel can be attached above or below the tie plate, giving a further increment of ± 30 mm (1 3/16 in.) on the tie plate.

The channel is fixed to the structure with either M16 expansion or cast in place bolts for concrete structures or bolts/nuts for steel structures.

Remark: For a SE 300 lift with floor area not exceeding 0.78 x 1.04 m (width x depth) (2 ft. 6 3/4 in. x 3 ft. 5 in.) tie distances can be increased to 3 m (every second guide rail section), provided that prescribed bolt tightening torque/prestress is regularly checked.

Modified type A guide rail – for lifting heights above 50 up to 200 meter (650 ft.)

The modified type A guide rail has brackets, with slotted holes, welded to the guide rail tubes in the upper end.

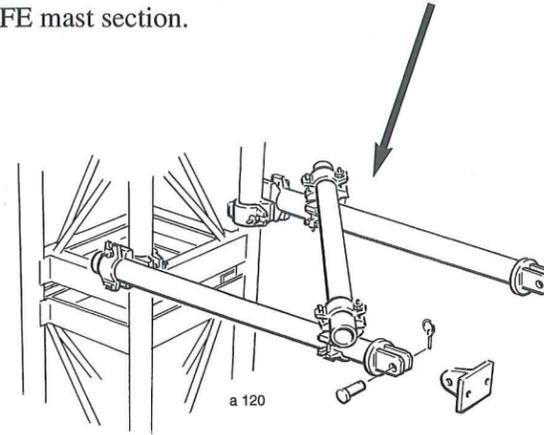
Spacers on the attachment bolts allow the guide rail to expand and contract with variations in temperature.

All tie parts are hot dip galvanized.

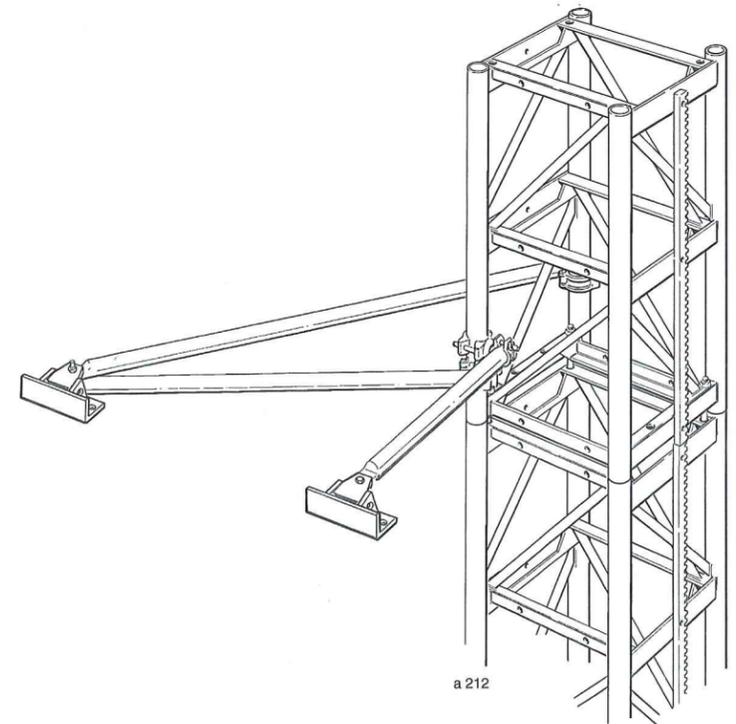
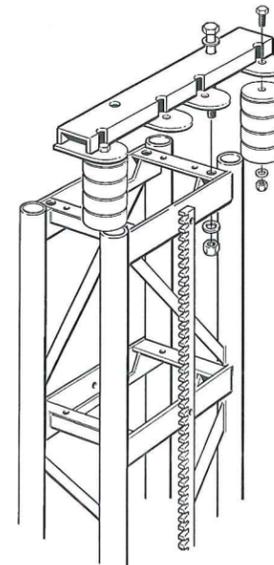
A₅

Rectangular and square tube mast sections type FE and A50 are attached to the structure with mast tube clamps and wall brackets or special telescoping tie assemblies. Mast ties are available in several sizes and adjustable within the minimum and maximum specifications.

Note: The large car frame for loads higher than 700 kg (1540 lbs.) will interfere with the pivoted tube clamps on the rear mast tubes and makes it impossible to use THIS solution for tying the FE mast section.

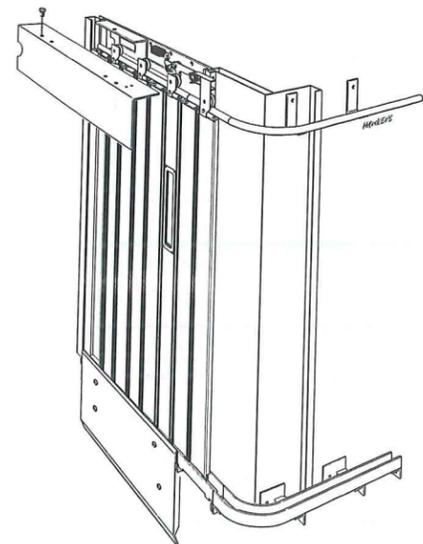
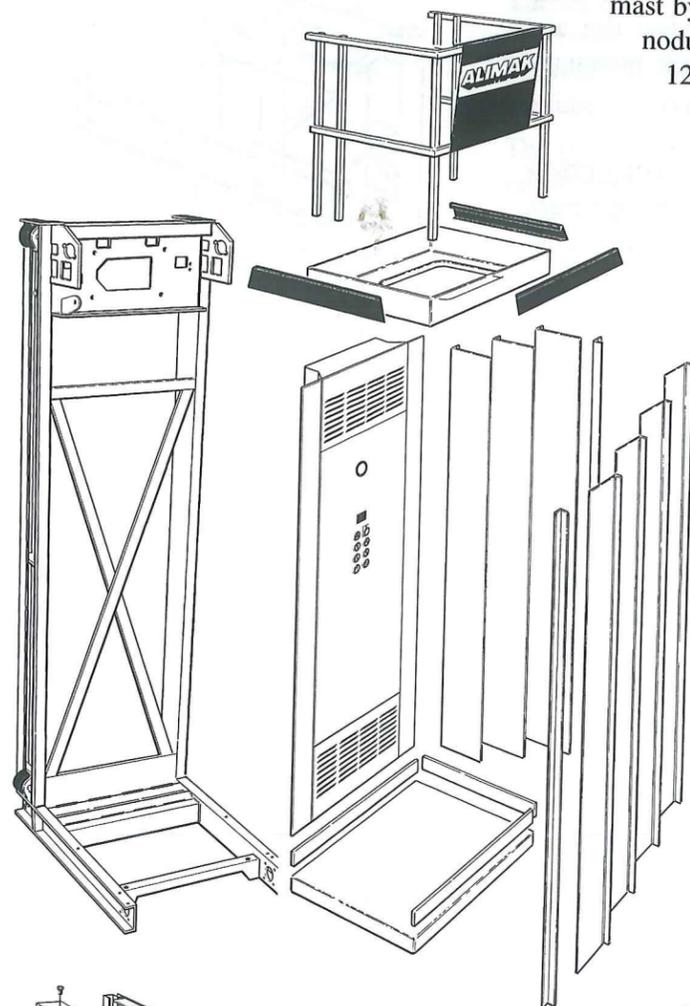


Top buffer arrangement



a 212

Car



"Wrap around" manually operated sliding door

The car is attached to a main frame which is guided on the mast by guide rollers. The guide rollers are available in nodular iron, and for lifts with a max. capacity of 1200 kg (2646 lbs.), steel coated with polyurethane.

To prevent the car from climbing off the mast, the safety brackets are placed beneath the lowest drive pinion of the machinery.

The car is constructed of extruded aluminium panels bolted to floor and roof to form a complete unit. The roof and floor are constructed of durable, aluminium plate with a non-skid surface.

The car can be equipped with either one or two horizontal bi-folding door(s) or "wrap around" manually operated sliding door(s). The car doors are locked by car door actuators. The actuator operates on both car and landing doors, when the car has stopped at landing.

Sliding doors can be furnished for all car sizes and are available in four widths.

The bi-fold car door is only available in a width of 660 mm (2 ft. 2 in.).

The car roof which is provided with a safety railing serves as a working platform during erection and as a maintenance inspection platform. There is also a trapdoor in the roof and a ladder in the car to allow access to the roof.

The roof trapdoor is also the emergency exit.

To achieve rider comfort, the lift is equipped with vibration absorbing rubber pads between the car and the main frame.

Model designation

SE 300, SE 400, etc, are model names, each describing rated load for a particular car size (based on number of passengers allowed in the car according to regulation EN 81 and/or floor area based on ASME 17.1).

Various combinations of motors and gear ratios can be combined to suit power required and nominal speed.

Lift machinery

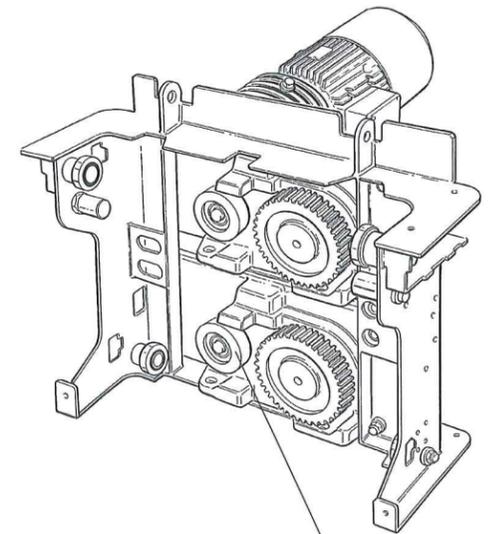
The drive unit consists of either one or two squirrel cage motor(s) with built-in electromagnetic disc brake and a helical gear box which has a pinion attached to the output shaft. The pinion is in constant engagement with the rack and drives the car up or down the mast dependent on the rotation of the motor(s).

The drive unit is located on the top of the car and is available in various sizes dependent upon speed and load capacity.

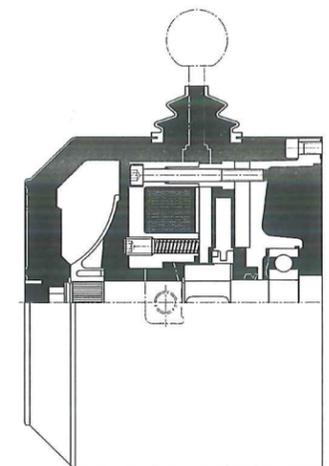
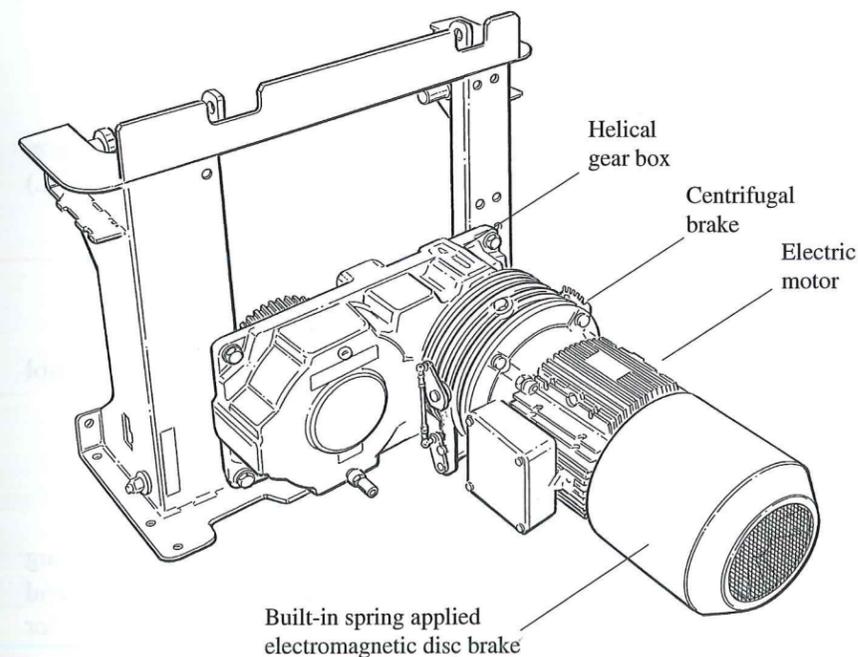
A direct start system is used for speeds 0.40, 0.59 or 0.63 m/s at 50 Hz (95, 140 or 150 fpm at 60 Hz).

VFC systems can be for speeds 0.4, 0.6, 0.8 or maximum operating speed 1.0 m/s (80, 120, 140 or 200 fpm).

In the event of a power failure the lift can be lowered using a centrifugal brake system which allows the lift to lower by gravity at a speed less than the tripping speed of the speed governor / safety device.



Gear box with counter rollers



Spring applied disc brake

Electrical equipment

The electrical equipment can be of several different types depending on local requirements and regulations. The equipment is designed to accept operating conditions such as weather conditions and undesirable environments.

The components have been thoroughly tested and conform to one or several of the following international/national standards: IEC, CEE, EN, DIN, UL, CSA and SS.

In order to meet the requirements of the customer and conform to the applicable lift regulations and codes, the electrical equipment is designed specific for each order.

Required documents, such as wiring diagrams, circuit diagrams and component lists are included with the delivery.

FC vs DOL

Frequency controlled electric motors give:

- better (softer) riding comfort at start and stop.
- better stopping accuracy.
- less brake wear.
- lift speed can be reduced during installation and inspection procedures, which is not possible with direct on line (DOL) started electric motors.

Hybrid cable

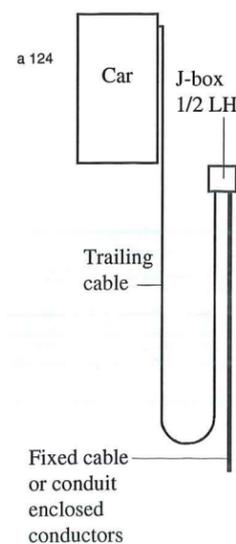
A special cable is used which permits power and control conductors to be contained within one outer sheath.

Cable guiding system

Cable guiding is accomplished by either having a free-hanging cable where the hoistway is enclosed or with a cable trolley and cable guides in an open hoistway or where there is concern for cable hang-up.

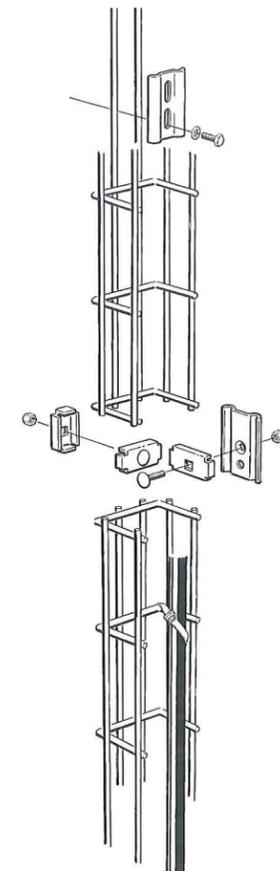
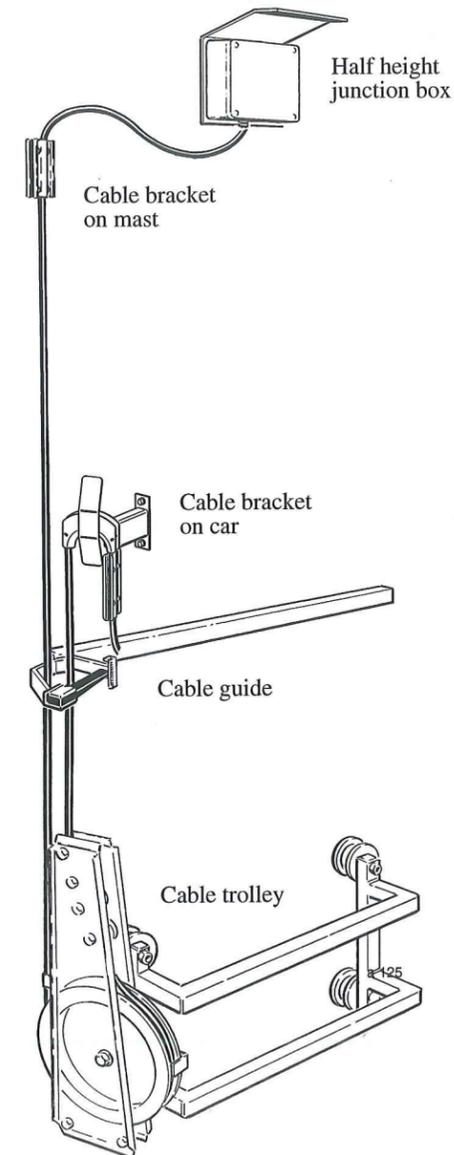
Free-hanging cable

The trailing cable hangs from half height junction box in the hoistway, fed by a fixed cable, or conductors running in conduits.



Cable trolley

This is an all purpose system. It can operate indoors and outdoors with special versions available for both inclined or curved installations. The trolley maintains an even tension in the trailing cable. Up to 2 cables can be handled with a cable trolley wheel on each side of the cable trolley.



Cable tray for fixed power cable to half height junction box in mast

Standard control systems

ALC collective control system

The lift is provided with Alimak Lift Control system type ALC. The ALC system is a selective collective control system based on modern microprocessor technology. The ALC system is modular built and can be extended to handle sixteen (16) floors.

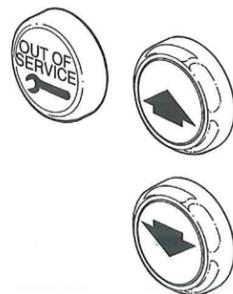
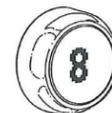
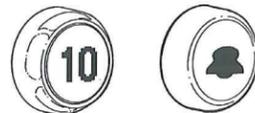
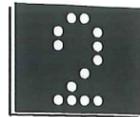
A reference point is established by means of a cam attached to the mast and located above the bottom landing level. A limit switch picks up the reference point when travelling in the initial set-up mode.

The car position is determined by counting pulses generated by a pulse transmitter attached to the gearbox.

The ALC system picks up all destination orders from inside the car and the outside calls from the landings. This information is memorized and processed within the system. During travel the lift will automatically respond to all calls in a sequential and systematic manner.

The car push button station has one illuminated button for each landing served and a display showing the actual landing number.

The landing stations are provided with two illuminated call buttons, one for each travel direction and an indication lamp "Out of service". As an option the landing stations can be provided with a car position indication display.



Single automatic control system

The lift is provided with a Single Automatic control system designed to handle two or three landings. The car push button station has one illuminated button for each landing.

The landing stations are provided with one illuminated call button and an indication lamp "Occupied". The Single Automatic control system will carry out one order at the time, i.e. it picks up the first order and ignores all other calls until the first one is completed.

The Single Automatic control system is a simple call system suitable for low traffic applications. The system is based on well-proven electromechanical relay technique and offers easy handling for service and maintenance.

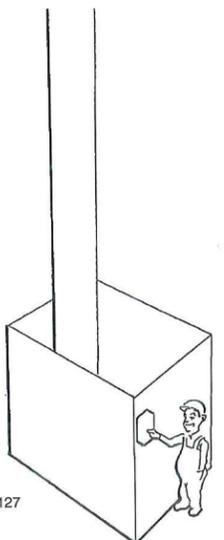
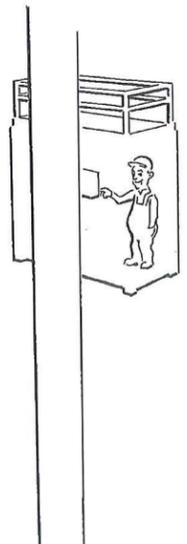
Semi-automatic control system

The lift is provided with a Semi-automatic control system designed to handle three or more landings in low traffic applications. The lift is operated both from inside the car and from the landings by means of push buttons Up / Down / Stop Next Landing. By pressing the Up or the Down button, the car starts in the chosen direction.

When the car is approaching the desired landing, the button "Stop Next Landing" is pressed. The car will then automatically stop at the landing.

The Semi-automatic control system requires an open hoistway so the location of the car can be visually observed from the landings (in case of a closed hoistway you cannot see where the car is located and consequently you don't know whether to press the Up- or Down-button when calling the lift from a landing).

This control system is a simple control system based on well-proven electromechanical relay technique. It offers easy handling for service and maintenance and can easily be extended to the required number of landings.



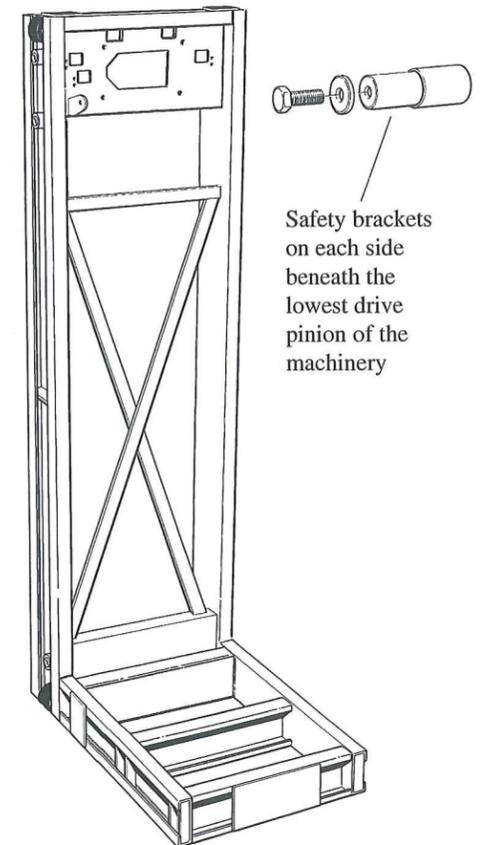
Safety equipment

Automatic stop at top and bottom landings

At the top and bottom landings, limit cams are mounted on the mast. These cams activate the limit switches on the car which automatically stop the car. A final limit switch with separate cam on the mast at top and bottom landings cuts the power supply and stops the car should the normal limit switch not function.

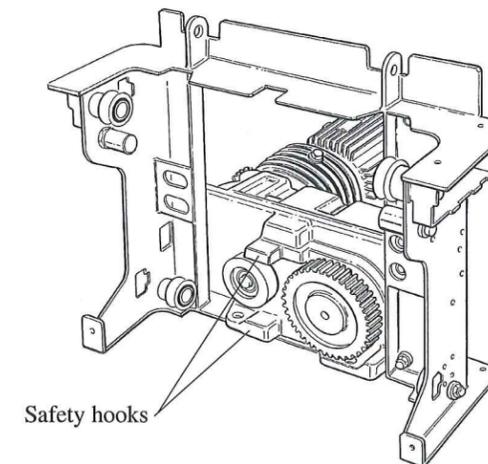
Safety brackets

To prevent the car from climbing off the mast, the safety brackets are placed beneath the lowest drive pinion of the machinery.



Safety details on the machinery plate

Integrated safety hooks as part of machinery plate prevents the pinion from disengaging in case of a guide roller failure.

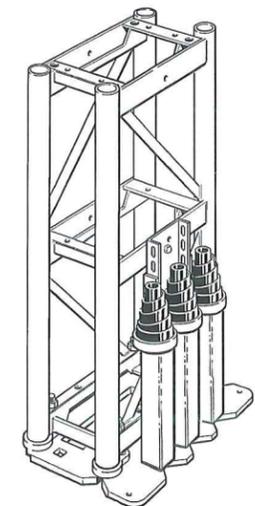


Buffers

Buffer springs are located below the bottom landing level, close to the lift mast. These buffers are designed to stop a car at governor tripping speed with rated load, travelling beyond its normal limit.

Phase failure relay

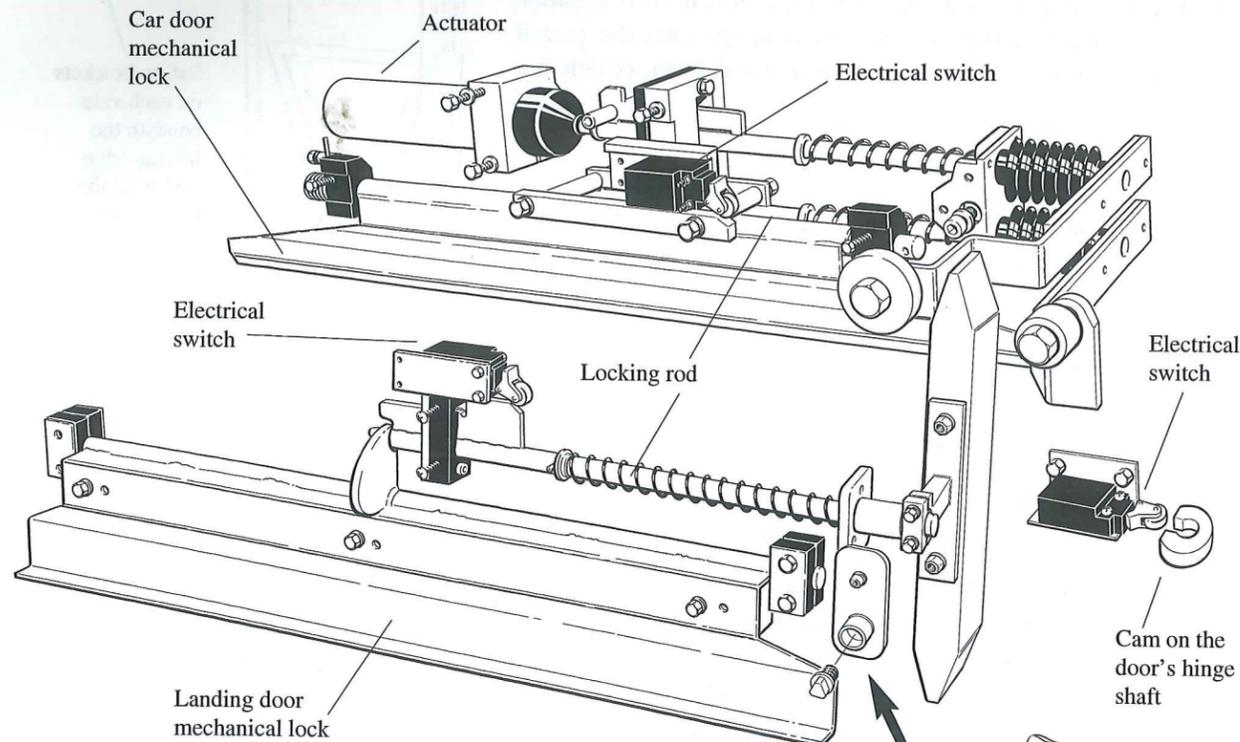
The electrical equipment is protected by a phase failure and phase reversal relay ensuring that the correct phase sequence is always connected to the motor(s).



Door interlocks on car and landing doors

The car and landing doors are interlocked to prevent the lift from operating unless the doors are closed and locked.

The door cannot be opened unless the car has stopped at a landing.



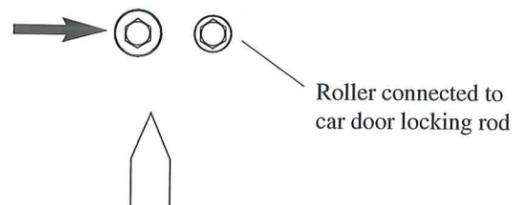
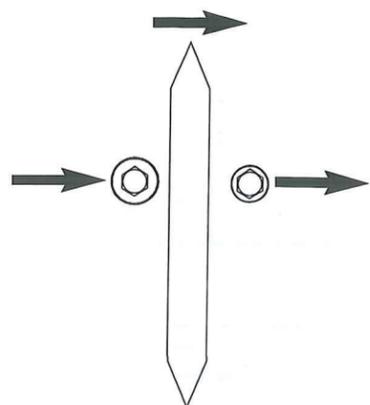
In an emergency situation, the landing door can be opened from outside by means of a special key.

Function

The car door lock actuator starts to open the landing door when the lift has stopped at the landing.

The landing door interlock cam transfers the actuator movement to the car door locking rod and both car and landing door can be opened.

If there is no landing door (and interlock cam) where the car has stopped, the car door cannot be opened.



Emergency lowering device

One unique Alimak lift feature is the emergency lowering device. Should a power failure take place, this allows passengers in the car to lower the car under reduced and controlled speed to the next lower landing. With other lifts, passengers must call for help, remaining in the stopped car until help arrives.

Resetting cams *on each landing* will automatically cause the manual lowering lever to reset and stop the car level with the next lower landing, i.e. the brake(s) is (are) activated.

It is **NOT** possible to lower the car if the car is stopped at a landing. The system only works when due to a power failure, the car is stopped in-between landings.

Remark: Exception to the above may only be permitted with the customer's approval and only after a risk assessment is performed and documented.

Emergency lowering to a designated emergency exit landing or to a bottom landing can be accomplished.

This can be desirable if as an example the car is stopped in-between landings and there is a risk of toxic gas built-up in the hoistway.

Another example is a tall chimney with intermediate landings and ladders available for exiting the structure, where it is determined that it is safer to stay in the car and emergency lower than climbing down the ladder(s).

The consequence if emergency lowering from a landing is that the car door actuator will not return to its "lock"-position. Regardless of this, the closed car door will be locked by the spring force of the interlock.

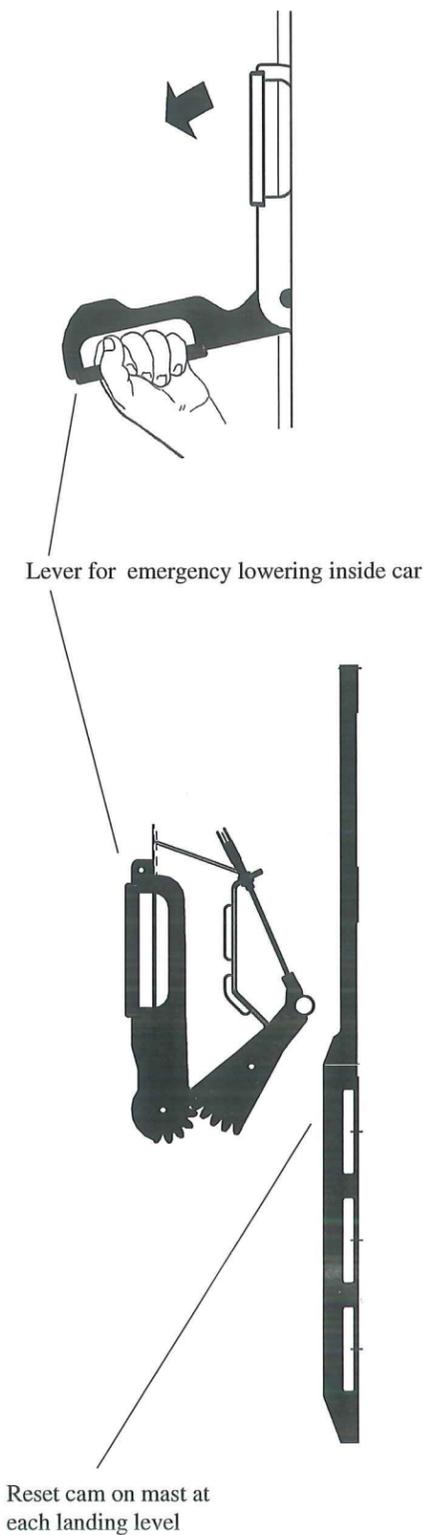
If the landing door *is closed*, the spring action of the interlock will lock the landing door when the car leaves the landing.

If the landing door *is left open* (which should never take place), the landing door will remain unlocked and open when the car leaves the landing.

This possible risk must be communicated by means of a Danger Sign with proper text and located in the car.

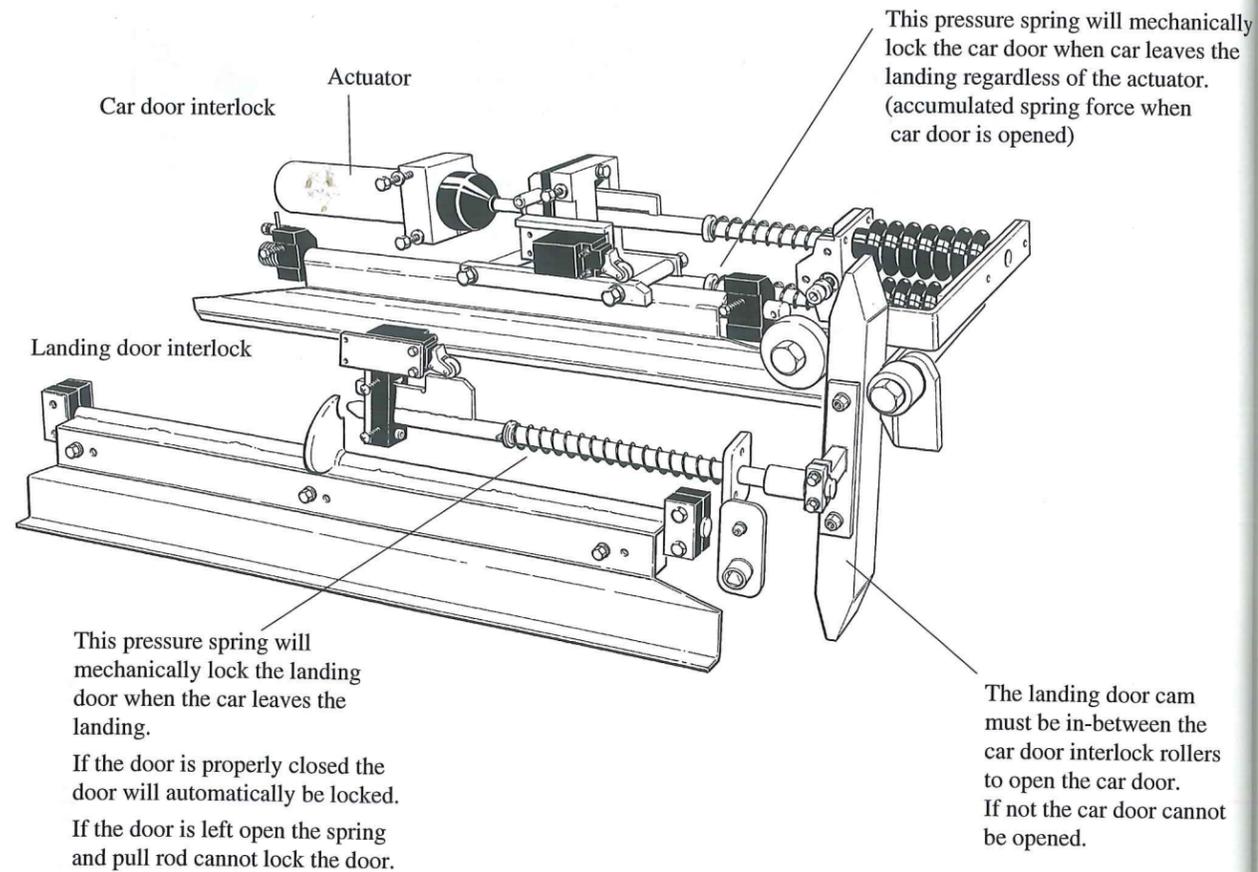
IMPORTANT: Emergency lowering through intermediate landings with the door actuator in its extended position requires that all landing door units must be installed correctly and within the stated tolerances. **If not, door locks and fixed equipment at the landings will be damaged**

Also see page A15 for further details.

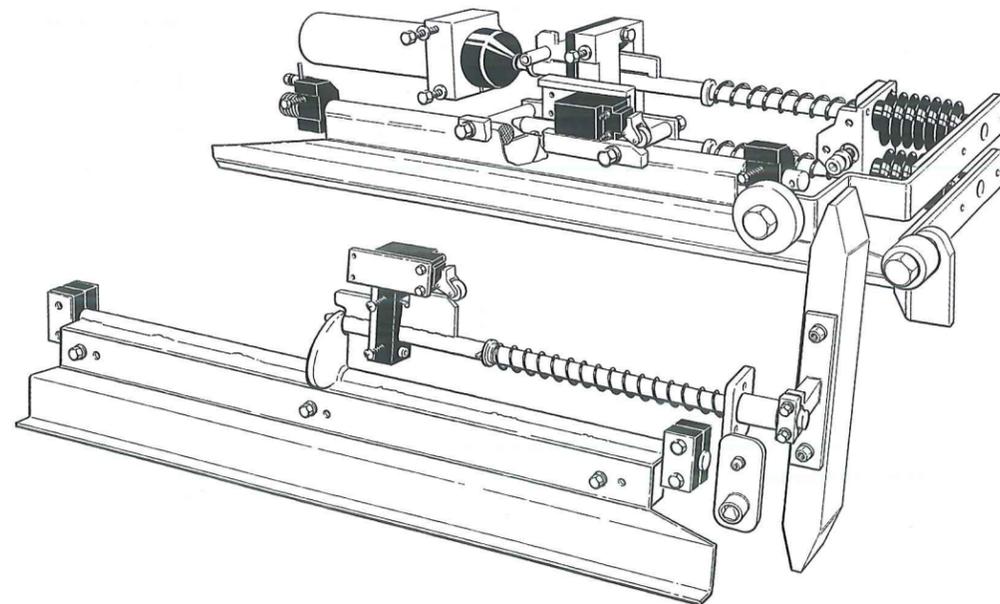


Reset cam on mast at each landing level

Unlocked car and landing door

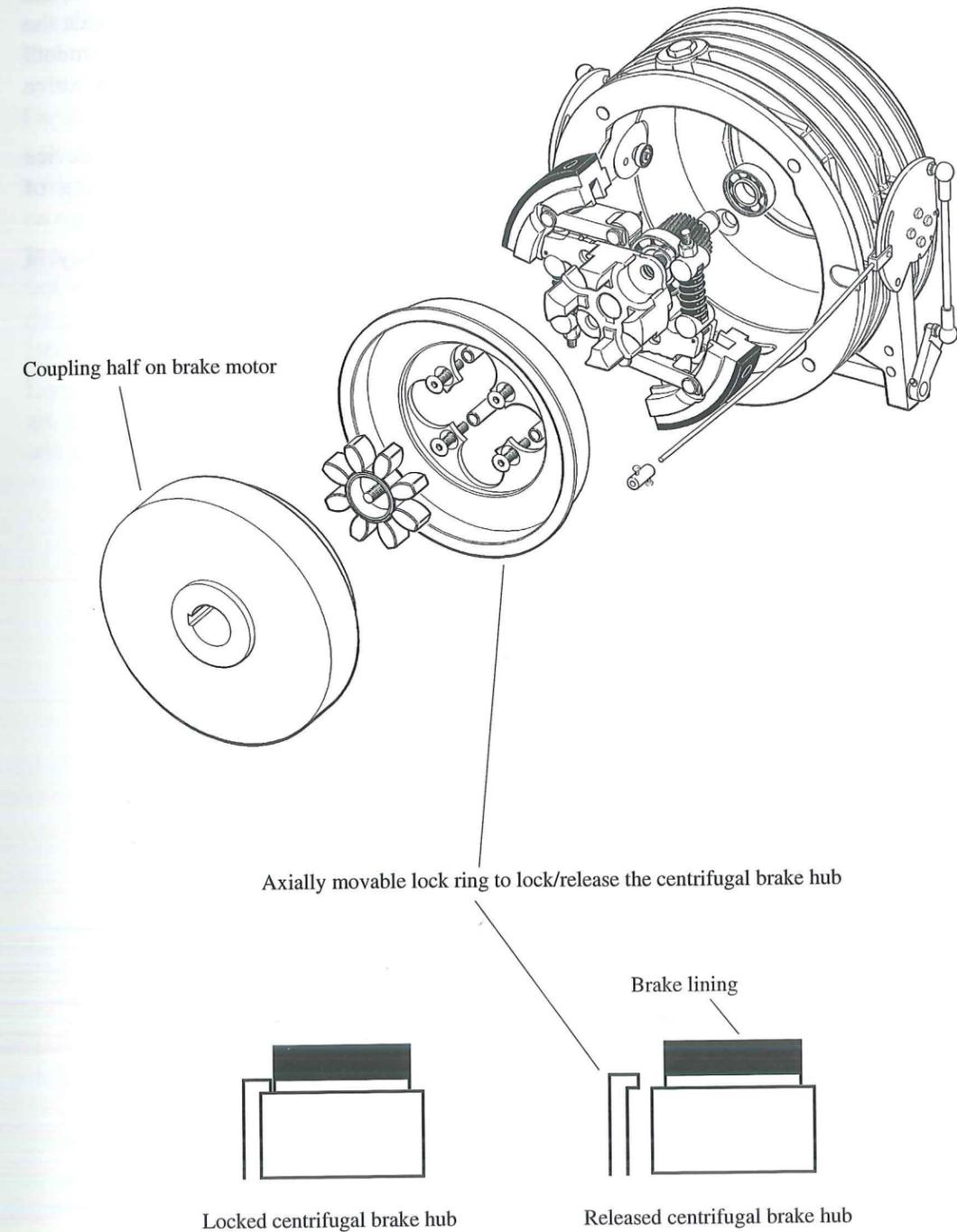


Locked car and landing door



Centrifugal brake

When lowering by gravity in case of a power failure, a centrifugal brake incorporated into the drive machinery will maintain a constant speed preventing the governor tripping speed, and thereby activating the safety device.



Safety device

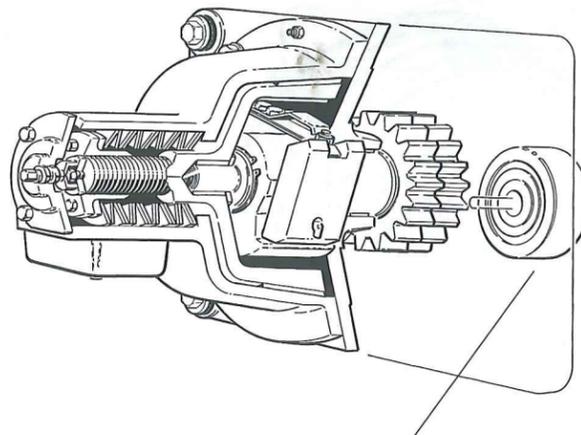
The lift has an overspeed safety device which progressively stops the car on the mast should normal driving speed be exceeded by a preset amount.

The safety device has a shaft with a centrifugal weight and a pinion constantly engaged with the rack on the lift mast. When the centrifugal weight actuates, the brake cone is screwed in against a brake lining inside the safety housing. The lift is brought to a smooth stop and simultaneously the power to the drive motors is cut off.

A counter roller attached to the safety device mounting plate, ensures correct meshing of the pinion at all times.

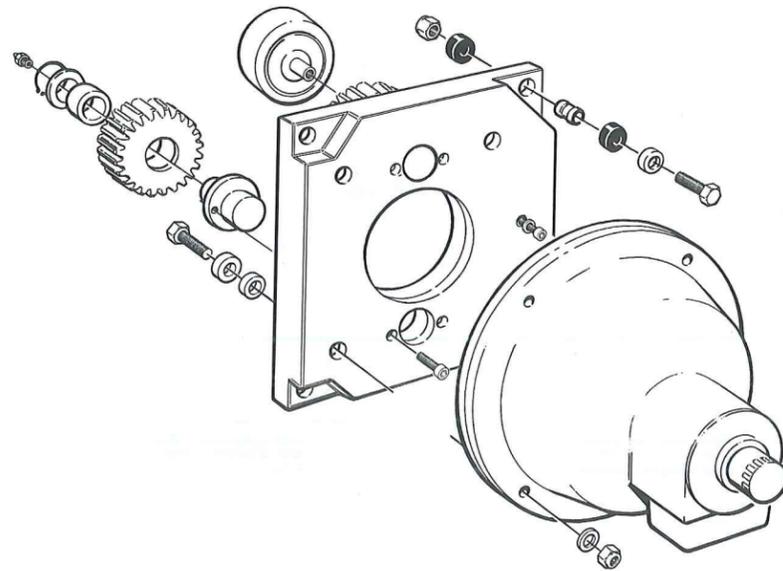
A safety hook provides additional safety in case of failure of the counter roller.

Safety Device type GF for cars with payload 2000 kg and less



Integrated counter roller

Safety device type GFD for cars with payload more than 2000 kg



Special purpose lifts

SE 300 L, 400 L & 450 L

SE L lifts are optimized for installation on container cranes as an example.

Machinery for SE L lifts are bolted rigid to the car frame to reduce the number of guide rollers needed and is equipped with one direct start electric motor – 7.0 or 8.8 kW.

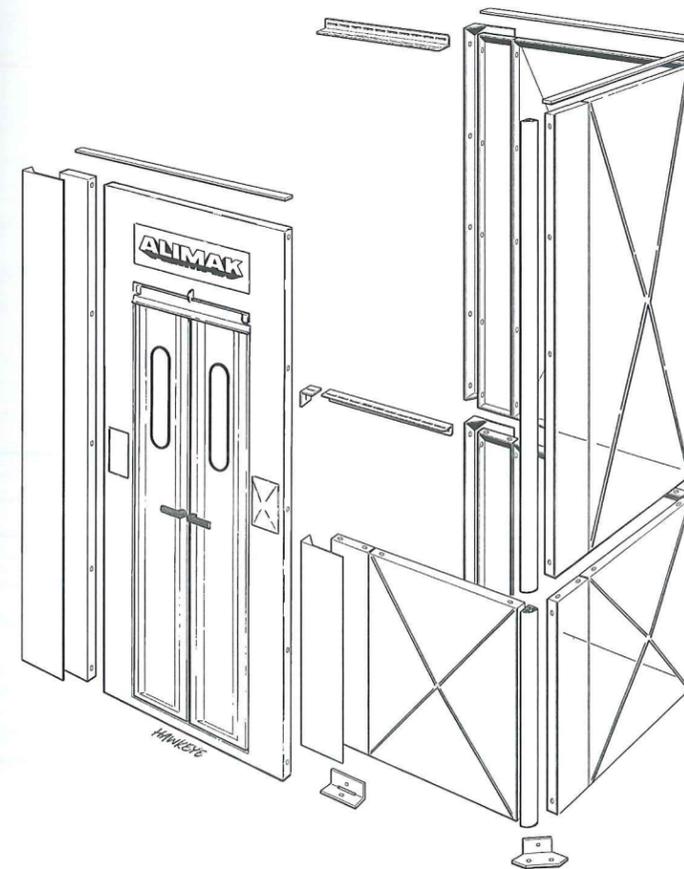
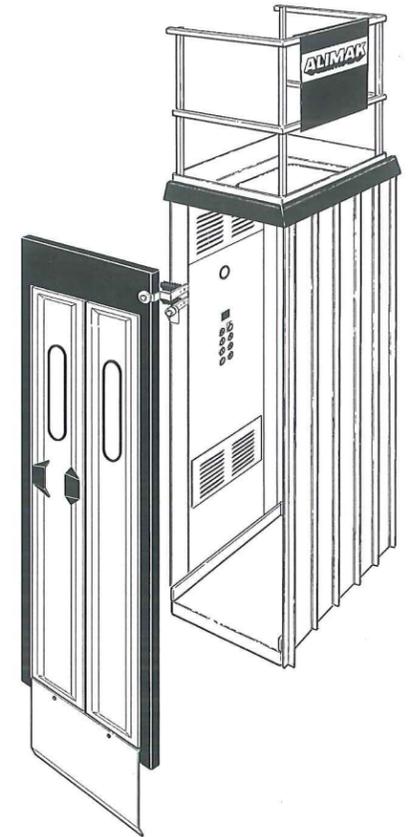
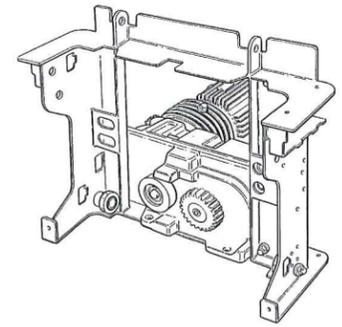
Pinion dia. 115 mm (4 - 17/32"), which gives a speed of 0.63 m/s at 50 Hz and (150 fpm at 60 Hz).

Guide rollers are of nodular iron.

Lift car with one only entrance / exit door of type horizontal bi-folding type. Car floor of durable aluminium checker plate glued on top of galvanized steel sheeting.

The lifts are provided with a relay-based single automatic control system designed to accommodate two or three landings and the overload sensing system is the proximity switch type and is located beneath the car.

Landing enclosures for SE L lifts running on type A guide rail are available in three car sizes for SE 300 L, 400 L & 450 L, and are made of galvanized steel sheet.



Data sheet.....B 1
DimensionsB 7
Motor power, speed and loadB 16
Conversion tablesB 17

ALIMAK SE-series

TECHNICAL DATA

CAPACITY	Metric	Imperial
Payload capacities:	300 – 2400 kg	650 – 5300 lbs
Average speed up/down at rated payload:	Direct on line (DOL) 50 Hz: 0.40, 0.59 or 0.63 m/s Direct on line (DOL) 60 Hz: 95, 140 or 150 fpm Frequency control (VFC): 0.4, 0.6, 0.8 or 1.0 m/s or 80, 120, 150 or 200 fpm	
Max. lifting height with std. accessories:	250* m	825* ft.

*Depending on the optional equipment chosen

DIMENSIONS

Internal width:	0.78 – 1.56 m	2'-6 3/4" – 5'-1 3/8"
Internal length:	1.04 – 2.99 m	3'-5" – 9'-9 3/4"
Internal height:	2.17 m	7'-1 1/2"
Bi-folding door opening width:	0.66 m	2'-2"
Sliding door opening width:	0.69 m alt. 0.95 m alt. 1.27 m or 1.53 m	2'-3" 3'-1 3/8" alt. 4'-2" or 5'-1/4"
Door opening height:	2.015 m	6'-8"
Headroom required above the landing:	4.0 to 4.5 m	13'-2" to 15'
Min. required shaft dimension = Landing enclosure outside dimension		
Mast section length:	1.508 m	4'-11 3/8"

CAR WEIGHT

Car weight	750 – 1900 kg	1655 – 4190 lbs
------------	---------------	-----------------

CONTROLS

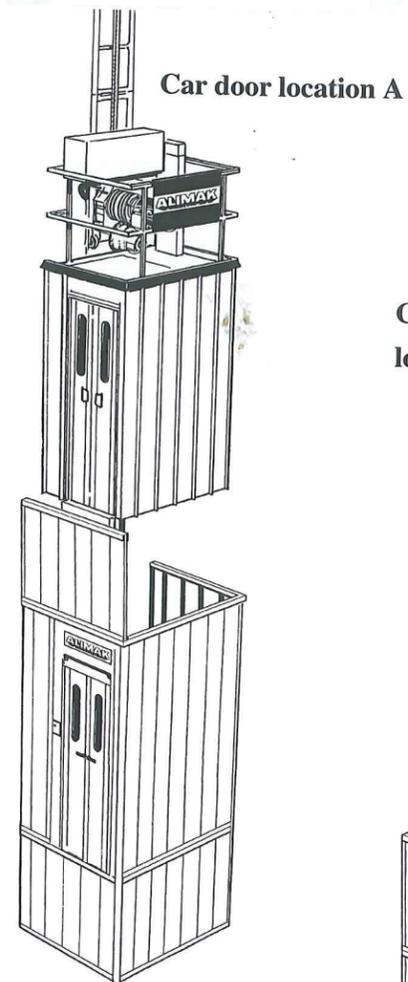
- Operation:**
- Single automatic. 2 – 3 landings
 - Semi-automatic. 3 – n landings
 - Collective / Selective. 2 – 16 landings

All systems can control DOL, only collective for VFC.

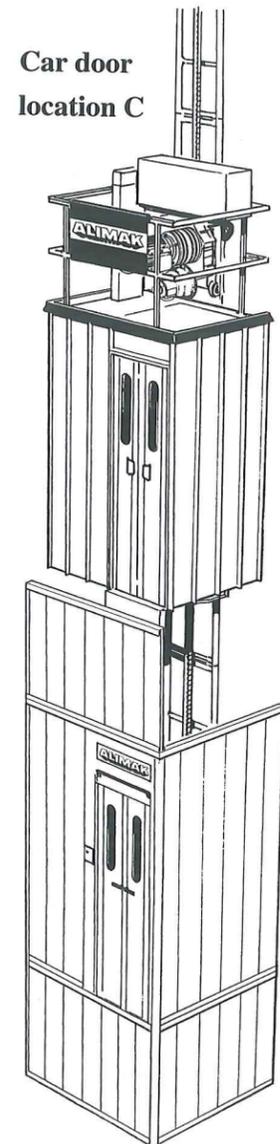
Separate power voltage: 230V AC / 110V AC

Control circuit voltage: 230V AC

Motor control: direct on line (DOL) or variable frequency control (VFC)



Car door location A



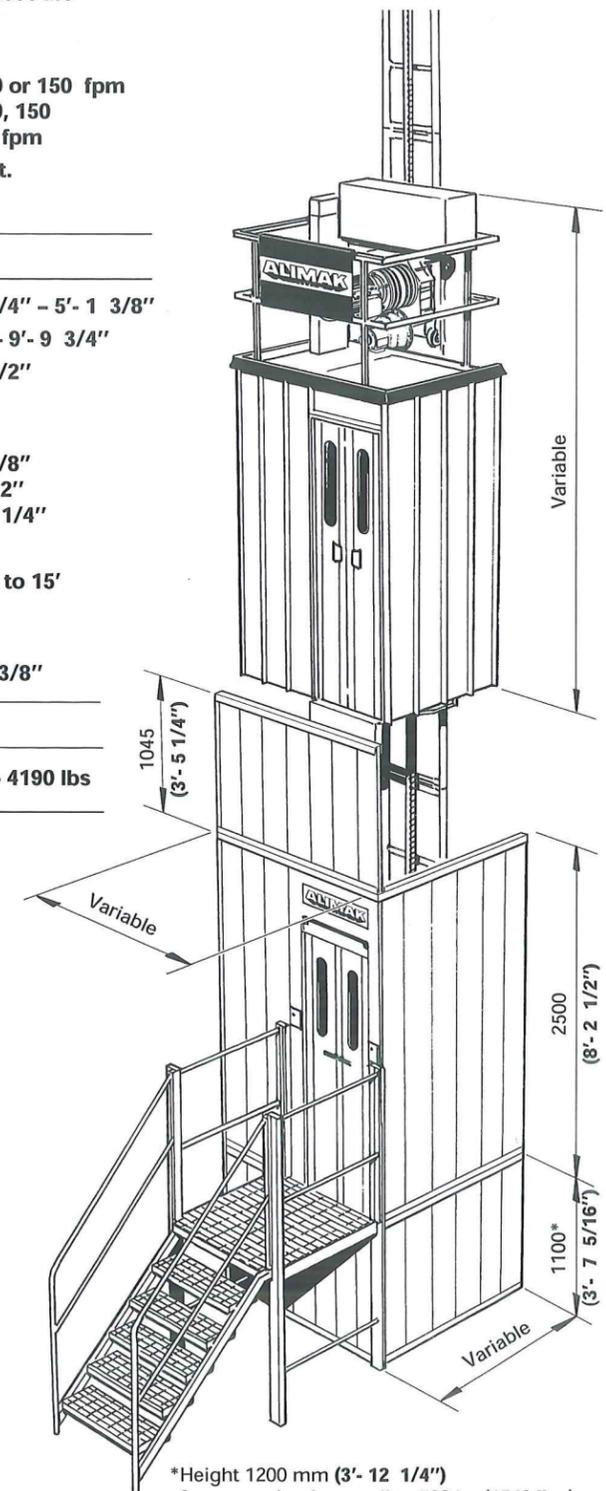
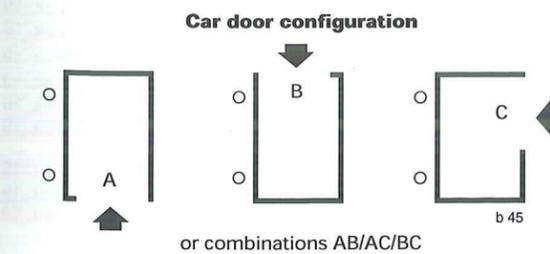
Car door location C

Car door location B



Standardized "A" car-sizes

CAR DIMENSIONS	Metric	Imperial
Internal width x length:		
SE 300	780 x 1040	2'-6 3/4" x 3'-5"
SE 400	910 x 1170	3' x 3'-10"
SE 500	1040 x 1170	3'-5" x 3'-10"
SE 1200	1300 x 2080	4'-3" x 6'-10"
SE 2000	1560 x 2600	5'-1 3/8" x 9'-6 3/8"



Technical Data Alimak SE-series Lifts DOL (load & car size

Lift type	Speed m/s at 50 Hz	No. of passengers EN	Pay-load kg	Car size w x l m	Door opening width meter					Headroom required above top landing in m		Min. required shaft dimensions	Enclosure w x d m	Power supply fuses A ***	Rated power kW ***	Starting current A	Power kVA ***	Car weight approx. kg	Mast type			
					0.66	0.69	0.95	1.27	1.53	1 motor	2 motor								A	A mod.	FE	A-50
SE 300	0.59	4	300	0.78 x 1.04	x	x**	NA	NA	NA	4.0	NA	depends on mast choice	depends on mast choice	25	7.0	93	~10.5	770	53	58	100	110
SE 300 L	0.63	4	300	0.78 x 1.04	x	x**	NA	NA	NA	4.0	NA	depends on mast choice	depends on mast choice	25	7.0	93	~11	770	53	58	100	110
SE 400	0.59	5	400	0.91 x 1.17	x	x**	x**	NA	NA	4.0	NA	"	"	25	7.0	93	~10.5	830	53	58	100	110
SE 400 L	0.63	5	400	0.91 x 1.17	x	x**	x**	NA	NA	4.0	NA	"	"	25	7.0	93	~11	830	53	58	100	110
SE 450 L	0.63	5	450	0.91 x 1.17	x	x**	x**	NA	NA	4.0	NA	"	"	35	8.8	104	~12	830	53	58	100	110
SE 500	0.59	6	500	1.04 x 1.17	x	x	x**	NA	NA	4.0	NA	"	"	35	8.8	144	~11.5	810	53	58	100	110
SE 1200	0.40	16	1200	1.30 x 2.08	NA	NA	NA	x	NA	NA	4.1	"	"	50	2 x 8.8	208	~16	1470	NA	NA	100	110

L means models adapted for container cranes

Technical Data Alimak SE-series Lifts VFC (load & car size

Lift type	Speed m/s	No. of passengers EN	Pay-load kg	Car size w x l m	Door opening width meter					Headroom required above top landing in m		Min. required shaft dimensions	Enclosure w x d m	Power supply fuses A ****	Rated power kW ****	Starting current A ****	Power kVA ****	Car weight approx. kg	Mast type			
					0.66	0.69	0.95	1.27	1.53	1 motor	2 motor								A	A mod.	FE	A-50
SE 300	0.6 alt. 0.8 or 1.0	4	300	0.78 x 1.04	x	x**	NA	NA	NA	4.1	NA	depends on mast choice	depends on mast choice	20 - 35	13 alt. 19	15 - 28	~ 10 - 16.5	880	53	58	100	110
SE 400	0.6 alt. 0.8 or 1.0	5	400	0.91 x 1.17	x	x**	x**	NA	NA	4.1	NA	depends on mast choice	depends on mast choice	20 - 35	13 alt. 19	16 - 30	~ 11 - 18	910	53	58	100	110
SE 500	0.6 alt. 0.8 or 1.0	6	500	1.04 x 1.17	x	x	x**	NA	NA	4.1	NA	"	"	25 - 35	13 alt. 19	17 - 33	~ 11.5 - 19	900	53	58	100	110
SE 1200	0.6 alt. 0.8 or 1.0	16	1200	1.30 x 2.08	NA	NA	NA	x	NA	NA	4.5	"	"	50 - 63	2 x 13 alt. 19	33 - 64	~ 21 - 34.5	1560	NA	NA	100	110
SE 2000	0.4 alt. 0.6	26	2000	1.56 x 2.60	NA	NA	NA	NA	x	NA	4.5	"	"	35 - 50	2 x 13 alt. 19	29 - 51	~ 19 - 28.5	1780	NA	NA	100	110

AVAILABLE CAR SIZES

Lift Size	No. of pass.	Car size meter	Door opening width					DOL ***		VFC ****	
			0.66	0.69	0.95	1.27	1.53	Speed m/s	Power kW	Speed m/s	Power kW
A SE 300	4	0.78 x 1.04	x	x	NA	NA	NA	0.6	7.0	0.6 alt. 0.8 or 1.0	13 alt. 19
SE 400	4	0.78 x 1.17	x	x	x**	NA	NA	0.6	7.0	0.6 alt. 0.8 or 1.0	13 alt. 19
"	5	0.78 x 1.30	x	x	x**	NA	NA	0.6	7.0	0.6 alt. 0.8 or 1.0	13 alt. 19
"	5	0.78 x 1.43	x	x	x**	NA	NA	0.6	7.0	0.6 alt. 0.8 or 1.0	13 alt. 19
SE 500	6	0.78 x 1.56	x	x	x**	NA	NA	0.6	8.8	0.6 alt. 0.8 or 1.0	13 alt. 19
SE 400	4	0.91 x 1.04	x	x	x**	NA	NA	0.6	7.0	0.6 alt. 0.8 or 1.0	13 alt. 19
A SE 400	5	0.91 x 1.17	x	x	x**	NA	NA	0.6	7.0	0.6 alt. 0.8 or 1.0	13 alt. 19
SE 500	6	0.91 x 1.30	x	x	x**	NA	NA	0.6	8.8	0.6 alt. 0.8 or 1.0	13 alt. 19
"	6	0.91 x 1.43	x	x	x**	NA	NA	0.6	8.8	0.6 alt. 0.8 or 1.0	13 alt. 19
SE 600	7	0.91 x 1.56	x	x	x**	NA	NA	0.6	8.8	0.6 alt. 0.8 or 1.0	13 alt. 19
SE 400	5	1.04 x 1.04	x	x	x	NA	NA	0.6	8.8	0.6 alt. 0.8 or 1.0	13 alt. 19
A SE 500	6	1.04 x 1.17	x	x	x	NA	NA	0.6	8.8	0.6 alt. 0.8 or 1.0	13 alt. 19
"	6	1.04 x 1.30	x	x	x	NA	NA	0.6	8.8	0.6 alt. 0.8 or 1.0	13 alt. 19
SE 600	8	1.04 x 1.43	x	x	x	NA	NA	0.6	8.8	0.6 alt. 0.8 or 1.0	13 alt. 19
SE 700	9	1.04 x 1.56	x	x	x	NA	NA	0.6	13.0	0.6 alt. 0.8 or 1.0	13 alt. 19
SE 900	12	1.30 x 1.69	NA	NA	NA	x	NA	0.4	2 x 8.8	0.6 alt. 0.8 or 1.0	2 x 13 alt. 19
SE 1100	14	1.30 x 1.95	NA	NA	NA	x	NA	0.4	2 x 8.8	0.6 alt. 0.8 or 1.0	2 x 13 alt. 19
A SE 1200	16	1.30 x 2.08	NA	NA	NA	x	NA	0.4	2 x 8.8	0.6 alt. 0.8 or 1.0	2 x 13 alt. 19
SE 1300	17	1.30 x 2.21	NA	NA	NA	x	NA			0.6 alt. 0.8	2 x 13 alt. 19
SE 1500	20	1.30 x 2.47	NA	NA	NA	x	NA			0.6 alt. 0.8	2 x 13 alt. 19
SE 1600	21	1.30 x 2.73	NA	NA	NA	x	NA			0.6 alt. 0.8	2 x 13 alt. 19
SE 1800	24	1.30 x 2.99	NA	NA	NA	x	NA			0.4 alt. 0.6	2 x 13 alt. 19
SE 1200	16	1.56 x 1.69	NA	NA	NA	NA	x			0.6 alt. 0.8 or 1.0	2 x 13 alt. 19
SE 1400	18	1.56 x 1.95	NA	NA	NA	NA	x			0.6 alt. 0.8	2 x 13 alt. 19
SE 1600	21	1.56 x 2.21	NA	NA	NA	NA	x			0.6 alt. 0.8	2 x 13 alt. 19
SE 1800	24	1.56 x 2.47	NA	NA	NA	NA	x			0.4 alt. 0.6	2 x 13 alt. 19
A SE 2000	26	1.56 x 2.60	NA	NA	NA	NA	x			0.4 alt. 0.6	2 x 13 alt. 19
SE 2100	28	1.56 x 2.73	NA	NA	NA	NA	x			0.4 alt. 0.6	2 x 13 alt. 19
SE 2400	32	1.56 x 2.99	NA	NA	NA	NA	x			0.4 alt. 0.6	2 x 13 alt. 19

A means A standard range specified above

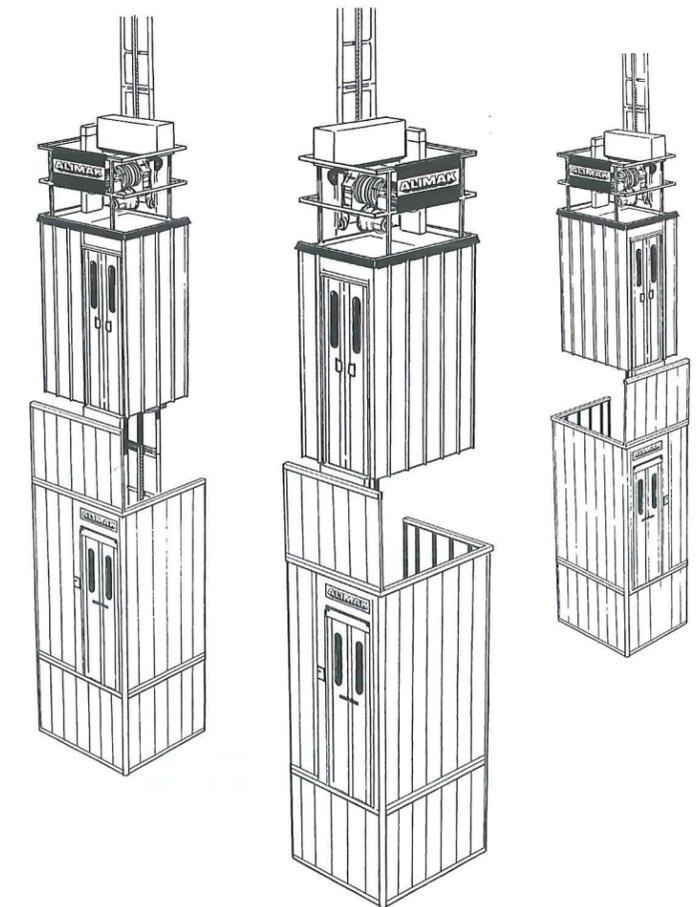
METRIC UNITS

acc. to EN 81)

Lift type	Speed m/s at 50 Hz	No. of passengers EN	Pay-load kg	Car size w x l m	Door opening width meter					Headroom required above top landing in m		Min. required shaft dimensions	Enclosure w x d m	Power supply fuses A ***	Rated power kW ***	Starting current A	Power kVA ***	Car weight approx. kg	Mast type			
					0.66	0.69	0.95	1.27	1.53	1 motor	2 motor								A	A mod.	FE	A-50
SE 300	0.59	4	300	0.78 x 1.04	x	x**	NA	NA	NA	4.0	NA	depends on mast choice	depends on mast choice	25	7.0	93	~10.5	770	53	58	100	110
SE 300 L	0.63	4	300	0.78 x 1.04	x	x**	NA	NA	NA	4.0	NA	depends on mast choice	depends on mast choice	25	7.0	93	~11	770	53	58	100	110
SE 400	0.59	5	400	0.91 x 1.17	x	x**	x**	NA	NA	4.0	NA	"	"	25	7.0	93	~10.5	830	53	58	100	110
SE 400 L	0.63	5	400	0.91 x 1.17	x	x**	x**	NA	NA	4.0	NA	"	"	25	7.0	93	~11	830	53	58	100	110
SE 450 L	0.63	5	450	0.91 x 1.17	x	x**	x**	NA	NA	4.0	NA	"	"	35	8.8	104	~12	830	53	58	100	110
SE 500	0.59	6	500	1.04 x 1.17	x	x	x**	NA	NA	4.0	NA	"	"	35	8.8	144	~11.5	810	53	58	100	110
SE 1200	0.40	16	1200	1.30 x 2.08	NA	NA	NA	x	NA	NA	4.1	"	"	50	2 x 8.8	208	~16	1470	NA	NA	100	110

acc. to EN 81)

Lift type	Speed m/s	No. of passengers EN	Pay-load kg	Car size w x l m	Door opening width meter					Headroom required above top landing in m		Min. required shaft dimensions	Enclosure w x d m	Power supply fuses A ****	Rated power kW ****	Starting current A ****	Power kVA ****	Car weight approx. kg	Mast type			
					0.66	0.69	0.95	1.27	1.53	1 motor	2 motor								A	A mod.	FE	A-50
SE 300	0.6 alt. 0.8 or 1.0	4	300	0.78 x 1.04	x	x**	NA	NA	NA	4.1	NA	depends on mast choice	depends on mast choice	20 - 35	13 alt. 19	15 - 28	~ 10 - 16.5	880	53	58	100	110
SE 400	0.6 alt. 0.8 or 1.0	5	400	0.91 x 1.17	x	x**	x**	NA	NA	4.1	NA	depends on mast choice	depends on mast choice	20 - 35	13 alt. 19	16 - 30	~ 11 - 18	910	53	58	100	110
SE 500	0.6 alt. 0.8 or 1.0	6	500	1.04 x 1.17	x	x	x**	NA	NA	4.1	NA	"	"	25 - 35	13 alt. 19	17 - 33	~ 11.5 - 19	900	53	58	100	110
SE 1200	0.6 alt. 0.8 or 1.0	16	1200	1.30 x 2.08	NA	NA	NA	x	NA	NA	4.5	"	"	50 - 63	2 x 13 alt. 19	33 - 64	~ 21 - 34.5	1560	NA	NA	100	110
SE 2000	0.4 alt. 0.6	26	2000	1.56 x 2.60	NA	NA	NA	NA	x	NA	4.5	"	"	35 - 50	2 x 13 alt. 19	29 - 51	~ 19 - 28.5	1780	NA	NA	100	110



** For C-door only
 *** 400V 50Hz
 **** The higher value at maximum speed

Technical Data Alimak SE-series Lifts DOL (load & car size acc. to ASME 17.1)

Lift type	Speed fpm at 60 Hz	No. of passengers ASME	Pay-load lbs.	Car size w x l	Door opening width					Headroom required above top landing in feet		
					2'-2"	2'-3"	3'-1"	3/8"	4'-2"	5'-1/4"	1 motor	2 motors
					2'-2"	2'-3"	3'-1"	3/8"	4'-2"	5'-1/4"	1 motor	2 motors
SE 300	140	3	660	2'-6 3/4" x 3'-5"	x	x**	NA	NA	NA	13'	NA	
SE 300 L	150	3	660	2'-6 3/4" x 3'-5"	x	x**	NA	NA	NA	13'	NA	
SE 400	140	4	880	3' x 3'-10"	x	x**	x**	NA	NA	13'	NA	
SE 400 L	150	4	880	3' x 3'-10"	x	x**	x**	NA	NA	13'	NA	
SE 450 L	150	4	1000	3' x 3'-10"	x	x**	x**	NA	NA	13'	NA	
SE 500	140	5	1100	3'-5" x 3'-10"	x	x	x**	NA	NA	13'	NA	
SE 1200	95	13	2650	4'-3" x 6'-10"	NA	NA	NA	x	NA	NA	13 1/2'	

L means models adapted for container cranes

Technical Data Alimak SE-series Lifts VFC (load & car size acc. to ASME 17.1)

Lift type	Speed fpm	No. of passengers ASME	Pay-load lbs.	Car size w x l	Door opening width					Headroom required above top landing in feet		
					2'-2"	2'-3"	3'-1"	3/8"	4'-2"	5'-1/4"	1 motor	2 motors
					2'-2"	2'-3"	3'-1"	3/8"	4'-2"	5'-1/4"	1 motor	2 motors
SE 300	120, 150, 200	3	600	2'-6 3/4" x 3'-5"	x	x**	NA	NA	NA	13 1/2'	NA	
SE 400	120, 150, 200	4	880	3' x 3'-10"	x	x**	x**	NA	NA	13 1/2'	NA	
SE 500	120, 150, 200	5	1100	3'-5" x 3'-10"	x	x	x**	NA	NA	13 1/2'	NA	
SE 1200	120, 150, 200	13	2650	4'-3" x 6'-10"	NA	NA	NA	x	NA	NA	15'	
SE 2000	80 alt. 120	20	4400	5'-1 3/8" x 8'-6 3/8"	NA	N	NA	NA	x	NA	15'	

AVAILABLE CAR SIZES

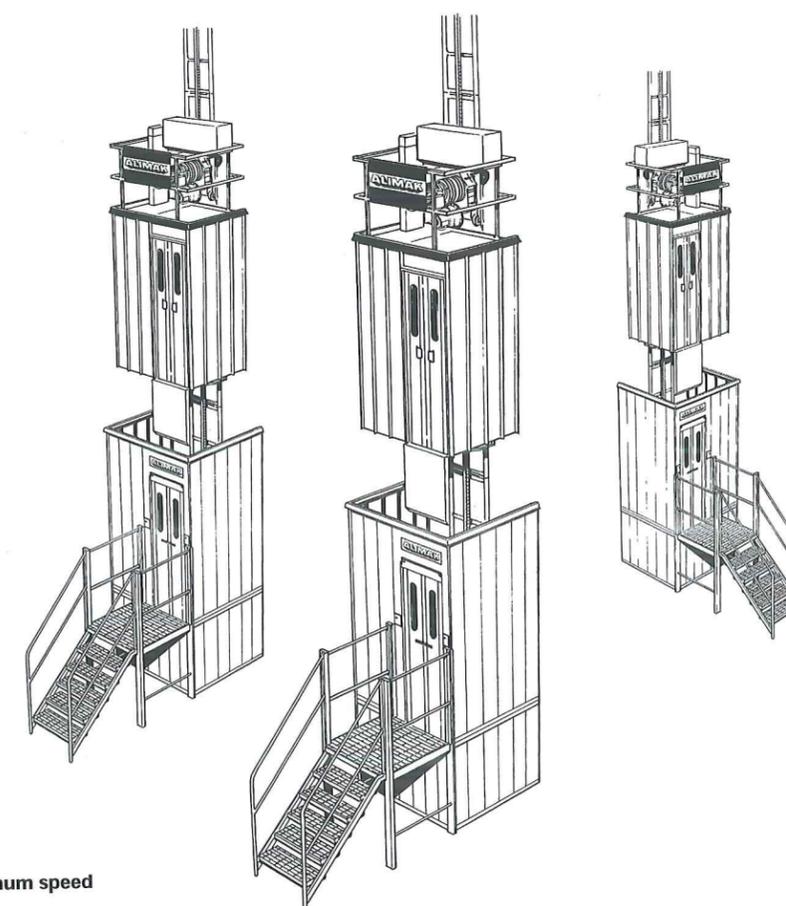
Lift Size	No. of pass.	Car size Imperial	Door opening width					DOL***		VFC ****	
			2'-2"	2'-3"	3'-1-3/8"	4'-2"	5'-1/4"	Speed fpm	Power kW	Speed fpm	Power kW
A SE 300	3	2'-6 3/4" x 3'-5"	x	x	NA	NA	NA	140	8.5	120 alt. 150 or 200	13 alt. 19
SE 400	4	2'-6 3/4" x 3'-10"	x	x	x**	NA	NA	140	8.5	120 alt. 150 or 200	13 alt. 19
- "	4	2'-6 3/4" x 4'-3"	x	x	x**	NA	NA	140	8.5	120 alt. 150 or 200	13 alt. 19
- "	5	2'-6 3/4" x 4'-8 1/4"	x	x	x**	NA	NA	140	8.5	120 alt. 150 or 200	13 alt. 19
SE 500	5	2'-6 3/4" x 5'-1 3/8"	x	x	x**	NA	NA	140	10	120 alt. 150 or 200	13 alt. 19
SE 400	4	3' x 3'-5"	x	x	x**	NA	NA	140	8.5	120 alt. 150 or 200	13 alt. 19
A SE 400	4	3' x 3'-10"	x	x	x**	NA	NA	140	8.5	120 alt. 150 or 200	13 alt. 19
SE 500	5	3' x 4'-3"	x	x	x**	NA	NA	140	10	120 alt. 150 or 200	13 alt. 19
- "	5	3' x 4'-8 1/4"	x	x	x**	NA	NA	140	10	120 alt. 150 or 200	13 alt. 19
SE 600	6	3' x 5'-1 3/8"	x	x	x**	NA	NA	140	10	120 alt. 150 or 200	13 alt. 19
SE 400	4	3'-5" x 3'-5"	x	x	x	NA	NA	140	10	120 alt. 150 or 200	13 alt. 19
A SE 500	5	3'-5" x 3'-10"	x	x	x	NA	NA	140	10	120 alt. 150 or 200	13 alt. 19
- "	6	3'-5" x 4'-3"	x	x	x	NA	NA	140	10	120 alt. 150 or 200	13 alt. 19
SE 600	6	3'-5" x 4'-8 1/4"	x	x	x	NA	NA	140	10	120 alt. 150 or 200	13 alt. 19
SE 700	7	3'-5" x 5'-1 3/8"	x	x	x	NA	NA	140	15	120 alt. 150 or 200	13 alt. 19
SE 900	9	4'-3" x 5'-6 1/2"	NA	NA	NA	x	NA	95	2 x 10	120 alt. 150 or 200	2 x 13 alt. 19
SE 1100	12	4'-3" x 6'-4 3/4"	NA	NA	NA	x	NA	95	2 x 10	120 alt. 150 or 200	2 x 13 alt. 19
A SE 1200	13	4'-3" x 6'-10"	NA	NA	NA	x	NA	95	2 x 10	120 alt. 150 or 200	2 x 13 alt. 19
SE 1300	14	4'-3" x 7'-3"	NA	NA	NA	x	NA			80 alt. 150	2 x 13 alt. 19
SE 1500	16	4'-3" x 8'-1 1/4"	NA	NA	NA	x	NA			80 alt. 150	2 x 13 alt. 19
SE 1600	17	4'-3" x 8'-11 1/2"	NA	NA	NA	x	NA			80 alt. 150	2 x 13 alt. 19
SE 1800	19	4'-3" x 9'-9 3/4"	NA	NA	NA	x	NA			80 alt. 150	2 x 13 alt. 19
SE 1200	13	5'-1 3/8" x 5'-6 1/2"	NA	NA	NA	NA	x			120 alt. 150 or 200	2 x 13 alt. 19
SE 1400	15	5'-1 3/8" x 6'-4 3/4"	NA	NA	NA	NA	x			80 alt. 150	2 x 13 alt. 19
SE 1600	17	5'-1 3/8" x 7'-3"	NA	NA	NA	NA	x			80 alt. 150	2 x 13 alt. 19
SE 1800	19	5'-1 3/8" x 8'-1 1/4"	NA	NA	NA	NA	x			80 alt. 150	2 x 13 alt. 19
A SE 2000	20	5'-1 3/8" x 8'-6 3/8"	NA	NA	NA	NA	x			80 alt. 150	2 x 13 alt. 19
SE 2100	23	5'-1 3/8" x 8'-11 1/2"	NA	NA	NA	NA	x			80 alt. 150	2 x 13 alt. 19
SE 2400	25	5'-1 3/8" x 9'-9 3/4"	NA	NA	NA	NA	x			80 alt. 150	2 x 13 alt. 19

A means A standard range specified above

IMPERIAL UNITS

Min. required shaft dimensions	Enclosure w x d m	Power supply fuses A ***	Rated power kW ***	Starting current A ***	Power kVA ***	Car weight approx. lbs.	Mast type			
							A lbs.	A mod. lbs.	FE lbs.	A-50 lbs.
depends on mast choice	depends on mast choice	30	8.5	93	~ 13.5	1700	117	128	220	243
- " -	- " -	30	8.5	93	~ 13.5	1830	117	128	220	243
- " -	- " -	30	8.5	93	~ 13.5	1830	117	128	220	243
- " -	- " -	35	10.0	104	~ 14.5	1830	117	128	220	243
- " -	- " -	35	10.0	104	~ 14.5	1785	117	128	220	243
- " -	- " -	50	2 x 10.0	208	~ 21	3240	NA	NA	220	243

Min. required shaft dimensions	Enclosure w x d m	Power supply fuses A ****	Rated power kW ****	Starting current A ****	Power kVA ****	Car weight approx. lbs.	Mast type			
							A lbs.	A mod. lbs.	FE lbs.	A-50 lbs.
depends on mast choice	depends on mast choice	16 - 25	13 alt. 19	14 - 23	~ 10 - 16.5	1940	117	128	220	243
- " -	- " -	20 - 30	13 alt. 19	15 - 25	~ 11 - 18	2006	117	128	220	243
- " -	- " -	20 - 30	13 alt. 19	16 - 26	~ 11.5 - 19	1985	117	128	220	243
- " -	- " -	35 - 50	2 x 13 alt. 19	29 - 48	~ 21.5 - 35	3440	NA	NA	220	243
- " -	- " -	30 - 50	2 x 13 alt. 19	26 - 40	~ 19 - 29	3925	NA	NA	220	243



** For C-door only
 *** 460V 60Hz
 **** The higher value at maximum speed

B₆

Tube guide rail type A
for lifting heights up
to 50 meter (165 ft.)



Modified tube guide rail type A
for lifting heights above
50 up to 200 meter (650 ft.)



Rectangular tube
mast section type FE



Square tube
mast section type A50



GUIDE RAILS / MASTS

Type: Tubular steel with integrated rack
Section length 1.508 m (4'- 11 3/8")

Alternative:	Type	Weight	Tie-distance
	A	53 kg (117 lbs)	each 1.5 m (5 ft.)
	modified A	58 kg (128 lbs)	each 1.5 m (5 ft.)
	FE	100 kg (220 lbs)	up to 12 m (40 ft.)
	A50	110 kg (243 lbs)	up to 24 m (80 ft.)

ELECTRICAL DATA

Power supply

Voltage:	DOL	380 - 420 V, 50 Hz or 440 - 480 V, 60 Hz
	VFC	380 - 500 V, 50/60 Hz

Electrical motor

Type:	AC squirrel cage motor	
Alternative: (kW at 25 % intermittent duty)	DOL	1 x 7.0 kW (1 x 8.5 kW at 60 Hz)
		1 x 13 kW (1 x 15 kW at 60 Hz)
		1 x 8.8 kW (1 x 10 kW at 60 Hz)
		2 x 8.8 kW (2 x 10 kW at 60 Hz)

VFC	1 x 13 kW	Star / 1 x 19 kW Delta
	2 x 13 kW	Star / 1 x 19 kW Delta

Electrical brake

Type spring applied electromagnetic disc brake:

7.0 kW:s motor brake torque	120 Nm (88.5 lbf x ft)
8.8 kW:s motor brake torque	170 Nm (125 lbf x ft)
13.0 kW:s motor brake torque	170 Nm (125 lbf x ft)
motor with EN 81-1 approved motor brake:	
13.0 kW:s motor brake torque	130 Nm (96 lbf x ft)

Electrical ingress protection class: min. IP 55
Data on other voltages on request.

Measured noise level in car less than ≤ 80 db(A)

SURFACE TREATMENT

Structural parts (mast, car frame):

- Hot dip galvanized

Car and enclosure panels:

- Anodized aluminium
- Stainless steel (for extreme environment)

Other parts:

- Hot dip galvanized
- Stainless steel

OPTIONAL FEATURES

- Platforms and stairs
- Communication
- Automatic rack lubricator
- Ventilation fan
- Extra ventilation
- Overload detection
- Automatic return to base, automatic alarm etc
- Windows in car
- PTC-detection in motor windings
- Heater in motor windings

B₇

Dimensions

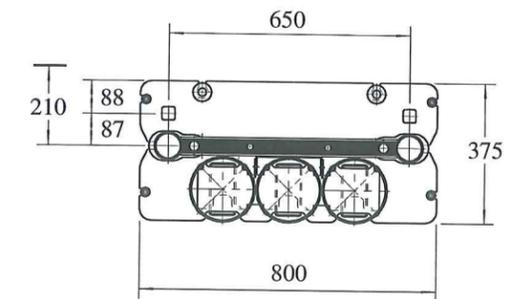
Tube guide rail type A

Bottom guide rail support

Plan view dimensions: 800 x 375 mm
Height: 1538 mm (4'-12-9/16") Weight: 110 kg (243 lbs)

Guide rail section

Plan view dimensions: 726 x 114 mm (incl. rack)
Height: 1508 mm (4'-11-3/8") Weight: 53 kg (117 lbs)



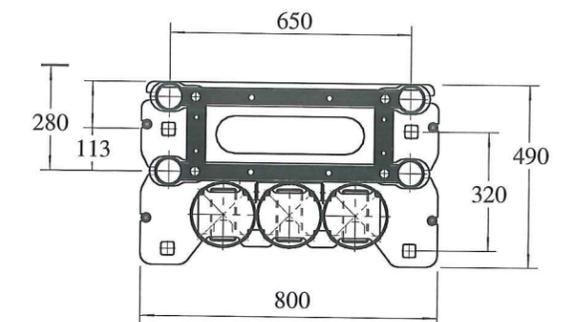
Rectangular tube mast section type FE

Bottom mast support

Plan view dimensions: 800 x 490 mm
Height: 1538 mm (4'- 12 9/16") Weight: 155 kg (342 lbs)

Mast section

Plan view dimensions: 726 x 314 mm (incl. rack)
Height: 1508 mm (4'- 11 3/8") Weight: 100 kg (220 lbs)



Square tube mast section type A50

Bottom mast support

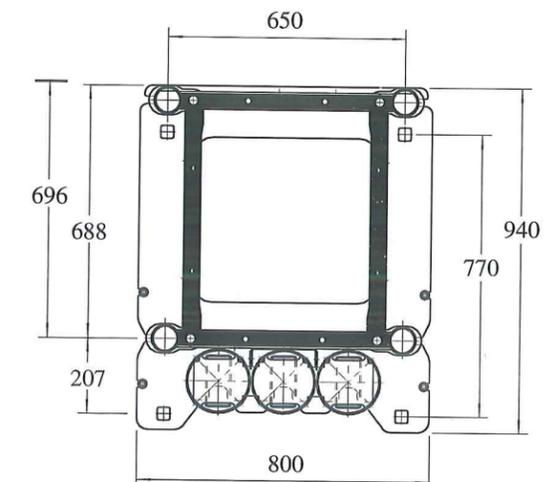
Plan view dimensions: 800 x 940 mm
Height: 1538 mm (4'- 12 9/16") Weight: 190 kg (419 lbs)

Mast section

Plan view dimensions: 726 x 764 mm (incl. rack)
Height: 1508 mm (4'- 11 3/8") Weight: 110 kg (243 lbs)

Mast expansion/contraction

The expansion/contraction of the mast is: 0.012 mm/m and degree °C (or 0.000008 in./ft. and degree °F).



(mm x 0.03937 = inches)

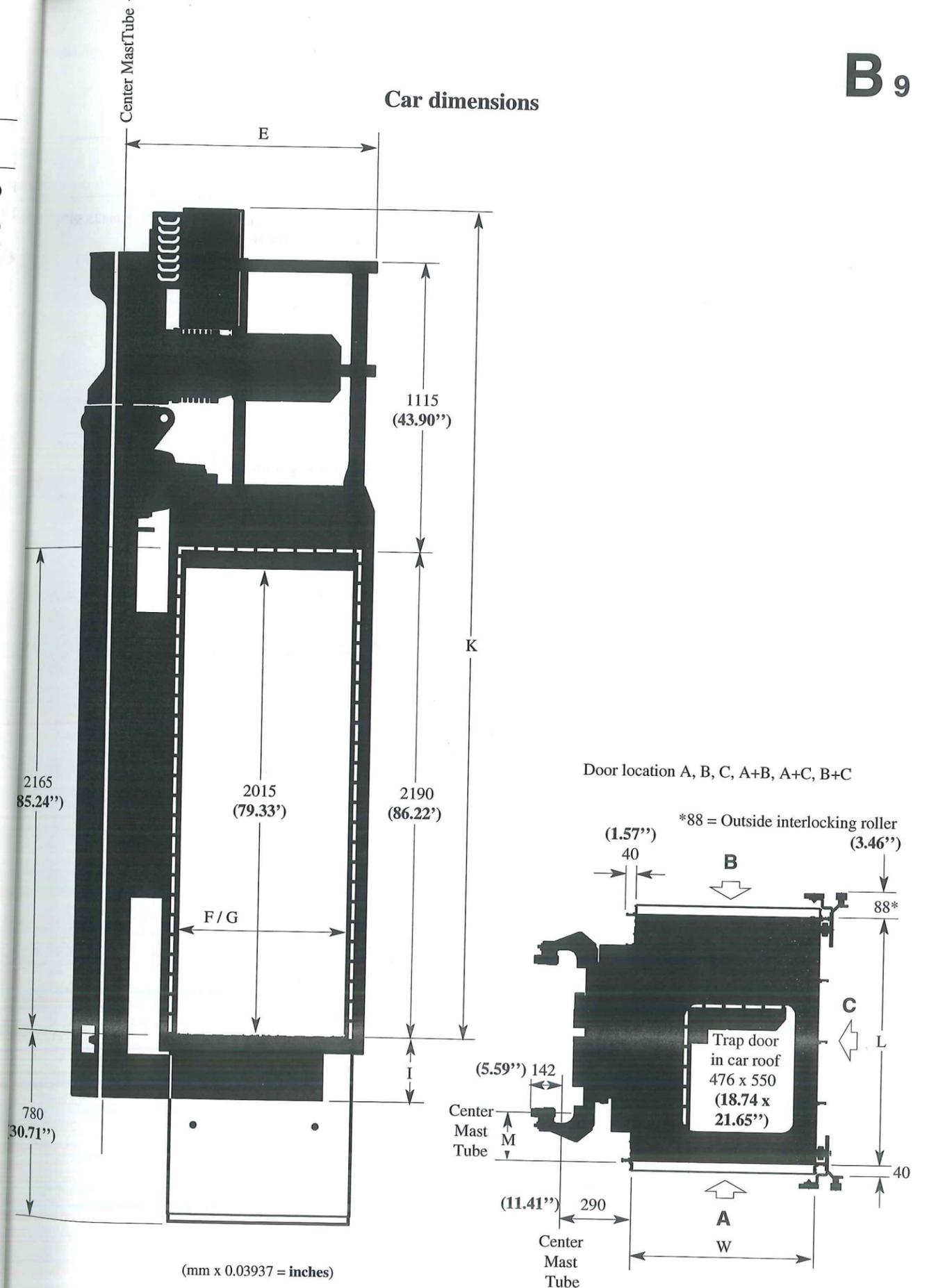
Car dimensions

Car size W x L mm	E	F	G ₁	G ₂	G ₃	G ₄	I	K*	M
	mm (in.)								
A 780 x 1040	1188 (46.77")	654 (25.75")	690 (27.16")	NA	NA	NA	257 (10.12")	3515 / 3835 (138.38 / 150.98")	195 (7.68") (see above)
780 x 1170	"	"	"	"	"	"	"	"	260 (10.24")
780 x 1300	"	"	"	"	"	"	"	"	325 (12.79")
780 x 1430	"	"	"	"	"	"	"	"	390 (15.35")
780 x 1560	"	"	"	"	"	"	"	"	455 (17.91")
910 x 1040	1318 (51.89")	"	"	"	"	"	"	"	195 (7.68") (see above)
A 910 x 1170	"	"	"	"	"	"	"	"	260 (10.24")
910 x 1300	"	"	"	"	"	"	"	"	325 (12.79")
910 x 1430	"	"	"	"	"	"	"	"	390 (15.35")
1040 x 1040	1448 (57.00")	"	"	950 (37.40")	"	"	"	"	195 (7.68") (see above)
A 1040 x 1170	"	"	"	"	"	"	"	"	260 (10.24")
1040 x 1300	"	"	"	"	"	"	"	"	325 (12.79")
1040 x 1430	"	"	"	"	"	"	"	"	390 (15.35")
1040 x 1560	"	"	"	"	"	"	"	"	455 (17.91")
1300 x 1690	1773 (69.80")	NA	NA	NA	1270 (50")	NA	267 (10.51")	"	520 (20.47") (see above)
1300 x 1950	"	NA	NA	NA	NA	NA	"	"	650 (25.59")
A 1300 x 2080	"	NA	NA	NA	NA	NA	"	"	715 (28.15")
1300 x 2210	"	NA	NA	NA	NA	NA	"	"	780 (30.71")
1300 x 2470	"	NA	NA	NA	NA	NA	"	"	910 (35.83")
1300 x 2730	"	NA	NA	NA	NA	NA	"	"	1105 (43.50")
1300 x 2990	"	NA	NA	NA	NA	NA	"	"	1235 (48.62")
1560 x 1690	2033 (80.04")	NA	NA	NA	NA	1530 (60.24")	"	"	520 (20.47") (see above)
1560 x 1950	"	NA	NA	NA	NA	NA	"	"	650 (25.59")
1560 x 2080	"	NA	NA	NA	NA	NA	"	"	715 (28.15")
1560 x 2210	"	NA	NA	NA	NA	NA	"	"	780 (30.71")
1560 x 2470	"	NA	NA	NA	NA	NA	"	"	910 (35.83")
A 1560 x 2600	"	NA	NA	NA	NA	NA	"	"	1040 (40.94")
1560 x 2730	"	NA	NA	NA	NA	NA	"	"	1105 (43.50")
1560 x 2990	"	NA	NA	NA	NA	NA	"	"	1235 (48.62")

* 1 motor VFC drive unit / 2 motor VFC drive unit respectively.
For (DOL) direct on line started, single and dual drive units = 3421 mm (134.68").

F = Bi-parting car door.
G₁ - G₄ = Slide doors of different width.

Car dimensions

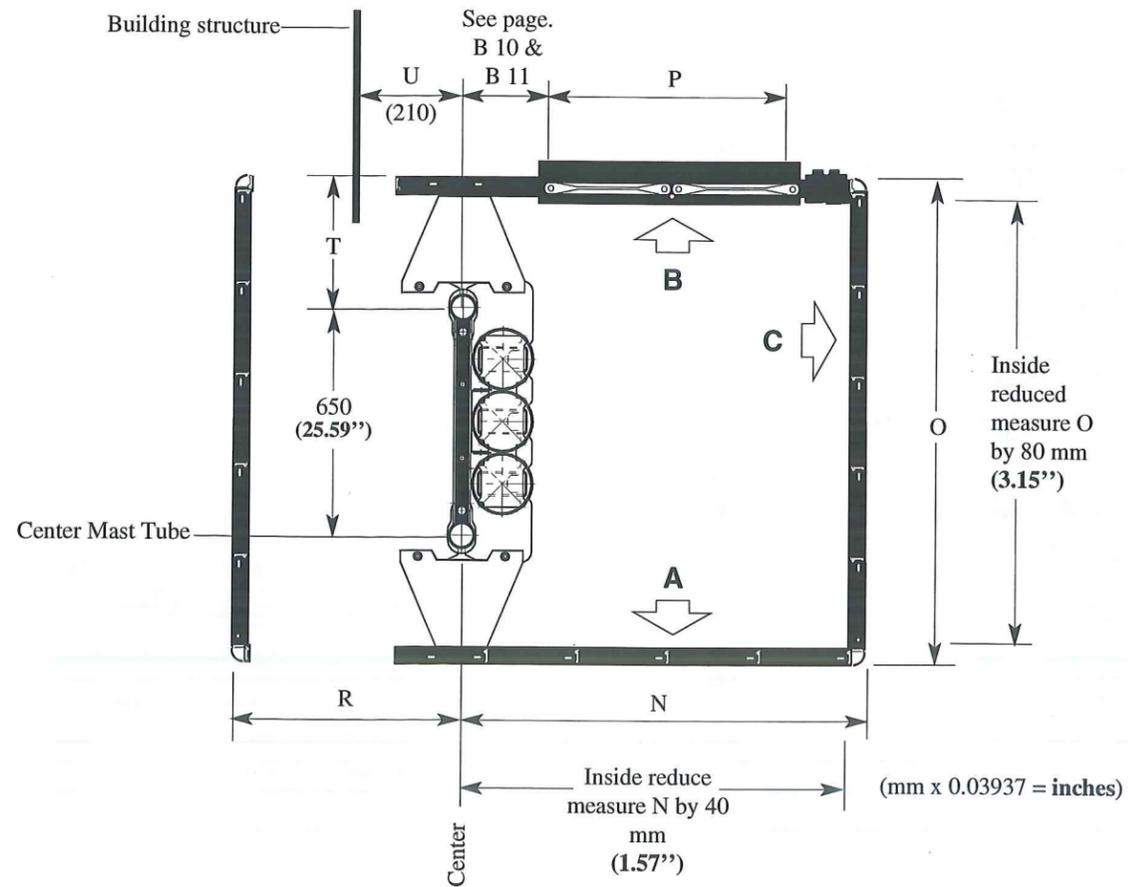


(mm x 0.03937 = inches)

Landing enclosure dimensions

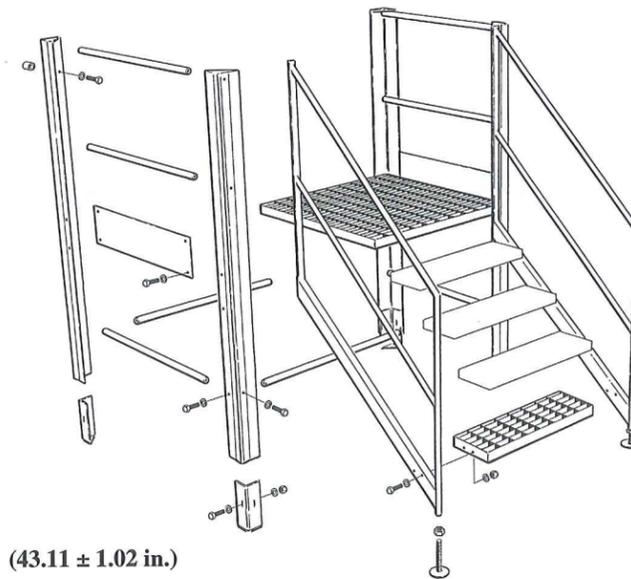
Car width	N	O Door location A and B	alt. O Door location C	P	T
780 mm (2' 6-3/4")	1255 mm (49.41")	car length + 370 mm (car length + 14.57")	car length + 370 mm (car length + 14.57")	690 mm (27.16")	= measure O reduce by 650 mm (25.59") and divided by 2.
910 mm (3')	1385 mm (54.53")	-"-	-"-	690 mm (27.16")	-"-
1040 mm (3' 5")	1515 mm (59.65")	-"-	-"-	950 mm (37.40")	-"-
1300 mm (4' 3")	1840 mm (72.44")	-"-	car length + 500 mm (car length + 19.68")	1270 mm (50")	-"-
1560 mm (5' 1-3/8")	2100 mm (82.68")	-"-	-"-	1530 mm (60.24")	-"-

Minimum hoistway / shaft opening See page G 2

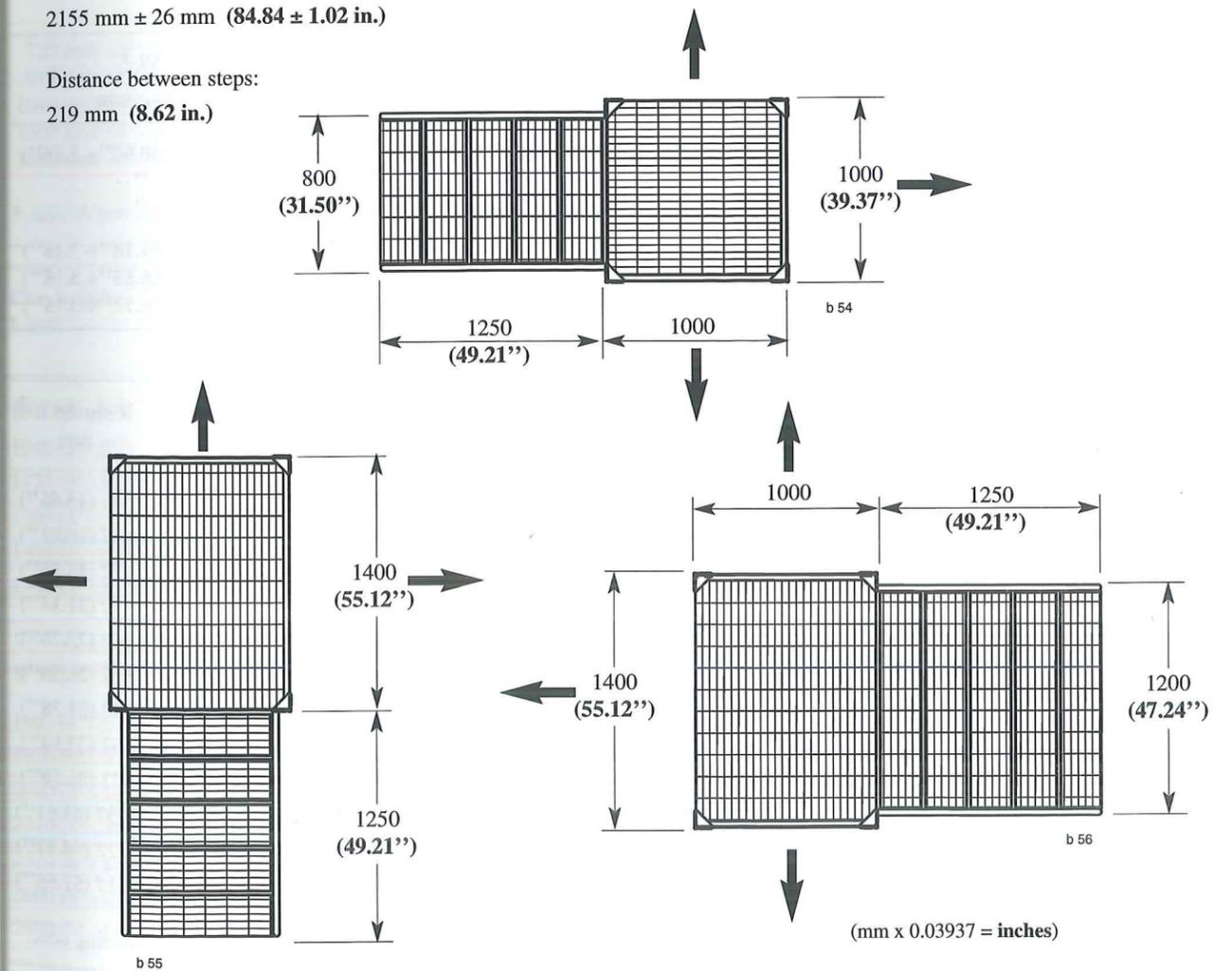


Guide rail / Mast	U	R
Guide rail type A	210 mm (8.27")	-
Mast section type FE	280 mm (11.02")	420 mm (16.53")
Mast section type A50	696 mm (27.40")	810 mm (31.89")

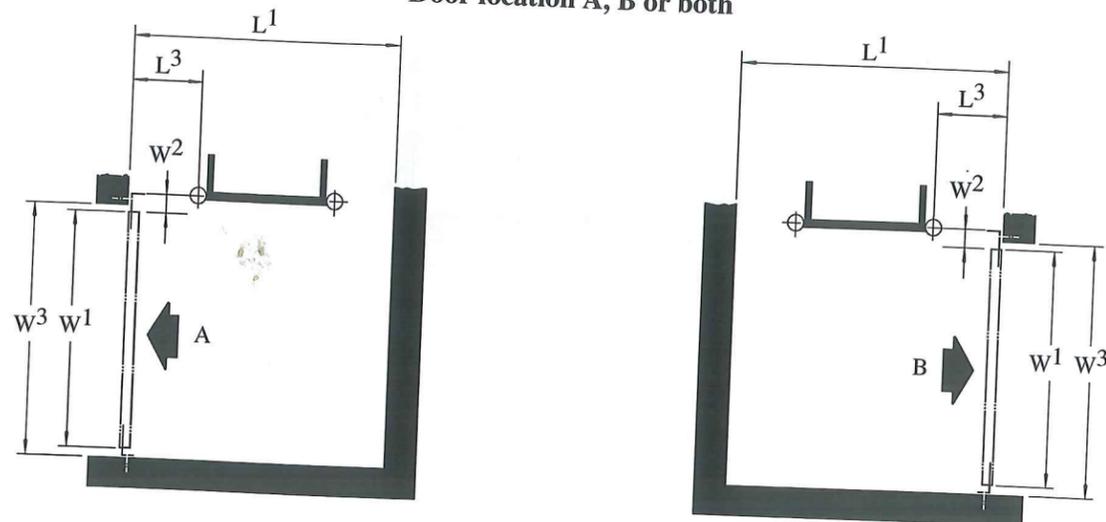
Staircase dimensions



Distance between steps:
219 mm (8.62 in.)



Alternative door locations
Door location A, B or both



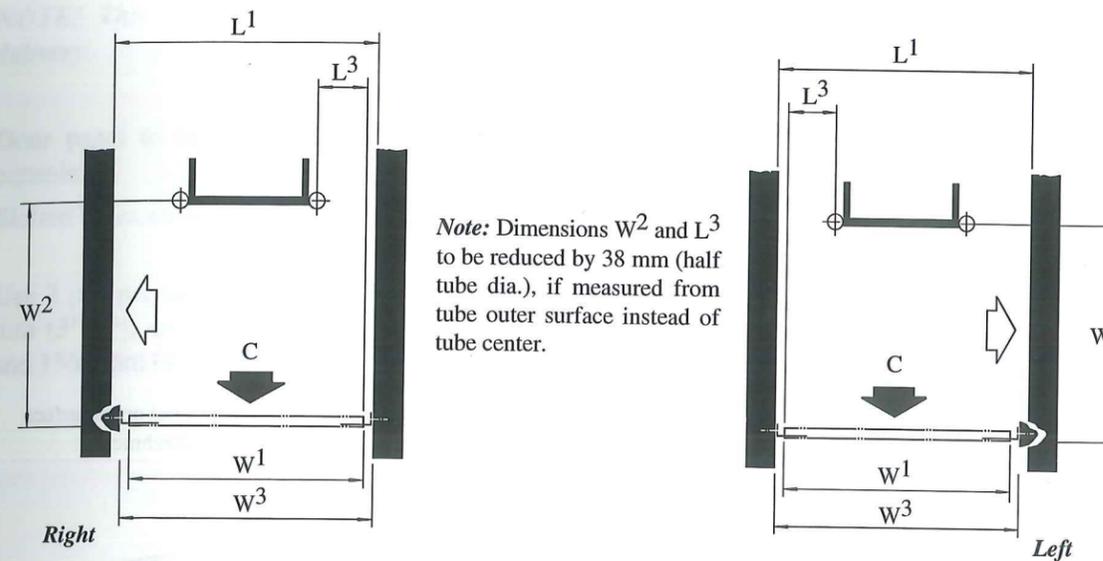
Note: Dimensions W² and L³ to be reduced by 38 mm (half tube dia.), if measured from tube outer surface instead of tube center.

Car width W	Landing door opening width W ⁰	W ¹ mm	W ² mm	Reduced W ² mm	W ³ minimum
780 mm (2' - 6 3/4'')	690 mm (27.16'')	1040 (40.94'')	160 (6.30'')	122 (4.80'')	1040 + 80 (40.94'' + 3.15'')
910 mm (3') Left	-''-	-''-	-''-	-''-	-''-
910 mm (3') Right	-''-	-''-	290 (11.42'')	252 (9.92'')	-''-
1040 mm (3' - 5'')	950 mm (37.40'')	1300 (51.18'')	160 (6.30'')	122 (4.80'')	1300 + 80 (51.18'' + 3.15'')
1300 mm (4' - 3'')	1270 mm (50'')	1690 (66.53'')	95 (3.74'')	57 (2.24'')	1690 + 80 (66.53'' + 3.15'')
1560 mm (5' - 1 3/8'')	1530 mm (60.24'')	1950 (76.77'')	-''-	-''-	1950 + 80 (76.77'' + 3.15'')

Car length L mm	L ¹	L ³ mm	Reduced L ³ mm
1040 (3' - 5'')	car length +370 mm (14.57'')	380 (14.96'')	342 (13.46'')
1170 (3' - 10'')	-''-	445 (17.52'')	407 (16.02'')
1300 (4' - 3'')	-''-	510 (20.08'')	472 (18.58'')
1430 (4' - 8 1/4'')	-''-	575 (22.64'')	537 (21.14'')
1560 (5' - 1 3/8'')	-''-	640 (25.20'')	602 (23.70'')
1690 (5' - 6 1/2'')	car length +370 mm [+18 mm]* (14.57'' [+ 0.79'']*)	705 [+18 mm]* (27.75'' [+ 0.79'']*)	667 (26.26'')
1950 (6' - 4 3/4'')	-''-	835 [+18 mm]* (32.87'' [+ 0.79'']*)	797 (31.38'')
2080 (6' - 10'')	-''-	900 [+18 mm]* (35.43'' [+ 0.79'']*)	862 (33.94'')
2210 (7' - 3'')	-''-	965 [+18 mm]* (37.99'' [+ 0.79'']*)	927 (36.50'')
2470 (8' - 1 1/4'')	-''-	1095 [+18 mm]* (43.11'' [+ 0.79'']*)	1057 (41.61'')
2600 (8' - 6 3/8'')	-''-	1160 [+18 mm]* (45.67'' [+ 0.79'']*)	1122 (44.17'')
2990 (9' - 9 3/4'')	-''-	1355 [+18 mm]* (53.35'' [+ 0.79'']*)	1317 (51.85'')

* Add additional 18 mm for car width 1690 mm or larger if equipped with increased thickness type 1690 or 1950 mm landing door.

Door location C, C and A or C and B

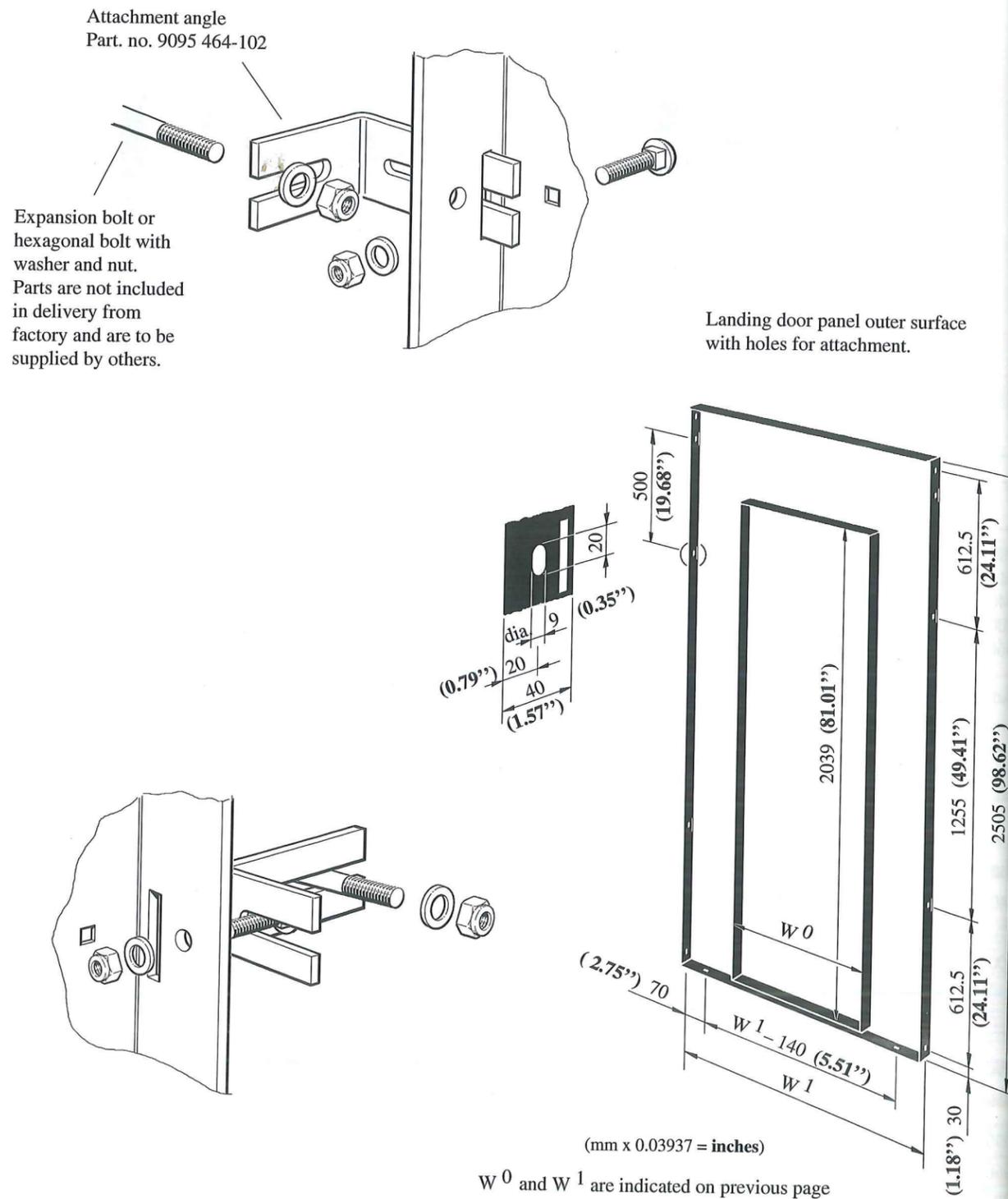


Car width W	W ² minimum	Reduced W ² mm
780 mm (2' - 6 3/4'')	1255 mm (49.41'')	1217 mm (47.91'')
910 mm (3')	1385 mm (54.53'')	1347 mm (53.03'')
1040 mm (3' - 5'')	1515 mm (59.64'')	1477 mm (58.15'')
1300 mm (4' - 3'')	1840 [+ 18 mm]* (72.44'' [+ 0.79'']*)	1800 mm (70.87'')
1560 mm (5' - 1 3/8'')	2100 [+ 18 mm]* (82.68'' [+ 0.79'']*)	2060 mm (81.10'')

* Add 18 mm for car width 1300 mm or larger if equipped with increased thickness type 1690 or 1950 mm landing door.

Car length L mm	Landing door opening width W ⁰ mm	W ¹ mm	L ¹ mm	L ³ mm	Reduced L ³ mm	W ³ minimum mm
1040 (3' - 5'')	690 (27.16'')	1040 (40.94'')	1410 (55.51'')	325 (12.79'')	287 (11.30'')	1040 + 80 (40.94'' + 3.15'')
1040 (3' - 5'')	950 (37.40'')	1300 (51.18'')	1410 (55.51'')	325 (12.79'')	287 (11.30'')	1300 + 80 (51.18'' + 3.15'')
1170 (3' - 10'')	-''-	-''-	1540 (60.63'')	390 (15.35'')	352 (13.86'')	-''-
1300 (4' - 3'')	-''-	-''-	1670 (65.75'')	455 (17.91'')	417 (16.42'')	-''-
1430 (4' - 8 1/4'')	-''-	-''-	1800 (70.87'')	520 (20.47'')	482 (18.98'')	-''-
1560 (5' - 1 3/8'')	-''-	-''-	1930 (75.98'')	585 (23.03'')	547 (21.53'')	-''-
1690 (5' - 6 1/2'')	1270 (50'')	1690 (66.53'')	2190 (86.22'')	715 (28.15'')	677 (26.65'')	1690 + 80 (66.53'' + 3.15'')
1950 (6' - 4 3/4'')	-''-	-''-	2450 (96.46'')	845 (33.27'')	807 (31.77'')	-''-
1690 (5' - 6 1/2'')	1530 (60.24'')	1950 (76.77'')	2190 (86.22'')	715 (28.15'')	677 (26.65'')	1950 + 80 (76.77'' + 3.15'')
1950 (6' - 4 3/4'')	-''-	-''-	2450 (96.46'')	845 (33.27'')	807 (31.77'')	-''-
2080 (6' - 10'')	-''-	-''-	2580 (101.57'')	910 (35.83'')	872 (34.33'')	-''-
2210 (7' - 3'')	-''-	-''-	2710 (106.69'')	975 (38.38'')	937 (36.89'')	-''-
2470 (8' - 1 1/4'')	-''-	-''-	2970 (116.93'')	1105 (43.50'')	1067 (42.01'')	-''-
2600 (8' - 6 3/8'')	-''-	-''-	3100 (122.05'')	1170 (46.06'')	1132 (44.57'')	-''-
2990 (9' - 9 3/4'')	-''-	-''-	3490 (137.40'')	1365 (53.74'')	1327 (52.24'')	-''-

Details for attaching landing door front to concrete shaft or other existing structure



Filler elements to finish the installation of the door panel must be fabricated locally and are NOT a part of the ordinary lift delivery.

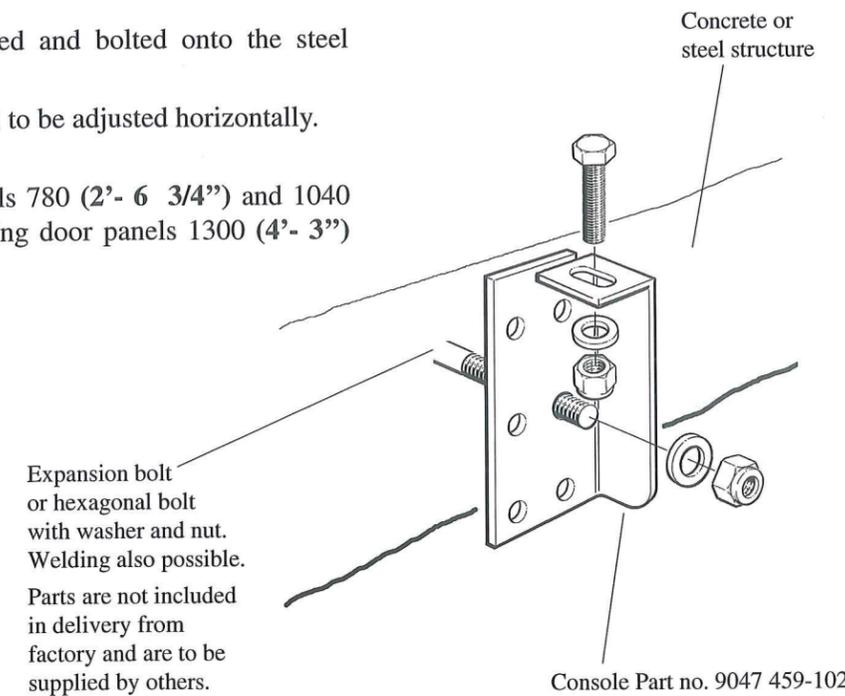
Optional support underneath the landing door front

NOTE! This option is not a part of the Alimak standard delivery.

Door panel to be placed, levelled and bolted onto the steel console.

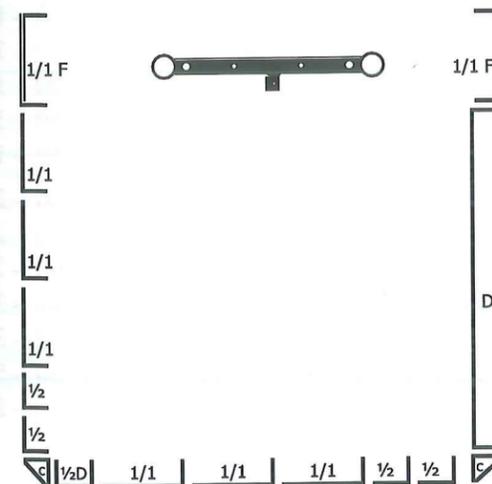
Slotted holes allow the door panel to be adjusted horizontally.

Use 3 pcs per landing door panels 780 (2'- 6 3/4") and 1040 mm (3'- 5"), and 5 pcs per landing door panels 1300 (4'- 3") and 1560 mm (5'- 1 3/8").



Assembly of enclosure panels

A chart (example shown below) showing the combination of enclosure panels for the actual lift configuration, comes with the delivery. Look for this information in the lift's main electrical panel.



Motor power, speed and load

Motor power	Gear ratio	*Pinion dia.	Speed	Load range
According to EN 81				
400 V, 50 Hz DOL				
1 x 7.0 kW	26.85 : 1	200 mm	0.59 m/s	300 - 400 kg
1 x 7.0 kW (SE 300 L)	14.29 : 1	115 mm	0.63 m/s	300 - 400 kg
1 x 8.8 kW (SE 450 L)	14.29 : 1	115 mm	0.63 m/s	450 kg
1 x 8.8 kW	26.85 : 1	200 mm	0.59 m/s	400 - 600 kg
1 x 13 kW	26.85 : 1	200 mm	0.59 m/s	500 - 700 kg
2 x 8.8 kW	22.64 : 1	115 mm	0.40 m/s	1000 - 1200 kg
VFC				
1 x 13 kW Star/	26.85 : 1	200 mm	0.60 m/s	300 - 700 kg
1 x 13 kW Star/	26.85 : 1	200 mm	0.80 m/s	300 - 700 kg
1 x 19 kW /Delta	22.64 : 1	200 mm	1.00 m/s	300 - 700 kg
2 x 13 kW Star/	26.85 : 1	200 mm	0.60 m/s	1000 - 1600 kg
2 x 13 kW Star/	26.85 : 1	200 mm	0.80 m/s	1000 - 1600 kg
2 x 19 kW /Delta	22.64 : 1	200 mm	1.00 m/s	1000 - 1200 kg
2 x 13 kW Star/	22.64 : 1	115 mm	0.40 m/s	1700 - 2400 kg
2 x 19 kW /Delta	22.64 : 1	115 mm	0.60 m/s	1700 - 2400 kg
According to ASME 17.1				
460 V, 60 Hz DOL				
1 x 8.5 kW	26.85 : 1	dia. 7- 7/8"	140 fpm	660 - 880 lbs.
1 x 8.5 kW (SE 300 L)	14.29 : 1	dia. 4- 17/32"	150 fpm	660 - 880 lbs.
1 x 10 kW (SE 450)	14.29 : 1	dia. 4- 17/32"	150 fpm	1000 - 1320 lbs.
1 x 15 kW	14.29 : 1	dia. 4- 17/32"	150 fpm	880 - 1540 lbs.
2 x 10 kW	22.64 : 1	dia. 4- 17/32"	95 fpm	1700 - 2650 lbs.
VFC				
1 x 13 kW Star/	26.85 : 1	dia. 7- 7/8"	120 fpm	660 - 1000 lbs.
1 x 13 kW Star/	26.85 : 1	dia. 7- 7/8"	150 fpm	660 - 1000 lbs.
1 x 19 kW /Delta	22.64 : 1	dia. 7- 7/8"	200 fpm	660 - 1000 lbs.
1 x 13 kW Star/	22.65 : 1	dia. 4- 17/32"	120 fpm	880 - 1540 lbs.
1 x 13 kW Star/	14.29 : 1	dia. 4- 17/32"	150 fpm	880 - 1540 lbs.
1 x 13 kW Star/	14.29 : 1	dia. 4- 17/32"	200 fpm	880 - 1540 lbs.
2 x 13 kW Star/	26.85 : 1	dia. 7- 7/8"	120 fpm	2200 - 2650 lbs.
2 x 13 kW Star/	26.85 : 1	dia. 7- 7/8"	150 fpm	2200 - 2650 lbs.
2 x 19 kW /Delta	22.64 : 1	dia. 7- 7/8"	200 fpm	2200 - 2650 lbs.
2 x 13 kW Star/	22.64 : 1	dia. 4- 17/32"	120 fpm	2645 - 3530 lbs.
2 x 19 kW /Delta	14.29 : 1	dia. 4- 17/32"	150 fpm	2645 - 3530 lbs.
2 x 13 kW Star/	22.64 : 1	dia. 4- 17/32"	80 fpm	3700 - 5300 lbs.
2 x 19 kW /Delta	22.64 : 1	dia. 4- 17/32"	120 fpm	3700 - 5300 lbs.

*dia. 200 mm = 7- 7/8"
dia. 115 mm = 4- 17/32"

Conversion tables

Linear measure

1 mm	=	0.039"	(inches)
1 m	=	3.281'	(feet)
1 inch	=	25.4	mm
1 foot	=	304.8	mm

Torque

1 Nm	=	0.738	lbf x ft
1 Nm	=	0.102	kpm
1 kpm	=	9.807	Nm
1 lb x ft	=	1.356	Nm
1 kpm	=	7.233	lbf x ft
1 lbf x ft	=	0.138	kpm

Pressure

1 kPa	=	1000	Pa
1 Mpa	=	1000	kPa
1 Mpa	=	1	N/mm ²
1 Mpa	=	145	psi
1 Mpa	=	10.2	kp/cm ²
1 Mpa	=	10	bar
1 kp/cm ²	=	0.098	MPa
1 psi	=	0.006	MPa
1 bar	=	0.1	MPa
1 kp/cm ²	=	14.22	psi
1 bar	=	14.503	psi
1 psi	=	0.070	kp/cm ²
1 psi	=	0.069	bar

Effect

1 kW	=	1000	W
1 kW	=	1.341	hp
1 kW	=	1.36	hk
1 hk	=	0.735	kW
1 hp	=	0.746	kW
1 hk	=	0.986	hp
1 hp	=	1.014	hk

Volume

1 m ³	=	1000	dm ³
1 dm ³	=	1	liter
1 liter	=	0.220	Imp.gallon
1 liter	=	0.264	US.gallon
1 Imp.gallon	=	4.546	liter
1 US.gallon	=	3.785	liter
1 Imp.gallon	=	1.201	US.gallon
1 US.gallon	=	0.833	Imp.gallon

Moment of inertia

1 kgm ²	=	3417	lbin ²
--------------------	---	------	-------------------

Force

1 N	=	0.225	lbf
1 N	=	0.102	kp
1 kN	=	1000	N
1 kp	=	9.807	N
1 lbf	=	4.448	N
1 kp	=	2.205	lbf
1 lbf	=	0.454	kp

Weight

1 kg	=	2.205	lbs
1 lb	=	0.454	kg

Temperature

C	=	$\frac{5}{9} (F^{\circ} - 32)$
F	=	$32 + \frac{9}{5} C^{\circ}$

FOUNDATION

G₀

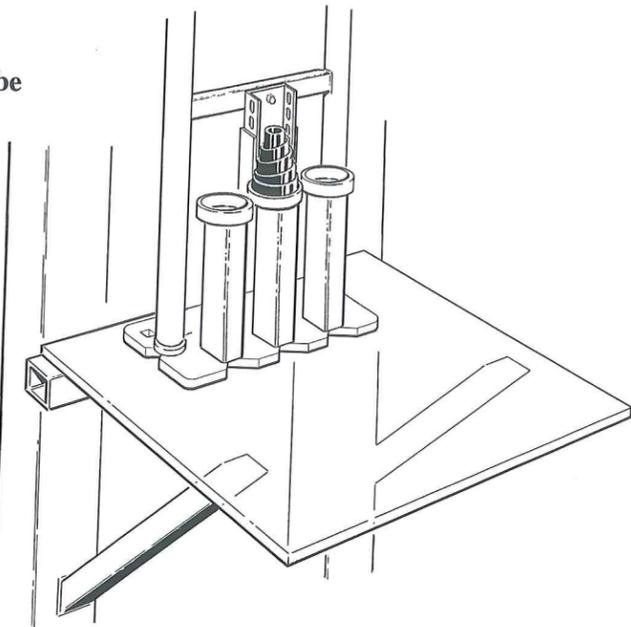
Foundation	G 1
Concrete slab dimensions.....	G 2
Foundation pit dimensions	G 3
Vertical forces	G 5

Foundation

Base plate of steel

A base plate of steel is used when the lift is installed above ground level, for example on container cranes. The steel construction of the crane must be able to withstand the calculated forces of the lift.

IMPORTANT: The foundation area must be enclosed so as to prevent persons from entering this area.



Foundation slab of concrete

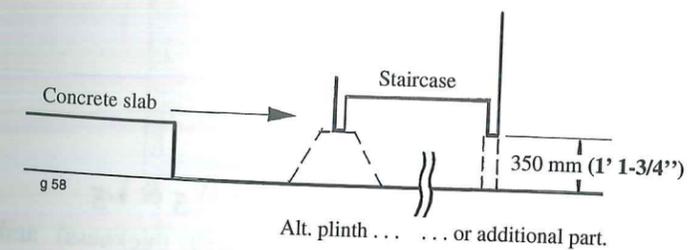
Normally, lifts are placed on level and horizontal concrete slabs. The foundation must be able to:

- Withstand the calculated forces of the lift
- Be level and horizontal
- Be designed for frost heave where applicable

The base frame of the lift can be fastened to the concrete slab with expansion bolts.

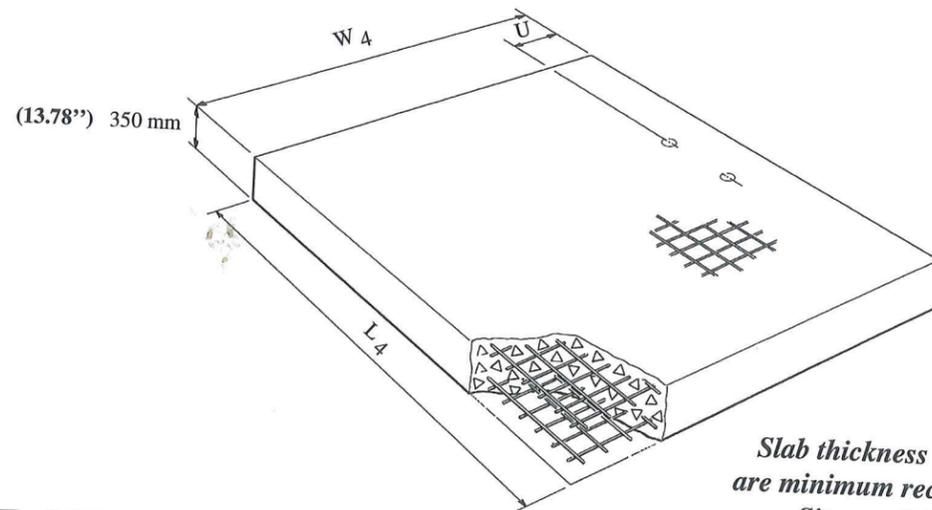
When required a foundation frame is available as an option.

It is important that the top of the foundation frame be level with the concrete surface and that the concrete is vibrated thoroughly – especially around the foundation frame. The concrete must reach 70% of the required 28 days compressive strength before the installation of the lift commences.



IMPORTANT: It is recommended to make the concrete slab and surrounding surfaces at the same level – if staircase is to be installed. See actual dimensions on the next page.

Concrete slab dimensions



Slab thickness and reinforcing are minimum recommendations. Site conditions will govern.

Alt. guide rail/ mast section	U	W ₄	L ₄ for door location A - B or ... C alternatively	
Car width 780 and 1040 mm				
	210 mm (8.27")	Car width + 860 mm (Car width + 33.86")	Car length + 720 mm (Car length + 28.35")	Car length + 720 mm (Car length + 28.35")
	280 / * 420 mm (11.02 / * 16.53")	Car width + 930 / * 1075 mm (Car width + 36.61 / * 42.32")	- " -	- " -
	696 / * 810 mm (27.40 / * 31.89")	Car width + 1346 / * 1465 mm (Car width + 53 / * 57.68")	- " -	- " -
Car width 1300 and 1560 mm				
	280 / * 420 mm (11.02 / * 16.53")	Car width + 995 / * 1140 mm (Car width + 36.42 / * 44.88")	Car length + 720 mm (Car length + 28.35")	Car length + 850 mm (Car length + 33.46")
	696 / * 810 mm (27.40 / * 31.89")	Car width + 1411 / * 1530 mm (Car width + 55.55 / * 60.24")	- " -	- " -

* If the 4th enclosure wall is to be installed. Rear foundation pit wall 175 mm (6.89") included.

Minimum hoistway / shaft opening W₅ & L₅

W₅ = W₄ reduced by 175 mm (pit wall thickness) and additional 40 mm (enclosure wall thickness).

L₅ = L₄ reduced by 175 + 175 mm (2 times pit wall thickness) and additional 40 + 40 mm (2 times enclosure wall thickness).

Foundation pit dimensions

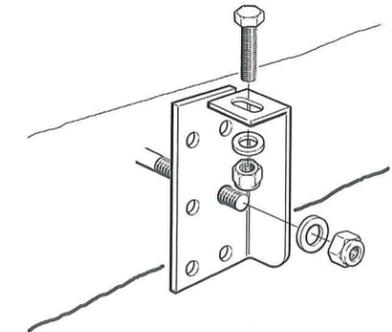
Construct a concrete slab with additional vertical reinforcement for the pit walls. (Identical to the one for a concrete slab level with the ground). When the base slab has cured add the horizontal reinforcement, followed by formwork and completion of the walls of the foundation pit according to the specification.

Note that in cases where a pit with a back wall is required, the measurements of the foundation (W₄) must be increased by the wall thickness 175 mm (6.89 in.).

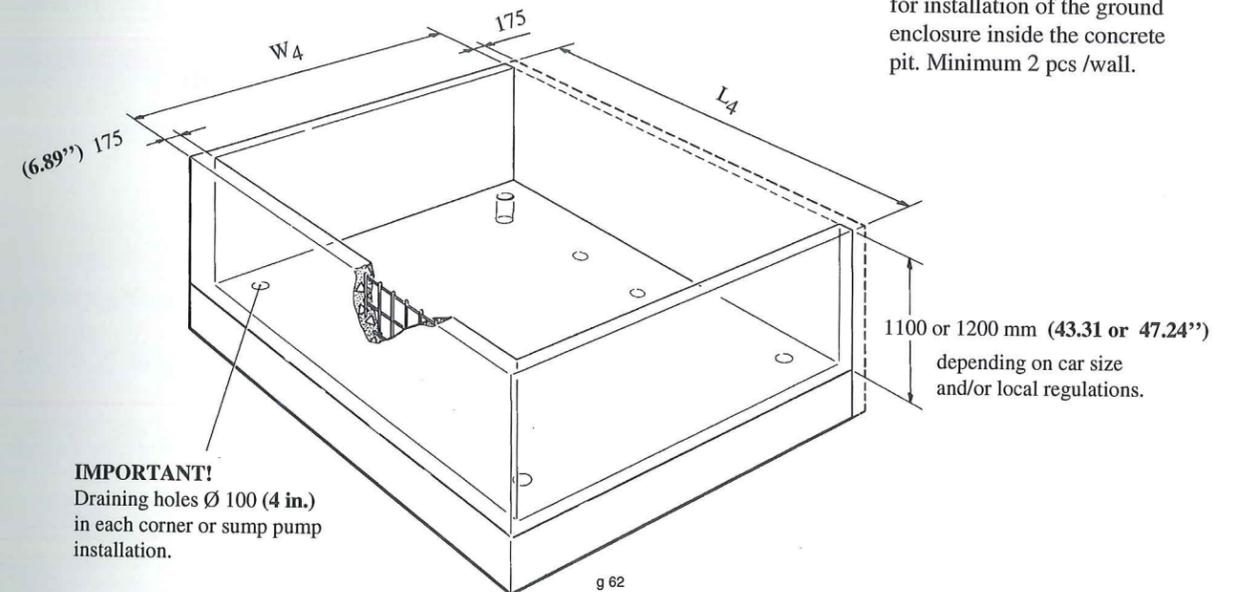
(See broken line in figure below).

Measurements L₄ and W₄, see the dimensions of the concrete slab.

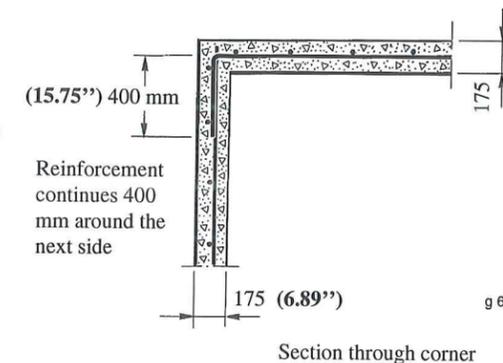
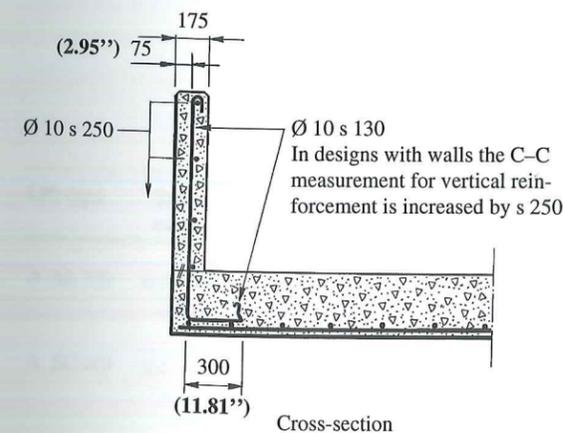
Pit wall thickness and reinforcing are minimum recommendations. Site conditions will govern.



Use expansion bolts and consoles p/n. 9047459-102 for installation of the ground enclosure inside the concrete pit. Minimum 2 pcs /wall.



IMPORTANT!
Draining holes Ø 100 (4 in.) in each corner or sump pump installation.

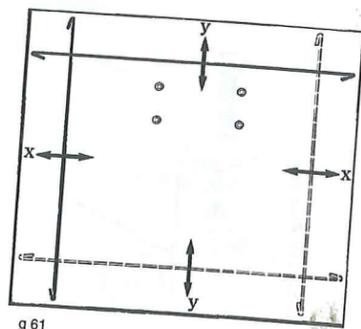


Components for attachments of enclosure

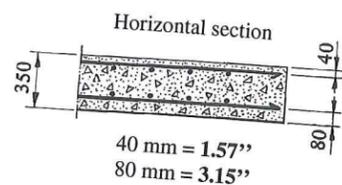
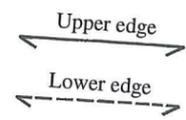
For the attachment of the enclosure, we recommend the use of expansion bolts.

Please note, that these items are not furnished with the lift.

Conversion table:
Ø 10 mm ≈ dia. 3/8 in.
Continue on next page !



g 61



Conversion table:

- Ø 10 mm ≈ dia. 3/8 in.
- s 125 mm ≈ 5 in.
- s 130 mm ≈ 5 1/8 in.
- s 140 mm ≈ 5 1/2 in.
- s 180 mm ≈ 7 in.
- s 200 mm ≈ 8 in.
- s 210 mm ≈ 8 1/4 in.
- s 250 mm ≈ 10 in.
- s 270 mm ≈ 10 5/8 in.
- s 280 mm ≈ 11 in.
- s 330 mm ≈ 13 in.
- s 350 mm ≈ 13 3/4 in.

Minimum recommended reinforcement for concrete slab

Reinforcement bar quality: minimum KS 400
(Yield strength = 390 N/mm² or 56550 psi).

Alternative	Upper edge		Lower edge		Mast height
	(x-x)	(y-y)	(x-x)	(y-y)	
	Ø10 s 330	Ø10 s 180	Ø10 s 270	Ø10 s 200	≤ 200 m (650 ft.)
	Ø10 s 350	Ø10 s 130	Ø10 s 280	Ø10 s 180	≤ 400 m (1300 ft.)
	Ø10 s 350	Ø10 s 210	Ø10 s 125	Ø10 s 250	≤ 300 m (975 ft.)

Concrete quality

Recommended maximum K 25 (25 N/mm² or 3625 psi).

Vertical forces

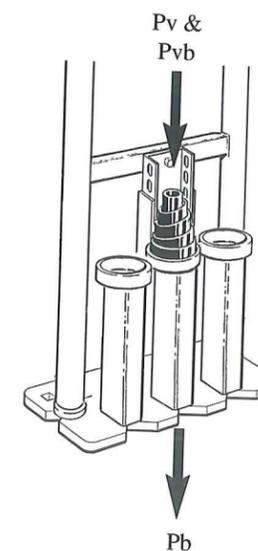
Vertical forces are calculated and shown on the Installation drawing for each specific installation.
Below some examples;

Operating conditions:

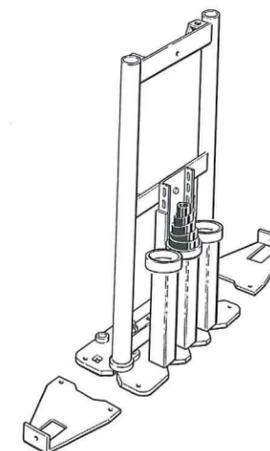
- P_v = according to table for 200 m (650 ft.) mast height
- P_b = 0
- P_{vb} = 0

Buffer collision:

- P_v = 0
- P_b = according to table
- P_{vb} = according to table for 200 m (650 ft.) mast height

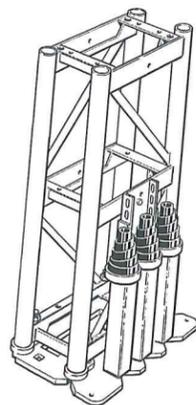
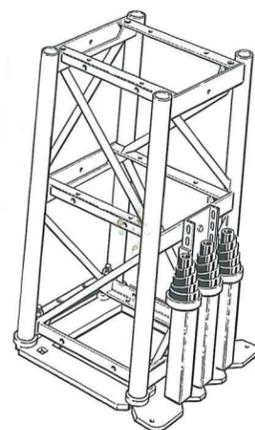


Guide rail type A



Lift type	Speed m/sec.	Car size W x L	Max. load	No of passengers	P _v	P _b	P _{vb}
A SE 300	0.6 - 1.0	780 x 1040	300 kg	4 pcs.	110 kN	88 kN	23 kN
	-"-	2'- 6 3/4" x 3'- 5"	660 lbs.	3 pcs.	24729 lbf.	19783 lbf.	5171 lbf.
A SE 400	0.6 - 1.0	910 x 1170	400 kg	5 pcs.	113 kN	121 kN	- 2 kN
	-"-	3' x 3'- 10"	880 lbs.	4 pcs.	25403 lbf.	27202 (4721) lbf.	- 450 lbf.
A SE 500	0.6 - 1.0	1040 x 1170	500 kg	6 pcs.	115 kN	123 kN	- 1 kN
	-"-	3'- 5" x 3'- 10"	1100 lbs.	5 pcs.	25853 lbf.	27652 (27652) lbf.	- 22 lbf.
A SE 1200	0.6 - 1.0	1300 x 2080	1200 kg	16 pcs.	0 kN	0 kN	0 kN
	-"-	4'- 3" x 6'- 10"	2650 lbs.	13 pcs.	0 lbf.	0 lbf.	- 0 lbf.
A SE 2000	NA						

Mast sections type A50 and FE:
 - values for mast section type FE in brackets ().



Lift type	Speed m/sec.	Car size W x L	Max. load	No of passengers	Pv	Pb	Pvb
A SE 300	0.6 - 1.0 - " -	780 x 1040 2'- 6 3/4" x 3'- 5"	300 kg 660 lbs.	4 pcs. 3 pcs.	192 (166) kN 43163 (37318) lbf.	88 (88) kN 19783 (19783) lbf.	104 (78) kN 23380 (17535) lbf.
A SE 400	0.6 - 1.0 - " -	910 x 1170 3' x 3'- 10"	400 kg 880 lbs.	5 pcs. 4 pcs.	194 (168) kN 43613 (37768) lbf.	90 (90) kN 20233 (20233) lbf.	105 (79) kN 23605 (17760) lbf.
A SE 500	0.6 - 1.0 - " -	1040 x 1170 3'- 5" x 3'- 10"	500 kg 1100 lbs.	6 pcs. 5 pcs.	196 (170) kN 44062 (38217) lbf.	123 (123) kN 27651 (27651) lbf.	80 (54) kN 17985 (12140) lbf.
A SE 1200	0.6 - 1.0 - " -	1300 x 2080 4'- 3" x 6'- 10"	1200 kg 2650 lbs.	16 pcs. 13 pcs.	223 (197) kN 50132 (44287) lbf.	216 (216) kN 48599 (48599) lbf.	16 (-10) kN 3597 (-2248) lbf.
A SE 2000	0.4 - 0.7 - " -	1560 x 2600 5'- 1 3/8" x 9'- 6 3/8"	2000 kg 4400 lbs.	26 pcs. 20 pcs.	243 (217) kN 54628 (48783) lbf.	226 (226) kN 50807 (50807) lbf.	5 (-21) kN 1124 (-4721) lbf.

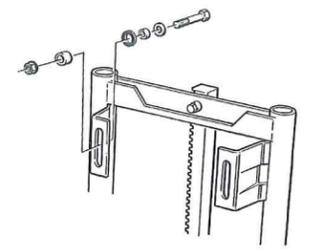
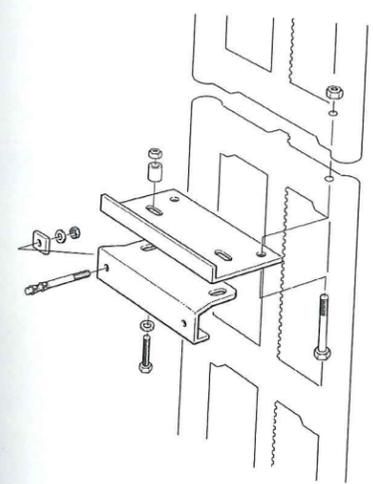
Lift guide rail/mast section and ties H 1
 Tube guide rail type A H 3
 Rectangular tube mast section type FE H 4
 Square tube mast section type A50 H 5
 Ties and Attachments H 6

Lift guide rail/mast section and ties

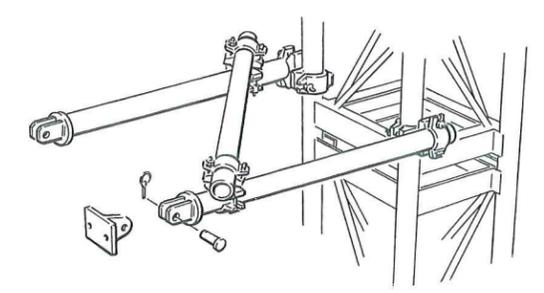
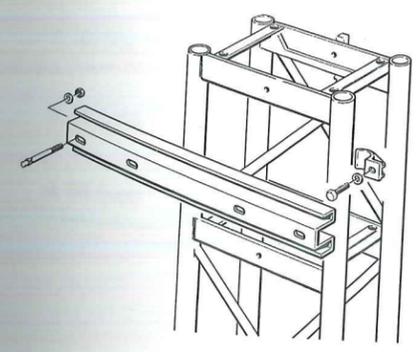
Selection of type guide rail or mast section

Decisive of the selection of guide rail or mast section type is loading capacity of the lift (car size), speed, lifting height, tie distance, overhang, wind forces at outdoor installation and available space for the lift installation.

Type A guide rail and B reinforced guide rail can be combined so that type B guide rails are placed in the top of the mast in order to achieve an overhang.



On the following pages permitted max tie distances, overhang and force of reaction for each type of mast are shown.



Tube guide rail type A

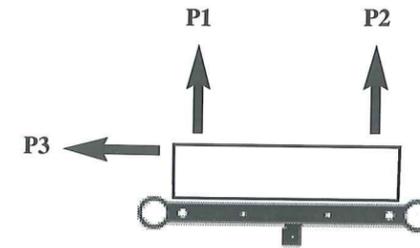
Reaction forces P1, P2 and P3 at 50 respectively 200 m (165 resp. 650 ft.) mast height.

Tie intervals 1.5 m (5 ft.) – overhang 0 m.

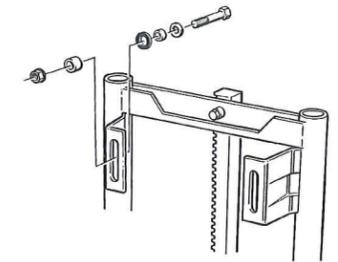
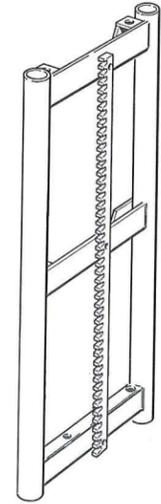
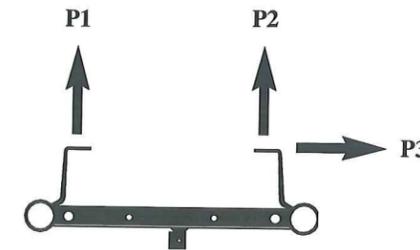
Tie forces are calculated and shown on the installation drawing for each specific installation.

Some examples are shown below;

Mast tie for lifting heights up to 50 meter (165 ft.)



Modified type A guide rail for lifting heights above 50 up to 200 meter (650 ft.)



P1, P2, P3 = Outdoor(Indoor)

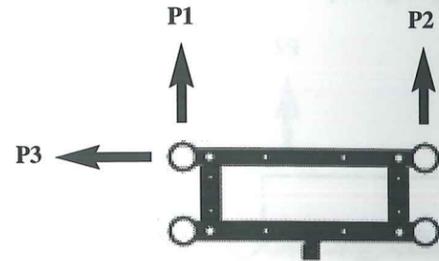
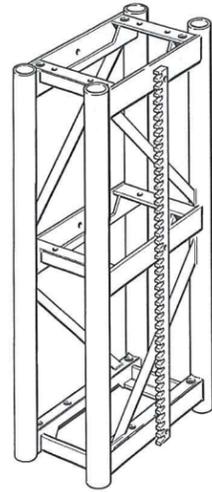
Lift type	Speed m/sec.	Car size W x L	Max. load	No of passengers	Tie interval	Overhang	P1/P2	P3
A SE 300	0.6 – 1.0	780 x 1040	300 kg	4 pcs.	1.5 m	0	3400 (2300) N	1200 (600) N
	–"–	2'- 6 3/4" x 3'- 5"	660 lbs.	3 pcs.	5 ft.	0	764 (517) lbf.	270 (135) lbf.
A SE 400	0.6 – 1.0	910 x 1170	400 kg	5 pcs.	1.5 m	0	4300 (3500) N	1400 (1100) N
	–"–	3' x 3'- 10"	880 lbs.	4 pcs.	5 ft.	0	967 (787) lbf.	315 (247) lbf.
A SE 500	0.6 – 1.0	1040 x 1170	500 kg	6 pcs.	1.5 m	0	5200 (4200) N	1600 (1200) N
	–"–	3'- 5" x 3'- 10"	1100 lbs.	5 pcs.	5 ft.	0	1169 (944) lbf.	360 (270) lbf.
A SE 1200	NA							
A SE 2000	NA							

Rectangular tube mast section type FE

Reaction forces P1, P2 and P3 at 200 m (650 ft.) mast height.
Max. tie intervals and overhang according to table.

Tie forces are calculated and shown on the installation drawing for each specific installation.

Some examples are shown below;



P1, P2, P3 = Outdoor (Indoor)

Figures shown in parentheses are valid for installation indoors.

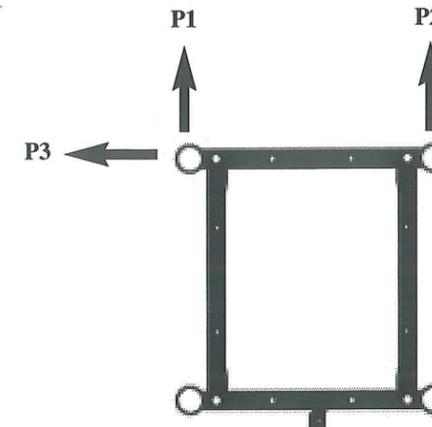
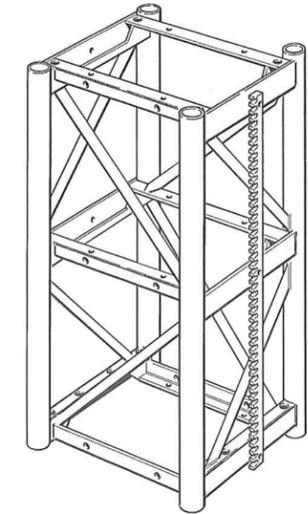
Lift type	Speed m/sec.	Car size W x L	Max. load	No of passengers	Tie interval	Overhang	P1/P2	P3
A SE 300	0.6 – 1.0 – –	780 x 1040 2'- 6 3/4" x 3'- 5"	300 kg 660 lbs.	4 pcs. 3 pcs.	10.0 m 33 ft.	6.0 m 20 ft.	3500 (1400) N 787 (315) lbf.	9500 (300) N 2136 (67) lbf.
A SE 400	0.6 – 1.0 – –	910 x 1170 3' x 3'- 10"	400 kg 880 lbs.	5 pcs. 4 pcs.	8.0 m 26 ft.	5.5 m 18 ft.	4200 (2100) N 944 (472) lbf.	7500 (500) N 1686 (112) lbf.
A SE 500	0.6 – 1.0 – –	1040 x 1170 3'- 5" x 3'- 10"	500 kg 1100 lbs.	6 pcs. 5 pcs.	8.0 m 26 ft.	5.0 m 16.5 ft.	4700 (2400) N 1057 (540) lbf.	7100 (500) N 1596 (113) lbf.
A SE 1200	0.6 – 1.0 – –	1300 x 2080 4'- 3" x 6'- 10"	1200 kg 2650 lbs.	16 pcs. 13 pcs.	6.0 m 20 ft.	3.0 m 10 ft.	8400 (6300) N 1888 (1416) lbf.	4300 (1200) N 967 (270) lbf.
A SE 2000	0.4 – 0.7 – –	1560 x 2600 5'- 1 3/8" x 9'- 6 3/8"	2000 kg 4400 lbs.	26 pcs. 20 pcs.	4.5 m 15 ft.	0 0	13600 (11400) N 3057 (2563) lbf.	3500 (1900) N 787 (427) lbf.

Square tube mast section type A50

Reaction forces P1, P2 and P3 at 200 m (650 ft.) mast height.
Max. tie intervals and overhang according to table.

Tie forces are calculated and shown on the installation drawing for each specific installation.

Some examples are shown below;



P1, P2, P3 = Outdoor (Indoor)

Figures shown in parentheses are valid for installation indoors.

Lift type	Speed m/sec.	Car size W x L	Max. load	No of passengers	Tie interval	Overhang	P1/P2	P3
A SE 300	0.6 – 1.0 – –	780 x 1040 2'- 6 3/4" x 3'- 5"	300 kg 660 lbs.	4 pcs. 3 pcs.	24.0 m 79 ft.	13.5 m 44 ft.	33100 (800) N 7441 (180) lbf.	42000 (200) N 9442 (45) lbf.
A SE 400	0.6 – 1.0 – –	910 x 1170 3' x 3'- 10"	400 kg 880 lbs.	5 pcs. 4 pcs.	22.0 m 72 ft.	12.0 m 39 ft.	28200 (1100) N 6340 (247) lbf.	36000 (200) N 8093 (45) lbf.
A SE 500	0.6 – 1.0 – –	1040 x 1170 3'- 5" x 3'- 10"	500 kg 1100 lbs.	6 pcs. 5 pcs.	20.0 m 66 ft.	11.0 m 36 ft.	23000 (1300) N 5171 (292) lbf.	30200 (200) N 6789 (45) lbf.
A SE 1200	0.6 – 1.0 – –	1300 x 2080 4'- 3" x 6'- 10"	1200 kg 2650 lbs.	16 pcs. 13 pcs.	14.0 m 46 ft.	10.0 m 33 ft.	15300 (3900) N 3440 (877) lbf.	19100 (500) N 4294 (112) lbf.
A SE 2000	0.4 – 0.7 – –	1560 x 2600 5'- 1 3/8" x 9'- 6 3/8"	2000 kg 4400 lbs.	26 pcs. 20 pcs.	10.0 m 33 ft.	6.0 m 20 ft.	12800 (8400) N 2878 (1888) lbf.	11300 (1100) N 2540 (247) lbf.

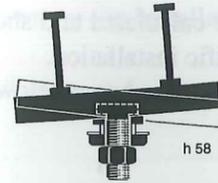
Ties for type A guide rail



Bolt and nut dim. M16
(approximately 5/8")

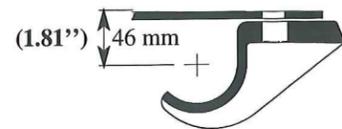


Expansion bolt dim. M16



Concrete anchor type
"Halfeneisen"
Part No. 9017 407-000

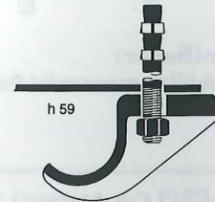
Ties for type FE and A50 mast sections



Mast tube clamp

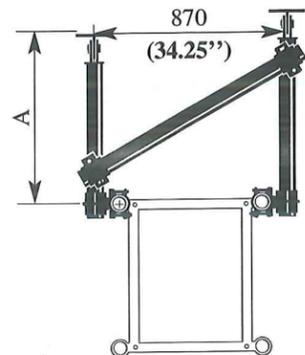


Mast tube clamp with bolt
and nut dim. M16.

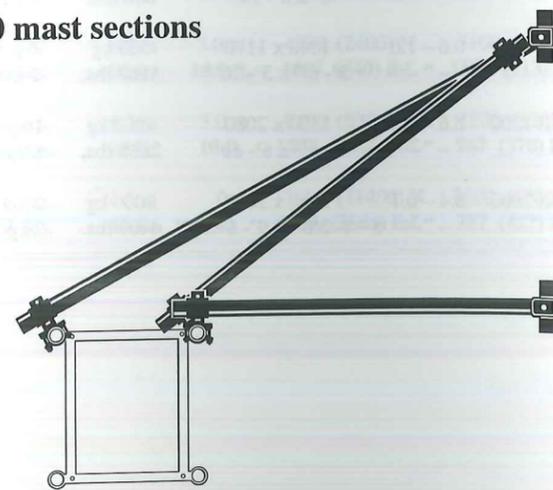


Mast tube clamp with
expansion bolt dim. M16.

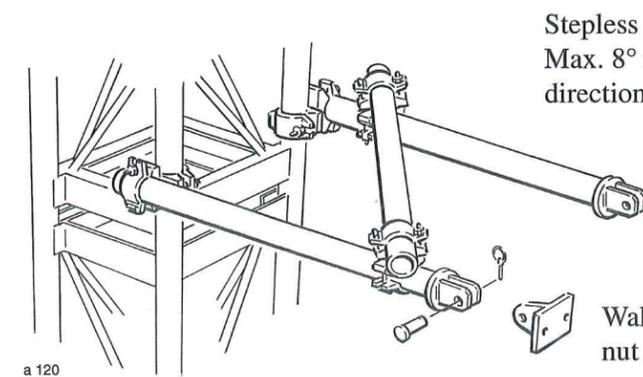
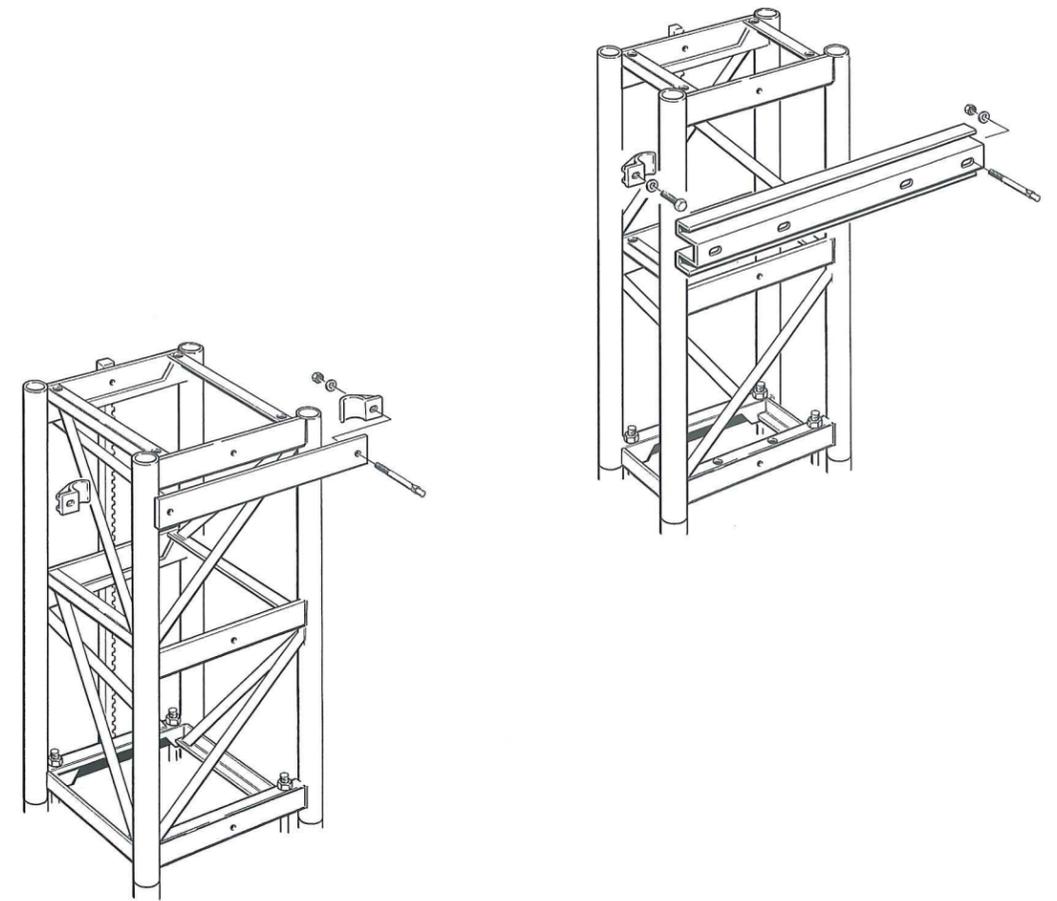
Ties for type A50 mast sections



Mast tie less wall anchoring details:
length A max. 870 mm (34.25"), Part No. 0265 886-102
length A max. 1170 mm (46.06"), Part No. 0265 886-202
length A max. 1670 mm (65.75"), Part No. 0265 886-302



Mast tie less wall anchoring details:
Part No. 9096 233-sub.



Stepless adjustable support legs.
Max. 8° inclination in any
direction.

Wall bracket to be installed with
nut and bolt or expansion bolt.

General	I 1
Permission	I 1
Erection place.....	I 1
Foundation	I 1
Delivery inspection	I 1
Arrangement of power supply.....	I 2
Client's power supply	I 2
Power supply from generator set at jobsite	I 4
Voltage drop in the power supply	I 4

Preparations before installation

To install your rack and pinion lift as efficiently and safely as possible and at lowest cost, it is important that the following preparations be made before the erector is called and the installation is started.

Permission

Make sure that the chosen site of erection meets the requirements set out by local authorities for safety and inspection and that their permission, if necessary, to install the lift has been obtained.

Erection place

Prepare the installation site so that electric power, light, lifting equipment and tools are available and there is adequate access for the lift transporter – beware of overhead obstructions.

If possible, prepare for the installation of ties and landing accessories such as supports, platforms and railing. Suitable places for attaching the ties are vaults, balconies or other concrete or steel structures. See applicable Installation drawing.

Remember that these structures must be strong enough to absorb the reaction forces of the ties and landing door assemblies.

All mast sections should be stored on dry firm ground and as close to the erection site as possible.

Foundation

Prepare the foundation with parts required for attaching the base frame of the mast. See chapter "Foundation" in the manual Technical Description.

IMPORTANT! Make sure before pouring the foundation that the measurement between the foundation frame and the face of the hoistway corresponds to the ties to be used.

Delivery inspection

Check the delivery against shipping lists and look for transportation damage.

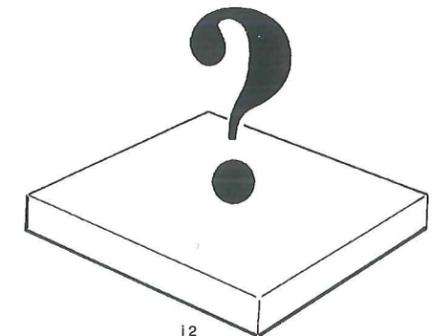
Should there be any damage, report the same to the responsible transportation insurance company within 7 days from the date of arrival of the goods.

Other claims should be made to ALIMAK representative within the same period.

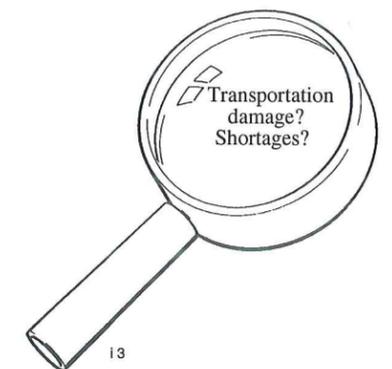
STOP



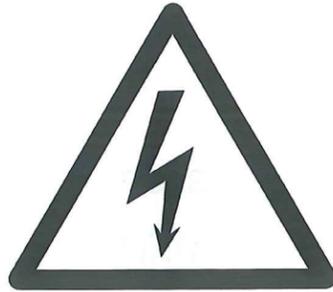
11



12



13



14

Arrangement of power supply

Direct On Line (DOL) starting of electric motors results in a very high starting current. The current must overcome the resistance in the cables which results in a voltage drop. This voltage drop occurs not only in the trailing cables, but also in the power supply cable installed between the jobsite distribution board and the electric panel "B" at the base. The total voltage drop is the sum of the voltage drop in all the cables. **The consequence of the voltage drop is a substantial reduction in the output torque of the motor.**

In order to avoid starting problems it is of the utmost importance that the **main power supply is adequately sized** with respect to the starting current and the voltage drop. The following data should be noted:

- During starting conditions, in the upward direction with rated load, the voltage drop must not exceed 15% of the rated voltage when measured at the motor terminals. In the base panel, the voltage drop of the incoming power supply terminals must not exceed 3% of the rated voltage during the starting conditions.
- Once the rated speed is established during upward travel with rated load, the voltage drop must not exceed 5% of the rated voltage when measured at the motor terminals. In the base panel, the incoming power supply voltage should, in practice, not drop at all, i.e. not exceed 1 – 2 % drop.

Client's power supply

Supply cables to hoists and lifts with DOL or Y/D starting

The 3-phase power supply cable from the jobsite distribution board to the "B" panel at the base can be calculated from the formulas below. The formulas are applicable for the most common types of lifts and lifts having 1, 2 or 3 motor drive machinery with **DOL-starting at 400V, 50Hz and 460V, 60Hz.**

Note: If an earth leakage circuit breaker, ELCB, (ground fault circuit breaker) is to be used, the trip-out value should be chosen for equipment protection i.e. 500mA.

Use of 30mA ELCB is not recommended as it continuously trips due to the motor starting current.

The following table should only be used for guidance. See actual lift data.

No. of motors	Motor power continuous / 25% intermittent 50 Hz	Motor power continuous / 25% intermittent 60 Hz	Power supply cable to Base panel. Conductor area, copper	Minimum recommended Cu-Conductor area	Fuse at * 400V 50Hz 460V 60 Hz
1	4.8 / 7.0 kW	5.7 / 8.5 kW	a = L x 0.09 mm ²	6 mm ²	25 AT
1	7.5 / 8.8 kW	8.6 / 10 kW	a = L x 0.17 mm ²	10 mm ²	35 AT
2	7.5 / 8.8 kW	8.6 / 10 kW	a = L x 0.34 mm ²	16 mm ²	63 AT
1	11 / 13 kW	12.6 / 15 kW	a = L x 0.25 mm ²	10 mm ²	35 AT

a = Conductor area mm², Cu. To be rounded up to standard sizes, i.e. 10, 16, 25, 35 mm² etc.

L = Length in m of the 3-phase power supply cable from the jobsite distribution board to the Base panel

For conductor sizes in AWG Nos., see conversion table below.

* In order to avoid single phasing should a main fuse blow, we strongly recommend the power supply to be fused by means of a three-phase circuit breaker.

Supply cables to hoists and lifts with VFC (Variable Frequency Converter)

The size of the power supply cable must always comply with Rules and Regulations stipulated by the local Authority for electrical installations. Customers power supply cable must also be sized to ensure that the voltage drop in the Base panel does not exceed 3% when starting with full load with the lift moving in the upward direction.

The size of the power supply cable can be calculated by following formula:

$$a = L \times P \times 0.0056... \quad \dots \text{where}$$

a = Conductor area in mm² copper

L = Length in m of the power supply cable from distribution board to the Base panel

P = Drive motor power in kW on the lift

Installed motor power kW (S3 = 25% ED)	Minimum cable size (copper) mm ²
3 – 5.5	4
6 – 10	6
11 – 20	10
21 – 30	10
31 – 40	16
41 – 50	25
51 – 75	(35) 50

IMPORTANT! The power supply cable must be sized according to the drive motor power installed on the hoist/lift. Minimum size of the supply cable is shown on the table above. The table refers to supply voltage 400V to 460V, 50/60Hz.

See note re: earth circuit breaker on previous page.

Power supply from generator set at jobsite

Required generator power

It is recommended that the generator be capable of providing a **starting current** of A amperes at rated voltage. If this is not possible, the guidelines below can be used.

For DOL starting of Alimak lifts having 1 or 2 drive motors we suggest the following generator sizes:

- 1 motor drive size 112, 7.0 kW (8.5 kW) 65 kVA min.
- 1 motor drive size 132, 8.8 kW (10 kW) 70 kVA min.
- 2 motor drive size 132, 8.8 kW (10 kW) 140 kVA min.

It should be noted that the recommended generator sizes are large due to the fact that the DOL starting of the motor(s) draws a large current resulting in a voltage drop which would cause the contactors to oscillate on and off. A smaller generator might be used but this can only be established by practical experience related to a specific make and model of the generator set.

For VFC (Variable Frequency Converter) operated lifts the generator size in kVA should be approximately 2 x the installed motor power in kW, (S3 = 25% ED).

Voltage drop in the power supply

Typical symptoms

- The lift will not start with the full rated load.
- The brakes will not lift when starting in the Up-direction.
- The contactors oscillate on and off ("chatter") when starting with full load in the Up-direction.
- The contacts of the Up and the main contactors are damaged.

Steps to be taken to overcome a voltage drop problem at the jobsite

The best method to avoid any voltage drop problem is to make a proper engineering review of the conditions at the job site *before* installing the lift. When installed, the options are limited.

However, should a situation occur where the power supply seems to be insufficient, it is important to determine whether this depends on the voltage drop in the power supply or something else. Use an instrument to measure the incoming power supply voltage in both the B-panel at the base and the M-panel on/in the car. Take the readings *during starting conditions* in the

upward direction with rated load in the car. If the voltage drop exceeds the values given above, one or more of the following steps can be taken:

1. Increase the conductor size in the power supply cable from the jobsite distribution board to the B-panel at base.
2. Increase the conductor size in the trailing power cables between the base panel and the car. Due to mechanical and performance reasons, the conductors in the trailing cable should not exceed 16 mm².

The fixed cable to the junction box at 1/2 lifting height can be increased in size.
3. Reduce the rated load.
4. Install a step-up transformer xxx/690V in the power supply in order to increase the voltage.

Note! Motor windings must be adaptable to this higher voltage. Otherwise the motor must be changed. To give the best possible advantage, the step-up transformer should preferably be located close to the jobsite distribution board.

5. Use some sort of soft start equipment.

If you have any questions regarding the power supply cables or the trailing cables, please contact Alimak for advice.

Conversion table mm² to AWG

AWG No. (American Wire Gauge)	mm ²	Nearest IEC std. mm ²
0000	107.2	95 alt. 120
000	85.03	70 alt. 95
00	67.43	70
0	53.48	50
1	42.41	35 alt. 50
2	33.63	35
4	21.15	16 alt. 25
6	13.3	10 alt. 16
8	8.366	6 alt. 10
10	5.261	4 alt. 6
12	3.309	2.5 alt. 4
14	2.081	1.5 alt. 2.5
16	1.309	1.5
18	0.8231	0.75 alt. 1.0

ATTACHMENT D
SHEC PREVENTATIVE MAINTENANCE SCHEDULE
for the Alimak SE-Series Industrial Lift

Service Date: _____

Arrival Time: _____

PM Interval	Part	Instructions	Disposition of Part or Function <i>(Description of condition and function level at time of PM inspection)</i>	Description of Follow-Up Required <i>(examples: Recommended replacements or updates, additional service required)</i>	Initials of Verifying Technician
40 operating hours or once a month	1. Sign plates/ instruction manuals	Check that all signs are in position according to the spare parts manual, and that they are legible. Check also that the documentation according to the documentation box is available.			
	2. Safety device	Check with the user/users if the safety device has been tripping without cause or if noise can be heard from the device during operation. See the instructions for checking wear on the safety device under the heading "Adjustment and wear limits", in Attachment B - OEM Maintenance Manual for Alimak SE-series Industrial Lifts, chapter E.			
	3. Gear box	Check the oil level and refill, if necessary. Leaking seals shall be replaced by trained/authorized personnel.			
	4. Counter roller(s) at the rear of the machinery plate and safety hooks and guide rollers on the lift car frame.	Check that all screw joints are properly tightened.			
	5. Attachment of gear box	Check that all screw joints are properly tightened.			
	6. Electric motor, motor control, and brakes	Check that the car stops within acceptable limits, specified later in this chapter. Refer to Attachment B - OEM Maintenance Manual for Alimak SE-series Industrial Lifts, chapter E.			
	7. Main switches and emergency stop switches	Check that all main switches and emergency stop switches are working. Make test runs with each one of the switches in "off" position.			
	8. Control	Check that the operation of the control system is correct.			
	9. Brake lining and brake torque	Check the play between the electro-magnet armature and the rotating brake disc according to instructions later in this chapter. See also the special instruction for checking the brake torque with a spring balance. Refer to Attachment B - OEM Maintenance Manual for Alimak SE-series Industrial Lifts, chapter E.			
	10. Lift cable(s)	Check the cable for wear and to ensure that no kinks occur. Check also the attachment of the cable in the cable support arm on the lift car and the fixture in the lift mast – where a cable guiding device and trolley are furnished.			
	11. Cable basket, where applicable	Clean the cable basket. If the cable guiding device is of a type for power and control cables, which has been taped together, check the tape and, if necessary, reinforce it along the entire length of the cable.			
	12. Electrical interlocks	Check all electrical interlocks by making test runs with: a) Car entrance door open c) with car trap door open b) car exit door open d) each landing door open The lift must not start. Be sure to check only ONE switch at a time.			
	13. Mechanical interlocks	Check all mechanical interlocks by making test runs and at the same time try to open the doors. Car and landing doors must remain locked until the car stops at the landing.			
	14. Car Floor and Roof	Clean the car floor and roof.			
	15. Lubricating	See the instructions in the "Lubrication diagram", Attachment B - OEM Maintenance Manual for Alimak SE-series Industrial Lifts, chapter E. Also check the rack for possible damages, misalignment and attachment, when lubricating.			
28. Doors on car and enclosures	Check the function, attachment and wear on the doors.				
29. Signal equipment and lighting	Check the function of the alarm signal, lighting and, where applicable, voice communication system.				
36. Emergency Lowering	Check by test that the emergency lowering device works properly and that the handle is fully reset after operation.				

ATTACHMENT D
SHEC PREVENTATIVE MAINTENANCE SCHEDULE
for the Alimak SE-Series Industrial Lift

PM Interval	Part	Instructions	Disposition of Part or Function <i>(Description of condition and function level at time of PM inspection)</i>	Description of Follow-Up Required <i>(examples: Recommended replacements or updates, additional service required)</i>	Initials of Verifying Technician
120 operating hours or every three months	20. Rack	Retorque rack bolts to 195 Nm (144 lbf x ft) after 120 hours of initial operation and then once a year.			
	21. Lift mast	Check by striking them that all screw joints of all racks and mast joints are properly tightened. Also check the screw joints for attaching the mast in the base frame.			
	22. Mast ties	Check that all screw joints in all mast ties are properly tightened. Also check attachment to structure.			
	23. Limit Switches and cams, and final limit switch with associated cams	Check attachment and function. Check function by making test runs. Loosen the attachment of the Up and Down limit switches from the machinery plate (alternatively make jumpers for these switches in the electrical panel) and check the final limit switch correspondingly.			
	24. Cable guides	Check the cable guides with regard to attachment, function and installation in the mast in relations to the cable support arm on the lift car.			
	25. Cable trolley, where applicable	Check that the cable trolley does not come in contact with the buffer frame at the ground landing and that the trolley is parallel to the mast tubes. Check also the function, attachment and wear on the guide and cable rollers and that the cable wheel on the trolley runs smoothly. See also special instructions for checking the trolleys guide roller play.			
	26. Base slab/pit	Remove all debris, which may have fallen on/into the base (or pit).			
	27. Buffers for lift	Check that the buffers are in position and in a proper condition.			
	30. Emergency lighting	Switch off the main ON/OFF switch in the car roof and check to ensure that the emergency light functions. Switch on the main ON/OFF switch and check that the LED on the battery charger is illuminated.			
	31. Rack and pinion	Check the wear on the rack and pinion according to the instructions under the heading "Adjustment and wear limits", see Attachment B - OEM Maintenance Manual for Alimak SE-series Industrial Lifts, chapter E.			
	32. Enclosures	Check that there is nothing in the vicinity of the landings, which can be used as a ladder, or can reduce the correct height of the enclosure in any way. Point out any infringements and risks of injuries to the site manager.			
	33. Scaffolding adjacent to lift	Check that the distance from the lift car to landings, scaffolding, balconies, windows or any other location where persons may find themselves, are not less than regulation dictate. Point out any infringements and risks of injuries to the site manager.			
	34. Guide rollers and roller assemblies	Check wear and bearing play of the lift car guide rollers. Adjustment and replacement, when required shall be carried out by trained/authorized service personnel.			
	35. Safety devices	Test the safety device according to the instructions under the heading "Drop test", Attachment B - OEM Maintenance Manual for Alimak SE-series Industrial Lifts, chapter E. At months 3, 6, & 9 no load drop test to be conducted and at the 12 month a full load drop test shall be conducted.			
37. Electric motor(s)	If necessary, clean the cooling flanges of the electric motor(s).				
38. Lubricating	See the instructions in the "Lubrication diagram", Attachment B - OEM Maintenance Manual for Alimak SE-series Industrial Lifts, chapter E				

**ATTACHMENT D
SHEC PREVENTATIVE MAINTENANCE SCHEDULE
for the Alimak SE-Series Industrial Lift**

PM Interval	Part	Instructions	Disposition of Part or Function <i>(Description of condition and function level at time of PM inspection)</i>	Description of Follow-Up Required <i>(examples: Recommended replacements or updates, additional service required)</i>	Initials of Verifying Technician
1000 operating hours or once a year	50. Electric wiring	Check all wires, sealing glands and connections.			
	51. Motor overload protector	Check that the motor overload protector is set with the rated current on the data plate for the electric motor.			
	52. Deformations/ mechanical damage	Inspect the equipment visually in its entirety for deformation/mechanical damage to mast tubes/beams, diagonal members of the mast sections, mast ties, doors, protective rails, floors, etc. This inspection and any actions, which may be necessary after the inspection must be performed by trained/authorized service personnel.			
	53. Corrosion, damage and wear	Inspect the equipment in its entirety for corrosion and wear on loadbearing and force-absorbing components by the aid of an ultrasonic thickness measuring instrument. This inspection and any actions which may need to be taken after the inspection must be performed by trained/authorized service personnel.			
	54. Lift mast/guide rail	Check that all screw joints of all racks and mast joints are properly tightened. Also check the screw joints for attaching the mast in the base.			
	55. Centrifugal brake	Inspect centrifugal brake and brake lining according to the instructions under heading adjustment and wear limit; "Centrifugal brake". Refer to Attachment B - OEM Maintenance Manual for Alimak SE-series Industrial Lifts, chapter E.			
PM Interval	Part	Instructions	Disposition of Part or Function <i>(Description of condition and function level at time of PM inspection)</i>	Description of Follow-Up Required <i>(examples: Recommended replacements or updates, additional service required)</i>	Initials of Verifying Technician
2000 operating hours or every two years	58. Pinion and counter roller on drive unit	Dismount and lift out the motor / gear unit from the machinery plate to be able to make a precise check of the pinion and its counter roller.			
	59. Lubricating	See the instructions in the "Lubricating diagram", Attachment B - OEM Maintenance Manual for Alimak SE-series Industrial Lifts, chapter E.			
	60. Centrifugal brake	Dismantle the brake motor from the centrifugal break and inspect the brake hub with linings. See the instructions under the heading "Centrifugal brake". Refer to OEM Maintenance Manual for Alimak SE-series Industrial Lifts chapter E.			
	61. Corrosion protection devices	Replace the corrosion protection devices which are located inside the electrical panels according to the following: Main panel (M-panel) 2 pcs. P/N 3002 301-105 Car top control panel (VFC) 2 pcs. P/N 3002 301-105 Car top control panel (DOL) 1 pcs. P/N 3002 301-101 Base panel (B-panel) 1 pcs. P/N 3002 301-105 Landing control stations 1 pcs. P/N 3002 301-101			
PM Interval	Part	Instructions	Disposition of Part or Function <i>(Description of condition and function level at time of PM inspection)</i>	Description of Follow-Up Required <i>(examples: Recommended replacements or updates, additional service required)</i>	Initials of Verifying Technician
Every fourth (4th) year from commissioning or according to sign on the safety device	62. Safety device	Replace the complete safety device. NOTE: Due to be replaced at SHEC on 10/21/2018.			

Technician: _____
Print/Sign Name

Date: _____

EC Project Manager or Desginee: _____
Print/Sign Name

Date: _____

**ATTACHMENT D
SHEC PREVENTATIVE MAINTENANCE LUBRICATION SCHEDULE
for the Alimak SE-Series Industrial Lift**

Service Date: _____

Arrival Time: _____

Interval	POS	Lubricating Point	Lubricant	Volume	Service Instructions	Disposition of Part or Function <i>(Description of condition and function level at time of PM inspection)</i>	Description of Follow-Up Required <i>(examples: Recommended replacements or updates, additional service required)</i>	Initials of Verifying Technician
40 operating hours or once a month	1	Gear Box	Alioil Tropic		Check the oil level and refill - if necessary.			
	2	Rack	Alilube Part No. 3001396-201		Lubricate during lowering. Take lift out of operation for 2-3 hours to permit the spray to congeal.			
		Autom, lubricator for rack - where applicable	Alirack grease Part No. 9063930-00		Check grease level and refill - if necessary.			
	3	Safety device	Shell Retinax LX2 or equivalent Part No. 5402 101-3851		Grease nipple.			
120 operating hours or every three months	4	Cable guiding device <i>Note: Do not grease the hybrid trailing power cable</i>	Ali-low-fric compound Part No. 9052045-000		Grease slide surfaces on trolley and car cable and car cable bracket. Do not mast tubes / guides - the cable trolley may get stuck.			
	5	Landings doors, interlocks and ramps	Aeroshell Grease 6		Grease bearings and slide surfaces.			
	6	Car doors, gate interlocks and ramps	Aeroshell Grease 6		Grease slide surfaces and bearings/hinges.			
	7	Centrifugal brake linkage and control cable	Spray can with mutipurpose oile type CRC 5-56 or equivalent		Lubricate bearings and slide surfaces. Use the spray can's additional extension tube to apply the oil inside the control cable's external hose.			
		Roof trapdoor and electric cabinet hinges	See above					
2000 operating hours or every two years	10	Gear Box	Alioil Tropic Part No. 9041980-000	2.9 lit. (.77 US gal)	Change oil.			

Technician: _____
Print/Sign Name

Date: _____

: Project Manager or Desginee: _____
Print/Sign Name

Date: _____

**BID SHEET
CITY OF AUSTIN
ALIMAK ELEVATOR PREVENTATIVE & CORRECTIVE MAINTENANCE
SOLICITATION: IFB MEA0004 BUYER: MARIA ANDRADE**

INSTRUCTIONS:

Preventative Maintenance Services:

- Line item prices (service unit rate) shall consider all costs for the required services, including labor, replacement parts, transportation, and other indirect costs necessary to complete the specified SHEC PM work (Attachment D) at the required interval/frequency, or at minimum, per the OEM Maintenance Manual for Alimak SE-Series Industrial Lifts (Attachment B)

Corrective Repair Services:

- Line item prices (hourly service unit rate) shall consider all costs for the required services, including labor, replacement parts, transportation, and other indirect costs necessary to complete the specified work request.

ITEM	ITEM DESCRIPTION [Reference the Scope of Work (Section 0500)]	ESTIMATED QUANTITY	UNIT	UNIT PRICE	EXTENDED PRICE
	PREVENTATIVE MAINTENANCE				
1	40 operating hours or once a month - in accordance with SHEC Preventative Maintenance Schedule, (Attachment A), items 1-15, 28, 29, and 36.	12	EA		
2	120 operating hours or every three months - in accordance with SHEC Preventative Maintenance Schedule, (Attachment A), items 20 - 27, and items 30 - 38.	4	EA		
3	1000 operating hours or once a year - in accordance with SHEC Preventative Maintenance Schedule, (Attachment A), items 50 - 55.	1	EA		

4	2000 operating hours or every two years - in accordance with SHEC Preventative Maintenance Schedule, (Attachment A), items 58 - 61.	1	EA		
5	Every fourth (4th) year from commissioning or according to sign on the safety device - replace safety device in accordance with SHEC Preventative Maintenance Schedule, (Attachment D), item 62. Device due to be replaced on 10/21/2018	1	EA		
CORRECTIVE REPAIR SERVICES					
1	Hourly Service Unit Rate during Standard Work Hours	110	HR		
2	Hourly Service Unit Rate during Non-Standard Work Hours	40	HR		
				TOTAL BID	
COMPANY NAME: _____ DATE: _____ PRINTED NAME: _____ EMAIL ADDRESS: _____					