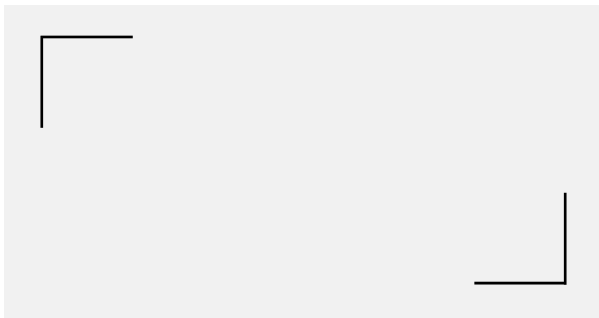




**EN Assembly Instructions**  
Electric cylinder Lambda.....28



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# 1. Declaration of Incorporation

## 1.1 Declaration of incorporation for the Lambda electric cylinder

As set out in Machinery Directive 2006/42/EC, Annex II, 1.B for partly completed machinery

The manufacturer	The person in the community that is authorised to compile the relevant technical documents:
Phoenix Mecano Solutions AG Hofwisenstrasse 6 CH-8260 Stein am Rhein	Timo Fluck Phoenix Mecano Solutions AG Hofwisenstrasse 6 CH-8260 Stein am Rhein  Authorised representative: Phoenix Mecano Solutions AG Hofwisenstrasse 6 CH-8260 Stein am Rhein

confirms that the named product

<i>Product/manufacture:</i>	Lambda electric cylinder
<i>Project number: Trade name:</i>	See type plate label
<i>name:</i>	Lambda electric cylinder
<i>Function:</i>	Extending and retracting the push rod by electromotive power to create a linear movement

complies with the requirements for partly completed machinery in accordance with EC Machinery Directive 2006/42/EG.

The following basic requirements of Machinery Directive 2006/42/EC are fulfilled:

1.1.5, 1.3.2, 1.3.3, 1.3.7, 1.3.8, 1.3.9, 1.5.1, 1.5.5, 1.5.6, 1.5.15, 4.1.2.3, 4.3.3

Moreover, we declare that the special technical documents have been created according to Appendix VII Part B.

The manufacturer declares explicitly that the partially completed machinery meets all the relevant provisions of the following EC directives and ordinances:

2011/65/EC	Directive 2011/65/EC of the European Parliament and of the Council from June 8th, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment Published in L 174/88 from 01/07/2011
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Sources for the applied harmonised standards according to article 7, paragraph 2:

EN ISO 12100:2010-11	Safety of machinery – General principles for design – Risk assessment and risk reduction (ISO 12100:2010)
----------------------	---

## 1. Declaration of Incorporation

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The manufacturer or the person authorised are obliged to hand over the special documents for the partially completed machine to the national authorities on reasoned request. This transmission is carried out electronically.

The commercial protective rights remain unaffected by this.

Important note! The partially completed machine must not be put into operation, until, if required, it has been determined that the machine in which the partially completed machine is to be installed complies with the regulations of this guideline.

Stein am Rhein / 13/07/2017

Location / Date



Signature

Technical Manager

Signatory's position

Stein am Rhein / 13/07/2017

Location / Date



Signature

Managing Director

Signatory's position

## 2. General notes

---

### 2.1 Notes on these assembly instructions

These assembly instructions are documentation which is only valid for the electric cylinder described and are intended for the manufacturer of the end product into which this partly completed machinery is to be installed.

We wish to explicitly point out that the manufacturer of the end product must produce operating instructions for the end user containing all the functions and hazard warnings of the end product.

This also applies to installation in a machine. In this case, the manufacturer of the machine is responsible for the relevant safety devices, checks, monitoring potential crushing and shearing points and the documentation.

These assembly instructions will help you:

- to avoid hazards,
- to prevent downtime,
- and to guarantee and increase the lifetime of this product.

Hazards warnings, safety regulations and the information in these assembly instructions are to be observed at all times.

These assembly instructions must be read and applied by everyone who works with the product.

Commissioning is forbidden until the machine complies with the provisions of EC Directive 2006/42/EC (Machinery Directive). Before bringing onto the market, this must comply with the CE Directives, including documentation.

We hereby inform any re-user of this partially completed machine/partial machine/machine parts explicitly of its obligation to expand and complete this documentation. In particular, when installing or attaching electrical components and/or drives, the re-user is to complete a CE declaration of conformity.

Our declaration of incorporation becomes invalid automatically.

## *3. Liability/Warranty*

### **3.1 Liability**

Phoenix Mecano Solutions AG does not accept any liability for damage or impairments which occur as a result of changes to the construction of this electric cylinder by third parties or changes to its protective equipment.

Only original spare parts may be used when undertaking repair and maintenance.

Phoenix Mecano Solutions AG does not accept any liability for spare parts that have not been tested and approved for use by Phoenix Mecano Solutions AG.

The EC declaration of incorporation will otherwise become invalid.

Safety-relevant devices must be inspected at regular intervals, but at least once a year, for proper function, damage and completeness.

We reserve the right to make technical changes to the lifting column and changes to these assembly instructions.

Advertising, public statements or similar announcements may not be used as a basis for the quality and suitability of the product. Claims to Phoenix Mecano Solutions AG regarding the availability of earlier versions or adaptations to the current version of the electric cylinder will not be accepted.

In the event of any questions, please state the details on the type plate.

Our address:

Phoenix Mecano Solutions AG  
Hofwisenstrasse 6  
CH-8260 Stein am Rhein  
Tel.: +41 (0) 527427500  
Fax: +41 (0) 527427590

### **3.2 Product monitoring**

Phoenix Mecano Solutions AG offers you state of the art products compliant with current safety standards.

Please inform us immediately if you experience repeated failures or faults.

### **3.3 Language of the assembly instructions**

The original version of these assembly instructions was produced in the official EU language used by the manufacturer of this partially completed machine.

Translations into other languages are translations of the original version and the legal provisions of the Machinery Directive apply to these.

### **3.4 Copyright**

Individual reproductions, e.g., copies and printouts, may only be made for private use. The production and distribution of further reproductions is permitted only with the explicit approval of Phoenix Mecano Solutions AG. The user is personally responsible for complying with statutory regulations and may be liable for prosecution in the event of misuse.

The copyright to these assembly instructions is held by Phoenix Mecano Solutions AG.

## 4. Use/Operators

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### 4.1 Intended use

The electric cylinder is to be used exclusively for the adjustment of guided components or other movement applications of a similar nature.

The electric cylinder may not be used in areas with a potentially explosive atmosphere or in direct contact with foodstuffs, pharmaceutical or cosmetic products.

Catalogue information, the contents of these assembly instructions and/or conditions determined in the order are to be taken into account.

The values given in these assembly instructions are maximum values and must not be exceeded.

### 4.2 Improper use

“Improper use” means that the information given in section *Intended use* is not being observed. In the event of improper use, incorrect operation and if this electric cylinder is used, installed or operated by untrained personnel, this electric cylinder may pose risks for the personnel.

Moving persons with this electric cylinder, for example, is an example of improper use and is forbidden.

In event of improper use, Phoenix Mecano Solutions AG is no longer liable for this electric cylinder and its general operating licence will expire.

#### 4.2.1 Reasonably foreseeable misuse

- Overloading the appliance by exceeding the weight or duty cycle Use in
- areas outside the specified IP protection class.
- Use in an environment with high air humidity > dewpoint
- Use in rooms with a potentially explosive atmosphere as defined in the ATEX directive
- Use with damaged feed lines or housing
- Use when the electric cylinder is not sufficiently fixed.
- Moving up to the stop.
- Use when the push rod inside is rotated Use
- outdoors
- Use with damaged feed lines or housing
- Use when force or torque act laterally.

### 4.3 Who may use, install and operate this electric cylinder

Persons who have read and understood all of these assembly instructions are permitted to use the electric cylinder, install it and operate it. The responsibilities for dealing with this electric cylinder must be clearly defined and adhered to.



### 5.1 Safety instructions

Phoenix Mecano Solutions AG has built this electric cylinder according to the current state of the art and existing safety regulations. Nonetheless, this electric cylinder can pose risks to persons and property if it is used improperly or for a non-intended use or if the safety instructions are not observed.

Correct operation guarantees high performance and availability of this electric cylinder.

Faults or conditions which can impair safety are to be rectified immediately.

Every person who is involved in the assembly, use or operation of this electric cylinder must have read and understood these assembly instructions.

This includes:

- understanding the safety instructions in the text and
- being familiar with the arrangement and function of the various operating and application options.

Only nominated persons may use, install and operate the electric cylinder. All work on and with the electric cylinder may only be carried out in accordance with this assembly instruction. For this reason, this assembly instruction must always be kept in a location near the electric cylinder and stored safely.

The general, national and company safety regulations must be observed. Responsibilities for the use, assembly and operation of this electric cylinder must be clearly stipulated and observed so that no unclear situations can arise with regards to safety aspects. The operator must always ensure that no person or object remains in the danger area around the electric cylinder before putting into operation. The user must only use the electric cylinder if it is in perfect condition. Any change is to be reported to the nearest line manager immediately.

## 5. Safety

### 5.2 Special safety instructions

- All work with the electric cylinder may only be carried out in accordance with these instructions. The device may only be opened by authorized specialist personnel. If there is a fault in the electric cylinder, we recommend contacting the manufacturer and/or sending the electric cylinder to be repaired.
- Before installation, removal work, maintenance or troubleshooting, disconnect the power source.
- The correct routing of supply lines prevents this application from being a risk.
- Use original accessories and spare parts only.
- Possible damage from failure of the limit switch or from a nut breaking must be prevented in a constructive manner.
- Unauthorised modifications or changes to the electric cylinder are not permitted for safety reasons.
- The performance specifications of these electric cylinder specified by Phoenix Mecano Solutions AG must not be exceeded.
- The type plate must remain legible. It must be possible to identify the ratings data effortlessly at any time.
- Safety-relevant hazard symbols identify danger areas on the product.
- Safety-relevant devices must be inspected at regular intervals, but at least once a year, for proper function, damage and completeness.
- With an overhead installation of the electric cylinder, fixed loads must be secured against falling down. The danger area underneath the application must be marked in the documentation of the end product.
- If a mains lead and/or feed line is damaged, the electric cylinder is to be taken out of service immediately.

### 5.3 Safety signs

The warning and mandatory signs are safety signs that warn of risk or danger.

Information in these assembly instructions on particular hazards or situations on the electric cylinder must be observed, as failure to do so increases the risk of accidents.



The "General mandatory sign" instructs you to be alert.

Marked information in these assembly instructions requires your particular attention.

They contain important information about functions, settings and procedures. Failure to observe may lead to personal injury and malfunctions to the electric cylinder or damage to the environment.

## 6. Product information

### 6.1 Mode of operation

The electric cylinder is to be used exclusively for the adjustment of guided components or other adjustment tasks of a similar nature. The drive is carried out using the integrated DC motor.

### 6.2 Versions

The Lambda electric cylinder is available in three versions.

	<b>Version 1</b>	<b>Version 2</b>	<b>Version 3</b>
Compressive force	6000 N	4500 N	2000 N
Tensile force	4000 N	4000 N	2000 N
Lifting speed	5 mm/s	8 mm/s	21 mm/s

### 6.3 Variants

The following versions are available for the Lambda electric cylinder:

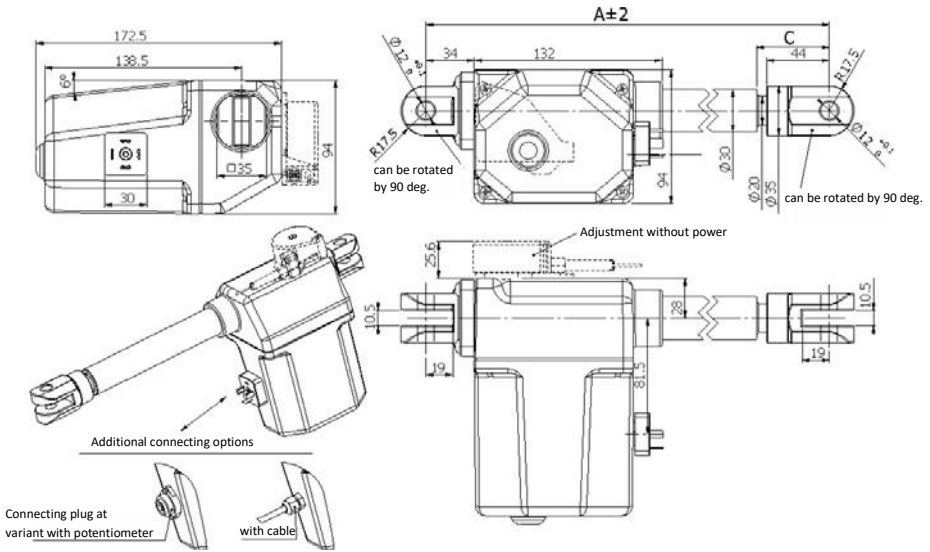
- Without anti-trap protection: pull and press at full force.
- With anti-trap protection with tensile: press with full force and pull with very little force. With
- anti-trap protection with pressure: pull with full force and press with very little force.

#### 6.3.1 Other variants / options

- With potentiometer 10 k $\Omega$ .
- Signal contact potential-free or non-isolated.
- Adjustment without power (mechanical extraction).
- Power supply 12 VDC.

## 6. Product information

### 6.4 Dimensions of the geometry



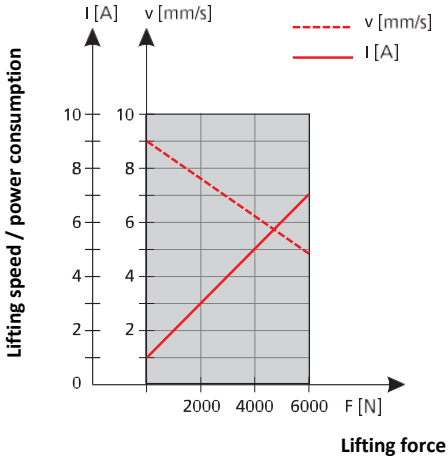
## 6. Product information

### 6.5 Technical specifications

	Version 1	Version 2	Version 3
Stroke length	up to 400 mm	up to 600 mm	
Dimension A - Installation dimension	Stroke smaller than 400 mm = Stroke+175 mm Stroke greater than or equal to 400 mm = Stroke+225 mm		
Standard lifting length	100; 150; 200; 250; 300; 400; 500 and 600 mm		
Lifting force, pressure	6000 N	4500 N	2000 N
Lifting force, tensile	4000 N	4000 N	2000 N
Lifting speed	5 mm/s	8 mm/s	21 mm/s
Protection class (static)	IP 66		
Power input	10 A (19 A)		
Voltage (VDC)	24 VDC (12 VDC)		
Power consumption	240 W		
Ambient temperature Storage temperature	-10 deg. Celsius to +60 deg. Celsius -20 deg. Celsius to +60 deg. Celsius		
Anti-trap protection to tension / pressure	available as an option		
Activation force for clamping protection	100 N to 300 N	60 N to 220 N	20 N to 80 N
Adjustment without power	possible in some cases	available as an option	
Self-locking	Yes		
Stroke tube routing	Sliding bearing		
Limit switch of the stroke end positions	installed permanently		
Repeatability	0.5 mm (depending on the control and configuration)		
Operating mode	ED 10%; 2 minutes operation / 18 minutes break		
Overheat protection	installed		
Maintenance	maintenance-free		
Colour	Plastic parts black or grey RAL9002		
Electric connection	2-pin plug; DIN43650-A		
Custom stroke lengths / installation lengths	on request		
Installation position	as desired, without lateral forces		

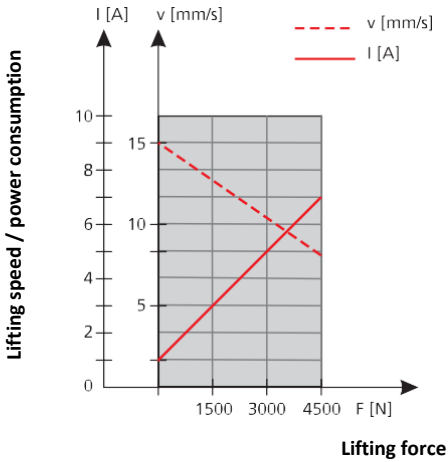
## 6. Product information

### 6.5.1 Performance chart, version 1



max. 6,000 N pressure  
max. 4,000 N tension  
5 mm/s lifting speed  
max. up to 400 mm lift

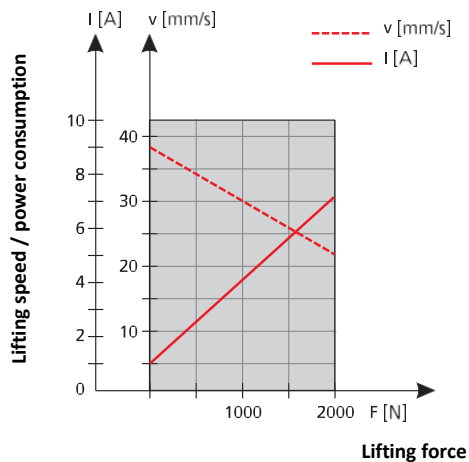
### 6.5.2 Performance chart, version 2



max. 4,500 N pressure  
max. 4,000 N tension  
8 mm/s lifting speed  
max. up to 600 mm lift

## 6. Product information

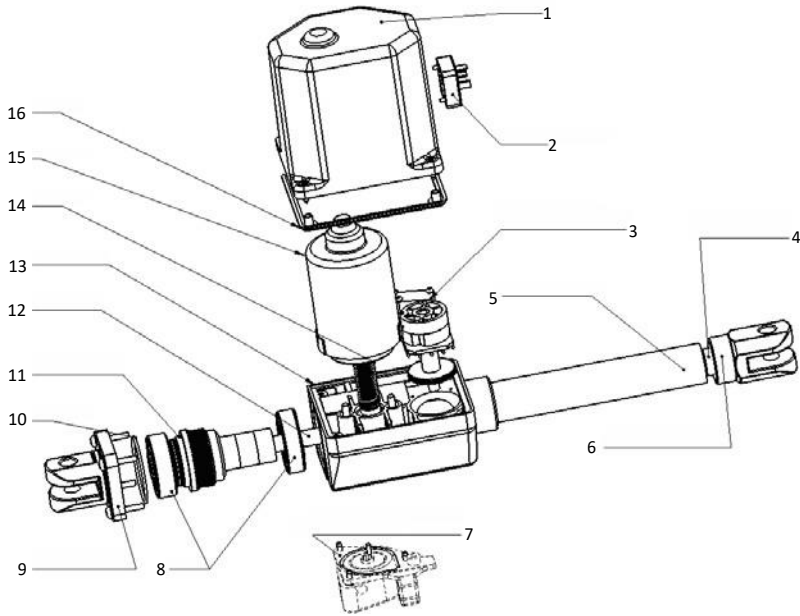
### 6.5.3 Performance chart, version 3



max. 2,000 N pressure  
 max. 2,000 N tension 21  
 mm/s lifting speed max.  
 up to 600 mm lift

## 6. Product information

### 6.6 Electric cylinder overview diagram.



- 1 Hood
- 2 Linch pin
- 3 Limit switchunit
- 4 Push rod
- 5 Guide tube
- 6 Suspension "front"
- 7 Adjustment without power (optional)
- 8 Bearing
- 9 Suspension "rear"
- 10 O ring seal
- 11 Worm gear shaft
- 12 Trapezium spindle
- 13 Gear housing
- 14 Auger
- 15 Motor
- 16 Seal



### 7.1 Electric cylinder scope of delivery

The electric cylinder will be delivered as an individual component.

The controllers and handsets and accessories are not included in delivery.

### 7.2 Transport and storage

The product is to be checked by suitable personnel for visible and functional damage. Damage caused by transport and storage must be reported to the responsible person and Phoenix Mecano Solutions AG immediately.

Putting damaged electric cylinders into service is forbidden.

The ambient conditions for the storage of the electric cylinder are prescribed as follows:

- No oil-contaminated air
- Contact with solvent-based paints must be avoided
- Lowest/highest ambient temperature:  $-20\text{ °C}/+60\text{ °C}$
- Relative humidity: from 30 % to 75 %
- Air pressure: from 700 hPa to 1060 hPa
- Falling below the dewpoint is not allowed

Divergent environmental factors must be approved by Phoenix Mecano Solutions AG.

## 7. Life phases

### 7.3 Important information on installation and putting into operation




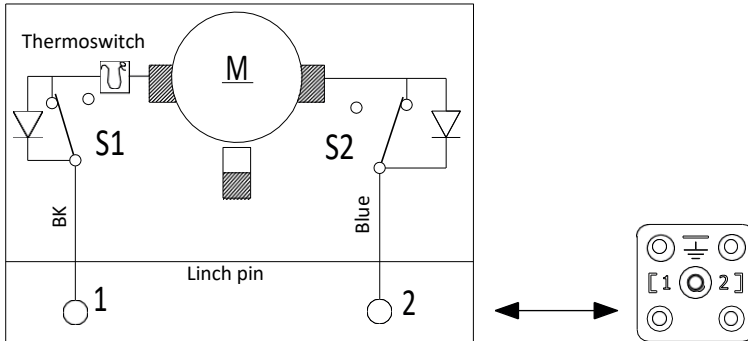
It is essential that you note and observe the following instructions. Otherwise persons could be injured or the electric cylinder or other components could be damaged.

- No additional holes may be made in the electric cylinder.
- This electric cylinder may only be used outdoors using the respective protective measures that are defined by the factory order number.
- The electric cylinder must be protected against the moisture, e.g., condensed water.
- After setting up and putting into operation, it is essential that the plug of the power supply is freely accessible.
- The electric cylinder must not be moved to "Block". Risk of mechanical damage. The electric cylinder must not be opened.
- The user must ensure that there is no danger when the power supply is active.
- When designing applications with this electric cylinder, take care to avoid crushing and shear points. These must be respectively secured and marked.
- Automatic start-up of the electric cylinder due to a fault is to be stopped immediately by disconnecting the power supply.
- If the supply line is damaged, the electric cylinder must be taken out of use immediately. The push rod is secured against twisting using a red adhesive safety tape.
- The adhesive safety tape must be removed during installation. The push rod with fork head must be secured against twisting. Non-observance leads to the adjustment of the stroke end position.
- The electric cylinder has not been designed for continuous operation. The operating cycle per

## 7.4 Electrical connecting possibilities

### 7.4.1 Electrical connection with plug

The electric cylinder is installed with a 2-pin device socket +  as standard. The socket complies with DIN43650-A / ISO4400.



S1= Limit switch for traversing direction -extract-

S2= Limit switch for traversing direction -retract-

M= Permanent magnet motor

 = Thermoswitch

With (+) at connection 1 and (-) at connection 2, the electric cylinder moves in the direction: extract.

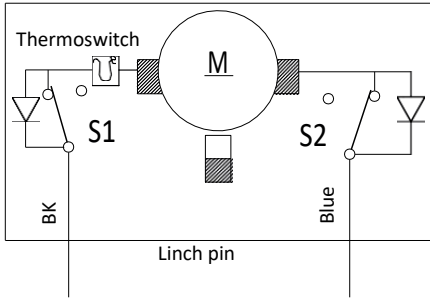
You can change the direction of movement by reversing the polarity of the connections - No. 1 and No. 2.

Other wiring is carried out by the customer

## 7. Life phases

### 7.4.2 Electrical connection with cable


The electric cylinder with potentiometer is supplied with an Amphenol device plug, number of poles 6 + PE; series C16-1.



S1= Limit switch for traversing direction -extract-

S2= Limit switch for traversing direction -retract-

M= Permanent magnet motor

 = Thermoswitch

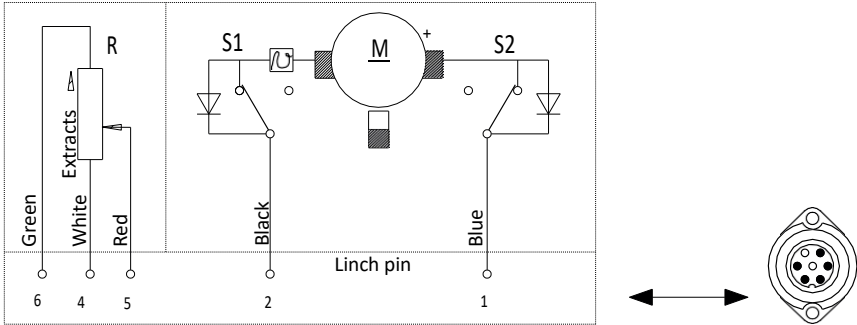
With (+) at connection 1 and (-) at connection 2: the electric cylinder moves in the direction: extract.

You can change the direction of movement by reversing the polarity of the connections - No. 1 and No. 2.

Other wiring is carried out by the customer

### 7.4.3 Electrical connection with integrated potentiometer


The Lambda Colonne wit potentiometer is supplied with an Amphenol device plug, number of poles 6 + PE; series C16-1.



S1= Limit switch for traversing direction -extract-

S2= Limit switch for traversing direction -retract-

M= Permanent magnet motor

 = Thermoswitch

R= Potentiometer

With (+) at connection 1 and (-) at connection 2: the electric cylinder moves in the direction: extract.

You can change the direction of movement by reversing the polarity of the connections - No. 1 and No. 2.

### 7.4.4 Other electrical connections

Other electrical connections (e.g. potential-bound signal contacts, potential-free signal contacts, signal contacts for intermediate lifting positions) are possible.

These modifications must be defined with Phoenix Mecano Solutions AG.



Unauthorised modifications or changes to the electric cylinder are not permitted for safety reasons.

Unauthorized conversions of or changes to the electric cylinder lead to the general operating license of this electric cylinder expiring.

In this case, Phoenix Mecano Solutions AG cannot be held liable.

### 7.4.5 Limit switch

The electric cylinder is equipped with two internal limits switches. When using controllers that are intended for the electric cylinder, the limit switch prevents an overrunning the maximum lifting height as well as overrunning the lower stop position.

When using another controller or direct and an incorrect supply of current, the electric cylinder can traverse beyond the limit switches and lead to their destruction.

## 7. Life phases

### 7.5 Adjustment without power (can be extracted)



All activities described in this chapter must be carried out without loads.

#### 7.5.1 Description

By the adjustment without power, the linear movement of the electric cylinder can be carried out by hand without using the drive motor.

The adjustment without power is required in situations where a quicker change in the position has to be carried out. For example, with a quick low position of hospital beds or an adjustment in event of power failure.

#### 7.5.2 Function and procedure

The push rod is released from the drive motor by actuating the Bowden cable. One or two Bowden cables can be mounted on the electric cylinder.



- Before the Bowden cable is pulled, the push rod must always be relieved first.
- The push rod is not secured against being pulled out completely when actuating the Bowden cable!
- A respective safety precaution, such as a stop, must be guaranteed by the user of the drive.
- Relieve the electric cylinder. Then release the push rod by pulling on the Bowden cable (approx. 8 mm). Keep holding the Bowden cable.
- Without the electric cylinder drive, move the load to the desired position.
- Let go of the Bowden cable. The push rod is coupled again.

The stroke of the cylinder originally set is not changed when using the Bowden cable.

The adjustment force required on the push rod after releasing using the Bowden cable is different depending on the configuration of the Lambda electric cylinder:

Version 1: approx. 300 N

Version 2: approx. 200 N

Version 3: approx. 80 N

### 7.5.3 Fitting and installation



Never pretension the Bowden cable when it is in a free state otherwise there is a risk of releasing the push rod.

Thereafter, the electric cylinder will not fulfil its function in operation.

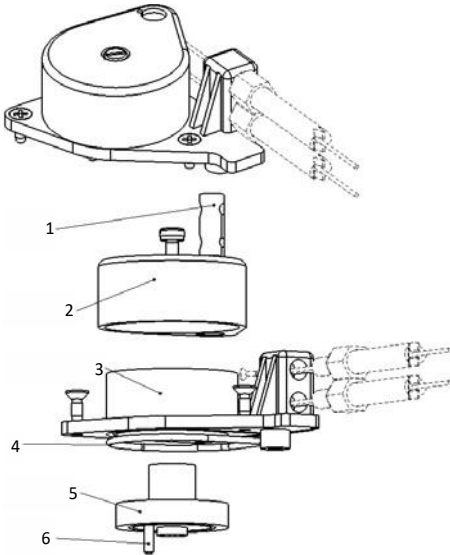
There is a risk of damage when applying a little force.

The Bowden cable is mounted onto the electric cylinder by the manufacturer.

The Bowden cable is mounted opposite to the electric cylinder.

The play can be reduced using the adjustment screw.

### 7.5.4 Overview of the Bowden cable unit



- 1 Cylinder pin
- 2 Mounting attachment
- 3 Bowden cable housing
- 4 O ring seal
- 5 Eccentric wheel
- 6 Cylinder pin

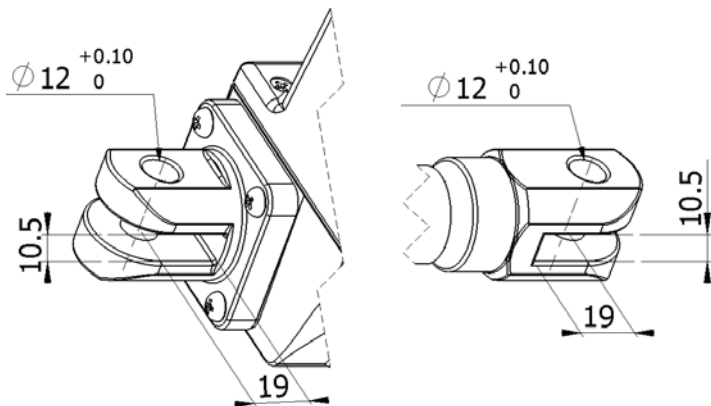
## 7. Life phases

### 7.6 Installation

Check for any damage or missing components after receipt of the electric cylinder. The electric cylinder will be delivered ready for operation without a controller.

The fixing of the electric cylinder is carried out using the fork heads on the push rod and the gear housing. The assembly sequence described in these assembly instructions must be followed.

The transverse holes of the fork head have a diameter of 12 mm  $+0.1/0$  mm. The fastening bolts are not included in the scope of delivery.



The following instructions must be observed during installation:



The electric cylinder must not be operated electrically before being installed in its final position.

This will otherwise adjust the set end positions of the electric cylinder.

- The stroke end positions of the electric cylinder are set in the factory. The push rod is not secured against twisting.
- A rotation of the push rod or the joint head mounted on the thread of the push rod leads to an adjustment of the end position.
- In order to prevent the adjustment of the stroke and installation position, the red safety cord must only be removed after installing the electric cylinder.
- Forces and torque on the push rod acting laterally is not permitted.
- Perform a test run



Non observance of this procedure will lead to damage to the electric cylinder! This nullifies the guarantee!

- With regard to the installation position of the components, take care to avoid crushing and shear points, especially when taking into consideration any future applications.

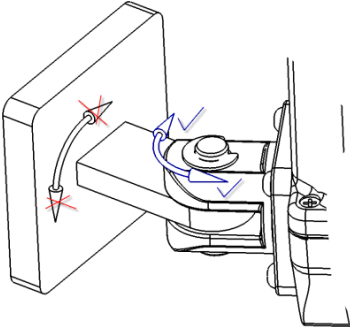


### 7.6.1 Installation procedure / installation sequence

- Hang the rear suspension onto the "counter-piece".



The counter-piece must not be able to be twisted. The electric cylinder must be able to be rotated in the direction of the arrow (see graphic).



- Remove the adhesive safety tape.



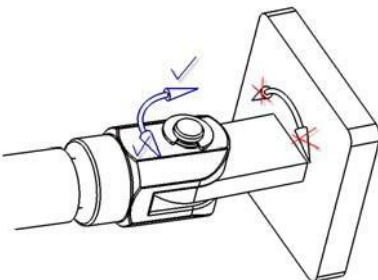
The push rod must not be rotated.



- Fix the suspension at the "front".



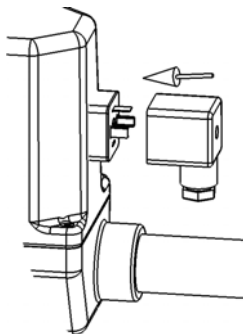
The counter-piece must not be able to be twisted. The electric cylinder must be able to be rotated in the direction of the arrow (see graphic).



## 7. Life phases

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- Connect to the respective controller.



- Perform the test run / initial run without load and check the function of the system.

### 7.7 Maintenance

The electric cylinder generally does not require servicing, but it is not exempt from wear and tear.

You can recognise possible wear on faulty functions, increased play of the moving parts or unusual sounds that originate from the electric cylinder.

The replacement of worn parts must only be carried out by the manufacturer. The electric cylinder must be sent to up for this purpose. This means that in the case of wear and non-replacement of worn product parts, the safety of the product could be compromised.

All work with the electric cylinder may only be carried out in accordance with these instructions. The device may only be opened by authorized specialist personnel.

If there is a fault in the electric cylinder, we recommend contacting the manufacturer and/or sending the electric cylinder to be repaired.

- When working on the electrics or the electrical elements, they must be first disconnected from the supply to prevent any risk of injury.
- Unauthorised modifications or changes to the electric cylinder are not permitted for safety reasons.
- Safety-relevant devices must be inspected for proper function and completeness at regular intervals.

### 7.8 Cleaning

You can clean the hand switch and the outside surface of the electric cylinder's profile using a lint-free, clean cloth.



Solvent-based cleaners will corrode the material and can damage it.

### 7.9 Disposal and return

The electric cylinder must either be disposed of in accordance with the applicable regulations and guidelines, or returned to the manufacturer.

The electric cylinder contains electronic components, cable, metals, plastics etc. and is to be disposed of in accordance with the applicable environmental regulations of the respective country.

In the European Economic Area disposal is governed by the EU Directive 2002/95/EC or the relevant national legislation.