



# INSTALLATION AND OPERATING INSTRUCTIONS

Energy elements

WER4000

DDOC01250

THE KNOW-HOW FACTORY



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## 1 Supporting documents

### NOTICE



Read through the installation and operating instructions before installing or working with the product.

The installation and operating 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](http://www.zimmer-group.com).

- Installation and operating 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 installation and operating instructions, "product" refers to the product designation on the title page!

### 1.1 Notices and graphics in the installation and operating 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**

Installation, commissioning, maintenance and repairs may only be performed by qualified specialists in accordance with these installation and operating instructions.

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 installation and operating 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 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.

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

#### INFORMATION



Proper use also includes compliance with the threshold values for the electrical parameters shown in the corresponding data sheet.

- ▶ You can find the information in the technical data sheet on our website.
- ▶ Please contact Customer Service if you have any questions.

### 4 Personnel qualification

#### WARNING



#### Injuries and material damage due to inadequate qualification

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

The products are connected directly to tool changers of the WWR1000 series.

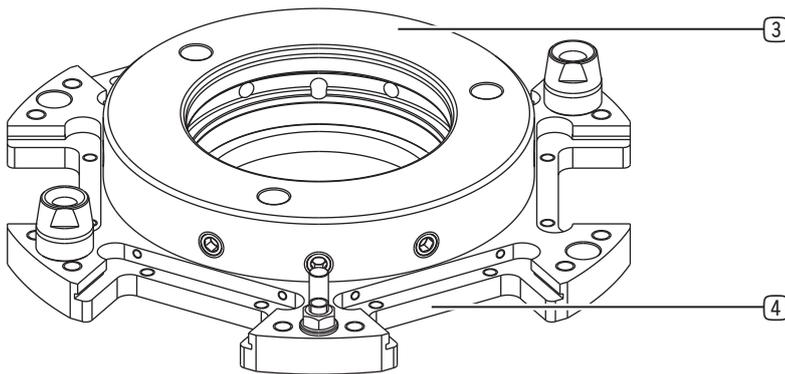
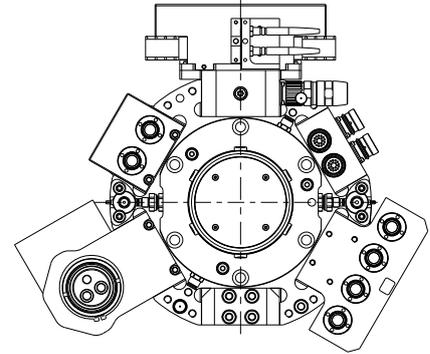
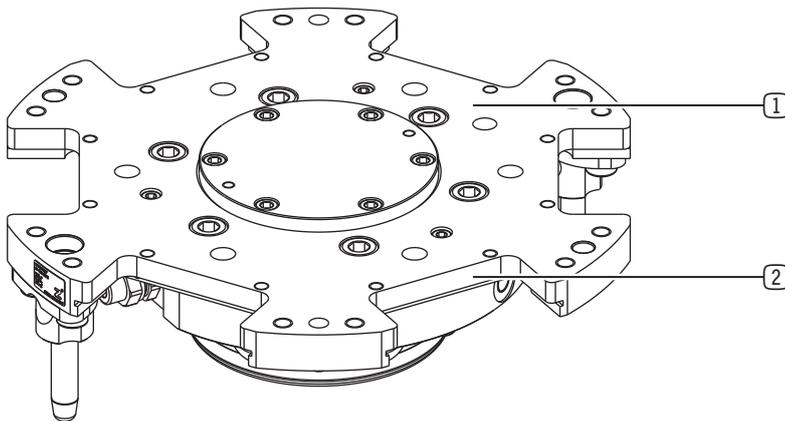
The WWR1000 series tool changers have five mounting positions for energy elements.

The products also differ with respect to loose parts and stationary parts in accordance with the designations of the tool changer's parts.

The stationary part of the product is always on the robot side, while the loose part is always on the tool side.

### Example 1: WWR1160

### WWR1160F with energy elements



- |   |  |
|---|--|
| ① Tool Changer Fix Part                                       | ③ Tool Changer Loose Part                                |
| ② Installation location for stationary part of energy element | ④ Installation location for loose part of energy element |

### INFORMATION



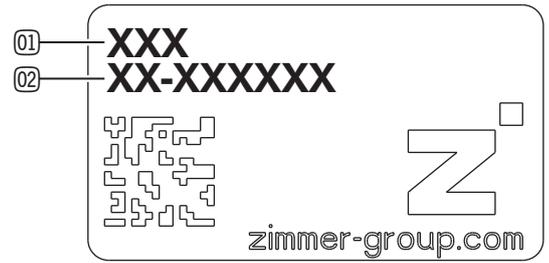
► Shut off electrical and hydraulic power before decoupling and in the decoupled state.

### 5.1 Type plate

A type plate is attached to the housing of the product.

The article number and the confirmation number are shown on the type plate.

- ① Article number
- ② Confirmation number



### 5.2 Product variants

#### INFORMATION



- ▶ You can find information about product variants and their compatibility on our website.
- ▶ Please contact Customer Service if you have any questions.

## 6 Functional description

The energy elements are suitable for the transfer of fluids and electrical energy.

## 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.
- ▶ Please contact Customer Service if you have any questions.

## 8 Accessories/scope of delivery

### INFORMATION



- ▶ If any accessories not sold or authorized by Zimmer GmbH are used, the function of the product cannot be guaranteed. Zimmer 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.

## 10 Installation

### DANGER



#### Risk of injury in case of non-compliance

Risk of injury due to exposed contacts that are live at all times.

- ▶ Never mount the loose part of electrical products on the stationary part of a tool changer.

### 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.

### WARNING



#### Risk of injury from crushing

During coupling and decoupling, a crushing point may occur between the product and the tool changer.

- ▶ Make sure that there are no parts of the body in the range of movement of the product!
- ▶ Only permit installation, maintenance and servicing work to be carried out by trained personnel.

### NOTICE



#### Non-compliance may result in material damage.

Installation may only be carried out by qualified personnel in accordance with these installation and operating instructions.

- ▶ Switch off the power supply before any assembly, installation or maintenance work.

### Assembly requirements

Permissible unevenness [mm]	0,03
Strength class (DIN EN ISO 4762)	8.8

### INFORMATION



Further installation information:

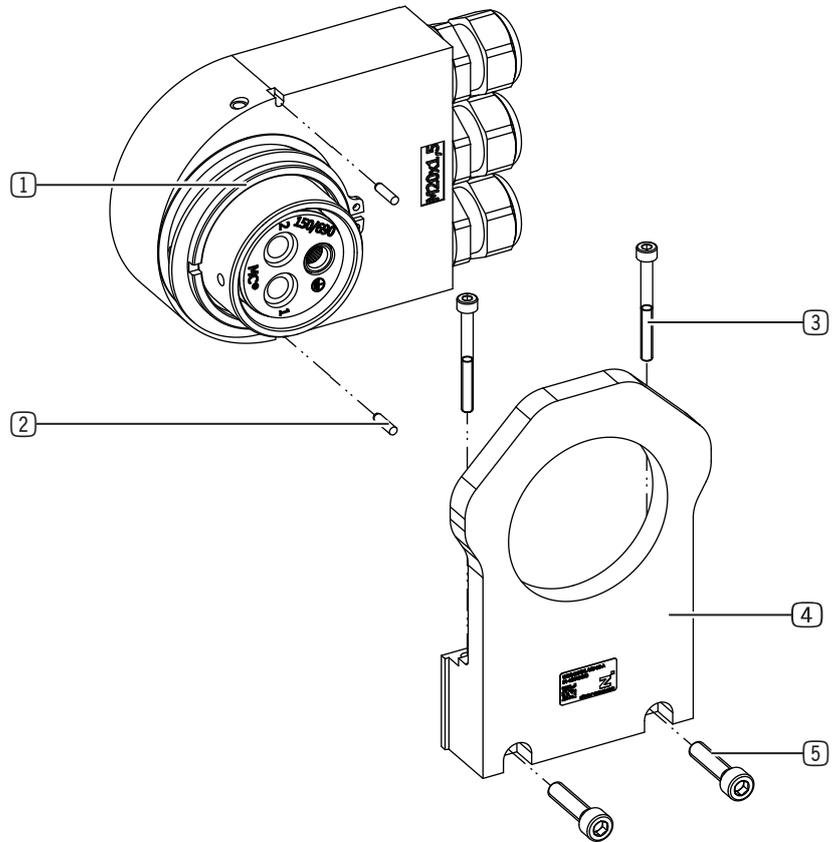
- The mounting screws are not included in the scope of delivery.

- ▶ Install the product on an appropriate mounting surface in accordance with the flatness specifications.
- ▶ Make sure that the mounting piece is sufficiently rigid.
- ▶ Make sure that the mounting surface of the product and connection structure are clean.
- ▶ Please note the permitted tightening torques of the mounting screws at [www.zimmer-group.com/de/td](http://www.zimmer-group.com/de/td).

## 10.1 Installing the product

### 10.1.1 Electrical products

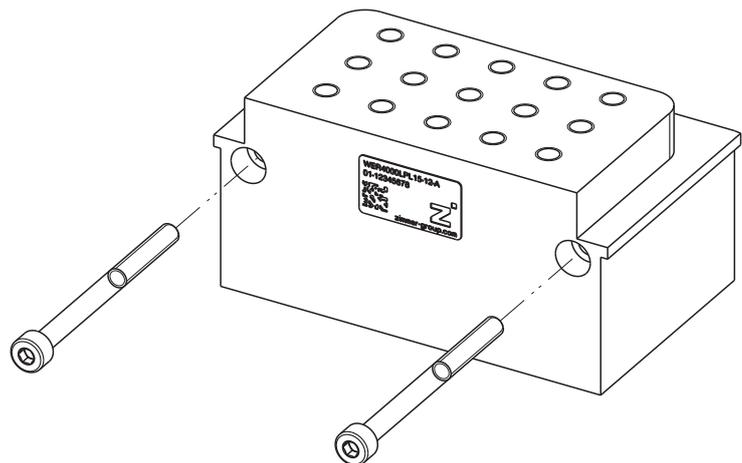
- ▶ Detach the product from the plate by unscrewing the retaining ring.
- ▶ Insert the plate at the desired mounting position on the tool changer.
- ▶ Install the plate using the included mounting screws.
- ▶ Comply with the permitted tightening torques of the mounting screws.
- ▶ Position the product on the plate using straight pins.
- ▶ Mount the product on the plate again using the retaining ring.



- ① Circlip
- ② Mounting screw M4
- ③ Straight pins
- ④ Plate
- ⑤ Mounting screw M6

### 10.1.2 Pneumatic products

- ▶ Insert the product at the desired mounting position on the tool changer.
- ▶ Mount the product using the mounting screws.
- ▶ Comply with the permitted tightening torques of the mounting screws.



### 10.1.3 Hydraulic products

#### INFORMATION



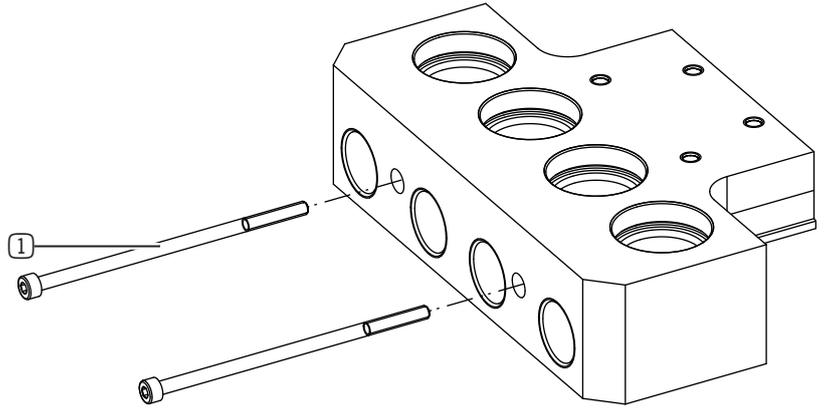
This chapter pertains to the products WER4000FFL01-13-A, WER4000FFL02-13-A, WER4000FFL04-13-A, WER4000LFL01-13-A, WER4000LFL02-13-A and WER4000LFL04-13-A.

#### INFORMATION



► Make sure that the loads are spaced out evenly when arranging the products.

- Insert the product at the desired mounting position on the tool changer.
- Mount the product using the mounting screws.
- Comply with the permitted tightening torques of the mounting screws.



① Mounting screw M4

#### WARNING



##### Risk of injury in case of non-compliance

At operating pressures of 30 bar and higher, high forces are exerted that require the fluidic products to have an additional support or be locked.

- Support on the robot
- Support by a trimmed piece of metal or an adapter plate
- Pneumatic locking

⇒ Without appropriate measures, leaks may result.

#### WARNING



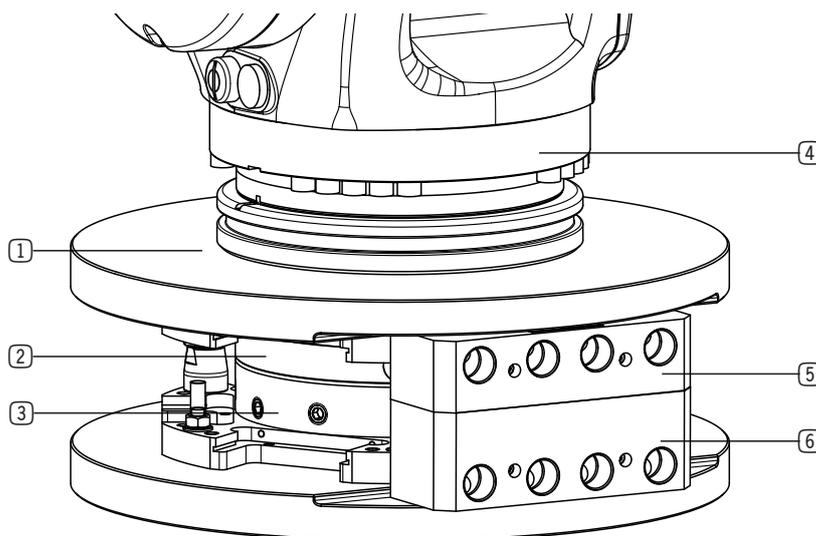
##### Risk of injury in case of non-compliance

► Note that the products reduce the maximum possible axial force of the tool changer.

- The pressure-dependent axial force of the products must be subtracted from the maximum possible axial force of the tool changer.

► For information, refer to the technical data sheet.

► Make sure that fluidic products are completely covered in their width and at least 70% towards the outside.



- ① Bracing
- ② Stationary-part tool changer
- ③ Loose-part tool changer
- ④ Robot
- ⑤ Stationary-part energy element
- ⑥ Loose-part energy element

### 10.1.3.1 Determining the support thickness for the WWR1000 series

#### INFORMATION



In the following table, the thickness of the support corresponds to the minimum requirement.

Steel			Aluminum		
Number of conductors	Pressure [bar]	Bracing thickness [mm]	Number of conductors	Pressure [bar]	Bracing thickness [mm]
1	30	4	1	30	5
1	50	6	1	50	8
1	100	7	1	100	9
1	150	9	1	150	11
1	200	10	1	200	13
1	250	12	1	250	16
2	30	5	2	30	7
2	50	7	2	50	10
2	100	9	2	100	12
2	150	11	2	150	15
2	200	13	2	200	17
2	250	15	2	250	21
4	30	6	4	30	9
4	50	9	4	50	13
4	100	11	4	100	16
4	150	13	4	150	19
4	200	16	4	200	23
4	250	19	4	250	27

## 10.2 Installing the energy supply

### CAUTION



#### Non-compliance may result in material damage.

- ▶ When routing the supply lines, ensure that the joints of the robot arm or tool changer move easily enough.
- ▶ Switch off the power supply to the machine before carrying out any work.
- ▶ Secure the power supply against being switched on unintentionally.
- ▶ Use only supply lines of adequate length.
- ▶ Comply with the permitted bending radii of the supply lines.
- ▶ Use suitable protection systems and fastening points for the supply lines.
- ▶ When routing and securing the supply lines, make sure that they do not put any additional load on the product.

### INFORMATION



The pneumatic and hydraulic products are connected to the respective line system using the connecting thread.

- ▶ Make sure that the pressure class is correct when selecting suitable hoses.
- ▶ You can find the information about connecting threads on the technical data sheet on our website.

### 10.2.1 Electrical products

#### NOTICE



For easier installation, the power supply should only be installed before the product is installed on the tool changer.

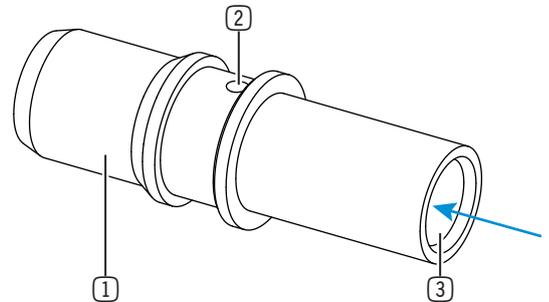
There are sockets that are crimped directly to the line for electric power transmission.

Sockets are available for 25 and 35 mm<sup>2</sup> cable cross-sections.

#### 10.2.1.1 Assembling lines

- ▶ Remove the insulation on the line at a length of  $16 \pm 0.5$  mm.
- ▶ Guide the line into the crimping sleeve until you can see it in the viewing hole.
- ▶ Establish the cable connection using a crimping tool.
- ▶ Mark the ground wire.

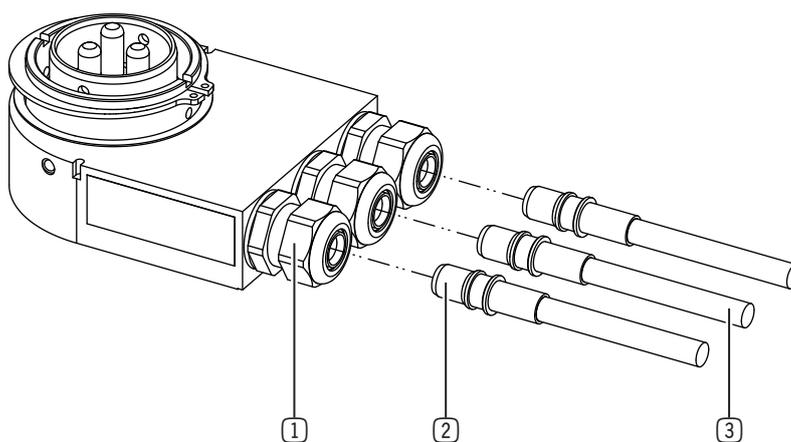
- ① Socket
- ② Viewing hole
- ③ Crimping sleeve



### 10.2.1.2 Connecting the lines

- ▶ Loosen the cable screws.
- ▶ Place the cable screws on the lines.
- ▶ Insert the sockets into the connection on the housing until they engage.
  - ▶ First, connect the ground wire in the middle.
- ▶ Tighten the cable screws.
  - ▶ Comply with the maximum tightening torque of 3 Nm.

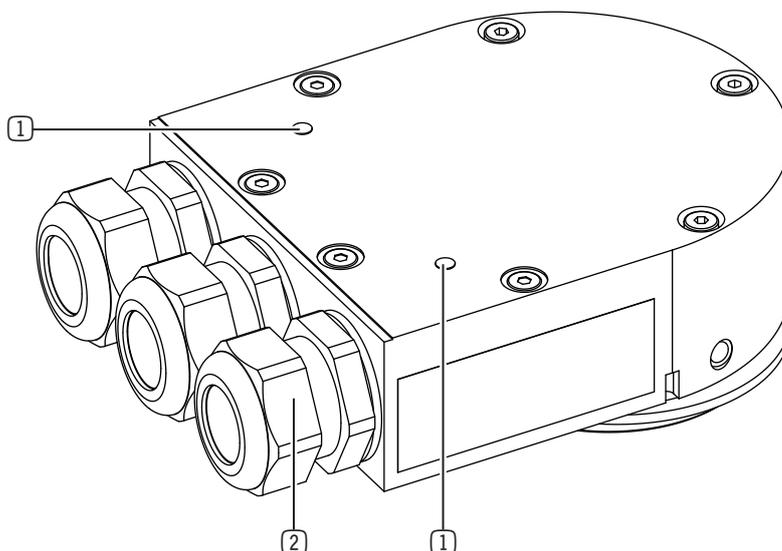
- ① Cable screw
- ② Socket
- ③ Ground wire



### 10.2.1.3 Removing lines

- ▶ Loosen the cable screws.
- ▶ Using a suitable tool, press on the pressure point on the opposite side of the housing.
  - ▶ To loosen the middle line, press both pressure points on the housing at the same time.
- ▶ Pull the line out with a slight turning movement.

- ① Pressure point
- ② Cable screw



**10.2.2 Pneumatic products**

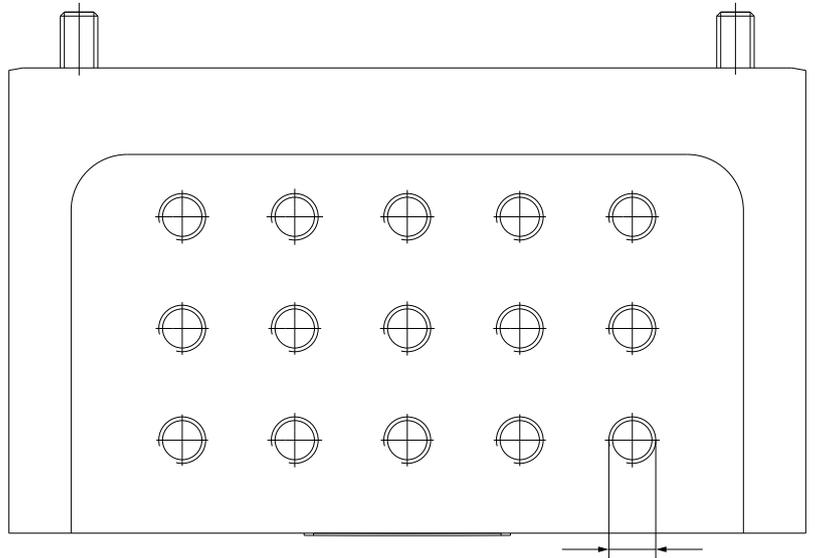
**NOTICE**



For easier installation and line feed, the supply lines should only be installed after the product is installed on the tool changer.

The adjacent image serves as an example.

- ▶ Screw the connections into the provided threads.
- ▶ For the thread size and number, refer to the technical data sheet on our website.



**10.2.3 Hydraulic products**

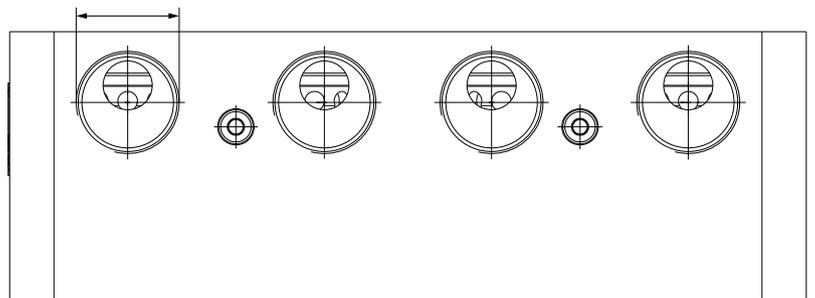
**NOTICE**



For easier installation and line feed, the supply lines should only be installed after the product is installed on the tool changer.

The adjacent image serves as an example.

- ▶ Screw the connections into the provided threads.
- ▶ For the thread size and number, refer to the technical data sheet on our website.



## 11 Service life

The following service life values can be expected if maintenance is carried out correctly.

Transmission type	Mating cycles
Electric	500,000
Hydraulic	1 million
Pneumatic	5 million

## 12 Maintenance

### CAUTION



#### Risk of burns from hot surfaces

During operation and commissioning, the surfaces of the product may become hot.

- ▶ Observe the recommended cooling temperature in accordance with standard EN ISO 13732-1.
- ▶ Wear suitable protective equipment.

This maintenance work includes inspection, maintenance and overhauling.

Maintenance-free operation includes the following number of cycles, depending on the version of the product:

Transmission type	Maintenance work
Electric	<ul style="list-style-type: none"> <li>▶ Carry out a visual inspection every 50,000 plug cycles or every 8 weeks.</li> <li>▶ Clean the pins if there is a small amount of dirt or minor discoloration.</li> <li>▶ Check the electrical function.</li> <li>▶ Replace damaged products.</li> </ul>
Hydraulic	<ul style="list-style-type: none"> <li>▶ Carry out a visual inspection every 50,000 plug cycles or every 8 weeks.</li> <li>▶ Clean the contact surfaces if there is a small amount of dirt or minor discoloration.</li> <li>▶ Check the leak-tightness.</li> <li>▶ Replace damaged products.</li> </ul>
Pneumatic	<ul style="list-style-type: none"> <li>▶ Carry out a visual inspection every 50,000 plug cycles or every 8 weeks.</li> <li>▶ Clean the contact surfaces if there is a small amount of dirt or minor discoloration.</li> <li>▶ Check the leak-tightness.</li> <li>▶ Replace damaged products.</li> </ul>

- ▶ Comply with the specifications for maintenance work in order to ensure failure-free operation.
  - ▶ Take into account the maintenance work in the maintenance plan of the complete system.
  - ▶ Document all maintenance work.
- ⇒ The operator is responsible for documenting maintenance work.

### 12.1 Visual inspection

The visual inspection merely includes visually inspecting component parts and their function. If any irregularities or damage are identified during the visual inspection, a more detailed check of the component parts must be carried out.

### 12.2 Check for leaks

A check for leaks is carried out for pneumatic and hydraulic products. The check for leaks involves visually and acoustically inspecting the connection points of the supply lines and the transitions of the products themselves. The check can also be carried out using a leak tester.

- ▶ Replace leaky component parts immediately.

### 12.3 Cleaning

Clean products and contact surfaces are essentially important for the functional safety.

⇒ Contamination can lead to malfunctions.

#### 12.3.1 Cleaning electrical products

##### NOTICE



**Non-compliance may result in material damage.**

Cleaning the contact pins with liquid or aggressive agents or hard brushes or other tools can lead to damage of the contact pins and to malfunctions.

- ▶ Do not clean the product with any cleaning agents that are liquid or contain solvents.
- ▶ Do not clean the product using any sharp-edged tools.

##### INFORMATION



If there is severe contamination that cannot be cleaned using a cloth or if there are deformations, cracks or other mechanical damage in the area of the contact pins or contact holder, these elements must be replaced completely.

- ▶ Please contact Customer Service.

- ▶ Clean contamination from electrical contacts using suitable fiberglass pencils.
- ▶ In order to prevent damage, refrain from cleaning the socket contacts.

#### 12.3.2 Cleaning hydraulic products

##### INFORMATION



- ▶ You can find the information in the technical data sheet on our website.
- ▶ Please contact Customer Service if you have any questions.

- ▶ Use soft, lint-free cloths for cleaning.
- ▶ Replace damaged products.

### 12.3.3 Cleaning pneumatic products

#### NOTICE

**Non-compliance may result in material damage.**

The surface of the loose part serves as the sealing surface and must be free of damage and dirt. Cleaning the surface using liquid or aggressive agents or hard brushes or other tools can lead to damage.

- ▶ Do not clean the product with any cleaning agents that are liquid or contain solvents.
- ▶ Do not clean the product using any sharp-edged tools.

#### INFORMATION



If there is severe contamination that cannot be cleaned using a cloth or if there are deformations, cracks or other mechanical damage in the area of the contact pins or contact holder, these elements must be replaced completely.

- ▶ Please contact Customer Service.

- ▶ Use soft, lint-free cloths for cleaning.
- ▶ Replace damaged products.

### 13 Decommissioning/disposal

#### INFORMATION



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

- ▶ Disconnect the product completely from the power supply.
- ▶ Dispose of the components properly according to the material groups.
- ▶ Comply with the locally applicable environmental and disposal regulations.

## 14 RoHS declaration

in terms of the EU Regulation 2011/65/EU

### Name and address of the manufacturer:

#### Zimmer GmbH

-  Im Salmenkopf  
77866 Rheinau, Germany
-  +49 7844 9138 0
-  [info@zimmer-group.com](mailto:info@zimmer-group.com)
-  [www.zimmer-group.com](http://www.zimmer-group.com)

We hereby declare that the incomplete machine described below

**Product designation:** Energy elements

**Type designation:** WER4000

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

Michael Hoch  
Authorized representative for the  
compilation of relevant technical  
documents

Rheinau, Germany, 2021-07-01  
(Place and date of issuance)



Martin Zimmer  
(Legally binding signature)  
Managing Partner

## 15 Declaration of Incorporation

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

### Name and address of the manufacturer:

#### Zimmer GmbH

 Im Salmenkopf  
 77866 Rheinau, Germany  
 +49 7844 9138 0  
 [info@zimmer-group.com](mailto:info@zimmer-group.com)  
 [www.zimmer-group.com](http://www.zimmer-group.com)

We hereby declare that the incomplete machine described below

**Product designation:** Energy elements  
**Type designation:** WER4000

conform 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.

Basic health and safety requirements:

No. 1.1.2, No. 1.1.3, No. 1.1.5, No. 1.3.2, No. 1.3.4, No. 1.3.7, No. 1.5.3, No. 1.5.4, No. 1.6.4, No. 1.7.1, No. 1.7.4

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

Authorized representative for the compilation of relevant technical documents

Rheinau, Germany, 2021-07-01

(Place and date of issuance)



Martin Zimmer  
(Legally binding signature)  
Managing Partner

## 16 Declaration of Conformity

In terms of the EU Directive 2014/35/EU (Low voltage directive)

### Name and address of the manufacturer:

#### Zimmer GmbH

📍 Im Salmenkopf  
77866 Rheinau, Germany  
☎ +49 7844 9138 0  
✉ [info@zimmer-group.com](mailto:info@zimmer-group.com)  
🌐 [www.zimmer-group.com](http://www.zimmer-group.com)

We hereby declare that the products described below

**Product designation:** Energy elements

**Type designation:** WER4000

conforms to the requirements of the 2014/35/EC directive 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 60204-1	Safety of machinery – Electrical equipment of machines - Part 1: General requirements

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

Kurt Ross

Authorized representative for the compilation of relevant technical documents

Rheinau, Germany, 2021-07-01

(Place and date of issuance)

Martin Zimmer  
(Legally binding signature)  
Managing Partner