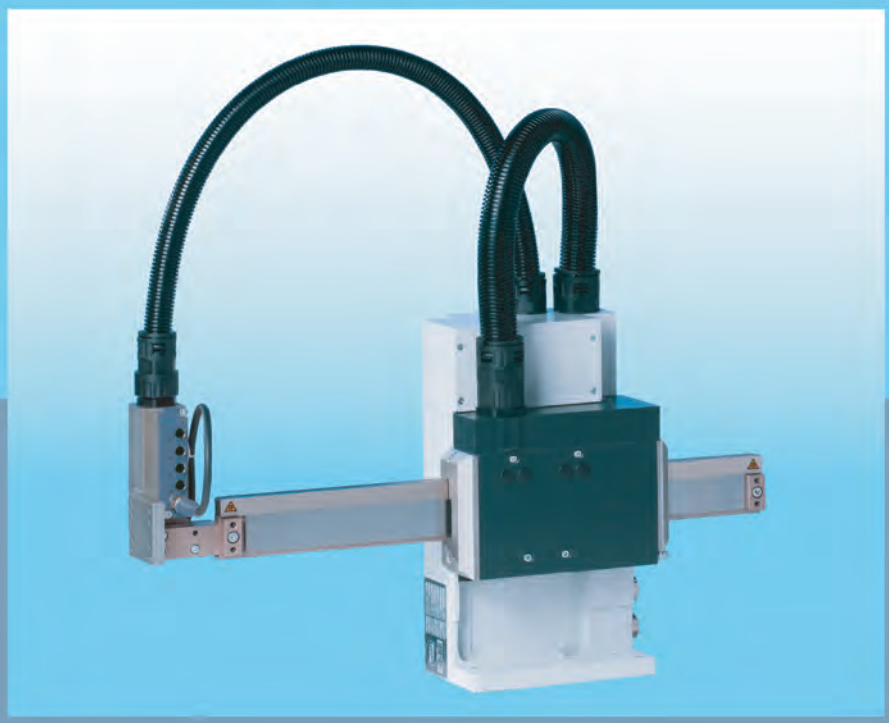

# Installation- and operating manual HP140T

## Mechanical system documentation

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Document version: Mechanical system documentation
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| Date | Revision | Chapter | Reason |
| 15.08.2008 | R08 - 2008 | All | Created |
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| | | | |
| | | | |
| | | | |

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# List of contents

## Illustration index

# 1 Introduction

## 1.1 Definition

Mechanical system documentation

Handling device HP140T

The Pick & Place is a handling device with direct motor-driven axles.

**In the following, the Pick & Place will be referred to as "machine".**

## 1.2 Correct use

The machine is a noncomplete machine conforming to Directive 2006/42/EC, Article 1g and 2g.

The machine is designed for integration in other machines, in other incomplete machines or equipment or for connection to these.

It may only be used within the limitations defined in the order characteristics.

Commissioning is forbidden until the conformity of the product in which the machine is installed with Directive 2006/42/EC and all other Directives governing use has been determined and confirmed.

Observance of the accompanying documentation and adherence to maintenance regulations are also component parts of correct use.

## 1.3 Incorrect use

Any use of the machine above or beyond the directions for correct use is regarded as incorrect and prohibited.

The machine must not be subjected to loads that exceed the maximum limits.

The machine is not suitable for use

- in wet or damp environments of any kind (water, oils, acids, steam or vapours, etc.).
- in an environment with gases or radiation.
- in potentially-explosive atmospheres.
- in environments which contain swarf.

## 1.4 Laws / EC Directives / Norms

The machine is designed and constructed to conform to

- applicable laws
- Directive 2006/42/EC (Machinery Directive)
- Low Voltage Directive, 2006/95/EC
- EMC Directive 2004/108/EC
- and the harmonised standards that we have cited

and meets state-of-the-art technological standards in terms of its construction.

## 1.5 EC Declaration

An EC Declaration as specified by Directive 2006/42/EC (Machinery Directive) is included with each machine at delivery.

The text of this EC Declaration is as follows:

**WEISS GmbH**

Siemensstrasse 17

D-74722 Buchen, Germany

Declaration of incorporation of partly completed machinery
in accordance with EC Machinery Directive 2006/42/EC, Annex II B

Prohibition of commissioning

We hereby declare that the machine called Handling device HP140T is intended for the installation into another machine or is to be assembled with other machines to a machine in terms of the directive 2006/42/EC.

Commissioning is prohibited until it has been established that the machine into which the aforementioned product should be installed satisfies the provisions of the EC Machinery Directive, and that a Declaration of Conformity in accordance with EC Machinery Directive 2006/42/EC, Annex II A has been issued.

## 1.6 System-dependant documentation

In addition to this manual, further documents are required to ensure safe operation of this machine. The specifications stated in these documents are to be observed.

For control system by WEISS-GmbH:

- Electrical operating manual
- WAS.handling Windows program operating manual
  - WAS.indexer Profibus DP
  - WAS.indexer CAN
  - WAS.indexer Ethernet
  - WAS.indexer RS232
  - AsIMA
  - DeviceNet
- Operating manual Hand-held grease gun (for the model with lubricating nipples)
- Operating manual automatic lubrication pump (for model with automatic lubrication)

## 1.7 Operating manual

**This operating manual is a translation of the original operating manual and is part of the scope of delivery.**

We reserve the right to undertake modifications resulting from further technological development which diverge from the data and illustrations contained in this operating manual.

The operating manual and the associated valid documentation are not subject to an automatic revision service.

Information on the respective current edition can be obtained from the manufacturer.

Local regulations must be heeded.

This operating manual describes handling of the machine and contains important instructions and information to assist you in correct use of the machine.

The operating manual is designed for trained technical personnel and instructed persons. It should be kept at the location of use of the machine at all times and read, understood and applied by all persons entrusted with work on or with the machine.

Safety instructions in individual chapters should be observed.

### 1.7.1 Explanation of safety instructions in this manual

This manual contains instructions which you should observe for your personal safety and to avoid material damage.

Safety instructions for your personal safety are highlighted by a sign containing a warning triangle and signal word. The associated text describes the hazard involved, avoidance options and the consequences of a failure to heed the safety instruction.

General instructions or instructions relating to possible material damage are highlighted by a sign without a warning triangle.

They are, depending on the degree of risk involved, illustrated as follows:

| | |
|---|---|
| DANGER | ***A warning triangle with the signal word DANGER indicates an immediate hazardous situation which, if not avoided, will lead to fatalities or grievous injuries.*** |
| WARNING | ***A warning triangle with the signal word WARNING indicates an potential hazardous situation which, if not avoided, can lead to fatalities or grievous injuries.*** |
| CAUTION | ***A warning triangle with the signal word CAUTION indicates an potential hazardous situation which, if not avoided, can lead to light or medium injuries.*** |
| NOTICE | ***A sign with the signal word NOTICE indicates potential material damage or provides additional information which should be observed when operating the machine.*** |

### 1.7.2 Legend

In these manual images, symbols and abbreviations with the following meaning are used for clarity:

1. Marks a numbered list.
   a) Marks the second level of a numbered list.
- Marks a list.
  - Marks the second level of a list.

The book symbol before a section of text indicates additional applicable documents.

The information symbol before a section of text marks an additional note or an important tip for use.

### 1.7.3 Figures

The figures used are examples. There may be differences between the illustrations and the actual delivery.

### 1.7.4 Index of valid pages

Pages of this operating manual including the title page: 52

## 1.8 Guarantee and liability

The machine is covered by a guarantee of 24 months without shift limitations.

# 2 Safety

## 2.1 Fundamental safety instructions

### 2.1.1 Operator‘s obligation to exercise diligence

This machine conforms to state-of-the-art technological standards and ensures a maximum level of safety.

However, this level of safety can only be attained under operating conditions if all measures necessary for this have been taken. The operator‘s obligation to exercise diligence includes planning of these measures and the inspection of their realisation.

The operator must ensure that

- the machine is only used as intended.
- the machine is only operated in faultless, functional condition and mechanical and electrical safety devices are present.
- required personal protective clothing is provided for and used by operating, maintenance and repair personnel.
- the operating manual and all other applicable documentation is maintained at all times in legible condition and is accessible at the implementation site of the machine. Ensure that all personnel who must execute activities tasks on the machine can access the operating manual at all times.
- only adequately qualified and authorised personnel maintain and repair the machine.
- such personnel are instructed regularly in all questions concerning occupational safety and environmental protection, including the operating manual and safety instructions contained therein.
- all safety instructions and warnings affixed to the product are not removed and must remain legible.
- national accident prevention guidelines and company-internal guidelines are complied with.
- VDE regulations are complied with.
- the EMC legislation is complied with during installation.

### 2.1.2 Requirements to be met by personnel

It is imperative that the following safety instructions be observed during all operations involving the machine. This ensures avoidance of life-threatening injuries, machine damage, other material damage and environmental damage.

Personnel must ensure that

- trainees are initially permitted to only work on the machine under the supervision of an experienced person.
- all personnel who maintain the machine read the operating manual and confirm with their signature that they have understood the operating manual.
- unauthorised persons are not in the vicinity of the machine when tasks are being performed.
- supplemental to the operating manual the operating instructions as specified in labour protection legislation and work equipment use legislation are complied with.
- the operator or supervisory personnel are informed in the event of malfunction.
- required personal protective clothing is used.

The following work described in this operating manual should only be realised by qualified personnel:

- Installation
- Commissioning
- Operating
- Maintenance

## 2.2 Safety equipment for the machine

There are danger signs attached to the machine. Danger signs provide information about possible hazards, which could be caused by the machine.

| Danger sign | Meaning |
|---|---|
|  | Beware of magnetic field<br>ASR A1.3 Annex 1; DIN 4844-2: 2001-02 and DIN 4844-2/A1:2004-05; 92/58/EEC directive regarding safety signs |
|  | Beware of hot surface<br>ASR A1.3 Annex 1; DIN 4844-2: 2001-02 and DIN 4844-2/A1:2004-05 |

The operator is responsible for ensuring that a suitable safety concept is developed and applied for the safe operation of the machine.

The operator must take all measures to protect his personnel against injury by the machine.

These include:

- Safety housing with monitored safety door
- Emergency stop circuit
- Light barriers or switch mats
- Warning indicators
- Attach danger sign at the access point of the entire machine

| Danger sign | Meaning |
|---|---|
|  | Prohibited for persons with pacemakers<br>ASR A1.3 Annex 1; DIN 4844-2:2001-02 and DIN 4844-2/A1:2004-05; ISO/FDIS 7010: 2003; ISO 7010 |

ⓘ We also recommend that the danger signs shown in chapter 2.2 are attached in an enlarged form at the access points to the protection area of the entire machine.

## 2.3 Residual hazards

### 2.3.1 General residual hazards

**WARNING**

***Strong magnetic fields***

*The axles give rise to strong magnetic fields. They can lead to failure of medical implants such as pacemakers and may result in severe or fatal injury. Persons with medical implants such as pacemakers must maintain a safety distance of at least 50 cm from the axles.*

*Objects made of magnetisable materials such as jewellery, watches or tools can be attracted. Do not wear any magnetisable materials when handling the machine. Handle tools carefully. Injuries caused by being pulled in.*

***Missing safety equipment***

*Operation without safety equipment is dangerous. The realisation of a suitable The operator is responsible for the safety concept. The operator must provide for sufficient safety measures such as protective grating, light grids, emergency stop button, covers, warning notices, etc. Operation without safety equipment is prohibited. Injuries caused by squeezing, impact, magnetism.*

***Missing danger signs***

*Damaged or illegible danger signs no longer fulfil their purpose. Make sure the danger signs are complete and legible. Replace damaged danger signs.*

***Risk of explosion during operation in a potentially-explosive environment.***

*Due to constraints governing the correct used of the machine, the machine is not designed for use in a potentially-explosive atmospheres. The operator must take all measures to ensure that the machine is only operated in a correct manner.*

***Use of spare parts / attachment of supplemental devices***

*If spare parts are used, or if supplemental devices are attached that are not approved by the manufacturer, consequential damages can occur. Only use spare parts that are cited in our spare parts list or spare parts that we have approved. You must consult with us prior to attaching supplemental devices. Failure to comply with these instructions means that the possibility of personal injury cannot be excluded.*

***Danger of crushing injuries due to impermissible changes***

*Injuries can occur as a consequence of impermissible changes. Do not make any changes to the machine. Failure to comply with these instructions means that the possibility of personal injury cannot be excluded.*

***Electric shock***

*Power and control connections may still conduct electricity after the machine has been deactivated and is stationary. Energised capacitors inside the servo amplifier may still be charged, despite the power supply being deactivated. Work on electrical equipment should only be realised by skilled electrical personnel and under observance of specifications in the electrical operating manual. Electrical connections for the machine should only be loosened or plugged in when the power supply is deactivated and secured against reactivation. The status of capacitor charging should be measured prior to working on machine electrical equipment. The procedure for measuring charges is described in the electrical operating manual. Touching energised components can lead to serious or even fatal injuries.*

***Squeezing or pulling in***

*The axles of the machine move very rapidly. Reaching into areas where parts are moving may result in the crushing of limbs. Hence, never reach into the working area of the axles. Injuries due to the moving axles are to be avoided by using appropriate safety devices.*

*Von den Permanentmagneten auf der horizontalen Laufschiene gehen starke magnetische Kräfte bis zu einem Abstand von 15 mm aus. Personen, die magnetische Gegenstände wie herabhängenden Schmuck oder Uhren tragen, können angezogen und verletzt werden.*

**⚠ CAUTION**

***Risk of injuries through burning.***

*The temperature of the housing and the axles can reach up to 80 °C during operation. Prior to carrying out any work on these components, the machine must first cool down sufficiently, to avoid any risk of burning through contact. Burn injuries will arise from contact with hot components.*

**NOTICE**

***Hazards arising from machine damage***

*If the horizontal axle makes contact with magnetic objects, then this will destroy the magnetic measuring system. The protective cover of the horizontal axle may first be removed shortly before start-up.*

# 3 Product description

## 3.1 Structure

The freely programmable Pick & Place HP140T integrates two perpendicular linear axles - the horizontal axle [Y] and the vertical axle [Z] - in a compact housing.

All connections are guided through the rear.

The operator can add grippers or another device to the horizontal axle [Y].

A magnetic length-measuring system is employed.

The following parameters for the Pick & Place are variables:

- design of lubrication connections
- maximum horizontal and vertical stroke
- number of integrated pneumatic valves
- Adaption grippers
- Measuring system

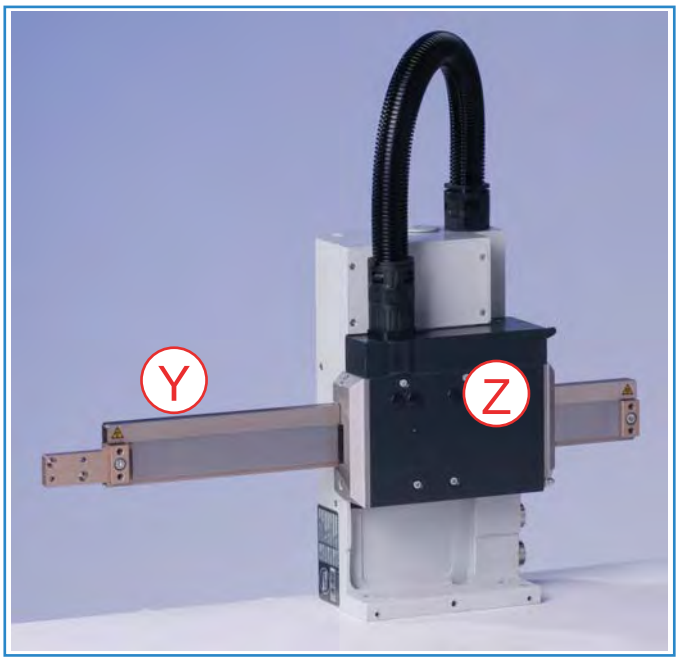



**Fig. 1: General view of the Pick & Place**

## 3.2 Function

The linear motors of the two axles are controlled via amplifiers. High positional accuracy and repeat accuracy is achieved by the integrated magnetic measuring system.

The positional accuracy describes the acceptable tolerance of the linear unit for an operating command involving movement to a specified position. It is determined by mechanical tolerances and the accuracy of the measurement system. Furthermore, the positional accuracy is influenced by external and internal temperature changes. The specified positional accuracy is attained for temperatures within a range of +/-15°C.

The repeat accuracy describes the acceptable tolerance of the linear unit for the repeated approach to the same position, including repeated activation and deactivation. It is influenced by external and internal temperature changes as well as by the mechanical stop conditions for the referencing. The specified repeat accuracy is attained for a constant temperature (+/-10°C) only and without any external loads.

## 3.3 Technical data

### 3.3.1 Scope of delivery

The scope of delivery of the machine depends on the order involved. Please refer to the ordering information or order characteristics for individual components.

### 3.3.2 Sound level

The A-weighted emission sound pressure level do not exeed the allowable peak.

### 3.3.3 Ambient conditions and weight

| | |
|---|---|
| **Humidity** | 5 % to 95 %, non-condensing |
| **Allowable temperature range** | Storage: +5 °C to +55 °C<br>Operation: +15 °C to +45 °C |
| **Environment** | The HP140T must not be operated in environments that contain abrasive dust |
| **Protection class** | IP20 |
| **Weight** | HP140 T with vertical stroke 65 mm: ca. 13 kg<br>HP140T with vertical stroke 100 mm: ca. 16 kg |

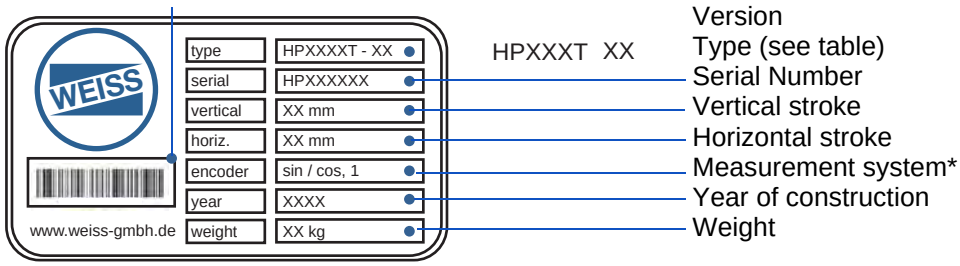
### 3.3.4 Type plate

The type plate is fitted to the housing of the machine and contains the details described in the illustration.

NOTICE ***The illustrated type plate is merely an example of any machine and is not identical to the actual type plate of the described product.***

A second type plate is included in the scope of delivery. This second plate can be mounted at a clearly-visible location on the machine to allow viewing of performance data if the type plate fitted by the manufacturer is concealed by any other structures.

Additional barcode serial number




* sinus / cosinus measurement system with pole pitch of 1 mm

**Fig. 2: Example of a type plate**

| Type | Encoder | Description |
|---|---|---|
| HP140T-BB | sin/cos 1 Vpp | Encoders incremental with interface SIN/COS |
| HP140T-CB | TTL | Encoders incremental in customized special design |
| HP140T-DB | SSI sin/cos | Encoders absolute with interface SSI and interface SIN/COS |
| HP140T-EB | BISS | Encoders absolute with interface BISS-C |
| **Special types:** | | |
| HP140T-BB-CL6 | | Clean room certificated type |
| HP140T-xC | | Type with special isolated temperature indicator for Siemens-controller |
| HP140T-BB-R | | Type with Hall-Sensor for Rockwell-Controller |

### 3.3.5 Axles

| Type | (Z-Axle) | (Y-Axle) |
|---|---|---|
| **Traverse paths** | Max. 65 / 100 mm | Max. 160 / 270 / 300 / 400 mm |
| **Acceleration** | Max. 40 m/s² | Max. 40 m/s² |
| **Speed** | Max. 2.0 m/s | Max. 4.0 m/s |

| | | |
|---|---|---|
| **System accuracy** | 10 µm/m | incremental (sin/cos 1 $V_{ss}$) |
| | 5 µm/m | absolut (BISS/C,SSI) optional |
| **Repeat accuracy** | 5 µm | incremental (sin/cos 1 $V_{ss}$) |
| | 2 µm | absolut (BISS/C,SSI) optional |
| **Handling weight** | Maximum of 3 kg for gripper and work piece | |

### 3.3.6 Loads

The specified forces must not be exceeded, especially for picking up and setting down.

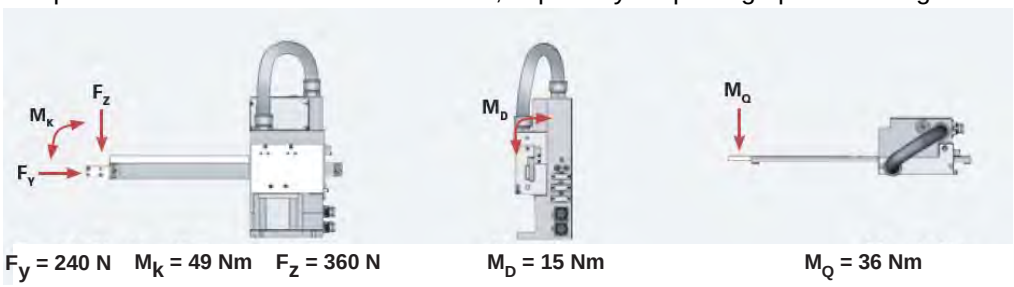



**Fig. 3: Axle loads**

### 3.3.7 Installation positions

Permissible installation positions for the machine are:

- Standing, horizontal axle horizontal, vertical axle vertical with a maximum incline of ±25°.

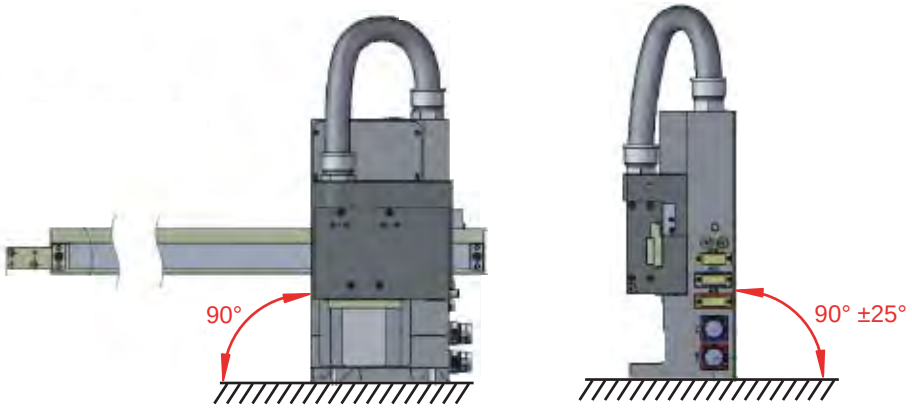



**Fig. 4: Installation positions**

### 3.3.8 Linear motors

| ID - B&R | Description | Unit | Horizontal motor | Vertical motor |
|---|---|---|---|---|
| | Electrical Cycle Length | [mm] | 27,6 | 28,1 |
| 48 | Nominal Voltage (DC) | [VDC] | 560 | 560 |
| 49 | Back-EMF Constant (RMS) | [V/(m/s)] | 52 | 49 |
| 50 | Nominal Speed | [m/s] | 3 | 3 |
| 51 | Maximum Speed | [m/s] | 4 | 4 |
| 52 | Stall Force | [N] | 65 | 130 |
| 53 | Nominal Force | [N] | 65 | 130 |
| 54 | Maximum Force | [N] | 240 | 360 |
| 55 | Force Constant | [N/A] | 70 | 70 |
| 56 | Stall Current | [A] | 1,2 | 2,4 |
| 57 | Nominal Current | [A] | 1,2 | 2,4 |
| 58 | Maximum Current | [A] | 3,5 | 5,8 |
| 59 | Cross Section Area | [mm$^2$ | 0,088 | 0,196 |
| 60 | Stator Resistance | [Ohm) | 33 | 13 |
| 61 | Stator Inductance | [Henry] | 0,092 | 0,094 |
| 62 | Actuator Mass | [kg) | 2,2 | 5,4 |
| | Thermostat | PTC-Switch<br>< 250 Ohm at 20 °C / > 1000 Ohm at120 °C | | |

### 3.3.9 Measurement system

3.3.9.1 Incremental (HP140TBx)

| **Type** | EHP 1/90 |
|---|---|
| **Voltage supply** | +5 V ±5%, 35 mA |
| **Incremental signals** | sin / cos 1 Vss |
| **Signal period** | 1 mm |
| **Resolution** | 0,244 µm (bei 4096times-Interpolation) |
| **Accuracy measuring system** | 10 µm (transmitter + tape measure) at 20 °C |
| **Referencs marks** | on request |
| **Allowable temperature range** | Storage: -30 °C bis +80 °C<br>Operation: +10 °C bis +60 °C |
| **Protection class** | IP 67 |

3.3.9.2 Absolut (HP140TDx / HP140TEx)

| **Type** | AHP 1/90 |
|---|---|
| **Voltage supply** | +5 V |
| **Interfaces absolut** | BISS-C / SSI |
| **Incremental signals** | sin / cos 1 Vss |
| **Accuracy measuring system** | 5 µm (transmitter + tape measure) at 20 °C |
| **Allowable temperature range** | Storage: -30 °C bis +80 °C<br>Operation: +10 °C bis +60 °C |
| **Protection class** | IP 67 |
| **Data interfaces** | |
| **Data length single turn** | 19 bits |
| **Advanved zeros** | 0 |
| **Subsequent zeros** | 0 |
| **Data length multi turn** | no data output |
| **Encoding** | binary |
| **Fault bits** | none |
| **Standardisation** | 1024/mm |
| **Time -Out (Mono flop time)** | Siemens: SSI: 16 µs<br>Bosch-Rexroth: SSI: 8 µs<br>BISS-C: 1 µs<br>The encoder may be read every X µs only |
| **Work cycle** | Siemens: 100 kHz<br>Bosch-Rexroth: 500 kHz<br>BISS-C: < 1 MHz |

### 3.3.10 Referencing by incremental encoder

The reference motion involves moving towards one fixed stop of the respective axle.

### 3.3.11 Dimensions

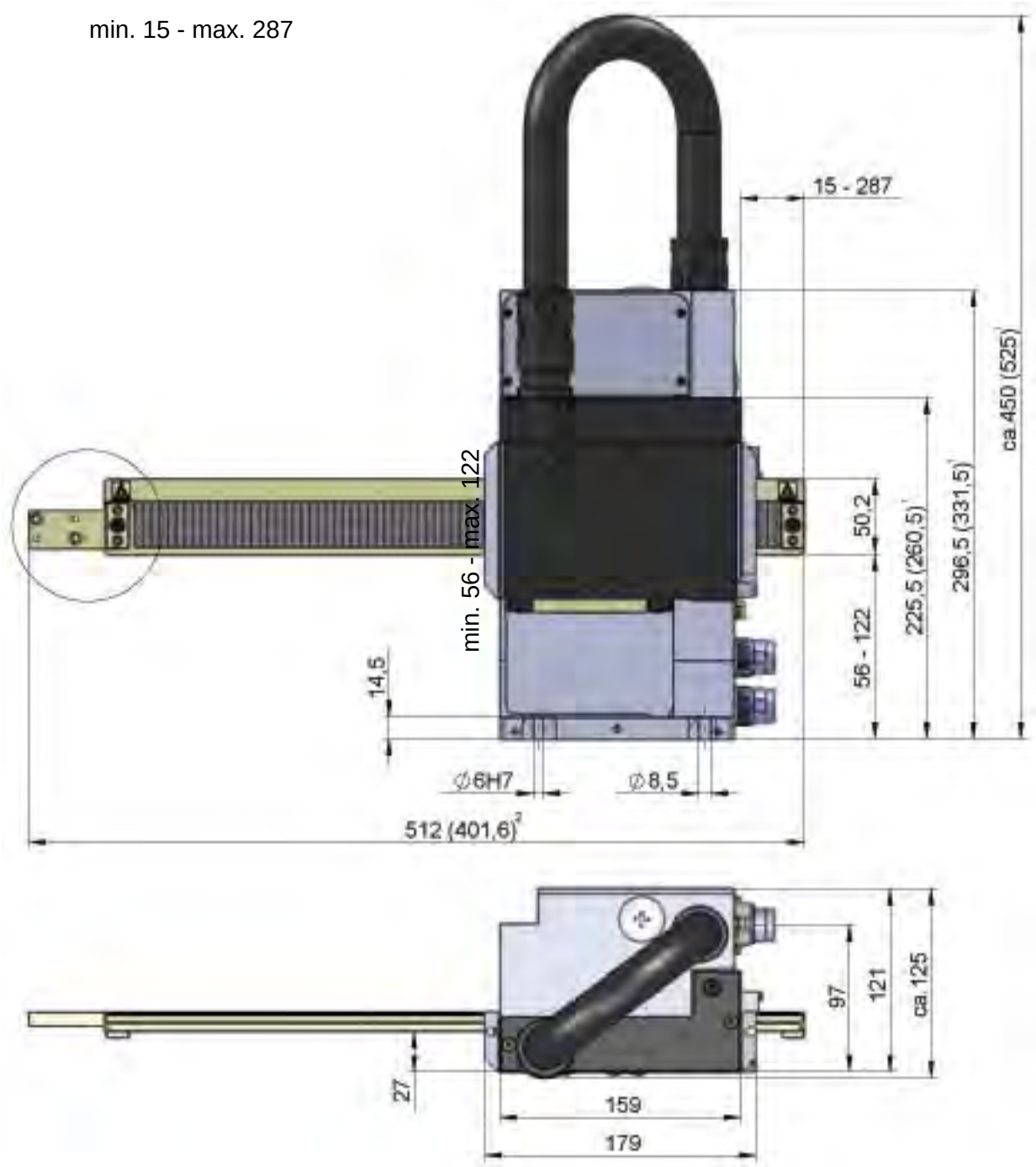



**Fig. 5: Dimensions**

[1] stroke vertical 100 mm

[2] stroke horizontal 160 mm

### 3.3.12 Hole patterns

3.3.12.1 Screw hole pattern

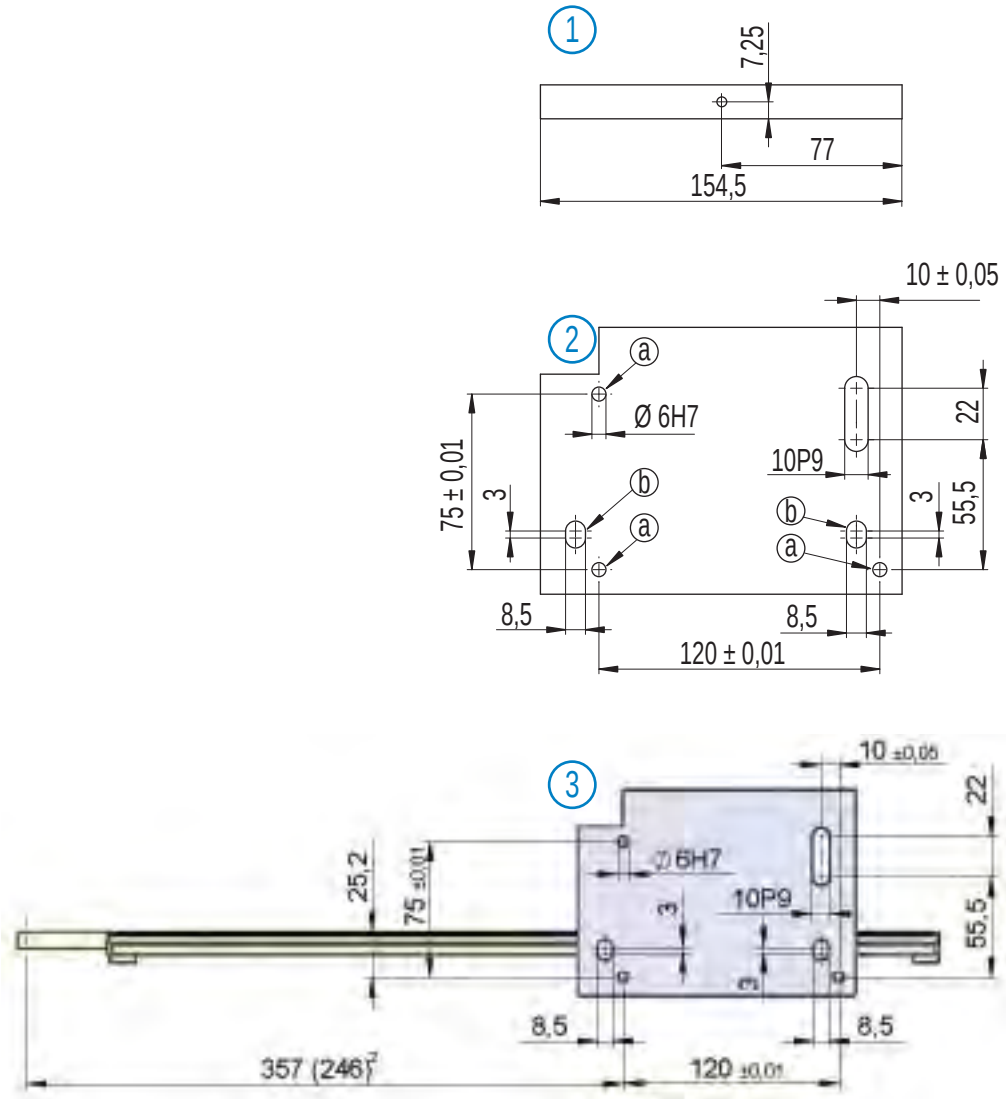



**Fig. 6: Screw hole pattern**

[2] stroke horizontal 160 mm

**1 Side view base plate**

**2 Basic housing, HP140T**

a Pin holes 6H7

b Long holes for M8 bolts

**3 Hole pattern for customer base plate**

### 3.3.12.2 Adaption gripper

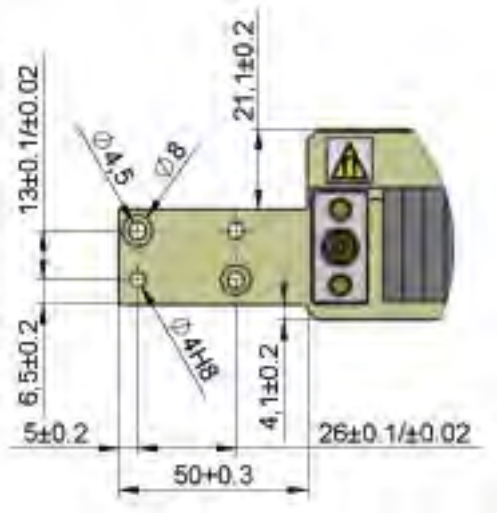



**Fig. 7: Adaption gripper**

## 3.4 Electrical connections

Deliveries with electrics package includes the drive controls and the customised electrical lines.

The connections for the vertical axle are marked red.

The connections for the horizontal axle are marked blue.

### 3.4.1 Plug-in connections

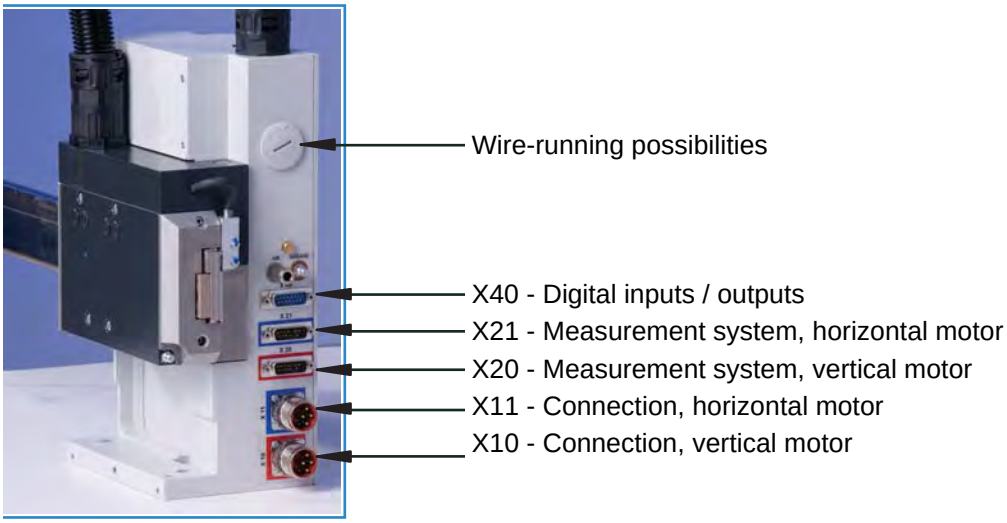
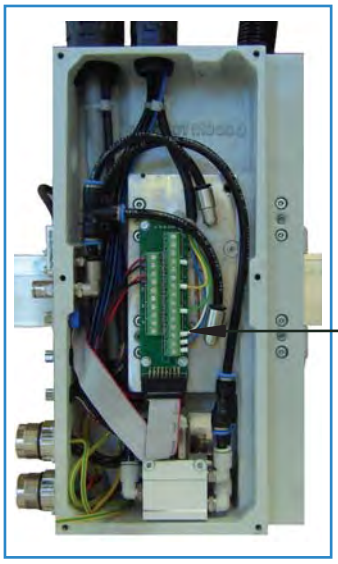



**Fig. 8: Plug-in connections**

### 3.4.2 Terminals



A board with terminals for applying digital inputs and outputs can be found inside the housing.

It is possible to apply 5 inputs and 5 outputs.

The connection to the control is realised by the X40 connector.

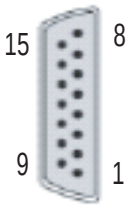
**Fig. 9: Terminals**

### 3.4.3 Connector pin assignment

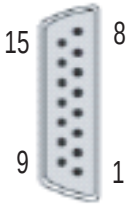
3.4.3.1 Motors

| Round plug | Pin | Name | Function |
|---|---|---|---|
| Size 1BEGA125MR13 00 000 6 000  **X10 X20** | 1 | U | Motor connection, U |
| | 4 | V | Motor connection, V |
| | 3 | W | Motor connection, W |
| | 2 | PE | Protective earth |
| | A | T+ | Temperature sensor |
| | B | T- | Temperature sensor |
| | C | B+ | Brake + (reserve) |
| | D | B- | Brake - (reserve) |

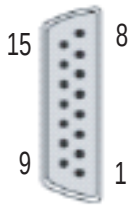
3.4.3.2 Encoder incremental

| D-sub plug | Pin | Name | Function |
|---|---|---|---|
| 15-pin male   **X11 X21** | 1 | A | Channel A (SIN) |
| | 2 | GND | Encoder supply 0 V |
| | 3 | B | Channel B (COS) |
| | 4 | +5V / 0.05A | 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 0 V |
| | 11 | \B | Channel B inverted (COS/) |
| | 12 | Sense +5V | Sense +5 V |
| | 13 | --- | n.c. |
| | 14 | R | Reference pulse |
| | 15 | --- | n.c. |

3.4.3.3 Encoder absolut

| D-sub plug | Pin | Name | Function |
|---|---|---|---|
| 15-pin male   **X11 X21** | 1 | A | Channel A (SIN) |
| | 2 | GND | Encoder supply 0 V |
| | 3 | B | Channel B (COS) |
| | 4 | +5V / 0,05A | 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 0 V |
| | 11 | \B | Channel B inverted (COS/) |
| | 12 | Sense +5V | Sense +5 V |
| | 13 | /DATA | Data inverted |
| | 14 | --- | n.c. |
| | 15 | /CLOCK | Clock inverted |

3.4.3.4 Control lead

| D-sub plug | Pin | Name | Function |
|---|---|---|---|
| 15-pin male<br>  <br><br>**X40** | 1 | +24 V | 24 V supply |
| | 2 | GND | GND supply |
| | 3 | E1 | Sensor 1 |
| | 4 | E3 | Sensor 3 |
| | 5 | E5 | |
| | 6 | A2 | Valve 2 |
| | 7 | A4 | |
| | 8 | --- | |
| | 9 | +24 V | 24 V supply |
| | 10 | GND | GND supply |
| | 11 | E2 | Sensor 2 |
| | 12 | E4 | Sensor 4 |
| | 13 | A1 | Valve 1 |
| | 14 | A3 | |
| | 15 | A5 | |

## 3.5 Option with automatic lubrication

Instead of lubricating nipples, connections [1] for automatic lubrication are provided.

Specifications for the automatic lubrication are described in the respective documentation.


**Fig. 10: Connections for automatic lubrication**

## 3.6 Option with integrated pneumatic valves

Up to two pneumatic valves [1] for the control of the gripper function can be installed in the housing.

The supply of the pneumatic valves with compressed air is realised using a plug-in threaded fitting[2]. The pneumatic tubes [3] for the gripper are passed through the top of the housing.

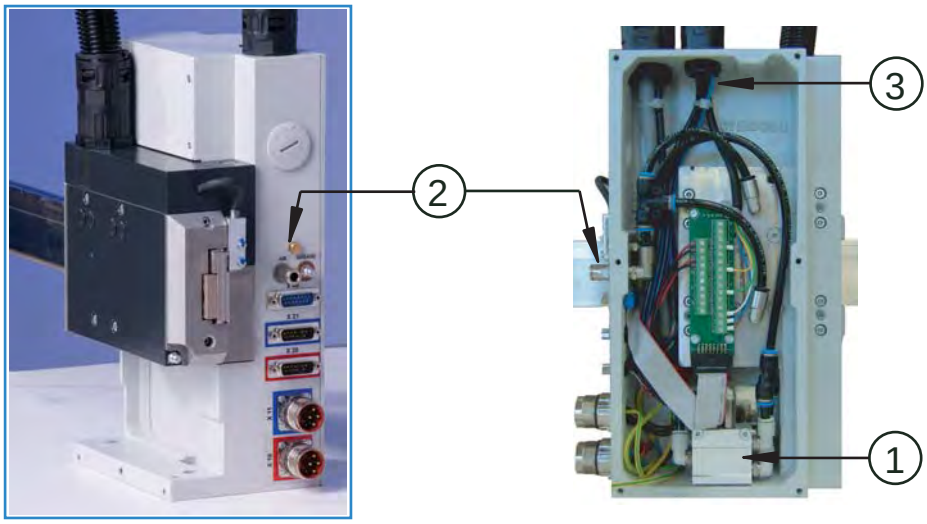



**Fig. 11: Pneumatic valve**

| Pneumatic valve | | |
|---|---|---|
| Manufacturer | SMC |  |
| Type | SYJ3143-5LOU-Q | |
| Function | 5/2 monostable | |
| Operating pressure | 0.15 - 0.7 MPa | |
| Flow rate | 98 l/min | |
| Pneumatic connections | | |
| Supply connection | D = 6 mm | |
| Hose line | FESTO PUN-4 x 0,75-DUO-BS | |
| Hose length | Approx. 1.3 m | |
| Electrical connections | | |
| Voltage | 24 VDC | |
| Valve 1 | A1 - Output 1 | |
| Valve 2 | A2 - Output 2 | |

## 3.7 Option with tool connector

The machine can be optionally delivered with a tool connector. With this, the pneumatic and electrical supply up to the gripper is prepared.

The tool connector consists of the following components:

- Aluminium flange
- Sensor actuator box incl. connection lead
- Corrugated hose

Tool connector weight: 0.35 kg.

The tool connector is equipped with a fourport sensor actuator box.

Sensors provided the customer are connected via a 3-pin M8 plug [1] (e.g. RSMCK3 type).

The electrical signals are applied as follows:

- M8 - Bush 1: E1 - Input 1
- M8 - Bush 2: E2 - Input 2
- M8 - Bush 3: E3 - Input 3
- M8 - Bush 4: E4 - Input 4

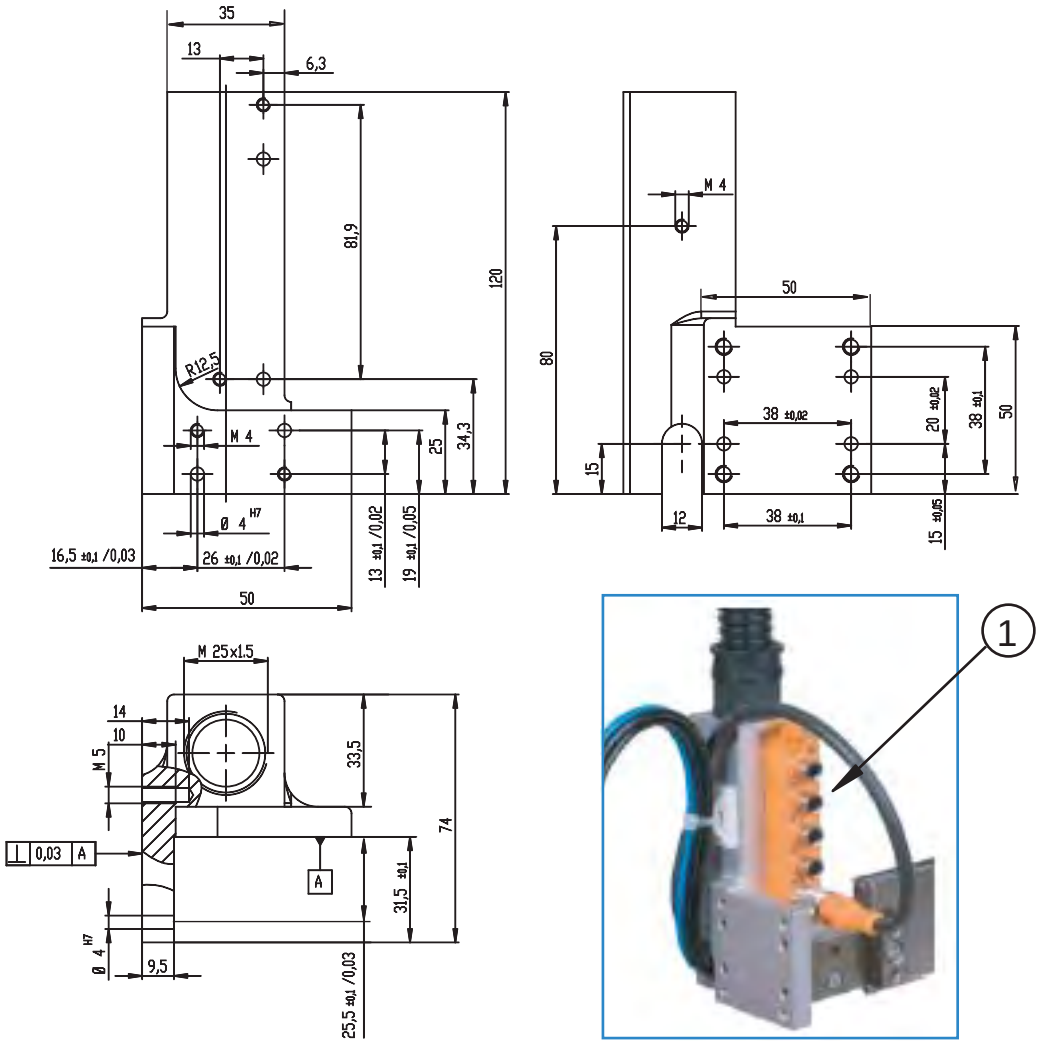



**Fig. 12: Tool connector**

# 4 Transportation

NOTICE ***During transport and storage, devices must be protected from excessive stress (mechanical load, temperature, humidity, rough atmospheric conditions). The horizontal track of the HP140T must be protected from exposure to magnetic or metallic objects. Do not bring any external magnets into contact with the horizontal track; this would result in the failure of the magnetic measurement system, i.e. the control of the axle would no longer be possible.***

- Transport work may only be conducted by specialised personnel, who take the safety instructions into account.
- Note that projecting sharp edges can cause injuries.
- The transport path must be cordoned off and safeguarded in such a manner that unauthorised personnel cannot enter the danger zone.
- The parts must be safeguarded against tipping or falling.

## 4.1 Transportation damage

The delivery should be inspected for damage immediately after receipt. The contents of the delivery should be checked for damage if damage to the packaging is detected, which could indicate damage to the contents. Details of the scope of delivery are provided in Chapter 3.3.1.

Damage detected should be immediately reported to and confirmed by the transportation company.

## 4.2 Intermediate storage

The storage conditions detailed in the table should be observed if intermediate storage over a longer period of time is planned.

| Climatic zone | Packaging | Storage location | Storage duration |
|---|---|---|---|
| **All** | Packed in containers<br>With moisture absorbers and humidity indicator sealed in film<br>Protect against insect damage and mould formation through chemical treatment | Roofed over<br>Protected against rain<br>Not exposed to vibrations | Max. 3 years with regular inspection of packaging |
| | Open | Roofed over and sealed at a constant temperature and air humidity (5 °C < T < 60 °C, 50% relative humidity)<br>No sudden temperature fluctuation and controlled ventilation with filter (free of dirt and dust)<br>No aggressive vapours and no vibrations<br>Protected against insect damage | 2 years and longer with regular inspection. Check for cleanliness and machine damage during inspection. Check that anticorrosion protection is unspoiled. |

# 5 Installation

## 5.1 Safety during installation

**WARNING**

***Injuries caused by incorrect installation.***
*The dimensions of the supporting ground and fastening equipment must sufficient, so that they can withstand the stresses produced during operation.*

*Work should only be assigned to auxiliary personnel by company installation personnel.*

***Injuries caused by sharp-edged machine parts which are still uncovered and accessible.***
*Wear personal protective clothing.*

***Injuries caused by falling loads.***
*Parts stacked on top of each other can slip and fall. Do not loosen any fixing elements and transportation securing devices without the express instructions of the company installation personnel. Wear personal protective clothing.*

Particularly ensure that:

- only authorised persons are in the work area and that no other persons are endangered by the assembly work.
- no components are damaged and are only installed in a clean, functional condition.
- all components are installed according to the described instructions.
- specified starting torques are adhered to.
- the key aspect of the structural components is taken into consideration.

## 5.2 Installation prerequisites

Check prior to installation whether the dimensions of the installation site and building conditions correspond to the necessary prerequisites and measurement specification in the drawing documents.

Particularly ensure that:

- The supporting floor is level and rigid.
- The dimensions of the supporting structure at the installation location must be sufficient to withstand the dynamic forces that occur. Forces of up to 350 N can occur.

## 5.3 Assembling the Pick & Place

NOTICE ***The magnetic measurement system will be destroyed, in case there is contact between the horizontal axles or with magnetized objects. The horizontal axle of the Pick & Place therefore has a protective cover [1], which guards it against damage and exposure to metallic or magnetic objects. These protective covers may only be removed, once installation of the machine is complete. If several machines are assembled, there must be no contact between the horizontal axles.***


**Fig. 13: Protective cover on the horizontal axle**

### 5.3.1 Operating media / Auxiliary media / Tools

The following are required for installation of the machine:

- One set of spanners
- One torque wrench
- One set of screwdrivers
- Screw securing agent (e.g. Loctite ® 243)
- Quality 8.8 screws

| | |
|---|---|
| **Thread** | M8 |
| **Tightening torque** | 25 Nm |

### 5.3.2 Installation preparation

NOTICE ***The horizontal axle is not fixed and can move. Therefore the machine could tilt over and be damaged when placed at the installation locations due to loss of balance. The machine must be held or secured against tilting until it is screwed to the mounting surface.***

- Open the packaging unit prior to the assembly and remove the machine from the packaging unit.
- The customer's bores must be made based on the hole pattern in Chapter 3.3.12.
- The M8 fastening bolts must be ready for use.
- Additionally the dowel pins must be ready for use, if assembling with pins.
- If assembling at a groove, the grooves must be milled in the mounting surface and the fastening bolts and dowel pins must be ready for use.

### 5.3.3 Mounting of attachment parts

Regarding the mounting of attachment parts at the housing, the side cover plate of the HP140T can be bored at appropriate positions.

NOTICE ***The side cover plate needs to be removed from the housing before the bores are made.***

## 5.4 Assembly suggestions

### 5.4.1 Option 1 - Adjustment via long holes

1. Bring the Pick & Place to its assembly position.
2. Screw in the two fastening bolts [1], but do not tighten them yet.
3. Align the Pick & Place.
   - For this purpose, a stop rail [2] with adjusting bolts [3] may be used at the site.
4. Tighten fastening bolts [1].

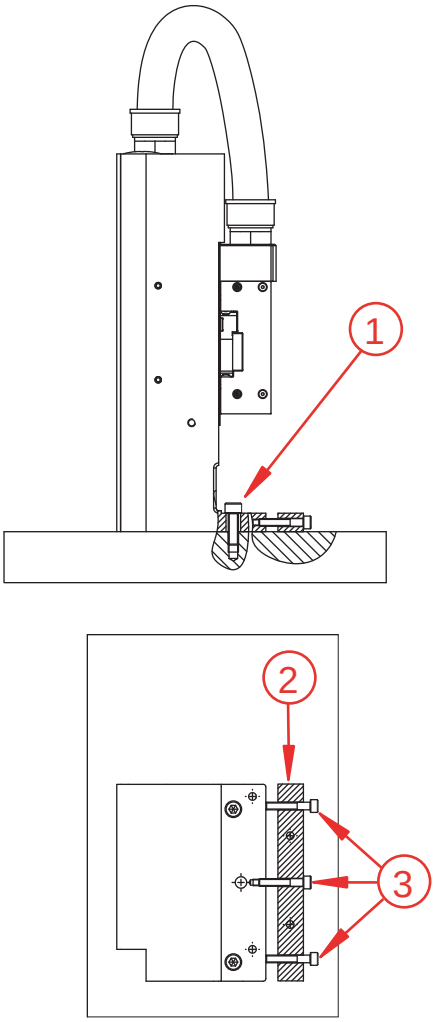



**Fig. 14: Adjustment via long holes**

### 5.4.2 Option 2 - firm pinning

1. Bring the Pick & Place to its assembly position.
2. Screw in the two fastening bolts [1], but do not tighten them yet.
3. Drive a dowel pin into each of the three pin holes [2].
4. Tighten fastening bolts [1].

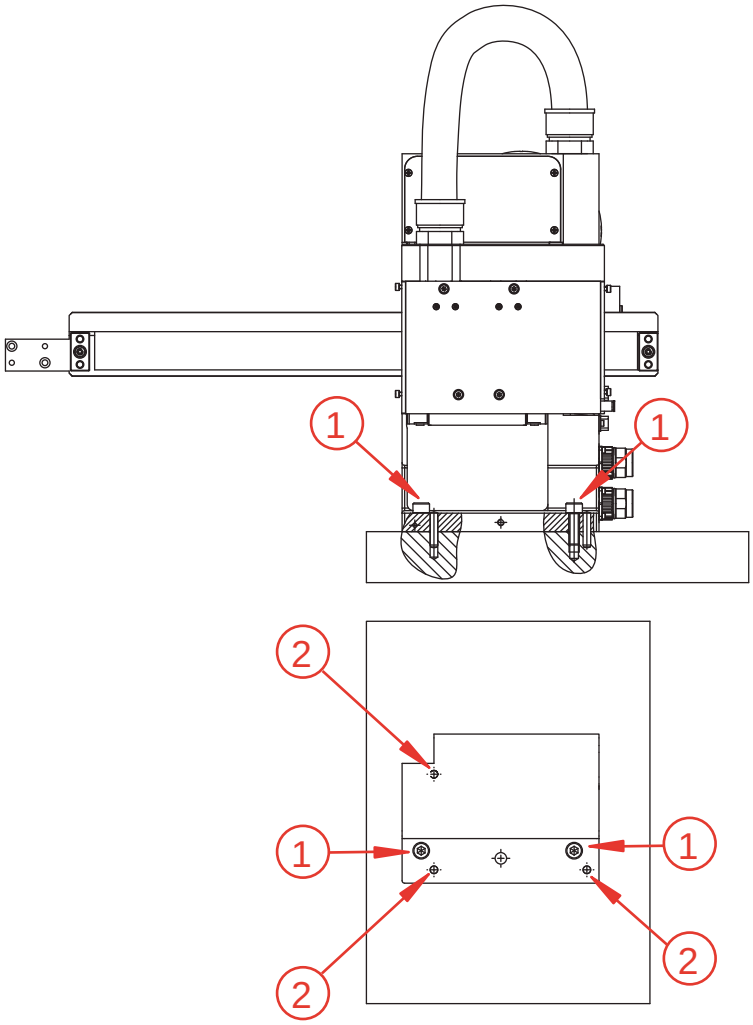



**Fig. 15: Firm pinning**

### 5.4.3 Option 3 - Movable via groove

1. Bring the Pick & Place to its assembly position.
2. Screw in the two fastening bolts [1], but do not tighten them yet.
3. Drive a dowel pin into each of the two front pin holes [2].
4. Align the Pick & Place in the groove [3].
5. Tighten fastening bolts [1].

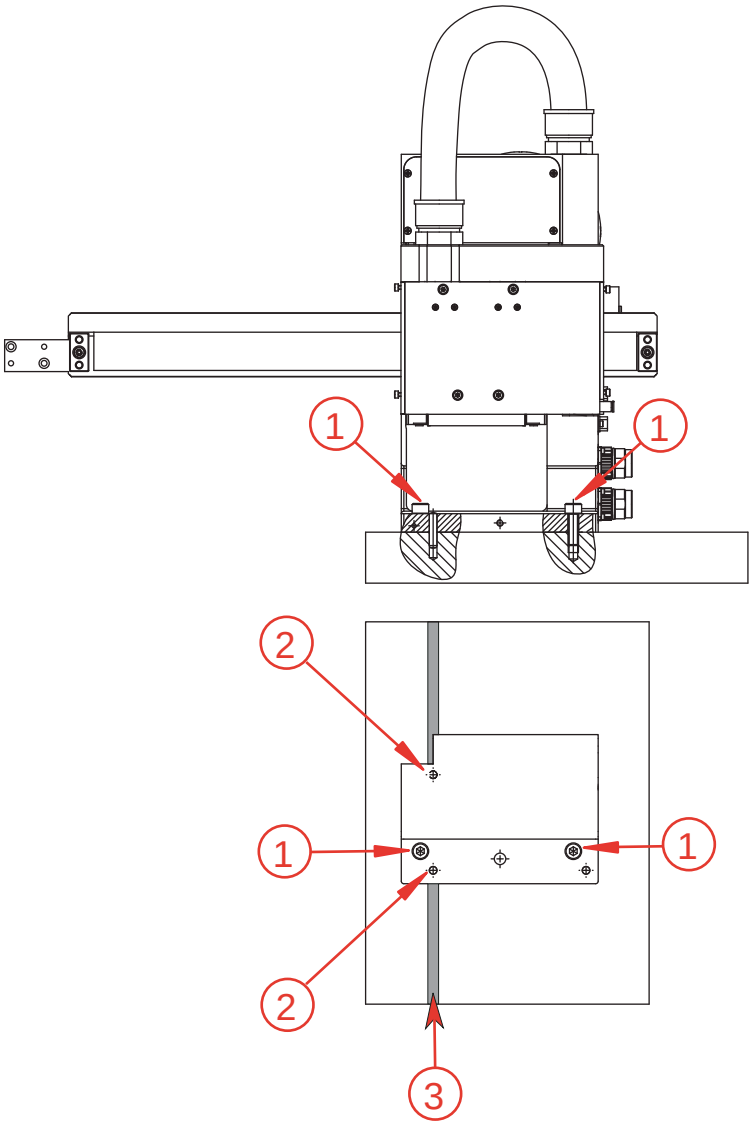



**Fig. 16: Assembly at a groove**

## 5.5 Weiss Tool-Connector

### 5.5.1 Adaption gripper on front side

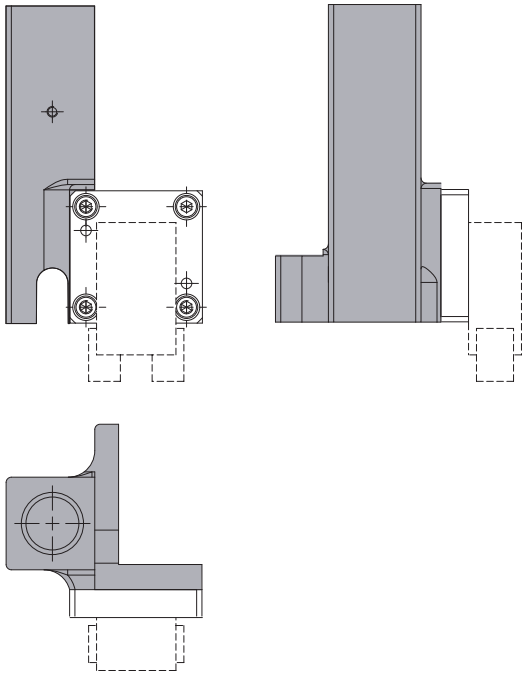


**Fig. 17: Gripper front side**

### 5.5.2 Adaption gripper left

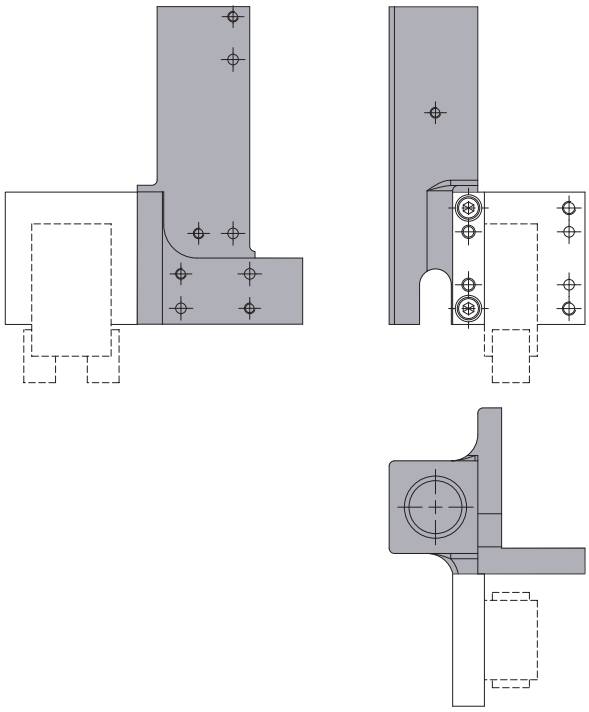


**Fig. 18: Gripper left**

### 5.5.3 Adaption gripper right

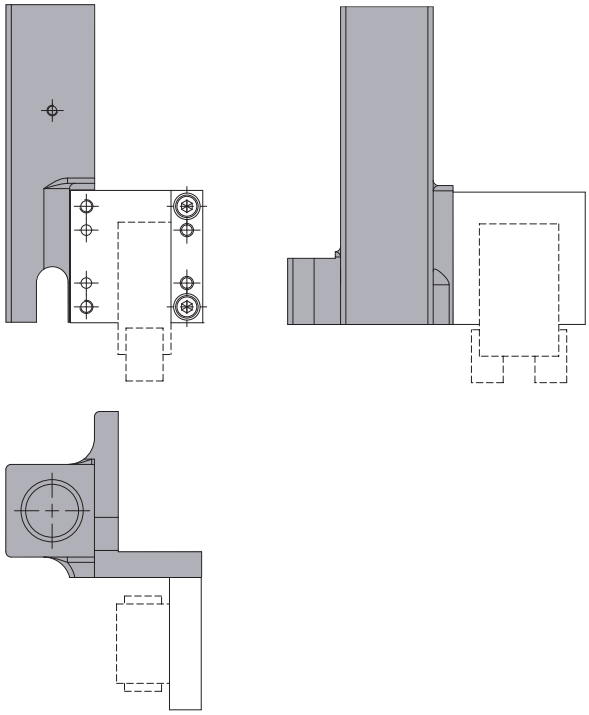


**Fig. 19: Gripper right**

## 5.6 Installing the safety equipment

Fitting of safety equipment and emergency stop buttons is the responsibility of the operator. The machine may not be operated without safety equipment suitable for the intended purpose.

## 5.7 Instructions on disposal of packaging material

Packaging materials should be reused or disposed of correctly in compliance with national regulations.

# 6 Commissioning

## 6.1 Safety during commissioning

**WARNING**

***Injuries emanating from unexpected activation.***
*Incorrectly-established connections or external influences on electrical equipment can cause unexpected activation of the machine or uncontrolled movement. Ensure that nobody is present in the hazardous zone around the machine. Activate and check all safety equipment and emergency stop circuits prior to commissioning.*

- Ensure that the machine is only commissioned by qualified personnel in compliance with the safety instructions.
- Ensure that only authorised personnel are in the work area, and that no one could be injured due to the commissioning process.

The following prerequisites must be met prior to commissioning the machine:

- The machine is correctly mounted.
- The electrical equipment for the power supply is available and correctly fitted.
- All cables are laid properly and correctly connected in compliance with valid electrical circuit documents.
- The shielding of the motor wires is in place.
- The static discharge must be conducted properly.
  - The shunt resistance must be measured and have a value of < 10 MOhm.
  - The measurement must be recorded in a log.
- The required safety equipment and emergency stop circuits are available and functioning correctly.

Prior to commissioning the machine, check whether

- the drive is undamaged and not blocked.
- all connections have been correctly established.
- all safety covers are correctly installed.
- no other hazard sources are present.
- no foreign materials, tools or other objects are lying in the operating area of the machine.

The following should be checked during commissioning

- the axles are running properly.
  - Jerking of the axles may indicate incorrect control parameters.
- no excessive noise development is detected.
  - A strong development of noise may indicate improper assembly or incorrect control parameters.

## 6.2 Initial commissioning

If a Pick & Place is delivered with amplifier and software, the commissioning will be carried out via the Weiss Application Software (WAS).


📖 Further information on this can be found in the electrical and software documentation for the HP140T.

## 6.3 Recommissioning

**WARNING** ***Risk of injury emanating from an operationally unsafe machine.***
*An operationally unsafe machine can cause injuries and material damage. Recommissioning should only be realised after it has been ascertained that the machine is in a functionally reliable condition and no risk emanate from it during operation.*

A visual inspection of the machine should be conducted prior to re-commissioning. The following should be checked and ensured in this regard:

- No damage is present on the machine.
- No foreign materials, tools or other objects are lying in the operating area of the machine.
- All supply units are connected and operating.
- Safety equipment is ready for operation.

# 7 Operation

## 7.1 Safety during operation

**WARNING**

***Risk of injury due to incorrect alteration of operating parameters.***
*Operating parameters should only be changed by authorised persons. Altered operating parameters should be checked in a test.*

## 7.2 Operating the Pick & Place

The machine is designed for integration in other machines, in other incomplete machines or equipment or for connection to these.

Safe operation and control are the responsibility of the operator.

## 7.3 Operating personnel workstations

The operating personnel workstations are determined by the operator of the plant or product in which the machine is integrated.

# 8 Malfunctions

## 8.1 Safety when remedying malfunctions

**WARNING**

***Injury of non-authorised personnel.***
*Malfunctions should only be remedied by instructed personnel provided by the operator who have been trained in and are authorised to perform these tasks. The machine should be deactivated with the main switches and secured against unintentional reactivation prior to remedy. The radius of action of moving machine parts should be secured.*

## 8.2 Errors / Cause / Remedy

Please refer to the electrical and software documentation of the HP140T for information on faults and errors, and troubleshooting.

## 8.3 Customer Service

Please provide the following details if you require the assistance of our Customer Service:

- Serial number of the machine
- Description of the malfunction that has occurred
- Time and attendant circumstances of the malfunction that has occurred
- Assumed cause

You can contact our Customer Service from Monday to Friday between 08:00 and 17:00 at the

**Service number +49 (0) 6281 - 5208-0**

or at service@weiss-gmbh.de

An answering machine will provide you with information outside of the abovementioned hours.

# 9 Maintenance

## 9.1 Safety during maintenance

**WARNING**

***Injuries caused by the power supply and residual energy.***
*All power sources should be deactivated prior to carrying out maintenance work, and secured against unintentional reactivation and marked with a sign indicating that maintenance work is in progress. All moving parts should be stationary. Loads should be secured against sagging or slipping. All components energized with electrical power should be de-energized (Extinguished LED's on the servo amplifier do not mean that all components have been completely de-energised). Check by measuring to ensure that all components are de-energised. Work on electrical equipment may only commence if the voltage is less than 42 VDC.*

***Injury of non-authorised personnel.***
*Maintenance work should only be realised by instructed personnel who have been authorised to perform these tasks. The operating instructions laid down by the operator must be rigidly adhered to.*

***Injuries resulting from maintenance work which has not been announced.***
*The working area should be secured over a wide area prior to realising maintenance work and marked with warning signs. Operating personnel must be informed that maintenance work is being carried out.*

***Injuries caused by the use of incorrect components or incorrect operating media.***
*Only spare parts which are specified in our spare parts lists should be used. Subsequent modifications to the machine are not permitted. Only specified operating media should be used. Self-securing screws and nuts should always be replaced. All specified screw tightening torques should be strictly adhered to.*

***Injuries caused by the absence of safety equipment.***
*No safety equipment or safety components should be removed. Where dismantling of individual safety equipment is unavoidable for maintenance purposes, the parts removed should be refitted immediately after maintenance work is completed and tested to ensure that the integrity of their safety functions is assured.*

**CAUTION**

***Risk of injuries through burning.***
*The temperature of the housing and the axles can reach up to 80 °C during operation. Prior to carrying out any work on these components, the machine must first cool down sufficiently, to avoid any risk of burning through contact. Burn injuries will arise from contact with hot components.*

- Ensure that only qualified electricians perform all tasks on the electrical equipment.
- Ensure that all work steps for maintenance are performed in the specified sequence.
- Ensure that specified tightening torques are observed.
- Ensure that all foreign objects are removed from the work area after the maintenance.

## 9.2 Maintenance work

Maintenance includes tasks for the purpose of:

- Inspection
- Maintenance
- Repair

**WARNING** ***Risk emanating from unexpected activation.***
*There is a risk of unexpected start-up if the power supply has not been deactivated or is inadvertent reactivated. The power supply to the machine should be deactivated and secured against reactivation prior to commencing inspection. An unexpected start-up could injure persons who remain present in the working area of the machine.*

## 9.3 Inspections

### 9.3.1 Conducting a six-monthly visual inspection

1. Move the horizontal and vertical axles by hand, one after the other and each one over a complete stroke, and check for
   - ease of motion of the axles;
   - running noise;
   - noise at the spring of the vertical axle.
     In case of noise development the spring can be lubricated by applying an adhesive spray lubricant in the slot [1].
   - Wipe off excessive lubricant from axle with a soft cloth.

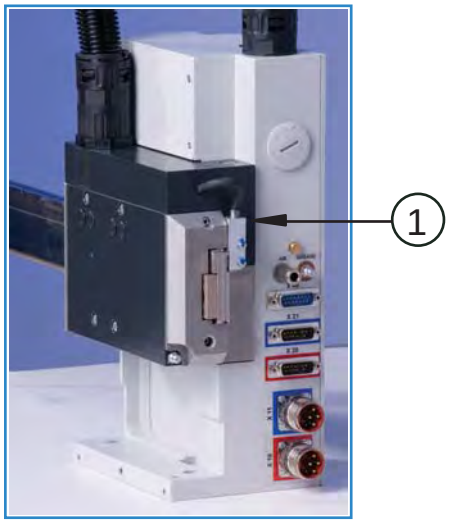



**Fig. 20: Lubricating spring**

2. Conduct visual inspection for
   - loose bolt or pin connections.
   - loose bolts or nuts.
   - damage to wires and compressed-air hoses.
   - damage to hoses used for automatic lubrication. The hoses must not carry air.
   - damage to the Pick & Place.

## 9.4 Maintenance

### 9.4.1 Lubricating vertical axle and horizontal axle

NOTICE ***The lubrication must be carried out after a service performance of 600 km, at the latest however, once a year. The respective service performance can be seen via the WAS software in the menu Extras/Parameters. There is also the alternative (as described in the documentation WAS.handling Windows programme) of reading out and resetting the value via different interfaces.***

1. Place the grease gun on the conical lubricating nipple of vertical axle [1] or horizontal axle [2] and press in the required amount of grease.
   - Move the respective axle about 40 mm by hand during lubrication.
   - The pump stroke for the hand-held grease gun from Weiss is approx. 0.8 $cm^3$.

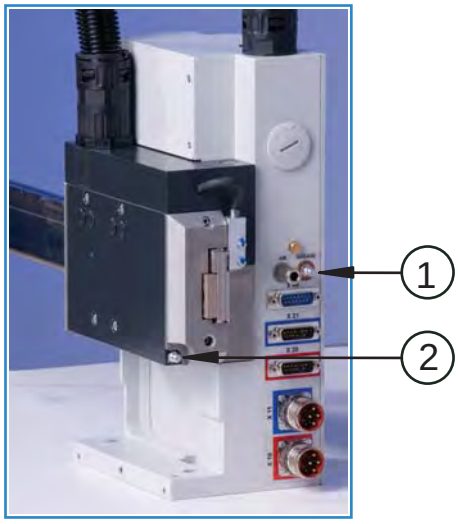



**Fig. 21: Lubricating axles**

2. Wipe off leaked excess grease with a soft cloth.

For further information on the hand-held grease gun from Weiss see the operating manual for the hand-held grease gun (Art.-No. LUBEMAN-0800-00-0).

9.4.1.1 Grease

a) First lubricating by the factory and re-lubricating with LE special grease Synth EP2 with qualities as follows:

- Standard for cleanness by FDA guideline 21 CFR 178.3570
- Clearance by NSF H1 (National Sanitary Foundation)

| | |
|---|---|
| Type of thickener | Al-Complex |
| Operating temperatur for long-term lubrication | -45 °C bis +160 °C |
| Short time admissible temperature peak value | +200 °C |
| Drop point (ASTM D 2265) | > 250 °C |
| Worked penetration (ASTM D 217) | 265 - 295 |
| Type od base oil | synthetic |
| Base oil viscosity at 40 °C (ASTM D 445) | 350 $mm^2/s$ |
| Water resistance (DIN 51807 T1) | 0 - 90 |
| SKF Emcor Test (DIN 51802) | Corrosion degree 0/0 |
| Designation (DIN 51502) | KPFHC 2 P-40 |

Alternative the use of a comparable grease is possible.

b) Use of grease without FDA-Certifikation

- DIN 51502: KP2K-30
- ISO 6743-9: ISO-L-X-CCEB 2

NOTICE ***In this case the original grease has to be pressed out of the bearings completely. Do not mix greases.***

9.4.1.2 Amount of grease

- 1.0 $cm^3$ for the vertical axle
- 0.6 $cm^3$ for the horizontal axle

## 9.5 Repair

The operator should not perform any maintenance or repair work on the machine.

Should maintenance or repair work become necessary, the customer service of WEISS GmbH is to be contacted.

# 10 Decommissioning / Dismantling / Disposal

## 10.1 Safety during decommissioning and dismantling

**WARNING**

***Strong magnetic fields***

*Strong magnetic fields are emitted from the permanent magnets. The magnetic pull increases very strongly at close range (< 150 mm). Magnetisable materials but also handling devices mutually, are attracted with a great force. Disassembly only by qualified, trained and instructed personnel. A second person must always be present during disassembly. Transport disassembled machines individually. Do not stack disassembled machines. Do not bring any magnetisable objects near the machine. Keep separating tools at hand for emergencies. Danger of severe crushing or pinching.*

***Injury of unauthorised persons.***

*Ensure that decommissioning and dismantling is only realised by persons trained, instructed and authorised for this purpose. These persons should be familiar with the operating manual and act in accordance with it.*

## 10.2 Decommissioning

### 10.2.1 Temporary decommissioning

The machine should be deactivated for decommissioning and secured against unintentional reactivation.

The machine should be fitted with a sign that clearly indicates that it is temporarily decommissioned.

NOTICE ***For recommissioning, comply with the instructions in chapter 6.3.***

## 10.3 Dismantling and disposal

CAUTION ***Injuries can occur during disassembly through falling components.***

*The following points must be observed to avoid injuries and/or environmental damage during dismantling and disposal:*

- In order to avoid injury, ensure that suitable tools are used and that dismantled machine components are stable.
- Note that emerging lubricant, solvent, preserving agents, etc. can cause cauterizing and burns if they come into direct contact with skin.

### 10.3.1 Disposal of components

NOTICE ***Modules should be disposed of correctly!***
***Incorrect disposal of modules can cause environmental damage and will be prosecuted!***
*Dispose of modules in compliance with valid local regulations. Ensure that auxiliary operational media are disposed of in compliance with environmental protection regulations. Local regulations governing the correct recycling and disposal of waste should be observed.*

The machine consists of:

- steel and aluminium (housing, axles)
- copper (motor, electric wires)
- plastic (electric wires, hoses)
- Electronic components (servo amplifiers, boards)

# 11 Service and spare parts

## 11.1 Ordering spare parts

Please supply us with the following details when ordering spare parts:

- Serial number of the machine
- Order number of the spare part obtained from the spare parts list
- Number of spare parts required

Please send your spare parts order to

WEISS GmbH
Siemensstraße 17
D-74722 Buchen/Odw.

Tel: +49 (0) 6281 - 5208-0
Fax: +49 (0) 6281 - 5208-99
eMail: service@weiss-gmbh.de
Internet:http://www.weiss-gmbh.de

All our representative addresses can be obtained on our website.

## 11.2 Spare parts list

A spare parts list is included in the supplied documentation. The exact name and order number of the required spare part can be found in this list.

# 12 Appendix

## 12.1 Index

## 12.2 Personal notes


## 12.2 Personal notes


**WEISS GmbH** | Siemensstraße 17 | D-74722 Buchen
Telefon +49(0)6281-5208-0 | Fax +49(0)6281-520899 | info@weiss-gmbh.de | www.weiss-gmbh.de