MESUTRONIC

Metal Detection made in Germany

USER MANUAL

QUICKTRON 07 RH

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Original manual

CE

Read the operating manual before commencing with any work!

Copyright

Technical changes that cause variations of the specifications and illustrations in this instruction manual, which are necessary for the improvement of the device, are subject to modification.

All copyrights and proprietary rights to this device and all associated technical documentation remain the property of the manufacturer.

These operating instructions contain regulations and drawings of a technical nature which may not be copied, distributed or used for competitive purposes without authorization or communicated to others.

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Contents

1 About this manual

1.1 Use and Storage

This manual is an integral part of the product. It contains important information to operate the described device safely, properly and efficiently.

Always keep this manual in a convenient place close to the machine.

This manual is only for use by trained and authorized personnel.

These instructions must be read and applied by everyone who performs work on the device.

If necessary, the instructions must be complemented with accident prevention and environmental protection regulations that apply specifically at the place of use by the operator.

If the owner of the device changes, the manual must be passed on to the next owner.

NOTE

Copyright protection

Please treat these instructions confidentially. The transfer of this manual to third parties is not permitted without the manufacturer's written permission.

All contents and representations are protected by copyright and are subject to commercial intellectual property rights. Any misuse is punishable by law.

1.2 Scope of application

These instructions are part of the scope of delivery and apply from transport to final disposal of the device.

This manual applies only to the device indicated on the front page.

This device complies with European Union directives.

Please note:

- the enclosed CE Declaration of Conformity
- the chapter "Intended Use".

1.3 Applicable documents

The following other applicable documents are relevant for the use of the product and these operating instructions:

- Codes of the device control
- service form
- Drawings
- CE Declaration of Conformity or Declaration of Incorporation
- Data sheets
- Note on storage of spare parts (only for delivery with conveyor belt)
- Electrical documentation with wiring diagram

NOTE

The specific documents to be considered in the applicable documents can be found in the specifications of the order confirmation.

1.4 Warranty and Guarantee

- Report warranty claims to the manufacturer immediately after discovering the defect or error.
- The warranty expires in all cases in which no liability claims can be asserted.
- The information, data and notes in this manual were up-to-date at the time of writing.
- No liability is assumed for damage and malfunctions which occur as described below:
  - Disregarding the operating instructions
  - Unauthorized modifications to the device
  - Operating errors
  - Failure to perform maintenance tasks
  - Use of non-approved accessories and spare parts

2 Security

2.1 General safety information

The chapter Safety gives an overview of all important safety aspects for optimum protection of personnel and for safe and trouble-free use of the device from transport, through operation, to disposal.

Failure to comply with the instructions and safety information given in these operating instructions can lead to considerable danger to people and damage to the device.

The device is designed and built according to the state of the art and the recognised safety guidelines and standards.

The device is safe to operate.

To avoid certain residual risks that may be caused by the device, please adhere to the following instructions:

- Operate the device only within the scope of its intended use.
- Only allow trained or instructed personnel to operate the device.
- Maintain and repair the unit properly.
- Perform the prescribed maintenance regularly.
- Comply with the safety instructions and warnings given in this manual.
- Do not modify or reconstruct the device.

2.2 Compliance with the operating instructions

NOTE

All persons assigned to work on the device must have read and understood these instructions, in particular the chapter on "Safety".

Knowledge and observance of the present contents serves to avoid personal injury and errors on the device.

For this reason, all safety instructions must be followed at all costs, and these must be observed for your safety.

The operating instructions are part of the device and must always be available on the device. These instructions must be read, understood and observed by all personnel working on or using the device. If the contents of this manual do not answer your questions or are incomprehensible, please contact the manufacturer immediately.

In addition to the safety instructions in this manual, please also observe the following rules and regulations:

- Intended use
- Relevant accident prevention regulations (UVV)
- Occupational health regulations
- Generally accepted safety rules
- Country-specific regulations
- Documentation of the add-on parts
- Documentation supplied with the device from the device manufacturer and from other manufacturers
- Manufacturer's data (safety data sheets) for operating and auxiliary materials, chemical substances

Carry out in-house instruction, taking into account the professional qualifications of the operating personnel.

Supplement these regulations and provisions with operating instructions to take account of internal company regulations or operational peculiarities (if any).

Additional safety regulations of the operator of the device are not invalidated by the manufacturer's documentation accompanying the product.

2.3 Intended use

Intended use

The device is designed and built to detect metals in industrial environments. It may only be used for this purpose.

Products with one or more of the following properties may only be tested after prior consultation with the manufacturer:

- Products in metallic or partially metallic containers
- electrically conductive products
- magnetic products
- Products with intended metal additions

Proper use also includes compliance with the operating instructions and compliance with the maintenance conditions.

Improper Use

Any other or further use of the device is not permitted. The manufacturer shall not be liable for any damage resulting thereof. The operator/user alone is responsible for the risk.

The device and each individual component are not approved for the following applications:

- It is forbidden to modify the device in any way.
- It is forbidden to operate the device without using the safety equipments.
- It is forbidden to detect products other than those specified in this manual (unless otherwise stated in the order confirmation).
- It is forbidden to operate the device in hazardous areas (available as a special device).
- It is forbidden to operate the device outside of the following
  - the specified protection class,
  - the permitted temperature range,
  - the permissible air humidity,
  - the approved voltage limits.

The manufacturer is not liable for damage resulting from improper use.

2.4 Display of warnings

The warnings in this manual are introduced by signal words that express the extent of the hazard.

Comply with the warnings to avoid accidents, personal injury and property damage.

This manual uses the following signal words and symbols:

⚠ DANGER

Death or serious injury will occur if the appropriate precautions are not taken.

⚠ WARNING

Death or serious injury may occur if appropriate precautions are not taken.

⚠ CAUTION

Indicates a potentially dangerous situation that can result in minor injury if not avoided.

CAUTION

Indicates a potentially dangerous situation that can lead to property damage if it is not avoided.

NOTE

Indicates instructions for use and useful information.

2.5 Operating requirements

The dependence on other systems and equipment is not clearly defined by the manufacturer and must be checked separately by the operator.

In addition, the following requirements must be met for regular operation of the device:

- Check the dependency on other devices.
- Correctly completed assembly.
- Successful test run with all necessary adjustments.
- Instruction of the operating personnel in the operation of the device and in the relevant safety regulations.
- Avoidance of mechanical hazards (e.g. moving parts, insufficient fastening, etc.).
- Avoidance of hazards from electrical current (for details see the national regulations or the regulations of the power supply utility).
- If necessary, shield hot or cold parts of the unit from contact.
- Keep the device easily accessible.
- Clean and maintain the unit regularly.
- Appoint a person who is primarily responsible for proper operation.

2.6 Safety equipments

There is an increased risk of injury if safety equipments are damaged, modified, removed or not used. The device may only be operated with all protective and safety equipments.

- Ensure that the safety equipment is properly functioning.
- As a general rule, do not disassemble any protective and safety equipment, do not switch it off and do not modify it, not even during a test run.
- In the event of malfunctions at the safety equipments, inform the person responsible (shift supervisor, foreman, etc.) immediately.

The proper functioning of the safety equipments must be checked at regular intervals by qualified personnel. If the device or parts thereof have to run temporarily without one or the other safety equipments for maintenance, repair or maintenance work, no persons may be present in the danger area.

NOTE

Check safety equipment, especially after completion of maintenance, repair and overhaul work.

2.7 Operator's duties

2.7.1 General requirements

- Operate the device only in the sense of its intended use and in compliance with all safety instructions.
- Have the device checked by an expert before initial start-up and after maintenance and repair work.

2.7.2 Operating manual

This manual is an integral part of the device. The operator must ensure that the manual is read by everyone who works on and with the device. The manual must be accessible at all times at the place of use of the device.

The operator is required to supplement the manual with operating instructions in accordance with applicable local regulations. In addition to the provisions listed below, this also includes information on supervisory and reporting obligations. The aim is to take into account operational peculiarities with regard to work organization, work processes and personnel employed.

2.7.3 Local regulations

The operator is responsible for compliance with the binding laws, regulations, provisions and the existing national regulations for accident prevention as well as any internal work, operating and safety regulations that apply to the respective installation site.

The applicable local regulations and laws include, for example, accident prevention regulations, waste legislation or environmental protection requirements.

The operator must ensure that at least the following inspections are carried out:

- Testing of the device for operational safety
- Functional test of the safety devices
- All inspections according to maintenance plan

2.7.4 Personnel requirements

The operator must ensure that at least the following conditions are met:

- Only trained personnel who are familiar with the basic occupational safety regulations and have been instructed in the handling of the device may be used.
- Compliance with the legal minimum employment age.
- The device may only be operated, maintained, serviced and repaired by personnel commissioned in writing by the operator.
- The area of responsibility, competence and supervision of the personnel must be precisely defined and regulated by the operator so that no unclear duties arise.
- Only allow trainee personnel to work under the supervision of already trained personnel. New personnel must receive the same instructions as personnel already instructed.
- Access for unauthorized persons is forbidden in the area of the device.
- Observance of internal and external supervisory and reporting obligations as well as operational peculiarities.
- Explanation of instructions for emergency response.
- Explanation of handling hazardous substances (e.g. cleaning agents).
- Provide the personnel with all necessary protective equipment. The operator is responsible for determining which protective equipment is necessary for safe operation.

NOTE

The operator or the personnel authorized by him is responsible for Safe operation. If the personnel lack the necessary knowledge, they must be trained and instructed.

2.7.5 Modifications and unauthorized changes

The operator may not make any additions or modifications to the device without the manufacturer's approval and may not make any safety-impairing changes.

This applies in particular to the installation and adjustment of existing safety devices as well as to any machining of load-bearing parts.

2.7.6 Safety areas of the device

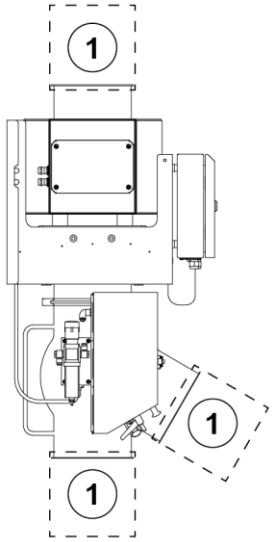

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Fig.1: Safety areas (1) of the device

The operator must ensure that the safety areas of the equipment are protected from external intervention at all times.

The safety areas must be protected by suitable protective equipment, such as, for example, connecting devices or pipes of sufficient length, before the system is put into operation.

Operation without protective equipment is not permitted.

NOTE

There should be a mechanism for opening or removing the protective equipment coupled to the compressed air and power supply (for example, for maintenance work).

To do this, install a second safety circuit that disconnects the device from the power and compressed air supply as soon as the protective equipment is opened or removed.

2.7.7 Testing

The operator may only put the device into operation when an expert has carried out a check for safe operation and proper functioning of the device. This applies to the first commissioning as well as after maintenance or structural changes.

The operator must have the device checked for operational safety by an expert at regular intervals on the basis of self or locally specified regulations. The results must be recorded in an inspection report.

2.7.8 Cleaning, maintenance and repair

The operator must ensure that the device and its safety equipments are maintained in a functional condition. The effectiveness of control, regulation and safety equipment must be checked.

Service, maintenance and repair work may only be carried out by professionally trained personnel.

Maintenance and repair are described in these instructions.

2.7.9 Instruction

The operator must protect the personnel from accidents and health hazards and instruct the personnel before starting their work for the first time.

NOTE

Carry out the instruction again at fixed intervals (at least once a year).

The personnel must have read the operating instructions and taken part in the training. The participants must confirm their understanding of the contents by signing.

2.8 Personnel Duties

2.8.1 Qualification of personnel

Work on the device may only be carried out by qualified and instructed personnel. The personnel must have the following qualifications:

- Special knowledge and experience in the respective area of expertise. This applies in particular to maintenance and repair work on electrical, mechanical, hydraulic and pneumatic equipment.
- Safety instruction by a safety officer.
- Instruction for activities on and with the device (see following table 'Qualification of personnel').
- Reliable knowledge of relevant standards, regulations, accident prevention regulations and operating conditions.
- Competence to detect and avoid hazards.

The required personnel qualifications are subject to different legal regulations depending on the place of work. The operator must ensure compliance with the applicable laws.

Unless otherwise specified by law, the following list defines the permitted personnel and their minimum qualifications.

person	Description
Layperson	The person has little technical knowledge or skills. He may only perform simple tasks that do not require specific knowledge.
Trained operating personnel	The person has been instructed on the system by an authorized person and knows the relevant operating steps for the activity to be performed.
Qualified personnel	The person has a relevant, subject-related training and thus proves corresponding specialist knowledge. An apprenticeship can be e.g. electronics technician, mechanic.

Tab. 1: Definition of groups of persons

2.8.2 Allowed and prohibited activities for the personnel

Activity	Layperson	Trained operating personnel	Qualified personnel
Transport	Prohibited	Prohibited	Allowed
Installation and commissioning	Prohibited	Prohibited	Allowed
Troubleshooting and fault correction	Prohibited	Prohibited	Allowed
Setting up, assembly	Prohibited	Prohibited	Allowed
Operation	Prohibited	Allowed	Prohibited
Maintenance	Prohibited	Prohibited	Allowed
Disposal	Prohibited	Prohibited	Allowed

Tab. 2: Allowed and prohibited activities for the personnel

2.8.3 Safety instructions for personnel

Avoid any activity that may:

- Endanger the life and limb of the user or third parties,
- Impair the device or any other tangibles assets,
- Affect the safety and function of the device,
- Disregard the safety instructions listed.

Moreover:

- Do not carry out any work on the device while it is in operation.
- Never work on live components.
- Always wear personal protective equipment when working on the device.

There is a risk of injury from safety devices that have been taken out of service. Do not disassemble any safety equipment. Do not switch off any safety equipment.

- Inspect the function of safety devices daily.
- Report malfunctions and defects of safety devices immediately to the operator.
- Keep covers (e.g. Panels, shields, housings) closed during operation.
- When using chemicals, observe the relevant safety data sheets and disposal instructions of the respective manufacturers. Comply with all local safety requirements.
- Wear protective clothing.
- Only carry out work with the appropriate authority.
- When handling materials (e.g. oils, greases and other chemical substances), follow the manufacturer's instructions and safety information for the respective product.

There is a risk of damage to property if the device is operated improperly.

- Observe descriptions of attachments parts and additional equipment, if any. Cross-check the supplier documentation or separate documentation from other manufacturers.

2.8.4 Personal Protective Equipment

Personal protective equipment can prevent serious injury or death.

- Wear your operationally prescribed protective equipment for all work on the device.

2.9 Instructions on certain hazards and residual risks

The instructions listed here are to be understood as basic safety notes on certain types of hazards.

The residual risks are determined on the basis of a risk assessment. All persons working on the unit must meet the following conditions:

- Knowledge about residual risks.
- Complete in-house training, taking into account your professional qualifications.
- Follow instructions to minimize residual risks and avoid accidents or damage.

2.9.1 Risks emanating from untrained personnel

Inexperienced and unqualified personnel endanger themselves and others.

- The work may only be carried out by persons who are experienced in carrying out the commissioned work and have been informed of the hazards involved.
- Clearly define personnel responsibilities for each phase of the device's life.
- Use only adequately trained and authorized personnel with the qualifications described in the personnel requirements.
- Personnel to be trained may only work on the device under the constant supervision of an experienced specialist.

2.9.2 Hazards caused by electrical current

Contact with live components can be fatal. Serious injury or death can result In addition, switched-on electrical components can perform uncontrolled movements.

- Keep the covers of the electronics housing closed.
- Keep the power plug of the device freely accessible.
- Only have work on the electrical device and equipment carried out by a qualified electrician and in accordance with electrical engineering regulations. Before starting work on the electrical system:
  - Disconnect the device from the power supply.
  - Secure the device against being switched on again.
  - Check that the device is isolated from the power supply.
  - Ground and Plug the device.
  - Cover adjacent live parts with an insulating mat or similar.
- Only use insulated tools.
- Pay attention to damage to the electrical equipment and check it regularly. Danger emanating from loose cable connections and damaged cables. Eliminate defects immediately.

2.9.3 Dangers from electromagnetic fields

The device emits non-ionising wave radiation in the form of an electromagnetic field.

- The electromagnetic field can destroy magnet-sensitive products (laptops, credit cards, etc.).
- Make sure that people without pacemakers do not spend more than 5 minutes in the coil passage area.
  – Failure to comply may cause feelings of discomfort.

The following also applies to people with pacemakers:

- The operation of the device on the control panel is generally harmless for people with pacemakers.
- Ensure that persons with pacemakers maintain a safety distance of at least 20 cm from the detector surface.
- People with pacemakers may not remain within the detector coil or directly in front of the coil opening.
- Failure to follow the instructions may present a life-threatening hazard to people using pacemakers.

2.9.4 Dangers when handling cleaning agents

Contact with harmful or irritating substances can cause chemical reactions.

- Wear personal protective equipment.
- When handling chemical substances, observe the applicable manufacturer's regulations and safety data sheets.
- In case of eye or skin contact, rinse the affected area immediately (see safety data sheet of the cleaning agent).
  - Suitable facilities (e.g. eye wash bottle) must be available near the workplace.

2.9.5 Dangers from steam jets and high-pressure cleaners

Pressurized (hot) water can cause serious injury.

- Wear your personal protective gear.
- Observe the manufacturer's safety instructions.
- Observe the protection class of the device.

2.9.6 Dangers arising from pneumatic power

Pneumatic components under pressure can cause serious injuries or death.

- Keep the covers of the electronics housing closed.
- Work on pneumatic components may only be carried out by personnel with special knowledge and experience in pneumatic systems.
- Hold the compressed air opening firmly when opening.
- De-pressurise the system sections and pressure lines (compressed air) to be opened before the start of repair works. Do not open any lubricating or regulating oil lines under pressure or tighten any screw connections under existing pressure. There is a danger of injury from any oil leaking.
- Lay and install compressed air lines properly. Do not confuse connections. The fittings, length and quality of the hose lines must meet the requirements.
- There is a danger of injury and fire due to leakages. Check all lines, hoses and fittings regularly for leakages and externally visible damage. Repair any damage immediately.
- After cleaning air lines, inspect them for leaks, loose connections, chafing sites and damage. Rectify any defects determined immediately.

2.9.7 Hazards from noise

The operator must determine and assess the risks to workers from exposure to noise. By way of example, the type, extent and duration of the noise exposure must be considered. The device can briefly reach about 95 dB (A) during the switching process. Noise can cause hearing damage and other hazards.

- Provide your staff with suitable personal protective equipment (PPE) in the form of hearing protection (earmuffs or earplugs). The use of hearing protection must not prevent the perception of danger acoustic signals and noises.
- Alternatively, staff can be protected by enclosures or other soundproofing measures on the device.

2.10 How to react in case of failures

In case of malfunctions on the device, an error may exist which can be localized and eliminated with the aid of the chapter Troubleshooting.

- Disconnect the device from the mains supply immediately in the event of imminent danger. Switch off the unit also if unusual operating behavior is detected. These may include, for example:
  - unusual noises, vibrations, odours
  - Incorrect behavior and false indications
  - elevated temperatures
- Secure the device against restart.
- Only have all troubleshooting work carried out by appropriately qualified personnel when the device is de-energized.
- In case of malfunctions, inform the person responsible on site immediately.
- If the fault cannot be fixed, contact the manufacturer's service department.

2.11 Notes on spare and wearing parts

In maintenance and repair work, the operator must ensure that approved spare parts that meet the technical requirements specified by the manufacturer are used. This is guaranteed by using original spare parts.

Spare parts and wear-and-tear parts not supplied by the manufacturer have not been tested or approved for use. The installation and use of these parts may have a negative effect on the functionality of the unit and thus put its safety at risk.

The manufacturer accepts no liability for damage caused by the use of non-original parts and accessories. In this case, any manufacturer's guarantee and warranty will be nullified.

- Use only original parts or accessories approved by the manufacturer.
- We recommend keeping the most important spare and wear-and-tear parts in stock on site.

3 Product description

3.1 Target group

This chapter is intended for the group of "qualified personnel" (*see chapter Safety, qualification of personnel*). Other groups of persons must not carry out the described work.

3.2 Device overview

The metal detector is used to detect metallic foreign objects in industrial goods.

With the aid of a feeding device, the product to be tested is passed through the metal detector and checked for metallic impurities.

The identified metal parts can then be ejected by a downstream separating device or removed manually (depending on configuration and device type).

The individual components of the metal detector are shown in the following graphic.

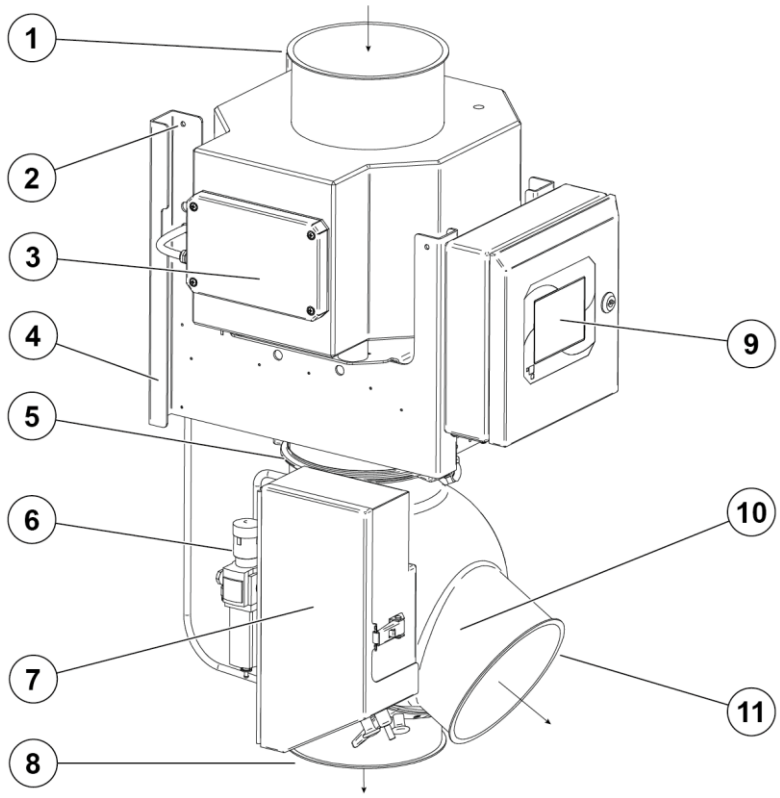


Fig. 2: Device overview QUICKTRON RH (example)

1 Feed
2 Mounting hole
3 Connection housing
4 Mounting frame
2 Clamping ring
3 Compressed air maintenance unit
7 Pneumatic unit with pressure cylinder
8 Good item discharge
9 Electronics housing with control panel
10 Separation flap (concealed)
11 Rejected item discharge

3.3 Operating principle of a metal detector

The operating principle of a metal detector is simplified in the following graphic. The shape and appearance of your metal detector may differ therefrom. However, the operating principle remains the same.

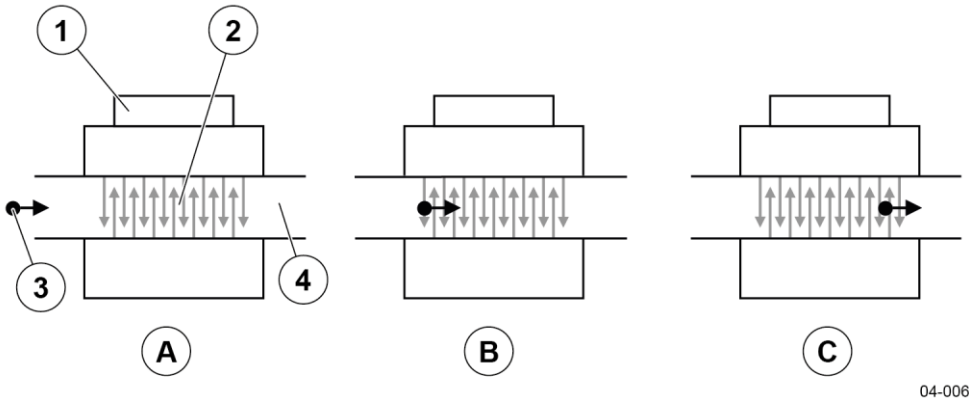


Fig. 3: Operating principle of a metal detector

1	Metal detector	3	Metal part
2	electromagnetic field	4	Conveyor line

Metal detection process:

A The metal detector (1) generates an electromagnetic field (2) (open-circuit voltage).

B If a metal part (3) enters the field, it interferes with the frequency fields of the detector coils and minimally changes the idle voltage

C If the metal part (3) leaves the field again, the frequency fields varies again. The open-circuit voltage has been restored.

If both variations exceed the set limit value, the evaluation electronics outputs a signal.

The metal part is detected and can be removed from the product flow.

3.4 Notes for metal search

Metal detection can be influenced by various factors. Below you will find some general information that must be observed to ensure faultless operation of the metal detector.

Electromagnetic short circuits

Certain metal frame constructions in conveyor frames and suspensions (e.g. rollers, cross struts, adapter plates) can act as an electromagnetic coil near the metal detector and influence the magnetic field of the metal detector. Metal connections must either be welded or interrupted, e.g. by one-sided insulation.

Electrostatic discharges

Electrostatic discharges can cause false alarms. This can lead to damage to the evaluation electronics. Ground the metal detector and surrounding construction parts.

Sensitivity differences within the detector coil

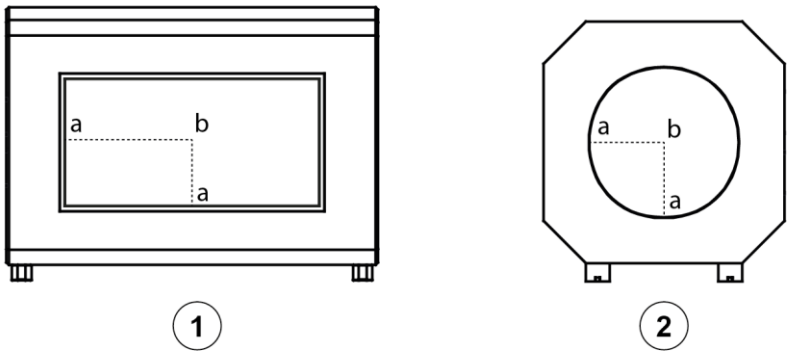


Fig. 4: Sensitivity distribution within the detector coil (example)

1 Detector coil with rectangular opening
2 Detector coil with circular opening

a Highest sensitivity range
b Lowest sensitivity range

Note that the detector coil does not generate a homogeneous electromagnetic field. As a result, sensitivity differences occur within the outlet opening. The most insensitive point of the detector is located in the middle of the detector passage opening.

Sensitivity differences of different types of metal

Different types of metal influence the electromagnetic field to varying degrees. The corresponding maximum sensitivity values according to metal type can be found in the data sheet.

Sensitivity when starting up the conveyor belt

If the metal detector is operated with a conveyor belt, losses of sensitivity can occur when the conveyor belt starts up, which can lead to a drop in detection performance.

Position-dependent sensitivity of the metal parts

Metal detection can depend on the position and orientation of the metal part, depending on the shape of the metal body. The maximum sensitivity values of the data sheet were determined with spherical test objects. In principle, all metal parts with at least the same diameter as the sphere used in the data sheet can be reliably detected regardless of their position and orientation.

Regular testing

Usually, self-errors of the detector are detected by the self-monitoring system. Nevertheless, it cannot be ruled out that undetected errors may occur. Changes in the environment of the detector (e.g. new machines) can also influence the function of the detector. For this reason, the settings and functions of the metal detector must be checked at regular intervals with suitable test objects.

Standardized test bodies are available from the manufacturer.

Environmental and weather influences

The metal detector must be protected against environmental and weather influences (direct sunlight, wind, frost). The detector must be protected from direct or indirect heat radiation, especially when heated above the permissible temperature. High surface temperatures can lead to false alarms and even destroy the metal detector.

NOTE

Protect the metal detector from external influences with a suitable protective device.

In the metal-free zone, this protective device must be metal-free (*see chapter Transport and assembly, installation guidelines for the detector*).

3.5 Security labels/plates

The following safety labels are provided on the device:

Sign	Quantity	Caution
	1	Warning of dangerous electrical voltage
	1	Warning of hand injuries

Tab. 3: Safety labels on the device

Keep all safety labels on the device complete and in an easily legible condition.
Attention: Danger of injury due to missing or illegible symbols!

4 Transport, storage and assembly

4.1 Target group

This chapter is intended for the group of "qualified personnel" (*see chapter Safety, qualification of personnel*). Other groups of persons must not carry out the described work.

4.2 Security

There is an increased risk of injury to persons carrying out work for which they have neither been qualified nor instructed.

- Observe the accident prevention regulations for all transport and installation work.
- Only instruct trained specialist personnel to fasten loads and instruct crane drivers.
- Only use suitable and technically faultless lifting, transport, load-lifting or slinging equipment with sufficient lifting capacity.
- Carefully attach and secure device parts or larger assemblies to the hoists when replacing them.
- Only lift the device at the attachment points provided for this purpose.
- Check all attachment points, such as lifting eyes, before use. This applies in particular to subsequent transport of the device after a longer period of operation. Do not use attachment points that no longer correspond to the state in which the device was delivered.
- No additional fastening points may be attached to the device by welding, burning or drilling. There is a risk of cracking and defect of the device due to the notching effect of the weld or the focal point or bore.
- The guide must remain within sight of the operator and in verbal contact with him.
- Carefully reassemble and secure dismantled device parts after transport.

4.3 Checking the delivery

When the device is delivered, it must be checked immediately for completeness and possible transport damage.

1.Remove the transport packaging of the device or the individual components.

2.Inspect the device for transport damage.

- Immediately notify the transport company and the manufacturer in writing of any transport damage.
- Protect the device from further damage.

3.Check the delivery for completeness using the delivery note.

4.4 Device Transport

DANGER

Suspended loads

Tilting or falling loads can cause serious or fatal injuries.

- Never stand under suspended loads.
- Only use approved hoists and slings that are designed for the total weight of the attached load.
- Observe the load attachment points.
- Avoid one-sided loads.
- Only use slings/load-lifting devices that are in technically perfect condition.
- Secure loads with suitable devices.
- If transport locks are used, do not remove them until the installation has been completed.
- Secure loading areas against unauthorized access.
- Ensure sufficient lighting in the loading areas.
- Move loads only under supervision.
- When leaving the workplace, lower the load.

Lifting equipment should be used when exceeding the country-specific permissible weight limit for goods to be moved by persons.

Use suitable hoists. The load-lifting capacity must at least correspond to the total weight of the loading.

The mounting of the lifting devices and the transport may only be carried out by trained and authorised personnel.

4.5 Storage

Intermediate storage may be required from transport to assembly. The following conditions apply to storage:

1. If possible, place the device in a dry, clean, dust-, vibration- and frost-free environment until it is finally installed.
2. Only place the unit on load-bearing and flat surfaces.
3. Do not place the unit on the protective covers of drives.
4. Secure the device against falling over.
5. Protect the device against the effects of soil moisture.
6. Avoid the formation of condensation; if possible, adjust the storage temperature accordingly.
   - For outdoor storage, cover the unit with tarpaulins that are open at the bottom to allow condensation to drain off.
7. Always store electrical connection devices in closed, dry, frost-free rooms.
8. When shipping the unit by sea, do not damage the packaging and do not remove it until it is ready for installation.
9. Leave the parts to be stored in the delivered condition until installation.
10. Do not remove transport locks until after installation.

NOTE

Please observe the information in the attached data sheet. Refer to the separate supplier documentation for instructions on preserving supplier parts, if available. If you have any questions about storage, please contact the service department.

4.6 Assembly Guidelines

4.6.1 Assembly instructions for electronics

Connect the device to a constant power supply.

– It is recommended that you use an AC line conditioner. Caution - voltage fluctuations can lead to incorrect metal releases of the device!
– Connect the device to a constant power supply for a short amount of time to test whether the false alarms are caused by voltage fluctuations.
– Disconnect the UPS from the power supply during the test.
– Disconnect the metal detector from the power supply as rarely as possible during operation.

Do not install the evaluation electronics in switch cabinets or control cabinets.

Motors, high-voltage cables, frequency converters and DC drives in the vicinity can lead to false tripping of the metal detector.

Follow the manufacturer's guidelines.

Ensure a flat, two-sided grounding of the screen.

Use RFI and sinusoidal filters.

Do not mount the electronics housing on other machine parts.

This may cause interference.

Fix the electronics housing in an insulated manner (for example, using plastic washers and insulating nipples).

Reduce interference with the power cord.

– Install the power cable away from motors and high voltage cables.
– To shield the mains cable, it is recommended that you use stable metal tubes with good grounding (for best performance make sure that they have been welded).
– Do not connect any protective conduits to the housing of the device.

Avoid placing the evaluation electronics near a vibration source.

– Mount the evaluation electronics on a vibration-free surface. **Caution - vibrations can lead to false tripping and damage to the electronic components!**

Ensure that all cables are shielded.

– Shield the cables using EMC connectors.

Ensure that your device is properly grounded.

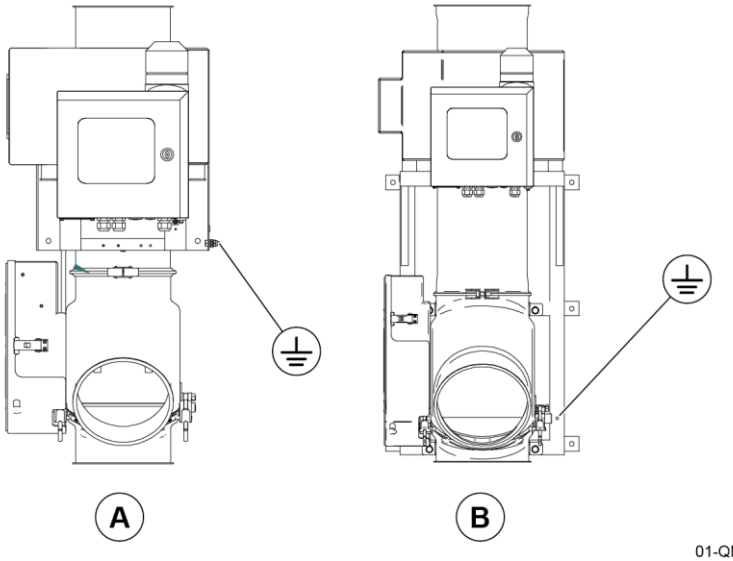


Fig. 5: Grounding points of the device

A For nominal widths 50-200 B For nominal widths 250-300

All earthing points, especially those marked, must be included in the same earthing potential. Potential differences are not permitted.

Please note the nominal width of your device.

The metal detector is earthed via the electronics housing. The connection is established via the shielding of the transmitter/receiver cable.

4.6.2 Assembly instructions for the detector

Pay attention to frequency overlaps when several metal detectors are being used.

- If interference occurs when using several metal detectors in the immediate vicinity, switch one of the devices to a secondary frequency (*see chapter on Operation, Operating Level 2, "Frequency" 'Secondary Frequency'*).
- Please contact our Service Department if you have any questions or problems.

Do not expose the device to strong electromagnetic fields.

- Avoid load fluctuations in the immediate vicinity of the detector coil. **Caution - Electromagnetic fields, especially those near the operating frequency of the device, can lead to false alarms!**

Please adhere to the device's metal-free zone.

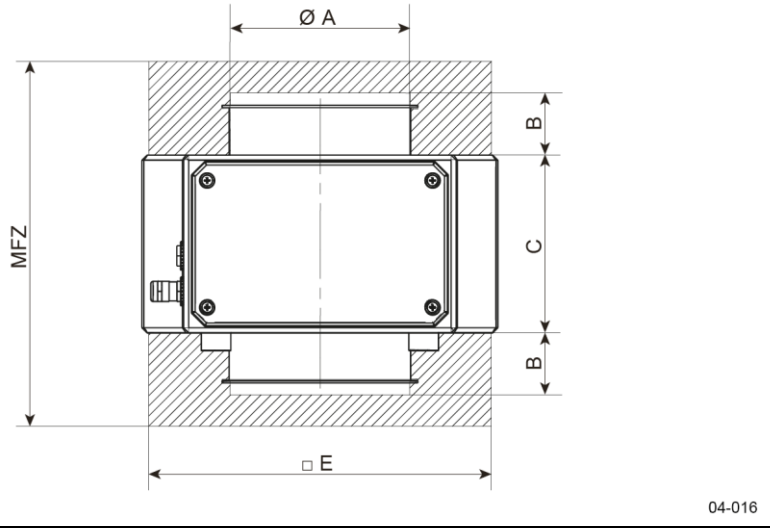


Figure 6: Location of the metal-free zone (MFZ) of a PowerLine detector coil

Sizes DN 50-200	Sizes DN 250-300
MFZ[1)] = 2 · B + C + 50 mm	MFZ[1)] = 2 ·B + C + 100 mm

Table 4: Determining the metal-free zone (MFZ) of a PowerLine detector coil

[1)] The metal detector must be positioned centrally within the MFZ. For the other levels: The MFZ is symmetrical to the passage or tunnel opening.

NOTE

When using a shaft extension, the size of the metal-free zone can change. If you have any questions, please contact Service.

- The values determined for the MFZ serve only as a guide (minimum values that may be exceeded) and must be confirmed by the manufacturer on a project-related basis.
- Always choose a MFZ that is as large as possible.
- Avoid metallic and magnetic materials within the metal-free zone.
- Avoid metal parts that change their distance to the detector coil (levers, swivel arms, etc.).
- Avoid loose metal connections in the vicinity or inside the detector coil (e.g. rolling axes, screw connections of the conveyor frame, loose gratings of walkways or broken welds).
- Insulate or weld metal parts that have loose contact with each other.
- "Non-moving metals" are e.g. conveyor belt frames or coil consoles (not the cross-connections within such constructions!).
- "Moving metals" are, for example, deflection and drive rollers or the axis of a reject pusher.

Operate the detector coil vibration-free (does not apply to VT-coils).

- Attach the coil to a solid surface.
- The lower the vibrations, the higher the sensitivity of the coil can be set.

Ensure that the device is installed vertically.

- Non-observance can lead to increased wear of the device.
- If the position is not vertical, contact Service.

Use the clamping ring to connect both halves of the metal detector together (only for nominal widths 50-200).

Hold the feed of the separation mechanism against the lower end of the sensing pipe and close the clamping ring.

Make sure that the structure is electrically insulated.

- Do not remove the coil feet or oscillating metals from the detector.

Do not touch the sensor surface of the detector coil.

- **Attention - Mechanical contacts can lead to false tripping!**

Keep the metal detector, and especially its reject item discharge, freely accessible.

If the metal detector is mounted in a place which inaccessible or difficult to access, problems may occur with the setting of the separation time and thus with the functioning of the device.

In this case, a test set-up is recommended before installing the device in a production system. This should be in the immediate vicinity of the final installation location.

- Contaminated, separated product must be able to flow away unhindered in order to avoid clogging.

Observe the maximum drop height of the conveyed product.

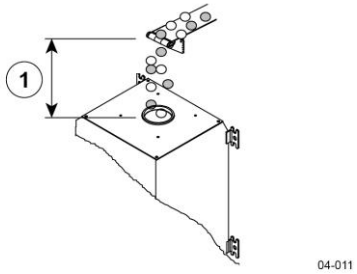


Fig. 7: Maximum drop height of the conveyed product

Please note that the free-fall height (1) of the conveyed product should not exceed the guideline value of 0.5 m.

For larger drop heights, contact Service.

5 Commissioning

5.1 Target group

This chapter is intended for the group of "qualified personnel" (*see chapter Safety, qualification of personnel*). Other groups of persons must not carry out the described work.

5.2 Security

DANGER

Risk of death due to high voltage

Contact with live components can be fatal. Switched on electrical components can perform uncontrolled movements. Serious injury or death can result

- Work on the electrical system may only be carried out by authorized electricians.
- Before starting work on the electrical system, switch off the power supply and secure it against being switched on again.

5.3 Commissioning

The metal detector is pre-configured as extensively as possible. The factory settings represent the best possible compromise between maximum detection accuracy and stable operation. The data sheet sensitivities are achieved with detection levels between 10 and 20 for dry products (*see menu "detection level"*).

Commissioning is described schematically below, and covers only the process flow. Refer to the relevant chapters in this manual for further information.

How to put the metal detector into operation:

1. Clean the metal detector.
   – Clean all surfaces in contact with the product if the product must not come into contact with foreign substances (*see Maintenance and Cleaning chapter*).
2. Assemble the metal detector (*see Assembly chapter*).
3. Optional: Depending on the configuration of your metal detector and your network, connect relays, switch inputs and outputs and any other interfaces (*see "Connections")*.
4. If available, connect the compressed air supply (*see "Connections")*.

5. Connect the supply voltage.
   – If you do not connect the metal detector with the supplied mains plug or your metal detector was supplied without a mains plug (e.g. ex-protection version), follow the corresponding instructions (*see Connections chapter: Supply Voltage Connection*).

Interim result 1: The metal detector is completely assembled and connected.

6. Switch on the metal detector without production and conveyor equipment.
   – The unit is now only exposed to external influences (peripheral interference).
7 .Locate and eliminate the source of interference in the event of false alarms. A way of doing it is :
   – Switch off all surrounding machines until the measuring signal of the metal detector is stable.
   – Switch the machines on again step by step.
   – After each step, check the measurement signal to locate the source of interference.
   – If interference suppression is not possible, increase the detection threshold until there is no more false triggering (*see "detection threshold" in the Control chapter*).
8. Switch on the production and conveyor equipment without any product.
   – The influence of the production line becomes recognizable.
9. Locate and eliminate the source of interference in the event of false alarms. Proceed as described above.
10. Start the complete production line and convey the product.
   – Only use a metal-free product.
   – The metal detector should detect no metal.
11. If the metal detector has detected metal, perform a learning process for the product (*see "Learn product"*) in the chapter Control menu.
   – Cause of triggering: The metal-free product is conductive and influences the metal detector. The product effect is compensated by the learning process.

12. Optimise the sensitivity settings (*see Control Menu chapter: "Detection Threshold"*).
13. If necessary, configure the switch outputs for the metal detector and the rejection unit (*see Control Menu chapter: "Switch Outputs"*).

Interim result 2: The settings for the metal detector are complete.

14. Create further products in the product memory (*see in chapter Control menu "Product memory"*). Only do this if several products are to be inspected with the metal detector.
15. Repeat points 9 to 13 until all products have been set.

Result: The metal detector is optimally set.

All other setting settings are used to adapt to the production process and to implement application-related functions/evaluations.

An overview of all functions can be found under Control.

5.4 Connections

The connections to the device are listed and explained in the following chapter. Work on the connections must be carried out according to the order specification.

5.4.1 Connection of the compressed air supply

⚠ WARNING

Personal injury due to incorrect connection of the compressed air

Improper connection of the compressed air can lead to property damage and personal injury.

- Ensure that the air in the compressed air supply line is clean, dry and oil-free.
- Ensure that the compressed air supply line has a sufficiently large cross-section.
- Ensure that a sufficient pressure reserve is available in the compressed air system.
- Ensure that the actual pressure corresponds to the anticipated operating pressure (*see below*).
- The compressed air supply must be separable, that is, it must always be possible to separate the device from the compressed air.
- The compressed air connection must be visible near the unit and be easily accessible.

Connect the compressed air supply before connecting the supply voltage. Otherwise the metal detector issues an error message.

NOTE

The compressed air supply must be within the following limits:

- Minimum pressure = 6 bar
- Maximum pressure = 10 bar (up to 40 °C)

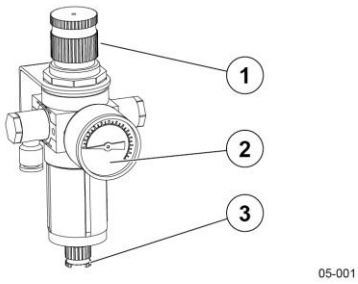


Fig. 8: Compressed air maintenance unit

The intended operating pressure is set at the factory and has the following value:

Operating pressure: 5 bar

If necessary, the operating pressure can be changed using the pressure setting knob (1).

The compressed air maintenance unit is supplied with a compressed air hose with a 7.2 mm push-on nipple.

1 Pressure setting knob
2 Pressure gauge
3 Valve for emptying the condensation water collecting container

5.4.2 electronics housing set up

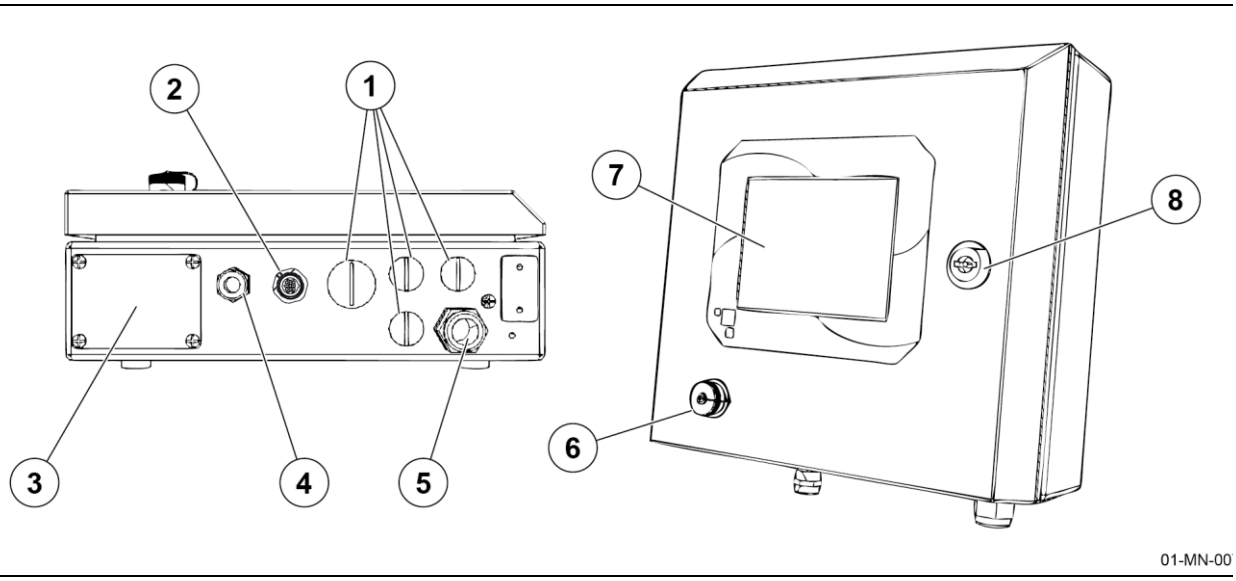


Fig. 9: Electronics housing

1 Free (1x M25x1.5 and 4x M16x1.5)

2 Socket M12 8-pin, A-coded (optional interface for e.g. networking, remote control unit)

3 Adapter plates
Optionally available with:
- 1x M12 socket 4-pole (D-coded)
- 2x M20x1.5 free

4 Coil connection (sensor unit, M16)

5 Mains connection (screw connection M20) with socket M12 4-pin, A-coded

6 USB type A socket

7 Control panel

8 Lock (double-bit key 3 mm)

The electronics housing with control panel is set up separately from the detector coil. It can be mounted on the four mounting holes (ø 5.2 mm) on the rear side.

To connect components to the electronic boards, you must open the electronics housing.

To make changes to the connections on the electronics boards:

1. Shut down the delivery
2. Unplug the unit from the mains.
3. Secure the device against accidental switch-on.
4. Open the electronics housing by turning the lock (7) counterclockwise with a double-bit key (3 mm).
5. Make your changes to the electronic boards.
6. Close the electronics housing again clockwise with the double-bit key.
   - When closing the electronics housing, make sure that you do not pinch any cables.

5.4.3 Design of the electronics circuit boards

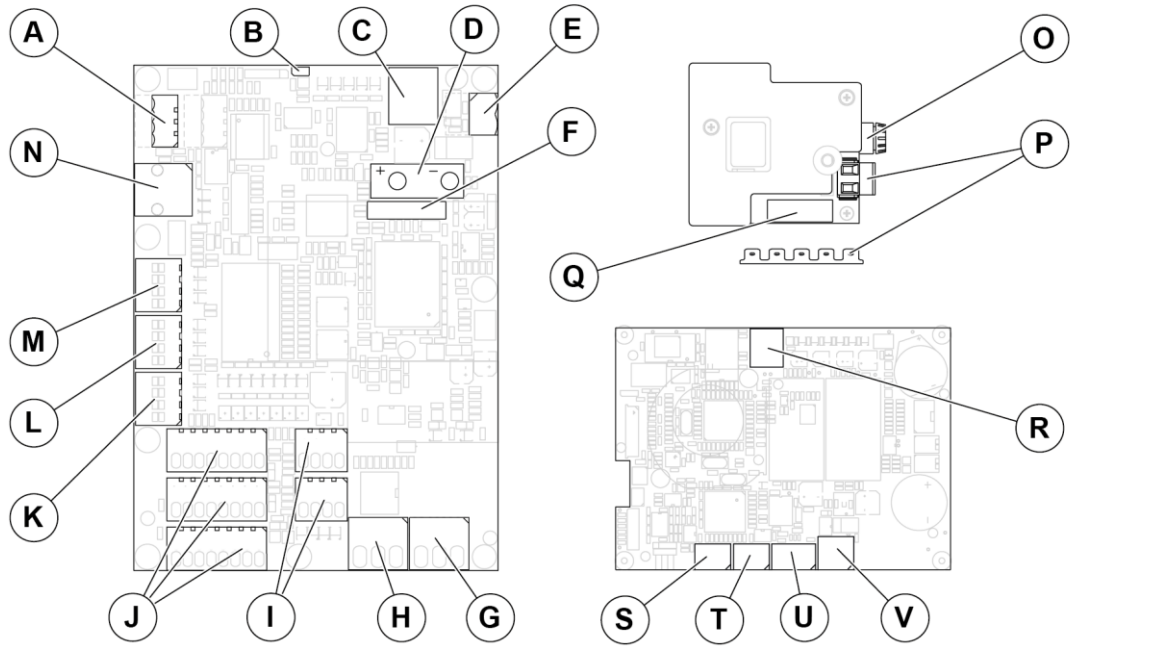


Fig. 10: Structure of the electronic boards with control unit (left), power connection unit (top right) and display unit (bottom right)

Control Unit

A Serial interface (RS232 optional)
B Port for external temperature sensor
C SD card reader
D Battery
E 24 V DC power supply
F Expansion connector
G Relay 1 (toggles by default in the case of metal)
H Relay 2 (switches by default if there is an error)
I 24V DC powered outputs
J 24V DC inputs
K Port for display unit
L Port for sensor unit
M Ethernet interface or *autoTEST*
N Service ports

Power connection unit

O Device fuse 1.25 A slow-blow, 5 x 20 mm
P Mains connection
Q Replacement fuse 1.25 A slow-blow, 5 x 20 mm

Display unit

R microSD card reader
S Serial interface (RS 485)
T Serial interface (RS 232)
U USB port
V Control unit port

5.4.3.1 Pin assignmentPlug assignment

The most important connections of the electronic boards and their pin assignments are described below.

The positions refer to the figure "Design of the electronic boards".

More detailed information is included in the optional wiring diagram. If you have any questions, please contact the service department.

Ethernet interface (see position M)

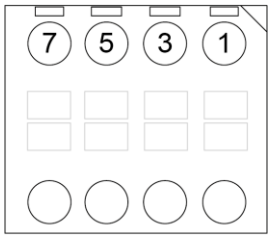


Fig. 11: Ethernet interface for networking

This interface is used for connection to a customer network or to an optional *autoTEST* system.

Pin	signal	color code
1	TX -	green
3	TX +	White-green
5	RX-	orange
7	RX +	white-orange

Tab. 5: Ethernet interface for networking - Pin assignment

Display unit connection (see position K)

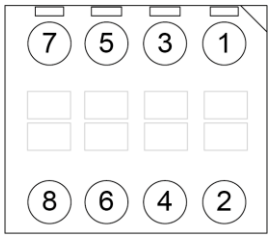


Fig. 12: Display unit connection

This interface is used to connect the display unit. It is used at the factory.

Pin	signal	color code
1	TX -	green
2	GND	blue
3	TX +	white-green
4	GND	white - blue
5	RX-	orange
6	24 V	Brown
7	RX +	white-orange
8	24 V	white-brown

Tab. 6: Display unit connection - Pin assignment

Sensor unit connection (see position K)

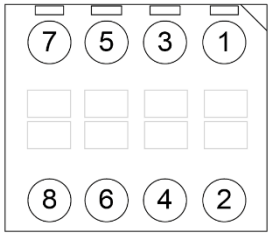


Fig.13: Sensor unit connection

This interface is used to connect the display unit. It is used at the factory.

Pin	Signal	color code
1	TX -	Green
2	GND	Blue
3	TX +	White-Green
4	GND	White - Blue
5	RX-	Orange
6	24 V	Brown
7	RX +	White-orange
8	24 V	White-brown

Tab.7: Sensor unit connection - Pin assignment

Relay (see positions G and H)

The metal detector has two relays which are already preassigned. Depending on the design of your device, the relays may be preassigned differently.

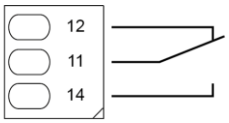
The following table gives you an overview of the switching states of the relays (standard assignment).

	Normal state	Switches when...			Function
		Note	Warning	Error	
Relay 1	OFF	-	-	-	Metal
Relay 2	ON	-	-	X	-

Tab. 8: Switching states of the relays (standard assignment)

Relay 1

Relay 1 switches **on metal detection** (standard assignment).



02-01-001

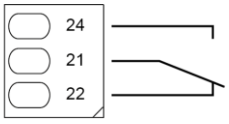
- Contacts 12, 11, 14
- Potential-free changeover contact
- Voltage-free state when contacts 11 and 12 are closed
- Maximum contact load: $U_{\sim}$ = 250 V AC, I_{max} = 3 A

Fig. 14: Relay 1

Relay 2

Relay 2 switches **in case of error** (standard assignment).

The relay is configured as a standby relay, which means that you can use the relay's switching operation to activate a warning device or to interrupt the product flow through the metal detector, for example.



02-01-002

- Contacts 24, 21, 22
- Potential-free changeover contact
- Voltage-free state when contacts 21 and 22 are closed
- Maximum contact load: $U_{\sim}$ = 250 V AC, I_{max} = 3 A

Fig. 15: Relay 2

24 V DC switching inputs (see position J)

CAUTION

Damage to property due to excessive current load

Too high a load on the switching inputs can lead to damage to the electronic components and, in the worst case, fire on the electronics board.

Do not exceed a total current load of max. 300 mA for all inputs and outputs!

Application-specific inputs are configured via the switching inputs (position I).

Depending on the design of your device, different switching inputs can be preassigned differently.

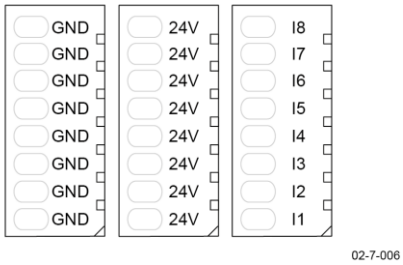


Fig. 16: Structure of the 24 V DC switching inputs

The following configurations are possible for the switching inputs:

Separator unit, separation position
Separator unit, normal position
Separator unit, product separation
Separator unit, test
Pressure monitoring
Rotary encoder (inputs I1-I4 only)
Photoelectric barrier
External reset
External metal
Separation crosscheck
Disable detection
Fill level sensor
Separator unit, external activation
Collecting vessel

24 V DC switching outputs (see position I)

CAUTION

Damage to property due to excessive current load

Too high a load on the switching outputs can cause damage to the electronic components and, in the worst case, fire on the electronics board.

Do not exceed a total current load of max. 300 mA for all inputs and outputs!

Application-specific outputs are configured via the switching outputs (position H).

Depending on the design of your device, different switching outputs can be preassigned differently.

The function of the switching outputs is freely configurable.

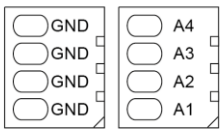


Fig. 17: Structure of the 24 V DC switching outputs

The following configurations are possible for the switching outputs:

Metal
Conveyor belt control
Pinch valve 1
Pinch valve 2
Trigger output
Collecting vessel
Separator unit
Standby
Detector test

5.4.3.2 Connection of the supply voltage

Use the following instructions if you are not using the supplied mains plug and want to connect to the mains in another way. Also use the following instructions if your metal detector was supplied without a mains plug (for example, explosive protection version).

NOTE

<Ensure that a network separator is installed. It must always be possible to disconnect the device from the electrical power supply.>

Standard version of the supply voltage

NOTE

The local supply voltage must be within the following limits:

- 100–240 V AC
- 50 / 60 Hz
- TN system

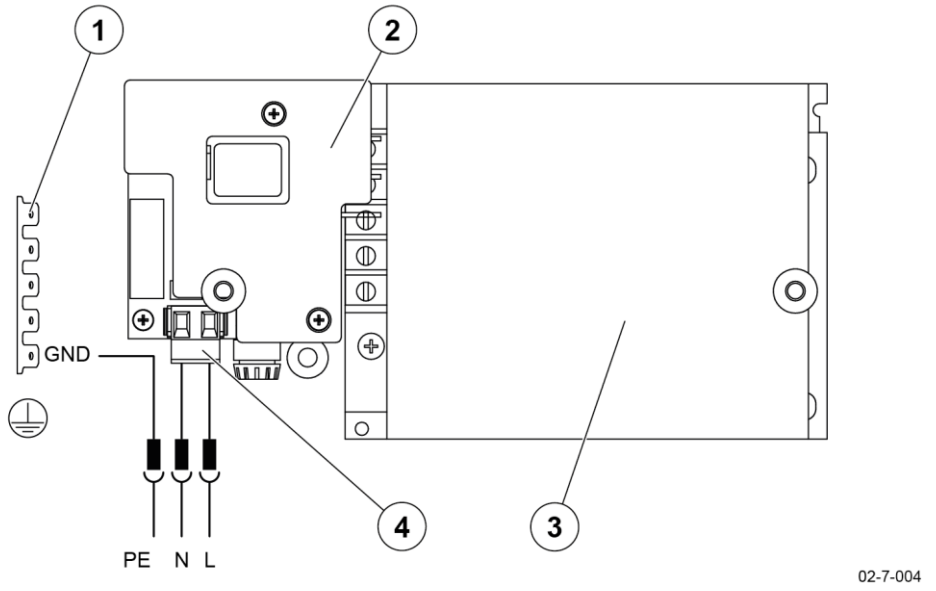


Fig. 18: Connection of the supply voltage (standard version)

1 Ground connection	L outer conductor
2 Power connection unit	N Neutral wire
3 Power Unit	PE Protective conductor
4 Plug-in terminal Mains connection	

How to connect the supply voltage (standard version):

1. Disconnect the supply line from the mains, secure it against being switched on again and check that it is at zero potential.
2. Open the electronics housing (*see "Design of the electronics housing"*).
3. Connect the supply cable to the power connection unit (2) using the supplied plug terminal (4).
4. Connect the protective earth (PE) to the earth connection (1).
5. Close the electronics housing (*see "Design of the electronics housing"*).

Special version of the supply voltage

NOTE

- The operating voltage of the DC voltage source must be 24 V DC ± 10%.
- The electronics and, if applicable, the frame must be included in the earthing potential.

  See chapter Product Description, Notes on Metal Detection, Electrostatic Discharges.

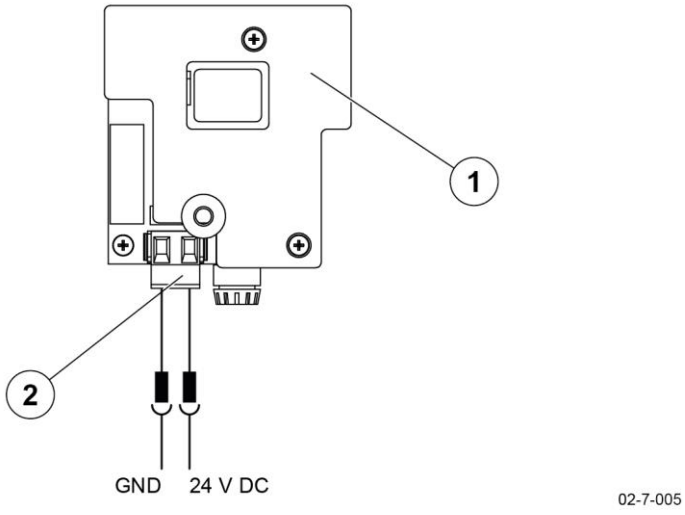


Fig19: Connection of the supply voltage (special version)

1 power connection unit 2 Plug-in terminal Mains connection

How to connect the supply voltage (special version):

1. Disconnect the supply line from the mains, secure it against being switched on again and check that it is at zero potential.
2. Open the electronics housing (*see "Design of the electronics housing"*).
3. Provide an external 24 V DC voltage source.
4. Connect the 24 V DC power source to the Power Connection Unit (1) using the supplied plug-in terminal (2).
5. Switch on the 24 V DC voltage source and start up the metal detector.
6. Check the function of the metal detector by performing a detector test (*see chapter Operation, operating level 1 "Start detector test"*).
7. Close the electronics housing (*see "Design of the electronics housing"*).

6 Operation

6.1 Target group

This chapter is intended for the group of "Trained personnel" (*see chapter Safety, qualification of personnel*). Other groups of persons must not carry out the described work.

6.2 Security

- Only use approved components in technically perfect and operational condition.
- Operate the device only within the scope of its intended use.
- Keep the workplace of the unit clean.
- Do not place any objects in the workplace to ensure access at all times.
- Secure the device against unauthorized access.
- Block access to the danger zone before putting the unit into operation.
- Before switching on, make sure that nobody can be endangered by the starting device.
- Observe the control displays during switch-on and switch-off processes.
- Only operate the device if all safety equipments are present and fully functional.

6.3 Before operation

Improper use and misconduct can cause life-threatening injuries to persons and damage to property.

Always follow the instructions in the Safety chapter before operating or operating the device. Regularly train persons in charge of the operation.

Before putting the unit in operation, the following must be present:

- Information and understanding of the operating instructions
- Qualification for operating the device (training, instruction)
- Authorization to operate the device by the operator

Preparations for operation and operating the unit:

- Put on personal protective equipment.
- Familiarize yourself with the device.
- Familiarize yourself with the applicable regulations.
- Coordinate workflows with everyone involved.
- Check the condition of the unit for damage before starting work.

6.4 Control

The metal detector is operated via a touch screen. Information required for operation is displayed on the screen.

All important functions are operated directly via menus and submenus.

CAUTION

Improper parameter settings

Changes to parameters can impair or cancel the proper operation of the metal detector.

Parameter changes may only be carried out by trained and authorized personnel.

The control of the metal detector is preset at the factory. Usually, no or only a few changes to the factory settings are necessary.

On the following pages you will find the following information:

- Basic structure of the user interface
- Symbol descriptions
- Menu structure / Overview of all menus
- More information about each menu

6.4.1 Symbol description

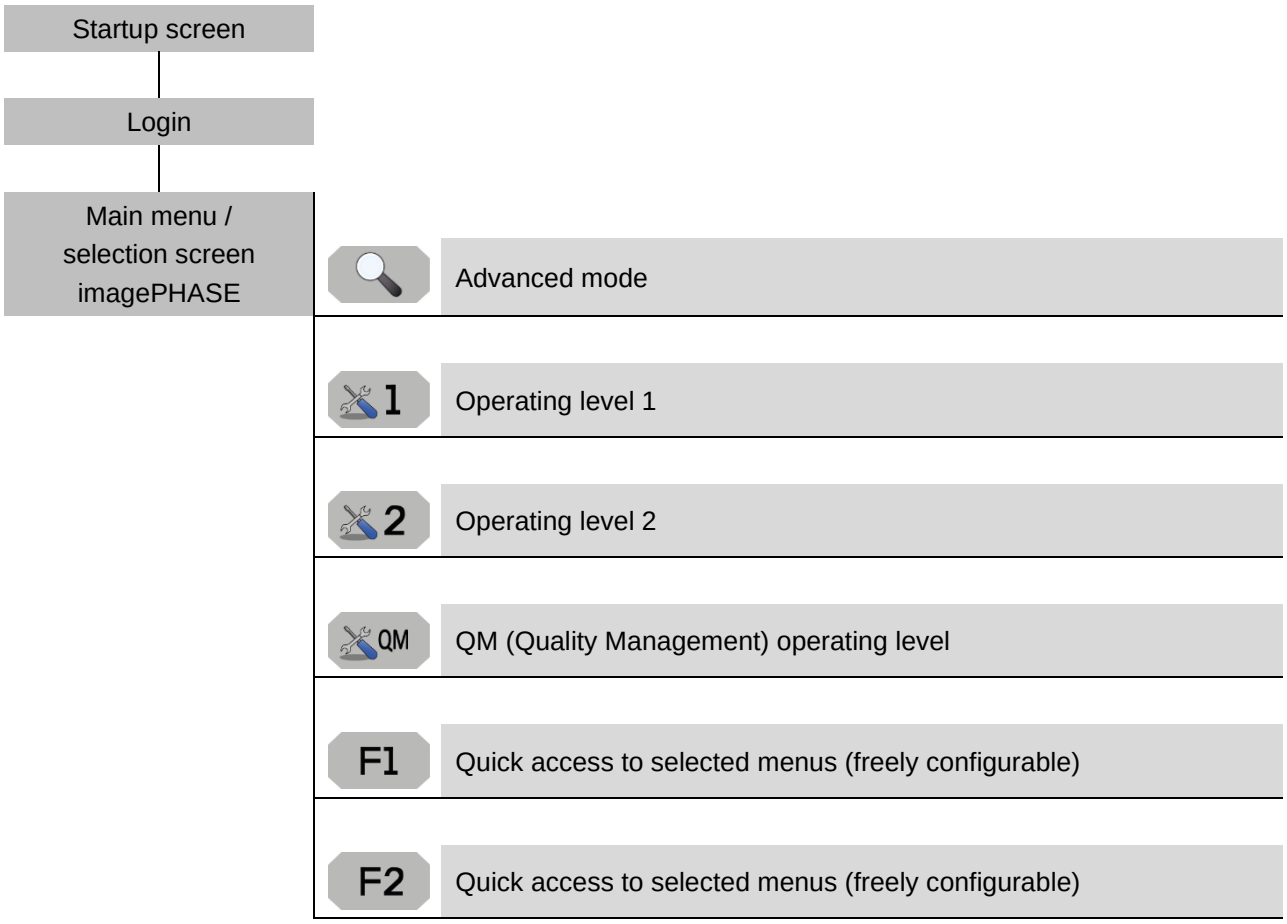
Symbol	Description
	Calling up the "login" menu (login)
	Please wait
	Confirmation
	Cancel, back to previous menu
	Hide
	Calling the expert mode
	Metal is detected
	Log out, return to the "login" menu (registration)
	Message in the background that has not yet been acknowledged
	Call up an operating level
	Back to previous menu, move cursor back
	Move cursor forward
	Setting the corresponding value
	Calling up further setting options
	Menu with further subitems
	Resetting the counter reading
	Save
	Restore factory settings

Tab. 9: Symbol description

6.4.2 Menu structure (overview)

The structure of the individual menus, which can be selected via the screen, is shown here schematically.

Depending on the application, some menus may be disabled and not visible on the screen. These menus are labelled "(option)".



The operating levels can only be called up with the appropriate permissions.

6.4.3 Home screen

The home screen appears as soon as the control has been switched on and started up.

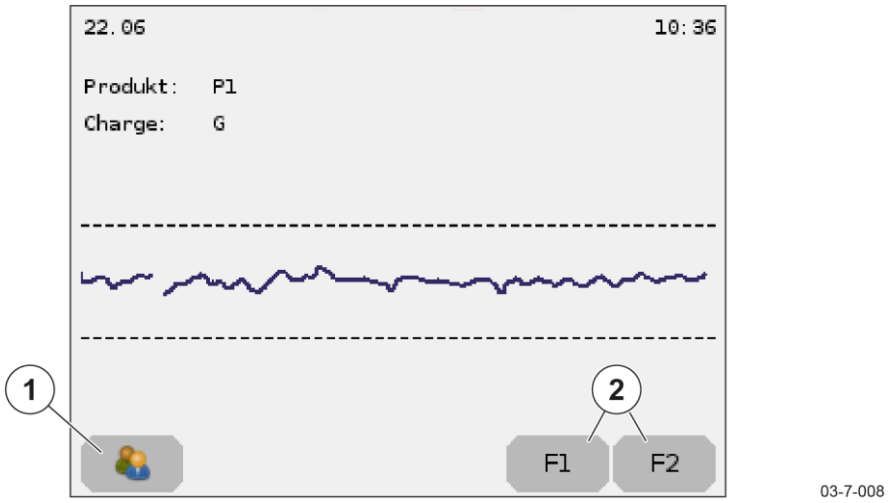


Fig. 20: Start screen (example)

The measurement signals are displayed graphically on the screen. Settings are not possible here.

The login menu (1) and the function keys (2) can be called up from the home screen.

6.4.4 Menu "Login" (Registration)

In the menu "login" the user logs in with his Code. Different menus are then available depending on the selected user.

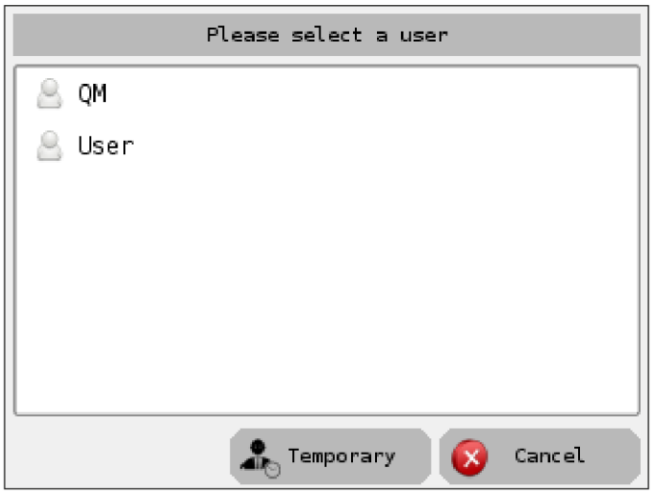


Fig. 21: Menu "Login"

To login:

1.Switch on the device.

- The start screen appears (*see start screen*).

2.Press the 'Login' button (bottom left).

- The 'login' menu appears.

3.Select a user

- The users 'QM' and 'User' are already created by default.

4.Enter the 4-digit Code using the keypad.

- You will find the Code in the appendix of this manual. **Caution - Keep these numbers safe and only provide them to authorized persons!**

5.Confirm your entry with 'login'.

- The main menu appears with the operating levels enabled for the selected user.

It is also possible to login with a temporary user account. This must be provided by the manufacturer's service department and loaded onto a USB stick.

To login temporarily:

1.Connect the USB stick received from the service department to the electronics housing.

2.In the 'login' menu, press 'Temporary'.

3.Press Yes.

4.Select the authentication file on the USB stick.

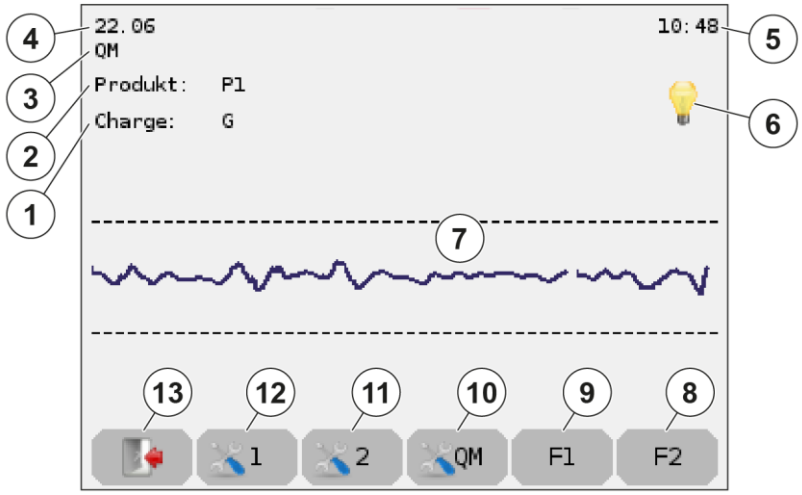
5.Press OK.

- The temporary Permission is set.
- If you have any questions, please contact the service department.

6.4.5 Main menu

The measurement signals are displayed graphically in the main menu.

In addition, general information and the hotkeys for calling up further operating levels and menus are displayed.



Tab. 22: User interface main menu

1	current batch number	8	Function key F2
2	Name of the currently set product	9	Function key F1
3	active user	10	Operating level QM
4	Current date	11	Operating level 2
5	Current time	12	Operating level 1
6	Signal (icon)	13	Log-out, return to "Log-in"
7	Graphical representation of the measurement signal		

Graphical representation of the measurement signal

In the graphical display of the measurement signal, the set detection limits (1) and the measurement signal (1; blue) of the currently detected product are displayed.

If the measuring signal (1) crosses both the upper and lower detection limits (2), a metal signal is triggered.

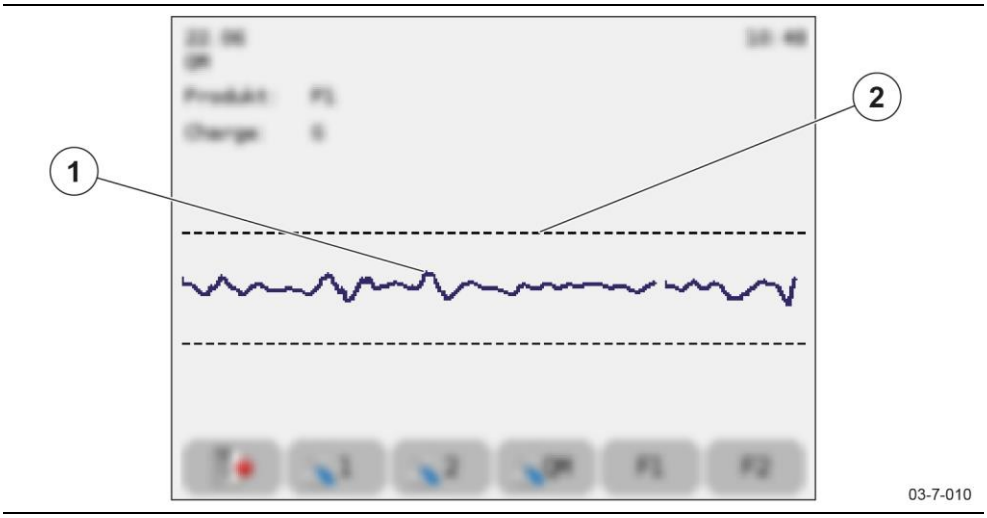


Fig. 23: Graphical representation of the measurement signal (example)

An unstable and strongly fluctuating signal can have the following causes:

- Peripheral fault

  Locate and eliminate the source of interference or increase the detection threshold (*see menu "Detection threshold"*).

- Strong product effect

  – Perform the learning process for the product (*see menu "Learn Product"*).

6.4.6 Operating level 1

To access operation level 1:

1.From the main menu, select the button '1'.

- The Operating level 1 with the list of selectable menus appears.

2.Select the desired menu.

The menus for operating level 1 are listed and explained below.

6.4.6.1 "Detection threshold" menu

The detection threshold is optimised In the "detection threshold" menu.

Unless otherwise agreed, the metal detector is pre-set to an optimum detection threshold. The standard values represent the best possible compromise between maximum detection accuracy and the lowest possible susceptibility to interference.

NOTE

The lower the set detection level, the higher the detection sensitivity. However, this also increases the susceptibility to false alarms.

You can optimise the detection level in this manner:

1.Open the menu "Detection threshold".

2.Press on 'Signal'. The graphical representation of the measurement signal appears (*see above under "Main menu"*).

3.Guide a reference metal part that is just about to be detected.

- Standardised test pieces are available from the manufacturer.
- You can see from the representation of the measurement signal that a metal part has been detected if the measurement signal (blue) exceeds both the upper and lower detection limits.

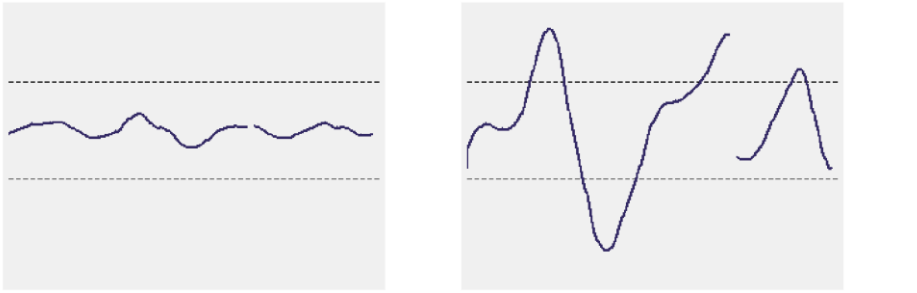


Fig. 24: Metal part is not detected (left), metal part is detected (right)

Case A: Metal part is detected

4.Increase the value for the detection threshold in small steps until the metal part is no longer detected.

5.Reduce the value by a safety margin of 10%.

6.Complete your input with 'OK'

Case B: Metal part is not detected

4. Decrease the detection threshold value in small steps until the metal part is just detected.

5.Reduce the value by a safety margin of 10%.

7.Complete your input with 'OK'

6.4.6.2 menu "Choose Product"

In the "Select product" menu, a previously created product will be selected. To create a new product, use the "Product memory" menu.

The products are displayed in a product list. The list can be sorted by product numbers (1-9) or product names (A-Z).

To select a product:

1.Open the "Select product" menu.

2.Click on the desired product in the list.

The selected line will be highlighted in blue.

3.Confirm your selection by pressing "OK".

To filter by product name in the list:

1.Press the 'Magnifying glass' button.

2.Enter the name of the product or parts of it in the text field.

3.Confirm with "OK".

–Only products whose names fully or partially match the search term will be displayed. Press the 'Magnifying glass' button again to remove the filter.

6.4.6.3 Menu "Batch handling"

In the "Batch handling" menu a batch number is entered which will start or finish the batch.

For example, different sales orders are recorded separately using the batch number in the "Protocol" menu.

To start a batch:

1.Open the "Batch handling" menu.

2.Enter the desired batch number using the keyboard.

–Change between upper and lower case letters with the "Up/Down" arrow.

3.Press the 'Start batch' button.

–The batch will start.

–Automatically return to "Operating Level 1" menu.

To end a batch:

1.Open the "Batch handling" menu.

-The screen indicating the current batch number appears.

2.Press the 'End batch' button.

–The batch will end.

–Automatically return to "Operating Level 1" menu.

The start and end of all batches are recorded in the "log " menu.

6.4.6.4 "Show counters" menu

The "Show counters" menu is used to display the current counter readings for the following parameters:

- Number of rejects upon detection
- Reject unit test
- Detector test rejects

Depending on the configuration of your metal detector, additional counters may be displayed.

If the products/batches are changed, all active counters are automatically reset to "0". The counters can be reset manually via the "Reset counters" menu by users with Level 2 authorization.

6.4.6.5 Menu "Test reject unit" (option)

In menu "Test reject unit" a function test of the reject mechanism is performed. The menu is only integrated in systems with a reject unit.

NOTE

Perform a daily function test on the reject mechanism.

If the device shows an error, the function test will be blocked for safety reasons.

To perform the reject mechanism function test:

1.Open the menu "Test reject unit".

- A reject test is carried out at the separation unit.
- After the reject test, an indication of the measured response times appears on the screen when the reject device is switched on and off.

6.4.6.6 "Start detector test" menu

A manual detector test can be performed from the "Start detector test" menu.

NOTE

Standardised test bodies for the detector test are available from the manufacturer.

To perform a detector test:

1. Open the "Start detector test" menu.
   – The time until the test must be performed is displayed in the upper area.
2. Perform the detector test.
   Calls to action in the lower screen field guide you through the test.
3. Exit the menu with 'OK'.

The detector test is configured via the "Detector test" menu.

If a code entry has been configured to abort, a test abort will be recorded in the "Log" menu.

NOTE

Test body data cannot be processed if manual reset mode, position 0 and light barrier are deactivated.

6.4.6.7 Menu "Start autoTEST" (Option)

In the "Start autoTEST" menu, a function test of the autoTEST unit is performed. The menu is only integrated in systems with an autoTEST unit.

To perform a function test of the autoTEST unit:

1.Open the menu "Start autoTEST".

- An operation is performed on the autoTEST unit.
- Refer to the autoTEST system manual for more information.

6.4.6.8 "start autoTEST" menu (Option)

In the "Start autoTEST" menu, a function test of the autoTEST-P unit is performed. The menu is only integrated in systems with an autoTEST-P unit.

To perform a function test of the autoTEST-P unit:

1. Open the menu "Start autoTEST-P".
   - A process is carried out on the autoTEST unit. (*see QM operating level "Detector test"*)

6.4.6.9 Menu "Change password">

In the menu "Change Password" the password of the currently logged in user is changed.

To change the password:

1.Open the menu "Change password".

2.Please provide current password

3.Press OK.

4.Enter a new password below.

5.Press OK.

Your password has been changed. Automatic return to operating level 1.

NOTE

If you change your password, inform the authorized persons about the new password.

6.4.7 Operating level 2

CAUTION

Improper parameter settings

Changes to parameters can impair or cancel the proper operation of the metal detector.

Parameter changes may only be carried out by trained and authorized personnel.

To access operation level 2:

1.From the main menu, select the button '2'.

The Operating level 2 with the list of selectable menus appears.

2.Select the desired menu.

The menus for operating level 2 are listed and explained below.

6.4.7.1 "Learn product" menu

NOTE

Only carry out the learning process if the signal *Metal appears* on the screen when metal-free products are conveyed.

Only carry out the learning process with metal-free products.

Always learn the product first using the 'New' button. The 'Expand' function does NOT replace the learning of a product via the 'New' button.

- Ensure that there are interruptions in the product flow during the learning process (for example, accumulations in bulk materials).
- Ensure that the speed and conveying density of the product during the learning process are the same as later in the production facility.
- If you cannot create interruptions in the product flow, convey your product in a non-conductive bag. Make sure that the filling density of the bag is the same as later in the production facility.

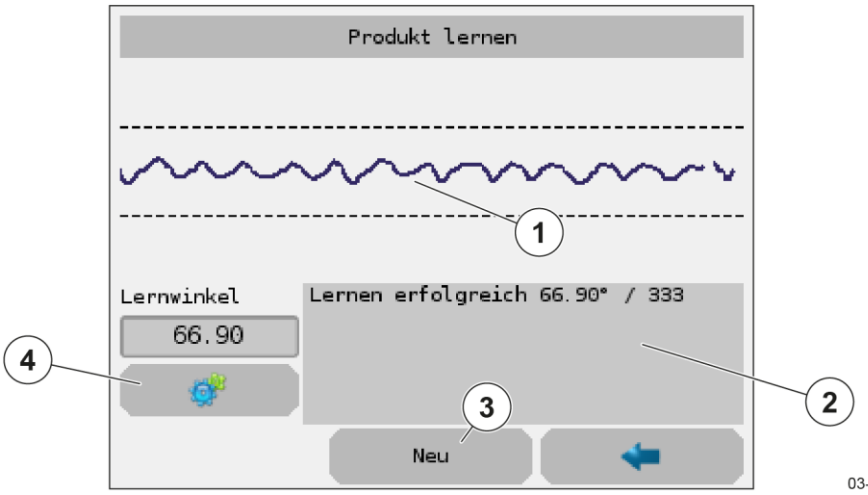


Fig. 25: "Learn product" menu

The measurement signal (1) for a product is recorded in the "Learn product"menu. The configuration of the learning process occurs via the 'Settings' button (4).

Learn product

This is how you carry out the learning process for a new product:

1.Open the "learn product "menu.

2.Press 'New' (3).

– The transmitter frequency is set automatically.

3.Feed the product to be taught as soon as the prompt "*Please feed the product" appears in the* information field (2). **Attention - Products containing metal distort the learning process. Only use metal-free products during the learning process!**

4.Select "Next".

– The transmitter frequency is set automatically.

5.Repeat steps 2 and 3 until the 'Fnish' button appears.

The number of product runs varies depending on the product and its composition. For dry products, three product runs are often sufficient, whereby difficult products require several runs.

6.Press 'Finish'.

- The optimization process is running.

– The results of the learning process are displayed in the information field (4).

Settings

The parameters for the learning process of a product are configured via the 'Settings' button (7):

Parameter	Description	Setting	Explanation
'Learning mode'	Control the length of the recording phase	User	Recording phase is started or stopped manually using the 'New' and 'Done' buttons.
		Auto	The recording phase is started manually via the 'New' button. The recording phase is stopped automatically after a certain adjustable time has elapsed (*see 'Learning time' parameter*). If the measuring signal (3) has to be adapted to the display range, the recording phase starts anew.
		Trigger (option)	Learning mode for metal detection systems with product light barriers. The recording phase is started manually via the 'New' button. The recording phase is stopped manually using the 'Next' or 'Done' buttons. The recording phase stops automatically as soon as the set number of products has passed the light barrier (*see 'Number of products' parameter*).
'Number of products' (optional)	Number of product runs (only visible in 'Trigger' learning mode)	[1–100]	Default setting: 5 The number of product runs varies depending on the product and its composition. For dry products, three product runs are often sufficient. Difficult products require several runs.
'Learning time' (optional)	Duration of the recording phase (only visible in 'Auto' learning mode)	[mm:ss:ms]	Default setting: 5 s The duration to be set varies according to the product and product characteristics. The duration must be long enough to fully understand the product.

Parameter	Description	Setting	Explanation
'Optimisation'	Automatic determination of the detection threshold and strain	Off	Parameter is inactive.
		On	Default setting The optimisation progress is given as a percentage.
'Detection standard' (optional)	Choice of test body size (only available with active *imagePHASE,* active 'optimisation' and if there is a test body pool)	Checkbox deactivated	Default setting No selection of test body size
		Checkbox activated	Size of the test objects for the specified materials can be selected. The selected test objects are found safely in the product, but not smaller ones. The detection threshold and strain are set automatically during 'optimisation'. If a test object is not found, the detection threshold is set to a minimum value. In this case, change the selected detection standard. Make the settings for each product separately. A change only takes effect during the next learning process.
'Optimisation priority' (optional)	Choice of test body material for automatic frequency selection (only for multi-frequency devices with *imagePHASE* and active 'optimisation')	Iron	Test bodies consist of iron (Fe).
		Non-ferrous	Test bodies consist of non-ferrous metals (NFe).
		Stainless steel	Test bodies are made of stainless steel (SS).
		none	Default setting No selection of the test body material.
'Product fluctuation'	Stage of fluctuations during optimisation (only with active 'Optimisation')	Low	Product fluctuation of 10%
		Medium	Product fluctuation of 20%
		High	Product fluctuation of 40%
			For settings, see table below.
'Optimisation frequencies' (optional)	Transmitter frequency for frequency optimisation (only for multi-frequency devices with *imagePHASE* and active 'optimisation')	High | Medium | Low	During a new learning process, the selected frequency is optimally adjusted to the respective product. If no frequency is selected, no frequency optimisation is performed during learning.
'Stretching image'	Value for resizing the envelope (only for devices with *imagePHASE*)	[1.0–100.0]	Default setting: 5 Change the size of the envelope (2) at the edges. Prevents false tripping in the event of minor product fluctuations.

Parameter	Description	Setting	Explanation
'Product learnt'	Indicates whether the product has been learned	No	Product was not learned in the learning process.
		Yes	Product was learned in the learning process.
'Product length'	Length of the product	[0–20000] mm	Length of the product to be learned (in conveying direction).

Tab. 10: Parameter – Learn product

Parameter	Description	Setting
'Product fluctuation "low"'	Value of fluctuations during optimisation	[0–19]
'Product fluctuation "medium"'	Value of fluctuations during optimisation	[11–39]
'Product fluctuation "high"'	Value of fluctuations during optimisation	[21–99]
'Minimum detection threshold for product fluctuation "low"'	Minimum value of the detection threshold if product fluctuation "low" is selected	[1–9]
'Minimum detection threshold for product fluctuation "medium"'	Minimum value of the detection threshold if product fluctuation "medium" is selected	[3–19]
'Minimum detection threshold for product fluctuation "high"'	Minimum value of the detection threshold if product fluctuation "high" is selected	[11–3 200 000]

Tab. 11: Parameter – Product fluctuation settings

6.4.7.2 Menu "Product memory"

New products are created and managed in the "Product memory" menu.

In a product memory, the name, item number, detection level, period, mechanical delay, learning angle and frequency of a product are all combined together.

The following buttons are available:

Button	Explanation
New	Add New Product The settings of the currently selected product are applied.
Copy	Copy the values associated with the selected product to another one.
Edit	Change the name of the selected product.
Delete	Delete the product selected on the left.
Item number	Change or delete the item number of the selected product.
1-9 / A-Z	Sort product memories from 1-9 or from A-Z.
Magnifying glass	Search by name or item number of an existing product. Partial matches are also found.

Tab. 12: Buttons - Product memory

To create a new product:

1.Open the menu "Product memory".

2.Press 'New'.

3.Enter a product name

4.Complete your entry with 'OK'

NOTE

When creating a product, observe the following points:

- A name must be assigned to the product.
- Assign an item number one time only.
- A maximum of 500 products can be created.

6.4.7.3 “Reset counter” menu

In the “Counter” menu, you can reset the Counter readings (*see operating level 1 “Counter”)* to ‘0’.

How to reset the counter:

1. Open the menu “reset counter” in operating level 2.
2. Press the “Eraser” icon.
3. Confirm the deletion query with ‘Yes’ to reset the desired counter.

6.4.7.4 Menu "outputs"

In menu "outputs", the outputs for the metal detector and the Separating unit are configured.

Furthermore, the collection container of the separating unit, if present, is unlocked in order to be able to empty it.

To configure the outputs:

1.Open the menu "outputs".

2.Select the desired device via the button ' Metal R1 Configuration' (relay 1) or 'Configuration reject unit A1' (active 1).

- Depending on the configuration of your device, the names of the buttons may differ.

3.Select the desired parameter (*see list below*).

4.Adjust the setting.

5.Complete your entry with 'OK'

Parameter	Description	Setting	Explanation
Position	Time delay between metal detection and output at the outputs	[0 ms]	No switching delay
		[1–30.000 ms]	Time between detection of a metal part in the detector coil and Separation via the Separation device. For preset systems with rotary encoder or fixed speed, the value is in millimeters. The time delay can be set independently of the 'Reset mode'.
Period	Duration of the separation process	[1–30.000 ms]	Time during which the separation device stops in the bad discharge position after a metal detection. Setting the optimum value: Reduce the value step by step, starting from an absolutely safe switching time. If the metal part is not removed for the first time, increase the value again, taking into account a small safety margin.
Reset mode	How to reset the metal message	automatic	Default setting No metal message is issued. The detected metal and signal data are recorded and can be traced in the Log. (Use this setting for automatic removal of metal contaminated products)
		manual	Metal messages must be reset via a reset of the metal detector on the screen with 'OK' or via an external reset button. The detected metal and signal data are recorded and can be traced in the Log.
Mechanical delay	Time between activation and separation	[0 ms]	No time delay
		[1-500 ms]	Time between signal being sent to the separation mechanism and the mechanical separation of the product (time when the separation mechanism hits the product). Compensation of mechanical delay by a separation system.

Tab. 13: Parameter - outputs

Unlock collecting container (optional)

Press the “Unlock collecting container” button to unlock the separation unit's collecting container, then open and empty it.

This button is only visible if your device includes a collecting container.

How to unlock and open the collecting container:

1. Open the "Switch outputs" menu.
2. Press "Unlock collecting container".
   - An info message appears and gives you important information about this process.
3. Press "Unlock".
4. Open the collecting container within the pre-set unlocking period.
5. Empty the collecting container.
   -**Attention: It is possible that a metal-contaminated product will be removed from the product stream during the emptying process!**
6. Close the container again within the pre-set opening period.

NOTE

- The default value for the unlocking period is 20 s.
- The default value for the opening period is 30 s.
- To change the values, please contact customer service.
- If closure does NOT take place within the specified opening period, the device switches to the error state and is stopped.

6.4.7.5 Menu "Detection"

In the "Detection" menu, the metal detector's metal detection and separation process are activated or deactivated.

To enable/disable detection:

1.Open the menu "Detection".

2.Press the 'Enable' or 'Disable' button.

- The metal detection and removal process of the metal detector is activated or deactivated.

6.4.7.6 "Frequency" menu

In the"Frequency" menu, a default transmitter frequency (option) or a Secondary frequency is selected.

Transmitter frequency (option)

NOTE

- This menu item is only available if your device is a multi-frequency system and optimisation is deactivated (*see operating level 2 "Learn product" 'Settings' 'Optimization'*).
- If optimisation is activated, then in "Learn product", the product is automatically recorded at each of the three transmitter frequencies and the most suitable one is selected at the end.

In the submenu 'Transmitter frequency' one of three factory configured frequencies (high, low, medium) is selected.

To select a transmitter frequency:

1.Open the "Frequency" menu.

2.Press 'Station frequency'.

3.Select the desired frequency.

- 'High'
  for low product effect
- 'Low'
  for high product effect or for conveying aluminium packaging
- 'Mid'

4.Confirm your input using 'OK'.

Longer waiting times may occur during a frequency change. A waiting dialog will be displayed to show that the frequency change is running.

Secondary frequency (option)

The secondary frequency is switched on and off in the submenu 'Secondary frequency'.

If interference occurs at the metal detector at the main frequency that makes reliable operation impossible, the secondary frequency can be used instead (e.g. 63.5 kHz when main frequency is 62.5 kHz).

To activate/deactivate the Side frequency:

1.Open the "Frequency" menu.

2.Press 'Secondary frequency'.

3.Set the secondary frequency to 'Off' or to'On'.

NOTE

If you operate several metal detectors in a common production environment, the corresponding main and secondary frequencies of the individual metal detectors should be optimally matched at the factory.

6.4.7.7 “USB” menu

A software update is performed in the “USB” menu. Furthermore, data of the device control are stored on a USB stick and can be transferred back to the device control.

Software Update

NOTE

The update can only be carried out if all necessary sub-units (control unit, sensor unit and display unit) are activated.

Via the submenu ‘Software Update’ the current software is replaced by a new software version.

How to perform a software update:

1. Connect a USB stick with the new software version to the electronics housing.

   The update file must be stored in a subdirectory on the USB stick, not in the main directory.
2. Open the “USB” menu.
3. Press ‘Software Update’.
4. On the USB stick, select the folder containing the new software version and press ‘Update’.
   – The update process starts automatically.
   – The individual updates (of each subunit) are displayed.
5. After the update process, press ‘Restart’.

   After the restart, the update process is completed.

NOTE

No messages are displayed while the update is running.

Do not turn off the power during the update.

Backup

Using the ‘Backup’ submenu, a backup file is saved to a USB stick and can be restored later at the device control.

Products, users and settings that have been created, among other things, are stored in the backup file.

To create a backup file:

1. Connect a USB stick to the electronics housing.
2. Open the “USB” menu.
3. Press ‘Backup’.
4. Press ‘Create backup’ twice.
5. Enter the file name using the keyboard.
6. Select the folder on the USB stick where you want to save the file.

   The backup file is stored on the USB stick.

To restore the backup file:

1. Connect a USB stick to the electronics housing.
2. Open the “USB” menu.
3. Press ‘Backup’.
4. Press ‘Restore backup’ twice.
5. Select the backup file on the USB stick.

   The current backup file on the device control is overwritten.

NOTE

If the backup file was created from a newer software version, the process is aborted and a message indicating that the backup file is incompatible appears.

Product parameter

Product data (e.g. product names, detection levels, etc.) are stored on a USB stick via the ‘Product parameters’ submenu and can be restored at a later time at the device control.

To export product data:

1. Connect a USB stick to the electronics housing.
2. Open the “USB” menu.
3. Press ‘Product parameters’.
4. Press ‘Export’ twice.
5. Enter a file name using the keyboard.
6. Select the folder on the USB stick where you want to save the file.

   All relevant product data are stored on the USB stick.

To import product data:

1. Connect a USB stick to the electronics housing.
2. Open the “USB” menu.
3. Press ‘Product parameters’.
4. Press ‘Import’ twice.
5. Select the file on the USB stick.

   The current product data on the device control are overwritten.

NOTE

If the import file was created from a newer software version, the process is aborted and a message indicating that the import file is incompatible appears.

Export menu structure

Via the submenu ‘Export menu structure’ the menu structure with the corresponding setting values is exported to a USB stick as a PDF file.

To export the menu structure:

1. Connect a USB stick to the electronics housing.
2. Open the “USB” menu.
3. Press ‘Export Menu Structure’.
4. Select the folder on the USB stick where you want to save the file.
   – The menu structure is saved as a PDF file on the USB stick.
   – Only the operating levels for which the current user has permission are included in the PDF.

6.4.7.8 Menu "System info"

The "System info" menu displays information on the current software version and measured values.

Version info

The'Version info' button displays the software version and other important data.

To view the version information:

1.Open the "System Info" menu.

2.Press 'Version Info'.

- Information is displayed.

3.Write down the information for any service requests.

Measured values

The 'Measured values' button displays the internal parameters of the metal detection electronics for service and diagnostic purposes.

This calls up the measured values:

1.Open the "System Info" menu.

2.Press 'Measured values'.

- Information is displayed.

6.4.7.9 Menu "Clock setup"

In the "Clock setup" menu, the date and time are set.

To set the date and time:

1.Open the menu "Clock setup".

2.Set the desired value with '+' and '-'.

3.Confirm your entries with 'Save'.

NOTE

The changeover from summer to winter time must be made via the menu. The time setting is not automatic.

6.4.7.10 Menu "Language"

In the menu "Language" the language for text output on the screen is selected.

To select the language on the screen:

1.Open the menu "Language".

2.Select the desired language.

3.Complete your entry with 'OK'

- The screen language has been changed.

6.4.7.11 Menu "Display"

In the "Display" menu, you select which displays appear in the main view. Furthermore, the screen is calibrated and the display lock time and signal fade-out time are entered.

Information on main view

The 'Information in main view' button indicates whether messages or the current measurement signal are displayed in the main menu/main view.

To select the main view display:

1.Open the "Display" menu.

2.Press 'Information on main view'.

3.Select the desired display type:

- "No View"
  No display of messages or signals.
- Messages'.
  Display of the latest messages.
- Signal View'.
  Display of the measured signal and the envelope.

Display calibration

Display calibration

If the touch screen does not react as usual, i.e. if a key is pressed and ignored or an adjacent key is triggered, the screen must be recalibrated.

To perform a display calibration:

1.Open the "Display" menu.

2.Press 'Display Calibration'.

- An explanatory text for the subsequent calibration appears.

3.Press the five calibration points (+) on the screen with your finger or with the help of a fine but neither pointed nor sharp object. Hit the points as accurately as possible.

Display lock time

Use the 'Screen lock time' button to enter the time until the lock screen appears.

If the screen is not operated within this time, a lock screen appears, which can only be removed by logging in the active user.

To enter the display lockout time:

1.Open the "Display" menu.

2.Press 'Display lock time'.

3.Enter the desired time [00:00-01:00 - hh:mm].

- By default, the locking period is deactivated (value = 00:00).
- The locking and unlocking processes are logged.

Signal fade-out time

The 'Signal fade-out time' button is used to set the fade-out time ("persistence") of a measurement signal. After the set time, a measurement signal is slowly faded out.

To enter the signal fade-out time:

1.Open the "Display" menu.

2.Press 'signal fade-out time'.

3.Enter the desired time[00:00:00.030–23:59:49.999 – hh:mm:ss.ms].

6.4.7.12 Menu "Data backup"

In the "Backup" menu, a new backup file is created, a previous backup is restored or deleted.

A maximum of 30 automatic and 30 manual backup files can be created. Each additional backup deletes the oldest existing backup.

Products, users and settings created, among others, are stored in the data backup.

A data backup is automatically performed every day at 0:00 or shortly after the device is powered on. The backup of the device settings is stored on a microSD card.

NOTE

You can also restore a data backup onto a USB stick.

See the "USB" menu.

To perform a data backup:

1.Open the "Backup" menu.

2.Press 'New'.

- A new data backup is created.

To restore a data backup:

1.Open the "Backup" menu.

2.Select the backup you want to restore from the list.

- The selected file is highlighted in blue.

3.Press [Restore].

- The device restarts automatically to restore the selected data backup.
- All changed data since this data backup is reset.

To delete a backup:

1.Open the "Backup" menu.

2.Select the backup you want to delete from the list.

- The selected file is highlighted in blue.

3.Press 'Delete'.

- The selected data backup is deleted.

Acceptance of settings after changing hardware components

The previous settings can be adopted by exchanging the microSD cards after changing a hardware component.

NOTE

If the device is networked, disconnect from the network before replacing one or more components. Non-observance can lead to an IP conflict in the network.

This allows you to replace one or more components:

1. Turn off the device and disconnect from the network.
2. Remove the microSD card from the board of the new component.
3. Insert the microSD card of the old component into the board of the new component.

NOTE

If several components are exchanged, make sure that the cards match the correct components. The individual cards are marked with 'CU' (Control Unit), 'SU' (Sensor Unit) and'DU' (Display Unit).

4. Insert the new component.
5. Switch on the device.
   - The board serial number indicates that the card has been inserted into a new board.
   - An automatic restore of the most recent backup is started.
   - A status dialog appears.
6. Press 'OK' to start the recovery.
7. Press 'Restart' when prompted.
   - A restart is performed.
   - The previous settings have been applied.

If an SD card is defective, insert a new, pre-formatted card from the manufacturer.

If you have problems installing the components, contact the service department.

6.4.7.13 Menu "Restore factory settings"

In the "Restore factory settings" menu, the factory settings of the controller are restored.

Attention - All previous settings will be overwritten!

To Restore the factory settings:

1.Open the "Restore factory settings" menu.

2.Press [Restore].

3.The device restarts automatically.

- The previous settings are overwritten with the factory settings.

NOTE

If the factory settings file was created from a newer software version, the process is aborted and a message indicating that the factory settings file is incompatible appears.

6.4.7.14 "Predictive Maintenance" menu

The "Predictive Maintenance" menu is used to check and reset the status of the discharge flap.

Reset

The status of the discharge flap is reset with the "Reset" button.

To reset the status:

1. Open the "Predictive Maintenance" menu.
2. Press the "Reset" button
3. Confirm the entry with the "Yes" button
   - The status of the discharge flap is reset.

Discharge flap status

You can use the "Discharge flap status" button to view the threshold value and the current value in switching cycles.

To see the current status of the discharge flap:

1. Open the "Predictive Maintenance" menu.
2. Press the "Discharge flap status" button

6.4.8 Operating level QM

CAUTION

Improper parameter settings

Changes to parameters can impair or cancel the proper operation of the metal detector.

Parameter changes may only be carried out by trained and authorized personnel.

To access operation level QM:

1.From the main menu, select the button 'QM'.
   - The Operating level QM with the list of selectable menus appears.

2.Select the desired menu.

The menus for operating level QM are listed and explained below.

6.4.8.1 "User management" menu

In the "User management" menu, users are created, managed, edited and deleted.

The device can only be operated when a user is logged in. The login is done by entering the user name and the corresponding password. Only one user can be logged in. This allows the operator to be clearly identified.

New

Click the 'New' button to create a new user. The name is determined by the system administrator of the operator.

To create a new user:

1. Open the "User manager" menu.
2. Press 'New'.
3. Press the 'Name' input field.
4. Enter a new user name in the input field using the keyboard.
   A user name can only be assigned once, i.e. identical names are not possible.
5. Press the 'Code' input field.
6. Enter a new 4-digit access code in the input field using the keyboard.
7. Switch to the 'Permissions' tab.
8. Assign the desired rights for the new user (*see list below*).
9. Confirm your entries with 'Save'.
10. Communicate the user name and access code to the respective user. The access code should only be known to the user and should not be passed on.
    – The access code can be changed by the user (*for the procedure, see below under 'Edit'*).

Permission	Explanation
LEVEL 1	Access to operating level 1
Level 2	Access to operating level 2
Level QM	Access to QM (Quality Management) operating level
Reset detector test	User may abort a detector test.
"Learn product *imagePHASE*"	User may learn a product with *imagePHASE*.
"Reset failsafe system" (only with existing Retailer Kit)	User can confirm information messages of the Retailer Kit (user QM assigned by default).
'Function key F1'	The user can use the menus under the function key 'F1'.
'Function key F2'	The user can use the menus under the function key 'F2'.

Tab. 14:Permissions for users

Editing

Existing user data can be edited using the 'Edit' button.

To edit user information:

1. Open the "User management" menu.
2. Press 'Edit'.
3. Switch to the input fields 'Name' or 'Access code' or the 'Permissions' tab in which something needs to be edited.
4. Make the required edit in the corresponding input field.
5. Confirm your entries with 'Save'.

Deleting

Users are deleted using the 'Delete' button.

How to delete a user:

1. Open the "User management" menu.
2. Press 'Delete'.
3. Select the user to be deleted.
4. Confirm your selection with 'Save'.

NOTE

The users *User* and *QM* cannot be deleted.

6.4.8.2 Menu "password expires"

In the "Password expires" menu, the request to assign a new password after a certain period of time is activated or deactivated.

To enable the request:

1.Open the menu "Password expires".

2.Press Yes.

3.Complete your entry with 'OK'

- After a preset time has elapsed, each user is prompted to change his password.
- The time can be set in the "Password expires in (days)" menu (*see "Password expires in (days)"*).

4.The function can be deactivated again by pressing the 'No' button. You will not be prompted to change your password.

6.4.8.3 Menu "Password expires in (days)" (Option)

In the "Password expires in (days)" menu, the time is set until the request to change the password appears.

This menu is only displayed if the request 'Yes' has been activated in the "Password expires" menu.

To set the time:

1.Open the menu "Password expires in (days)".

2.Enter the desired time [1-365 days].

3.Complete your entry with 'OK'

6.4.8.4 Menu "Protocol"

In menu "Log" all occurred events are listed with date and time. This makes it possible to trace when which activity took place.

The various event types are shown and hidden using the checkboxes (1). Using the ›?‹ Button you get to the explanations of the individual checkboxes.

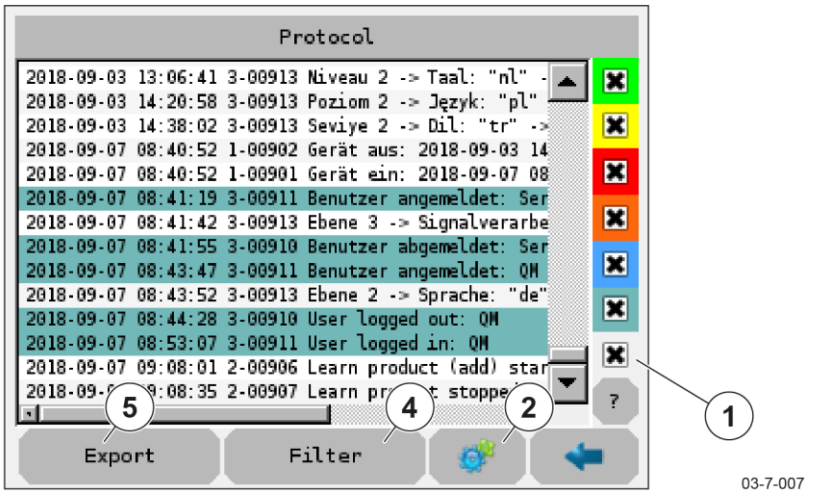


Fig. 26: Menu "Protocol" (example)

Export

Click the 'Export' button to save the protocol to a USB stick.

To save a log to a USB stick:

1.Connect a USB stick to the electronics housing.

2.Open the "Protocol " menu.

3.Press 'Export' (5).

4.Select the desired file format 'CSV file', 'PDF report' or 'Export information'.

- If 'PDF-Report' is selected, a CSV file is also generated.
- If 'Export Information' is selected, a PDF file is generated only with the information about the exports performed.

5.A prompt appears asking whether the exported messages should be deleted.

6.If you confirm the query with 'Yes':

- the exported messages are deleted from the protocol.
- the used memory is freed again.

7.The protocol is stored on the USB stick. The deletion process is logged.

Filter

Use the 'Filter' button to select a filter to filter the events listed in the 'Protocol' menu.

To select a filter:

1.Open the "log " menu.

2.Press 'Filter' (4).

- The "log Filter" menu appears.

3.Select the desired Filter (*see list below*).

- The active filter is marked with a green circle.
- Only one filter can be activated at a time.

4.Make the appropriate selection for the corresponding filter (*see list below*).

5.The active filter can be reset with 'Reset' or overwritten with a new filter.

6.Press the 'Back' button to return to the "Log" menu.

log filter	Selection
Time based	Choose a date range
Product based	Select a product and optionally a period of time.
Batch based	Select a batch.
Detector test	Returns only events of type *detector* test.
Access log	Select a user

Tab. 15: log filter - Buttons

Automatically delete old entries

If the function 'Automatically delete old entries' (2) is activated, the oldest 1000 protocol messages are automatically deleted as soon as the protocol data memory is full.

If the function is deactivated, warning messages are displayed just before the protocol data memory is full.

To enable/disable the 'Automatically delete old entries' function:

1.Open the "Protocol " menu.

2.First press 'Settings' (2), then 'Automatically delete old entries'.

3.Activate the checkbox at 'Automatically delete old entries'.

4.Enter the Code and confirm with 'OK'. **Attention - You must have the appropriate Permission to activate this function.**

5.Complete your entry with 'OK'

6.4.8.5 "Detector test" menu

In the "Detector test" menu, settings for the detector test are configured.

NOTE

Standardised test bodies for the detector test are available from the manufacturer.

To perform a detector test, *see "Start detector test" menu*.

The configuration options for the detector test are listed below.

Trigger settings

The 'Trigger settings' button is used to set when a detector test is to be carried out.

To set the parameters for the detector test:

1. Open the "Detector test" menu.
2. Press 'Trigger Settings'.
3. Select the desired parameter (*see list below*).
4. Configure the desired setting using the numeric keypad or the checkboxes.
5. Confirm your entry with 'OK'.

Parameters	Explanation	Setting
'After power on'	Time period after the unit has been switched on	[00:30–10:00 – mm:ss]
Test cycle	Time period after which the detector test is repeated	[00:00:15–24:00:00 – hh:mm:ss]
After product change	Time period after which a product change took place	[00:00–30:00 – mm:ss]
After batch begin	Time period after which a new batch was started	[00:00–30:00 – mm:ss]
Before batch end	Detector test is carried out before the end of a batch	Enabled / Disabled
After product learning	Time span after which a product has been learned	[00:00–30:00 – mm:ss]
'After detection threshold change'	Time period after which the detection threshold was changed	[00:00–30:00 – mm:ss]
'Configure fixed planned events'	Regular time of the detector test (maximum 5 events)	[Hourly 00–55 – mm] [Monday-Sunday 00:00-23:55 - hh:mm] [Every day 00:00-23:55 - hh:mm]
Reset cycle on every test	Restart of the cycle time after a detector test	No / Yes
'Production volume'	Number of products being conveyed	1–100000

Tab. 16: Trigger settings for the detector test – parameters

Timeout settings

The 'Timeout settings' button is used to set timeouts, such as the request or execution timeout.

To set the timeouts for the detector test:

1. Open the "Detector test" menu.
2. Press 'Timeout settings'.
3. Select the desired parameters (*see list below*).
4. Configure the desired setting using '+' or '-'.
5. Complete your entry with 'OK'

Parameters	Explanation	Setting
Request timeout	Time period after request until the start of the detector test	[00:05–59:59 – mm:ss]
Execution timeout	Time span within which the detector test must be carried out	[00:05–59:59 – mm:ss]
'Request production volume'	Number of products that can be conveyed until the detector test has to be carried out	1–10000
'Resubmission after timeout'	Time after the timeout until the detector test is requested again	[00:00–59:59 – mm:ss]
'Error on timeout'	Should an error message be displayed after the timeout?	No / Yes

Tab. 17: Duration of detector test – parameters

Code input required

The requirements for aborting the detector test are defined via the'Code entry required' button.

To define a cancellation:

1. Open the "Detector test" menu.
2. Press 'Code entry required'.
3. Select the desired setting:
   - OFF: Detector test can always be aborted.
   - ON: Detector test can only be aborted if a user with the corresponding authorisation is logged on (*see "User management" menu for 'Edit' 'Permissions' 'Reset detector test'*).

NOTE

If this is set to 'ON', the error message "Detector test failed: timeout" cannot be dismissed. This prevents unauthorised persons from resetting a faulty detector test.

Assign test piece (option)

Test pieces are configured for the detector test via the 'Assign test body' button.

To configure a test piece:

1. Open the "Detector test" menu.
2. Press 'Assign test piece'.
3. Press one of the 'Start' buttons.
4. Feed the test body into the metal detector.
   – After metal/test piece has been detected, the values for the test body are displayed.
5. Confirm your entry with 'OK'.
6. The automatically generated number of the test piece can be renamed. To do this, tap on the number and rename it using the keyboard (e.g. "Ferrite"). Confirm with "OK".
7. Select the desired parameters (*see list below*).
8. Select the desired setting using the numeric keypad.
9. Confirm your entry with 'OK'.

Parameters	Explanation	Setting
'Signal tolerance'	Maximum deviation between the signal detected by the detector and the stored learned target value. Default setting: 0 % (no signal level check)	[0–1000 %]
Angle tolerance	Maximum deviation between the angle detected by the detector and the stored learned target value. Standard setting: 0 °	[0–50 °]

Tab. 18: test piece – parameters

Test piece count

The 'Number of test pieces' button determines the number of test bodies required for the detector test.

To set the number of test pieces:

1. Open the "Detector test" menu.
2. Press 'Number of test pieces'.
3. Enter the desired number[1-9] using the numeric keypad.
   Default setting: 3
4. Complete your entry with 'OK'

Test piece confirm

The 'Confirm test Piece' button determines whether the user must confirm this by pressing the corresponding' Test Piece ready' button each time before placing a test body on the device. Only then is the test piece recognition activated.

To activate the test Piece confirmation:

1. Open the "Detector test" menu.
2. Press 'Confirm test piece'.
3. Press 'Yes'.
4. Confirm your entry with 'OK'.
5. The function can be deactivated again by pressing the 'No' button. No request for test Piece confirmation will then be issued.

Reject on detector test

The 'Reject on detector test' button is used to determine whether a rejection is to take place via the rejection device during a detector test.

To activate the test Piece separation:

1. Open the menu "Detector test".
2. Press 'Reject on detector test'.
3. Press Yes.
4. Confirm your entry with 'OK'.
5. The function can be deactivated again by pressing the 'No' button. Press Yes.

CAUTION

Metal parts in the product flow

If this is set to 'NO', no separation takes place. This means that any metal parts present in the product flow during the test may not be separated either!

6.4.8.6 Menu "Contamination level"

In the "Contamination Level" menu, a limit of Metal detections *per time period* is set. If this limit is exceeded, a warning message is output.

To set the level of contamination limit:

1.Open the "Contamination Level" menu.

2.Select the desired parameter (*see list below*).

3.Make the desired setting using the numeric keypad.

4.Complete your entry with 'OK'

Parameter	Explanation	Setting
Interval	Time span in which a maximum number of 'detections' may occur before a warning message appears. Default setting: 00:00:00 (function off)	[00:00:00–24:00:00 – hh:mm:ss]
Detections	Maximum number of metal detections that may occur per 'interval' before a warning message appears. Default setting: 3	[1–100]

Tab. 19: Contamination Level - Parameter

6.4.8.7 Menu "Signal validation"

In the menu "Signal validation" reference values are defined and compared with the current measurement signals. An evaluation shows whether the measured signals are OK, borderline or faulty.

This allows external interference to be detected. These are, for example, a contaminated conveyor belt, vibrations or malfunctions caused by adjacent machines.

Acquisition/Validation

Reference values are determined via the 'Acquire' button. These reference values must be determined without external interference.

These reference values are compared with current measurement signals via the 'Check' button. The test should be carried out, for example, if the device no longer functions properly.

This can be used to determine whether the current signals are within the permitted tolerance or whether there is a limit-value or a faulty signal. The tolerances/thresholds are adjustable (*see below 'Signal marginal' and 'Signal faulty'*).

To enter reference values:

1.Make sure that all external interference has been eliminated.

2.Open the "Signal validation" menu.

3.Press 'Acquisition/Validation'.

4.Press 'Acquisition'.

- Reference values are determined.
- Values that have already been entered are overwritten.

5.The detection phase ends automatically after the set Validation duration (*see below 'Validation duration'*). The phase can also be ended prematurely:

- " Finish": Phase is ended manually.
- " Cancel": Phase is terminated.

To check current measurement signals (with the reference values):

1.Open the "Signal validation" menu.

2.Press 'Acquisition/Validation'.

3.Press 'Validate'.

- The test phase lasts just as long as the acquisition phase.
- The current signals are compared with the reference values.

4.The test phase ends automatically after the set Validation duration (*see below*). The phase can also be ended prematurely:

- " Finish": Phase is ended manually.
- " Cancel": Phase is terminated.

5.The evaluation is displayed (*see example below*)

Validation duration

The 'Validation duration' button determines the duration after which the recording phase or the test phase is automatically ended.

The Validation duration should be long enough to detect all possible interference signals (e.g. at least one complete belt run).

To enter the Validation duration:

1.Open the "Signal validation" menu.

2.Press 'Validation duration'.

3.Enter the desired time
[00:03.000-10:00.000 - mm:ss:ms].

- Default value: 15 s

Signal marginal

The 'Signal marginal' button is used to define the threshold value for a limit value measurement. The value to be set refers to a reference value of 100%.

A measurement signal recorded during the test phase is classified as borderline if it is above the 'Signal marginal' and below the value 'signal faulty' (*see below*).

To enter a threshold value:

1.Open the "Signal validation" menu.

2.Press 'Signal marginal'.

3.Enter the desired value [100.00-100000.00 %].

- Default value: 115 %.

Signal faulty

The 'Signal faulty' button is used to set the threshold value for an incorrect measurement. The value to be set refers to a reference value of 100%.

A measurement signal recorded during the test phase is classified as faulty if it is above the value 'Signal faulty'.

To enter a threshold value:

1.Open the "Signal validation" menu.

2.Press 'Signal Faulty'.

3.Enter the desired value [100.00-100000.00 %].

- Default value: 120 %.

Example:

reference value	100 %	
Signal marginal	115%	
Signal faulty	120 %	
measured signal	150	→ Signal faulty
measured signal	118	→ Signal marginal
measured signal	110	→ Signal OK

Tab. 20: Evaluation of a Signal validation (example)

6.4.8.8 Menu "Detector name"

In menu "Detector name" the metal detector can be given a designation with up to 10 digits.

This avoids confusion when operating several detectors. The characters available are the complete alphabet (upper and lower case), the digits 0-9, as well as hyphens, periods and spaces.

To enter a detector name:

1.Open the menu "detector name".

2.Enter a new Detector name in the input field using the keyboard.

3.Complete your entry with 'OK'

6.4.8.9 "Function keys" menu

The function keys F1 and F2 can be freely assigned using the menus in the "Function keys" menu.

Pressing the function keys F1 and F2 will then cause the respective stored menus to appear.

NOTE

If detection is deactivated, the Start detector test and Start autoTEST menu items will be greyed out.

To assign one or more menus to the function keys:

1. Open the »Function keys« menu.
2. Select 'F1 Configuration' or 'F2 Configuration'.
   A drop-down list appears.
3. Select the desired operating level.
4. Select the desired menu.
   A row appears in which another menu can be added.
5. Repeat steps 3 and 4 until all desired menus have been added.
6. To delete a menu from the list, select the value '- - - - - - - -' from the drop-down list.
7. Confirm your entry with "OK".

NOTE

Use the function keys to give users access to certain menus that they would otherwise not be able to access.

Use the 'Function key access protection' buttons to assign a password to the corresponding function key.

6.4.8.10 Menu "Export product list"

In the "Export product list" menu, a list in CSV format with product-relevant data is created and saved on a connected USB stick.

To export a product list:

1.Connect a USB stick to the electronics housing.

2.Open the menu "Export product list":

3.Press 'Export to CSV'.

4.Assign a name by pressing the name of the file and entering a new name.

5.Select the folder on the USB stick where you want to save the file.

6.Press Save.

- The product list is stored on the USB stick.

NOTE

The following product-relevant data is contained in the list:

- Product number
- Product name
- Item number
- FE performance
- NFe Performance
- SS Performance
- Frequency
- detection level

6.4.9 Menu "Behavior during calculation"

The "Behavior during calculation" menu determines how the metal detector behaves during a calculation (e.g. when the detection level is changed manually, during a product change).

This is how you define the behavior during calculation:

1.Open the "behavior during calculation" menu.
- An information message appears.
- Press 'OK'.

2.Select the desired parameter (*see list below*).

3.Complete your entry with 'OK'
- The behavior during calculation is defined.

Parameter	Explanation
Ignore	Contaminated products are not Separated during a calculation.
Reject products	All products that pass through the metal detector are Separated.
Deactivate "Detector ready"	The switching output must be configured by the service for this function. The switching process is logged. When the device is ready for detection again after the calculation, the output switches over again automatically.

Tab. 21: Behavior during calculation - Parameters

6.4.9.1 "Automatic log export" menu (option)

In the "Automatic log export" menu, you can specify whether a log with all events that have occurred should be saved to a network drive at defined intervals.

NOTE

The SMB protocol is used for data exchange between the metal detector and the customer server. The SMB protocol version 1 (SMBv1) is used on the metal detector for this purpose. On newer Windows systems (Windows Server 2016 and Windows 10), support for SMBv1 is no longer installed by default. To be able to guarantee data exchange on these systems, the protocol support for SMBv1 must be activated on the customer server.

To set the automatic log export:

1. Open the "Automatic log export" menu.
2. Choose between 'daily log', 'weekly log', 'product log' and 'batch log'.
   - Daily log: the log will be issued once a day.
   - Weekly log: the log will be issued once a week.
   - Product log: the log will be issued as soon as the product is changed.
   - Batch log: the log will be issued as soon as the batch is changed.
   - More than one checkbox can be activated at a time.
3. Select the desired settings via the 'Settings' button (*see list below*).
4. Configure the setting.
5. Confirm your entry with 'Back'.

Parameters	Explanation
Directory structure	Folder structure which must be created for the log (e.g., year/month).
Mount settings	Settings for your network (see below). These settings are factory-set. For changes or problems, please contact your IT department or the service team.
Calendar week prefix	Activation of the abbreviation for calendar week (e.g. "CW") in the folder name.
File name	Name of the log file.
PDF/CSV export	Export as PDF file, CSV file or both.
Log filter	Additional filtering according to message data (e.g. error, warning, detector test) which should be taken into account in the automatically generated log.
Test	Test for the function "Automatic log export".

Tab. 22: Parameters – Automatic log export

You can connect to the network drive via CIFS. Required data which must be entered is: IP, share name and share directory.

Optional information includes username, password and domain.

The mount point is set to the directory "/mnt/cifs" and cannot be changed.

If a valid network drive is configured and a log type (e.g. daily log) is selected, the network drive will automatically be mounted on system startup.

If there are problems during this process, an error message will be issued.

In the event of connection problems, 20 report files can be stored locally on the display unit in the "/home/du/auto_protocol/" directory. When the connection is restored, the files will be transferred to the network drive and deleted.

NOTE

If there are already 20 files being stored locally, caching will cease and an error message will be displayed.

6.4.9.2 "Export diagnostic information" menu (option)

In the "Export diagnostic information" menu, internal parameters of the evaluation electronics are stored on a connected USB stick for servicing and diagnostic purposes.

NOTE

The diagnostic information includes configuration settings, logs, login files, measured values, version information, product lists and meter readings.

To save the diagnostic information on a USB stick:

1. Connect a USB stick to the electronics housing.
2. Open the "Export diagnostic information" menu.
3. Press 'USB'.
4. Select the folder on the USB stick in which the diagnostic information is to be stored.
   – The diagnostic information will be stored on the USB stick.

6.4.9.3 "Upload licence file" menu

In the "Upload licence file" menu, a licence file is installed onto the device from a connected USB stick.

To upload a licence file:

1. Connect a USB stick with the licence file to the electronics housing.
2. Open the "Upload licence file" menu.
3. Press 'USB'.
4. On the USB stick, select the folder with the licence file and press 'OK'.
   – The licence file will be installed onto the device.

7 Maintenance and cleaning

7.1 Target group

This chapter is intended for the group of "qualified personnel" (*see chapter Safety, qualification of personnel*). Other groups of persons must not carry out the described work.

7.2 Security

- Before any maintenance or cleaning, disconnect the unit from the mains, depressurise it, check that it is de-energized, disconnect the conveyor and secure it against unintentional switching on.
- Commission only professionally trained personnel with maintenance work.

7.3 Maintenance

The operator must keep the device and all safety devices in a functional condition. The effectiveness of the safety devices must be checked regularly.

7.3.1 Electrical unit maintenance

The electronic components inside the unit are maintenance-free.

7.3.2 Maintenance of the connections

- At regular intervals, check both the clamping connections of all cables of the device and the cables themselves for damage of all kinds.
- Replace damaged and defective components.

7.3.3 Detector coil maintenance

- Check the device at regular intervals for mechanical stability.
- Check the sensor surface of the detector coil at regular intervals for damage (if accessible).
- Check the fixtures or feet of the detector coil at regular intervals for damage.

7.3.4 Maintenance of the mechanism

⚠ WARNING

Crushing of limbs between components

During work on the separation mechanism, moving parts can crush limbs and cause serious injuries.

- Switch off the compressed air supply and the power supply before carrying out any work on the separation mechanism and secure them permanently against being switched on.
- Wear personal protective equipment.

The following points are to be checked regularly and after cleaning:

- Check the tightness of hoses and fittings.
- Check screws and pipe connections regularly and tighten them if necessary.
- Secure screw connections with "medium strength" screw locking lacquer (not for pipe supports).
- Check all mechanical components for wear, especially the separation flap and the feed.
- Check the probe tube for wear and ensure that the probe tube and sensor surface do not touch.

7.3.4.1 Maintenance of the separation mechanism

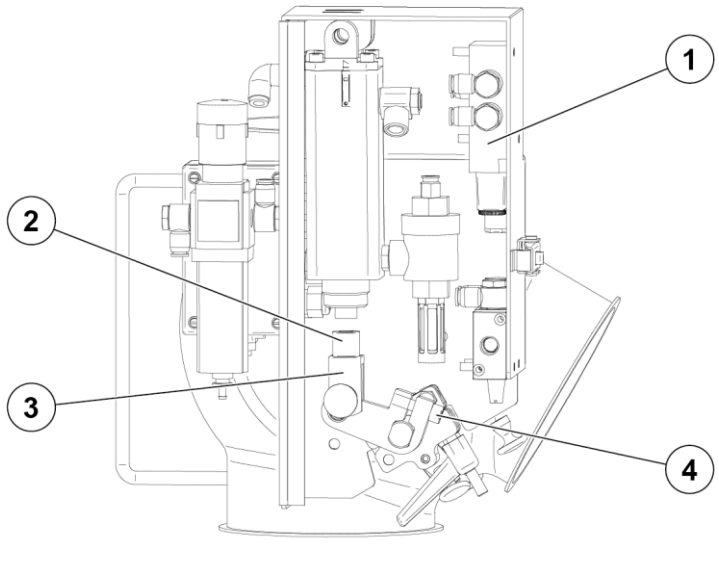


Fig. 27: Maintenance-relevant components of the separation mechanism

1 Solenoid valve	3 Fork head
2 Lock nut	4 Socket head screw

- Check the solenoid valve (1) for contamination.
- Check the marked counter nut (2) and socket head screw (4) for tightness.
- Check the adjacent connection between the fork head (3) and the adjacent component for wear.
- If the metal detector has not carried out any separation for 24 hours, start a test separation (*see Operation chapter, Operating Level 1, "Test separation unit"*).

NOTE

The pressure cylinder requires no oil. However, as soon as you use oil for the first time, oil must always be used!

7.3.5 Maintenance of the compressed air maintenance unit

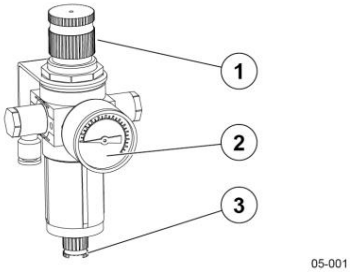


Fig. 28: Compressed air maintenance unit

- Check the operating pressure at regular intervals on the pressure gauge (2).
- Empty the condensation water collecting container at regular intervals by turning the valve (3).

See Commissioning chapter, Connections, Connecting the compressed air supply.

7.4 Cleaning

Cleaning includes removing dust and dirt from all surfaces, spaces and interiors.

CAUTION

Damage due to incorrect cleaning

Improper cleaning can lead to material damage.

- Observe the approved protection class of your device (*see order confirmation*).
- All housings must be closed.
- All covers must be on.
- During CIP cleaning, if present, existing mechanisms must be switched several times.
- Always keep the sensor surface free of impurities, especially metallic and conductive ones.
- Do not clean the electronics housing and cover with a high pressure cleaner and do not use a high pressure water jet.
- If a splashguard is attached to the screen, the electronics housing may be cleaned with a water jet.
  - Observe the approved protection class of your device (*see order confirmation*).
  - Contact Service if necessary.
- Work on the device may only be carried out by trained and authorized personnel.
- Please observe the relevant notes and product data sheets of the cleaning agent manufacturers:
  - Use of cleaning agents,
  - disposal of cleaning agents in accordance with regulations,
  - personal protective equipment.

7.4.1 Cleaning of the screen

CAUTION

Damage to the screen due to incorrect cleaning

- Improper cleaning can cause damage to the screen.
- Only clean the screen with a slightly damp, soft cloth.
- Use a suitable screen cleaner, for example an antistatic screen cleaner, to moisten the cloth.
- Do not use any corrosive detergents, chemicals, abrasives or hard objects for cleaning. These can damage the screen!
- Do not clean the screen with a high pressure cleaner.
- Do not submerge the screen in water.

7.4.2 Removal of the separation flap ("Easy Clean" deflection flap)

For maintenance and cleaning, the device's separation flap can be removed and re-installed without tools.

- Before any removal of the separation flap, disconnect the unit from the mains, depressurise it, check that it is de-energised, disconnect the conveyor and secure it against unintentional switching on.
- Before removal of the separation flap, make sure that there is no product in the pipeline and in the device.
- Re-install the separation flap before putting the device back into operation.
- The separation flap may only be removed and installed by authorised and trained personnel.

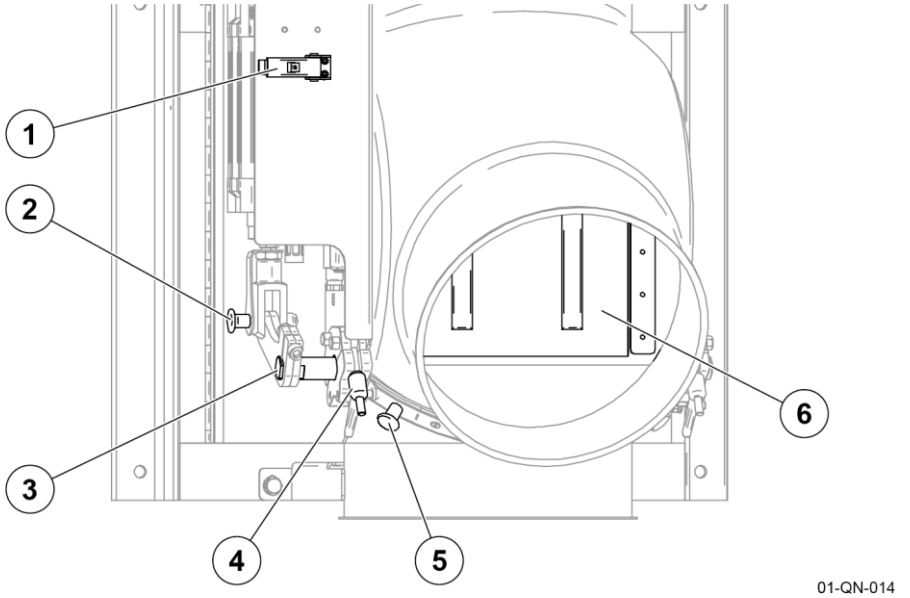


Fig. 29: Removal of the separation flap (overview)

1 Tension lock of the mounting housing

2 Safety bolts (grip)

3 Shaft of the separation flap

4 Clamping levers on both sides of the separation unit

5 Sealing wedge (grips on both sides of the separation unit)

6 Separation flap (inside the separation unit)

Removal of the separation flap

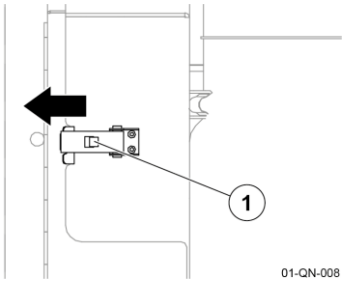


Fig. 30: Open the mounting housing (step 1)

Step 1:

Slide the fuse (1) of the mounting housing to the left and open the hinge.

Then open the mounting housing.

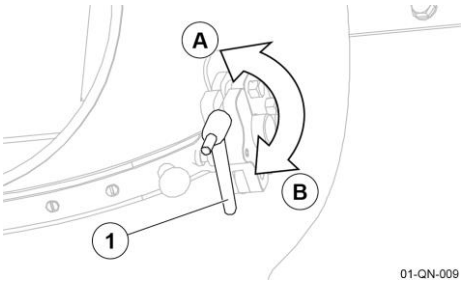


Fig. 31: Unlock the clamping lever (step 2)

Step 2:

The clamping lever (1) automatically engages in the direction of the device.

Turn the clamping lever in the direction of rotation (A) as far as possible.

Pull the clamping lever away from the device and turn the clamping lever back in the direction of rotation (B).

Let the clamping lever engage again in the direction of the device.

Repeat the steps until the clamping lever is unlocked.

Unlock the other clamping lever in the same manner.

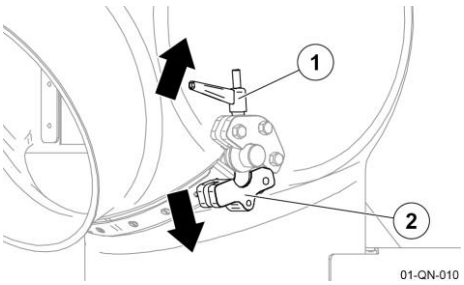


Fig. 32: Fold back the clamping lever and bearing clamping (step 3)

Step 3:

Fold the clamping lever (1) upwards.

Fold the bearing assembly (2) downwards.

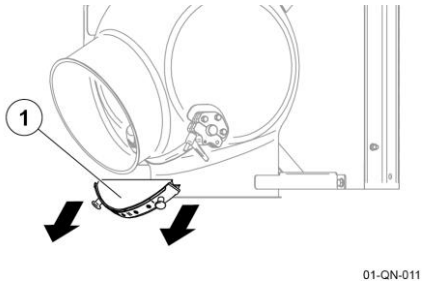


Fig. 33: Remove sealing wedge (step 4)

Step 4:

Take the sealing wedge (1) by the two grips and remove it carefully.

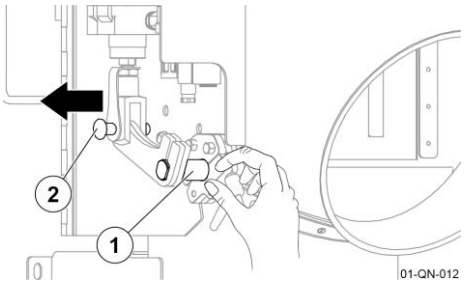


Fig 34: Remove the safety bolts (step 5)

Step 5:

Hold the shaft (1) firmly and pull out the locking bolt (2).

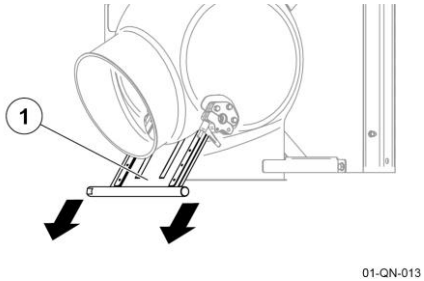


Fig. 35: Pulling out the separation flap (step 6)

Step 6:

Take the separation flap (1) by the shaft and carefully remove it, turning it if necessary.

Result: The separation flap has been removed and now can be cleaned and maintained.

Installation of the separation flap

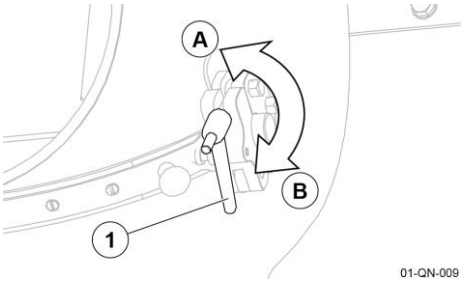


Fig. 36: Secure the clamping lever

The installation of the separation flap takes place in reverse order.

Hand tighten the two clamping levers.

Attention - Secure the two clamping levers (1) by pulling them away from the device and turning them as far as possible in the direction of rotation (A).

Result: The separation flap is now re-installed.

Connect the compressed air supply and connect the unit to the mains to put the device back into operation.

8 Troubleshooting

NOTE

To contact the service in the event of a fault, use the service form in the appendix of this operating manual.

8.1 Target group

This chapter is intended for the group of "qualified personnel" (*see chapter Safety, qualification of personnel*). Other groups of persons must not carry out the described work.

8.2 Behavior in the event of malfunctions

In general, the following applies:

1. Switch off the device immediately in the event of malfunctions that pose an immediate danger to persons or property.
2. Determine the cause of the fault.
3. If troubleshooting requires work in the danger area, switch off the device and secure it against being switched on again.
4. Inform the person responsible at the site immediately of the fault.
5. Have the fault rectified by authorized specialist personnel.
6. When replacing components, ensure correct assembly.

8.3 mains voltage failure>

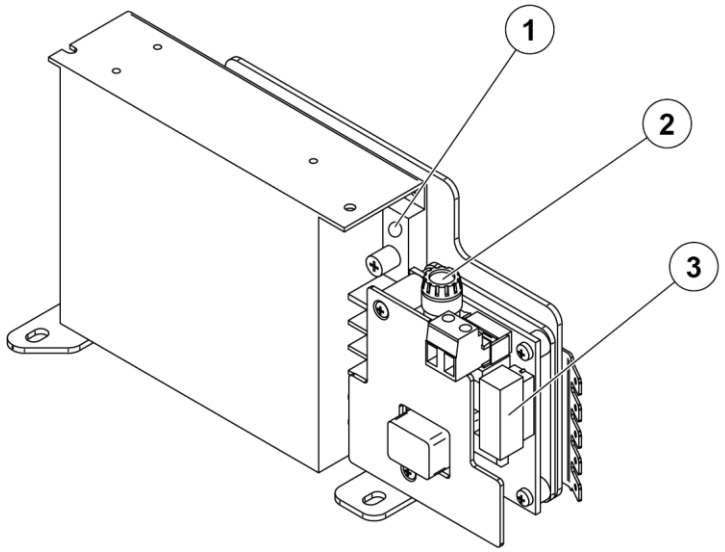


Fig. 37: Mains voltage LED and device fuses

1	Mains voltage LED	3	Spare fuse (1.25 A slow blow, 5x20 mm to DIN internal)
2	Fuse (1.25 A slow blow, 5x20 mm according to DIN)		

If the mains voltage fails, check the mains voltage LED (1) on the electronics board for proper functionality.

To do this, open the electronics housing (*see chapter "Connections", "Design of the electronics housing"*).

Proceed as follows if the mains voltage LED does not light up:

1.Check the power supply for correct values.

- The values can be found in the chapter "Connections", "Pin assignment" and in the data sheet.

2.Check the fuse (2).

Case A: Device fuse is OK

3. Check the actual voltage at the mains connection.
4. If necessary, contact the service department.

Case B: Device fuse is defective

3. Replace the fuse with the replacement fuse.
4. If no replacement fuse is available, contact the service department.

8.4 fault list

The possible error messages/warnings with the respective causes and remedies are listed below.

NOTE

If the message/fault is not listed or cannot be remedied by the measures described, contact the service department.

8.4.1 Control Unit Messages (1-XXX)

No.	Report/Message	Cause	Remedy/Comment
1-001	Note: Metal	Metal detector has detected a metal part.	Remove the metal part. Reset each metal message on the screen with 'OK'. (manual reset)
1-002	Error: Reject unit: Sensor faulty	Sensor delivers wrong signal at Normal position. Rejection device or initiator is defective.	Check the function of the Separation device. Check the initiator using the initiator LED and initiator cable.
1-003	Error: reject unit: Separation faulty	After a metal message, the normal position of the separation device is not left within the specified time. Rejection device or initiator is defective.	Check the function of the Separation device. Check the initiator using the initiator LED and initiator cable.
1-004	Error: Separation unit: Sensor faulty	Sensor for Separation position delivers wrong signal. Rejection device or initiator is defective.	Check the function of the Separation device. Check the initiator using the initiator LED and initiator cable.
1-005	Error: Separation unit: Separation faulty	The normal position of the Separation device is not reached within the specified time after the period has elapsed. Rejection device or initiator is defective.	Check the function of the Separation device. Check the initiator using the initiator LED and initiator cable.
1-006	Error: Separation unit: Separation faulty	The Separation position of the Separation device is not reached within the specified time after a metal message. Rejection device or initiator is defective.	Check the function of the Separation device. Check the initiator using the initiator LED and initiator cable.

No.	Report/Message	Cause	Remedy/Comment
1-007	Error: Separation unit: Separation faulty	The Separation position of the Separation device is not left within the specified time after the switching time has elapsed. Rejection device or initiator is defective.	Check the function of the Separation device. Check the initiator using the initiator LED and initiator cable.
1-008	Note: Test reject unit: Separation position sensor, activation time[ms]	Separation Test was carried out.	Information about the measured activation time of the Separation Unit.
1-009	Note: Test reject unit: normal position sensor, reset time[ms]	Separation Test was carried out.	Information about the measured reset time of the Separation unit.
1-010	Error: Separation unit: Collecting tray full	Collecting tray for metal contaminated products is full.	Empty the collection container, acknowledge the message on the screen with 'OK' and press "Empty collecting tray" on the screen.
		The "Tray filling time" parameter is set incorrectly.	Parameter setting.
1-011	Error: Pressure monitoring	Pressure in not enough to actuate the separating device.	Check Compressed air supply
		For systems with compressed air shut-off valve: Message appears during power off and emergency stop.	Restart Device
1-012	Error: Product jam or light barrier defective	product jam	Clear product jam.
		Light barrier is defective.	Check the functionality of the light barrier.
1-013	Error: Rotary encoder monitoring	Encoder does not supply a signal.	Check the functionality of the encoder.

No.	Report/Message	Cause	Remedy/Comment
1-014	Error: Contamination degree	The set criteria (number of detections per measurement interval) for checking the degree of contamination of a product stream were achieved.	Check the production process with regard to the set criteria.
1-015	Error: Separation unit: Separation faulty	The product to be separated has not entered the separation container. Separation unit or monitoring sensor defective.	Check the function of the Separation device. Set parameters for exact Separation. Check monitoring sensor and sensor cable and replace if necessary.
1-016	Error: reject unit: No reject unit configured	No reject unit configured.	Configure a switching output as a reject unit (contact service). Note: If no reject unit is configured, no Separation are counted ("Counter" menu item). The message appears a maximum of five times (*see "Counter" menu in the Control chapter*).
1-017	Reserve		
1-018	Note: backup errors	MicroSD card not found. No suitable software found. Wrong file system on microSD card. Wrong microSD card in control unit.	Check MicroSD card.
1-019	Error: System monitoring: 24V external voltage	Voltage is not within the tolerance range.	Contact Service department.
1-020	Error: System monitoring: Voltage 24VDC	Voltage is not within the tolerance range.	Contact Service department.
1-021	Reserve		
1-022	Error: System monitoring: Voltage 3.3V	Voltage is not within the tolerance range.	Contact Service department.
1-023	Error: System monitoring: Voltage 1.8V	Voltage is not within the tolerance range.	Contact Service department.

No.	Report/Message	Cause	Remedy/Comment
1-024	Error: System monitoring: Voltage 1.2V	Voltage is not within the tolerance range.	Contact Service department.
1-025	Warning: System monitoring: Battery voltage too low	The battery voltage is too low.	Replace the battery.
1-026	Warning: Userlog: No connection to server	logging data (mesuNET) buffer on the respective unit exceed a size of 3 KByte (approx. 40 messages)	Check Link0-LED. Check connection to server.
1-027	Error: Userlog: No connection to server - Data Loss	logging data (mesuNET) buffer on the respective unit exceed a size of 100 KByte (approx. 1300 messages) Further data is no longer cached.	Check Link0-LED. Check connection to server.
1-028	Error: Internal communication timeout	Communication timeout via a client. (Long form indicates the command for which the error occurred.)	Restart Device
1-029	Error: Collecting tray open	Collecting tray is open.	Close the collecting tray and acknowledge the message on the screen with 'OK'.
1-030	Error: Opening time of collection tray exceeded	The set opening time of the collection tray door has been exceeded.	Close the collecting tray and acknowledge the message on the screen with 'OK'.
1-031	Error: No connection to sensor unit	No connection to the sensor unit.	Check physical connection to sensor unit.
1-032	Error: Separation unit: Sensor faulty	Product separation sensor delivers wrong signal.	If errors occur frequently, contact service.

No.	Report/Message	Cause	Remedy/Comment
1-033	Error: reject unit: Separation faulty	Sensor for product Separation has exceeded activation time. Separation mechanism may be defective.	Increase activation time. Contact Service department.
1-034	Error: Separation countercheck: Missing product	A product detected by the incoming light barrier has not been detected by the Separation countercheck.	If errors occur frequently, contact service.
1-035	Error: Separation countercheck: Incorrect activation	Incorrect activation of the Separation countercheck (product not detected or expected gap not present after elimination).	If errors occur frequently, contact service.
1-036	Note: Test reject unit: Sensor product separation %s, activation time %d ms	In test mode, the switching times are measured and displayed as a tip in the switching input function "Separation unit Product separation".	Information about the measured switching times in test mode.

Tab. 23: Control unit messages

8.4.2 Sensor Unit (2-XXX) Messages

No.	Report/Message	Cause	Remedy/Comment
2-001	Error: System monitoring: Transmitter overloaded	Transmitter output stage is overloaded.	Check transmitter connection cable for short circuit. Check the connections and contacts in the transmitter connection box.
2-002	Error: System monitoring: Transmitter not connected	Transmitter output stage is not loaded.	Check transmitter connection cable for cable breakage. Check the connections and contacts in the transmitter connection box.
2-003	Error: System monitoring: Voltage 24VDC	Voltage is not within the tolerance range.	Contact Service department.
2-004	Error: System monitoring: Voltage +15V	Voltage is not within the tolerance range.	Contact Service department.
2-005	Error: System monitoring: Voltage -15V	Voltage is not within the tolerance range.	Contact Service department.
2-006	Error: System monitoring: Voltage 3.3VA	Voltage is not within the tolerance range.	Contact Service department.

No.	Report/Message	Cause	Remedy/Comment
2-007	Error: System monitoring: Voltage 1.2VD	Voltage is not within the tolerance range.	Contact Service department.
2-008	Error: System monitoring: Voltage +8V	Voltage is not within the tolerance range.	Contact Service department.
2-009	Error: System monitoring: Voltage -8V	Voltage is not within the tolerance range.	Contact Service department.
2-010	Error: System monitoring: Voltage +12V	Voltage is not within the tolerance range.	Contact Service department.
2-011	Error: System monitoring: Voltage -12V	Voltage is not within the tolerance range.	Contact Service department.
2-012	Error: System monitoring: Receiver voltage High	Receiver voltage is not within the tolerance range.	Check the connections and contacts of the receiver connection box.
		A large metal part is located in or immediately in front of the detector coil.	Check the installation situation of the detector. Remove metals within the metal-free zone.
2-013	Error: System monitoring: Maximum electronics temperature exceeded	Electronics temperature is too high.	Check the fan. Check ambient temperature.
2-014	Warning: Detection disabled	Metal detection and separation process of the detector are deactivated.	For information only (*see "Detection" menu in chapter Control*).
2-015	Note: Detection activated	Metal detection and separation process of the detector are activated.	For information only (*see "Detection" menu in chapter Control*).
2-016	Warning: Userlog : No connection to server	logging data (mesuNET) buffer on the respective unit exceed a size of 3 KByte (approx. 40 messages)	Check Link0-LED. Check Link1 LED. Test Connection

No.	Report/Message	Cause	Remedy/Comment
2-017	Error: Userlog : No connection to server - Data Loss	logging data (mesuNET) buffer on the respective unit exceed a size of 100 KByte (approx. 1300 messages) Further data is no longer cached.	Check Link0-LED. Check Link1 LED. Test Connection
2-018	Error: Error during calculation	Error in the calculation of the product image during the learning process.	Re-learn the product.
2-019	Warning: System monitoring: Asymmetrical receiver voltage	Receiver voltage is asymmetrical.	Contact Service department.
2-020	System Monitoring: Receiver Calibration Failed	Receiver calibration failed.	Restart Device If the error persists, contact the service.
2-021	Reserve		
2-022	Note: backup errors	MicroSD card not found. No suitable software found. Wrong file system on microSD card. Wrong microSD card in sensor unit.	Check MicroSD card.
2-023	Note: Selected product not learned	Product is not learned.	Learn the product (*see "Learn product" menu in chapter Control*).
2-024	Error: Internal communication timeout	Communication timeout via a client. (Long form indicates the command for which the error occurred.)	Restart Device
2-025	Note: Detection standard cannot be met	At least one test object cannot be detected with the current settings.	Check settings (*see "Learn product" menu* 'Detection *standard*').

Tab. 24: Sensor unit Messages

8.4.3 Display unit messages (3-XXX)

No	Message	Cause	Troubleshooting/comment
3-001	Error: No connection to the control unit	No connection to the control unit.	Check Link2 LED. Check cable connection.
3-002	Error: No connection to sensor unit	No connection to the sensor unit.	Check Link1 LED. Check cable connection.
3-003	Error: No connection for signal transmission	No connection for signal transmission.	Check Link1 LED. Check the cable connection.
3-004	Error: System monitoring: Voltage 24V	Voltage is not within tolerance range.	Contact service department.
3-005	Error: System monitoring: Voltage 10V	Voltage is not within tolerance range.	Contact service department.
3-006	Error: System monitoring: Voltage 5V	Voltage is not within tolerance range.	Contact service department.
3-007	Error: System monitoring: Voltage 3.3V	Voltage is not within tolerance range.	Contact service department.
3-008	Error: System monitoring: Voltage 2.5V	Voltage is not within tolerance range.	Contact service department.
3-009	Error: System monitoring: Lan Core Voltage 1.8V	Voltage is not within tolerance range.	Contact service department.
3-010	Error: System monitoring: Lan PII Voltage 1.8V	Voltage is not within tolerance range.	Contact service department.

No	Message	Cause	Troubleshooting/comment
3-011	Error: System monitoring: Voltage 1.2V	Voltage is not within tolerance range.	Contact service department.
3-012	Reserve		
3-013	Warning: User log: no connection to server	Log data (mesuNET) buffered on the applicable unit exceed a size of 3 KByte (approx. 40 messages)	Check Link0 LED. Check connection.
3-014	Error: Userlog: No connection to server - Data Loss	Log data (mesuNET) cached on the applicable unit exceed a size of 100 KByte (approx. 1300 messages). Additional data will no longer be cached.	Check Link0 LED. Check connection.
3-015	Error: Detector test failed: time exceeded	No metal signal detected during the test duration of the detector test.	Check the settings. Start detector test manually. Inform service department in case of repeated error message. For more information *see "Detector Test" menu in chapter Control*.
3-016	Reserve		
3-017	Warning: Password expired	Password has expired.	Enter a new password (*see "Change Password" menu in chapter Control*).
3-018	Note: Approaching maximum log size	Approaching maximum log size.	Back up and delete logs (*see "log" menu in chapter Control*).
3-019	Warning: Maximum log size reached	Maximum log number of 10,000 entries is reached (1000 old entries are automatically deleted).	Delete or save entries (*see "Log" menu in chapter Control*).
3-020	Error: Data backup error	MicroSD card not found. No suitable software found. Wrong file system on microSD card. Wrong microSD card in control unit.	Check MicroSD card.

No	Message	Cause	Troubleshooting/comment
3-021	Error: Internal communication timeout	Communication timeout via a client. (Long form indicates the command for which the error occurred.)	Restart device.
3-022	Warning: Different software versions determined	Different software versions are installed.	Install the same software version on each sub-unit.
3-023	Warning: Approaching maximum export info table size	Number of exported logs exceeds 1950 entries (a maximum of 2000 entries is possible).	Save logs and delete export information (*see "Log" menu for 'Export' 'Export Information' in chapter Control*).
3-024	Note: Maximum export info table size reached	Number of exported logs has reached 2000 entries (100 old entries are automatically deleted).	Delete or save entries (*see "Log" menu for 'Export' 'Export information' in chapter Control*).
3-025	Note: Detector test: due date exceeded	Detector test was not started within the set time after request.	Perform detector test on request (*see "Detector test" menu in chapter Control*).
3-026	Note: Detector test cannot be carried out due to active warm-up period of the warm-up phase	Device warm-up phase.	Wait for the warm-up phase and restart the detector test.
3-029	Note: The set production volume of the detector test was exceeded	Detector test not performed within the set production volume.	Restart detector test.
3-041	Note: Connection to network drive could not be established. Logs cannot be saved and will be lost.	Number of cached report files has reached 20 files.	Data loss should be expected from this point onwards.

The following messages only appear for devices with an autoTEST unit:			
3-027	Note: autoTEST cannot be carried out due to active warm-up period of the warm-up phase	Device warm-up phase.	Wait for the warm-up phase and restart autoTEST.
3-100	Error: No connection to the autoTEST Unit	autoTEST-Unit has no connection to the AMD 07 board.	Check the connection between the autoTEST unit and the AMD 07 board.
3-101	Error: autoTEST failed: number of attempts exceeded	Wrong test piece.	Use, teach and assign other test objects.
		Signal does not exceed the set detection threshold.	Check setting and correct if necessary (*see "Detection threshold" menu in chapter Control*).
		Angle and signal tolerance set incorrectly.	Check the setting and correct if necessary (*see menu "Detector test" 'Assign test piece' in the Control chapter*).

Tab. 25: Display unit messages

9 Decommissioning, dismantling, disposal

9.1 Target group

This chapter is intended for the group of "qualified personnel" (*see chapter Safety, qualification of personnel*). Other groups of persons must not carry out the described work.

9.2 Security

- Decommission the device in accordance with the applicable local regulations and laws.
- Only the operator or a person appointed by him may take the device out of operation.

9.3 Decommissioning

Please note the following points during decommissioning:

1. Disconnect the device from the mains and secure it against being switched on again.
2. Clean the unit from dirt, dust and product residues.
3. If the unit is installed outdoors, cover it with a protective housing, if available.

9.4 Dismantling

9.4.1 Requirements for disassembly

Before dismantling, observe the following points:

1. Disconnect the device from the mains and secure it against being switched on again.
2. Clean the unit from dirt, dust and product residues.

9.4.2 Mechanical disassembly ("QUICK-OUT")

Please note the following points for mechanical disassembly:

1.Attach the transport locks to prevent the unit from slipping, tipping, etc.

2.Disconnect all cable connections between detection unit and separation unit.

3.Loosen the fixing of the device.

4.Option: Loosen the device's clamping ring to separate the detection unit from the separation unit.

Caution – A careless loosening of the clamping ring can lead to injuries to persons and damage to the device.

Ensure sufficient support when loosening the ring.

Make sure that the device does not fall to the ground when the ring is loosened.

5.To transport the unit to another location, *see Chapter "Transport and installation".*

NOTE

The QUICK-OUT is only available for device types with nominal diameters of 50-200.

9.5 Disposal

⚠ CAUTION

Danger of environmental damage

Careless behavior can pollute the environment, especially substances that contaminate the soil and drinking water must proliferate into the soil or the sewage system.

- Clean contaminated components before disassembly.
- Collect substances such as greases, oils and other chemical substances in suitable containers and dispose of them properly.
- Observe local regulations and legal requirements for disposal.

The intentional or unintentional re-use of used components can endanger people and the environment.

If no return or disposal agreement exists, the disassembled components must be recycled following proper disassembly.

Some typical errors during these calculations can be avoided by taking the following aspects into consideration:

- The operator is responsible for professional disposal.
- Disposal by qualified personnel only.
- Drain operating and consumable materials into suitable collection containers and dispose of them professionally.
- At the end of its useful life, disassemble the unit into various separable materials and return it to a specialist recycling company.

10 Spare parts

NOTE

The manufacturer is not liable for damages resulting from the use of third-party parts.

Excluded from the warranty are all wearing parts (that is, moving parts or parts in contact with product).

In case of replacement, only original parts may be used. The use of third-party parts can cause damage.

- Spare parts are available through a representative or directly from the manufacturer.
- For the order of spare parts, please specify the data of the cover sheet or the spare parts list:

  Serial number and device type

  Order confirmation number

  Item designation

  Quantity
- The manufacturer recommends stocking spare and wear parts in accordance with the spare parts list in order to reduce or avoid waiting and downtime in the event of a fault.
- Otherwise, please order on time to have the appropriate parts available for the next scheduled maintenance. Spare parts are subject to different delivery times. Therefore, a comprehensive spare parts order based on the longest delivery time is recommended.

10.1 Complete device QUICKTRON RH

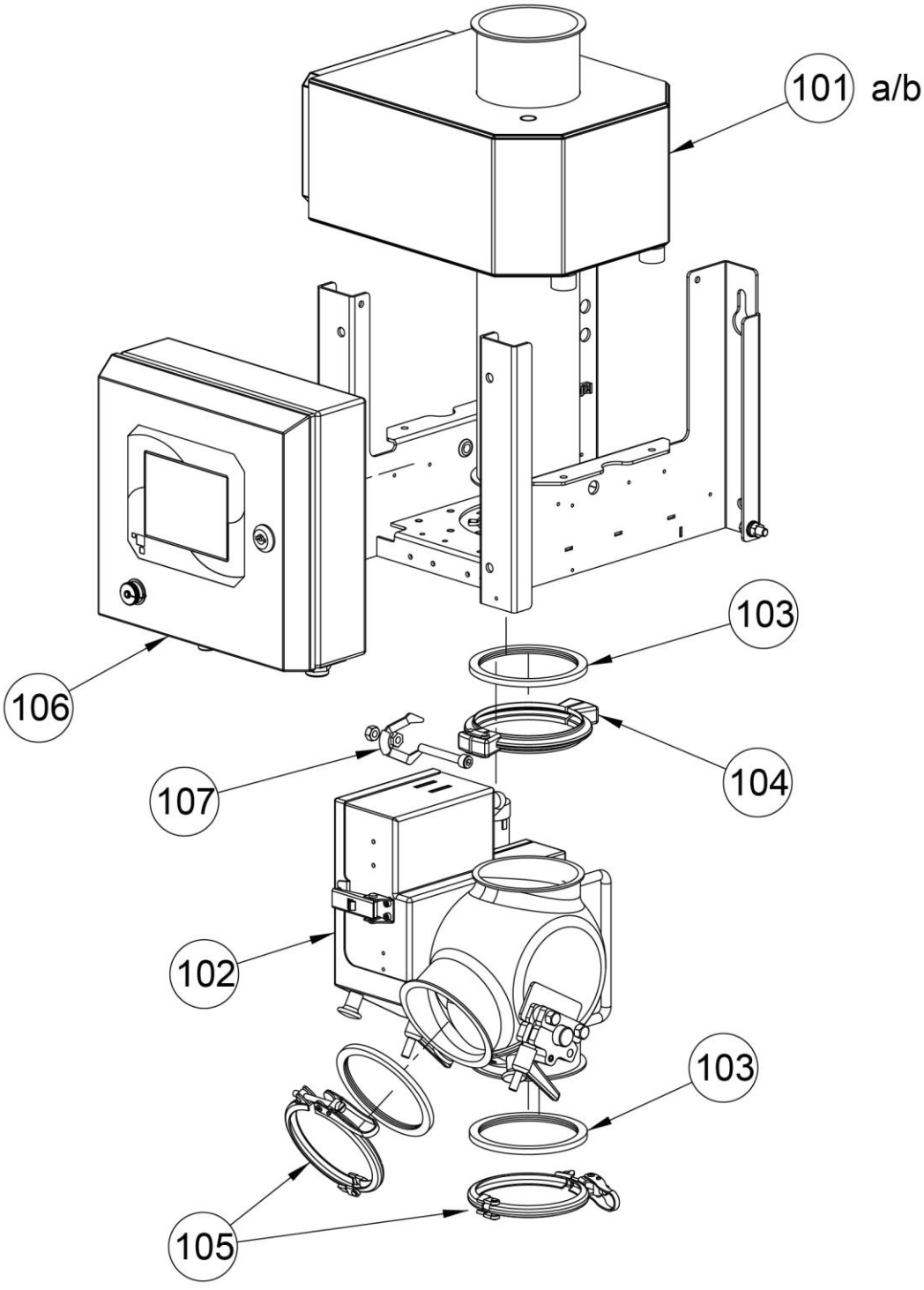


Fig. 38: Spare parts - Complete device QUICKTRON RH

Nominal sizes (NW) 50-120

		NW 50	NW 60	NW 80	NW 100	NW 120	
Description	**Spare part no.**	**Item no.**	**Item no.**	**Item no.**	**Item no.**	**Item no.**	**Note**
101a	Coil PowerLine - 07 QNRH	350953-2	351007-2	351027-2	351009-2	351029-2	
101b	Coil PowerLine - 05 QNRH	350953-4	351007-4	351027-4	351009-4	351029-4	
102	Mechanics RH - cpl.	350785	350785	350785	350785	350786	
103	Seal	300519	300519	300519	300519	303905-1	
104	Clamping ring	300518	300518	300518	300518	302282	
105	Clamping ring cpl.	350639	350639	350639	350639	350640	
106	Electronics housing	*	*	*	*	*	
107	Earth strap	302986	302986	302986	302986	302986	
	Connection cable						
107a	Transmitter cable - electronics mounted - 05 QNRH	*	*	*	*	*	not shown!
107b	Transmitter cable - electronics separated - 05 QNRH	*	*	*	*	*	not shown, length specified
108a	Receiver cable - Electronics	*	*	*	*	*	not shown
109a	Detector cable - electronics mounted - 07 QNRH	*	*	*	*	*	not shown!
109b	Detector cable - electronics separated - 07 QNRH	*	*	*	*	*	not shown, length specified
110a	Monitoring cable - electronics mounted	*	*	*	*	*	not shown!
110b	Monitoring cable - electronics separated	*	*	*	*	*	not shown, length specified

Nominal sizes (NW) 150-300

		NW 150	NW 200	NW 250	NW 300	
Description	**Spare part**	**Item no.**	**Item no.**	**Item no.**	**Item no.**	**Note**
101a	Coil PowerLine - 07 QNRH	351031-2	351033-2	351037-2	351039-2	
101b	Coil PowerLine - 05 QNRH	351031-4	351033-4	351037-4	351039-4	
102	Mechanics RH - cpl.	350787	350788	350789	350790	
103	Seal	302056	303906-1	303462	303907-1	
104	Clamping ring	302057	302283	302960	302961	
105	Clamping ring cpl.	---	---	---	---	
106	Electronics housing	*	*	*	*	
107	Earth strap	302986	302986	302986	302986	302986
	Connection cable					
107a	Transmitter cable - electronics mounted - 05 QNRH	*	*	*	*	not shown!
107b	Transmitter cable - electronics separated -	*	*	*	*	not shown, Length specified!
108a	Receiver cable - Electronics	*	*	*	*	not shown!
108b	Receiver cable - Electronics	*	*	*	*	not shown, Length specified!
109a	Detector cable - electronics mounted - 07 QNRH	*	*	*	*	not shown!
109b	Detector cable - electronics separated - 07 QNRH	*	*	*	*	not shown, Length specified!
110a	Surveillance cable	*	*	*	*	not shown!
110b	Surveillance cable	*	*	*	*	not shown, Length specified!

10.2 PowerLine BA 3

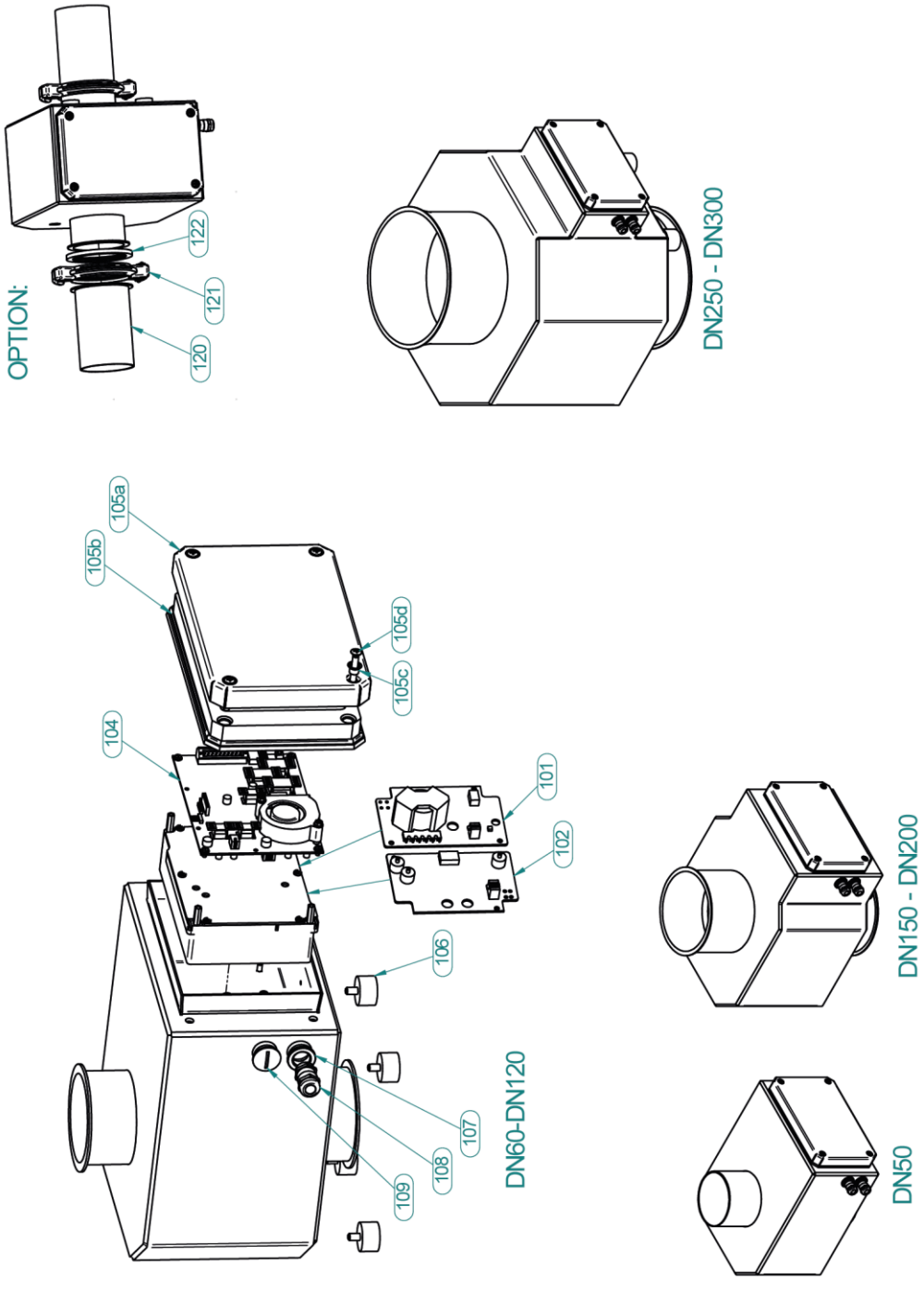


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Fig. 39: Spare parts - PowerLine BA 3

Pos.	Spare part	Product no.	Comment
101	TX-Unit	*	Specify detector serial number
102	RX unit [1)]	*	Specify detector serial number
104	Sensor unit	*	Specify detector serial number
105	Lid (complete)	350870	
105a	Lid	260509	
105b	Seal	303438	
105c	Sealing insert M5	302637	
105d	Oval countersunk head screw ISO 7047 - M5x30 A2	303564	
106	rubber-bonded metal / Coil base	*	Specify detector serial number
107	Reduction M20 x 1.5 to M16 x 1.5	301687	
108	Cable gland M 16 x 1.5 - MS - EMV	301653	
109	Lock screw M20 x 1,5- MS	300616	
111	Plastic funnel	*	Specify detector serial number
OPTION			
120	Sliding	*	Wearing parts
121	Clamping ring	*	
122	Sealing ring	*	Wearing parts

[1)] Replace only after consulting customer Service.

Tab. 26: Spare parts - PowerLine BA 3

10.3 Separation mechanism RH

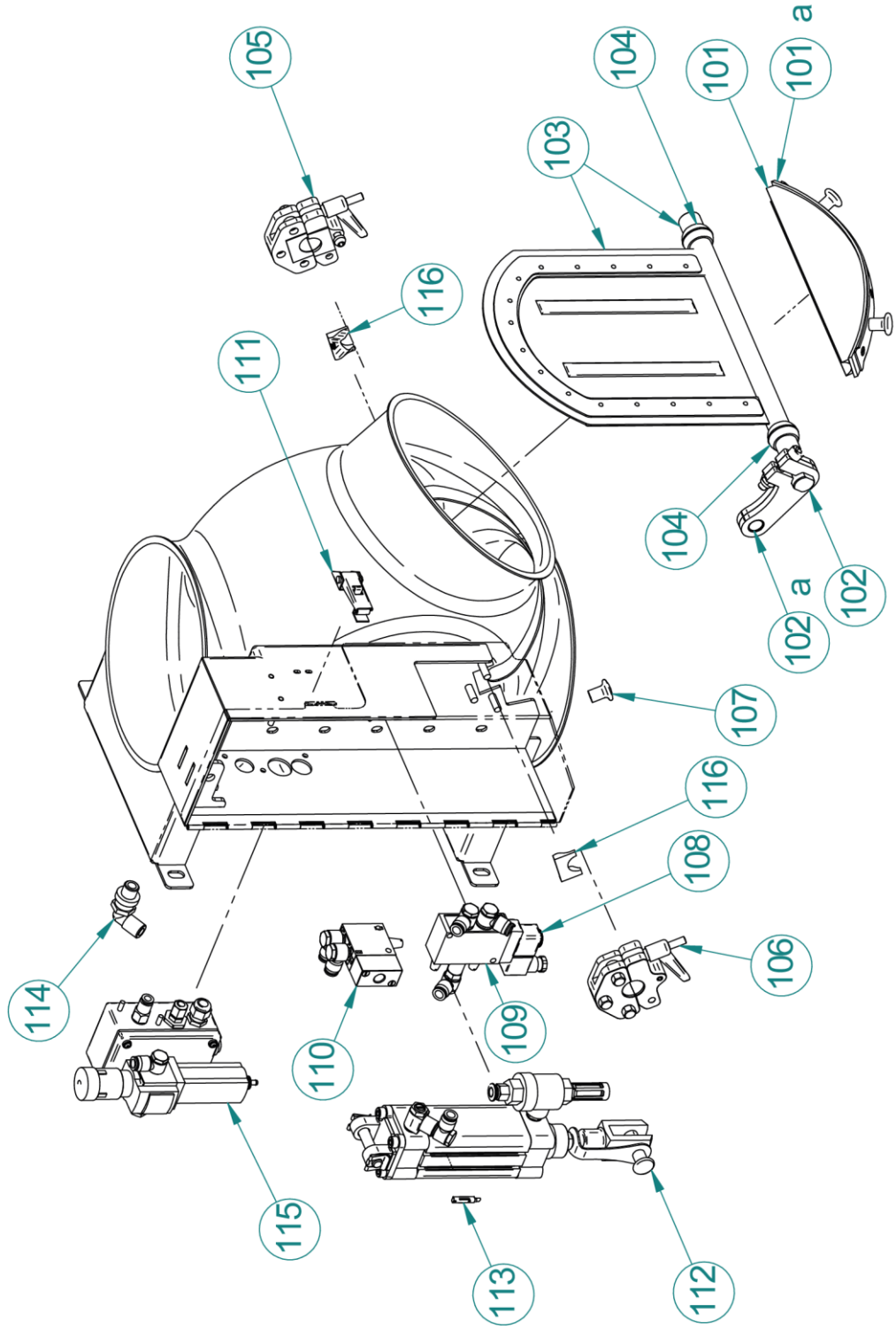


Fig. 40: Spare parts - separation mechanism RH

Nominal sizes (NW) 50-120

		NW 50	NW 80	NW 100	NW 120	
Item	**Spare part**	**Item no.**	**Item no.**	**Item no.**	**Item no.**	**Remark**
100	Separation mechanism RH - complete	350785	350785	350785	350786	
101	Sealing wedge - complete	350705	350705	350705	350704	Wearing part
101a	Seal for sealing wedge	303137	303137	303137	303136	Wearing part
102	Lever - cpl.	350731	350731	350731	350731	Wearing part
102a	Bearing bush in lever	300813	300813	300813	300813	Wearing part
103	Shaft with flap	350958	350958	350958	350959	Wearing part
104	Spherical cap	350635	350635	350635	350635	Wearing part
105	Bearing mounting left without retaining plate - cpl.	350736-2	350736-2	350736-2	350736-2	
106	Bearing mounting right - cpl.	350736-1	350736-1	350736-1	350736-1	
107	mushroom handle	300729	300729	300729	300729	
108	Solenoid coil cpl.	300252	300252	300252	300252	
109	Solenoid valve cpl.	351581	351581	351581	351581	
110	Plunger valve cpl.	351370	351370	351370	351370	
111	Tension lock	302813	302813	302813	302813	
112	Pneumatic cylinder cpl.	351371	351371	351371	351371	Wearing part
113	initiator	300656	300656	300656	300656	
114	Angular bulkhead screw	301794	301794	301794	301794	
115	Monitoring for RH	350784-50	350784-50	350784-50	350784-50	
116	Bearing mounting seal	305038-100	305038-100	305038-100	305038-120	

Nominal sizes (NW) 150-300

		NW 150	NW 200	NW 250	NW 300	
Item	**Spare part**	**Item no.**	**Item no.**	**Item no.**	**Item no.**	**Remark**
100	Separation mechanism RH - complete	350787	350788	350789	350790	
101	Sealing wedge - complete	350637	350710	350703	350782	Wearing part
101a	Seal for sealing wedge	303135	303142	303134	303296	Wearing part
102	Lever - cpl.	350572	350572	350738	351153	Wearing part
102a	Bearing bush in lever	300725	300725	301966	301966	Wearing part
103	Shaft with flap	350916	350960	350957	350987	Wearing part
104	Spherical cap	350635	350635	350739	350739	Wearing part
105	Bearing mounting left without retaining plate - cpl.	350736-2	350736-2	350737-2	350737-2	
106	Bearing mounting right - cpl.	350736-1	350736-1	350737-1	350737-1	
107	Mushroom handle	300729	300729	300729	300729	
108	Solenoid coil cpl.	300252	300252	300252	300252	
109	Solenoid valve cpl.	351385	351385	351388	351388	
110	Plunger valve cpl.	351386	351386	351389	351389	
111	Tension lock	302813	302813	302813	302813	
112	Pneumatic cylinder cpl.	351387	351387	351390	351392	Wearing part
113	Initiator	300656	300656	300656	300656	
114	Angular bulkhead screw	301794	301794	302989	302989	
115	Monitoring for RH	350784-150	350784-150	350784-250	350784-250	
116	Bearing mounting seal	305038-150	305038-200	305038-250	305038-300	

10.4 Electronics housing AMD07

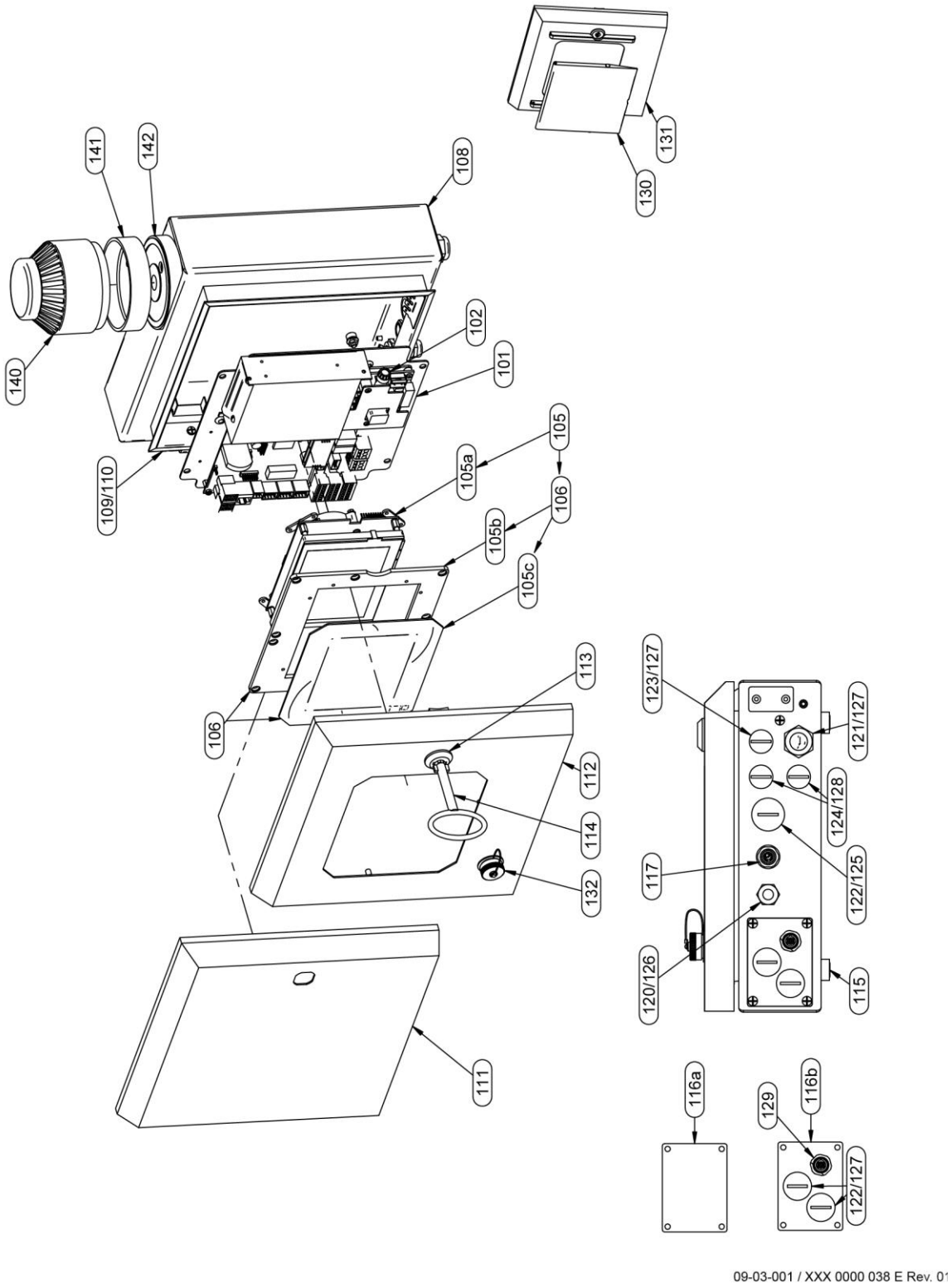


Fig.41: Spare parts - Electronics housing AMD07

Item	Spare part	Item no.	Remark
100a	Electronics housing complete with display unit (102 + 108b + 105 + 132)	351226-1	Specify serial number
100b	Electronic housing complete without display unit (102 + 108b + 132)	351226-2	Specify serial number
101	Control unit with power unit on mounting plate	351035	Specify serial number
102	Spare fuse 1.25A slow blow, 5x20 mm acc. to DIN	200616	
105	Display unit (complete) 1)	351091	Specify serial number
105a	Display unit on circuit board	400129	Specify serial number
105b	Base plate for foil 1)	260760	
105c	Foil for display unit 1)	303807	
106	Foil for display unit on base plate (complete) 1)	351073	
108b	Lower part of housing (stainless steel)	250650	
109b	Hinge with hinge pin, (stainless steel)	301824	
110	Lock washer (stainless steel)	301530	
111b	Cover closed (stainless steel)	250818	
112c	Cover for display unit (stainless steel and pre-assembled) (consists of item 112d and mounted item 106)	351095	not shown
112d	Cover for display unit (stainless steel)	260503	
113	Fastener with tongue, black	301536	
114	Double-bit key	300152	
115	Insulating bushing M5 (1 set = 4 pieces)	350241	
116a	Standard adapter plate with seal	350247	
116b	Adapter plate with seal	260052/301571	
117	Panel jack M12 - 8-pin A-coded	200624	
120	Cable screw fitting EMC M 16 x 1.5 brass Clamping range 5-9 mm	301653	
121	Cable screw fitting M 20 x 1.5 polyamide Clamping range 6.5-9 mm	301306	
122	Screw plug M 25 x 1.5 polyamide	301019	
123	Screw plug M 20 x 1.5 polyamide	300984	
124	Screw plug M 16 x 1.5 polyamide	301018	
125	Lock nut M 25 x 1.5 polyamide	300 614	
126	Lock nut EMC M 20 x 1.5 brass	301655	
127	Lock nut M 20 x 1.5 polyamide	300613	
128	Lock nut M 16 x 1.5 polyamide	300612	
129	Panel jack M12 4-pin D-coded	200625	

Item	Spare part	Item no.	Remark
130a	Splash guard cover (polycarbonate)	350311	
130b	Splash guard cover (stainless steel)	350676	
131	Cover for splash guard	*	
132	USB socket (complete)	351114	
140	Combination light	200155	Specify serial number
141	Slim socket for combination lamp	200159	
142	Holder combi light	380113	

1) Replacement only after consultation with Service.

Table27: Spare parts - Electronics housing AMD07

10.5 Monitoring

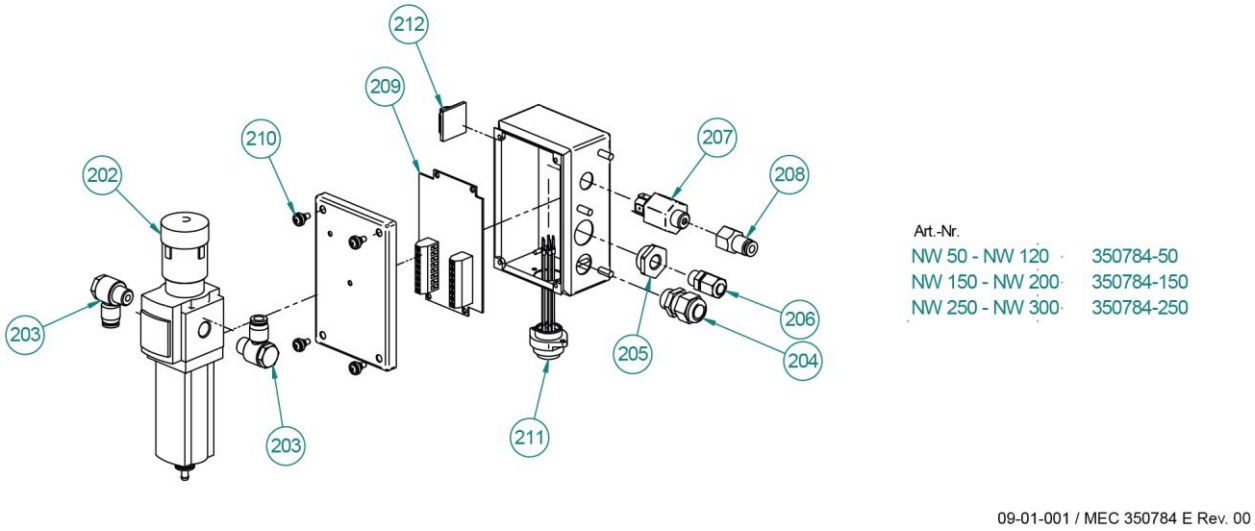


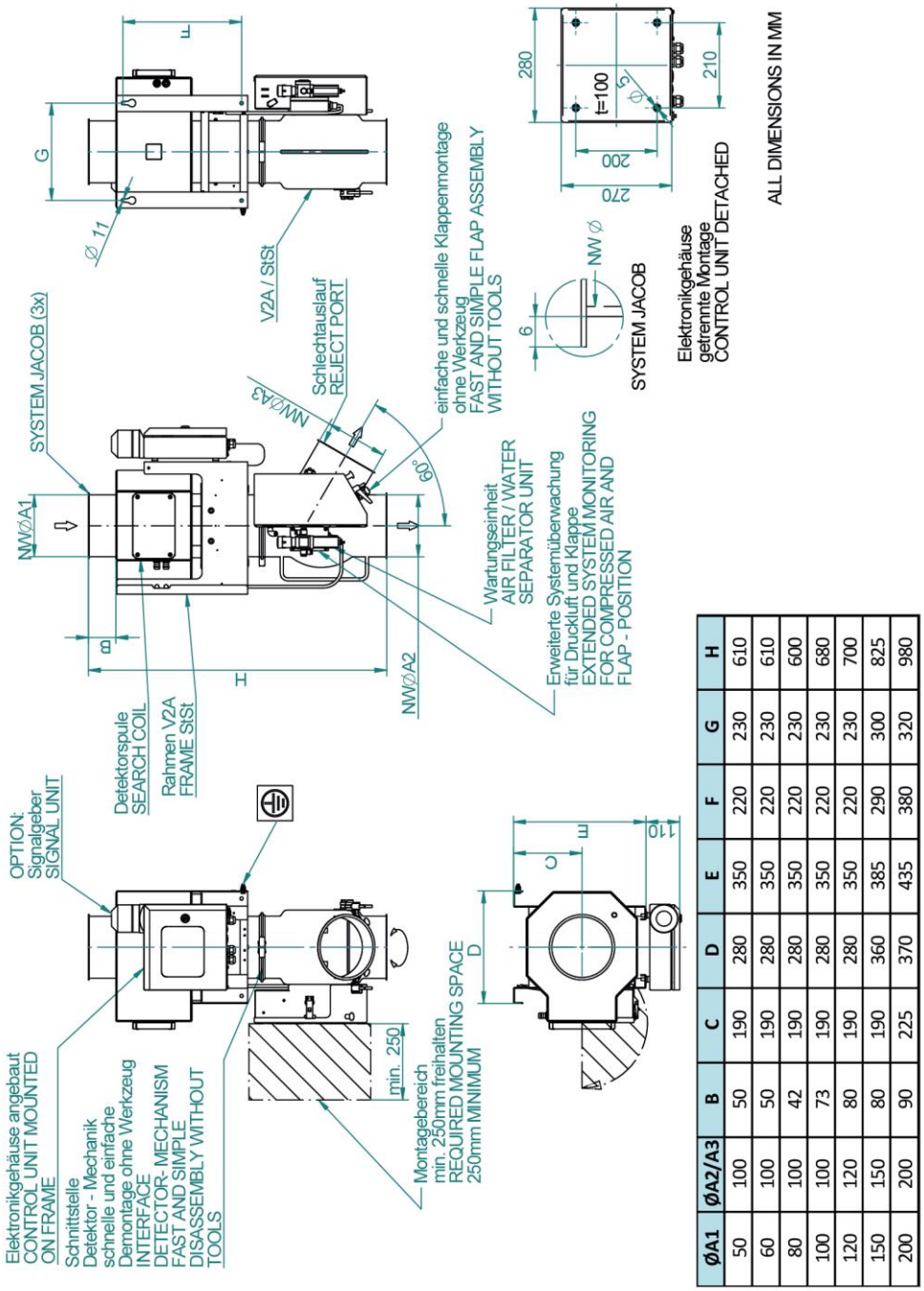
Fig. 42: Spare parts - Monitoring

		NW 50-120	NW 150–200	NW 250-300	
Description	**Spare part**	**Item no.**	**Item no.**	**Item no.**	**Remark**
201	Monitoring with maintenance unit complete	350784-50	350784-150	350784-250	
202	Conditioning unit	380323	380323	380323	
203	Push-in elbow fitting	300144	300144	301500	
204	Screw joint M16 x 1.5	300609	300609	300609	
205	Reduction M20 x 1.5 to M12	301201	301201	301201	
206	Screw joint M12 x 1.5	301696	301696	301696	
207	Diaphragm pressure switch	300084	300084	300084	
208	Push-in elbow fitting	300137	300141	300141	
209	connection board	350535	350535	350535	
210	Mounting kit 1	351382-1	351382-1	351382-1	
211	male flange	350822	350822	350822	
212	Adhesive clip	200789	200789	----	

11 Technical specifications

Operating voltage	100 - 240 VAC, 50/60 Hz (standard version) 24 V DC ± 10 % (special version)
Power consumption	≤ 75 W
Device fuse	1,25 A (time-lag), 5 x 20 mm acc. to DIN (standard version) 3,15 A (time-lag), 5 x 20 mm acc. to DIN (special version)
Degree of protection	IP 66 (option: -)
Temperature range	-5 °C– +40 °C (in operation) -10 °C– +60 °C (storage & transport)
Operating pressure	-
Relative humidity	0–95 % (without condensation water)
Product temperature	-
Conveying speed	-
Conveying capacity	-
Delivery pressure	-
Switching time	0,1–30 s
Compressed air supply	6–10 bar
Mains connection	approx. 1,8 m cable with Schuko plug (US version with US standard plug)
Material (electronics housing)	stainless steel, sandblasted
Material (detector coil)	-
Paint	-
Weight (approx.)	-

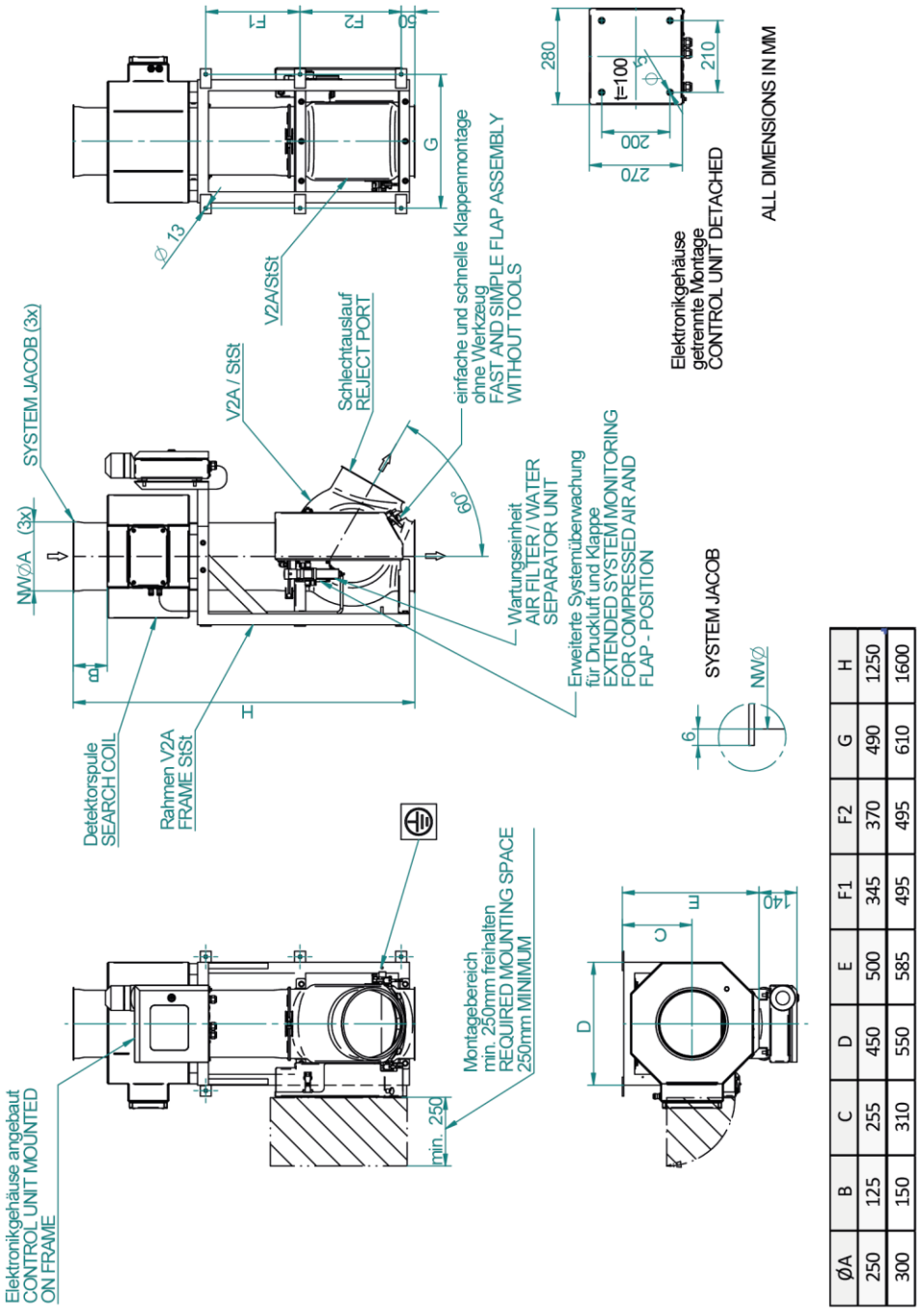
11.1 Dimensions for the QUICKTRON RH (Nominal sizes 50-200)



ØA1	ØA2/A3	B	C	D	E	F	G	H
50	100	50	190	280	350	220	230	610
60	100	50	190	280	350	220	230	610
80	100	42	190	280	350	220	230	600
100	100	73	190	280	350	220	230	680
120	120	80	190	280	350	220	230	700
150	150	80	190	360	385	290	300	825
200	200	90	225	370	435	380	320	980

Fig. 43: Dimensions QUICKTRON RH (nominal sizes 50-200)

11.2 Dimensions for the QUICKTRON RH (Nominal sizes 250-300)



ØA	B	C	D	E	F1	F2	G	H
250	125	255	450	500	345	370	490	1250
300	150	310	550	585	495	495	610	1600

Fig. 44: Dimensions QUICKTRON RH (nominal sizes 250-300)

11.3 Dimensions electronics housing AMD07

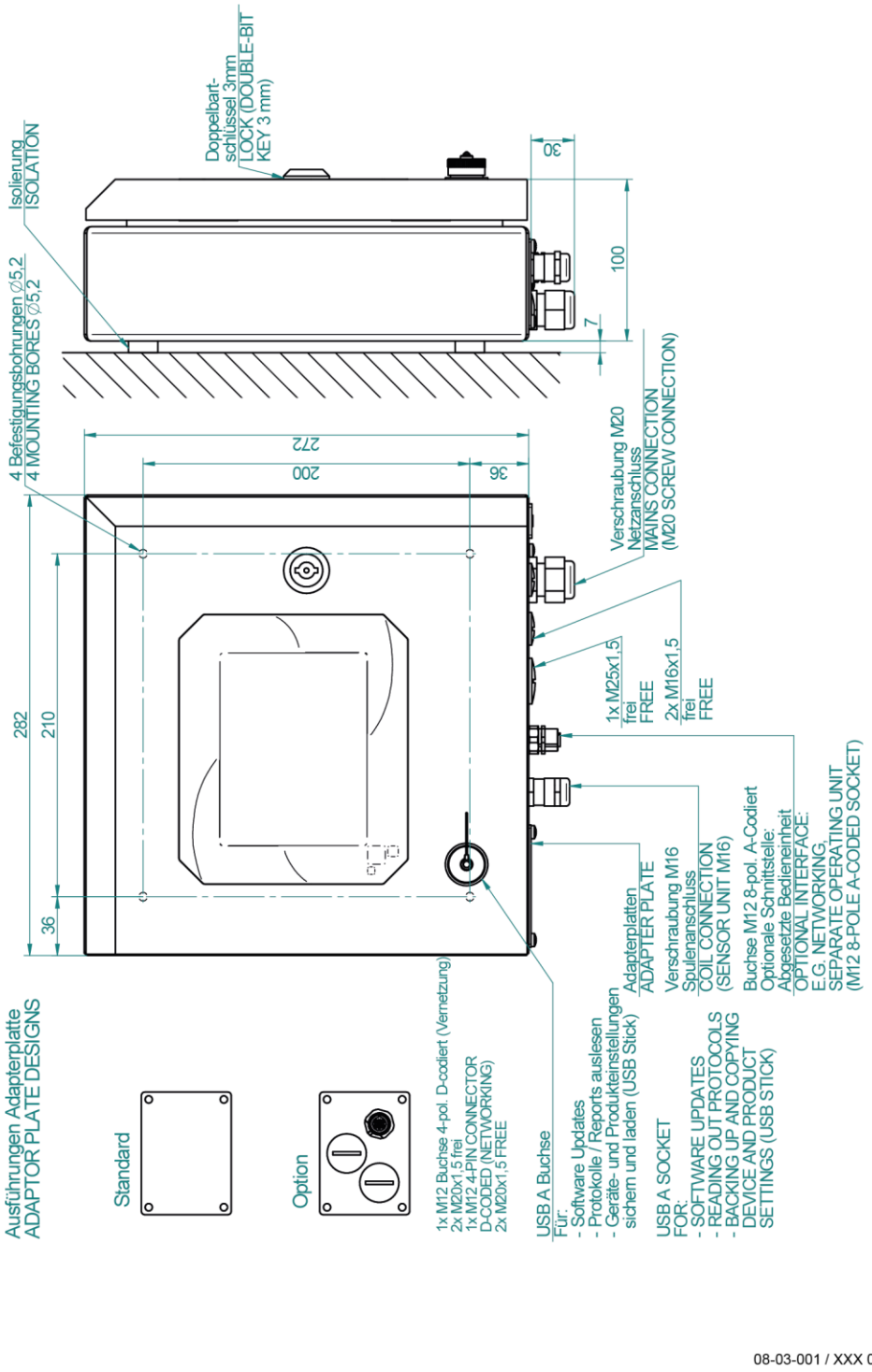


Fig.45: Dimensions electronics housing AMD07

12 Annex

Appendix: Access codes

NOTE

Keep these numbers safe and only provide them to authorized persons!

The following access codes are factory-set for users:

QM	**2077**
User	**2314**

Appendix: Service Form

Our trained personnel will be happy to assist you with any faults or problems on your unit.

NOTE

Your contact person is listed on the type plate
on the outside of the unit's housing and on the inside of the electronics housing cover.

Before contacting the service center, please fill in the following form carefully. This makes it easier for our service technicians to determine the cause of the error.

Also note down the measured values stored in the instrument software (*see operating level 2 > System Info > Measured Values*) and send them to us.

Photos or videos of the fault can also be helpful. The more information you give us about the problem, the better!

Product serial number

The serial number of the device can be found on the type plate. It is an eight-digit number and a two to three-digit letter combination (*e.g. 2018-1112-CI*).

Serial numbers of the electronic components

The serial numbers of the electronic components can be obtained in the software

(*e.g. DU-17-5313-IN*).

See Operating Level 2 > System Info > Version Info.

Product description

(type, temperature, impurities...)

Detailed fault description

Previous measures taken

Have there been previous service calls?

If yes, **date and error description**