PHOENIX MECANO

Assembly Instructions

LD75E, LD75P

Document: B.017663
Date: June 13, 2025
Version: 2.0 (193)

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PHOENIX MECANO

Contents

1 Installation Declaration

Installation Declaration within the meaning of the Machinery Directive 2006/42/EC, Annex II, 1.B for incomplete machines

The Manufacturer

Phoenix Mecano Solutions AG
Hofwisenstrasse 6
CH-8260 Stein am Rhein

confirms that the product named therein

Product designation: LD75E, LD75P

Type designation: LD75E, LD75P

Trade name: LD75E, LD75P

Function: Electromotive extension and retraction of the pushrod for creation of linear motion

meets the requirements for an **incomplete machine** according to the Machinery Directive 2006/42/EC.

The following essential requirements of the Machinery Directive 2006/42/EC according to Annex I have been applied and fulfilled:

1.1.5.; 1.3.2.; 1.3.3.; 1.3.4.; 1.3.7.; 1.5.1.; 4.1.2.1.; 4.1.2.3.

It is also declared herewith that the special technical documentation according to Annex VII Part B has been compiled.

It is expressly stated that the **incomplete machine** complies with all applicable provisions of the following EC guidelines:

2011/65/EU: Directive 2011/65/EU of the European Parliament and the Council dd. 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

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 test (IEC 60601-1-2:2014); German version EN 60601-1-2:2015

Phoenix Mecano Solutions AG undertakes to submit technical documentation for the incomplete machine upon substantiated request of the national compe-tent bodies in electronic format.

Setting into operation is forbidden until it is established that the machine, into which this incomplete machine is installed, complies with the provisions of the EC Directive 2006/42/EC.

It must comply with the CE guidelines prior to marketing, including with regard to documentation.

2 General information

2.1 Notes on these assembly instructions

These assembly instructions are only applicable for the electric cylinder described and intended as documentation for the manufacturer of the final product, into which this incomplete machine will be installed.

We herewith particularly emphasize that the operating instruction containing description of all functions and safety notes for the final product must be compiled for the end customer by the manufacturer of the final product.

This also applies to the installation into a machine. The machine manufacturer is responsible for the respective safety equipment, inspections, documentation and monitoring of pinch and shear points that may potentially arise.

This assembly instructions help

- avoid hazards,
- and downtime,
- and guarantee and/or extend the lifetime of the product.

Hazard warnings, safety recommendations and data in these assembly instructions shall be adhered to with no exception.

The assembly instructions must be read and used by each person, who works with the product.

Setting into operation is forbidden until it is established that the machine complies with the provisions of the EC Guidelines 2006/42/EC (Machinery Directive). It must comply with the CE guidelines prior to marketing, including with regard to documentation.

We expressly draw the attention of the re-user of this incomplete machine / partial machine / machine part to the duty of ex-tension and complementation of this documentation. In particular, a CE Declaration of Conformity must be drawn up by the re-user in case of fitting or mounting of electric elements and/or drives. Our Installation Declaration will automatically become void.

3 Liability / warranty

3.1 Liability

Phoenix Mecano Solutions AG assumes no liability for damages or impairments resulting from structural modifications by a third party or modifications of the safety devices of this electric cylinder.

Phoenix Mecano Solutions AG assumes no responsibility for the spare parts that have not been tested and authorised by Phoenix Mecano Solutions AG .

Otherwise, the EC Installation Declaration becomes void.

The safety-related devices must be regularly tested for operability, damage and integrity.

We reserve the right to make technical modifications of the electric cylinder and changes of its assembly instructions.

Advertising materials, product leaflets on sales activities, public statements or similar notices may not be taken as basis for suitability and quality of the product, for which purpose a detailed technical advice is strongly recommended. No claims can be asserted against Phoenix Mecano Solutions AG as to availability of previous versions or adjustments to the current version of the electric cylinder.

In case of any inquiries please specify the type plate data.

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3.2 Product monitoring

Phoenix Mecano Solutions AG offers products with highest possible technical level, adapted to the latest safety standards. Inform us please immediately of any recurrent failures or malfunctions.

3.3 Language of the operating instructions

The original version of these assembly instructions was drawn up in the EU official language of the manufacturer of this in-complete machine. Translations into other languages are translations of the original version subject to the legal require-ments of the machinery directive.

3.4 Copyright

4 Use / operating personnel

4.1 Intended use

The electric cylinder shall be used exclusively for the adjustment of the guided components or other comparable adjustment tasks. The electric cylinder may not be used in potentially explosive atmosphere as well as in direct contact with food, pharmaceutical or cosmetic products. Catalogue information, content of these assembly instructions and / or conditions specified in the order must be taken into account. The values specified in these assembly instructions are maximum values and may not be exceeded.

4.2 Unintended use

”Unintended use” means that the information given in section 4.1 is not being observed. Unintended use and improper handling, as well as operating, installing or handling this electric cylinder by untrained personnel may result in hazards to the personnel. Moving persons with this electric cylinder, for example, is an example of an unintended use and is forbidden. Phoenix Mecano Solutions AG is released of liability and general operating licence of this electric cylinder becomes void in case of unintended use.

4.3 Reasonably foreseeable misuse

- Overloading the device by exceeding the weight or duty cycle
- Use in the environments outside the specified IP protection class
- Use in the environment with high humidity > dew point
- Use in the premises with potentially explosive atmosphere as defined in ATEX Directive
- Operating in damage to the mains supply, housing, motor cable, manual switch or other control lines (SPS, PC, etc.)

  Attention

  Accessories (power supply, manual switch, etc.) have protection class IP40

- Use when incompletely assembled or insufficiently fixed
- Stroking out (moving up to a stop)
- Use in applications with lateral forces and torques

Attention

When unplugged, no hazard may arise.

4.4 Who may use, install and operate this electric cylinder?

Individuals, who have fully read and understood the assembly instructions, may use, install and operate this electric cylinder. The responsibilities associated with handling this electric cylinder must be clearly defined and observed.

5 Safety

5.1 Safety instructions

Phoenix Mecano Solutions AG has constructed this electric cylinder according to the current state of the art and existing safety regulations. However, if the electric cylinder is misused and/or operated in the manner inconsistent with the intended use or if the safety instructions are not observed, this may result in hazards to personnel and property. Competent handling guarantees high performance and availability of the electric cylinder. Faults or conditions, which may impair the safety, must be rectified immediately.

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

This includes:

- Understanding the safety instructions in the text, and
- Being familiar with the configuration and functioning of various options of operation and application.

The electric cylinder may only be used, installed and operated by the designated, trained personnel. Any works on and with the electric cylinder may only be carried out according to this instruction. This instruction needs therefore be kept safe and close at hand in the vicinity of the electric cylinder.

The general, national or operational safety instructions shall be observed. Responsibilities for the use, installation and operation of this electric cylinder must be unequivocally stipulated and observed so that no unclear situation may arise with regard to safety aspects. Before every commissioning, the user must ensure that no persons or objects remain in the danger area of the electric cylinder. The user may only operate the electric cylinder if it is in a faultless condition. Any change must be immediately reported to the nearest person responsible.

5.2 Special safety instructions

- Any works with the electric cylinder may only be carried out according to this instruction.
- The device may only be opened (installed / dismantled) by authorised specialist personnel. In case of any defect of the electric cylinder, we recommend to contact the manufacturer and/or send this electric cylinder for repair.
- Power supply must be disconnected before installation, dismantling, maintenance or troubleshooting.
- The re-user must prevent pinching between guiding tube and the front suspension by means of design.
- A proper installation of the supply lines prevents the hazards posed by this application.

- Only use original accessories and spare parts.
- The re-user must prevent potential damages caused by the failure of the end position switch-off or nut breakage by means of design.
- The electric cylinder may not be exposed to lateral forces or torques.
- Only use suitable screws (no shoulder screws). Note the hole- Ø of the cylinder mounts!
- Tighten the screws so firmly that they cannot loosen - but not too tight, as otherwise high forces would act on the mounts and safe operation would no longer be ensured! The drive must be freely rotatable in the suspensions - tension would result in immediate destruction of the drive!
- Loss of connection between the thrust rod and guiding tube in case of a tensile load must be prevented by means of design. It means that, especially with suspended loads, additional safety devices (e.g.: cable, chain, etc.) must be affixed!
- During maintenance, only original parts must be used and installed by trained specialist personnel.
- For safety reasons, unauthorised modifications or changes of the electric cylinder are prohibited.
- The performance data of this electric cylinder determined by Phoenix Mecano Solutions AG may not be exceeded (see chapter 6.9 Performance charts on page 22).
- The type plate must remain legible. The data must be retrievable without effort at any time.
- Safety-relevant hazard signs identify danger areas on the product.
- Safety-relevant devices must be tested for operability, damage and integrity on a regular basis, at least once a year.
- In case of an overhead installation of the electric cylinder, the fastened loads must be secured onsite against dropping. The danger area under the application must be marked in the documentation of the final product.
- The electric cylinder must immediately be put out of operation if the mains cable and/or supply line is damaged.
- Higher-level safety circuits (emergency stop, etc.) are required for safe operation of the electric cylinders and must be provided and installed on site by the subsequent user / user.

5.3 Safety signs

These warning and mandatory actions signs are the safety symbols which warn of risk or hazard. Data of these assembly instructions regarding special hazards or situations with electric cylinder must be complied with, while non-observance increases the risk of an accident.

Attention

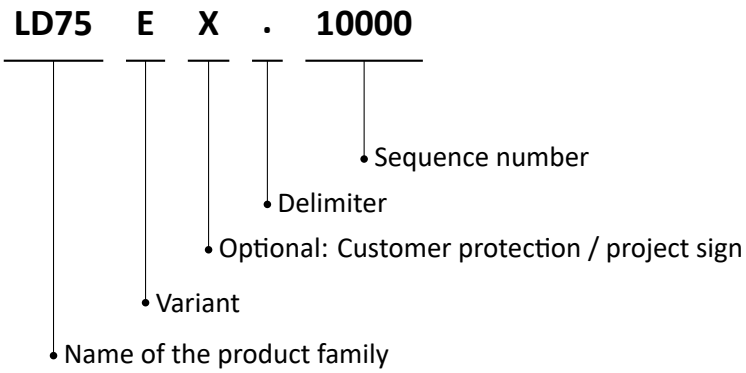
The ”General mandatory action sign” indicates the necessity to exercise caution. Data marked with this sign in these assembly instructions require your particular attention. These contain important information on functions, settings and procedures. Failure to observe may lead to personal injuries, disturbances of the electric cylinder or the environment.

6 Product information

6.1 Article number definition

6.1.1 Definition

The standard article number for products in the LD75 family is structured as follows:



Note on variants The product family is initially assigned to a variant, represented by a letter in the article number.

- **Variant E:** Drive for classic control.
- **Variant P:** Identical to variant E with position feedback. For example via an internal potentiometer or an active position voltage.
- **Variant C:** Smart drive with communication interface and setting options that can be parameterized by the factory and by the customer.

The explicit function and cable assignment is defined in the connection plan. (see chapter 6.8 Connection plan on page 21).

Note on customer protection / project sign Individual drives are marked with a **X** to indicate customer protection and/or customizations for a project. Examples of project customizations are

- Special suspension
- Special color
- Preset parameters
- Defined firmware version for variant C
- . . .

Attention

The item number may vary if justified interest is shown.

6.1.2 Examples

Attention

The article numbers used in the example are only there to illustrate the definition of an article number. These numbers are not based on real numbers and may therefore have been defined differently.

LD75E.00000 Drive for retracting and extending.

LD75P.00000 Drive for retracting and extending with position feedback.

LD75EX.00000 Drive for retracting and extending. For example, the drive has a suspension that differs from the standard, which is why it is marked as a project.

6.2 Mode of operation

The electric cylinder serves for adjustment of the guided components or other similar adjustment tasks. It is driven by a low voltage motor.

6.2.1 Variants of power supply

Power supply 12 / 24 VDC

6.2.2 Variants of force / speed

The basic executions in terms of force / travel speed of the electric cylinder LD75E and LD75P are shown in table 6.1. The stated values were determined under optimum conditions (room temperature) and may differ as a result of friction loss, temperature changes or external disturbances.

Attention

Self-locking force: Ensure that the motor is short-circuited after stopping, in order to achieve the maximum self-locking effect (see Table 6.1) zu erreichen, stellen Sie bitte sicher, dass der Motor nach dem Anhalten kurzgeschlossen). Actuators with integrated control provide this feature as long as the actuator is supplied with power.

Attention

Emission: The A-weighted equivalent continuous sound pressure level of these linear units is approx. 65 dB(A) at a microphone distance of 50 cm.

Table 6.1: Variants of force / speed

Executions	Voltage	Push force	Pull force	Max. Self-locking (pressure)	Max. Self-locking (tension)	No load	Rated load
	VDC	N	N	N	N	mm/s	mm/s
Execution 1	12	750	750	750	400	14	≤ 11
Execution 2	12	750	750	750	400	24	≤ 17
Execution 3	12	300	300	160	150	24	≤ 21
Execution 4	12	300	300	160	150	48	≤ 39
Execution 5	24	750	750	750	400	15	≤ 13
Execution 6	24	750	750	750	400	25	≤ 19
Execution 7	24	300	300	160	150	25	≤ 23
Execution 8	24	300	300	160	150	50	≤ 44

6.3 Dimensions of geometry

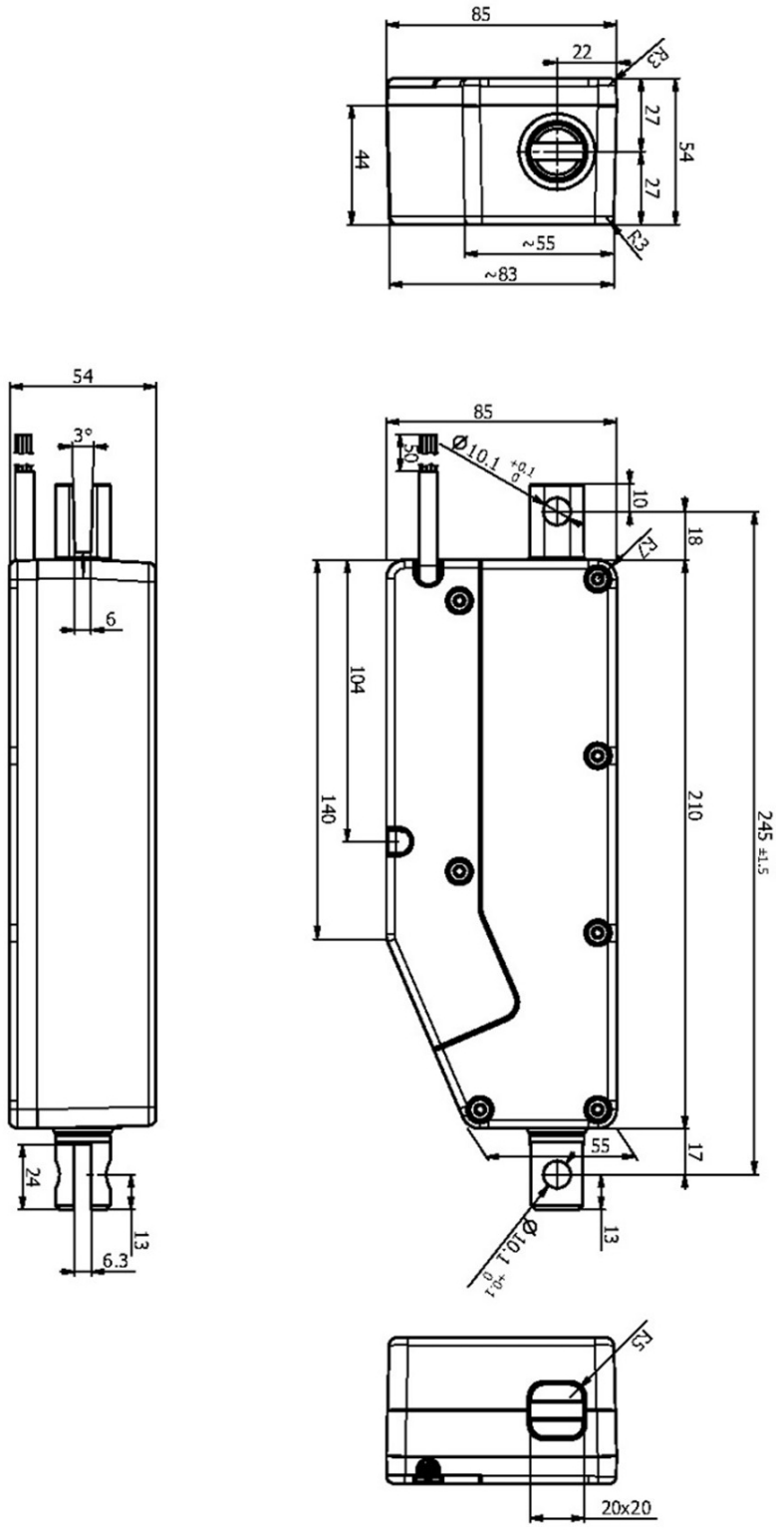
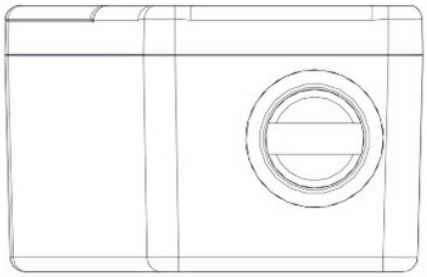
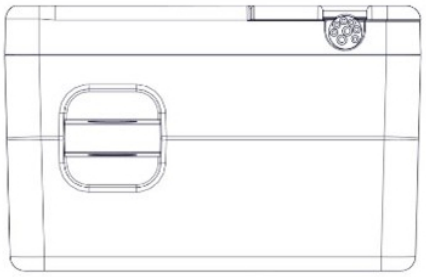


Figure 6.1: Representation of the dimensions of the geometry

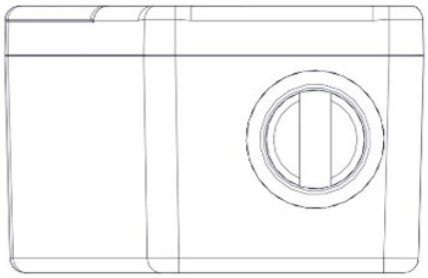
6.4 Variants of suspension



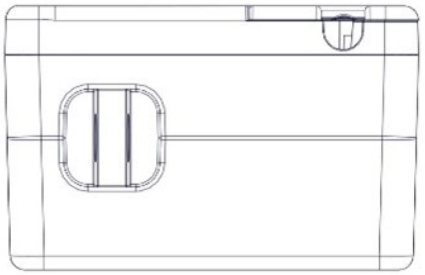
(a) Option 1 - front



(b) Option 1 - rear



(c) Option 2 - front



(d) Option 2 - rear

Figure 6.2: Overview of the suspension variants

6.5 Technical data

Table 6.2: Technical data

Stroke length	up to 130 mm
Special stroke lengths / installation lengths	Customisation possible on request
Installation dimension	245 ± 1.5 mm (see figure 6.1 on page 16)
Mounting position	any desired, without cross forces
Lifting force	Up to 750 N pull / push (depending on gear ratio and spindle pitch)
Lifting speed	11 – 50 mm/s (depending on load / spindle)
Protection class	IP 69k static (≙ IP 65 dynamic)
Operating voltage	12 VDC, max. 7 A)** 24 VDC, max. 4 A)** **Measured with a stable power supply at room temperature and under laboratory conditions
Storage temperature	–40 °C bis +85 °C
Operating temperature	–20 °C bis +65 °C (full power +5 °C bis +40 °C)
Self-locking	Yes (depending on gear ratio and spindle pitch) (see chapter 6.2.2 on page 14)
Stroke tube guide	Slide bearing
Operating mode	750N ON-time 20% (2 min. operation / 8 min. pause at rated load) 300N ON-time 30% (3 min. operation / 7 min. pause at rated load)
Maintenance	Maintenance-free up to (min. 20000 cycles, max. 60000 cycles depend on Execution)
Colour	Black powder coated RAL7024 / other colours on request
Electrical connection	Connection cable with plug
Control options	Supply voltage polarity

6.6 Overview diagram of the electric cylinder

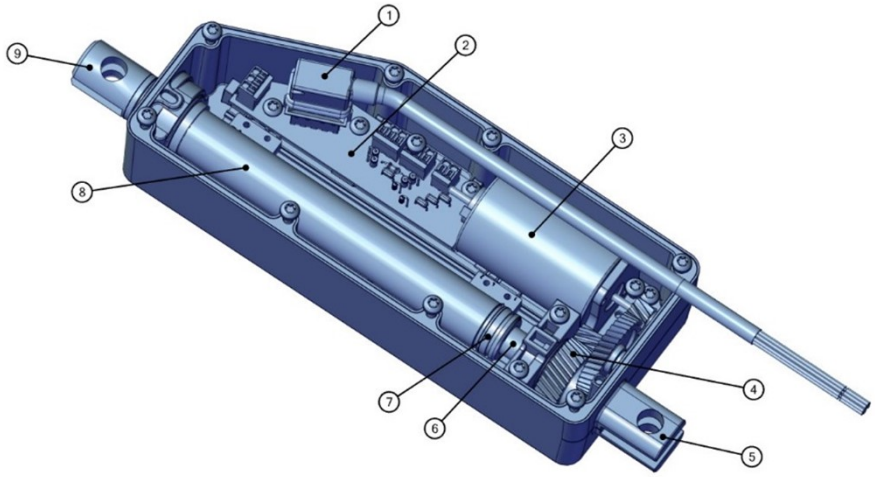


Figure 6.3: Overview LD75

1: Connection cable with plug
2: Control board
3: Motor
4: Transmission
5: Mounting adapter, rear
6: Spindle
7: Guide nut
8: Pushrod
9: Mounting adapter, front

6.7 Connection cable with plug / connection diagrams

A connection cable with a compatible plug is supplied as standard for electric cylinders of the LD75E and LD75P series.

Please note that the specified protection class (see chapter 6.5 on page 18) for the electric cylinder is only provided with a correctly mounted connection cable with plug (see figure 6.4)! In order to guarantee a high IP protection class, we recommend that the free cable end is laid and connected in such a way that it is inside a protected area (e.g. junction box, switch cabinet, machine enclosure, etc.).

Figure 6.4: Connection cable LD75

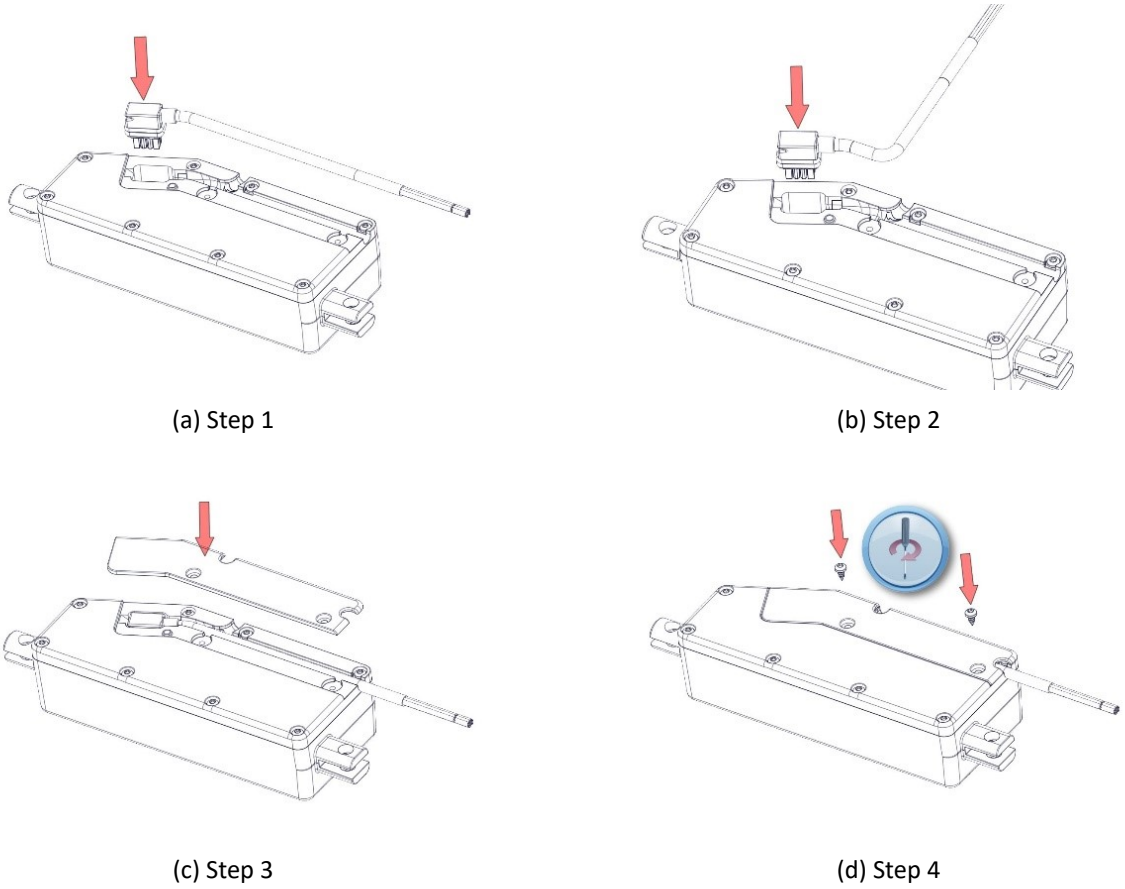
The connection cable with plug is available in the following lengths (measured from the edge of the housing with a tolerance of ±150mm):

- Total cable length L = 1500 mm
- Total cable length L = 3000 mm
- Total cable length L = 5000 mm

Attention

When assembling/disassembling the connection cable, please ensure that the plug is correctly inserted in the plug socket provided for this purpose and avoid using undue force (**Recommendation:** lightly grease the seal). Ensure that the connecting cables are laid correctly, in order to eliminate trip hazards.

6.7.1 Assembly of the connection cable with plug



(a) Step 1

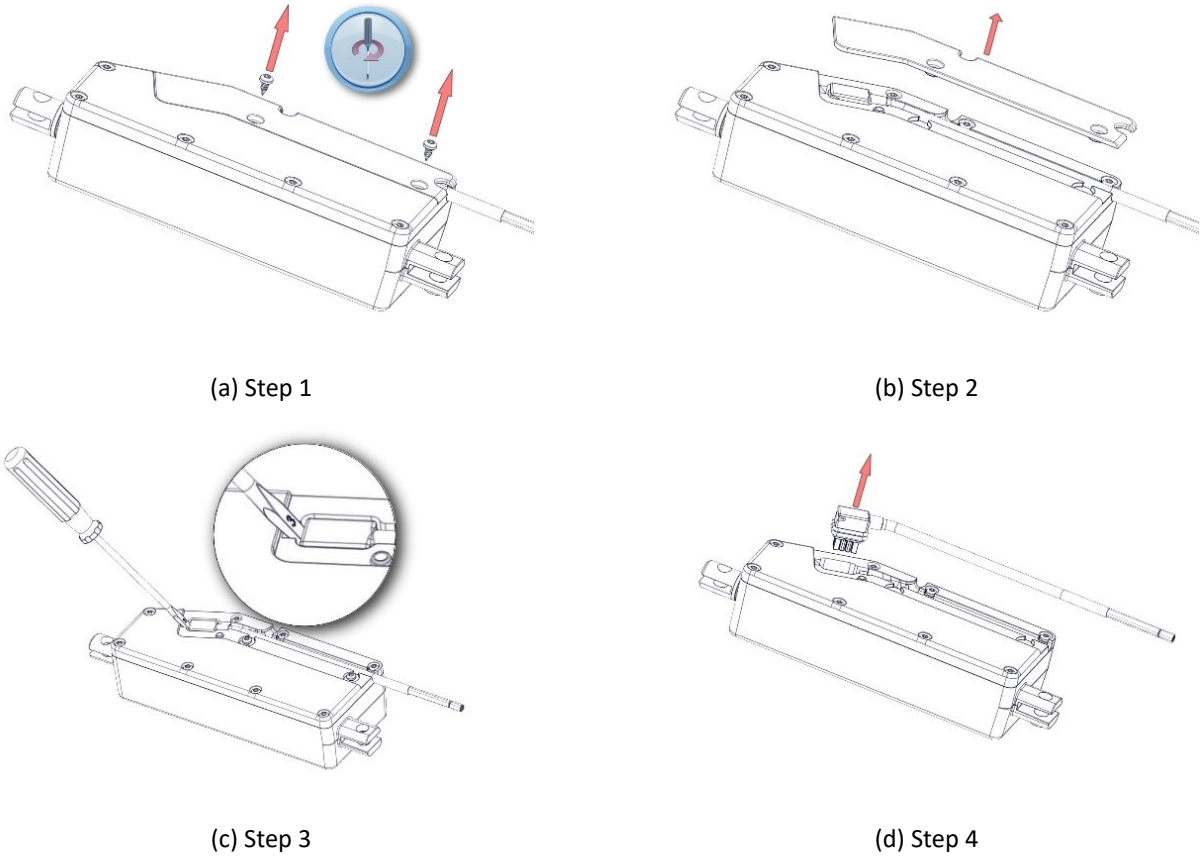
(b) Step 2

(c) Step 3

(d) Step 4

Figure 6.5: Assembly of the cable

6.7.2 Disassembly of the connection cable with plug



(a) Step 1

(b) Step 2

(c) Step 3

(d) Step 4

Figure 6.6: Disassembly of the cable

6.7.3 Variants in this document

The basic execution of the LD75E series electric cylinders is available in two different variants:

Variant E → LD75E Control by polarity of the supply voltage

Variant P → LD75P Control by polarity of the supply voltage + position feedback signal

Note: All variants include an internal end position switch-off.

6.8 Connection plan

Each actuator in the LD75 is defined in its connection via the connection plan. The wiring diagrams are automatically attached to the latest version of the digital assembly instructions. Alternatively, you can request the connection plan from Phoenix Mecano Solutions AG . Connection plans start with the number ”AP”, such as AP.4.017661.

Attention

Like the assembly instructions, the connection plan must be read and understood before installation and commissioning. It is part of the assembly instructions.

The connection plan is indicated on the type plate and on the specification sheet. The following is an incomplete list of standard connection plans:

AP.4.017661 Standard connection plan for extending and retracting with the supply voltage polarity.

AP.4.017662 Identical to AP.4.017661, but has an internal potentiometer for position feedback.

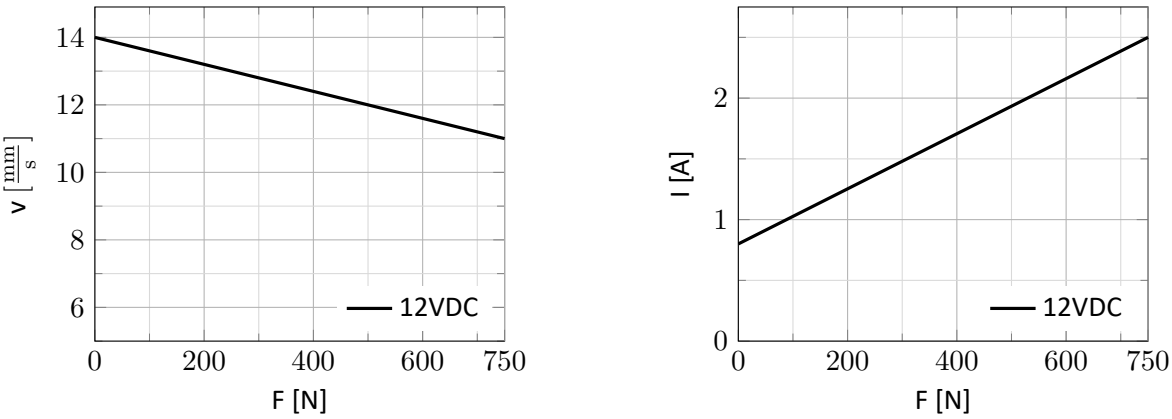
AP.4.017665 Identical to AP.4.017662, but has an ”AMP SUPERSEAL 1.5MM” connector.

AP.4.018049 Identical to AP.4.017661, but has an internal active voltage output 0.5 to 4.5V for position feedback.

6.9 Performance charts

Attention

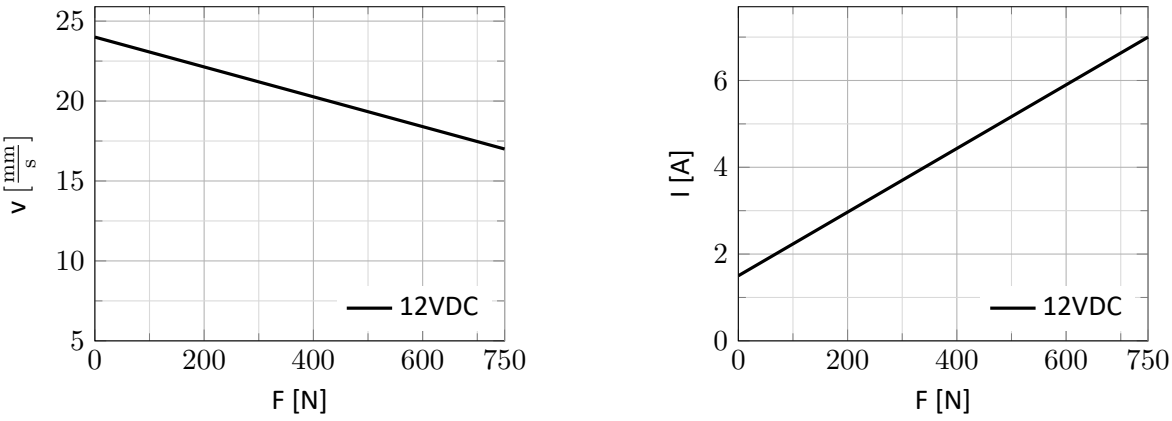
All values in the performance charts are typical values measured under optimal conditions (stabilised power source and room temperature). These values may vary due to components which are subject to tolerances such as the leading spindle, guide nut and gear wheels as well as tribological influences.



(a) Velocity

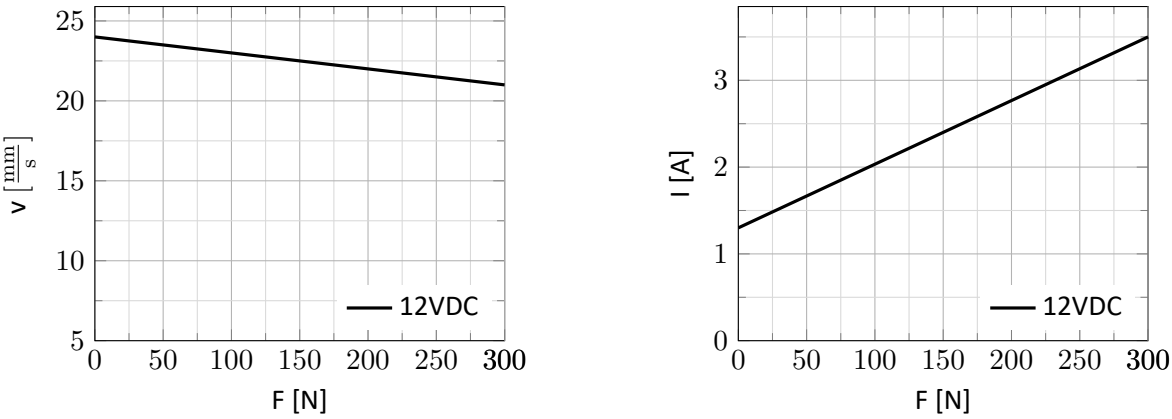
(b) Motor current

Figure 6.7: Performance chart - Execution 1



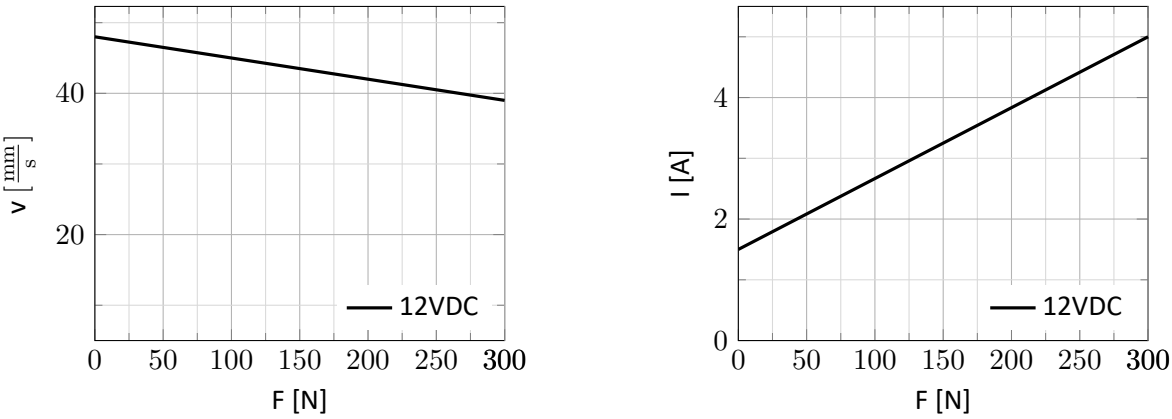
(a) Velocity (b) Motor current

Figure 6.8: Performance chart - Execution 2



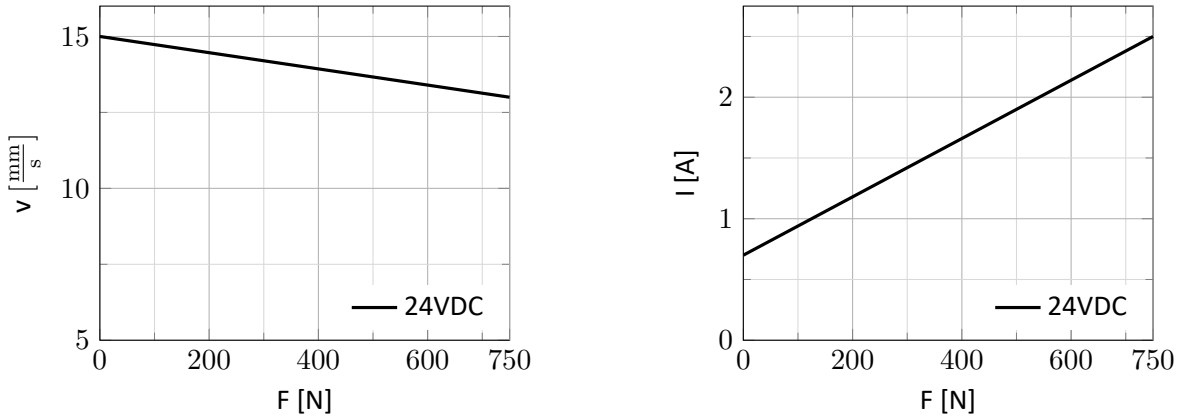
(a) Velocity (b) Motor current

Figure 6.9: Performance chart - Execution 3



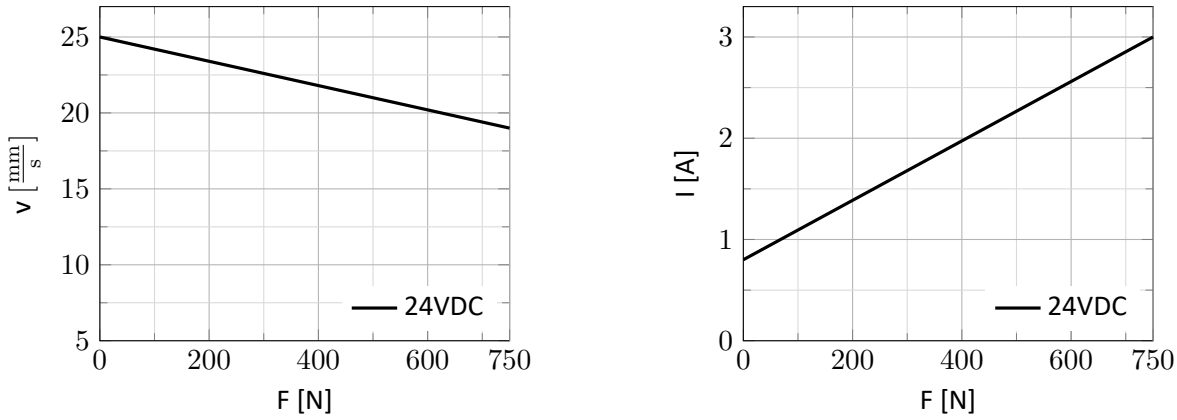
(a) Velocity (b) Motor current

Figure 6.10: Performance chart - Execution 4



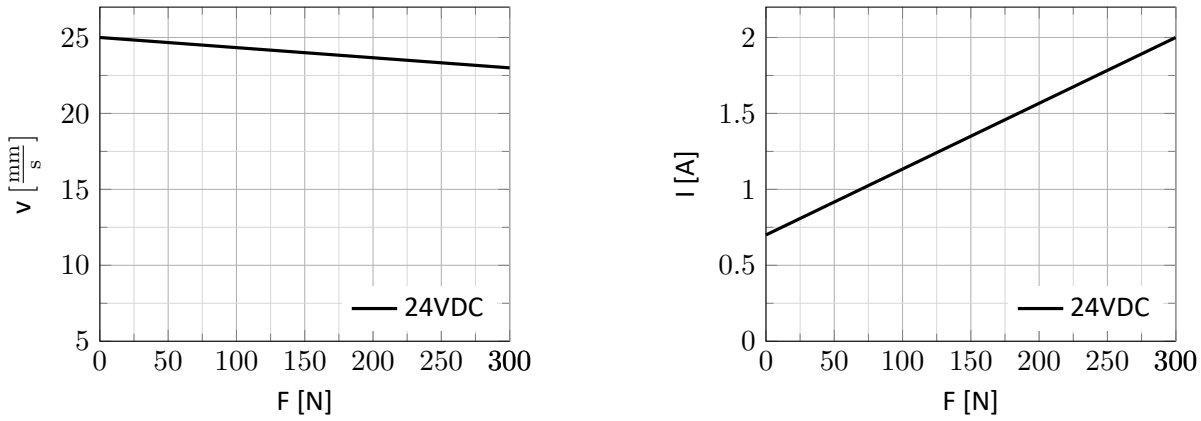
(a) Velocity (b) Motor current

Figure 6.11: Performance chart - Execution 5



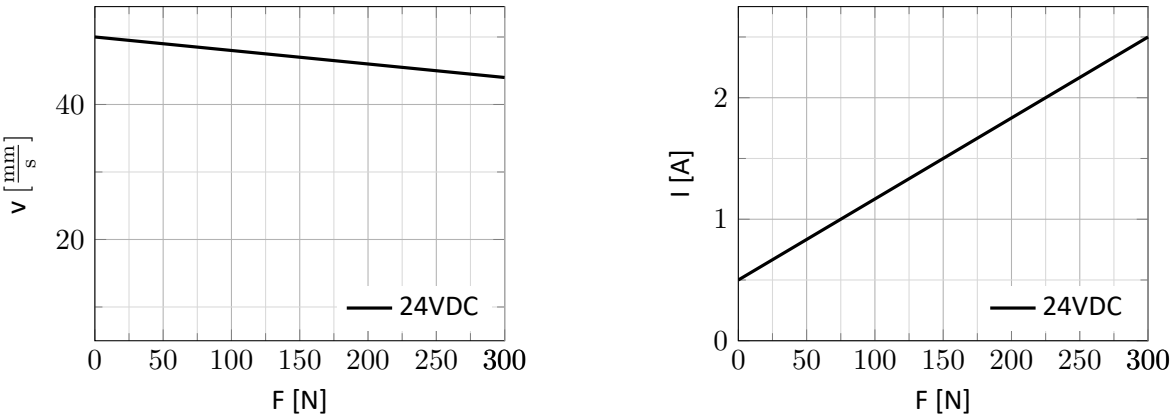
(a) Velocity (b) Motor current

Figure 6.12: Performance chart - Execution 6



(a) Velocity (b) Motor current

Figure 6.13: Performance chart - Execution 7



(a) Velocity

(b) Motor current

Figure 6.14: Performance chart - Execution 8

7 Life phases

7.1 Electric cylinder scope of delivery

The electric cylinder is delivered as an individual component (incomplete machine). The controls and manual switches and/or accessories are not included in scope of 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.

Commissioning damaged electric cylinders is forbidden.

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

- air must not contain oils
- contact with solvent-based paints must be avoided
- lowest / highest ambient temperature: -40 °C to +85 °C
- air pressure: from 700 to 1060 hPa

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

7.3 Important information on installation and commissioning

Attention

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

- It is essential to implement an emergency stop onsite, which could interrupt reliably the operating voltage in the event of a failure or malfunction of the incomplete machine!
- No additional holes may be made in the electric cylinder.
- After setting up and commissioning, it is essential that the plug of the power supply is freely accessible.
- The electric cylinder must not be moved to ”Stop”. Risk of mechanical damage.
- The electric cylinder may not be opened.

- The user must ensure that there is no danger when the power supply is active.
- Pinch and shear points must be avoided in the design of the applications with this electric cylinder. These must be secured and marked correspondingly.
- Automatic start-up of the electric cylinder caused by a defect is to be stopped immediately by disconnecting the power supply (see EMERGENCY STOP above).
- If the supply line is damaged, the electric cylinder must be taken out of operation immediately.
- The pushrod with suspension 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 number of starts per hour determined for your application may not be exceeded.

7.4 Assembly

After the receipt of the electric cylinder, check the device for any damage. The electric cylinder is delivered ready for operation without a controller.

The installation of the LD75E and LD75P consists in fixing the electric cylinder using the rear and front suspensions. The cross bores of both suspensions measure 10.1 0/+0.1 mm according to the standard. The fastening bolts are not included in the scope of delivery.

The following instructions must be observed during installation:

- Stroke end positions are set with the pushrod. The pushrod is not secured against twisting. This means that a turning (rotation) of the pushrod - or the fixed swivel head - is equal to an adjustment of the end positions!

  Attention

  Attention: The attachment points for installation of the electric cylinder must be aligned flawlessly to ensure the safe and flawless operation!

- Action of lateral forces on the pushrod must be excluded!
- When a swivel head or clevis is used/assembled, the head must be correctly locked using the lock nut supplied.
- Test or trial run must be performed.

Attention

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

Installation positions of the components must ensure avoiding pinch and shear points, in particular taking into consideration any future applications. Make sure to exclude the tripping hazard by proper and safe laying of the supply lines / cables!

Attention

It is very important to ensure that the mounted electric cylinder can move freely in the attachment points / that the electric cylinder is neither strained nor buckled. Improper assembly and any emergency situation associated with it would damage the drive and prevent it from operating smoothly!

- The assembly bolts or fastening screws (no shoulder set screws) must be available in the correct size (pay attention to the hole diameter of the cylinder uptakes).
- The bolts and nuts must be manufactured of high-quality steel (for example, 10.8). There may not be any threads on the nuts in the rear uptake nor at the piston rod eye.
- The screws and nuts must be tightened tight enough that they cannot come loose.
- However, do not use too high a torque on the screws in the rear uptake since otherwise the uptakes will be unnecessarily strained (see figure 7.1).

(a) (b)

Figure 7.1: Tightening torque

7.4.1 Installation procedure

1. Hang the rear suspension onto the counterpart piece.

   Attention

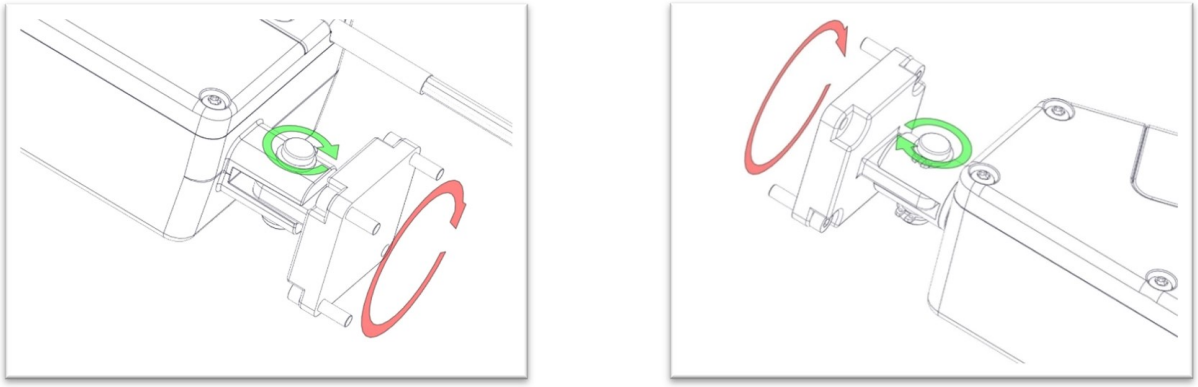
   The counterpart piece may not be able to rotate. The electric cylinder must be able to be rotated in the direction of the arrow (see figure 7.2a).

2. Fix the suspension at the front.

   Attention

   Attention: The cunterpart piece may not be able to rotate. The electric cylinder must be able to be rotated in the direction of the arrow (see figure 7.2b).

3. Connect the connection cables in accordance with the connection plan.



(a) (b)

Figure 7.2: Montagevorgang

4. Perform the test run / initial run without load and check operability of the system.

7.4.2 Additional installation-recommendations

Zusätzliche Installationsempfehlungen

Attention

When using our products in rough environments, we recommend adhering to the following specifications to ensure a long service life:

Whenever possible, make sure that the more critical areas (piston rod outlet, insertion openings of the connector plug, etc.) are protected from heavy contamination by dirt, salt, chemicals or other strong environmental influences like possibly water jets etc. pp. (see figure 7.3). This can be achieved relatively easily by cleverly choosing the installation position:

7.5 Maintenance

The electric cylinder is basically maintenance-free, but is not wear-free.

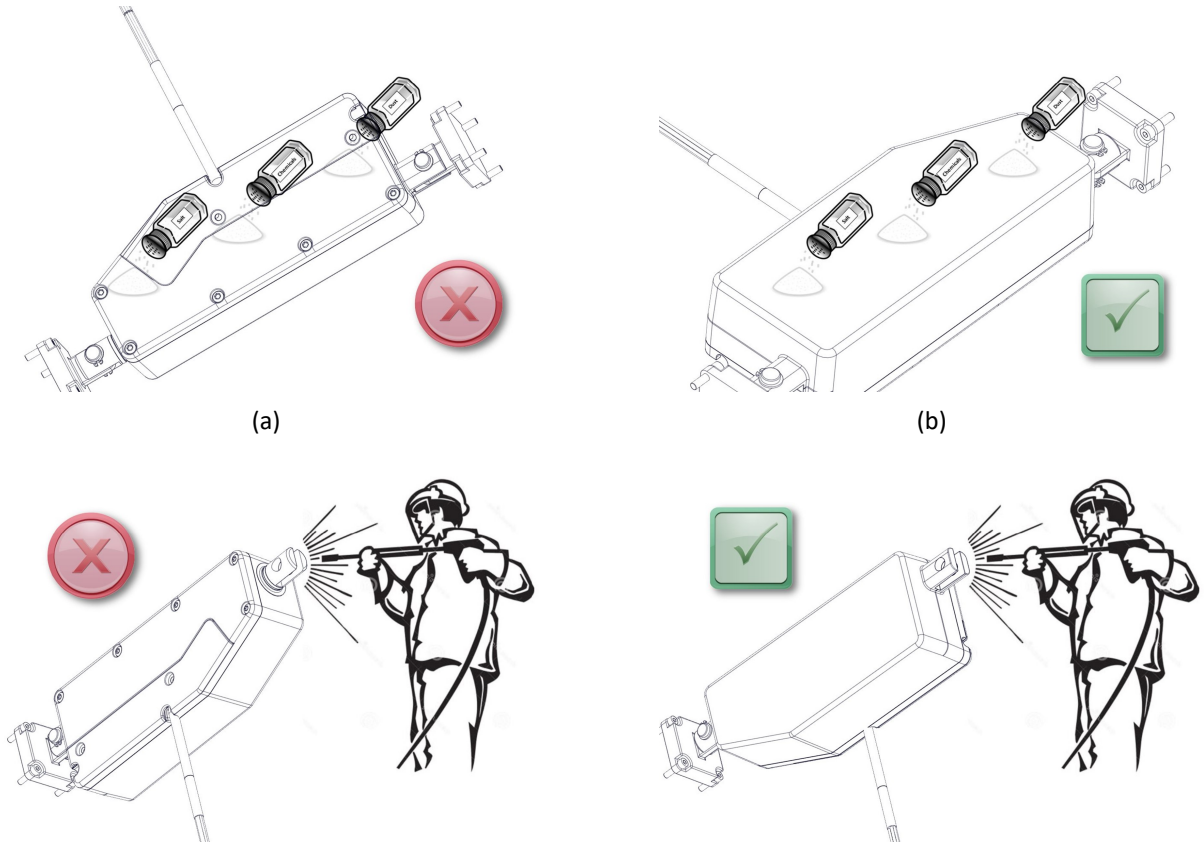
Faulty functioning, excessive play of the movable parts or unusual sounds generated by the electric cylinder can be the signs of wear.

Worn parts of the product must only be replaced by the manufacturer. The electric cylinder must be sent to the manufacturer for these works. In the case of wear without replacement of the worn product parts, the safety of the product cannot be guaranteed.

Any works with the electric cylinder may only be carried out according to this instruction. The device may only be opened by authorised and trained specialist personnel.

In case of any defect of the drive, we recommend to contact the manufacturer and/or send this electric cylinder for repair.

- When working on electric circuits or elements, these must first be disconnected from the supply to prevent the risk of injury.



(a) (b)

(c) (d)

Figure 7.3: Optimum installation orientation for long service life in harsh environments.

- For safety reasons, unauthorised modifications or changes of the electric cylinder are prohibited
- Safety-related devices must be tested on a regular basis depending on the frequency of use, however at least once a year for integrity and operability

7.6 Cleaning

You can clean the manual switch and the external surface of the electric cylinder profile using a lint-free, clean cloth.

Attention

Solvent-based cleaners attack and can damage the material.
Attention: Protection class of the manual switch is not IP69K, but IP40, and therefore may not be washed using the high-pressure cleaner and exposed to moisture, which would immediately lead to damage!

7.7 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 manufacturer reserves the right to charge for the disposal of these drives.

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

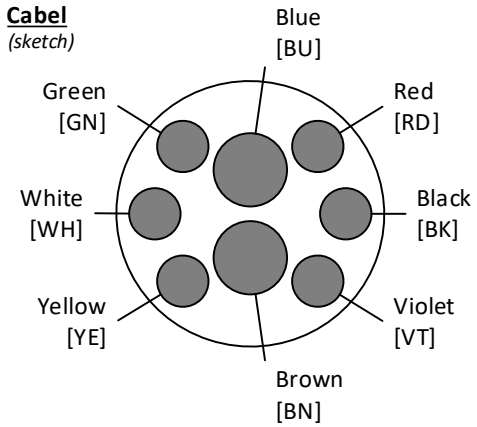
In the European Economic Area, the disposal of the product is governed by the EU Directive 2002/95/EC or the relevant national legislation.

Phoenix Mecano Solutions AG

www.phoenix-mecano.ch

Connection plan AP.4.017661

Cabel



Cabel (8pol)

***** Control cable *****

1.0mm² (AWG18): BU, BN;

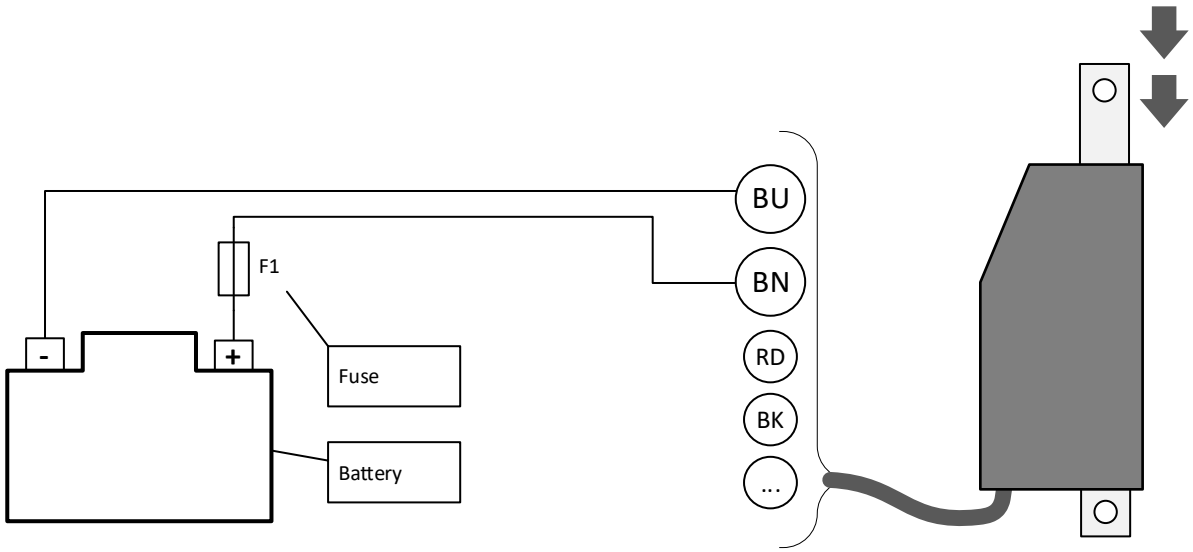
0.5mm2 (AWG20): RD, BK, VT, YE, WH, GN

Ader	*Beschreibung*
Blue (BU)	**Motor** The actuator can be extended and retracted with the blue and brown stranded wires. Please refer to the nameplate for the voltage the power parameter. **Direction** The actuator extends or retracts according to the polarity of the power supply. The actuator stops automatically in the end positions.
Brown (BN)	
Yellow (YE)	**Do not connect** Leave unconnected
White (WH)	
Green (GN)	
Red (RD)	
Black (BK)	
Violette (VT)	

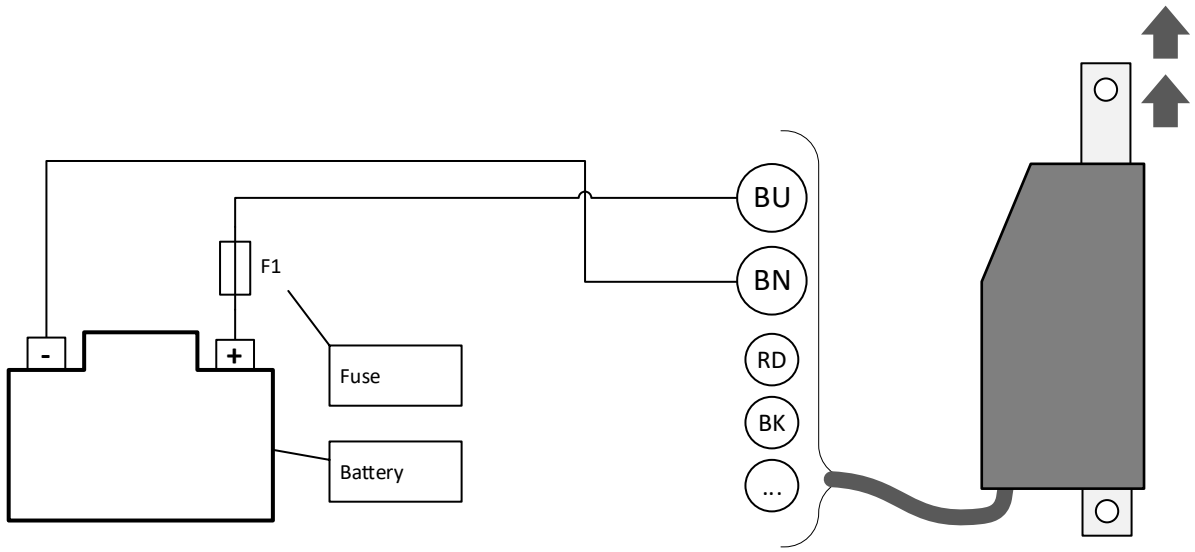
	Blue	**Brown**
Retract	Minus	Plus
Extend	Plus	Minus

Example

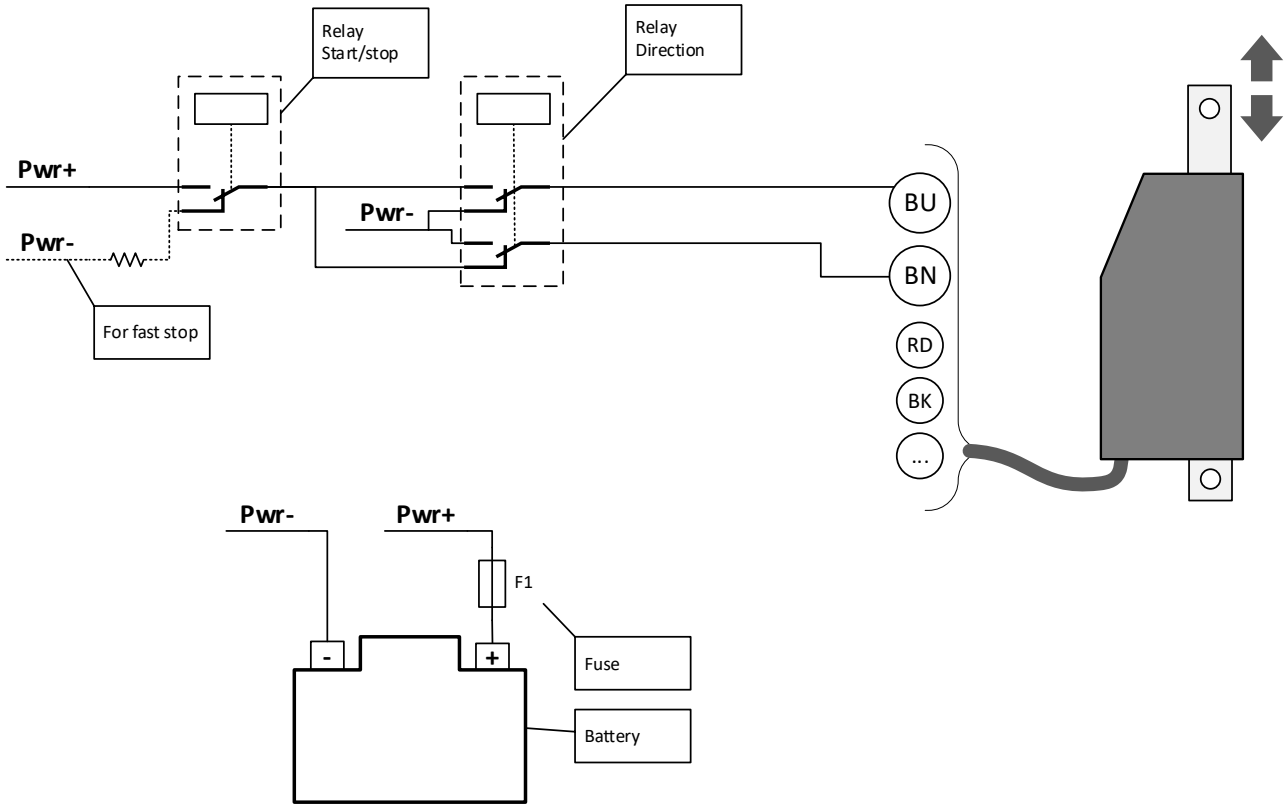
Connection example – Retract



Connection example – Extend



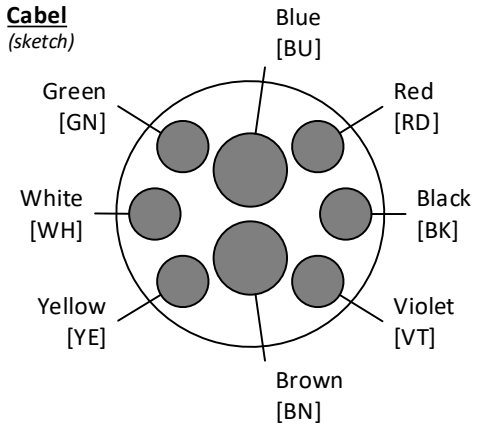
Connection example – Relay



Note: Do not change the direction during travel. Always stop the travel via K1 before changing the direction with K2.

Connection plan AP.4.017662

Cabel



Cabel (8pol)

***** Control cable *****

1.0mm² (AWG18): BU, BN;

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Brown (BN)	
Yellow (YE)	**Do not connect** Leave unconnected
White (WH)	
Green (GN)	

	Blue	**Brown**
Retract	Minus	Plus
Extend	Plus	Minus

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Red
(RD)

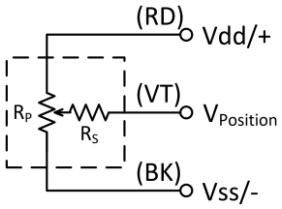
Mechanical potentiometer

The potentiometer generates an analog position signal across the complete stroke of 130mm.

- Red: Plus (e.g. 12V)
- Black: Minus
- Violette: Signal $V_{Position}$

Specification

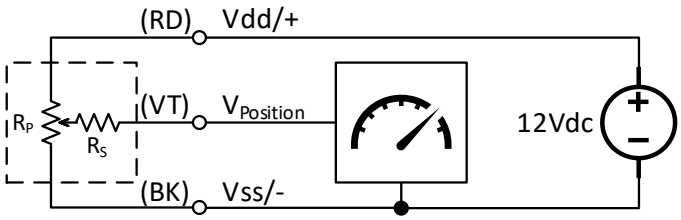
Potentiometer:	R_P	= 10kΩ
Resisitor R_S:	R_S	= 1kΩ
Maximum power:	P_{tot}	= 0.1W
Maximum voltage:	Vdd-Vss	= 30V



Retracted:	1kΩ*
Extended:	11kΩ*
*Reference:	Violette (VT) with respect to black (BK)

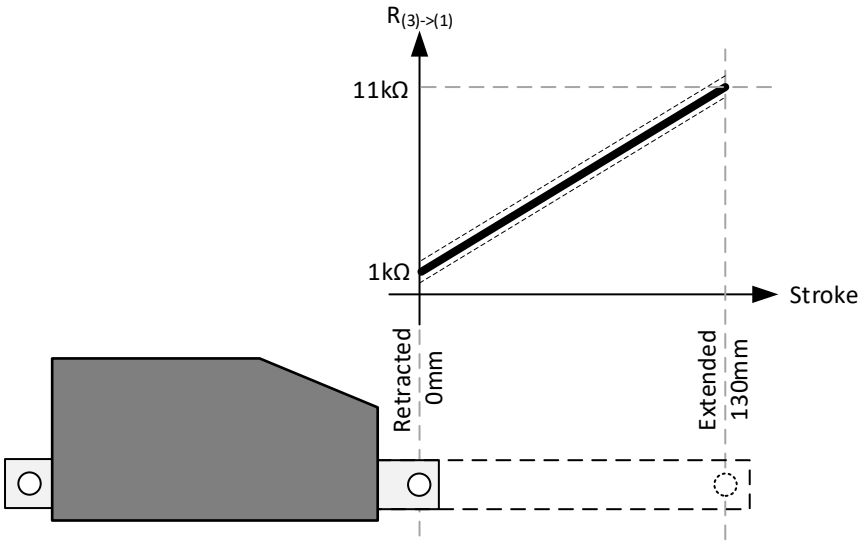
Black
(BK)

Connection example



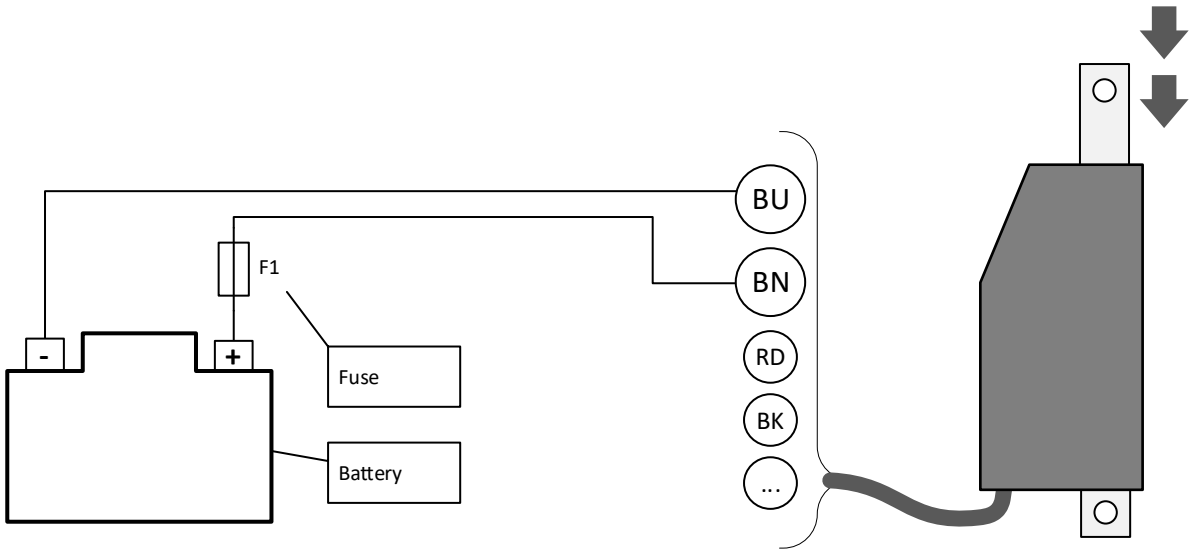
Position (Resistance between VT and BK)

Violette
(VT)

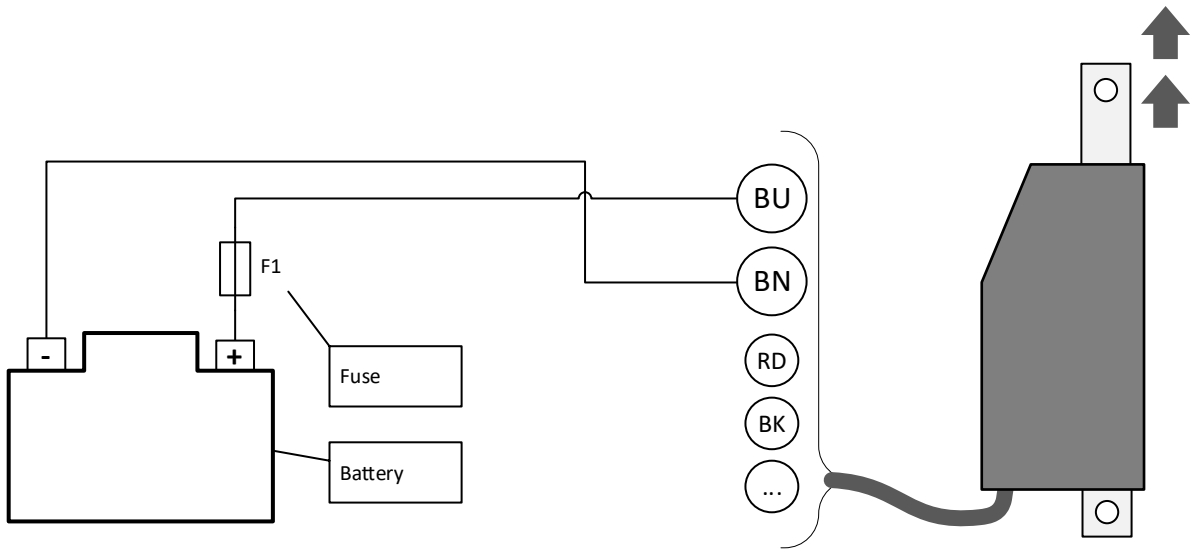


Example

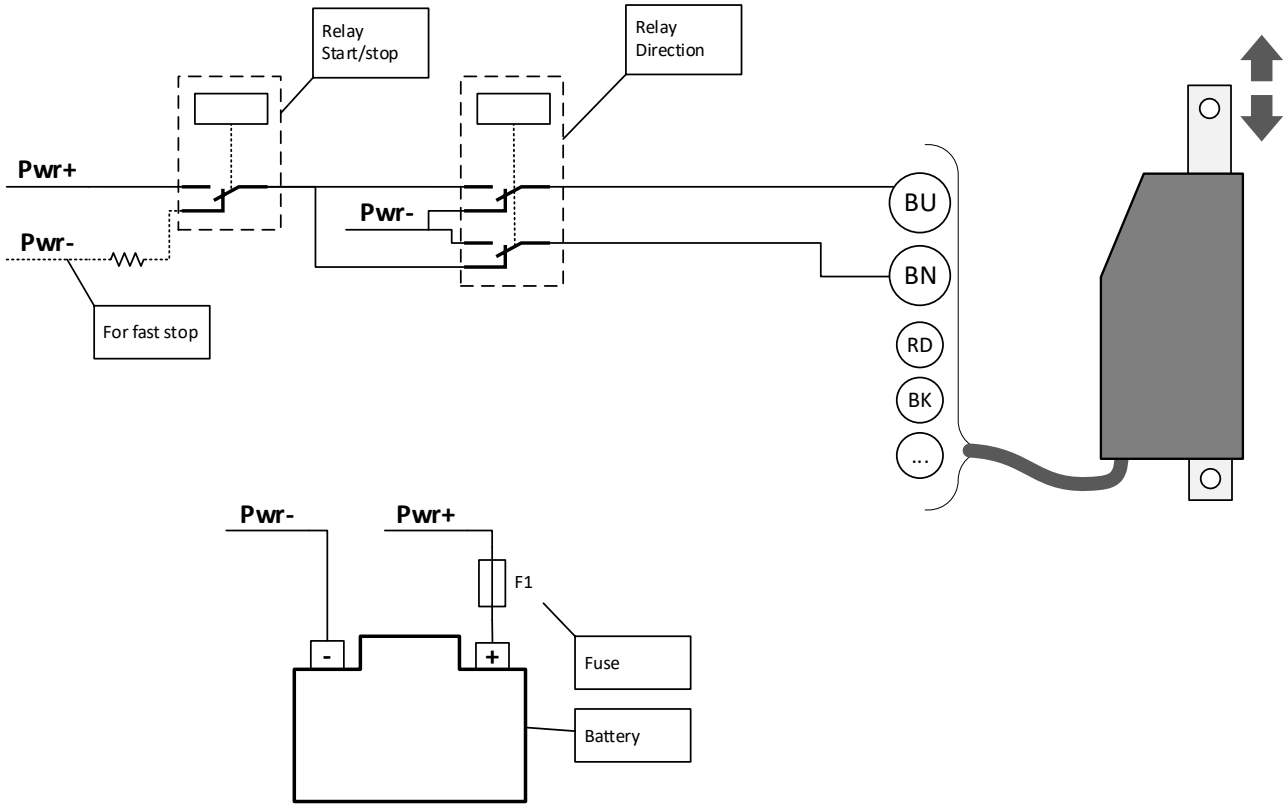
Connection example – Retract



Connection example – Extend



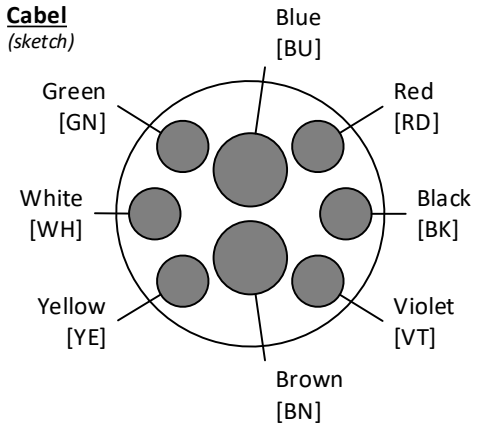
Connection example – Relay



Note: Do not change the direction during travel. Always stop the travel via K1 before changing the direction with K2.

Connection plan AP.4.018049

Cabel



Cabel (8pol)

***** Control cable *****

1.0mm² (AWG18): BU, BN;

0.5mm2 (AWG20): RD, BK, VT, YE, WH, GN

Ader	*Beschreibung*
Blue (BU)	**Motor** The actuator can be extended and retracted with the blue and brown stranded wires. Please refer to the nameplate for the voltage the power parameter. **Direction** The actuator extends or retracts according to the polarity of the power supply. The actuator stops automatically in the end positions.
Brown (BN)	
Yellow (YE)	**Do not connect** Leave unconnected
White (WH)	
Green (GN)	

	Blue	**Brown**
Retract	Minus	Plus
Extend	Plus	Minus

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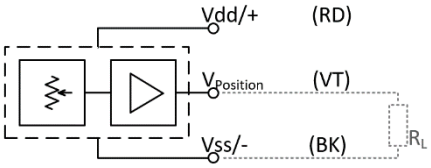
Red
(RD)

Active position feedback 0.5 - 4.5V

Depending on the set stroke, the output voltage VPosition will generate a voltage between 0.5 and 4.5V. 0.5V corresponds to the retracted end position and 4.5V to the extended end position. By the active output voltage the influence of different loads (RL), as for example from controllers and PLC, can be almost neglected.



Specification

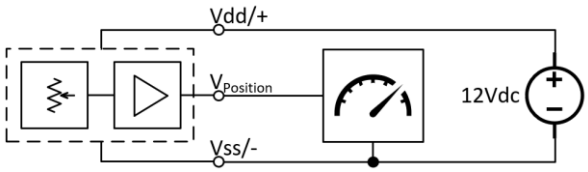
Power supply Vdd-Vss	12Vdc ±20% 24Vdc ±10%
Load R_L	≥1kΩ
Retracted position $V_{Position}$	0.5 V[1,2]
Extended position $V_{Position}$	4.5 V[1,2]

[1]With respect to Vss/-

[2]The voltage $V_{Position}$ is adjusted to the specified stroke at the factory.

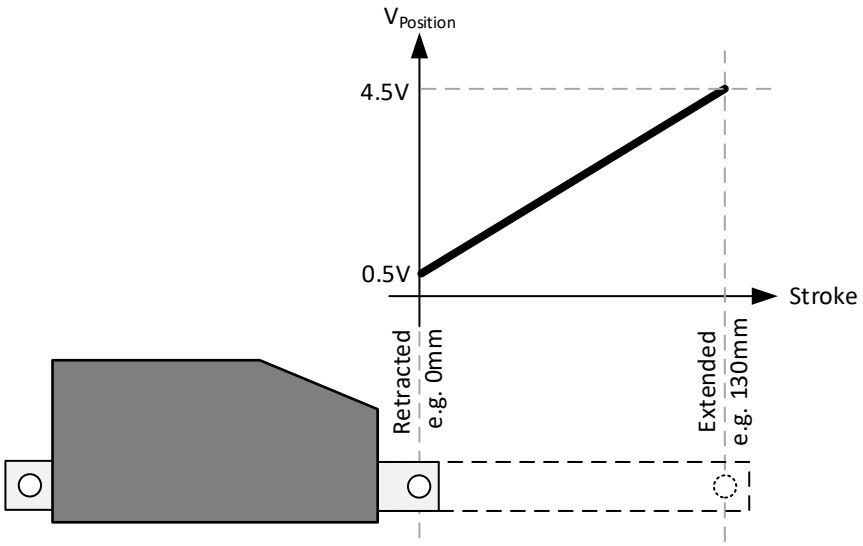
Black
(BK)

Connection example



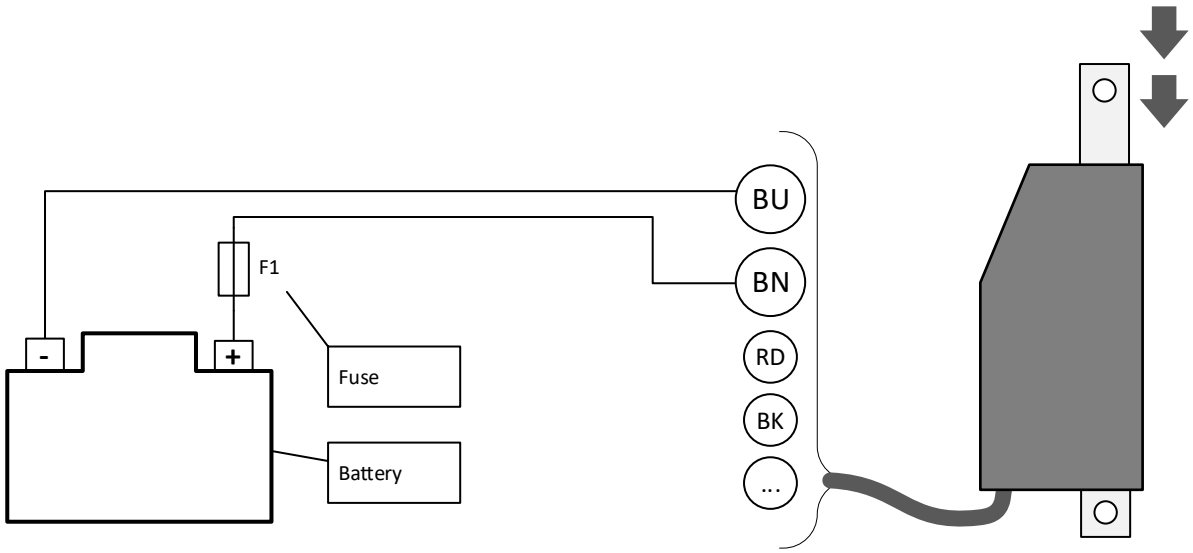
Output voltage $V_{Position}$ - Vss

Violette
(VT)

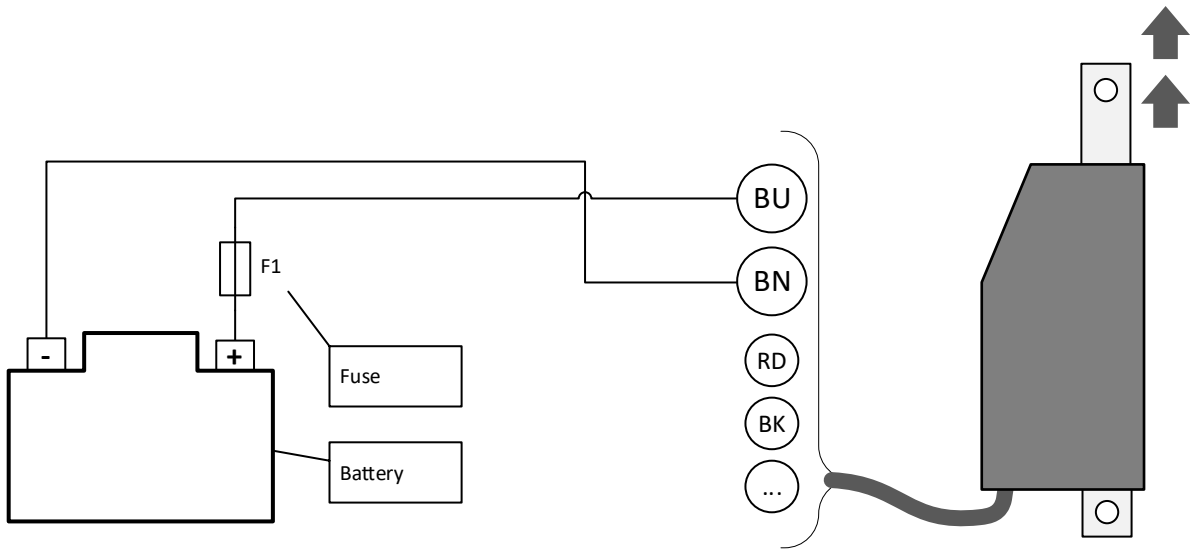


Example

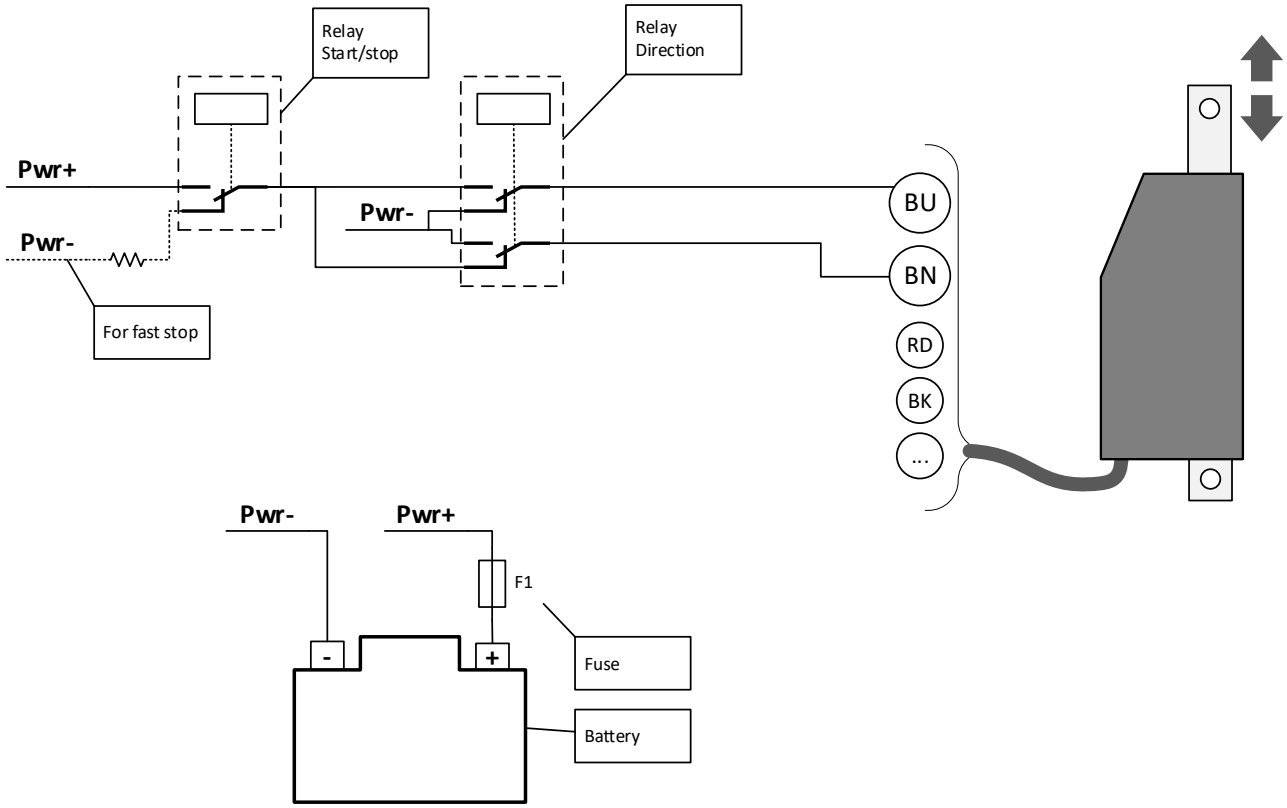
Connection example – Retract



Connection example – Extend



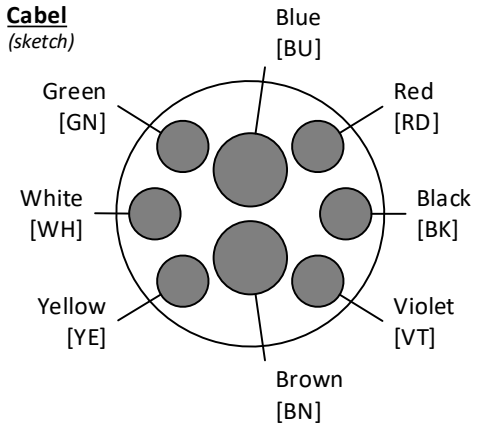
Connection example – Relay



Note: Do not change the direction during travel. Always stop the travel via K1 before changing the direction with K2.

Connection plan AP.4.018315

Cabel



Cabel (8pol)

***** Control cable *****

1.0mm² (AWG18): BU, BN;

0.5mm2 (AWG20): RD, BK, VT, YE, WH, GN

Ader	*Beschreibung*
Blue (BU)	**Motor** The actuator can be extended and retracted with the blue and brown stranded wires. Please refer to the nameplate for the voltage the power parameter. **Direction** The actuator extends or retracts according to the polarity of the power supply. The actuator stops automatically in the end positions.
Brown (BN)	
Yellow (YE)	**Do not connect** Leave unconnected
White (WH)	
Green (GN)	
Black (BK)	

	Blue	**Brown**
Retract	Minus	Plus
Extend	Plus	Minus

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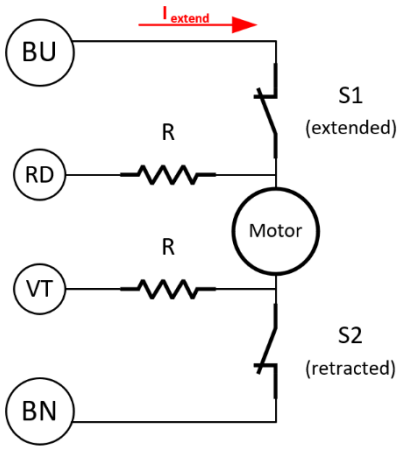
Red
(RD)

End position feedback

Signal feedback on reaching the corresponding end position.

Functional description

The motor of the actuator is operated via the wires BU and BN. The end position feedback is provided by the wires RD and VT, each of which is connected to the motor voltage via the resistor R. The motor is switched off by a limit switch S when the end position is reached. When the end position is reached, the motor is disconnected from the power supply via a limit switch S, which cuts the motor voltage at RD or VT.

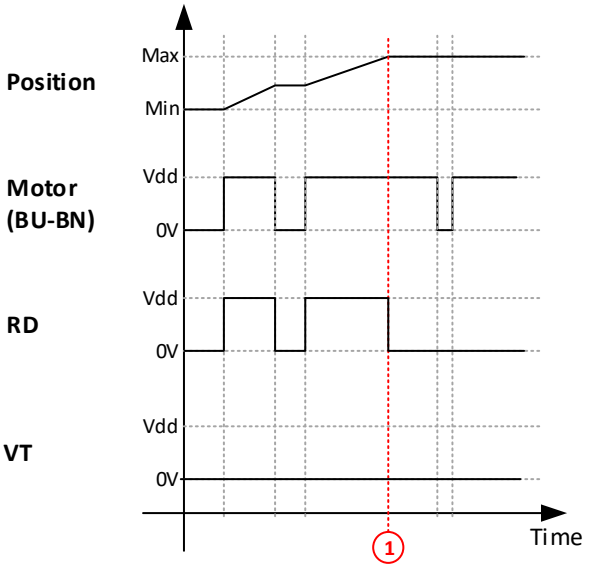


Definition

- **Rot (RD)** Extended
- **Violette (VT)** Retracted
- **R** 1k Ω

Overview – Extend

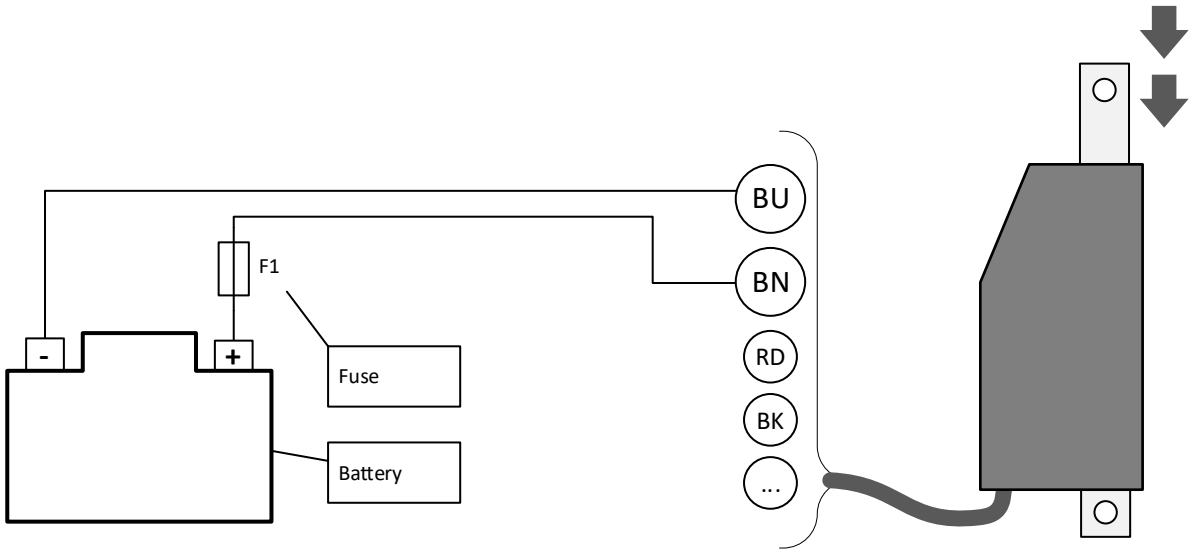
Violette
(VT)



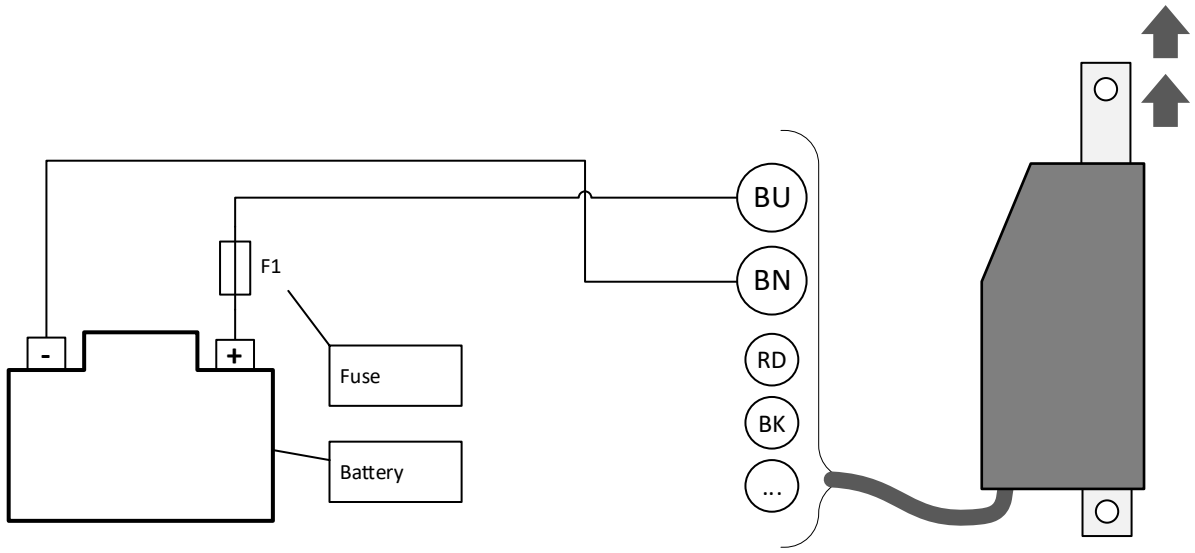
Position (1): Reaching the extended end position

Example

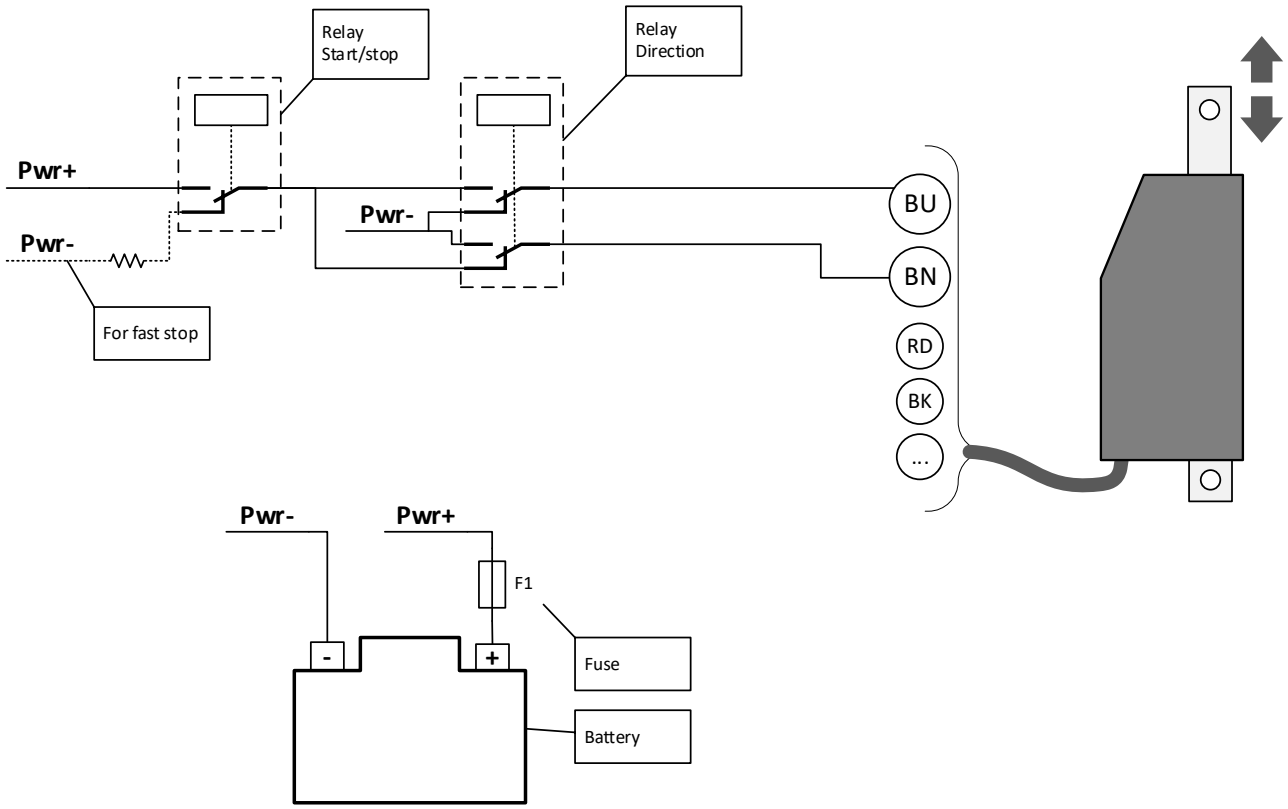
Connection example – Retract



Connection example – Extend



Connection example – Relay



Note: Do not change the direction during travel. Always stop the travel via K1 before changing the direction with K2.

Connection example – PLC