Operating instructions
E-Chuck

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German original document Operating instructions E-Chuck

Important information

This operating manual contains important information for the commissioning, operation, maintenance and disposal of the system. You will also receive information and important information about your safety and help with problems. The operating instructions are part of the system and must be given when passing it on.

The operator of this system is responsible for ensuring that the instructions and instructions in this manual are read, understood and followed by the personnel prior to the commissioning of the system.

Copyright

Disclaimer

The manufacturer declines any liability for damage caused by disregard of the instructions and instructions listed in the operating instructions.

This applies in particular to:

- Damage caused by improper use and incorrect operation.
- Damage caused by disregard of safety-relevant information in the operating instructions or warnings affixed to the device.
- Damage caused by inadequate or non-performing maintenance work.

Unauthorized modifications and modifications to the device can affect safety and are not permitted. This can lead to product compliance no longer being met.

1 Table of contents

Version

Version	Created by	Condition	Date
V1.0	RaKl, ThFl	Regeneration	March 2025
V1.1	RaKl	Addendum/Adjustment Menu Navigation IO Box, Adjustment Force	
V2.0	DoCo	Standalone document for E-Chuck	November 2025
V2.1	RoEh	Adaptions to E-Chuck Code version 1.1.0	January 2026

2 Identification

2.1 Contact

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2.2 Explanation of the presentation notes

Danger
Indicates an imminent danger that can lead to the most serious bodily injury, damage to health or death.

Warning
Indicates a possible imminent danger that can lead to serious bodily injury, damage to health, death or significant property damage.

Important
Refers to application and operating instructions and other useful information.

Commissioning and maintenance personnel
Sections with this symbol mainly concern commissioning and maintenance personnel. The specified work may only be carried out by trained personnel.

2.3 Text

Controls or modes of operation are printed *in italics*.
Example: Press the *Start* button .
A sequence of steps in the operation is shown as follows:
► Press 1 button *START*
► 2 Select operating mode

3 System description

3.1 Description

The E-Chuck is an electric automatic 3-jaw chuck designed for use on measuring machines.

Workpieces of a maximum of 4 kg and a diameter of 140 mm on the outside or up to 172 mm on the inside can be clamped on the chuck.

In conjunction with a loading system, the E-Chuck enables automation of the measuring machine.

3.2 Specifications

Dimensions	
Dimensions (D x H)	Ø246x110 mm
Weight	7.5 kg
Feed data	
Number of jaws	3
Clamping area outside	1.5-140 mm
Clamping area inside	46-172 mm
Spiral torque adjustment range	100 … 3000 mNm
Minimum clamping force	~20N (depending on clamping diameter)
Maximum clamping force	60N
Maximum workpiece weight	4 kg
Power supply	
Communication	CANopen
Voltage	24 V DC
Current (Peak)	10 A
Environment	
Maximum speed	30 rpm
Operating temperature	15 … 40 °C
Storage	0 … 40 °C
Humidity (non-condensing)	20 … 80 %

4 Overview Modules

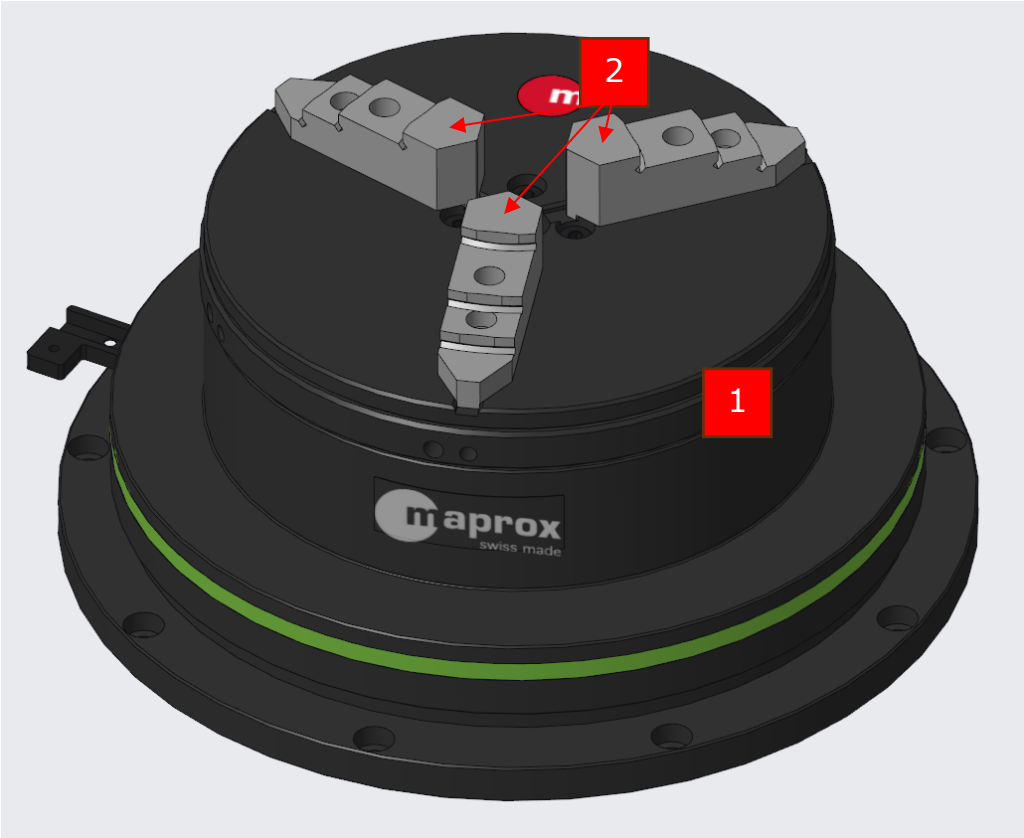

Figure 1: Module Overview

Legend:

1. E-Chuck
2. Jaw

4.1 E-Chuck

Figure 2: E-Chuck

The E-Chuck is an electric automatic 3-jaw chuck designed for use on measuring machines. The jaws can be used for both external and internal clamping. By turning the jaws, the clamping range can be enlarged.

No.	Module
1	E-Chuck

5 Basic safety instructions

The following basic safety instructions must be followed when operating the system.
Safety regulations for operation and maintenance are listed in the corresponding chapters and must be strictly observed!

5.1 Personal Qualification

The E-Chuck may only be operated by instructed and trained personnel.
The operator of the system must confirm in writing that he:

- has read and understood the operating instructions,
- has received an introduction to the safe operation of the system,
- knows the operating regulations.

Maprox AG declines any responsibility if the machine is used for a purpose other than that described here.

5.2 Environment

The system must be operated in a well-lit environment. There must be enough space around the operating front for the operating personnel to operate the system freely

5.3 Improper use

- Use without training.
- Use in machines with higher force (e.g. machine tools)
- Operation in disregard of safety regulations.
- Operation outside the limits specified in the *technical data* of the operating instructions.
- Operation in disregard of local accident prevention regulations and industrial safety regulations.
- Operation with defective device parts and components.
- Repairs by unauthorized persons (warranty claim or product conformity may expire).
- Replacement of defective components with components that are not suitable or not specified by the manufacturer.

5.4 Predictable misuse

- When inserting the workpieces or removing them by hand, there is a risk of crushing between the loaded parts and the jaws. When loading and unloading the system, you must never reach between the jaws and the workpiece or there must be no part of the body in the danger zone.

  The operator is responsible for ensuring that no body parts are in the danger area.

5.5 Personal Protective Equipment, Training

The user must wear the personal protective equipment in accordance with the country-specific legal or internal accident prevention regulations.

5.6 Suggestion for an operating instruction

Operating instructions are regulations that an entrepreneur creates for the safe operation of the company. These are binding instructions issued by the entrepreneur. Employees are obliged by accident prevention regulations to follow these instructions.

The general obligation of the entrepreneur to prepare and publish operating instructions must be derived from the accident prevention regulation "General Regulations". According to this provision, the employer must issue orders to prevent accidents at work and it is required that the employer must inform the insured people about the risks arising from their activities and about the measures to be taken to avert them.

The entrepreneur can meet these requirements with the help of operating instructions.

The operating instructions presented here are therefore intended to supplement national regulations on accident prevention and environmental protection!

The employee must be given information about:

- The operator must operate the system only when it is in perfect condition.
- The hazards arising from the handling of the substances used and the necessary protective measures as well as the rules of conduct, including instructions in the event of danger and first aid.
- Type and scope of regular inspections for safe working conditions
- Maintenance
- Rectification of operational disruptions
- Environmental protection
- The user company must ensure cleanliness and clarity at the workplace by means of instructions and controls.
- Responsibilities for operation and maintenance must be clearly defined by the user company and observed by all persons so that there is no ambiguity regarding safety-related responsibilities.
- The operator is obliged to immediately report any changes to the system that affect safety to his superior.
- Appropriate information and warning signs to be observed
- The operator must also ensure that no unauthorized persons are present at the system.

5.7 Reliability

Do not **start the system** if:

- Electrical connections on the system have defects

6 Preparing the system for use

6.1 Site requirements

The installation site must have a level surface. The surface must be dry and hard.
The space dimensions must at least correspond to the specifications in the technical data regarding the required base area.

6.2 Setting up and aligning

Transport
The e-chuck is packed and shipped.
Remove the transport packaging.

Placement
Place the E-Chuck on a flat surface.

Leveling and alignment
If the E-Chuck is used rotatically on a turntable or spindle, it must be aligned. To do this, clamp a precise shaft by hand (manual operation 8.2) into the E-Chuck. Then align the concentricity with a suitable measuring device and secure the E-Chuck.

Connecting the E-Chuck
The E-Chuck has an M8x1 (4 pin, A-coded) connector (see pinout).

6.3 Connection to the machine-side supply

The cable tail of the E-Chuck can be extended with an M8x1 (4-pole, A coded, plug). Maximum length is 5m.

Electric

DANGER!
The *24V supply* is to be switched off by the customer via the emergency stop.

PIN	Connection
1	24VDC
2	CAN High
3	GND
4	CAN Low

Information
The GND potentials are not isolated.

WARNING!
Connection to the on-site supply may only be carried out by qualified personnel. The machine must not be put into operation with temporary connections.

6.4 First commissioning

Before starting for the first time, familiarize yourself with the remaining chapters of this operating manual. Make sure that everyone has followed and executed work and instructions.

7 Hazards

7.1 Mechanical hazards

When inserting or removing workpieces by hand, there is a risk of crushing between the loading parts and the jaws. **When loading and unloading the system, you must never reach between the jaws and the workpiece or there must be no part of the body in the danger zone.**

The operator is responsible for ensuring that no body parts are in the danger area.

7.1.1.1 WARNING!

This machine has moving parts. No covers and safety precautions may be removed.

7.2 Electrical hazards

Electric shock:
For all electrical work, the machine must be switched off at the main switch of the main control cabinet and secured against reactivation with the appropriate LOTO method. The covers for the electrical installations can only be removed when the power is de-energized.

8 Operation

8.1 Automatic operation of the E-Chuck via CANopen

The E-Chuck is a CANopen slave with Node ID 3

The registers with index 0x2201 subindex 0x1 – 0x9 are available for operation.
The service is carried out according to the table:

Index [Hex]	Subindex	Type	R/W	Name	Range	Default	Unit	Meaning
2201	1	S32	r	EChuckState	0-10	1	-	0 – Generic undefined Error, 1 – Ready / Idle 2 – Releasing 4 – Clamping 6 – Resetting 8 – Error 10 – Position Error 11 – Timeout Error 15 – Initialisation 16 – Referencing
2201	2	S32	rw	Operation	1-3	0	-	0 – Idle, 1 – Clamp 2 – Open 3 – Reset 4 – Save 5 – Reference 6 – Reset to default values
2201	3	S32	rw	ClampForce	100-3000	200	mNm	Clamping Force in mN
2201	4	S32	rw	ReleaseDistance	1000-20000	4000	um	Opening Distance in um
2201	5	S32	rw	ClampingVelocity	10-30	20	1/min	Closing Velocity
2201	6	S32	r	ReleasingVelocity	-	20	1/min	Opening Velocity
2201	7	S32	r	MaxOpeningForce	-	6390	mN	Limit opening force
2201	8	S32	rw	Timeout	2000-30000	20000	ms	Timeout for Moving
2201	9	S32	rw	ClampDirection	-1 / 1	1		-1 - Clamping inside Diameter 1 - Clamping Outside Diameter

8.2 Manual operation of the chuck

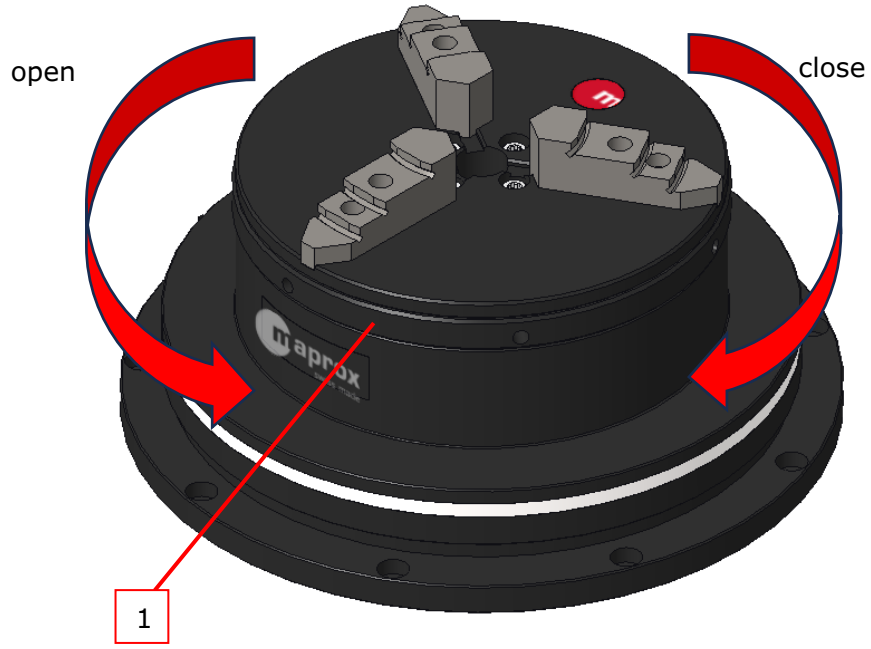

Figure 3: Manual operation

The E-Chuck can be opened and closed by hand.
To move the jaws outwards, turn the spiral body (1) counterclockwise. To move the jaws inwards, turn clockwise.

8.3 Special mode “referencing”

The E-Chuck can be referenced. This means that the absolute position of the clamping jaws can be determined. To do this, the jaws slowly move over the entire working area and move to the middle of the working area at the end. During the process, the ring glows orange.
A referenced E-Chuck no longer travels into the end stops but halts 1mm before the end stops. This makes it possible to drive at an increased speed.
The E-Chuck must be re-referenced once it has been powerless, i.e. at every restart and after every emergency stop.

8.4 Operating the E-Chuck via I/O box (optional)

The E-Chuck can optionally be connected to the I/O box (sold separately) and operated via I/O signals.

For detailed information on connection and operation, please refer to the operating instructions for the I/O box (514500.00 Operating Instructions I/O Box).

9 Troubleshooting

9.1 Error in standby state

9.1.1.1 Error pattern	9.1.1.2 Cause	9.1.1.3 Solutions
LED ring does not light up	Missing power supply 24V Power	Check Power Supply (X3)
LED ring lights up red	Active error on the E-Chuck	Eliminate errors (E-Chuck should be able to rotate freely), perform reset
IO-Box: Can Comm Error	Lack of communication between IO-Box and E-Chuck	Check communication & power supply (X3)
Slip ring jammed	Temperature too cold	Let the E-Chuck run for 24 hours so that everything can heat up

9.2 Clamping errors

9.2.1.1 Error pattern	9.2.1.2 Cause	9.2.1.3 Solutions
E-Chuck Has Not Tensioned, Green LED Ring	The E-Chuck has reached the required force before the part has been clamped	Perform a reset, increase the clamping force if necessary
E-Chuck Has Not Tensioned, Red LED Ring	The E-Chuck could not start to	Solve by hand, perform reset Make sure the E-Chuck doesn't get stuck at the end of the stroke
IO Box: TimeOut Error	The E-Chuck could not complete the opening process, the specified distance could not be driven	Solve by hand, perform reset Check the stroke and opening distance

9.3 Error opening

9.3.1.1 Error pattern	9.3.1.2 Cause	9.3.1.3 Solutions
E-Chuck Has Not Opened, Red LED Ring	The E-Chuck was unable to complete the opening process	Solve by hand, perform reset
IO-Box: TimeOut Error	The E-Chuck could not perform the opening process, it was not possible to release it	Solve by hand, perform reset
IO-Box Position Error	The E-Chuck could not complete the opening process, the specified distance could not be driven	Solve by hand, perform reset Check the stroke and opening distance

10 Maintenance

10.1 Introduction

All operating materials require careful, regular cleaning and maintenance. Pay special attention to these works. With correct maintenance, you extend the life of the machine, shorten downtime and thus increase productivity.

10.2 Maintenance schedule

10.2.1.1 Period	10.2.1.2 Assembly	10.2.1.3 Activity
Weekly	Whole Machine	Cleaning
Weekly	Electricity	Checking the connectors
Monthly	Attachment jaws	Check the backlash, lightly oil the baking

Figure 4: Maintenance Plan

10.3 Cleaning

It is recommended to clean the entire machine weekly. The machine must only be cleaned when it is switched off.

Caution!

Do not use compressed air for machine cleaning. Parts or dust could get into the machine's motion sequence and cause malfunctions.
Do not use solvents, they can attack plastic parts, cable insulation or paintwork.

10.4 Safety during repairs

If you need to carry out repairs or service on the machine, turn off the main switch whenever possible.

WARNING!
Always lock switched off main switches with a padlock when you are carrying out work on the system.

11 Dismantling the machine

Important
At the end of the machine's service life, it must be disposed of by a qualified specialist company. In exceptional cases and after consultation with Maprox AG, the machine can be returned. Operating materials (e.g. oil, etc.) must also be disposed of properly Become.

Preparations must be made to dismantle the machine. Follow the points in order.

- Empty product completely
- Turn off machines
- Disconnect electrical supply.
- Prepare machines for forwarding

12 Appendix

- *E-Schema*
- *Declaration of incorporation*