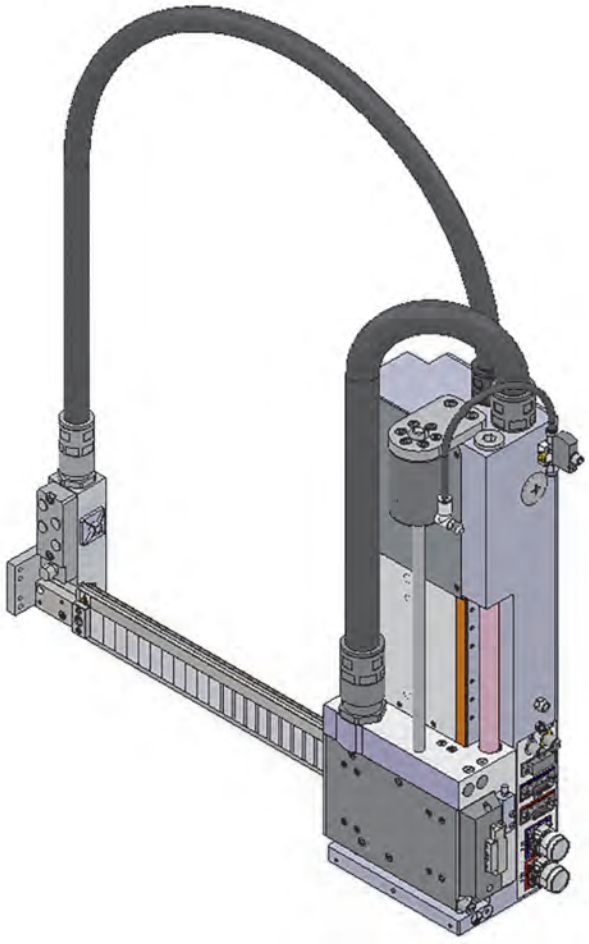
PICK & PLACE
HP140

MOUNTING INSTRUCTIONS

TD 1005014

052020_3.0_EN



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1 Introduction

1.1 About these mounting instructions

These mounting instructions describe the product "PICK & PLACE HP140" (also referred to as "product" in this document).

These mounting instructions are part of the product.

- You may only use the product if you have fully read and understood these mounting instructions.
- Verify that these mounting instructions are always accessible for any type of work performed on or with the product.
- Pass these mounting instructions as well as all other product-related documents on to all owners of the product.
- If you feel that these mounting instructions contain errors, inconsistencies, ambiguities or other issues, contact the manufacturer prior to using the product.

The manufacturer shall not be liable in any form whatsoever for direct or consequential damage resulting from failure to observe these mounting instructions or from failure to comply with directives, regulations and standards and any other statutory requirements applicable at the installation site of the product.

1.2 Intended use

The product is a partly complete machine pursuant to Directive 2006/42/EU, articles 1g and 2g. The product is only intended to be incorporated into or assembled with other machinery or other partly completed machinery or equipment, thereby forming machinery to which Directive 2006/42/EU applies.

The product may only be used within the limits specified in these mounting instructions and in the applicable documents. The applicable documents are also part of the product.

The machinery must not be put into service until the machinery into which the product has been incorporated has been determined and declared in conformity with the provisions of Directive 2006/42/EU and with all other applicable directives and regulations.

In addition, perform a risk assessment in view of the planned application, according to an approved risk assessment method, and implement the appropriate safety measures, based on the results of the risk assessment. Take into account the consequences of installing or integrating the product into a system or a plant.

When using the product, perform all work and all other activities in conjunction with the product in compliance with the conditions specified in the mounting instructions, in the applicable documents, and on the nameplate, as well as with all directives, standards, and safety regulations applicable at the installation site of the product.

1.3 Predictable incorrect application

Any use of the product beyond the explicitly indicated intended use is an impermissible, incorrect application of the product.

The product must never be used in the following cases, under the following conditions, and for the following purposes:

- Operation in residential environments
- Operation in life-supporting systems
- Operation in potentially explosive atmospheres/hazardous areas
- Operation on ships, in rail vehicles, land craft or in aircraft
- Operation in military facilities
- Operation outside of the specified order data
- Applications involving transportation of persons (fairground rides)

1.4 Applicable documents

In addition to these mounting instructions, the following documents are binding for and apply to any type of use of the product:

- Order data (including, but not limited to, design data, load data, performance data, transportation and storage instructions, information attached to the product and the package, as well as other specifications).
- Documentations of the manufacturers of all products belonging to the scope of delivery (for example, motor, accessories, attachment parts). This includes, among other things:

Type of manual	Type	Manufacturer	Delivery	
			Paper format	Electronic
Operating instructions	Encoder BML-S1F...	Balluff GmbH	-	X
Certificate MTTF and MTTFD / B10d	Encoder BML-S1F1-Q61D-M310-P0-KA00,3-S284	Balluff GmbH	-	X
Operating instructions	Encoder BML-S1H...	Balluff GmbH	-	X
Certificate MTTF and MTTFD / B10d	Encoder BML-S1H1-S6QC-M3AA-D0-KA00,3-S284	Balluff GmbH	-	X
Data sheet	Pneumatic valve SY3143-5LOU-Q	SMC	-	X
Safety data sheet	Lubricant LE-Spezialfett Synt EP 2	HERM GmbH & Co. KG	X	X
Safety data sheet	Adhesive lubrication oil HHS 2000	Adolf Wuerth GmbH & Co. KG	X	X

In the case of delivery with WEISS GmbH controller/software package:			Delivery	
			Paper format	Electronic
User manual	"W.A.S. 2 COMPACT" TD0079A-XX00-0000-00	WEISS GmbH	-	X
User manual	"W.A.S. 2 SCALABLE" TD0081A-XX00-0000-00	WEISS GmbH	-	X
Electrical documentation	List of applicable documents, per product (see documents on the USB flash drive delivered with the product)	WEISS GmbH	-	X

1.5 Warranty

See our website for our General Terms and Conditions at www.weiss-world.com or your purchase order.

2 Safety

2.1 Safety messages and hazard categories

These mounting instructions contain safety messages to alert you to potential hazards and risks. Safety messages in these mounting instructions are highlighted with warning symbols and warning words.

The signal word describes the source of the hazard. The text contains instructions on how to avoid the hazard as well as the consequence resulting from failure to follow the instructions given in the safety message.

Depending on the severity of a hazard, the safety messages are classified according to different hazard categories.

⚠ DANGER

DANGER indicates an immediately hazardous situation, which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation, which, if not avoided, can result in death or serious injury or equipment damage.

⚠ CAUTION

CAUTION indicates a hazardous situation, which, if not avoided, can result in injury or equipment damage.

NOTICE

NOTICE indicates a hazardous situation, which, if not avoided, can result in equipment damage.

In addition to the instructions and safety messages provided in these mounting instructions, you must comply with all directives, standards, and safety regulations applicable at the installation site of the product.

2.2 Hazard symbols

The following symbols are used in these mounting instructions:

This is the general safety alert symbol. It alerts to injury hazards or equipment damage. Comply with all safety instructions in conjunction with this symbol to help avoid possible death, injury, or equipment damage.

This symbol alerts to hazardous electrical voltage. If this symbol is used in a safety message, there is a hazard of electric shock.

Hazard symbols may also be attached to the product.

Hazard of hot surface

Hazard of magnetic field

No access for persons with heart pacemakers or other medical implants

2.3 Responsibilities of the system integrator and/or operator

The system integrator (the person who incorporates the product in a machine pursuant to Directive 2006/42/EU, i.e., for example, the machine builder) and/or the operator must ensure the following:

- The application and use of the product must be limited to the specified intended use.
- In the integration of the product, all functional safety requirements must be met.
- All directives, standards, and safety regulations, including all regulations concerning workplace safety and prevention of accidents, applicable at the installation site of the product must be complied with.
- Any type of work whatsoever on and with the product may only be performed by qualified personnel.
- The product may only be operated when it is in flawless, fully functional condition.
- All safety equipment must operate as required and planned.
- The personal protective equipment for the personnel/operator must be available and must be used.
- The mounting instructions and all applicable documents must always be accessible in their entirety to the personnel at the installation site of the product.
- Safety instructions, labels, and any other information attached to the product must not be removed.
- A complete manual must be available for the machine into which the product is incorporated; this manual must describe all types of work on and with the machine and contain all information relevant with regard to the product.

If the system integrator himself is not in the position to comply with any of these obligations, the system integrator must impose compliance with these obligations on the operator.

2.4 Qualification of personnel

Only trained personnel who have fully read and understood the mounting instructions and all applicable documents for the product may perform work on and with the product.

This trained personnel must have sufficient technical training, knowledge, and experience, and be able to foresee and detect potential hazards that may be caused by using the product.

All trained personnel working on and with the product must be fully familiar with all directives, standards, and safety regulations that must be observed for performing such work.

2.5 Hazards caused by strong magnetic fields

The magnetic attraction of the motor components containing permanent magnets increases with decreasing distance and can be higher than several kN in the hazardous exposure range (distance less than 100 mm).

⚠ DANGER

ELECTRIC SHOCK
Each movement of electrically conductive materials vis à vis permanent magnets results in inductive voltage.

Failure to follow these instructions will result in death or serious injury.

- Avoid any movement of components with permanent magnets vis à vis electrically conductive materials in vice versa.

⚠ WARNING

ELECTROMAGNETIC FIELDS

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify compliance with all international, national, and local directives, standards, and safety regulations, including all regulations concerning workplace safety and prevention of accidents, with regard to strong magnetic fields.
- Take all necessary measures to ensure that persons with active medical implants (such as heart pacemakers or insulin pumps), metal implants, and magnetically or electrically conductive objects are not exposed to the magnetic fields generated by the product.
- Do not operate devices in the vicinity of the product which are sensitive to electromagnetic emission.
- Verify that a distance to the product of at least 15 cm is kept.

⚠ WARNING

FORCES OF ATTRACTION ACTING ON MAGNETIZABLE MATERIALS

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify that you do not move objects consisting of magnetizable materials (such as watches, steel or iron tools) and/or permanent magnets into the hazardous exposure range of a component containing a permanent magnet.
- The following must be available to free trapped parts of the body in case of accidents during work with permanent magnets:
  - Hammer (approx. 3 kg) made of solid, non-magnetizable material
  - Two pointed wedges (wedge angle approx.10 ° to 15 °) made of solid, non-magnetizable material

NOTICE

LOSS OF DATA AND DAMAGE TO ELECTRONIC EQUIPMENT

Failure to follow these instructions can result in equipment damage.

- Do not allow electronic devices which are sensitive to magnetic attraction forces in the vicinity of the product.

2.6 Functional safety

⚠ WARNING

INSUFFICIENT AND/OR MISSING SAFETY-RELATED FUNCTIONS

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Perform a risk assessment as per ISO 12100 and/or another equivalent risk assessment, and appropriately consider all applicable regulations and standards that apply to your machine/process before using the product.
- In your risk assessment and with regard to all requirements, determine the Safety Integrity Level (SIL), the Performance Level (PL), and any other safety-related requirements and capabilities necessary to safely operate your machine/process in any operating state and to reach the required safe state.
- In your risk assessment, verify that the product meets all requirements regarding the Safety Integrity Level (SIL), the Performance Level (PL), and any other safety-related requirements and capabilities applicable to your machine/process.
- In your risk assessment, consider all documents mentioned in the section "Applicable Documents" of the present document.
- Verify that the type of integration of the product into your machine/process does not compromise or reduce the data on functional safety specified in the present document and in the applicable documents.
- Do not use wiring information, programming or configuration logic, parameter values, or any other settings described in the present document in your machine/process without validating and verifying their suitability for your application according to the applicable directives, regulations, and standards.
- During initial commissioning, each subsequent recommissioning, and during each restart of the machine/process, verify correct operation and the effectiveness of all safety-related functions and all non-safety-related functions by performing systematic, defined tests for all operating states, for the safe state, and for all potential error conditions.
- Verify that the instructions/documentation you have to create as a system integrator describe all safety-related functions and all non-safety-related functions in a way compliant with all applicable directives, regulations, and standards.
- Verify that your machine/process in which the product is used is properly certified and/or approved according to all standards, regulations, and directives applicable at the installation site of the machine/process.

The product comprises the following components which can be used as safety-related parts of a control system pursuant to ISO 13849-1:

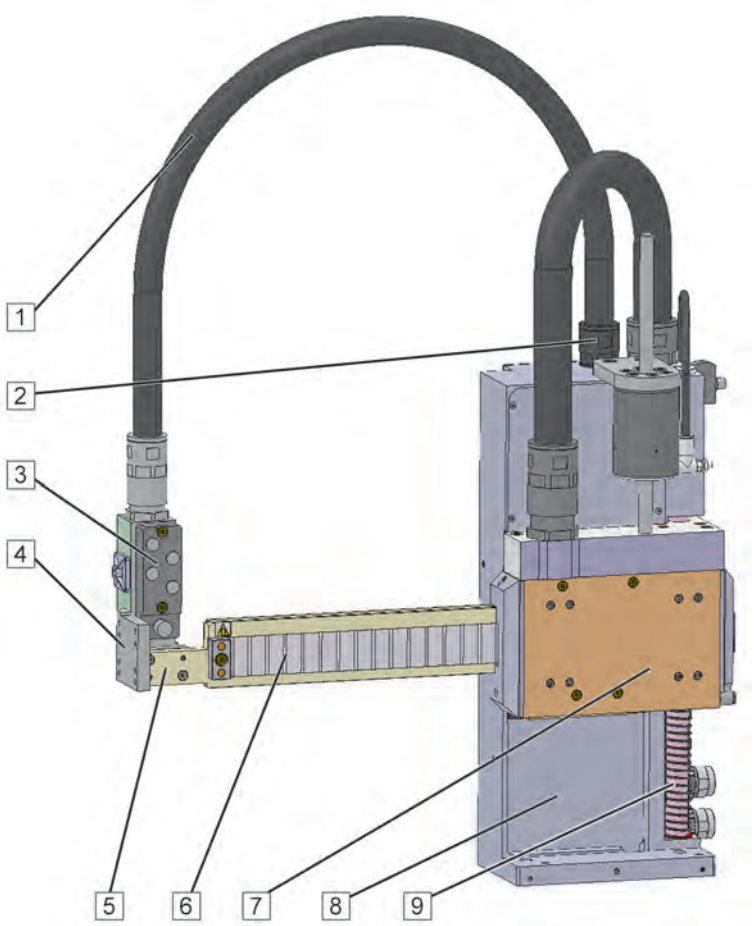
- Encoder (BML-S1F1-Q61D-M310-P0-KA00,3-S284)
- Encoder (BML-S1H1-S6QC-M3AA-D0-KA00,3-S284)

Refer to the section "Functional safety encoder" for data on functional safety provided by the manufacturer of these components. Refer to the documents of the manufacturer listed in the chapter "Applicable documents" for additional data.

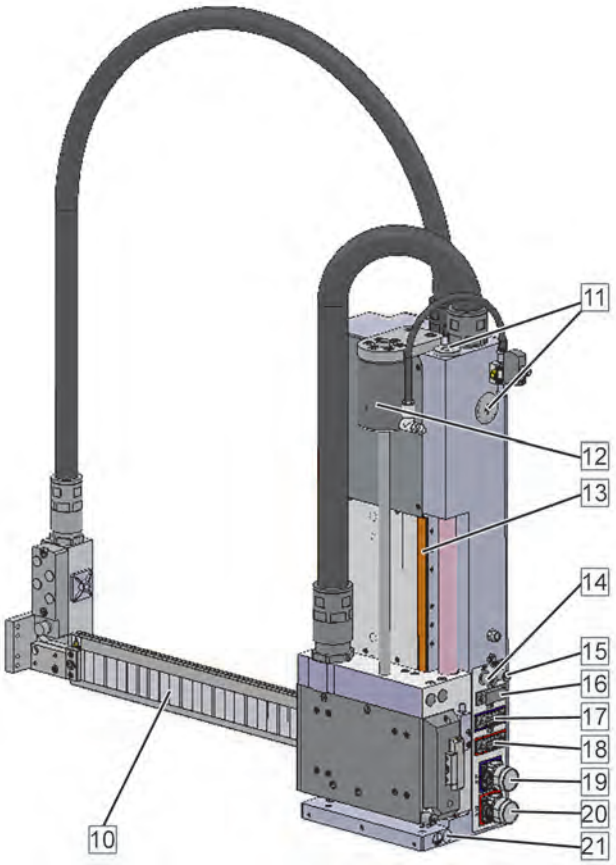
3 Product description

3.1 Overview

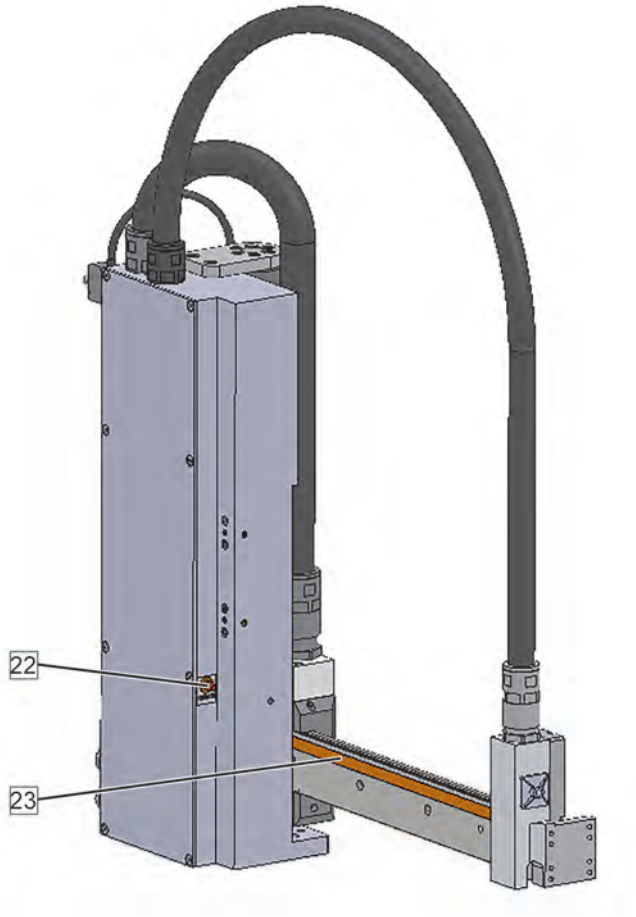
The product consists of the following components:



1	Corrugated hose tool connector (optional)	**6**	Horizontal axis (y axis)
2	Rapid-action connector "Tool-Connector" (optional)	**7**	Vertical axis (z axis)
3	Sensor/actuator box (optional)	**8**	Housing
4	Mounting surface for optional tool connector	**9**	Return spring
5	Mounting surface without use of the tool connector		



10	Magnet way	**16**	Connection control signals
11	Passage of media - Pneumatic hoses - Other cables	**17**	Connection encoder
12	Vertical clamping system (optional)	**18**	Connection encoder
13	Scale	**19**	Connection motor cable
14	Lubrication connection	**20**	Connection motor cable
15	Connection compressed air	**21**	Connection protective ground conductor

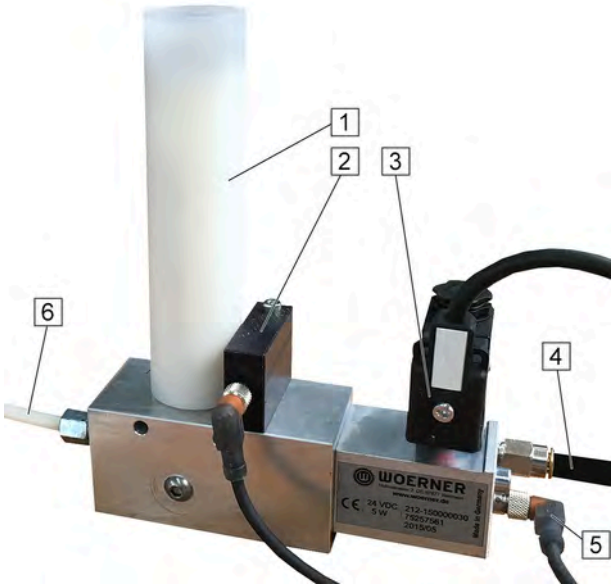


22 Lubrication connection

23 Scale

3.1.1 Overview "Automatic lubrication pump" (optional)

The automatic lubrication pump consists of the following components:



1	Grease cartridge	**4**	Pneumatic supply
2	Level sensor	**5**	Function monitoring
3	Pneumatic valve	**6**	Lubrication hose (optionally available with two lubrication hose connections)

3.2 Function description

The product is designed for typical pick & place applications.

The directly driven linear axes allow for highly dynamic movements. The vertical movements and the horizontal movements are programmable. Different stroke lengths are available for vertical and horizontal movements. The product is available with an incremental or absolute encoder.

The product can be equipped with an optional WEISS tool connector. The tool connector provides a simplified cable guide system for a gripper system connected to the product. The integrated cable guide routes the signal cable and the pneumatic hoses from the connections at the rear side of the product to the mounting surface at the front.

The vertical clamping system helps to avoid unintended movements such as lowering of the load.

To reduce the maintenance, the product can be equipped with an optional automatic lubrication pump.

For commissioning, parameterization and diagnostics, the product can be operated with the WEISS Application Software (W.A.S. 2).

3.3 Nameplate

The nameplate is attached to the housing of the product; it contains the following information:

Figure 1: Example of nameplate

1	Name	**5**	Year of manufacture
2	Model	**6**	Weight
3	Type	**7**	QR code company website
4	Serial number		

3.4 Type code

Structure of the type code:

Type	Vertical stroke (mm)	Horizontal stroke (mm)	Encoder	Application	Clamping element	Tool connector
HP140	65 100 150	148 203 258 288 388	**SICO1** (Incremental 1Vpp) **SSI20B** (absolute SSI 20Bit Bosch) **BISS20** (absolute BiSS-C 20Bit)	**S** (safe encoder mounting, for safety-related application) **N** (standard application)	**NCL** (without) **WCL**(with, vertical only)	**NTC** (without) **ETC** (with empty pipe and lateral cable entry) **CTC** (with signal cable, including junction box) **PTC** (with signal cable, including junction box, and with two integrated 5/2 pneumatic valves with pneumatic hoses)

3.5 Mounting positions

NOTICE

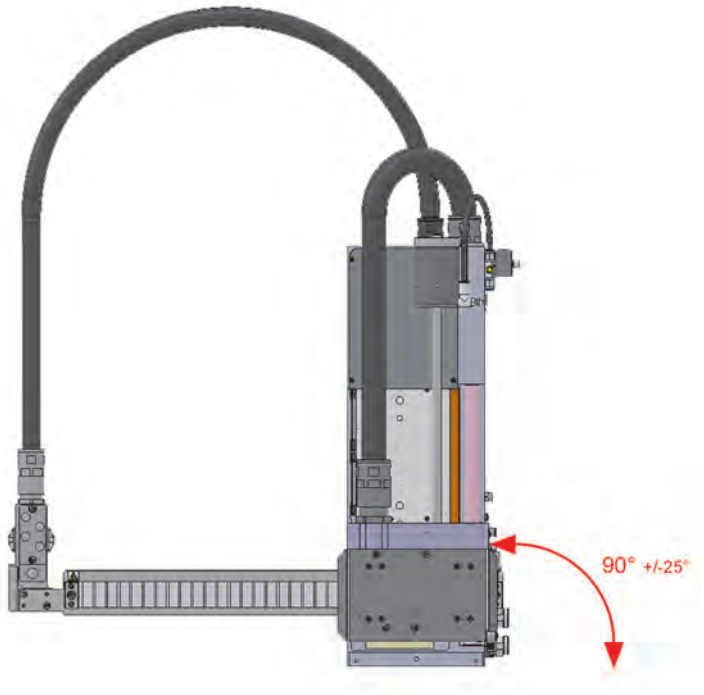
EQUIPMENT DAMAGE DUE TO INCORRECT MOUNTING POSITION

Failure to follow these instructions can result in equipment damage.

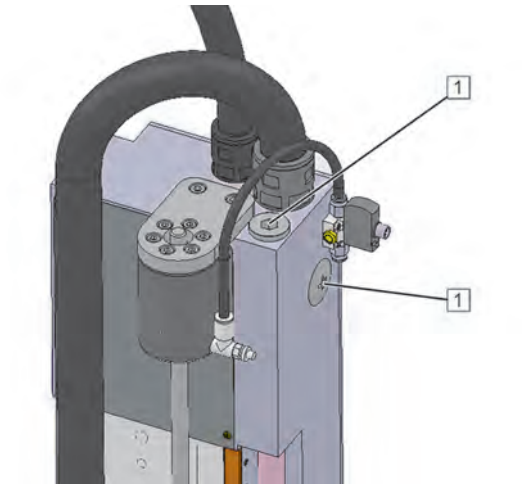
- Verify that you only use the standard mounting positions approved in these mounting instructions.
- Only use special mounting positions if such special mounting positions have been approved by the manufacturer in writing.

Permissible standard mounting positions

Upright, horizontal axis horizontally, vertical axis vertically with a maximum deviation from the vertical plane of ± 25°, see illustration below.



3.6 Passage of media



The two openings in the housing [1] can be used for the passage of media.

4 Technical data

4.1 General

Characteristic	Unit	Value	
Stroke horizontal (depending on type, see nameplate)	mm	S N	148, 203, 258, 288, 388 160, 215, 270, 300, 400
Stroke vertical (depending on type, see nameplate)	mm	65, 100, 150	
Repeatability (at a constant temperature +/- 10 K)	mm	0.005	
Maximum load	kg	3	
Weight	kg	See nameplate	
Total weight including packaging	kg	See bill of delivery	
Sound pressure	dB(A)	< 70	
Lubricant	-	LE-Spezialfett Synt EP 2	

4.2 Motor

Characteristic	Unit	Value	
		Horizontal axis (y axis)	**Vertical axis (Z axis)**
Pole width	mm	27.6	28.1
Maximum DC bus voltage	V DC	560	
Voltage constant (rms)	V/(m/s)	52	49
Maximum acceleration	m/s^2	40	
Maximum velocity	m/s	4	
Nominal force	N	80	150
Peak force	N	240	370
Force constant	N/A_{rms}	65	70
Nominal current	A	1.7	2.4
Peak current	A	3.8	5.8
Winding cross section	mm^2	0.088	0.196
Stator resistance at 20°C*	Ohm	33	13
Stator inductance*	Henry	0.092	0.094
Rotor mass	kgm^2	2.2	5.4

* Measured between phase and phase (star connection)

4.3 Clamping element

Vertical clamping system (optional)

Characteristic	Unit	Value
Braking force	N	2500
Releasing pressure	bar	4
Time delay for applying	sec	0.3
Time delay for releasing	sec	0.3

4.4 Encoder

Refer to the documentation of the manufacturer for the technical data of the encoder; see applicable documents.

Incremental

Characteristic	Unit	Value
		Balluff BML-S1F
Supply voltage	V	5 ± 5 %
Incremental signals	V_{pp}	sin/cos 1
Signal period/resolution	mm	1
Reference mark	-	Without
Accuracy	µm/m	± 10

Absolute BiSS

Characteristic	Unit	Value
		Balluff BML-S1H - 20 bits
Supply voltage	V	5 ± 5 %
Absolute signals	-	BiSS
Resolution	/mm	1024
BiSS cycle frequency	MHz	2 ... 10
Coding	-	Binary code
CRC	-	6
CRC numerator polynomial	hex / dec	0 x 43 / 67
Number of data bits	-	20
Number of error bits	-	0
Number of zero bits	-	2

Characteristic	Unit	Value
Order of data	-	Position: 20 Zero bit: 2 CRC: 6
Incremental signals	V_{pp}	sin/cos 1
Signal period	mm	1

Absolute SSI

Characteristic	Unit	Value	
		Balluff BML-S1H - 20 bits	
Option		Parameteriza-tion BOSCH	Parameteriza-tion Siemens
Supply voltage	V	5 ± 5 %	
Absolute signals	-	SSI	
Resolution	/mm	1024	
SSI cycle frequency	kHz	400	100
Monoflop time	µs	8	16
Coding	-	Binary code	
Number of data bits	-	20	
Number of error bits	-	0	
Number of zero bits	-	2	
Order of data	-	Position: 20 Zero bit: 2	
Incremental signals	V_{pp}	sin/cos 1	
Signal period	mm	1	

4.5 Pneumatic valve (optional)

Characteristic	Unit	Value
Manufacturer	-	SMC
Type	-	SYJ3143-5LOU-Q
Function	-	5/2 monostable
Operating pressure	MPa	0.15 - 0.7
Flow rate	l/min	98
Diameter connection for compressed air supply	mm	6
Hose	-	FESTO PUN-4x0,75-DUO-BS

Characteristic	Unit	Value
Hose length	m	Approximately 1.3
Voltage	VDC	24
Valve 1	-	A1 - output 1
Valve 2	-	A2 - output 2

4.6 Climatic environmental conditions "Operation"

Characteristic	Unit	Value
Ambient temperature	°C	+15 ... +45
Relative humidity, non-condensing	%	+5 ... +70
Maximum surface temperature	°C	80
Maximum installation altitude above mean sea level without derating motor and drive/frequency inverter	m	1000
External magnetic fields (to help avoid permanent damage)	mT	< 30
External magnetic fields (to help avoid deterioration of the measurement)	mT	< 1

4.7 Climatic environmental conditions "Transportation and Storage"

Characteristic	Unit	Value
Ambient temperature	°C	+5 ... +55
Relative humidity, non-condensing	%	+5 ... +70
Degree of protection	-	IP20
Protection class (as per EN 61140)	-	I
Maximum storage duration of the mechanical components	-	see chapter 8

4.8 Dimensions

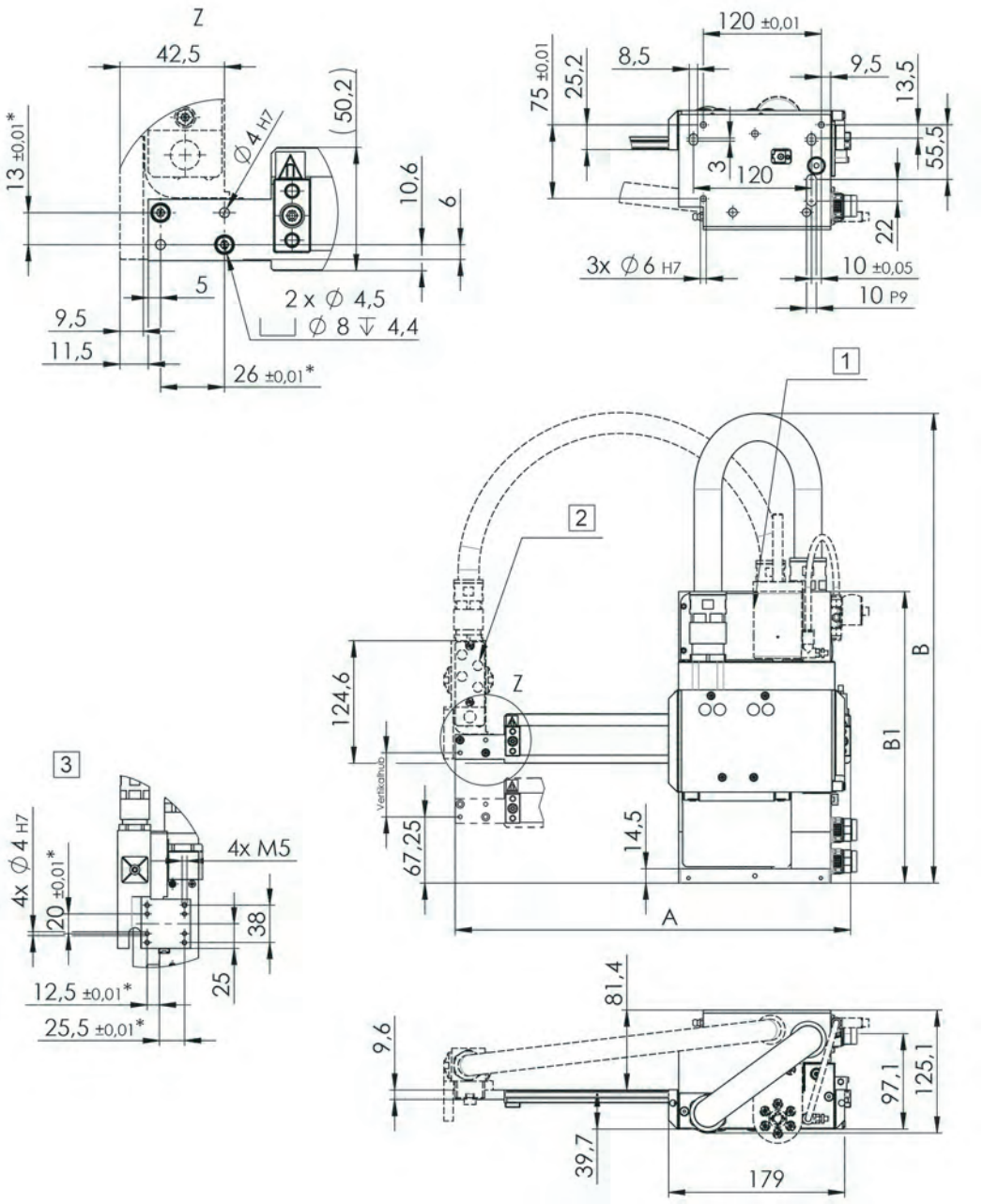


Figure 2: Lengths and diameters in mm

1 Vertical clamping system (optional)

2 Tool connector (optional)

3 Connection dimensions tool connector

* Tolerance valid for Ø 4 H7

Horizontal stroke	Dimension A in mm
148	
203	
258	
288	
388	

Vertical stroke	Dimension B in mm	Dimension B_1 in mm
65	478	296.5
100	581	371.5
150	653	471.5

4.8.1 Dimensions "Automatic lubrication pump" (optional)

With two lubrication hose connections

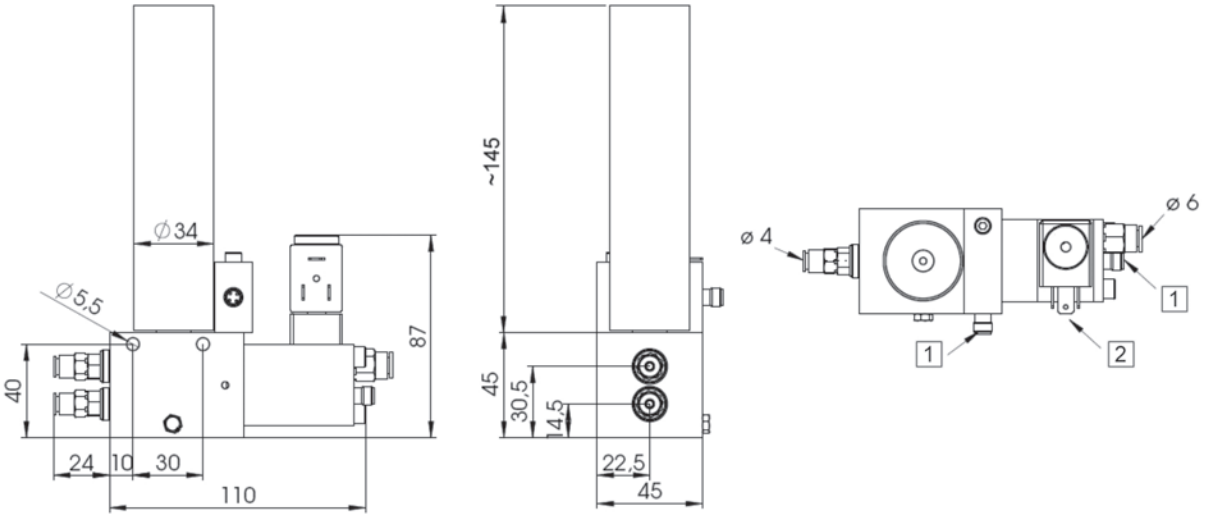


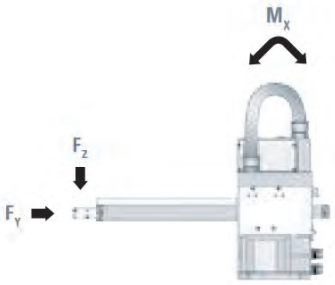
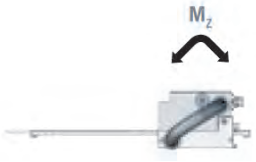
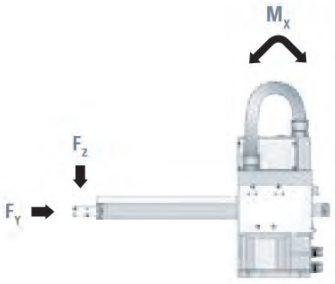
Figure 3: Lengths and diameters in mm

1 M8 - 3-pin

2 Valve, type B

4.9 Load data

Static load data

Characteristic	Representation	Unit	Value
Maximum static moment around the X axis		Nm	49
Maximum static moment around the horizontal axis (y axis)		Nm	15
Maximum static moment around the vertical axis (z axis)		Nm	36
Maximum static force in the horizontal axis (y axis)		N	80
Maximum static force in the vertical axis (y axis)		N	100

5 Data functional safety

The following data on functional safety relate to the following components integrated in the product:

- Encoder (BML-S1F1-Q61D-M310-P0-KA00,3-S284)
- Encoder (BML-S1H1-S6QC-M3AA-D0-KA00,3-S284)

You can use these components as safety-related components of a control system pursuant to ISO 13849-1. Use the data for your functional safety calculations.

BML-S1F1-Q61D-M310-P0-KA00

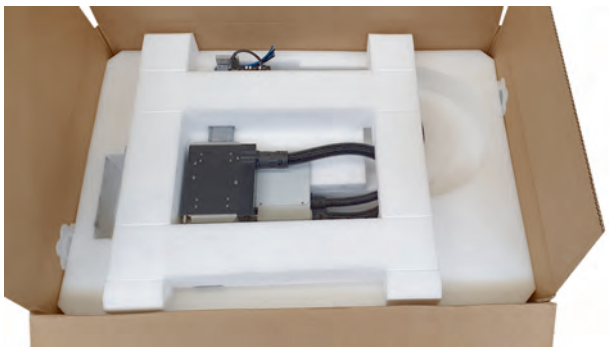
Characteristic	Unit	Value
MTTF (40 °C)	Years	510
$MTTF_D$	Years	1020
B10d	-	-
Mission time	Years	20
Diagnostic coverage	%	0 (sensor heads do not have diagnostics functionality)

BML-S1H1-S6QC-M3AA-D0-KA00

Characteristic	Unit	Value
MTTF (40 °C)	Years	1189
$MTTF_D$	Years	2378
B10d	-	-
Mission time	Years	20
Diagnostic coverage	%	0 (sensor heads do not have diagnostics functionality)

6 Packaging

6.1 Types of packaging



The product is packaged in a cardboard box with foam plastic material.

Only products with a stroke of 400 mm are screwed onto a palette and packaged in a covering box.

6.2 Unpacking the product

1. Do not remove the packaging until immediately prior to mounting.
2. Dispose of the packaging material in compliance with all directives, standards, and safety regulations applicable at the installation site.

6.3 Verification of the delivery

- Check the delivery for completeness and transportation damage upon reception.
- In the case of damage, reject the delivery or accept it only conditionally.

- Document the damage in the transportation documents/bill of delivery (any damage detected must be immediately reported to the forwarding agent and confirmed by the forwarding agent).
- Take photographs of the damage.
- Report the damage to WEISS GmbH.

7 Transportation

⚠ WARNING

FALLING, TOPPLING, OR LOWERING LOADS
Insufficiently rated load lifting and handling equipment may break. Transportation vehicles, lifting gear, chains, belts, and other equipment not rated for the product may fail or tilt.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Only use transportation vehicles, lifting gear, chains, belts, and other lifting and handling equipment that comply with all applicable regulations and that are rated for the weight of the product including packaging.
- Verify that there are no persons in the danger zone.
- Verify that the product is properly secured against falling and toppling.

7.1 Transporting the product

Packages fastened to a palette can be transported with a fork lift truck, a pallet jack or similar transportation means. Verify that the transportation means used is suitable and approved for the weight and the dimensions of the package.

1. Place the forks below the pallet.
2. Verify that the pallet with the package fully rests on the forks.
3. Fasten the pallet with the package using additional straps if the center of gravity is not in the center of the pallet.

8 Storage

8.1 Storing the product

⚠ CAUTION

STRONG MAGNETIC FIELDS
The permanent magnets of the magnet way generate magnetic fields. The magnetic attraction forces considerably increase in the range of hazardous exposure (distance of less than 100 mm). Magnetizable materials, but also the linear motor axes, are attracted with high forces.

Failure to follow these instructions can result in injury or equipment damage.

- Transport and store the products separately.
- Do not stack the products.
- Verify that separating tools are available for emergencies.

The mechanical components of the product can be stored for a period of up to two years.

Conditions for the specified maximum storage duration:

- Storage in original packaging
- Compliance with all specified storage conditions
- Storage in suitable closed, dry, dust-free room, protected against direct sunlight
- No contact with corrosive media
- Corrosion protection intact

The electrical components (for example, the encoder) have a different maximum storage duration (see documentations of the manufacturers).

If the maximum storage duration has been exceeded, you must contact the manufacturer prior to commissioning the product. This also applies if the machine in which the product has been incorporated has not been operated for a period of time exceeding the maximum storage durations specified for the mechanical and electrical components.

If you plan to store the product for a period of time exceeding the maximum permissible storage duration specified for the mechanical components, you must uninstall the electrical components prior to storing the product. The electrical components must be stored according to the specifications of the manufacturers (see documentations of the manufacturers).

If the product is to be stored for a period of more than three months, the product must first be preserved. If the factory-applied anti-corrosion agent is no longer intact, you must request preservation instructions from the manufacturer.

9 Mounting

9.1 Prerequisites for mounting

Prior to mounting, verify that the dimensions of the installation site and construction conditions meet the requirements and the dimensions specified in these mounting instructions and the applicable documents.

- Verify that the supporting base is level and rigid.
- Verify that the supporting structure at the installation site has a sufficient structural strength to carry the weight of the product and of all loads.

9.2 Equipment and tools

⚠ CAUTION

STRONG MAGNETIC FIELDS
The permanent magnets of the magnet way generate magnetic fields. The magnetic attraction forces considerably increase in the range of hazardous exposure (distance of less than 100 mm). Magnetizable materials are attracted with high forces.

Failure to follow these instructions can result in injury or equipment damage.

- Only use non-magnetic tools.

The following is required for mounting:

- Torque wrench
- Set of hex keys
- Locating pins (depending on mounting version)
- Cotter pin punch (for mounting centering elements locating pins)
- Ball pane hammer

9.3 Tightening torques and property classes

For fastening the product, only use screws with the property class shown in the following table unless a different property class is explicitly specified for a screw connection.

Use the tightening torque shown in the following table unless a different tightening torque is explicitly specified for a screw connection.

Property class of screws	10.9 (coefficient of friction $\mu_{tot.}$0.10)
Thread	M8
Tightening torque	31.8 Nm

9.4 Bolting down the product

⚠ WARNING

FALLING, TOPPLING, OR LOWERING LOADS
Insufficiently rated load lifting and handling equipment may break. Transportation vehicles, lifting gear, chains, belts, and other equipment not rated for the product may fail or tilt.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Only use transportation vehicles, lifting gear, chains, belts, and other lifting and handling equipment that comply with all applicable regulations and that are rated for the weight of the product including packaging.
- Verify that there are no persons in the danger zone.
- Verify that the product is properly secured against falling and toppling.

⚠ WARNING

ELECTROMAGNETIC FIELDS

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify compliance with all international, national, and local directives, standards, and safety regulations, including all regulations concerning workplace safety and prevention of accidents, with regard to strong magnetic fields.
- Take all necessary measures to ensure that persons with active medical implants (such as heart pacemakers or insulin pumps), metal implants, and magnetically or electrically conductive objects are not exposed to the magnetic fields generated by the product.
- Do not operate devices in the vicinity of the product which are sensitive to electromagnetic emission.
- Verify that a distance to the product of at least 15 cm is kept.

⚠ WARNING

IMPROPERLY FASTENED PARTS

Failure to follow these instructions can result in death, serious injury, and equipment damage.

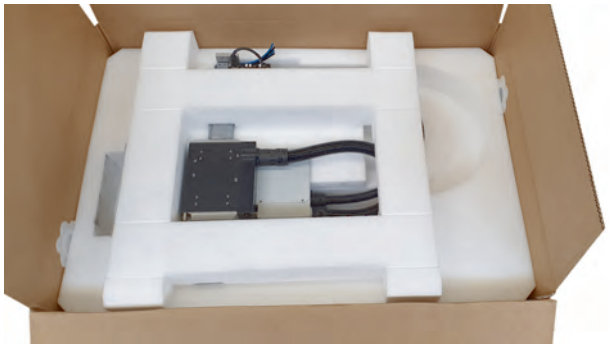
- Verify that the supporting structure and/or the frame and/or the mounting surface for fastening the product are sufficiently rated to withstand all static and dynamic loads and forces during operation.
- Verify that the fastening parts comply with the specifications indicated and that they are sufficiently rated for all load conditions during operation.

NOTICE

HARMFUL EXTERNAL INFLUENCES

Failure to follow these instructions can result in equipment damage.

- Verify that the magnet way does not come into contact with magnetized objects.
- Do not subject the magnet way to mechanical impact.
- If you mount several products, avoid any contact between the magnet ways of the products.



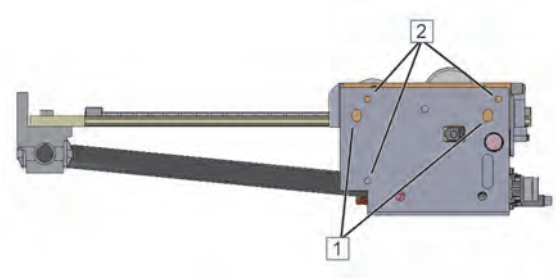
Packaged in cardboard box

1. Remove the product from the cardboard box.

Packaged in covering box

2. Remove the screws of the two packaging bars [2] used to fasten the product to the palette.
3. Remove the product from the cardboard box.
4. Remove the two packaging bars [2] from the product by removing the screws [1].

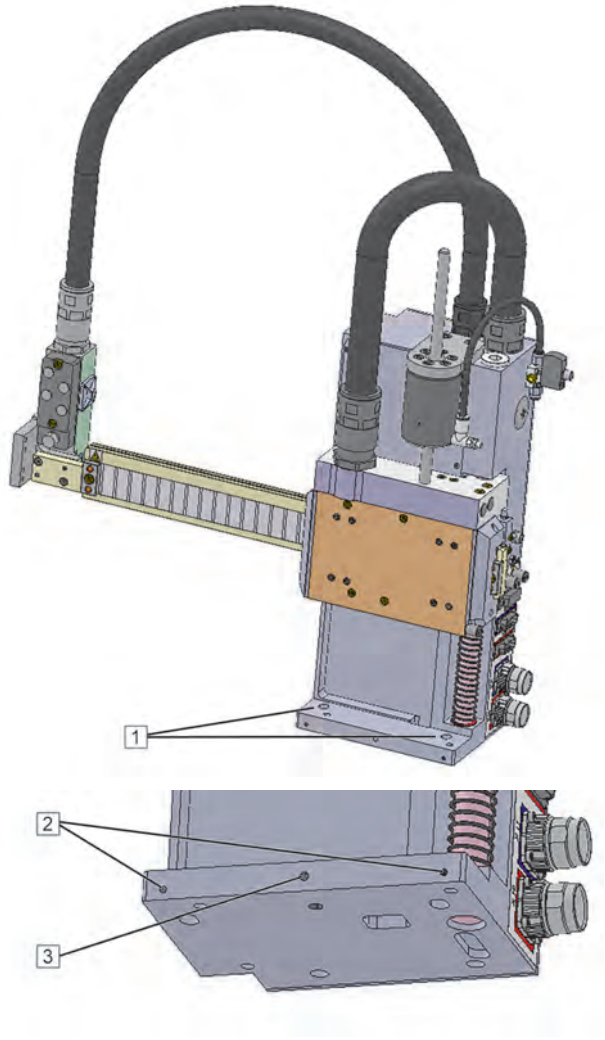
Fastening by means of locating pins



Use M8 screws with the property class specified to mount the product. When determining the length of the screws, take into account the loads and forces acting in your application as well as the characteristics of the supporting structure to which the product is mounted.

1. Lower the product onto the mounting surface in compliance with the transportation instructions.
2. Hand-tighten the two screws (M8) in the elongated holes [1].
3. Fully drive the three locating pins into the pin holes [2].
4. Tighten the two screws (M8) at the mounting surface of the product with a tightening torque of 31.8 Nm.
5. Remove all transportation aids and equipment as well as all mounting tools from the product.

Fastening by means of elongated holes

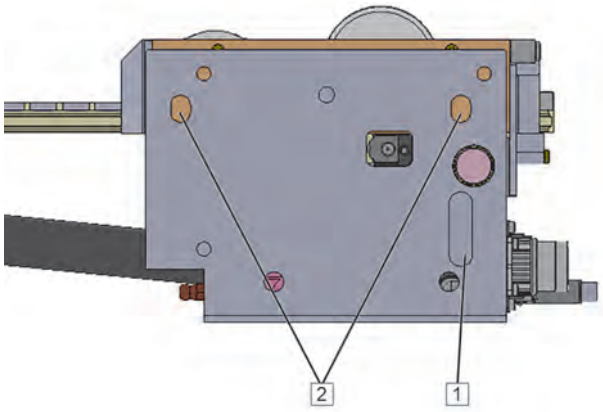


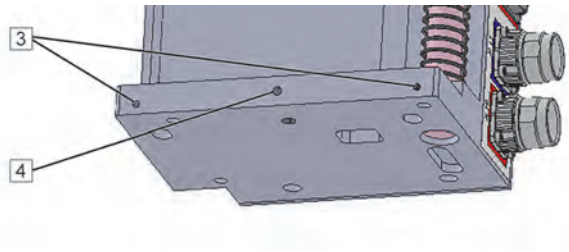
Use M8 screws with the property class specified to mount the product. When determining the length of the screws, take into account the loads and forces acting in your application as well as the characteristics of the supporting structure to which the product is mounted.

1. Lower the product onto the mounting surface in compliance with the transportation instructions.
2. Hand-tighten the two screws (M8) in the elongated holes [1].
3. Align the product. The product can be aligned with a fixed stop via the threaded holes [2] and [3].
4. Tighten the two screws (M8) at the mounting surface of the product with a tightening torque of 31.8 Nm.
5. Remove all transportation aids and equipment as well as all mounting tools from the product.

Movable fastening via groove

The fastened product can be loosened from the mounting surface and moved to a different position along a guide groove in the mounting surface and fastened at that position via a parallel key.

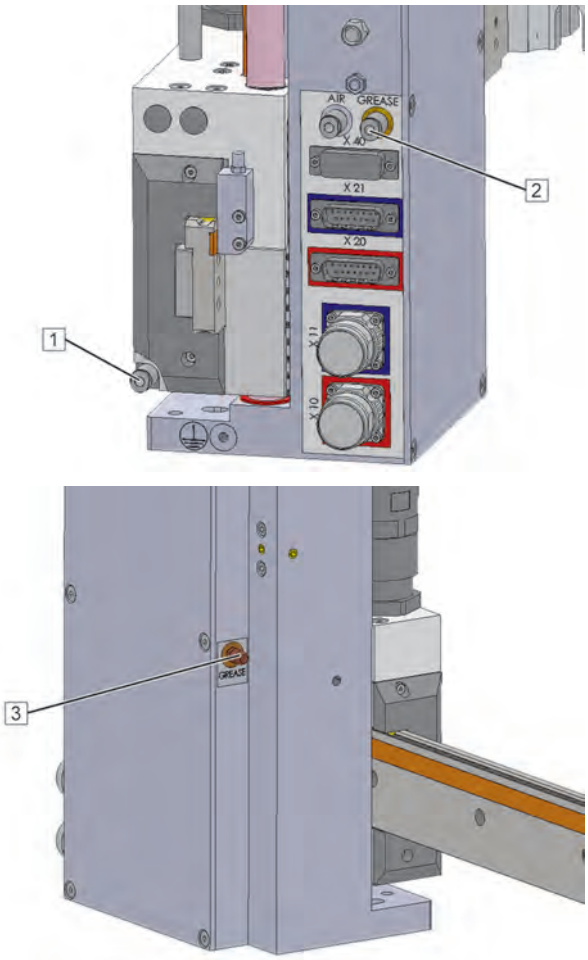




Use M8 screws with the property class specified to mount the product. When determining the length of the screws, take into account the loads and forces acting in your application as well as the characteristics of the supporting structure to which the product is mounted.

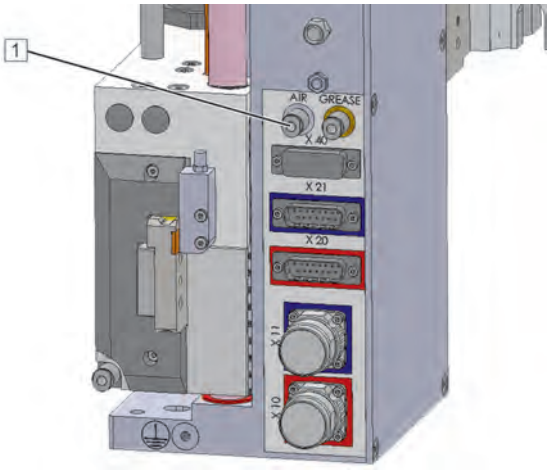
6. Fit the parallel key into the parallel key groove [1].
7. Lower the product onto the mounting surface in compliance with the transportation instructions.
8. The parallel key in the parallel key groove [1] must be in the guiding groove of the mounting surface.
   The product can be moved along the guiding groove.
9. Hand-tighten the two screws (M8) in the elongated holes [2].
10. Align the product. The product can be aligned with a fixed stop via the threaded holes [3] and [4].
11. Tighten the two screws (M8) at the mounting surface of the product with a tightening torque of 31.8 Nm.
12. Remove all transportation aids and equipment as well as all mounting tools from the product.

9.5 Connecting the lubrication hoses (optional for automatic lubrication)



1. Ensure that the lubrication hoses are completely bled prior to mounting.
2. Ensure sure that the length of the lubrication hoses does not exceed 2 m when replacing the lubrication hoses.
3. Connect the lubrication hoses to connection [1], [2] and [3].

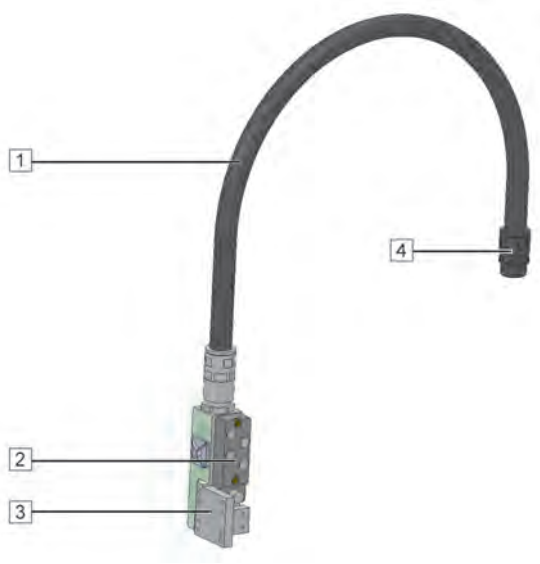
9.6 Compressed air supply pneumatic valves (optional)



The product can be delivered with one or two optional pneumatic valves for customer-specific gripper applications.

1. Connect the pneumatic hose to plug connection [1] to supply the pneumatic valves with compressed air.

9.7 Tool connector (optional)



The product can be equipped with an optional tool connector to route one data cable and two pneumatic hoses to the gripper.
The tool connector consists of the corrugated hose [1], the sensor/actuator box [2], the mounting surface [3] and the quick-action connector [4].
The mounting surface [3] allows for mounting additional equipment (such as a gripper).

Sensor/actuator box

Type: Balluff BPI 4M303P-5K-B0-SM48T

Sensors provided by the customer are connected by means of 3-pin M8 connectors.

Control signals	Assignments sensor/actuator box
E1 - digital input/output 1	M8 - socket 1
E2 - digital input/output 2	M8 - socket 2
E3 - digital input/output 3	M8 - socket 3
E4 - digital input/output 4	M8 - socket 4

Information on the control signals see chapter 10.2.

Dimensions of the tool connector see chapter 4.8.

9.8 Mounting safety equipment

The product is a partly complete machine pursuant to Directive 2006/42/EU and intended to be incorporated into or assembled with other machinery. The requirements concerning functional safety and the corresponding safety equipment result from the risk analysis and the risk assessment for the final machine or plant.

Selection, mounting, installation, commissioning, operation and maintenance of the safety equipment must be performed by the system integrator (the person who incorporates the product in a machine pursuant to Directive 2006/42/EU, i.e., for example, the machine builder) and/or the operator.

The product requires at least the following safety equipment:

- Emergency Stop system as per IEC 60204-1 / ISO 13850
- Lockable main switch to interrupt the complete power supply to all electrical components of the product

10 Electrical connection

⚠ DANGER

ELECTRIC SHOCK CAUSED BY LIVE PARTS

Failure to follow these instructions will result in death or serious injury.

- Disconnect the mains supply voltage before performing the work and ensure that it cannot be switched on.
- Verify that no hazards can be caused by electrically conductive objects.
- Verify that all cables for the power supply are disconnected from power.
- Verify that all electrical connections are made to the specifications in the wiring diagrams.

⚠ WARNING

UNANTICIPATED MOVEMENT

Interchanging the motor connections inverts the direction of rotation of the motor.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify correct wiring and connection of all electrical connections.

⚠ CAUTION

IMPROPERLY INSTALLED CABLES

Failure to follow these instructions can result in injury or equipment damage.

- Verify that the cables are correctly routed.
- Verify compliance with the bend radius specifications for the electrical lines.
- Only use cables with the correct cross sections.
- Verify that the electrical cables are correctly connected to the terminals.

The product is factory-wired. The electrical installation is limited to connecting the cables between the product and the drives.

Electrical installation of any other equipment is the responsibility of the system integrator and/operator.

The electrical cables are pre-assembled with a connector at one cable end.

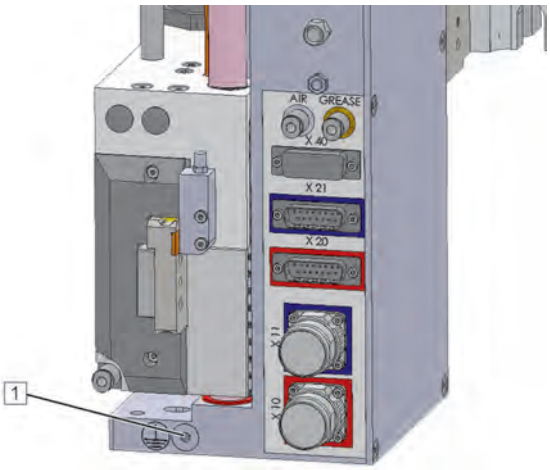
10.1 Connecting the protective ground conductor

⚠ DANGER

ELECTRIC SHOCK DUE TO INSUFFICIENT PROTECTIVE GROUNDING

Failure to follow these instructions will result in death or serious injury.

- Verify compliance with all local and national electrical code requirements as well as all other applicable directives, regulations, and standards with regard to protective grounding of the entire machine.
- Before applying voltage, implement protective grounding of the product according to the valid standard (EN 60204-1:2019-08-01; section 8.2.6).
- Do not use cable shields as protective ground conductors.



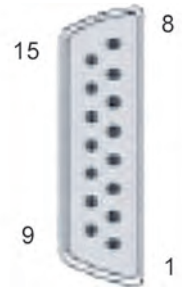
1. Connect a protective ground conductor with a minimum cross section of 10 mm² (copper) to the housing [1].

10.2 Connection assignment

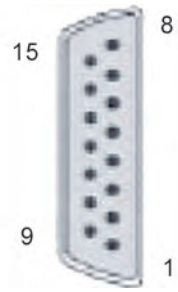
Motors

Circular plug	Pin	Designation	Function
1BEGA125MR 13 00 000 6 000  X10 X11	1	U	Motor phase U
	4	V	Motor phase V
	3	W	Motor phase W
	2	PE	Protective ground conductor
	A	T+	Temperature sensor
	B	T-	Temperature sensor
	C	B+	Vertical clamping system + (reserved)
	D	B-	Vertical clamping system - (reserved)

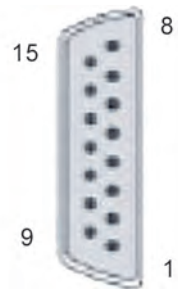
Incremental encoder

D-Sub connector	Pin	Designation	Function
15-pin  X20 X21	1	A	Channel A (SIN)
	2	GND	Encoder supply 0 V
	3	B	Channel B (COS)
	4	+ 5 V / 0.05 A	Encoder supply + 5 V
	5	---	n.c.
	6	SH	Shield
	7	\R	Reference inverted
	8	---	n.c.
	9	\A	Channel A inverted (SIN\)
	10	Sense GND	Sense input 0 V
	11	\B	Channel B inverted (COS\)
	12	Sense + 5 V	Sense input + 5 V
	13	---	n.c.
	14	R	Reference pulse
	15	---	n.c.

Encoder absolute

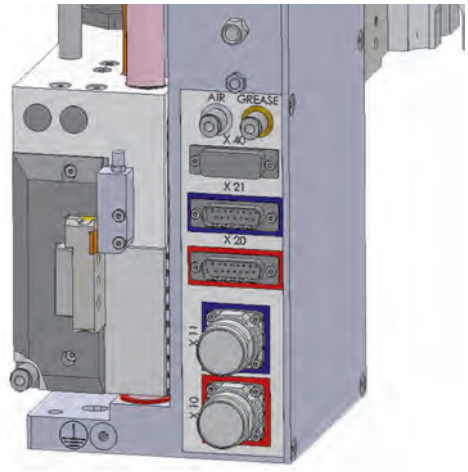
D-Sub connector	Pin	Designation	Function
15-pin  X20 X21	1	A	Channel A (SIN)
	2	GND	Encoder supply 0 V
	3	B	Channel B (COS)
	4	+ 5 V / 0.05 A	Encoder supply + 5 V
	5	DATA	Data
	6	SH	Shield
	7	---	n.c.
	8	CLOCK	Clock
	9	\A	Channel A inverted (SIN\)
	10	Sense GND	Sense input 0 V
	11	\B	Channel B inverted (COS\)
	12	Sense + 5 V	Sense input + 5 V
	13	\DATA	Data inverted
	14	---	n.c.
	15	\CLOCK	Clock inverted

Control signals

D-Sub connector	Pin	Designation	Function
15-pin  X40	1	+ 24 V	Supply 24 V
	2	GND	Supply GND
	3	E1	Digital input/output 1
	4	E3	Digital input/output 3
	5	E5	---
	6	A2	Valve 2
	7	A4	---
	8	---	---
	9	+ 24 V	Supply 24 V
	10	GND	Supply GND
	11	E2	Digital input/output 2
	12	E4	Digital input/output 4
	13	A1	Valve 1
	14	A3	---
	15	A5	---

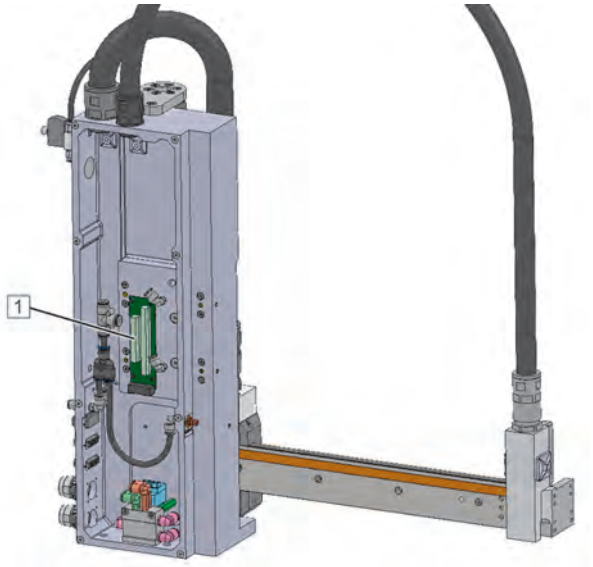
10.3 Plug connectors

When the electrical package is delivered by WEISS GmbH, the servo drives and the pre-assembled electrical cables with connectors at both cable ends are contained in the scope of delivery.



X40 = Digital inputs/outputs
X21 = Connection encoder motor horizontal axis
X20 = Connection encoder motor vertical axis
X11 = Connection motor horizontal axis
X10 = Connection motor vertical axis

10.4 Connection terminals (for connection X40)



Terminal block [1] for connecting up to five digital inputs and up to five digital outputs is located inside the housing.
Verify that you only use the free terminals (3, 11, 4, 12, 5) of the terminal block for connecting digital inputs and the free terminals (13, 6, 14, 7, 15) of the terminal block for connecting digital outputs.

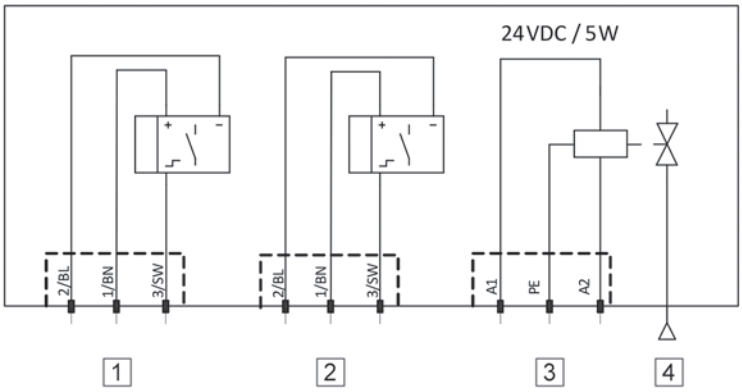
1. Loosen the screws of the cover and remove the cover.
2. Connect the digital inputs to terminals 3, 11, 4, 12, 5.
3. Connect the digital outputs to terminals 13, 6, 14, 7, 15.
4. Fit the cover and close it with the screws.

Connection to the controller is made via the connection X40. The terminal block and the connector inside the housing are factory-wired.

Terminal block	Assignment X40	Wire colour
(+)	1, 9	Black & white
(-)	2, 10	Purple & brown
A1	13	White/green
A2	6	Pink

Terminal block	Assignment X40	Wire colour
A3	14	Brown/green
A4	7	Blue
A5	15	Red
E1	3	Green
E2	11	Gray/red
E3	4	Yellow
E4	12	Red/blue
E5	5	Gray

10.5 Connection assignment "Automatic lubrication pump" (optional)



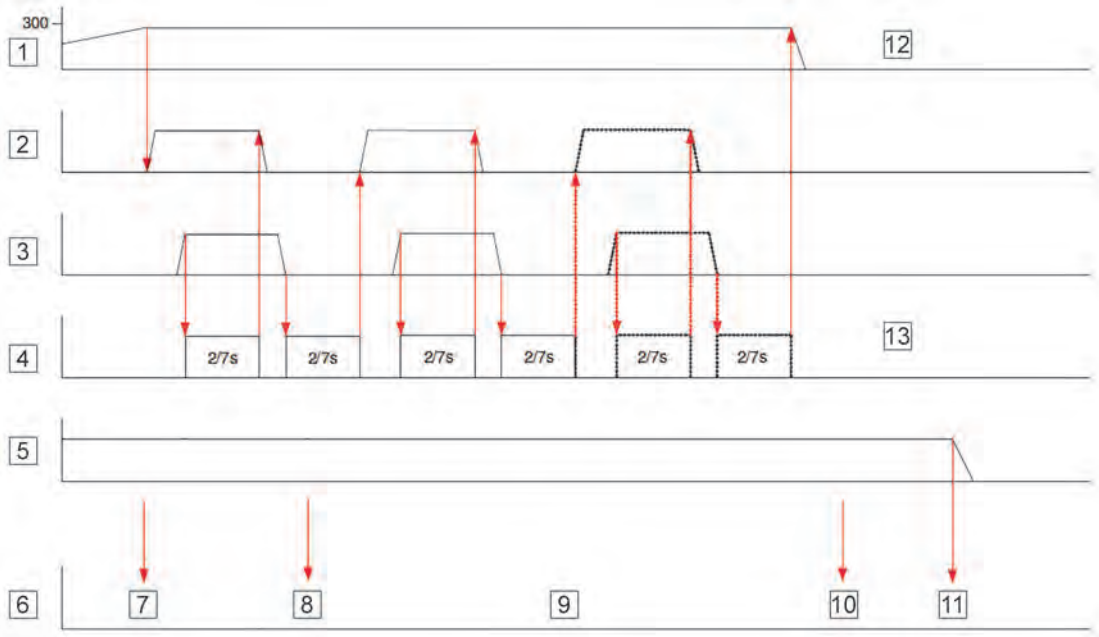
1 Level sensor
M8 - 3-pin

2 Sensor function
M8 - 3-pin

3 Valve connector, type B

4 Connection

Operation of the automatic lubrication pump without WEISS ´GmbH controller



1 Kilometrage [km]

2 SPS-OUT
Valve coil

3 SPS-IN
Lubrication active

4 Waiting time

5 SPS-IN
Level

6 Software

7 Check:
- Level OK
- Input lubrication "Active LOW"

8 Check:
- Input lubrication "Active LOW"

9 If the input lubrication does not turn "Active LOW", the error message "Error pneumatic supply" is generated

10 Check:
- Level OK

11 Error message "Level"
(If the error message is generated during the [see table] cycles of a running lubrication procedure, the remaining cycles are completed and the lubrication procedure is terminated)

12 Lubrication interval: see table

13 Number of cycles: see table

Lubricant volume	Lubrication interval	Cycles of the automatic lubrication pump	Additional time with 1 m hose	Additional time with 2 m hose
2 x 0.56 cm^3	300 km or every 100 days at the latest	8	2 sec	7 sec

11 Controller

11.1 Basic information on control

⚠ WARNING

LOSS OF CONTROL

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Consider all potential failure modes of all control paths in your control concept.
- Implement means and measures for all critical functions to achieve a safe state if a control path fails (for example, emergency stop, overtravel of positions, power outage, and restart).
- Implement separate or redundant control paths for all critical functions.
- If the control system of the machine comprises communication links, consider the consequences of unanticipated transmission delays or failures of the link and implement appropriate measures.
- Subject each machine in which the product described in these mounting instructions is used to a comprehensive and thorough commissioning test before operating the machine.

11.2 WEISS GmbH controller/software package (optional)

WEISS GmbH offers a controller/software package for controlling the product.
If this option is used, you must follow all instructions in the corresponding documentations.
The documentations can be found on the USB flash drive delivered with the product in your Technical Documentation folder.

12 Commissioning

12.1 Prerequisites for commissioning

The following requirements must be met before the product may be commissioned:

- The product is properly mounted.
- The electrical equipment for the power supply of the electrical components of the product is correctly installed.
- All cables are properly routed and connected.
- All electrical connections have been made properly.
- The static discharge must be performed properly.
  - The leakage resistance must have been measured and have a value of less than 10 Ohm.
- All parts of the system are properly grounded in compliance with all applicable directives, regulations, and standards.
- All safety equipment and EMERGENCY-STOP circuits are operational.
- All environmental conditions are respected.
- All protective covers are properly mounted.
- All tools, equipment, and other objects have been removed from the zone of operation of the product.
- All hazards are excluded.

Prior to commissioning, perform a test for each prerequisite mentioned and verify compliance with all information and specifications contained in these mounting instructions, in all applicable documents, and in all applicable directives, regulations, and standards.

12.2 Performing commissioning

⚠ WARNING

UNANTICIPATED MOVEMENT
Incorrect connections or external influences on electrical equipment can cause unanticipated movements.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify correct wiring.
- Verify that there are no persons or obstacles in the danger zone of the product before starting the product.
- Perform initial test movements without loads and without other processing units.
- Verify that all safety-related equipment and EMERGENCY STOP circuits are activated prior to commissioning.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION
Incorrect or unsuitable parameter values or settings can cause unintended movements, trigger signals, and compromise functional safety.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify that parameter values and settings can only be modified by authorized personnel who fully understand each and every effect of such a modification.
- Verify that all parameter values and settings are correct by performing a test run.

⚠ WARNING

ELECTROMAGNETIC FIELDS

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify compliance with all international, national, and local directives, standards, and safety regulations, including all regulations concerning workplace safety and prevention of accidents, with regard to strong magnetic fields.
- Take all necessary measures to ensure that persons with active medical implants (such as heart pacemakers or insulin pumps), metal implants, and magnetically or electrically conductive objects are not exposed to the magnetic fields generated by the product.
- Do not operate devices in the vicinity of the product which are sensitive to electromagnetic emission.
- Verify that a distance to the product of at least 15 cm is kept.

⚠ WARNING

HOT SURFACES
The temperature of the product can exceed 80 °C during operation.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Avoid unprotected contact with hot surfaces.
- Do not allow flammable or heat-sensitive objects in the vicinity of hot surfaces.
- Before performing work on the product, verify that you wait for a sufficient period of time to allow such parts to cool down to a temperature that allows for safe contact.

⚠ CAUTION

UNANTICIPATED MOVEMENT

If the power to the motor is switched off or if the vertical clamping system is released or if no vertical clamping system is used at all, the vertical axis may move up or down due to external forces such as forces of gravity or the force of the return spring. This leads to a movement of the horizontal axis as well.

Failure to follow these instructions can result in injury or equipment damage.

- Verify that vertical movements cannot cause damage.
- If necessary, safeguard or block the vertical axis in its current position before removing the power to the motor and/or the clamping system.

Power on the power supply to the product via the main switch.

Check the following points during commissioning:

- Operating state, potential error conditions, and protective equipment
  - During commissioning, perform tests for all operating states and error conditions. In doing so, verify that all protective equipment operates as planned and required.
- Correct operation of the horizontal axis and the vertical axis
  - There are no overloads.
  - There are no unusual jerks. Immediately stop the product in the case of overloads or unusual jerks and verify correct mounting.
- Noise emission
  - Excessive noise emission can be an indication of incorrect mounting, for example, an uneven ground that causes mechanical stress. Immediately stop the product in the case of high noise emission and verify correct mounting and correct setting of the controller parameters.

If the product and/or the machine into which the product is incorporated is temporarily decommissioned, it must be recommissioned. For recommissioning, the same prerequisites must be met as for initial commissioning.

Perform the same tests for each recommissioning of the product as for initial commissioning.

13 Operation

13.1 Basic information on operation

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION
Incorrect or unsuitable parameter values or settings can cause unintended movements, trigger signals, and compromise functional safety.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify that parameter values and settings can only be modified by authorized personnel who fully understand each and every effect of such a modification.
- Verify that all parameter values and settings are correct by performing a test run.

⚠ WARNING

ELECTROMAGNETIC FIELDS

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify compliance with all international, national, and local directives, standards, and safety regulations, including all regulations concerning workplace safety and prevention of accidents, with regard to strong magnetic fields.
- Take all necessary measures to ensure that persons with active medical implants (such as heart pacemakers or insulin pumps), metal implants, and magnetically or electrically conductive objects are not exposed to the magnetic fields generated by the product.
- Do not operate devices in the vicinity of the product which are sensitive to electromagnetic emission.
- Verify that a distance to the product of at least 15 cm is kept.

The product is a partly complete machine pursuant to Directive 2006/42/EU and intended to be incorporated into or assembled with other machinery. The information required for operation results from the functionality of the machine or system into which the product is incorporated and from the application implemented with it.

The instructions for the safe operation of the final machine or system must be provided by the system integrator (the person who incorporates the product in a machine pursuant to Directive 2006/42/EU) and/or the operator in the form of a manual with operating instructions, see chapter 2.3.

These operating instructions must be a complete manual which describes all work on and with the product and which contains all information relevant to the product. The system integrator and/or operator must ensure compliance of the operating instructions with all applicable directives, regulations, and standards.

14 Troubleshooting

14.1 Issue, cause and remedy

⚠ DANGER

ELECTRIC SHOCK CAUSED BY LIVE PARTS

Failure to follow these instructions will result in death or serious injury.

- Disconnect the mains supply voltage before performing the work and ensure that it cannot be switched on.
- Verify that no hazards can be caused by electrically conductive objects.
- Verify that all cables for the power supply are disconnected from power.
- Verify that all electrical connections are made to the specifications in the wiring diagrams.

⚠ WARNING

ELECTROMAGNETIC FIELDS

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify compliance with all international, national, and local directives, standards, and safety regulations, including all regulations concerning workplace safety and prevention of accidents, with regard to strong magnetic fields.
- Take all necessary measures to ensure that persons with active medical implants (such as heart pacemakers or insulin pumps), metal implants, and magnetically or electrically conductive objects are not exposed to the magnetic fields generated by the product.
- Do not operate devices in the vicinity of the product which are sensitive to electromagnetic emission.
- Verify that a distance to the product of at least 15 cm is kept.

⚠ WARNING

UNANTICIPATED MOVEMENT OF THE VERTICAL AXIS

The vertical axis may move due to forces of gravity when the vertical clamping system is released. This also results in a vertical movement of the horizontal axis.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Block or safeguard the vertical axis in such a way that a movement of the axes is safely prevented before releasing the vertical clamping system or before performing work.

⚠ WARNING

HOT SURFACES
The temperature of the product can exceed 80 °C during operation.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Avoid unprotected contact with hot surfaces.
- Do not allow flammable or heat-sensitive objects in the vicinity of hot surfaces.
- Before performing work on the product, verify that you wait for a sufficient period of time to allow such parts to cool down to a temperature that allows for safe contact.

Issue	Cause	Remedy
The horizontal axis or the vertical axis do not move freely or not at all	Guide rails and/or magnet ways are polluted	▪ Clean the guide rails and the magnet ways, see chapter 15.1
	The horizontal axis and/or the vertical axis are not sufficiently lubricated	In the case of automatic lubrication ▪ Check the grease cartridge of the automatic lubrication pump, see chapter 16.4 ▪ Verify correct settings of the automatic lubrication pump, see chapter 10.5 In the case of manual lubrication ▪ Lubricate the horizontal axis and the vertical axis, see chapter 16.3
	The vertical clamping system is applied	▪ Verify correct electrical and pneumatic connection of the clamping system ▪ Verify that the compressed air for releasing the vertical clamping system is sufficient ▪ Verify that the vertical clamping system is correctly controlled by the controller

15 Cleaning

15.1 Performing cleaning

⚠ DANGER

ELECTRIC SHOCK CAUSED BY LIVE PARTS

Failure to follow these instructions will result in death or serious injury.

- Disconnect the mains supply voltage before performing the work and ensure that it cannot be switched on.
- Verify that no hazards can be caused by electrically conductive objects.
- Verify that all cables for the power supply are disconnected from power.
- Verify that all electrical connections are made to the specifications in the wiring diagrams.

⚠ WARNING

ELECTROMAGNETIC FIELDS

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify compliance with all international, national, and local directives, standards, and safety regulations, including all regulations concerning workplace safety and prevention of accidents, with regard to strong magnetic fields.
- Take all necessary measures to ensure that persons with active medical implants (such as heart pacemakers or insulin pumps), metal implants, and magnetically or electrically conductive objects are not exposed to the magnetic fields generated by the product.
- Do not operate devices in the vicinity of the product which are sensitive to electromagnetic emission.
- Verify that a distance to the product of at least 15 cm is kept.

⚠ WARNING

MISSING PROTECTIVE EQUIPMENT

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Immediately reinstall protective equipment that you may have removed to perform maintenance work after having completed the maintenance work and verify the effectiveness of the protective equipment.

⚠ WARNING

UNANTICIPATED MOVEMENT OF THE VERTICAL AXIS
The vertical axis may move due to forces of gravity when the vertical clamping system is released. This also results in a vertical movement of the horizontal axis.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Block or safeguard the vertical axis in such a way that a movement of the axes is safely prevented before releasing the vertical clamping system or before performing work.

⚠ WARNING

HOT SURFACES
The temperature of the product can exceed 80 °C during operation.

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Avoid unprotected contact with hot surfaces.
- Do not allow flammable or heat-sensitive objects in the vicinity of hot surfaces.
- Before performing work on the product, verify that you wait for a sufficient period of time to allow such parts to cool down to a temperature that allows for safe contact.

For cleaning of electrical components and additional components, respect the instructions in the documentations of the manufacturer; refer to the applicable documents.

Use the following cleaning agents for cleaning the product:

Component	Cleaning agents
Housing	Neutral, mildly alkaline
Guide rail	Dry cleaning
Magnet way	
Corrugated hose tool connector	

1. Clean the guide rail and the magnet way of the horizontal axes with a dry, lint-free cloth.
2. Remove excess lubricant with a dry, lint-free cloth.
3. Use a wet cloth and a neutral, mildly alkaline cleaning agent to remove stains from the housing.
4. Dry the cleaned areas.
5. Remove all equipment from the product.
6. Restore the readiness for operation of the product.

16 Maintenance

16.1 Maintenance plan

When	Activity
At least once per month	▪ Manually move the horizontal axis and the vertical axis along the entire stroke length and verify smooth operation without running noise
At least every six months	▪ Clean all surfaces of the product, see chapter 15.1
	▪ Verify correct tightening torque of all screw connections used to fasten the product, see chapter 9.4
	▪ Verify correct connection of all plug connections
	▪ Check all cables and compressed air hoses for damage
	▪ Check the lubrication hose for the automatic lubrication system for damage. The lubrication hose must not contain air
	▪ Lubricate the spring of the vertical axis, see chapter 16.7
Every 300 km (manual lubrication only)	▪ Lubricate the horizontal axis and the vertical axis, see chapter 16.3
If required	▪ Replace the grease cartridge at the automatic lubrication pump (verify continuous, even consumption of lubricant), see chapter 16.4
	▪ Bleed the lubrication hose, see chapter 16.5
	▪ Replace the corrugated hose (tool connector), see chapter 16.6

16.2 Lubricant

NOTICE

INSUFFICIENT LUBRICATION

Failure to follow these instructions can result in equipment damage.

- Respect the lubrication intervals specified in these mounting instructions.
- Only use the lubricants specified in these mounting instructions for lubrication of the product.
- If you want to use a lubricant without FDA approval for relubrication, the factory-applied lubricant must first be completely removed because the two lubricants are not compatible.

The lubricant "LE-Spezialfett Synt EP 2" is used for initial factory-lubrication and relubrication.

Refer to the safety datasheet of the manufacturer for information on the lubricants used; see applicable documents.

16.3 Lubricating the product (manual lubrication)

⚠ WARNING

UNANTICIPATED MOVEMENT
In the case of vertical installation of the product, the axes may move due to forces of gravity when the holding brake is released.

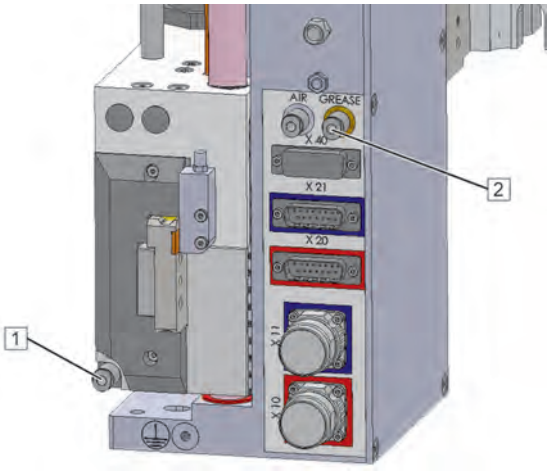
Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Block or safeguard the axes in such a way that a movement of the axes is safely prevented before releasing the holding brake.

The product must be lubricated after 300 km of operation.

The kilometrage can be read out via the W.A.S. 2 software. In addition, it is possible to read out and reset the value via various parameters (as described in the manual for the W.A.S. 2 software).

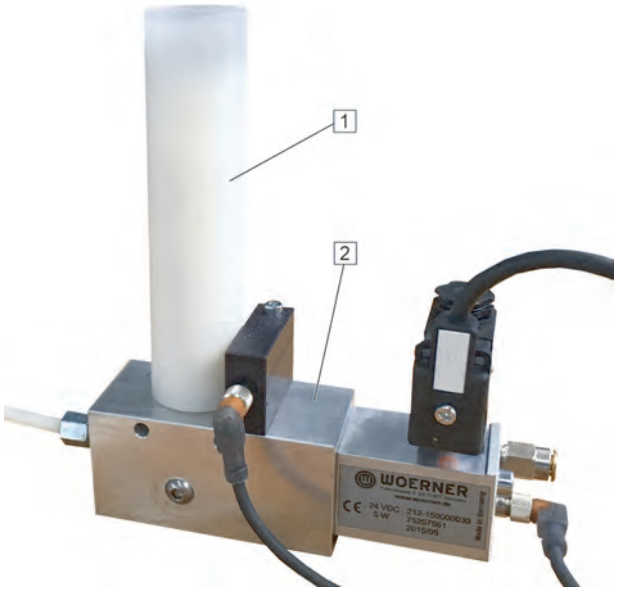
If the product has not been operated for an extended period of time, verify that all axes are lubricated before recommissioning it.



1. **Horizontal axis:** Use a grease gun to apply the specified amount of grease via the lubrication nipple [1].
2. **Vertical axis:** Use a grease gun to apply the specified amount of grease via the lubrication nipple [2].
   – Manually move the horizontal axis and the vertical axis along the entire stroke several times during the lubrication procedure.
3. Remove excess grease with a soft, lint-free cloth from both axes.

Axis	Lubricant volume
Horizontal axis	1.0 cm^3
Vertical axis	0.6 cm^3

16.4 Replacing the grease cartridge at the automatic lubrication pump



1. Unscrew the grease cartridge [1] from the pump housing [2].

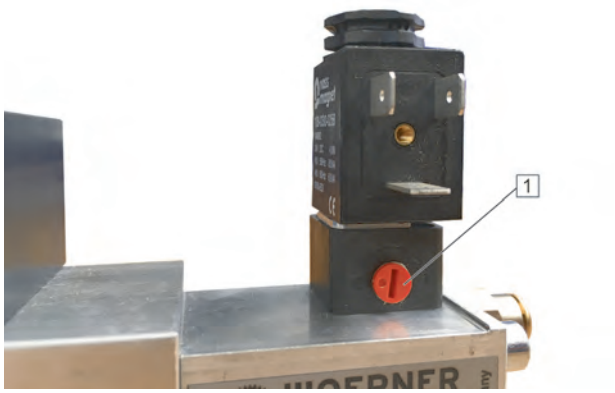
2. Remove the cap from the new grease cartridge.
3. Press from the bottom until grease escapes from the grease cartridge.

✓ This helps to keep air from getting into the lubrication hose.

4. Verify that the seal [3] and the magnets [4] are in the new grease cartridge.
5. Screw the grease cartridge into the pump housing.
6. Bleed the lubrication hose at the automatic lubrication pump, see chapter 16.5.

16.5 Bleeding the lubrication hose

The automatic lubrication pump is delivered with the lubrication hosed bled.

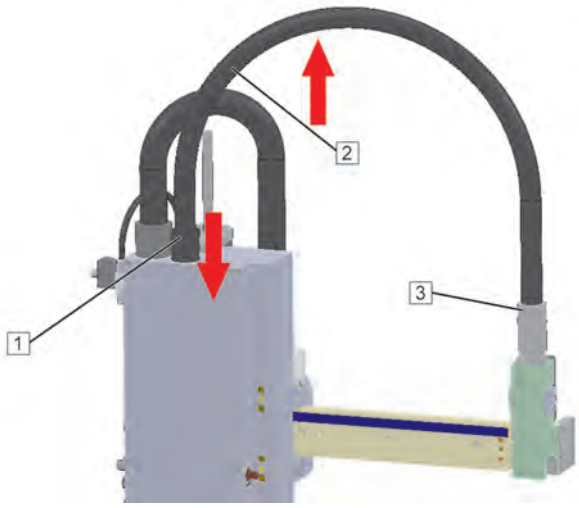


The automatic lubrication pump can be operated manually via a rotary switch [1] at the pneumatic valve. For this, compressed air must be supplied.

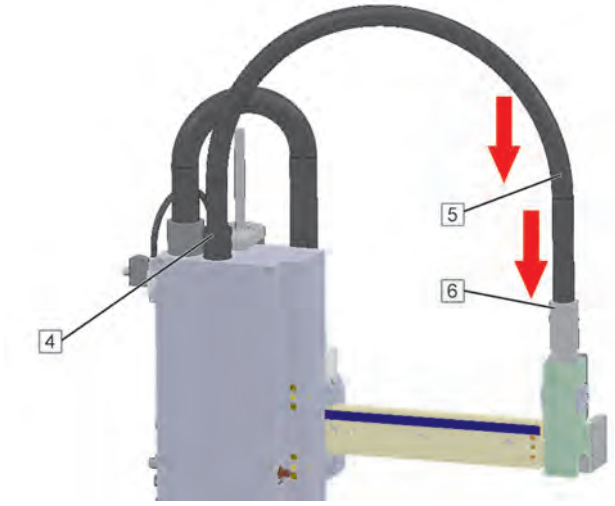
1. Turn the rotary switch [1] from position "0" to position "1" and back to position "0".

✓ A single pump stroke is performed.

16.6 Replacing the corrugated hose (tool connector)



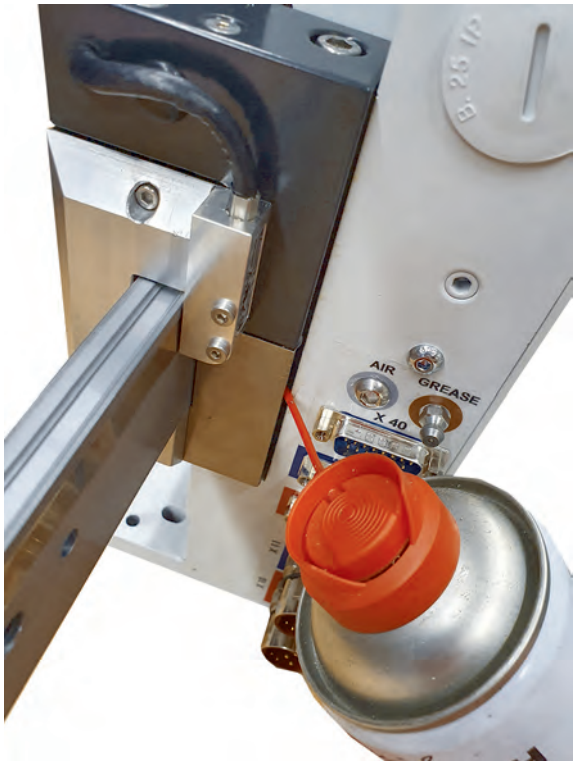
1. Remove the connections (data cable, pneumatic hose) from the gripper.
2. Push the upper ring [1] of the quick-action connector down and pull out the corrugated hose [2] towards the top.
3. Perform the same step at the other quick-action connector [3].
4. Pull the corrugated hose over the disconnected gripper connections off of the data cable and the pneumatic hose.



5. Route the data cable and the pneumatic hose through the new corrugated hose.
6. Push the upper ring [6] of the quick-action connector down and push the corrugated hose [5] into the quick-action connector.
7. Perform the same step at the other quick-action connector [4].
8. Reconnect the data cable and the pneumatic hose to the gripper.
9. Perform a test run.

16.7 Lubricating the spring

The spring of the vertical axis must be lubricated with adhesive lubricant (HHS 2000) every six months or if there is noise.



1. Spray the adhesive lubricant into the slot of the vertical axis.
2. Remove excess adhesive lubricant with a soft, lint-free cloth.
3. In the case of versions with a vertical stroke of 100 mm and 150 mm, the external spring at the housing must also be lubricated.

   Refer to the safety datasheet of the manufacturer for information on the adhesive lubricant used; see applicable documents.

17 Decommissioning

17.1 Decommissioning the product

1. Switch off the product and secure it against unintended switching on.
2. Remove all workpieces and all other objects not belonging to the product from the product.
3. In the case of recommissioning, follow the instructions described, see chapter 12.

18 Dismounting

18.1 Dismounting the product

⚠ WARNING

ELECTROMAGNETIC FIELDS

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Verify compliance with all international, national, and local directives, standards, and safety regulations, including all regulations concerning workplace safety and prevention of accidents, with regard to strong magnetic fields.
- Take all necessary measures to ensure that persons with active medical implants (such as heart pacemakers or insulin pumps), metal implants, and magnetically or electrically conductive objects are not exposed to the magnetic fields generated by the product.
- Do not operate devices in the vicinity of the product which are sensitive to electromagnetic emission.
- Verify that a distance to the product of at least 15 cm is kept.

1. Switch off the supply voltage.
2. Dismount the product (reverse sequence of steps), see chapter 9.

19 Disposal

19.1 Disposing of the product

Dispose of the product in compliance with all applicable directives, standards, and safety regulations.

Environmental protection

Dispose of lubricants, greases, residue of cleaning agents and other non-recyclable materials according to the applicable directives, standards, and safety regulations.

20 Service and spare parts

20.1 Worldwide service

If you need the assistance of our service departments, please provide the following information:

- Serial number of the product (see nameplate)
- Description of the problem
- Time of occurrence and circumstances of the problem
- Suspected cause

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20.2 Ordering spare parts

⚠ WARNING

UNSUITABLE SPARE PARTS AND ACCESSORIES

Failure to follow these instructions can result in death, serious injury, and equipment damage.

- Only use spare parts and accessories which are approved by the manufacturer.

Please provide the following information when ordering spare parts:

- Serial number of the product (see nameplate)
- Part number of the spare part according to spare parts list
- Quantity of spare parts required

20.3 Spare parts

Part number (NAV18)	Part number (NAV13)	Designation	Description	Qty
1001062	711-250000014	Corrugated hose Ø 20.7	-	1 m
1001367	784-000000007	Hose 6 x 1	-	1 m
1005114	LUBEMAN-0810-0001-00	Spare cartridge for grease gun	Lubricant Synth EP2	1
1005106	LUBEMAN-0800-0000-00	Manual grease gun	For manual lubrication	1
1004965	LUBESYS-0800-0000-00	Automatic lubrication pump	Lubricant Synth EP2	1
1004957	LUBESYS-0810-0000-00	Spare cartridge	Lubricant Synth EP2	1

21 Appendix

21.1 Versions

These mounting instructions are valid for the following versions/variants.

Part number	Description		Part number	Description
1003935	HP140 65-148 SICO1 NCL NTC		1003936	HP140 65-148 SICO1 NCL PTC
1003937	HP140 65-148 SSI20B NCL NTC		1003938	HP140 65-148 SSI20B NCL PTC
1003939	HP140 65-148 BISS20 NCL NTC		1003940	HP140 65-148 BISS20 NCL PTC
1003941	HP140 65-258 SICO1 NCL PTC		1003942	HP140 65-258 SSI20B NCL PTC
1003943	HP140 65-258 BISS20 NCL PTC		1003944	HP140 65-288 SSI20B NCL PTC
1003945	HP140 65-288 BISS20 WCL PTC		1003946	HP140 65-388 SSI20B NCL PTC
1003947	HP140 65-388 SSI20B NCL PTC		1003948	HP140 100-148 SICO1 NCL NTC
1003949	HP140 100-148 SICO1 NCL PTC		1003950	HP140 100-148 SSI20B NCL PTC
1003951	HP140 100-148 BISS20 NCL PTC		1003952	HP140 100-258 SICO1 NCL PTC
1003953	HP140 100-258 SSI20B NCL PTC		1003954	HP140 100-258 BISS20 NCL PTC
1003955	HP140 150-258 SICO1 NCL PTC		1004209	HP140 65-148 SICO1 NCL ETC
1004210	HP140 65-148 SICO1 NCL CTC		1004211	HP140 65-148 SICO1 WCL NTC
1004212	HP140 65-148 SICO1 WCL ETC		1004213	HP140 65-148 SICO1 WCL CTC
1004214	HP140 65-148 SICO1 WCL PTC		1004215	HP140 65-148 SSI20B NCL ETC
1004216	HP140 65-148 SSI20B NCL CTC		1004217	HP140 65-148 SSI20B WCL NTC
1004218	HP140 65-148 SSI20B WCL ETC		1004219	HP140 65-148 SSI20B WCL CTC
1004220	HP140 65-148 SSI20B WCL PTC		1004221	HP140 65-148 BISS20 NCL ETC
1004222	HP140 65-148 BISS20 NCL CTC		1004223	HP140 65-148 BISS20 WCL NTC

Part number	Description		Part number	Description
1004224	HP140 65-148 BISS20 WCL ETC		1004225	HP140 65-148 BISS20 WCL CTC
1004226	HP140 65-148 BISS20 WCL PTC		1004227	HP140 65-258 SICO1 NCL NTC
1004228	HP140 65-258 SICO1 NCL ETC		1004229	HP140 65-258 SICO1 NCL CTC
1004230	HP140 65-258 SICO1 WCL NTC		1004231	HP140 65-258 SICO1 WCL ETC
1004232	HP140 65-258 SICO1 WCL CTC		1004233	HP140 65-258 SICO1 WCL PTC
1004234	HP140 65-258 SSI20B NCL NTC		1004235	HP140 65-258 SSI20B NCL ETC
1004236	HP140 65-258 SSI20B NCL CTC		1004237	HP140 65-258 SSI20B WCL NTC
1004238	HP140 65-258 SSI20B WCL ETC		1004239	HP140 65-258 SSI20B WCL CTC
1004240	HP140 65-258 SSI20B WCL PTC		1004241	HP140 65-258 BISS20 NCL NTC
1004242	HP140 65-258 BISS20 NCL ETC		1004243	HP140 65-258 BISS20 NCL CTC
1004244	HP140 65-258 BISS20 WCL NTC		1004245	HP140 65-258 BISS20 WCL ETC
1004246	HP140 65-258 BISS20 WCL CTC		1004247	HP140 65-258 BISS20 WCL PTC
1004248	HP140 65-288 SSI20B NCL NTC		1004249	HP140 65-288 SSI20B NCL ETC
1004250	HP140 65-288 SSI20B NCL CTC		1004251	HP140 65-288 SSI20B WCL NTC
1004252	HP140 65-288 SSI20B WCL ETC		1004253	HP140 65-288 SSI20B WCL CTC
1004254	HP140 65-288 SSI20B WCL PTC		1004262	HP140 65-288 BISS20 NCL NTC
1004263	HP140 65-288 BISS20 NCL ETC		1004264	HP140 65-288 BISS20 NCL CTC
1004265	HP140 65-288 BISS20 NCL PTC		1004266	HP140 65-288 BISS20 WCL NTC
1004267	HP140 65-288 BISS20 WCL ETC		1004268	HP140 65-288 BISS20 WCL CTC
1004269	HP140 65-388 SSI20B NCL NTC		1004270	HP140 65-388 SSI20B NCL ETC

Part number	Description		Part number	Description
1004271	HP140 65-388 SSI20B NCL CTC		1004272	HP140 65-388 SSI20B WCL NTC
1004273	HP140 65-388 SSI20B WCL ETC		1004274	HP140 65-388 SSI20B WCL CTC
1004275	HP140 65-388 SSI20B WCL PTC		1004276	HP140 100-148 SICO1 NCL ETC
1004277	HP140 100-148 SICO1 NCL CTC		1004278	HP140 100-148 SICO1 WCL NTC
1004279	HP140 100-148 SICO1 WCL ETC		1004280	HP140 100-148 SICO1 WCL CTC
1004281	HP140 100-148 SICO1 WCL PTC		1004282	HP140 100-148 SSI20B NCL NTC
1004283	HP140 100-148 SSI20B NCL ETC		1004284	HP140 100-148 SSI20B NCL CTC
1004285	HP140 100-148 SSI20B WCL NTC		1004286	HP140 100-148 SSI20B WCL ETC
1004287	HP140 100-148 SSI20B WCL CTC		1004288	HP140 100-148 SSI20B WCL PTC
1004289	HP140 100-148 BISS20 NCL NTC		1004290	HP140 100-148 BISS20 NCL ETC
1004291	HP140 100-148 BISS20 NCL CTC		1004292	HP140 100-148 BISS20 WCL NTC
1004293	HP140 100-148 BISS20 WCL ETC		1004294	HP140 100-148 BISS20 WCL CTC
1004295	HP140 100-148 BISS20 WCL PTC		1004296	HP140 100-258 SICO1 NCL NTC
1004297	HP140 100-258 SICO1 NCL ETC		1004298	HP140 100-258 SICO1 NCL CTC
1004299	HP140 100-258 SICO1 WCL NTC		1004300	HP140 100-258 SICO1 WCL ETC
1004301	HP140 100-258 SICO1 WCL CTC		1004302	HP140 100-258 SICO1 WCL PTC
1004303	HP140 100-258 SSI20B NCL NTC		1004304	HP140 100-258 SSI20B NCL ETC
1004305	HP140 100-258 SSI20B NCL CTC		1004306	HP140 100-258 SSI20B WCL NTC
1004307	HP140 100-258 SSI20B WCL ETC		1004308	HP140 100-258 SSI20B WCL CTC
1004309	HP140 100-258 SSI20B WCL PTC		1004310	HP140 100-258 BISS20 NCL NTC

Part number	Description		Part number	Description
1004311	HP140 100-258 BISS20 NCL ETC		1004312	HP140 100-258 BISS20 NCL CTC
1004313	HP140 100-258 BISS20 WCL NTC		1004314	HP140 100-258 BISS20 WCL ETC
1004315	HP140 100-258 BISS20 WCL CTC		1004316	HP140 100-258 BISS20 WCL PTC
1004317	HP140 150-258 SICO1 NCL NTC		1004318	HP140 150-258 SICO1 NCL ETC
1004319	HP140 150-258 SICO1 NCL CTC		1004320	HP140 150-258 SICO1 WCL NTC
1004321	HP140 150-258 SICO1 WCL ETC		1004322	HP140 150-258 SICO1 WCL CTC
1004323	HP140 150-258 SICO1 WCL PTC		1004324	HP140 65-203 SICO1 NCL NTC
1004325	HP140 65-203 SICO1 NCL ETC		1004326	HP140 65-203 SICO1 NCL CTC
1004327	HP140 65-203 SICO1 NCL PTC		1004328	HP140 65-203 SICO1 WCL NTC
1004329	HP140 65-203 SICO1 WCL ETC		1004330	HP140 65-203 SICO1 WCL CTC
1004331	HP140 65-203 SICO1 WCL PTC		1004332	HP140 65-203 SSI20B NCL NTC
1004333	HP140 65-203 SSI20B NCL ETC		1004334	HP140 65-203 SSI20B NCL CTC
1004335	HP140 65-203 SSI20B NCL PTC		1004336	HP140 65-203 SSI20B WCL NTC
1004337	HP140 65-203 SSI20B WCL ETC		1004338	HP140 65-203 SSI20B WCL CTC
1004339	HP140 65-203 SSI20B WCL PTC		1004340	HP140 65-203 BISS20 NCL NTC
1004341	HP140 65-203 BISS20 NCL ETC		1004342	HP140 65-203 BISS20 NCL CTC
1004343	HP140 65-203 BISS20 NCL PTC		1004344	HP140 65-203 BISS20 WCL NTC
1004345	HP140 65-203 BISS20 WCL ETC		1004346	HP140 65-203 BISS20 WCL CTC
1004347	HP140 65-203 BISS20 WCL PTC		1004348	HP140 65-288 SICO1 NCL NTC
1004349	HP140 65-288 SICO1 NCL ETC		1004350	HP140 65-288 SICO1 NCL CTC

Part number	Description		Part number	Description
1004351	HP140 65-288 SICO1 NCL PTC		1004352	HP140 65-288 SICO1 WCL NTC
1004353	HP140 65-288 SICO1 WCL ETC		1004354	HP140 65-288 SICO1 WCL CTC
1004355	HP140 65-288 SICO1 WCL PTC		1004356	HP140 65-388 SICO1 NCL NTC
1004357	HP140 65-388 SICO1 NCL ETC		1004358	HP140 65-388 SICO1 NCL CTC
1004359	HP140 65-388 SICO1 NCL PTC		1004360	HP140 65-388 SICO1 WCL NTC
1004361	HP140 65-388 SICO1 WCL ETC		1004362	HP140 65-388 SICO1 WCL CTC
1004363	HP140 65-388 SICO1 WCL PTC		1004364	HP140 65-388 BISS20 NCL NTC
1004365	HP140 65-388 BISS20 NCL ETC		1004366	HP140 65-388 BISS20 NCL CTC
1004367	HP140 65-388 BISS20 NCL PTC		1004368	HP140 65-388 BISS20 WCL NTC
1004369	HP140 65-388 BISS20 WCL ETC		1004370	HP140 65-388 BISS20 WCL CTC
1004371	HP140 65-388 BISS20 WCL PTC		1004372	HP140 100-203 SICO1 NCL NTC
1004373	HP140 100-203 SICO1 NCL ETC		1004374	HP140 100-203 SICO1 NCL CTC
1004375	HP140 100-203 SICO1 NCL PTC		1004376	HP140 100-203 SICO1 WCL NTC
1004377	HP140 100-203 SICO1 WCL ETC		1004378	HP140 100-203 SICO1 WCL CTC
1004379	HP140 100-203 SICO1 WCL PTC		1004380	HP140 100-203 SSI20B NCL NTC
1004381	HP140 100-203 SSI20B NCL ETC		1004382	HP140 100-203 SSI20B NCL CTC
1004383	HP140 100-203 SSI20B NCL PTC		1004384	HP140 100-203 SSI20B WCL NTC
1004385	HP140 100-203 SSI20B WCL ETC		1004386	HP140 100-203 SSI20B WCL CTC
1004387	HP140 100-203 SSI20B WCL PTC		1004388	HP140 100-203 BISS20 NCL NTC
1004389	HP140 100-203 BISS20 NCL ETC		1004390	HP140 100-203 BISS20 NCL CTC

Part number	Description		Part number	Description
1004391	HP140 100-203 BISS20 NCL PTC		1004392	HP140 100-203 BISS20 WCL NTC
1004393	HP140 100-203 BISS20 WCL ETC		1004394	HP140 100-203 BISS20 WCL CTC
1004395	HP140 100-203 BISS20 WCL PTC		1004396	HP140 100-288 SICO1 NCL NTC
1004397	HP140 100-288 SICO1 NCL ETC		1004398	HP140 100-288 SICO1 NCL CTC
1004399	HP140 100-288 SICO1 NCL PTC		1004400	HP140 100-288 SICO1 WCL NTC
1004401	HP140 100-288 SICO1 WCL ETC		1004402	HP140 100-288 SICO1 WCL CTC
1004403	HP140 100-288 SICO1 WCL PTC		1004404	HP140 100-288 SSI20B NCL NTC
1004405	HP140 100-288 SSI20B NCL PTC		1004406	HP140 100-288 SSI20B NCL ETC
1004407	HP140 100-288 SSI20B NCL CTC		1004408	HP140 100-288 SSI20B WCL NTC
1004409	HP140 100-288 SSI20B WCL ETC		1004410	HP140 100-288 SSI20B WCL CTC
1004411	HP140 100-288 SSI20B WCL PTC		1004412	HP140 100-288 BISS20 NCL NTC
1004413	HP140 100-288 BISS20 NCL ETC		1004414	HP140 100-288 BISS20 NCL CTC
1004415	HP140 100-288 BISS20 NCL PTC		1004416	HP140 100-288 BISS20 WCL NTC
1004417	HP140 100-288 BISS20 WCL ETC		1004418	HP140 100-288 BISS20 WCL CTC
1004419	HP140 100-288 BISS20 WCL PTC		1004420	HP140 150-148 SICO1 NCL NTC
1004421	HP140 150-148 SICO1 NCL ETC		1004423	HP140 150-148 SICO1 NCL CTC
1004425	HP140 150-148 SICO1 NCL PTC		1004426	HP140 150-148 SICO1 WCL NTC
1004427	HP140 150-148 SICO1 WCL ETC		1004428	HP140 150-148 SICO1 WCL CTC
1004429	HP140 150-148 SICO1 WCL PTC		1004430	HP140 150-148 SSI20B NCL NTC
1004431	HP140 150-148 SSI20B NCL ETC		1004432	HP140 150-148 SSI20B NCL CTC

Part number	Description		Part number	Description
1004433	HP140 150-148 SSI20B NCL PTC		1004434	HP140 150-148 SSI20B WCL NTC
1004435	HP140 150-148 SSI20B WCL ETC		1004436	HP140 150-148 SSI20B WCL CTC
1004437	HP140 150-148 SSI20B WCL PTC		1004438	HP140 150-148 BISS20 NCL NTC
1004439	HP140 150-148 BISS20 NCL ETC		1004440	HP140 150-148 BISS20 NCL CTC
1004441	HP140 150-148 BISS20 NCL PTC		1004442	HP140 150-148 BISS20 WCL NTC
1004443	HP140 150-148 BISS20 WCL ETC		1004444	HP140 150-148 BISS20 WCL CTC
1004445	HP140 150-148 BISS20 WCL PTC		1004446	HP140 150-203 SICO1 NCL NTC
1004447	HP140 150-203 SICO1 NCL ETC		1004448	HP140 150-203 SICO1 NCL CTC
1004449	HP140 150-203 SICO1 NCL PTC		1004450	HP140 150-203 SICO1 WCL NTC
1004451	HP140 150-203 SICO1 WCL ETC		1004452	HP140 150-203 SICO1 WCL CTC
1004453	HP140 150-203 SICO1 WCL PTC		1004454	HP140 150-203 SSI20B NCL NTC
1004455	HP140 150-203 SSI20B NCL ETC		1004456	HP140 150-203 SSI20B NCL CTC
1004457	HP140 150-203 SSI20B NCL PTC		1004458	HP140 150-203 SSI20B WCL NTC
1004459	HP140 150-203 SSI20B WCL ETC		1004460	HP140 150-203 SSI20B WCL CTC
1004461	HP140 150-203 SSI20B WCL PTC		1004462	HP140 150-203 BISS20 NCL NTC
1004463	HP140 150-203 BISS20 NCL ETC		1004464	HP140 150-203 BISS20 NCL CTC
1004465	HP140 150-203 BISS20 NCL PTC		1004466	HP140 150-203 BISS20 WCL NTC
1004467	HP140 150-203 BISS20 WCL ETC		1004468	HP140 150-203 BISS20 WCL CTC
1004469	HP140 150-203 BISS20 WCL PTC		1004470	HP140 150-258 SSI20B NCL NTC
1004471	HP140 150-258 SSI20B NCL ETC		1004472	HP140 150-258 SSI20B NCL CTC

Part number	Description		Part number	Description
1004473	HP140 150-258 SSI20B NCL PTC		1004474	HP140 150-258 SSI20B WCL NTC
1004475	HP140 150-258 SSI20B WCL ETC		1004476	HP140 150-258 SSI20B WCL CTC
1004477	HP140 150-258 SSI20B WCL PTC		1004478	HP140 150-258 BISS20 NCL NTC
1004479	HP140 150-258 BISS20 NCL ETC		1004480	HP140 150-258 BISS20 NCL CTC
1004481	HP140 150-258 BISS20 NCL PTC		1004482	HP140 150-258 BISS20 WCL NTC
1004483	HP140 150-258 BISS20 WCL ETC		1004484	HP140 150-258 BISS20 WCL CTC
1004485	HP140 150-258 BISS20 WCL PTC		1004486	HP140 150-288 SICO1 NCL NTC
1004487	HP140 150-288 SICO1 NCL ETC		1004488	HP140 150-288 SICO1 NCL CTC
1004489	HP140 150-288 SICO1 NCL PTC		1004490	HP140 150-288 SICO1 WCL NTC
1004491	HP140 150-288 SICO1 WCL ETC		1004492	HP140 150-288 SICO1 WCL CTC
1004493	HP140 150-288 SICO1 WCL PTC		1004494	HP140 150-288 SSI20B NCL NTC
1004495	HP140 150-288 SSI20B NCL ETC		1004496	HP140 150-288 SSI20B NCL CTC
1004497	HP140 150-288 SSI20B NCL PTC		1004498	HP140 150-288 SSI20B WCL NTC
1004499	HP140 150-288 SSI20B WCL ETC		1004500	HP140 150-288 SSI20B WCL CTC
1004501	HP140 150-288 SSI20B WCL PTC		1004502	HP140 150-288 BISS20 NCL NTC
1004503	HP140 150-288 BISS20 NCL ETC		1004504	HP140 150-288 BISS20 NCL CTC
1004505	HP140 150-288 BISS20 NCL PTC		1004506	HP140 150-288 BISS20 WCL NTC
1004507	HP140 150-288 BISS20 WCL ETC		1004508	HP140 150-288 BISS20 WCL CTC
1004509	HP140 150-288 BISS20 WCL PTC		1004795	HP140 100-388 SICO1 NCL NTC
1004796	HP140 100-388 SICO1 NCL ETC		1004797	HP140 100-388 SICO1 NCL CTC

Part number	Description		Part number	Description
1004798	HP140 100-388 SICO1 NCL PTC		1004799	HP140 100-388 SICO1 WCL NTC
1004800	HP140 100-388 SICO1 WCL ETC		1004801	HP140 100-388 SICO1 WCL CTC
1004802	HP140 100-388 SICO1 WCL PTC		1004803	HP140 100-388 SSI20B NCL NTC
1004804	HP140 100-388 SSI20B NCL ETC		1004805	HP140 100-388 SSI20B NCL CTC
1004806	HP140 100-388 SSI20B NCL PTC		1004807	HP140 100-388 SSI20B WCL NTC
1004808	HP140 100-388 SSI20B WCL ETC		1004809	HP140 100-388 SSI20B WCL CTC
1004810	HP140 100-388 SSI20B WCL PTC		1004811	HP140 100-388 BISS20 NCL NTC
1004812	HP140 100-388 BISS20 NCL ETC		1004813	HP140 100-388 BISS20 NCL CTC
1004814	HP140 100-388 BISS20 NCL PTC		1004815	HP140 100-388 BISS20 WCL NTC
1004816	HP140 100-388 BISS20 WCL ETC		1004817	HP140 100-388 BISS20 WCL CTC
1004818	HP140 100-388 BISS20 WCL PTC		1004819	HP140 150-388 SICO1 NCL NTC
1004820	HP140 150-388 SICO1 NCL ETC		1004821	HP140 150-388 SICO1 NCL CTC
1004822	HP140 150-388 SICO1 NCL PTC		1004823	HP140 150-388 SICO1 WCL NTC
1004824	HP140 150-388 SICO1 WCL ETC		1004825	HP140 150-388 SICO1 WCL CTC
1004826	HP140 150-388 SICO1 WCL PTC		1004827	HP140 150-388 SSI20B NCL NTC
1004828	HP140 150-388 SSI20B NCL ETC		1004829	HP140 150-388 SSI20B NCL CTC
1004830	HP140 150-388 SSI20B NCL PTC		1004831	HP140 150-388 SSI20B WCL NTC
1004832	HP140 150-388 SSI20B WCL ETC		1004833	HP140 150-388 SSI20B WCL CTC
1004834	HP140 150-388 SSI20B WCL PTC		1004835	HP140 150-388 BISS20 NCL NTC
1004836	HP140 150-388 BISS20 NCL ETC		1004837	HP140 150-388 BISS20 NCL CTC

Part number	Description		Part number	Description
1004838	HP140 150-388 BISS20 NCL PTC		1004839	HP140 150-388 BISS20 WCL NTC
1004840	HP140 150-388 BISS20 WCL ETC		1004841	HP140 150-388 BISS20 WCL CTC
1004842	HP140 150-388 BISS20 WCL PTC			

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