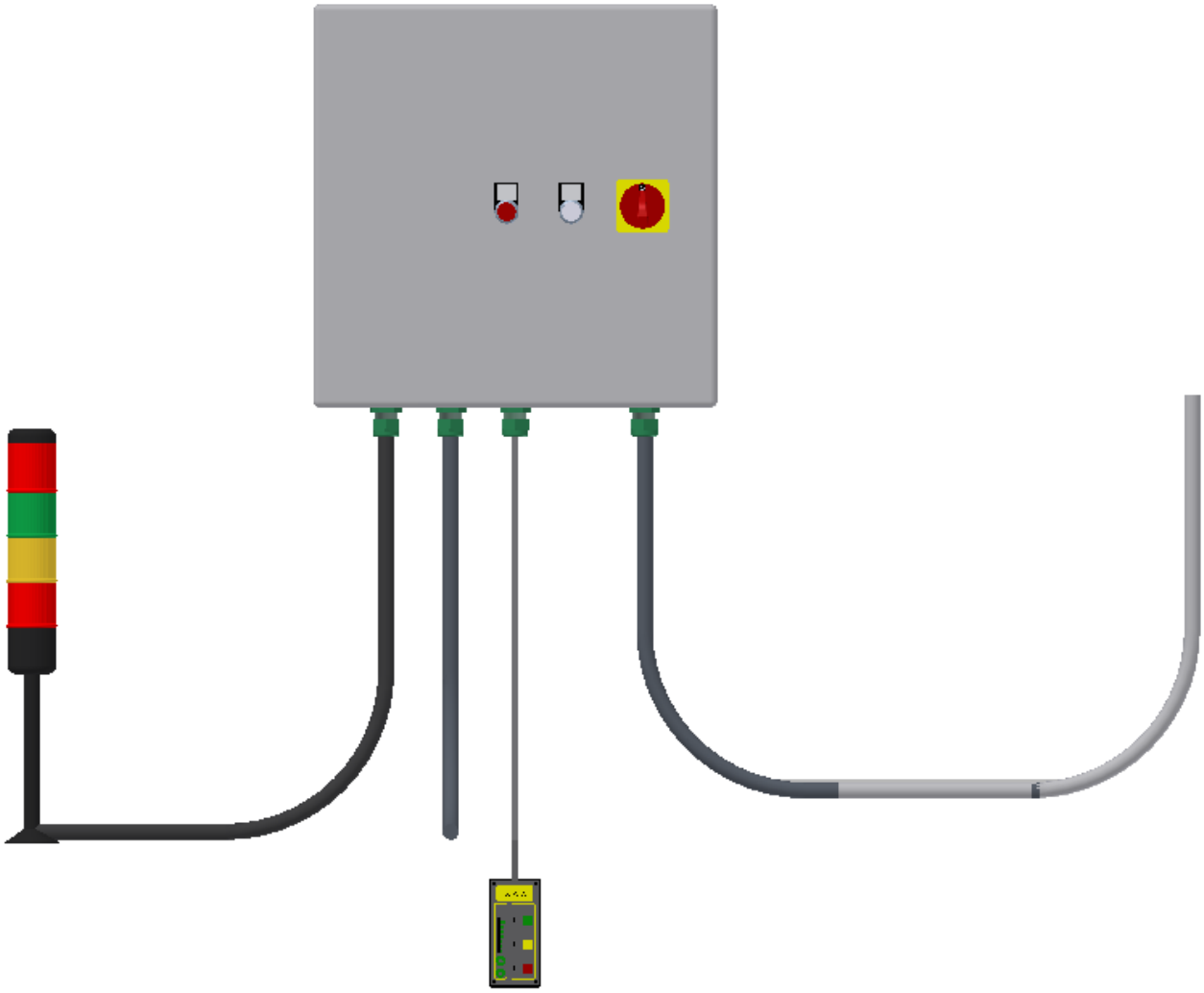
Control Unit
MUSA

Assembly and Operating Manual



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Dear customer,

Congratulation on choosing a SCHUNK product. By choosing SCHUNK, 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 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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Table of contents

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.
ATTENTION	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 is exclusively designed for the operation of SCHUNK electro-permanent-chucks. During the use of the electro-permanent-chucks it is essential, that the time between two ON/OFF cycles is not less than 3 minutes.

This control unit has been designed for the installation on 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.

To use this unit as intended, 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 to 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.

ATTENTION

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 control unit only within its defined application parameters. "Technical data" (☞ 5, Page 12).
- Make sure that the environment is clean and the ambient temperature corresponds to the specifications.

2.3 Product safety

Dangers arise from the control unit, if e.g.:

- the control unit is not used in accordance with its intended purpose.
- the control unit 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 control unit.

Wear protective equipment.

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 control unit may be performed only by trained specialist personnel. Every person called upon by the operator to work on the control unit 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 energy supplies before installation, modification, maintenance, or adjustment work.
- Ensure that no residual energy remains in the system.
- Perform maintenance, modifications, and additions outside the danger zone.
- For all work, secure the control unit 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 within 10 days after identification.

4 Scope of delivery

Type IC

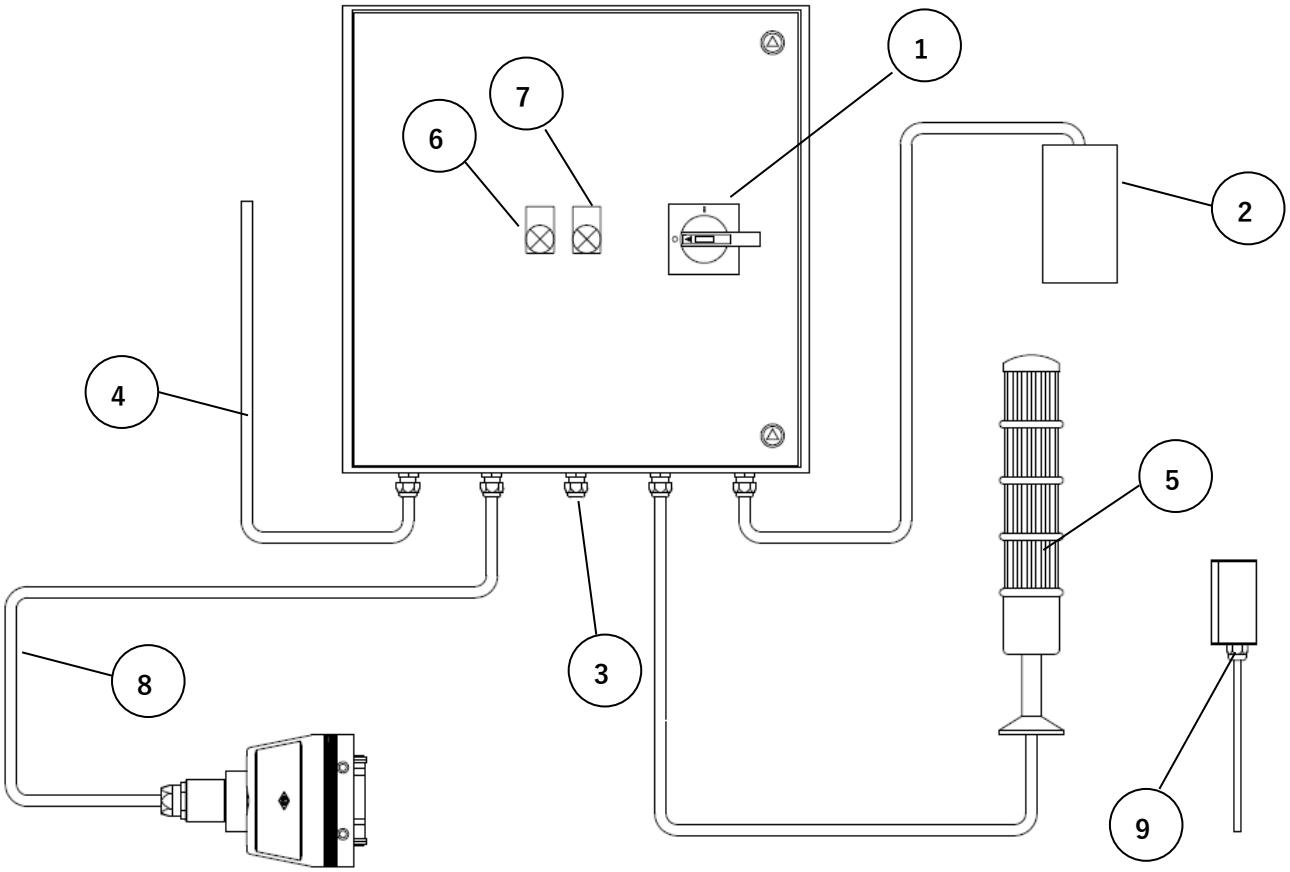

Fig. 1

Type RC

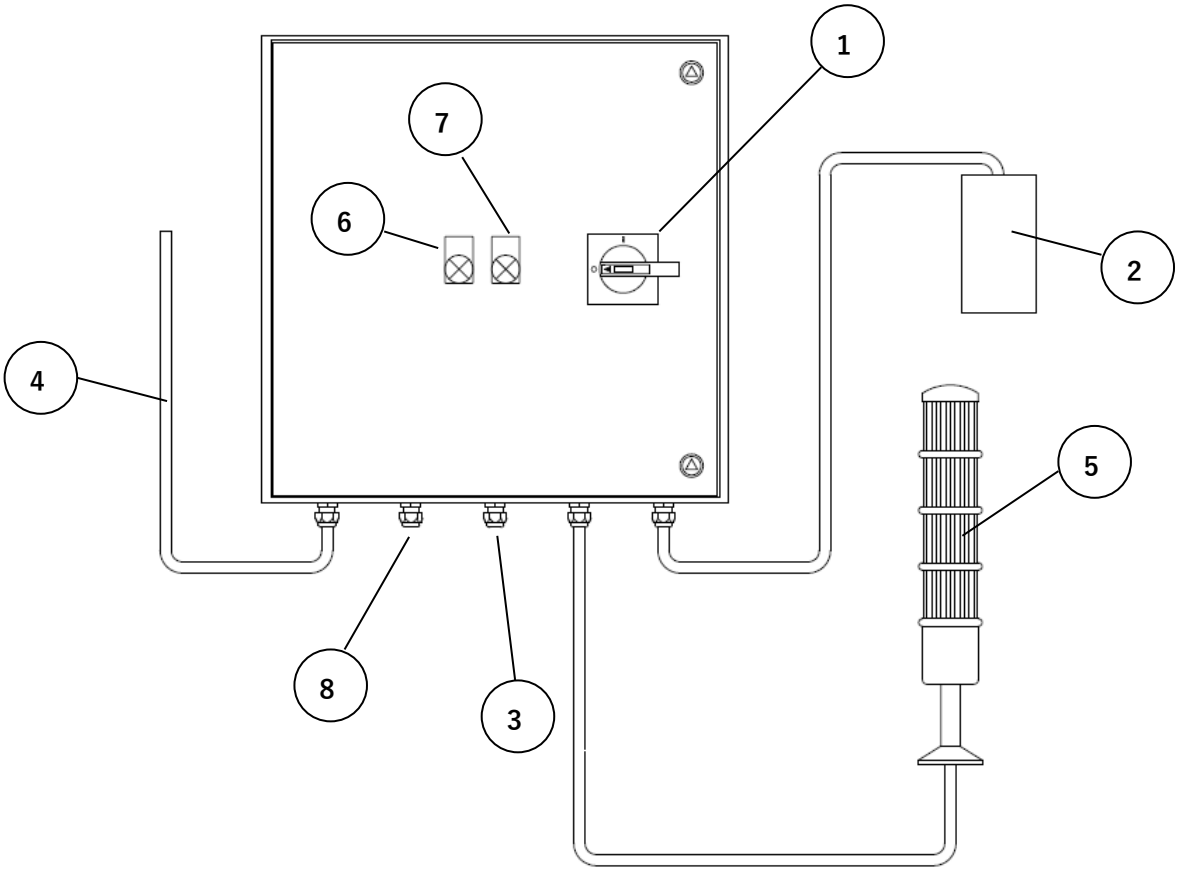

Fig. 2

The scope of delivery includes for both types:

- Electronic control unit with main ON/OFF switch on the front panel (1)
- Remote control with power adjustment and 10 m cable (2)
- Cable gland for the connection of the machine safety / PLC interface (3)
- 5 m cable with rubber sheathing for the connection to the mains (4)
- Signalling tower indicating the magnetic status (5)
- Red warning light indicating a malfunctioning (6)
- White warning light indicating that the control unit is electrically energized (7)

Only for the IC-version:

- 5 m cable with metal sheathing for the connection to the magnetic system (8)
- Docking Station serving as seating for the discharge connector during the machining of the workpiece (9)

Only for the RC-version:

- Cable gland for the connection to the magnetic system (8).

5 Technical Data

Version IC:

Type	MUSA B-01-C	MUSA B-02-C	MUSA B-04-C	MUSA B-08-C
Mains voltage	400 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	Magnetization: >0.3 sec to < 1 sec Demagnetiza-tion: >3 sec to < 8 sec	Magnetization: >1.5 sec to < 2 sec Demagnetiza-tion: >13 sec to < 24 sec	Magnetization: >6 sec to < 7.5 sec Demagnetiza-tion: >21 sec to < 36 sec	Magnetization: >11 sec to < 13.5 sec Demagnetiza-tion: >42 sec to < 70 sec
Activation change	1 (de-) magnetization - max. every 3 min.			
Weight	~ 12 kg		~ 15 kg	
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.			

Version RC

Type	MUSA B-01-L	MUSA B-02-L	MUSA B-04-L	MUSA B-08-L
Mains voltage	400 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	Magnetization: >0.3 sec to < 1 sec Demagnetization: >3 sec to < 8 sec	Magnetization: >1.5 sec to < 2 sec Demagnetization: >13 sec to < 24 sec	Magnetization: >6 sec to < 7.5 sec Demagnetization: >21 sec to < 36 sec	Magnetization: >11 sec to < 13.5 sec Demagnetization: >42 sec to < 70 sec
Activation change	1 (de-) magnetization - max. every 3 min.			
Weight	~ 12 kg		~ 15 kg	
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 name plate is on the rear of the control unit:

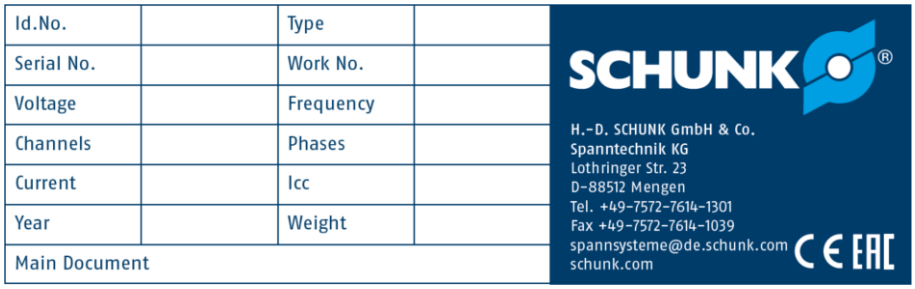

Fig. 3

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 identification plate must never be removed! Please always have the serial no. at hand when contacting SCHUNK about technical matters.

5.2 Dimensions

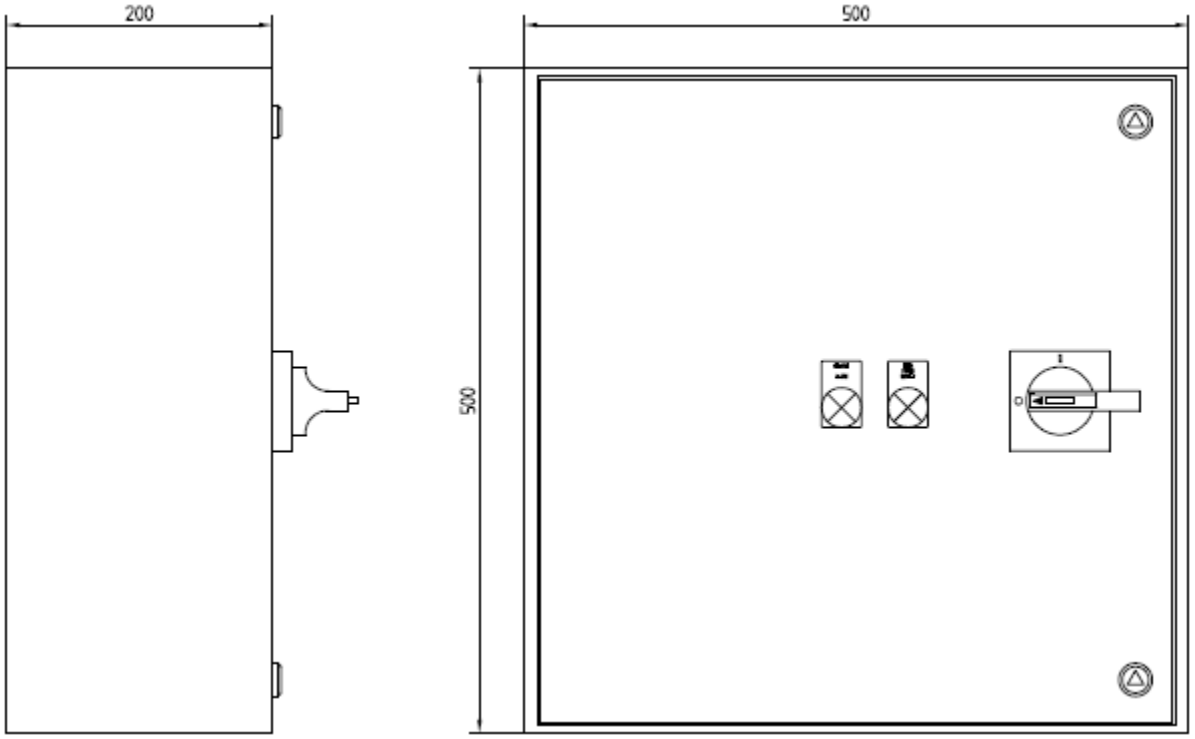

Fig. 4

6 Description

6.1 Functioning description

By using this electronic control unit, the operator is able to magnetize and to demagnetize small and large magnetic electro-permanent chucks manufactured by SCHUNK.

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

A real time electrical current monitoring system signals any possible malfunctioning.

6.2 Product description

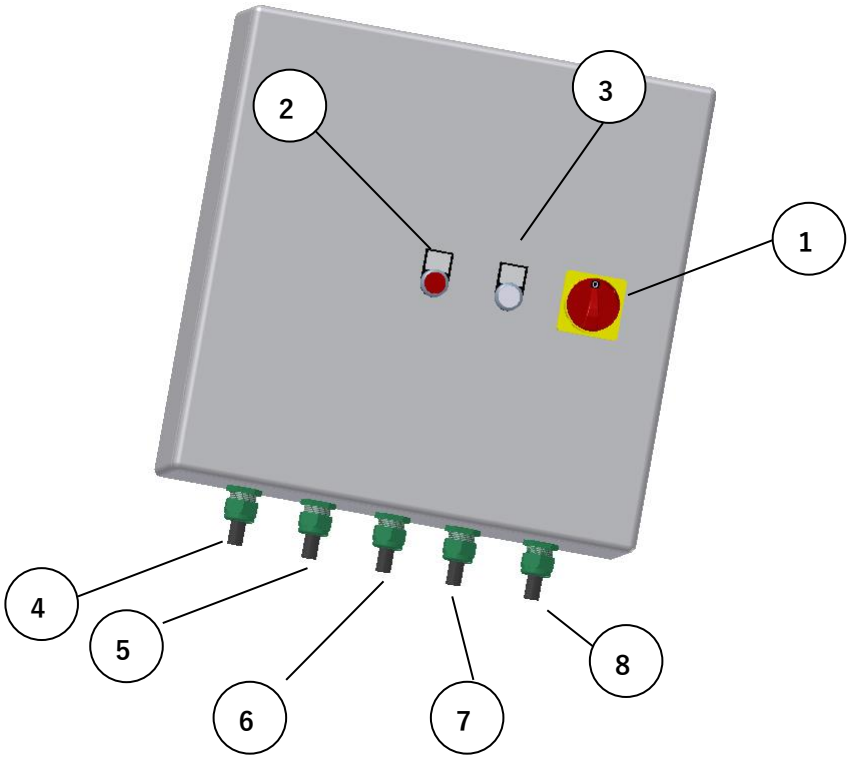

Fig. 5

1	Main ON/OFF switch
2	ALARM warning light
3	ELECTRICALLY ENERGIZED warning light
4	Cable gland for the connection to the mains
5	Cable gland for the connection to the magnetic chuck
6	Cable gland for the connection to the machine safety / PLC interface
7	Cable gland for the connection to the signalling tower indicating the magnetic status
8	Cable gland for the connection of the remote hand control

6.4 Description of the remote control and the relevant 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. 6 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.

6.4 Description of the signalling tower

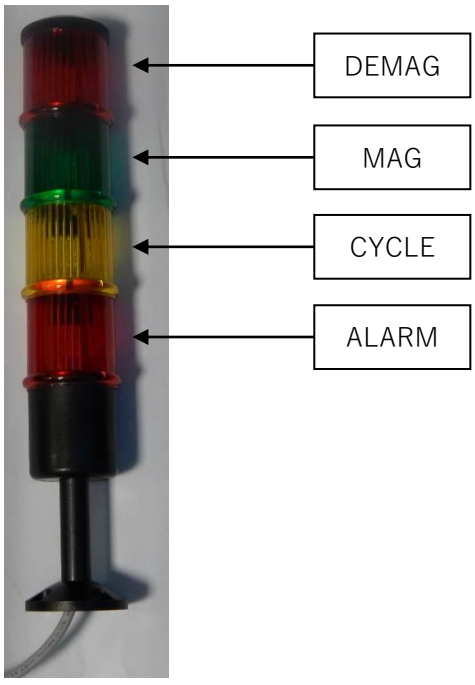

Fig. 7

- Whenever the red light on the bottom turns on, it indicates an alarm status on the magnetic system. In this case it is necessary to read the relevant manual of the control unit, section “Problem solving”, in order to identify the possible cause of the defect. Under normal conditions this light is always switched off.
- The orange light turns on during the magnetization or demagnetization cycle. Please wait until this cycle is completed before you proceed!
- Whenever the green light turns on, the magnetic system is magnetized and the workpiece can be safely handled by means of the magnetic modules.
- Whenever the red light on top turns on, the magnetic system is demagnetized. In this case the workpiece can safely be removed from the magnetic system.

⚠ CAUTION!

Indication not free from errors

The operator must always check the actual state of the chuck after each magnetization and demagnetization maneuver. Failure to check may cause dangers due to an incorrect indication of the control unit.

7 Assembly and Installation

7.1 Assembly

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?)

6 By means of the cable gland, fix the connection cable to the machine tool / PLC interface on the bottom of the control unit (☞ 7.3, Page 22). Tighten the cable gland.

NOTE
Please always have the serial number at hand when contacting SCHUNK GmbH & Co. KG or Service Centres.

DANGER

Dangers 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

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 electrician. Removing protective devices is reserved exclusively to SCHUNK.

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

ATTENTION

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 carried out 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 19), carry out installation based on the following notes:

1. Compare performance data on the control unit's identification 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 12) are met and the control unit 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. Connect the main power supply cable of the control unit according to the instructions in the circuit diagram.

4 ***Only for the RC version:*** Connect the discharge cable to the magnetic system.

DANGER

Danger due to a wrong electrical connection!
Please refer to the wiring diagram for a proper connection of the discharge cable.

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 switch. 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 diagram. Automatic power off must be checked at the end of installation!

NOTE (*only for the RC-version*):
When using junction boxes, carefully read through the supplied operating manuals and circuit diagrams so as to ensure correct installation and selection of the interrupting devices.

7.3 Connection to the machine's enabling system / PLC

The control unit can be connected to the machine tool by means of the terminal board X3. 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

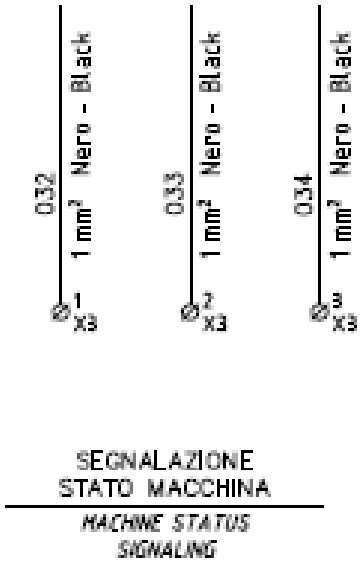

Fig. 8

- **MACHINE STATUS** = change-over contact for the identification of the machine status (magnetized or demagnetized).

  If the system is demagnetized, this contact is closed between the terminal X3-1 and X3-3.

  If the system is magnetized, this contact is closed between the terminal X3-2 and X3-3

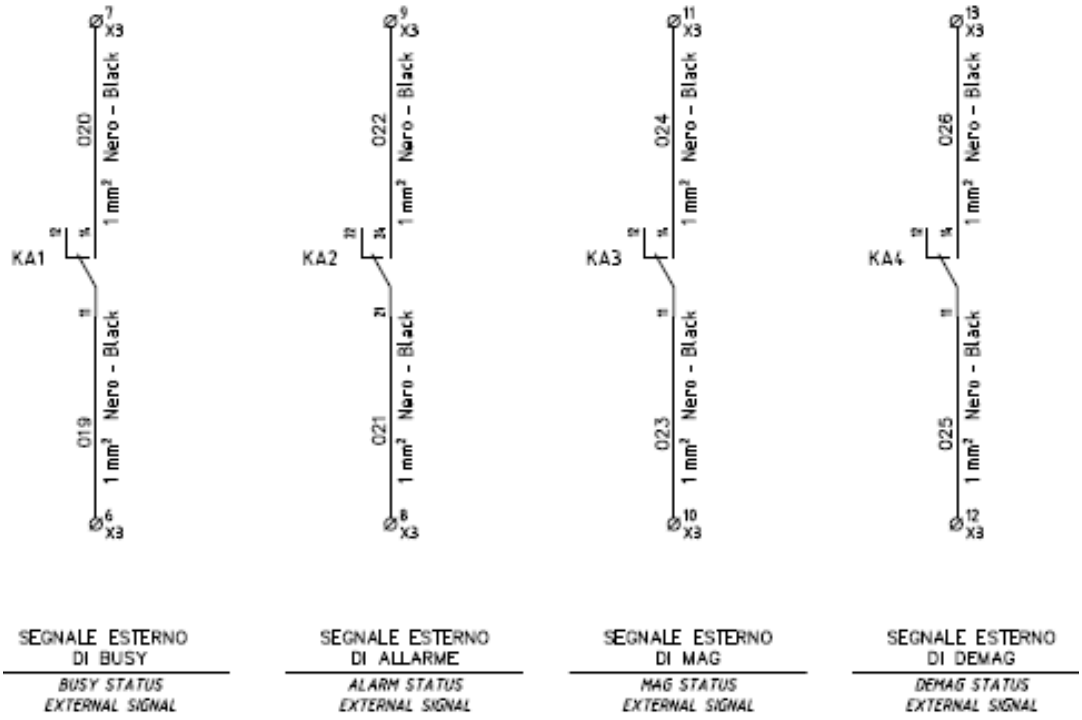

Fig. 9

EXTERNAL SIGNALS

- **BUSY** = activated signal during the (de-) magnetization cycle;
- **ALARM** = activated only if a malfunctioning occurs during the (de-) magnetization cycle
- **MAG** = activated signal at the end of the magnetization cycle;
- **DEMAG** = activated signal at the end of the demagnetization cycle

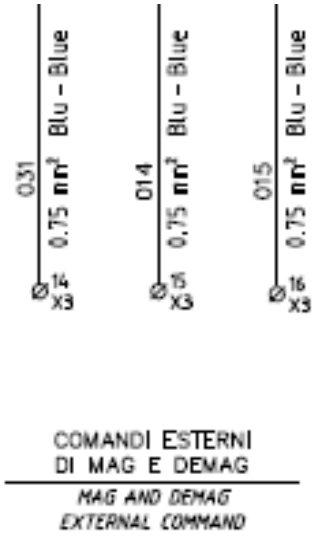

Fig. 10

- **EXTERNAL MAGNETIZATION COMMAND** = signal enabling the magnetization cycle by means of a remote command via PLC.

  Start the magnetization cycle by closing the terminals X3-14 and X3-16. For a correct interpretation by the control unit, this signal must be impulsive and transmitted for at least 100msec.

- **EXTERNAL DEMAGNETIZATION COMMAND** = signal enabling the demagnetization cycle by means of a remote command via PLC.

  Start the demagnetization cycle by closing the terminals X3-14 and X3-15. For a correct interpretation by the control unit, this signal must be impulsive and transmitted for at least 100msec

Only for the RC-version:

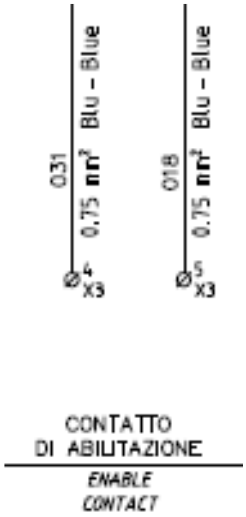

Fig. 11

- **ENABLING CONTACT** = remote enabling contact in order to start the (de-)magnetization operations.

8 Initial commissioning and normal operation

8.1 Initial commissioning

After the installation of the control unit (☞ 7.2, Page 20) and its connection to the machine tool (☞ 7.3, Page 22) the proper functioning of the system 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 a slight residual magnetization upon delivery, e.g. due to the handling of the chucks with magnetic lifters.

⚠ WARNING

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

2 Place the workpiece onto the magnetic chucks.

Only for the IC-version (from point 3 to point 5):

3 The contact area between the magnetic plate and the discharging cable (reinforced) must be free of metal, chips and dirt in general. The area must also be absolutely dry. If there is dirt, water or chips, carefully clean the connecting elements and contact surfaces and remove any causes of problems.

4 Remove the protective cap from the connection plug of the magnetic chuck and ensure that it is free of chips, dirt and liquids. Otherwise remove carefully anything that could cause problems to the electromechanical properties of the connection plug.

Fig. 12

Fig. 13

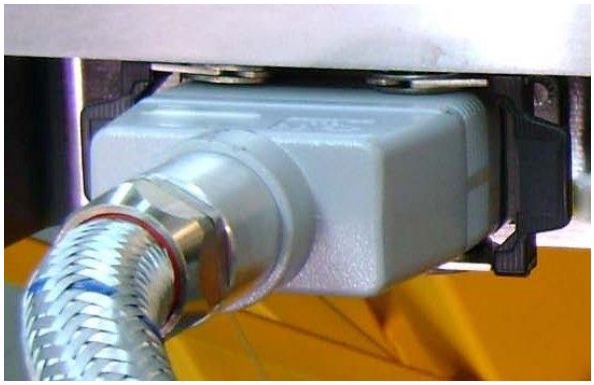

Fig. 14

5 Connect discharging cable (armoured) to the junction box, and then fasten the two side brackets.

⚠ CAUTION

Danger due to faulty connection.
Problems may arise due to partial magnetization or demagnetization.

- The connector of the discharging cable must be properly fixed to the magnetic system. For a correct contacting, insert the connector of the discharging cable into the connector of the magnetic chuck, then fasten the two side brackets.

⚠ DANGER

Danger of electric shock due to a faulty connection.
Touching live parts can cause death by electric shock.

- The following step may only be taken after a correct installation and inspection of the protective devices (☞ 7.2, Page 20).

Fig. 15

6 Turn main switch to "I".

⇨ The white light on the control panel lights up indicating that the control is switched on.

Fig. 16

7 Ensure that the red (= "demagnetized") and blue button (= “safe”) light up on the remote control and that the red DEMAG lamp on the signalling tower switches on (=system correctly demagnetized).

8 Check the correct capture of the changeover signals, as referred to at paragraph 7.3.

Fig. 17

9 Magnetization by means of the remote hand control: press the blue and green button at the same time.

Magnetization by means of the external PLC signals: please refer to the wiring diagram for a correct signal connection.

Upon starting the magnetization cycle, the red DEMAG lamp on the signalling tower switches off, whereas the orange BUSY lamp turns on, indicating that the magnetization cycle is running.

10 Check the correct capture of the changeover signals, as referred to at paragraph 7.3.

Fig. 18

11 Check the LED status on the remote control after the magnetization time (☞ 5, Page 12). GREEN LED: ON; RED LED: OFF; BLUE LED: ALWAYS ON!

Make sure that the orange BUSY lamp on the signalling tower switches off and that the green MAG lamp turns on, indicating that the magnetization has been completed.

12 Check the correct capture of the changeover signals, as referred to at paragraph 7.3

⚠ CAUTION

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

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

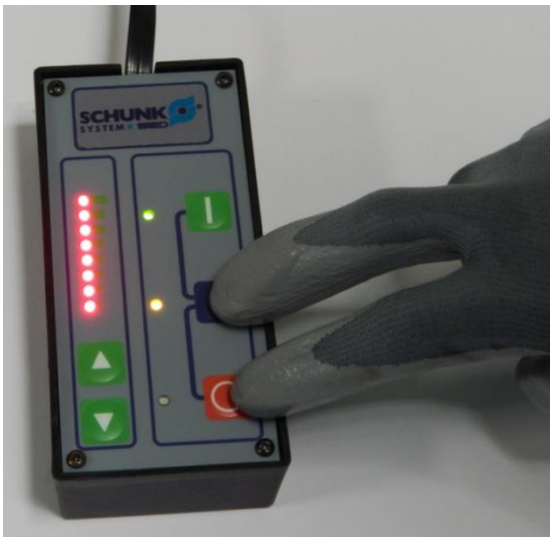

Fig. 19

13 Demagnetization by means of the remote hand control: press the blue and the red button simultaneously.

Demagnetization by means of the external PLC signals: please refer to the wiring diagram for a correct signal connection.

Upon starting the demagnetization cycle, the green MAG lamp on the signalling tower switches off, whereas the orange BUSY lamp turns on, indicating that the demagnetization cycle is running.

14 Check the correct capture of the changeover signals, as referred to at paragraph 7.3.

Fig. 20

15 Check the LED status on the remote control after the demagnetization time (☞ 5, Page 12). RED LED: ON; GREEN LED: OFF; BLUE LED: ALWAYS ON!

16 Check the correct capture of the changeover signals, as referred to at paragraph 7.3.

Fig. 21

17 Turn main switch to "O".

⇨ The control unit is switched off.

Only for the IC-version (from point 18 to point 20):

18 The contact area between the magnetic plate and the discharge cable (reinforced) must be free of metal, chips and dirt in general. The area must also be absolutely dry. If there is dirt, water or chips, carefully clean the connecting elements and contact surfaces and remove any causes of problems.

19 Remove the discharging cable from the magnetic chuck by unfastening the side brackets of the connector.

20 Put back the protective cap to protect the magnetic chuck connector from dirt, liquids, chips etc.

⚠ WARNING

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

21 Remove the workpiece from the magnetic chucks.

Please contact SCHUNK if the expected results are not achieved even if you strictly followed the previously described steps.

8.2 Normal operation

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

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

WARNING

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

2 Place the workpiece onto the magnetic chucks.

Only for the IC-version (from point 3 to point 5):

3 The contact area between the magnetic clamping plate and the discharging cable (reinforced) must be free of metal, chips and dirt in general. The area must also be absolutely dry. If there is dirt, water or chips, carefully clean the connecting elements and contact surfaces and remove any causes of problems.

4 Remove the protective cap from the connection plug of the magnetic chuck and ensure that it is free of chips, dirt and liquids. Otherwise carefully remove anything that could cause problems to the electromechanical properties of the connection plug.

Fig. 22

Fig. 23

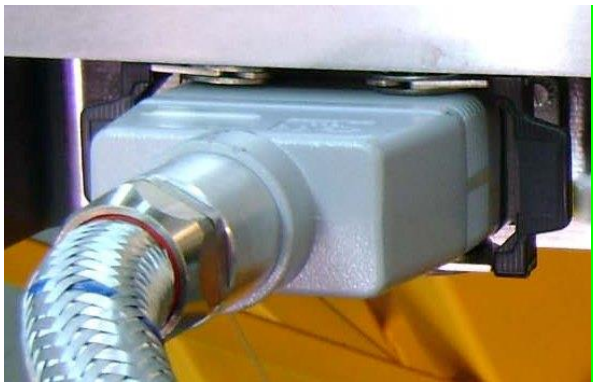

Fig. 24

5 Connect discharging cable (armoured) to the junction box, and then fasten the two side brackets.

⚠ CAUTION

Danger due to a faulty connection.
Problems may arise due to partial magnetization or demagnetization.

- The connector of the discharging cable must be properly fixed to the magnetic system. For a correct contacting, insert the connector of the discharging cable into the connector of the magnetic chuck, then fasten the two side brackets.

⚠ DANGER

Danger of electric shock from faulty connection.
Touching live parts can cause death by electric shock.

- The following step may only be taken after correct installation and inspection of the protective devices (☞ 7.2, Page 20).

Fig. 25

6 Turn main switch to "I".

⇨ The white light on the control panel lights up indicating that the control is switched on.

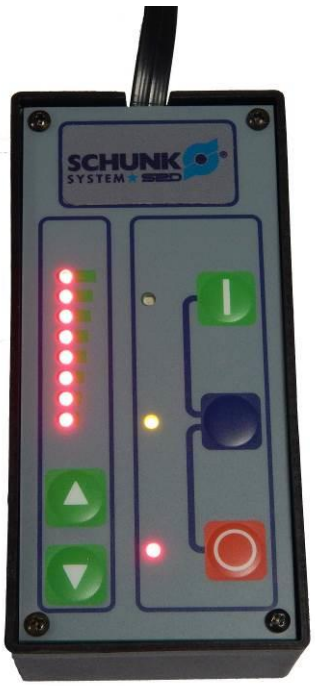

Fig. 26

7 Ensure that the red (= "demagnetized") and blue button (= “safe”) light up on the remote control and that the red DE-AMG lamp on the signalling tower switches on (=system correctly demagnetized.

Fig. 27

8 Magnetization by means of the remote hand 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-buttons.

Fig. 28

Fig. 29

Magnetization by means of the external PLC signals: please refer to the wiring diagram for a correct signal connection. **In this case it is NOT possible to adjust the magnetization power, which is only possible by means of the remote hand control.**

Upon starting the magnetization cycle, the red DEMAG lamp on the signalling tower switches off, whereas the orange BUSY lamp turns on, indicating that the magnetization cycle is running.

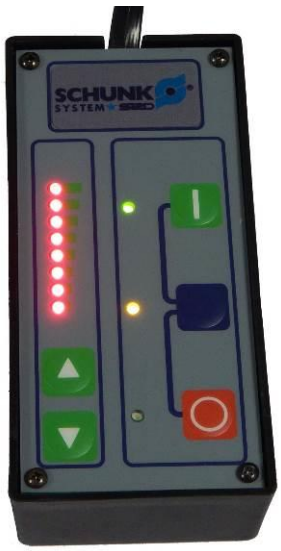

Fig. 30

9 Check the LEDs status on the remote control after the magnetization time (☞ 5, Page 12). GREEN LED: ON; RED LED: OFF; BLUE LED: ALWAYS ON!

Make sure that the orange BUSY lamp on the signalling tower switches off and that the green MAG lamp turns on, indicating that the magnetization has been completed.

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

Fig. 31

10 Turn main switch to "O".

⇨ The control unit is switched off.

Only for the IC-version (from point 11 to point 13):

11 The contact area between the magnetic chuck and the discharging cable (reinforced) must be free of metal, chips and dirt in general. The area must also be absolutely dry. If there is dirt, water or chips, carefully clean the connecting elements and contact surfaces and remove any causes of problems.

12 Remove discharging cable from the magnetic chuck by unfastening the side brackets.

13 Put back the protective cap to protect the connector of the magnetic chuck from dirt, liquids, chips etc.

14 The workpiece can now be machined.

Only for the IC-version (from point 15 to point 17):

15 The contact area between the magnetic clamping plate and the discharging cable (reinforced) must be free of metal, chips and dirt in general. The area must also be absolutely dry. If there is dirt, water or chips, carefully clean the connecting elements and contact surfaces and remove any causes of problems.

16 Remove the protective cap from the connection plug of the magnetic chuck and ensure that it is free of chips, dirt and liquids. Otherwise carefully remove anything that could cause problems to the electromechanical properties of the connection plug.

Fig. 32

Fig. 33

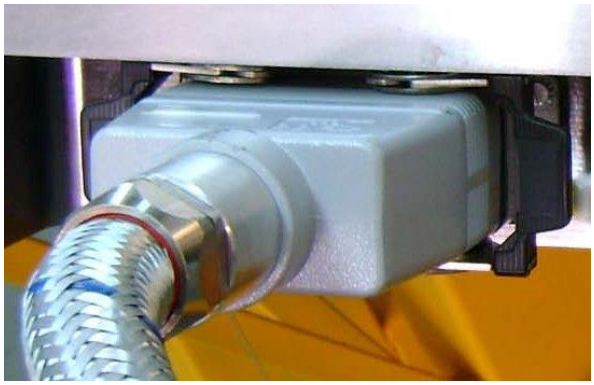

Fig. 34

17 Connect discharging cable (armoured) to the junction box, and then fasten the two side brackets

Fig. 35

18 Turn main switch to "I".

⇨ The white light on the control panel lights up indicating that the control is switched on.

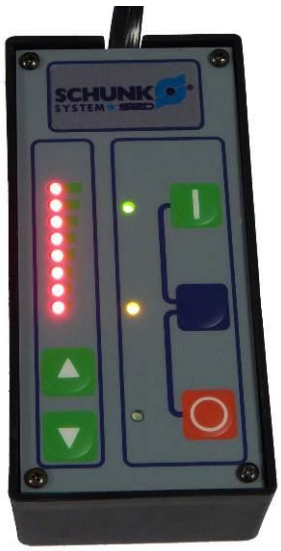

Fig. 36

19 Make sure that the green push button lights up on the remote control (= "magnetized") and that on the signalling tower the green MAG lamp turns on (=system correctly magnetized).

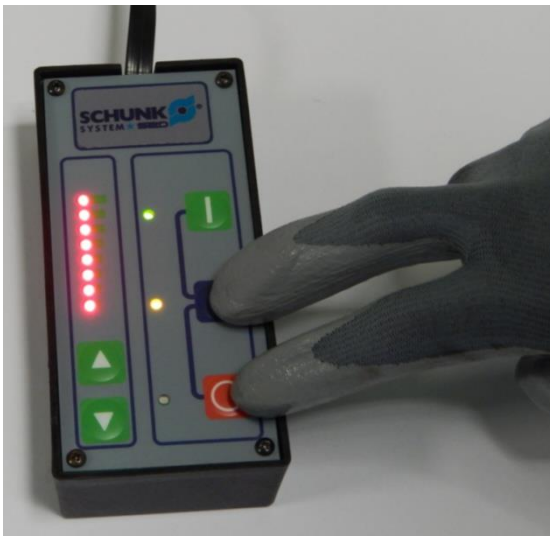

Fig. 37

20 Demagnetization by means of the remote hand control: press the blue and the red button simultaneously.

Demagnetization by means of the external PLC signals: please refer to the wiring diagram for a correct signal connection.

Upon starting the demagnetization cycle, the green MAG lamp on the signalling tower switches off, whereas the orange BUSY lamp turns on, indicating that the demagnetization cycle is running.

Fig. 38

21 Check the LED status on the remote control after the demagnetization time (☞ 5, Page 12). RED LED: ON; GREEN LED: OFF; BLUE LED: ALWAYS ON.

Fig. 39

22 Turn main switch to "O".

⇨ The control unit is switched off.

Only for the IC-version (from point 23 to point 25):

23 The contact area between the magnetic clamping plate and the discharging cable (reinforced) must be free of metal, chips and dirt in general. The area must also be absolutely dry. If there is dirt, water or chips, carefully clean the connecting elements and contact surfaces and remove any causes of problems.

24 Remove discharging cable from the magnetic chuck by unfastening the side brackets.

25 Put back the protective cap to protect the magnetic chuck connector from dirt, liquids, chips etc.

⚠ WARNING

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

26 Remove the workpiece from the magnetic chucks.

Please contact SCHUNK if the expected results are not achieved even if you followed the steps described strictly.

ATTENTION

Damage to the magnetic chuck due to overheating
The control unit has been designed for cycle times (magnetization and demagnetization) of at least 3 min. to avoid overheating of the magnetic chuck (☞ 5, Page 12). Non-observance of these instructions may cause irreversible damage to the magnetic chuck and render the warranty invalid!

9 Troubleshooting

Problem	Possible cause	Corrective action
No (de-) magnetization	The control unit is switched off.	Turn the main switch to "I" position (not to "O").
	Only for the IC-version: The discharge cable is not connected to the magnetic system.	Connect the discharge cable to the magnetic system.
	The remote control is not connected to the control unit	Make sure that the remote control is correctly connected to the control unit.
	The supply voltage is lower than the one mentioned on the identification plate	Connect the control unit to the right supply voltage.
	Error during the activation of the signals sent out by the external logic controller	Check the signals sent out by the PLC.
The red LED on the remote control doesn't switch on.	Faulty contact on the remote control.	Switch the system off, disconnect it from the mains and check the connection between remote control and control unit.
	The power supply cable is not properly connected and / or the plug is not correctly inserted.	
Demagnetization and magnetization are inverted.	Fault on the control unit. After an overhaul or after the installation, the positive and the negative wires of the discharge cable have been inverted.	Turn the control unit off and check the electrical wiring between control unit and magnetic system.
The overcurrent protection device switches off the power during the (de-) magnetization.	Chips inside the connector of the control unit and/or of the magnetic system	Switch the system off, disconnect it from the mains and notify SCHUNK Service. Move the magnetic system into a safe position since it could still be partially magnetized.
The residual current device cuts the power off during (de-) magnetization.	Water / liquid on the connector of the control unit and/or of the magnetic system	

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 discharge cable and / or the connection 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 Service personnel only.

To ensure optimum availability and reliability of the control unit in the long run, the parts 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
Only for the IC-version: Clean the connector	With the control unit switched off: inspect connector for chips, dirt etc. and remove as necessary.	●			
Inspect the connection cable to the magnetic chuck	***Only for the IC-version*** Check the discharge cable's metal jacket for damage.	●			
Inspect the remote control cable	Check the cable between the remote control and the control unit for damage etc.	●			
Check the identification plate / label on the control unit	Check identification plates and other labels etc. on the control unit for damage and ensure good legibility.	●			
Inspect seals	Check all the seals of the system (connectors, caps, housings etc.).	●			
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 indicator and warning lamps (control unit and remote control) for proper functioning.		●		

Activity	Description	Frequency			
		Each time before switching on	Once a week	Once a month	Once a year
Check safety devices on the control unit	Start with demagnetized system. Do NOT connect discharging cable (reinforced) to the magnetic chuck. Start magnetizing cycle by pressing only the green button. Check: the indicated status on the remote control must not change!		●		
Check the safety button on the remote control	Start with the demagnetized system. Connect discharge cable to the magnetic chuck, and start the magnetizing cycle by pressing the green button only. Check: the indicated status on the remote control must not change!			●	
Check the fault current circuit breaker	Check proper functioning of the upstream protective system using suitable tests.	Test as often and with the method recommended by manufacturer.			

Defective electrical and electromechanical components must always be exchanged by SCHUNK Service personnel. If components are exchanged by the operator, this automatically renders the warranty invalid.

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

11 Transportation and storage

11.1 Transportation

⚠ CAUTION

Risk of injury and risk of damage to the control unit in case of its falling down during transportation!
The control unit weighs more than 15 kg and contains electronic components. Persons may be injured and the electronic components may get damaged.

- Please consider the weight of the package stated on the side label for its handling and shipping.
- Use the required personal protective equipment during its handling and shipping.

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 other purposes than the original intended use! SCHUNK GmbH & Co. KG provides neither implicit nor explicit declarations about any 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 the product from all devices.

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

13 Spare parts

For any spare parts request and / or replacement, please contact our service department.