



INSTALLATION AND OPERATING INSTRUCTIONS

2-jaw parallel gripper
GEP5000
3-jaw concentric gripper
GED5000
IO-Link

DDOC02457

THE KNOW-HOW FACTORY

Glossary

Term	Explanation
ActualPosition	Value of the current jaw position [1/100 mm]
Adjust	Starts the travel routing stored in the product to teach the BasePosition and WorkPosition.
BasePosition	Outer jaw position Depending on the application, this can be the base position or the work position.
ControlWord	Activation of the product Only one bit is permitted to be active in the ControlWord. The value 0 is also permitted.
DeviceMode	Used to select gripping profiles as well as the additional help modes in the product.
Diagnosis	If an error occurs, outputs a diagnostic code that can be compared with the error list.
GND	Ground/earth
GripForce	Setting the gripping force
PositionTolerance	Tolerance range for TeachPosition The value of the parameter acts in both directions.
StatusWord	Summary of binary states of the product that can be returned as information to the control system.
Teach	Adoption of the ActualPosition as the TeachPosition
TeachPosition	Taught-in workpiece position
Traversing routine	Defined procedure for movement of the jaws
Travel path	Path on which the gripper jaws travel.
WorkpieceNo	Number of the selected workpiece recipe
WorkPosition	Inner jaw position Depending on the application, this can be the standby position or the work position.

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1 Introduction

1.1 Supporting documents

NOTICE



Read through the instructions before installing or working with the product.

The instructions contain important notes for your personal safety. They must be read and understood by all persons who work with or handle the product during any phase of the product lifetime.



The documents listed below are available for download on our website www.zimmer-group.com.

- Instructions
- Catalogs, drawings, CAD data, performance data
- Information on accessories
- Technical data sheets
- General Terms and Conditions, including warranty information.

⇨ Only those documents currently available on the website are valid.

In these instructions, "product" refers to the product designation on the title page!

1.2 Notices and graphics in the instructions

DANGER



This notice warns of an imminent danger to the life and health of people. Ignoring these notices can lead to serious injury or even death.

► You absolutely must comply with the described measures for avoiding these dangers!

⇨ The warning symbols are assigned according to the type of danger.

WARNING



This notice warns of a situation that is potentially hazardous to personal health. Ignoring these notices can cause serious injury or damage to health.

► You absolutely must comply with the described measures for avoiding these dangers!

⇨ The warning symbols are assigned according to the type of danger.

CAUTION



This notice warns of a situation that is potentially hazardous to persons. Ignoring these notices can cause minor, reversible injuries.

► You absolutely must comply with the described measures for avoiding these dangers!

⇨ The warning symbols are assigned according to the type of danger.

NOTICE



This notice warns of possible material and environmental damage. Ignoring these notices can result in damage to the product or the environment.

► You absolutely must comply with the described measures for avoiding these dangers!

⇨ The warning symbols are assigned according to the type of danger.

INFORMATION



This category contains useful tips for handling the product efficiently. Failure to observe these tips will not result in damage to the product. This information does not include any information relevant to health or workplace safety.

2 Safety notices

CAUTION



Risk of injury and material damage in case of non-compliance

The product is state-of-the-art.

The following are examples of situations in which the product may cause a hazard:

- The product is not properly installed, used or maintained.
- The product is not used for its designated purpose.
- The locally applicable regulations, laws, directives or guidelines are not observed.

▶ The product may only be used in accordance with these instructions and the product's technical data. Any changes or additions to the intended use of the product, as well as modifications to the product, such as those in the following examples, require the written permission of the manufacturer:

- Use of the product under extreme conditions, such as aggressive fluids or abrasive dusts
- Additional drilled holes or threads

⇨ Zimmer Group GmbH shall accept no liability for any damage caused by improper use. The operator bears sole responsibility.

▶ Make sure that the power supply is disconnected before you mount, adjust, modify, maintain or repair the product.

▶ Whenever work is carried out on the product, make sure that the product cannot be actuated by mistake.

▶ Perform maintenance tasks, renovation work or attachment work outside of the machine's danger zone when possible.

▶ Do not reach into the operational range of the product.

▶ Always adhere to the required maintenance intervals.

▶ When using the product under extreme conditions, adjust the maintenance interval according to the degree of contamination.

▶ Check the completeness and tightening torques of all mounting screws.

CAUTION



Notes and handling regulations for electrostatically sensitive components

Electrostatically sensitive components are individual components, integrated circuits or assemblies that can be damaged by electrostatic fields or electrostatic discharge.

▶ When handling electrostatic components, make sure that persons, the work area and packaging are all fully grounded.

▶ Touch electronic components only in appropriately identified areas with conductive flooring and only if:

- You are grounded by means of special bracelets.
- You wear shoes that are suitable and approved for the discharge of electrostatic charges.

▶ Do not bring electronic assemblies into contact with plastics and parts of clothing that have plastic content.

▶ Store electronic assemblies on conductive underlays only.

▶ Do not install electronic assemblies in the vicinity of data back-up devices or monitors (monitor distance > 100 mm).

▶ Perform measurements on electronic assemblies only if:

- The measuring instrument is grounded (e.g. via a ground conductor).
- The measuring head is momentarily discharged before measuring with a floating measuring instrument.

NOTICE



Cybersecurity

▶ The operator is responsible for ensuring that unauthorized persons do not have access to the product, either physically or remotely.

3 Proper use

NOTICE



Material damage and malfunction in case of non-compliance

The product is only to be used in its original state with its original accessories, with no unauthorized changes and within the stipulated parameter limits and operating conditions.

Any other or secondary use is deemed improper.

- ▶ Operate the product only in compliance with the associated instructions.
- ▶ Operate the product only when it is in a technical condition that corresponds to the guaranteed parameters and operating conditions.
- ⇨ Zimmer Group GmbH shall accept no liability for any damage caused by improper use. The operator bears sole responsibility.

- The product is to be used as intended in enclosed rooms for temporary gripping, handling and holding.
- The product is intended for industrial use.
- The product is not suited for use in a potentially explosive atmosphere.
- Direct contact with perishable goods/food is not permitted.
- The product must always be mounted on materials that dissipate heat.
- The product is not suitable for clamping workpieces during a machining process.
- The product is designed exclusively for electric operation using a 24 V DC power supply.

4 Personnel qualification

WARNING



Inadequate qualification can cause injury and material damage

If inadequately qualified personnel perform work on the product, this can cause serious injuries and significant material damage.

- ▶ All work on the product must be performed by qualified personnel.
- ▶ Before working with the product, read the document in its entirety and make sure that you have understood everything.
- ▶ Observe country-specific accident prevention regulations and the general safety notices.

The following qualifications are a prerequisite for performing various work on the product.

4.1 Electricians

Electricians are able to perform work on electrical systems, can recognize and avoid possible dangers and know the relevant standards and provisions due to their technical training, knowledge and experience.

4.2 Specialists

Specialists are able to perform the assigned work, can recognize and avoid possible dangers and know the relevant standards and provisions due to their technical training, knowledge and experience.

4.3 Instructed personnel

Instructed personnel have been trained by the operating company on the tasks and possible dangers of improper behavior.

4.4 Service personnel

Service personnel are able to perform the assigned work and can recognize and avoid possible dangers due to their technical training, knowledge and experience.

4.5 Additional qualifications

Persons who work with the product must be familiar with the valid safety regulations and laws as well as the standards, guidelines and laws listed in this document.

Personnel who work with the product must have facility-issued authorization to commission, program, configure, operate, maintain and also decommission this product.

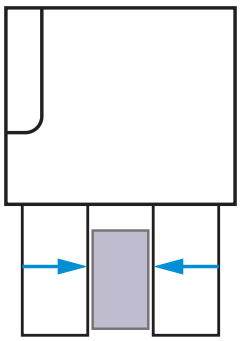
5 Product description

5.1 Possible applications

Outside gripping

The product can be used for outside gripping.

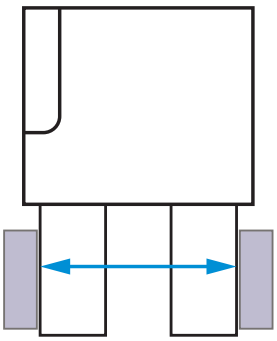
MoveToWork command



Inside gripping

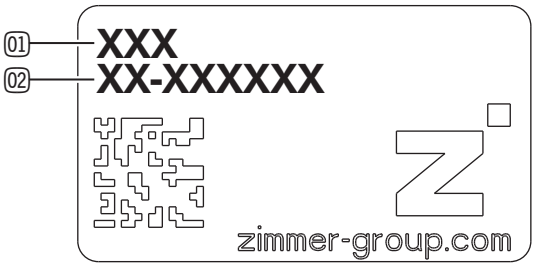
The product can be used for inside gripping.

MoveToBase command



5.2 Type plate

A type plate is attached to the product.



01 Article number

02 Confirmation number

6 Functional description

The gripper jaws of the 2-jaw parallel gripper are arranged parallel to each other on two opposing guide rails and can be moved relative to each other.

The gripper jaws of the 3-jaw concentric gripper are arranged on three guide rails offset to each other at a 120° angle.

The product has a double-acting pneumatic rotor cylinder.

The electrical connection controls a solenoid valve that directs the air flow from the corresponding direction to the piston.

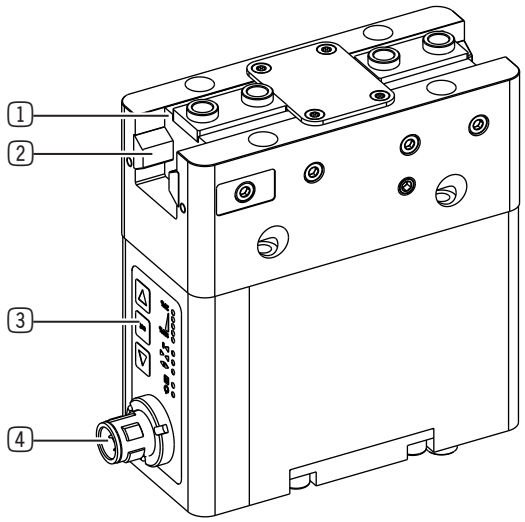
The force of the piston is transferred to a wedge hook mechanism that sets the jaws in synchronized motion.

The product has a mechanical self-locking mechanism to ensure that the workpiece remains held in the event of a power supply loss.

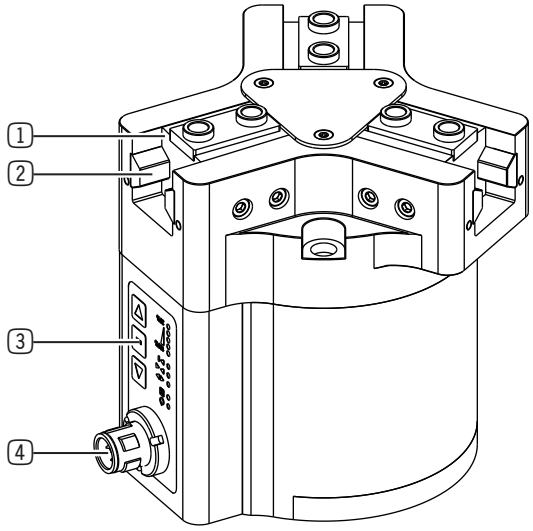
The products can be easily integrated into the existing control system.

The gripping force can be adapted optimally to the workpiece conditions via IO-Link.

GEP5000



GED5000



1 Gripper jaw

2 Guide rail

3 Integrated control module

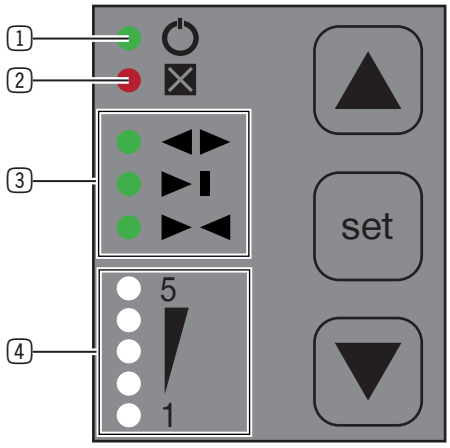
4 Power supply

6.1 LED status display

INFORMATION

For products with IO-Link only the LED display is active, the buttons have no function. The configuration of functions and all settings are made via the control system.

▶ Please contact Customer Service if you have any questions.



1 Power supply

2 Error

3 Gripper positions

4 Force level

6.2 Verified configuration examples

INFORMATION

▶ You can find the information in the technical data sheet on our website.

▶ Please contact Customer Service if you have any questions.

7 Technical data

INFORMATION



► You can find the information in the technical data sheet on our website.

This data varies within the series, depending on the specific design.

8 Accessories/scope of delivery

INFORMATION



If any accessories not sold or authorized by Zimmer Group GmbH are used, the function of the product cannot be guaranteed. Zimmer Group GmbH accessories are specifically tailored to the individual products.

► For optional accessories and those included in the scope of delivery, refer to our website.

9 Transportation/storage/preservation

► Transport and storage of the product must be done only with the original packaging.

► If the product has already been installed on the superordinate machine unit, care must be taken during transport to ensure that no unexpected movements can occur.

  ► Before commissioning the product and after transport, check all power and communication connections as well as all mechanical connections.

► If the product is stored for an extended period, the following points are to be observed:

  ► Keep the storage location as dust-free and dry as possible.

  ► Avoid temperature fluctuations.

  ► Avoid wind/drafts/water condensation formation.

  ► Pack the product and do not expose it to direct sunlight during storage.

► Clean all components. There must be no soiling left on the components.

► Visually inspect all components.

► Remove all foreign substances.

► Properly remove potential corrosion spots.

► Close electrical connections using suitable covers.

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10 Installation

WARNING



Risk of injury due to uncontrolled movements

Risk of injury in case of unexpected movement of the machine or system into which the product is to be installed.

- ► Switch off the energy supply of the machine before any work.
- ► Secure the power supply against being switched on unintentionally.
- ► Check the machine for any residual energy that may be present.

CAUTION



Risk of injury due to uncontrolled movements

Risk of injury in the event of uncontrolled movement of the product when the power supply is connected.

- ► Switch off the power supply to the machine before carrying out any work.
- ► Secure the power supply against being switched on unintentionally.
- ► Check the machine for any residual energy that may be present.

Assembly requirements	
Permissible flatness tolerance [mm]	0,03
Strength class of the mounting screws	8.8

INFORMATION



Further installation information:

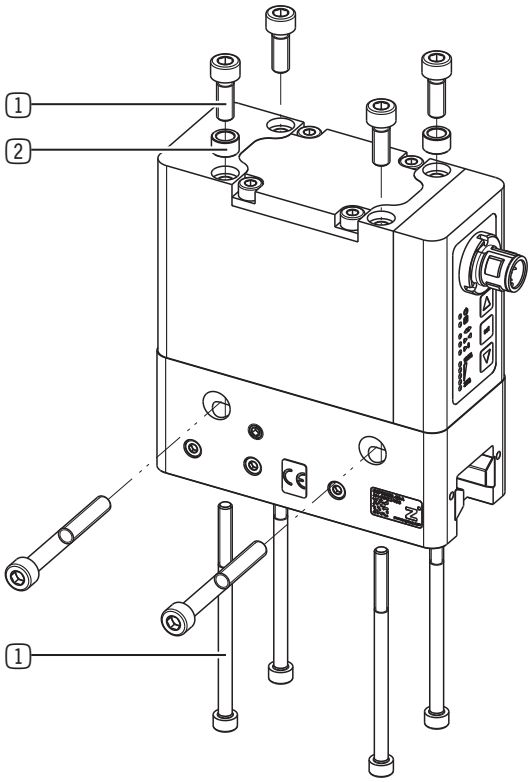
- The mounting screws are not included in the scope of delivery.

- ► Install the product on an appropriate mounting surface in accordance with the flatness specifications.
- ► Make sure that the mounting piece is sufficiently rigid.
- ► Ensure the cleanliness of the connection surfaces.
- ► Please note the permitted tightening torques of the mounting screws at www.zimmer-group.com/en/td.

10.1 Installing GEP5000

The product can be installed from multiple sides.

- ► Insert the centering sleeves into the provided fits on the product.
- ► Position the product on the mounting piece using centering sleeves.
- ► Mount the product on the mounting piece using the appropriate mounting screws.



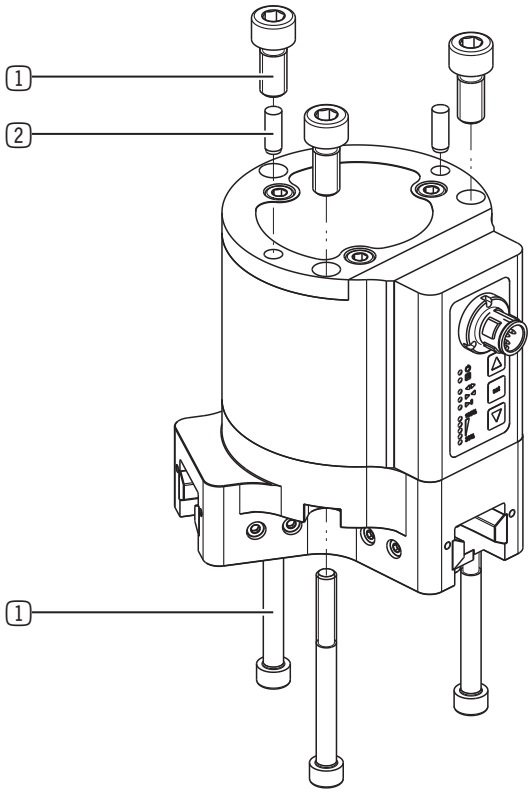
1 Mounting screw

2 Centering Disc

10.2 Installing GED5000

The product can be installed from multiple sides.

- ► Insert the straight pins into the designated fits on the product.
- ► Position the product on the mounting piece with the straight pins.
- ► Mount the product on the mounting piece using the appropriate mounting screws.



1 Mounting screw

2 Straight pins

10.3 Safe shutoff for products with IO-Link

INFORMATION

To ensure safe shutoff for products with IO-Link, two contactors, Q1 and Q2 – each with one auxiliary contact – are connected in series. Here, the auxiliary contacts monitor the state of the contactors. If one contactor does not switch, the second contactor ensures safety. The malfunction can still be detected with the contacts.

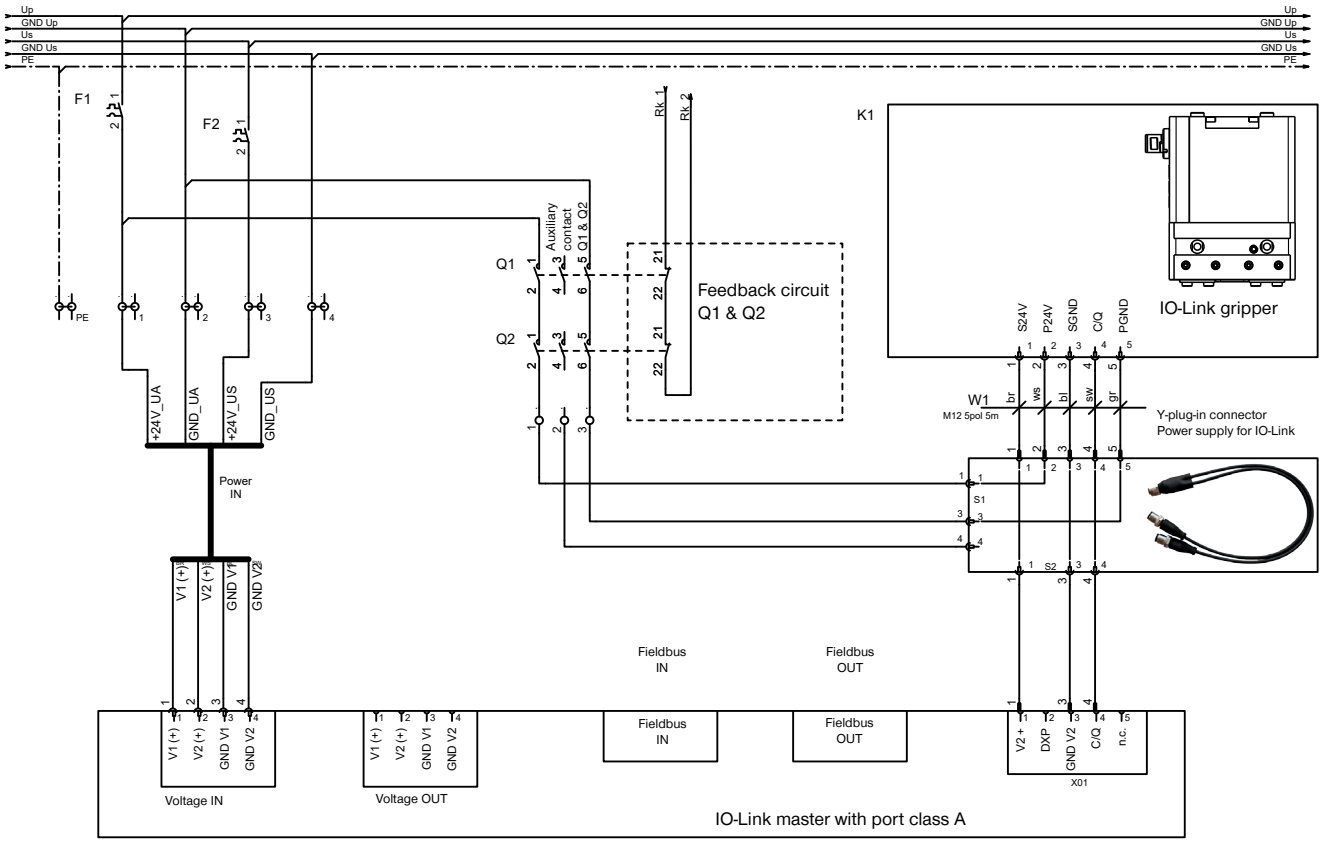
INFORMATION

Without an externally fed voltage supply, the motor of the product cannot carry out an active movement and thus cannot carry out a hazardous movement.

There is a galvanic separation between the two voltage supplies (signal and power).

Because of the self-locking mechanism, the product remains in the last approached position, even if no voltage is supplied.

The figure shows the actuator power supply via a redundant bypass in parallel with the IO-Link master. The bypass enables the actuator power supply to be safely shut off in the event of a fault, e.g., if the IO-Link master can no longer pass actuator current through the circuit. This ensures that the actuator is safely shut off in any operating or fault situation.



10.4 Installing the energy supply

NOTICE

Destruction of the product

In the event that the polarity of the product is reversed, the IO-Link chip may be destroyed as a result of the duration of current of the C/Q (pin 4) being too long.

► Connect the product according to its assignment diagram.

NOTICE

Material damage and malfunction in case of non-compliance

The cable mounted on the product can be subjected to a torsional angle of +50°.

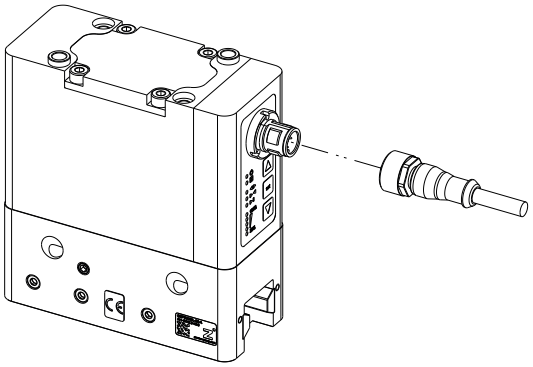
► Do not route the cable so that it is strained.

► You must meet the minimum bending radius of 10x the outer diameter.

► Secure free-hanging cables to prevent excessive motion loads or pinching.

► The contacts of the energy supply must be dry, clean and undamaged at all times.

► Connect the power supply cable to the control system of the product.



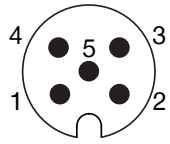
10.4.1 Pin assignment

CAUTION

Risk of injury and material damage in case of non-compliance

Incorrect pin assignment can lead to malfunction or destruction of the product.

► Be absolutely certain to ensure correct pin assignment.

Pin	Color	Function	Explanation	Male connector, M12
1	Brown	24 V DC sensor	24 V DC supply voltage for IO-Link communication	
2	White	PWR actuator	24 V DC supply voltage for actuator	
3	Blue	GND sensor	0 V DC supply voltage for IO-Link communication	
4	Black	C/Q	IO-Link communication	
5	Gray	GND actuator	0 V DC supply voltage for actuator	

► Connect the product to the IO-Link master.

► Switch on the voltage supply.

► Configure the IO-Link master (see the chapter "Commissioning").

10.5 Static charge

NOTICE



Material damage from static charge

Electrostatic voltages can occur if the product is mounted on insulating surfaces and no effective dissipation of static charges is possible.

- ▶ Please note that ESD-sensitive parts can be damaged if they come into contact with the product.
- ▶ Ground the product for applications that require high EMC resistance.

10.6 Heat dissipation

NOTICE



Material damage from overheating of the product

If the product is operated under a very high ambient temperature or with fast clock cycles on an ongoing basis, this can reduce its service life.

- ▶ If the product is exposed to high ambient temperatures, always install it on heat-conducting materials.
- ▶ Reduce the load with increasing temperature.

10.7 Installing accessories

NOTICE



Non-compliance may result in material damage.

- ▶ Before installing an accessory, make sure it is suitable for use with the selected variant.
- ▶ You can find information on our website.
- ▶ Please contact Customer Service if you have any questions.

11 Commissioning

WARNING



Suspended loads can cause injury

Falling loads can cause severe injuries.

► Always keep an adequate safety distance from suspended loads.

WARNING



Risk of injury from crushing

Injuries can be caused by crushing and clamping during the gripping process on the product or between the product and the workpiece.

► Always keep an adequate safety distance.

CAUTION



Risk of injury from impact

When the gripper jaws are opening, there is a risk of impact in the guide area.

► Always keep an adequate safety distance.

CAUTION



Reduction of the gripping force can cause injury and material damage

When flexible components are gripped, the gripping force of the product is reduced.

Reduced gripping force can cause injuries or material damage because the components can no longer be securely gripped and transported.

► Always keep an adequate safety distance from suspended loads.

NOTICE



Malfunction in case of non-compliance

► Note the correct setting of the gripping force and the selection of the gripper finger length to prevent the gripper jaws from tensioning.

NOTICE



Exclusion of liability regarding unauthorized use

This product may only be used for the proper use described in this documentation.

In particular, the following actions are prohibited:

- Tampering with the product or software
- Bypassing or disabling security mechanisms
- Unauthorized access to the product or interfaces

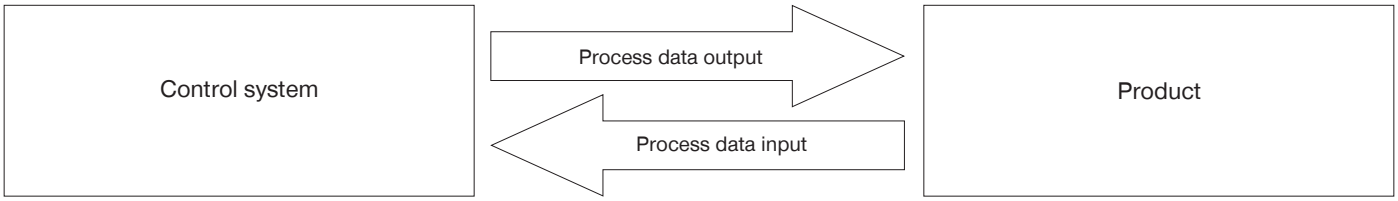
► Please note that the manufacturer assumes no liability for any resulting damage.

► Please note that warranty and support claims will be void in the event of misuse.

11.1 Process data

There is an option to control the product only with the process data that is transmitted in each cycle.

Process data output	Data type
ControlWord	UINT16
DeviceMode	UINT8
WorkpieceNo	UINT8
TeachPosition	UINT16
GripForce	UINT8
PositionTolerance	UINT8



Process data input	Data type
StatusWord	UINT16
Diagnosis	UINT16
ActualPosition	UINT16

11.2 IODD Import

INFORMATION

The product is controlled via IO-Link by means of the cyclical process data as well as the acyclic service data with a cycle time of 5 ms.

► You must check the process data.

► Import the IODD (device description) into the control system.

- ► Go to our website.
- ► Select the desired product.
- ► Download the corresponding .zip file via the Downloads section under IODD.

As soon as the hardware configuration is complete and the IO-Link connection to the product is established, data will be displayed in the process input data.

Some control systems demand a byte swap to bring this process data into a logical sequence.

► Look at bit 6 (GripperPLCActive) in the StatusWord to determine whether a byte swap is necessary.

- ► Determine whether bit 6 is active in the first or second byte of the StatusWord.
  - ⇨ Bit 6 is active in the first byte: The bytes already have the correct sequence.
    - ► Continue with the commissioning.
  - ⇨ Bit 6 is active in the second byte:
    - ► Apply a byte swap (see the section “StatusWord”).

11.3 Data transmission via handshake

The transfer of process data to the product takes place with what is referred to as a handshake. All process data described in the following sections must be transferred with the handshake.

► Send the ControlWord = 0x0001 to the product.

⇨ The data transfer has been started.

► Check the response of the product by using StatusWord.12 (DataTransferOK) = TRUE.

⇨ The product is ready to operate.

► Send the ControlWord = 0x0000 to stop the data transfer.

⇨ The data transfer is complete when the product sends back StatusWord.12 = FALSE.

INFORMATION

► For examples, refer to the "Quickstart Basic Parameters" section.

11.4 Parameters

11.4.1 ControlWord

NOTICE



Malfunction in case of non-compliance

For ControlWord, only one single bit or the value 0 may be set at a time.

► Only use the values listed in the following table.

Parameter	Decimal value	Hexadecimal value
DataTransfer	1	0x0001
WritePDU	2	0x0002
Teach	8	0x0008
Adjust	128	0x0080
MoveToBase	256	0x0100
MoveToWork	512	0x0200
ErrorReset	32768	0x8000

Data type	UINT16
Permission	Write
Transfer	Cyclical
Value range	0 - 65535

	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Byte 1	ErrorReset	-	-	-	-	-	MoveToWork	MoveToBase
	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte 2	Adjust	-	-	-	Teach	-	WritePDU	DataTransfer

Bit 0: DataTransfer

Setting this bit causes the product to acquire the data transmitted in the process data ("WorkpieceNo" = 0) or the data stored in the workpiece data ("WorkpieceNo" = 1 to 32) as the active data set.

Bit 1: WritePDU

Setting this bit tells the product that the current process data should be written to the selected tool recipe.

Bit 3: Teach

Setting this bit tells the product that the current position should be saved as the TeachPosition in the selected WorkpieceNo. This only works if there is no "0" that is transmitted in the workpiece number.

Bit 7: Adjust

Setting this bit causes a readjustment of the jaw end positions if no other bit is set in the control word.

Bit 8: MoveToBase

Setting this bit tells the product to move toward the BasePosition.

Bit 9: MoveToWork

Setting this bit tells the product to move toward the WorkPosition.

Bit 15: ErrorReset

This bit can be used to acknowledge all errors that can be reset (see the section “Error diagnosis”).

11.4.2 DeviceMode

INFORMATION

The DeviceMode parameter can be used to control the movement of the product and the adaptation to the workpiece. For this purpose, various basic modes and movement profiles are available.

For operation of the product, Zimmer Group GmbH recommends DeviceMode 60, 70 and 100.

Input	Mode	Description
1	Universal mode	Inside and outside gripping Both movements at the same speed depending on the desired gripping force
2	Outside gripping	Inward with the desired gripping force, outward at maximum speed
3	Inside gripping	Inward with the desired gripping force, outward at maximum speed
60	Outside gripping	Inward with the desired gripping force, outward at maximum speed
70	Inside gripping	Inward with the desired gripping force, outward at maximum speed
100	Universal mode	Inside and outside gripping Both movements at the same speed depending on the desired gripping force

Data type	UINT8
Permission	Write
Transfer	Cyclical
Value range	1, 2, 3, 60, 70, 100

11.4.3 WorkpieceNo

The workpiece number is used for selecting the previously stored workpiece data, as well as for selecting the WorkpieceNo data record in which the current process data is stored.

WorkpieceNo enables individual workpieces to be taught in to the product very quickly if the recipes are not managed on the control system.

With a value > 0 and data acquisition via a handshake, the corresponding workpiece recipe is loaded in the product.

INFORMATION



► You can find example codes in the sections “Quickstart Basic Parameters” and “Recipe Examples”.

Data type	UINT8
Permission	Write
Transfer	Cyclical
Value range	0 - 32

11.4.4 TeachPosition

The TeachPosition notifies the product of the expected position of the workpiece.

The PositionTolerance defines the tolerance range around the TeachPosition.

The StatusWord notifies the control system of whether the correct workpiece has been gripped.

If the jaws are within the tolerance range in the vicinity of the TeachPosition, bit 9 is set in the StatusWord.

With the position measuring system used, it is possible to achieve position accuracy of ± 0.2 mm.

► Use the following values:

Product	BasePosition	WorkPosition	TeachPosition
GEP5006/GED5006	0	1200	0 to max. 1200
GEP5008/GED5008	0	1600	0 to max. 1600
GEP5010/GED5010	0	2000	0 to max. 2000

Data type	UINT16
Permission	Write
Transfer	Cyclical
Value range	0 to max. jaw stroke of the product

11.4.5 GripForce

The product can use various gripping forces and gripping speeds to achieve an optimized flow of the gripping process. Since the product generates gripping force from the gripping speed and the amperage, the gripping force setting also conversely influences the gripping speed and amperage. The gripping force can be adjusted in five stages.

Name	GripForce	
Data type	UINT8	
Permission	Write	
Transfer	Cyclical	
Value range	1	Level 1
	2	Level 2
	3	Level 3
	4	Level 4
	5	Stage 5

11.4.6 PositionTolerance

The TeachPosition notifies the product of the expected position of the workpiece.

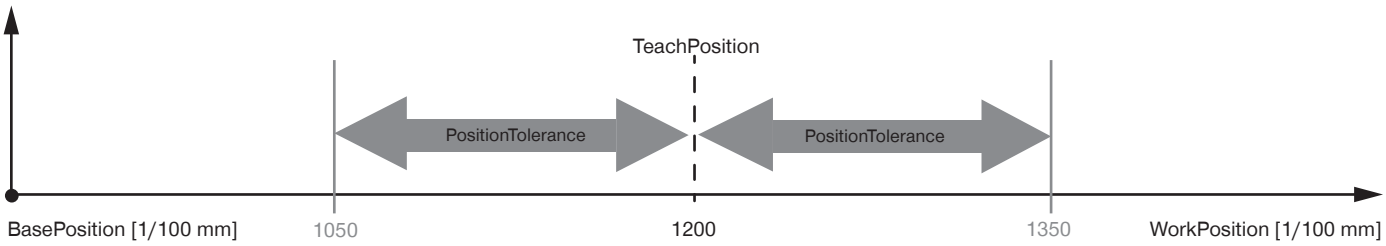
The PositionTolerance defines the tolerance range around the TeachPosition.

They are used to configure the position tolerance with a resolution of 0.01 mm.

Thus, the value range of 0 to 255 can be used to set a maximum tolerance of 2.55 mm in both directions.

INFORMATION

Example:
For TeachPosition 1200 (12 mm), PositionTolerance 150 lets you set a tolerance of 1.5 mm in both directions.
This means that the TeachPosition range starts at 10.5 mm and goes up to 13.5 mm.



Data type	UINT8
Permission	Write
Transfer	Cyclical
Value range	0 to 255

11.4.7 StatusWord

NOTICE

Malfunction due to fluctuating operating temperatures

The internal position sensor is not temperature-compensated. At high operating temperatures or with insufficient heat dissipation, the accuracy of position detection may decrease, particularly near the end positions.

As a result, feedback on the BasePosition and WorkPosition via the StatusWord may be missing.

- ► If necessary, perform a reference run to relearn the BasePosition and WorkPosition and restore correct position detection and signal feedback via the StatusWord.
- ► Whenever possible, grip workpieces in the middle of the gripper stroke.
- ► Refer to the section "Heat dissipation".

Data type	UINT16
Permission	Read
Transfer	Cyclical
Value range	0 - 65535

	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Byte 1	Error	ControlWord 0x0200	ControlWord 0x0100	DataTransferOK	UndefinedPo-sition	WorkPosition	TeachPosition	BasePosition
	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte 0	-	Gripper-PLCActive	-	-	-	-	-	-

Bit 6: GripperPLCActive

Active as soon as the product has booted up after the cold boot.This bit can be used to verify a “byte swap."

Bit 8: BasePosition

Active if the product is set to BasePosition.

Bit 9: TeachPosition

Active if the product is set to TeachPosition.

Bit 10: WorkPosition

Active if the product is set to WorkPosition.

Bit 11: UndefinedPosition

Active if the product is not set to TeachPosition, WorkPosition or BasePosition.

Bit 12: DataTransferOK

This bit is used for data transmission with the handshake. Active as soon as the product has taken over the data with the parameter ControlWord 1 (decimal).

Bit 13: ControlWord 0x0100

This bit is a direction flag. Active if the last motion task was carried out toward BasePosition.

Bit 14: ControlWord 0x0200

This bit is a direction flag. Active if the last motion task was carried out toward WorkPosition.

Bit 15: Error

Active if the product has an active error. The error message can be determined using Diagnosis.

11.4.7.1 Acknowledging an error

If the product has a fault, the error bit is set in the StatusWord.

► Acknowledge the error by sending ControlWord 0x8000.

NOTICE

Malfunction in case of non-compliance

Not all errors can be reset. For some errors, such as *maximum permissible temperature exceeded*, the error message is not reset after acknowledgment.

► In this case, wait until correct values are sent to the product.

INFORMATION

► Use the StatusWord to check whether a workpiece has been gripped correctly.

► The TeachPosition tolerance can be adjusted in another process parameter.

► Observe the tolerances and fluctuations around the exact value of the actual position during programming the position query.

11.4.8 Diagnosis

The value returned in Diagnosis corresponds to the error code (see "Error Diagnosis" section).

Data type	UINT16
Permission	Read
Transfer	Cyclical
Value range	0 - 65535

11.4.9 ActualPosition

ActualPosition is the current position of the gripper jaws.

The value is specified with a resolution of 0.01 mm.

The values can move between the BasePosition (minimum values) and the WorkPosition (maximum values).

Product	BasePosition	WorkPosition
GEP5006/GED5006	0	1200
GEP5008/GED5008	0	1600
GEP5010/GED5010	0	2000

Data type	UINT16
Permission	Read
Transfer	Cyclical
Value range	0 to max. jaw stroke of the product

INFORMATION

► Use the StatusWord to check whether a workpiece has been gripped correctly.

- The position measurement resolution is 0.01 mm.
- The position measurement accuracy is 0.2 mm.

► During commissioning, be aware of fluctuations around the exact value if you use ActualPosition to detect the workpiece.

11.5 Cold start

For proper function, Zimmer Group GmbH recommends that the actuator and sensor voltage be supplied with power separately.

► Switch on the sensor voltage.

► Switch on the actuator voltage as soon as the product communicates with the control system.

Depending on the application, simultaneous activation of both voltages is possible.

INFORMATION

If the sensor voltage is disconnected, the C/Q signal (IO-Link) must be disconnected as well.

11.6 Minimum travel path

INFORMATION

The minimum travel path applies to both directions of movement and is independent of the start position. The product moves slightly past the front and rear end position. The value shown on the LED display corresponds to the end position.

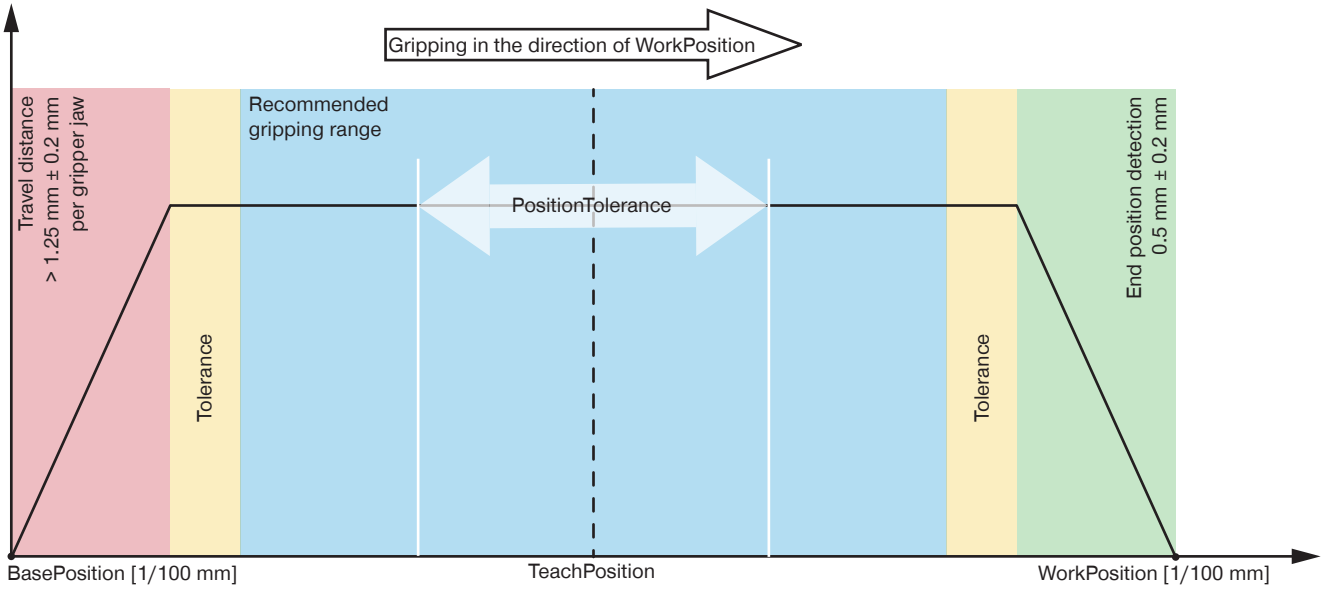
The product requires a certain minimum travel path to move to the desired position.

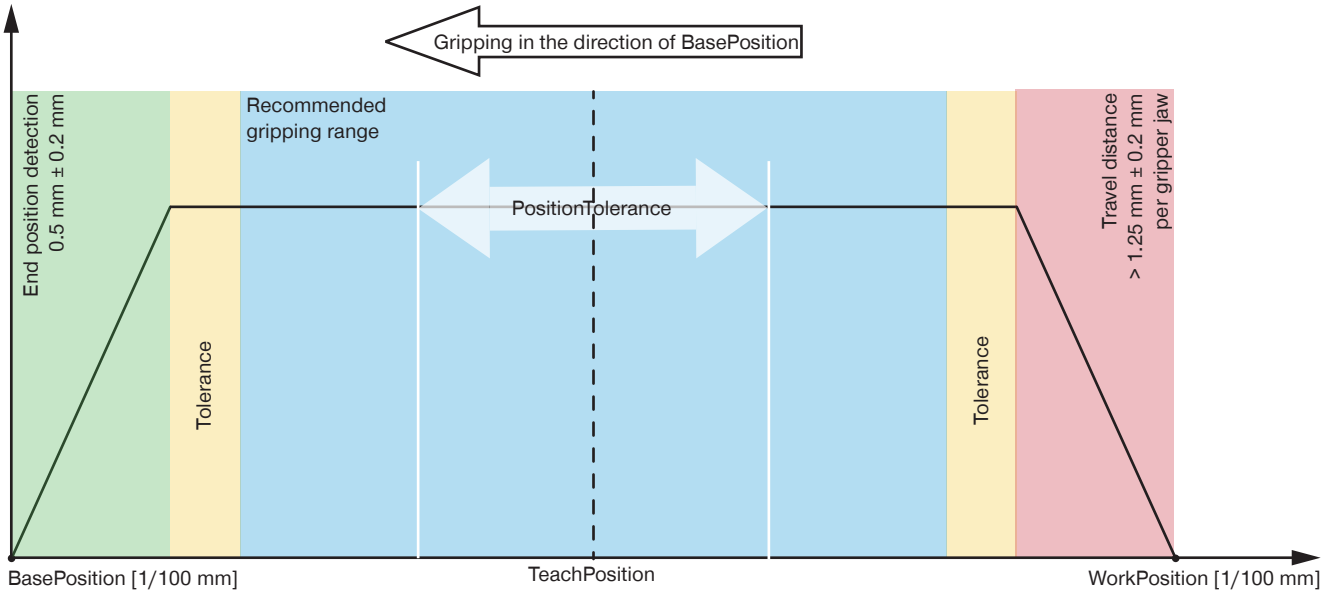
INFORMATION

► You can find the information in the technical data sheet on our website.

► Please contact Customer Service if you have any questions.

11.7 Movement profiles





Design size	Calculation	Recommended working stroke [mm]
GEP5006/GED5006	12 mm - value of end position - value of travel distance	8.6
GEP5008/GED5008	16 mm - value of end position - value of travel distance	12.6
GEP5010/GED5010	20 mm - value of end position - value of travel distance	16.6

11.8 Easy Startup

Describes the process from switching on the product to the initial movement.

► Connect the product according to its assignment diagram.

⇨ The product reports the process parameters StatusWord, Diagnosis and ActualPosition immediately after the internal controller is booted up.

⇨ As soon as the PLCActive bit is registered in the StatusWord, the communication process can start.

► Transmit the process parameters to move the gripper jaws.

- DeviceMode
- GripForce
- PositionTolerance

► Transmit the parameters to the product with a handshake.

INFORMATION

► For more information, refer to the section “Handshake data transfer method”.

► You can find example codes in the sections “Quickstart Basic Parameters” and “Recipe Examples”.

11.9 Quickstart Basic Parameters

In the following example, you see the first initialization of the product and the transmission of the process parameters.

```
// Initialization of the product
// Motor switch-on
// Initial move command
// = EasyStartUp Example

IF bStart = TRUE THEN
        iStep           := 10;
END_IF

CASE iStep OF

10:
    IF StatusWord.6 THEN                // Query for PLCActive bit in the StatusWord
        ControlWord     := 1;           // Sends the DataTransfer bit in the ControlWord for initialization
        iStep           := 20;          // Jump to the next step
    END_IF

20:
    IF StatusWord.12 THEN               // Query for DataTransferOK bit in the StatusWord
        ControlWord     := 0;           // Reset of the initialization
        iStep           := 30;          // Jump to the next step
    END_IF

30:
    IF NOT StatusWord.12 THEN
        DeviceMode      := 100;         // Command to select the universal mode
        GripForce       := 4;           // Gripping force setting
        ControlWord     := 1;           // Data transfer to the product
        iStep           := 40;          // Jump to the next step
    END_IF

40:
    IF StatusWord.12 THEN               // Query for DataTransferOK bit in the StatusWord
        ControlWord     := 0;           // Reset of the ControlWord
        iStep           := 50;          // Jump to the next step
    END_IF

50:
    IF NOT StatusWord.12 THEN           // Query for DataTransferOK bit in the StatusWord
        ControlWord     := 512;         // Handshake is completed,
                                        // Product moves to WorkPosition (0x0200 or 512(decimal) = MoveToWork)
        iStep           := 100;
    END_IF

100:
        ;                               // Continue with the program

END_CASE
```

11.10 Starting jaw movement

► Send ControlWord 0x0200 so that the jaws move toward the WorkPosition.
⇨ The jaws move toward the inside.
► Send ControlWord 0x0100 so that the jaws move toward the BasePosition.
⇨ The jaws move toward the outside.
- The motion task must be pending for as long as it takes until the desired position is reached.
- The current motion task is canceled as a result of a new handshake.

⇨ When the jaws reach the corresponding position, this is displayed in the StatusWord as follows:
- The jaws are in the BasePosition: StatusWord.8 = TRUE
- The jaws are in the TeachPosition: StatusWord.9 = TRUE
- The jaws are in the WorkPosition: StatusWord.10 = TRUE

11.11 Recipe examples

INFORMATION

The process parameters can be saved in the internal workpiece recipe and reloaded.

Workpiece recipes can be managed at both the product and control levels.

► Manage the process parameters at the control level.

- Same amount of time, since the workpiece recipe is transferred via a handshake.
- The product can be easily replaced.

11.11.1 Save recipe

The following example code shows how process parameters can be stored in the internal workpiece recipe.

```
// Store tool workpiece recipes in Structured Text (ST)

IF bStart = TRUE THEN
        iStep               := 10;
END_IF

CASE iStep OF

10:
        DeviceMode          := 100;   // Assignment of desired process parameters
        WorkpieceNo         := 3;     // Recipe is to be stored as the third workpiece recipe
        PositionTolerance   := 50;
        GripForce           := 3;
        TeachPosition       := 500;
        iStep               := 20;    // Jump to the next step

20:
        ControlWord         := 1;     // Begins with the handshake
        iStep               := 30;    // Jump to the next step

30:
    IF StatusWord.12 THEN             // Queries the bit DataTransferOK=TRUE from StatusWord,
                                      // Response of the product to transferred data
        ControlWord         := 0;     // Reset the ControlWord
        iStep               := 40;    // Jump to the next step
    END_IF;

40:
    IF NOT StatusWord.12 THEN         // Query for completion of the data transfer,
                                      // DataTransferOK = FALSE
        ControlWord         := 2;     // Handshake is completed,
                                      // storage starts here via the WritePDU bit in the ControlWord
        iStep               := 50;    // Jump to the next step
    END_IF;

50:
    IF StatusWord.12 THEN             // Queries the DataTransferOK = TRUE bit from StatusWord
        ControlWord         := 0;     // Reset the ControlWord
        iStep               := 60;    // Jump to the next step
    END_IF;

60:
    IF NOT StatusWord.12 THEN         // Query for completion of the data transfer,
                                      // DataTransferOK = FALSE
        iStep               := 0;     // Storage is completed
    END_IF;

END_CASE
```

11.11.2 Loading a recipe

The following example code shows how process parameters can be loaded to the internal workpiece recipe.

```
// Load workpiece recipes in Structured Text (ST)

IF bLoad = TRUE THEN
        iStep               := 10;
END_IF

CASE iStep OF

10:
        WorkpieceNo         := 3;    // Load third workpiece recipe
        iStep               := 20;   // Jump to the next step

20:
        ControlWord         := 1;    // Begins with the handshake
        iStep               := 30;   // Jump to the next step

30:
    IF StatusWord.12 THEN            // Queries the bit DataTransferOK=TRUE from StatusWord,
                                     // Response of the product to transferred data
        ControlWord         := 0;    // Reset the ControlWord
        iStep               := 40;   // Jump to the next step
    END_IF;

40:
    IF NOT StatusWord.12 THEN        // Query for completion of the data transfer,
                                     // DataTransferOK = FALSE
        iStep               := 0;    //Handshake is completed,
                                     // Parameters from the third recipe have been taken over into the current process parameters.
    END_IF;

END_CASE
```

12 Operation

INFORMATION

For products with IO-Link, menu operation is performed via the control system.

▶ Please contact Customer Service if you have any questions.

13 Gripping force charts

INFORMATION

▶ You can find the information in the technical data sheet on our website.

▶ Please contact Customer Service if you have any questions.

14 Error diagnosis

Error code	Error	Possible cause	Measure
0x0000	Device is ready for operation.	-	-
0x0100	Actuator voltage is not present or is too low.	• Actuator voltage not connected • Actuator voltage insufficient • Cable break • STO input circuit is interrupted.	▶ Check the actuator voltage. ▶ Switch on the STO input circuit.
0x0101	Temperature above maximum permitted temperature.	• Ambient temperature is too high • Overload of the product	▶ Ensure improved cooling of the product. ▶ Reduce the clock speed/ cycle count. ▶ Make sure that the product moves freely.
0x0102	Max. permitted temperature undershot	• Ambient temperature is too low	▶ Provide an adequate operating temperature.
0x0300	ControlWord is not plausible.	• Multiple bits were set in the ControlWord.	▶ In the ControlWord, check that only one bit is set.
0x0301	Positions implausible	• Transmitted positions are not plausible. • Modified process data were not taken over.	▶ Check the transmitted process data. ▶ Apply the process data via a handshake.
0x0302	GripForce is not plausible.	• Transmitted GripForce is not plausible. • Modified process data were not taken over.	▶ Check the transmitted process data. ▶ Apply the process data via a handshake.
0x0303	Required motor speed not reached.	• Insufficient power supply. • Gripper jaws are blocked. • Guide moves with difficulty.	▶ Check the power supply. ▶ Make sure that the product moves freely.
0x0304	PositionTolerance is not plausible.	• Transmitted PositionTolerance is not plausible. • Modified process data were not taken over.	▶ Check the transmitted process data. ▶ Apply the process data via a handshake.
0x0305	Position measuring system not referenced.	• Position measuring system is not referenced. • A reference run is being performed.	▶ Reference the product. ▶ Wait until the reference run is complete.
0x0306	DeviceMode is not plausible.	• Transmitted DeviceMode is not plausible. • Modified process data were not taken over.	▶ Check the transmitted process data. ▶ Apply the process data via a handshake.
0x0308	WorkpieceNo cannot be selected.	• Transmitted workpiece number is outside the permitted range. • Modified process data were not taken over.	▶ Check the transmitted process data. ▶ Apply the process data via a handshake.
0x0309	TeachPosition was changed.	• Modified process data were not taken over.	▶ Apply the process data via a handshake.

Error code	Error	Possible cause	Measure
0x030D	GripForce was changed.	• Modified process data were not taken over.	▶ Apply the process data via a handshake.
0x030F	PositionTolerance was changed.	• Modified process data were not taken over.	▶ Apply the process data via a handshake.
0x0310	DeviceMode was changed.	• Modified process data were not taken over.	▶ Apply the process data via a handshake.
0x0311	WorkpieceNo was changed.	• Modified process data were not taken over.	▶ Apply the process data via a handshake.
0x0312	Initial state after gripper restart	• Modified process data were not taken over.	▶ Apply the process data via a handshake.
0x0400	Difficulty of movement	• Insufficient power supply. • Incorrect DeviceMode (NO/NC) selection. • The free travel of the gripper (NO/NC) is blocked. • Gripper jaws are blocked. • Gripper jaws are difficult to move. • Travel distance of the gripper jaw is too small.	▶ Check the power supply. ▶ Check the selected DeviceMode. ▶ Make sure that the product moves freely. ▶ Check the travel distance.
0x0401	Current limit exceeded.	• Gripper jaws are blocked. • Gripper jaws are tensioned incorrectly.	▶ Make sure that the product moves freely.
0x0403	Temperature sensor error	• Fault of the integrated temperature sensor	▶ Please contact Customer Service.
0x0404	Position sensor error	• Fault of the integrated position sensor	▶ Please contact Customer Service.
0x0405	Travel time/runtime exceeded	• Gripper jaws are blocked. • Gripper jaws are tensioned incorrectly.	▶ Make sure that the product moves freely.
0x0406	System error	• Internal system error	▶ Please contact Customer Service.

15 Table with acyclic data (ISDU)

INFORMATION

IO-Link distinguishes between cyclical data (PDU) and acyclic data (ISDU).

Access to acyclic data is not arranged very conveniently for all control system and IO-Link master combinations. For this reason, the product can be used without acyclic data. This makes it as easy as possible to control the product.

► Please contact Customer Service if you have any questions.

INFORMATION

► Note that the acyclic data with the following parameters correspond to the reflection of the process data:

- StatusWord, Diagnosis, ControlWord, ActualPosition, TeachPosition, WorkpieceNo, DeviceMode, PositionTolerance, Gripforce

Index	Name	Data type	Access rights	Values
0x0040 (64)	StatusWord	UINT16	Read	0 - 65535
	Description			
	Read out the StatusWord			
0x0041 (65)	Diagnosis	UINT16	Read	0 - 65535
	Description			
	Read out of the diagnostic code			
0x0042 (66)	Cycle counter	UINT32	Read	0 to 4294967295
	Description			
	Read out of the total number of cycles			
0x0043 (67)	Temperature	UINT16	Read	0 to 100 °C
	Description			
	Read out the current temperature			
0x0044 (68)	ControlWord	UINT16	Read	0 - 65535
	Description			
	Read out of the ControlWord			
0x0045 (69)	Error code	STRING	Read	1 to 32
	Description			
	Read out of the current error state			
0x0046 (70)	Error counter	UINT32	Read	0 to 4294967295
	Description			
	Read out of the number of errors since the restart			
0x0064 (64)	Firmware application	STRING	Read	1 to 64
	Description			
	Current firmware of the application controller			
0x0100 (256)	ActualPosition	UINT16	Read	0 to max. jaw stroke of the product [0,01 mm]
	Description			
	Read out the current position of the gripper jaws			
0x0101 (257)	TeachPosition	UINT16	Read	0 to max. jaw stroke of the product [0,01 mm]
	Description			
	Read out of the current transmitted TeachPosition			
0x0102 (258)	WorkpieceNo	UINT8	Read	0 - 32
	Description			
	Read out of the transmitted workpiece number			

Index	Name	Data type	Access rights	Values
0x0103 (259)	DeviceMode	UINT8	Read	1 to 95
	Description			
	Read out of the transmitted travel mode			
0x0104 (260)	PositionTolerance	UINT8	Read	0 to 255
	Description			
	Read out of the transmitted tolerance of the TeachPosition			
0x0105 (261)	GripForce	UINT8	Read	1 to 130 %
	Description			
	Read out of the transmitted gripping force			

16 Maintenance

NOTICE



Material damage resulting from blowing out with compressed air

Blowing out the product with compressed air can cause malfunctions.

▶ Never purge the product with compressed air.

NOTICE



Material damage caused by unsuitable cleaning materials

Seals, insulation, coatings and other surfaces may be damaged by solvent-based cleaning agents.

▶ Make sure that no liquids penetrate the product.

▶ Use chemically and biologically neutral cleaning agents.

▶ Use cleaning agents that are categorized as being nonhazardous to health.

▶ Use soft, lint-free cloths for cleaning the surface.

The use of the following cleaning agents is strictly prohibited:

- Acetone
- Cleaning solvent
- Nitrocellulose thinner/turpentine oil (solvents)

NOTICE



Contamination of the environment due to escaping lubricants

Lubricants can escape through moving machine parts. This can lead to contamination of the machine, the workpiece and the environment.

▶ Remove leaking lubricant immediately and thoroughly.

Maintenance-free operation of the product is guaranteed for up to **30 million cycles**.

▶ Note that the product could become damaged under the following circumstances:

- Dirty environment
- Improper use and use that does not comply with the performance data
- Permissible temperature range not observed

▶ Even though the product is maintenance-free as mentioned above, perform a regular visual inspection to check for any damage or contamination.

▶ Have maintenance work that requires disassembly of the product performed by customer service only.

⇨ Dismantling and reassembling the product without authorization may result in complications, as special installation equipment is required in some cases. Zimmer Group GmbH accepts no liability for any resulting malfunctions or damage.

17 Decommissioning/disposal

INFORMATION



When the product reaches the end of its operational phase, it can be disposed of.

▶ Disconnect the product completely from the power supply.

▶ Comply with the locally applicable environmental and disposal regulations.

18 RoHS declaration

in terms of the EU Regulation 2011/65/EU

Name and address of the manufacturer:

Zimmer Group GmbH
Am Glockenloch 2
77866 Rheinau, Germany
+49 7844 9138 0
info@zimmer-group.com
www.zimmer-group.com

We hereby declare that the incomplete machine described below

Product designation: 2-jaw parallel gripper, 3-jaw concentric gripper

Type designation: GEP5000, GED5000

conforms to the requirements of the directive in its design and the version we put on the market.

Michael Hoch	Rheinau, Germany, 2020-11-15	
Authorized representative for compiling the relevant technical documents	(Place and date of issuance)	Martin Zimmer (Legally binding signature) Managing Partner

19 Declaration of Incorporation (Machinery Directive)

In terms of the EU Machinery Directive 2006/42/EC (Annex II 1 B)

Name and address of the manufacturer:

Zimmer Group GmbH

Am Glockenloch 2
77866 Rheinau, Germany
+49 7844 9138 0
info@zimmer-group.com
www.zimmer-group.com

We hereby declare that the incomplete machine described below

Product designation:	2-jaw parallel gripper, 3-jaw concentric gripper
Type designation:	GEP5000, GED5000

conforms to the requirements of the Machinery Directive, 2006/42/EC, Article 2g, Annex VII, b – Annex II, b, in its design and the version we put on the market.

We hereby confirm that all the relevant basic health and safety requirements for the product have been observed and implemented.

A full list of applied standards can be obtained from the manufacturer.

We also declare that the specific technical documents were produced in accordance with Annex VII Part B of this Directive. We undertake to provide the market supervisory bodies with electronic versions of special documents for the incomplete machine through our documentation department, should they have reason to request them.

The incomplete machine may only be commissioned if it has been ascertained, if applicable, that the machine or system in which the incomplete machine is to be installed satisfies the requirements of Directive 2006/42/EC on Machinery and an EC Declaration of Conformity has been drawn up in accordance with Annex II 1 A.

Kurt Ross	Rheinau, Germany, 2021-05-01	
Authorized representative for compiling the relevant technical documents	(Place and date of issuance)	Martin Zimmer (Legally binding signature) Managing Partner

20 Declaration of Incorporation

In terms of the EU Machinery Regulation 2023/1230, Annex V, Part B

Name and address of the manufacturer:

Zimmer Group GmbH

Am Glockenloch 2
77866 Rheinau, Germany
+49 7844 9138 0
info@zimmer-group.com
www.zimmer-group.com

We hereby declare that the incomplete machine described below

Product designation: 2-jaw parallel gripper, 3-jaw concentric gripper

Type designation: GEP5000, GED5000

in their design and in the version we have placed on the market comply with the requirements of Regulation 2023/1230, Article 3.10, Annex III, Annex IV, Part B and Annex V, Part B.

A complete list of the standards applied and the essential health and safety requirements is available from the manufacturer.

The incomplete machine must not be commissioned until it has been determined that - where applicable - the machine into which the incomplete machine is to be incorporated complies with the provisions of EU Machinery Regulation 2023/1230 and the EC Declaration of Conformity has been issued in accordance with Annex V, Part A.

Kurt Ross	Rheinau, Germany, 2021-05-01	
Authorized representative for compiling the relevant technical documents	(Place and date of issuance)	Martin Zimmer (Legally binding signature) Managing Partner

21 Declaration of Conformity

As defined by the EC Directive 2014/30/EU on electromagnetic compatibility

Name and address of the manufacturer:

Zimmer Group GmbH
Am Glockenloch 2
77866 Rheinau, Germany
+49 7844 9138 0
info@zimmer-group.com
www.zimmer-group.com

We hereby declare that the product described below

Product designation:	2-jaw parallel gripper, 3-jaw concentric gripper
Type designation:	GEP5000, GED5000

conforms to the requirements of the Electromagnetic Compatibility Directive 2014/30/EU in its design and the version we put on the market.

The following harmonized standards have been used:

DIN EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
DIN EN 61000-6-3	EMC Generic standard, Emission standard for residential, commercial and light-industrial
DIN EN 61000-6-2	EMC Generic standard, Emission standard for industrial environments
DIN EN 61000-6-4	EMC Generic standard, Immunity for industrial environments

A full list of applied standards can be obtained from the manufacturer.

Kurt Ross	Rheinau, Germany, 2021-05-01	
Authorized representative for compiling the relevant technical documents	(Place and date of issuance)	Martin Zimmer (Legally binding signature) Managing Partner