

Assembly and operating instructions

Electric slide ES40 | ES40-HP



Translation of the Original Assembly Instructions EN

■ ES40-100-SL	⇒ Order no.: 50465218	■ ES40-100-HP-SL	⇒ Order no.: 50465225
■ ES40-100	⇒ Order no.: 50465219	■ ES40-100-HP	⇒ Order no.: 50465226
■ ES40-200	⇒ Order no.: 50465220	■ ES40-200-HP	⇒ Order no.: 50465227
■ ES40-300	⇒ Order no.: 50465221	■ ES40-300-HP	⇒ Order no.: 50465228
■ ES40-400	⇒ Order no.: 50465222	■ ES40-400-HP	⇒ Order no.: 50465229
■ ES40-500	⇒ Order no.: 50465223	■ ES40-500-HP	⇒ Order no.: 50465230

Dear Customer,

Thank you for choosing our products and placing your trust and confidence in our company!

These assembly and operating instructions contain all essential information you need about your product. Our aim is to provide the required information as concisely and clearly as possible. If, however, you still have any questions on the contents or suggestions, please do not hesitate to contact us. We are always grateful for any feedback.

Our team will also be glad to answer any further question you may have regarding the electric slide or other options.

We wish you every success with our products!

With kind regards

Your Afag team

© Subject to modifications

The electric slides have been designed by Afag Automation AG according to the state of the art. Due to the constant technical development and improvement of our products, we reserve the right to make technical changes at any time.

Updates of our documentations



Unlike the printed documents, our digital instructions manuals, product data sheets and catalogues are being continuously updated on our website.

Please keep in mind that the digital documents on our website are always the latest versions.

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1 General

1.1 Contents and purpose of these assembly instructions

These assembly instructions contain important information on assembly, commissioning, functioning and maintenance of the electric slide to ensure safe and efficient handling of the electric slide ES40 and ES40-HP.

Consistent compliance with these assembly instructions will ensure:

- permanent operational reliability of the electric slide,
- optimal functioning of the electric slide,
- timely detection and elimination of defects (thereby reducing maintenance and repair costs),
- prolongation of the electric slide's service life.

The illustrations in this manual shall provide you with a basic understanding of the module and may vary from the actual design of your module.

1.2 Explanation of symbols

The safety notes are marked by a pictogram and a signal word. The safety notes describe the extent of the hazard.

DANGER



Danger!

This safety note indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING



Warning!

This safety note points out a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION



Caution!

This safety note points out a potentially dangerous situation which, if not avoided, can result in minor or slight injuries.

NOTICE

This safety note points out a potentially dangerous situation which, if not avoided, can cause substantial damage to property and the environment.



This note contains important additional information as well as useful tips for safe, efficient and trouble-free operation of the electric slide.

Further warning signs:

Where applicable, the following standardised symbols are used in this manual to point out the various potential health risks.

	Warning - Dangerous electrical voltage.
	Warning - Risk of injury from contact with hot surfaces.
	Warning - Risk of hand and finger injury due to uncontrolled movements of components.
	Warning - Magnetic field.
	Warning - Back injury due to heavy lifting.
	Warning - Risk of injury as a result of parts being flung out!
	Warning - High noise levels.

1.3 Additional symbols

In these assembly instructions the following symbols are used to highlight instructions, results, references, etc.

Symbol	Description
1.	Instructions (steps ...)
⇨	Results of actions
↪	References to sections
■	Enumerations not ordered

1.4 Applicable documents



Each electric slide is accompanied by a safety information sheet. This information sheet must be read carefully by every person who carries out work on and with the electric slides.

1.5 Warranty

The warranty terms for Afag handling components and handling systems are the following:

- 24 months from initial operation and up to a maximum of 27 months from delivery.
- Wear parts are excluded from the warranty (*The customer is entitled to a product free of defects. This does also apply to defective accessories and wear parts. Normal wear and tear are excluded from the warranty*).

The warranty covers the replacement or repair of defective Afag parts. Further claims are excluded.

The warranty shall expire in the following cases:

- Improper use of the module
- Non-observance of the instructions regarding assembly, commissioning, operation and maintenance of the module.
- Improper assembly, commissioning, operation and maintenance
- Repairs and design changes carried out without prior technical instructions of Afag Automation AG
- Removing the serial number from the product
- Inadequate checking of wear parts
- Non-observance of the EC Machinery Directive, the Accident Prevention Regulations, the Standards of the German Electrotechnology Association (VDE) and these safety and assembly instructions.

1.6 Liability

No changes shall be made to the electric slides unless described in this instructions manual or approved in writing by Afag Automation AG.

Afag Automation AG accepts no liability for unauthorized changes or improper assembly, installation, commissioning, operation, maintenance or repair work.

2 Safety instructions

2.1 General

This chapter provides an overview of all important safety aspects to ensure safe and proper use of the electric slide and optimal protection of personnel.

Safe handling and trouble-free operation of the electric slides requires knowledge of the basic safety regulations.

Every person carrying out installation, commissioning, maintenance work or operating the ES modules must have read and understood the complete user manual, especially the chapter on safety instructions.

Also observe all rules and regulations regarding accident prevention applicable to the place of installation of the modules.

Improper use may result in danger to life and limb of the user or third parties or in damage to the automation system or other material assets.



Failure to follow the directions and safety instructions given in this instructions manual may result in serious hazards.

2.2 Intended use

The ES electric slides series is designed for the shock-free linear movement of permanently mounted loads in **non-explosive** environments and in the ambient and operating specially conditions defined for these modules.

The electric slides are used in automation systems.

The electric slides are exclusively intended for operation with original LinMot components (controller, cables ...).

Any use beyond the described purpose is considered to be not in accordance with the intended use.



The intended use of the module also includes:

- observance of all instructions given in this instructions manual,
 - compliance with the inspection and maintenance work and the specifications in the data sheets,
 - using only original spare parts.
-

2.3 Foreseeable misuse

Any use other than or beyond the intended use described above is considered a misuse/improper use of the electric slides.

Especially the following use is considered a misuse:

- Use in potentially explosive atmospheres

WARNING

Risk of injury if the module is not used as intended!

The improper use of the electric slides poses a potential hazard to the personnel.

- The electric slides may only be used in a technically perfect condition in accordance with their intended use and instructions in this manual as well as in compliance with the safety requirements!
- Any malfunctions, particularly those that could impair safety, must be eliminated immediately!



Risks can occur if the module is not used as intended. In the event of damages caused by improper use the following shall apply:

- the operating company shall be solely responsible for such damage, and
- AFAG does not accept any liability for damages caused by improper use.

2.4 Obligations of the operator and the personnel

2.4.1 Observe the assembly instructions

A basic prerequisite for safe and proper handling of the parallel gripper is a good knowledge of the basic safety instructions.



These assembly instructions, in particular the safety instructions contained therein, must be observed by all persons working with the electric slides.

2.4.2 Obligations of the operating company

In addition to the safety instructions given in this manual, the operating company must also comply with the safety, accident prevention and environmental protection regulations valid for the field of application of the electric slides.

The operating company is required to use only personnel who:

- have the necessary professional qualifications and experience,
- are familiar with the basic rules regarding occupational safety and accident prevention,
- have been instructed in the correct handling of the electric slides,
- have read and understood these assembly instructions.

The operating company is also required to:

- monitor on an ongoing basis that the personnel work safely considering any potential hazard involved and the assembly instructions are observed,
- ensure that the assembly instructions are always kept at hand at the automation system in which the electric slides have been integrated,
- observe and communicate universally applicable laws and regulations regarding accident prevention and environmental protection,
- provide the necessary personal protective equipment (e.g. protective gloves) and instruct the personnel to wear it.

2.4.3 Obligations of the personnel

All personnel working with the electric slides are required to:

- read and observe these assembly instructions, especially the chapter on safety,
- observe the occupational safety and accident prevention regulations,
- observe all safety and warning signs on the electric slides,
- refrain from any activity that might compromise safety and health.



In addition, the personnel must wear the personal protective equipment required for carrying out their work. (➔Chapter 2.6).

2.5 Personnel requirements

2.5.1 Personnel qualification

The activities described in the assembly instructions require specific requisites at the level of professional qualifications of the personnel.

Personnel not having the required qualification will not be able to assess the risks that may arise from the use of the electric slides thus exposing himself and others to the risk of serious injury. Therefore, only qualified personnel may be permitted to carry out the described activities on the electric slides.

Persons whose ability to react is restricted due to the intake of medication or the like must not interact with the electric slides.

These installation instructions are intended for skilled personnel (installers, system integrators, maintenance personnel, technicians), electricians and operating personnel.

The following is a description of the professional skills (qualifications) required for carrying out the different activities:

Qualified personnel:

Qualified personnel with appropriate training who are qualified due to their special know-how and fully familiar with the machine and who have been given instructions on how to carry out the task entrusted to them safely.

Qualified electrician:

Persons who have obtained their electrical qualifications through appropriate professional training and complementary courses that enables them to identify risks and prevent possible hazards resulting from electricity.

Operator (trained personnel):

Authorized persons who due to their specialized professional training, expertise and experience are capable of identifying risks and preventing possible hazards arising from the use of the machine.





2.6 Personal protective equipment (PPE)

The personal protective equipment serves to protect the personnel from hazards affecting their safety and health at work.

When working on/with the electric slides, the personnel must wear the personal protective equipment assigned by the safety officer of the operating company or as required by safety regulations. In addition, the personnel are required to:

- wear the personal protective equipment provided by the operating company (employer),
- check the personal protective equipment for proper condition, and
- immediately notify the person responsible on site of any defects found on the personal protective equipment.

Personal protective equipment and the respective mandatory signs:

	<p><i>Protective clothing</i> is a close-fitting clothing specifically designed to protect personnel from hazards during work.</p>
	<p><i>Protective gloves</i> are specifically designed to protect the personnel against hand injuries (such as cuts, abrasion, burns).</p>
	<p><i>Safety shoes</i> are specifically designed to protect the personnel against foot injuries from crushing, falling objects or slipping on slippery surfaces.</p>
	<p>Hearing protectors are required to protect the personnel against excessive noise levels to prevent noise-induced hearing loss.</p>

2.7 Changes & modifications

No changes may be made to the electric slides which have not been described in these assembly instructions or approved in writing by Afag Automation AG.

AFAG Automation AG accepts no liability for unauthorised changes or improper assembly, installation, commissioning, maintenance or repair work.



The electric slides may not be changed or modified in any way, except with the prior written consent of AFAG Automation AG.

2.8 General hazards / residual risks

Despite the safe design of the electric slides and the technical protective measures taken, there still remain residual risks that cannot be avoided and which present a non-obvious residual risk when operating the electric slides.

Observe the safety instructions in this chapter and in the other sections of this manual to avoid damage to property and dangerous situations for the personnel.

2.8.1 General hazards at the workplace

The electric slides have been built according to the state-of-the-art and the applicable health and safety requirements. Nevertheless, improper use of the electric slides may cause the following hazards to the personnel:

- danger to life and limb of the operator or third parties,
- on the electric slides themselves,
- property damage.



Always keep the assembly instructions ready at hand at the workplace! Please, also observe:

- the general and local regulations on accident prevention and environmental protection.
- Observe the safety information sheet for the electric slide.

WARNING



Danger - Do not use in unsuitable environment!

The electric slides are designed for use in **non**-explosive atmospheres.

- Do **not** use the electric slides in potentially explosive atmospheres!

CAUTION



Risk of injuries due to uncontrolled parts movements!

When connecting the electric slides to the control unit or when operating the electric slides sudden, unexpected movements may occur which can cause personal injury or property damage.

- Only qualified personnel may work with or on the electric slides.
- Read the assembly instructions carefully before carrying out any work on or with the electric slides.

2.8.2 Danger due to electricity

WARNING



Danger! Risk of electric shock!

If work on electrical components is required, ensure that the work is carried out properly, failure to do so will cause serious or fatal injuries.

- Work on the machine's electrical equipment may only be performed by skilled electrician or trained personnel under the supervision of a skilled electrician in accordance with all relevant electrical regulations.

2.8.3 Danger due to strong magnetic fields

DANGER



Danger due to magnetic fields!

Due to the strong magnetic fields, electronic devices such as pacemakers can be disturbed or their function impaired.

Persons with a pacemaker must keep a safety distance of at least 50 cm.

2.8.4 Danger due to high temperatures

CAUTION



Danger of injury from hot surfaces!

During continuous operation of the electric slide, the surface of the slide heats up.

- Before touching hot surfaces without protective gloves, make sure they have cooled down to ambient temperature.

2.8.5 Mechanical hazards

CAUTION



Danger of injury from moving components!

Limbs can be crushed by moving components!

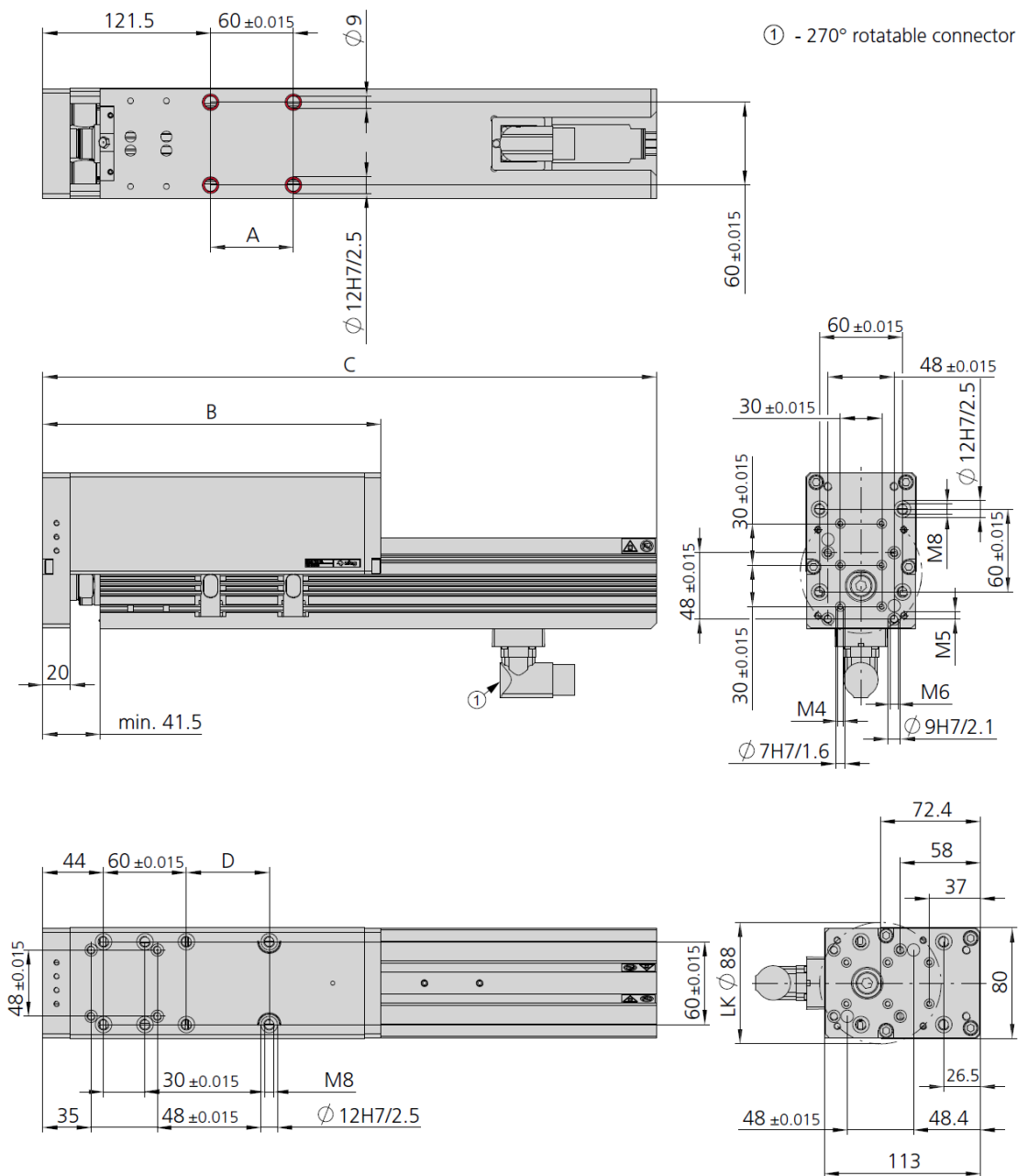
- Work on and with the electric slides may only be carried out by qualified personnel.
- Never reach into the system during normal operation!

3 Technical data

3.1 Electric slide ES40

3.1.1 Dimension drawing ES40

Type	ES40-100-SL	ES40-100	ES40-200	ES40-300	ES40-400	ES40-500
A	1 x 60 mm	2 x 60 mm	2 x 60 mm	2 x 60 mm	2 x 60 mm	3 x 60 mm
B	245 mm	445 mm	545 mm	645 mm	745 mm	904 mm
C	444.5 mm	451.5 mm	551.5 mm	651.5 mm	751.5 mm	910.5 mm
D	2 x 60 mm	6 x 60 mm	7 x 60 mm	9 x 60 mm	11 x 60 mm	13 x 60 mm



Bores can be screwed through

Fig. 1 Dimensional drawing of electric slide ES40

3.1.2 Technical data ES40

ES40	
Attachment grid	60 x 60 mm
Attachment thread	M8
Operating temperature	0 - 50 °C
Storage temperature	0 - 50 °C
Humidity	< 90 %

Type	ES40-100-SL	ES40-100	ES40-200	ES40-300	ES40-400	ES40-500
Order number	50465218	50465219	50465220	50465221	50465222	50465223
Stroke H	100 mm	100 mm	200 mm	300 mm	400 mm	500 mm
Net weight	8.23 kg	10.08 kg	11.65 kg	13.35 kg	14.91 kg	17.11 kg
Moving weight	3.84 kg	5.33 kg	6.48 kg	7.67 kg	8.91 kg	10.5 kg
Max. speed	2 m/s	2 m/s	2 m/s	2 m/s	2 m/s	1.8 m/s
Nominal voltage	72 VDC	72 VDC	72 VDC	72 VDC	72 VDC	72 VDC
Drive	Linear motor, electric					
Protection type	IP 30	IP 30	IP 30	IP 30	IP 30	IP 30
Peak force Fx	550 N	550 N	550 N	550 N	550 N	550 N
Constant force Fx	145 N	145 N	145 N	145 N	145 N	145 N
Force constant	22 N/A	22 N/A	22 N/A	22 N/A	22 N/A	22 N/A
Repeat accuracy	+/- 0.05 mm	+/- 0.05 mm	+/- 0.05 mm	+/- 0.05 mm	+/- 0.05 mm	+/- 0.05 mm
- with external position measuring system	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm
Mounting position	✦	✦	✦	✦	✦	✦

Note: For vertical installation, a weight compensation via MagSpring or pneumatic weight balancing is required. If the weight compensation is not carried out, the slide will fall below when in a deenergised state. Furthermore, the operation time from the operation time diagram cannot be achieved.
Cleanroom class ISO 14644-1, class ISO 7

Included in the delivery
(Catalogue HT accessories)

- 2x Centering bushing Ø12x4.8
- 4x Mounting screw M8x25

Accessories

(Product-specific accessories)

- MagSpring side/front
- External position measuring system ES40

(Catalogue HT accessories)

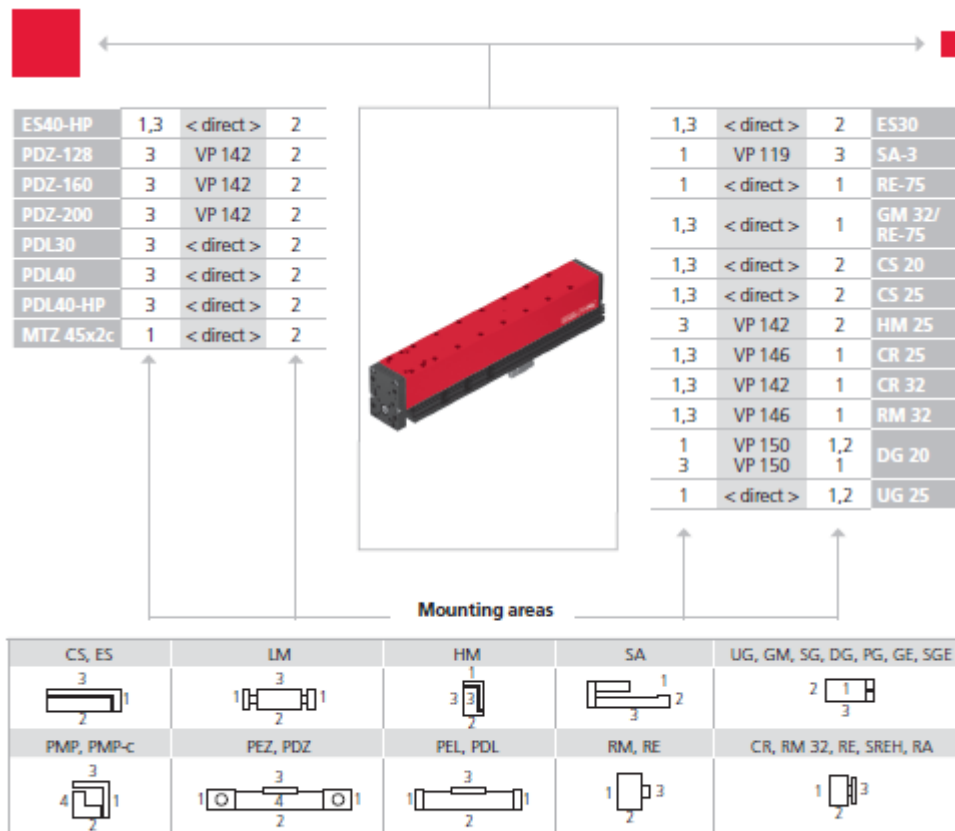
- Motor cable-M17
- Controller C1xxx-1S
- Plug kit for C1xxx-1S
- USB-RS232 Converter for controllers
- Power supply T01-72/1500 Multi, 3-phase
- Double module support centric MTZ 45x2c

Alternative accessories

(Catalogue HT accessories)

- Additional motor cables
- Additional controllers
- Additional power supplies

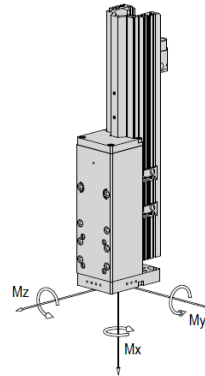
3.1.3 Preferred combinations ES40



Note that there might be different mounting positions from one module to another one. The required connection elements and the range of support columns are depicted in the catalogue HT accessories.

3.1.4 Module loads ES40

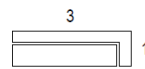
Type	ES40-100-SL	ES40-100	ES40-200	ES40-300	ES40-400	ES40-500
Max. dynamic torque Mx	35 Nm	45 Nm	45 Nm	45 Nm	45 Nm	45 Nm
Max. dynamic torque My	80 Nm	180 Nm	180 Nm	180 Nm	180 Nm	200 Nm
Max. dynamic torque Mz	80 Nm	180 Nm	180 Nm	180 Nm	180 Nm	200 Nm



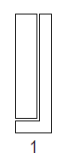
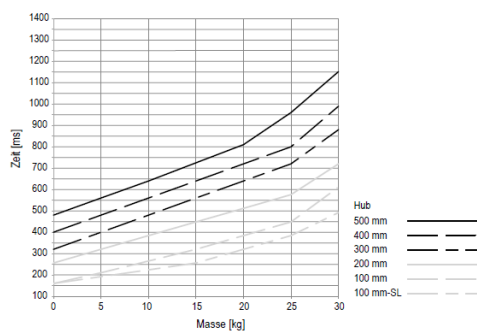
Maximum payload/type	ES40-100-SL	ES40-100	ES40-200	ES40-300	ES40-400	ES40-500
Installation position (horizontal) for mounting side 1/3	25 kg	30 kg	30 kg	30 kg	30 kg	30 kg
Installation position (vertical) for mounting side 1/3	8 kg	6 kg	5 kg	4 kg		

Assembly sides module mounting

horizontal:



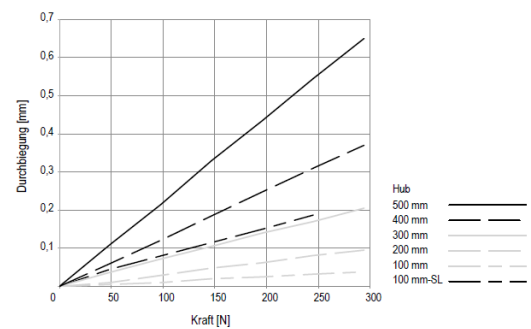
vertical:


Diagrams ES40
Operation time ES40


Die Fahrzeiten wurden unter den nachfolgenden Bedingungen gemessen:

- horizontal
- Umgebungstemperatur 20 °C
- Servoregler C1150-1S-PN
- Motorspannung 72 VDC
- Motorkabel-M17-8m-0-1-1

The times refer to break times of 200 ms.

Deflection ES40


3.1.5 Motor overview ES40

Module	Stroke	Motor	Stator	Stator no	Rotor	Rotor no.
ES40-100-SL	100	P01-48x240F/90x240-C	PS01-48x240F	50467386	PL01-28x410/330	50467392
ES40-100	100	P01-48x240F/90x240-C	PS01-48x240F	50467386	PL01-28x410/330	50467392
ES40-200	200	P01-48x240F/180x330-C	PS01-48x240F	50467386	PL01-28x500/420	50467396
ES40-300	300	P01-48x240F/300x450-C	PS01-48x240F	50467386	PL01-28x620/540	50467397
ES40-400	400	P01-48x240F/390x540-C	PS01-48x240F	50467386	PL01-28x710/630	50467398
ES40-500	500	P01-48x240F/480x630-C	PS01-48x240F	50467386	PL01-28x800/720	50467399
ES40-100-SL-HP	100	P01-48x360F/60x210-C	PS01-48x360F	50467389	PL01-28x500/420	50467396
ES40-100-HP	100	P01-48x360F/60x210-C	PS01-48x360F	50467389	PL01-28x500/420	50467396
ES40-200-HP	200	P01-48x360F/180x330-C	PS01-48x360F	50467389	PL01-28x620/540	50467397
ES40-300-HP	300	P01-48x360F/270x420-C	PS01-48x360F	50467389	PL01-28x710/630	50467398
ES40-400-HP	400	P01-48x360F/360x510-C	PS01-48x360F	50467389	PL01-28x800/720	50467399

3.2 Electric slide ES40-HP

3.2.1 Dimensional drawing ES40-HP

Type	ES40-100-HP-SL	ES40-100-HP	ES40-200-HP	ES40-300-HP	ES40-400-HP	ES40-500-HP
A	1 x 60 mm	2 x 60 mm	2 x 60 mm	2 x 60 mm	2 x 60 mm	3 x 60 mm
B	245 mm	445 mm	545 mm	645 mm	745 mm	1024 mm
C	534.5 mm	534.5 mm	654.5 mm	744.5 mm	834.5 mm	1031.5 mm
D	2 x 60 mm	6 x 60 mm	7 x 60 mm	9 x 60 mm	11 x 60 mm	15 x 60 mm

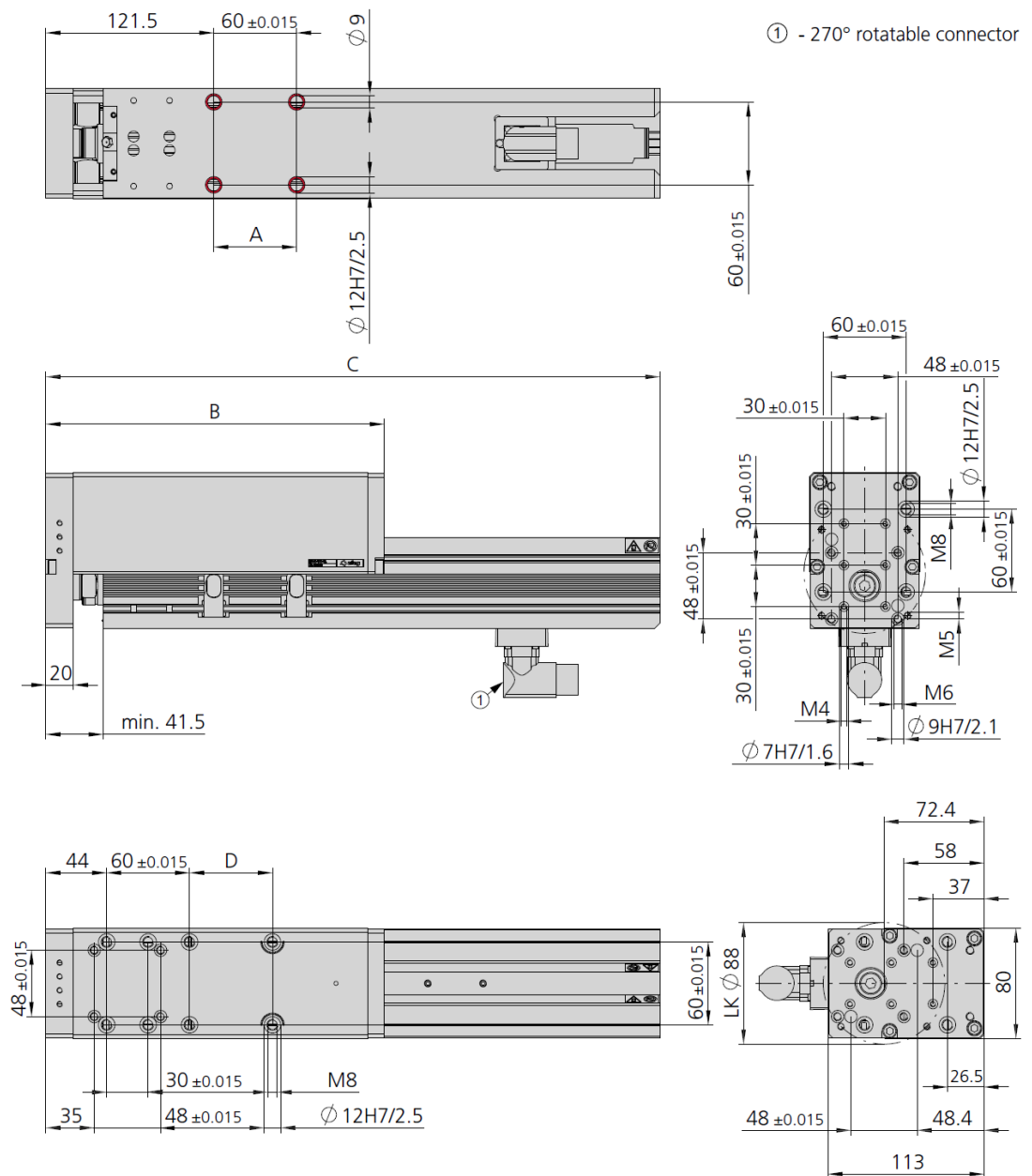








Fig. 2 Dimensional drawing of electric slide ES40-HP

Technical data

3.2.2 Technical data ES40-HP

ES40-HP	
Attachment grid	60 x 60 mm
Attachment thread	M8
Operating temperature	0 - 50 °C
Storage temperature	0 - 50 °C
Humidity	< 90 %

Type	ES40-100-HP-SL	ES40-100-HP	ES40-200-HP	ES40-300-HP	ES40-400-HP	ES40-500-HP
Order number	50465225	50465226	50465227	50465228	50465229	50465230
Stroke H	100 mm	100 mm	200 mm	300 mm	400 mm	500 mm
Net weight	10.08 kg	11.9 kg	13.7 kg	15.21 kg	16.73 kg	18.91 kg
Moving weight	4.27 kg	5.75 kg	7.04 kg	8.18 kg	9.34 kg	11.06 kg
Max. speed	2 m/s	2 m/s	1.8 m/s	1.8 m/s	1.8 m/s	1.7 m/s
Nominal voltage	72 VDC	72 VDC	72 VDC	72 VDC	72 VDC	72 VDC
Drive	Linear motor, electric					
Protection type	IP 30	IP 30	IP 30	IP 30	IP 30	IP 30
Peak force Fx	1024 N	1024 N	1024 N	1024 N	1024 N	1024 N
Constant force Fx	203 N	203 N	203 N	203 N	203 N	203 N
Force constant	32 N/A	32 N/A	32 N/A	32 N/A	32 N/A	32 N/A
Repeat accuracy	+/- 0.05 mm	+/- 0.05 mm	+/- 0.05 mm	+/- 0.05 mm	+/- 0.05 mm	+/- 0.05 mm
- with external position measuring system	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm
Mounting position						

Note: For vertical installation, a weight compensation via MagSpring or pneumatic weight balancing is required. If the weight compensation is not carried out, the slide will fall below when in a deenergised state. Furthermore, the operation time from the operation time diagram cannot be achieved.
Cleanroom class ISO 14644-1, class ISO 7

Included in the delivery (Catalogue HT accessories)

- 2x Centering bushing Ø12x4.8
- 4x Mounting screw M8x25

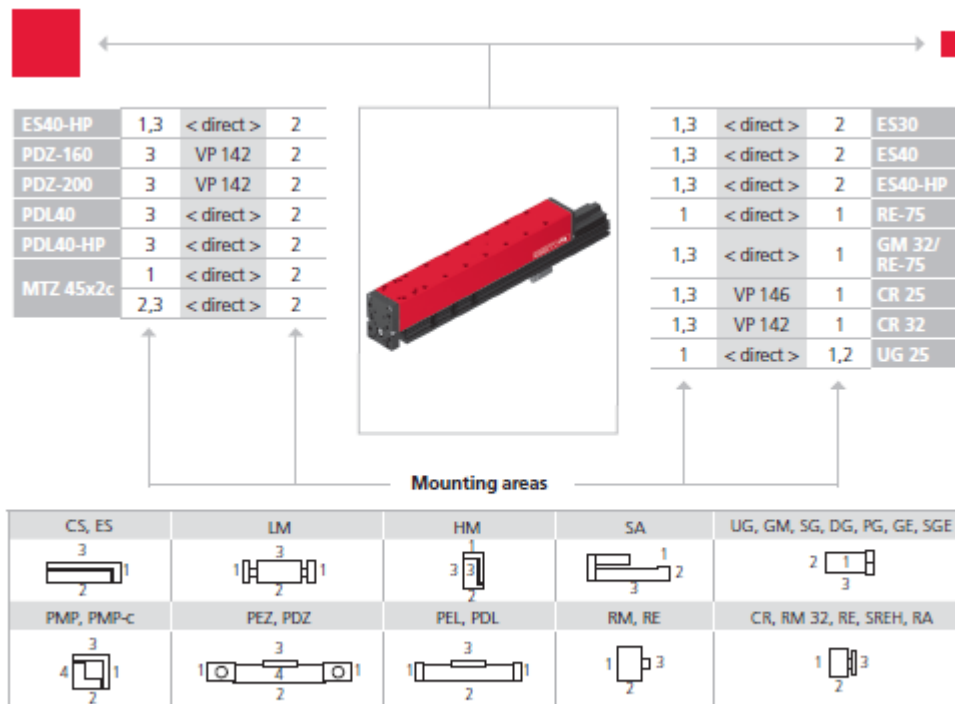
Accessories (Product-specific accessories)

- MagSpring side/front
- External position measuring system ES40 (Catalogue HT accessories)
- Motor cable-M17
- Controller C1xxx-15
- Plug kit for C1xxx-15
- USB-RS232 Converter for controllers
- Power supply T01-72/1500 Multi, 3-phase
- Double module support centric MTZ 45x2c

Alternative accessories (Catalogue HT accessories)

- Additional motor cables
- Additional controllers
- Additional power supplies

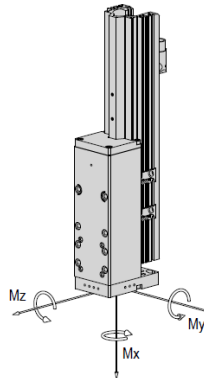
3.2.3 Preferred combinations ES40-HP



Note that there might be different mounting positions from one module to another one. The required connection elements and the range of support columns are depicted in the catalogue HT accessories.

3.2.4 Module loads ES40-HP

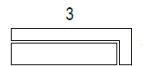
Type	ES40-100-HP-SL	ES40-100-HP	ES40-200-HP	ES40-300-HP	ES40-400-HP	ES40-500-HP
Max. dynamic torque Mx	40 Nm	45 Nm	45 Nm	45 Nm	45 Nm	45 Nm
Max. dynamic torque My	80 Nm	180 Nm	180 Nm	180 Nm	180 Nm	200 Nm
Max. dynamic torque Mz	80 Nm	180 Nm	180 Nm	180 Nm	180 Nm	200 Nm



Maximum payload/type	ES40-100-HP-SL	ES40-100-HP	ES40-200-HP	ES40-300-HP	ES40-400-HP	ES40-500-HP
Installation position (horizontal) for mounting side 1/3	25 kg	30 kg	30 kg	30 kg	30 kg	30 kg
Installation position (vertical) for mounting side 1/3	7 kg	6 kg	4 kg	3 kg		

Assembly sides module mounting

horizontal:

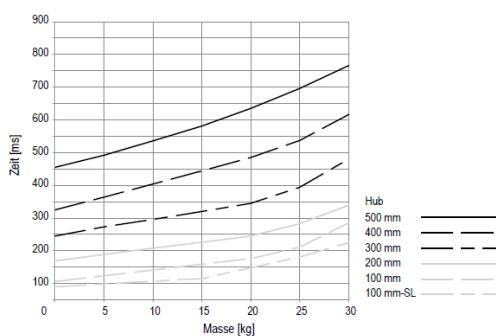


vertical:



Diagrams ES40-HP

Operation time ES40-HP

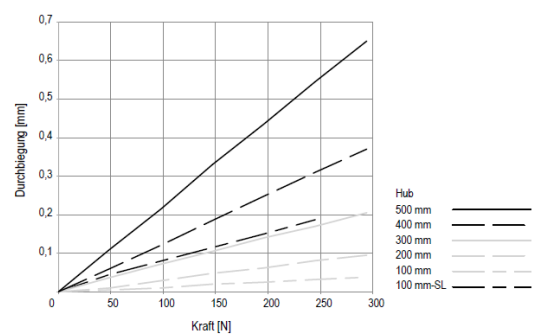


Die Fahrzeiten wurden unter den nachfolgenden Bedingungen gemessen:

- horizontal
- Umgebungstemperatur 20 °C
- Servoregler **E1250-1S-PN (32A)**
- Motorspannung 72 VDC
- Motorkabel-M17-8m-0-1-1

The times refer to break times of 200 ms.

Deflection ES40-HP



4 Transport, packaging and storage

4.1 Safety instructions for transport




CAUTION

Risk of injury when packing and unpacking the electric slides!

The electric slides can be moved back and forth while they are still loose and cause crushing injuries.

- Pack and unpack the electric slides carefully.



Also observe the safety instructions in  chapter 2 „Safety instructions“ in this manual.

4.2 Scope of supply



In addition to the assembly and operating instructions, a safety information sheet is enclosed with each electric slide.

This information sheet must be read by every person who carries out work with and on the electric slides!



Fig. 3 Scope of delivery electric slide ES40

Unt.	ES40
1 x	Module ES40
2 x	Centering sleeves \varnothing 12x4.8 mm
2 x	Mounting screws M8x25 mm
1 x	Mounting/operating instructions

4.3 Transport



No liability can be assumed for damages caused by improper installation on the part of the operating company.



The following conditions must be complied with for transport and storage:

- Storage temperature: 0-50 °C
 - Relative air humidity: < 90%, non condensing
-

4.4 Packaging

The electric slides are transported in the transport packaging of AFAG Automation AG. If no AFAG packaging used, the electric slides must be packed so that they are protected against shock and dust.

NOTICE

Risk to the environment due to incorrect disposal of the packaging material

Environmental damage can be caused by incorrect disposal of the packaging material.

- Dispose of the packaging material in an environmentally sensitive way in accordance with the local environmental regulations.
-

4.5 Storage

If the electric slides are stored for an extended period of time, observe the following:

- Store the electric slides in the transport packaging.
- Do not store the electric slides outdoors or expose them to weather conditions.
- The storage space must be dry and dust free.
- Room temperature of the storage space: 0-50 °C.
- Relative air humidity: < 90% non condensing.
- Clean the electric slides and protect the blank metal parts against corrosion using the appropriate means.
- Protect the electric slides from dirt and dust.

5 Structure and description

5.1 Design electric slides

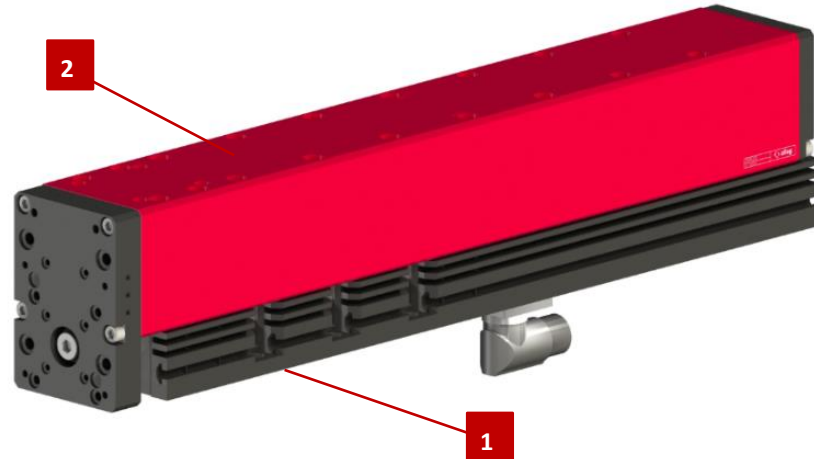


Fig. 4 Design of the electric slide (example ES40)

1. Base element
2. Slide

5.2 Product description

The electric slides are designed according to the state of the art and the recognised safety regulations. These modules are used in automation systems and serve exclusively to move workpieces.

The electric slides are designed for use in **non** explosive atmospheres.

The electric slides are intended exclusively for operation with original LinMot components (controller, cables, etc.). Any use beyond this is considered improper.

The electric slides are available in the following versions:

Module	Stroke	Number of guide units	Order no.
ES40-100-SL	100 mm	2	50465218
ES40-100	100 mm	4	50465219
ES40-200	200 mm	4	50465220
ES40-300	300 mm	4	50465221
ES40-400	400 mm	4	50465222
ES40-500	500 mm	4	50465223
ES40-100-HP-SL	100 mm	2	50465225
ES40-100-HP	100 mm	4	50465226
ES40-200-HP	200 mm	4	50465227
ES40-300-HP	300 mm	4	50465228
ES40-400-HP	400 mm	4	50465229
ES40-500-HP	500 mm	4	50465230

5.3 Accessories

5.3.1 MagSpring

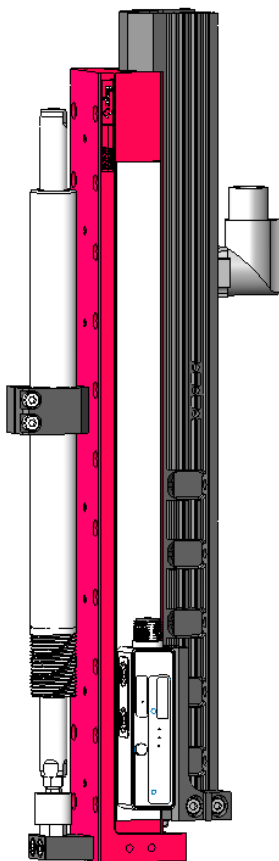
The MagSpring is a passive component with a constant force over a certain stroke range based on permanent magnets.

As a result, the load mass is compensated for vertically installed axes (counterbalance in vertical mounting position). The dropping of the periphery or the workpiece is prevented, when the electric slide is de-energized.

The MagSpring is offered with a holder, suitable for the electric slides ES40. This can be mounted laterally, left, right, or in front of the axle.



Fig. 5 Overview of MagSpring



Function:

The mode of operation is based on the attraction force of permanent magnets. Correspondingly, no power supply (electricity, compressed air, etc.) is necessary so that safety relevant applications are also possible.

Due to the special design of the flux-carrying components, as well as of the magnets, the highly non linear relationships between force and displacement of magnet arrangements are converted into a constant force profile.

Depending on the strength class of the MagSpring the permanent magnets are located either in the stator, in the rotor or in both components.

The rotor is supported by an integrated sliding guide so that the MagSpring can be used in a similar manner to gas pressured springs.

In case of vertical installation, linear motors and other direct drives must constantly apply a constant force in order to counteract the weight force. With a MagSpring installed parallel to the linear motor, the weight force can be passively compensated. The linear motor is used only for the actual positioning operation or the application of the dynamic forces and can be correspondingly be reduced.

Mounting positions for the MagSpring:

The thread on the stator and the end of the rotor with four flats are facing downwards.

In the normal installation position, dimension SP=35 adjusted by clamping the MagSpring stator with fully retracted slide. This measure (SP=35) is the same for all MagSprings.

MagSpring lateral attachment

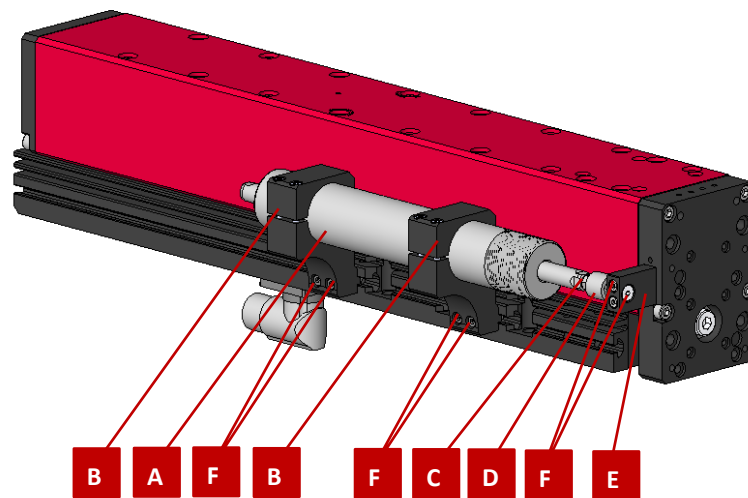


Fig. 6 *MagSpring lateral attachment*

The MagSpring for the lateral attachment is supplied as a set and consists the following components:

- | | | | |
|---|----------------------------|---|----------------------|
| A | MagSpring Stator and rotor | D | Compensating element |
| B | Bracket | E | Adapter |
| C | Hexagon nut | F | Mounting parts |

MagSpring front attachment

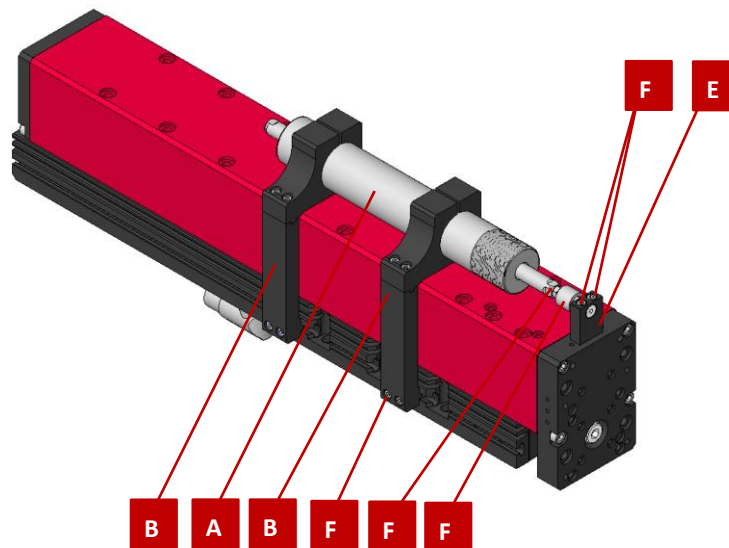


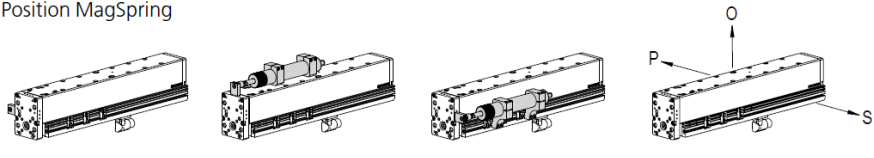
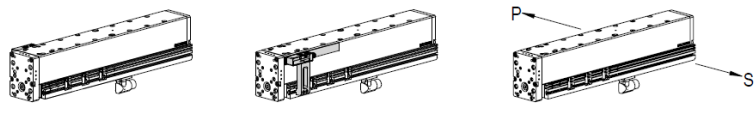
Fig. 7 *MagSpring front attachment*

The MagSpring for the front attachment is supplied as a set and consists the following components:

- | | | | |
|---|----------------------------|---|----------------------|
| A | MagSpring Stator and rotor | D | Compensating element |
| B | Bracket | E | Adapter |
| C | Hexagon nut | F | Mounting parts |

Structure and description

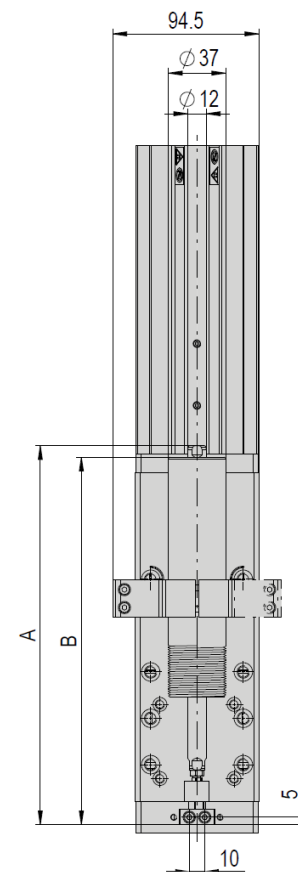
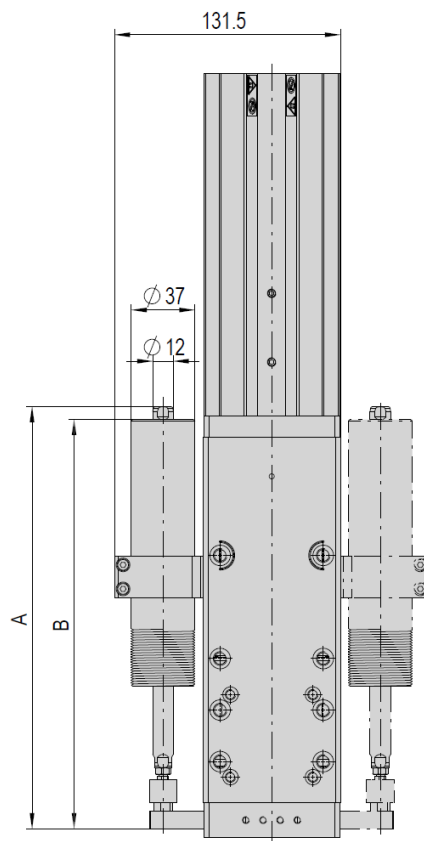
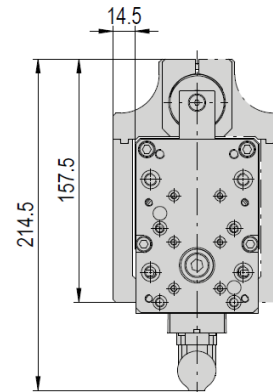
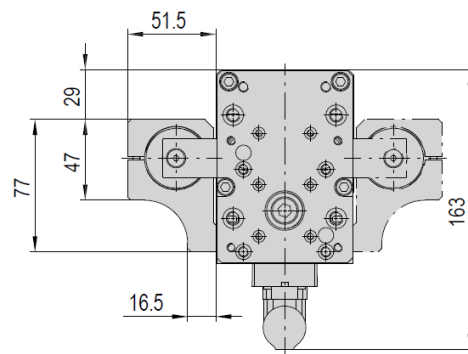
Overview MagSpring ES40 and ES40-HP

Electro slide	ES40	xxxxxxx	xxxxxxx		xxxxxxx	x	x
	ES40-100-SL	50465218	MagSpring side (s)	MagSpring front (v)	External position measuring system	Position MagSpring	
	ES40-100	50465219					
	ES40-200	50465220					
	ES40-300	50465221					
	ES40-400	50465222					
	ES40-500	50465223					
MagSpring for ES40-100	MagSpring ES40 s/v 40N	50470226					50470229
	MagSpring ES40 s/v 50N	50470227	50470230				
	MagSpring ES40 s/v 60N	50470228	50470231				
MagSpring for ES40-200	MagSpring ES40 s/v 40N	50470232	50470235	Position external position measuring system			
	MagSpring ES40 s/v 50N	50470233	50470236				
	MagSpring ES40 s/v 60N	50470234	50470237				
MagSpring for ES40-300	MagSpring ES40 s/v 40N	50470238	50470241	Position external position measuring system			
	MagSpring ES40 s/v 50N	50470239	50470242				
	MagSpring ES40 s/v 60N	50470240	50470243				
	Without MagSpring				X		
External position measuring system	External position measuring system ES40 100mm			50470244	X		
	External position measuring system ES40 200mm			50470245			
	External position measuring system ES40 300mm			50470246			
	External position measuring system ES40 400mm			50470247			
	External position measuring system ES40 500mm			50470248			
	Without external position measuring system				X		
Mounting	Position MagSpring					P O S	
	Position external position measuring system					P S	

Technical data MagSpring ES40 40N-60N

MagSpring side	ES40-100/-SL/-HP	ES40-200/-HP	ES40-300/-HP
A	245.5 mm	325.5 mm	405.5 mm
B	238 mm	300.5 mm	363 mm

MagSpring front	ES40-100/-SL/-HP	ES40-200/-HP	ES40-300/-HP
A	245.5 mm	325.5 mm	405.5 mm
B	238 mm	300.5 mm	363 mm



Structure and description

Magspring ES40-100	side			front		
Order number	50470226	50470227	50470228	50470229	50470230	50470231
Stroke H	100 mm	100 mm	100 mm	100 mm	100 mm	100 mm
Net weight	1.205 kg	1.205 kg	1.205 kg	1.295 kg	1.295 kg	1.295 kg
Permanent force	40 N	50 N	60 N	40 N	50 N	60 N

Magspring ES40-200	side			front		
Order number	50470232	50470233	50470234	50470235	50470236	50470237
Stroke H	200 mm	200 mm	200 mm	200 mm	200 mm	200 mm
Net weight	1.842 kg	1.842 kg	1.842 kg	2.02 kg	2.02 kg	2.02 kg
Permanent force	40 N	50 N	60 N	40 N	50 N	60 N

Magspring ES40-300	side			front		
Order number	50470238	50470239	50470240	50470241	50470242	50470243
Stroke H	275 mm	275 mm	275 mm	275 mm	275 mm	275 mm
Net weight	2.382 kg	2.382 kg	2.382 kg	2.56 kg	2.56 kg	2.56 kg
Permanent force	40 N	50 N	60 N	40 N	50 N	60 N

5.3.2 External position measuring system for ES40 and ES40-HP

The contactless position measuring system on a magnetic basis with integrated evaluation electronics is used everywhere, where you cannot safely reference the axes. In addition, a high positional accuracy and a high accuracy are achieved and quiet driving behaviour.

The system consists a sensor and a tape on which magnetic information are stored. Both components are fixed to the module.

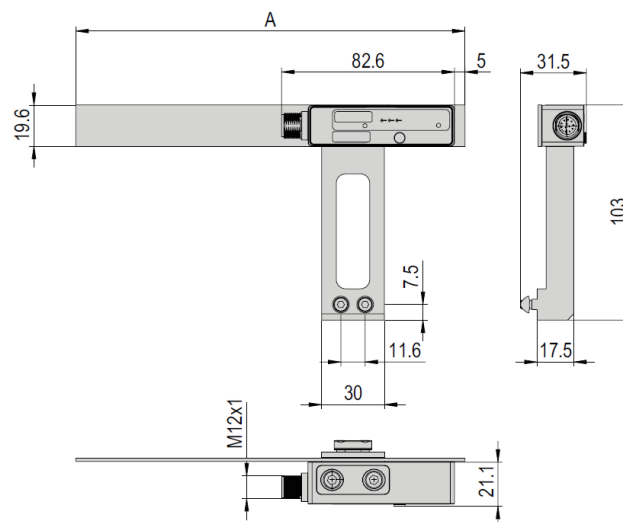
With the internal measuring system of the motor, a repeatability of ± 0.05 mm and a deviation of the absolute accuracy between 0.1% and 0.4% (depending on the drive unit) is achieved. Is this not enough, we recommend an external measuring system.

Advantages:

- Referencing not necessary
- High repeatability and absolute accuracy
- Dynamic and quiet driving
- Minimize control noise

External position measuring system ES40 and ES40-HP

External position measuring system ES40/-HP/-SL	100	200	300	400	500
Order number	50470244	50470245	50470246	50470247	50470248
Net weight	0.172 kg	0.185 kg	0.197 kg	0.21 kg	0.222 kg
Repeat accuracy	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm
A	186 mm	286 mm	386 mm	486 mm	586 mm



Setting of the external position measuring system

Distance between sensor and belt

The sensor is installed parallel to the belt using a feeler gauge. The value can be found in the table below.

Sensor type	Distance min. [mm]	Distance max. [mm]	Recommended distance [mm]
1MSA501	0.2	1.3	0.5

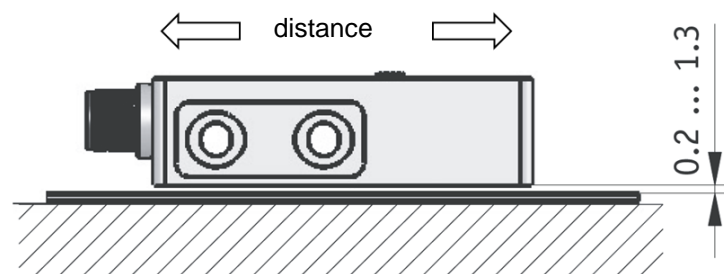


Fig. 8 External position measuring system (example illustration)

5.3.3 Servo controller

Modules	SE-24	SE-Power 1kVA	SE-Power 3kVA	SE-Power 6kVA	C11xx	C12xx	E12xx	E14xx	Third party con- trollers
Catalogue HT linear									
ES12					Standard	Alternative	Alternative	Alternative	Alternative
ES20					Standard	Alternative	Alternative	Alternative	Alternative
ES30					Standard	Alternative	Alternative	Alternative	Alternative
ES40/-HP					Standard	Alternative	Alternative	Alternative	Alternative
SA-1/-FL		Standard			Alternative	Alternative	Alternative	Alternative	Alternative
SA-3/-FL		Standard			Alternative	Alternative	Alternative	Alternative	Alternative
SA-6/-FL		Standard			Alternative	Alternative	Alternative	Alternative	Alternative
PEZ-52		Standard			Alternative	Alternative	Alternative	Alternative	Alternative
PEZ-65		Standard			Alternative	Alternative	Alternative	Alternative	Alternative
PEZ-80		Alternative	Standard	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative
PEZ-100		Alternative	Standard	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative
PDZ-128		Standard	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative
PDZ-160		Alternative	Standard	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative
PDZ-200		Alternative	Standard	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative
PEL20/-SL					Standard	Alternative	Alternative	Alternative	Alternative
PDL30					Standard	Alternative	Alternative	Alternative	Alternative
PDL40/-HP					Standard	Alternative	Alternative	Alternative	Alternative
Catalogue HT gripping & turning									
RE-50		Standard			Alternative	Alternative	Alternative	Alternative	Alternative
RE-50 18-100V		Alternative			Standard	Alternative	Alternative	Alternative	Alternative
RE-75		Standard			Alternative	Alternative	Alternative	Alternative	Alternative
RE-75 18-100V A		Alternative			Standard	Alternative	Alternative	Alternative	Alternative
SE20					Standard	Alternative	Alternative	Alternative	Alternative
SE30					Standard	Alternative	Alternative	Alternative	Alternative
RA-40					Standard	Alternative	Alternative	Alternative	Alternative
SG-50	Standard				Alternative	Alternative	Alternative	Alternative	Alternative
SG-50-ABq					Standard	Alternative	Alternative	Alternative	Alternative

The servo controllers (except the third party controllers) are servo position controllers that are specifically tailored to all Afag modules and axes. They provide you, the user, with extremely short commissioning times and simple, practical handling. The effort required for system integration is reduced to a minimum because all modules and axes are parameterised ex works, and processed to ensure optimal operation.

Note: In order to be connected to third party controllers, all cables are also available with open ends. If you have any questions, please contact your sales partner.

Standard
 Alternative

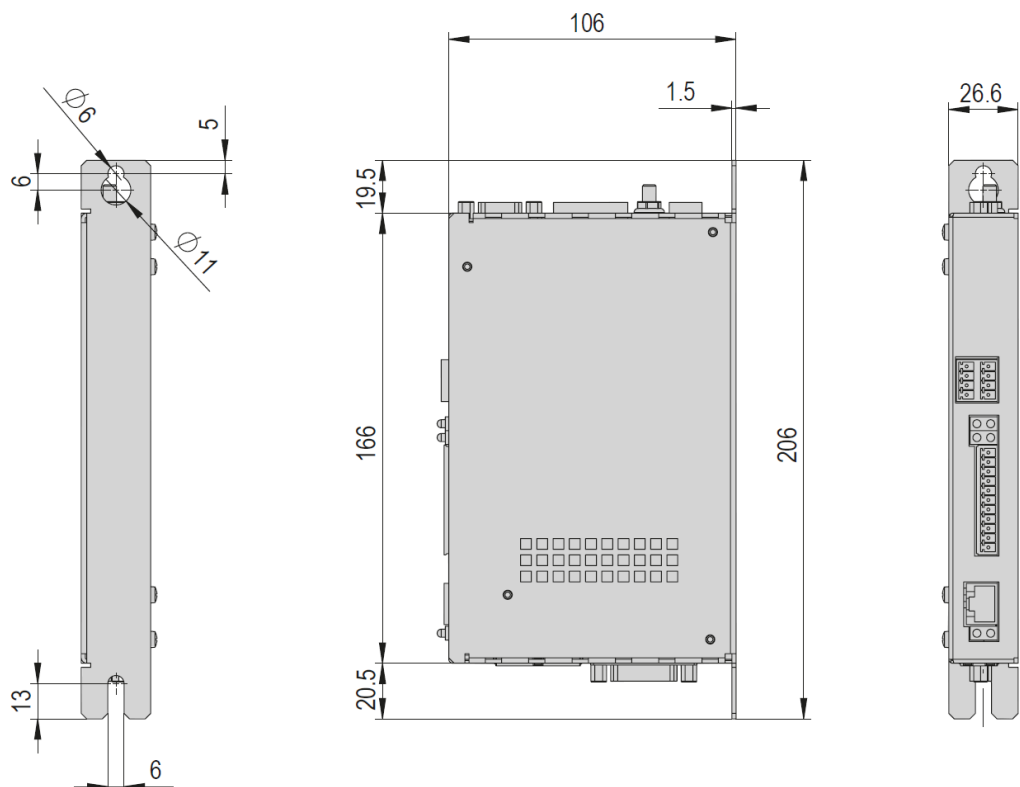
Fig. 9 Overview of servo controllers

Technical data servo controllers

Controller C11xx

C11xx	
Operating temperature	0 - 40 °C
Bearing temperature	-25 - 70 °C
Humidity	< 90 %

Type	C1100 CanOpen STO	C1150 EtherCat STO	C1150 Profinet PN STO
Order number	50419402	50419403	50419404
Net weight	0.7 kg	0.7 kg	0.7 kg
Dimensions W x H x D	26.6x206x106 mm	26.6x206x106 mm	26.6x206x106 mm
Nominal output current	25 A	25 A	25 A
Supply voltage	24 - 72 VDC	24 - 72 VDC	24 - 72VDC
Control voltage	24 VDC	24 VDC	24 VDC
Protection type	IP 20	IP 20	IP 20
Intermediate circuit voltage	24 - 80 VDC	24 - 80 VDC	24 - 80 VDC
Programming interface	RS 232	RS 232	RS 232



Included in the delivery

- 1x Plug kit for C1xxx-1S

Accessories

- Power supply S01-72/500, 1-phase
- Motor plug for controller C1x00
- USB-RS232 Converter for controllers

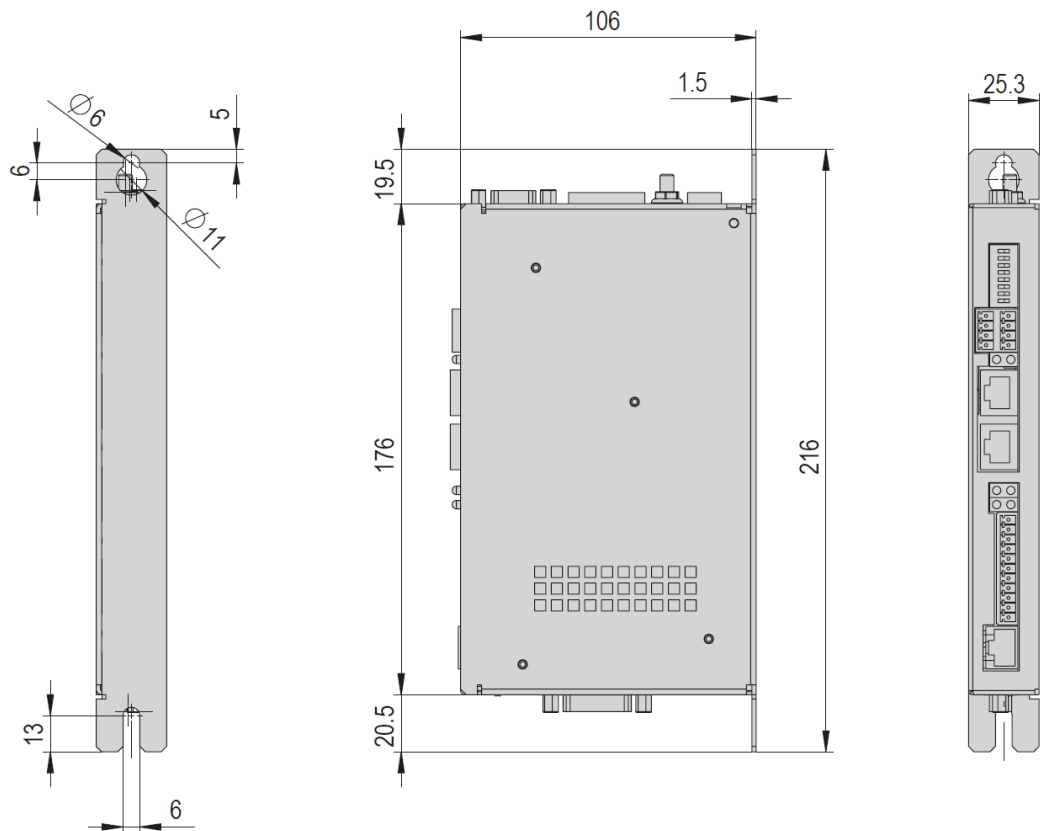
Alternative Accessories

- Additional power supplies

Controller C12xx

C12xx	
Operating temperature	0 - 40 °C
Bearing temperature	-25 - 70 °C
Humidity	< 90 %

Type	C1250 EtherCat STO	C1250 Profinet PN STO
Order number	50419400	50419401
Net weight	0.7 kg	0.7 kg
Dimensions W x H x D	25.3x216x106 mm	25.3x216x106 mm
Nominal output current	25 A	25 A
Supply voltage	24 - 72 VDC	24 - 72 VDC
Control voltage	24 VDC	24 VDC
Protection type	IP 20	IP 20
Intermediate circuit voltage	24 - 80 VDC	24 - 80 VDC
Programming interface	RS 232	RS 232


Included in the delivery

- 1x Plug kit for C1xxx-1S

Accessories

- Power supply S01-72/500, 1-phase
- Motor plug for controller C1x00
- USB-RS232 Converter for controllers

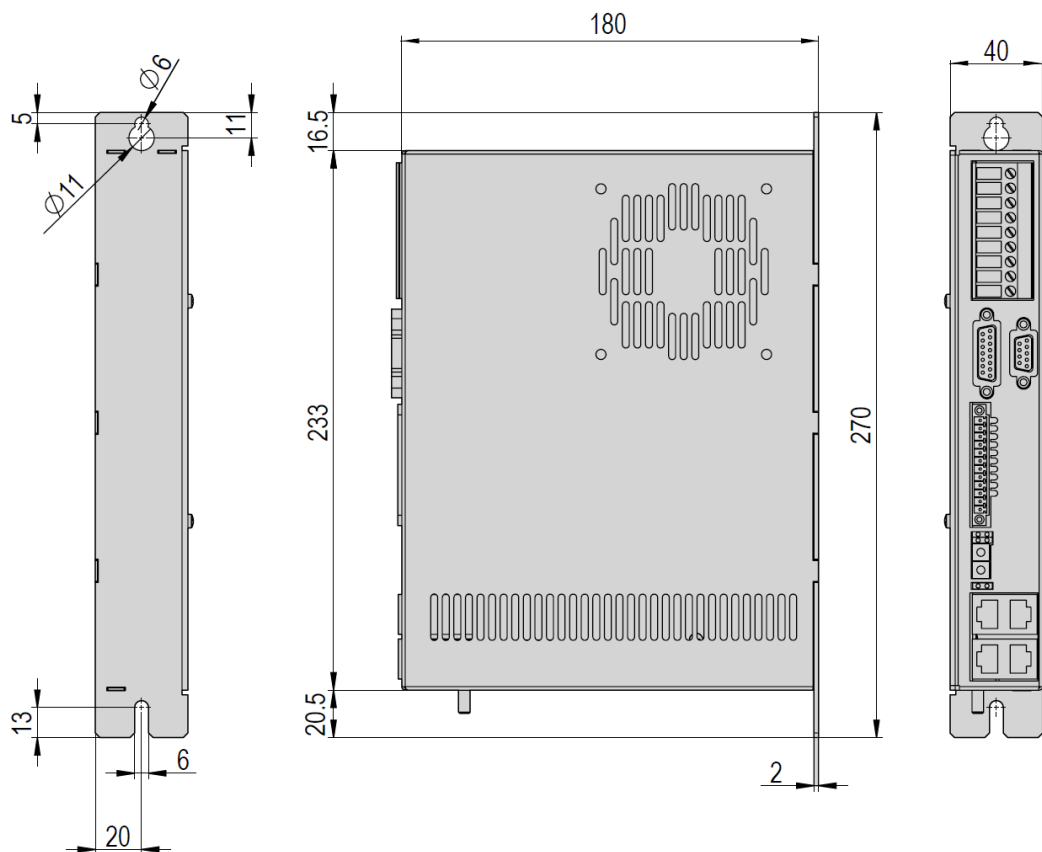
Alternative Accessories

- Additional power supplies

Controller E12xx

E12xx	
Operating temperature	0 - 40 °C
Bearing temperature	-25 - 40 °C
Humidity	< 90 %

Type	E1250 Powerlink PL-UC	E1250 Ethernet IP-UC	E1250 Ethercat SoE SE-UC	E1250 Sercos III SC-UC
Order number	50465787	50465792	50465793	50465794
Net weight	1 kg	1 kg	1 kg	1 kg
Dimensions W x H x D	40x270x180 mm	40x270x180 mm	40x270x180 mm	40x270x180 mm
Nominal output current	32 A	32 A	32 A	32 A
Supply voltage	24 - 72 VDC	24 - 72 VDC	24 - 72 VDC	24 - 72 VDC
Control voltage	24 VDC	24 VDC	24 VDC	24 VDC
Protection type	IP 20	IP 20	IP 20	IP 20
Intermediate circuit voltage	max. 91 VDC	max. 91 VDC	max. 91 VDC	max. 91 VDC
Programming interface	RS 232 + Ethernet	RS 232 + Ethernet	RS 232 + Ethernet	RS 232 + Ethernet




Accessories

- Power supply S01-72/500, 1-phase
- USB-RS232 Converter for controllers


Alternative Accessories

- Additional power supplies

5.3.4 Controllers, cables, plugs



USB-RS232 converter for Linmot controller



C11xx & C12xx

	M			G	R	Motor connector	Plug X3	Adapter
	...-X	...-1	...-2	...-1	...-1			
ES12	M16	M16	M16					50455642
ES20	M16	M16	M16					
ES30	M23	M17						
ES40	M23	M17						
SA-1		M10		G14	R8	50426481	50530603	
SA-3		M10		G14	R1	50426481	50530603	
SA-6		M18		G16	R1	50426481	50530603	
PEZ-52		M18		G16	R1	50426481	50530603	
PEZ-65		M18		G16	R1	50426481	50530603	
PDZ-128		M18		G16	R1	50426481	50530603	
PEL20	M16	M16	M16					
PDL30	M23	M17						
PDL40	M23	M17						
RE-50 18-100V		M12		G14	R1	50426481		
RE-75 18-100V A		M27		G14	R1	50426481		
RA-40	M16	M16	M16					
SE20	M16	M16	M16					
SE30	M23	M17						
SG-50-Abq		M19				50426481		




The C11xx and C12xx controllers are supplied with a plug set.

Structure and description

←

→

USB-RS232
converter for
Linmot controller



E12xx

	M		G	R	Adapter
	...-X	...-1	...-2	...-1	
ES12	M20	M20			50455642
ES20	M20	M20			
ES30	M24	M22	M22		
ES40	M24	M22	M22		
SA-1		M10	G14	R8	
SA-3		M10	G14	R1	
SA-6		M18	G16	R1	
PEZ-52		M18	G16	R1	
PEZ-65		M18	G16	R1	
PDZ-128		M18	G16	R1	
PEL20	M20	M20			
PDL30	M24	M22	M22		
PDL40	M24	M22	M22		
RE-50 18-100V		M12	G14	R1	
RE-75 18-100V A		M27	G14	R1	
RA-40	M20	M20			
SE20	M20	M20			
SE30	M24	M22	M22		

Accessories C1xxx

Motor plug for controller C1xxx

Order number 50426481

Net weight 0.01 kg

Plug kit for controller C1xxx-15

Order number 50426471

Net weight 0.02 kg

USB-RS232 Converter for controllers

Order number 50426494

Net weight 0.07 kg

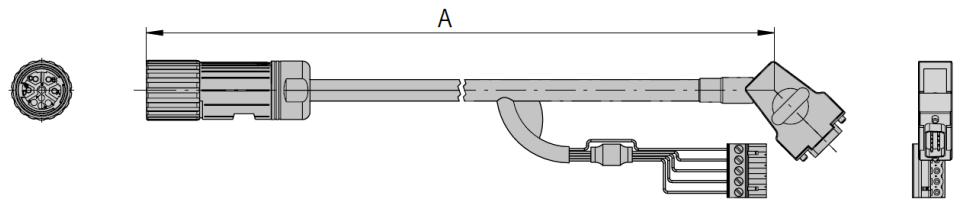
Plug X3 for controller C1xxx

Order number 50530603

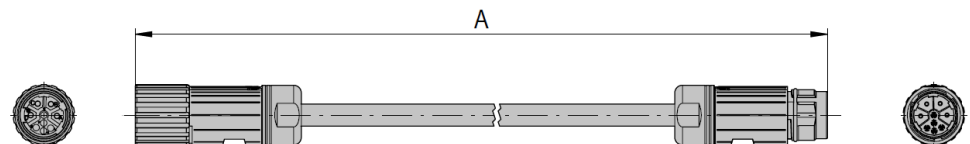
Net weight 0.02 kg

Cable types
Motor cable M17-0-1-1

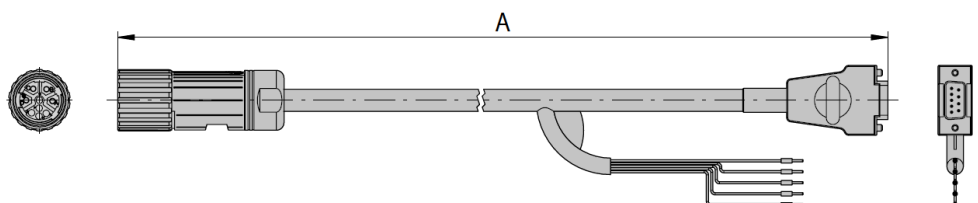
Motor cable-M17-0-1-1	4m-0-1-1	6m-0-1-1	8m-0-1-1
Order number	50437170	50437169	50427021
Net weight	0.6 kg	0.8 kg	1.1 kg
Cable Ø	10.8 mm	10.8 mm	10.8 mm
Min. bending radii	100 mm	100 mm	100 mm
Material	PUR	PUR	PUR
A	4 m	6 m	8 m


Motor cable extension to M17-0-0-1/2

Motor cable extension for M17-0-0-1/2	2m-0-0-1	4m-0-0-1	6m-0-0-1	2m-0-0-2	4m-0-0-2
Order number	50463084	50427024	50463087	50463085	50463086
Net weight	0.4 kg	0.8 kg	1.2 kg	0.4 kg	0.8 kg
Cable Ø	10.8 mm	10.8 mm	10.8 mm	10.9 mm	10.9 mm
Min. bending radii	100 mm	100 mm	100 mm	100 mm	100 mm
Material	PUR	PUR	PUR	PUR	PUR
A	2 m	4 m	6 m	2 m	4 m

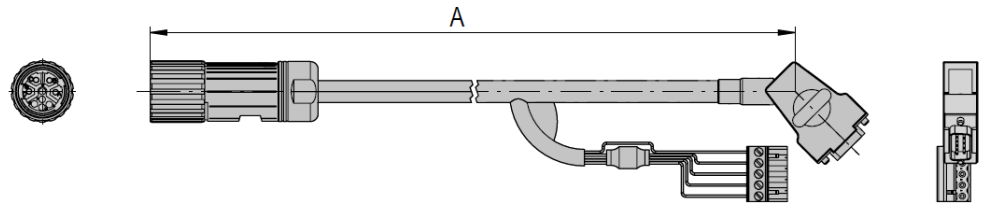

Motor cable-M22-0-2-1

Motor cable-M22-0-2-1	4m-0-2-1	6m-0-2-1	8m-0-2-1
Order number	50463100	50463101	50463103
Net weight	0.7 kg	1.1 kg	1.4 kg
Cable Ø	10.8 mm	10.8 mm	10.8 mm
Min. bending radii	100 mm	100 mm	100 mm
Material	PUR	PUR	PUR
A	4 m	6 m	8 m



Motor cable-M23-0-1-x

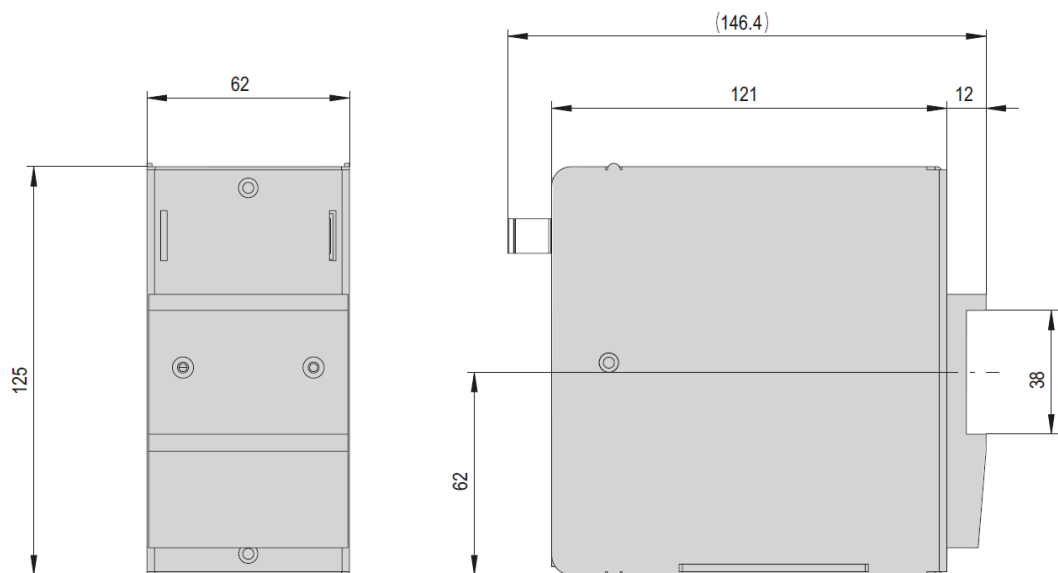
Motor cable-M23-0-1-X	4m-0-1-X	6m-0-1-X	8m-0-1-X
Order number	50463104	50463105	50463106
Net weight	1 kg	1.5 kg	2 kg
Cable Ø	11.2 mm	11.2 mm	11.2 mm
Min. bending radii	static 50 mm	static 50 mm	static 50 mm
Material	PUR	PUR	PUR
A	4 m	6 m	8 m



5.3.5 Transformers and power supplies
Power supply S01-72/500, 1 phase

Power supply S01-72/500, 1 phase	
Operating temperature	-25 - 70 °C

Type	Power supply S01-72/500, 1-phase
Order number	50439465
Net weight	1 kg
Protection rating	IP 20
Output power	480 W
Primar voltage	90 - 132 VAC, 50/60 Hz oder 180 - 264 VAC, 50/60 Hz
Secondary voltage	54 - 80 VDC adjustable
Nominal output current	10 A
External fuse	6 A (C, D, K Typ)



Structure and description

Power supply S01-72/1000, 3 phases

Power supply S01-72/1000, 3 phase

Operating temperature

-25 - 70 °C

Type

Power supply S01-72/1000, 3-phase

Order number

50439466

Net weight

2 kg

Protection rating

IP 20

Output power

960 W

Primary voltage

3x 340 - 550 VAC, 50/60 Hz

Secondary voltage

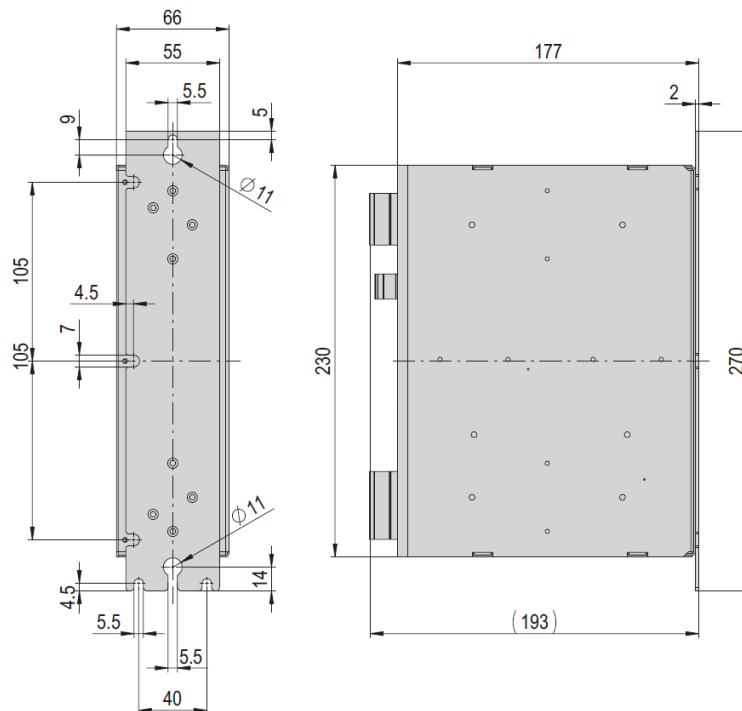
54 - 80 VDC adjustable

Nominal output current

27 A

External fuse

16-32 A (C, D, K Typ)



6 Installation, assembly & setting



The customer is responsible for the installation of the electric slides into the automation system!

6.1 Safety Instructions for installation & assembly

The electric slide is an incomplete machine.

For safe operation, the electric slides must be integrated into the safety concept of the automation system in which they are installed.

During normal operation it must be ensured that the user cannot interfere with the working area of the electric slide.



When installing an electric slide in an assembly system, the system operator must provide the system with a protective device with a locked door safety circuit!

CAUTION



Danger of injury from attachments!


The electric slide is electrically controlled. Attachments can restrict the free movement of the electric slide and cause injuries such as crushing.

- Make sure that the movement of the is not restricted by mounted attachments.
- Take appropriate measures to ensure safe operation!



No liability can be assumed for damages caused by improper installation/assembling work carried out by the operator.



Also observe the safety instructions in  chap. 2 „Safety instructions“ in this manual.

6.2 Assembly & attachment

The electric slides (up to sizes ES40-300) can be installed in any position, the mounting holes (M8 and M6) are on the slide. Use the centering sleeves included in the scope of delivery.

The ES40-400 and ES40-500 may only be mounted in a horizontal position as no load compensation (MagSpring) is available for vertical mounting.

6.2.1 Mounting holes

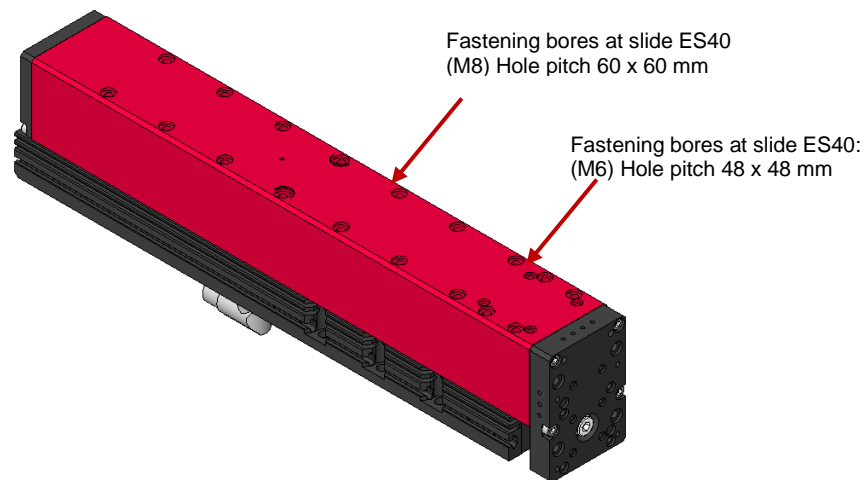


Fig. 10 Mounting holes on the slide

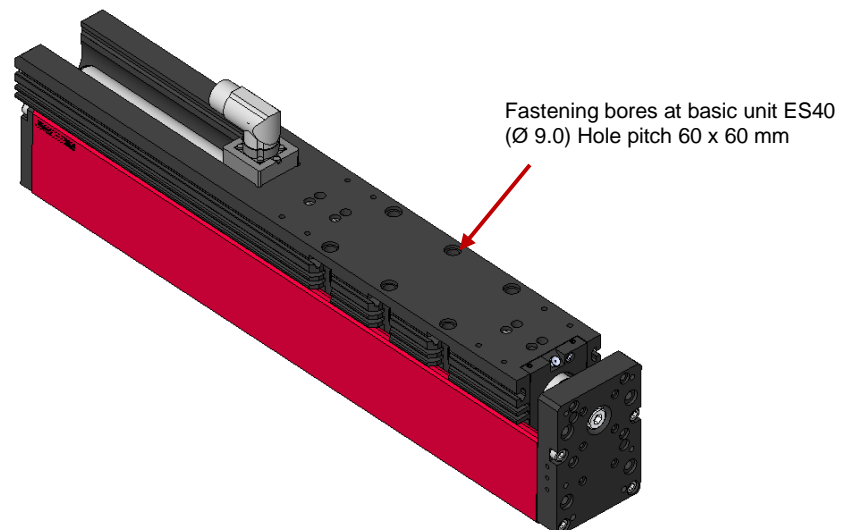


Fig. 11 Mounting holes on the base element



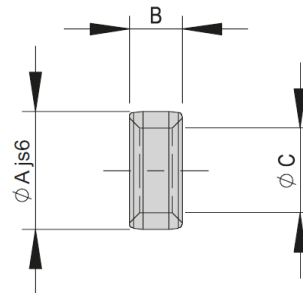
For mounting use the centering sleeves (➡ chapter 6.2.2) included in the scope of delivery.

6.2.2 Centering bushing

Use the centring sleeves supplied for positioning. Insert the centering sleeves in two diagonally opposed holes of the installation grid.

ES40	Base element	Slide
Hole grid	60 x 60 mm	60 x 60 mm 48 x 48 mm
Bore hole and fastening thread	Ø 9.0 mm	M8 M6
Centr. sleeves (H7) 50187424 Centr. sleeves (H7) 11004942	Ø 12 mm	Ø 12 mm Ø 9 mm

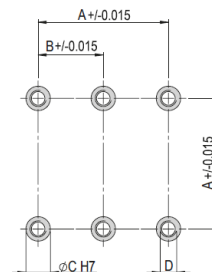
Centering bushings	Ø4x2	Ø5x2.5	Ø7x3	Ø8x3.5	Ø9x4	Ø12x4.8	Ø19x5.8
Order number	50332257	50035831	11016850	50263565	11004942	50187424	50189497
Net weight	0.001 kg	0.001 kg	0.001 kg	0.001 kg	0.001 kg	0.002 kg	0.006 kg
A	4 mm	5 mm	7 mm	8 mm	9 mm	12 mm	19 mm
B	2 mm	2.5 mm	3 mm	3.5 mm	4 mm	4.8 mm	5.8 mm
C	2.6 mm	3.2 mm	4.3 mm	5.4 mm	6.5 mm	8.5 mm	13 mm



Attachment grid	16x16 mm	20x20 mm	30x30 mm	38x38 mm	48x48 mm	60x60 mm	75x75 mm	96x96 mm
A	16 mm	20 mm	30 mm	38 mm	48 mm	60 mm	75 mm	96 mm
B	8 mm	10 mm	15 mm	19 mm	24 mm	30 mm	38 mm	48 mm
C	4x1.1 mm	5x1.3 mm	7x1.6 mm	8x1.8 mm	9x2.1 mm	12x2.5 mm	15x2.7 mm	19x3 mm
D	M2.5	M3	M4	M5	M6	M8	M10	M12

Module-centering, centering bushings

In order to guarantee a high and repetitive fit accuracy during installation, operation or replacement of a module, all components of the entire program are consequently provided with a precise module centering. Centering bushings or pins are supplied as standard with each module.



6.2.3 Tightening torques

For assembling use screws with the following minimum specifications:

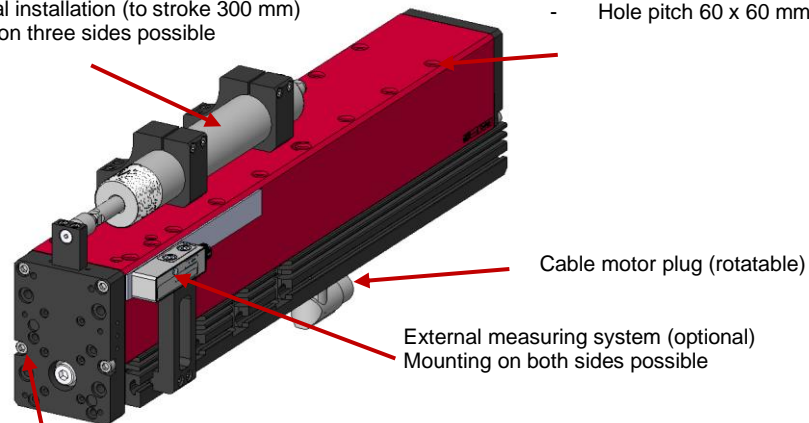
Standard	VDI 2230
Screw strength	Category 8.8
Surface:	Galvanized blue, oiled or greased

Thread	Tightening torque
M3	1.1 ... 1.4 Nm
M4	2.6 ... 3.3 Nm
M5	5.2 ... 6.5 Nm
M6	9.0 ... 11.3 Nm
M8	21.6 ... 27.3 Nm

6.2.4 Mounting ES40 (slide)

MagSpring (optional)
For vertical installation (to stroke 300 mm)
Mounting on three sides possible

Mounting of the module (slide):
- M8 with centring \varnothing 12 H7
- Hole pitch 60 x 60 mm

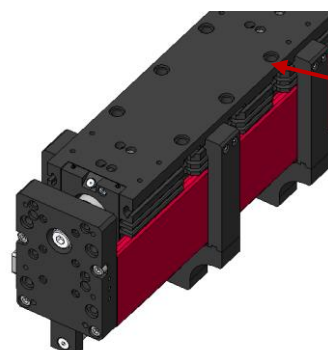


Fastening of the periphery:

- 4x M8 with centring \varnothing 12 H7 hole pitch 60 x 60 mm
- 6x M6 with centring \varnothing 9 H7 hole pitch 48 x 48 mm
- 6x M4 with centring \varnothing 7 H7 hole pitch 30 x 30 mm

Fig. 12 Electric slide ES40 (mounting of the slide)

6.2.5 Mounting ES40 (basic element)



Mounting of the module (base element):
- \varnothing 9 with centring \varnothing 12 H7 hole pitch 60 x 60 mm

Fig. 13 Electric slide ES40 (mounting basic element)

NOTICE**Magnetic tape with information!**

The magnetic tape of the external measuring system contains information.

- Keep sufficient distance from other magnetic sources.

6.2.6 Rotatability of C motor connector (ES40)

If C-motor connector are provided for the ES40 modules, the C-connector can be rotated in both directions (see Fig. 14). In this case, the maximum rotatability of the C-connector must be observed.

NOTICE**Risk of damage to the motor!**

Do not overtighten the motor connector beyond the intended position, as this will damage the motor.

- If it is necessary to adjust the connector, always observe the maximum permissible rotatability (see Fig. 14).

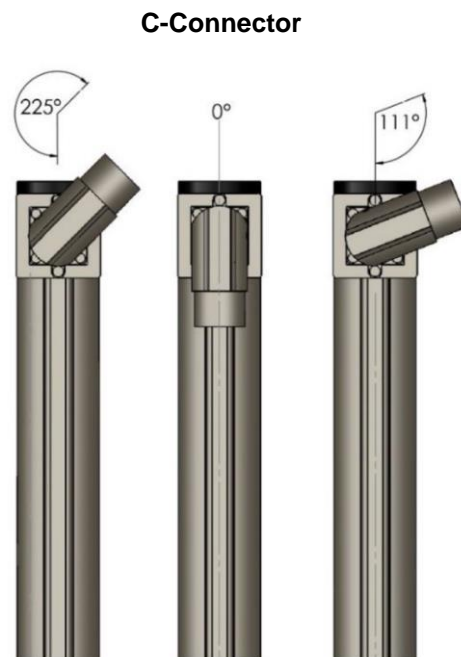


Fig. 14 Setting the C-motor connector (ES40 modules)



Our service technicians will be happy to answer any further questions you may have about setting the C-motor plugs.

6.3 Programming of the electric slides

6.3.1 Safety instructions for programming



WARNING

Risk of injury due to flying parts ejected from the module!

If the control unit is incorrectly programmed, the electric slides can move to the stop position unbraked and injure persons by ejected parts.

- Programming should only be carried out by qualified personnel.
 - Observe the operating instructions of the control system used!
-



CAUTION

Risk of injuries due to uncontrolled parts movements!

If the position sensor fails or a limit switch cable is defective, unexpected movements of the electric slides may occur and cause injuries.

- Replace the defective position sensor or limit switch cable immediately.
-

6.3.2 Programming



The programming differs depending on the control system used.

Observe the respective manuals of the control system manufacturer!

7 Commissioning

After connection, the electric slides are put into operation for the first time via the control.

7.1 Safety instructions for commissioning

WARNING



Risk of injury from incorrect programming!

Incorrect programming can cause uncontrolled movements of the ES, resulting in serious injury or death and material damage.

- Commissioning must only be carried out in setup mode or jog mode.
 - Before working on the electric slide, make sure that the control unit is switched off and that it cannot be switched on again unintentionally.
-

CAUTION



Danger of injury in the working area of the electric slides!

Due to the decentralised control system, the operator of the electric slide must not necessarily stand next to the rotary modules during operation so that he may not have a complete view of the working area. Persons within the working area may be injured.

- When operating the electric slides, ensure a good overview of the entire working area.
 - Unauthorized persons must not stay within the working area during operation.
-

CAUTION



Risk of injuries due to uncontrolled parts movements!

When the control unit is switched on, signals from the control unit can lead to unintentional movements of the electric slides and cause serious injuries or material damage.

- When working on the electric slides, make sure that the control unit is switched off and that it cannot be switched on again unintentionally.
 - Only connect or disconnect the cables when the control unit is switched off.
 - Observe the operating instructions of the controller used!
-



Observe the safety instructions in  chapter 2 "Safety instructions" of these mounting instructions!

7.2 Preparatory activities for commissioning

The electric slide is designed for operation with LinMot servo controllers.

The operation of the servo controllers is described in the operating manual of the respective servo controller.

To prepare commissioning proceed as follows:

1. Connect the electric slide with the motor cable M16 and an adapter cable to the servo controller.
2. For test operation:
 - Connect the servo controller to a computer on which the operating software is installed (refer to ↻ operating instructions of the operating software).



If the electric slide is delivered with a LinMot servo controller, the operating parameters are already stored in the controller.

The electric slide can be operated immediately.

CAUTION

Danger due to missing safety devices!

Operating the electric slide without appropriate protective devices can lead to considerable material damage and injuries.



- The user must provide protective hoods, safety doors or other appropriate safety measures for operation!
- These safety devices must comply with the usual safety guidelines and safety standards and prevent people from being in the working area of the electric slide in an appropriate manner.
- The electric slides may only be put into operation with closed and functioning safety devices!

7.3 Commissioning of the modules

Proceed carefully and follow the instructions step by step when commissioning the modules for the first time:

1. Observe the permissible technical values (↻ Chapter 3).
 - Payload
 - Movement frequency
 - Momentary load
2. Make sure that there are no persons or tools in the working area.
3. Connect the cable to the electric slide and the system control.
4. Perform test run:
 - Start with slow movements
 - Then continue under normal operating conditions

⇒ Commissioning is completed.

Setting the speeds on the electric axes

The speeds of the electric axes are usually specified by the higher-level control system.

A variety of example programs are available for a large number of common control systems. This allows the target speed, the acceleration and the target position to be specified.

NOTICE

Material damage due to excessive speeds or acceleration!

Excessively high speeds or acceleration can cause damage to the electric slide or the periphery.

- Observe the operating instructions of the control unit used!

7.4 Setting up & retrofitting



Before carrying out any setting work at the electric slide, deactivate the controller enable. Activate the controller enable only after the work has been completed!

CAUTION



Risk of injury due to incorrect operation of the system!

Incorrect operation during setup work on the machine can lead to unintentional starting of the electric slide and cause injuries.

- Setting up and retrofitting work may only be carried out by qualified personnel.
- Observe the operating instructions!

CAUTION



Danger of injury from attachments!

The electric slide is electrically controlled. Attachments can restrict the free movement of the electric slide and lead to injuries.

- Ensure that the movement of the electric slide is not restricted by mounted attachments.
- Take appropriate measures to ensure safe operation!

8 Fault elimination

8.1 Safety instructions for troubleshooting

WARNING



Danger of injury due to faulty troubleshooting!

Poorly performed troubleshooting work can lead to serious injuries and damage to property.

- Only use trained specialist personnel for troubleshooting.
- All work on the electric slides must be carried out with the power supply cut off!


NOTICE

Risk of material damage due to unexpected movements!

There is a risk of material damage if unusual movement of the electric slides (e.g. hard shocks) is detected during normal operation.

- Stop the system immediately and eliminate the cause!



Also observe the safety instructions in  chap. 2 „Safety instructions“ in this manual.

8.2 Fault causes and remedy

The following table contains an overview of possible fault causes and how to proceed to eliminate them.

Fault	Possible cause	Remedy:
Slide does not move	<ul style="list-style-type: none"> ▪ Payload too high ▪ Slide blocked by foreign matter ▪ Module defect ▪ Module incorrectly connected 	<ul style="list-style-type: none"> ▪ Reduce payload ▪ Remove foreign matter ▪ Send module to Afag for overhaul ▪ Check connections and connect module correctly
Slide does not approach end position correctly	<ul style="list-style-type: none"> ▪ Incorrect control 	<ul style="list-style-type: none"> ▪ Check and correct control
Abnormal noises or rough running	<ul style="list-style-type: none"> ▪ Soiling of the module ▪ Tensions ▪ insufficient lubrication 	<ul style="list-style-type: none"> ▪ Cleaning the module ▪ Install the module without tension ▪ Lubricating the module

9 Maintenance and repair

9.1 General notes

The electric slides are almost maintenance-free. Nevertheless, some maintenance work must be carried out to ensure an optimum operating condition of the electric slides.

9.2 Safety instructions for maintenance and repair

WARNING



Danger of injury due to improper maintenance!

Improperly carried out maintenance activities can cause considerable damage to property and serious injury.

- Only use qualified personnel to carry out the activities.
 - Always wear personal protective equipment when carrying out maintenance and repair work!
-

WARNING



Risk of injuries due to uncontrolled parts movements!

Signals from the control system can trigger unintentional movements of the electric slides and cause injury.

- Before starting any work on the electric slides, switch off the control unit and make sure that it cannot be switched on again unintentionally. Observe the operating instructions of the controller used!
 - Before starting any activities, switch off the media supply and make sure it cannot be switched on again unintentionally!
-



Also observe the safety instructions in  chap. 2 „Safety instructions“ in this manual.

9.3 Maintenance activities and maintenance intervals



- Observe the specified maintenance and care intervals. The intervals refer to normal operating conditions.
- If the electric slides are to be operated in an environment with abrasive dusts or corrosive or aggressive vapours, gases or liquids, the approval of Afag Automation AG must be obtained in advance.

9.3.1 Overview of the maintenance points

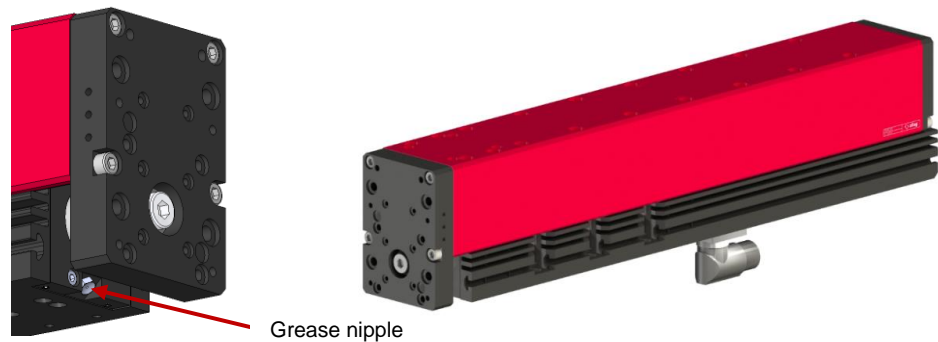





Fig. 15 Electric slide

No.	Maintenance point	Maintenance work	Interval	System [On/Off]	Remarks
1	Fasteners	Checking 	After commissioning	[Off]	-
					<ul style="list-style-type: none"> ▪ Check screws for tight fit
2	Guideways	Cleaning 	After commissioning	[Off]	-
					<ul style="list-style-type: none"> ▪ Clean guides with a slightly oily cloth
3	Linear motor axes with wiper	Cleaning and lubricating 	every 3 months	[Off]	Recommended lubricant: Klübersynth UH1 14-31
					<ul style="list-style-type: none"> ▪ Clean the rotor ▪ Lubricate linear motor axes with a grease gun via the grease nipple (Fig. 15) on the axis. Recommended lubricant: Klübersynth UH1 14-31. If other lubricants are used, see 'Minimum requirements for lubricant' below. ▪ Minimum requirements for lubricant: <ul style="list-style-type: none"> - Lithium soap grease KP2-K (DIN-Nr.: 51502 or 51825 - Lubric. oil CLP32-100 (DIN-Nr.: 51517, 3) ISO VD 32-68

9.3.2 Further maintenance

Further maintenance is not required, if the ambient conditions listed below are complied with:

- Clean working area
- No use of splash water
- No abrasive or process dust and vapours
- Ambient conditions as specified in the technical data

9.4 Spare parts and repair work

AFAG Automation AG offers a reliable repair service. Defective electric slides can be sent to AFAG for repair within the warranty period.

After expiry of the warranty period, the customer may replace or repair defective modules or wear parts himself or send them to the AFAG repair service.



Please note that AFAG does not provide any warranty for modules that have not been replaced or repaired by AFAG!

CAUTION

Risk of injury when removing the electric slides from uncontrolled movements!

When dismantling the electric slides from the machine, there is a danger of uncontrolled movements.

- Disconnect the media supply (electrics) before removing the grippers!
 - Disassembling should only be carried out by qualified personnel!
 - Only remove the electric slides when the control system is switched off and secured!
-



10 Decommissioning and disposal

The electric slides must be properly dismantled after use and disposed of in an environmentally friendly manner.

10.1 Safety instructions for decommissioning and disposal

WARNING




Risk of injury from improper decommissioning and disposal!

Improperly carried out activities can result in considerable material damage and serious injury.

- Use only qualified personnel to carry out the activities.
 - Disconnect the media supply (electrics) before removing the grippers!
 - Only remove the electric slides when the control system is switched off and secured!
-

10.2 Decommissioning

If the electric slides are not used for a longer period of time, they must be properly decommissioned and stored as described in  chapter 4.5.

10.3 Disposal

The electric slides must be disposed of properly at the end of their service life and the raw materials used must be recycled. Observe the legal regulations and company requirements.

The electric slides must not be disposed of as a complete unit. Dismantle the electric slides and separate the various components according to type of material and dispose of properly:

- Scrap the metallic materials.
- Hand over plastic parts for recycling.
- Sort the rest of the components by their material properties and dispose of them accordingly.

NOTICE

Risk to the environment from incorrect disposal of the electric slides.

Environmental damage can be caused by improper disposal of the electric slides.

- Electronic parts, electrical scrap, auxiliary and operating materials must be disposed of by approved specialist companies.
 - Information on proper disposal can be obtained from the responsible local authorities.
-

11 Declaration of incorporation

Declaration of incorporation

for partly completed machinery according to the Machinery Directive 2006/42/EC, Annex II, 1.B

The manufacturer hereby declares:

Afag Automation AG, Luzernstrasse 32, CH-6144 Zell

that the partly completed machine:

Product description	Electric slide ES
Type:	ES40-100-SL, ES40-100, ES40-200, ES40-300, ES40-400, ES40-500, ES40-100-HP-SL, ES40-100-HP, ES40-200-HP, ES40-300-HP, ES40-400-HP, ES40-500-HP

complies with the following essential health and safety requirements of the Machinery Directive 2006/42/EC at the time of declaration: 1.1; 1.1.1; 1.1.2; 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.5.1

Harmonised standards applied, in particular:	
2014/30/EU	Electromagnetic Compatibility Directive (EMC)
2014/35/EU	Low Voltage Directive (LVD)
EN ISO 12100:2010	Safety of machinery - General design principles - Risk assessment and risk reduction.
DIN EN 60204-1:2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements

Note: The partly completed machinery must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of Machinery Directive 2006/42/EC.

The manufacturer undertakes to transmit, in response to a reasoned request by the national authorities, relevant technical documentation for the partly completed machinery.

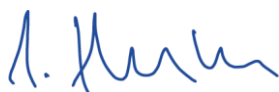
The relevant technical documentation were created according to Annex VII, Part B of the above-mentioned Directive.

Authorised representative for compiling the technical documentation:

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Zell, 31.05.2023

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