

Assembly and operating instructions

Electric gripper GE-25-P



Translation of the Original Assembly Instructions EN

■ GE-25-P ⇒ Order no.: 50538537

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 gripper or other options.

We wish you every success with our products!

With kind regards

Your Afag team

© Subject to modifications

The modules 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 gripper GE-25-P to ensure safe and efficient handling and operation.

Consistent compliance with these assembly instructions will ensure:

- permanent operational reliability of the GE-25-P,
- optimal functioning of the GE-25-P,
- timely detection and elimination of defects (thereby reducing maintenance and repair costs),
- extension of the service life of the GE-25-P.

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 module.

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

In addition to the assembly instructions, the following documents must be observed:

- General terms and conditions
- Catalogue data sheet of the GE-25-P
- Instructions for integrated components (→ supplier documentation)

This documentation can be downloaded from www.afag.ch.



Each GE-25-P 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 GE-25-P.

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.
- Parts in contact with the workpiece and wear parts are excluded from the warranty.

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

Note: However, a customer has a right to a defect-free product. This does also apply to defective accessories and wear parts. Normal wear and tear is excluded from the warranty.

The warranty shall expire in the following cases:

- Improper use of the module
- Non-observance of the instructions regarding assembly, commissioning, operation and maintenance as well as ambient and operating conditions.
- 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 module 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 gripper and optimal protection of personnel.

Safe handling and trouble-free operation of the EPS handling system requires knowledge of the basic safety regulations.

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

Beyond this, there are rules and regulations regarding accident prevention that are applicable to the place of installation which must be observed.

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 GE-25-P are used exclusively for gripping and time-limited safe holding of workpieces or objects.

The GE-25-P are intended for industrial and industry-related applications.

The GE-25-P are intended for installation in a machine. The applicable guidelines must be observed and complied with.



When implementing and operating the GE-25-P in safety-related parts of control systems, the basic safety principles according to DIN EN ISO 13849-2 must be applied. For categories 1, 2, 3 and 4, the proven safety principles according to DIN EN ISO 13849-2 must also be applied.

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 of the GE-25-P.

Especially the following use is considered a misuse:

- The use of the module as a pressing tool, punching tool, lifting tool, guiding aid, cutting tool, clamping device or drilling tool.
-



The GE-25-P must not be exposed to corrosive media. Products for special environmental conditions are excluded.

WARNING

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

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



- The module may only be used in a technically perfect condition in accordance with its intended use and the 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 damage 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 electric 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 gripper.

2.4.2 Obligations of the operating company

In addition to the safety instructions given in this manual, the operating company must comply with the safety, accident prevention and environmental protection regulations valid for the field of application of the electric gripper. The operating company is required to allow only persons to work on the GE-25-P 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 GE-25-P,
- 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 installation in which the modules are mounted,
- 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,
- update the related safety data sheets.

2.4.3 Obligations of the personnel

All personnel working with the GE-25-P are required to:

- read and observe these assembly instructions, especially the chapter on safety,
- to use the GE-25-P as intended,
- observe the occupational safety and accident prevention regulations,
- observe all safety and warning signs on the GE-25-P,
- all questionable safety practices are to be avoided
- to refrain from any working methods that impair the function and operational safety of the GE-25-P,
- to eliminate any faults that occur immediately,
- observe the maintenance and care instructions,
- to observe the safety, accident prevention and environmental protection regulations for the area of application of the GE-25-P.



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 gripper 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 gripper.

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

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 can identify 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 module, 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:

- To observe the occupational health and safety regulations and to comply with valid safety and accident prevention regulations,
- 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 GE-25-P which have not been described in these assembly instructions or approved in writing by Afag. Conversions, modifications and reworking (e.g. additional threads, drill holes, etc.) can impair function or safety or cause damage to the GE-25-P.

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



The electric gripper 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 machine 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 modules.

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 gripper has been built according to the state-of-the-art and the applicable health and safety requirements. However, improper use of the electric gripper may cause the following hazards to the personnel:

- danger to life and limb of the operator or third parties,
- to the GE-25-P itself,
- 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,
- the safety information sheet for the electric gripper.

WARNING



Danger - Do not use the GE-25-P in unsuitable environment!

Incorrect ambient and operating conditions can cause hazards from the GE-25-P that can lead to serious injuries and considerable damage to property or reduce the service life of the modules.

- Ensure that the GE-25-P is only used within the defined application parameters (➔Technical data).

WARNING



Risk of injury from sharp edges and pointed corners!

Sharp edges and pointed corners can cause cuts.

- Wear personal protective equipment.

WARNING



Danger of injury from hot surfaces!

Surfaces of components can heat up strongly during operation. Skin contact with hot surfaces will cause severe burns to the skin.

- Wear protective gloves when working near hot surfaces.
- Ensure that all surfaces have cooled down before carrying out any work.

CAUTION



Danger of injury in the working area of the modules!

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

- During operation ensure a good overview of the entire working area.
- Unauthorized persons must not stay within the working area during operation.
- Observe safety distances.

CAUTION



Risk of injuries due to uncontrolled parts movements!

Incorrect control of connected drives, operating errors, incorrect parameterisation during commissioning or software errors can trigger unexpected movements that can cause personal injury or damage to property.

- Only qualified personnel may work with or on the GE-25-P.
- Read the instructions carefully before working on or with the GE-25-P.

CAUTION



Risk of noise-induced hearing loss!

When the modules are installed in a machine or plant, the permissible noise level may be exceeded depending on the various components, the environment and the resonance.

- The operating company is responsible for ensuring that the permissible noise levels are observed.
- If the noise level exceeds 85 dB(A) in normal operation, the operator must wear hearing protectors at the workplace.

2.8.2 Danger due to electricity

DANGER

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.
- Before connecting or disconnecting electrical lines and before assembly, conversion, maintenance and adjustment work, switch off the power supply and secure it against being switched on again.
- When the power supply is connected, do not touch the connection points of the GE-25-P and do not move any parts by hand.
- Cover live parts.

WARNING

Risk of injuries due to uncontrolled parts movements!

If the power supply is switched on or there is still residual energy in the system, unexpected movements when working on the GE-25-P can cause serious injuries.



- Switch off the power supply and use a lockout device to make sure that the system cannot be switched on again.
- Ensure that there is no residual energy left in the system.

2.8.3 Dangers in case of power failure

WARNING

Risk of injury from falling objects if the power supply fails!

Electronic products are fundamentally not fail-safe. If the power supply fails, the gripping force drops and it cannot be guaranteed that the gripped workpiece is held securely.



- The operator is responsible for ensuring that the drive is brought to a safe state in the event of a power supply failure.

2.8.4 Mechanical hazards

WARNING

Risk of injury - Do not reach into the system during operation!

There is a risk of injury if the personnel reaches into the system during normal operation.



- Never reach into the system during normal operation!

WARNING



Risk of injury from falling or ejected objects!

During operation, falling or ejected objects can cause serious injuries or even death.

- Secure the danger zone with suitable measures!
-

CAUTION



Risk of injury from crushing and pushing!

When moving the base jaws and by breaking or loosening the gripping fingers, injuries to limbs can occur!

- Wear personal protective equipment!
 - Do not reach into the open mechanism and into the movement area of the GE-25-P.
-

2.8.5 Danger caused by omitting maintenance work

CAUTION



Danger of injury!

Poor or not regularly performed maintenance work may cause malfunction of the components which may result in injuries.

- The due diligence obligations of the operating company include ensuring that the personnel carrying out maintenance work is appropriately trained and qualified.
-

3 Technical data

3.1 Dimensional drawing GE-25-P

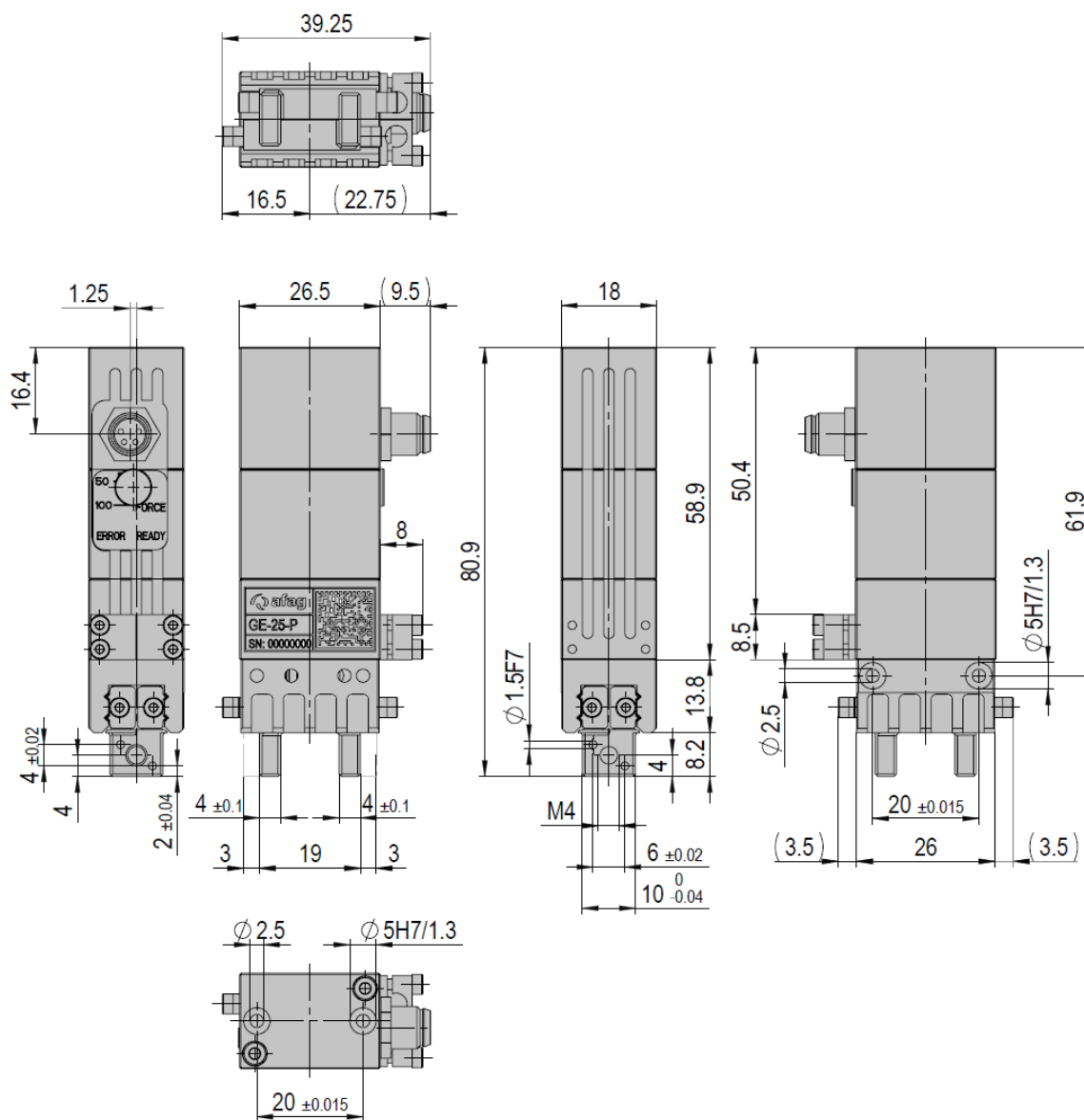


Fig. 1 Dimensional drawing electric gripper GE-25-P

3.2 Technical data GE-25-P

GE-25-P	
Attachment grid	20 mm
Attachment thread	M3
Operating temperature (min./max.)	5 - 55 °C
Storage temperature	5 - 55 °C
Humidity	< 90 %

Type	GE-25-P
Order number	50538537
Jaw stroke	2 x 3 mm
Net weight	0.11 kg
Recommended workpiece weight	0.2 kg
Gripping force min. 100%	40 N
Gripping force max. 50%	20 N
Max. admissible finger length	32 mm
Max. admissible mass per finger	0.02 kg
Closing/opening time	0.09/0.09 sec.
Noise level	< 70 dB(A)
Protection class IP (mechanical)	30
Protection class IP (electrical)	40
Repeat accuracy	+/- 0.02 mm
Supply voltage (min./max.)	21.6 / 26.4 VDC
Rated current	0.14 A
Min. supply current (power supply)*	1.0 A
Max. current input**	1 A
Current input in blocked state***	0.07 / 0.14 A
Controller electronics	integrated
Communication interface	digital inputs
Number of digital I/O	2/-
Mounting position	✚

* minimum supply current for reliable operation of product.

** maximum current input in the acceleration phase (max. t = 50 ms).

*** Current input in blocked state (in gripper end position onwhile gripping a workpiece) with active command „OpenGripper“ or „Close Gripper“.

Cleanroom class ISO 14644-1, class ISO 7

Included in the delivery

(Catalogue HT accessories)

- 2x Centering bushing Ø5x2.5
- 2x Special screw M3x23 5/6

Accessories

(Catalogue HT accessories)

- Sensor-actuator cable-S3
- INI d4x25-Sn1.0-PNP-NC-M8x1
- INI d4x25-Sn1.0-PNP-NO-M8x1



Note on EMC conformity (according to EN 61000-6-4:2007 + A1:2011): The GE-25-P may only be used in DC distribution networks with an extension < 30 m.

3.3 Preferred combinations GE-25-P

ES20	1	< direct >	1
	3	VP 107	1
	1,3	VP 151	2
SA-1	1,2	< direct >	1
	1,2	VP 101	2
RE-50	3	VP 107	1
	3	VP 151	2
SREH-50	3	direct	1
	3	VP 151	2
RA-40	3	VP 50486393	1,2
		50596647*	
CS 8	1,3	< direct >	1
	1,3	VP 101	2
CS 12	1,3	VP 107	1
	1,3	VP 151	2
CS 16	1,3	VP 107	1
	1,3	VP 151	2
LM 12	1	VW 305	1
LM 16	1	VW 305	1
CR 12	3	< direct >	1
	3	VP 151	2
CR 16	3	< direct >	1
	3	VP 151	2

Mounting areas				
CS, ES	LM	HM	SA	UG, GM, SG, DG, PG, GE, SGE
PMP, PMP-c	PEZ, PDZ	PEL, PDL	RM, RE	CR, RM 32, RE, SREH, RA

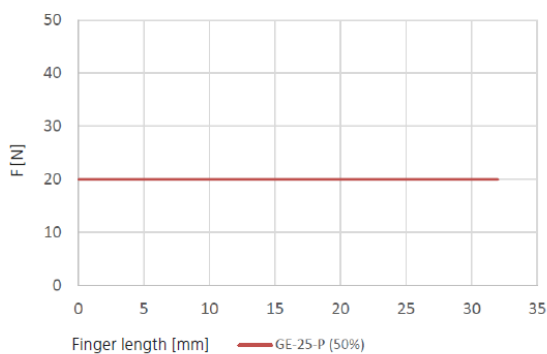
* Verbindungskabel
/ Cable de connexion
/ Connection cable

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.

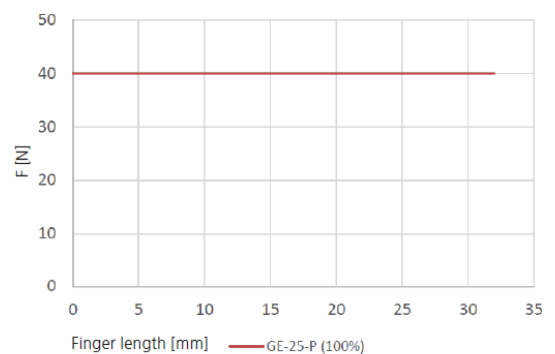
3.4 Gripping force diagram GE-25-P

Gripping force diagrams

Gripping force diagram (GE-25-P 50%)



Gripping force diagram (GE-25-P 100%)



3.5 Load of gripper fingers GE-25-P

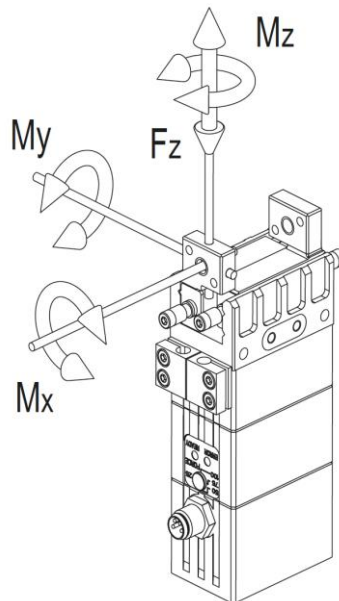
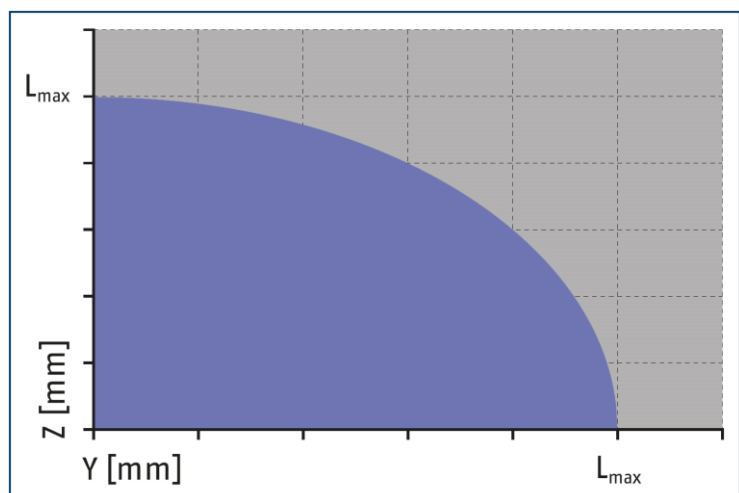
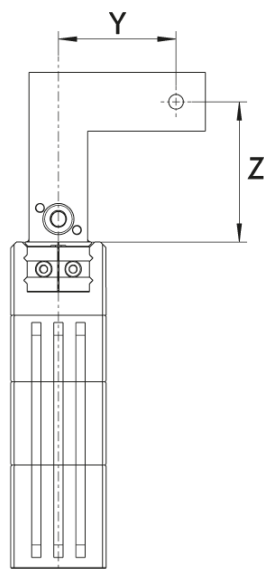


Fig. 2 Load of gripper fingers GE-25-P

Type	GE-25-P
Max. static torque M_x	0.50 Nm
Max. static torque M_y	0.42 Nm
Max. static torque M_z	1.50 Nm
Max. static force F_z	70 N

3.6 Maximum permissible cantilever



■ Permissible range ■ Inadmissible range

L_{max} corresponds to the max. permissible finger length (↪ techn. data)

4 Transport, Packaging and Storage

This chapter provides information regarding proper transport, packaging and storage of the electric grippers.

4.1 Safety instructions for transport

Incorrect ambient and operating conditions can cause hazards from the GE-25-P that can lead to serious injuries and considerable damage to property or reduce the service life of the modules.

CAUTION



Danger of injury when unpacking the GE-25-P!

The electric grippers are packed in the original packaging (cardboard box). If handled incorrectly, the module may fall out of the box when unpacked and cause limb injuries.

- Carefully unpack the GE-25-P.



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

4.2 Scope of supply

The GE-25-P are supplied with an operating and assembly manual and a safety data sheet (see scope of supply below).



Fig. 3 Scope of delivery electric gripper GE-25-P

[Unt]	GE-25-P
1 x	Electric gripper
1 x	Assembly and operating instructions
1 x	Supplementary set

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: 5-55 °C
- Relative air humidity: < 90%, non condensing

4.4 Packaging

The electric gripper is packed in the most appropriate manner.

Standardized symbols for packages

Symbol	Note	Explanation
	Top	The package shall be transported, handled and stored with the arrows always pointing upwards (top side of the package).
	Fragile	Products marked with this symbol shall be handled with care and may never be turned upside down or tied up.
	Protect against moisture	The packages shall be protected against moisture and kept dry (keep covered during storage).
	Attachment points	The hosting equipment (chain, etc.) may only be attached to the points marked by this symbol.
	Centre of gravity	This symbol marks the centre of gravity of the packages (pay attention to the position of the centre of gravity).

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 GE-25-P is stored for an extended period of time, observe the following:

- Do not store the modules outdoors or expose them to weather conditions.
- The storage space must be dry and dust free.
- Room temperature of the storage space: 5-55 °C.
- Relative air humidity: < 90% non condensing
- Clean the electric gripper and protect the blank metal parts against corrosion using the appropriate means.
- Protect the electric gripper from dirt and dust.

4.6 Operating and ambient conditions

Designation	GE-25-P
Protection class IP (mechanical) *	30
Protection class IP (electrical) * (only with sealing plug)	40
Noise emission	≤ 70 dB(A)
Ambient temperature (min. / max.)	5 – 55 °C



Note on EMC conformity (according to EN 61000-6-4:2007 + A1:2011): The GE-25-P may only be used in DC distribution networks with an extension < 30 m.

5 Design and description

This chapter provides an overview of the modules' structure and functioning.

5.1 Design electric gripper GE-25-P

5.1.1 Digital I/O variant

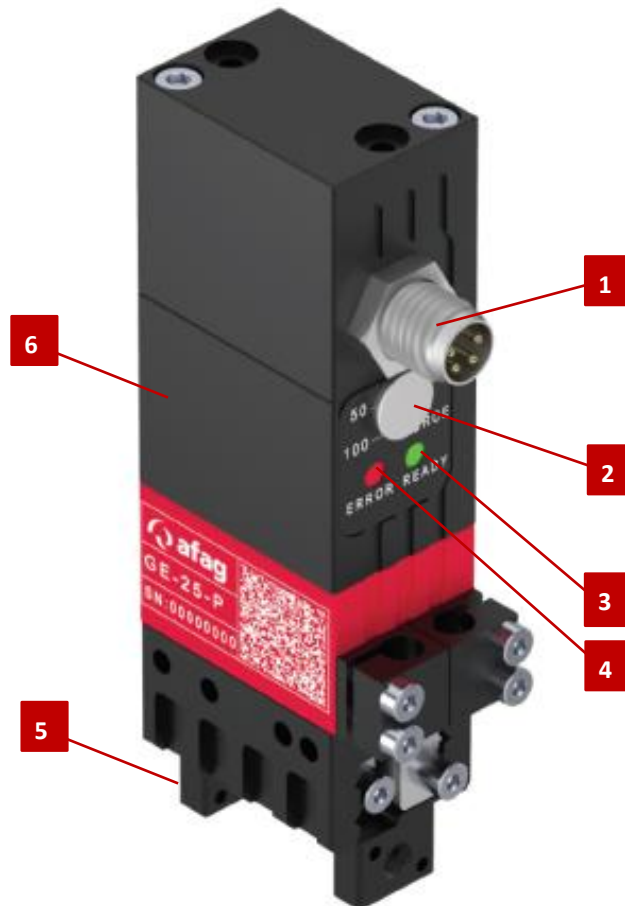


Fig. 4 Variant «Digital I/O»

1. Connector "Supply and control"
2. Rotary switch "Gripping force"
3. LED "READY"
4. LED "ERROR"
5. Base jaw
6. Housing

5.2 Product description

Electric grippers of the GE-25-P series are precision devices. In order ensure safe and reliable operation it is important that the modules are handled with care.

The GE-25-P are used exclusively for gripping and time-limited safe holding of workpieces or objects.

The GE-25-P are suitable for industrial applications and are intended for installation in a machine. The GE-25-P is a high-performance servo-electric two-finger electric gripper with integrated electronics.

5.3 Displays

The displays of the GE-25-P differ depending on the variant. This chapter describes the displays of the variants.

5.3.1 Display and LED function description "Digital I/O" variant

Digital I/O display

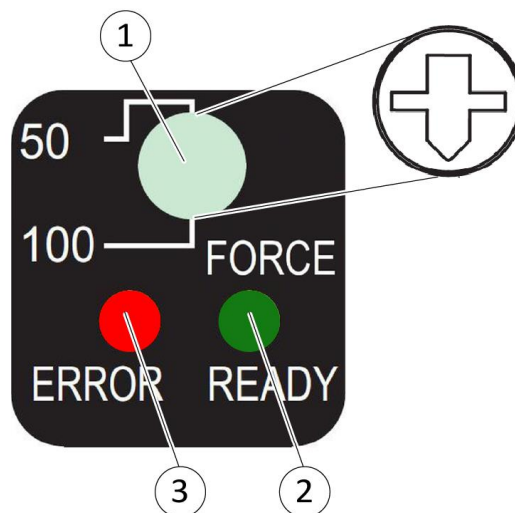


Fig. 5 Function label GE-25-P

1. Rotary switch "Gripping force"
2. LED "READY"
3. LED "ERROR"

Functional description of the "READY" and "ERROR" LEDs

Display	Colour	Function
READY	GREEN	Indicates whether voltage is connected. <ul style="list-style-type: none"> ▪ Lights up as long as voltage is applied to the GE-25-P. ▪ Does not light up if no voltage is applied to the product.
ERROR	RED	Indicates whether there is a warning or an error. <ul style="list-style-type: none"> ▪ Does not light up if no warning or error is present and the GE-25-P is ready for operation. ▪ Lights up when there is an "Overtemperature" warning. <ul style="list-style-type: none"> → The phase current of the motor is limited to "IDauer". → Closing and opening time may increase. → Automatically deleted when warning is no longer present ▪ Flashes slowly (approx. every 1.2 s) when an "overtemperature" error is present <ul style="list-style-type: none"> → The GE-25-P goes into sleep mode until it has cooled down. The commands "Open gripper" and "Close gripper" are not processed. → The error must be acknowledged (⇒ Acknowledge error) ▪ Flashes quickly (approx. every 0.6 s) when the rotary switch "Gripping force" is between two switching positions.

Error acknowledgement (Digital I/O):

To acknowledge the error, proceed as follows:

1. Wait until the GE-25-P has cooled down.
2. Control both digital inputs (PIN 2 and PIN 4) with "High" signal.

or:

Disconnect and reconnect the power supply.

- LED "Error" goes out.

⇒ The error is acknowledged.

5.4 Accessories

The following accessories are available for this product and can be ordered separately. The catalogue data sheet contains information on the various accessory items that can be used with the corresponding product variant.



You will find more information on the accessories for the GE-25-P on our website www.afag.com.

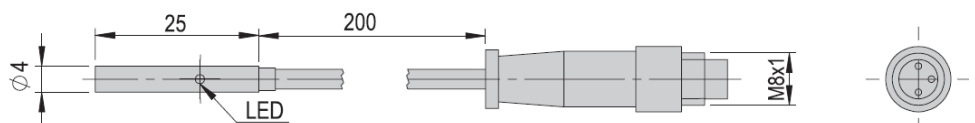
The following accessories are available for the GE-25-P described in this manual:

Connection cable	
Denomination	Order Nr.
Sensor-actuator cable S3-2m-0-open-1	50359710
Sensor-actuator cable S3-5m-0-open-1	11007828
Sensor-actuator cable S3-2m-90-open-1	50551477
Sensor-actuator cable S3-5m-90-open-1	50551478

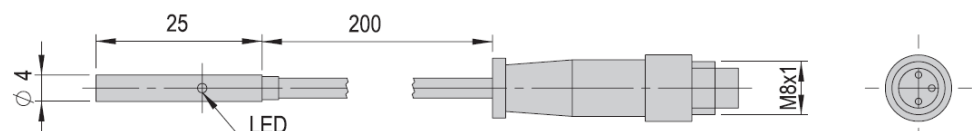


When using customer-supplied cable: **4 x 0.25 mm²**

INI d4x25-Sn1.0-PNP-NC-M8x1	
Order number	50093507
Net weight	0.004 kg
Operating voltage	10 - 30 VDC
Switching distance	1.0 mm



INI d4x25-Sn1.0-PNP-NO-M8x1	
Order number	11016714
Net weight	0.002 kg
Operating voltage	10 - 30 VDC
Switching distance	1.0 mm



6 Installation, assembly & setting

This chapter contains specific safety instructions and information regarding proper installation, assembly and setting of the GE-25-P including their connection to the control unit and the electric system.

6.1 Safety instructions for installation, assembly and adjustment

WARNING



Danger due to stored energy!

Incorrect ambient and operating conditions can cause hazards from the GE-25-P that can lead to serious injuries and considerable damage to property or reduce the service life of the module.

- Design the gripper finger in such a way that the product reaches either the "Open" or "Closed" position in the energy-free state.
- Only change the gripper fingers if no residual energy can be released.
- Ensure that the GE-25-P and the gripper fingers are sufficiently dimensioned according to the application.

CAUTION



Risk of injury when connecting to mechanics and electrics!

When connecting the GE-25-P to the mechanics and electrics, unexpected movements can occur when the power supply is still switched on or due to existing residual energies, which can cause personal injury or damage to property.

- The connecting work may only be carried out by qualified personnel!
- Before starting any work on the GE-25-P, switch off the power supply/control unit and use a lockout device to make sure that it cannot be switched on again.
- Ensure that there is no residual energy left in the system.
- Carefully read the assembly and safety instructions before working with or on the GE-25-P.

CAUTION



Danger of crushing or shearing between the gripper fingers and the system!

The gripper fingers are electrically operated. Restricted freedom of movement between the gripper fingers and the machine components can cause crushing or shearing injury.

- Observe the instructions manual of the machine on which the GE-25-P is mounted.
- Maintenance and care work may only be carried out by qualified personnel.
- The operating company shall make sure that the machine is operated in a safe manner.

CAUTION



Danger of injury when handling the GE-25-P!

Careless handling of the GE-25-P can cause personal injuries and damage to the GE-25-P.

- Only qualified personnel may work with or on the module!
- Observe the assembly instructions!

NOTICE

No liability can be assumed for damages caused by improper installation/assembling work on the part of the operator.



The safety instructions in ↗ chap. 2 "Safety instructions" of these assembly instructions must be observed in addition to the safety instructions contained in this chapter.

6.2 Installation & Assembly

NOTICE

Avoid overtemperature faults due to too high temperatures!

Excessively high temperatures of GE-25-P can lead to temperature errors.

- Ensure sufficient heat dissipation via the screw-on surface.
- Mount the GE-25-P in such a way that sufficient cooling is ensured.
- The size of the cooling surface depends on the application.
- Avoid additional heat input, e.g. through attachments or through the attached axle.

6.2.1 Mounting of variant «Digital I/O»

1. Check the evenness of the mounting surface (↗ chap. 6.3).
2. Screw the GE-25-P to the machine/system (↗ chap. 6.3).
 - If necessary, use suitable connecting elements (adapter plates).
 - Observe the permissible screw-in depth (↗ chap. 6.3).
 - Observe the tightening torque of the fastening screws (↗ chap. 6.3).
3. Attach the gripper fingers to the base jaws (↗ chap. 6.3).
4. Place the cable for sensors on the M8 connector and tighten the threaded ring hand-tight (↗ chap. 6.4).
5. If necessary, adjust the gripping force.
6. Mount the sensor (↗ chap. 6.5).
7. Place the cable for power supply and control on the M8 connector and tighten the threaded ring hand-tight (↗ chap. 6.4).
 - ⇒ GE-25-P Variant Digital I/O is mounted.

6.3 Mechanical connection

6.3.1 Flatness of the mounting surface

The values given below refer to the entire screw-on surface on which the GE-25-P are mounted.

Units	Mounting kit
< 100	< 0.02
> 100	< 0.05

Requirements for the evenness of the screw-on surface (dimensions in mm)

6.3.2 Connections on the housing

The GE-25-P can be mounted from three sides.

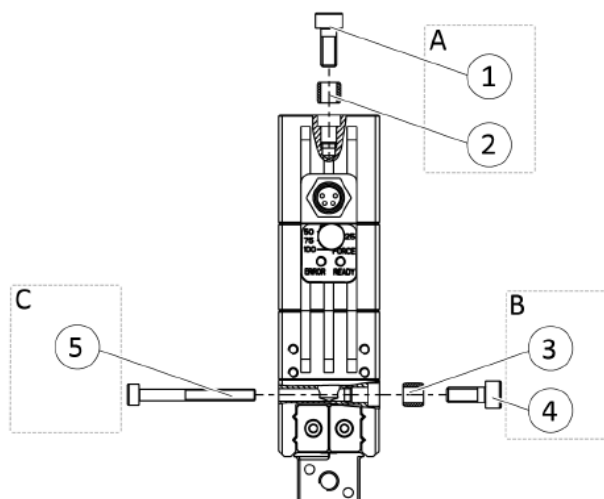


Fig. 6 Options for mounting the GE-25-P (sides A, B, C)

6.3.3 Screw-in depth and tightening torques - Assembly GE-25-P

For assembly, the following screw-in depths and tightening torques must be observed.

Item	Fastening the module	GE-25-P
Side A		
1	Fastening screw	M3
	Max. screw-in depth	7.4 mm
	Min. screw-in depth	6.9 mm
	Tightening torque	1.2 Nm
2	Centering bushing	Ø 5 mm

Item	Fastening the module	GE-25-P
Side B		
3	Fastening screw	M3
	Max. screw-in depth [mm]	6.9mm
	Min. screw-in depth [mm]	6.4mm
	Tightening torque [Nm]	1.2 Nm
4	Centering bushing [mm]	Ø 5 mm
Side C		
5	Fastening screw	M2.5

6.3.4 Connections on the base jaws (for gripper fingers)

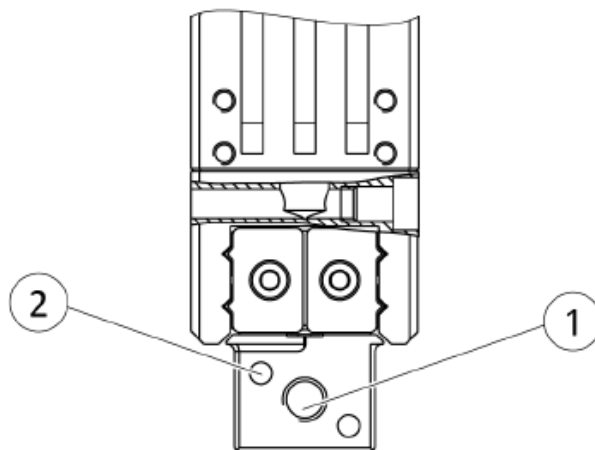


Fig. 7 Assembly of the gripper fingers

Item	Fastening the module	GE-25-P
Side A		
1	Thread in base jaws	M4
	Max. screw-in depth from stop surface	4mm
	Max. tightening torque screws	3.1 Nm
2	Bore for cylindrical pin	Ø 1.5 mm

6.4 Electrical connection

WARNING

Danger due to electrostatic energy!

Components or assemblies can become electrostatically charged. When touched, the electrostatic discharge can cause a startle reaction that can lead to injuries.



- The operator must ensure that all components and assemblies are included in the local equipotential bonding in accordance with the relevant rules.
- Have the equipotential bonding carried out by a qualified electrician in accordance with the relevant rules, taking particular account of the actual working environment conditions.
- Have the effectiveness of the equipotential bonding verified by regular safety measurements.

6.4.1 Digital I/O variant

Power supply and control

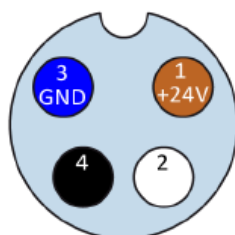


Fig. 8 M8 connector for gripper (view to connector)

Pin	Strand	Signal
1	Brown	+ 24 V
2	White	Open gripper
3	blue	GND
4	Black	Close gripper

Pin assignment

Connection	Plug connector EBP	Connector (customer)
Gripper	Connector 4-pole, M8	Connection cable 4-pole, socket M8

Components electrical connection



Tightening torque M8 plug-in connection: **50 cNm**.

Control of the digital inputs (truth table)

The truth table shows the control of the digital inputs with the possible commands of the higher-level control.



The current consumption per digital input is **max. I=10mA**.

Function	Pin 2 (open)	Pin 4 (close)
Drive not energised (standstill, motor is short-circuited)	0	0
Open gripper	1	0
Close gripper	0	1
Reset error (standstill, motor is short-circuited)	1	1

Digital inputs open/close

Pause time between two commands

NOTICE

Risk of damage due to improper control!

The internal electronics can be damaged by double pulses.

- Observe pause times between commands.

The following graph shows the minimum pause time that must be observed between two commands.

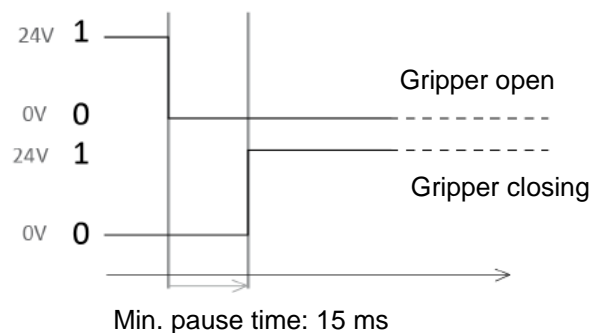


Fig. 9 Example of opening gripper / closing gripper

6.5 Mounting the sensors

6.5.1 General notes

The GE-25-P are designed for the use of sensors. For the exact type designations of the matching sensors, please refer to the catalogue data sheet and the following overview of the sensors.

The technical data of the matching sensors are included in the installation and operating instructions as well as in the catalogue data sheet. The installation instructions and the catalogue data sheet are included in the scope of delivery of the sensor.



Before mounting and connecting the sensors, observe the mounting and operating instructions of the sensors as well as the catalogue data sheet!

6.5.2 Overview of the sensors

Designation	Order Number
INI d4x25-Sn1.0-PNP-NC-M8x1	50093507
INI d4x25-Sn1.0-PNP-NO-M8x1	11016714

Overview of sensors for the GE-25-P

6.5.3 Inductive proximity switch INI XXX

The inductive proximity switches are mounted on the connector side of the product. If the cable routing on this side is unfavourable in the customer-specific application, the inductive proximity switches can be mounted on the opposite side.

The screw heads and the spacer sleeve are used for the inductive proximity switches and are mounted on the gripper fingers.

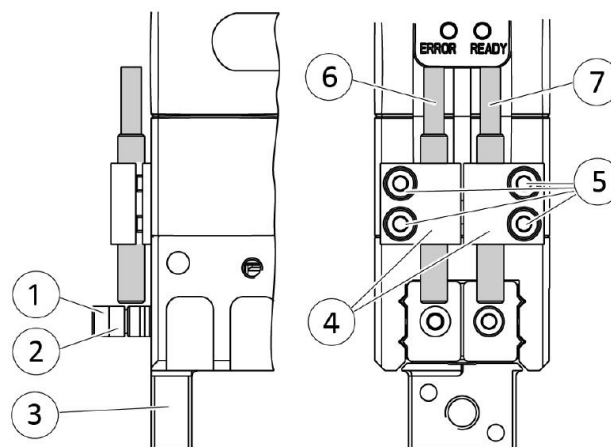


Fig. 10 Mounting proximity switch



The positions "gripper open" and "gripper closed" are detected via the screws (1) without an additional spacer sleeve (2).

Mounting the proximity switch for detection "workpiece gripped":

1. Screw the spacer sleeve (2) and screw (1) from the accessory pack onto the gripper finger (3).
 - Tightening torque: 12.5 Ncm
2. Screw on sensor holder (4) with screws (5)
 - Tighten only slightly by means of screws (5).
3. Move the GE-25-P to the "Gripper open" position.
4. Push the sensor (7) into the sensor holder (4) and set the distance to the screw head to 0.2 mm.
5. Tighten the screws (5) at the sensor holder (4).
 - Tightening torque: 10 Ncm
6. Connect both sensors (6) and (7).
7. Move the GE-25-P to the position to be set
8. Test function
 - ⇒ The proximity switch "workpiece gripped" is mounted.

Adjustment of the inductive proximity switch:

The proximity switch is damped by the screw heads.

To detect the positions "Gripper open" and "Gripper closed":

-> Use screws without spacer sleeve.

To detect other positions, such as "Gripper closed varied" and "Part gripped":

-> Use spacer sleeve. This increases the distance between the screw head and the gripper finger.

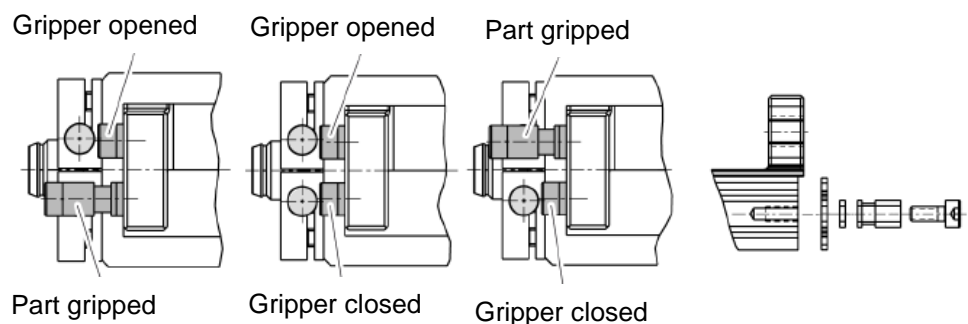


Fig. 11 Setting the proximity switch INI XXX

7 Commissioning

This chapter contains instructions for commissioning the GE-25-P. After connecting and mounting the sensors, the electric grippers are put into operation for the first time via the control system.

7.1 Safety instructions for commissioning

Incorrect ambient and operating conditions can cause hazards from the GE-25-P that can lead to serious injuries and considerable damage to property or reduce the service life of the modules.

DANGER



Danger from live parts!

Touching live parts can lead to serious or fatal injuries.

- Before switching on the GE-25-P, check that the protective earth conductor is correctly attached to all electrical components according to the connection diagram.
- Check that covers and guards are in place to prevent contact with live components.

WARNING



Danger due to electrostatic energy!

Components or assemblies can become electrostatically charged. When touched, the electrostatic discharge can cause a startle reaction that can lead to injuries.

- The operator must ensure that all components and assemblies are included in the local equipotential bonding in accordance with the relevant rules.
- Have the equipotential bonding carried out by a qualified electrician in accordance with the relevant rules, taking particular account of the actual working environment conditions.
- Have the effectiveness of the equipotential bonding verified by regular safety measurements.

CAUTION



Danger of injury by moving components!

Limbs can be crushed by moving components!

- Work on and with the electric gripper may only be carried out by qualified personnel.
- Make sure that there are no persons or tools in the working area of the gripper.

CAUTION

Danger of injury in the working area of the modules!

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

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

CAUTION

Risk of injury to third parties during commissioning!

There is a risk of injury to third parties during commissioning of the electric gripper GE-25-P.

- Before commissioning the GE-25-P, secure the danger zone with a suitable protective measure.



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

7.2 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. First, make sure that there are no persons or tools in the working area.
3. Then, perform a test run
 - Start with slow movements
 - Then continue under normal operating conditions

⇒ Commissioning is completed.

8 Fault elimination

8.1 General Notes

This chapter contains general information and safety instructions for troubleshooting for the GE-25-P.

8.2 Safety instructions for troubleshooting

WARNING



Danger of injury due to improper work!

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

- The due diligence obligations of the user include ensuring that personnel working on eliminating faults appropriately trained and qualified.

Measures to be taken in the event of faults

- Immediately take the GE-25-P out of operation and report the fault to the responsible authorities/persons.
- Have the fault rectified by trained personnel.
- Do not put the GE-25-P back into operation until the fault has been completely eliminated.
- Check the GE-25-P after a malfunction to ensure that the functions of the GE-25-P are still given and that no extended hazards have arisen.



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

8.3 Table Fault causes and remedy

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

8.3.1 Troubleshooting table

Fault	Possible cause	Remedy:
GE-25-P does not move	<ul style="list-style-type: none"> ▪ Base jaws jammed in housing, e.g. because the flatness of the mounting surface is insufficient ▪ Sensor incorrectly adjusted / sensor has become misaligned ▪ Power supply incorrectly connected 	<ul style="list-style-type: none"> ▪ Check the flatness of the screwed-on surfaces (➞ chap. 6.3) ▪ Loosen fastening screws of the GE-25-P and operate the gripper again. ▪ Adjust the sensor so that it is not in the travel path of the GE-25-P. Distance to mechanics: 0.2 mm). ▪ Check power supply (elec. Connection - “Digital I/O” 30)

Fault	Possible cause	Remedy:
GE-25-P does not perform the full stroke	<ul style="list-style-type: none"> ▪ Dirt accumulation between base jaws and guide ▪ Screw-on surface not sufficiently flat ▪ Breakage of components in the product (e.g. due to overload) 	<ul style="list-style-type: none"> ▪ Clean and lubricate GE-25-P (➔ chap. 9) ▪ Check the mounting surface for evenness (➔ chap. 6.3) ▪ Send GE-25-P with repair order to Afag
GE-25-P opens or closes jerkily	<ul style="list-style-type: none"> ▪ Not enough lubricant in the mechanical guide surfaces ▪ Screw-on surface not sufficiently flat ▪ Loading too large 	<ul style="list-style-type: none"> ▪ Clean and lubricate GE-25-P (➔ chap. 9) ▪ Check the mounting surface for evenness (➔ chap. 6.3) ▪ Check the permissible weight and length of the gripper fingers (➔ 6.3)
Gripping force too low	<ul style="list-style-type: none"> ▪ Too much lubricant in the mechanical clearances ▪ Incorrect gripping force preselection 	<ul style="list-style-type: none"> ▪ Clean and lubricate GE-25-P (➔ chap. 9) ▪ Check setting of the gripping force ▪ Check design of the GE, observe the max. workpiece weight (➔ chap. 3)
Opening and closing times are not achieved	<ul style="list-style-type: none"> ▪ Loading too large 	<ul style="list-style-type: none"> ▪ Check the permissible weight and length of the gripper fingers
Electrical signals are not transmitted	<ul style="list-style-type: none"> ▪ Cable incorrectly connected ▪ Strands reversed 	<ul style="list-style-type: none"> ▪ Check round plug connector for correct seating ▪ Check PIN assignment
Faults indicated via LED Error (only with "Digital I/O" variant)	<ul style="list-style-type: none"> ▪ Rotary switch is in intermediate position (LED flashes for 0.6 s) ▪ Error overtemperature (LED flashes for 1.2 s) ▪ Warning overtemperature (LED lights up permanently) 	<ul style="list-style-type: none"> ▪ Turn the rotary switch to the marked position ▪ Wait until GE-25-P has cooled down ▪ Control digital inputs "Open gripper" and "Close gripper" with High OR: Disconnect and reconnect the power supply ▪ LED "Error" goes out. The error is acknowledged. ▪ When the GE-25-P has cooled down, the warning is automatically deleted

9 Maintenance and Repair

9.1 General notes

The electric grippers are almost maintenance-free. Nevertheless, some maintenance work must be carried out to ensure an optimum operating condition of the electric grippers. This chapter describes the required maintenance activities.



Each electric gripper 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 gripper.

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.

- The operator must exercise due care and only use trained maintenance personnel to carry out the activities.
- Always wear personal protective equipment when carrying out maintenance and repair work!

WARNING



Risk of injury due to uncontrolled movements of the electric gripper!

Signals from the control system can trigger unintentional movements of the modules, which can cause injury.

- Before starting any work on the electric gripper, switch off the control unit and secure to prevent it from being switched on.
- Observe the operating instructions of the controller used!
- Before starting any activities, switch off the media supply and secure it from being switched on again!
- Set safety devices out of function.



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

9.3 Maintenance activities and maintenance intervals

The GE-25-P are almost maintenance-free. Nevertheless, some maintenance work must be carried out to ensure an optimum operating condition of the electric grippers.






The gripper does not need to be dismantled for maintenance work.

9.3.1 Maintenance intervals



Fig. 12 Maintenance points GE-25-P

No.	Maintenance point	Maintenance work	Interval	System [On/Off]	Remarks
1	GE-25-P	Check 	1000 cycles or daily	[On]	<ul style="list-style-type: none"> Perform a complete stroke on the GE-25-P
2	Module GE-25-P	Cleaning and checking 	As required	[Off]	<ul style="list-style-type: none"> Clean the electric gripper with a dry, lint-free cloth. <ul style="list-style-type: none"> - Do not spray the electric gripper with water, do not use aggressive cleaning agents. Perform a visual inspection of the electric gripper.
3	Metal guide surfaces	Lubricating 	2 Million cycles	[Off]	<ul style="list-style-type: none"> Lubricate all lubrication points with lubricant (guides: lubricant Isoflex-Topas NCA 52)



In extreme ambient and operating conditions, shortened maintenance cycles can ensure that the service life is maintained.

9.3.1 Lubricants and lubrication points

Lubricate all lubrication points with lubricant during maintenance. Apply lubricant thinly with a non-linting rag or brush.

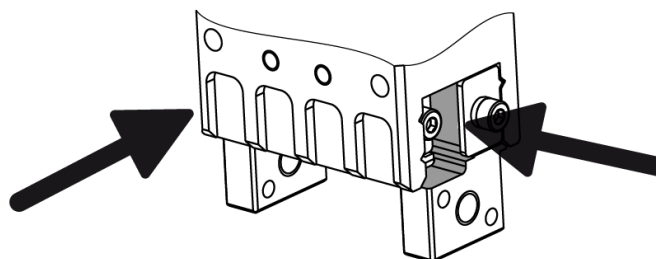


Fig. 13 Lubrication point overview GE-25-P

Lubrication point	Lubricant
Metal guide surfaces	Isoflex-Topas NCA 52

NOTICE

Risk of damage due to hardening lubricants!

At temperatures above 60°C lubricants harden faster and the GE-25-P can be damaged.

- Reduce the maintenance interval accordingly.

NOTICE

Risk of damage due to insufficient lubrication!

In the case of continuous short lifting movements, insufficient lubrication can cause the product to run dry and be damaged.

- Run the complete stroke every 1000 cycles or at least once a day.

NOTICE

Risk of corrosion due to ionized air environment

If the electric modules are used in an ionised air environment, there is a risk that exposed parts could corrode.

- Always grease exposed flanges, shafts, guides and jaws regularly.
- Afag standard lubrication: Staburax NBU8EP (flat guides), Blasolube 301 (piston rods)

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
- Climate and temperature as specified in the technical data

9.4 Spare parts and repair work

Afag Automation AG offers a reliable repair service. Defective electric grippers can be sent to Afag for warranty 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 assume any warranty for electric modules that have not been replaced or repaired by Afag!

CAUTION

Risk of injury when removing the GE-25-P due to uncontrolled movements!

When disassembling the electric grippers from a system, there is a danger of uncontrolled movements.



- Disconnect the media supply (electrics, pneumatics) before removing the modules!
- Disassembling should only be carried out by qualified personnel!
- Only dismantle the electric gripper when the control unit is switched off and secured!

NOTICE

Risk of injury by using unauthorized spare parts!

The use of unauthorised spare parts can be dangerous to personnel and cause damage or malfunction to the GE-25-P.

- Only use original spare parts approved by Afag.

NOTICE

Material damage due to unauthorised disassembly!

Incorrectly performed work can cause damage to the mechanics and internal electronics.

- Disassembly or opening of the GE-25-P is not permitted.

10 Decommissioning, disassembly, disposal

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

10.1 Safety instructions for decommissioning, dismantling and disposal

WARNING



Risk of injury due to improper decommissioning, disassembly and disposal!

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

- The operator must exercise due care and only use specially trained and qualified personnel for this work.



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

10.2 Decommissioning

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

10.3 Disassembly

The electric grippers may only be dismantled by qualified personnel.

CAUTION



Risk of injury due to uncontrolled movements of the gripper!

When disassembling the electric grippers from a system, there is a danger of uncontrolled movements.

- Disconnect the media supply (electrics, pneumatics) before removing the modules!
- Disassembling should only be carried out by qualified personnel!
- Only dismantle the electric gripper when the control unit is switched off and secured!

10.4 Disposal

The GE-25-P 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 gripper must not be disposed of as a complete unit. Dismantle the electric gripper and separate the various components according to type of material and dispose of them 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 due to incorrect disposal of the packaging material of the GE-25-P!

Incorrect disposal of the GE-25-P may present hazards from the product that could result in serious injury, significant property damage and environmental damage.

- 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 gripper
Type:	GE-25-P

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; 1.1.4; 1.1.5; 1.1.6; 1.2; 1.2.1; 1.2.2; 1.2.3; 1.2.4; 1.2.4.1; 1.2.4.2; 1.2.4.3; 1.2.4.4; 1.2.5; 1.3; 1.3.3; 1.3.4; 1.3.5; 1.3.6; 1.3.7; 1.3.8; 1.3.8.1; 1.3.8.2; 1.3.9; 1.4; 1.4.1; 1.4.2; 1.5; 1.5.1; 1.5.2; 1.5.3; 1.5.4; 1.6; 1.6.1; 1.6.3; 1.6.4; 1.6.5; 1.7; 1.7.1; 1.7.1.1; 1.7.1.2; 1.7.2; 1.7.4; 1.7.4.1; 1.7.4.2; 1.7.4.3; 3.3.5; 3.4.1.

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:

Niklaus Röthlisberger, Product Manager, Afag Automation AG, CH-6144 Zell

Zell, 31.05.2023

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