

Assembly and operating manual

ELP

Electrical Linear Module

Firmware 0-1.3.0



Imprint

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Dear Customer,

thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

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1 General

1.1 About this manual

This manual contains important information for a safe and appropriate use of the product.

This manual is an integral part of the product and must be kept accessible for the personnel at all times.

Before starting work, the personnel must have read and understood this operating manual. Prerequisite for safe working is the observance of all safety instructions in this manual.

Illustrations in this manual are provided for basic understanding and may differ from the actual product design.

In addition to these instructions, the documents listed under [Applicable documents](#) [► 6] are applicable.

1.1.1 Presentation of Warning Labels

To make risks clear, the following signal words and symbols are used for safety notes.



⚠ DANGER

Danger for persons!

Non-observance will inevitably cause irreversible injury or death.



⚠ WARNING

Dangers for persons!

Non-observance can lead to irreversible injury and even death.



⚠ CAUTION

Dangers for persons!

Non-observance can cause minor injuries.

CAUTION

Material damage!

Information about avoiding material damage.

1.1.2 Definition of Terms

The term "product" replaces the product name on the title page in this manual.

1.1.3 Applicable documents

- General terms of business *
- Catalog data sheet of the purchased product *
- Assembly and operating manuals of the accessories *

The documents marked with an asterisk (*) can be downloaded on our homepage **schunk.com**

1.1.4 Sizes

This operating manual applies to the following sizes:

- ELP 025
- ELP 050
- ELP 100

1.1.5 Variants

This operating manual applies to the following variations:

Size	Stroke variant		
ELP 025	- H030	- H050	- H080
ELP 050	- H040	- H060	- H100
ELP 100	- H080	- H120	- H200

1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the ex-works delivery date under the following conditions:

- Observe the ambient conditions and operating conditions, [Ambient conditions and operating conditions](#) [► 19]
- Observe the maximum service life. [Technical data](#) [► 16]
- Observe the specified maintenance and lubrication intervals, [Maintenance](#) [► 46]
- Observe the applicable documents, [Applicable documents](#) [► 6]

Parts touching the workpiece and wear parts are not included in the warranty.

A disassembly of the product that exceeds the instructions described in this manual leads to an expiration of the warranty.

1.3 Scope of delivery

The scope of delivery includes

- Electric linear module ELP in the version ordered
- Assembly and Operating Manual
- Accessory pack

1.3.1 Accessory pack

Content of the accessory pack:

Accessory pack for	Contents
ELP 025	Centering sleeves: 4 x ZHU 8
ELP 050	Centering sleeves: 4 x ZHU 8 + 4 x ZHU 10
ELP 100	Centering sleeves: 2 x ZHU 8, 2 x ZHU 10 + 4 x ZHU 12

More information about the centering sleeves,
[Dimensions of the centering elements](#) [► 33].

1.4 Accessories

A wide range of accessories are available for this product

For information regarding which accessory articles can be used with the corresponding product variants, see catalog data sheet.

2 Basic safety notes

2.1 Intended use

The product is exclusively for linear movement of the load capacity.

- The product may only be used within the scope of its technical data, [Technical data](#) [► 16].
- When implementing and operating components in safety-related parts of the control systems, the basic safety principles in accordance with DIN EN ISO 13849-2 apply. The proven safety principles in accordance with DIN EN ISO 13849-2 also apply to categories 1, 2, 3 and 4.
- The product is intended for installation in a machine/system. The applicable guidelines must be observed and complied with.
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.

2.2 Not intended use

The product is not being used as intended if it

- is operated without safety installations,
- comes into contact with water,
- is deployed in explosive environments.
- Any utilization that exceeds or differs from the appropriate use is regarded as misuse.

2.3 Constructional changes

Implementation of structural changes

By conversions, changes, and reworking, e.g. additional threads, holes, or safety devices can impair the functioning or safety of the product or damage it.

- Structural changes should only be made with the written approval of SCHUNK.

2.4 Spare parts

Use of unauthorized spare parts

Using unauthorized spare parts can endanger personnel and damage the product or cause it to malfunction.

- Use only original spare parts or spares authorized by SCHUNK.

2.5 Environmental and operating conditions

Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span. See also [Ambient conditions and operating conditions](#) [► 19].

2.6 Personnel qualification

Inadequate qualifications of the personnel

If the personnel working with the product is not sufficiently qualified, the result may be serious injuries and significant property damage.

- All work may only be performed by qualified personnel.
- Before working with the product, the personnel must have read and understood the complete assembly and operating manual.
- Observe the national safety regulations and rules and general safety instructions.

The following personal qualifications are necessary for the various activities related to the product:

Trained electrician	Due to their technical training, knowledge and experience, trained electricians are able to work on electrical systems, recognize and avoid possible dangers and know the relevant standards and regulations.
Qualified personnel	Due to its technical training, knowledge and experience, qualified personnel is able to perform the delegated tasks, recognize and avoid possible dangers and knows the relevant standards and regulations.
Instructed person	Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.
Service personnel of the manufacturer	Due to its technical training, knowledge and experience, service personnel of the manufacturer is able to perform the delegated tasks and to recognize and avoid possible dangers.

2.7 Personal protective equipment

Use of personal protective equipment

Personal protective equipment serves to protect staff against danger which may interfere with their health or safety at work.

- When working on and with the product, observe the occupational health and safety regulations and wear the required personal protective equipment.
- Observe the valid safety and accident prevention regulations.
- Wear protective gloves to guard against sharp edges and corners or rough surfaces.
- Wear heat-resistant protective gloves when handling hot surfaces.
- Wear protective gloves and safety goggles when handling hazardous substances.
- Wear close-fitting protective clothing and also wear long hair in a hairnet when dealing with moving components.

2.8 Notes on safe operation

Incorrect handling of the personnel

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Avoid any manner of working that may interfere with the function and operational safety of the product.
- Use the product as intended.
- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. This does not apply to products that are designed for special environments.
- Eliminate any malfunction immediately.
- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention and environmental protection regulations regarding the product's application field.

2.9 Transport

Handling during transport

Incorrect handling during transport may impair the product's safety and cause serious injuries and considerable material damage.

- When handling heavy weights, use lifting equipment to lift the product and transport it by appropriate means.
- Secure the product against falling during transportation and handling.
- Stand clear of suspended loads.

2.10 Malfunctions

Behavior in case of malfunctions

- Immediately remove the product from operation and report the malfunction to the responsible departments/persons.
- Order appropriately trained personnel to rectify the malfunction.
- Do not recommission the product until the malfunction has been rectified.
- Test the product after a malfunction to establish whether it still functions properly and no increased risks have arisen.

2.11 Disposal

Handling of disposal

The incorrect handling of disposal may impair the product's safety and cause serious injuries as well as considerable material and environmental harm.

- Follow local regulations on dispatching product components for recycling or proper disposal.

2.12 Fundamental dangers

General

- Observe safety distances.
- Never deactivate safety devices.
- Before commissioning the product, take appropriate protective measures to secure the danger zone.
- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- If the energy supply is connected, do not move any parts by hand.
- Do not reach into the open mechanism or movement area of the product during operation.

2.12.1 Protection during handling and assembly

Incorrect handling and assembly

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Have all work carried out by appropriately qualified personnel.
- For all work, secure the product against accidental operation.
- Observe the relevant accident prevention rules.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

Incorrect lifting of loads

Falling loads may cause serious injuries and even death.

- Stand clear of suspended loads and do not step into their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.

2.12.2 Protection during commissioning and operation

Falling or violently ejected components

Falling and violently ejected components can cause serious injuries and even death.

- Take appropriate protective measures to secure the danger zone.
- Never step into the danger zone during operation.

2.12.3 Protection against dangerous movements

Unexpected movements

Residual energy in the system may cause serious injuries while working with the product.

- Switch off the energy supply, ensure that no residual energy remains and secure against inadvertent reactivation.
- Never rely solely on the response of the monitoring function to avert danger. Until the installed monitors become effective, it must be assumed that the drive movement is faulty, with its action being dependent on the control unit and the current operating condition of the drive. Perform maintenance work, modifications, and attachments outside the danger zone defined by the movement range.
- To avoid accidents and/or material damage, human access to the movement range of the machine must be restricted. Limit/prevent accidental access for people in this area due through technical safety measures. The protective cover and protective fence must be rigid enough to withstand the maximum possible movement energy. EMERGENCY STOP switches must be easily and quickly accessible. Before starting up the machine or automated system, check that the EMERGENCY STOP system is working. Prevent operation of the machine if this protective equipment does not function correctly.

2.12.4 Protection against electric shock

Possible electrostatic energy

Components or assembly groups may become electrostatically charged. When the electrostatic charge is touched, the discharge may trigger a shock reaction leading to injuries.

- The operator must ensure that all components and assembly groups are included in the local potential equalisation in accordance with the applicable regulations.
- While paying attention to the actual conditions of the working environment, the potential equalisation must be implemented by a specialist electrician according to the applicable regulations.
- The effectiveness of the potential equalisation must be verified by executing regular safety measurements.

2.12.5 Protection against magnetic and electromagnetic fields

Work in areas with magnetic and electromagnetic fields

Magnetic and electromagnetic fields can lead to serious injuries.

- Persons with pace-makers, metal implants, metal shards, or hearing aids require the consent of a physician before entering areas in which components of the electric drive and control systems are mounted, started up, and operated.
- Persons with pace-makers, metal implants, metal shards, or hearing aids require the consent of a physician before entering areas in which magnetic grippers or motor parts with permanent magnets are stored, repaired, or assembled.
- Do not operate high-frequency or radio devices in the proximity of electric components of the drive system and their feed lines.

If the use of such devices is necessary:

When starting up the electric drive and control system, check the machine or automated system for possible failures when such systems are used at different intervals and in different states of the control system. A special additional EMC test may be necessary if the system has a high risk potential.

2.13 Notes on particular risks



⚠ DANGER

Risk of injury due to magnetic fields!

The integrated electric permanent magnets can pose a risk to people with an active or passive implant.

- People with pacemakers or active or passive implants are prohibited from entering the area of the magnetic field.



⚠ WARNING

Risk of injury due to unexpected movements!

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.



⚠ WARNING

Risk of injury due to product falling unexpectedly!

Components moving linearly may cause severe injuries.

- Before beginning any work on the product, pay attention to the falling slide and secure the slide.



⚠ WARNING

Risk of burns through contact with hot surfaces!

Surfaces of components can heat up severely during operation. Skin contact with hot surfaces causes severe burns to the skin.

- For all work in the vicinity of hot surfaces, wear safety gloves.
- Before carrying out any work, make sure that all surfaces have cooled down to the ambient temperature.



⚠ WARNING

Danger of crushing due to magnetically attracted tools!

Tools may be attracted by strong magnetic fields and cause severe injuries.

- Only work in deactivated and demagnetized state.

3 Technical data

3.1 Basic data

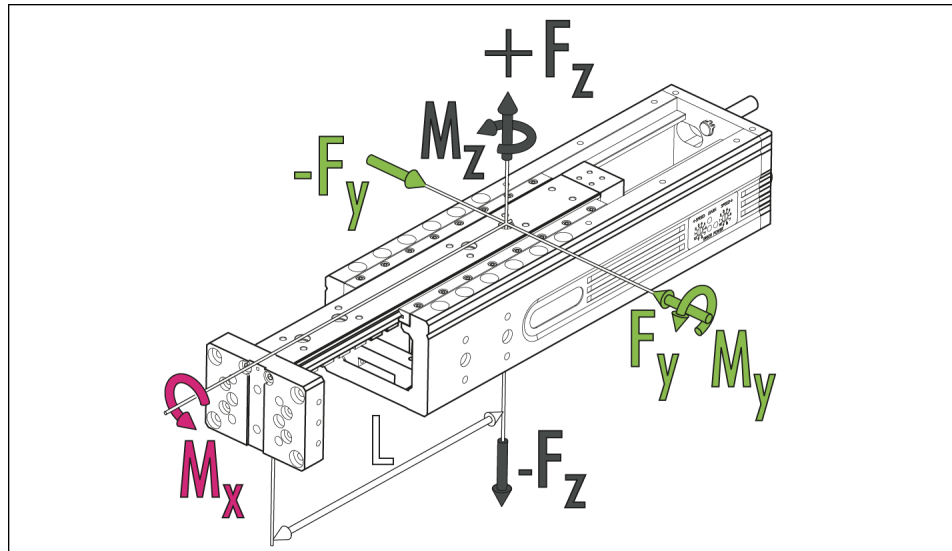
Types	ELP 025-H030	ELP 025-H050	ELP 025-H080
ID number	0315700	0315708	0315716
Stroke [mm] min. / max.	5 / 30	20 / 50	50 / 80
Stroke adjustment range per side [mm]	15	15	15
Logic voltage and actuator voltage [V] +/- 10%	24	24	24
Rated current (Logic) [A]	0.04	0.04	0.04
Rated current (actuator) [A]	0.64	0.64	0.64
Current (actuator) [A] max.	2.00	2.00	2.00
Number of digital inputs	2	2	2
Level of digital inputs [V] high low	15 to 24 0 to 5	15 to 24 0 to 5	15 to 24 0 to 5
Input impedance digital inputs [kOhm]	4.7	4.7	4.7
Repeat accuracy (+ / -) [mm]	0.01	0.01	0.01
Rated force [N]	17	17	17
(Horizontal) payload [kg] max.	1.0	1.0	1.0
(Vertical) payload [kg] max.	0.75	0.75	0.75
Weight [kg]	1.8	1.8	2
Fy ** [N]	1140	1140	1140
Fz ** [N]	1140	1140	1140
Mx ** [Nm]	9	9	9
My ** [Nm]	16	16	16
Mz ** [Nm]	16	16	16
L [mm]	89	109	139
Performance [km]	3000	5000	8000
Maximum cycles [piece]	50,000,000	50,000,000	50,000,000

Types	ELP 050-H040	ELP 050-H060	ELP 050-H100
ID number	0315724	0315732	0315740
Stroke [mm] min. / max.	5 / 40	20 / 60	60 / 100
Stroke adjustment range per side [mm]	20	20	20
Logic voltage and actuator voltage [V] +/- 10%	24	24	24
Rated current (Logic) [A]	0.04	0.04	0.04
Rated current (actuator) [A]	1.0	1.0	1.0
Current (actuator) [A] max.	2.10	2.10	2.10
Number of digital inputs	2	2	2
Level of digital inputs [V] high low	15 to 24 0 to 5	15 to 24 0 to 5	15 to 24 0 to 5
Input impedance digital inputs [kOhm]	4.7	4.7	4.7
Repeat accuracy (+ / -) [mm]	0.01	0.01	0.01
Rated force [N]	45	45	45
(Horizontal) payload [kg] max.	3.0	3.0	3.0
(Vertical) payload [kg] max.	2.0	2.0	2.0
Weight [kg]	3	3	3.4
Fy ** [N]	1740	1740	1740
Fz ** [N]	1740	1740	1740
Mx ** [Nm]	26	26	26
My ** [Nm]	32	32	32
Mz ** [Nm]	32	32	32
L [mm]	106	126	166
Performance [km]	5000	6000	10000
Maximum cycles [piece]	50,000,000	50,000,000	50,000,000

Types	ELP 100-H080	ELP 100-H120	ELP 100-H200
ID number	0315748	0315756	0315764
Stroke [mm] min. / max.	30 / 80	70 / 120	150 / 200
Stroke adjustment range per side [mm]	25	25	25
Logic voltage and actuator voltage [V] +/- 10%	24	24	24
Rated current (Logic) [A]	0.06	0.06	0.06
Rated current (actuator) [A]	1.60	1.60	1.60
Current (actuator) [A] max.	5.90	5.90	5.90
Number of digital inputs	2	2	2
Level of digital inputs [V] high low	15 to 24 0 to 5	15 to 24 0 to 5	15 to 24 0 to 5
Input impedance digital inputs [kOhm]	4.7	4.7	4.7
Repeat accuracy (+ / -) [mm]	0.01	0.01	0.01
Rated force [N]	104	104	104
(Horizontal) payload [kg] max.	6.0	6.0	6.0
(Vertical) payload [kg] max.	4.0	4.0	4.0
Weight [kg]	6.6	7.2	8.3
Fz ** [N]	3880	3880	3880
Fy ** [N]	3880	3880	3880
Mx ** [Nm]	83	83	83
My ** [Nm]	107	107	107
Mz ** [Nm]	107	107	107
L [mm]	179	219	299
Performance [km]	8000	12000	20000
Maximum cycles [piece]	50,000,000	50,000,000	50,000,000

** is several forces are acting simultaneously, the following applies:

$$\frac{|F_y|}{F_{y_{\max}}} + \frac{|F_z|}{F_{z_{\max}}} + \frac{|M_x|}{M_{x_{\max}}} + \frac{|M_y|}{M_{y_{\max}}} + \frac{|M_z|}{M_{z_{\max}}} \leq 1$$



Forces and torques

More technical data is included in the catalog data sheet.
Whichever is the latest version.

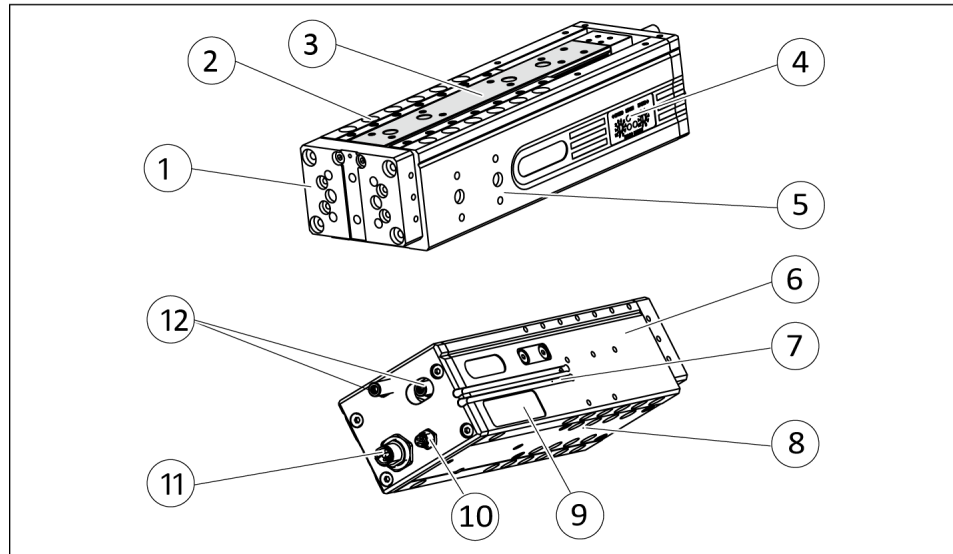
3.2 Ambient conditions and operating conditions

Designation	ELP 025	ELP 050	ELP 100
Ambient temperature [°C]			
min.		+5	
max.		+55	
Relative air humidity [%]	No condensation permitted		
min.		5	
max.		95	
Protection class IP *, DIN EN 60529	IP20		
Noise emission [dB(A)], 1m	52	58	68

- * For use in dirty ambient conditions (e.g. sprayed water, vapors, abrasion or processing dust) SCHUNK offers corresponding product options as standard. SCHUNK also offers customized solutions for special applications in dirty ambient conditions.

4 Design and description

4.1 Configuration



Electric linear module ELP

1	Flange plate for securing the customer application
2	Product fastening (top)
3	Slides for securing the customer application
4	Operating field
5	Product fastening (side)
6	Accessories fastening
7	Grooves for sensors (2 pieces)
8	Product fastening (bottom)
9	Name plate
10	M8 plug for digital signals
11	M12 power supply plug
12	Setting of end positions

4.2 Description

Electrical linear module with a directly driven 3 phase synchronous motor which produces linear movements or forces.

- No mechanical power transmission elements (direct drive)
- Electrical drive controllers integrated
- Control via digital signals
- Cycle times adjustable via rotary switch
- Controller settings are not required [Auto-learn function](#) [► 21]
- Retracted and extended position is set using mechanical back stops

4.3 Auto-learn function

Description

Using the auto-learn function, the product can be commissioned easily. This function takes into account the conditions such as

- horizontal or vertical setup,
- fitted payload,
- end stop setting,
- rotary switch setting and
- rigidity of the installation location.

With the auto-learn function, the slide moves at a slow speed up to the front or rear end stop depending on the triggering signal. For other travel commands, the speed is increased on each journey until the yellow LED goes out. Teaching is now complete. If it was not possible to successfully complete teaching, this is signaled by the red LED display and the auto-learn function is restarted. In this case, the cause must be eliminated (to do so, see chapter [Product teaches in again during the process](#) [► 45]) or the set speed reduced.

Advantages

The product's auto-learn function detects incorrect speed configurations. During the teaching process, the speed selected by the user is checked for the current payload. This precludes operation that is hazardous to the limit stops on account of excessively high impact speeds.

When does the product perform the auto-learn function?

- During initial commissioning
- After reset
- If the logic voltage was switched off
- If the end position setting has been changed
- If the acceleration monitor is used, e.g. due to mass change, position change, external forces ...

Switching off the actuator voltage

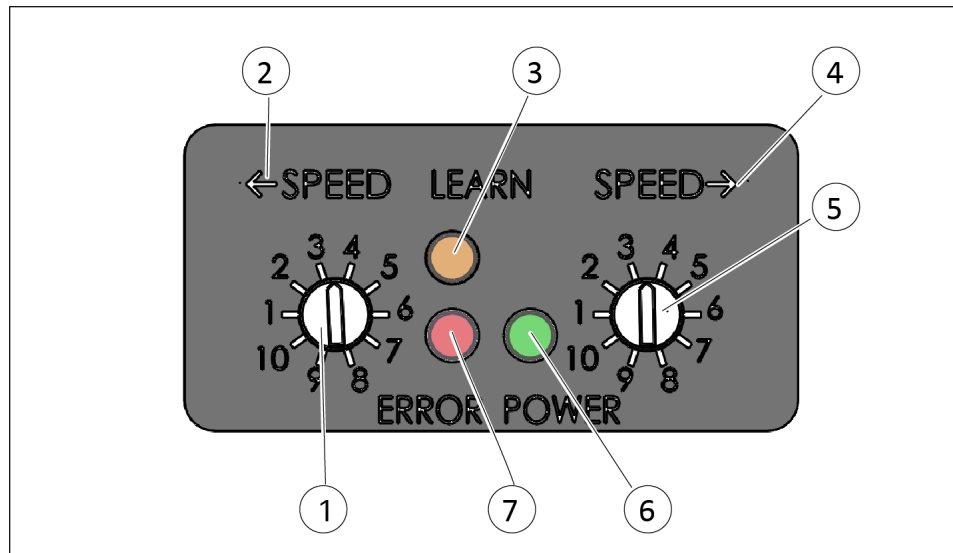
In the "Power off" operating mode, it is possible to shutdown the actuator voltage without an error occurring. After starting up the actuator voltage again, the linear modules complete a slow travel stroke in the desired direction up to the stop the next time a travel command is issued. After this, the continued movement is determined by the settings as it is with the auto-learn function completed. This feature is available from serial number 400363; it can be retrofitted.

4.4 Safety function STO (Safe Torque Off)

The product does not have an input for STO. The "Power off" operating mode is not a safety function and may not be used for STO. However, there is the possibility of a monitored shut-down of the actuator voltage U_a and logic voltage U_s at the customer's site using a safety switch. The performance level corresponds to the PL of the shutdown device. After shutting down both operating voltages, the product performs the auto-learn function.

If the logic voltage is on permanently to prevent the auto-learn function, it must be ensured by means of excluding the faults that the actuator voltage cannot be supplied through the logic voltage behind the safety switch by means of creeping current or short circuit. In order to be able to eliminate the faults in accordance with DIN EN 61800-5-1, conductive contaminants must be avoided, e.g. using a casing with protection class IP54.

4.5 Operating field



Operating field

1	Stroke time rotary switch when extending
2	Displays the travel direction for rotary switch (1)
3	LED diagnostics: Learn
4	Displays the travel direction for the rotary switch (5)
5	Stroke time rotary switch when retracting
6	LED diagnostics: Power
7	LED diagnostics: Error

4.5.1 Rotary switch

Setting options on rotary switch

The stroke time for retracting and extending the product can be set on the rotary switches. At level 10, the shortest stroke times are reached. At low levels however, the product becomes increasingly sturdy with regard to interference factors in the process.

Level	Velocity	Sturdiness *
1	+	+++++
2 to 4	++	++++
5 to 7	+++	+++
8 to 9	++++	++
10	+++++	+

* Sturdiness: Tolerance with regard to interference factors such as

- Change in mass
- Change in installation position
- Oscillations
- etc.

4.5.2 LEDs and their meaning

LED	Color	Status	Meaning
Power	Green	ON	Ready for operation
		OFF	Logic voltage or actuator voltage are incorrectly poled or not in the valid range
Learn	Yellow	ON	The product has a previous stroke taught in
		OFF	Normal Operation
Error	Red	ON	The product has detected a deviation in the movement; error will be reset on the next movement
		Flashes 0.8 Hz	Overcurrent/overheating of the product
		Flashes 5 Hz	Actuator voltage has left the permitted range during the drive or pressing
		OFF	Normal Operation

4.6 Power supply

The product is supplied with energy via a combined power supply in the safety extra low voltage range.

Logic supply

Stable supply voltage 24 V to supply the controller and sensoric systems, hereinafter described as **Logic voltage** U_s .

Only consumers which do not supply any energy back to the supply are connected here. The power supply unit continually feeds in power in order to keep the voltage constant.

Actuator supply

Supply voltage 24 V to supply actuators, hereinafter described as **actuator voltage** U_a .

Consumers which intermittently supply any energy back to the supply are connected here. If the sum of all regenerative currents is greater than the sum of all consumption currents, the voltage increases, although the power supply unit interrupts the power supply. The increasing supply voltage may endanger the power supply unit as well as the connected devices. For this reason, the actuator voltage is loaded and restricted with an electronically controlled brake resistor in case of recovery. The power supply unit must be in a position to supply at short notice the sum of the peak current occurring simultaneously (see [Technical data](#) ► 16]) from all connected products. Only use power supply units with a recovery strength up to at least 35 V.

For ELP 100 or several ELP 050 use a brake chopper, see following illustration "Wiring principle, correct".

Both supply voltages are electronically isolated in order to avoid them influencing each other due to high peak currents in a shared return line. The GND connections of both supply voltages must be connected to each other not in the product but rather only in the vicinity of the power supply units. A joint reference potential of both supplies is attained by connecting the power supply unit negative terminals via 0V terminals, which are connected to the protective conductor PE using a separation terminal. Only use the distributor recommended by SCHUNK as an accessory with separate return lines.

For the supply, power supply units with secure disconnection in accordance with IEC 60364-4-41 (DIN VDE 0100-410) must be used. The product's housing does not require any connection to PE. However, it may be connected with PE via conductive electrical assembly.

4.7 Actuation

Truth table

The truth table shows the actuation of the digital inputs during possible commands by the superordinated control unit.

The signals at the digital inputs may be switched simultaneously. On detecting a signal change, the product switches to the new status after the activation time has elapsed.

For current input see technical data, [Technical data](#) [► 16].

Extend/retract digital inputs

Function	Pin 4 (extend)	Pin 2 (retract)	Activation time [ms]
Power off	0	0	20
Extend	1	0	5
Retract	0	1	5
Reset	1	1	3000

Statuses

- **Power off:** The drive is powerless with speed-dependent braking due to the short-circuit of the motor coil. The next movement after a "Power off" always takes place with reduced speed.
- **Retract and extend:** The slide is retracted or extended after activation. It is only possible to interrupt the extension or retraction after activating the "Power off" function. The signals must also be continuously present in the end position for the position of the axle to be retained.
- **Reset:** The product is completely reset and is in the "Power off" state until the next command is activated.

Examples for activation time

- Between the commands "retract" and "extend", an undesired time of 15 ms arises in the PLC actuation, during which time both signals at Pin 2 and Pin 4 are on "0". Here, the last motion command is not interrupted by a "Power off" function, as the activation time for "Power off" has not yet been reached.
- After the "Power off" function, the "extend" command is created. At the latest after 5 ms, the movement will start.
- The "Reset" command is created for 4 s. After 3 seconds, a reset is performed and the activation time for the next reset is restarted.

5 Assembly and settings

5.1 Assembly and connection



⚠ WARNING

Risk of injury due to sudden movements!

Is the energy supply is switched on, this can cause components to move unexpectedly, which may result in serious injuries.

- Disconnect power sources before installation and calibration.
- Only allow qualified electricians to perform any work on electrical components.

Requirements for the assembly location

- For trouble-free operation, the connection structure must exhibit the required rigidity.
- The product generates dissipated heat during operation, which must be discharged out into the surroundings. The product must be installed in the machine in such a way so that it can dissipate heat by convection (transferring heat to the air) and by heat radiation. An efficient thermotechnical connection to the connection assembly will extend the product lifetime.
- Permanent magnets are installed in the product. These magnets may attract and hold iron fragments or other magnetic objects, thus damaging the product.

Overview

- Check the evenness of the mounting surface, [Mechanical connection](#) [▶ 29].
- Screw the product to the machine/system, [Mechanical connection](#) [▶ 29].
 - ✓ Centering sleeves from the accessory pack are to be used for the secure transmission of shearing forces and the positioning of the product.
 - ✓ Observe the maximal tightening torque, admissible screw-in depth and, if necessary, strength class.
- Assemble customer application and if required install accessories, [Mechanical connection](#) [▶ 29] and [Assemble additional accessories](#) [▶ 40].
 - ✓ Observe the maximal tightening torque, admissible screw-in depth and, if necessary, strength class.
- Adjust end positions, [Adjust end position](#) [▶ 35].
- Mount sensor if necessary, [Mounting the sensor](#) [▶ 36].
- Connect cable for power supply and actuation, [Electrical connection](#) [▶ 34]
- Carry out function test for longest stroke time. To do this, switch rotary switch to level 1, [Rotary switch](#) [▶ 23].
- **WARNING Danger of crushing - safety installations must be active.**
Move slides using actuation signal.
- Set desired stroke times when extending and retracting using the rotary switch, [Rotary switch](#) [▶ 23].

5.2 Connections

5.2.1 Mechanical connection

5.2.1.1 Assembly possibilities of the product

Evenness of the mounting surface

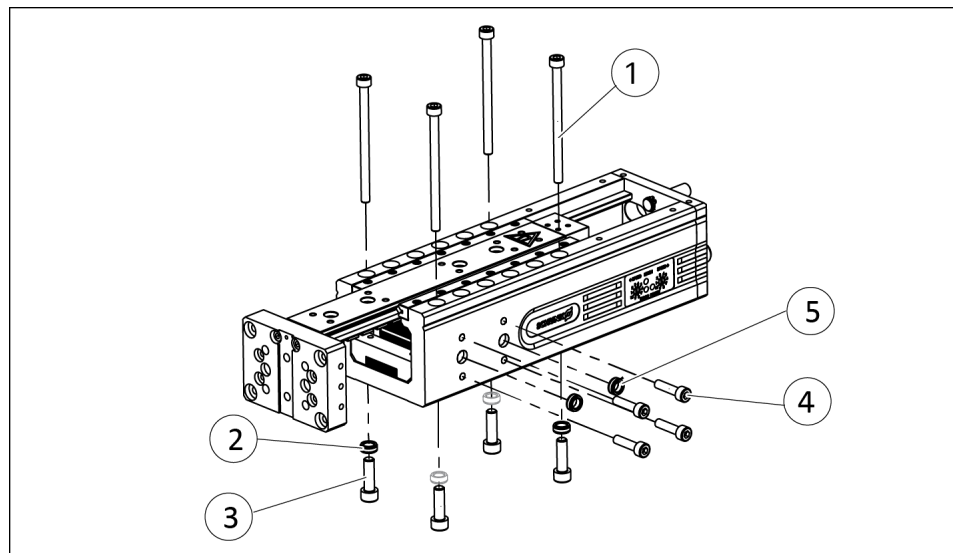
The values apply to the whole mounting surface to which the product is mounted.

Requirements for evenness of the mounting surface (Dimensions in mm)

Edge length	Permissible unevenness
< 100	< 0.02
> 100	< 0.05

The product can be mounted from three sides.

When selecting the fastening screws, observe the values prescribed by SCHUNK, see following table.



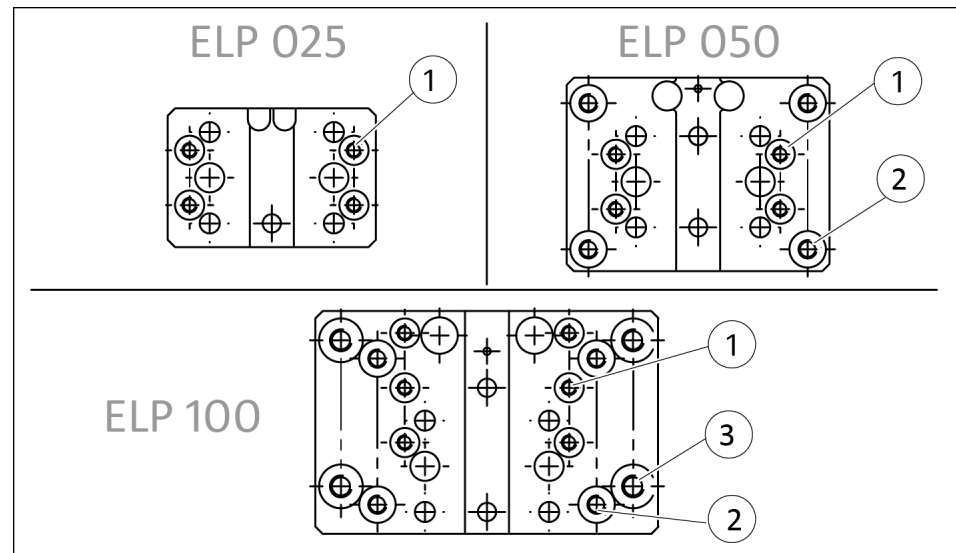
Assembly options

Item	Mounting	ELP 025	ELP 050	ELP 100
Product from above				
1	Screw, DIN EN ISO 4762	M4	M5	M6
2	Centering sleeve ZHU	Ø8	Ø10	Ø12
Product from below				
3	Screw	M5	M6	M8
	Max. depth of engagement [mm]	14	16	20
2	Centering sleeve ZHU	Ø8	Ø10	Ø12
Product from side				
4	Screw	M5	M5	M5
	Max. depth of engagement [mm]	10	10	10
2	Centering sleeve ZHU	Ø8	Ø8	Ø8

5.2.1.2 Assembly possibilities for customer applications

The customer application can be secured on the flange plate from the front, at the back and on the slide.

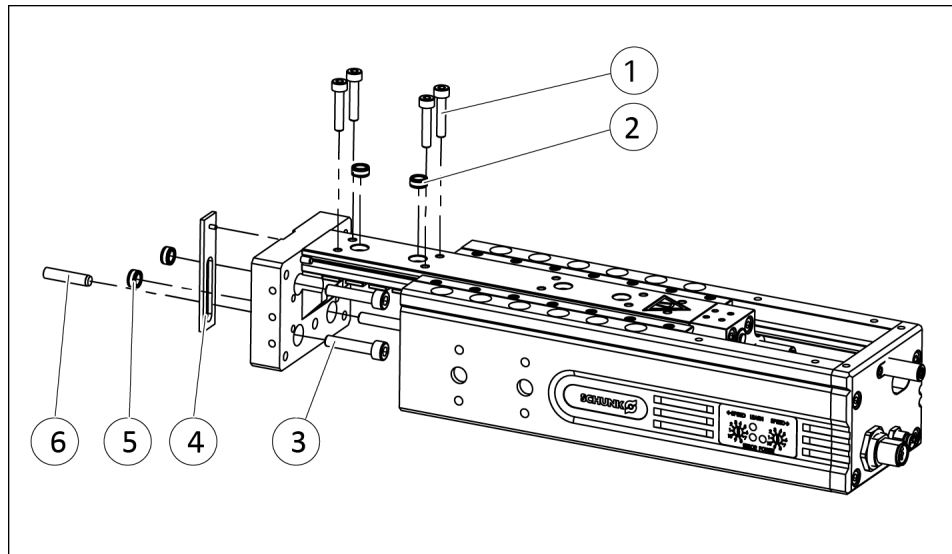
Securing on the flange plate from the front



Assembly possibility for customer applications (flange plate from the front)

Item	Mounting	ELP 025	ELP 050	ELP 100
Flange plate from the front				
1	Thread	M4	M4	M4
	Maximum depth of engagement from locating surface [mm]	11	15	11
	Centering sleeves ZHU	Ø8	Ø8	Ø8
	Drilling pattern [mm x mm]	15 x 45	15 x 45	15 x 45
2	Thread		M5	M5
	Maximum depth of engagement from locating surface [mm]		15	16
	Centering sleeves ZHU		Ø10	Ø10
	Drilling pattern [mm x mm]		40 x 60	40 x 60
3	Thread			M6
	Maximum depth of engagement from locating surface [mm]			16
	Centering sleeves ZHU			Ø12
	Drilling pattern [mm x mm]			40 x 80

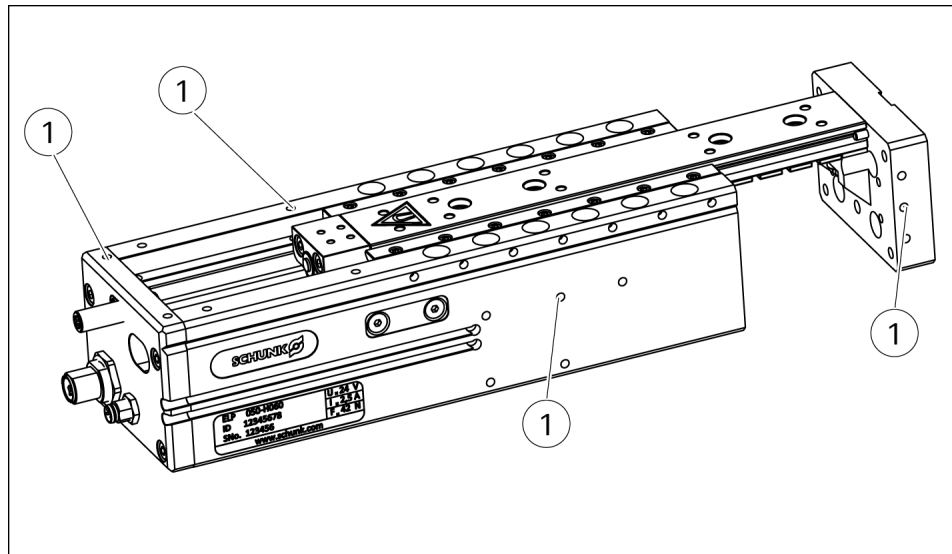
Securing on the flange plate from the back and on the slide



Assembly possibility for customer applications (flange plate from the back, on the slide)

Item	Mounting	ELP 025	ELP 050	ELP 100
Slide top				
1	Screws	M4	M4	M5
	Drilling pattern [mm x mm]	30	15 x 45	20 x 60
	Maximum depth of engagement [mm]	6	7	9
2	Centering sleeves ZHU	Ø8	Ø8	Ø10
Flange plate from the back				
3	Screws, DIN EN ISO 4762	M5	M5	M5
	Drilling pattern [mm x mm]	25 x 34	25 x 34	25 x 34
4	Centering element width ZMZL [mm]	12	12	12
5	Centering sleeves ZHU	Ø8	Ø8	Ø8
6	Cylindrical pin	Ø5	Ø5	Ø5

5.2.1.3 Assembly possibilities for the accessories



Assembly possibilities for the accessories

Item	Mounting	ELP 025	ELP 050	ELP 100
1	Thread	M4	M4	M5
	Machine flange [mm]	8	8	8

5.2.1.4 Tightening torques

Screw dimension	Tightening torque [Nm] for strength class 8.8 *
M4	3.1
M5	6.1
M6	10
M8	25

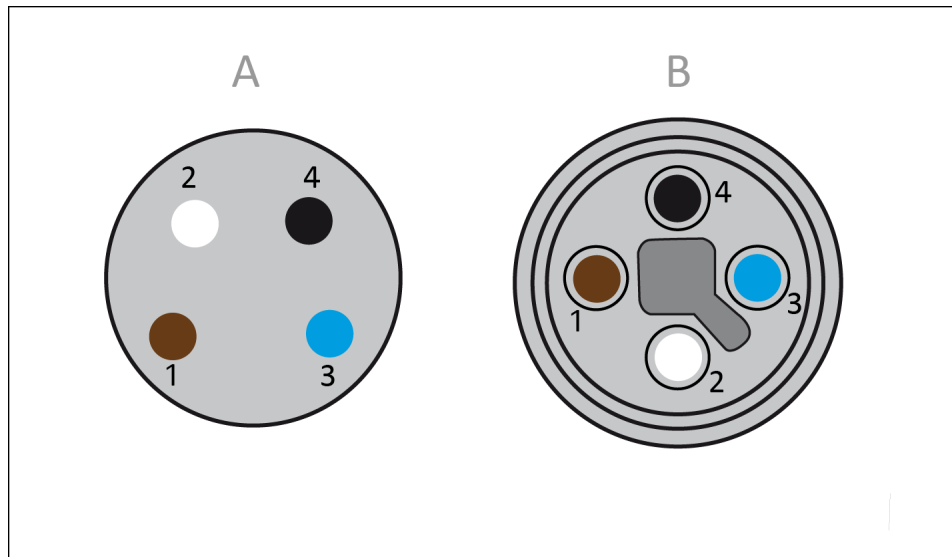
* SCHUNK recommends screws with a strength class of 8.8 and above.

5.2.1.5 Dimensions of the centering elements

Designation	Ø [mm]	h [mm]	W x H x L [mm]	ID no.
ZHU 8	8	5.35	-	9939378
ZHU 10	10	6.65	-	9939379
ZHU 12	12	6.65	-	9939380
ZMZL 50	-	-	12 x 2 x 40	0314211
ZMZL 100	-	-	12 x 2 x 55	0314212

5.2.2 Electrical connection

Pin allocation



A: Connection for actuation
4-pole M8 connector (view on the connector)

B: Connection for power supply
4-pole M12 connector, T coded (view on the connector)

A: Actuation

Pin	Wire color (*)	Signal
1	brown	not connected
2	white	Retract
3	blue	GND
4	black	Extend

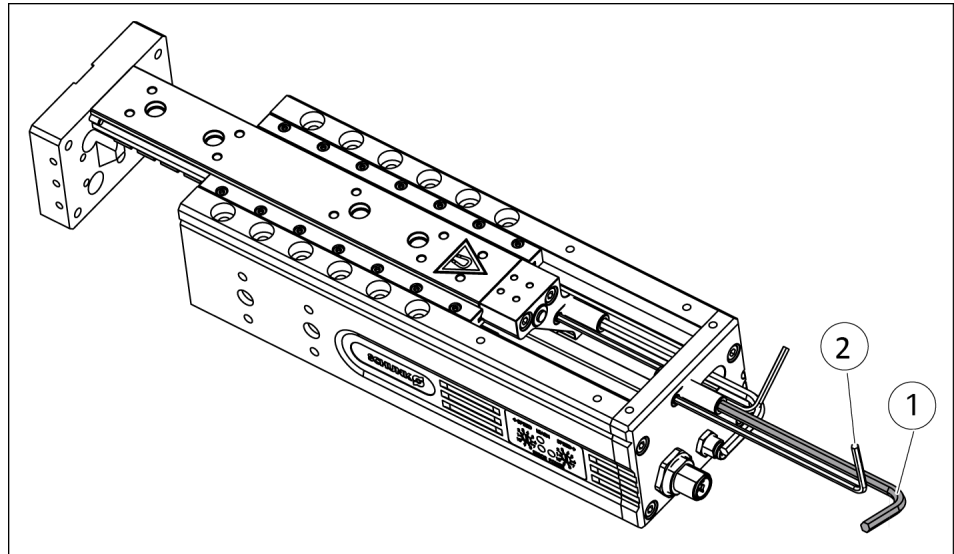
For current input see technical data, [Technical data](#) [► 16].

B: Power supply

Pin	Wire color	Signal
1	Brown	+24 V DC supply electronics / logic voltage U_s
2	White	GND power
3	Blue	GND electronics
4	Black	+24 V DC supply power / actuator voltage U_A

For current input see technical data, [Technical data](#) [► 16].

5.3 Adjust end position



- Loosen clamping element with Allen key (1).
 - Put end position into the desired position using the Allen key (2). (Thread pitch 1 mm)
 - Retighten clamping element.
- For tightening torque, see following table:

Item	Designation	ELP 025	ELP 050	ELP 100
1	Hexagon socket wrench for clamping element, width across flats A/F [mm]	2.5	2.5	4
	Tightening torque [Nm]	1.2	1.2	3.5
2	Hexagon socket wrench for set screw, width across flats [mm]	4	4	6

5.4 Mounting the sensor

NOTE

Observe the assembly and operating manual of the sensor for mounting and connecting.

The product is prepared for the use of sensors.

- For the exact type designations of suitable sensors, please see catalog datasheet and Link Übersicht Sensoren.
- For technical data for the suitable sensors, see assembly and operating manual and catalog datasheet.
 - The assembly and operating manual and catalog datasheet are included in the scope of delivery for the sensors and are available at schunk.com.
- Information on handling sensors is available at schunk.com or from SCHUNK contact persons.

5.4.1 Overview of sensors

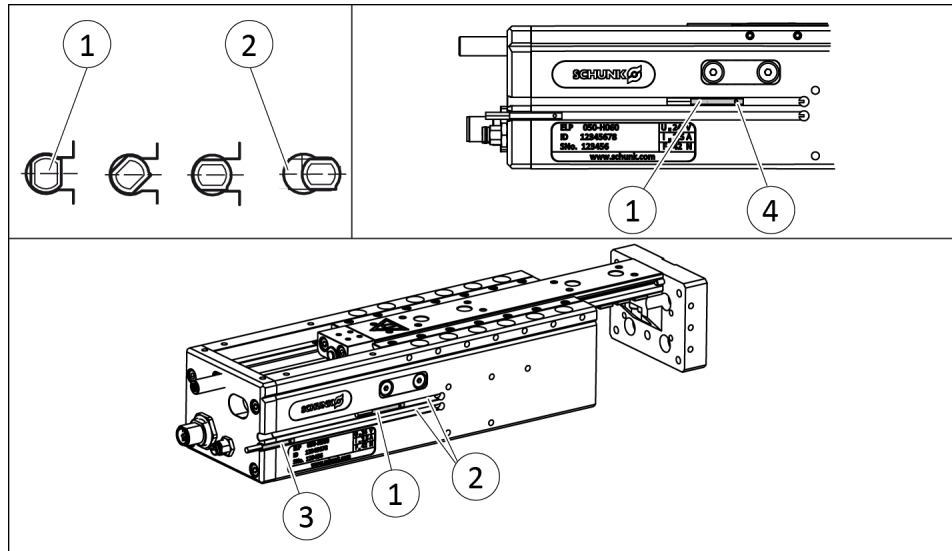
Designation	ELP		
	025	050	100
Magnetic switch MMS 22	X	X	X
Inductive proximity switch IN 80	X	X	X

5.4.2 Mounting MMS 22 magnetic switch

CAUTION

Risk of damage to the sensor during assembly!

- Observe the maximal tightening torque.



Set "slide extended" position

- End position is set, [Adjust end position](#) [► 35].
- Extend slide to end position.
- Turn the sensor (1) into the groove (2).
OR: Push the sensor (1) into the groove until the sensor stops at the housing.
- Slowly pull back the sensor (1) again until it switches (plus approx. 1 mm safeguard).
- Secure the sensor (1) using the set-screw (4).
Tightening torque: 10 Nm
- Move slide to and fro to test the functionality.

Set "slide retracted" position

- End position is set, [Adjust end position](#) [► 35].
- Retract slide to end position.
- Turn the sensor (3) into the groove (2).
OR: slide sensor (3) into the groove until the sensor switches (plus approx. 1 mm safeguard).
- Secure the sensor (3) using the set-screw (4).
Tightening torque: 10 Nm
- Move slide to and fro to test the functionality.

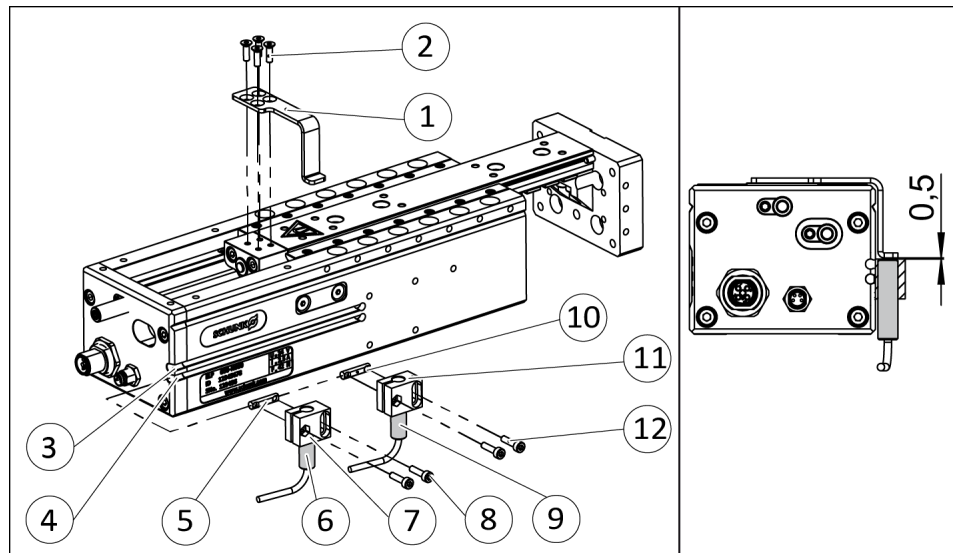
CAUTION: Constant end position positionings are only achieved during operation (end position power effect!).

5.4.3 Mounting inductive proximity switch IN 80

CAUTION

Risk of damage to the sensor during assembly!

- Observe the maximal tightening torque.



Item	Screw dimension	Maximum tightening torque [Nm]
2	M3 x 8, DIN 7991	1.2
8	M3 x 12, DIN EN ISO 4762	0.4
12	M3 x 12, DIN EN ISO 4762	0.4

Installing switching lug

- **ELP 025:** Secure switching lug (1) with two screws (2) on the slides.
- ELP 050 and ELP 100:** Secure switching lug (1) with four screws (2) on the slide.

Set "slide extended" position

- End position is set, [Adjust end position](#) [► 35].
- Extend slide to end position.
- Secure T-nut (10) to the bracket (11) with two screws (12). Tighten screws only slightly.
- Slide T-nut (10) with attached bracket (11) into the groove (4), until the bracket is underneath the switching lug.
- Slide sensor (9) into the bracket (11) as far as it will go.
- Position sensor (9) incl. bracket and T-nut centrally underneath the switching lug (1).
- Set distance of 0.5 mm between bracket (11) and switching lug (1). Tighten screws (12) with prescribed tightening torque.
- Move slide to and fro to test the functionality.

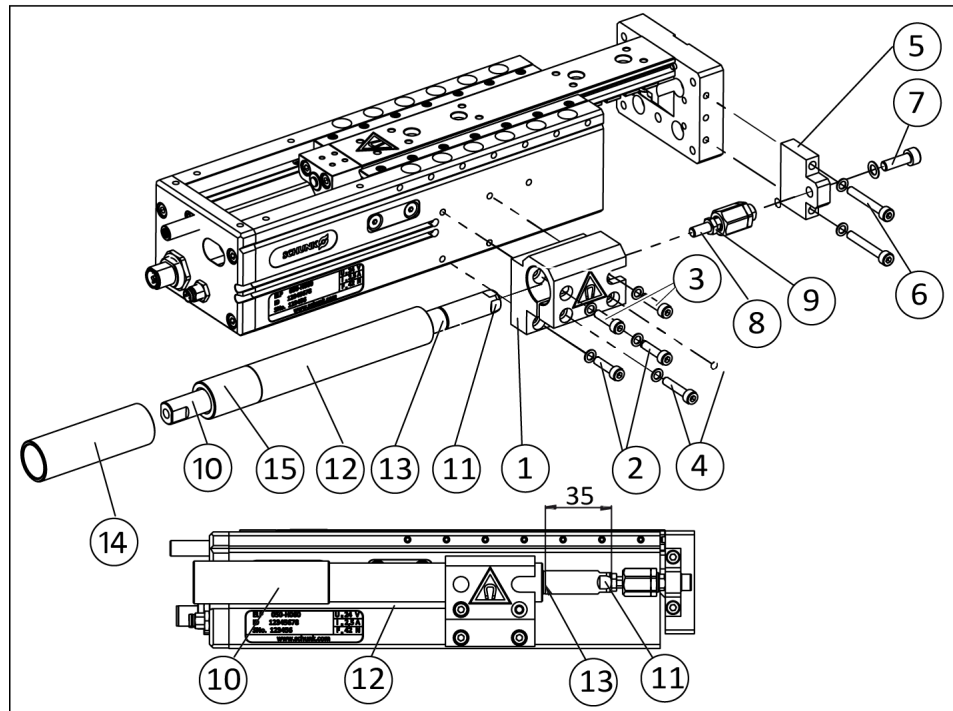
Set "slide retracted" position

- End position is set, [Adjust end position](#) [► 35].
- Retract slide to end position.
- Secure T-nut (5) with two screws (8) to the bracket (7). Tighten screws only slightly.
- Slide T-nut (5) with attached bracket (7) into the groove (4), until the T-nut sits fully in the groove (4).
- Slide sensor (6) into the bracket (7) as far as it will go.
- Position sensor (6) incl. bracket and T-nut centrally underneath the switching lug (1).
- Set distance of 0.5 mm between bracket (7) and switching lug (1), tighten screws (8) with prescribed tightening torque.
- Move slide to and fro to test the functionality.

CAUTION: Constant end position positionings are only achieved during operation (end position power effect!).

5.5 Assemble additional accessories

5.5.1 Assemble load compensation (MagSpring®)



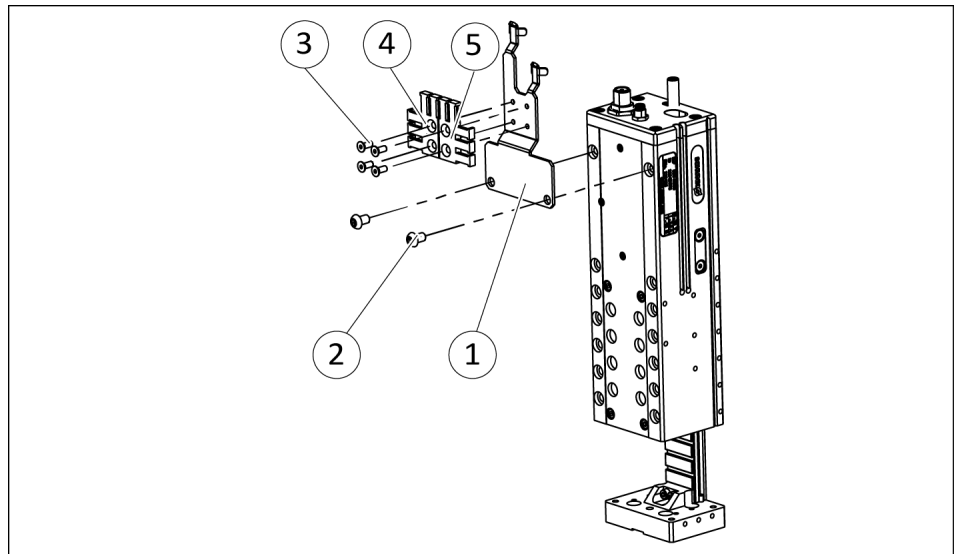
Item	Screw dimension
2	M4 x 16, DIN EN ISO 4762
3	M4 x 16, DIN EN ISO 4762
4	M4 x 20, DIN EN ISO 4762
6	M4 x 30, DIN EN ISO 4762
7	M5 x 16, DIN EN ISO 4762

NOTE

Secure all screw connections with the thrust washer provided.

- Insert runs (10) into the stator (12), refer to "MagSpring®" operating manual for this.
- Fasten clamping element (1) to housing using two screws (2). Only tighten screws lightly, so that the clamping element (1) cannot move.
- Secure angular compensation (8) on the mounting plate (5) using screw (7).
- Secure mounting plate (5) with screws (6) to the adapter plate. Only tighten screws lightly, so that the mounting plate (5) can still move.
- Screw on counter nut (9) up to thread.
- Insert stator (12) with run (10) into the clamping element (1), to that the rectangle (11) is pointing in the direction of the mounting plate (5).
- Screw angular compensation (8) in the run (10).
- Align clamping element (1) and mounting plate (5) and adjust in parallel to the guide. Tighten screws (2) and (6).
- Disassemble stator (12) with run (10) from the clamping element (1) again. Now tighten the screws (3) firmly.
- Ensure that the end positions are at the maximum positions (delivery state).
- For easier assembly, attach a marking (13) at a distance of 35 mm on the run (10).
- Insert stator (12) with run (10) into the clamping element (1), so that the rectangle (11) is pointing in the direction of the mounting plate (5).
- Screw angular compensation (8) in stator (11) and secure with counter nut (9). Secure the screw connection between the angular compensation (8) and stator (11) using locking liquid.
- Pull stator (12) out of the clamping element (1), until the marking (13) is flush with the stator (12). When pulling out, the slide must go into its retraction position.
- Secure stator (12) with screws (4). Tightening torque: 2 Nm.
- Screw the screening tube (14) onto the thread (15) of the stator (12). Secure the screw connection with locking liquid.

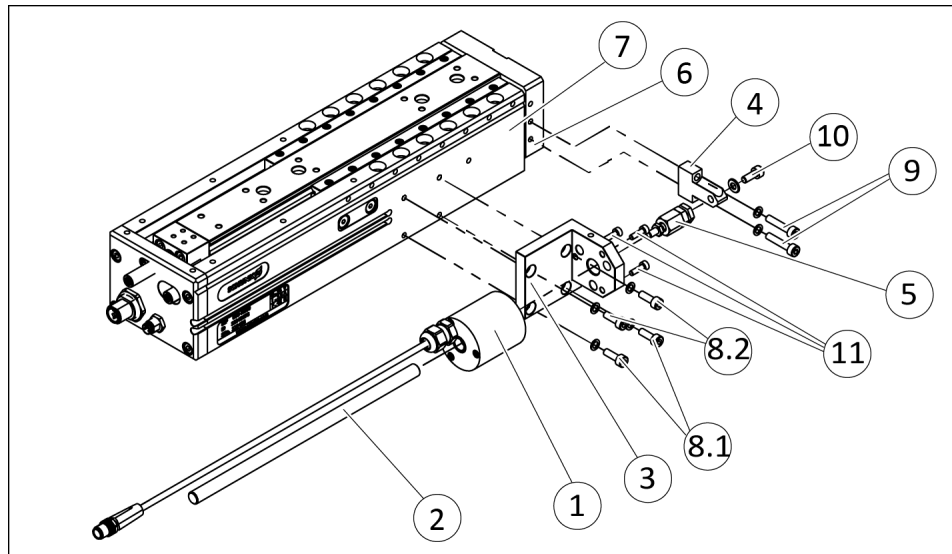
5.5.2 Mount strain relieve for cable



Item	Screw dimension		
	ELP 025	ELP 050	ELP 100
2	M5 x 10, DIN 7380	M6 x 10, DIN 7380	M8 x 10, DIN 7380
3	M4 x 10, DIN 7991		

- Secure retaining plate (1) with two screws (2) on the housing
- Depending upon requirement: Secure strain relief (4) and/or (5) with screws (3) on the retaining plate (1).
- Secure cable on retaining plate (1) or strain relief (4, 5) with cable tie. In doing so, observe the bending radii of the cables used.

5.5.3 Installing electric lowering lock



Item	Screw dimension DIN EN ISO 4762/ tightening torque	
	ELP 025 / ELP 050	ELP 100
8.1	M4 x 12 / 3.1 Nm	M4 x 12 / 3.1 Nm
8.2		
9	M4 x 20 / 3.1 Nm	M4 x 20 / 3.1 Nm
10	M4 x 16 / 3.1 Nm	M5 x 18 / 5.1 Nm
11	M3 x 10 / 1.1 Nm	M5 x 12 / 5.1 Nm

NOTE

- For assembly always consult the brake operating manual (1), which is available for download at schunk.com.
Brake type: *electric ROBA linear stop, type 382.0__0*
- Fasten all screws with the enclosed locking washers and tighten to the required tightening torque.

- Fasten the fastening bracket (3) to the housing (7) with two screws (8.1). Only tighten screws slightly, so that the fastening bracket (3) can still move.
- Secure angular compensation (5) on the mounting plate (4) using screw (10).
- Secure mounting plate (4) with screws (9) to the adapter plate (6). Only tighten screws slightly, so that the mounting plate (4) can still move.
- Screw the angular compensation counter nut (5) on as far as the end of the thread.
- Insert the shaft (2) into the brake (1). The mounting thread in the shaft (2) must point in the same direction as the mounting thread of the brake (1).
- Fasten the brake (1) with the shaft (2) on the fastening bracket (3) using screws (11). Tighten screws only slightly.
- Screw angular compensation (5) into the shaft (2) and secure with counter nut.
- Align the fastening bracket (3) and mounting plate (4) so they are flush and parallel to the guide. Tighten the screws (8.1/9).
- Disassemble the brake (1) from the fastening bracket (3) again.
- Tighten the screws (8.2) on the fastening bracket (3).
- Fasten the brake (1) again to the fastening bracket (3), align it and gently tighten the screws (11) so that the brake (1) can still move.
- Connect the brake (1) and energize it.
- Unscrew the transport lock, see brake operating manual.
- Power down the brake (1), thereby tensioning it (centering).
- Tighten the screws (11).

6 Troubleshooting

6.1 Product not moving

Operating field display	Possible cause	Corrective action
LED Power (green) = off	Logic voltage and/or actuator voltage are not fitted	Check logic voltage and actuator voltage
	Product defective	Replace the product
LED Error (red) = flashes with 0.8 Hz	Overcurrent/overheating of the product	- Check whether the product is attached so it is not thermally insulated - Refit logic voltage or trigger reset - If the error pattern keeps reappearing and the operating conditions are correct, replace the product
LED Error (red) = flashes with 5 Hz	Power supply unit of the actuator voltage is overloaded Brake chopper is missing Error in the cabling of the actuator voltage	- Check actuator voltage - Use brake chopper - Replace power supply unit with a more powerful one - Replace defective cable - Refit logic voltage or trigger reset
LED Power (green) = on LED Error (red) = off	Missing control signals	- Replace connection cable for control signals - Check control

6.2 Product teaches in again during the process

Operating field display	Possible cause	Corrective action
LED Error (red) = on	Oscillation of the assembly	Eliminate oscillation or reduce speed
	Product blocking	Remove blockage
	Stop set incorrectly	Check clamping of the stop screw
	Change in moved mass too great	Reduce mass change or reduce speed
	Installation position of the product not constant	Fix installation location or reduce speed

6.3 Product moving too slowly

Operating field display	Possible cause	Corrective action
LED Learn (yellow) = on	Teach-in phase not yet completed	Continue working until the teach-in phase is completed
LED Learn (yellow) = off	Speed too low	Increase speed setting on the rotary switches

7 Maintenance

Maintenance-free

The product is maintenance-free under the following conditions:

- Within the warranty
- No contaminants (guidance system is not sealed)
- Operation within the permissible ambient and application conditions

Maintenance interval	Maintenance work
Regularly	Inspection: • Regularly check all electrical and mechanical connections for secure fitting. • Regularly check cables for damage. Replace any damaged cables.
As required	Clean product: • Depending on contamination and the application conditions, clean the product regularly. Cleaning with lint-free cloth. • If the running surfaces are also cleaned during the cleaning work, these must be lubricated again.
As required	Lubricate the guide: • To lubricate the guide, use special grease (ID no.: GAS364056). • Clean running surfaces of the guide with a lint-free cloth. • Evenly distribute a thin layer of grease on both sides of the running surface using CleanTips. • Move the slide several times over the maximum stroke length.

8 Translation of original declaration of incorporation

in terms of the Directive 2006/42/EG, Annex II, Part 1.B of the European Parliament and of the Council on machinery.

Manufacturer/
Distributor SCHUNK Electronic Solutions GmbH
Am Tannwald 17
D-78112 St. Georgen

We hereby declare that on the date of the declaration the following partly completed machine complied with all basic safety and health regulations found in the directive 2006/42/EC of the European Parliament and of the Council on machinery. The declaration is rendered invalid if modifications are made to the product.

The product also complies with the regulations found in directive 2014/30/EU from the European Parliament and the Council on electromagnetic compatibility.

Product designation: Electric linear module / ELP / electric
ID number 0315700; 0315708; 0315716; 0315724; 0315732; 0315740;
0315748; 0315756; 0315764

The partly completed machine may not be put into operation until conformity of the machine into which the partly completed machine is to be installed with the provisions of the Machinery Directive (2006/42/EC) is confirmed.

Applied harmonized standards, especially:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 61000-6-2 (2005)	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards -Immunity for industrial environments IEC 61000-6-2: 2005
EN 61000-6-4:2007 + A1:2011	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments (IEC 61000-6-4:2006 + A1:2010);

The manufacturer agrees to forward on demand the relevant technical documentation for the partly completed machinery in electronic form to national authorities.

The relevant technical documentation according to Annex VII, Part B, belonging to the partly completed machinery, has been created.

Person authorized to compile the technical documentation:
Markus Ganter, Address: see manufacturer's address

Signature: see original declaration

St. Georgen, March 2019

p.p. Matthias Heilmann; Head of Development

9 Annex to Declaration of Incorporation

according 2006/42/EG, Annex II, No. 1 B

1. Description of the essential health and safety requirements pursuant to 2006/42/EC, Annex I that are applicable and that have been fulfilled with:

Product designation	Electric linear module
Type designation	ELP
ID number	0315700; 0315708; 0315716; 0315724; 0315732; 0315740; 0315748; 0315756; 0315764

To be provided by the System Integrator for the overall machine	↓
Fulfilled for the scope of the partly completed machine	↓
Not relevant	↓

1.1	Essential Requirements			
1.1.1	Definitions		X	
1.1.2	Principles of safety integration		X	
1.1.3	Materials and products		X	
1.1.4	Lighting			X
1.1.5	Design of machinery to facilitate its handling			X
1.1.6	Ergonomics			X
1.1.7	Operating positions			X
1.1.8	Seating			X

1.2	Control Systems			
1.2.1	Safety and reliability of control systems			X
1.2.2	Control devices			X
1.2.3	Starting			X
1.2.4	Stopping			X
1.2.4.1	Normal stop			X
1.2.4.2	Operational stop			X
1.2.4.3	Emergency stop			X
1.2.4.4	Assembly of machinery			X
1.2.5	Selection of control or operating modes			X
1.2.6	Failure of the power supply			X

1.3	Protection against mechanical hazards			
1.3.1	Risk of loss of stability			X
1.3.2	Risk of break-up during operation			X
1.3.3	Risks due to falling or ejected objects			X
1.3.4	Risks due to surfaces, edges or angles		X	

1.3	Protection against mechanical hazards			
1.3.5	Risks related to combined machinery			X
1.3.6	Risks related to variations in operating conditions			X
1.3.7	Risks related to moving parts			X
1.3.8	Choice of protection against risks arising from moving parts			X
1.3.8.1	Moving transmission parts			X
1.3.8.2	Moving parts involved in the process			X
1.3.9	Risks of uncontrolled movements			X
1.4	Required characteristics of guards and protective devices			
1.4.1	General requirements			X
1.4.2	Special requirements for guards			X
1.4.2.1	Fixed guards			X
1.4.2.2	Interlocking movable guards			X
1.4.2.3	Adjustable guards restricting access			X
1.4.3	Special requirements for protective devices			X
1.5	Risks due to other hazards			
1.5.1	Electricity supply			X
1.5.2	Static electricity			X
1.5.3	Energy supply other than electricity			X
1.5.4	Errors of fitting			X
1.5.5	Extreme temperatures			X
1.5.6	Fire			X
1.5.7	Explosion			X
1.5.8	Noise			X
1.5.9	Vibrations			X
1.5.10	Radiation			X
1.5.11	External radiation			X
1.5.12	Laser radiation			X
1.5.13	Emissions of hazardous materials and substances			X
1.5.14	Risk of being trapped in a machine			X
1.5.15	Risk of slipping, tripping or falling			X
1.5.16	Lightning			X
1.6	Maintenance			
1.6.1	Machinery maintenance			X
1.6.2	Access to operating positions and servicing points			X
1.6.3	Isolation of energy sources			X
1.6.4	Operator intervention			X
1.6.5	Cleaning of internal parts			X

1.7	Information			
1.7.1	Information and warnings on the machinery			X
1.7.1.1	Information and information devices			X
1.7.1.2	Warning devices			X
1.7.2	Warning of residual risks			X
1.7.3	Marking of machinery			X
1.7.4	Instructions		X	
1.7.4.1	General principles for the drafting of instructions		X	
1.7.4.2	Contents of the instructions		X	
1.7.4.3	Sales literature		X	

	The classification from Annex 1 is to be supplemented from here forward.			
2	Supplementary essential health and safety requirements for certain categories of machinery			X
2.1	Foodstuffs machinery and machinery for cosmetics or pharmaceutical products			X
2.2	Portable hand-held and/or guided machinery			X
2.2.1	Portable fixing and other impact machinery			X
2.3	Machinery for working wood and material with similar physical characteristics			X
3	Supplementary essential health and safety requirements to offset hazards due to the mobility of machinery			X
4	Supplementary essential health and safety requirements to offset hazards due to lifting operations			X
5	Supplementary essential health and safety requirements for machinery intended for underground work			X
6	Supplementary essential health and safety requirements for machinery presenting particular hazards due to the lifting of persons			X

