

Patio

**Linearantrieb / Linear actuator / Vérin électrique /
Motore lineare / Motor lineal**



- DE Montageanleitung**
Bitte bewahren Sie die Montageanleitung auf!
- EN Operating instructions**
Please take care of the operating instructions!
- FR Instructions de montage**
Veuillez conserver les présentes instructions de montage!
- IT Istruzioni per l'uso**
La preghiamo di conservare le istruzioni per l'uso!
- ES Instrucciones de montaje**
Por favor, conserve estas instrucciones de montaje!

DE

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1 General

1.1 Notes on the installation instructions

The classification of the contents is based on the life stages of the linear drive (hereinafter referred to as the “device”).

The manufacturer reserves the right to make changes to the technical specifications stated in these installation instructions. They may differ slightly from the respective version of the device without the factual information being fundamentally changed or losing validity. The current status of the technical specifications can be requested from the manufacturer at any time. Claims may not be asserted in this respect. Deviations from the text and images are possible and depend on the technical development, equipment and accessories of the device. The manufacturer shall provide information on any differing details relating to special versions by means of the sales documentation. Other specifications shall remain unaffected by this.

1.2 Standards and guidelines

The basic health and safety requirements of the applicable laws, standards and guidelines were applied during the design phase.

The safety of the device is confirmed by the Declaration of Incorporation (see chapter “Declaration of Incorporation”). All information relating to safety in these installation instructions refers to the laws and regulations that are currently valid in Germany. All information in these installation instructions must be complied with at all times and without limitation. In addition to the safety information in these installation instructions, the regulations applicable at the place of installation with regard to accident prevention, environmental protection and occupational safety must be observed and adhered to. The guidelines and standards for safety assessment can be found in the Declaration of Incorporation.

1.3 Use in line with intended use

The device is designed for use in sunlight and shade systems. Other fields of application must be agreed in advance with the manufacturer.

The device must not be used in areas where there is danger to personnel or in potentially explosive environments.

If direct or indirect danger to personnel cannot be ruled out, additional measures (e.g. covers, barriers, etc.) must be taken in order to minimise the potential risk accordingly.

The operator alone is liable for any damage resulting from non-intended use of the device. The manufacturer assumes no liability for personal injury or damage to property caused by misuse or procedural errors, improper operator control or improper start of operation. The device may only be operated by trained and authorised specialist personnel who observe all of the safety information.

Safe and error-free use of the device and its operational safety can only be guaranteed if the device is used as intended, in accordance with the information in this installation manual.

Intended use includes observation of and adherence to all of the safety information specified in these installation instructions, as well as all applicable regulations of trade associations and the applicable laws concerning environmental protection. Use in compliance with the intended use also includes adherence to the operating regulations prescribed in these installation instructions.

1.4 Foreseeable misuse

Installation deviating from the intended purpose approved by the manufacturer is considered foreseeable misuse.

1.5 Guarantee and liability

The guarantee periods specified in the manufacturer's General Terms & Conditions of Sale and Delivery apply. The Terms & Conditions of Sale and Delivery are part of the sales documentation and are given to the operator at the time of delivery. Liability claims for personal injury and damage to property are excluded if they can be attributed to one or more of the following causes:

- The customer opening the device (breaking the seal)
- Improper use of the device
- Improper installation, commissioning or operation of the device
- Structural modifications to the device without the written approval of the manufacturer
- Operation of the device with incorrectly installed connections, defective safety devices or incorrectly fitted safety and protection devices
- Non-compliance with the safety regulations and information provided in these installation instructions

- Exceeding the limits of the technical specifications

1.6 Customer service of the manufacturer

The device may be repaired only by the manufacturer in the event of a fault. The address for sending the device to the customer service department can be found on the inside of the back cover.

If you have not purchased the device directly from elero, please contact the manufacturer of the machine or the supplier of the device.

Mechanically secure the machine before dismantling the device. The device must not be separated from the machine by force.



Please have the serial number ready on request from customer services. This can be found in the top right-hand half of the type plate.

1.7 Declaration of Incorporation

The Declaration of Incorporation in accordance with 2006/42/EC is available to download online at www.elero-linear.de in the Service area.

2 Safety

2.1 General safety notices

These installation instructions contain all of the safety information that must be observed in order to avoid and prevent hazards when working with the device at any stage in its individual life cycles. Safe use of the device is guaranteed when all the safety information provided is adhered to.

2.1.1 Formulation of safety information

The safety notices in this document are marked with safety symbols and formulated in accordance with the SAFE principle. They contain specifications relating to the type and source of danger, the possible consequences, as well as the prevention of the danger.

The following table provides the illustrations and descriptions used in these installation instructions to indicate the levels of danger and the potential physical injuries arising from them.

Symbol	Keyword	Meaning
	DANGER	Warns of an accident that will occur if the instructions are not followed, which can lead to life-threatening, irreversible injuries or death.
	WARNING	Warns of an accident that may occur if the instructions are not followed, which can lead to serious, potentially life-threatening, irreversible injuries or death.
	CAUTION	Warns of an accident that may occur if the instructions are not followed, which can lead to minor, reversible injuries.

The following table provides the images used in these installation instructions to visually represent the hazard situations together with the symbols used to indicate the level of danger.

Symbol	Meaning
	Danger from electrical voltage - risk of electric shock: This symbol refers to dangers associated with electrical currents.
	Danger of crushing and fatal injuries: This symbol indicates dangerous situations in which the entire body or individual limbs can become crushed or injured.

The following table provides the illustrations and descriptions used in these installation instructions to indicate situations in which damage to the product may occur or highlights important facts, statuses, tips or information.

Symbol	Keyword	Meaning
	<i>WARNING</i>	This symbol warns of possible material damage.
		This symbol highlights important facts, statuses as well as further information in these installation instructions. It also indicates specific instructions that provide additional information or help you to perform a procedure more easily.

The following is an example of the structure of a safety notice:



DANGER

Type and source of danger

Explanation of the type and source of danger

- Measures to avert danger.

2.2 Safety principles

The device has been built using state-of-the-art technology in accordance with generally accepted rules of safety and is safe to operate. The basic health and safety requirements of the applicable laws, standards and guidelines were applied when designing the device. The safety of the device is confirmed by the Declaration of Incorporation.

All specifications pertaining to safety relate to the currently valid regulations of the European Union. In other countries, the operator must ensure that the relevant laws and national regulations are adhered to.

In addition to the safety information in these installation instructions, the generally applicable regulations regarding accident prevention and environmental protection must be observed and complied with.

The device must only be used when in perfect working order, for its intended use, and in compliance with the safety information in these installation instructions. The device is designed for use as described in the “Intended use” section. Any improper use could result in risks to life and limb of the operator or third parties and could affect the condition of the device and other property. Accidents or near-accidents arising during the use of the device which have resulted, or might have resulted, in personal injury and/or damage to the working environment must be reported to the manufacturer directly and immediately.

All safety information specified in the installation instructions and on the device must be adhered to. In addition to this safety information, the operator must ensure that all national and international regulations applicable in the respective country of use, as well as other binding regulations relating to operational safety, accident prevention and environmental protection, are complied with. All work on the device must be performed only by trained and authorised personnel who have been instructed on safety.

2.3 General duties of the plant operator

- The operator is obligated to use the device only when it is in perfect working order and is safe to operate. The operator must ensure that, in addition to the safety information in the installation instructions, the generally accepted safety and accident-prevention regulations, the specifications of DIN VDE 0100 and the provisions relating to environmental protection of the respective country of use are observed and complied with.
- The operator is responsible for ensuring that all work with device is carried out only by appropriately trained and authorised personnel who have been instructed on safety.
- The operator of the device, or personnel authorised by the operator, bear(s) ultimate responsibility for ensuring accident-free operation.
- The operator is responsible for ensuring compliance with the technical specifications and in particular compliance with the static loads.

Non-compliance with the static loads may cause loss of the support or holding function.

2.4 Personnel requirements

- Any person commissioned with performing work on the device must have read through and understood the operating instructions completely before performing the corresponding work. This also applies if the person concerned has previously worked with such a device or has been trained to do so.
- All work on the device must be performed only by trained and authorized personnel who have received safety instruction. Before starting any operations, personnel must be made aware of the dangers involved in handling the device.
- Personnel may only perform work for which they are qualified. The responsibilities of each person must be clearly defined.
- Any personnel commissioned with working on the device must have no physical limitations that could temporarily or permanently impair their attentiveness or judgement (e.g. due to excessive fatigue).
- Minors or persons under the influence of alcohol, drugs or medication are prohibited from working with the device and performing any installation, dismantling or cleaning work.
- Personnel must wear personal protective equipment appropriate to their job and their working environment.

2.5 Safety information on the technical condition

- The device must be checked for damage and correct operation before installation.
- The operator is obligated to operate the device only when it is in perfect working order and is safe to operate. The technical condition must comply with the legal requirements at all times.
- If dangers to personnel or changes in operating behaviour are identified, the device must be shut down immediately and the incident reported to superiors or the operator.
- The device may only be connected to the energy supply intended and designed for this purpose. Please refer to the type plate or sales documentation for the permissible voltage type and operating voltage.
- Modifications and attachments to or conversions of the device are not permitted without the authorisation of the manufacturer.

2.6 Safety information on transport, assembly and installation

The respective transport company is responsible for transporting the device. The following safety requirements must be observed during transport, assembly and installation of the device:

- During transport, the device must be secured in accordance with the regulations of the mode of transport used.
- For transport, all hoists and slings used must be sufficiently dimensioned to safely bear the forces generated during loading, unloading and installation of the device.
- Only the points indicated on the pallet and the device may be used as slinging and lifting points.
- If work is required on lifted parts or work equipment, these must be secured against falling using suitable means. Work equipment for lifting loads must prevent the loads from shifting unintentionally, falling freely or unhooking unintentionally.
- Standing under suspended loads is strictly prohibited.
- A hard hat must be worn during loading work with hoists.
- Assembly and installation work must only be carried out by trained and qualified personnel.

2.7 Safety information on operation

- The operator of the device is obligated to ensure that the device is safe to operate and working correctly before initial start-up.
- This is also required during operation of the device, at regular intervals determined by the operator.
- Faults, misuse and/or incorrect connection of control components can cause the supporting and retaining function of the device to be impaired.
- Radial and/or torsional forces must not be allowed to act on the device.

2.8 Safety information on the electrical installation

- All work on electrical connections must only be performed by authorised electricians in accordance with the applicable regulations and provisions of the trade association, in particular the specifications in accordance with DIN VDE 0100.
- In the event of any defects, such as loose connections or defective or damaged cables, the device must not be put into operation.
- In the event of faults with the electrical equipment, the device must be shut down immediately.
- The device must be de-energised before any inspection, installation or dismantling work.

The following must be checked before connecting the device to the power supply:

- Are all electrical connections, safety devices, fuses, etc. properly installed, connected and earthed?
- Is the power connection provided in accordance with the information in the electrical wiring diagram (voltage type, voltage level)?
- Has the supply line been de-energised?

3 Product description

3.1 General

The device is an electromechanical linear drive. It performs linear movements.

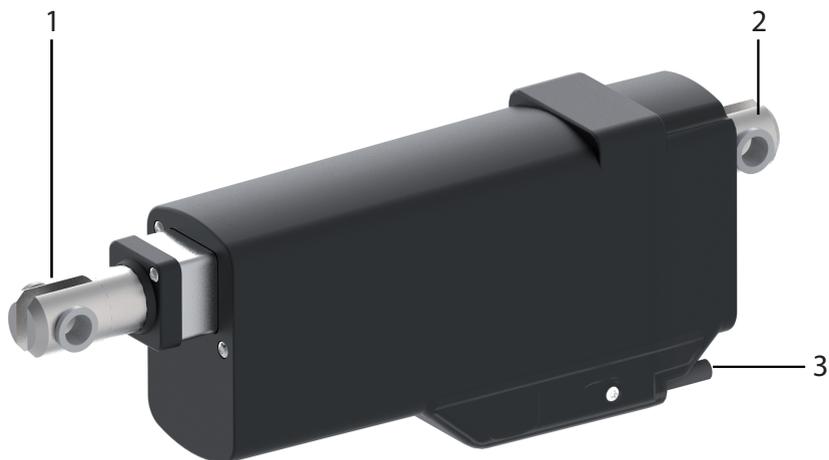


Abb. 1 Patio linear drive

- 1 Fastening piston side (fork head)
- 2 Fastening housing (fork head)
- 3 Connection cable

3.2 Technical data



All information in this section assumes an ambient temperature of 20°C.

3.2.1 Summary of the technical parameters

Σ
Σ

Technical data	Patio
Rated voltage	24 V DC
Force, dynamic (N)	1.500
Force, static (N)	1.200
Stroke speed (mm/s)	approx. 6
Stroke length (mm)	150
Rated current (A)	approx. 2.3 ¹⁾
Output (W)	55
Duty cycle	S3 15%
Type of protection	IP 65
Temperature range	-10°C - +60°C ²⁾
Limit switches	Limit stop deactivation
Connecting rod	Secured against rotation
Airborne noise emission	> 60 dB (A) ³⁾
Weight	up to 1.5 kg

Tab. 1 Technical parameters

- 1) Option without deactivation: If there is a blockage, the control unit must switch off the current supply within 10 seconds in order to avoid overloading the drive. Observe changeover time of at least 2 seconds.
- 2) Discrepancies in technical data possible.
- 3) Noise level 60 dB(A) (with nominal power and without load in accordance with EN ISO 3745)

3.2.2 Information on the self-locking facility



WARNING

Danger of injury from loss of self-locking facility.

Crushing and battering possible.

- Provide safety equipment



WARNING

Possible damage to the device or the customer system from loss of self-locking facility.

- Provide safety equipment.

There is a difference between dynamic and static self-locking in the devices. Dynamic self-locking is activated by movement and static self-locking is activated when the machine stops. The self locking facility on the devices is dependent on various factors, e.g.:

- Angle of elevation of the spindle and nut
- Surface roughness of the flanks of the spindle and nut
- Running speed
- Lubricant

The self-locking facility can be negatively influenced by a number of factors, e.g.:

- Shocks and vibrations
- Loads
- Heating

A theoretical self-locking spindle does not provide absolute self-locking. For this reason, the assumption of any warranty obligations relating to self-locking is excluded.

Self-locking is NOT for the purpose of fulfilling any safety-related criteria.

In order to minimise any further dangers, observe the duty of care that is normal for technical products.

4 Installation



WARNING

- Danger of injury from weather influences.
The skin may suffer frostbite or burns.
- Wear personal protective equipment.
-



WARNING

- Risk of injury from incorrectly dimensioned mountings.
Crushing and battering possible.



- Use only fastening materials that are suitable for the dimensions of the mountings.
 - The counter-mountings (provided by customer) must be designed at least for the forces for which the device has been designed.
-



WARNING

- Danger of injury from loss of support and holding function.
Crushing and battering possible.



- Pay attention to static loads.
-



WARNING

- Damage to the device from installation outside or in damp rooms.

- The clamping units of the connecting cable must be designed with the required IP protection class.
 - If laid outdoors, cables must be fitted with a drip loop.
-



WARNING

- Damage to the device from radial and/or torsional forces.

- The device must be designed in such a way that no radial and/or torsional forces can act on the device.
-



WARNING

- Damage to the device from blocking of the piston rod.

- The linear pathway of the piston must be freely moveable at all times.
 - The pivoting range of the device must be kept clear.
-



WARNING

Damage to the device from loss of support and holding function.

- Pay attention to static loads.
-

4.1 Installation and connection



WARNING

Damage to electric cables from crushing or a tensile load.

- All electric cables must be laid in such a way as to avoid the risk of crushing and exposure to tensile loads.
-

1. Fasten the device only by the fastening elements provided for this purpose. These are located at the end of the housing and on the piston rod (see Fig. 1).
2. Connect the device to the electrical supply.

4.2 Electrical connection



WARNING

Damage to the device due to faulty electrical connection.

- The device must be operated with the correct connection voltage (see type plate).
-



WARNING

Damage to the device from the use of a non-fitting or unsuitable drive control unit.

- The control unit must support all the options attached to the device.
 - Connect all the marked cable conductors.
 - Insulate unmarked cores/cables.
-



WARNING

Damage or destruction of the device due to faulty electrical connection.

- The device must not be operated without an overcurrent shut-off.
 - The device must be shut off by an overcurrent shut-off when it reaches the limit positions. The overcurrent shut-off is optionally available as an internal or external model.
 - The customer-provided power supply must be capable of making at least the minimum amount of current available to each device (see section 4.2.2). If this current is not supplied, the device cannot be shut off when it reaches the limit positions.
 - If a configuration of the device without electronics has been selected, the overcurrent shut-off must be implemented externally by the customer.
-



WARNING

Damage or destruction of the device through ingress of moisture in the connection cables.

- For devices with protection type IP 65, the customer-provided connection of the cable ends or connectors must also have IP 65 protection.
-

No circuit diagrams are listed below on account of the multitude of configuration possibilities.

The device must be connected in accordance with the circuit diagram included with the delivery.

Please refer to the following pages or the circuit diagram enclosed with the delivery for connection of the option selected by you.

4.2.1 **Parallel connection**

Multiple devices can be connected in parallel.

However, in this case the devices will not behave synchronously.

4.2.2 **Minimum current of customer-provided power supply for each device**

Model of device	Rated voltage 24 V DC
1500 N	4 A

Tab. 2 Minimum current

4.3 **Mechanical limit positions**

Factory setting:

The limit positions have been preset to the dimensions corresponding to the stroke length defined in the order confirmation.

The device does not have a limit switch to shut it off when it reaches the limit positions.

Upon reaching the limit stops, the device must switch off by means of an over-current safety device (see chapter „4.2 Electrical connection“).

4.3.1 Operation of unit



WARNING

Damage to the device due to wrong operation.

- Fast polarity reversal of the traversing direction of the device is not permissible.
- The device must come to a complete standstill before switching the traversing direction.



If the device is blocked during a stroke traverse, the increased motor current will shut it off (overcurrent shut-off). The device remains at a standstill and requires a renewed traversing signal. However, the device will not traverse again until the cause of the blockade has been eliminated.

5 Waste disposal

5.1 Scrapping

When scrapping the device, the currently applicable international, national and regional laws and regulations must be observed.



Ensure that the recycling, dismantling and separation capabilities of the materials and assemblies, as well as the environmental and health dangers, are taken into consideration during recycling and waste disposal.

Material groups, such as plastics and metals of different types, must be sorted before being sent for recycling or disposal.

5.2 Disposal of waste electrical and electronic components

The disposal and recycling of electrical and electronic components must be carried out in accordance with the respective laws or national regulations.

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