

# Runner

## Linear Actuator



*Read this manual before installing, operating or maintaining this actuator. Failure to follow safety precautions and instructions could cause actuator failure and result in serious injury, death or property damage.*



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## Basic Principles

The following chapters are part of the basic principles:

- 1. *Introduction*, page 4
- 2. *Safety*, page 7
- 3. *Structure and Function*, page 11

### 1. Introduction

**This chapter contains information on the organization and structure of the operating instructions. It makes the instruction manual easier to understand and enables quick access to the desired information.**

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## Operating Instructions

Magnetic Elektromotoren AG manufactures state of the art electric motors.

The purpose of these operating instructions is to introduce you, as the user and the entity doing the further processing, to correct utilization and safe use.

For this goal to be achieved, it is essential that you very carefully read the chapter on *safety* (2. *Safety*, page 7) and follow the instructions in this manual.

### Validity

The instructions in this manual refer to the linear actuator RUNNER™ with the following identification:

- Manufacturer: Magnetic Elektromotoren AG, Liestal
- Product name: Linear actuator RUNNER™
- Type designation: RU20, RU21, RU22, RU23, RU24, RU25
- Year of manufacture: from 2003
- CE Mark: according to Technical Documentation
- Serial number: from the start of batch production

### Target Audience

The operating manual is intended for technical personnel and authorized users who use the linear actuator RUNNER™ in their products and work with it. The operating authority determines who the user is.

We distinguish between different user groups, as the requirements on the users vary, depending on the activity they perform.

**Note: you will find definitions of the user groups along with their corresponding requirements in the chapter on safety (2. *Safety*, page 7). You can assume one or more of these user groups provided you meet the applicable requirements.**

## Introduction

The organization and implementation of the operating instructions takes into account the different user groups.

### Summary of Contents

The operating instructions serve as a reference work. The information therein is organized into four task- and theme-related parts:

<i>Basic Principles</i>	The " <b>Basic Principles</b> " section gives the basic knowledge that every user should have.
<i>Normal Operation</i>	The " <b>Normal Operation</b> " section contains information needed for operating the product under normal conditions, i.e. uninterrupted operation for use according to its intended application.
<i>Special Operations</i>	The " <b>Special Operations</b> " section describes all jobs deviating from normal operation, such as installation, initial start-up, maintenance, fixing faults and doing repairs.
<i>Appendix</i>	The " <b>Appendix</b> " contains information that the user has to be able to access at any time. This includes information on using the operating instructions (indexes) as well as data concerning the product itself (technical data).

### Aids for accessing information

This manual has access aids that make it easier for you to quickly access the desired information:

- You can most easily find all information on a given topic from the "**Table of Contents**", thanks to the task and theme-related organization of the operating instructions.
- Information on a certain activity or a special topic can be found most quickly through the "**Index**".
- Within the chapters of the operating instructions, you can orient yourself with the help of the margin notes.

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## Organizational Measures

If you have questions that can't be answered through the operating instructions, contact the manufacturer directly.

### Location of the Operating Instructions

The operating instructions can only serve you if you have them available at all times. For this reason, always keep the operating instructions where the equipment is being used.

#### Manufacturer Address

Magnetic Elektromotoren AG  
Oristalstrasse 97  
CH-4410 Liestal  
Tel.: +41 / 61 / 925 41 11  
Fax: +41 / 61 / 921 37 04  
E-mail: actuators.switzerland@skf.com

#### Contact Address

Your local SKF representative.

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## Conventions


In this manual we use a few abbreviations and markings to label sections of text or notes. In the following sections you will find these conventions explained.

### Warnings and Usage Hints

Please make note of the meaning of the following warnings and usage hints:

**Note:** indicates usage information that helps the user to use the product correctly and efficiently or to understand the properties of the product.

	<b>⚠ CAUTION</b>
	Caution: warning to inform the user of hazards that remain due to the incomplete effectiveness of protective measures against property damage or personal injury; pointer to the possible required special training and personal protective equipment.

	<b>⚠ WARNING</b>
	Warning: warning of irreparable property damage or personal injury that remains based on hazard analysis. With reference to protective measures and possible required special training and personal protective equipment.

### Position Numbers and References

#### Position numbers

We number diagram parts clockwise in serial order on a one-to-one basis.

#### Cross-references to text passages

Cross-references to chapters or diagrams are given in parentheses. They contain the appropriate chapter or diagram number.

## 2. Safety

This chapter is intended for all users of the linear actuator RUNNER™. It contains information on its safe use and optimal utilization.

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### Safety Program

The safety program for Magnetic Elektromotoren AG spells out who is entitled to use it and the responsibility of the individual user.

The RUNNER™ was designed and built in accordance with the latest technical standards and accepted safety rules.

EU-conformity is documented with the technical documentation.

#### Purpose of the RUNNER™

The linear actuator RUNNER™ was designed and built for implementation in accordance with its authorized use. If you use the RUNNER™ for any use other than that cited, the manufacturer cannot be held responsible for damage resulting from this.

#### Authorized Use

The authorized use of the RUNNER™ is the:

- dynamic central push-loaded or pull-loaded stroke

**Note: For the operations data, please see the Annex of this operating manual (see *Operations data*, page 27).**

#### Unauthorized Use

Every use other than the *authorized use without the written agreement of the manufacturer or operation beyond the technical limits is considered unauthorized.*

You can find the technical operating limits in the appendix (*Technical data*, page 27) of this manual and on the model label of the RUNNER™.

**Note: in unauthorized use of the RUNNER™, personal injury and property damage can occur. Keep to the instructions of this manual under all circumstances.**

#### User groups

To ensure safety, we place requirements on the users of the RUNNER™, that must be adhered to under all circumstances. Only persons who meet the requirements are entitled to use the RUNNER™.

We refer to all persons who operate, use, commission the linear actuator, process it further or pass it on for further processing as user groups. As the requirements of these

## Safety

user groups strongly depend on their role, we distinguish between the following user groups:

<i>Operating Authority</i>	The operating authority is the contractual partner of the executor or the reseller. They can impose legal conditions on the operating authority when purchasing the linear actuator. The operating authority ensures that the user is instructed on the authorized use of the equipment.
<i>Executor</i>	The executor is the contractual partner of the reseller or the manufacturer. He assembles the linear actuator into a total device. He is authorized by the manufacturer RUNNER™ to use the linear actuator in accordance with the regulations and has the necessary expert knowledge.
<i>Technician</i>	The technician has the professional technical training to implement the linear actuator RUNNER™ according to its authorized use. Besides the chapter <i>Safety</i> , he is also familiar with the chapter <i>Special operating modes</i> . He finds the necessary technical characteristic data in the <i>Annex</i> .
<i>Reseller</i>	The reseller forwards the machine.
<i>Operator</i>	Every other person who uses the RUNNER™ we define as an operator. The operator must have read the <i>Safety</i> chapter in this manual before using the machine. Moreover, he must be instructed about the <i>normal operation</i> by the <i>operating authority</i> .

### Types of Operation

<i>Intermittent</i>	The linear actuator RUNNER™ is exclusively intended for intermittent operation (see <i>Technical data</i> , page 27).
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### Danger Zones

We differentiate between two danger zones that must be observed, depending on user role.

<i>Persons</i>	The danger zone covering "persons" includes, aside from the actual user, third persons as well (other personnel, visitors, patients etc.) In case of injury, the operating authority is responsible.
<i>Device</i>	The danger zone <i>device</i> comes under the user group <i>Executor</i> and <i>Technician</i> and covers the linear actuator RUNNER™ and all the mounted-on elements.

### Areas of Responsibility

Different areas of responsibility arise, corresponding to the different user groups.

<i>Operating Authority</i>	The operating authority bears the responsibility for the danger zone covering <i>persons</i> and ensures that only authorized and trained users work with the RUNNER™. He or she is responsible for the following: <ul style="list-style-type: none"><li>■ Identifying the persons who are allowed to use the RUNNER™ (authorized persons)</li><li>■ Training the user groups</li><li>■ Holding to all relevant legal conditions and regulations</li></ul>
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## Safety

**Note: The *operating authority* may only authorize persons to use the RUNNER™, who meet the requirements for the user groups.**

### *Executor*

The executor is responsible for the following:

- Forwarding a CE-conformant operating manual of the device in which the linear actuator RUNNER™ is installed
- Adherence to the safety regulations according to this operating manual

### *Reseller*

The reseller is responsible for the following:

- Forwarding this operating manual and the linear actuator RUNNER™ to the executor or
- Forwarding a CE-conformant operating manual and the device in which the linear actuator RUNNER™ is installed to the operating authority

### *Technician*

The technician is responsible for the following:

- Observing the manufacturer's instructions and the safe set-up of interfaces with other equipment.
- Installation and use of the RUNNER™ in accordance with its authorized use
- Installation of optional modules and connecting cables

### *Operator*

The operator ensures that nobody is endangered when the RUNNER™ is running. He or she is especially responsible for:

- Operating the RUNNER™ in normal operating conditions
- Immediate and proper reaction to malfunctions

## General safety measures

The linear actuator is suitable **only for internal use** and must not be subjected to weathering, strong UV radiation or corrosive or explosive atmospheric media (see Annex *Ambient conditions*, page 27).


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## Other hazards


The manufacturer has constructively, and with protective measures, minimized the effects of existing hazards. Pay attention to the remaining hazards and the possible countermeasures given in the following chapters.


### Other hazards for people, things and property

Pay attention to following hazards and the possible countermeasures in dealing with them RUNNER™:

<b>⚠ WARNING</b>	
	<p>Warning of hand injury from being caught in the fork head of the push tube when the motor is running. There will be a rotating motion as long as the fork head is not installed in a device. Do not let any object or person come into contact with the fork head of the push tube when the motor is running. Hold the RUNNER™ only by the guide tube.</p>

<b>⚠ WARNING</b>	
	<p>Warning of danger of crushing and damage to the RUNNER™ owing to static and dynamic overloading of the linear actuator. When driving against fixed objects the impact of the force can cause personal injury. Make sure that there are no persons or fixed objects present in the danger zone during the stroke..</p> <ul style="list-style-type: none"><li>• Note the maximum permissible operating data in the Annex (see <i>Operations data</i>, page 27)</li><li>• Note the type plate of the linear actuator</li></ul>

<b>⚠ WARNING</b>	
	<p>Warning of side-acting forces. Side forces destroy the actuator and pose a danger to people. During the stroke, do not manipulate any of the elements that are connected to the RUNNER™.</p>

<b>⚠ CAUTION</b>	
	<p>Take care about damage to the RUNNER™ from water sprays. The linear actuator RUNNER™ is splashproofed according to IPX4S, optionally hoseproofed according to IPX6S. These protection types are not guaranteed during the inward and outward movement. Prevent the RUNNER™ from being subjected to water sprays or hosing during the stroke.</p>

### 3. Structure and Function

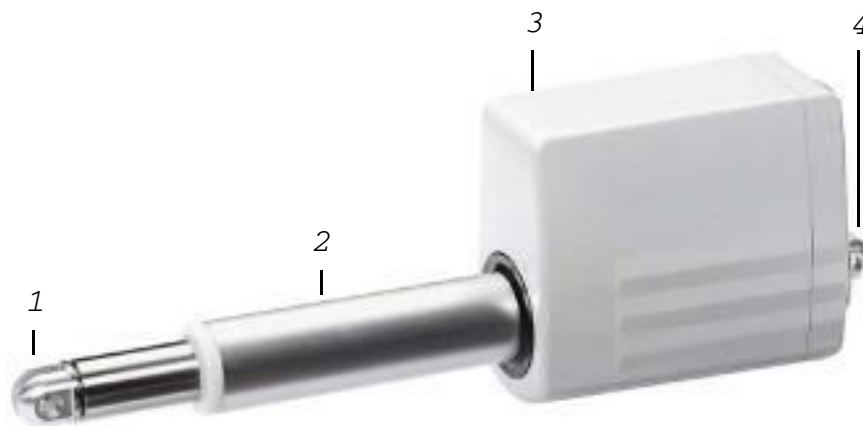
This chapter is intended for all users of the RUNNER™. It shows its structure and explains its function.

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#### Structure

The following figure will give you an overview of the linear actuator.

#### Overall view RUNNER™



*Fig. 3-1 RUNNER™ Overall view*

- 1 Fork head of the push tube
- 2 Linear actuator (guide tube)
- 3 Motor housing (gears and motor unit)
- 4 Hinge head of the motor housing

#### Operating elements

The Magnetic operating elements are available as accessories for the RUNNER™ and the Magnetic control unit. If you have any questions, please consult the corresponding operating manuals of these devices.

Structure and Function

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## Function

A description of its function allows you to understand what the linear actuator and its individual parts do.

### Principles of its function

The principle of the linear actuator RUNNER™ is based on push or pull functions. A push or pull movement is exerted with a push tube. The built-in brake brakes the movement or holds the position at a standstill. There must be no side pressure and no torque.

The linear actuator RUNNER™ has to be equipped with a Magnetic-controller and a Magnetic-operating element.

<i>Core</i>	The core is the load-bearing component that connects the motor unit, the gears and the linear unit (main bearing) with each other.
<i>Motor housing(3)</i>	The motor housing is a two-piece synthetic housing and must not be opened for any reason. The power supply cable (motor cable with low-voltage plug) is permanently built into the motor housing. The motor unit and the gears are located inside the motor housing.
<i>Motor unit</i>	The permanent magnet motor is a 24 V DC motor that drives the gears via the toothed belt. The speed of the stroke depends on the load.
<i>Gears</i>	The two-step planetary gear system is driven by the toothed belt, by which a threaded spindle is moved.
<i>Linear unit</i>	The linear unit is one of the components separate from the motor unit. The threaded spindle converts the rotational motion of the gears into a linear motion via the spindle nut. A <b>safety nut</b> provides additional protection, in case of a fracture of the spindle nut, from a fracture of the push tube. The push or pull movement is carried out by means of the push tube. The push tube is surrounded and protected by the guide tube 2. The base of the push tube is connected via the spindle nut to the threaded spindle; on the top piece is the fork head of the push tube.1
<i>Thermo-switch</i>	The thermo-switch in the motor controls thermal and electrical overload and switches off the motor in an emergency. The actuator must not be operated until the actuator temperature has fallen below the switching threshold.
<i>Brake</i>	The brake is attached to the threaded spindle and serves to brake it.
<i>Limit switch</i>	The actuator is equipped with two internal limit switches, which turn the actuator off at the limit positions. An <b>additional emergency limit</b> switch de-energizes the linear actuator if one of the limit switches fails. Switching on the RUNNER™ again is then no longer possible and the actuator has to be returned to the manufacturer. (see <i>Manufacturer Address</i> , page 6).

Structure and Function

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## Options and accessories

### Options

Options can be seen on the type plate from the type designation.

<i>Emergency lowering mechanism</i>	It is possible to equip the actuator with an optional emergency lowering mechanism for patient lifter applications. Then it is possible, e.g. as happens with a power failure or actuator malfunction, to manually lower the lifter; also see the section <i>Emergency Shut-down</i> , page 15.
<i>Electric entrapment safeguard</i>	The <i>electric entrapment safeguard</i> is an electrical switch that switches off the linear actuator when the stroke is hindered by an object or a body part.
<i>Impulse sender</i>	With the Hall sensor, the <i>impulse sender</i> picks up impulses from a magnetic disk located on the threaded spindle.
<i>Linear potentiometer</i>	The <i>Linear potentiometer</i> determines the position through the resistance value (actual value) and therefore registers the absolute path.
<i>IPX6S</i>	The linear actuator RUNNER™ can be optionally supplied with method of protection <i>IPX6S</i> . It is then also RUNNER™ protected from water sprays (also see 4. <i>Normal Operation</i> , page 14).

### Accessories

<i>Control unit</i>	The linear actuator RUNNER™ needs a Magnetic control unit to power the motor. Only use Magnetic controller units.
<i>Operating elements</i>	You can operate the linear actuator RUNNER™ remotely by means of the Magnetic operating element on the control unit. Only use Magnetic operating elements.

**Important: Magnetic Elektromotoren AG will not take any liability if the linear actuator RUNNER™ is not used with a suitable Magnetic control unit / operating unit.**

## Normal Operation

### 4. Normal Operation

This chapter is directed at the user groups *operator* and *operating authority*. It gives all the information that they need for the safe and smooth use of the linear actuator under normal operating conditions.

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### Normal Operation


In normal operation, the linear actuator raises and lowers elements that are connected with the RUNNER™ through the two fork heads.


#### Preconditions for operation

Control of the RUNNER™ takes place through a Magnetic control unit (accessory).

#### Switching on the linear actuator

	<b>⚠ WARNING</b>
	<p>Warning of danger of crushing and damage to the RUNNER™ owing to static and dynamic overloading of the linear actuator. When driving against fixed objects the impact of the force can cause personal injury. Make sure that there are no persons or fixed objects present in the danger zone during the stroke..</p> <ul style="list-style-type: none"><li>• Note the maximum permissible operating data in the Annex (see <i>Operations data</i>, page 27)</li><li>• Note the type plate of the linear actuator</li></ul>

	<b>⚠ WARNING</b>
	<p>Warning of side-acting forces. Side forces destroy the actuator and pose a danger to people. During the stroke, do not manipulate any of the elements that are connected to the RUNNER™.</p>

	<b>⚠ CAUTION</b>
	<p>Take care about damage to the RUNNER™ from water sprays. The linear actuator RUNNER™ is splashproofed according to IPX4S, optionally hoseproofed according to IPX6S. These protection types are not guaranteed during the inward and outward movement. Prevent the RUNNER™ from being subjected to water sprays or hosing during the stroke.</p>

Normal Operation

The Magnetic control unit must be connected to the electrical main. Operation takes place through a Magnetic operating element (also see *Accessories*, page 13).

*Emergency lowering mechanism*

For patient lifter applications with an emergency lowering system, it is desirable in special cases, such as in a power failure or actuator malfunction, to lower the load by turning by hand.

**Note: needing to use excessive force or an independent downward movement indicate a damaged actuator. The RUNNER™ must not be run any more. Immediately inform the manufacturer that performs the inspection.**

**Emergency Shutdown**

1 Pull out the plug of the cable that connects the linear actuator to the control unit.

**Note: The RUNNER™ does not have an on / off switch and must be separated from the power supply to the control unit. Only this measure will de-energize the RUNNER™.**

*Patient lifter*

An emergency off switch is absolutely essential for patient lifters.

**Note: The emergency shut-off switch must be fitted by the executor.**

## Special Operations

The following chapters are part of the special operations:

- 5. *Installation and Initial Start-Up*, page 16
- 6. *Maintenance, Clearing malfunctions, Repairs*, page 20
- 7. *Removing from service, dismantling and disposal*, page 25

### 5. Installation and Initial Start-Up

This chapter is intended for the *engineers* and *those doing the further processing*. It gives all the information that you need to assemble, connect and start up the linear actuator RUNNER™.

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#### Preparation

Good preparation is a part of efficient installation and start-up. This includes, among other things, deciding on a location for it and having an energy source ready.

#### Transport

**Note:** At the time of delivery, the actuator must be checked for cracks in the housing. Immediately report any transportation damage that is found in writing to the transporters and the manufacturer.

The linear actuator RUNNER™ is delivered as a unit in one box or in palettes. Contract a transportation company with the freight of the linear actuator.

*Return to the manufacturer*

Prepare the linear actuator for transport as follows:

- 1 Dismantle the linear actuator (see *Dismantling*, page 25)
- 2 Pack the linear actuator carefully

**Note:** you will find the weight, dimensions and the environmental requirements in the technical data in the appendix (*Technical data*, page 27).

#### Check Items in Shipment

The linear actuator consists of:

- a complete actuator unit with gear, motor and linear unit
- a cable with the low-voltage plug

#### Energy supply

The linear unit RUNNER™ runs solely on electricity. Observe the connection values in the appendix of this manual (chapter *Technical data*, page 27).



Installation and Initial Start-Up

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## Installation and Connections

Installing the linear actuator RUNNER™ on other elements (patient lift, etc.) involves taking into account the special requirements of the different applications.

The linear actuator RUNNER™ is fastened to two elements via the fork head and the hinge head.

The following sections show how to set up and align the linear actuator, as well as the interfaces and connections. RUNNER™

### Set-up and Adjustment

In setting up and aligning the linear actuator, RUNNER™ the following points must be observed.

Make sure that

- the acting force is always applied centrally to the push tube. Laterally acting forces, or those that exert a torque on the linear unit, can damage the actuator.
- the actuator is not obstructed in any way in the entire stroke area.
- the cable is not pinched or caught or subject to tension stress.

*Emergency lowering mechanism for pulling application*

Make sure that

- the acting force is always applied centrally to the push tube. Laterally acting forces, or those that exert a torque on the linear unit, can damage the actuator.
- the actuator is not obstructed in any way in the entire stroke area.
- the cable is not pinched or caught or subject to tension stress.
- an **external mechanical emergency stop is fitted**.

**Note: An external mechanical emergency stop must be fitted by the executor. The actuator with emergency lowering mechanism must not be operated for pulling applications without an emergency stop.**


### Interfaces and Connections

Take the nominal values from the appendix (section *Technical data*, page 27). Check the following interfaces and connections:

- Interfaces of the application fastened to the fork head and hinge head
- Connection to a Magnetic controller (see *Accessories*, page 13)
- Connection to a Magnetic operating element (see *Accessories*, page 13)

Installation and Initial Start-Up

Installation

	<b>⚠ WARNING</b>
	<p>Warning of hand injury from being caught in the fork head of the push tube when the motor is running. There will be a rotating motion as long as the fork head is not installed in a device. Do not let any object or person come into contact with the fork head of the push tube when the motor is running. Hold onto the RUNNER™ only at the guide tube.</p>

Proceed as follows for installation:

- 1 Secure the elements that you want to connect the linear actuator to, so that you can place the RUNNER™ between them.
- 2 Connect the fork head and the hinge head with the elements
- 3 Mount the elements on the fork head and on the hinge head with fastening bolts

**Note: The fastening bolts are not supplied. The bore dimensions can be found in the *Plans and schemes*, page 27 section. Please ensure that the connection cannot become loose unintentionally.**

**Note: there must be no lateral force nor any torque acting on the linear actuator.**

- 4 Connect the linear actuator RUNNER™ with the matching control unit by connecting the plug with the motor output of the control unit.
- 5 Lock the low voltage plug in of the Magnetic controller
- 6 Connect the Magnetic operating element to the Magnetic control unit (see applicable operating instructions)
- 7 Connect the Magnetic control unit to the electrical main (see applicable operating instructions)

Now you can operate the linear actuator according to the operating instructions for the Magnetic controller.

**Important: Magnetic Elektromotoren AG will not take any liability if the linear actuator RUNNER™ is not used with a suitable Magnetic control unit / operating unit.**


**Note: If the linear actuator RUNNER™ is used with a non Magnetic control unit, the control unit has to be equipped with an overcurrent protection in order to protect the actuator against overload. The actuator has to be stopped immediately if the current at RU20, RU21, RU22 of 7.7 A and at RU23, RU24, RU25 of 12 A is exceeded during max. 50 ms. To start the actuator the overcurrent protection has to be deactivated during max. 250 ms.**

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## Initial Start-Up

Perform the installation check before you initially start up the linear actuator RUNNER™.

### Installation Check

	<b>⚠ WARNING</b>
	<p>Warning of danger of crushing and damage to the RUNNER™ owing to static and dynamic overloading of the linear actuator. When driving against fixed objects the impact of the force can cause personal injury. Make sure that there are no persons or fixed objects present in the danger zone during the stroke..</p> <ul style="list-style-type: none"><li>• Note the maximum permissible operating data in the Annex (see <i>Operations data</i>, page 27)</li><li>• Note the type plate of the linear actuator</li></ul>

Check the following points before the commissioning:

- No side forces acting on the push tube
- No torque on the push tube
- Fastening bolts on the fork head and the hinge head secured
- Entire stroke area not obstructed, so that the actuator cannot be driven onto a fixed object
- Electrical supply ensured through a Magnetic control unit (low voltage plug connected correctly to Magnetic control unit)
- Magnetic operating element connected to the Magnetic control unit

### Initial Start-Up

After the installation check has been completed, you can start up the linear actuator RUNNER™: To do so, press the corresponding operating button of the Magnetic operating element.

## 6. Maintenance, Clearing malfunctions, Repairs

This chapter is intended for the *engineers and those doing the further processing*. It **RUNNER™** provides you all the information that you need for maintenance, clearing malfunctions and doing repairs on the linear actuator.

---


### Maintenance

The maintenance includes all the work that serves to keep the functioning linear actuator operational. It also includes inspections, replacement of worn-out parts and cleaning.

#### Maintenance plan

The linear actuator **RUNNER™** is maintenance-free for life (the life-span is given in the Appendix *Operations data*, page 27) The connecting cable and the housing must be regularly checked for wear.

#### Cleaning

	<b>⚠ CAUTION</b>
	<p>Take care about damage to the <b>RUNNER™</b> from water sprays. The linear actuator <b>RUNNER™</b> is splashproofed according to IPX4S, optionally hoseproofed according to IPX6S. These protection types are not guaranteed during the inward and outward movement. Prevent the <b>RUNNER™</b> from being subjected to water sprays or hosing during the stroke.</p>

Observe the following points when cleaning:

- Wash water, including added chemicals must be pH-neutral.
- acidic or basic wash water can destroy metallic and synthetic parts.

#### Medical area

- Handwash disinfecting exclusively with *Isopropylalcohol*

#### Emergency lowering mechanism

For patient lifters with an emergency lowering mechanism, the following must also be observed:

- Disinfect **and clean the emergency lowering mechanism only with "propyl alcohol"**
- The emergency lowering mechanism must not be treated with oil, grease or any other lubricant
- In case of malfunctioning of the emergency lowering mechanism, immediately inform the manufacturer of the patient lifter

**Note: cleaning agents other than those mentioned will damage the linear actuator. In all cases contact the manufacturer if you want to use other cleaning agents.**

Maintenance, Clearing malfunctions, Repairs

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## Malfunctions

Faults that occur in the linear actuator RUNNER™ may only be rectified by a technician authorized by the manufacturer. In this case the RUNNER™ must be removed from service (see section *Shutting down*, page 25) and sent to the Magnetic Elektromotoren AG (see section *Transport*, page 16).

In the following sections, you will find hints on how you can recognize, remedy or handle malfunctions.

**Note:** In any case, immediately inform the customer service (see *Manufacturer Address*, page 6) if the fault cannot be rectified on the basis of the following instructions.

### Recognizing malfunctions

**Symptom 1:** Linear actuator RUNNER™ doesn't move

Hypothesis 1-A: No supply voltage or absence of plug contact

- 1 Plug the low voltage plug of the RUNNER™ to the Magnetic control unit
- 2 Plug the mains cable of the Magnetic control unit into a mains socket

Finding: RUNNER™ does it move now?

Yes. . . . . 4. *Normal Operation*, page 14  
No . . . . . *Hypothesis 1-B*

Hypothesis 1-B: Motor cable defective

- 1 Check the motor cable for squeezing, tears and other damage

Finding: Motor cable damaged?

Yes. . . . . *Manufacturer Address*, page 6  
No . . . . . *Hypothesis 1-C*

Hypothesis 1-C: Hindrance is preventing the RUNNER™

- 1 Remove all objects that impede the stroke

Finding: RUNNER™ does it move now?

Yes. . . . . 4. *Normal Operation*, page 14  
No . . . . . *Hypothesis 1-D*

Hypothesis 1-D: Wrong control unit

Maintenance, Clearing malfunctions, Repairs

- 1 Check the type plate of the controller

Finding: Is the manufacturer of the controller that Magnetic Elektromotoren AG and permitted for the RUNNER™?

Yes..... Hypothesis 1-E  
No ..... Replace control unit

Hypothesis 1-E: Wrong useful load

- 1 Check the type plate of the linear actuator
- 2 Measure the static or dynamic load

Finding: Has the useful load been exceeded (see *Technical data*, page 27)?

Yes..... *Manufacturer Address*, page 6  
No ..... Hypothesis 1-F

Hypothesis 1-F: Control unit defective

- 1 Carry out the troubleshooting of the Magnetic controller

Finding: Is the Magnetic controller faulty?

Yes..... Replace control unit  
No ..... Hypothesis 1-G

Hypothesis 1-G: Life exceeded

Finding: Is the linear actuator RUNNER™ older than 10 years or has it carried out more than 20'000 double strokes?

Yes..... *Manufacturer Address*, page 6  
No ..... Hypothesis 1-H

Hypothesis 1-H: Pilotherm stopped actuator

- 1 Isolate the actuator from the controller and let the actuator cool for about 20 minutes

**Note: The actuator must not be operated until the actuator temperature has gone below the switching threshold.**

Finding: RUNNER™ does it move now?

Yes..... *4. Normal Operation*, page 14  
No ..... *Manufacturer Address*, page 6

Hypothesis 1-I: The actuator cannot be made to move by any of the measures listed above

- 1 Immediately contact the manufacturer (*Manufacturer Address*, page 6)

Maintenance, Clearing malfunctions, Repairs

**Symptom 2: Actuator can't be operated**

Hypothesis 2-A: Magnetic operating element defective

- 1 Check the type plate of the operating element

Finding: Is the manufacturer of the operating elements the Magnetic Elektromotoren AG and permitted for the RUNNER™?

Yes..... *Manufacturer Address, page 6*  
No ..... *Replace operating element*

**Symptom 3: Cannot be lifted**

Hypothesis 3-A: Spindle nut defective

- 1 Remove all objects that impede the stroke
- 2 Remove all loads on the elements

Finding: Does the actuator move normally?

Yes..... *4. Normal Operation, page 14*  
No ..... *Manufacturer Address, page 6*

**Symptom 4: Greatly reduced speed**

Hypothesis 4-A: Motor, gears, toothed belt or spindle nut faulty

- 1 Remove all objects that impede the stroke
- 2 Remove all loads on the elements

Finding: Is the speed normal again?

Yes..... *4. Normal Operation, page 14*  
No ..... *Manufacturer Address, page 6*

**Symptom 5: Greatly increased running noises**

Hypothesis 5-A: Motor, gears, toothed belt or spindle nut faulty

- 1 Remove all objects that impede the stroke
- 2 Remove all loads on the elements

Finding: Still elevated running noises?

Yes..... *Manufacturer Address, page 6*  
No ..... *4. Normal Operation, page 14*

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Maintenance, Clearing malfunctions, Repairs

**Symptom 6:** Increased play in the guiding system

**Diagnosis 6-A:** Sliding elements worn, immediately inform customer service (*Manufacturer Address, page 6*).

---

## Repair

The linear actuator RUNNER™ is not designed for repair work. In any case, contact customer service (*Manufacturer Address, page 6*).

*Emergency lowering mechanism*

If there is excessive rotational force or extremely easy motion under nominal load (i.e. independent downward movement of the actuator), the actuator may no longer be operated. The manufacturer must then check the linear actuator RUNNER™. Contact customer service immediately (*Manufacturer Address, page 6*).



## 7. Removing from service, dismantling and disposal

This chapter is intended for the *engineers and those doing the further processing*. It gives you all the information needed to remove the linear actuator RUNNER™ from service, dismantle it and dispose of it.

---

### Shutting down

The linear actuator RUNNER™ is to be removed from service in the following sequence:

- 1 De-energize the linear actuator by pulling the mains plug of the controller from the power outlet.
- 2 Secure the elements in such a way that there is no load resting on the fork and the hinge head
- 3 Loosen the locking that joints the low-voltage plug of the RUNNER™ with the Magnetic-controller
- 4 Pull the low voltage plug out of the Magnetic controller

Afterwards you can dismantle or reinstall the RUNNER™.

---

### Dismantling

Before you start dismantling, put the linear drive RUNNER™ out of operation (see *Shutting down*, page 25). The linear actuator RUNNER™ is to be dismantled in the following sequence:

- 1 Loosen the fastening bolt from the fastening strap of the fork and hinge head
- 2 Ensure that there is no pressure acting on the fork and hinge head
- 3 Remove the fastening pins
- 4 Separate the linear actuator from the elements

Afterwards, you can prepare the RUNNER™ for transport (see section *Transport*, page 16) or store or dispose of it as described in the following sections.

---

### Storage

For storage, pack the RUNNER™ in its original packaging. Observe the following values when selecting a storage location:

- Ambient temperature: +10 °C to +40 °C
- Atmospheric humidity: 5% to 85%

Removing from service, dismantling and disposal

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## Disposal

The actuator must be disposed of in a technically correct manner in accordance with local specifications. The plastic parts are marked with material specifications on the actual parts (except some of the smallest parts).

Please find dismantling instructions and requirements for transport in their corresponding sections.

## Appendix

### 8. Appendix

This chapter makes it possible for the user to find technical data, directories, schemes and plans quickly.

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#### Technical data

##### Device data

The device data can be taken from the current datasheet.

- Datasheet RUNNER™ RU20, RU21, RU22 (L5321,2540E)
- Datasheet RUNNER™ RU23, RU24, RU25 (L5321,2541E)
- Datasheet RUNNER™ Accessories (L5321,2545E)

The current datasheets are available on the Website (see [www.magnetic.ch](http://www.magnetic.ch)).

##### Operations data

The operating data can be taken from the current datasheet.

- Datasheet RUNNER™ RU20, RU21, RU22 (L5321,2540E)
- Datasheet RUNNER™ RU23, RU24, RU25 (L5321,2541E)
- Datasheet RUNNER™ Accessories (L5321,2545E)

The current datasheets are available on the Website (see [www.magnetic.ch](http://www.magnetic.ch)).

**Note: the linear actuator RUNNER™ is designed for a life of 10 years or 20'000 double strokes (with authorized usage).**

##### Ambient conditions

- Temperature range: +10 °C to +40 °C
- Atmospheric humidity: 5% to 85%

The linear actuator is suitable **only for internal use** and must not be subjected to weathering, strong UV radiation or corrosive or explosive atmospheric media.

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#### Plans and schemes

For viewing the plants and schemes, please contact the manufacturer (see *Manufacturer Address*, page 6). Further information can be taken from the datasheet. The current datasheets are available on the Website (see [www.magnetic.ch](http://www.magnetic.ch)).

Appendix

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### Standards applied

- EN 60601-1
- UL 60601-1

For further information, please contact the manufacturer (see *Manufacturer Address*, page 6).



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