Control Unit

REBOX-SC

Assembly and Operating Manual

Imprint

Technical changes:

We reserve the right to make alterations for the purpose of technical improvement.

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Dear customer,

congratulation on choosing a SCHUNK GMBH & CO. KG product. By choosing SCHUNK GMBH & CO. KG , you have opted for the highest precision, top quality and best service.

You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.

SCHUNK GMBH & CO. KG products are inspiring.

Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase.

Kindest Regards.

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1 About this manual

This instruction is an integral part of the product and contains important information for a safe and proper assembly, commissioning, operation, maintenance and helps for an easier trouble shooting.

Before using the product, read and note the instruction, especially the chapter "Basic safety notes ".

1.1 Warnings

The following signal words and symbols are used to highlight dangers.

1.1.1 Signal words

DANGER	Dangers for persons. Non-compliance will inevitably cause irreversible injury or death.
WARNING	Dangers for persons. Non-compliance may cause irreversible injury or death.
CAUTION	Dangers for persons. Non-observance may cause minor injuries.
CAUTION	Information about avoiding material damage

1.1.2 Symbols

Warning about a danger point

Warning about dangerous electrical voltage

Danger of magnetic field

Danger of pieces falling down

General mandatory sign to prevent material damage

2 Basic safety notes

2.1 Intended use

This control unit has exclusively been designed for the operation of electro-permanent-chucks for grinding operations manufactured by the company SCHUNK GMBH & CO. KG

Furthermore, it has been designed for installation in machine tools for the metal cutting processing of workpieces and for the operation in a dry interior at a relative air humidity of 5-15 % and an ambient temperature of 5°-55°C.

The requirements of the applicable standards must be observed and complied with. The control unit may be used only in the context of its defined application parameters.

For its intended use, it is also essential to observe the technical data and installation and operation notes in this manual and to comply with the maintenance intervals.

DANGER

Danger caused by short circuit

- The control unit **must** be installed outside of the machine tool and must always be protected against water and/or operating fluids from the machine and protected against metal chips.

NOTICE

This control unit **must not** be placed in service until the machine tool, for which the controller is provided, satisfies the requirements of the Machinery Directive 2006/42/EC!!

2.2 Environmental and operating conditions

- Use the module only within its defined application parameters. "Technical data" (☞ 5, Page 10).
- Make sure that the environment is clean and the ambient temperature corresponds to the specifications.

2.3 Product safety

Dangers arise from the module, if e.g.:

- the module is not used in accordance with its intended purpose.
- the module is not installed or maintained properly.
- the safety and installation notes are not observed.

Avoid any manner of working that may interfere with the function and operational safety of the module.

Wear protective equipment.

PLEASE NOTE
More information is contained in the relevant chapters.

2.3.1 Protective equipment

Provide protective equipment per EC Machinery Directive.

2.4 Personnel qualification

Assembly, initial commissioning, maintenance, and repair of the module may only be performed by trained specialist personnel. Every person called upon by the operator to work on the module must have read and understood the complete assembly and operating manual especially the chapter "Basic safety notes" (☞ 2, Page 5). This applies particularly to personnel only used occasionally, such as maintenance personnel.

DANGER

Danger due to a magnetic field.
This control unit always uses a magnetic system. The following groups of persons must not come into contact with it:

- Persons with pacemakers.
- Persons with metal or electronic prostheses.
- Persons with insulin pumps.
- Persons with muscular stimulation systems.
- Pregnant women.

These persons should always keep a safe distance of at least 2m from the magnetic system.

2.5 Using personal protective equipment

When using this product, observe the relevant industrial safety regulations and use the personal protective equipment (PPE) required!

- Use protective gloves, safety shoes and safety goggles.
- Observe safe distances.
- Minimal safety requirements for the use of equipment.

2.6 Notes on particular risks

- Remove the power supplies before installation, modification, maintenance, or adjustment work.
- Ensure that no residual energy remains in the system.
- Perform maintenance, modifications, and extensions outside the danger zone.
- For all work, secure the module against accidental operation.

3 Warranty

The warranty is valid for 12 months from the delivery date to the production facility under the following conditions:

- Intended use in 1-shift operation
- Observe the mandatory maintenance and lubrication intervals.
- Observe the environmental and operating conditions.

Parts touching the work piece and wearing parts are not part of the warranty.

Procedure in the event of warranty

The buyer agrees to send a written detailed report on newly discovered defects of the control unit to SCHUNK GMBH & CO. KG within 10 days after identification.

4 Scope of delivery

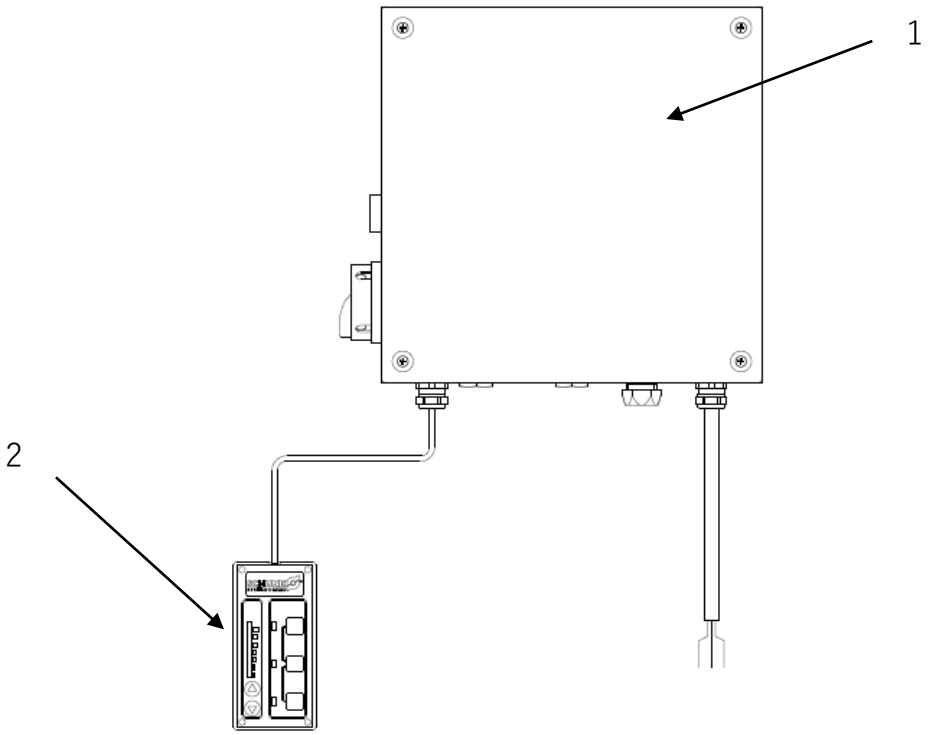


Fig. 1

The scope of delivery includes:

- Electronic control unit (1) featuring a remote control with 10 m cable (2)

5 Technical Data

Type	REBOX.1-SC	REBOX.1D-SC	REBOX.1Q-SC	REBOX.2-SC	REBOX.2D-SC	REBOX.4-SC	REBOX.4D-SC	REBOX.8-SC
Mains voltage	200-230-400-460 VAC							
Frequency	50Hz / 60Hz							
Phases	2 + PE							
Rated current	32 A							
Rated short circuit current	6 kA							
Breaking current of the fuse for the auxiliary circuit	500 mA at 500 VAC							
IP rating	IP20							
Activation time	>0,3s at cycle 3 <1s at cycle 8	>0,5s at cycle 3 <2s at cycle 8	>6s at cycle 3 <7,5s at cycle 8	>1,5s at cycle 3 <2s at cycle 8	>6s at cycle 3 <7,5s at cycle 8	>6s at cycle 3 <7,5s at cycle 8	>11s at cycle 3 <13,5s at cycle 8	>11s at cycle 3 <13,5s at cycle 8
Activation change	>3s at cycle 3 <8s at cycle 8	>7s at cycle 3 <15s at cycle 8	>32s at cycle 3 <47s at cycle 8	>13s at cycle 3 <24s at cycle 8	>32s at cycle 3 <47s at cycle 8	>21s at cycle 3 <36s at cycle 8	>64s at cycle 3 <92s at cycle 8	>42s at cycle 3 <70s at cycle 8
Weight	~ 8Kg	~ 8Kg	~ 9Kg	~ 8Kg	~ 9Kg	~ 9Kg	~ 9Kg	~ 9Kg
Ambient temperature	5° - 55° C							
Ambient conditions	Operation in dry interiors with a maximum relative air humidity of 50%. Protect product from caustic vapours and excessive heat.							

5.1 Identification plate

The identification plate is on the rear of the control unit:

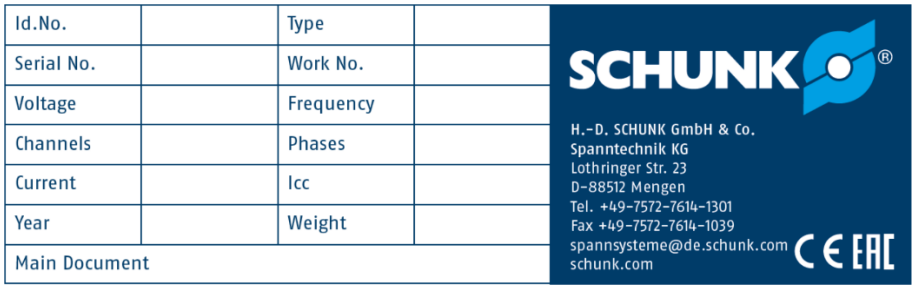


Fig. 2

Information	Description
Id. No.	Product code no.
Type	Model
Serial No.	Product serial no.
Work No.	Product production no.
Voltage	Rated voltage (mains)
Frequency	Rated frequency (mains)
Channels	Number of output channels
Phases	Phases (mains)
Current	Rated current (mains)
Icc	Rated short-circuit data
Year	Year of manufacture
Weight	Weight

The name plate must never be removed! Please always have the serial no. at hand when contacting SCHUNK GMBH & CO. KG about technical matters!

5.2 Dimensions

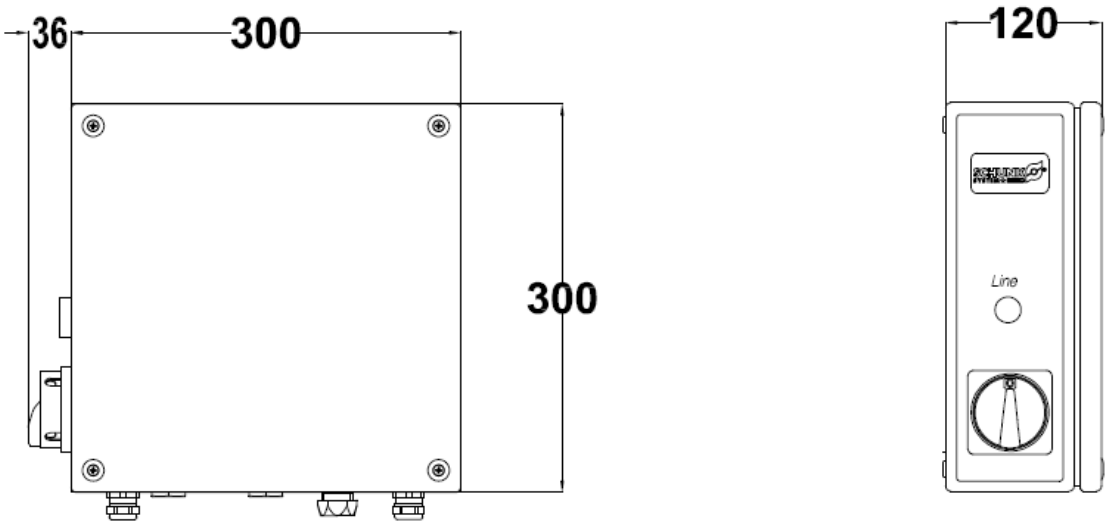


Fig. 3 Dimensions of REBOX.1-SC, REBOX.1D-SC und REBOX.2-SC

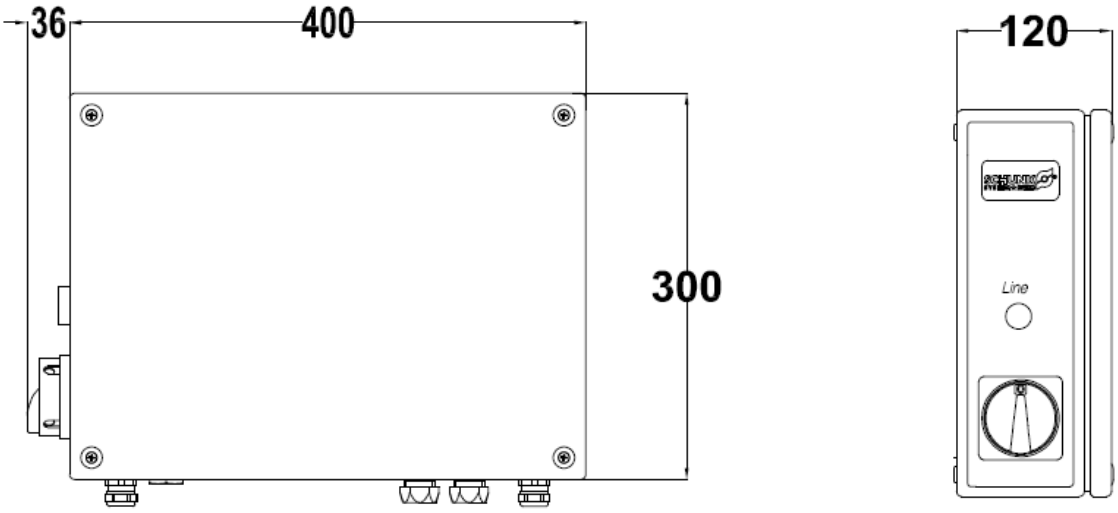


Fig. 4 Dimensions of REBOX.1Q-SC, REBOX.2D-SC, REBOX.4-SC, REBOX.4D-SC und REBOX.8-SC

6 Description

6.1 Functioning description

Using the electronic control unit for SCHUNK GMBH & CO. KG magnetic chucks the operator is able to magnetize and to demagnetize small and large magnetic electro-permanent chuck.

The use of the control unit model with 2, 4 or 8 channels allows the clamping of large magnetic workpieces across multiple magnetic chucks.

The power supply and the digital electronic system have been combined in a single microprocessor.

A real electrical current monitoring system signals any possible functional irregularities.

6.2 Product description

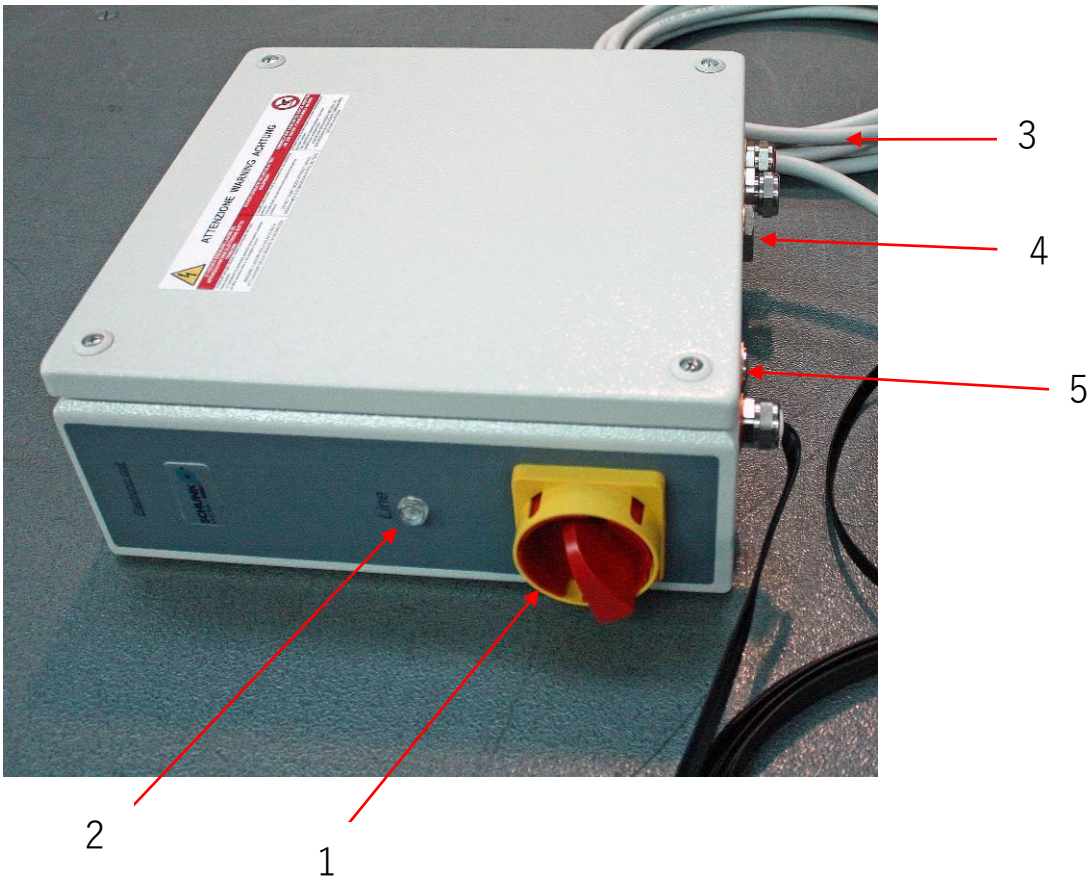


Fig. 5

1	Main switch
2	Warning light
3	Main power supply cable
4	Cable gland for the connection to magnetic chuck
5	Connection to the machine's enabling system
6	Remote control
7	Identification plate

6.3 Control panel description

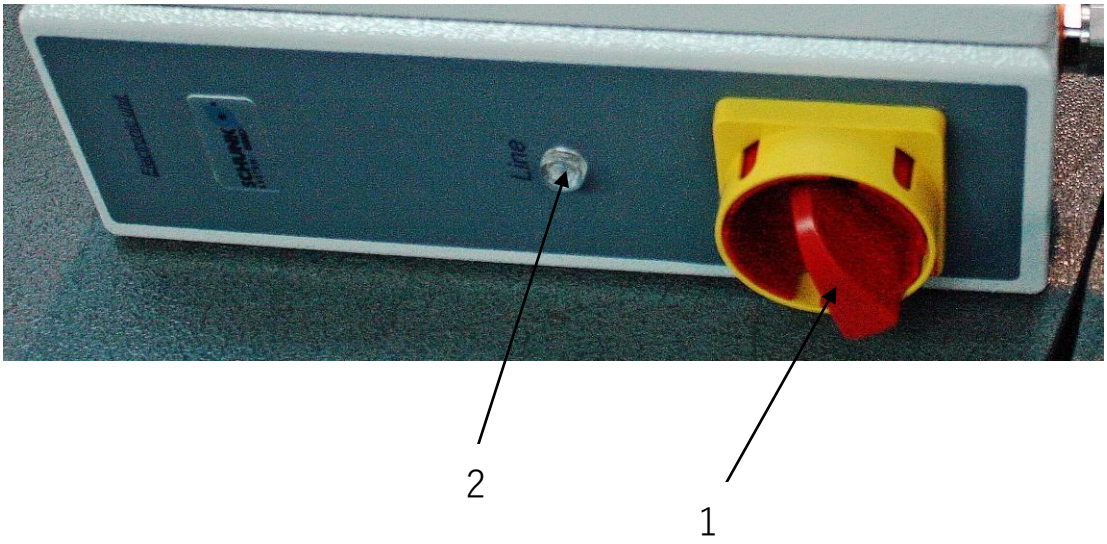


Fig. 6 For all types

1	O-I main switch
2	Warning light

6.4 Description of the remote control and instruction signals

The remote control has LEDs that indicate the current status of the magnetic system and offers furthermore the possibility to adjust the power up to 8 different levels during the magnetization cycle.

Fig. 7 Remote control with buttons / LED

Signal	Meaning	Description
	Demagnetized system	The magnetic clamping system has been properly demagnetized. The workpiece can be removed.
	Safety button	This button must be pressed each time you wish to start a (de-)magnetizing cycle. This button prevents the cycle from being started accidentally.
	Magnetized system	The magnetic clamping system has been properly magnetized. Work on the workpiece can begin.
	UP-Button	By means of this push button the power level of the magnetization cycle can be increased.
	DOWN-Button	By means of this push button the power level of the magnetization cycle can be reduced.
	Adjustment scale	This scale indicates the power level of the magnetization cycle.

7 Checks and Installation

7.1 Product check

1 Check the packaging before accepting the control unit.

2 Open the packaging and take out the control unit.

3 Check the control unit for transport damage!

4 Compare the control unit with the specifications given in the order!

5 Visually inspect the connection cable for damage. (Notches? Abrasion? Cut?)

NOTE
Please always have the serial number at hand when contacting SCHUNK GMBH & CO. KG or Service Centers.

DANGER

Danger caused by short-circuit.
Never start up the control unit if you have detected visual damage!

- Notify the freight carrier or SCHUNK GMBH & CO. KG immediately if you detect damage and/or missing components (with all the relevant details)!

7.2 Installation

⚠ CAUTION

Danger caused by falling control unit.

- When fixing the control unit with the help of the "magnetic rubber foil" on the bottom, ensure that the magnetic foil firmly sticks to the metal surface of the machine tool.

⚠ DANGER

Danger from electric shock.
Touching live parts can cause death by electric shock.
The control unit may be opened for the connections to the mains only by an electrican. Removing protective devices is reserved exclusively to SCHUNK.

- Always disconnect control unit from the mains before opening the top cover, etc.

NOTICE

Damage to the control unit as a result of a short-circuit.
The control unit could be damaged by oil and water.

- Positioning the control unit in the machine's machining area should be avoided during installation and operation;

NOTE
All the electrical connections must be established by an electrician who has all the relevant information for the job. Always observe laws, regulations and standards applicable at the site of installation and operation.

Once all of the requirements have been met (☞ 7.1, Page 18), carry out installation based on the following notes:

1 Compare performance data on the control unit's name plate with the mains data on site.

2 Position the control unit in such a way that the requirements of the IP protection class (☞ 5, Page 10) are met and that it is easily accessible for maintenance and repairs. We recommend installing the control unit and the power supply interrupting devices in an easily accessible place; recommended **distances approx. 0.6 to 1.7 m** above operating level.

3 Remove the upper cover of the control unit and connect the magnetic chuck to the same as follows:

For the model REBOX.1-SC: connect the cable indicated with U1 to the corresponding position U1 of the control unit and the cable indicated with V1 to the corresponding position V1 of the control unit

For the model REBOX.1D-SC: connect the cable indicated with U1 to the corresponding position U1 of the control unit and the cables indicated with V1 and V2 to the corresponding positions V1 and V2 of the control unit.

For the model REBOX.1Q-SC: connect the cable indicated with U1 e U2 to the corresponding positions U1 and U2 of the control unit and the cables indicated with V1, V2, V3 and V4 to the corresponding positions V1, V2, V3 and V4 of the control unit.

For the model REBOX.2-SC: connect the cables indicated with U1 and U2 to the corresponding positions U1 and U2 of the control unit and the cables indicated with V1 and V2 to the corresponding positions V1 and V2 of the control unit.

For the model REBOX.2D-SC: connect the cables indicated with U1 and U2 to the corresponding positions U1 and U2 of the control unit and the cables indicated with V1, V2, V3 and V4 to the corresponding positions V1, V2, V3 and V4 of the control unit.

For the model REBOX.4-SC: connect the cables indicated with U1, U2, U3 and U4 to the corresponding positions U1, U2, U3 and U4 of the control unit and the cables indicated with V1, V2, V3 and V4 to the corresponding positions V1, V2, V3 and V4 of the control unit.

For the model REBOX.4D-SC: connect the cables indicated with U1, U2, U3 and U4 to the corresponding positions U1, U2, U3 and U4 of the control unit and the cables indicated with V1, V2, V3, V4, V5, V6, V7 and V8 to the corresponding positions V1, V2, V3, V4, V5, V6, V7 and V8 of the control unit.
For the model REBOX.8-SC: connect the cables indicated with U1, U2, U3, U4, U5, U6, U7 and U8 to the corresponding positions U1, U2, U3, U4, U5, U6, U7 and U8 of the control unit and the cables indicated with V1, V2, V3, V4, V5, V6, V7 and V8 to the corresponding positions V1, V2, V3, V4, V5, V6, V7 and V8 of the control unit.
The cables of each magnetic chuck marked with PE must be fixed to the assembly plate by means of a self-tapping screw.

Fig. 8

4 Connect the power supply cable of the control unit to the mains according to the instructions diagram (☞ 8.3, page 50).
Connect the brown cable to the terminal L1 of the plug, the black cable to the terminal L2, and the green/yellow cable to the terminal PE.
The following devices must be installed prior to the control unit in order to protect the unit, other devices and persons:

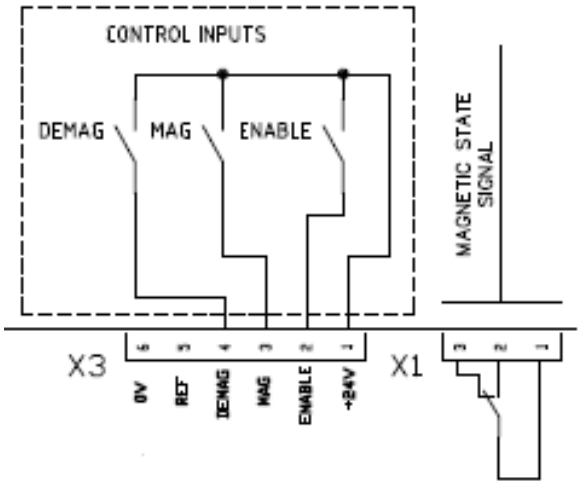
1 Protection device for overcurrent, i.e. fuse or circuit breakers. This device must comply with the specifications in the wiring diagram of the control unit and always with the relevant regulations and standards applicable in the country of installation and operation. This device must be designed for a **rated current of 32A in case of aM-type fuses and for a rated current of 32A with type C trip curve in case of circuit breakers**.

2 **The residual current devices must be highly sensitive (30 mA) of type A or B, in case of current leaks from the controller to the grounding.** Some applications may require a residual current circuit breaker of a different size. Please refer for this purpose to the corresponding wiring diagramAutomatic power off must be checked at the end of installation!

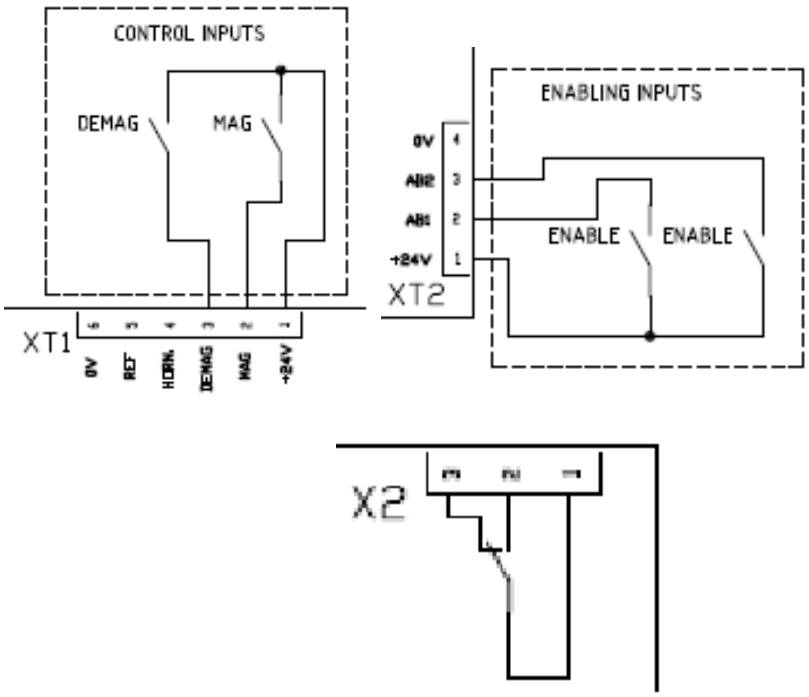
7.3 Connection to the machine's enabling system / PLC

The control unit can be connected to the machine tool using a terminal strip. The following diagram explains the connections for the signals exchanged between the machine tool and the control unit, thus ensuring a correct interpretation and functioning of the same:

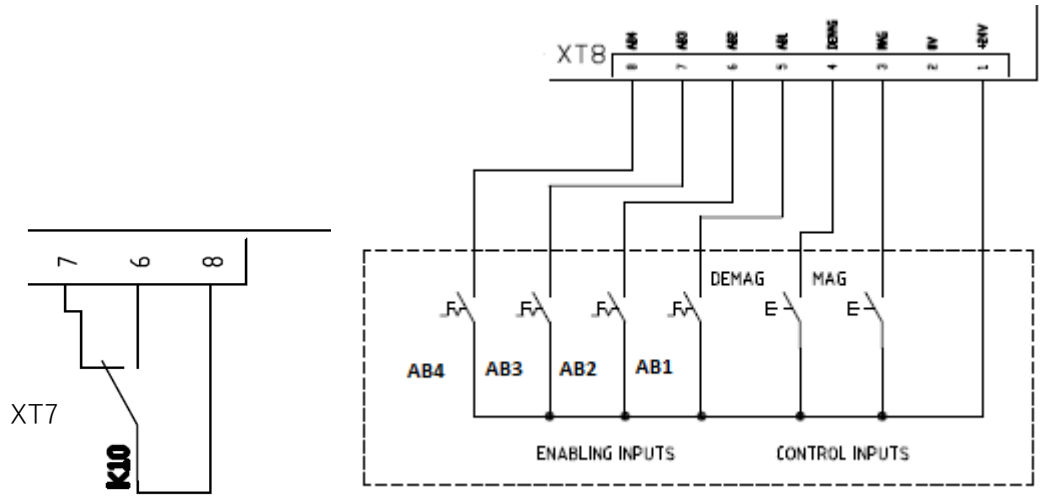
REBOX.1-SC



REBOX.1D-SC REBOX.2-SC



REBOX.1Q-SC REBOX.2D-SC REBOX.4-SC



REBOX.4D-SC REBOX.8-SC

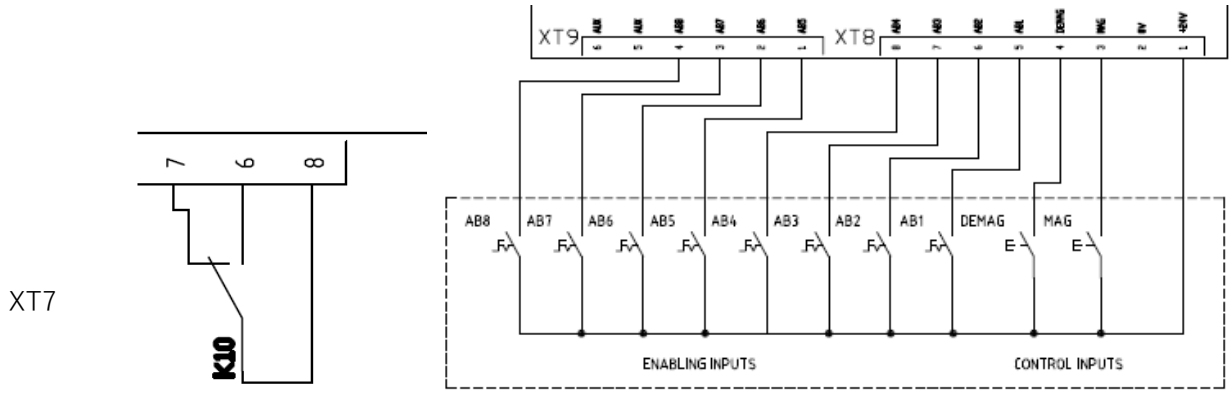


Fig. 9 Recommended connections

The control unit can receive specific commands from specific input sources.

In the following the correct connection of the input/output pins according to the different types of control units.

REBOX.1-SC

Enabling pins

Pins 1 and 2 of the connector X3 are enabling contacts. They are used to confirm the commands of the input pins:

Status of the safety pins	Command via input pin	executed command
Circuit between pin 1 and 2 closed	Magnetization	Magnetization
	Demagnetization	Demagnetization
Circuit between pin 1 and 2 open	Magnetization	no command
	Demagnetization	

The enabling contacts are to be used to confirm the PLC input commands and the input commands for the remote control.

Input pins

Pins 3, 4, and 1 are input contacts; they are used to transmit commands to the control unit (along with the enabling contacts). The control unit activates the output signals only if one of the following status changes takes place:

Open circuit ▶ Closed circuit for contact pairs 1 – 3 and 1 – 4.

The following table represents the functions of the control system:

Status of the input pins	Status of the safety pins	Executed command
1 – circuit between pin 1 and 3 closed	circuit between pin 1 and 2 closed	Magnetization
2 – waiting time 100ms		
3- circuit between pin 1 and 3 open		
1 - circuit between pin 1 and 4 closed		Demagnetizatione
2 – waiting time 100ms		
3- circuit between pin 1 and 4 open		
1 - circuit between pin 1 and 3 closed	circuit between pin 1 and 2 open	no command
2 – waiting time 100ms		
3- circuit between pin 1 and 3 open		
1 - circuit between pin 1 and 4 closed		
2 – waiting time 100ms		
3- circuit between pin 1 and 4 open		

Output pins Pins 1, 2, and 3 of the connector X1 are output pins. They are used to indicate the current operating status of the magnetic system:

Status of the control unit	Status of the pins
Demagnetized	Circuit between pin 1 and 2 open
	Circuit between pin 1 and 3 closed
Magnetized	Circuit between pin 1 and 3 open
	Circuit between pin 1 and 2 closed

General notes

- The PLC output pins are usually used as 'enabling contacts' for the machine tool, on which the magnetic chuck is installed (if required).
- The selection of pin 1 in combination with the pins 2 and 3 of the connector X1 allow identifying the status of the magnetic clamping system, i.e. as an open or closed circuit (positive or negative logic).

REBOX.2-SC and REBOX.1D-SC

Enabling pins Pins 1, 2 and 3 of the connector XT2 are enabling contacts. They are used both to confirm the commands of the input pins and to enable any magnetic system connected to the discharging channel of the control unit:

Status of the safety pins	Command via input pin	Executed command
Circuit between pin 1 and 2 closed	Magnetization	Magnetization of the magnetic system connected to channel 1
	Demagnetization	Demagnetization of the magnetic system connected to channel 1
Circuit between pin 1 and 2 open	Magnetization	no command
	Demagnetization	
Circuit between pin 1 and 3 closed	Magnetization	Magnetization of the magnetic system connected to channel 2
	Demagnetization	Demagnetization of the magnetic system connected to channel 2
Circuit between pin 1 and 3 open	Magnetization	no command
	Demagnetization	

The enabling contacts are to be used to confirm the PLC input commands and the input commands for the remote control.

Input pins

Pins 2, 3, and 1 of the connector XT1 are input contacts; they are used to transmit commands to the control unit (along with the enabling contacts). The control unit activates the output signals only if one of the following status changes takes place:

Open circuit ► Closed circuit for contact pairs 1 – 2 and 1 – 3.

The following table represents the functions of the control system:

Status of the input pins	Status of the safety pins	Executed command
1 – circuit between pin 1 and 2 closed 2 – waiting time 100ms 3- circuit between pin 1 and 2 open	Circuit between pin 1 and 2 closed	Magnetization of the magnetic system connected to channel 1
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open		Demagnetization of the magnetic system connected to channel 1
1 - circuit between pin 1 and 2 closed 2 – waiting time 100ms 3- circuit between pin 1 and 2 open	Circuit between pin 1 and 2 open	no command
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open		
1 - circuit between pin 1 and 2 closed 2 – waiting time 100ms 3- circuit between pin 1 and 2 open	Circuit between pin 1 and 3 closed	Magnetization of the magnetic system connected to channel 2
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open		Demagnetization of the magnetic system connected to channel 2
1 - circuit between pin 1 and 2 closed 2 – waiting time 100ms 3- circuit between pin 1 and 2 open	Circuit between pin 1 and 3 open	no command
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open		

Output pins

Pins 1, 2, and 3 of the connector X2 are output pins. They are used to indicate the current operating status of the magnetic system:

Status of the control unit	Status of the pins
Demagnetized	Circuit between pin 1 and 2 open
	Circuit between pin 1 and 3 closed
Magnetized	Circuit between pin 1 and 3 open
	Circuit between pin 1 and 2 closed

General notes

- The PLC output pins are usually used as 'enabling contacts' for the machine tool, on which the magnetic chuck is installed (if required).
- The selection of pin 1 in combination with the pins 2 and 3 of the connector X2 allow identifying the status of the magnetic clamping system, i.e. as an open or closed circuit (positive or negative logic).

REBOX.4-SC REBOX.2D-SC and REBOX.1Q-SC

Enabling pins

Pins 1, 5, 6, 7 and 8 of the connector XT8 are enabling contacts. They are used both to confirm the commands of the input pins and to enable any magnetic system connected to the discharging channel of the control unit:

Status of the safety pins	Command via input pin	Executed command
Circuit between pin 1 and 5 closed	Magnetization	Magnetization of the magnetic system connected to channel 1
	Demagnetization	Demagnetization of the magnetic system connected to channel 1
Circuit between pin 1 and 5 open	Magnetization	no command
	Demagnetization	
Circuit between pin 1 and 6 closed	Magnetization	Magnetization of the magnetic system connected to channel 2
	Demagnetization	Demagnetization of the magnetic system connected to channel 2
Circuit between pin 1 and 6 open	Magnetization	no command
	Demagnetization	
Circuit between pin 1 and 7 closed	Magnetization	Magnetization of the magnetic system connected to channel 3
	Demagnetization	Demagnetization of the magnetic system connected to channel 3
Circuit between pin 1 and 7 open	Magnetization	no command
	Demagnetization	
Circuit between pin 1 and 8 closed	Magnetization	Magnetization of the magnetic system connected to channel 4
	Demagnetization	Demagnetization of the magnetic system connected to channel 4
Circuit between pin 1 and 8 open	Magnetization	no command
	Demagnetization	

Input pins

Pins 3, 4 and 1 of the connector XT8 are input contacts; they are used to transmit commands to the control unit (along with the enabling contacts). The control unit activates the output signals only if one of the following status changes takes place:

Open circuit ▶ Closed circuit for contact pairs 1 – 3 and 1 – 4.

The following table represents the functions of the control system:

Status of the input pins	Status of the safety pins	Executed command
1 – circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 5 closed	Magnetization of the magnetic system connected to channel 1
		Demagnetization of the magnetic system connected to channel 1
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 5 open	No command
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 6 closed	Magnetization of the magnetic system connected to channel 2
		Demagnetization of the magnetic system connected to channel 2
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 6 open	No command

1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 7 closed	Magnetization of the magnetic system connected to channel 3
		Demagnetization of the magnetic system connected to channel 3
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 7 open	No command
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 8 closed	Magnetization of the magnetic system connected to channel 4
		Demagnetization of the magnetic system connected to channel 4
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 8 open	No command

Output pins Pins 6, 7, and 8 of the connector XT7 are output pins. They are used to indicate the current operating status of the magnetic system:

Status of the control unit	Status of the pins
Demagnetized	Circuit between pin 8 and 6 open
	Circuit between pin 8 and 7 closed
Magnetized	Circuit between pin 8 and 7 open
	Circuit between pin 1 and 6 closed

General notes

- The PLC output pins are usually used as 'enabling contacts' for the machine tool, on which the magnetic chuck is installed (if required).
- The selection of pin 8 in combination with the pins 7 and 6 of the connector XT7 allow identifying the status of the magnetic clamping system, i.e. as an open or closed circuit (positive or negative logic).

REBOX.8-SC and REBOX.4D-SC

Enabling pins Pins 1, 5, 6, 7 and 8 of the connector XT8 and pins 1, 2, 3, and 4 of the connector XT9 are enabling contacts. They are used both to confirm the commands of the input pins and to enable any magnetic system connected to the discharging channel of the control unit:

Status of the safety pins	Command via input pin	Executed command
Circuit between pin 1 and 5 closed	Magnetization	Magnetization of the magnetic system connected to channel 1
	Demagnetization	Demagnetization of the magnetic system connected to channel 1
Circuit between pin 1 and 5 open	Magnetization	no command
	Demagnetization	
Circuit between pin 1 and 6 closed	Magnetization	Magnetization of the magnetic system connected to channel 2
	Demagnetization	Demagnetization of the magnetic system connected to channel 2
Circuit between pin 1 and 6 open	Magnetization	no command
	Demagnetization	
Circuit between pin 1 and 7 closed	Magnetization	Magnetization of the magnetic system connected to channel 3
	Demagnetization	Demagnetization of the magnetic system connected to channel 3
Circuit between pin 1 and 7 open	Magnetization	no command
	Demagnetization	
Circuit between pin 1 and 8 closed	Magnetization	Magnetization of the magnetic system connected to channel 4
	Demagnetization	Demagnetization of the magnetic system connected to channel 4
Circuit between pin 1 and 8 open	Magnetization	no command
	Demagnetization	

Circuit between pin 1 and 1 (XT9) closed	Magnetization	Magnetization of the magnetic system connected to channel 5
	Demagnetization	Demagnetization of the magnetic system connected to channel 5
Circuit between pin 1 and 1 (XT9) open	Magnetization	no command
	Demagnetization	
Circuit between pin 1 and 2 (XT9) closed	Magnetization	Magnetization of the magnetic system connected to channel 6
	Demagnetization	Demagnetization of the magnetic system connected to channel 6
Circuit between pin 1 and 2 (XT9) open	Magnetization	no command
	Demagnetization	
Circuit between pin 1 and 3 (XT9) closed	Magnetization	Magnetization of the magnetic system connected to channel 7
	Demagnetization	Demagnetization of the magnetic system connected to channel 7
Circuit between pin 1 and 3 (XT9) open	Magnetization	no command
	Demagnetization	
Circuit between pin 1 and 4 (XT9) closed	Magnetizzazione	Magnetization of the magnetic system connected to channel 8
	Demagnetization	Demagnetization of the magnetic system connected to channel 8
Circuit between pin 1 and 4 (XT9) open	Magnetization	no command
	Demagnetization	

Input pins Pins 3, 4 and 1 of the connector XT8 are input contacts; they are used to transmit commands to the control unit (along with the enabling contacts). The control unit activates the output signals only if one of the following status changes takes place:

Open circuit ► Closed circuit for contact pairs 1 – 3 and 1 – 4.

The following table represents the functions of the control system:

Status of the input pins	Status of the safety pins	Executed command
1 – circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 5 closed	Magnetization of the magnetic system connected to channel 1
		Demagnetization of the magnetic system connected to channel 1
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 5 open	no command
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 6 closed	Magnetization of the magnetic system connected to channel 2
		Demagnetization of the magnetic system connected to channel 2
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 6 open	no command

1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 7 closed	Magnetization of the magnetic system connected to channel 3
		Demagnetization of the magnetic system connected to channel 3
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 7 open	no command
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 8 closed	Magnetization of the magnetic system connected to channel 4
		Demagnetization of the magnetic system connected to channel 4
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 8 open	no command
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 1 (XT9) closed	Magnetization of the magnetic system connected to channel 5
		Demagnetization of the magnetic system connected to channel 5

1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 1 (XT9) open	no command
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 2 (XT9) closed	Magnetization of the magnetic system connected to channel 6
		Demagnetization of the magnetic system connected to channel 6
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 2 (XT9) open	no command
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 3 (XT9) closed	Magnetization of the magnetic system connected to channel 7
		Demagnetization of the magnetic system connected to channel 7
1 - circuit between pin 1 and 3 closed 2 – waiting time 100ms 3- circuit between pin 1 and 3 open 1 - circuit between pin 1 and 4 closed 2 – waiting time 100ms 3- circuit between pin 1 and 4 open	Circuit between pin 1 and 3 (XT9) open	No command

1 - circuit between pin 1 and 3 closed	Circuit between pin 1 and 4 (XT9) closed	Magnetization of the magnetic system connected to channel 8
2 – waiting time 100ms		
3- circuit between pin 1 and 3 open		
1 - circuit between pin 1 and 4 closed		Demagnetization of the magnetic system connected to channel 8
2 – waiting time 100ms		
3- circuit between pin 1 and 4 open		
1 - circuit between pin 1 and 3 closed	Circuit between pin 1 and 4 (XT9) open	no command
2 – waiting time 100ms		
3- circuit between pin 1 and 3 open		
1 - circuit between pin 1 and 4 closed		
2 – waiting time 100ms		
3- circuit between pin 1 and 4 open		

Output pins Pins 6, 7, and 8 of the connector XT7 are output pins. They are used to indicate the current operating status of the magnetic system:

Status of the control unit	Status of the pins
Demagnetized	Circuit between pin 8 and 6 open
	Circuit between pin 8 and 7 closed
Magnetized	Circuit between pin 8 and 7 open
	Circuit between pin 1 and 6 closed

General notes

- The PLC output pins are usually used as 'enabling contacts' for the machine tool, on which the magnetic chuck is installed (if required).
- The selection of pin 8 in combination with the pins 7 and 6 of the connector XT7 allow identifying the status of the magnetic clamping system, i.e. as an open or closed circuit (positive or negative logic).

8 Initial commissioning and normal operation

8.1 Initial commissioning

After the installation of the control unit (☞ 7.2, Page 19) and a possible connection of the control unit to the machine (☞ 7.3, Page 22), the following proper functioning must be checked:

1 Ensure that the magnetic chucks are not magnetized; by means of the steel tip of a screw driver.

NOTE
There may be slight residual magnetization on delivery, e.g. due to transportation of the chucks with lifting magnets.

⚠ WARNING

Danger due to suspended loads.
If moving the workpiece requires the use of lifting equipment, cranes etc., please keep the respective safe distances!

2 Place the workpiece onto the magnetic chuck.

Fig. 10

3 Turn main switch to "I".

⇨ The control unit is switched on.

Fig. 11

4 Ensure that the red (= "demagnetized") and blue button (= “safe”) light up on the remote control.

Fig. 12

5 Magnetization with the remote control: press the blue and the green button at the same time.

Fig. 13

6 Check the LED status on the remote control after the magnetization time (☞ 5, Page 10). GREEN LED: LIGHTS UP; RED LED: OFF; BLUE LED: ALWAYS ON.

	**⚠ CAUTION** **Risk of injury due to workpieces coming undone as a result of faulty displays of the magnetic clamping system.** • Ensure that the workpiece is properly clamped on the magnetic chuck, by taking suitable safety precautions!

Fig. 14

7 For the demagnetization press the blue and the red button simultaneously.

Fig. 15

8 Check the LED status on the remote control after the demagnetization time (☞ 5, Page 10). RED LED: LIGHTS UP; GREEN LED: OFF; BLUE LED: ALWAYS ON.

	**⚠ CAUTION** **Risk of injury due to workpieces still partially anchored to the magnetic chuck as a result of faulty displays of the magnetic clamping system.** • Ensure that the workpiece has now properly come undone from the magnetic chuck. Take suitable safety precautions when doing so!

Fig. 16

9 Turn main switch to "O".

⇨ The control unit is switched off.

⚠ WARNING

Danger due to suspended loads.
If this work requires the use of lifting equipment, cranes etc., please keep the respective safe distances!

10 Remove the workpiece from the magnetic chuck.

11 Please contact SCHUNK GMBH & CO. KG if the expected results are not achieved even if you followed the steps described strictly!

8.2 Normal operation

To guarantee proper magnetization or demagnetization, please follow the following steps:

1 Ensure that the magnetic chucks are not magnetized; but the means of the steel tip of a screw driver.

⚠ WARNING

Danger due to suspended loads.
If moving the workpiece requires the use of lifting equipment, cranes etc., please keep the respective safe distances!

2 Place the workpiece onto the magnetic chuck.

Fig. 17

3 Turn main switch to "I".

⇨ The control device is switched on.

Fig. 18

4 Ensure that the red (= "demagnetized") and blue button (= “safe”) light up on the remote control.

Fig. 19

5 Magnetization by means of the remote control: press the blue and green button at the same time. Before carrying out this operation it is possible to adjust the magnetization power by means of the UP- and DOWN-button.

Fig. 20

Fig. 21

Fig. 22

6 Check the LED status on the remote control after the magnetization time (☞ 5, Page 10). GREEN LED: LIGHTS UP; RED LED: OFF; BLUE LED: ALWAYS ON.

⚠ CAUTION

Risk of injury due to workpieces coming undone as a result of faulty displays of the magnetic clamping system.

- Ensure that the workpiece is properly clamped on the magnetic chuck, by taking suitable safety precautions!

Fig. 23

7 For the demagnetization press the blue and the red button simultaneously.

Fig. 24

8 Check the LED status on the remote control after the demagnetization time (☞ 5, Page 10). RED LED: LIGHTS UP; GREEN LED: OFF; BLUE LED: ALWAYS ON.

	**⚠ CAUTION** **Risk of injury due to workpieces still partially anchored to the magnetic chuck as a result of faulty displays of the magnetic clamping system.** • Ensure that the workpiece has now properly come undone from the magnetic chuck. Take suitable safety precautions when doing so!

Fig. 25

9 Turn main switch to "O".

⇨ The control unit is switched off.

⚠ WARNING

Danger due to suspended loads.
If this work requires the use of lifting equipment, cranes etc., please keep the respective safe distances!

10 Remove the workpiece from the magnetic clamping plate.

11 Please contact SCHUNK GMBH & CO. KG if the expected results are not achieved even if you followed the steps described strictly.

NOTICE

Damage to the magnetic clamping plate from overheating
The control unit has been designed for cycle times (magnetization and demagnetization) of at least 3 min. to avoid overheating of the magnetic clamping plate. Non-observance of these instructions may cause irreversible damage to the magnetic chuck and render the warranty invalid!

8.3 Function diagram

The following diagram shows the operation sequences:

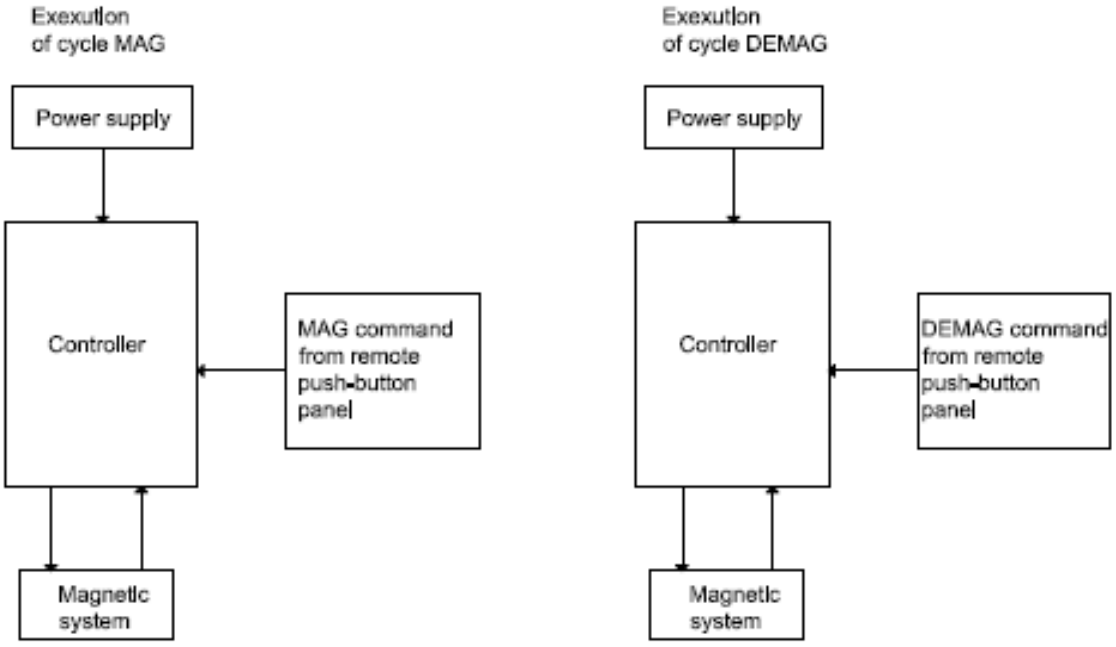


Fig. 26

9 Troubleshooting

Problem	Possible cause	Corrective action
No (de-) magnetization	Control unit is switched off.	Turn main switch to "I" position (not to "O").
	Connection cable is not connected.	Check connection between the control unit and the magnetic chuck.
The red LED on the remote control doesn’t light up.	Loose contact inside the remote control.	Switch the system off, disconnect it from the mains and check connection between remote control and control unit.
Demagnetization and magnetization are inverted.	Fault inside the control unit.	Switch the system off, disconnect it from the mains and notify SCHUNK GMBH & CO. KG Service. Move magnetic chuck into a safe position since it could still be partially magnetized.
The power is switched off by the overcurrent protection device during (de-) magnetization.	Chips inside the control unit.	
The circuit breaker switches off the power during (de-) magnetization.	Water / liquids inside of the control unit and/or of the magnetic chuck.	

10 Servicing and maintenance

We recommend you to check the state of the power and connection cables to the magnetic systems regularly, and to replace them if necessary. Do not bundle cables! The connection cable and the cable from the remote control to the control unit should not be attached to each other with fixing devices (adhesive tape, cable straps). Excellent and careful maintenance is a decisive factor for optimum safety, functioning and performance and a longer service life of the product.

DANGER

Maintenance work must always be performed by an electrician. The maintenance personnel must read this operating manual carefully. Work inside the control unit must be done by SCHUNK GMBH & CO. KG Service personnel only.

To ensure optimum availability and reliability of the control unit in the long run, the parts that are exposed to the greatest strain during operation must be inspected regularly.

Please follow the instructions and maintenance intervals given in the table below so as to avoid repairs and resulting down-times, failures and inconvenience.

Activity	Description	Frequency			
		Each time before switching on	Once a week	Once a month	Once a year
Inspect connection cable of the magnetic chuck	Check if the protective sheath of the discharge cable is damaged	●			
Inspect the remote control cable	Check if the connection cable between remote control and control unit is damaged.	●			
Check the identification plate / label on the control unit	Check identification plates and other plates etc. on the control unit for damage and ensure good legibility.	●			
Outer cleaning	Wipe with a damp cloth and dry immediately with a dry cloth.		●		
Inspect power cable	Check the power cable's insulation for damage.		●		
Check LEDs	Check all the system's indicators and warning lamps (control unit and remote control) for proper functioning.		●		
Check the safety button of the remote control	Starting from the demagnetized system, activate the magnetizing cycle by pressing the green button only. Check: the indicated status on the remote control must not change!			●	
Check the circuit breaker	Check proper functioning of the protection system by carrying out suitable tests.	Carry out the test according to the frequency and method recommended by the manufacturer.			

Defective electrical and electromechanical components must always be exchanged by SCHUNK GMBH & CO. KG Service personnel. If components are replaced by the operator, this automatically renders the warranty void.

After maintenance and before reconnecting and restarting the control unit, reinstall all protection devices.

11 Transportation and storage

11.1 Transportation

⚠ CAUTION

Risk of injury and risk of damage to the control unit if it falls during transportation!
The control unit weights more than 5 kg and contains electronic components. Persons may be injured and the electronic components may be damaged.

- The weight of the package is stated on the label on the side; please pay attention to this data during the delivery.
- Use the required personal protective equipment for the transportation.

11.2 Storage

When storing the control unit for a longer period of time, observe the following instructions to ensure functionality up to the time of installation:

- Ensure correct packaging!
  Recommendation: store the product in its original packaging.
- The control unit and the packaging should be inspected at regular intervals.
- Inspect packaging for outer damage and effects of the weather.

12 Disposal

This product is made of plastics, iron and electrical components. If it is taken out of operation, it has to be disposed of in compliance with the applicable regulations.

As soon as the end of the lifecycle has been reached, the control unit has to be decommissioned, i.e. put into a state in which it can no longer be used for its original intended use and in which it is still possible to recycle the raw materials contained.

NOTE
SCHUNK GMBH & CO. KG assumes no liability for material damage or personal injury that may result from reusing individual components of the control unit for purposes other than the original intended use! SCHUNK GMBH & CO. KG provides neither implicit nor explicit declarations about possible usability of recycled components after decommissioning the control unit.

Procedure for final decommissioning and disposal of the control unit:

⚠ CAUTION

Risk of injury.
Decommissioning, disassembly and disposal of the control unit must be performed by qualified persons using suitable tools.

1 Ensure that the machine tool has safely come to a halt. Disconnect all the electrical, hydraulic and pneumatic connections that could cause unexpected movements of the machine or its components.

2 Disconnect product from all devices.

⇨ Have the control unit disposed of by a company specialized in the disposal of electrical equipment.

13 Spare parts

For any spare parts request, please contact our service department.