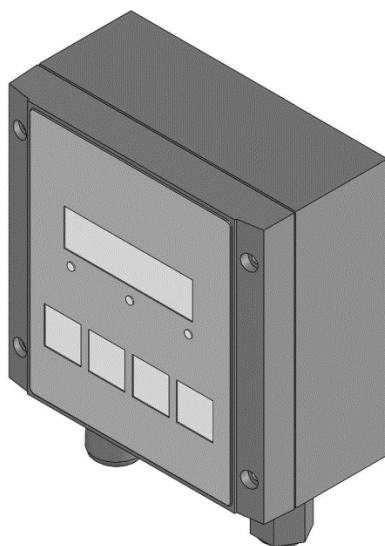


User manual

Vibration control

RMA-POWER-BOX 108



| | |
|----------------------------------|----------------------|
| RMA-POWER-BOX 108 Version | 2.2 |
| Document no. | HB_EN(US)_RMA108-2.2 |
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Ihr Zeichen

Ihre Nachricht vom

Unser Zeichen
AO

Date
Datum
17.02.2009

EU Konformitätserklärung

EU Declaration of Conformity

Gegenstand: RMA-POWER-BOX 108 24Volt

Product:

Hiermit erklären wir, dass das nachstehend bezeichnete Gerät in seiner Konzeption und Bauart sowie in der von uns gelieferten Ausführung mit folgenden Europäischen Richtlinien übereinstimmt:

We declare that the product complies with the requirements of the following European directives:

EMV Richtlinie 2004/108/EG EMC Directive No.: 2004/108/EC

Niederspannungsrichtlinie 2006/95/EG Low Voltage Directive No.: 2006/95/EC

RoHS Richtlinie 2002/95/EG RoHS - Directive 2002/95/EC

Die Übereinstimmung des bezeichneten Gegenstandes mit den Anforderungen dieser Richtlinien wurde geprüft durch Anwendung folgender Normen:

The compliance of the above product with the requirements of this directives was proved by the application of the following standards:

EN61000-6-1:2007 Störaussendung Wohnbereiche Emission Residential

EN61000-6-4:2007 Störfestigkeit Industriebereiche Immunity Industrial environment

Angewandte Prüfnorm:

Applied test standard:

EN55011:2009 Störaussendung: ISM-Geräte – Grenzwerte und Messverfahren

Emission: ISM-Devices - Limits and methods of measurement



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|---------|------------|---|-----------|
| 1.0 | | Version 1.0 | |
| 2.0 | 06/18/2020 | Revised and adapted to the new K & S standard | K. Werner |
| | | | |
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1. Information about this user manual

This user manual contains all information about the proper use, correct installation, commissioning, operation, storage and disposal of the RMA-POWER-BOX (referred to as RMA in the following).

i *In the usage instructions, gender-differentiating pronouns and job designations were not used both for the sake of brevity and for ensuring a gender-neutral language. If this document refers to “operator” or “user”, these of course relate to both genders.*

Please observe the following:

- This user manual is part of the RMA.
- It must always be made available to the user.
- It must always be stored in close proximity to the RMA for its entire lifespan.

Standardized illustrations

The illustrations in this user manual correspond to the described RMA to the greatest possible extent. A few of the figures are standardized illustrations which may deviate slightly from the actual RMA.

Use the user manual

The information in this user manual is binding. Each person handling the RMA must previously have read and understood the user manual in its entirety. The instructions, prohibitions and orders in this user manual must always be followed, and all safety instructions must be observed.

When using this user manual, you must pay attention to the symbols and abbreviations used.

1.1. Typographic conventions

| Format | Meaning |
|---------------|--|
| <i>Italic</i> | General information |
| Bold | Important information which should be emphasized in particular |

Table 1: Typographic conventions

1.2. Abbreviations in these instructions

| Abbreviation | Meaning |
|--------------|---|
| EMC | Electromagnetic compatibility |
| GSD | General station description file for Profibus |
| K & S | Köberlein & Seigert GmbH |
| r/w | read/write |
| RMA | Solenoid control (RMA-POWER-BOX) |
| PLC | Programmable logic controller |

Table 2: Abbreviations

1.3. Symbols in these instructions

In the following, the symbols used in this user manual are explained.

General symbols









| Symbol | Meaning |
|---|---|
|  | General additional information, helpful tips and supplementary information |
|  | Read the safety instructions before using the RMA; not observing these may lead to injuries and material and environmental damage |
|  | Information which, if not observed, can lead to environmental damage |
|  | Information which, if not observed, can lead to material damage |
|  | Reference to detailed work stages in the form of work instructions |
|  | Position labeling of operating buttons or display elements |
|  | An action or activity which is required to carry out a work stage |
|  | Result or outcome of an action or activity |

Table 3: General symbols

Signal colors for safety information

The following signal colors are used in the safety instructions to highlight hazards. The signal colors conform with the DIN ISO 3864 standard (ASR A1.3 / DIN EN ISO 7010:2012-10).



| Signal color | Meaning |
|---|---|
|  | DANGER: indicates a hazard with a high degree of risk which, if not avoided, will result in death or severe injury. |
|  | ORDER: indicates a standard of conduct which commands a certain behavior. |

Table 4: Safety information signal colors

Warning signs

The following symbols are used in the safety instructions to highlight hazards. The warning signs conform with the DIN ISO 3864 standard (ASR A1.3 / DIN EN ISO 7010:2012-10).




| Symbol | Meaning |
|---|--------------------------------|
|  | General warning signs |
|  | Warning of electrical voltage |
|  | Warning of flammable materials |

Table 5: Safety and warning symbols

Mandatory signs


| Symbol | Meaning |
|---|--------------------|
|  | Remove power cable |

Table 6: Mandatory signs

Prohibitory signs


| Symbol | Meaning |
|---|--------------------------------------|
|  | No access for unauthorized personnel |

Table 7: Prohibitory signs

2. Copyright

This user manual is protected by the copyright of Köberlein & Seigert GmbH. Any reproduction of the whole document or excerpts of it and/or the forwarding of this to third parties is only permitted with prior written permission from Köberlein & Seigert GmbH.

Use of trademarks

The names of companies and products used in this document may be registered trademarks of the respective owner.

3. Warranty

Compliance with the user manual is the requirement for operating the RMA without faults and for the fulfillment of any warranty claims. For this reason, read the user manual before you work with the device.

Köberlein & Seigert GmbH assumes no responsibility and warranty, and will dismiss any claims against third parties if personal injury or material damage are the result of one or more of the following causes by the operator or a third party:

- Improper use of the RMA,
- Non-observation of the information and instructions in this user manual,
- Non-observation of the prescribed usage limitations and conditions,
- Improper installation, commissioning and operation of the RMA,
- Modifications to the RMA,
- Use of unapproved accessories.

4. Information for your safety

You can find all the information relating to safety in this chapter. Read thoroughly all safety and warning information before handling the RMA and observe these during use.

The safety information draws your attention to the dangers of possible personal injury, material damage and damage to the environment, and contains information about how to avoid and prevent hazards. As well as the safety information listed in the following, the safety and accident prevention requirements applicable at the site of use also apply, as does the Industrial Safety Regulation (Betriebssicherheitsverordnung BGV A1).



We reserve the right to make changes to the technical data and structures in the interest of technical progress.

4.1. General safety information

Throughout the whole user manual, pay attention to this symbol which refers to the chapter “Information for your safety”.



When handling the RMA, the safety information in the chapter “Information for your safety” must be observed to prevent personal injury, material damage and environmental damage!

To ensure safe handling of the RMA, the user must pay attention to the following:

- The RMA controls oscillating mechanical machine components (Köbrator or vibrating conveyor). Contact with moving machine components may lead to crushing and injuries to the hands and arms.
For this reason, maintain a safety distance and do not reach into moving machine parts.
- Using damaged electrical devices is dangerous.
Never put a damaged RMA into operation. Check the device for packaging damage and report any damage immediately. If the RMA is taken into storage, observe the storage conditions in the chapter on “Storage”.
- Personnel without sufficient qualifications or inadequate technical knowledge may cause accidents involving personal injury or material damage.
This is why connection, installation, operation, repair work and fault removal must only be carried out by qualified technical personnel. The RMA user manual, all circuit diagrams related to the RMA and the currently applicable national and international regulations regarding safety and accident prevention must always be taken into consideration here.
- Protective measures and safety features must meet the applicable national regulations (e.g. VDE 0100 T410 / VDE 0113-1 T1 or DIN EN 60204-1 / VDE 0160).
The RMA must therefore be earthed and a fuse must be integrated (device fuse provided).

We in particular refer to the following fundamental risks and hazards when handling the RMA:



Danger of death due to electric shock!

When working on live parts and cables, there is a risk of severe injury due to electric shocks which may lead to ventricular fibrillation, cardiac arrest or respiratory paralysis with a fatal outcome

- ▶ Deenergize the RMA before all work, e.g. by shutting off the fuse belonging to the power circuit and any upstream (external) fuses, if present
- ▶ Observe the warning signs affixed to the electrical equipment
- ▶ Do not touch components or parts which are not included in the deenergized power circuits



Fire hazard!

The RMA is designed exclusively for operation in a DC voltage grid (rated voltage 24 V DC). An incorrectly connected RMA can trigger a short-circuit fault and cause a fire.

- ▶ Electrical works must be carried out by qualified and trained electricians
- ▶ The RMA must be earthed via the power supply line
- ▶ Observe the data on operating voltage in the chapter "Technical data"

Specific warning information is listed at the beginning of a chapter or precedes the related work instruction. This warning information is structured as follows:



SIGNAL WORD

Type, source and consequences of the hazard

- ▶ Measure(s) to avoid or prevent the hazard

4.2. Qualification of personnel

Within the meaning of this user manual, handling the RMA is generally only permitted for qualified personnel who meet the following requirements:

- They are familiar with the connection, installation, operation, repair work and fault correction of the device as well as the associated hazards.
- They hold qualifications suitable for their duties, such as:
 - Training or instruction or permission to connect and disconnect, earth and label electrical circuits and devices according to the technical safety standards.
 - Training or instruction according to the technical safety standards in the maintenance and use of appropriate safety equipment

Throughout the whole usage instructions, pay attention to this symbol which indicates the authorized working methods of the personnel.



Only qualified technical personnel are authorized to connect, install, operate, carry out repair work and correct faults. Electrical works must be carried out by qualified and trained electricians. Here, the applicable occupational safety regulations must always be adhered to.

5. Intended use

The RMA may only be used to control the Köbrators or vibrating conveyors manufactured by Köberlein & Seigert GmbH.

Any use of the RMA for a purpose which differs from the purpose described in this chapter shall be considered improper use.

i *Köberlein & Seigert GmbH assumes no liability for personal injury or material damage resulting from the improper use of the RMA and its accessories. In these circumstances, the operator bears sole responsibility!*

6. Product identification

A type label is affixed to the RMA which allows you to identify the product precisely. The operator must ensure that the type label is replaced when damaged or lost.

The information on the type label about the version and serial number varies.

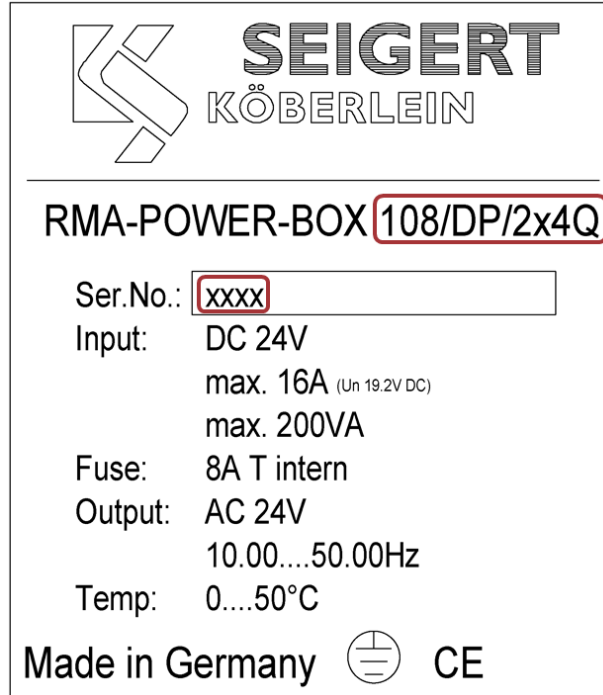


Figure 1: Type label

The RMA-POWER-BOX 108 is available in the following versions:

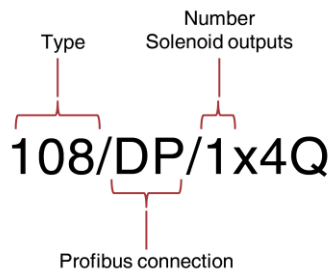


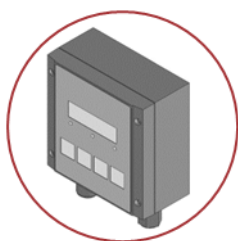
Figure 2: RMA – Versions

| RMA version | Profibus connection | Solenoid outputs |
|-------------|---------------------|----------------------|
| 108/1x4Q | No | One solenoid output |
| 108/2x4Q | No | Two solenoid outputs |
| 108/DP/1x4Q | Yes | One solenoid output |
| 108/DP/2x4Q | Yes | Two solenoid outputs |

Table 8: RMA – Versions

7. Product description

In the following, the function of the RMA and the elementary components are described.



The RMA acts as a central control element to control the oscillatory motion of the Köbrator or vibrating conveyor. The vibration power and frequency are set using the RMA.

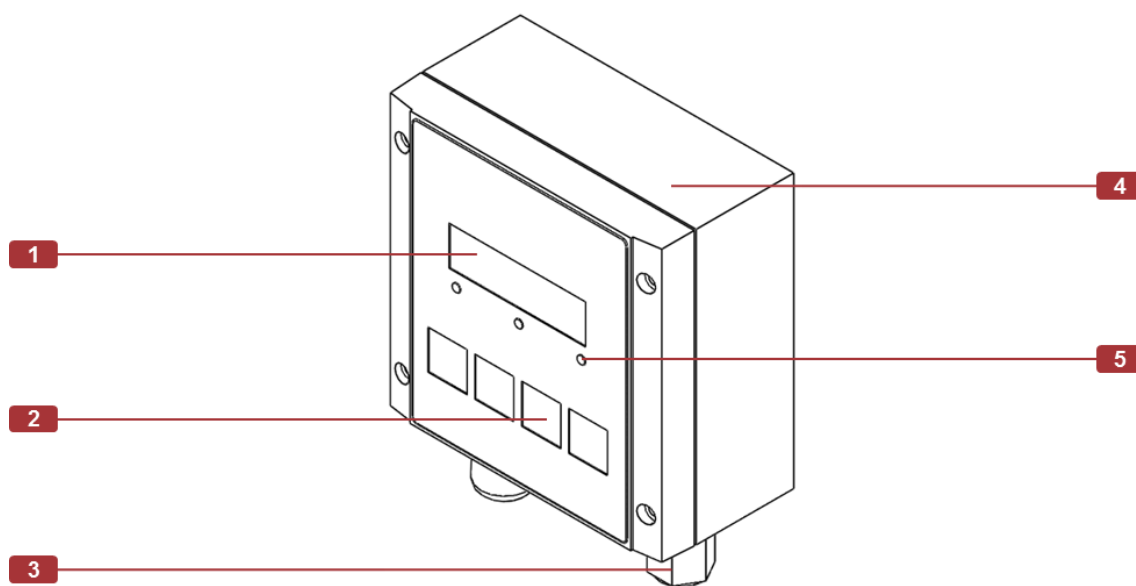


Figure 3: RMA – Overall view

1 Display

2 Operating buttons

3 Connections

4 Housing

5 Status displays

8. Operating conditions

This chapter describes the operating conditions which must be present for proper use of the RMA.

| Factor | Value |
|--|--------------------------------|
| Operating ambient temperature (min.) | 0 °C |
| Operating ambient temperature (max.) | +50 °C |
| Maximum humidity | 50% at +40 °C 90% at +20 °C |
| Maximum installation height (height above sea level) | 1000 m |

Table 9: Operating conditions



CAUTION

If the actual conditions deviate from the operating conditions, the RMA must not be operated until the actual conditions correspond to the operating conditions. Before commissioning the RMA, always check that all operating conditions are adhered to.

9. Installation

This chapter contains all the important information about the mechanical and electrical installation of the RMA. The following points of standard DIN EN 60204-1 must be observed: Point 12.1, point 12.5, point 13.1.3.



Only qualified technical personnel are authorized to carry out installation. Electrical works must be carried out by qualified and trained electricians.



When handling the RMA, the safety information in the chapter “Information for your safety” must be observed to prevent personal injury, material damage and environmental damage!

9.1. Mechanical and electrical installation

The individual work stages for installing the RMA are described below. Work stages 2 to 4 must only be carried out if the RMA is supplied separately. If the RMA has already been mounted by Köberlein & Seigert GmbH, you can skip work stages 2 to 4.



DANGER

Fire hazard due to crushed and damaged cables

- ▶ When closing the cover, ensure that there are no cables between the housing and the cover
- ▶ Do not commission the RMA if cables are crushed or damaged
- ▶ Replace crushed and damaged cables with new cables immediately



CAUTION

Minor injuries and crushing of jammed fingers

- ▶ When closing the cover, do not put your fingers between the housing and the cover
- ▶ Close the cover carefully

Required tools and/or software:

- Drill
- Bunsen burner or hot air gun
- Ferrite ring (included)
- Cable tie
- Cross-head screwdriver
- Solenoid connection line (included)
- Set of wrenches
- Power plug (included)
- Shrink tubing (included)
- Wire cutters
- Pen to mark the drill holes

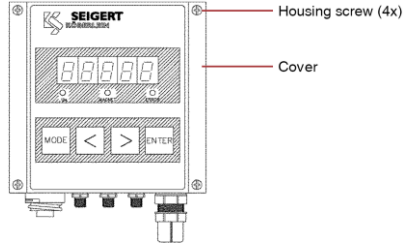
The work stages are as follows:

1. Disconnect the power supply



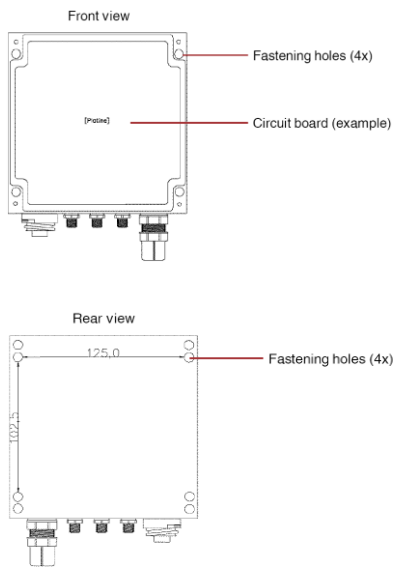
- ▶ Deenergize the machine (switch off the main switch)
- ▶ Secure the machine against restarting

2. Open the cover (optional)



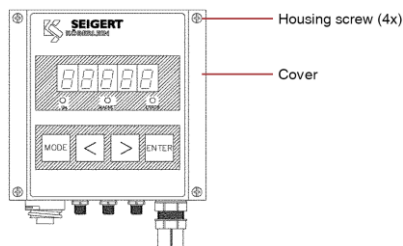
- ▶ Loosen the housing cover screws
 - ▶ Place the cover next to the housing
- CAUTION! Do not trap any cables!

3. Mount the RMA (optional)



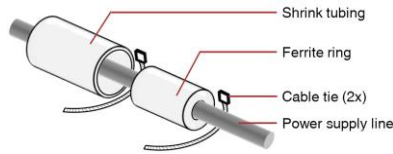
- ▶ Determine the position of the RMA
- IMPORTANT! The distance of the RMA to the Köbrator or vibrating conveyor must not exceed 10 meters.
- ▶ Mark the position of the drill holes
- NOTICE: Observe the following drill hole distances:
Horizontal = 125 mm
Vertical = 102.5 mm
- ▶ Drill the holes in the marked places
 - ▶ Mount the RMA via the intended fastening holes
- NOTICE: Use the following fastening screws: max. M4

4. Close the cover (optional)



- ▶ Fix the cover in place with the housing screws
- CAUTION! Do not jam or trap any cables between the cover and housing.

5. Attach the ferrite ring



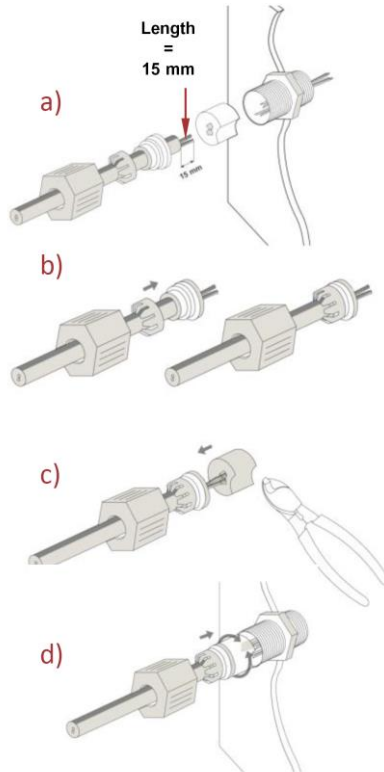
- ▶ Push the shrink tubing over the power supply line
- ▶ Push the ferrite ring over the power supply line
- ▶ Fix the ferrite ring to both sides with cable ties and cut off the protruding ends
IMPORTANT! The distance to the power plug must be max. 5.0 cm.
- ▶ Pull the shrink tubing over the ferrite ring and shrink
NOTICE: Use the Bunsen burner or hot air gun.

6. Connect the RMA to power

[See chapter “9.2 Connections and connection diagram”]

- ▶ Establish the electrical connections according to the connection diagram
IMPORTANT! The cross section of the power supply line must be 1.5 mm². For greater cable lengths, pay attention to the voltage drop!

7. Connect the RMA with the Köbrator



- ▶ Connect the cables “Solenoid output 1” or “Solenoid output 1 and 2”
IMPORTANT! Only the cable supplied may be used for the connection.
 When reconnecting a solenoid cable, ensure that this is stripped again so that a gas-tight contact point is created!
- ▷ RMA installed

9.2. Connections and connection diagram

The following diagram gives you an overview of the RMA connections.

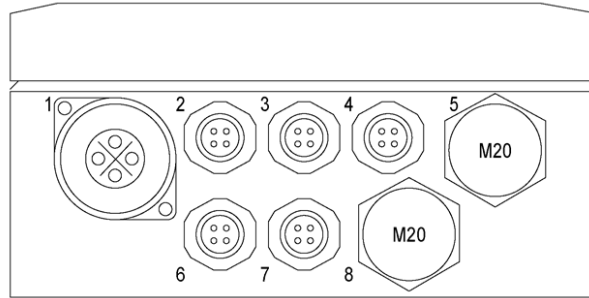


Figure 4: RMA – Connections

| No. | Function | Description |
|----------|--|--|
| 1 | Power supply | The power plug and ferrite ring including fastening materials are included in the delivery |
| 2 | Control, "Ready for operation" / "Fault" contact | M12 connector |
| 3 | Control, "Reset fault" (and alternatively, "Vibration on") | M12 connector |
| 4 | Control, "Vibration on" | M12 connector |
| 5 | Solenoid output 1 (for version RMA 108.../1x4Q or RMA 108.../2x4Q) | Plug and connection line included in the delivery IMPORTANT! Only the cable supplied may be used for the connection. |
| 6 | Profibus In (only for version RMA 108/DP/...) | M12 connector (B-coded) |
| 7 | Profibus Out (only for version RMA 108/DP/...) | M12 connection socket for routing Profibus (B coded) NOTICE: If the RMA is used as the last Profibus device, an M12 terminal resistor must be connected, e.g. Siemens 6GK1905-0EC00 |
| 8 | Solenoid output 2 (only for version RMA 108.../2x4Q) | Plug and connection line included in the delivery |

Table 10: Connections

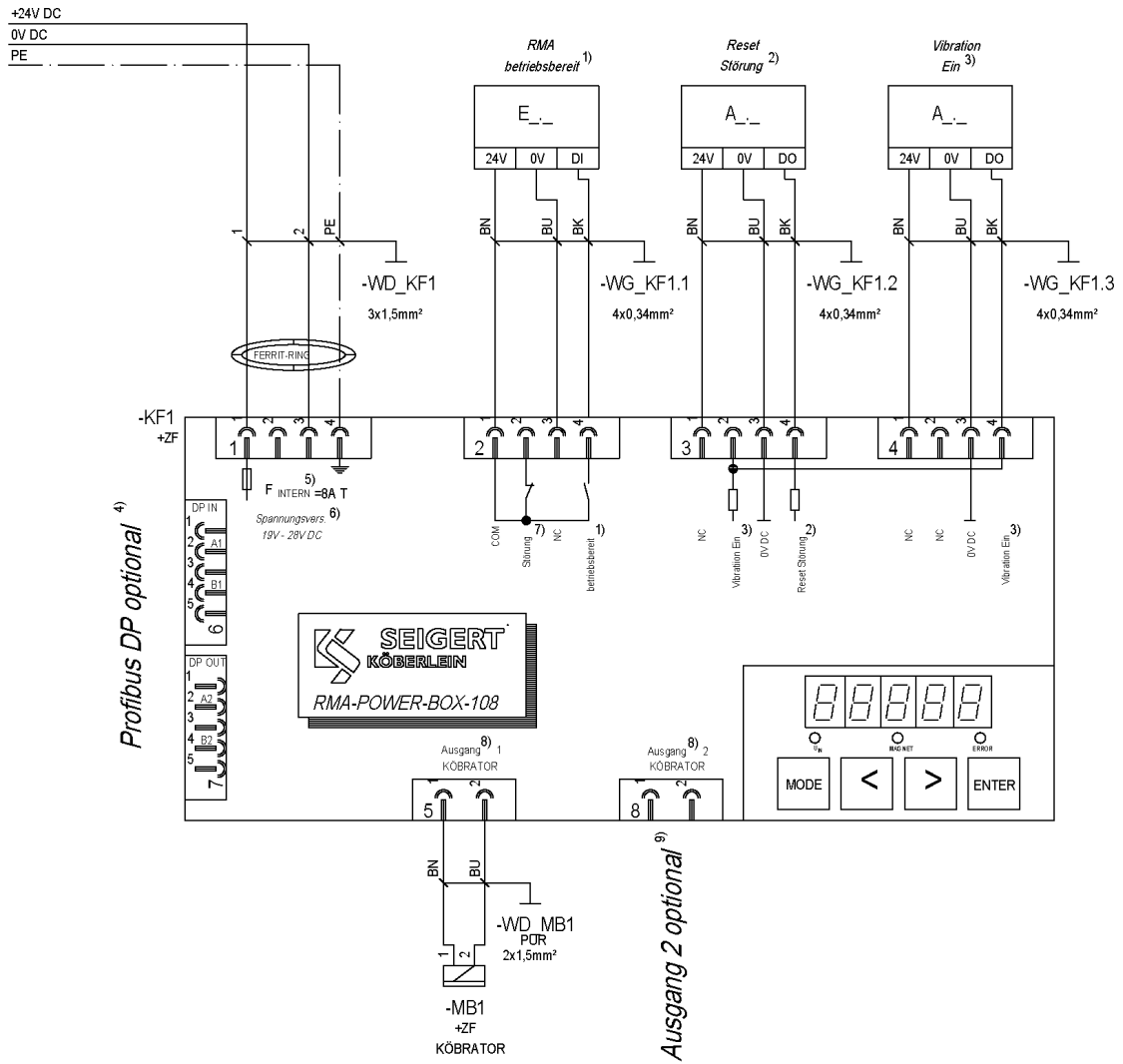


Figure 5: RMA – Connection diagram

- | | | | | | |
|----|-------|--------------------------------|----|-------|-------------------------|
| 1) | EN | ready for operation | 6) | EN | power supply |
| | FR | en ordre e marche | | FR | alimentation électrique |
| | HU | üzemkész | | HU | tápegység |
| | IT | in condizione di funzionamento | | IT | rifonimento di tensione |
| | PL | gotowy do pracy | | PL | zasilacz |
| | PT-BR | pronto para uso | | PT-BR | fonte de alimentação |
| | SK | prípravený na prevádzku | | SK | zdroj napätia |
| | SL | priljubljen za delovanje | | SL | napajanje |
| | SV | klar att tas i drift | | SV | elförsörjning |
| 2) | EN | reset error | 7) | EN | error |
| | FR | reset defaut | | FR | defaut |
| | HU | reset hiba | | HU | hiba |
| | IT | reset disturbo | | IT | disturbo |
| | PL | reset usterka | | PL | usterka |
| | PT-BR | falha de reset | | PT-BR | falha |
| | SK | reset porucha | | SK | porucha |
| | SL | ronastavitev motnje | | SL | motnja |
| | SV | reset störning | | SV | störning |

| | | | | | |
|----|-------|----------------------------|----|-------|-----------------------|
| 3) | EN | vibration on | 8) | EN | output |
| | FR | vibration marche | | FR | sortie |
| | HU | vibráció be | | HU | kimenet |
| | IT | vibrazione acceso | | IT | uscita |
| | PL | wibracja włączona | | PL | wyjście |
| | PT-BR | vibração on | | PT-BR | saída |
| | SK | vibrácie zap | | SK | výstup |
| | SL | vklop vibriranja | | SL | izhod |
| | SV | vibration till | | SV | utgång |
| 4) | EN | Profibus DP optional | 9) | EN | output 2 optional |
| | FR | Profibus DP facultatif | | FR | sortie 2 facultatif |
| | HU | Profibus DP választható | | HU | kimenet 2 választható |
| | IT | Profibus DP opzionale | | IT | uscita 2 opzionale |
| | PL | Profibus DP opcjonalne | | PL | wyjście 2 opcjonalne |
| | PT-BR | Profibus DP opcional | | PT-BR | saída 2 opcional |
| | SK | Profibus DP voliteľné | | SK | výstup 2 voliteľný |
| | SL | Izbirno vodilo Profibus DP | | SL | Izbirni izhod 2 |
| | SV | Profibus DP valfritt | | SV | utgång 2 valfritt |
| 5) | EN | internal | | | |
| | FR | interne | | | |
| | HU | belsőleg | | | |
| | IT | interno | | | |
| | PL | wewnętrzny | | | |
| | PT-BR | interno | | | |
| | SK | interne | | | |
| | SL | interno | | | |
| | SV | internt | | | |

10. Commissioning

Once installation is complete, the RMA can be commissioned.



Only qualified technical personnel are authorized to carry out commissioning.



When handling the RMA, the safety information in the chapter “Information for your safety” must be observed to prevent personal injury, material damage and environmental damage!

Required tools and/or software:

- RMA-POWER-BOX 108

The work stages are as follows:

- 1. Establish the power supply**
 - ▶ Switch on the power supply
NOTICE: The version of the RMA appears on the display for 3 seconds.
- 2. Check the function**
 - ▶ Check the display
NOTICE: After switching on, AUTO mode is always active. The solenoid can be switched on or off by a PLC via the input “Vibration ON” (connection no. 4 / PIN 4 or no. 3 / PIN 2), for example. When not controlled, “A 0” appears on the display; when controlled, the set vibration power value is displayed, e.g. “A 87”.
 - ▷ RMA commissioned

11. Operation

This chapter describes the fundamental use and menu structure of the RMA, including a detailed explanation of the operating buttons and displays, operating modes and setting parameters.

11.1. Operating buttons and status displays

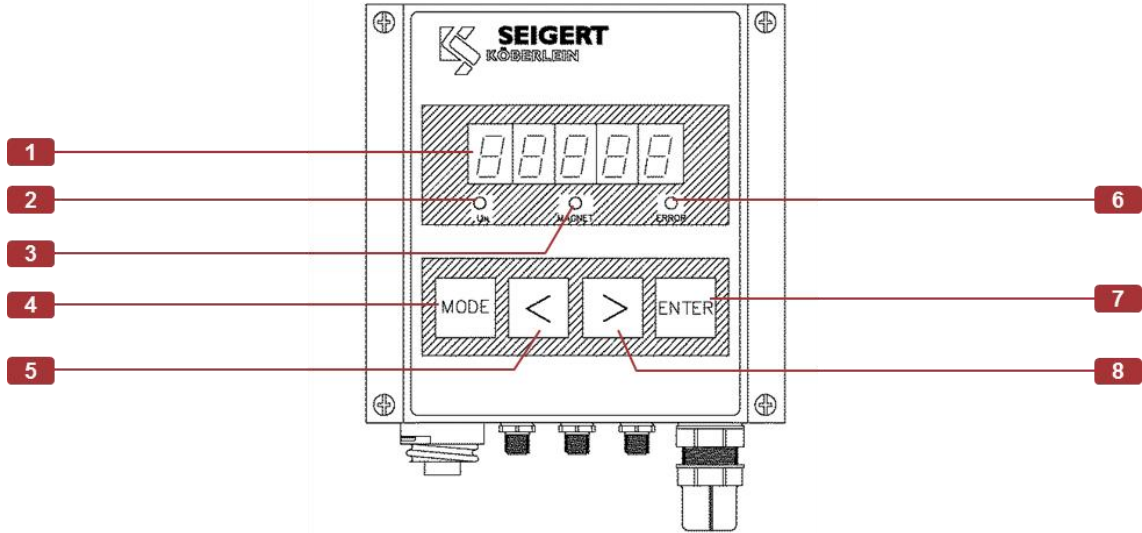


Figure 6: RMA – Operating buttons

| No. | Display / button | Function | Description |
|-----|---------------------|------------------------------------|--|
| 1 | Display | Shows functions, faults and errors | Display for all operating functions and information about the current status as well as faults and errors |
| 2 | Status-LED U_{in} | Shows power supply | Lights constant green when the device is connected to power |
| 3 | Status-LED MAGNET | Solenoid output display | Flashes green in the set solenoid output frequency when the output is active |
| 4 | MODE button | Changes the program parameters | Pressing the “MODE” button changes to the next operating mode or to the next setting parameter in the respective menu |
| 5 | < button | Reduce value | Gradual reduction of the set value(s) Holding the button down for longer starts a fast mode which allows you to change the setting values quickly |
| 6 | Status-LED ERROR | Shows faults and errors | Lights constant red when the device has identified an error |
| 7 | ENTER button | Confirms the set value(s) | Pressing the “ENTER” button accepts a set value; pressing and holding (3 secs) changes from the basic settings menu to the main menu |

| No. | Display / button | Function | Description |
|-----|------------------|----------------|---|
| 8 | > button | Increase value | Gradual increase of the set value(s) Holding the button down for longer starts a fast mode which allows you to change the setting values quickly |

Table 11: Operating buttons

11.2. Main menu

The user interface is subdivided into a main menu and a basic settings menu. In the main menu, the RMA can be configured in various operating modes to control the solenoid.

After switching on the RMA, AUTO mode is always active. If the device is in the basic settings menu, you can reach the main menu quickly by pressing and holding the ENTER button for 3 seconds.

11.2.1. Operating modes

| Mode | Description |
|---------------|---|
| AUTO [A] | <p>AUTO mode (automatic mode)</p> <p>It is only possible to switch on the solenoid by actuating the input “Vibration on” (connection no. 4). When switched off, “A 0” appears on the display and when switched on, the set vibration power value is displayed, e.g. “A 87”. It is not possible to adjust the vibration power in this mode!</p> <p>If smooth start is activated, the power is gradually adjusted to match the target power when the solenoid is switched on. The duration of this smooth start is defined via the parameter S in the basic settings menu. If smooth start is active, this is signaled via an additional “S” in the display (e.g. “AS 87”).</p> <p>Holding down the “ENTER” button for 10 seconds when in AUTO mode activates or deactivates the keylock.</p> <p>In the display, and L appears after the A (AL = AUTO LOCK).</p> |
| MANUAL [H] | <p>MANUAL mode</p> <p>The solenoid output is actuated. The value of the set vibration power is shown in the display (e.g. “H 87”). The vibration power can be changed using the < or > buttons. When you press the ENTER button, the value is accepted for AUTO mode (value also remains saved in the event of a power cut!).</p> <p>If no button is pressed for 1 minute, the device automatically reverts to AUTO mode.</p> <p>If the power is set too high, this can be heard from the solenoid hitting the bay. You should then gradually reduce the power until the knocking noise stops.</p> <p>If smooth start is activated, the power is gradually adjusted to match the target power when the solenoid is switched on. The duration of the smooth start is defined via the parameter S in the basic settings menu. If smooth start is active, this is signaled via an additional “S” in the display (e.g. “HS 87”).</p> |

| Mode | Description |
|--------------|---|
| BASIC [G] | <p>BASIC mode (basic settings mode)</p> <p>The solenoid output is actuated. The value of the current set vibration power is shown in the display (e.g. "G 87").</p> <p>If no button is pressed for 1 minute, the device automatically reverts to AUTO mode.</p> <p>If the device is in BASIC mode, you can reach the basic settings menu via the button combination "hold < and >, and press ENTER three times" (see chapter "Basic settings menu").</p> |

Table 12: Operating modes main menu

11.2.2. Displays

The following table explains the display options on the RMA display and indicates their meaning and additional input options.

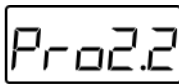
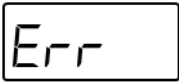


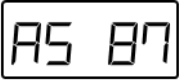
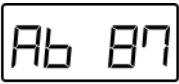

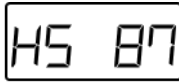
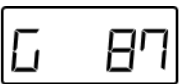
| Display | Description | Value / Function |
|---|--|---|
|  | Firmware display: Version 2.2 | Display only |
|  | Fault display (see chapter "Faults and errors") | Display only |
|  | AUTO mode: Normal operating mode, the set vibration power is displayed | Display only 10...130 |
|  | AUTO mode locked: Keylock activated; Behaves as in AUTO mode | Holding down the ENTER button (10 seconds) switches the keylock on or off |
|  | AUTO mode: Smooth start active; Behaves as in AUTO mode The smooth start duration (parameter S) can be set in the basic settings menu | Display only 10...130 |
|  | AUTO mode: Operating mode with Profibus; the transmitted vibration power is displayed | Display only 10...130 |
|  | MANUAL mode: Here, you can set the vibration power for the automatic mode | 10...130 |
|  | MANUAL mode: Smooth start active; The smooth start duration (parameter S) can be set in the basic settings menu | 10...130 |
|  | BASIC mode: You can reach the basic settings menu by pressing the following button combination: Hold < and >, and press ENTER three times | 10...130 |

Table 13: Main menu displays

11.3. Basic settings menu

The user interface is subdivided into a main menu and a basic settings menu. In the basic settings menu, you can set the vibration power, frequency and delay time as well as activate or deactivate solenoid output 2 (connection no. 8). The solenoid is actuated in the basic settings menu.

To reach the basic settings menu, the BASIC mode “G” must be displayed in the main menu. You can reach the basic settings menu via the button combination “hold < and >, and press ENTER three times”. You can return to the main menu quickly by pressing and holding the “ENTER” button (3 seconds).

11.3.1. Setting parameters

| Parameter | Description |
|-----------|--|
| u | <p>Vibration power</p> <p>This parameter has already been optimally set ex works.</p> <p>The value is used in all modes. In the overall system, the vibration power depends on various factors and can therefore deviate from the vibration power preset ex works. For this reason, it may be necessary to adjust it once the system has been set up and connected.</p> <p>If the vibration power value was changed in “H” mode, this value takes priority.</p> <p>If the power is set too high, this can be heard from the solenoid hitting the bay. You should then gradually reduce the power until the knocking noise stops.</p> |
| F | <p>Frequency</p> <p>This parameter sets the frequency of the solenoid output. The devices have all been set with the specific frequency of the Köbrator ex works. However, the resonance of the overall system depends on various factors. For this reason, it may be necessary to adjust it once the system has been set up and connected.</p> <p>To do so, proceed as follows:</p> <p>Set parameter “u” to 100 and confirm with “ENTER”. Switch to parameter “F” and change the frequency with the < or > buttons until the maximum vibration amplitude is set on the Köbrator. Confirm the value with “ENTER”. Switch to parameter “u” and set the optimal vibration power. Confirm the value with “ENTER”. If the power is set too high, this can be heard from the solenoid hitting the bay. You should then gradually reduce the power until the knocking noise stops.</p> <p>Press and hold the “ENTER” button for 3 seconds until the display switches to the main menu mode “G”.</p> |
| S | <p>Smooth start</p> <p>A delay time can be set in parameter “S”.</p> <p>During this time, the power is gradually increased to the set target power, starting from 10. After this, the set power is forwarded to the solenoid.</p> <p>EXAMPLE: Set power is 80. Set smooth start is 3.5. The power is therefore increased from 10 to 80 in 3.5 seconds.</p> <p>This delay prevents the solenoid from “hitting” the bay when switched on.</p> |

| Parameter | Description |
|-----------|--|
| d | <p>Delay</p> <p>The parameter “d” – delay (=1) causes a switch-off delay at the input “Vibration ON” (connection no. 4 / PIN 4 or no. 3 / PIN 2).</p> <p>This may be required for clocked outputs of safety controls to prevent switching off the solenoid output unintentionally.</p> |
| 2CH | <p>Activate / deactivate channel 2 (optional)</p> <p>The parameter “2CH” – channel 2 is used to activate or deactivate solenoid output 2 (connection no. 8). If the value is set to “1”, solenoid output 2 is active. If the value is set to “0”, solenoid output 2 is deactivated.</p> |
| PA | <p>PROFIBUS – address (optional)</p> <p>In parameter “PA”, the Profibus address can be set from 2 to 125.</p> |

Table 14: Basic settings menu setting parameters

11.3.2. Displays

The following table explains the display options on the RMA display and indicates their meaning and additional input options.


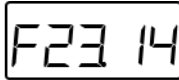
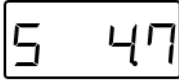
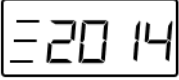
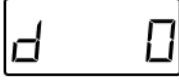
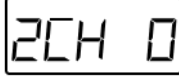
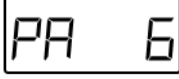
| Display | Description | Value / Function |
|---|--|-------------------|
|  | Vibration power: To set the vibration power for AUTO mode (set ex works) | 10...130% |
|  | Resonance frequency of the solenoid | 10.00...50.00 Hz |
|  | Smooth start: When you switch on the solenoid, the power is gradually increased to the set target value. | 0.0...10.00 Secs |
|  | Display of the serial number of the device | Display only |
|  | Delay: causes a switch-off delay at the input “Vibration ON” (connection no. 4 / PIN 4 or no. 3 / PIN 2) | 0 = off 1 = on |
|  | Channel 2: Here, channel 2 can be activated or deactivated | 0 = off 1 = on |
|  | Set PROFIBUS – address (see chapter “Profibus”) | 2...125 |

Table 15: Basic settings menu displays

11.4. Menu structure

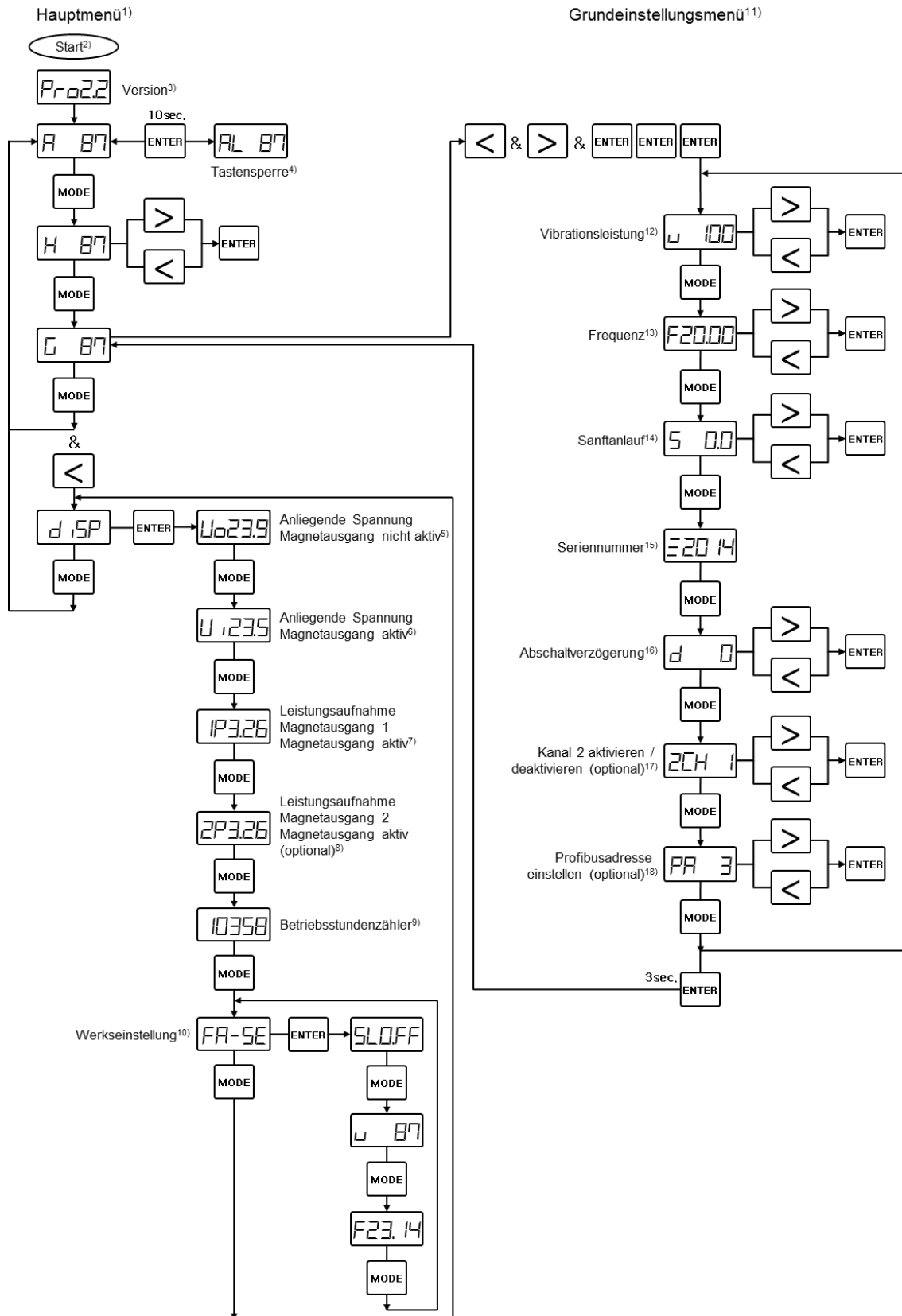


Figure 7: RMA – Menu structure

| | | | | | |
|----|-------|--|-----|-------|-----------------------------|
| 1) | EN | main menu | 10) | EN | factory setting |
| | FR | Menu principal | | FR | Paramètres d'usine |
| | HU | Főmenü | | HU | Gyári beállítás |
| | IT | Menu principale | | IT | Impostazione di fabbrica |
| | PL | Menu główne | | PL | Ustawienie fabryczne |
| | PT-BR | Menu principal | | PT-BR | Configuração de fábrica |
| | SK | Hlavná ponuka | | SK | Továrenské nastavenie |
| | SL | Glavni meni | | SL | Tovarniška nastavitve |
| | SV | Huvudmeny | | SV | Fabriksinställning |
| 2) | EN | start | 11) | EN | basic settings menu |
| | FR | Démarrage | | FR | Menu Réglages de base |
| | HU | Indítás | | HU | Alapbeállítások menü |
| | IT | Start | | IT | Menu impostazioni di base |
| | PL | Start | | PL | Menu ustawień podstawowych |
| | PT-BR | Iniciar | | PT-BR | Menu de configuração básica |
| | SK | Štart | | SK | Ponuka základné nastavenie |
| | SL | Začetek | | SL | Meni osnovnih nastavitve |
| | SV | Start | | SV | Grundinställningsmeny |
| 3) | EN | version | 12) | EN | vibration power |
| | FR | Version | | FR | Puissance de vibration |
| | HU | Verzió | | HU | Vibrációs teljesítmény |
| | IT | Versione | | IT | Potenza vibrazione |
| | PL | Wersja | | PL | Wydajność wibracji |
| | PT-BR | Versão | | PT-BR | Força de vibração |
| | SK | Verzia | | SK | Výkon vibrácií |
| | SL | Različica | | SL | Moč vibracij |
| | SV | Version | | SV | Vibrationseffekt |
| 4) | EN | keylock | 13) | EN | frequency |
| | FR | Verrouillage du clavier | | FR | Fréquence |
| | HU | Gombzár | | HU | Frekvencia |
| | IT | Blocco tasti | | IT | Frequenza |
| | PL | Blokada klawiatury | | PL | Częstotliwość |
| | PT-BR | Bloquear tecla | | PT-BR | Frequência |
| | SK | Blokovanie tlačidla | | SK | Frekvencia |
| | SL | Zaklepanje tipk | | SL | Frekvenca |
| | SV | Knappspärr | | SV | Frekvens |
| 5) | EN | applied voltage, magnet output not active | 14) | EN | soft start |
| | FR | Tension appliquée sortie sur l'électro-aimant pas active | | FR | Démarrage en douceur |
| | HU | Meglévő feszültség mágneskimenet nem aktív | | HU | Lágyindítás |
| | IT | Tensione presente uscita solenoide non attiva | | IT | Avvio morbido |
| | PL | Przyłożone napięcie wyjścia magnetycznego nieaktywne | | PL | Rozruch łagodny |
| | PT-BR | Tensão presente, saída do ímã não está ativa | | PT-BR | Partida suave |
| | SK | Pripojené napätie magnetický výstup nie je aktívny | | SK | Mäkký nábeh |
| | SL | Prisotna napetost izhoda magneta ni aktivna | | SL | Mehki zagon |
| | SV | Anliggande spänning magnetutgång ej aktiv | | SV | Mjukstart |
| 6) | EN | applied voltage, magnet output active | 15) | EN | serial number |
| | FR | Tension appliquée sortie sur l'électro-aimant active | | FR | Numéro de série |
| | HU | Meglévő feszültség mágneskimenet aktív | | HU | Sorozatszám |
| | IT | Tensione presente uscita solenoide attiva | | IT | Numero di serie |
| | PL | Przyłożone napięcie wyjścia magnetycznego aktywne | | PL | Numer seryjny |
| | PT-BR | Tensão presente, saída do ímã está ativa | | PT-BR | Número de série |
| | SK | Pripojené napätie magnetický výstup aktívny | | SK | Sériové číslo |
| | SL | Prisotna napetost izhoda magneta je aktivna | | SL | Serijska številka |
| | SV | Anliggande spänning magnetutgång aktiv | | SV | Serienummer |

| | | | | | |
|----|-------|--|-----|-------|--|
| 7) | EN | power consumption magnet output 1 magnet output active | 16) | EN | switch-off delay |
| | FR | Puissance absorbée sortie sur l'électro-aimant 1 Sortie sur l'électro-aimant active | | FR | Temporisation de coupure |
| | HU | Teljesítményfelvétel 1-es mágneskimenet Mágneskimenet aktív | | HU | Kikapcsolási késleltetés |
| | IT | Potenza assorbita uscita solenoide 1 Uscita solenoide attiva | | IT | Ritardo di spegnimento |
| | PL | Pobór mocy - wyjście magnetyczne 1 Wyjście magnetyczne aktywne | | PL | Opóźnienie wyłączenia |
| | PT-BR | Consumo elétrico da saída do ímã 1 Saída do ímã ativa | | PT-BR | Retardamento do desligamento |
| | SK | Príkon magnetický výstup 1 Magnetický výstup aktívny | | SK | Oneskorenie vypnutia |
| | SL | Moč izhoda magneta 1 Izhod magneta aktiven | | SL | Zakasnitev izklopa |
| | SV | Effektförbrukning magnetutgång 1 Magnetutgång aktiv | | SV | Frånkopplingsfördröjning |
| 8) | EN | power consumption magnet output 2 magnet output active (optional) | 17) | EN | activate / deactivate (optional) channel 2 |
| | FR | Puissance absorbée sortie sur l'électro-aimant 2 Sortie sur l'électro-aimant active (en option) | | FR | Activer / Désactiver le canal 2 (en option) |
| | HU | Teljesítményfelvétel 2-es mágneskimenet Mágneskimenet aktív (opcionális) | | HU | 2-es csatorna aktiválása / deaktiválása (opcionális) |
| | IT | Potenza assorbita uscita solenoide 2 Uscita solenoide attiva (opzionale) | | IT | Attivare / disattivare il canale 2 (opzionale) |
| | PL | Pobór mocy - wyjście magnetyczne 2 Wyjście magnetyczne aktywne (opcja) | | PL | Aktywacja / dezaktywacja kanału 2 (opcja) |
| | PT-BR | Consumo elétrico da saída do ímã 2 Saída do ímã ativa (opcional) | | PT-BR | Ativar/desativar canal 2 (opcional) |
| | SK | Príkon magnetický výstup 2 Magnetický výstup aktívny (voliteľné) | | SK | Kanáľ 2 aktivovať / deaktivovať (voliteľné) |
| | SL | Moč izhoda magneta 2 Izhod magneta aktiven (izbirno) | | SL | Aktiviranje / deaktiviranje kanala (izbirno) |
| | SV | Effektförbrukning magnetutgång 2 Magnetutgång aktiv (valfritt) | | SV | Aktivera / avaktivera kanal 2 (valfritt) |
| 9) | EN | operating hours | 18) | EN | set Profibus address (optional) |
| | FR | Compteur d'heures de service | | FR | Régler l'adresse Profibus (en option) |
| | HU | Üzemóraszámoló | | HU | Profibus-cím beállítás (opcionális) |
| | IT | Contaore di funzionamento | | IT | Impostare l'indirizzo Profibus (opzionale) |
| | PL | Licznik godzin roboczych | | PL | Ustawianie adresu Profibus (opcja) |
| | PT-BR | Contador de horas operacionais | | PT-BR | Definir endereço Profibus (opcional) |
| | SK | Počítadlo prevádzkových hodín | | SK | Nastaviť adresu Profibus (voliteľné) |
| | SL | Števec obratovainih ur | | SL | Nastavitev naslova vodila Profibus (izbirno) |
| | SV | Drifttidmätare | | SV | Ställ in profibusadress (valfritt) |

11.5. Profibus (for version RMA 108/DP/...)

The following 13 bytes are exchanged for Profibus communication:

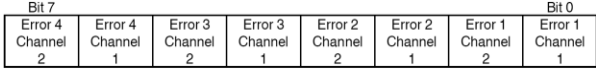
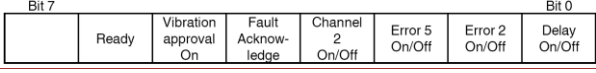
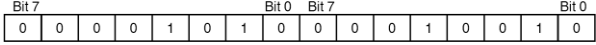
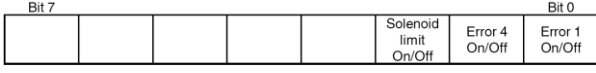
| Byte | r/w | Designation | Function | Range |
|-------|-----|------------------|---|-----------|
| 0 | r | Error status | Error byte displays the current fault  | 0/1 |
| 1 | r/w | Control | Operational readiness, approval, error acknowledgment, (De)activate error 2/5, (de)activate switch-off delay  | 0/1 |
| 2-3 | r/w | Target frequency | Target frequency 10.00-50.00 Hz (stated in whole numbers) EXAMPLE: Desired target frequency = 25.78 Hz. PROCEDURE: The value is transferred to bytes 3 and 4 without a decimal and in binary form. 25.78 >> 2578 >> 0000101000010010  | 1000-5000 |
| 4 | r/w | Vib. power | Vibration power (pulse width modulation) | 10-130 |
| 5 | r/w | Smooth start | Delay time when switching on the solenoid | 00-100 |
| 6 | r | PBAddr | Set Profibus address | 2-125 |
| 7 | | Reserve | | |
| 8-9 | r | SNR | Serial number of the device | 1-9999 |
| 10-11 | r/w | Solenoid limit | Solenoid limit | 00-790 |
| 12 | r/w | Control | (De)activate error 1/4, (de)activate solenoid limit  | 0/1 |

Table 16: Profibus communication

For the overarching controls (Profibus MASTER) to be able to transmit the Profibus values to the RMA (Profibus slave), a specific Profibus parameter must be activated. This parameter ("Pb") has already been set ex works. If a new RMA is installed (e.g. via exchange), this parameter is deactivated ("Pb" = 0). To activate, call up the serial number in the basic settings menu (see chapter "Menu structure"). Hold the < and > buttons and press ENTER three times until "SLO.OFF" appears. Press the "MODE" button five times until "Pb" appears in the display. The Profibus parameter can be set using the < or > buttons. You can return to the basic settings menu by pressing and holding the "ENTER" button (3 seconds).

A GSD file is required for the communication between the Profibus master and the Profibus slave. The required file "KuS0C42.zip" can be downloaded from the Köberlein & Seigert homepage: <http://www.koeberlein-seigert.net/unterlagen.html>. Changes to the Profibus address are only accepted after restarting the RMA!

12. Faults and errors

12.1. Fault display

If an error occurs on the device (e.g. outage or short circuit), the display provides information about possible causes of the error. "Err" appears in the display along with the number of the respective fault. The solenoid output (connection no. 5/8) is switched off and the potential-free relay contact (connection no. 2) switches over. The evaluation can be carried out via PINS 1, 2, 4 on connection no. 2 or Profibus byte 1 / bit 6.

As well as showing in the display, the "Status-LED ERROR" lights up in red.

The error can be acknowledged either by pressing the "ENTER" button, via the "Reset fault" input (connection no. 3) or via Profibus byte 1 / bit 4. The RMA then returns to the original operating mode.

12.2. Fault table

The following fault table only refers to RMA 108 in connection with a Köbrator.

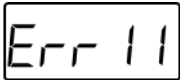
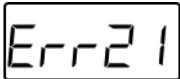


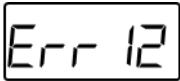

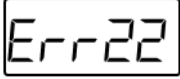

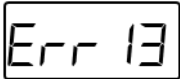

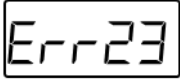
The fault table only gives rough information about how to remedy the fault.



CAUTION

To avoid damage and malfunctions, the operator may only carry out or have a third party carry out the maintenance work described in this manual. All other maintenance work must be carried out by Köberlein & Seigert GmbH or by a partner authorized by Köberlein & Seigert GmbH.

| Fault / display | Description | Cause | Remedy |
|---|---|---|--|
|  | Short circuit Solenoid output Channel 1 | Defective solenoid in Köbrator | <ul style="list-style-type: none"> ▶ Check the connection to the Köbrator ▶ Determine the resistance of the solenoid in the Köbrator, replace the solenoid if required |
| | | Defective cable connection between solenoid and RMA (short circuit) | <ul style="list-style-type: none"> ▶ Check the connection to the Köbrator ▶ Check the cable for short circuit, replace if required |
|  | Short circuit Solenoid output Channel 2 | See channel 1 | <ul style="list-style-type: none"> ▶ See channel 1 |

| Fault / display | Description | Cause | Remedy |
|---|---|--|--|
|  | Operation without solenoid Channel 1 | Electrical connection between Köbrator and RMA interrupted | <ul style="list-style-type: none"> ▶ Check that the solenoid is connected according to the connection diagram (see chapter “9.2 Connections and connection diagram”) ▶ Check the connection to the Köbrator ▶ Check the power consumption of solenoid output 1 <p> See chapter 12.3.1 Fault diagnostics</p> <ul style="list-style-type: none"> ▶ Check that the solenoid output 1 cable is firmly connected, reconnect if required (see work stage 7 in chapter “9.1 Mechanical and electrical installation”) ▶ Check the continuity of the cables, replace if required |
|  | Operation without solenoid Channel 2 | Electrical connection between Köbrator and RMA interrupted | <ul style="list-style-type: none"> ▶ Check that the solenoid is connected according to the connection diagram (see chapter “9.2 Connections and connection diagram”) ▶ Check the connection to the Köbrator ▶ Check the power consumption of solenoid output 2 <p> See chapter 12.3.1 Fault diagnostics</p> <ul style="list-style-type: none"> ▶ Check that the solenoid output 2 cable is firmly connected, reconnect if required (see work stage 7 in chapter “9.1 Mechanical and electrical installation”) ▶ Check the continuity of the cables, replace if required |
|  | Control error Channel 1 | Hysteresis between the target value and actual value at the solenoid output is too great | <ul style="list-style-type: none"> ▶ The device is defective and must be replaced. <p> Contact the Köberlein & Seigert GmbH customer service team.</p> |
|  | Control error Channel 2 | See channel 1 | <ul style="list-style-type: none"> ▶ See channel 1 |

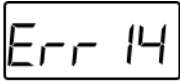

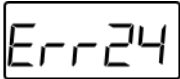
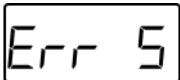


| Fault / display | Description | Cause | Remedy |
|---|---|--|--|
|  | Undervoltage Channel 1 | Supply voltage was under 19 V DC for longer than 100 milliseconds | <ul style="list-style-type: none"> ▶ Check the power supply  See chapter 12.3.1 Fault diagnostics |
|  | Undervoltage Channel 2 | See channel 1 | <ul style="list-style-type: none"> ▶ See channel 1 |
|  | PROFIBUS Communication | Profibus cable defective or not connected | <ul style="list-style-type: none"> ▶ Check that the “Profibus In” cable (connection no. 6) is firmly connected, reconnect if required (see chapter “9.2 Mechanical and electrical installation”) ▶ Check the continuity of the Profibus cable, replace if required |
| | | Profibus address set incorrectly | <ul style="list-style-type: none"> ▶ Set the Profibus address (see chapter “11.3 Basic settings menu”) |
| No display | The power supply is connected, but there is no display | Device fuse defective | <ul style="list-style-type: none"> ▶ Have the fuse replaced by technical personnel  See work instruction “Changing a fuse”. |
| | | Electrical connection between the main circuit board and cover interrupted | <ul style="list-style-type: none"> ▶ Check that the plug and connection cable between the main circuit board and cover is firmly connected |
| No vibration at the Köbrator | The solenoid output is actuated, but no vibration is detected at the Köbrator | Mechanical jamming of the Köbrator | <ul style="list-style-type: none"> ▶ Switch off the machine and determine whether the Köbrator is jammed (e.g. jammed sorting device at the transfer position) |
| | | Distance between the bay and the solenoid in the Köbrator has changed | <ul style="list-style-type: none"> ▶ Inquire what the set measurement between the bay and the solenoid should be  Contact the Köberlein & Seigert GmbH customer service team |

Table 17: Fault table

12.3. Fault diagnostics and correction

Information about correcting faults only refers to RMA 108 in connection with a Köbrator.



Only qualified personnel are authorized to carry out fault correction.



When handling the RMA, the safety information in the chapter “Information for your safety” must be observed to prevent personal injury, material damage and environmental damage!

12.3.1. Fault diagnostics

For an initial fault diagnosis, you can check specific values in the main menu (see chapter “Menu structure”). If the device is in BASIC mode, these values can be viewed by pressing the button combination “MODE and <”. Press the “ENTER” button once “disp” appears. Keep pressing the MODE button until the desired display appears. By repeatedly pressing the MODE button, you will reach AUTO mode.

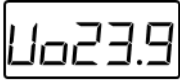
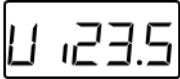
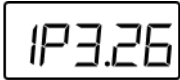
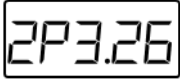
| Display | Value | Description |
|---|--|---|
|  | Power supply Solenoid output “not active” | Here, you can check the power supply connected to the RMA without a measurement device. |
|  | Power supply Solenoid output “active” | Here, you can check the power supply connected to the RMA without a measurement device. |
|  | Power consumption of solenoid output 1 “active” | You can check the power consumption of solenoid output 1 here IMPORTANT! If two solenoids are connected, you can assume that a large difference of the “power consumption” values stems from a contact problem (connector) with solenoid output 1 or 2. Check the connection to the Köbrator. |
|  | Power consumption of solenoid output 2 “active” | You can check the power consumption of solenoid output 2 here IMPORTANT! If two solenoids are connected, you can assume that a large difference of the “power consumption” values stems from a contact problem (connector) with solenoid output 1 or 2. Check the connection to the Köbrator. |

Table 18: Fault diagnostics

12.3.2. Changing a fuse

If you determine that the RMA device fuse is defective, it must be replaced. The individual work stages are described below.



Fire hazard due to crushed and damaged cables

- ▶ When closing the cover, ensure that there are no cables between the housing and the cover
- ▶ Do not commission the RMA if cables are crushed or damaged
- ▶ Replace crushed and damaged cables with new cables immediately



Minor injuries and crushing of jammed fingers

- ▶ When closing the cover, do not put your fingers between the housing and the cover
- ▶ Close the cover carefully

- Required tools and/or software:
- Cross-head screwdriver
 - Long-nose pliers

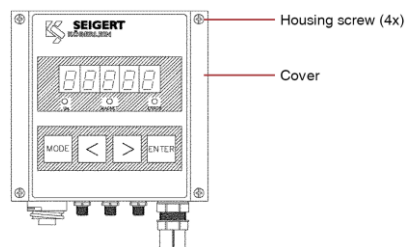
The work stages are as follows:

1. Disconnect the power supply



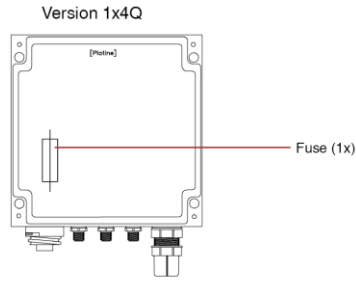
- ▶ Deenergize the machine (switch off the main switch)
- ▶ Secure the machine against restarting

2. Open the cover

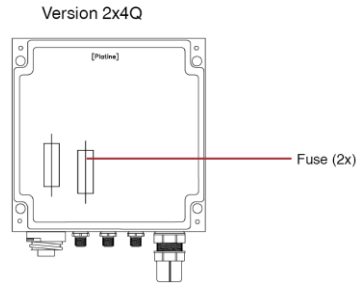


- ▶ Loosen the housing cover screws
 - ▶ Place the cover next to the housing
- CAUTION!** Do not trap any cables!

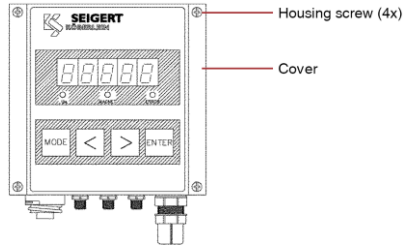
3. Replace the defective fuse



- ▶ Remove the defective fuse(s) using the long-nose pliers
NOTICE: The RMA contains either one fuse (version 1x4Q) or two fuses (version 2x4Q).
- ▶ Insert the new fuse(s) (I=8A T)



4. Close the cover



- ▶ Fix the cover in place with the housing screws
CAUTION! Do not jam or trap any cables between the cover and housing.
- ▶ Fuse(s) changed

13. Storage

This chapter describes the essential information about storing the RMA. When storing the RMA, the following storage conditions must be adhered to:

- Storage temperature: -25 to +55 °C
- The storage location must be within a building, clean and dry



CAUTION

The storage conditions must be adhered to in order to avoid damage to the RMA.

14. Disposal

This chapter contains all the necessary information for disposing of the RMA.



Disposal may only be carried out by trained technical personnel or by professional firms specially authorized to carry out disposal. Always ensure disposal is environmentally sound.



When handling the RMA, the safety information in the chapter “Information for your safety” must be observed to prevent personal injury, material damage and environmental damage!

Disassembled electronic components must be disposed of as electronic waste. You can find recycling centers or other suitable electronic waste collection points by asking the respective local authorities.

Depending on the properties and current regulations, dispose of the RMA as:

- Aluminum
- Copper
- Plastic
- Electronic waste



CAUTION

When disposing of scrap metal, ensure that it is not contaminated with oil residue.

15. Technical data

| RMA 108 | | |
|--|------|--|
| Dimensions | Unit | Data |
| Width | mm | 140 |
| Height | mm | 140 (without connector) |
| Depth | mm | 72 |
| Consumption data | | |
| Power consumption | VA | max. 200 |
| Fuse | | |
| Internal fuse (Wiring protection included according to DIN EN 60204-1!) | | ../1x4Q: Fine wire fuse 1x8A T ../2x4Q: Fine wire fuse 2x8A T (e.g. circuit breaker C6A) |
| Electrical connection | | |
| Operating voltage | V | 22.8 ... 28.8 DC |
| Output voltage | V | Connected operating voltage |
| Adjustable output frequency | Hz | 10 ... 50 |
| Smallest frequency step | Hz | 0.01 |
| Power input (max.) | VA | 200 |
| Switch-off | | In the event of overvoltage, short circuit, undervoltage, no-load voltage |
| “Vibration on” input (Power consumption at 24 V DC) | mA | approx. 7 |
| “Reset fault” input (Power consumption at 24 V DC) | mA | approx. 7 |
| Potential-free relay output: max. contact load | V DC | 30 |
| | A | 0.5 |
| Protection class | | I (earthed) |
| Protection type | | IP65 (with connection cables screwed into place) |
| Electromagnetic compatibility | | |
| EMC inspection | | According to DIN EN 55011, DIN EN 61000-6-1 and DIN EN 61000-6-4 |

Table 19: Technical data

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