EWELLIX

EWELLIX Linear Actuators

RUNNER

User Manual

We pioneer motion

SCHAEFFLER

Contents

1 About the manual

1.1 Information in this user manual

This manual provides important information on how to work with the device safely and efficiently.

The manual is part of the device, must always be kept in the device's direct proximity and should be available for personnel to read at any time. All personnel working with the device must read and understand this manual before starting any work. Strict compliance with all specified safety notes and instructions is a basic requirement for safety at work.

Moreover, the accident prevention guidelines and general safety regulations applicable at the place of use of the device must also be complied with.

1.2 Symbols

Safety precautions are identified by symbols and signal words as shown. The signal words indicate the severity of the hazard and the chance it could occur. Follow these safety precautions and act cautiously in order to avoid accidents, personal injury and damage to property.

The warning and hazard symbols are defined in accordance with ANSI Z535.6-2011.

1 Warning and hazard symbols

Signs and descriptions	
⚠ DANGER	In case of non-compliance, death or serious injury will occur.
⚠ WARNING	In case of non-compliance, death or serious injury may occur.
⚠ CAUTION	In case of non-compliance, minor or moderate injury may occur.
NOTICE	In case of non-compliance, damage or malfunctions in the product or the adjacent construction may occur.

1.3 Signs

The warning, prohibition, and mandatory signs are defined in accordance with DIN EN ISO 7010 or DIN 4844-2.

2 Warning, prohibition, and mandatory signs

Signs and descriptions	
	General warning
	Electrical voltage warning
	Observe the manual
	Wear protective gloves
	Wear safety shoes
	Wear eye protection

Signs and descriptions	
	Wear ear protection
	Wear head protection
	General mandatory sign

1.4 Availability

A current version of this manual can be found at:
https://www.schaeffler.de/std/2228

Ensure that this manual is always complete and legible and is available to all persons engaged in transporting, fitting, dismantling, commissioning, operating, or maintaining the product.

Keep the manual in a safe place for immediate reference.

1.5 Legal notices

The information in this manual reflects the status at the time of publication.

Unauthorized modifications to or improper use of the product are not permitted. Schaeffler accepts no liability in these cases.

1.6 Limitation of liability

All information and notes in this manual have been compiled in accordance with the applicable standards and regulations, the present status of technology and our many years of knowledge and experience.

The manufacturer is not liable for any damage resulting from:

- failure to observe this manual
- unintended use
- employment of untrained personnel
- unauthorized conversions
- technical changes
- tampering with or removal of screws on the linear actuator
- use of unapproved spare parts

Where the device has been customized, the actual product delivered may differ from the description provided in this manual. In such cases, please contact Schaeffler, to obtain further instructions or information on safety precautions for these devices.

We reserve the right to make technical modifications to the device to improve usability.

1.6.1 Validity

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

- manufacturer: Schaeffler
- product name: EWELLIX linear actuator RUNNER (hereinafter referred to as RUNNER)
- part designation: RU20, RU21, RU22, RU23, RU24, RU25
- year of manufacture: from 2003

1.7 Copyright

This manual is protected by copyright and may be used exclusively by Schaeffler customers for internal purposes.

Distribution of this manual to third parties, reproduction of any kind, including excerpts, as well as the use or disclosure of its content without the written consent of the manufacturer is not permitted, except for internal purposes.

Any copyright violation may become the subject of a future claim for damages.

1.8 Spare parts

This device is not designed to be repaired by the owner or operator. Any warranty or service claims will be rendered invalid immediately if repairs are not carried out by the manufacturer or by another party authorized by the manufacturer.

If the device cannot be repaired on site by authorized personnel it must be dismantled and sent to the manufacturer.

Safety risk from incorrect spare parts

Incorrect or faulty spare parts can compromise safety and result in damage, malfunctions, or complete failure.

- Only use original spare parts from the manufacturer ➤64|15.
- Spare parts in or on the device may only be replaced by the manufacturer. The device must be dismantled and returned to the manufacturer.

1.9 Warranty terms

The manufacturer’s warranty terms apply.

1.10 Customer service

Schaeffler Customer Service is available at any time to assist with technical information and inquiries. The responsible contact person can be reached by telephone, e-mail, or via the Internet, see manufacturer’s address on the back cover. Our employees are also always interested in receiving new information and practical experience. This information and experience helps us improve our products.

1.11 Images

The images in this manual may be schematic representations and may differ from the delivered device.

2 General safety regulations

This section provides an overview of all essential safety aspects for optimum personal protection as well as safe and trouble-free operation. Failure to observe this manual and the safety instructions contained herein may result in significant hazards and potentially lead to serious injury or death.

2.1 Usage for the intended purpose

The actuator has been designed and built exclusively for the intended use described in these instructions.

The actuator may only be used for dynamic central push-loaded or pull-loaded strokes. If the actuator is used in any manner other than as specified here, the manufacturer cannot be held liable for any resulting damage.

The actuator is intended for indoor use only and is used both in medical devices as well as in industrial and construction technology

Any use beyond the intended purpose or deviating from the description above shall be considered misuse and may lead to potentially hazardous situations. Therefore, observe the following:

- Strictly follow all safety precautions and instructions provided in this user manual.
- Do not expose the actuator to weather conditions, strong UV radiation, corrosive or explosive air media, or other aggressive substances.
- Do not alter the structural design or individual components of the actuator
- Never operate the actuator outside its technical application limits and operating ranges.

2.1.1 Service life

The device is designed for a service life of 10 years or 20000 double strokes at a stroke length of 250 mm.

2.1.2 User groups

To ensure safety, we specify requirements for the users of the device that must be adhered to under all circumstances. Only persons who meet these requirements are authorized to use the device.

We define user groups as all persons who operate, commission, further process, or pass on the device for further processing. Since the requirements of these user groups vary considerably depending on their role, we distinguish between the following user groups:

3 User groups

User group	Requirements
operating authority	The operating authority is the contractual partner of the executor or the reseller. The operating authority may be subject to legal conditions when acquiring the product. The operating authority ensures that the user is instructed on the authorized use of the product.
Executing party	The executing party is the contractual partner of the reseller or the manufacturer. They install the product in a system. They are authorized by the manufacturer of the device to use the product in accordance with the regulations and with the necessary technical expertise.
Technician	The technician has the professional technical training to implement the device according to its authorized use. They are familiar with the general safety regulations ➤9|2.
Reseller	The reseller passes the device on.
Operator	We define any other person who uses the device as an operator. The operator must have read the general safety instructions before using the device. In addition, they must be instructed in normal operation by the operating authority ➤9|2.

2.1.3 Operating modes

The device is intended exclusively for intermittent operation ➤60|14.3.

2.1.4 Hazard areas

We distinguish between 2 hazard areas, which must be observed depending on the user group and persons involved.

4 Hazard areas

Danger zone	Requirements
Persons	The danger zone includes not only the actual users but also third parties (other personnel, visitors, patients, etc.). In the event of damage, liability rests with the operator.
Device	The danger zone is the responsibility of the Executors and Technicians user group and includes the control unit and all attached elements.

2.2 Usage not for the intended purpose

Any use other than for the intended purpose without the manufacturer's written consent shall be considered unauthorized. Operation beyond the technical limits shall also be considered unauthorized.

The technical operating limits can be found in the technical data as well as on the label affixed to the device ➤57|14.

The device is suitable for internal use only and must not be subjected to weather conditions, strong UV radiation, or explosive atmospheric media.

Excluded applications:

- applications involving flammable mixtures of anesthetics and air
- applications involving flammable mixtures of anesthetics and oxygen or nitrous oxide
- applications in environments with elevated radiation levels

2.3 Responsibility of the owner and processor

The device has been developed by the owner or processor for commercial applications. The processor is the contracting partner of the reseller or the manufacturer. The processor installs the device into a complete system (application).

The owner or processor of the system is subject to the requirements of the Occupational Health and Environmental Act.

In addition to the safety instructions in this manual, the owner or processor must observe the following in relation to these safety regulations, accident prevention guidelines, and environmental protection regulations applicable at the system's installation site:

- Familiarize themselves with the applicable occupational health and safety regulations and, by means of a risk assessment, identify any additional hazards arising from the specific working conditions at the device's place of use. Implement the hazard assessment in the form of work instructions for operating the device.
- Confirm that the work instructions created for the system, including the device, comply with current legal requirements, and adapt the instructions accordingly
- Clearly define and assign responsibilities for installation, operation, maintenance, and cleaning.
- Ensure that all personnel handling the device have read and understood this manual..
- Provide personnel with the required protective equipment.
- Train personnel regularly and inform them about the dangers.

In addition, the owner or processors must ensure that the device is in proper working condition. They must do the following:

- Ensure that the maintenance intervals described in this manual are observed.
- Have all safety devices checked regularly to ensure their correct operation and completeness.

2.4 Personnel requirements

Operator duties:

- Ensure that only qualified and authorized personnel carry out the activities described in these instructions.
- Ensure that personal protective equipment is used.

Only persons who can be expected to reliably perform their tasks are permitted. Persons whose ability to react is impaired, e.g., due to drugs, alcohol, or medication, are not permitted.

2.4.1 Qualifications

For the various areas of activity described in this manual, the following qualifications are required:

Operator

The operator has been instructed by the customer on the assigned tasks and possible hazards in the event of improper conduct.

Qualified personnel

Qualified personnel meet the following criteria:

- Product knowledge, e.g. by receiving training on how to use the product
- are fully familiar with the contents of this manual and, in particular, with all of the safety instructions
- are familiar with the relevant country-specific regulations

Qualified personnel, on the basis of their technical training, knowledge, and experience as well as familiarity with the applicable standards and regulations, are capable of performing the work assigned to them and of independently recognizing and avoiding potential hazards.

Electrically skilled person

An electrically skilled person, on the basis of their technical training, knowledge, and experience as well as familiarity with the applicable standards and regulations, is capable of performing work on electrical systems and of independently recognizing and avoiding potential hazards.

The electrically skilled person is trained for the specific place of use and is familiar with the applicable standards and regulations.

2.5 Hazards

This section lists the residual risks identified by the risk assessment.

The manufacturer has minimized the effects of existing hazards through design and protective measures. Pay attention to the residual hazards and potential countermeasures described in the following sections, as well as to the warning notices.

Danger to life caused by electric current

Touching live parts poses an immediate danger to life. Damage to insulation or individual components can also pose a danger to life. Therefore, observe the following:

- In an emergency, the actuator must be disconnected from the control unit or power supply.
- Applications with built-in actuators must provide an emergency stop switch or isolation from the mains supply on all power lines.
- Prevent the runner from being subjected to spray water or hosing during the stroke.
- If the insulation is damaged, immediately disconnect the power supply and arrange for the defective parts to be repaired.
- Work on the electrical system may only be carried out by electrically skilled persons.
- Disconnect the system from the power supply before performing any work on the electrical system.
- Before maintenance, cleaning, or repair work, disconnect the power supply and secure it against reconnection.
- Do not bypass or disable fuses. When replacing fuses, ensure the correct current rating is used.
- Keep moisture away from live parts to prevent short circuits.

Risk of injury from moving parts

Rotating parts or parts with linear motion can cause serious injury. Therefore, observe the following:

- Do not working on moving parts.
- Keep your entire body, hands, and arms away from moving components.

Risk of injury from crushing

Impact against fixed objects may result in injury due to the force exerted.

- Ensure that no persons are in the hazard area during the stroke.
- Make that no objects or persons come into contact with the push tube or protection tube at the front or rear attachment.

Risk of injury from pinching in the fork head

Hand injuries may occur from pinching in the fork head of the push tube when the motor is running. As long as the fork head is not installed in a device, rotary motion will occur.

- As long as the fork head is not installed in a device, rotary motion will occur. Make sure that no objects or persons come into contact with the fork head of the push tube when the motor is running.
- Hold the runner only by the guide tube.

Risk of injury from pinching

If the actuator runs into fixed objects, the driving force can cause personal injury.

- If the actuator is left unattended, ensure that the full stroke length is free of obstructions and that no persons are located in the stroke area.
- Alternatively, provide a means of disconnecting all power lines from the mains power supply.

Risk of injury from damaged housing

Injury due to cracks and related openings in the housing of the actuator or its accessories.

- If the housing is damaged due to products, breakage or heavy wear, cease using the device and follow the disassembly instructions.

Risk of injury from gap openings

Customized runners that do not meet the gap opening requirements (e.g., IP degree of protection lower than IPX4) must be provided with a cover in the final application.

Property damage

- Any lateral force can destroy the actuator. Do not tamper with elements connected to the actuator during the stroke.
- Impact against fixed objects may result in injury due to the force exerted. Ensure that no fixed objects are in the hazard area during the stroke.
- Risk of damage to the linear actuator from static and dynamic overloading of the actuator. Do not use the actuator beyond the permissible operating data.

2.6 Safety equipment

⚠ WARNING

Faulty safety equipment

Risk of injury from malfunctioning safety equipment

- To ensure safe operation, all functions must be in perfect working condition.
- Always very the function of the safety equipment in accordance with the maintenance plan ➤49|11.1
- Never deactivate safety equipment.
- Safety equipment must never be bypassed or modified.

The processor determines which application requires the installation of the following safety systems:

- emergency stop system
- Power indicator lamp
- integrated power shut-off in the EWELLIX control unit

integration of an emergency stop system (for certain applications)

The device is intended exclusively for installation in an application system. It has no operating elements of its own and no independent emergency stop function. Please observe the following:

- Install the device in such a way that it is part of an emergency stop system and can be stopped if necessary.
- The emergency stop device must be connected in such a way that an interruption of the power supply, or restoration of the power supply after an interruption, does not cause any hazard to persons or property.
- Emergency stop equipment must always be freely accessible.

Power indicator lamp

The device has no dedicated operating indicator (LED) to show the equipment is ready for use or to show the movement of the stroke.

- Visualization is provided by the indicator light on the operating element.
- Push-to-run operation is recommended: The actuator operates for as long as the switch is pressed.
- If the device has no signals to indicate operation, it is recommended that an operating signal be installed in the third-party control unit, depending on the application

integrated power shut-off in the EWELLIX control unit

The device has been designed in conjunction with control units developed by Schaeffler.

- These control units (BCU, VCU, SCU) ensure double insulation (2 MOPP; patient protection) from the mains supply, including PE (protective grounding).
- In addition, all of these control units have an integrated (programmable) power shut-off. This ensures that a short circuit in the actuator will shut off the power supply.

Control units not approved by Schaeffler are treated as third-party control units and must meet the requirements for external controllers ➤26|4.2.4.

2.6.1 Securing against reconnection

When working in hazard zones, there is a risk that the power supply could be turned on without prior authorization. Uncontrolled reconnection represents a potentially life-threatening situation for people within the danger zone.

Observe the following:

- Follow the instructions provided in this user manual on preventing uncontrolled reconnection of the power supply.
- Follow the steps described below to secure against reconnection.

Securing the product against reconnection

▸ Remove the control unit's powerline plug from the socket and secure it against replugging.

2.7 Modifications to the device

To avoid hazardous situations and to ensure optimal performance, do not make any changes or modifications to the device that have not been specifically authorized by Schaeffler.

2.7.1 Warning notices

Symbols and warning signs are located in the hazard zone. They refer to the immediate surroundings.

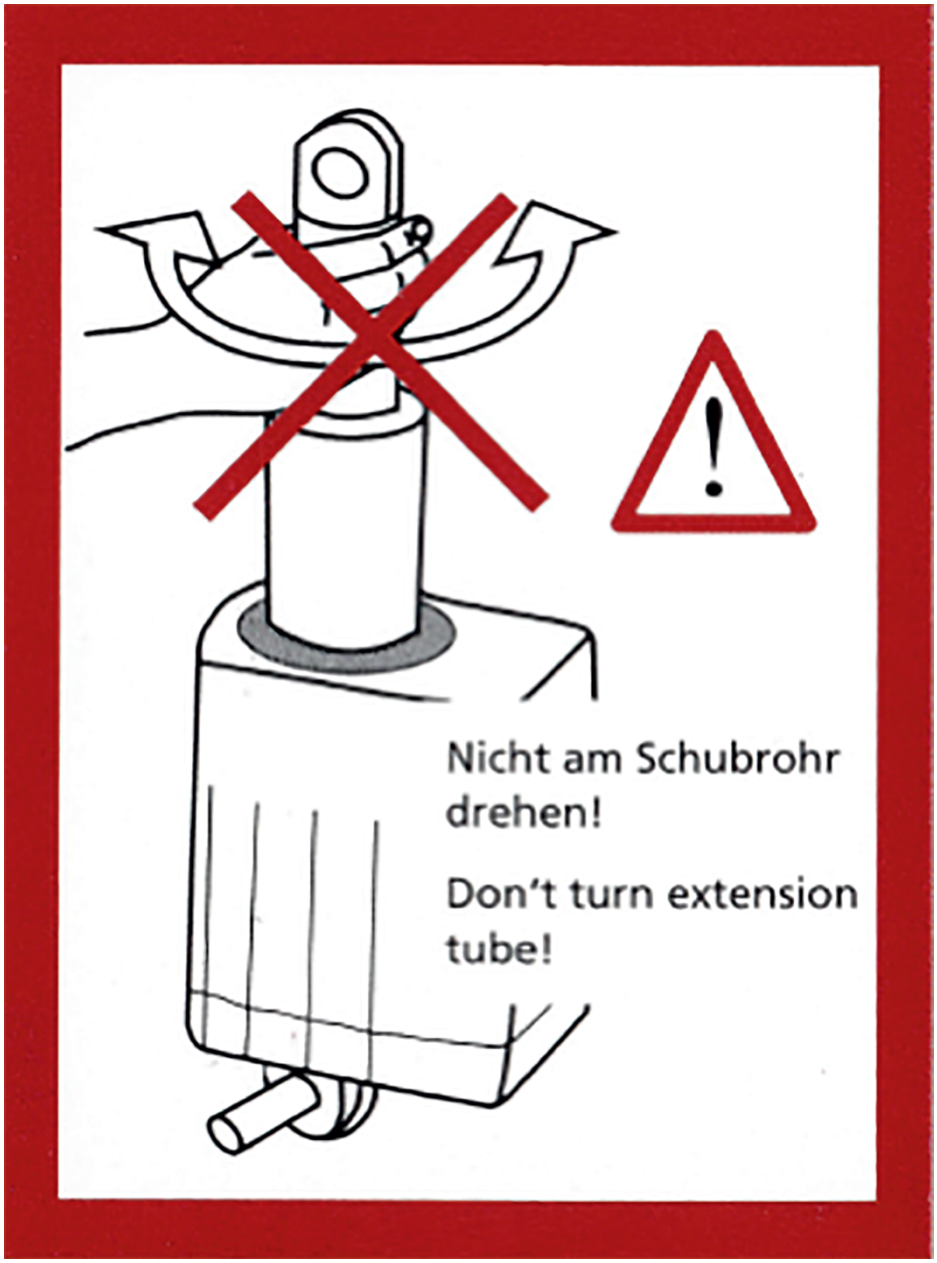
A description of the symbols and signs can be found in the section About the manual ➤6|1.

Stickers and warning signs may become dirty or illegible over time or for other reasons. Please observe the following:

- Ensure that all safety instructions, warning notices, and operating instructions remain legible at all times.
- Replace damaged stickers and warning signs

Do not rotate the push tube

1 Do not rotate the push tube



NOTICE

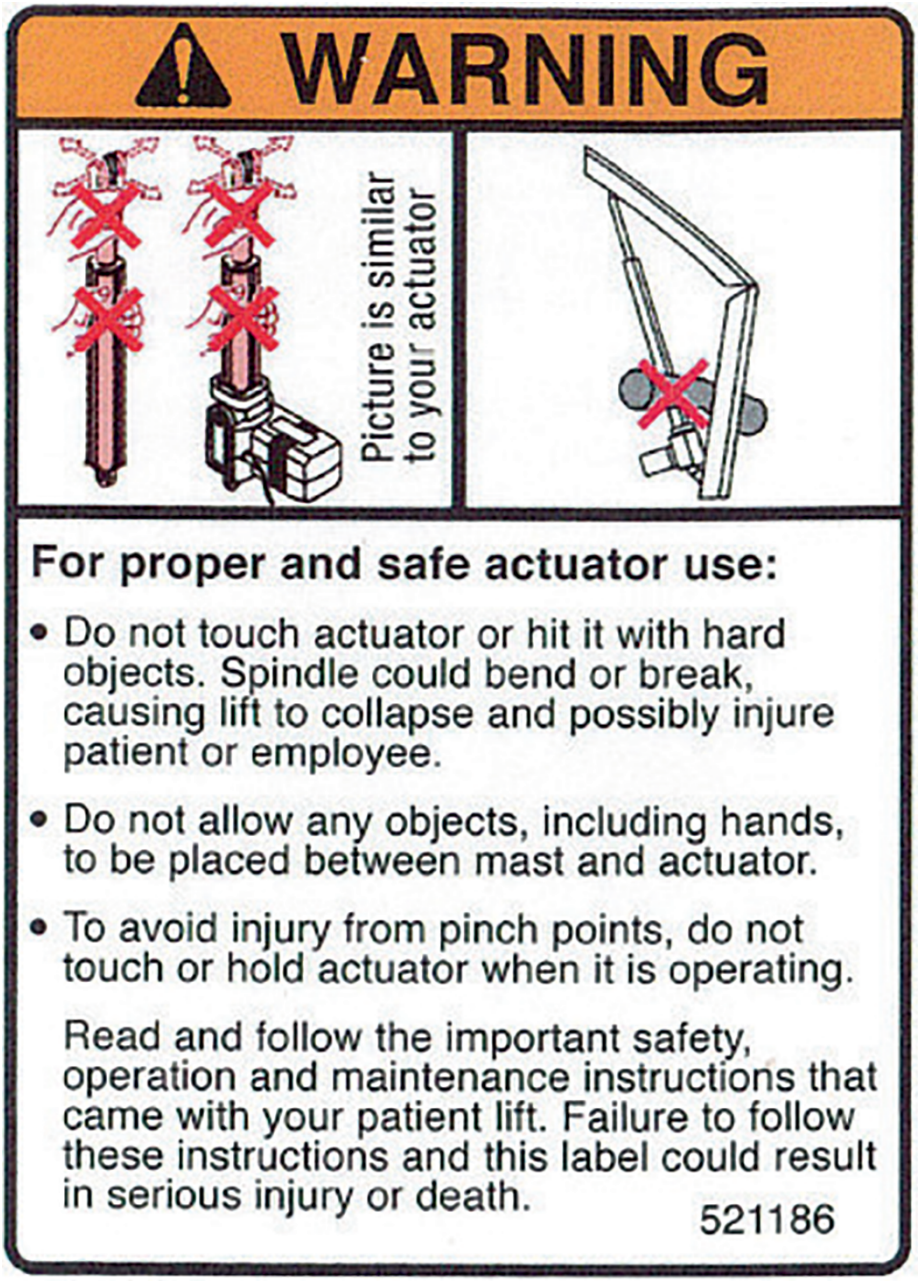
Risk of property damage from rotating the push tube

Rotating the push tube may activate the internal safety mechanism. The actuator will no longer function.

- Do not rotate the push tube

Touching the actuator

2 Sticker: WARNING – Shear force



⚠ CAUTION

Risk of injury from spindle damage

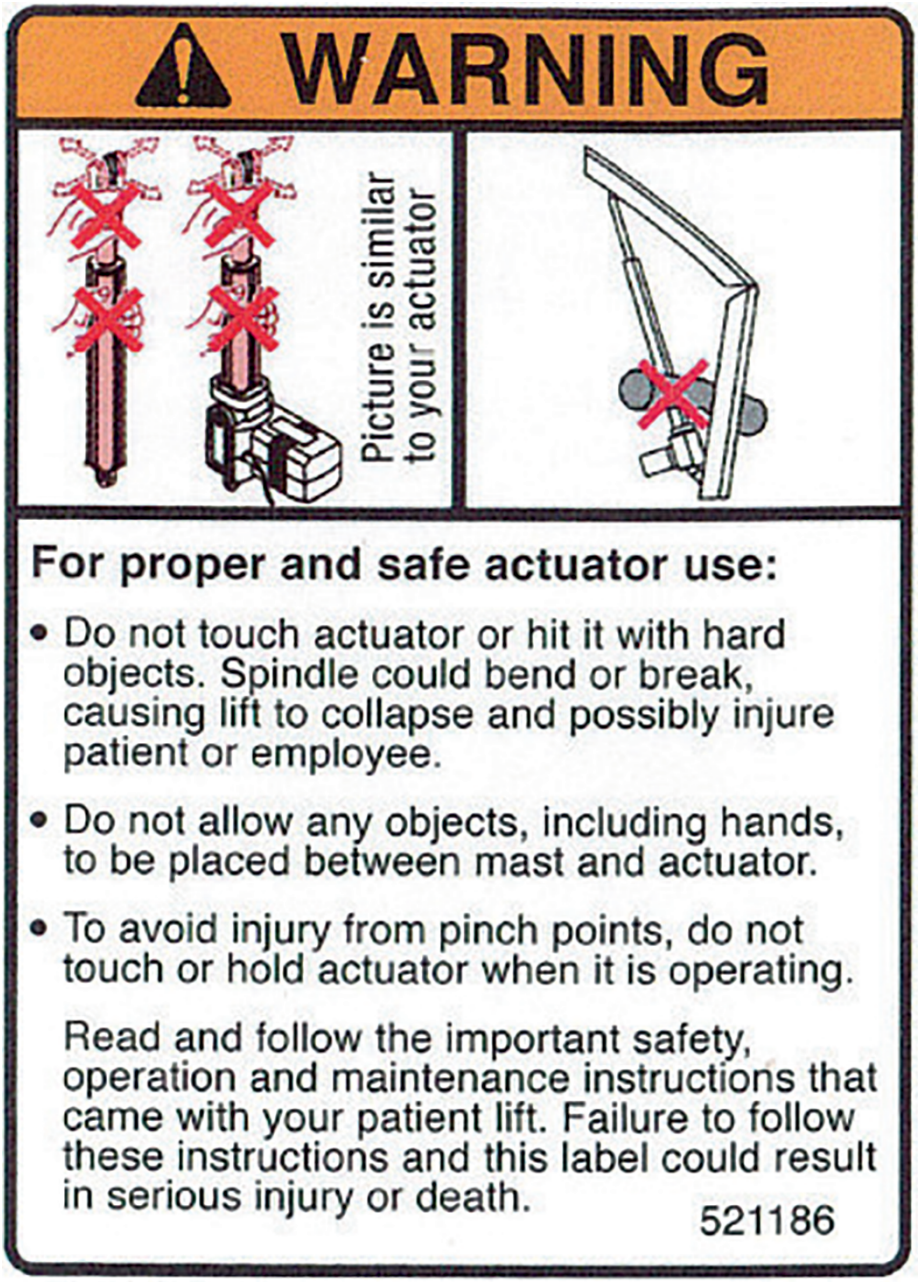
The spindle may bend or break

- Never touch the actuator between the mast and the actuator.
- Never touch the actuator when it is in operation.

2.7.2 Sticker

For a stroke length of 300 mm or more, the manufacturer must affix the sticker to the actuator before delivery. This sticker must be affixed to the actuator by the manufacturer of the lifter and must be clearly visible to patients and nursing staff.

3 Sticker: WARNING – Shear force



2.8 Manufacturer’s declaration of EMC compliance

This section is only valid if the devices are approved and used for medical applications or environments in accordance with DIN EN 60601-1-2.

An EMC declaration of conformity for the device can be provided upon request.

A report is available in accordance with generic standards DIN EN 61000-6-2 and EN 61000-6-3.

Depending on the final application and the environment, EMC tests (immunity and emission) are required in order to meet the standards.

Medical electrical equipment

- Emission: DIN EN 60601-1-2
- Immunity: DIN EN 60601-1-2

Industrial environments (generic standards)

- Emission: DIN EN 61000-6-2
- Immunity: EN 61000-6-4

Residential, commercial, and light-industrial environments (generic standards)

- Emission: EN 61000-6-3
- Immunity: DIN EN IEC 61000-6-1

3 Scope of delivery

The scope of delivery comprises:

- Actuator
- User manual
- Sticker: Do not rotate the push tube ➤15|2.7.1
- Sticker: WARNING – Shear force ➤17|2.7.2

3.1 Check for damage during transit

1. Check the product immediately upon delivery for any damage during transit.
2. Do not accept delivery, or only accept it with reservation, if transport damage is found.
3. Record the extent of damage on the transport documents or the carrier's delivery note.
4. Report any damage during transit promptly as a complaint to the carrier.

Report any damage as soon as it is discovered. Claims for damages can only be made within the applicable claim period stipulated by the transport company.

3.2 Check for defects

1. Check the product immediately upon delivery for any visible defects.
2. Check the product for completeness immediately upon delivery.
3. Report any defects promptly to the distributor of the product.
4. Do not put damaged products into operation.

4 Product description

The EWELLIX Linear Actuator RUNNER is a very compact and powerful actuator designed for holding and moving loads of up to 12 kN. The actuator operates very quietly and with low vibration. The RUNNER features a robust design for a long service life.

The standard version includes a safety nut, limit switches, and a jack plug (DIN with optional encoder).

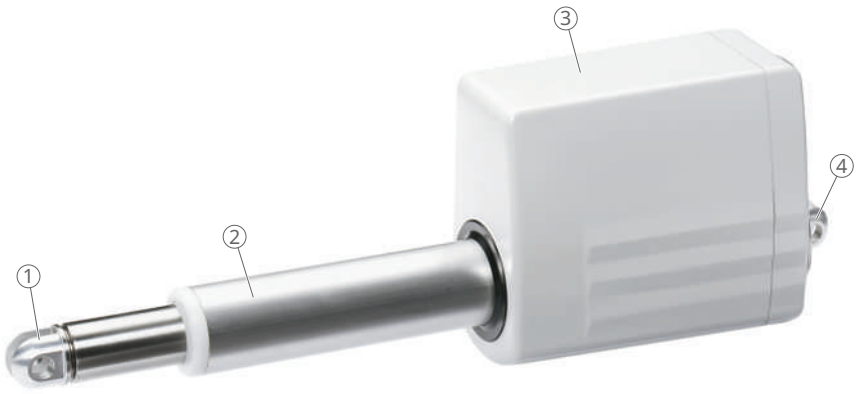
With a safety factor of 4 at a stroke length of up to 250 mm, the runner is ideally suited for medical applications. Thanks to its performance, it is also suitable for specialized applications in the industrial sector.

The device can also be fitted with an optional mechanical end stop in the fully extended position.

Advantages

- high push and pull load
- compact
- back up nut included as standard
- high safety factor
- quiet operation

4 RUNNER components



1	Push tube with fork head	2	Protection tube
3	Motor housing (gearbox and motor)	4	Fork head

4.1 Function

Functional principle

The principle of the RUNNER is based on push or pull functions. A push or pull movement is applied by means of a push tube. The built-in brake decelerates the movement or holds the position when at a standstill. No lateral pressure or torque may be exerted.

The RUNNER must be equipped with a control unit and an operating element from Schaeffler.

Core

The core is the load-bearing component that connects the motor unit, gearbox, and linear unit.

Motor housing

The motor housing is a two-piece plastic housing. and must not be opened under any circumstances. The power supply cable is permanently integrated into the motor housing. The motor unit and the gearbox are located inside the motor housing.

Motor unit

The permanent magnet motor is a direct current motor that drives the gearbox via the timing belt. The maximum linear speed depends on the load.

Gearbox

The two-stage planetary gearbox is driven by the timing belt, which moves a threaded spindle.

Linear unit

The linear unit is one of the components that is separate from the motor unit. The threaded spindle converts the rotational motion of the gearbox into linear motion via the spindle nut. A safety nut provides additional protection in the event the spindle nut breaks. The push and pull movements are carried out by means of the push tube. The push tube is enclosed and protected by the guide tube. The base of the push tube is connected to the threaded spindle via the spindle nut. The fork head of the push tube is located at the upper end

Thermal switch

The thermal switch in the motor monitors thermal and electrical overload and switches off the motor. The actuator may only be put back into operation once its temperature has dropped below the switch threshold value.

Brake

The brake is attached to the threaded spindle for the purpose of decelerating the spindle and for holding the load.

Limit switches

The actuator is equipped with 2 internal limit switches that switch the actuator off in the end positions. An additional emergency limit switch disconnects the actuator from the power supply if one of the limit switches fails. Once the switch has been activated, the RUNNER cannot be restarted and the actuator must be returned to the manufacturer.

Mechanical end stop

The RUNNER can also be fitted with an optional mechanical end stop in the fully extended position.

4.2 Control unit

A control unit and an operating element (hand switch, foot switch, desk switch) or low-voltage interface are required to operate the device.

The control units specially developed by Schaeffler for the device are BCU, VCU and SCU.

The device does not have its own operating elements. Operation is performed via a Schaeffler operating element connected to an external Schaeffler control unit. Observe the separate user manuals for these devices.

4.2.1 Connections

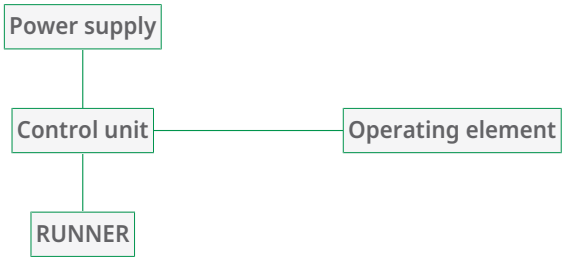
Connection to the power supply

The actuator is connected to the control unit, which is connected directly to the power supply.

Connection to the operating element

The operating element is connected directly to the control unit and controls the movement direction of the actuator.

5 Connections



4.2.2 Control unit

The actuator is only compatible with these control units.

The BCU works with models RU20, RU21, and RU22 only.

The VCU is designed for connecting up to 5 actuators, and the SCU for up to 6 actuators.

The VCU and SCU control units are available with battery operation.

6 EWELLIX Control unit BCU

001CA30C

7 EWELLIX Control unit SCU and VCU

001CA31C

4.2.3 Operating elements

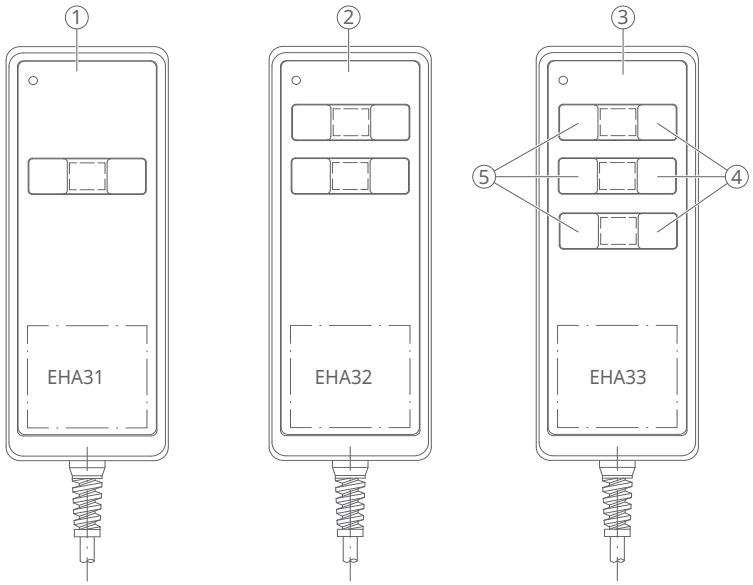
Schaeffler operating elements are available.

- Hand switch EHA3
- Foot switch STJ
- Desk switch STE

8 Hand switch EHA3

001CA32C

9 Manual switch in standard configuration



001CE259

1	Manual switch for 1 actuator	2	Manual switch for 2 actuators
3	Manual switch for 3 actuators	4	Retract actuator
5	Extend actuator		

10 Foot switch STJ

001CA32F

11 Desk switch STE

001CA34C

4.2.4 Requirements for third-party control units

Control units not approved by Schaeffler for the actuator are considered third-party control units.

The use of original Schaeffler control units is strongly recommended for operating the device. If third-party control units are used, well-documented proof must be provided to ensure that the following requirements are met.

- The secondary circuit of third-party control units must be designed as a category 1 overvoltage circuit.
- Third party control units must be fitted with overcurrent cutoff. The maximum current consumption of the linear actuator should not exceed the rated value by more than0.5 A.
- The maximum cutoff value must not exceed the rated value by more than 1 A.
- Example
  - The maximum current consumption is 5 A
  - The recommended cutoff value is 5.5 A
  - The maximum cutoff value is 6 A

The power shut-off must be set differently if the main load direction is in pull mode. The maximum power consumption values for each type can be found in the technical data.

- The third-party control unit must allow the linear actuator to draw currents of up to 25 A for 250 ms following activation (inrush current). The cutoff function for the input power must be temporarily deactivated for this purpose.
- The operating voltage of the linear actuators is DC 24 V to DC 30 V .
- The no-load voltage of DC 36 V must not be exceeded.
- Once the system has been installed, ensure electromagnetic compatibility.

The third-party power supply must provide separation between the primary and secondary circuits in accordance with 2 MOPP and a non-grounded secondary circuit.

Push-to-run operation (recommended)

The linear actuator operates as long as the switch is pressed. If the operating element has no signals to indicate operation, it is recommended to install a standby indicator in the third-party control unit.

4.3 Special features

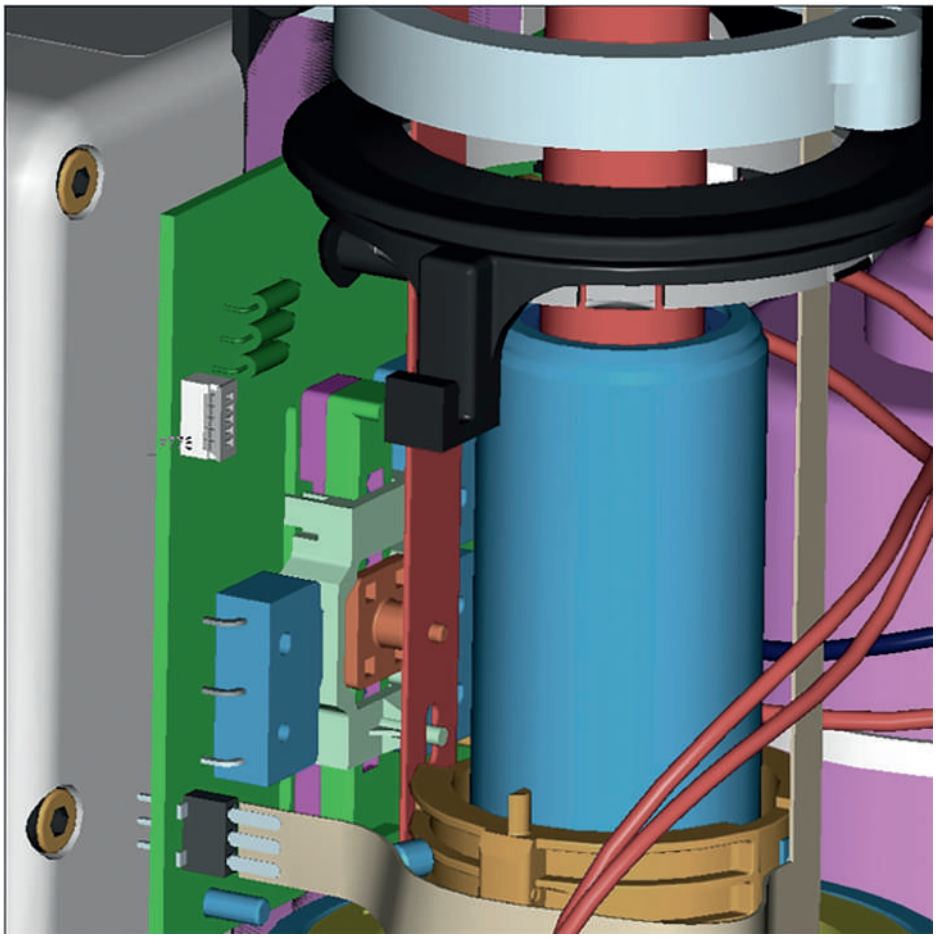
4.3.1 Internal limit switch

The device is equipped with internal power-disconnecting limit switches that stop the device in its end positions. The limit switches are located on the circuit board and are actuated by a rod.

If one of the limit switches is exceeded, the device is shut down by an emergency switch. In this case, the device can no longer be operated and must be returned to the manufacturer for servicing.

Do not lower the actuator by manually turning the push tube. There is a risk that the emergency switch will be activated and the actuator will no longer be movable.

12 Internal limit switch



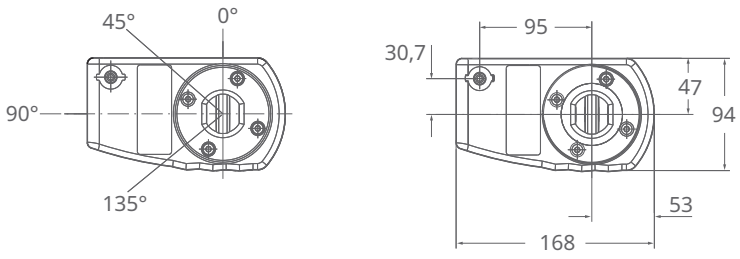
001CA35C

4.3.2 Orientation of the rear mounting

The rear mounting can be oriented at 0°, 45°, 90°, or 135° according to the application's space requirements.

The hole diameter of the mounting bores is 12 mm.

13 Orientation of the rear mounting



001CA37C

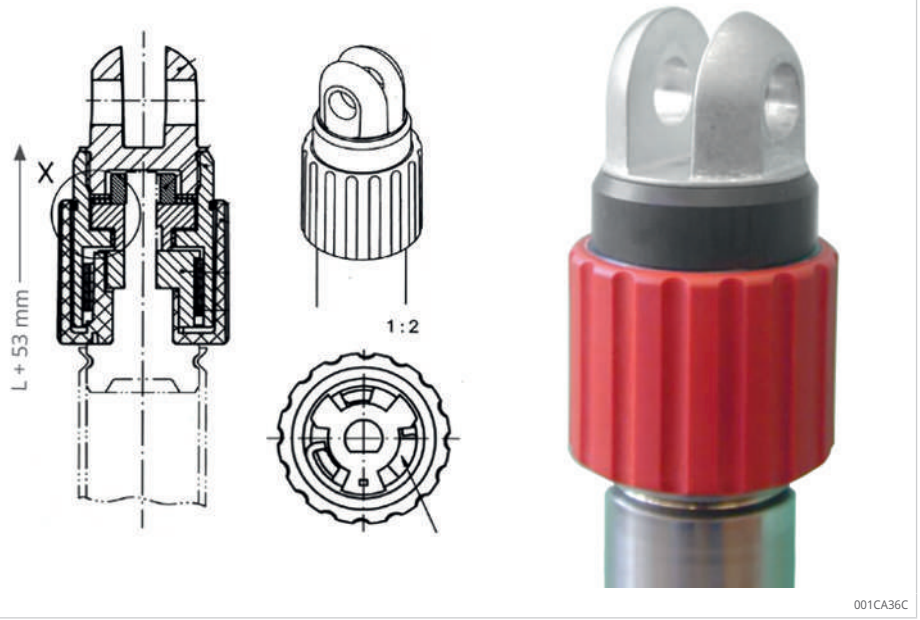
4.4 Options

The type designation on the type plate identifies the available options.

4.4.1 Emergency lowering mechanism

- The actuator can be fitted with an optional emergency lowering mechanism for patient lift applications.
- This allows the lifter to be lowered manually, for example in the event of a power failure or actuator malfunction.
- Up to 1000 manual lowering operations are possible.

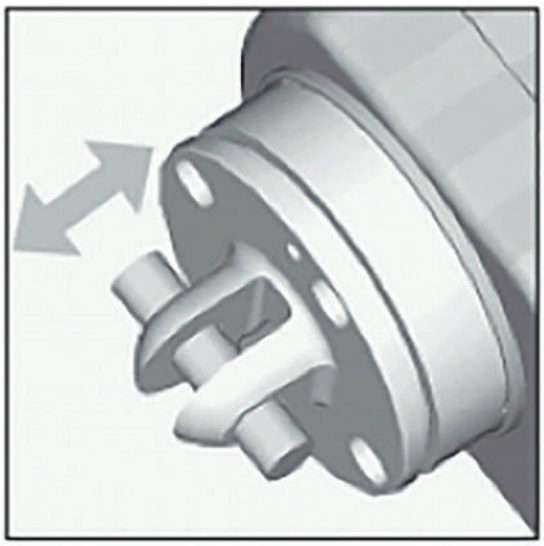
14 Emergency lowering mechanism



4.4.2 Electrical anti-pinch protection

- An optional electrical anti-pinch device can be provided as a shutoff.
- A special rear hinge knob with elongated hole and integrated cutoff pin ensures the actuator is shut off via a microswitch.
- If pinching or entrapment occurs, the pin is lifted out of the mounting bolt, triggering the shutoff.
- Pull load actuators are connected in reverse.

15 Optional anti-pinch



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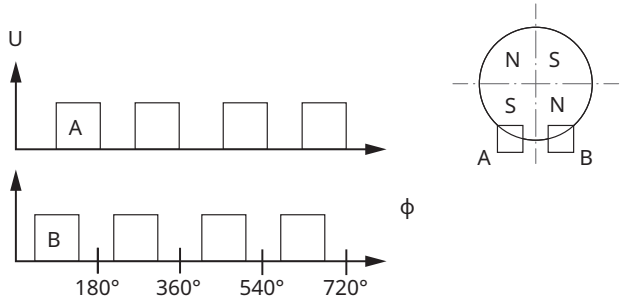
4.4.3 Hall sensor

- Using the Hall sensor, the pulse generator detects impulses from a magnetic plate mounted on the threaded spindle, enabling the relative position and movement direction of the actuator to be determined.
- With this technical feature, the control unit can
  - synchronize movements
  - memorize positions
  - display the height
- Functional principle
  - A magnetic ring with 14 poles is mounted on the thread.
  - 2 sensors (A+B) detect the magnetic field.
  - The control unit counts the flanks of the pulses: 14 poles × 2 flanks × 2 sensors = 56 pulses/revolution.
- 2 Hall sensors with a 45° phase shift enable detection of the movement direction.

16 2 Hall sensors 45° phase shift



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U	V	Voltage
φ	°	Motion angle

5 Stroke per count

Actuator	Thread pitch	Stroke / Count
	mm	µm
RU20, RU23	15	268
RU21, RU24	12	214
RU22, RU25	9	161

4.4.4 Control unit BCU mounted on the device

The system is equipped with a control unit (e.g. BCU) for operating up to 3 actuators. The control unit can be operated independently or mounted on the actuator using an adapter plate.

4.5 Required accessories

6 Required accessories

Accessories	Comments
EWELLIX control unit	The RUNNER requires a control unit to drive the Motor. Only use EWELLIX control units BCU, VCU and SCU.
EWELLIX operating element	You can operate the device remotely RUNNER via the EWELLIX operating element on the control device. Use only the following EWELLIX operating elements: hand switch EHA3, foot switch STJ, desk switch STE.

Schaeffler accepts no liability for damage resulting from use of the actuator without a suitable EWELLIX operating element or accessory.

Details on accessories can be found in the section Accessories

5 Transport and storage

NOTICE

Damage due to improper transport

Improper transport may result in significant property damage.

- Proceed with caution when unloading the packaged goods, during delivery, and during transport to the destination.
- Observe the symbols and instructions on the packaging.
- Do not remove the product from the packaging until immediately before installation.
- Observe the ambient conditions for return transport to the manufacturer.

5.1 Transport

Observe the safety regulations for transport.

Upon delivery, check the product for cracks in the housing. Report any transport damage immediately in writing to the carrier and the manufacturer.

1. Do not destroy the packaging and only remove it shortly before assembly.
2. Keep the packaging in case the product needs to be returned to the manufacturer ➤32|5.3.

If the packaging is to be disposed of:

3. Dispose of packaging material in an environmentally responsible manner.
4. Observe local disposal regulations.

5.2 Storage

Observe the safety regulations for the storage.

1. Store the product in its original packaging and avoid mechanical shocks.
2. For storage periods of ≥ 3 , regularly check the condition of all packaging components.
3. Follow any additional storage instructions detailed on the packaging.

5.3 Return to the manufacturer

Proceed as follows for return transport:

1. Dismantle the device if necessary.
2. Pack the device in its original packaging.
3. Observe the safety instructions for transport and storage.
4. Send to the manufacturer. The address is provided on the back of this operating manual.

6 Mounting

Observe the technical data in accordance with the operating instructions.

Comply with all safety instructions.

Authorized personnel

- Assembly and commissioning may only be carried out by qualified technical personnel.
- Work on the electrical system may only be carried out by trained, electrically skilled persons.

The device requires special precautions with regard to EMC and must be installed and commissioned in accordance with the EMC information contained in this manual ➤19|2.8.

Do not install the device adjacent to or stacked with other equipment. If installation adjacent to or stacking with other equipment is necessary, observe the device to ensure normal operation in the application.

Safety instructions

DANGER

Risk of serious or fatal injuries from live components and moving parts

Serious or fatal injuries may be caused by contact with live components and by unexpected actuator movements.

- Switch off the power supply and secure it against unintentional reconnection before performing any work on the system.

DANGER

Risk of fatal injury from unauthorized reconnection of the power supply

Risk of fatal injury to persons in the hazard area due to moving parts or electric shock if the power supply is switched on without authorization during work on the system and causes the system to restart.

- Before starting work, switch off the system and secure it against reconnection.

WARNING

Risk of injury and equipment damage due to improper installation of optional devices

Risk of injury and property damage if optional devices are installed improperly.

- Install optional devices, particularly components used in retrofits, only in accordance with the respective instructions (circuit diagram).
- Check the electromagnetic compatibility for the installation and, if necessary, take appropriate measures as described in the user manual for the device.

WARNING

Tampering with or loosening screws on the device or optional devices during operation

Risk of injury and property damage

- Never loosen screws on the device or on optional accessories.

WARNING

Contact with fork head during operation

Risk of injury from pinching in the fork head of the push tube while the motor is running. As long as the fork head has not been installed in a component, rotary motion is possible.

- Ensure that no objects or persons come into contact with the fork head of the push tube during operation.
- Hold the device only by the guide tube.

NOTICE

Risk of equipment damage due to static or dynamic overload

Risk of damage to or failure of the device

- Do not overload the linear actuator or use it outside the permissible operating data; see *Technical data* and product label.
- Do not exceed the rated load.
- Do not tamper with connected components while the device is in operation.
- Ensure that there are no objects are within the travel range of the linear actuator during operation.

The actuator is secured to the fork heads by means of bolts.

Ensure that the load to be moved acts centrally on the push tube. No lateral forces may act on the push tube, regardless of its orientation, and the actuator must not be installed off-center. Observe the user manual during assembly and commissioning.

Any applications that do not comply with these technical instructions must first be discussed with the manufacturer.

Applications involving a risk of personal injury must be made safe by the user.

When installing the device on other elements in the system, the special requirements of the various applications must be taken into account. The linear actuator is fastened to two elements via the fork head and the hinge head.

The device is powered exclusively by electricity. Observe the connection values in the technical data ➤57|14.

The devices must be secured using the designated fixing holes.

The devices can be installed in the envisaged positions.

The structure and orientation of the device and its connections are shown in the following sections.

6.1 Installation site

Thorough preparation is essential for efficient installation and commissioning. This includes selecting a suitable installation site and providing a power source.

Observe the technical data in accordance with the operating conditions ➤57|14.

Install the device at a location that complies with the specified ambient conditions ➤59|14.2.

6.2 Inspections before initial startup

A qualified electrical specialist must carry out and document the following inspections and measurements before initial startup:

1. Visual inspection of the condition.
2. Check operating and safety functions.
3. Measure protective conductor resistance.
4. Measure leakage currents.
5. Measure insulation resistance.

Further information on inspections and readings can be found in the section ➤49|11.

6.3 Setup and alignment

The following points must be observed when setting up and aligning the device.

- 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 over the entire stroke area.
- The cable is not crushed, pinched or subject to pull load.

6.4 Installation

Proceed with installation as follows:

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

1. Secure the application elements between which the linear actuator will be inserted.
2. Fit the fork head, the hinge head, and the application elements using the fastening bolts.

⚠ WARNING

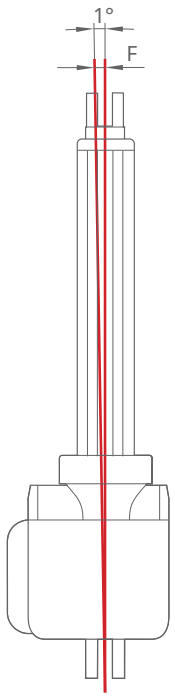
Insufficient fastening

Risk of personal injury and property damage

- Use fastening bolts only.
- Secure fastening bolts properly.
- Do not use screws for assembly.
- Never loosen or otherwise tamper with screws on actuators or options.

3. Ensure that the applied force is always directed centrally onto the actuator, with a maximum offset of 1°.

17 Maximum offset



F	N	Force

⚠ WARNING

Lateral impacts or torques during assembly

Risk of personal injury due to improper assembly of the device

- Do not expose the device to lateral impacts or torques during assembly.

NOTICE

Lateral impacts or torques during assembly

Risk of property damage due to improper assembly of the device

- Do not expose the device to lateral impacts or torques during assembly.

4. Ensure that the linear actuator is not impacted in its movement over the entire stroke area. Take the application's collision tests into account.
5. Ensure that the motor cable cannot be crushed, pinched, or pulled.
6. Connect the linear actuator to the control unit ➤37|6.5.

7. Connect the linear actuator to the operating element ➤40|6.6.
8. Connect the control unit to the power supply ➤40|6.7.
9. Ensure that the powerline plug is accessible at all times.
10. Ensure that none of the supply or control cables are pinched while the application is in motion or when the linear actuator extends and retracts.
11. Ensure that the installation requirements for options are observed ➤40|6.8.
12. Affix prohibition and warning signs to the linear actuator where required by the application.

Use of third-party control units

If the device is used with a control unit other than one from Schaeffler, the control unit must be equipped with overcurrent protection to protect the actuator from overload.

The actuator must be stopped immediately if a current of 7.7 A on RU20, RU21 and RU22 or 12 A on RU23, RU24 and RU25, is exceeded for more than 50 ms. To start the actuator, overvoltage protection must be deactivated for a maximum of 250 ms.

6.4.1 Emergency lowering mechanism for pulling applications

Observe the following:

- 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 over the entire stroke area.
- The cable is not crushed, pinched or subject to pull load.
- An external mechanical emergency stop is fitted as part of the equipment.

6.5 Connecting the control unit

Control units not approved by Schaeffler for the actuator are considered third-party control units.

The system is equipped with a control unit (e.g. BCU) for operating up to 3 actuators. The control unit can be operated independently or mounted on the actuator using an adapter plate.

⚠ CAUTION

Third-party control units

The use of third-party control units may cause property damage. The manufacturer accepts no liability for any damage incurred as a result of using an external controller.

Schaeffler recommends using the appropriate EWELLIX control unit, see Technical data.

When using an external controller, observe the requirements specified for external controllers ➤26|4.2.4.

NOTICE

Bent plugs or damaged cables

Risk of property damage to the device.

- Ensure that plugs are freely accessible.
- Ensure that all cables are secured and protected.

NOTICE

Misaligned plug

Risk of property damage to the control unit due to possible ingress of water.

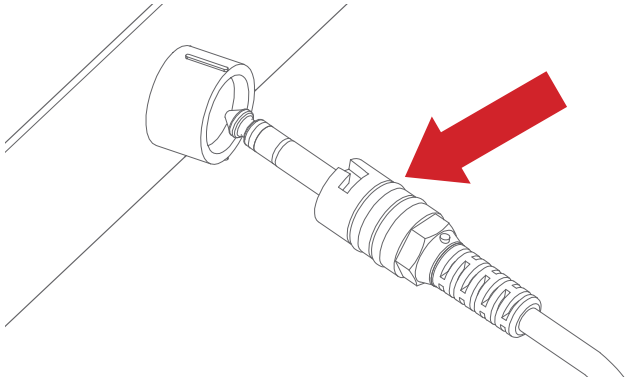
- Insert plugs properly.

Depending on the device version, the low-voltage plug is equipped with either a socket or a DIN-8 plug.

Jack plug (requires a special tool from the manufacturer)

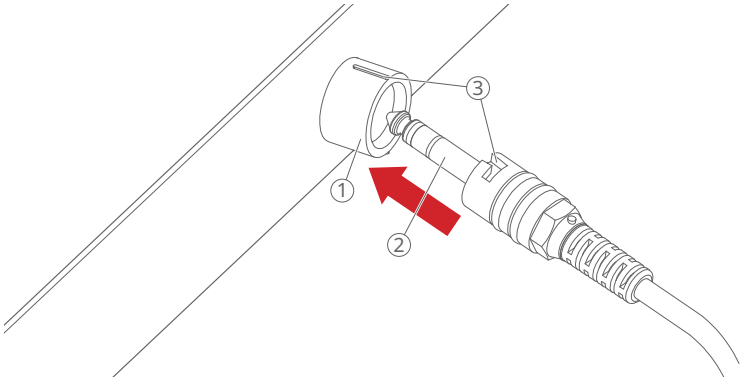
1. Connect the jack plug of RUNNER to the control unit.
2. Check the sealing ring of the jack plug and the plug itself for damage.

18 Checking the sealing ring of the jack plug for damage



3. Lightly lubricate the sealing ring with Klübersynth VR 69-252.
4. Insert the bayonet jack plug (2) into the socket (1) of the control unit. Ensure correct positioning of the groove (3).

19 Inserting the bayonet jack plug into the control unit socket



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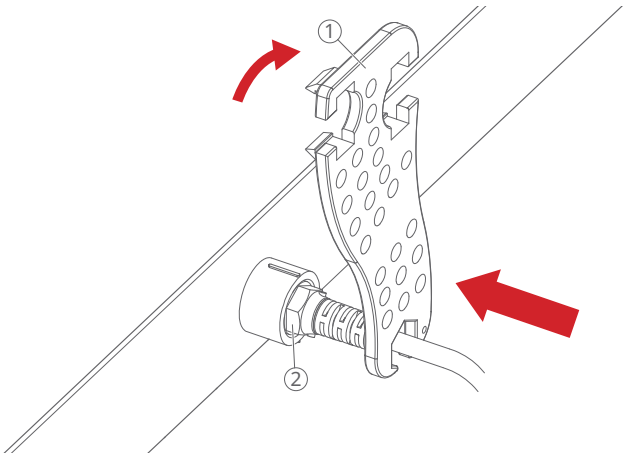
1	Socket	2	Jack plug with bayonet
3	Positioning of the groove		

5. Place the special tool (1) on the hexagon nut (2) of the plug housing.
6. Turn the special tool (1) clockwise until the bayonet lock of the jack plug is engaged.

20 Using the special tool



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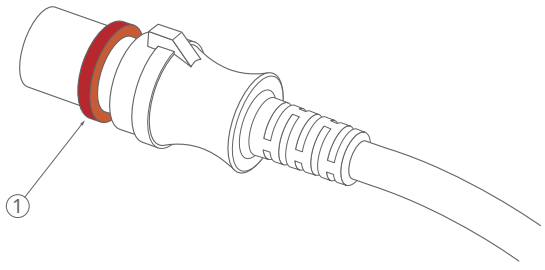
1	Special tool	2	Hexagon nut of the plug housing

DIN-8 plug

The insertion position is determined by the geometric shape of the plug. The strain relief of the connection cables must be done externally on the application.

1. Connect the of RUNNER to the control unit.
2. Check the sealing ring of the DIN-8 plug and the plug itself for damage.

21 Checking the sealing ring of the DIN-8 plug for damage



1	Sealing ring		

3. Lightly lubricate the sealing ring with Klübersynth VR 69-252.

NOTICE

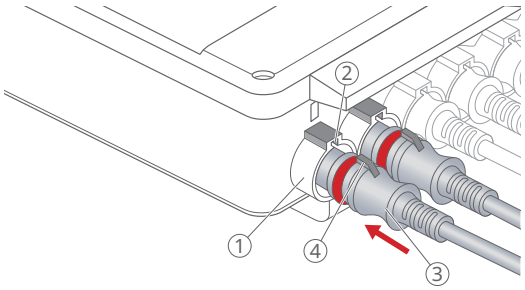
Incorrect lubricant

The use of incorrect additives may cause significant material damage.

- Use only the auxiliary products listed by the manufacturer.

4. Insert the DIN-8-plug into the socket of the control unit. Ensure that the groove and the lug are correctly positioned.

22 Inserting the DIN-8 plug into the connecting socket of the control unit



1	Connecting socket	2	Groove
3	DIN-8 plug	4	Key

6.6 Connecting the operating element

The RUNNER is not designed to be connected directly to a control element ➤23|4.2.1.

The operating element is connected directly to the control unit and controls the movement direction of the actuator.

1. Observe the separate user manual for the control unit.
2. Observe the separate user manual for the operating element.

⚠ WARNING

Third-party operating elements

The use of third-party operating elements may result in serious injury or property damage. The manufacturer accepts no liability for damage resulting from the use of third-party operating elements.

- Always use only suitable EWELLIX operating elements from Schaeffler.
- When using auxiliary devices that do not conform to degree of protection II, the fixation plate must be connected to the protective conductor.

6.7 Connecting the power supply

The RUNNER is not designed for direct connection to the mains power supply ➤23|4.2.1.

The actuator is connected to the control unit, which is connected directly to the power supply.

- Observe the separate user manual for the control unit.

6.8 Requirements for actuators with options

- Emergency lowering mechanism ➤29|4.4.1
- Electrical anti-pinch protection ➤29|4.4.2
- Hall sensor in combination with control unit SCU ➤30|4.4.3
- Control unit BCU mounted on the device ➤31|4.4.4.

Information on inspections and measurement values ➤49|11.

7 Commissioning

Authorized personnel

- Assembly and commissioning may only be carried out by qualified technical personnel.
- Work on the electrical system may only be carried out by trained, electrically skilled persons.

7.1 Initial start-up

Before initial start-up, check that the following points have been addressed:

- All assembly instructions have been followed.
- All cables are secured against crushing and pinching and are properly connected.
- Electrical supply is secured.
- The operating element is connected to the control unit.
- Ensure that no persons or obstructions are in the vicinity of movement.

⚠ WARNING

Static or dynamic overloading of the device

Crush hazard due to collision with fixed objects

- Ensure that no persons or fixed objects are in the hazard area during the stroke.
- Observe the maximum permissible operating data of the device, see Technical data.
- Do not exceed the nominal load.
- Do not tamper with connected components while the device is in operation.
- Observe the information on the type plate.

NOTICE

Static or dynamic overloading of the device

Risk of damage to or failure of the device

- Observe the maximum permissible operating data of the device, see Technical data.
- Do not exceed the nominal load.
- Do not tamper with connected components while the device is in operation.
- Observe the information on the type plate.

7.2 Installation check

Check the following points before commissioning:

- visual inspection
- No lateral forces acting on the push tube.
- No torque applied to the push tube.
- Fastening bolts at the fork head and hinge head are tight
- Entire stroke area is unobstructed so that the actuator cannot collide with a fixed object.
- Electrical supply ensured by control unit (low-voltage plug connected correctly to the control unit)
- Operating element is connected to the control unit.

7.3 Starting the system

✓ installation check complete

1. Start the system by pressing the corresponding button on the operating element.
2. Carry out function test

7.4 Function test

Once installation and initial startup are complete, a full function test must be performed before operation using the connected hand switch, foot switch, or desk switch to activate the relevant functions.

✓ initial startup complete

✓ installation check complete

✓ system started

1. Activate the connected hand switch to test functionality.
2. Activate the connected foot switch to test functionality.
3. Activate the connected desk switch to test functionality

⚠ WARNING

Static or dynamic overloading of the device

Crush hazard due to collision with fixed objects

- Ensure that no persons or fixed objects are in the hazard area during the stroke.
- Observe the maximum permissible operating data of the device, see Technical data.
- Do not exceed the nominal load.
- Do not tamper with connected components while the device is in operation.
- Observe the information on the type plate.

⚠ WARNING

Lateral forces

Risk of personal injury from lateral forces acting on the actuator

- Do not expose the device to lateral forces.
- Do not tamper with elements connected to the actuator during the stroke.

NOTICE

Lateral forces

Risk of damage to the device from lateral forces acting on the actuator

- Do not expose the device to lateral forces.
- Do not tamper with elements connected to the actuator during the stroke.

NOTICE

Damage from spray water

The device is splash-proof in accordance with IPX4S. Optionally also available with IPX6S. These protection types are not guaranteed during inward and outward motion.

- Do not expose the device to spray water during the stroke.
- Do not allow the device to come into contact with hoses during the stroke.

8 Operation

Safety instructions

⚠ WARNING

Static or dynamic overloading of the device

Crush hazard due to collision with fixed objects

- Ensure that no persons or fixed objects are in the hazard area during the stroke.
- Observe the maximum permissible operating data of the device, see Technical data.
- Do not exceed the nominal load.
- Do not tamper with connected components while the device is in operation.
- Observe the information on the type plate.
- Ensure that operating elements cannot be activated in a protected standby position.

⚠ WARNING

Contact with the fork head

Risk of injury from contact with the fork head

- Ensure that no objects or body parts come into contact with the fork head of the actuator.

NOTICE

Risk of equipment damage due to static or dynamic overload

Risk of damage to or failure of the device

- Do not overload the linear actuator or use it outside the permissible operating data; see *Technical data* and product label.
- Do not exceed the rated load.
- Do not tamper with connected components while the device is in operation.
- Ensure that there are no objects are within the travel range of the linear actuator during operation.

NOTICE

Ingress of liquids during extension and retraction

Risk of damage to or failure of the device

- Do not allow liquids to come into contact with the device.

8.1 Operation

Preconditions for operation:

- The device is controlled via a control unit ➤58|▦12.
- The device is operated via a control element ➤58|▦13.
- Control and operation of the device using third-party devices is possible, provided the specified requirements are met ➤26|4.2.4.

8.1.1 Switching on

The device has no operating element of its own. The device is operated via a separate operating element. Observe the user manual for the operating element.

8.1.2 Switching off

The device has no operating element of its own. The device is operated via a separate operating element. Observe the user manual for the operating element.

8.2 Normal operation

User groups:

- Operator
- operating authority

This section provides all the information required for the safe and reliable use of the linear actuator under normal operating conditions. In normal operation, the linear actuator raises and lowers elements that are connected to the device via the two fork heads.

✓ The control unit is connected to the mains power supply.

‣ Operation via a operating element ➤58|⊞13

Emergency lowering mechanism

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

Excessive current consumption, unusual noises, or unintended movement of the actuators indicate damage or a defect in the control unit. Stop operation and contact Schaeffler immediately.

If excessive force or an independent downward movement occurs, this indicates a damaged actuator. The device must no longer be operated. Notify the manufacturer immediately to arrange an inspection.

8.3 Emergency shutoff

The device has no on/off switch and must be disconnected from the power supply via the control unit. This is the only way to ensure the device is completely deenergized.

In hazardous situations, all movements of the application must be stopped as quickly as possible and the power supply turned off.

1. Unplug the power cable from the mains supply
2. Disconnect the cable that connects the device to the control unit.

Patient lifter

An emergency stop switch is mandatory for patient lifters.

The emergency stop switch must be fitted by the installer.

9 Troubleshooting

The following section describes possible causes of malfunctions and the necessary measures for restoring functionality.

If malfunctions occur frequently, shorten the maintenance intervals.

If a malfunction cannot be rectified with the measures described, contact Schaeffler Service.

Authorized personnel

- The measures described here may be carried out by the operator unless otherwise specified.
- Some tasks may only be performed by qualified personnel; this will be explicitly stated in the relevant fault description.
- Work on the electrical system may only be carried out by trained, electrically skilled persons.

Safety instructions

DANGER

Risk of serious or fatal injuries from live components and moving parts

Serious or fatal injuries may be caused by contact with live components and by unexpected actuator movements.

- ▸ Switch off the power supply and secure it against unintentional reconnection before performing any work on the system.

DANGER

Risk of fatal injury from unauthorized reconnection of the power supply

Risk of fatal injury to persons in the hazard area due to moving parts or electric shock if the power supply is switched on without authorization during work on the system and causes the system to restart.

- ▸ Before starting work, switch off the system and secure it against reconnection.

DANGER

Risk of injury and property damage due to improper troubleshooting

The device is not designed for repair work. Improper troubleshooting may result in injury or property damage.

- ▸ Do not loosen screws on the device.
- ▸ Do not open the device.
- ▸ If malfunctions cannot be resolved by following the instructions below, disassemble the actuator and return it to Schaeffler for repair.

Procedure for malfunctions

The following applies in general:

1. In the event of malfunctions that could pose a direct danger to persons or property: Switch off the actuator or the control system immediately and secure it against being switched back on.
2. Determine cause of malfunction.
3. Depending on the type of malfunction: Have the malfunction rectified by qualified personnel.
4. Inform the persons responsible on site about the malfunction.

Refer to the *Troubleshooting* table to determine who is authorized to remedy the malfunction.

7 Troubleshooting

Error	Possible cause	Remedy	To be carried out by
Linear actuator does not move.	No mains voltage available	▸ Check the power supply.	Electrically skilled person
	Poor plug contact or plug not properly inserted	▸ Insert the low-voltage plug of the runner into the control unit. ▸ Insert the powerline plug of the control unit into a socket.	Operator
	Motor cable defective	▸ Check motor cable for crushing, cracks, or other damage. ▸ If the motor cable is defective, contact Schaeffler.	Electrically skilled person
	Obstruction in the stroke area of the linear actuator	▸ Remove all obstructions from the stroke area.	Qualified personnel
	Incorrect control unit	▸ Check type plate. ▸ If the control unit is not from Schaeffler and not approved for the linear actuator, replace the control unit.	Qualified personnel
	Incorrect load	▸ Measure the static and dynamic load and compare with the data on the type plate. ▸ If the load is exceeded, replace the device.	Qualified personnel
	Control unit or operating element defective	▸ Troubleshoot the control unit. ▸ Identify any defect in the control unit. ▸ Replace the control unit if required.	Qualified personnel
	Device service life exceeded.	▸ If the device is more than 10 years old or has performed ≥ 20000 double strokes: Replace the device.	Qualified personnel
	Device still inoperative after implementing the above measures.	▸ Replace the device.	Qualified personnel
Device cannot be operated	Incorrect operating element	▸ Check type plate. ▸ If the operating element is not from Schaeffler and not approved for the device, replace the operating element.	Qualified personnel
Actuator fails to move	Obstruction in the stroke area of the actuator	▸ Remove all obstructions from the stroke area.	Operator
	Incorrect load	▸ Remove loads from the actuator.	Operator
	Spindle nut defective	▸ Replace the device.	Qualified personnel
Greatly reduced speed	Obstruction in the stroke area of the actuator	▸ Remove all obstructions from the stroke area.	Operator
	Incorrect load	▸ Remove loads from the actuator.	Operator
	Motor, gearbox, toothed belt, or spindle nut defective	▸ Replace the device.	Qualified personnel
Significantly increased running noise	Obstruction in the stroke area of the actuator	▸ Remove all obstructions from the stroke area.	Operator
	Incorrect load	▸ Remove loads from the actuator.	Operator
	Motor, gearbox, toothed belt, or spindle nut defective	▸ Replace the device.	Qualified personnel
Increased play in the guidance system	Sliding elements worn	▸ Contact Schaeffler.	Qualified personnel

9.1 Emergency lowering mechanism

If excessive rotational force or extremely light motion occurs under nominal load (i.e. independent downward movement of the device), the device may no longer be operated.

The device must be inspected by the operator. In all cases, contact Schaeffler.

9.2 Startup after correcting a malfunction

The device is not designed to be repaired by the customer. In any case, please contact Schaeffler.

Once the malfunction has been corrected:

- Before restarting, carry out the steps described in the Assembly and Commissioning sections.

10 Decommissioning

- Disconnect the actuator from the control unit.

11 Maintenance

The devices are maintenance-free for the duration of their service life. The connecting cable and housing must be checked for wear at regular intervals.

Safety inspections must be carried out periodically on site, in accordance with the applicable regulations.

Authorized personnel

- The measures described here may be carried out by the operator unless otherwise specified.
- Some tasks may only be performed by qualified technical personnel; this will be explicitly stated in the respective maintenance description.
- Work on the electrical system may only be carried out by trained, electrically skilled persons.

Safety instructions

DANGER

Improper maintenance

Risk of electric shock. Improper maintenance can result in serious injury, death, or damage.

- ▸ Work on electrical systems may only be carried out by professional electricians.

DANGER

Risk of fatal injury from unauthorized reconnection of the power supply

Risk of fatal injury to persons in the hazard area due to moving parts or electric shock if the power supply is switched on without authorization during work on the system and causes the system to restart.

- ▸ Before starting work, switch off the system and secure it against reconnection.

WARNING

Risk of injury from moving parts

Rotating and linear moving components can cause serious injuries.

- ▸ Before carrying out maintenance work, switch off the device and, if necessary, secure it against reconnection.

NOTICE

Risk of damage from spray water during the stroke

The device is splash-proof in accordance with IPX4S. An optional version provides protection against water jets in accordance with IPX6S. These protection types are not guaranteed during inward and outward motion.

- ▸ Do not expose the device to spray water or jet water during the stroke.

Schaeffler also recommends compliance with IEC 62353 with regard to maintenance.

11.1 Maintenance plan

The following sections describe the maintenance tasks required for optimal and trouble-free operation.

If increased wear is detected during regular inspections, shorten the maintenance intervals based on the actual wear condition.

If the linear actuator is used in conditions other than the ambient conditions specified in this manual, check the components once a month for changes such as oxidation or deposits.

8 Maintenance plan

Maintenance interval	Maintenance work	Performed by
Daily	▸ Visually inspect the device for damage ➤53|11.2.5. ▸ Remove dust and dirt if necessary ➤51|11.2.1.	Operator
Monthly	▸ Check operating and safety functions ➤52|11.2.2. ▸ Check the device is securely fitted at the fork head and hinge head, correct if necessary. ▸ Check connections for secure fit.	Qualified personnel
Semi-annually	▸ Visually inspect the device for damage ➤53|11.2.5. ▸ Test emergency lowering mechanism under nominal load ➤29|4.4. ▸ Test electrical crush protection facility under nominal load ➤29|4.4. ▸ Test quick-adjustment facility ➤29|4.4.	Qualified personnel
Annually	▸ Check labels and warning notices for damage; replace if necessary.	Qualified personnel
	▸ Read protective conductor resistance ➤52|11.2.2. ▸ Read leakage currents ➤52|11.2.2. ▸ Read insulation resistance ➤52|11.2.2. ▸ Check plugs for secure fit ▸ Check sealing O-rings for damage ➤53|11.2.4.	Electrically skilled person
To be defined by the processor	▸ Perform visual inspection of the permanent protective device and the routing of the supply and control cables within the application. ▸ Ensure that cable routing elements are not loose or damaged ➤29|4.4.	Processor

11.2 Maintenance work

The devices are maintenance-free for the duration of their service life. The connecting cable and housing must be checked for wear at regular intervals.

Safety inspections must be carried out periodically on site, in accordance with the applicable regulations.

Check grounding annually and measure leakage current.

The housing, membranes, keypads, and connected cables must be inspected at regular intervals (every 6 months) for signs of mechanical damage. If damage is detected, the devices must be disconnected from the control unit or actuator and defective parts replaced.

Every 6 months, the devices must also be checked by monitoring the actuators during extension and retraction.

The following must be checked regularly:

- plugs
- housing
- cables
- protection earth at control unit
- leakage current at control unit
- function
- protective membrane and keypads with symbols on the operating elements

⚠ WARNING

Damaged housing

Loss of protection type

▸ Inspect the housing for damage and replace if necessary.

⚠ WARNING

Damaged cables

Risk of short circuit or unintended movement of the linear unit.

- Inspect connected cables for damage and replace if necessary.

11.2.1 Cleaning

To be performed by the operator

If contaminated, clean the product immediately to prevent the buildup of residue.

9 Device protection types

Device		Protection type
Actuator	RUNNER	IPX4S, optional IPX6S
Control unit	BCU	IPX4
	VCU	IPX4
	SCU	IPX4
Operating element	EHA3	IP66
	STJ	IPX2
	STE	IPX0

The device must never be washed in a washing machine or similar appliance unless the actuator, control unit, and power cable are properly connected. Ingress of liquids may cause irreparable damage to the system.

NOTICE

Damage due to improper cleaning

Improper cleaning of the device may cause damage to the device.

- Do not use aggressive cleaning agents. Wash water, including chemical additives, must be pH-neutral.
- Only use cleaning agents specified by the manufacturer.
- Do not use steam cleaners or high-pressure cleaners.
- Other cleaning agents or cleaning devices may only be used with the manufacturer's approval.
- When retracting or extending, the actuator must not come into contact with liquids.

Observe the following points when cleaning

- Disconnect the acuator from the control unit.
- Disconnect the control unit from the power supply.
- Clean contaminated parts immediately.
- Use a damp cloth for cleaning. The water used for cleaning, including any chemical additives, must be pH-neutral.
- Disinfect only by wiping with isopropyl alcohol.

Emergency lowering mechanism

For nursing beds with an emergency lowering mechanism, observe the following additional instructions:

- Disinfect and clean the emergency lowering mechanism only with propyl alcohol.
- Do not treat an emergency lowering mechanism with oil, grease, or other lubricants.
- If the emergency lowering mechanism malfunctions, notify the nursing bed manufacturer immediately.

Risk of damage due to improper cleaning

- Do not use aggressive cleaning agents. The water used for cleaning, including any chemical additives, must be pH-neutral. Acidic or alkaline wash water can destroy metal and plastic parts.
- Liquids must not come into contact with the push tube during extension or retraction.
- Use only auxiliary agents specified by the manufacturer.
- Do not use steam cleaners or high-pressure cleaners for cleaning.
- Other cleaning agents or cleaning devices may only be utilized with the manufacturer's approval.

11.2.2 Checks and readings

Performed by a qualified electrician.

When carrying out checks and readings, observe the following:

- All checks and readings must be carried out in accordance with the applicable standards and regulations.
- All checks must be documented in a service log.

11.2.3 Service log

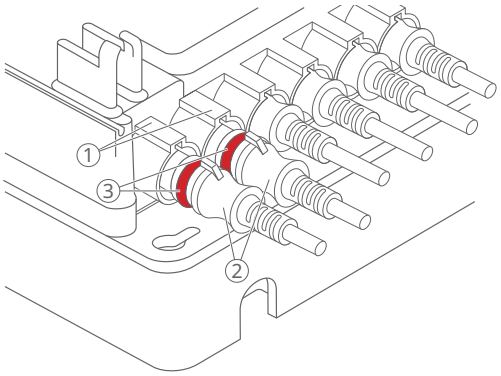
Enter the following in the maintenance log:

- name of the executing body (company, department)
- names of the staff on duty
- identification of the device or system (type, serial number, inventory number) and the respective accessories
- completed inspections and measurements
- scope and results of the inspections
- measurement method, measuring device, measuring results of the readings
- overall assessment and verification of all functions compared to specifications
- date and signature of the person performing the inspection, personal encoding is possible for IT applications.

11.2.4 Check plug sealing function

Performed by a qualified electrician.

23 Plug seals



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1	Housing socket	2	DIN-8 plug
3	Sealing O-ring		

1. Disconnect the device from the power supply.
2. Check sealing O-ring (3) of the DIN-8 plug (2) for damage.
3. Ensure that there is no irregular gap between the DIN-8 plug (2) and the housing socket (1).
4. Arrange for any damaged sealing O-rings (3) to be replaced by the manufacturer.
5. If no damage is detected and neither the processor nor the manufacturer has raised concerns, reconnect the device to the power supply.

NOTICE

Risk of property damage due to damaged or incorrect sealing rings

Loss of protection type

- Arrange for damaged sealing rings to be replaced by the manufacturer without delay.

11.2.5 Visual inspection of the condition

To be performed by qualified personnel.

1. Disconnect the device from the power supply.
2. Inspect the cable for visible external damage such as cracks, cuts, and crushing.
3. Inspect the plastic housing for visible external damage such as cracks, gaps, and fractures.
4. Inspect the dirt-repellent ring for cracks, gaps, and broken parts.
5. Inspect the housing tube for visible external damage such as scratches and dents.
6. If damage is found, notify the processor or the manufacturer.
7. If no damage is detected and neither the processor nor the manufacturer has raised concerns, reconnect the device to the power supply.

11.3 Measures following completed maintenance

After completing the maintenance work, carry out the following steps before recommissioning the device:

1. Check all previously loosened screw connections for a secure fit.
2. Ensure that all tools, materials, and other equipment used have been removed from the work area.
3. Clean the work area and remove any spilled liquids, process media, or similar substances.
4. Ensure that all of the system's safety measures are working correctly.
5. Check functions against the product specifications.
6. Document the inspections in the maintenance log.

12 Dismounting

Comply with all safety instructions.

Authorized personnel

- Disassembly may only be carried out qualified technical personnel.
- Work on the electrical system may only be carried out by trained, electrically skilled persons.

Safety instructions

DANGER

Risk of serious or fatal injuries from live components and moving parts

Serious or fatal injuries may be caused by contact with live components and by unexpected actuator movements.

- Switch off the power supply and secure it against unintentional reconnection before performing any work on the system.

WARNING

Risk of severe injury from improper disassembly

Stored residual energy, sharp-edged components, pins, and corners on individual parts or on the required tools can cause severe injuries if disassembly is performed improperly.

- Ensure sufficient space for disassembly before starting work.
- Exercise caution when working with exposed, sharp-edged components.
- Ensure that the disassembly area is clean and tidy. Avoid loosely stacked components or parts and tools lying on the floor which may pose a hazard.
- Disassemble components properly in accordance with applicable local regulations.
- Secure components to prevent them from falling or tipping over.
- Contact Schaeffler with any questions or concerns.

Disassembling the RUNNER

✓ Before starting disassembly, take the RUNNER out of operation ➤48 | 10.

1. Disconnect the actuator from the power supply and control unit.
2. Secure the application elements so that no pull or push forces act on the device.
3. Remove the fastening pins.
4. Disconnect the actuator from the attachment points of the application.

Preparing the RUNNER for transport

1. Clean the device
2. Carefully pack the device for shipping to the manufacturer.
3. Disassemble the device in accordance with locally applicable occupational safety and environmental protection regulations.

13 Disposal

If no return or disposal agreement is in place, disassembled components must be recycled.

⚠ CAUTION

Improper disposal

environmental damage

- Electronic waste, electronic components, lubricants, and other additives are subject to hazardous waste regulations and may only be disposed of by authorized specialist companies.

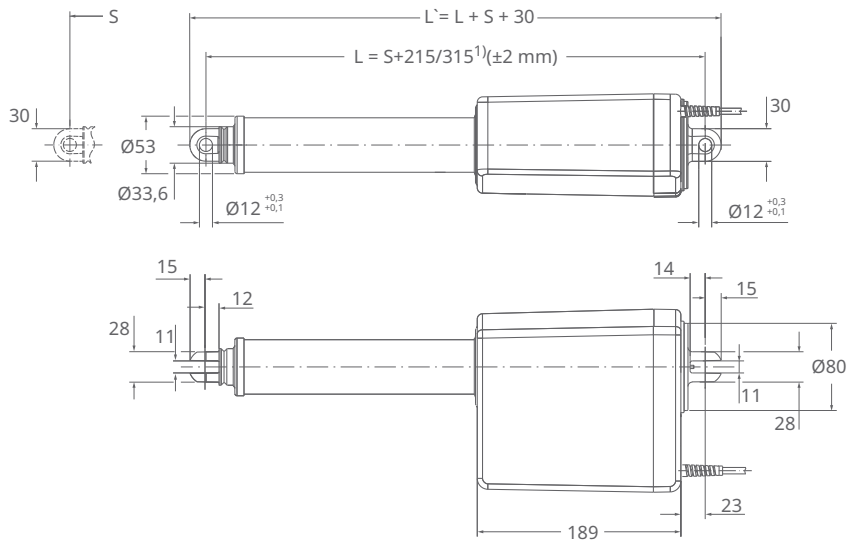
Observe the local regulations for disposal.

For information on environmentally sound disposal, contact your local authorities or specialist companies.

1. Dispose of metal and plastic parts at an appropriate recycling facility.
2. Sort remaining components by material and dispose of them in accordance with locally applicable occupational safety and environmental protection regulations.

14 Technical data

24 RUNNER dimensions



10 Technical data RU20 to RU25

Characteristic	Unit	RU20	RU21	RU22	RU23	RU24	RU25
Power supply	–	DC	DC	DC	DC	DC	DC
Voltage	V	24	24	24	24	24	24
Power consumption	W	–	–	–	–	–	–
Current consumption	A	7	7	7	10	10	10
Protection type	–	IPX4S, IPX6S	IPX4S, IPX6S	IPX4S, IPX6S	IPX4S, IPX6S	IPX4S, IPX6S	IPX4S, IPX6S
Nominal push load	N	8000	10000	12000 [1)]	8000	10000	12000 [1)]
Nominal pull load	N	8000	8000	8000	8000	8000	8000
Speed (full load to no load)	mm/s	7 ... 10	5 ... 8	4 ... 7	8 ... 15	6 ... 12	5 ... 9
Stroke length S	mm	50 ... 700	50 ... 700	50 ... 700	50 ... 700	50 ... 700	50 ... 700
Retracted length L [2)]	mm	S + 215 / 315	S + 215 / 315	S + 215 / 315	S + 215 / 315	S + 215 / 315	S + 215 / 315
Duty cycle	%	10	10	10	10	10	10
Ambient temperature	°C	+10 ... +40	+10 ... +40	+10 ... +40	+10 ... +40	+10 ... +40	+10 ... +40
Mass	kg	4.7	4.7	4.7	4.7	4.7	4.7
Color	–	Gray	Gray	Gray	Gray	Gray	Gray

1) The safe working load for medical applications is 10000 N in accordance with IEC 60601.

2) S ≤ 500 mm: L = S + 215
S > 500 mm: L = S + 315

11 Technical data RU30 to RU35

Characteristic	Unit	RU30	RU31	RU32	RU33	RU34	RU35
Power supply	–	DC	DC	DC	DC	DC	DC
Voltage	V	24	24	24	24	24	24
Power consumption	W	–	–	–	–	–	–
Current consumption	A	7	7	7	10	10	10
Protection type	–	IPX4S, IPX6S	IPX4S, IPX6S	IPX4S, IPX6S	IPX4S, IPX6S	IPX4S, IPX6S	IPX4S, IPX6S
Nominal push load	N	8000	10000	12000 [3)]	8000	10000	12000 [3)]
Nominal pull load	N	8000	8000	8000	8000	8000	8000
Speed (full load to no load)	mm/s	14 ... 15	11 ... 13	9 ... 10	17 ... 24	14 ... 20	11 ... 15
Stroke length S	mm	50 ... 700	50 ... 700	50 ... 700	50 ... 700	50 ... 700	50 ... 700
Retracted length L [4)]	mm	S + 215 / 315	S + 215 / 315	S + 215 / 315	S + 215 / 315	S + 215 / 315	S + 215 / 315
Duty cycle	%	10	10	10	10	10	10
Ambient temperature	°C	+10 ... +40	+10 ... +40	+10 ... +40	+10 ... +40	+10 ... +40	+10 ... +40
Mass	kg	4.7	4.7	4.7	4.7	4.7	4.7
Color	–	Gray	Gray	Gray	Gray	Gray	Gray

[3)] The safe working load for medical applications is 10000 N in accordance with IEC 60601.

[4)] S ≤ 500 mm: L = S + 215
S > 500 mm: L = S + 315

12 Suitable control units

Linear actuator	Control unit			
	SCU	VCU	BCU	MCU
RU20, RU21, RU22	✓	✓	✓	✓
RU23, RU24, RU25	✓	✓	–	✓

✓ suitable
– not suitable

13 Suitable operating elements

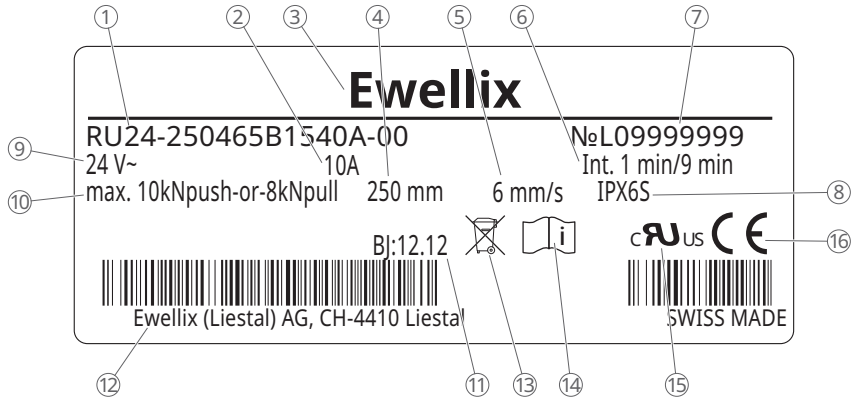
Operating element		Control unit			
Designation	Switches	SCU	VCU	BCU	MCU
EHA1	M	–	–	–	✓
EHA3	M	✓	✓	✓	–
STJ	F	✓	✓	✓	–
STF	F	–	–	–	✓
STA	T	–	–	–	✓
STE	T	✓	✓	✓	–

M Hand switch
F Foot switch
T Desk switch
✓ suitable
– not suitable

14.1 Type plate

The type plate contains the following Information:

25 RUNNER type plate



1	Type designation	2	Current consumption
3	Manufacturer	4	Stroke
5	Speed	6	Duty cycle (on/off time
7	Serial number	8	Protection type
9	Input voltage	10	Push force
11	Date of manufacture (month/year)	12	Manufacturer address
13	Disposal notice	14	Observe the manual
15	UL	16	CE

Type code

14 Medical standard

Option	Standard
K, L	IEC 60601-1:2005
M, N, P	IEC 60601-1:2005 + A1

14.2 Ambient conditions

Transport and storage

The product may only be transported in its original packaging under the following ambient conditions:

- dry and dust-free environment, not outdoors
- protected against sunlight and UV radiation
- no aggressive chemicals in the environment
- no mechanical shocks
- temperature: –20 °C to +70 °C
- humidity: max. 95 %, non-condensing
- air pressure from 700 hPa to 1060 hPa

If additional storage instructions are printed on the packaging that go beyond the requirements listed here, those instructions must also be observed.

Operation

The product may only be operated under the following ambient conditions:

- indoor use only
- temperature from +10 °C to +40 °C
- temperature from 5 % to 85 %, non-condensing
- air pressure from 700 hPa to 1060 hPa
- max. altitude above sea level: 3000 m (MOPP)

14.3 Duty factor

The permissible load depends on the duty factor, i.e., the load must be reduced if the duty factor is increased. The duty factor is defined as the time running under load in relation to the total cycle time.

ƒ1 Determining the duty factor

$$D = \frac{N}{N+R} \cdot 100$$

D	%	Duty factor
N	s	Time running under load
N+R	s	Total cycle time
R	s	Rest time

NOTICE

Duty factor exceeded

Material damage to the actuator due to overheating

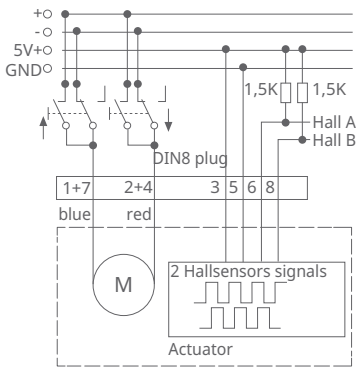
- ▸ Reduce running under load
- ▸ Extend rest time

15 Duty factor intermittent

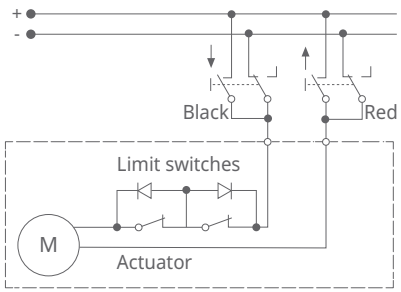
Information	Parameter	Time
Time running under load	N	1 min
Rest time	R	9 min

14.4 Circuit diagrams

26 DIN plug DC 24 V and DC 36 V



27 Jack plug DC 24 V



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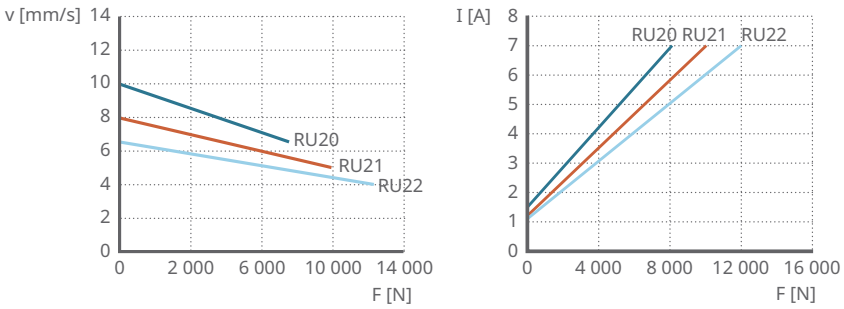
14.5 Performance diagrams

28 Performance diagram RU20, RU21, RU22



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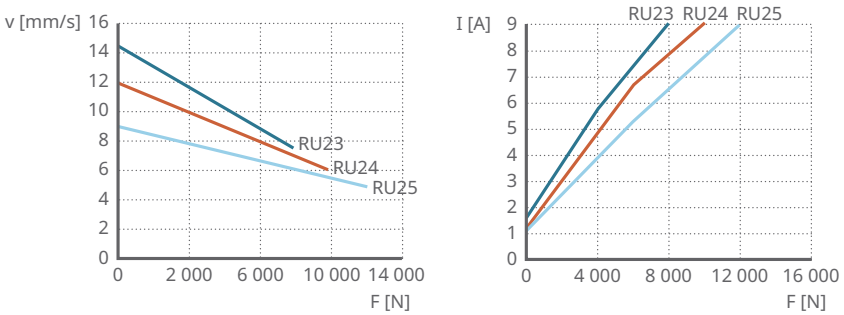
v	Speed	F	Load
I	Current consumption		

29 Performance diagram RU23, RU24, RU25



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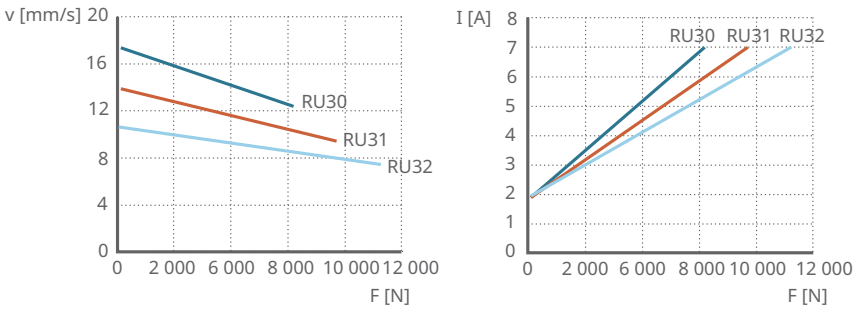
v	Speed	F	Load
I	Current consumption		

30 Performance diagram RU30, RU31, RU32



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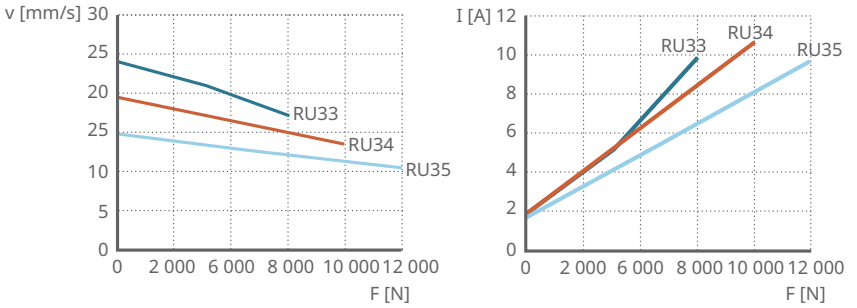
v	Speed	F	Load
I	Current consumption		

31 Performance diagram RU33, RU34, RU35



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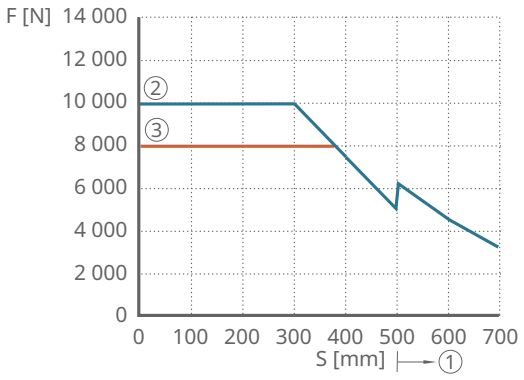
v	Speed	F	Load
I	Current consumption		

14

14.6 Load limit

32 Push load limit, safety factor S = 4 in accordance with IEC 60601, emergency lowering optional S = 2.5



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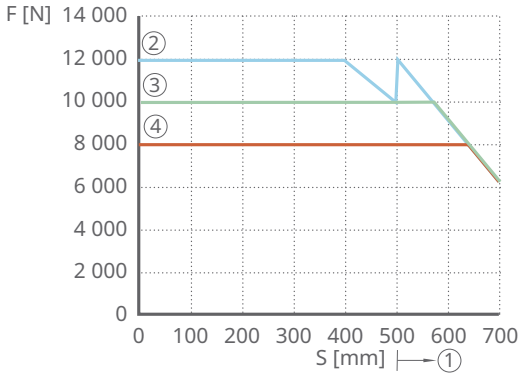
1	Extended retracted length at S > 500 mm	2	RU21, RU22, RU24, RU25 ,RU31, RU32, RU34, RU35
3	RU20, RU23, RU30, RU33		
F	Load	S	Stroke

33 Push load limit, safety factor S = 2 in accordance with IEC 60601



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1	Extended retracted length at S > 500 mm	2	RU22, RU25, RU32, RU35
3	RU21, RU24, RU31, RU34	4	RU20, RU23, RU30, RU33
F	Load	S	Stroke

14.7 Declaration of incorporation

RU |
https://www.schaeffler.de/std/228F

15 Spare parts

Spare parts not included in the scope of delivery.

16 Spare parts

Spare part		Ordering number	Drawing
Sticker	(adhesive label) “Don’t turn extension tube” (push tube)	0112464	521172
Sticker	WARNING “Shearing force”	0120698	521185
Key for locking the jack plug (ZGB-140375)		0125322	–
Sealing ring with Klübersynth VR 69-252		0118037	–

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