

Piccolo 0 synchronous control system



Operating instructions

Please take care of the operating instructions!



Translation from the original German version.

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1 General

1.1 Information on the Assembly Manual

The contents structure is based on the life stages of the synchronous control system (hereinafter referred to as "device").

The manufacturer reserves the right to make changes to the technical data stated in this Assembly Manual. In individual cases they may deviate from the respective device version without the information being categorically changed or losing validity. The current state of the technical data can be obtained from the manufacturer at any time. Any claims arising herefrom may not be asserted. Deviations from the text and image statements are possible and are dependent on the technical development, equipment and accessories of the device. The manufacturer shall provide information on any deviant details on special versions via the sales documentation. Other details shall remain unaffected thereby.



1.2 Standards and guidelines

During the design of the device the fundamental requirements for health and safety were applied and provision was made for the appropriate legislation, industrial standards and regulations.

The safety element is confirmed by the Declaration of Incorporation (see chapter "Declaration of Incorporation"). All information on safety in this Assembly Manual refers to legislation and regulations currently valid in Germany. All information in this Assembly Manual must be complied with at all times and to the full extent. In addition to the safety notices in this Assembly Manual, the regulations applicable at the place of installation with regard to accident prevention, environment protection and occupational safety must be observed and adhered to. The guidelines and standards for safety evaluation can be found in the Declaration of Incorporation.

1.3 Intended use

The device is intended for the synchronous control of two linear drives from the Picolo 0 series. Other fields of application must be agreed in advance with the manufacturer.

The device must not be used in areas where there is a risk of injury to personnel or in rooms in potentially explosive environments.

If a direct or indirect hazard to personnel cannot be ruled out, additional measures (e.g. covers, barriers, etc.) must be taken in order to minimise the potential risk accordingly.

The operator alone is liable for all damage arising from the non-intended use of the device. The manufacturer assumes no liability for personal injury and material damage caused through misuse or procedural errors, improper use and commissioning.

The device must only be operated by trained and authorised specialist staff who comply with all safety instructions.

The safe and error-free use and operating safety of the device can only be guaranteed on the basis of the intended use according to the information in this Assembly Manual.

Intended use includes observation of and adherence to all safety instructions specified in this Assembly Manual, as well as all applicable regulations of professional associations and the valid legislation regards environment protection. Adherence to the operating rules prescribed in this Assembly Manual also form part of the intended use.

1.4 Foreseeable misuse

Installation deviating from the intended purpose approved by the manufacturer is considered foreseeable misuse.

1.5 Warranty and liability

In principle, the General Terms & Conditions of Sale and Delivery of the manufacturer apply. The Terms & Conditions of Sale and Delivery form part of the sales documentation and are transferred to the operator upon delivery. Liability claims for personal injury and material damage shall be excluded if they are the result of one or more of the following causes:

- Non-intended use of the device
- Improper assembly, commissioning or operation of the device
- Changes to the design and construction of the device without written permission from the manufacturer

- Operating the device with improperly installed connections and defective or improperly installed safety and protective equipment
- Non-compliance with safety regulations and notices in this Assembly Manual
- Exceeding the limits of the specified technical specifications

1.6 Customer Service - manufacturer

The device must only be repaired by the manufacturer in the event of a fault. The address to send the device to customer service can be found on the inside of the back page.

If you have not purchased the device directly from elero, please contact the manufacturer of the machine or the supplier of the device.

Mechanically secure the system before disassembling the device. The device must not be separated from the system by force.



2 Safety




2.1 General safety notices

This Assembly Manual contains all safety notices that must be observed to avoid and prevent risks when working with the device in the individual life cycles. Safe use of the device is guaranteed when all the specified safety notices are adhered to.



2.1.1 Structure of the safety notices

The safety notices in this document are identified with safety symbols and designed in accordance with the SAFE principle. They contain information on the type and source of risk, the possible consequences, as well as the prevention of the risk.



The following table provides a description of the degrees of risk with possible physical injury, as they are used in this Assembly Manual.

Symbol	Key word	Meaning
	DANGER	Warns of an accident that will occur if the instructions are not followed, which may lead to life-threatening, irreversible injuries or death.
	WARNING	Warns of an accident that may occur if the instructions are not followed, which may lead to serious, perhaps life-threatening, irreversible injuries or death.
	CAUTION	Warns of an accident that may occur if the instructions are not followed, which may lead to minor, reversible injuries.

The following table describes the symbols used in the present Assembly Manual, which are used for the graphic display of danger situations in connection with the symbol for the degree of risk.

Symbol	Meaning
	Risk of electrical voltage or electric shock: This symbol refers to risks associated with electrical currents.
	Risk of crushing and killing persons: This symbol refers to dangers associated where the entire body or individual limbs may become crushed or suffer injury.

The following table describes the situations used in this Assembly Manual where damage may occur to the product or refers to important facts, states, tips and information.

Symbol	Key word	Meaning
	<i>CAUTION</i>	This symbol warns of possible material damage.
		This symbol refers to important facts and states, as well as to further information in this Assembly Manual. Furthermore, it refers to specific instructions which give additional information on or provide assistance in performing a process in a simpler manner.

The following is an example of the structure of a safety notice:



DANGER

Type and source of hazard

Explanation of the type and source of hazard

- Measures to avoid danger.

2.2 Safety principles

The device is built according to state-of-the-art technology and the generally accepted safety standards. The device is safe to operate. During the design of the device, the fundamental requirements for health and safety were applied and provision was made for the appropriate legislation, industrial standards and regulations. The safety of the device is confirmed in the Declaration of Incorporation.

All details pertaining to safety relate to the regulations from the European Union, which are valid at this time. In other countries the operator must ensure that the relevant laws and national regulations are adhered to.

In addition to the safety notices in this Assembly Manual, the generally applicable regulations regarding accident prevention and environmental protection must be observed and complied with.

The device must only be used when in perfect working order, for its intended use, and in compliance with the safety notices in this Assembly Manual. The device is designed for the application stated in the chapter "Intended use". In the event of non-intended use, injury to the life and limbs of the user or a third party may result or the device may be impacted or other material damage caused. Accidents or near misses during use of the device which led or could have led to personal injuries and/or damage in the work environment must be reported directly to the manufacturer with immediate effect.

All safety notices specified in the Assembly Manual and on the device must be adhered to. In addition to these safety notices, the operator must ensure that all national and international regulations applicable in the respective country of use, as well as other binding regulations on operational safety, accident prevention and environment protections, are complied with. All work on the device must only be performed by trained and authorised personnel who have received the appropriate safety instructions.

2.3 General duties of the operator

- ☐ The operator is obliged to only operate the device in a fault-free and operationally safe working condition. He must ensure that, in addition to the safety notices in the Assembly Manual, the generally accepted safety and accident prevention regulations, the specifications of DIN VDE 0100 and the provisions on environment protection in the respective country of application, are observed and complied with.
- ☐ The operator is responsible that all work with the device is performed by trained and authorised personnel who have received the appropriate safety instructions.
- ☐ Ultimately responsible for accident-free operation is the operator of the device or the personnel authorised by the operator.
- ☐ The operator is responsible for adhering to the technical specifications.

2.4 Requirements of the personnel

- ☐ Each person who is commissioned to work with the device must read and understand the Assembly Manual in its entirety before he/she carries out the respective work. This also applies if the assigned person has previously worked on such a device or was trained to do so.
- ☐ All work on the device must only be performed by trained and authorised personnel who have received the appropriate safety instructions. Before starting any operations, personnel must be made aware of the hazards involved in handling the device.
- ☐ All persons must only perform work according to their qualifications. The areas of responsibility of the respective personnel must be clearly specified.
- ☐ Any personnel who have been commissioned to work with the device must have no physical limitations, limitations on attention or judgement, whether temporary or permanent (e.g. due to overtiredness).
- ☐ Minors or persons who are under the influence of alcohol, drugs or medication, are prohibited from working with the device, as well as performing all assembly, disassembly and cleaning work.
- ☐ Personnel must wear the suitable personal protective gear appropriate to the work and present work environments.

2.5 Safety notices on technical condition

- ☐ The device must be checked before installation for damage and proper condition.
- ☐ The operator is obliged to only operate the device in a fault-free and operationally safe working condition. The technical condition must always comply with legal requirements.
- ☐ If risks to persons or changes in the operational behaviour are detected, the device must be shut down immediately and the incident reported to superiors or operator.
- ☐ The device may only be connected to the energy supply lines intended and designed for this purpose. The permissible type of voltage and operating voltage are stated on the type plate.
- ☐ No changes, extensions or retrofitting may be performed to the device without the approval of the manufacturer.

2.6 Safety notices on transport, assembly, installation

Responsibility for the transport of the device principally rests with the respective transport company. The following safety requirements must be complied with during transport, assembly and installation of the device.

- ☐ When transporting the device, it should be secured according to the instructions accompanying the means of transportation employed.
- ☐ Only the point defined on the device may be used as a securing point. (fitting on mounting rail).
- ☐ In principle, assembly and installation may only be conducted by trained and qualified personnel.

2.7 Safety instructions for operation

- ☐ The operator of the device is obligated to ensure the safe and proper state of the device before the initial commissioning.
- ☐ This is also necessary during the operation of the device at regular intervals determined by the operator.

2.8 Safety notices on electrical installation



- ☐ All work on electrical connections must only be performed by authorised electricians in accordance with the applicable regulations and provisions of the trade association, in particular the specifications in accordance with DIN VDE 0100. Furthermore, the national statutory regulations of the respective country of application must be observed.
- ☐ In the event of defects such as loose connections or defective or damaged cables, the device must not be operated.
- ☐ In the event of faults with the electrical equipment, the device must be shut down immediately.
- ☐ The device must be switched off before inspection, assembly and disassembly work.
- ☐ The device must not be hosed down with a high-pressure cleaner or a steam blaster.

The following must be checked before connecting the device to the power supply:

- ☐ Are all electrical connections, safety devices, safeguards, etc. properly installed, connected and earthed?
- ☐ Is the intended power connection designed according to the specifications in the electrical circuit diagram (voltage type, voltage level)?
- ☐ Has the supply line been isolated?

3 Product description

3.1 General

The device is intended for the synchronous control of two linear drives from the Picolo 0 series. The minimum path differences are controlled during moving.



The two drives have internal non-adjustable stops as end positions. The end position is switched off by the device and not the drives.

3.2 Technical specifications



All information in this chapter refers to an ambient temperature of 20 °C.

3.2.1 Configuration of technical parameters

Technical specifications	
Rated voltage	24 V DC $\pm 15\%$, residual ripple $\leq 5\%$
Rated current	4 A
Power	96 W
Duty cycle	KB 7 min
Readiness for operation	after < 0.2 s
Maximum deviation	1 mm
Weight	approx. 110 g
Housing	Plastic
Dimensions (L x B x H)	95 x 70 x 60 mm
Protection class	IP 20
Operating temperature range	-20 °C to +80 °C (Version B: 0 °C to +80 °C)
Airborne noise emission	< 70 dB(A)

Tab. 1 Technical parameters



CAUTION

Damage to the device through overvoltage

- Voltage supply above 28 V DC causes damage to the device.

4 Assembly



WARNING

Risk of injury by electrical current.



Electric shock possible.

- Electrical work must only be performed by an authorised electrician.

2
W



WARNING

Risk of life-threatening injury caused by faulty electrical connection.



Electric shock possible.

- Electrical work must only be performed by an authorised electrician.



CAUTION

Damage to the device through incorrect assembly

- Observe the protection class.

4.1 Fitting

The device is intended for installation in a switchgear cabinet or switch cabinet. It is fitted on a mounting rail.

4.2 Electrical connection

The device must be connected according to the circuit diagram.



The shield of the respective drive must be clamped at "0 V" of the respective connection at the device.

Only drives without internal power shutdown and with an impulse transmitter may be used.

4.2.1 Function

By switching on the rated voltage at the device the two drives are driven out or in synchronously. The drive direction depends on the polarity of the supply voltage. The two drives have internal non-adjustable stops as end positions. The end position is switched off by the device, which stops the drives.

The control system controls the speeds of the drives so that a minimum path difference arises.

Between the two drives a position difference may occur, which is retained during synchronisation as the synchronisation is always controlled from the start position.

The synchronisation is controlled depending on the start position with a typical precision of 0.5 mm. A fault shutdown is registered for a position difference greater than 1 mm.

4.2.2 Operating modes



CAUTION



Damage to the device

- The operating modes may only be adjusted when the device is in an idle state.



The sliding switches for adjusting the operating modes are located at the top on the device.

By adjusting the sliding switches on the device a choice can be made between two operating modes.

Switch setting	Text	Meaning
	M1 + M2 synchronous	The two drives are being synchronised (sliding switch at "2", M1 + M2 synchronous).
	M1	Only drive 1 moves (sliding switch at "1", M1). In this operating mode the desired position difference between the two drives can be set, with which synchronisation is effected in the operating mode.

4.2.3 Shutdown variants



CAUTION

Damage to the device

- The shutdown variants can only be adjusted when the device is in an idle state.



The DIP switches for adjusting the operating modes are located in the inside of the device. To actuate the DIP switch carefully unlock the device housing at the side and remove.

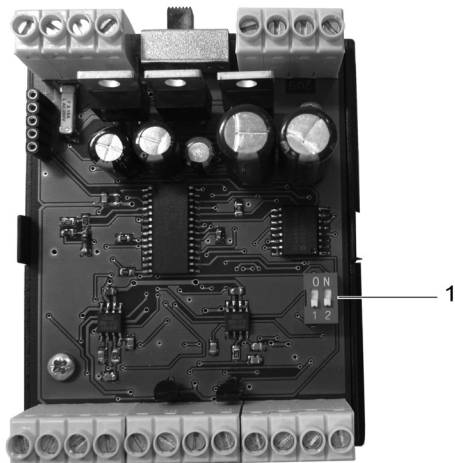
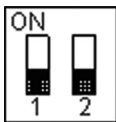
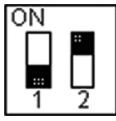
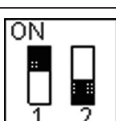
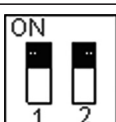


Abb. 1 Control circuit board

1 DIP switch

The following shutdown variants can be set using the two DIP switches:

Variants	Symbol	Meaning
1		The two drives move synchronously (both DIP switches at "OFF"). When the end position is reached by a drive the second drives stops immediately (factory setting).
2		The two drives move synchronously (DIP switch 1 at "OFF" and DIP switch 2 at "ON"). When the end position is reached by a drive the second drive only stops after 2 seconds or as soon as it reaches its end position.
3		The two drives move synchronously (DIP switch 1 at "ON" and DIP switch 2 at "OFF"). When the end position is reached by a drive the second drive only stops after 1 second or as soon as it reaches its end position.
4		The two drives move synchronously (both DIP switches at "ON"). When the end position is reached by a drive the second drive only stops after 2 seconds or as soon as it reaches its end position.



Variant 2, 3 or 4 makes sense if due to regular stopping the total position difference at the end positions is to be adjusted. For a permanent desired position difference variant 1 must be used.

4.2.4 Commissioning



CAUTION

Damage to the device

- DIP switches and sliding switches must only be actuated when the device is in an idle state.



The polarity of the supply voltage on the device determines the drive direction of the drives.

For commissioning proceed as follows:

1. Connect the two drives to the device according to the circuit diagram.
2. Adjust the shutdown variants on the DIP switches.
3. Adjust the position difference by moving drive 1 if the positioning of the two drives do not match.
4. Set the sliding switch on the device to "1", M1.
5. Adjust the position of drive 1 by applying the 24 V rated voltage with the correct polarity to drive 2.
6. For synchronisation set the sliding switch on the device back to "2", M1 + M2 synchronous.

✓ The two drives can now be driven synchronously.

4.2.5 Shutdown faults

There are various reasons why the drives shut down:

Overload:

The drive shuts down when a certain power is reached by the overcurrent switch

End position:

The drive shuts down when the end position is reached. The other drive shuts down immediately or with a delay (depending on the operating mode).

Synchronisation fault:

If the position difference of the two drives exceeds 1 mm the drive shuts down.

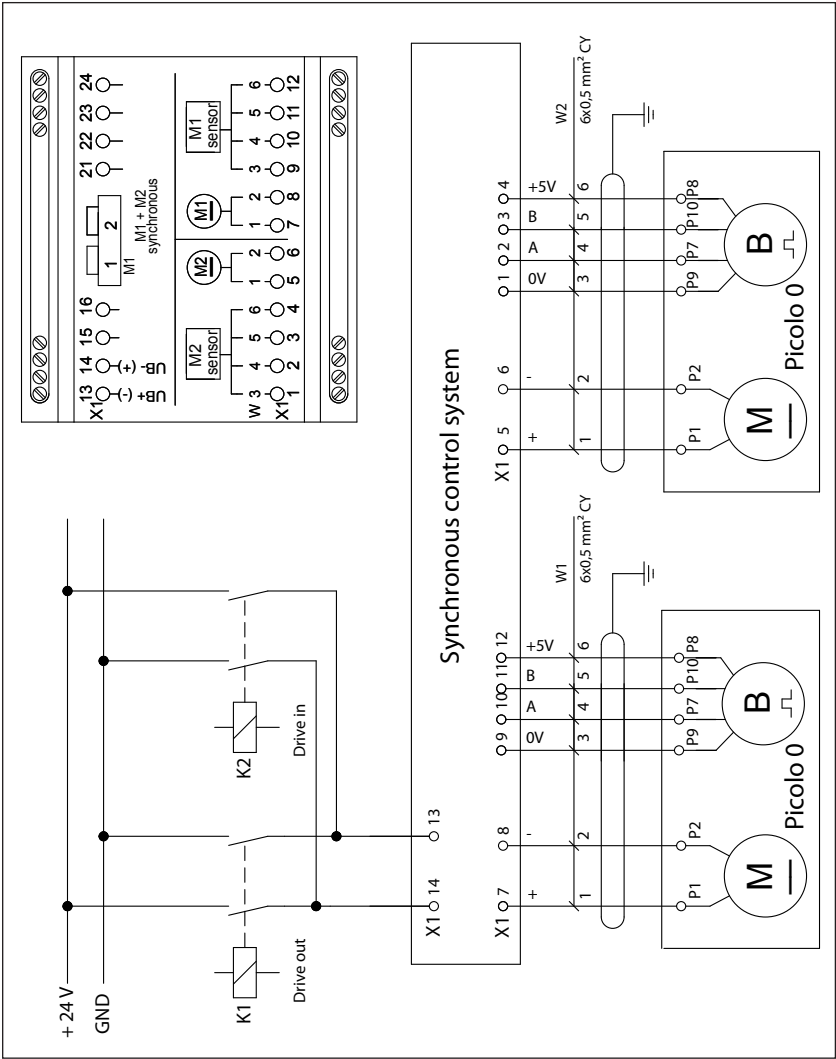
Connection fault from sensor or motor:

If the wires from a motor or a sensor have been swapped the two drives stop shortly after starting up.

Shutdown due to undervoltage:

If the supply voltage falls below 20 V the drives do not run or stop.

4.2.6 Circuit diagram



The shield of the respective drive must be clamped at "0 V" of the respective connection to the device.

5 Declaration of Incorporation



The complete declaration of incorporation can be downloaded from our website:
www.elero-linear.de/downloads.

6 Waste disposal

6.1 Scrapping

When scrapping the device, adhere to the international, national and local rules and regulations valid at the time of scrapping.



Ensure that material reusability, removal and separation of materials and sub-assemblies are also taken into consideration as there are also risks to the environment and health during recycling and disposal.

Material groups, such as plastics and metals of different types, must be sorted before submitting to the recycling and disposal process.

6.2 Disposal of electrical and electronic components

Disposal and recycling of electrical and electronic components must be carried out in accordance with the relevant laws and national directives.

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