

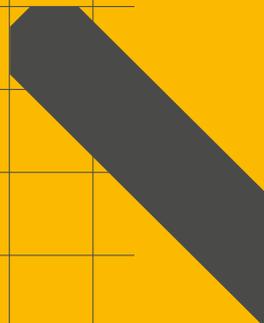
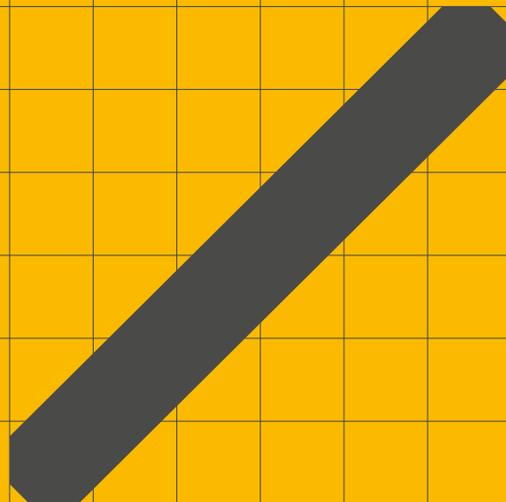
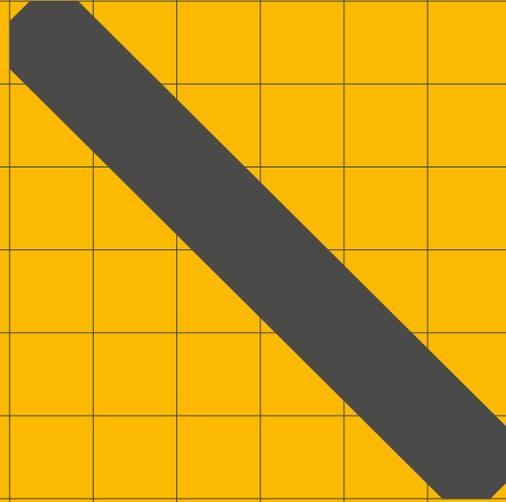


INSTALLATION, OPERATION  
AND MAINTENANCE MANUAL

# Runner RU

Linear Actuator





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## WARNING

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.

# 1.0 General information

## 1.1 Information on this manual

This manual provides important information on how to work with the actuator (also called device or drive) 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.

For a better representation of the circumstance of use, the illustrations used are not necessarily to scale and may vary from the actual design of the device.

All information and notes in this manual were compiled with due consideration given to applicable standards and regulations, the present status of technology and our years of knowledge and experience.

## 1.2 Explanation of symbols and signal words

Safety precautions are identified by symbols and signal words defined on the right hand side of this page.

These signal words indicate the severity of the hazard.

Adhere to these safety precautions and take caution in order to avoid accidents that may result in personal injuries or damage to property.

## 1.3 Limitation of liability

All information and notes in this manual were compiled under due consideration of valid standards and regulations, the present status of technology and our years of knowledge and experience.

The manufacturer will not be liable for damage resulting from:

- disregarding this manual
- unintended use
- employment of untrained personnel
- unauthorized conversions

### DANGER

Indicates a dangerous situation, which will lead to death or serious personal injury, if the precautionary measures are ignored.

### WARNING

Indicates a dangerous situation, which can lead to minor or moderate injury or property damage, if the precautionary measures are ignored.

### CAUTION

Indicates a dangerous situation, which can lead to minor or moderate injury, if the precautionary measures are ignored.

### NOTICE

Indicates information considered important, but not hazard-related (e.g. messages relating to property damage).



### NOTE

Emphasizes useful hints and recommendations as well as information for efficient and trouble-free operation.

- unauthorized technical modifications
- manipulation or removal of the screws on the device

Where the device has been customized, the actual product delivered may be different from what is described in this manual. In this case, ask Ewellix for any additional instructions or safety precautions relevant to these actuators.

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

### Validity

The instructions in this manual refer to the Linear Actuators Runner RU with the following identification:

- Manufacturer: Ewellix
- Product name: Linear Actuator Runner (called Runner hereafter)
- Type designation: RU20, RU21, RU22, RU23, RU24, RU25
- Year of manufacture: from 2003

When the device has been customized by Ewellix, the actual product delivered may be different from what is described in the manual. In this case, ask Ewellix for any additional instructions or safety precautions relevant to these.

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

## 1.4 Copyright

This manual is protected by copyright law and to be used exclusively by Ewellix customers internal purpose.

Passing this manual on to third parties, duplication of any kind – even in the form of excerpts – as well as the use and/or disclosure of the contents without the written consent of the manufacturer is not permitted, except for internal purposes.

Violation of Ewellix's copyright may become the subject of a future claim for damages.

## 1.5 Spare parts

This actuator is not designed for repair work by the owner/operator.

All warranty and service claims are void if repairs are not performed by the manufacturer or another entity approved by the manufacturer.

There are no spare parts provided; expect the two following adhesive labels and key for looking the jack plug.

- Sticker (adhesive label) “Don't turn extension tube” (push tube)! No. 0112464 / Drawing 521172 (↳ **2.7.1 Warning labels**)
- Sticker WARNING (adhesive label) “Shearing force” No. 0120698 / Drawing 521185 (↳ **2.7.2 Information labels**)
- Key for looking Jack plug (ZGB-140375) 0125322
- Sealing ring with Klubersynth VR 69-252 (part no. 0118037).

### ⚠ WARNING

#### Safety hazard caused by use of non-genuine spare parts

Wrong or faulty spare parts can adversely affect safety and cause serious injury, damage, malfunction or total failure.

Therefore:

- Use only genuine spare parts from the manufacturer.
- Spare parts in/on the device may only be replaced by the manufacturer.

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

## 1.6 Warranty terms

The warranty terms are included in the manufacturer's terms and conditions contained in the Ewellix sales contract that governs this sale.

## 1.7 Customer service

Ewellix Customer Service is always available to provide technical information and to answer questions.

The contact information for Ewellix Customer Service can be found on [www.ewellix.com](http://www.ewellix.com).

In addition, our employees are always interested in acquiring new information and experience gained from practical application; such information and experience may help improve our products.

## 2.0 Safety

This section provides an overview of important safety aspects of installing, operating and maintaining this device. Disregarding this Manual and safety regulations specified therein may result in considerable danger and possible serious injury or death or damage to device or equipment.

The Runner was designed and build in accordance with the latest technical standards and accepted rules.

## 2.1 Use

### 2.1.1 Intended Use

The device has been designed and built exclusively for its intended purpose as described in these instructions.

The authorized use of the Runner is the dynamic central push-loaded or pull-loaded stroke. If you use the Runner for any use other that cited, the manufacturer cannot be held the responsibility for damage resulting from this.

It is only intended for interior use and is implemented in medical devices as well as in industrial and construction technology.

#### ⚠ WARNING

##### Risk from misuse

Any utilization of this device beyond its intended purpose may lead to potentially hazardous situations.

Therefore:

- Strictly adhere to all safety precautions and instructions in this operating manual.
- Do not make this device subject to weather conditions, strong UV rays, corrosive or explosive air media as well as other aggressive media.
- Do not modify, retool or change the structural design or individual components of the actuator.
- Never use the device outside of the technical application and operational limits.

Range of environmental conditions:

- Ambient temperature: 10 °C to + 40 °C
- Relative humidity: 5% to 85%
- Atmospheric pressure: 700 hPa to 1060 hPa

### 2.1.1.1 Product life time

The Runner are designed for a service life of 10 years or 20 000 double strokes at a stroke length of 250 mm.

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

#### • **Operating Authority:**

The operating authority is the contractual partner of the executor or the reseller.

They can impose legal linear 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.

#### • **Executor:**

The executor is the contractual partner of the reseller or the manufacturer. He assembles the actuator into a total device. He is authorized by the manufacturer of the Runner to use the linear actuator in accordance with the regulations and has the necessary expert knowledge.

#### • **Technician:**

The technician has the professional technical training to implement the Runner according to its authorized use. Besides the **2.0 Safety**, he is also familiar with the **chapter Special operating modes**.

He finds the necessary technical characteristic data in the **11.0 Appendix**.

#### • **Reseller:**

The reseller forwards the device.

#### • **Operator:**

Every other person who uses the Runner we define as an operator.

The operator must have read the **2.0 Safety** in this manual before using actuator.

Moreover, he must be instructed about the Normal operation by the operating authority.

### 2.1.1.3 Type of operation

The Runner is exclusively intended for intermittent operation (↳ **3.0 Technical Data**)

### 2.1.1.4 Danger Zones

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

- **Persons:**

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.

- **Device:**

The danger zone device comes under the user group Executor and Technician and covers the Runner and all the mounted-on elements.

### 2.1.2 Unintended Use

Any use other than the intended use, or modifications to the device without the manufacturer's written agreement, or operation beyond the technical limits, is considered unauthorized.

See technical operating limits in the **3.0 Technical data** of this manual and on the label of the Runner.

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

Specific application exemptions are:

- Flammable anesthetic mixture with air
- Flammable anesthetic mixture with oxygen or nitrous oxide
- Increased radiation



#### NOTE

Any unauthorized use of the device can cause personal injury and property damage. Always adhere to the instructions given in this manual.

### 2.1.3 Essential performance

Holding and moving of loads

## 2.2 Responsibility of the owner and processor

The device is designed for commercial applications by its owner or processor. The processor is the contracting partner of the reseller or the manufacturer. The processor installs the device in a complete system (application).

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

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

- Inform themselves of applicable industrial safety regulations.  
They must also determine additional hazards that arise due to the specific working conditions prevailing at the site where the device is installed using risk assessment. The

risk assessment must be implemented in the form of work instructions for device operation.

- Confirm that the work instructions created for the system, including the device satisfy current legal requirements and must alter the instructions accordingly.
- Clearly regulate and specify the responsibilities for installation, operation, maintenance, and cleaning.
- Ensure that all employees who deal with the device have read and understood this manual.
- Provide personnel with the required protective equipment.
- Provide training for personnel at regular intervals and inform personnel of the hazards.

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

- Ensure that the maintenance intervals described in these instructions are complied with.
- Have all safety devices inspected regularly for function and completeness.

## 2.3 Personnel requirements

### WARNING

**Improper installation, operation and maintenance can result in serious injury, death or property damage.**

Use only qualified, instructed, or trained personnel (as described below) who have read, understand and follow these instructions.

### 2.3.1 Qualifications

The following qualifications are specified for different areas of activity listed in this manual:

- An instructed person (operator): Instructed by the customer in an orientation session on the assigned tasks and possible dangers arising from in case of improper behaviour.
- Qualified personnel: Based on their professional training, know-how and experience as well as knowledge of the applicable standards and regulations are able to independently perform assigned work activities and to detect and avoid possible dangers
- Professional electrician: Based on his/her professional training, know-how and experience as well as knowledge of the applicable standards and regulations is able to independently perform work on electrical systems and to detect and avoid possible dangers.  
In addition, the professional electrician has been trained for the special location where he/she works and knows the relevant standards and regulations.

Only persons who can be expected to perform their tasks reliably are permitted as personnel. Persons whose reaction capabilities are impaired, e.g. through the use of drugs, alcohol or medication for example, are not permitted.

## 2.4 Specific dangers

The following section lists the residual risks that have been determined by a risk assessment.

The manufacturer has constructively, and with protective measures, minimized the effects of existing hazards. Pay attention to the residual hazards and potential countermeasures described and the warnings in the following chapters.

### ⚠ WARNING

#### Electric shock hazard

The Runner does not have any on/off switch and if required to be switched off, for example in an emergency, the actuator must be disconnected from the control unit or the power supply. Only this measure will de-energize the actuator.

Applications where the actuators are built in, must provide an emergency stop switch or isolation from the mains supply on all conductors.

### ⚠ CAUTION

#### Electric shock hazard

Take care about damage to the Runner from water sprays. The Runner is splash-proofed according to IPX4S, optionally hose-proofed 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.

### ⚠ WARNING

#### Danger of injury caused by moving components

Rotating and/or linearly moving components can cause severe injury.

Therefore:

- Do not work on or place any of your body, hand, or arms near moving components.

### ⚠ WARNING

Any side-acting forces can destroy the actuator and pose a risk of serious injury. During the stroke, do not manipulate any of the elements connected to the actuator.

### ⚠ WARNING

#### Overloading

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.

### ⚠ WARNING

#### Crush hazard

Do not let any object or person come in contact with the push and/or protection tube on front and rear attachment.

Risk of damage to the linear actuator caused by static and dynamic overloading of the actuator. Do not use the actuator beyond the permissible operating data.

### ⚠ WARNING

#### Rotating of Fork Head

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 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.

### ⚠ WARNING

#### Pinch hazard

When the actuator runs into fixed objects, the driving force can cause personal injury. If the actuator is left unattended, check that the full stroke length is free of obstacles and that there is nobody in the stroke area. Alternatively, provide a means of disconnecting all conductors from the mains power supply.

### ⚠ WARNING

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

If the housing is damaged due to stock, breakage or heavy wear, cease using the device and follow the dismantling instructions.

### ⚠ WARNING

#### Mechanical end stop

To fulfil the safety of the requirement medical standard IEC 60601-1:2015 + A1 (Ed. 3.1) use Runner Models RU with letter M, N, P in Option 1 of the type key! (↳ **11.0 Appendix**)

Example: RU24-300515A150M0-00

### ⚠ WARNING

#### Gaps / Trapping zones

Customized Runners with are not fulfill the gaps requirements (e.g. IP protection class lower than IPX4) must be provided with a cover in the final application.

## 2.5 Safety equipment

### ⚠ WARNING

#### Danger due to malfunctioning safety equipment

For safe operation, be sure all features are in good working order.

Therefore:

- Always check functionality of safety equipment according to the maintenance plan.
- Never disengage safety equipment.
- Safety equipment may never be bypassed or modified.

#### Integration in an emergency-stop system required (for certain applications)

The device is only intended for installation into an application or system. It does not have its own operating control elements and does not have an independent emergency-stop-function.

Install the device so that it is part of an emergency shut-off system and can be stopped if necessary.

The emergency shut-off system has to be connected in such

a way that a disruption of the power supply or the reactivation of the power supply after a power disruption cannot cause a hazardous situation for persons and objects.

The emergency shut-off systems must always be freely accessible.

#### WARNING

##### **Overloading**

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.

## Power indicator

#### CAUTION

##### **Power indicator**

The Runner does not have a power indicate (LED) to show the equipment is ready for normal use and to show the movement of the stroke.

The visualization secures the indicator light on the operating element. (ex. hand switch)

Push-to-run operation (recommended): The actuator operates as long as the switch is pressed. If the device does not have signals to indicate operation, and depending on the application, it is recommended to have an operational signal installed in the third party control unit.

## Control unit to drive Runner

### • a) Ewellix control unit:

The Runner is designed together with control units development by Ewellix.

These control units (BCU,VCU,SCU) secure a double isolation (2 MOPP) from main supply including a PE (protection earth). In additional all these control units have an integrated (programmable) current cut-off circuit. That secure that a short circuit in the actuator shut down the supply.

### • b) Third-Party control unit:

Control units not approved by Ewellix for Runner actuators, are treated as third party control units.

The third party control must enable the drive to draw currents up to 25 A for 250ms after switching on (start-up current).

The access power shut-off feature can also be temporarily de-activated for this purpose.

The secondary circuit of third party control units must be designed as an over voltage category 1 circuit. The maximum power input to the device should be only 0,5 A above the nominal value.

The maximum shut-off value may be only 1 A above the nominal value.

For example: The maximum current consumption is 12 A.

The recommended shut-off value is 12,5 A, the maximum cut-off value is 13 A.

#### NOTE

The third party power supply must have an isolation between the primary and secondary circuits according to 2 MOPP, and provide a non-grounded secondary circuit.

#### NOTICE

##### **Material damage due to third-party control!**

The use of a third-party control may lead to material damage. If a third-party control unit is used, the manufacturer does not assume any liability for damage that may be caused.

Therefore:

- Only use Ewellix control unit.
- If you must use a third-party control unit, please contact Ewellix.

## 2.6 Safeguard against restart

To secure the Runner against unintentional restart:

Pull the power line plug of the control unit (connected to the Runner)

Out of the power outlet.

#### DANGER

##### **Life-threatening situation through unauthorized restart!**

For work in hazard zones, there is a risk that the power supply be turned on without prior authorization. This presents a life-threatening situation for people in the hazard zone.

Therefore:

- Follow the information concerning safeguarding against re-starting of the power supply in the chapters of this operating manual.
- Always follow the process to safeguard against a restart as described below.

## 2.7 Modification of device

#### WARNING

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

### 2.7.1 Warning labels

The following symbols and information decals can be found in the danger zone. They refer to the immediate vicinity around their location.

#### WARNING

##### **Danger of injury because of illegible symbols**

Over the course of time stickers and decals may become dirty or illegible for some other reason.

Therefore:

- Keep any safety, warning and operation related decals in legible condition at all times.
- Replace damaged decals or stickers immediately.

For the Runner the following warning labels are applied.

- a) Don't turn the push tube (fig.1)

Fig.1



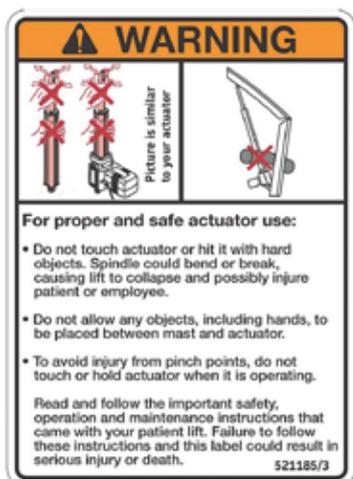
**CAUTION**

Push tube (extension tube)  
It is not allowed to turn the push tube!  
Otherwise the internal safety switch can operate and the actuator will not function anymore!

- b) Never touch the actuator between mast and actuator and never when it is operating

For Runners with a stroke length of 300 mm and more please note that the enclosed sticker (fig.2), by the delivery, has to be placed on the actuator (from the manufacturer)

Fig.2



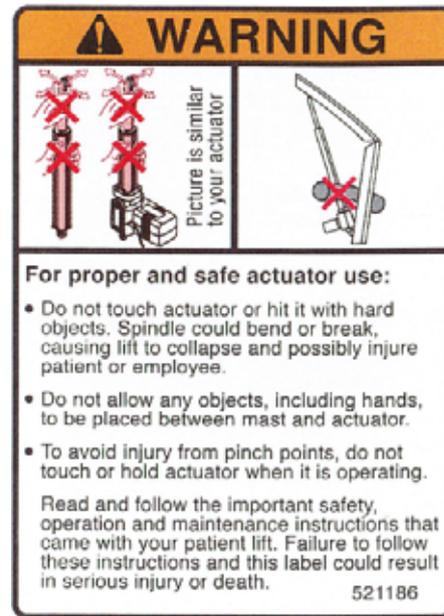
**NOTICE**

**For proper and safe actuator use**  
This sticker has to be placed on the actuator by the lifter producer, clearly visible for patients and nursing stuff.

**2.7.2 Information labels**

The leaflet (fig.3) is enclosed by each delivery (up from stroke 300 mm) and says that the sticker must be placed at the actuator visible for patient and nursing staff (Ex. final application "lifter")

Fig.3



*This sticker has to be placed on the actuator by the lifter producer, clearly visible for patients and nursing stuff.*

**2.8 Manufacturer's declaration of EMC compliance**

This section is only mandatory, if the devices are approved and attended for use in medical applications or environment (according the medicine standard IEC60601-1-2 / Ed. 4).

An actual declaration of EMC compliance for the Runner can be supplied on request.

A report is available acc. the generic standard 61000-6-2 and 61000-6-3.

In dependence of the final application and the Environment EMC-Tests (Immunity and Emission) are necessary to be in accordance with the standards:

- **Medical electrical equipment:**  
Emission: IEC / EN 60601-1-2 (4th ed.)  
Immunity: IEC / EN 60601-1-2 (4th ed.)

- **Industrial environments (Generic Standards):**  
Emission : IEC / EN 61000-6-2  
Immunity : IEC / EN 61000-6-4

- **Residential, commercial and light-industrial environments (Generic Standards):**  
Emission : IEC / EN 61000-6-3  
Immunity: IEC / EN 61000-6-1

# 3.0 Technical data

 **NOTE**

The technical data (dimensions, weight, output, connection values, etc.) can be found in the drawings and data sheets at the end of this manual (→ **11.0 Appendix**).

The datasheet provides information on all products RU20, RU21, RU22, RU23, RU24, RU25.

**Content:**

- Dimensional drawing
- Suitable control units and accessories
- Performance diagrams
- Safety factor load conditions
- Type key
- Operating data

**Remark Type key, Option 1:**

- Letter “K” “L”: fulfill the requirement of standard IEC 60601-1:2005 (Ed.3.0)
- Letter “M” “N” “P”: fulfill the requirement of standard IEC 60601-1:2005 + A1 (Ed.3.1)

## 3.1 Ambient conditions

The Runner is suitable for indoor use only and must not be exposed weathering, strong radiation fields or corrosive or explosive atmospheric media.

**Ambient conditions**

- Temperature range: +10 °C to +40 °C
- Atmospheric humidity: 5% to 85%
- non-Condensing
- Atmospheric pressure: 700 to 1060 hPa
- Height above sea level: 3 000 m (MOPP)
- Overvoltage category II
- Pollution degree 2

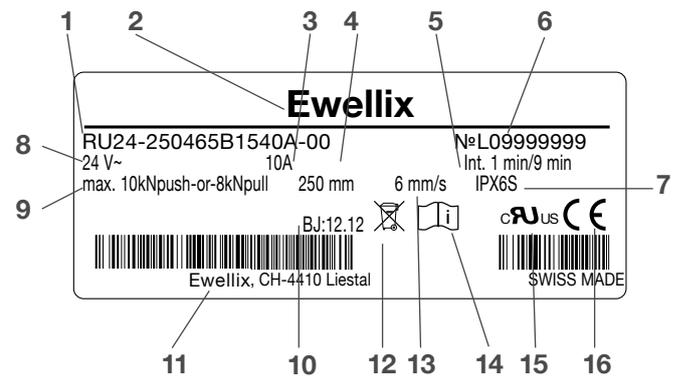
**Duration (intermittent)**

Information	Value	Unit
Maximum operating time without a break	1	Minutes
Break until next operation	9	Minutes

## 3.2 Product label

The product label provides the following Information:

Fig. 4



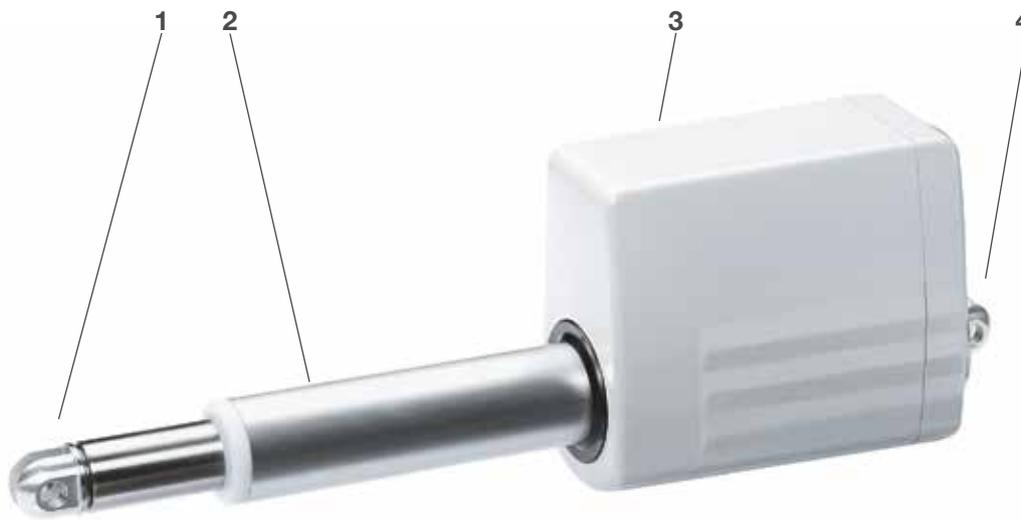
1. Type designation
2. Manufacturer
3. Maximum current consumption
4. Stroke
5. Duty cycle of operation
6. Serial number
7. IP protection class
8. Input Voltage
9. Nominal Load push/pull
10. Date of manufacture (month, year)
11. Manufacturer's address
12. Disposal information
13. Speed
14. Recommendation to read operating manual
15. UL mark
16. CE mark

# 4.0 Structure and function

## 4.1 Overview

### 4.1.1 View Runner

Fig.5



#### 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

### 4.1.2 Drive the Runner

To drive the Runner a power control unit and a operating element (hand switch, foot switch, desk switch) or low voltage interface is necessary.

#### Control units

Control units available and from Ewellix especially designed for the Runner are BCU (**Fig.6**), VCU & SCU (**Fig.7**).

The Runner is compatible with these control units. The BCU only runs with the RU models RU20, RU21, RU22.

The VCU is provided for connecting up to 5 actuators; the SCU for 6 actuators.

The control unit VCU and SCU are available with battery pack.

Please consult the corresponding user manuals of these devices! (**Fig.5**)

Fig.6

Control unit BCU



Fig.10

Operating element desk switch STE



Fig.7

Control unit VCU and SCU



## 4.2 Brief description

The Runner is a very compact and strong high-performance actuator, able to lift loads up to 12kN. The actuator runs very quietly and with low vibration. Based on the robust design, the Runner has a long lifetime.

The standard version includes a safety nut and limit switches as well as a Jack-plug (DIN with option encoder). With a safety factor of four for stroke length of up to 250 mm the Runner is ideally suited for medical applications. Based on its performance it is also suitable for specific applications in the industrial field.

Optional the Runner can be equipped with mechanical end stop (limit switch) in the extracted position. (see "Function")

### Operating elements

Operating elements are available from Ewellix.

These devices are called hand switch EHA3 (Fig.8), foot switch STJ (Fig. 9) and desk switch STE (Fig.10)

Fig.8

Operating element hand switch EHA3



### 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 Runner is based on push or pull functions. A push or pull movement is exerted with a push tube. The built-in brake decelerates the movement or holds the position at a standstill. There must be no side pressure and no torque applied.

The Runner has to be equipped with a Ewellix control unit and a Ewellix operating element.

#### Core

The core is the load-bearing component that connects the motor unit, the gears and the linear unit (main bearing) with each other.

#### Motor housing

The motor housing (Fig. 5/3) 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.

Fig.9

Operating element foot switch STJ



**Motor unit**

The permanent magnet motor is a DC-motor that drives the gears via the toothed belt.

The speed of the stroke depends on the load.

**Gears**

The two-step planetary gear system is driven by the toothed belt, by which a threaded spindle is moved.

**Linear unit**

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 back up nut provides additional protection, in case of a fracture of the spindle nut.

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 (Fig.5/2).

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 (Fig.5/1)

**Thermo-switch**

The thermo-switch in the motor controls thermal and electrical overload and switches off the motor.

The actuator must not be operated until the actuator temperature has fallen below the switching threshold.

**Brake**

The brake is attached to the threaded spindle and serves to brake it.

**Limit switch**

The actuator is equipped with two internal limit switches, which turn the actuator off at the limit positions.

An additional emergency limit 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. (The address is listed on the cover back.)

**Mechanical limit end stop**

Optional the Runner can be equipped with mechanical limit switch (end stop) in the extracted position.

In order to that feature the Runner fulfil the medical Standard IEC 60601-1:2005 + A1 (Ed. 3.1)

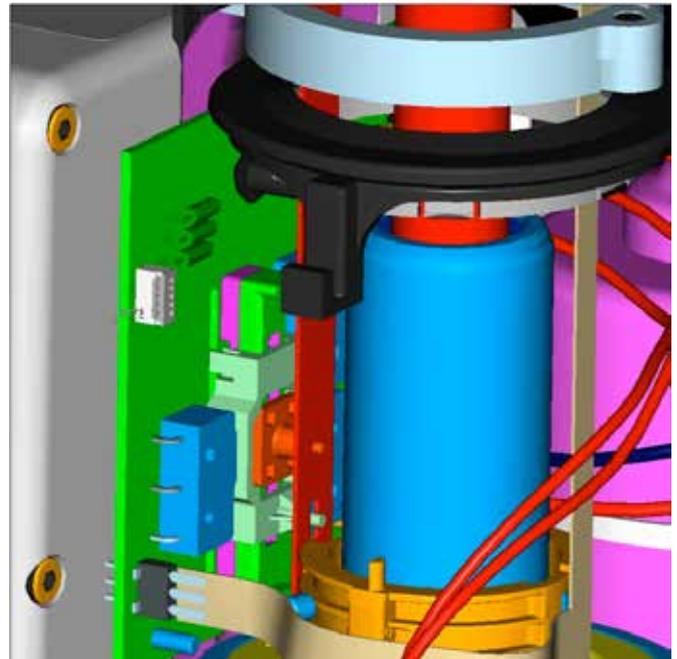
(↳ 11.0 Appendix type key option 1/letter M,N,P)

## 4.3 Special features

**Internal limit switches**

The electric entrapment safeguard is an electrical switch that switches off the linear actuator when the stroke is hindered by an object or a body part.

Fig.11



- The actuator is equipped with internal current-breaking limit switches to stop the actuator in its end positions
- The limit switches (fig.11) are placed on the printed circuit board and are operated by a rod
- In case of overrunning one of the limit switches, there will be an emergency switch to de-energize the actuator. If that happens, the actuator cannot operate anymore and needs to be returned to the manufacturer to service.

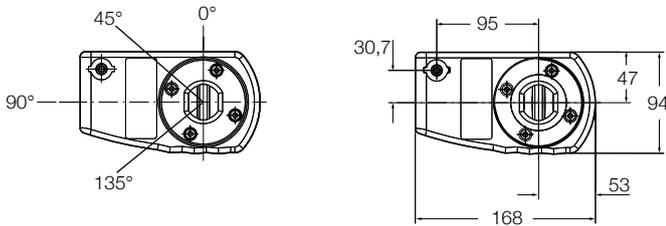
Do not lower the actuator by turning the push tube manually (↳ 2.7.1 Warning labels)

### Rear attachment orientation

Depending on the space requirements of the application, the rear attachment can be oriented in 0°, 45°, 90° or 135° (fig.12).

The hole diameter is 12 mm

Fig.12



## 4.4 Requirements for 3<sup>rd</sup> party power supply

Control units not approved by Ewellix for Runner are treated as third party control units.

**NOTE**

It is strongly recommended to use original Ewellix controls for the operation of the Runner actuator. If third party controls are used, there must be good documented evidence that the requirements listed below are complied with.

The secondary circuit of third party control units must be designed as an over voltage category 1 circuit. The third party control unit must be fitted with an overload safety cut-off. The maximum power input to the device should be only 0,5 A above the nominal value.

The maximum shut-off value may be only 1 A above the nominal value.

For example: The maximum current consumption is 12 A.

The recommended shut-off value is 12,5 A, the maximum cut-off value is 13 A.

**NOTE**

The current cut-off has to be set differently if the main load direction is in pull mode. Consult the technical data or datasheet in this manual, for maximum power consumption values for each type.

The third party control must enable the drive to draw currents up.

To 25 A for 250ms after switching on (start-up current).

The access power shut-off feature can also be temporarily de-activated for this purpose.

The operating voltage of the RU actuators is 24–30 V DC.

The no-load voltage of 36 V DC must not be exceeded.

After the system has been installed, ensure electro-magnetic compatibility.

**NOTE**

The third party power supply must have an isolation between the primary and secondary circuits according to 2 MOPP, and provide a non-grounded secondary circuit.

Push-to-run operation (recommended): The actuator operates as long as the switch is pressed. If the device does not have signals to indicate operation, and depending on the application, it is recommended to have an operational signal installed in the third party control unit.

## 4.5 Connections

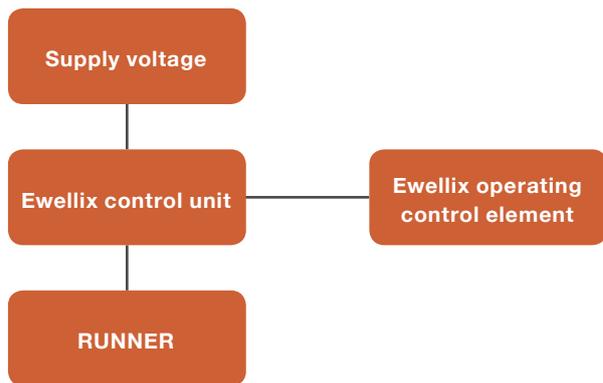
### Connection to power line

The Runner is connected to the control unit, which is directly connected to the to the power line.

### Connection to operating element

The operating element is directly connected to the control unit and controls the direction of movement of the Runner (fig.13).

Fig. 13



## 4.6 Operating elements

For operating elements see separate operating manual!

**NOTE**

The device does not feature its own operating elements. The operation takes place via Ewellix operating element at an external Ewellix control units (see related operating manual).

## 4.7 Options

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

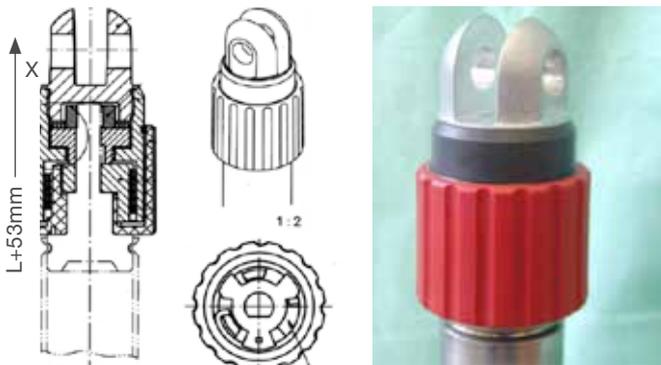
### Emergency lowering mechanism

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 actuator malfunction, to manually lower the lifter (fig.14); also see the 7.0 Operation

Up to 1000 manual lowerings are possible.

Fig. 14



### Electrical Anti Pinching (pinch protection)

- Optional electrical anti pinching (Safety shut-off)
- Special back hinge knob with elongated hole and integrated shut-off pin ensures shut-off of the actuator via a micro switch (fig.15).
- In the event of pinching, the pin is lifted up from the fastening bolt and triggers the shut-off.
- Pull load actuators are wired the other way around

Fig. 15



### Hall Encoders

- With the Hall sensor, the impulse sender picks up impulses from a magnetic disk located on the threaded spindle. In order to that it is possible to determine the relative position and the moving direction of the actuator
- With this technical feature the control unit can
  - memorize positions
  - indicate the height

- memorize positions
- indicate the height

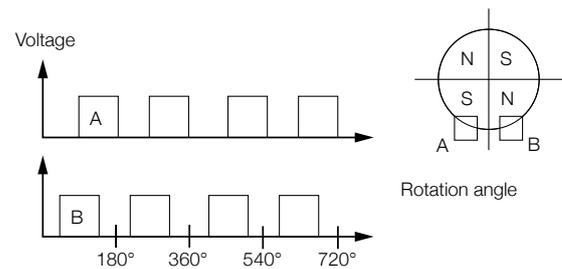
A magnet ring with 14 poles is mounted on the screw.

Two sensors (A+B) detect the magnet field. The control unit counts the flanges of the pulses:

14 poles x 2 flanges x 2 sensors = 56 counts/ screw turn

Two hall sensors with 45° phase shift enable to detect the movement direction (fig.16)

Fig. 16



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

### Linear potentiometer

This option is no longer available ! (see type key!)

[Linear potentiometer were developed to determine the position through the resistance value (actual value) and therefore registers the absolute path.]

### IPX6S

The Runner can be optionally supplied with method of protection IPX6S (standard IPX4S).

It is then also Runner protected from water sprays

(↳ 2.0 Safety)

## 4.8 Accessories

### Control unit

The Runner needs an Ewellix control unit to power the motor.

Only use Ewellix controller units BCU, VCU SCU.

### Operating elements

You can operate the Runner remotely by means of the Ewellix operating element on the control unit.

Only use Ewellix operating elements (hand switch, foot switch, desk switch).

### NOTICE

Ewellix will not take any liability if the Runner is not used with a suitable Ewellix control unit / operating element.

# 5.0 Transport, packaging and storage

## 5.1 Safety information for the transportation

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.

### ⚠ CAUTION

To prevent damage due to improper transport.

- Proceed carefully during delivery and unloading of the packaged items, as well as during the transport to final destination. Comply with the symbols and information shown on the packaging.
- Do not remove the Operating elements and Accessories from its packaging until just before installation.
- Note storage requirements for return transport of the device to the manufacturer.

## 5.2 Transport inspection

### 📄 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.

### If exterior transport damage is evident:

- Do not accept delivery or accept with exceptions (due to fulfill orders)
- Record scope of damage on the transport documents or bill of delivery of the shipping company
- Initiate complaint  
Check completeness of delivery for:
- A complete actuator unit.
- If cracks in the plastic casing were caused during the transport, the protection of accordance with rated IP class can no longer be guaranteed. The actuator must be sent back to the manufacturer.
- Installed cable and a low-voltage plug
- The storage inserts for hinge head and fork head.

### 📄 NOTE

Report any damage as soon as possible, as damage claim can only be submitted within the transporter's applicable complaint period.

## 5.3 Return to the manufacturer.

If device is damaged, arrange for return transport as follows:

1. Dismantle the device if necessary (↳ 10.0 Dismantling).
2. Pack device in its original packaging. Follow storage conditions (↳ 5.5 Storage).
3. Send to manufacturer. The address is listed on the cover back.



### NOTE

You will find the weight, dimensions and the environmental requirements in the technical data in the appendix!

### Check items in shipment

The Runner consists of:

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

## 5.4 Packaging

### Requirements:

All parts are packaged appropriately for anticipated transport conditions, using only environmentally-friendly packaging materials.

The packaging is intended to protect the individual components from damage caused during transport, or by corrosion and other potential hazards, until the components are ready for installation.

Only remove packaging shortly before installation. The packaging should not be destroyed, but kept for possible return shipment to the manufacturer.

If the packaging is to be disposed of, please note and adhere to the following notes:

### ⚠ CAUTION

#### Environmental damage due to incorrect disposal

Packaging material consist of valuable materials, much of which can effectively be recycled and reused.

Therefore:

- Dispose of packaging material in an environmentally correct way
- Comply with locally applicable disposal requirement

## 5.5 Storage

Ewellix products can be stored during a shipment from the manufacturer to the customer in an intermediate storage or/ and finally at the customer on the storage. Pack the device in its original packaging for storage.

For storage, pack the Runner in its original packaging. Observe the following when points selecting a storage location:

- Do not store outside.
- Dry and dust-free storage.
- Keep away from any aggressive media.
- Protect from UV radiation.
- Avoid mechanical vibrations.
- Observe the following values:
  - Storage temperature: +10 to +40 °C
  - Atmospheric humidity: 5 to 85%, non-condensing
  - Pressure: 700 to 1060 hPa
- For storage longer than three months, check the general condition of all parts of the packaging on a regular basis.

For specific storage conditions contact Ewellix.



### NOTE

It is possible that there are notices on the packaging concerning the storage, which go beyond the requirements listed here. Follow those accordingly.

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# 6.0 Installation and first operation

This chapter is intended for technicians and those involved with further processing. It provides the information needed to assemble, connect and start up the device Runner.

Qualification (↳ **2.3.1 Qualifications**)

## Authorized personnel

- The installation and first start of operation may only be conducted by qualified persons.
- Work on the electrical system may only be performed by trained professional electrician.

### WARNING

#### Electric shock and moving parts hazards.

Serious injury or death can be caused by touching live electrical components and by unexpected movement of the actuator.

**Be sure the system's power supply is off and the actuator is locked out before installing.**

### WARNING

#### Danger if restarted without authorization

When correcting faults there is a danger of the power supply being switched on without authorization. This poses a life-threatening hazard for persons in the danger zone.

Therefore:

- Prior to starting work, switch off the system and safeguard it from being lockout.

### WARNING

#### Risk of injury and material damage due to incorrect installation of the optional devices

Therefore:

- Optional devices, in particular components that are part of a retrofitting, may only be installed in accordance with the respective instructions (circuit diagram).
- The electromagnetic compability must be tested for the routing and appropriate measures must be carried out if necessary.

### WARNING

#### Special precautions regarding EMC

The device requires special precautions regarding EMC and must be installed and put into service according to the EMC information provided in this manual (↳ **2.8 Manufacturer's declaration of EMC compliance**).

### WARNING

#### Installation adjacent to other equipment

The device should not be installed adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the device should be under observation, to verify normal operation in the configuration in which it will be used.

### WARNING

#### Crush hazard

Risk of damage to the Runner caused by static and dynamic overload. Do not use the actuator beyond the permissible operating data.

- Note the maximum permissible operating data in the datasheet
- Note the product label of the actuator

## 6.1 Installation location

A good preparation is part of efficient installation and start-up.

This includes, among other things, deciding on a location for it and having an energy source ready.

Adhere to the technical data in accordance with operating conditions (↳ **11.0 Appendix**) .

Install in a location according to the ambient operating conditions and where the devices are not exposed to strong UV radiation or corrosive or explosive air media.

(↳ **3.1 Ambient conditions**)

## 6.2 Inspections prior to first operation

The installation and first start of operation may only be conducted

Perform an installation check before you start up the system with operating devices for the first time.

To be performed by a professional electrician

Prior to first operation, a professional electrician must perform and document the following tests and readings:

- Visual condition check
- Function check of operating features and safety features
- Reading of protective conductor resistance
- Reading of leakage currents
- The in Reading of insulation resistance

## 6.3 Installation

- Execution by qualified personnel

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

It is important here to ensure that the load which is to be moved acts centrally onto the push tube. No lateral forces may act on the push tube whatever the orientation, and the actuator must not be installed off-centre. The operating manual (technical instructions) must be observed for installation and putting into service.

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

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

### WARNING

#### **Risk of injury and material damage due to manipulation of the screws on the device**

Manipulation or loosening of the screws on the device or the optional devices may lead to injuries and material damage during the operations.

Therefore:

- Never loosen screws on the device or the options.

### WARNING

Warning of hand injury from being caught in the fork head of the push tube when the motor is running. There will be a rotation 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.

Installing the Runner on other elements in the system involves taking into account the special requirements of the different applications. The linear actuator is fastened to two elements via the fork head and the hinge head.

The Runner runs solely on electricity.

Observe the connection values in the appendix of this manual (↳ **11.0 Appendix, Technical data**)

The devices must be attached using the mounting holes provided (↳ **11.0 Appendix**).

The devices can be installed in the provided positions.

The erection and alignment of the device and connections are shown in the following sections.

### Set-up and Adjustment

In setting up and aligning the 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.

Proceed as follows for installation:

The Runner linear actuator is attached to two elements via the fork head and the hinge head.

1. Secure elements of the application in between which the linear actuator will be inserted.
2. Connect the fork head and the hinge head and the elements of the application with the fastening bolts.



### NOTE

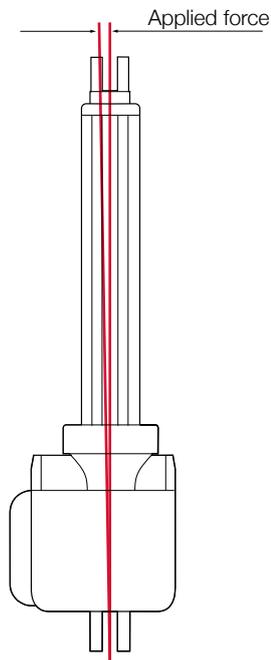
Information concerning the dimensions of the drill holes for fastening bolts can be found in the respective data sheets (↳ **11.0 Appendix**)

### WARNING

Risk of injury and material damage due to insufficient fastening! Only use fastening bolts and secure them adequately. Do not use screws to install. Never loosen or otherwise manipulate screws on actuator or options.

3. Ensure that the applied force is always centrally directed on the actuator offset  $1^\circ$  max. (fig.17).

Fig. 17



#### ⚠ WARNING

Risk of injury and material damage due to incorrect installation! During installation, do not subject the actuator to side-impact or to turning forces.

4. Ensure that the linear actuator is not impacted in its movement over the entire stroke area. Consider collision tests of the application.
5. Ensure that the motor cable cannot be squeezed, clamped or pulled.
6. Connect linear actuator to control unit.
7. Connect linear actuator to operating element.
8. Connect control unit to power supply.
9. Ensure that the power plug is accessible at all times.
10. Ensure that none of the supply or control cables can be pinched by the kinematics of the application or by the linear actuator during the extension or retraction.
11. Ensure that the installation requirements of the options have been adhered to (↳ **6.7 Requirements Concerning the Installation of the Actuators with Options**).
12. Affix prohibition and warning labels for the application onto the linear actuator, if necessary (↳ **2.7.1 Warning labels**).

## 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.

## Erection and Alignment

The following points must be kept in mind as regards the erection and alignment of the device.

Make sure that

- The device cable cannot be bent or squashed.
- The connecting cables between actuators, control units and operating elements cannot get crushed or squashed.

## Interfaces and connections

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 section ↳ **11.0 Appendix**. 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 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 Ewellix controller
6. Connect the Ewellix operating element to the Ewellix control unit (↳ **6.5 Connection to operating element**)
7. Connect the Ewellix control unit to the electrical main (↳ **6.6 Connection to power supply**)

**NOTICE**

To prevent damage to the devices owing to tilted plugs or damaged cables, ensure that the plugs remain freely accessible and all cables remain safe and hidden.

**NOTICE**

Tilted plugs could cease to be watertight, which would lead to the destruction of the connected control unit.

**WARNING**

**Risk of injury and material damage due to insufficient fastening!**

Only use fastening bolts and secure them adequately. Do not use screws to install. Never loosen or otherwise manipulate screws on actuator or options.

**WARNING**

**Risk of injury and material damage due to incorrect installation.**

During installation, do not subject the actuator to side-impact or to turning forces.

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

**NOTE**

Ewellix will not take any liability if the Runner is not used with a suitable Ewellix control unit / operating element.

If the Runner is used with a non Ewellix 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. 50ms. To start the actuator the over-current protection has to be deactivated during max. 250ms.

## 6.4 Connection to the control Unit

All control units which are not approved for the Runner devices by Ewellix are treated as third party controls.

The Runner system comes with a first failure safe control unit (ex. BCU) for the operation of up to 3 actuators. The control unit can be operated standalone or be mounted with an adapter plate on the actuator

**WARNING**

**Material damage due to third-party control unit**

The use of a third-party control unit may lead to material damage. In conjunction with the use of a third-party control unit is used, the manufacturer does not assume any liability for damage that may be caused.

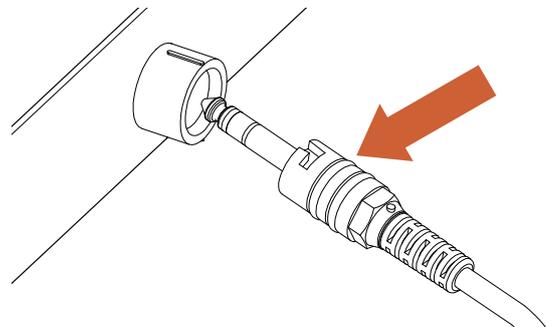
Therefore:

- It is recommended to use the Ewellix control unit from the manufacturer.
- When using a third-party control unit, the requirements stipulated for the third-party control unit must be adhered to (↳ 4.4 Requirements for third-party control units in the appendix).

Depending on the version of the Runner (see also type key designation), the low-voltage plug has been fitted with a jack or DIN-8 plug.

- a) Connect Jack plug of the Runner to control unit (Special tool required from the manufacturer (part no. 0125322))

Fig. 18



Check the sealing ring of the jack plug (arrow) and the plug for damage (fig.18).

Sealing ring with Klubersynth VR 69-252 (part no. 0118037), lightly lubricate.

Insert jack plug with bayonet joint (2) into the connecting socket (1) of the control unit (fig.19).

Ensure correct positioning of the groove (3).

Fig. 19

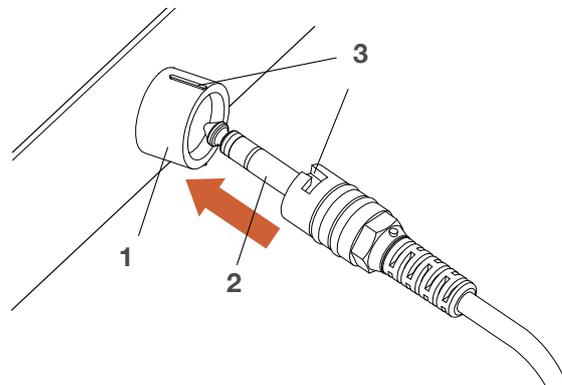
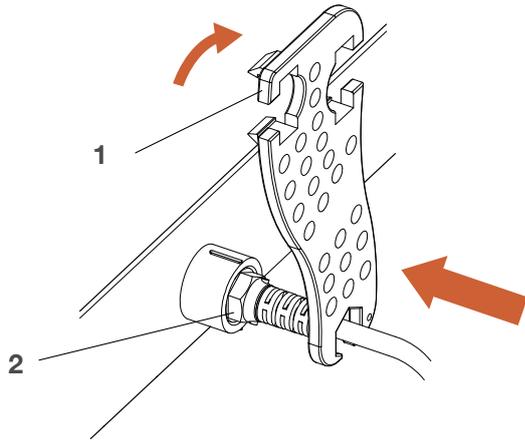
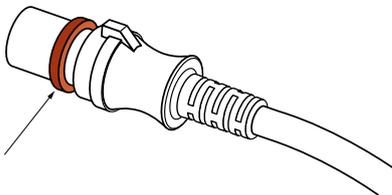


Fig. 20



4. Insert special tool (1) in the nut (2) of the jack plug (fig.20).
  5. Turn special tool (1, ↪ 1.5 Spare parts) clockwise until the bayonet joint of the jack plug is locked.
- **b)** Connect DIN8 plug of the Runner to control unit  
The insertion position is given by the geometric shape of the plug.  
The strain relief for this system is provided via attached components of the respective Ewellix control unit casing.
1. Check the sealing ring of the DIN-8 plug (arrow) and the plug for Damage (fig.21).

Fig. 21



**NOTE**

Damaged sealing rings and twisted plugs can no longer guarantee protection pursuant to IPX65. They must be replaced by the manufacturer (↪ 5.2 Transport inspection)

2. Sealing ring (arrow) with Klubersynth VR 69-252 (part no. 0118037), lightly apply lubricant.

**CAUTION**

**Damage due to wrong lubricants**

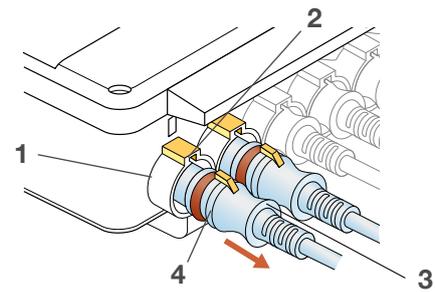
The use of incorrect additives may cause significant material damage

Therefore:

- Use only the auxiliary products listed by the manufacturer.

3. Insert DIN-8 plug (3) into the connecting socket (1) of the control unit (fig.22). Ensure correct positioning of the groove (2) and the lug (4).

Fig. 22



## 6.5 Connection to operating element

The Runner is not intended to connect directly an operating element.

For the connection diagram see 4.5 Connections, fig.13

**WARNING**

**Risk of injury and material damage due to third-party operating element**

The use of a third-party operating element may lead to significant injuries or material damage. In conjunction with the use of a third-party operating element, the manufacturer does not assume any liability for damage that may be caused.

Therefore:

- Only use the manufacturer's Ewellix operating element.



**NOTE**

The device is connected to the operating element via an external control (↪ Separate operating manual of the control and the operating element).



**NOTE**

A low-voltage plug connects the device to an external control unit. Adhere to the instructions of the operating manual of Ewellix control unit during the connection process.

## 6.6 Connection to power supply

The Runner is not intended to connect directly main supply.

For the connection diagram see 4.5 Connections, fig. 13.

## 6.7 Requirements concerning the installation of the actuators with options

- Emergency lowering (↳ 4.7 Options, fig. 14)
- Electrical anti-pinching protection (↳ 4.7 Options, fig. 15)
- Encoder (only functional with control unit SCU) (↳ 4.7 Options, fig. 16)

Option: Control unit BCU mounted on the Runner

The Runner system comes with a first failure safe control unit (ex. BCU) for the operation of up to 3 actuators. The control unit can be operated standalone or be mounted with an adapter plate on the actuator.



### NOTE

Additional information concerning inspections and readings (↳ 8.0 Maintenance).

## 6.8 Initial start-up

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

- All instructions followed in the above sections of this chapter.
- All cables secured against pinching and trapping, and properly connected.
- Electrical supply secured.
- Operating device connected to the control unit.
- No persons or obstacles near any movement.

### WARNING

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.

- Note the maximum permissible operating data in the Appendix (↳ 11.0 Appendix, Technical Data)
- Note the type plate of the linear actuator

### WARNING

#### Crush hazard

Risk of damage to the Runner caused by static and dynamic overload. Do not use the actuator beyond the permissible operating data.

- Note the maximum permissible operating data in the datasheet.
- Note the product label of the actuator.

#### Check the following points before the commissioning:

- Visual condition check
- 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 Ewellix control unit (low voltage plug connected correctly to Ewellix control unit)
- Ewellix operating element connected to the Ewellix control unit

After the installation check has been completed, you can start up the Runner, the system.

To do so, press the corresponding button on the Ewellix operating element.

Make sure that all functions are correctly operational.

# 7.0 Operation

## 7.1 Safety

### WARNING

#### Risk of crushing

While moving onto solid objects, the force of the device may cause injuries.

Therefore:

- Ensure that there are no persons in the stroke area of the device while in operation.
- Take note of maximum permissible operating data for the device (↳ **11.0 Appendix, Data sheets**).
- Never tamper with the elements that are connected to the device while the device is in operation.
- Make sure that operating elements cannot be activities in a protected standby position.

### CAUTION

#### Risk of injury through contact with the fork head.

Therefore:

- Do not let objects or body parts come in contact with the fork head of the actuator.

### CAUTION

#### Material damage due to static and dynamic overload of the device

Static and dynamic overload can lead to damage and failure of the device.

Therefore:

- Adhere to maximum permissible operating data for the device (↳ **11.0 Appendix, Data sheets**).
- Never exceed nominal load.
- Never tamper with the elements that are connected to the device while the device is in operation.

### CAUTION

**Actuator may be damaged if liquids penetrate the actuator during extension and retraction. Keep liquids away.**

## 7.2 Turn on

After the installation and first operation, a comprehensive function check should be done before operation, by activating the corresponding functions via the connected hand, foot or desk switch.

Before powering the system (Control unit, Runner, Operating element) take care the following information:

### WARNING

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.

- Note the maximum permissible operating data in the Appendix (↳ **11.0 Appendix, Technical Data**)
- Note the type plate of the linear actuator

### WARNING

Any side-acting forces can destroy the actuator and pose a risk of serious injury. During the stroke, do not manipulate any of the elements connected to the actuator.

### CAUTION

Take care about damage to the Runner from water sprays. The Runner is splash proofed according to IPX4S. Optionally hose proofed 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.



### NOTE

The device does not feature its own operating control elements. The operation takes place via a separate operating element (↳ **Separate operating manual**)

## 7.3 Turn off



**NOTE**

The device does not feature its own operating control elements. The operation takes place via a separate operating element (↳ **Separate operating manual**)

## 7.4 Actions before use

### NOTICE

Preconditions for operation  
Control the Runner takes place through a Ewellix control unit (BCU, VCU, SCU) and an operating element (EHA3, STJ, STE) or third party devices.

## 7.5 Actions during the operation

### 7.5.1 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.

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

The Ewellix control unit must be connected to main supply. Operation takes place through a Ewellix operating element (↳ **11.0 Appendix**).

### 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.

### CAUTION

Excessive current consumption, unusual noises or an unwanted movement from the actuators, indicate damage or defect of the control unit cease operation and contact Ewellix immediately.



**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.

### 7.5.2 Operate Options

Details of specific operations can be found in the following sections:

- Installation and first operation
- Maintenance
- Malfunctions
- Dismantling

## 7.6 Emergency disengagement

### WARNING

Pull out the plug of the main cable at main supply AND the cable that connects the Runner to the control unit.

### NOTICE

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

### WARNING

#### Emergency switch off

An emergency off switch is absolutely essential for patient lifters.

### NOTICE

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

Pull the mains power cable from the socket of the main supply (or from the control unit if not otherwise possible)!

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

### 7.6.1 Shut down

Proceed as follows in hazardous situations:

1. Immediately engage emergency shut-off, if present, or cut off power to actuator.
2. Evacuate people from the hazard zone, initiate first aid measures.
3. Notify doctor and fire department, if necessary.
4. Notify responsible person on-site.
5. Keep access paths open for rescue vehicles. Order specialized staff to repair malfunction.
6. Based on severity of emergency, notify the authorities if necessary.
7. Order specialized staff to repair malfunction.

**⚠ WARNING**

Do not restart until all persons are outside the hazard zone.  
Check the device and application that uses the device prior to starting the operation and ensure that all safety equipment is installed and fully functional.

---

8. Check the device and application that uses the device prior to restarting the operation.  
Ensure that all safety equipment is installed and fully functional.

## 7.7 Action after use

Separate the actuator from the power supply.

# 8.0 Maintenance

This chapter is intended for the engineers and those doing the further processing.

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.

## Personnel

- The maintenance work described here can be performed by the operator unless otherwise indicated.
- Some maintenance tasks should only be carried out by especially trained, qualified personnel, or exclusively by the manufacturer.  
This will be indicated in the description of the respective maintenance tasks.
- Only professional electricians should perform work on the electrical equipment.
- Only professional trained personnel can substitute any electrical equipment, accessories and cables.

## 8.1 Safety

### ⚠ DANGER

#### Electric shock hazard

Incorrect installation can result in serious injury, death or damage. Only professional electricians should work on electrical systems.

### ⚠ DANGER

#### Danger if restart without authorization

When correcting faults, there is a danger of the power supply being switched on without authorization. This poses a life threatening hazard to persons in the danger zone.

Therefore

- Prior to starting fault repair work, switch off the system and safeguard it from being lockout.

### ⚠ WARNING

#### Risk of injury through moving parts

Rotating and/or linear moveable components can cause serious injuries.

Therefore:

- Turn off pillar and if necessary, protect it against being turned on again before conducting any maintenance work on moveable components.

### ⚠ CAUTION

Take care about damage to the Runner from water sprays. The Runner is splash proofed according to IPX4S. Optionally hose proofed 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.



### NOTE

Cleaning agents other than those mentioned will damage the linear actuator (ex. plug, cable, plastic housing, guiding tube). In all cases contact the manufacturer if you want to use other cleaning agents.



### NOTE

It is recommended that you comply with IEC 62353 regarding maintenance (Medical electrical equipment - Recurrent test and test after repair of medical electrical equipment) before start-up, repair and inspection.

## 8.2 Maintenance plan

The Runner is maintenance-free for life (**2.1.1.1 Product life time**).

The connecting cable and the housing must be regularly checked for wear.

Maintenance tasks that are required for optimal and trouble-free operation are described in the sections below.

If increased wear is detected during regular inspections, shorten the required maintenance intervals according to the actual indications of wear.

Runner maintenance plan		
Interval	Maintenance work	To be carried out by
Daily	Check actuator for visible damage (↳ <b>8.3.4 Check of visula condicions</b> ).	Operator
	Clean off dust and dirt if necessary (↳ <b>8.3.1 Cleaning</b> )	Operator
Monthly	Function check of operating features and safety features (↳ <b>8.3.2 Inspections and Readings</b> )	Qualified personnel
	Check tight fit of the device to the fork head and hinge head, correct it if necessary Check connection for tight fit	Qualified personnel
Annually	Reading of protective conductor resistance (with control unit) (↳ <b>8.3.2 Inspections and Readings</b> )	Professional electrician
	Reading of leakage current (with control unit) (↳ <b>8.3.2 Inspections and Readings</b> )	Professional electrician
	Reading of insulation resistance (with control unit) (↳ <b>8.3.2 Inspections and Readings</b> )	Professional electrician
	Check labels and warning notices for damage and replace if necessary	Qualified personnel
	Check plug for tight fit	Professional electrician
Definition through the processor	Check sealing O-rings for damage (↳ <b>8.3.3 Check Sealing Function of Plug</b> )	Professional electrician
	Conduct visual inspection of the condition of the permanent safeguard and the routing of the supply and control cable within the application. Cable routing elements may not be loose or broken.	
Semi-annually	Options	
	Check options for visible damage	Qualified personnel
	Check functionality of emergency lowering device under nominal load (↳ <b>4.7 Options</b> )	Qualified personnel
	Check functionality of electric pinch protection Under nominal load (↳ <b>4.7 Options</b> )	Qualified personnel
	Check functionality of quick adjustment (↳ <b>4.7 Options</b> )	Qualified personnel



### NOTE

If the linear actuator is used outside the environmental conditions specified early in this manual, check such components once a month for any changes, such as oxidation or sedimentation.

## 8.3 Maintenance work

The devices are maintenance-free for their lifetime (↳ **2.1.1.1 Product life time**).

Connection cables and housing must be checked for wear and tear at regular intervals.

In compliance with applicable regulations, safety inspections must be carried out on location, at regular intervals.

Check grounding and substitute leakage currents annually.

The housing, foils, keypads and the cables connected must be examined at regular intervals (every six months) for signs of mechanical damage. If any damage is revealed, the devices must be isolated from the control unit or actuator and any defective parts must be replaced.

Every six months, the devices must be checked by monitoring the actuators as they are retracted and extended.

The following points have to be checked regularly:

- Plug
- Housing
- Cable
- Protection earth (with control unit)
- Leakage current (with control unit)
- Function
- Protective foil/Key pads (with symbols) on the operating elements

This regular check includes checking of all functions and safety measurements.

### ⚠ WARNING

Damaged housing does not provide IP protection specified in the technical data (↳ **11.0 Appendix**)

Damaged cables could result in a short circuit or unintended movement.

### 8.3.1 Cleaning

The cleaning is to be performed by the operator.

The devices are manufactured to comply with the followed degree of protection:

- Runner => IPX4S, optional (IPX6S)
- Control units:
  - BCU (IPX4)
  - VCU (IPX4)
  - SCU (IPX4)
- Operating elements:
  - EHA3: IP66
  - STJ: IPX2
  - STE: IPX0

### ⚠ CAUTION

#### Damage due to incorrect cleaning

Therefore:

- Do not use any aggressive cleaning agents. Water used for cleaning, including chemical additives, must be pH-neutral.
- Liquids must not touch the actuator during retraction or extension.
- Only use the auxiliary materials listed by the manufacturer.
- Emergency lowering mechanism for quick adjustment system may not be treated with oil, grease or other lubricants.
- No steam jets or pressure washers may be used for cleaning.
- Other cleaning agents or cleaning devices may only be utilized with the manufacturer's approval.

**The devices should be cleaned as soon as possible after use (with a damp cloth and water, to which isopropyl alcohol has been added), in order to prevent any accretion of unwanted material.**

### NOTICE

The device should never be washed using a washing machine or similar device unless the motors, control unit and mains cable have been properly connected.

The ingress of liquids could cause irreparable damage to the system.

#### Observe the following points when cleaning:

- Separate device from control unit or actuator. Unplug the cables from the socket
- Clean soiled parts immediately
- Use a damp cloth
- Wash water, including added chemicals, must be pH-neutral
- Acidic or alkaline wash water can destroy metallic and synthetic parts
- Disinfect by hand washing exclusively with isopropyl alcohol

#### 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

### Damage due to incorrect cleaning

Therefore:

- Do not use any aggressive cleaning agents. Water used for cleaning including the chemical additives must be pH-neutral.
- Liquids must not touch the actuator during the retraction or extension.
- Only use the auxiliary materials listed by the manufacturer.
- Emergency lowering mechanism for quick adjustment system may not be treated with oil, grease or other lubricants.
- No steam jets or pressure washers may be used for cleaning.
- Other cleaning agents or cleaning devices may only be utilized with the manufacturer's approval.

#### NOTICE

#### Washing / Cleaning

High pressure steam cleaning machines must not be used. Wash water containing chemical additives must be pH-neutral. Excessive acidic or alkaline wash water can cause irreparable damage to the metal and plastic parts of the device. Only isopropyl alcohol should be used for wiping over the control unit to disinfect it.

### 8.3.2 Inspections and readings

- To be performed by a professional electrician.
- To be conducted according to the applicable standards and regulations.
- To be fully documented (see Service Log, Manual).

Complete the following entries in the service log:

- Name of the executing body (company, department)
- Names of the staff on duty
- Identification of the device/system (type, serial number, inventory number) and the respective accessories
- Completed inspections and readings
- Scope and results of the inspections
- Measuring method, measuring device, measurement readings
- Overall assessment / verification of all functions compared to specifications
- Date of inspection or reading and signature of the assessor; personal coding is a viable alternative for IT applications.

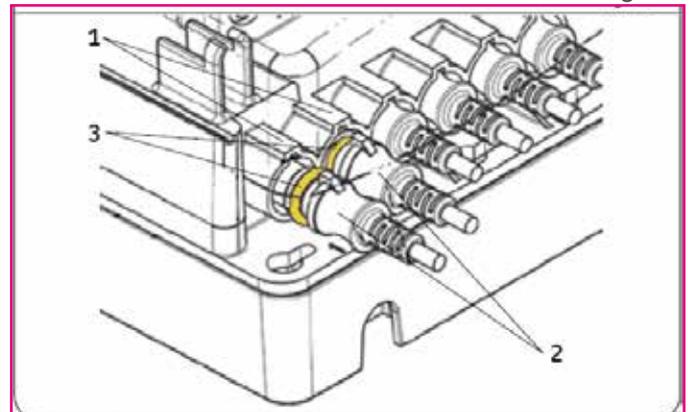
### 8.3.3 Check sealing function of plug

To be performed by professional electrician

Check sealing function of DIN-8 plug

1. Separate 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 connection outlet (1) of the housing.
4. If sealing O-rings (3) are damaged, have the manufacturer replace them.
5. If there is no damage, reconnect the device with the power supply.

Fig. 23



#### Material damage due to damage or wrong sealing rings

Damaged or wrong sealing rings cannot guarantee protection pursuant to IPX6S

Therefore:

- Ask the manufacturer to replace the damaged sealing rings immediately.

### 8.3.4 Check of visual conditions

To be performed by qualified personnel

1. Separate the device from the power supply.
2. Check the following structural components for visual external damage:
  1. Check connecting cables for cracks, cuts and pinched sections
  2. Check multi-shell plastic housing for cracks and gaps
  3. Check dirt removal ring for cracks, gaps and broken pieces
  4. Check casing tube for scratches and indentations
  5. Notify processor or manufacturer in case of damage
  6. If there is no damage and the processor/manufacturer has not communicated any concerns, reconnect the device to the power supply.

## 8.4 Measures following completed maintenance

Upon completion of the maintenance work, the following steps be performed prior to restarting the device.

1. Check all previously loosened screw connections for a tight fit.
2. Ensure that all used tools, materials and other equipment have been removed from the work area.
3. Clean work area and remove potential spills such as e. g. liquids, processing materials or similar substances.
4. Ensure that all the system's safety measures are working satisfactorily.
5. Check all functions against the product specifications
6. Document the inspections in the service log.

# 9.0 Malfunctions

This chapter describes potential causes of equipment malfunction and the work required to restore operation. In the event of more frequent malfunctions, shorten the maintenance intervals.

For any malfunction not resolved using the information provided here, contact the manufacturer.

See service contact details listed on [www.ewellix.com](http://www.ewellix.com) or the back cover.

## Personnel

- Unless otherwise indicated, the work required to solve malfunctions may be performed by the operator.
- Some work may only be carried out by qualified personnel, which is indicated in the description of the specific malfunction.
- Work on the electrical system may only be performed by professional electricians.

### DANGER

#### Danger if restarted without authorization

When correcting faults, there is danger of the power supply being switched on without authorization. This poses a life threatening hazard to persons in the danger zone. Therefore

- Prior to starting fault repair work, switch off the system and safeguard it from being lockout.

### DANGER

#### Risk of injury and material damage due to incorrect repair of malfunction

The Runner is not designed for repair work. Incorrect repair of a malfunction may lead to personal injury or material damage. Therefore:

- Never loosen the screws on the linear actuators or try to open the linear actuator.
- In the event of a malfunction that cannot be fixed by adhering to the subsequent notices, dismantle the device and send it to the manufacturer for repair (↳ **5.0 Transport, packaging and storage**).

## Actions during malfunctions

In principle:

1. In the event of a malfunction that may present an immediate danger to persons or assets, turn off the actuator or control unit immediately and safeguard against a restart.
2. Determine cause of malfunction.
3. Depending on the type of a malfunction, have it repaired by qualified personnel.
4. Inform responsible party on-site concerning malfunction.



### NOTE

The following malfunction table provides information as to the personnel authorized to perform the repair.

## 9.1 Malfunction table

Faults that occur in the Runner may only be rectified by a technician authorized by the manufacturer.

In this case the Runner must be removed from service (↳ **7.6.1 Shut down**) and sent to the Ewellix.

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

### NOTICE

In any case, immediately inform the customer service if the fault cannot be rectified on the basis of the following instructions.

**Symptom 1: 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 Ewellix control unit
- 2 Plug the mains cable of the Ewellix control unit into a mains socket

Finding: Runner does it move now?

- Yes ..... 4. Normal Operation, **chapter 7.5.1**
- 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
- 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, **chapter 7.5.1**
- No ..... Hypothesis 1-D

Hypothesis 1-D: Wrong control unit

- 1 Check the type plate of the controller

Finding: Is the manufacturer of the controller that Ewellix 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 (↳ **11.0 Appendix, Technical data**)?

- Yes ..... Manufacturer Address
- No ..... Hypothesis 1-F

Hypothesis 1-F: Control unit defective

- 1 Carry out the troubleshooting of the Ewellix controller

Finding: Is the Ewellix controller faulty?

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

Hypothesis 1-G: Life exceeded

Finding: Is the Runner older than 10 years or has it carried out more than 20 000 double strokes?

- Yes ..... Manufacturer Address
- No ..... Hypothesis 1-H

Hypothesis 1-H: Actuator stopped

- 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, **chapter 7.5.1**
- No ..... Manufacturer Address

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

- 1 Immediately contact the manufacturer (Manufacturer Address)

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

Hypothesis 2-A: Ewellix operating element defective

- 1 Check the type plate of the operating element

Finding: Is the manufacturer of the operating elements the Ewellix and permitted for the Runner?

Yes ..... Manufacturer Address  
 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, **chapter 7.5.1**

**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, **chapter 7.5.1**

**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  
 No ..... 4. Normal Operation, **chapter 7.5.1**

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

Diagnosis 6-A: Sliding elements worn, immediately inform customer service

(Manufacturer Address)

## 9.2 Start of operation after malfunction repair

The Runner is not designed for repair work.

In any case, contact customer service (↳ **1.7 Customer service**).

### 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 Runner.

Contact customer service immediately (↳ **1.7 Customer service**).

To restart device following repair of the malfunction, perform the steps described in **6.0 Installation and first operation**.

# 10.0 Dismantling

This chapter is intended for technicians and those carrying out further processing. It provides all the information needed for removal the devices from service, including dismantling and disposal.

## Personnel

- Dismantling may only be carried out by specifically qualified personnel.
- Work on the electrical system may only be performed by professional electricians.

## Shutting down

The 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 Ewellix control unit
4. Pull the low voltage plug out of the Ewellix controller

Afterwards you can dismantle or reinstall the Runner.

### ⚠ WARNING

#### Risk of injury due to incorrect dismantling

Stored residual power, sharp-edged components pins and corners on the individual components or on required tools can all cause serious injuries.

Therefore:

- Ensure there is ample space for the dismantling prior to starting with the work.
- Ensure order and cleanliness at the dismantling site! Loosely stacked structural components, or structural components and tools on the floor increase risk of accidents.
- Dismantle structural components professionally pursuant to applicable local regulations.
- Secure structural components in a way so they would not be able to fall or tip over.
- Contact the manufacturer if you have any questions or concerns.

### ⚠ WARNING

#### Electric shock and moving parts hazards

Serious injury or death can be caused by touching live electrical components and by unexpected movement of the telescopic pillar.

**Be sure power supply is off and actuator are locked out before dismantling.**

## 10.1 Dismantling

Before you start dismantling, put the Runner out of operation (↳ **7.6.1 Shut down**).

The 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 (↳ **5.0 Transport, packaging and storage**) or store or dispose of it as described in the following sections.

1. Separate device from energy supply.
2. Secure elements of the application such that no loads can impact the actuator and the control unit.
3. Loosen and remove fastening bolts from the mounting of the device
4. Separate devices from application elements.
5. Pull the plug of the operating device out of its corresponding terminal.
6. Clean the device.
7. Carefully package for shipment to the manufacturer.
8. For disposal, disassemble device according to applicable local occupational health and environmental regulations.

## 10.2 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.

Provided that no take-back or disposal agreement has been put in place, the disassembled components should be recycled.

- Dispose of metals and plastic components at an appropriate recycling center.
- Sort remaining components based on the respective materials and dispose of according to applicable local occupational health and environmental regulations. The local municipal authorities or specialized waste management companies can provide information concerning environmentally appropriate disposal.

### CAUTION

**Damage can be caused to the environment due to incorrect disposal.**

Electronic waste, electronic components, lubricant and other additives are subject to special waste treatment regulations and may only be disposed of by approved specialized companies.

# 11.0 Appendix

## Runner

### Linear actuator



#### Benefits

- High push/pull load
- Compact
- Back-up nut as standard
- High safety factor
- Silent operation

#### Technical data

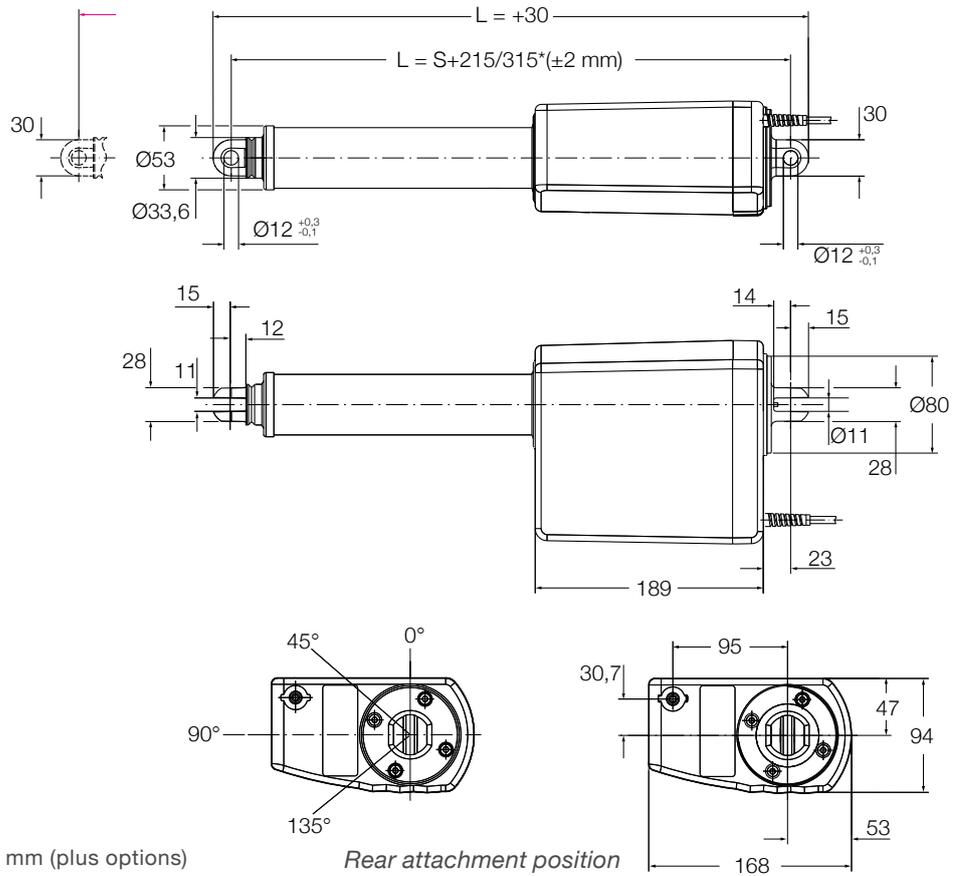
	Unit	RU20	RU21	RU22	RU23	RU24	RU25
Rated push load	N	8 000	10 000	12 000 <sup>1)</sup>	8 000	10 000	12 000 <sup>1)</sup>
Rated pull load	N	8 000	8 000	8 000	8 000	8 000	8 000
Speed (full load to no load)	mm/s	7 to 10	5 to 8	4 to 7	8 to 15	6 to 12	5 to 9
Stroke	mm	100 to 700					
Retracted length	mm	S+215/315 <sup>2)</sup>					
Voltage	V DC	24	24	24	24	24	24
Power consumption	W	N/A	N/A	N/A	N/A	N/A	N/A
Current consumption	A	7	7	7	10	10	10
Duty cycle	%	10 (1/9)	10 (1/9)	10 (1/9)	10 (1/9)	10 (1/9)	10 (1/9)
Ambient temperature	°C	+10 to +40					
Type of protection	IP	×4/×6S	×4/×6S	×4/×6S	×4/×6S	×4/×6S	×4/×6S
Weight	kg	4,7	4,7	4,7	4,7	4,7	4,7
Color	–	Grey	Grey	Grey	Grey	Grey	Grey

<sup>1)</sup> Safety working load for medical application is 10 000 N (EN 60601)

<sup>2)</sup> S ≤ 500 mm; L = S + 215

S > 500 mm; L = S + 315

## Dimensional drawing

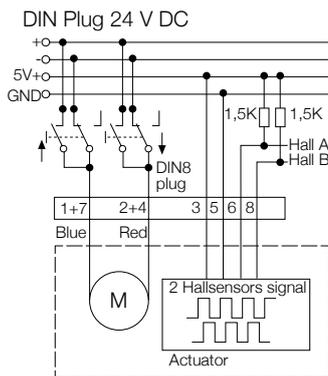


### Legend:

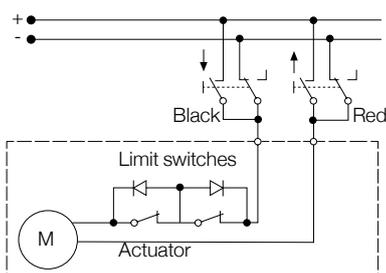
S = stroke  
L = retracted length

1) Retracted length:  
up to 500 mm stroke: stroke +215 mm (plus options)  
from 500 mm stroke: stroke +315 mm (plus options)

## Connecting diagrams



Jack Plug 24 V DC



## Suitable control units and accessories

	Control units			
	SCU	VCU	BCU	MCU
<b>RU20, RU21, RU22</b>	•	•	•	•
<b>RU23, RU24, RU25</b>	•	•	•	•
<b>Operating switches</b>				
EHA 1 				•
EHA 3 	•	•	•	
STJ 	•	•	•	
STF 				•
STE 	•	•	•	
STA 				•

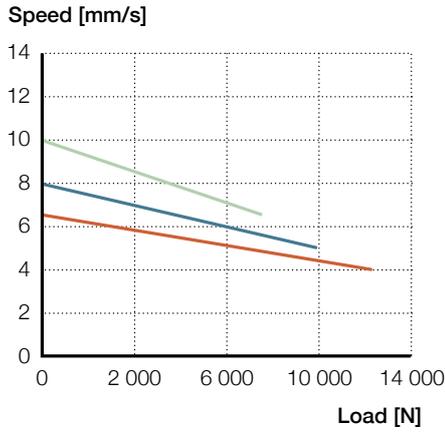
 Hand switch

 Foot switch

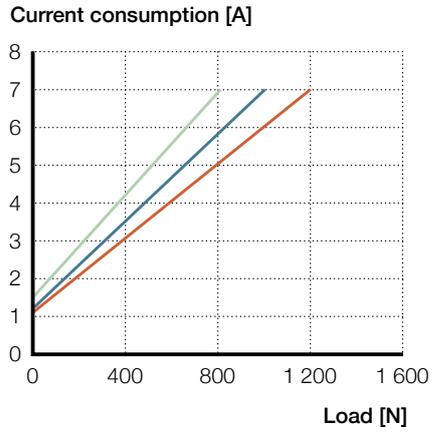
 Desk switch

### Performance diagrams

Speed-load diagram

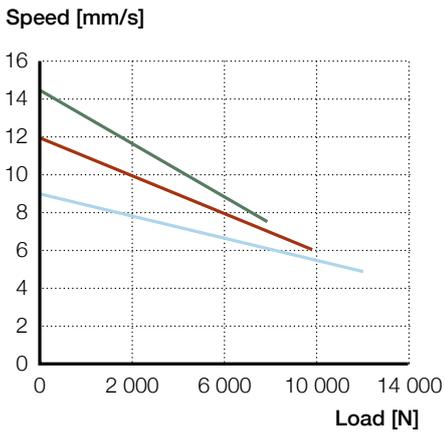


Current-load diagram

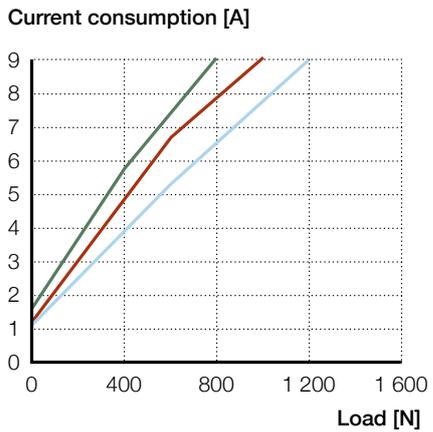


— Rated push load 8 000 RU20 — Rated push load 10 000 RU21 — Rated push load 12 000 RU22

Speed-load diagram

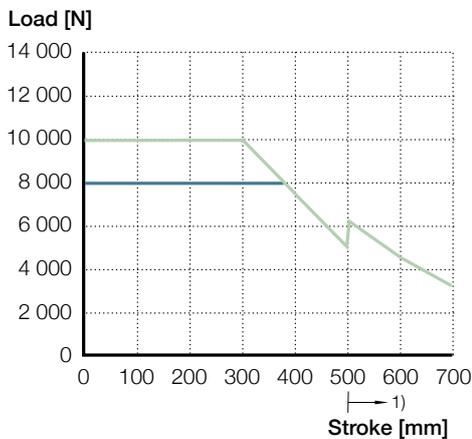


Current-load diagram

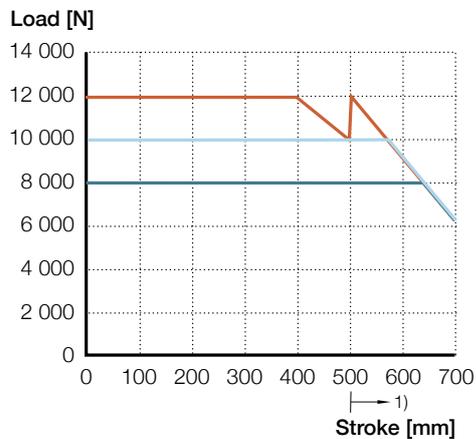


— Rated push load 8 000 RU23 — Rated push load 10 000 RU24 — Rated push load 12 000 RU25

### Safety factor load conditions



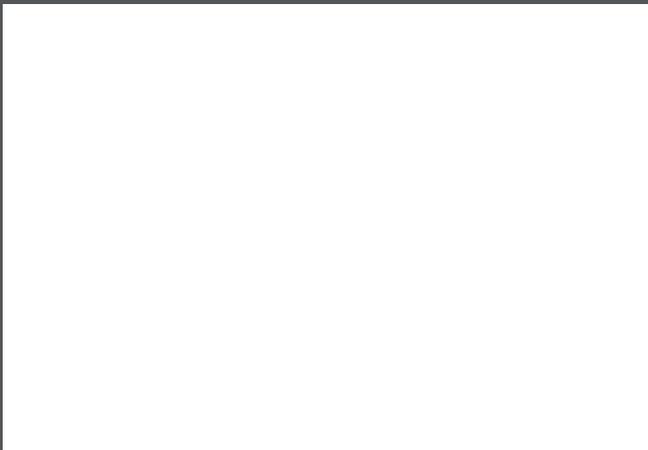
Push load limit, safety factor S=4 (EN 60601)  
<sup>1)</sup> retracted length extension at stroke >500 mm



Push load limit, safety factor S=2  
<sup>1)</sup> retracted length extension at stroke >500 mm

— RU21 RU22 RU24 RU25 — RU20 RU23 — RU22 RU25 — RU21 RU24





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