Control Unit
TRIBOX

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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Reg. No. 003496 QM08 Reg. No. 003496 QM08

Table of Contents

1 About this manual

The present manual 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 radial chucks for circular grinding and turning manufactured by the company SCHUNK GMBH & CO. KG

The control unit has to be installed on machine tools for the clamping and machining of workpieces and must operate 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 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 same is not used in accordance with its intended purpose.
- it 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.

Always wear protective equipment.

PLEASE NOTE
More information is contained in the relevant chapters.

2.3.1 Protective equipment

Provide protective equipment according to the EC Machinery Directive.

2.4 Personnel qualification

Assembly, initial commissioning, maintenance, and repair of the control unit 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 is linked to a magnetic system. The following groups of persons must therefore 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 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:

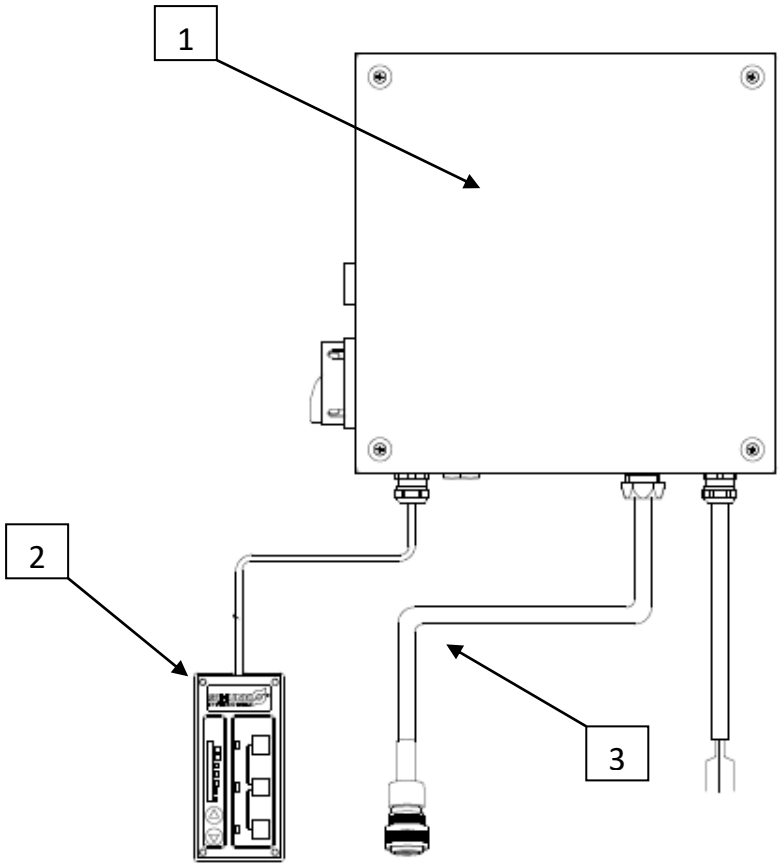
- Intended use in 1-shift operation
- Observe the mandatory maintenance and lubrication intervals.
- Observe the environmental and operating conditions.

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

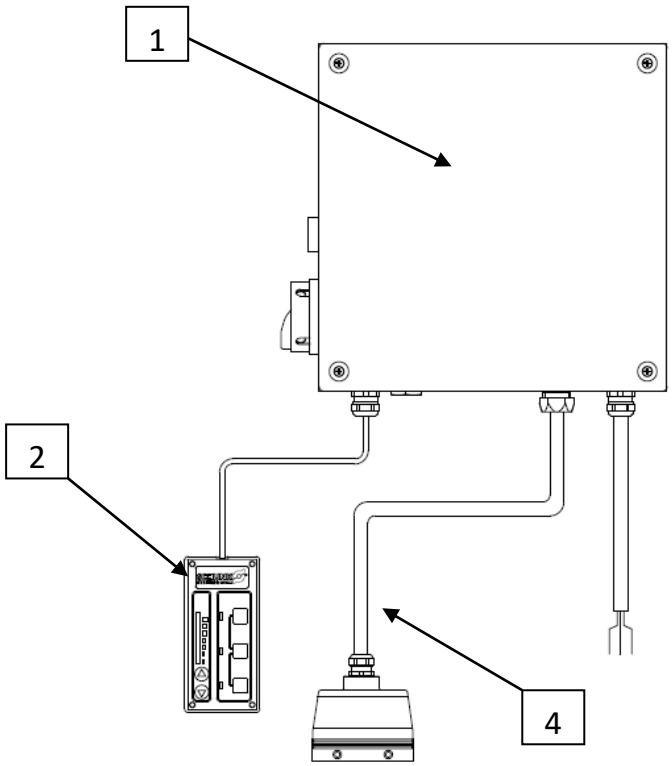
Procedure in the event of warranty

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

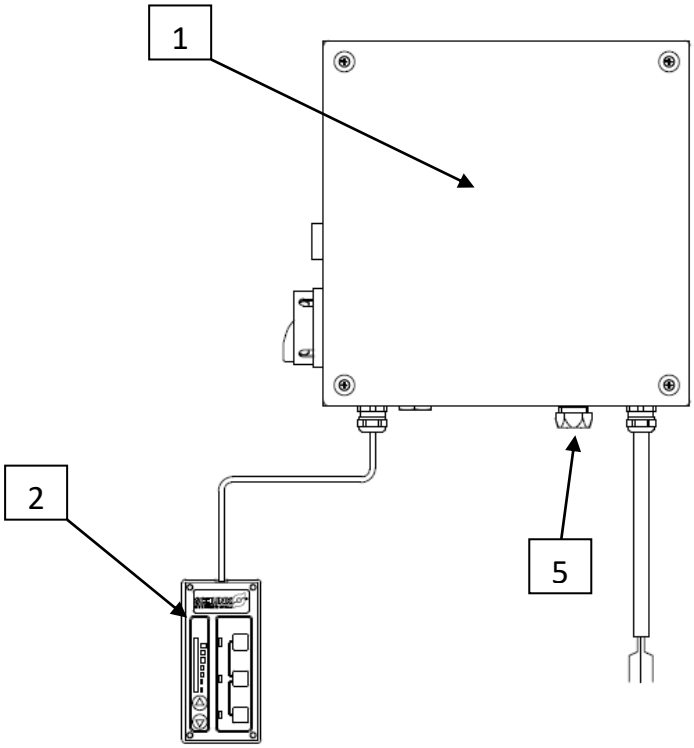
4 Scope of delivery



Pic. 1 Type 0420606, 0420607, 0420612 e 0420613 for radial chucks with circular connector



Pic. 2 Type 0420608, 0420609, 0420614 e 0420615for radial chucks with ILME connector



Pic.. 3 Type 0420604, 0420605, 0420610 e 0420611 for radial chucks with connections at customer's care

The scope of delivery includes for all types:

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

The output for the connection to the module varies according to the type of control unit, i.e.:

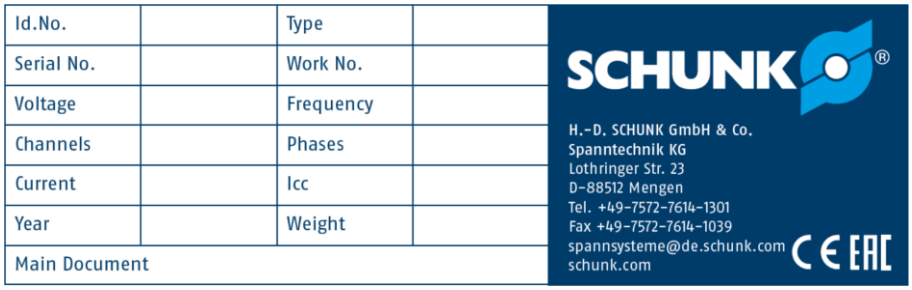
Connection cable	Type
5 meter armoured cable for single-channel control unit with circular female connector featuring 4 pins (3)	0420612
	0420606
5 meter armoured cable for two-channel control unit with circular female connector featuring 7 pins (3)	0420613
	0420607
5 meter armoured cable for single-channel control unit with female ILME connector (4)	0420614
	0420608
5 meter armoured cable for two-channel control unit with female ILME connector (4)	0420615
	0420609
Cable gland for single-channel control unit with connections at customer's care (5)	0420610
	0420604
Cable gland for two-channel control unit with connections at customer's care (5)	0420611
	0420605

5 Technical Data

Type	0420612	0420606	0420613	0420607	0420614	0420608	0420615	0420609	0420610	0420604	0420611	0420605
Mains voltage	400 VAC											
Frequency	50Hz / 60Hz											
Phases	2 + PE for 400 VAC											
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)	~ 1s	Not avail.	~2,5s	Not avail.	~ 1s	Not avail.	~2,5s	non disp.	~ 1s	Not avail.	~2,5s	Not avail.
Activation time (demagnetization)	~ 1s	Not avail.	~2,5s	Not avail.	~ 1s	Not avail.	~2,5s	non disp.	~ 1s	Not avail.	~2,5s	Not avail.
Weight	~ 8Kg	~ 8Kg	~ 9Kg	~ 9Kg	~ 8Kg	~ 8Kg	~ 9Kg	~ 9Kg	~ 8Kg	~ 8Kg	~ 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:

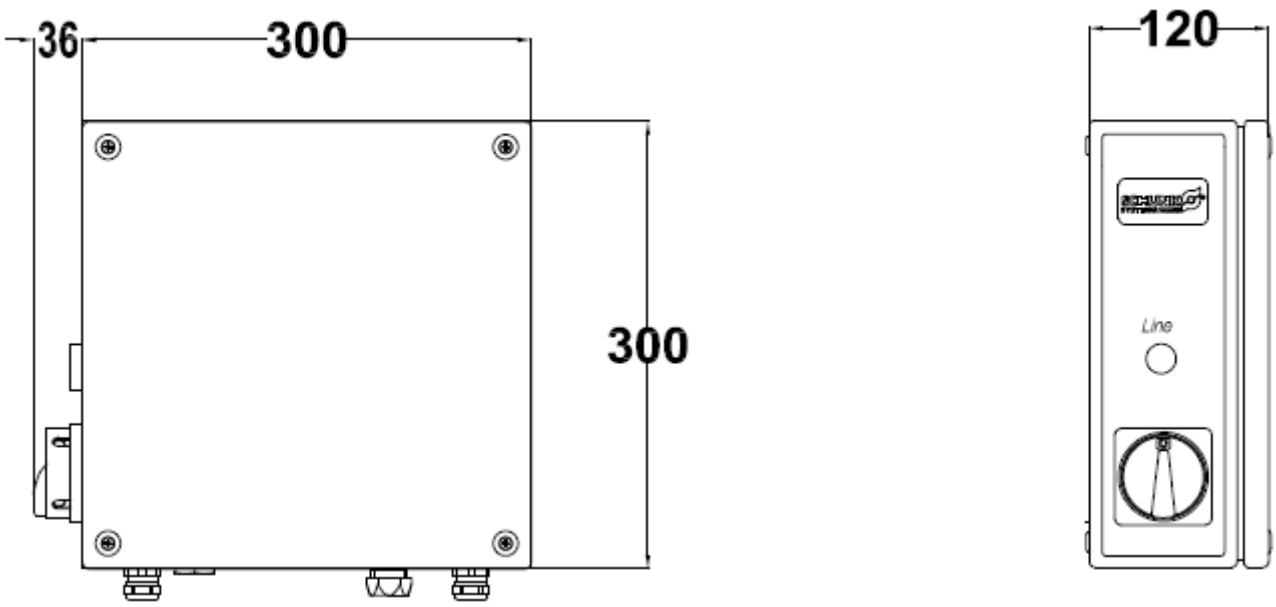


Pic. 4

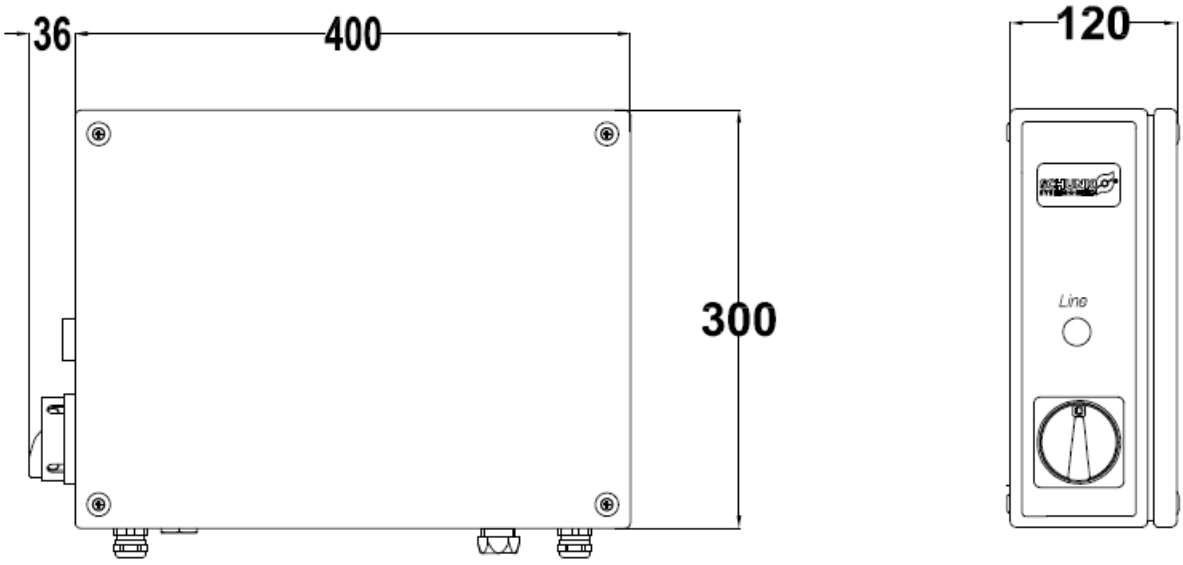
Information	Description
Id. No.	Product code no.
Type	Model
Serial No.	Product serial no.
Work No.	Product production no.
Voltage	Rated voltage (mains)
Frequency	Rated frequency (mains)
Channels	Number of output channels
Phases	Phases (mains)
Current	Rated current (mains)
Icc	Rated short-circuit data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



Pic. 5 Dimensions 0420612, 0420606, 0420610, 0420611, 0420604, 0420605, 0420614, 0420608



Pic. 6 Dimensions 0420613, 0420607, 0420615, 0420609

6 Description

6.1 Functioning description

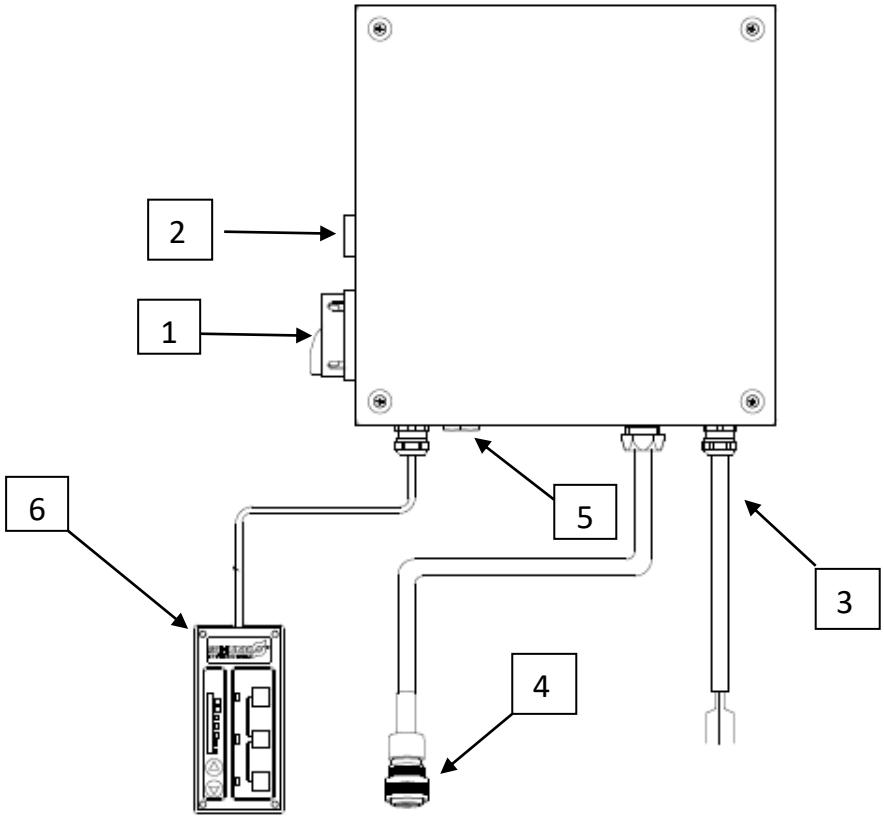
By using the electronic control by SCHUNK GMBH & CO. KG, the operator is able to magnetize and demagnetize small and large magnetic electro-permanent radial chucks.

The use of control units featuring 2 channels allows to clamp big ferromagnetic workpieces on two-channel magnetic chucks.

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

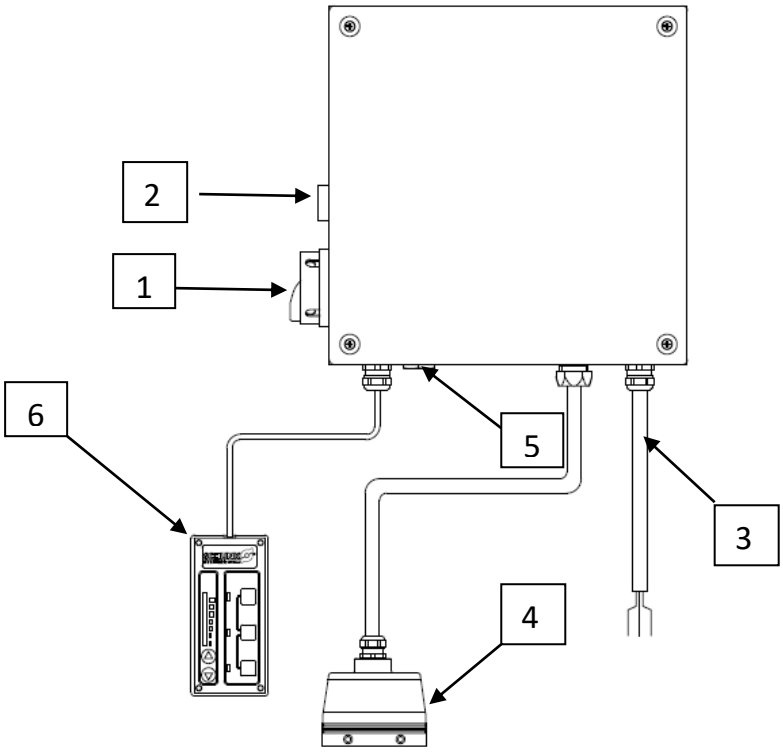
An electrical current monitoring system signals any possible functional irregularities in real time.

6.2 Product description



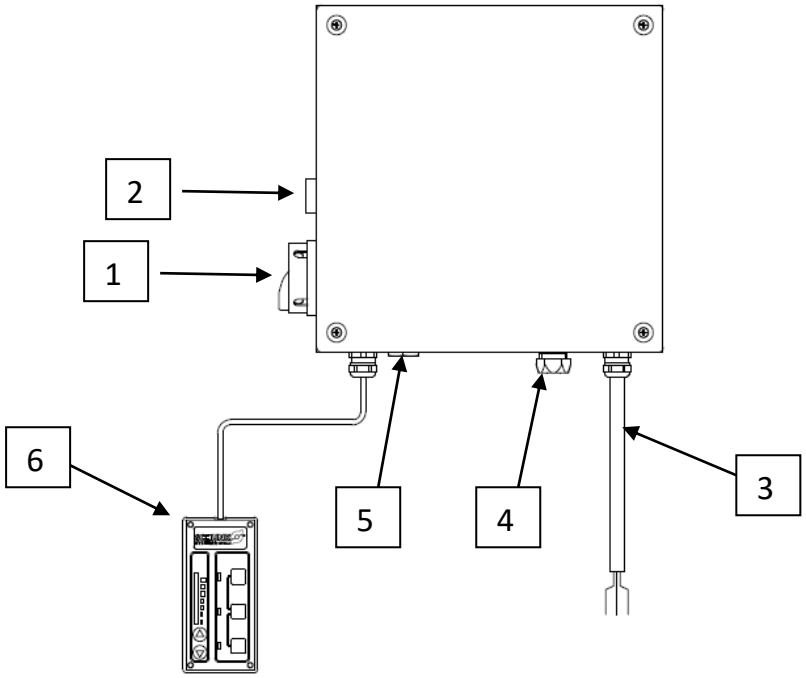
Pic. 7 0420612, 0420606, 0420613, 0420607 (picture for illustration purposes only)

1	Main switch
2	Warning light “Energized control unit”
3	Main power supply cable
4	CIR connector for the connection to the magnetic system
5	Connection to the machine enabling system
6	Remote control



Pic. 8 0420614, 0420615, 0420608, 0420609 (picture for illustration purposes only)

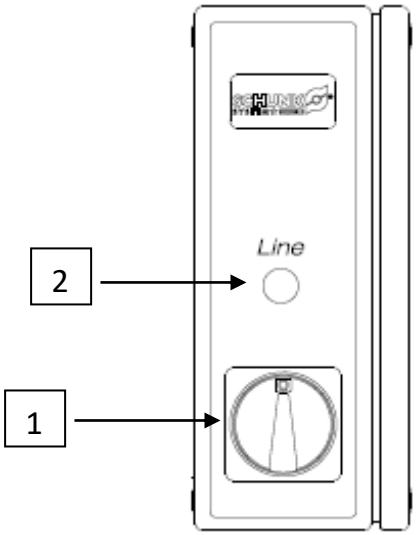
1	Main switch
2	Warning light “Energized control unit”
3	Main power supply cable
4	ILME connector for the connection to the magnetic system
5	Connection to the machine enabling system
6	Remote control



Pic. 9 0420610, 0420611, 0420604, 0420605

1	Main switch
2	Warning light “Energized control unit”
3	Main power supply cable
4	Cable gland for the connection to the magnetic system
5	Connection to the machine enabling system
6	Remote control

6.3 Control panel description



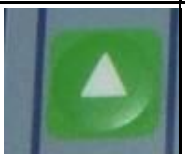
Pic. 10 for all types

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.

Pic. 11 Remote control with buttons / LEDs

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 Centres.

DANGER

Danger caused by short-circuits.
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" placed on the bottom part, ensure that it 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 and or to the magnetic system 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.

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 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 21), carry out installation based on the following notes:

1 Compare the performance data on the identification plate of the control unit 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 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.

ONLY FOR TYPE 0420610, 0420611, 0420604, 0420605:

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

- For type 0420610, connect the wire marked with U1 to the terminal U1 of the control unit and the wire marked with V1 to the terminal V1 of the control unit.
- For type 0420611 connect the wire marked with U1 to the terminal U1 of the control unit and the wires marked with V1 and V2 to the terminals V1 and V2 of the control unit.
- For type 0420604, connect the wire marked with U1 to the terminal U1 of the control unit and the wire marked with V1 to the terminal V1 of the control unit.
- For type 0420605 connect the wire marked with U1 to the terminal U1 of the control unit and the wires marked with V1 e V2 to the terminals V1 and V2 of the control unit.

4 Connect the power supply cable of the control unit to the mains according to the function diagram (☞ 8.3, page 51). Connect the brown wire of the supply cable to the terminal L1 of the plug, the black wire to the terminal L2, and the green/yellow wire to the terminal PE.

The following devices must be installed upstream to the control unit in order to protect the same as well as other devices and persons:

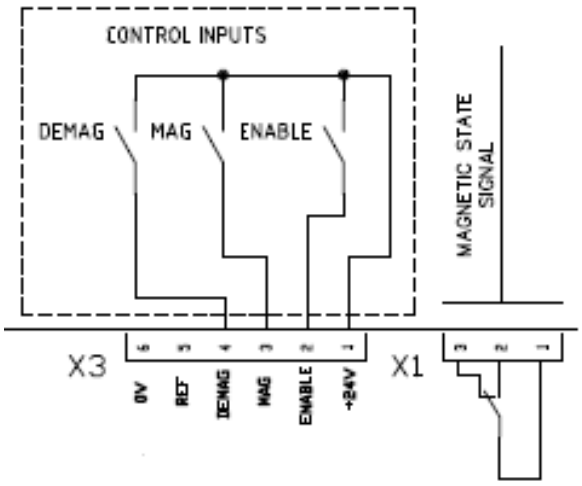
1 Protection device for overcurrent, i.e. fuse or circuit breakers. This device must comply with the specifications on the wiring diagram of the control unit and always with the relevant regulations and standards applicable in the country of installation and operation. These devices must be designed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

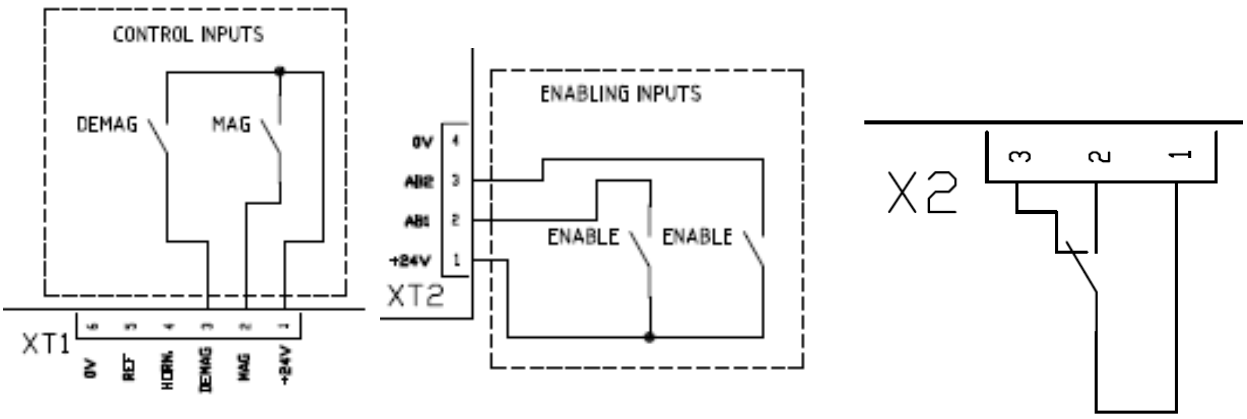
Automatic power off must be checked at the end of installation!

7.3 Connection to the machine enabling system / PLC

The control unit can be connected to the machine tool through 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:



Pic. 12 Recommended connections for type 0420612, 0420606, 0420610, 0420604, 0420612, 0420606



Pic. 13 Recommended connections for type 0420613, 0420607, 0420611, 0420605, 0420615, 0420609

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

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

0420612, 0420606, 0420610, 0420604, 0420614, 0420608

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		Demagnetization
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).

0420613, 0420607, 0420611, 0420605, 0420615, 0420609

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

8 Initial commissioning and normal operation

8.1 Initial commissioning

After having installed the control unit (☞ 7.2, Page 22) and connected it to the machine tool (☞ 7.3, Page 25), the following proper functioning must be checked:

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

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

⚠ WARNING

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

2 Place the workpiece onto the magnetic chuck.

Only for the types 0420612, 0420606, 0420613, 0420607, 0420614, 0420615, 0420608, 0420609 (see from point 3 to 6):

3 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.

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

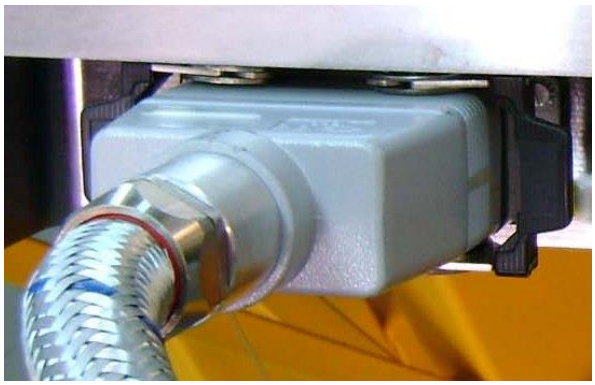
Pic. 15

Pic. 16

5 For the control units type 0420612, 0420606, 0420613, 0420607 connect the discharge cable (reinforced) with CIR connector to the magnetic chuck.

Pic. 17

Pic. 18



Pic. 19

6 For the control units type 0420614, 0420615, 0420608, 0420615 connect the discharge cable (reinforced) with ILME connector to the magnetic chuck.

<u>Only for control units type 0420610, 0420604, 0420611, 0420605 (see point 7):</u>

7 Remove the top cover of the control unit and connect the magnetic chuck to the same in the following way:

- For type 0420610, connect the wire marked with U1 to the terminal U1 of the control unit and the wire marked with V1 to the terminal V1 of the control unit.
- For type 0420611 connect the wire marked with U1 to the terminal U1 of the control unit and the wires marked with V1 and V2 to the terminals V1 and V2 of the control unit.

- For type 0420604, connect the wire marked with U1 to the terminal U1 of the control unit and the wire marked with V1 to the terminal V1 of the control unit.
- For type 0420605 connect the wire marked with U1 to the terminal U1 of the control unit and the wires marked with V1 e V2 to the terminals V1 and V2 of the control unit.

Pic. 20

8 Turn main switch to "I".

⇨The control unit is switched on.

Pic. 21

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

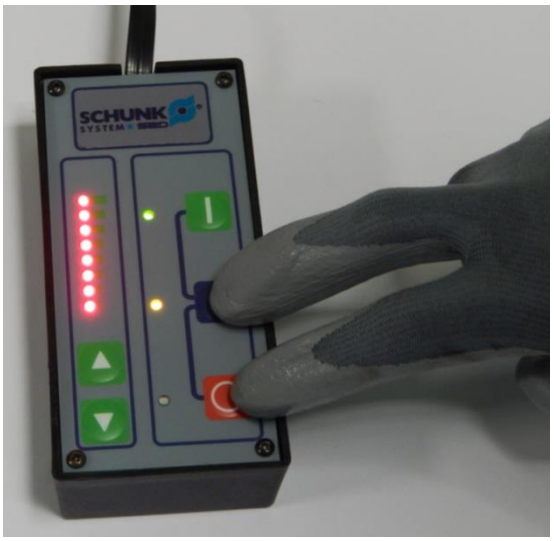
Pic. 22

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

Pic. 23

11 Check the LEDs status on the remote control after the magnetization time (☞ 5, Page 12). GREEN LED: LIGHTS UP; RED LED: OFF; ORANGE 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 onto the magnetic chuck, by taking suitable safety precautions!



Pic. 24

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

Pic. 25

13 Check the LEDs status on the remote control after the demagnetization time (☞ 5, Page 12). RED LED: LIGHTS UP; GREEN LED: OFF; ORANGE 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!

Pic. 26

14 Turn main switch to "O".

⇨ The control unit is switched off.

<u>Only for the control units type 0420612, 0420606, 0420613, 0420607, 0420614, 0420615, 0420608, 0420609 (see from point 15 to 17)</u>

15 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.

16 Remove the discharge cable from the magnetic chuck.

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

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

18 Remove the workpiece from the magnetic chuck.

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

8.2 Normal operation

To guarantee a proper magnetization or demagnetization, please proceed as follows:

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 safe distances!

2 Place the workpiece onto the magnetic chuck.

Only for the types 0420612, 0420606, 0420613, 0420607, 0420614, 0420615, 0420608, 0420609(see from point 3 to 6)

3 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.

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

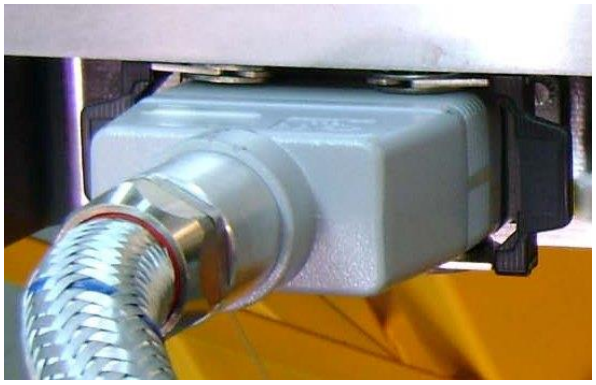
Pic. 27

Pic. 28

5 For the control units type 0420612, 0420606, 0420613, 0420607 connect the discharge cable (reinforced) with CIR connector to the magnetic chuck.

Pic. 29

Pic. 30



Pic. 31

6 For the control units type 0420614, 0420615, 0420608, 0420615 connect the discharge cable (reinforced) with ILME connector to the magnetic chuck.

Pic. 32

7 Turn main switch to "I".

⇨The control device is switched on.

Pic. 33

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

Pic. 34

9 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.

Pic. 35

Pic. 36

Pic. 37

10 Check the LEDs status on the remote control after the magnetization time (☞ 5, Page 12). GREEN LED: LIGHTS UP; RED LED: OFF; ORANGE LED: ALWAYS ON.

Pic. 38

11 Turn main switch to "O".

⇨The control unit is switched off.

Only for the control units type 0420612, 0420606, 0420613, 0420607, 0420614, 0420615, 0420608, 0420609 (see from point 12 to 14):

12 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.

WARNING

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

13 Remove the discharge cable from the magnetic chuck.

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

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 now properly clamped onto the magnetic chuck, by taking the suitable safety precautions!

15 **The workpiece can now be machined**.

<u>Only for the control units type 0420612, 0420606, 0420613, 0420607, 0420614, 0420615, 0420608, 0420609 (see from point 16 to 19)</u>

16 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.

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

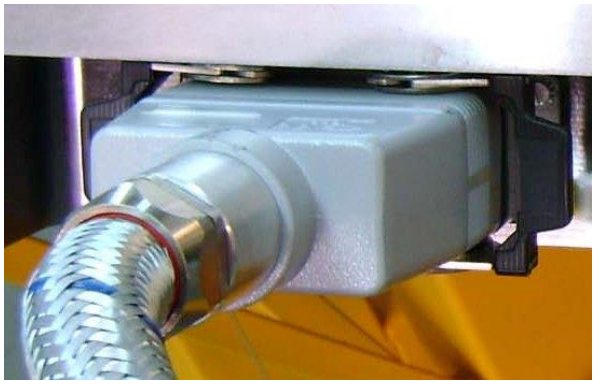
Pic. 39

Pic. 40

18 For the control units type 0420612, 0420606, 0420613, 0420607 connect the discharge cable (reinforced) with CIR connector to the magnetic chuck.

Pic. 41

Pic. 42



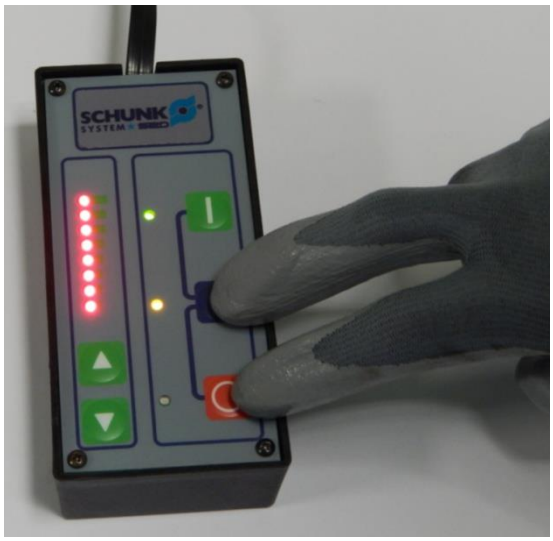
Pic. 43

19 For the control units type 0420614, 0420615, 0420608, 0420615 connect the discharge cable (reinforced) with ILME connector to the magnetic chuck.

Pic. 44

20 Turn main switch to "I".

⇨The control device is switched on.



Pic. 45

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

Pic. 46

22 Check the LEDs status on the remote control after the demagnetization time (☞ 5, Page 12). RED LED: LIGHTS UP; GREEN LED: OFF; ORANGE 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!

Pic. 47

23 Turn main switch to "O".

⇨The control unit is switched off.

<u>Only for the control units type 0420612, 0420606, 0420613, 0420607, 0420614, 0420615, 0420608, 0420609 (see from point 24 to 26):</u>

24 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.

25 Remove the discharge cable from the magnetic chuck.

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

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

27 Remove the workpiece from the magnetic chuck.

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

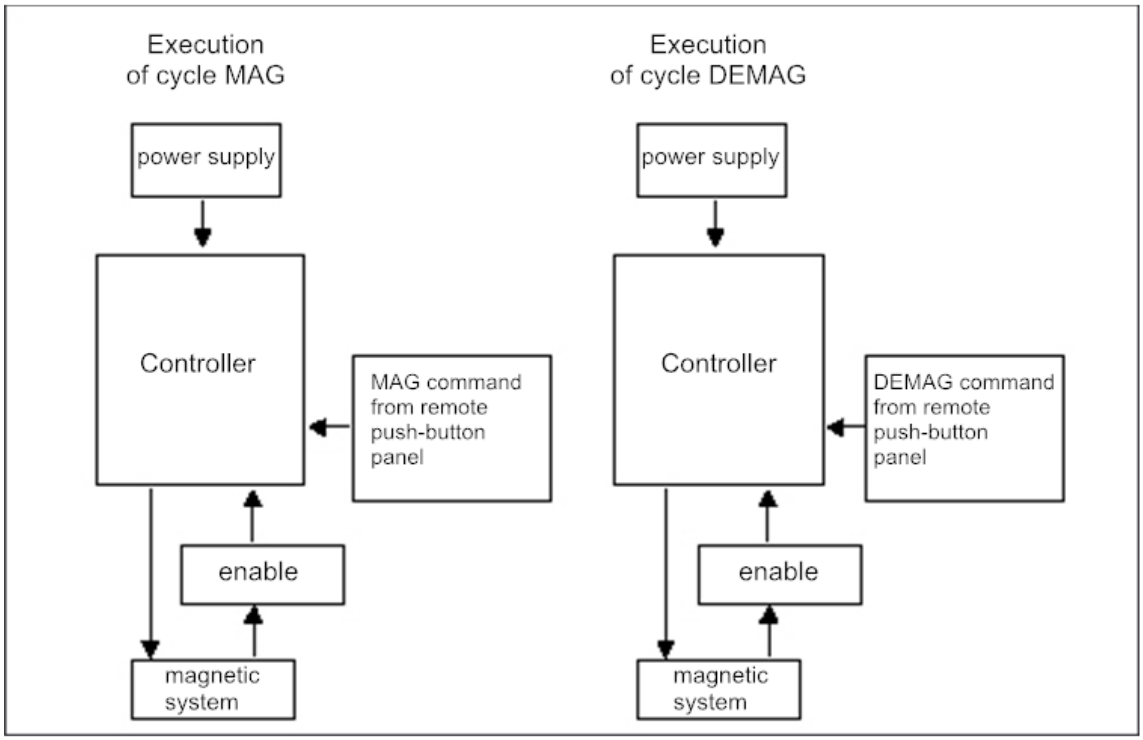
NOTICE

Damage to the magnetic chuck 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!

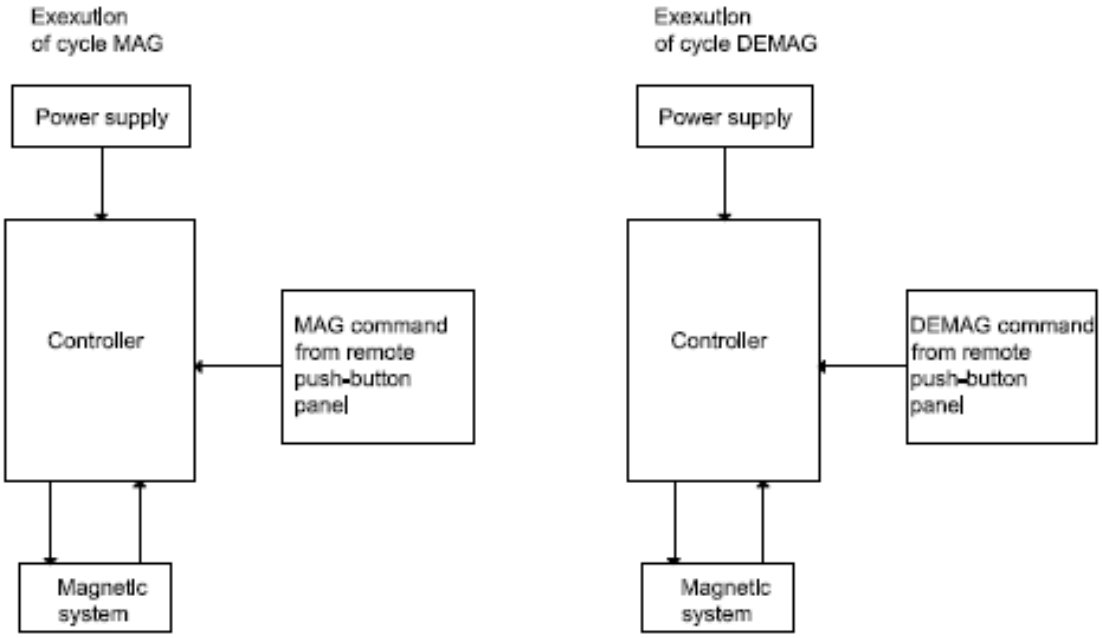
8.3 Function diagram

The following diagram shows the operation sequences of the control unit type 0420612, 0420613, 0420606, 0420607, 0420615, 0420608, 0420609:



Pic. 48

The following diagram shows the operation sequences of the control unit type 0420611, 0420605, 0420610, 0420604:



9 Troubleshooting

Problem	Possible cause	Corrective action
No (de-) magnetization	The control unit is switched off.	Turn main switch to "I" position (not to "O").
	The connection cable is not connected.	Check all the connections between the control unit and the magnetic chuck.
	Only for control units with connection made by customer: The connection cable upstream and downstream to the slip ring is not connected.	
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 the 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 the 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 (only for type 0420612, 0420606, 0420613, 0420607,0420614, 0420615, 0420608, 0420609.	
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 regularly check the state of the power and connection cables to the magnetic system, and to replace them if necessary. Do not bundle cables! The discharge cable and 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 qualified electricians. 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 inconveniences.

Activity	Description	Frequency			
		Each time before switching on	Once a week	Once a month	Once a year
Inspect the connection cable to the magnetic chuck	Check the protective sheathing of the discharge cable for damage.	•			
	Only for control units with connection made by customer: Check the connection upstream and downstream to the slip ring.	•			
Inspect the remote control cable	Check if the connection cable between remote control and control unit is damaged, etc.	•			
Check the identification plate / label on the control unit	Check the identification plate 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 the power cable	Check the power cable insulation for damage.		•		
Check LEDs	Check all the system indicators and warning lamps (control unit and remote control) for proper functioning.		•		
Check the safety button on 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 the 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 weighs more than 9 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 electronic 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 the SCHUNK GmbH & Co. KG service department.