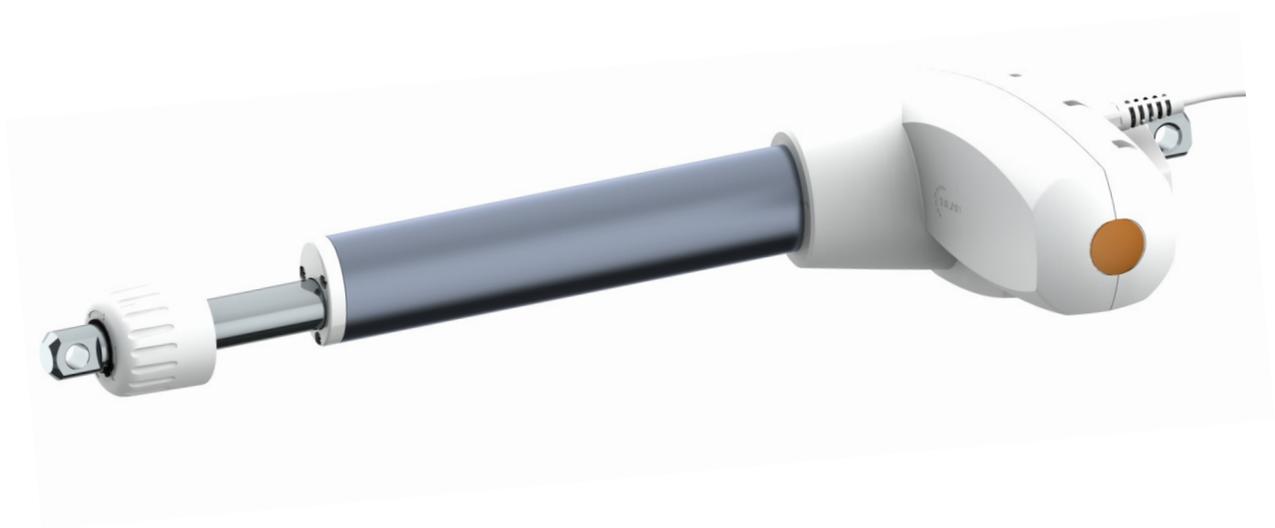




# USER MANUAL ACTUATOR RE7000





## About REAC

REAC is passionate about helping people in their daily lives, and by providing a wide range of advanced power solutions suitable for many different applications, we hope to make people's lives a little bit easier. Our aim is to offer our clients an excellent service, backed up by experience and know-how in the application of advanced motion systems.

REAC's power solutions contain compact and strong electrical actuators, lift and tilt systems, control boxes and hand controls. We know that our customers have different needs and therefore our products are designed to be customized according to their application's specific requirements.

We are confident to say that we can solve a wide range of motion problems, so please challenge us!

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# 1 Introduction

## 1.1 About this manual

The aim with this user manual is to describe the REAC actuator RE7000 with focus on:

- Working principle descriptions
- Safety
- Maintenance
- Troubleshooting
- Service

Next to this manual the following documentation is available:

- RE7000 data sheet

## 1.2 Symbols

The following symbols will be used in this document:



Failure to comply with these instructions may result in accidents involving personal injury.



Failing to follow these instructions can result in the product being damaged or destroyed.



Useful tips, recommendations and information for efficient, trouble-free use.

## 1.3 Product overview

RE7000 is a very efficient, high speed 12 000 N actuator developed to meet the requirements in patient lift systems. It is equipped with a manual lowering function, which allows lowering the lift by hand if the electrical power is not available. It also has a “pull force protection” to prevent injuries.

In combination with REAC control systems for patient lifts (RCB15, RCB20 and RCB25), RE7000 regenerates energy back to the batteries when lowering the lift, giving increased battery life time between charging.



## 2 Technical data

### 2.1 System and compatibility

Since RE7000 is so efficient and regenerates energy it must be combined with a control system which can handle this generative energy, the following REAC control systems can all handle this. If another control system is to be used this must be verified and approved by REAC.

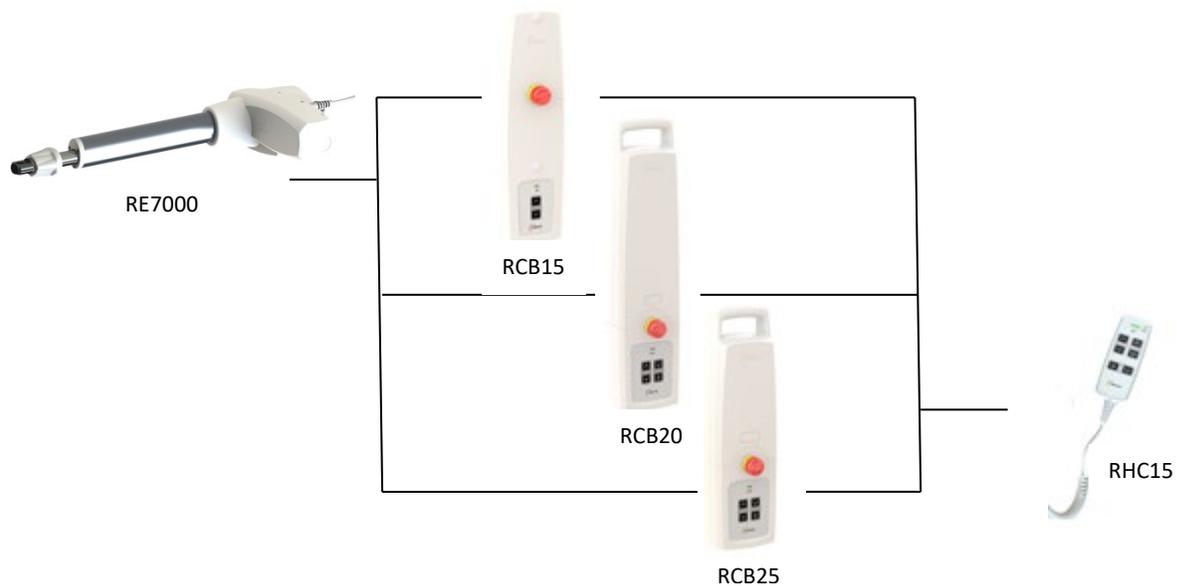


Figure 1. System and compatibility



RE7000 must be combined with a control system that can handle regenerative energy. Using RE7000 with a not approved control system may lead to malfunction or personal injury.

## 2.2 Basic characteristics

Basic characteristics	
Operating voltage	24V DC
Current consumption (Max load)	8,5 A
Current consumption (No load)	1,0 A
Max load	12000 N
Min built in length	290 mm + stroke
Stroke	100 - 300 mm
IP-class	IPX1
Efficiency	>40%
Duty cycle	10%
Weight	5,6 kg
Flammability rating	UL94 V-0
Color	RAL 9016
Expected service life	8 years <sup>1</sup>

## 2.3 Environmental conditions

Environmental conditions	Operating	Storage
Ambient temperature	-15 °C to +50 °C	-25 °C to +70 °C
Relative humidity	15% to 90%	15% to 90%
Atmospheric pressure	700 to 1060 hPa	700 to 1060 hPa
Oxygen rich environment	No	No
Label reading environment	50 cm / 500 lx	n/a



Using the the products outside their specified limits may lead to malfunction or personal injury.

<sup>1</sup> Provided that service schedule described in the user manuals are followed

## 2.4 Functional features

Functional features	
Manual lowering	✓
Built in limit switch	✓
Safety nut	✓
Energy regeneration	✓
Pull force protection	✓

## 2.5 Mounting instruction

RE7000 is easily mounted by using a pin with minimum  $\text{Ø}12\text{mm}$  together with a bushing. Without bushing a pin up to  $\text{Ø}14\text{mm}$  can be used. RE7000 is as standard equipped with a stereo jack plug for easy connection to REAC control systems.



Figure 2 Mounting of RE7000

Loads should act along the axis of the actuator. Off centre loads may cause binding and lead to premature unit failure.

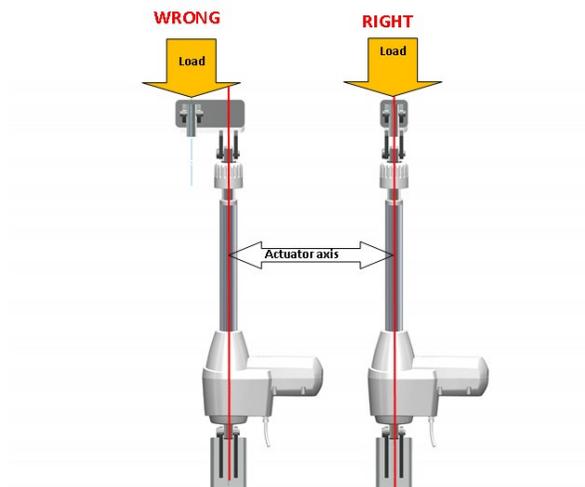


Figure 3 Load position



The actuator must not be subject to off centre loading, as this can damage the actuator



The mounting brackets must be capable of handling at least 30 Nm (22 ft-lb) torque generated by the RE7000 between top and bottom mount. Failing to do so may lead to subsequent malfunction or personal injury.

## 2.6 Operating instructions

The normal way to interact with the actuator is via the hand control (RHC15) and one of REACs control systems. RHC15 has as default two speed operations, which makes it possible to run the RE7000 with different speeds.

RE7000 has built-in end limit switches, which will immediately stop actuator movement when activated. For smoother stops (patient friendlier) it is recommended that the actuator is stopped by releasing the hand control button slightly before the mechanical end is reach to ensure the stop ramp to elapse.

## 2.7 Connectors

The RE7000 is equipped with a RCB-connector, which will serve as an identifier when used together with a REAC control box. For further information please refer to the user manual for the applicabel control box.

### 3 Safety

#### 3.1 Manual lowering

The RE7000 is equipped with a manual lowering function (patent pending), intended to be used in case of an emergency when the normal lowering function is not working.

To lower the actuator manually, turn the top of the actuator clockwise and the lift will move downwards.

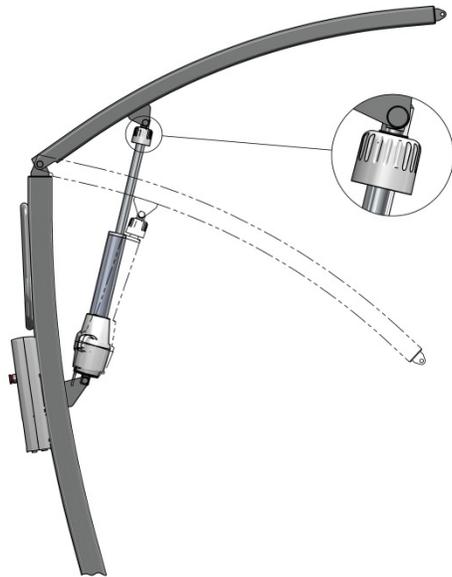


Figure 4 Manual lowering principle



Do not use the actuator without inspection of authorized service personnel after the manual lowering mechanism has been used<sup>2</sup>.

Using the actuator after the manual lowering was forced to be used may lead to subsequent malfunction or personal injury.

#### 3.2 Pull force protection

ISO 10535<sup>3</sup> specifies that if the spreader bar or lifting arm of the patient lift comes in contact with the lifted person, the lifting machinery must not increase the load imposed to lifted person by more than 50 N.

RE7000 has a patented solution for detection of actuator pull force, which will immediately stop downward movement when detected. Many patient lifts has a gearing of 1:5 and with that assumed it takes approximately a force of 8,5 N at the end of the lifting bar for the actuator to stop, i.e. RE7000 will only add a load of 8,5 N before the downward movement is stopped.

<sup>2</sup> If not obvious that nothing is wrong with the actuator, for example battery to low

<sup>3</sup> Hoists for the transfer of disabled persons – Requirements and test methods (ISO 10535:2006)

### 3.3 Over load

The RE7000 is designed for loads up to 12 000 N and should not be used above this limit as it will reduce the life length of the actuator and it can also lead to subsequent malfunction and personal injury.

An RE7000 used in combination with a REAC control system<sup>4</sup> will be supervised for over load and if detected by the control system the movement will be aborted and a warning alarm<sup>5</sup> will be initiated.



The actuator must not be subject to overload (> 12 000 N), as this can reduce the life length of the actuator or subsequent malfunction and personal injury

### 3.4 Side force

RE7000 is designed primarily for a patient lift system in line with ISO 10535. When used in a patient lift, it should be marked with a label to make sure that the user is aware of that the actuator should not be used as a handle and it is not allowed to move the lift by holding on the actuator tube or otherwise expose the actuator to side forces.



The actuator must not be subject to a side load above 1 000 N, as this can cause bending, which can lead to subsequent malfunction and personal injury.

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<sup>4</sup> RCB15, RCB20 or RCB25

<sup>5</sup> Indicated by warning LED on the hand control or a sound warning. Must be configured pre-delivery.

## 4 Maintenance

### 4.1 Service intervals

To ensure proper and safe operation, regular service is required. When used together with REAC control systems<sup>6</sup> a service interval based on number of actuator cycles and/or calendar time can be configured and a LED will be lit when service time is due. **Note:** there can be national norms for the applications in which the actuator is used, that specify a certain service interval. This can easily be handled with this configuration.

Between this service points regular maintenance and minor inspection must also be performed. Below follows a suggested maintenance schedule.

	Initially	Every 3:rd month	At planned service
<b>Actuator</b> Ensure actuator is firmly fixed	✓		✓
<b>Pull force protection</b> Run actuator downwards and put some stop object below, actuator should stop	✓		✓
<b>Bolts and brackets</b> Bolts and brackets are to be inspected and must be replaced if there are signs of wear	✓		✓
<b>Cables</b> Ensure cable that connects actuator with control box is firmly fixated.	✓	✓	✓
<b>Cover</b> The plastic housing must be checked for mechanical damage (cracks).	✓	✓	✓
<b>Sealing</b> The sealing rings of the actuator plug must be checked for damage and exchanged if necessary.	✓		✓
<b>Limit switch</b> Check the power cut-off (via limit switches) while running the actuator to both end positions. When reaching the end position, the actuator must stop without the button on the control device being released.	✓		✓

<sup>6</sup> RCB15, RCB20 or RCB25

## 4.2 Cleaning and disinfection

Product	Cleaning instructions
RE7000	Clean with a damp cloth or with a brush and water



The systems must not be washed directly with a high pressure cleaner. Cleaning with a steam cleaner is not permitted.



For disinfection it is recommended to use soap or equal and clean with a damp cloth. Cleaners and disinfectants must not:

- Be highly alkaline or acidic
- Contain caustic agents
- Be able to change the structure of the surface or adhesion of the plastic
- Break down grease

## 4.3 Waste disposal



All REAC products are marked with this symbol, which according to *Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/CE* means that products marked with this sign must be taken to a proper disposal site and cannot be disposed in in normal household waste.

A RE7000 consist of several parts with different material, which means that they cannot be disposed as one single item. It is recommended (at disposal) to disassemble and divide the product as much as possible into feasible waste groups to be able to recycle the product in the most environmental friendly way.

The following waste groups have been identified for the RCBs:

	Cables	Electronics	Metal	Plastic
RE7000	<ul style="list-style-type: none"> <li>• Internal harness</li> <li>• Connector cable</li> </ul>	<ul style="list-style-type: none"> <li>• Limit switch PCB</li> <li>• PCB</li> </ul>	<ul style="list-style-type: none"> <li>• Inner tube</li> <li>• Outer tube</li> <li>• Motor plates</li> <li>• Screws</li> <li>• Nuts</li> <li>• etc</li> </ul>	<ul style="list-style-type: none"> <li>• Cover</li> <li>• End sleeve</li> <li>• Manual lowering handle</li> </ul>

Some of these main groups can be divided into sub-groups, for example metal can be divided into iron, stainless steel and aluminum and alloy steel. Plastic can e.g. be divided into ABS, PA, PE and POM.

All our plastic units are provided with an interior code for plastic types and fibre contents.



## 4.4 Warranty

The warranty covers manufacturing defects in the product, starting from the date of manufacture. Standard warranty is 12 months. The warranty is limited to the value of the product.

REACs warranty is only valid if the product has been used and maintained correctly and has not been manipulated with.

This warranty does not apply to damage or failure of the product which is caused by improper or unprofessional use. The products must not be exposed to violent treatment. In the event of this, the warranty will be invalid.

## 4.5 Repairs

In order to avoid the risk of malfunction, all repairs must only be carried out by authorised REAC workshops or by a REAC appointed representative. If the RE7000 is opened or by other mean modified by other than authorised personnel, there may be a risk of subsequent malfunction.

Products under warranty must also be returned to an authorised REAC workshop.



Only authorised REAC workshops or by REAC appointed representatives must open or modify the product.

## 4.6 Troubleshooting

Problem	Probable cause	Description	Solution
<b>No actuator<sup>7</sup> movement</b> (or actuator switches off during operation)	Over current	If the actuator run in to a mechanical stop the current will increase fast. Current peaks above the current limit are allowed for 250ms, when this is exceeded the actuator will be turned off.	Run in opposite direction.
	Over load	Alert indication LED will be lit and/or sound alarm will be activated.	Reduce load. Use manual lowering <sup>8</sup> to lower the system.
	Short circuit	Alert indication LED will be lit.	Service needed.
	Duty cycle protection	Duty cycle protection is a function to protect the actuator motor from overheating. Alert indication LED will be lit, during attempt to run the actuator.	Wait until actuator “rest time” has elapsed.
	Hand control out of order	Nothing happens	Try to control the actuator via control box panel.
	The emergency stop button has been pressed.	The emergency stop is a normally closed switch, which at activation beaks all circuits (charger and battery) and immediately stops all movements.	Unlock the emergency stop button by turning it clock wise.
	Actuator not correctly connected to control box	Nothing happens	Make sure actuator is properly plugged into control box.
	Actuator mix up	Wrong actuator will move. If actuators are equipped with RCB-connectors <sup>9</sup> , mix up will be detected, movement will not be allowed and alert indication LED will lit	Make sure actuator/actuators are connected properly.
	Internal error	Alert indication LED will be lit.	If error remains after 10 s, service is needed.
	Actuator cable faulty		Check the cable and replace the actuator if necessary
Charging ongoing	Operation is not allowed (and is prevented by the system) during charging, the yellow LED will blink if any operation is requested.	Disconnect charging cable.	

<sup>7</sup> Combination with REAC control system assumed

<sup>8</sup> Further information on manual lowering, see chapter 3.1

<sup>9</sup> See chapter 2.7 for further details.

## 5 Labeling

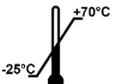
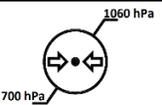
The following symbols are used on the label of RE7000.

	IEC 60417-5840: Patient part of type B
	Serial number./LOT number
IPXX	Ingress of particles (first character) and water (second character) as per EN60529.
	IEC 60417-5957: For indoor use only
	WEEE compliant
	CE-label attached based on Low Voltage Directive and EMC Directive.
	ISO 7010-M002: Risk(s) mitigated in accompanying documents

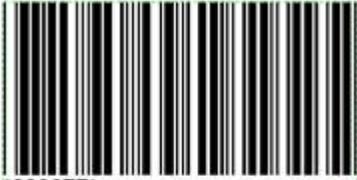
Example of label:

REAC Poland, Sulejowska 45 97-300 Piotrków Tryb., Poland		
Type: RE7000 IPX6 Power rating: 24VDC.MAX 8.5 Amp Duty cycle: Max.10% 2min/18min Max load: 12000 N (PUSH) Item No/Rev: 94Z004B1 / - Prod. date: 10.11.2016		
 000000		   
WARNING: Improper use may cause damage or injury. Read installing advice before use. CAUTION: Only to be opened by authorized personnel.		

The following symbols are used on the packaging of RE7000.

	<p>Manufacturer</p>
	<p>Do not use if package is damaged.</p>
	<p>Fragile, handle with care</p>
	<p>Keep dry</p>
	<p>Temperature limits</p>
	<p>Relative humidity limits</p>
	<p>Atmospheric pressure limits</p>
	<p>Consult instructions for use (Can be ordered via REAC homepage)</p>

Example of packaging information:

P.O #   
\*339077\*

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RE7000 WITH MANUAL LOWERING,  
12000N, 300MM, 24V, REV\_  
00.00.00: SHIP DATE

---

FROM: REAC Poland Sp.z o.o

 REAC Poland, Sulejowska 45  
97-300 Piotrków Tryb., Poland



## 6 Standard Compliance

	Complying Standards	Description
<b>Hoist Specific</b>	EN ISO 10535:2007	Hoists for the transfer of disabled persons –Requirements and test methods <i>Applicable parts</i>
<b>Electrical Safety</b>	IEC 60601-1:2005 and amendment 1:2012	Medical electrical equipment – Part 1: General requirements for basic safety and essential performance.
	IEC 60601-1-11:2015	Medical electrical equipment – Part 1-11: General requirements for basic safety and essential performance – Collateral Standard: Requirements for medical electrical equipment and medical electrical systems used in the home healthcare environment.
	IEC 60601-1-2:2014	Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral Standard: Electromagnetic disturbances – Requirements and tests.
<b>Electromagnetic Emission</b>	CISPR 11 Class B (2009)	Radiated and conducted emission
	IEC 61000-3-2 (2014)	Harmonic current emission
	IEC 61000-3-3 (2013)	Voltage fluctuations and flicker
<b>Electromagnetic Immunity</b>	IEC 61000-4-2 (2008)	Immunity to electrostatic discharge <i>Test levels:</i> <i>±8 kV contact discharge ±2, ±4, ±8 and ±15 kV air discharge</i>
	IEC 61000-4-3 (2006 + A1 + A2)	Immunity to radiated electromagnetic fields in the frequency range 80 – 1000 MHz and 1,0 – 2, 7GHz <i>Test levels:</i> <i>80 – 1000 MHz 10 V/m with 80 % AM @ 2 Hz</i> <i>1,0 – 2,7 GHz 10 V/m with 80 % AM @ 2 Hz.</i>
	IEC 60601-1-2:2014	Table 9 (up to 28 V/m pulse modulation at frequencies in ISM bands)
	IEC 61000-4-4 (2012)	Immunity to fast transients/burst <i>Test levels on AC Power input port: AC input/output power input port ± 2,0 kV noise in ISM bands)</i>

*Cont. next page*

<b>Electromagnetic Immunity cont.</b>	IEC 61000-4-5 (2006)	Surge immunity test <i>Test levels on AC Power input port: AC Power input port, ±0,5 kV and ±1,0 kV differential mode.</i>
	IEC 61000-4-6 (2014)	Immunity to conducted disturbances in the frequency range 0,15 – 80 MHz <i>Test levels on AC Power input port: 6 Vrms with 80 % AM @ 2 Hz.</i>
	IEC 61000-4-8 (2009)	Immunity to power frequency magnetic fields <i>Test level: 30 A/m, 50 Hz and 60 Hz</i>
	IEC 61000-4-11 (2004)	Voltage Dips and Interruptions <i>Test levels on AC Power input port: Test frequency: 50 Hz. Test voltages: 100 and 230 V. 100 % for ½ cycle positive and negative half period. 60 % for 10 cycles. 30 % for 25 cycles. 100 % for 250 s.</i>



RE7000 is designed to withstand electromagnetic interference.

Usage closely to other equipment may result in improper operation. During such use both the RE7000 and the other equipment should be observed to verify that they are operating normally.

Use of accessories other than those specified or provided by REAC, may result in increased electromagnetic emissions or decreased electromagnetic immunity and may result in improper operation.

Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm to any part of the RE7000, since this may lead to degradation and improper performance.



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REAC is continuously developing our products and can make changes without prior notice. Therefore we can't guarantee that the information stated on our webpage or in our written material always is up to date, nor can we take responsibility for any misinterpretation of our written context. Technical specification might change due to load and external circumstances. REAC products shall be tested in its intended application before use.

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