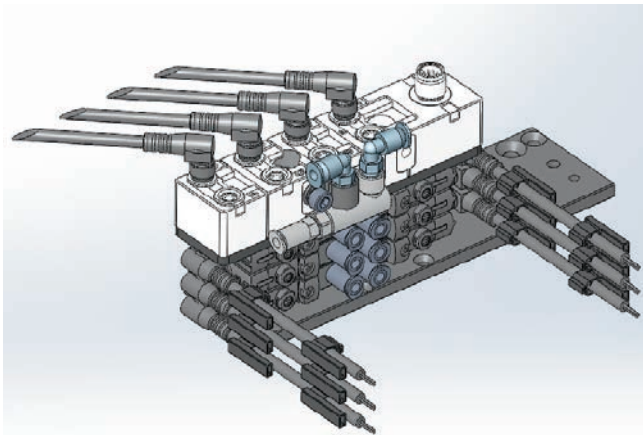


# Operating instructions

Valve block, mini



 **afag**

 **eps**

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## 2 Preface

It is our aim to present all essential information contained in these operating instructions as clearly and concisely as possible. However, please do not hesitate to contact us should you have any queries.

We are always very grateful for your suggestions.

We wish you a successful integration of our devices into your machines or systems.

## 3 Safety information

### 3.1 General safety information

The pick and place EPS devices are constructed according to the state of the art and the acknowledged safety-related guidelines; they may only be used

- for their intended purpose,
- and only when in an operationally safe condition.

### 3.2 Please observe the information in the operating instructions!

The prerequisite for the safe handling and smooth operation of the pick and place EPS devices is awareness of the fundamental safety standards

Every person tasked with the installation, commissioning, maintenance and operation of the pick and place EPS devices is required to have thoroughly read and understood the entire user manual, particularly the "safety information" chapter.

Furthermore, the rules and regulations on accident prevention applicable at the place of installation/operation must also be observed. Improper use may result in dangers to the life and limb of the operator or third parties and in impairments to the machine or other assets.

In the event of faults that could impair safety, the machine must be switched off immediately and secured to prevent restarting. The fault must then be remedied.

All work on the machines must be carried out with the machines depressurised and disconnected from the electrical power supply.

For the operation of the machines, the user must provide protective covers, safety doors or other safety precautions conforming to the normal safety guidelines and safety standards which prevent people from entering or remaining in the working area of the machines during operation. The machines may only be put into operation when the guards are securely closed.

### 3.3 Protection against dangerous movements

Dangerous movements can occur if drives are actuated incorrectly. The drive components are monitored so that a malfunction can be effectively ruled out. For reasons of personal safety, the risk of injury and the risk of material damage, however, this must not be relied on completely. Faulty drive movements must be expected until installed monitoring devices go into effect.

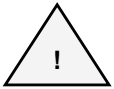
### 3.4 Explanation of symbols and signs

The following warnings and symbols help readers understand this manual quickly and ensure the modules can be handled safely.

#### 3.4.1 Warnings

**Danger**

This symbol draws attention to an imminently hazardous situation that will result in serious personal injury or even death if the safety regulations are not observed.

**Warning**

This symbol draws attention to a potentially hazardous situation that will result in serious personal injury or property damage if the safety regulations are not observed.

**Caution**

This symbol draws attention to a potentially hazardous situation that will result in property damage if the safety regulations are not observed.

#### 3.4.2 Symbols

**Information sign**

This symbol indicates information that contributes to better understanding.

## 4 Product description

### 4.1 Intended use

The pick and place EPS devices are used in automation systems and are intended exclusively for moving workpieces.

The pneumatic modules are intended exclusively for operation with compressed air (4.7 bar). Use for any other purpose does not constitute an intended use.

The electric axes are intended exclusively for operation with original LinMot components (controllers, cables...). Use for any other purpose does not constitute an intended use.

The intended use also includes compliance with the prescribed installation and removal instructions, the service and maintenance conditions and observance of the specifications in the data sheets.

### 4.2 Warranty and liability

The "General Conditions of Sale and Delivery" of eps GmbH shall apply in all cases.

The term of the warranty on Afag handling components and systems is:

- 24 months following commissioning, but not exceeding 27 months following delivery.
- Wear parts (e.g. shock absorbers) are excluded from the warranty. \*

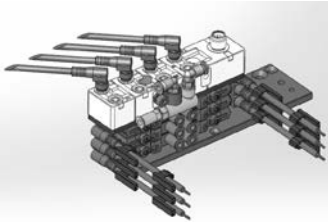
The guarantee covers the use or repair of defective Afag parts. No further claims will be accepted.

The warranty will be voided in event of the following:

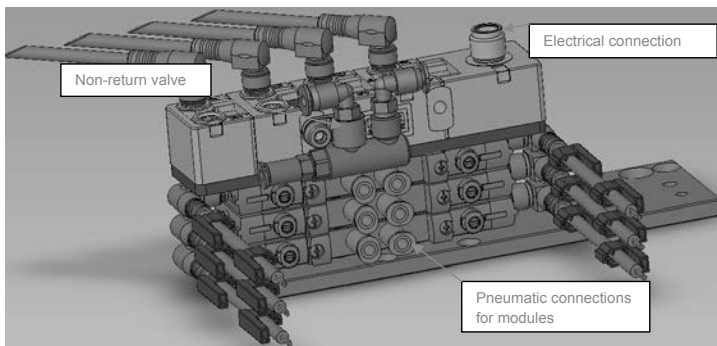
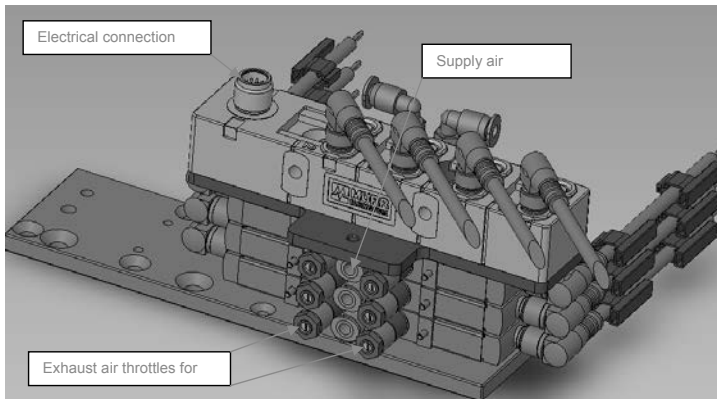
- Use for other than the intended purpose
- Failure to observe the information on installation, commissioning, operation and maintenance in the operating instructions
- Improper installation, commissioning, operation and maintenance
- Independent repairs and constructional changes without prior instruction by Afag Automation AG/eps GmbH
- Removal of the serial number on the product
- Using the module without shock absorbers, or with defective shock absorbers
- Inadequate monitoring of wear parts
- Failure to observe the EC Machinery Directive, accident prevention regulations, VDE guidelines as well as the safety/installation instructions
- Emergencies caused by external influence or force majeure.

\*A customer has the right to a defect-free product. This is also applicable for accessories and wear parts, if they are defective.

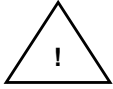
### 4.3 Valve block



| Technical data         |                                        |
|------------------------|----------------------------------------|
| Operating pressure     | 4...7 bar                              |
| Compressed air quality | Filtered 40 µm, oil-free or lubricated |
| Temperature range      | 0...50°C                               |
| Supply connection      | Quick-release couplings d=6 mm         |
| Electrical connection  | Round connector M12 x 1, 12-pin        |
| Valve slots            | 6                                      |



## 5 Installation



### Caution

The pick and place EPS device is a precision-mechanical unit. Therefore, you must work to ensure the necessary care and cleanliness during transportation, installation and adjustment.

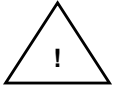
## 6 Connection

| Fct. | STL1 | PLC   | 12-pin | Cable colour | Y,Z           | Y,G             | Z,G             | C,G             |
|------|------|-------|--------|--------------|---------------|-----------------|-----------------|-----------------|
|      |      |       |        |              | <b>Y axis</b> | <b>Y axis</b>   | <b>Z axis</b>   | <b>Rotate</b>   |
| S1   | X1   | E 0.0 | 3      | white        | Y retracted   | Y retracted     | Z top           | C1 left         |
| S2   | X2   | E 0.1 | 4      | green        | Y extended    | Y extended      | Z bottom        | C1 right        |
| V1   | X5   | A 0.0 | 7      | pink         | Retract y     | Retract y       | Z on            | C1 left         |
| V2   | X6   | A 0.1 | 8      | red          | Extend Y      | Extend Y        | Z off           | C1 right        |
|      |      |       |        |              | <b>Z axis</b> | <b>Gripping</b> | <b>Gripping</b> | <b>Gripping</b> |
| S3   | X3   | E 0.2 | 5      | yellow       | Z top         | Gripper open    | Gripper open    | Gripper open    |
| S4   | X4   | E 0.3 | 6      | grey         | Z bottom      | Gripper closed  | Gripper closed  | Gripper closed  |
| V3   | X7   | A 0.2 | 9      | black        | Z on          | Gripper open    | Gripper open    | Gripper open    |
| V4   | X8   | A 0.3 | 10     | purple       | Z off         | Gripper closed  | Gripper closed  | Gripper closed  |
| (+)  |      | +24V  | 1      | brown        |               |                 |                 |                 |
| (-)  |      | GND   | 2      | blue         |               |                 |                 |                 |

| Fct. | STL1 | STL2 | PLC   | 12-pin | Cable colour | Y,Z,G           |
|------|------|------|-------|--------|--------------|-----------------|
|      |      |      |       |        |              | <b>Y axis</b>   |
| S1   | X1   |      | E 0.0 | 3      | white        | Retract y       |
| S2   | X2   |      | E 0.1 | 4      | green        | Extend Y        |
| V1   | X3   |      | A 0.0 | 5      | yellow       | Retract y       |
| V2   | X4   |      | A 0.1 | 6      | grey         | Extend Y        |
|      |      |      |       |        |              | <b>Z axis</b>   |
| S3   |      | X5   | E 0.2 | 7      | pink         | Z top           |
| S4   |      | X6   | E 0.3 | 8      | red          | Z bottom        |
| V3   | X5   |      | A 0.2 | 7      | pink         | Z on            |
| V4   | X6   |      | A 0.3 | 8      | red          | Z off           |
|      |      |      |       |        |              | <b>Gripping</b> |
| S5   |      | X7   | E 0.4 | 9      | black        | Gripper open    |
| S6   |      | X8   | E 0.5 | 10     | purple       | Gripper closed  |
| V5   | X7   |      | A 0.4 | 9      | black        | Gripper open    |
| V6   | X8   |      | A 0.5 | 10     | purple       | Gripper closed  |
| (+)  |      |      | +24V  | 1      | brown        |                 |
| (-)  |      |      | GND   | 2      | blue         |                 |

| Fct. | STL1 | STL2 | PLC   | 12-pin | Cable colour | Y,Z,D,G         | G,G,G,G         | Y,Y-ZP,Z,G      |
|------|------|------|-------|--------|--------------|-----------------|-----------------|-----------------|
|      |      |      |       |        |              |                 |                 |                 |
|      |      |      |       |        |              | <b>Y axis</b>   | <b>Gripping</b> | <b>Y axis</b>   |
| S1   |      | X1   | E 0.0 | 3      | white        | Y retracted     | Gripper open    | Y retracted     |
| S2   |      | X2   | E 0.1 | 4      | green        | Y extended      | Gripper closed  | Y extended      |
| V1   | X1   |      | A 0.0 | 3      | white        | Retract y       | Gripper open    | Retract y       |
| V2   | X2   |      | A 0.1 | 4      | green        | Extend Y        | Gripper closed  | Extend Y        |
|      |      |      |       |        |              |                 |                 |                 |
|      |      |      |       |        |              | <b>Z axis</b>   | <b>Gripping</b> | <b>Y_ZP</b>     |
| S3   |      | X3   | E 0.2 | 5      | yellow       | Z top           | Gripper open    | Y_ZP on         |
| S4   |      | X4   | E 0.3 | 6      | grey         | Z bottom        | Gripper closed  | Y_ZP off        |
| V3   | X3   |      | A 0.2 | 5      | yellow       | Z on            | Gripper open    | Y_ZP on         |
| V4   | X4   |      | A 0.3 | 6      | grey         | Z off           | Gripper closed  | Y_ZP off        |
|      |      |      |       |        |              |                 |                 |                 |
|      |      |      |       |        |              | <b>Rotate</b>   | <b>Gripping</b> | <b>Z axis</b>   |
| S5   |      | X5   | E 0.4 | 7      | pink         | C1 left         | Gripper open    | Z top           |
| S6   |      | X6   | E 0.5 | 8      | red          | C1 right        | Gripper closed  | Z bottom        |
| V5   | X5   |      | A 0.4 | 7      | pink         | C1 left         | Gripper open    | Z on            |
| V6   | X6   |      | A 0.5 | 8      | red          | C1 right        | Gripper closed  | Z off           |
|      |      |      |       |        |              |                 |                 |                 |
|      |      |      |       |        |              | <b>Gripping</b> | <b>Gripping</b> | <b>Gripping</b> |
| S7   |      | X7   | E 0.6 | 9      | black        | Gripper open    | Gripper open    | Gripper open    |
| S8   |      | X8   | E 0.7 | 10     | purple       | Gripper closed  | Gripper closed  | Gripper closed  |
| V7   | X7   |      | A 0.6 | 9      | black        | Gripper open    | Gripper open    | Gripper open    |
| V8   | X8   |      | A 0.7 | 10     | purple       | Gripper closed  | Gripper closed  | Gripper closed  |
|      |      |      |       |        |              |                 |                 |                 |
| (+)  |      |      | +24V  | 1      | brown        |                 |                 |                 |
|      |      |      |       |        |              |                 |                 |                 |
| (-)  |      |      | GND   | 2      | blue         |                 |                 |                 |

## 7 Maintenance



If the device makes abnormal movements during normal operation, e.g. hard banging, the causes should be immediately remedied.

The service and maintenance intervals must be observed. The intervals are based on a normal environment. The approval of eps GmbH must be obtained in advance if the devices are to be operated in an environment with abrasive dusts or with corrosive or aggressive vapours, gases or liquids.

## 8 Repairs

Repairs other than those described below may only be carried out by eps GmbH. If you carry out the repair yourself, approval must be obtained in advance from eps GmbH.



### **Caution**

Repairs may only be carried out by qualified personnel.

## 9 Component/replacement part lists

The replacement parts for the standard components are listed here. The order numbers on our delivery note are applicable to special components.

### 9.1 Valve block

| Designation                                         |                                      | Art. no. |
|-----------------------------------------------------|--------------------------------------|----------|
| Electric connection plate VAVE-L1-1VR8-LP           |                                      | 510,214  |
| 5/3 directional control valve VUVG-S10 M-closed     |                                      | 510,206  |
| 5/2 directional control valve VUVG-S10 (monostable) |                                      | 510,207  |
| 5/2 directional control valve VUVG-S10 impulse      |                                      | 510,208  |
| 2x 3/2 directional control valve VUVG-S10 closed    |                                      | 510,209  |
| 5/3 directional control valve VUVG-S10 M-open       |                                      | 510,210  |
| 5/3 directional control valve VUVG-S10 M-closed     | External precontrol                  | 510,229  |
| 5/2 directional control valve VUVG-S10 impulse      | External precontrol                  | 510,273  |
| 2x 3/2 directional control valve VUVG-S10 closed    | External precontrol                  | 510,274  |
| Power strip STL-8 for 8 sensors                     | 8x M8, 3-pin, 1x M12 12-pin.         | 520,685  |
| Connection cable, 12-pin with angled socket, l= 10m | f. power strip connection            | 520,686  |
| Connection cable, 3-pin M8 x1, 0.3m                 | Connector, angled - coupling, angled | 520,687  |

## 10 Disposal instructions

### Products

- Products that are predominantly made out of metal (axes, modules, adaptor plates etc.) must be disposed of in accordance with the national laws of metal recycling.
- Electronic products (controllers, etc.) must be disposed of in accordance with the national laws of electronic scrap.

### Packaging

Cardboard, paper or PE film are predominantly used as packaging material.

These are materials that can be used in global recycling processes.

If the packaging is returned to us free domicile, eps will take it back for free and dispose of it accordingly.

## **11 Installation manual in accordance with Appendix VI (EC-RL 2006/42/EC)**

### **Installation manual in accordance with Appendix VI (EC-RL 2006/42/EC)**

For the installation of the partly completed  
machinery

Valve block, mini

the following conditions must be satisfied so that it can be assembled together with other parts to form a complete machine correctly and without endangering the health and safety of persons:

- Please observe the safety information in the risk assessment
- Read, understand and observe the whole operating instructions
- Installation may only be carried out by qualified specialist personnel.

## 12 Installation declaration for partly completed machinery (EC-RL 2006/42/EC)

### Installation declaration for partly completed machinery (EC-RL 2006/42/EC)

The manufacturer:           eps elektropneumatische Systeme GmbH  
Gewerbestrasse 11  
D-78739 Hardt

hereby declares that the following products:  
Valve block, mini

meet the following basic requirements of the **machinery directive 2006/42/EC**:  
Appendix I, Article 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.5.1.

The partly completed machinery also corresponds to all provisions of the electrical equipment (2014/35/EU) and electromagnetic compatibility (2014/30/EU) directives.

The incomplete machine must only be put into operation when it has been found that the machine into which the incomplete machine is to be installed corresponds to the provisions of the machinery directive 2006/42/EC.

The manufacturer commits to electronically submitting these special documents to individual state offices upon request.

The technical documentation for this machine was drawn up according to Appendix VII, part B.

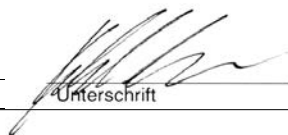
Name of the authorised representative: Bernhard Moosmann  
Address of the authorised representative: Gewerbestraße 11 - 78739 Hardt

15.09.16

Date

Dipl Ing FH Bernhard Moosmann, Managing Director

Signatory and attributes of the signatory

  
Unterschrift

## 13 Risk assessment (EC-RL 2006/42/EC)

### Procedures used for the risk assessment

Diagram utilised for general risk assessment in accordance with ISO/TR 1412-2:

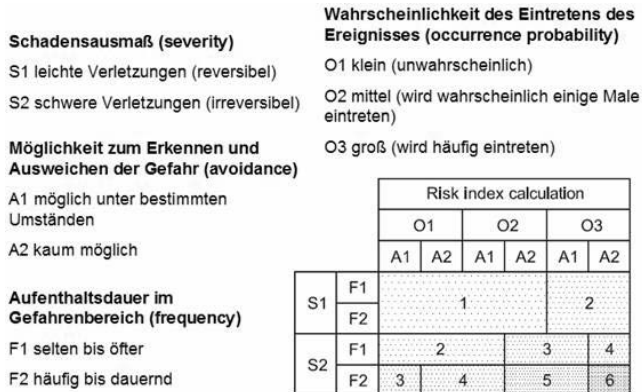


Diagram utilised in accordance with EN 13849 for the determination of the required performance level (PL):



### Determination of the machine limitations

#### 1. Limits of use

|                                        |                                                            |
|----------------------------------------|------------------------------------------------------------|
| Intended use                           | Installation and equipping of various components, products |
| <b>Application area of the machine</b> |                                                            |
| Business                               | Yes                                                        |
| Industry                               | Yes                                                        |
| Household                              | No                                                         |

|  | User groups         | Function                                   | Qualification/impairments |
|--|---------------------|--------------------------------------------|---------------------------|
|  | Qualified personnel | Maintenance,<br>commissioning<br>Operation | Specialist training       |
|  | Apprentices         | Operation                                  | trained                   |
|  | Operators           | Operation                                  | experienced/trained       |

|    |                                                 |                                                     |
|----|-------------------------------------------------|-----------------------------------------------------|
| 2. | Spatial limits                                  |                                                     |
|    | Machine/system description                      | See system description                              |
|    | Energy supply interfaces                        | Electrical energy supply<br>Pneumatic energy supply |
| 3. | Time limits                                     |                                                     |
|    | Intended application duration                   | 10 years                                            |
|    | Recommended maintenance intervals               | See Maintenance                                     |
| 4. | Additional limits                               |                                                     |
|    | Highest/lowest ambient temperatures             | 0-50°C                                              |
|    | Required degree of cleanliness                  | No special requirements                             |
|    | Materials and properties of processed materials | No special requirements                             |

| Identification of hazards |                                |                                                                                                                |                                                 |                                                                                                                                                                                                                                                                                                |                                          |
|---------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Pos.                      | Life phases                    | Description of hazard                                                                                          | Risk assessment                                 | Measures to reduce risk                                                                                                                                                                                                                                                                        | PL                                       |
| 1                         | Transport                      | Hazard due to improper transportation of machine                                                               | S = S2<br>F = F1<br>O = O1<br>A = A1<br>Erg = 3 | Observe the total weight and correct transportation methods in the operating instructions.                                                                                                                                                                                                     | --                                       |
| 2                         | Operation, Maintenance Repairs | Electrical hazard. Direct or indirect contact with energised parts when errors occur on electrical components. | S = S2<br>F = F1<br>O = O1<br>A = A1<br>Erg = 3 | 1. Electrical equipment designed in accordance with EN 60204.<br><br>2. Installation and maintenance of electrical equipment must only be carried out by specialist personnel.<br><br>3. Maintenance and repair work must only be carried out in a voltage-free and compressed air-free state. | S = S2<br>F = F1<br>P = P1<br><br>PL = c |
| 3                         | Maintenance Repairs            | Pacemakers may be affected by permanent magnets.                                                               | S = S2<br>F = F1<br>O = O1<br>A = A1<br>Erg = 3 | Persons who wear pacemakers must maintain a safety distance of a minimum of 0.2 m from the module.<br><br>The device is equipped with corresponding warning signs.<br><br>The personnel must be instructed accordingly.                                                                        | --                                       |

| Pos. | Life phases | Description of hazard | Risk assessment  | Measures to reduce risk | PL |
|------|-------------|-----------------------|------------------|-------------------------|----|
| 4    | Operation   | Pacemakers may be     | S = S2<br>F = F1 | With the safeguard, a   | -- |

|   |                                |                                                                                                           |                                                 |                                                                                                                                                                                                         |                                      |
|---|--------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
|   |                                | affected by permanent magnets.                                                                            | O = O1<br>A = A1<br>Erg = 3                     | safety distance of 0.2m from the pacemaker must be guaranteed                                                                                                                                           |                                      |
| 5 | Operation                      | Risks of limb crushing, bruising and broken bones due to accessing the travel range of the moving device. | S = S2<br>F = F2<br>O = O2<br>A = A1<br>Erg = 4 | Operation of the device behind a safeguard to ensure that access to the travel range is denied.                                                                                                         | S = S2<br>F = F1<br>P = P1<br>PL = c |
| 6 | Operation, Maintenance Repairs | Burning of the skin due to surface temperatures of up to 60°C.                                            | S = S1<br>F = F1<br>O = O2<br>A = A1<br>Erg = 1 | 1.<br>Avoid direct contact when the device is in operation.<br><br>2.<br>Allow the device to cool down before carrying out maintenance work, or protect the skin accordingly (gloves, long clothing...) | --                                   |

| Pos. | Life phases                | Description of hazard                                                                                                               | Risk assessment                                 | Measures to reduce risk                                                                               | PL                                   |
|------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------|
| 7    | Maintenance, commissioning | Risks of limb crushing, bruising and broken bones due to accessing the travel range of the device when the protective door is open. | S = S2<br>F = F2<br>O = O2<br>A = A1<br>Erg = 4 | 1.<br>The pressurised air supply must be reliably disconnected.<br><br>2.<br>The "safety relay" input | S = S2<br>F = F1<br>P = P1<br>PL = c |

|  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
|--|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  |  |  |  | <p>(X33) on the controller C1xx0 must be deactivated or the power pack (72V) must be reliably disconnected from the power supply on the primary side.</p> <p>3.<br/>The power pack (72V) must be reliably disconnected from the power on the primary side when using the B1100, E12x0 or E1x00 controllers.</p> <p>4.<br/>For linear motor axes (excluding PDL40 and PDL40-HP) through secure monitoring of the reduced speed!!!<br/>Observe the special documentation!!!<br/>Furthermore, specialist personnel must check that all components have been properly installed and ensure that there is no manipulation.</p> |  |
|--|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

## 14 Support

### **elektropneumatische Systeme GmbH**

Gewerbestraße 11

D-78739 Hardt

Phone        ++49 (0)7422/56003-20

Email        [support@eps-automation.de](mailto:support@eps-automation.de)

Internet     <http://www.eps-automation.de>

## 15 Notes

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[illegible]

This image shows a full page of blank graph paper. The grid consists of small, equal-sized squares formed by thin black lines. There are no margins, text, or other markings on the page.



**elektropneumatische Systeme GmbH**

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