BACSA®
WEIGHT QUALITY

# BDM5700

## User's Manual

**Version 15.05.16**

# *CONTENTS*

# *1* General information

## *1.1 Information about the operating manual*

This operating manual provides you with important information about handling the machine. The prerequisite for safe working is adherence to all instructions given for safety and action.

Beyond that, the local rules for the prevention of accidents and general safety regulations applicable to the place of use of the machine must be adhered to.

The operating manual is part of the product; it must be kept near to the machine and must be accessible to personnel at all times.

## *1.2 Copyright*

The operating manual must be treated confidentially. It is intended exclusive for those persons who deal with the machine. It is forbidden to give the operating manual to third parties without the written permission of the manufacturer.

**NOTE!**

The specifications, texts, drawings, pictures and other representations contained in the manual are protected by commercial property rights. Any misuse is punishable by law.

## 1.3 *Explanation of symbols*

The following symbols are used in this operating manual
(all symbols conform to DIN 4844 and/or BGV A 8 standards):

**Warning symbols:**

**Directive symbols:**

| | | |
|---|---|---|
|  Hazardous voltage |  This warning symbol designates potential hazards. Non-observance of this symbol can lead to injuries, even to death. |  Prohibited for persons fitted with a cardiac pacemaker |
|  Danger of injury to hands |  Warning of harmful or irritant substances | |

**Mandatory signs:**

| | | |
|---|---|---|
|  Take particular care |  Switch off before carrying out work | |

## 1.4 *Warranty and liability*

We are liable for defects in the unit manufactured by us in accordance with our terms and conditions of business. All claims are voided if damage occurs due to improper operation, repairs or interventions by persons not authorised by the manufacturer or the user, or the use of accessories and spare parts which not suitable for our unit.

## 1.5 Transport

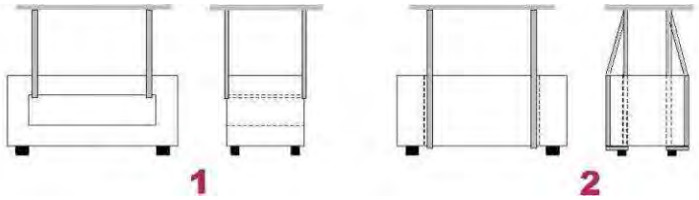
When transporting the machines, you must observe the following points:

- When exceeding the country's legally prescribed maximum weight limits for people moving goods, lifting devices must be used!
- Mount the lifting devices in accordance with the following drawing! (check your coil type!)
- When mounting the eye bolts, please take care that they fit snugly onto the bearing face. Loads that run diagonal to the ring face are not allowed.
- Mounting the lifting devices and transport may only be carried out by trained and authorised staff!
- During transport, the safety regulations in force must be observed!

### Mounting the C, CI-Coil, SlimLine

**1.** Horizontal

**2.** Vertical




## 1.6 Installation

Requirements for the place of installation:

- Sufficient stability and load-bearing capacity of the substrate
- Please consult the manufacturer if the position is not horizontal

## 1.7 Storage

- The place of storage must be free from direct influences of the weather (frost, wetness, direct exposure to the sun).
- Place of storage in dust-free, closed rooms.
- Place of storage free from condensed water, acids, alkalis and other corrosive materials (vapours of these materials)
- Storage in the packed condition
- The adherence to the storage conditions is to be checked at regular intervals.

In the event of non-adherence to the above conditions, no warranty claims can be accepted for any technical defects caused by improper storage.

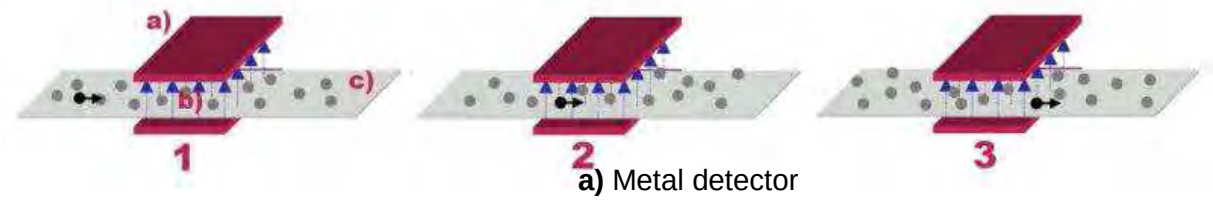
## 1.8 Disposal

If no agreement has been reached with regard to the taking back or disposal of the machine, dismantled components should be recycled following proper dismounting.

- Dispose of components according to the applicable laws/regulations of the user's country.
- Used substances and materials (greases, oils, cleaning agents or solvents, etc.) are to be disposed of according to the legal regulations.

## 1.9 Operating principle

The following shows the simplified principle of a metal search detector, with an example of a conveyor belt application. The shape and look of your application may differ, but the principle is the same.




**a)** Metal detector
**b)** Electromagnetic field
**c)** Product line

## 1.10 Metal detection

**1.** The seeker head creates and evaluates an electromagnetic field with the help of transmitter and receiver coils.

**2.** If a metal body enters the field, the signal indication display deflects in one direction.

See too chapter **Operation**

**3.** If the metal body leaves the field, the display deflects in the opposite direction.

If both switching thresholds are reached, metal is detected.

If metal is detected, several outputs, depending on your configuration, can be used to query the events:

At least one Relay and a 24V (output A1) are available for your queries.

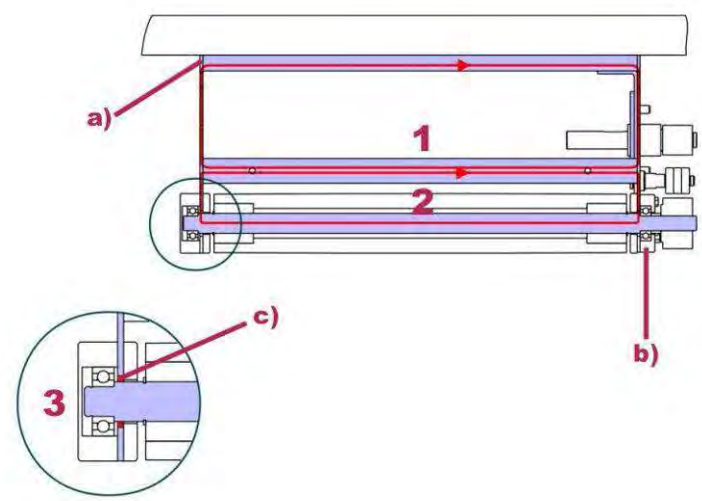
## *1.11 General notes on metal detection*

### Electro-magnetic short circuits

Certain metal frame constructions in conveyor belt frames (see drawing) and suspensions (e.g. castors, cross-bars, adaptor plates) can act as an electro-magnetic loop in the vicinity of the metal detector, affecting the magnetic field of the metal detector. Closed conductive loops must either be welded tight, or interrupted, e.g. with unilateral isolation.

**Example:**

**a)** Conveyor belt frame
**b)** Conveyor belt motor
**c)** Isolation




**1.** If the crossbar is permanently welded, the electromagnetic effect on the metal detector remains constant and does not negatively affect the field of the metal detector.

If the crossbar is only bolted, a constantly conducting connection cannot be guaranteed. The metal detector is negatively affected by the changing conductor loop.

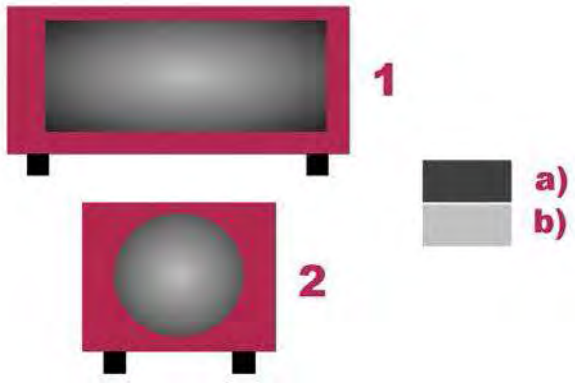
**2.** Rollers and moving parts that form a conductor loop must be insulated at one end (see fig. **3**.), in order to interrupt the conductor loop.

### Electrostatic discharges

Prevent at all cost electrostatic discharges to the metal detector and surrounding construction components using the appropriate earthing. Electrostatic discharges can cause false signals and at worst, destroy the analysis electronics.

## Differences in sensitivity within the outlet opening

Please note, that the detector coil does not create a homogeneous electromagnetic field. As a consequence, differences in sensitivity occur in the outlet opening. The least sensitive part of the detector is in the middle of the outlet opening.




Sensitivity distribution taking the example of a C-coil (**1**) and a CR-coil (**2**):

**a)** Area of highest sensitivity

**b)** Area of lowest sensitivity

## Sensitivity differences of different metal types

Please note, that different metal types influence the electromagnetic field to a different degree. Please read the metal-type dependent maximum sensitivity degrees in the data sheet.

## Position-dependency of the metal parts

Metal detection can be dependent on the position and orientation of the metal part, depending on the shape of the metal part. The maximum sensitivity values of the data sheet are tested with ball-shaped test parts.

Generally speaking, all metal parts that have at least the same diameter as the balls used for the data-sheet values can be detected with certainty, irrespective of position and orientation.

## Testing at regular intervals

Normally, errors of the detector itself are recognized by the self-monitoring system. However it cannot be excluded that errors may occur which are not detected. Changes in the environment of the detector (e.g. new machines) can influence the function of the detector.
For this reason, settings and function of the metal detector must be checked at regular intervals with suitable test equipment.

## Environmental and weather influences

The metal detector has to be protected against environmental and weather influences (direct sun, wind, frost). The detector has to be especially protected from direct or indirect insulation when heating up is above the allowed temperature. High surface temperatures can lead to false detections and destruction of the metal detector in the worst case. A suitable protection device must therefore be provided (do not use metal walls or roofing covers made from metal!).

# 2 Safety

## 2.1 Operation of the device as provided

The device only serves for detecting metal in flight conveyors. The following products are excluded:

- **Those contained in metallic or partially metallic casings.**
- **Electrically conductive products.**
- **Products containing desired metal constituents.**

Since these products could possibly disturb the sensitivity of the metal detector, they may only be examined after consulting the manufacturer beforehand.

This device may not be operated

- **In areas with explosive hazards (customized version available).**
- **Outside the stated protective system.**
- **Outside the permitted temperature range.**

**Operating the device in an improper way can lead to damages at the device and also to injuries or the death of persons.**

Any structural change of the device may only be effected after consent and prior inspection of the manufacturer.

The data provided in the manual regarding operation, maintenance have to be observed. Works at the metal detector may only be carried out by trained and authorized personnel.

## 2.2 Contents of the operating manual

Each person who is assigned to work on or with the machine must have read and understand the operating manual before commencing any work on the machine. This also applies if the person concerned has already worked with such a machine or a similar machine or has been trained by manufacturers.

## 2.3 Modifications and conversions of the machine

To avoid hazards and to ensure optimum performance, the machine may neither be modified nor converted nor may attachments be made to it unless expressly permitted by the manufacturer. Only original spare parts and accessories from the manufacturer may be used.

## 2.4 Duties of the operating company

The machine is used in an industrial area. The company that operates the machine is therefore subject at least to the legal health and safety requirements in the country of use.

Apart from the notes in this operating manual concerning health and safety at work, the regulations for safety, accident prevention and environmental protection applicable to the place of use of the machine must be adhered to. The following applies in particular here:

- **The product fulfils the CE marking requirements within the machine limits. The company that operates the machine is solely responsible for implementing the interfaces to the surroundings and the fixings in a safe manner, taking into account relevant regulations and directives. The machine may be put into operation only if it meets the safety requirements!**
- Assign only trained or instructed personnel.
- Clearly define the responsibilities of the personnel for the installation, operation, setup, maintenance and repair of the machine.
- The manual must always be kept at the place of use of the machine where it is accessible to all persons who operate the machine.
- Trainees may only work under the supervision of already trained personnel. New personnel must receive the same training as those personnel who have already been trained.
- The operating company is responsible for defining the protective equipment that is necessary in order to make safe working possible.
- Provide the personnel with all necessary protective equipment.
- Check regularly that personnel are working in a safety-conscious manner.
- Keep all safety and danger notices on the machine complete and in a good, legible condition. **Danger of injury due to illegible or missing symbols!**

## 2.5 *Duties of the personnel*

**Danger of injury if personnel are not sufficiently qualified to work on the machine!**
Inappropriate handling can lead to serious injuries and material damages.
Therefore:
- Allow only the persons named in the respective chapter to perform special tasks.
- Personnel assigned to work on the machine must have read and understood the operating manual before commencing work.
- Observe all legal and basic regulations for health and safety and accident prevention when working.
- Observe all safety and danger notices on the machine
- In case of malfunction, stop the machine immediately and secure it. Have faults rectified immediately.
- Observe the safety regulations applicable to the product when handling oils, greasesand other chemical substances. Use the necessary personal protective equipment.

All persons concerned with the assembly, commissioning, operation, maintenance and repair of the metal detector unit must be correspondingly qualified and trained.

| Persons / Activity | Specially trained personnel | Personnel under instuction | Personnel with job-Specific training (mechanical/electronic) |
|---|---|---|---|
| Transport | * | – | – |
| Commissioning | * | – | – |
| Fault-finding and repair | – | – | * |
| Adjustment, equipping | * | – | * |
| Operation | – | * | – |
| Maintenance | – | – | * |
| Disposal | * | – | – |

Key: * = allowed – = not allowed

## 2.6 *Hazards related to this metal detection equipment:*

A risk / hazard analysis has been carried out on the metal separator with subsequent safety check and safety acceptance. In the case of disoperation or misuse, there is a danger of injury to, or death of operators, maintenance personnel and others, damage to the metal detection equipment and the user's other property, and reduced efficiency of the equipment.

Safety and usage notices:

The following symbols have been applied to the equipment to indicate hazards which cannot be eliminated via structural measures:

**WARNING!**
**Danger of injury due to illegible or missing symbols!**
Keep all safety and danger notices on the plant complete and in a good, legible condition.

| Symbol | Description | Location |
|---|---|---|
|  | Hazardous voltage | Control and evaluation unit |

Please take particular notice of the following residual hazards:

| Hazard | Activity | Dangerous part | Solution |
|---|---|---|---|
|  Equipment weight | Transport / Removal | Complete equipment | Transport of the plant with suitable and approved lifting appliances by trained personnel. Observe applicable safety regulations. |
|  Danger of plant tipping | Set-up/installation, cleaning, decommissioning/dis assembly | Complete equipment | Mount plant securely on mounting holes. |
|  Danger of injury to hands | Assembly | Complete equipment | Mounting only by trained and authorised personnel |

| | | | |
|---|---|---|---|
|  Hazardous voltage | All operating modes | Electronic cabinet, pneumatic cabinet | Keep the covers of the electronic and pneumatic cabinets closed |
|  Danger due to pressurised hot water | Cleaning with steam jet | Complete equipment | Wear suitable protective clothing when cleaning with a steam jet. Observe the manufacturer's safety instructions. **Observe protection class of the plant.** |
|  Danger of substances hazardous to health or irritants | Cleaning with cleaning agents | Complete equipment | Wear personal protective equipment and observe the cleaning agent manufacturer's instructions. |
|  Warning of visual or acustic signal | All operating modes | Warning device (alarm) | Instruction of personnel on existing warning devices |
|  Prohibited for persons fitted with a cardiac pacemaker | Normal operation | Complete equipment | Persons fitted with a cardiac pacemaker (or other implanted medical aid) must not work on this machine. |
|  | Generally, before cleaning or repairing the equipment, it must be switched off, made safe against accidental switch-on, the air pressure released and the conveyor belt stopped. The switch outputs should be checked for external voltages. | | |

# 3 Actuation

## 3.1 General

It is our company's goal to ship the metal detector to the customer with as many pre-configured settings as possible. If the machine is shipped with factory default settings, it should be noted, that the factory defaults are the best possible compromise between maximally attainable detection precision and lowest possible sensitivity to interference. The data sheet sensitivities are achieved with detection threshold settings between 20 and 10.

In order to adapt the settings to your own needs, a schematic sequence is provided below in which the start up should ideally take place. Only the sequence is described. The individual explanations of the menu items must be read in the operating instructions.

## 3.2 Safety procedures before taking the device into operation

**Before actuating the metal detector at least the following parts of the device must be checked:**

- Is the device damaged anywhere?
- Are the electric ports and mains undamaged?
- Are all protective covers fitted and free of damage?
- Are all pneumatic supplies and mains undamaged (if installed)?

The device can start if **everything is perfect.**

**Danger due to incorrect assembly and commissioning!**

Assembly and commissioning require trained technical personnel with sufficient experience. Errors made during assembly can lead to life-threatening situations or result in considerable material damages.

## *3.3 Actuation manual*

### 1. Clean the metal detector

If the product is not allowed to have contact with foreign matter, all surfaces having contact with the product must be cleaned before start-up operation.

**Please follow the safety instructions!**

See chapter **Maintenance and cleaning →Cleaning**

### 2. Assemble metal detector

Assemble the metal detector according to the information provided in the chapter „Assembly“.

See chapter **Assembly**

### 3. Connecting the 24V switching exits and relays

Connect the 24V switching exits and relays as needed. Please follow the indications in the chapter **Set-up**.

See chapter **Assembly →Connection**

### 4. Connect power supply

See chapter **Assembly→Connection→Supply voltage**

**The metal detector is now fully assembled and connected.**
All further points are concerned with the most important adjustments that should be made to your machine in order to ensure trouble-free operation with the maximum possible sensitivity.

### 5. Switch metal detector on

Having assembled the detector mechanically, as a first step it is taken into operation. Under this condition the detector is only subject to external influences (peripheral disturbances). If at this point faulty responses are triggered, you have to try and find the source of the disturbance and to correct the error. For this switch off all machines (motors, actuation, etc.) in the direct surroundings of the metal detector so that the metal signal of the metal detecting device stays within the triggering range. As a next step the device is taken again into operation step by step.

After each step control the measure signal in order to locate the disturbance, that causes an increased noise level. If noise suppression is not possible, remains only an increase of the detection threshold, until there are no more false alarms.

See chapter **Adjustment →Operating level 1→Detection level**

## 6. Activate production- and transporting device

As a next step the production and transporting device is taken into operation without loading products. In this state the influence of the transporting device on the metal detector becomes evident. Here also applies: If there should be incorrect triggers try to locate the cause of the disturbance and suppress it. For this, take the production line into operation as mentioned above, step by step.
Contrary to peripheral disturbances that often need very high efforts to suppress them in this case a solution should be easily found.
Temporarily the sensitivity can be reduced until there is no more incorrect triggering.

See chapter **Adjustment→operating level 1→Detection level**

## 7. Start complete production line

Now start the complete production line. For the set-up-step you should, if possible, use only metal-free products. The further Steps depend on the current situation. If there are metal events while a metal-free product is passing through the coil, you should continue with the following point, otherwise you may skip the following point.

## 8. “Learn product”

Your product is conductive and therefore influences your metal detector without metal being existent in your product.
Follow the instructions as in “Adjustment→Operating level 2→Learn product manual”, in order to counterbalance the “product effect”.

See chapter **Adjustment→Operating level 2→Learn product**

## 9. Optimize sensitivity settings

**Note:**
The lower the detection threshold is set, the higher the detection sensitivity will be, but the susceptibility to false triggering will also be higher

See chapter **Adjustment→Operating level 1→Detection level**

## 10. Adapting the reject parameter (if need be)

See chapter **Adjustment→Operating level 2→Reject parameter**

**Adjustments completed**

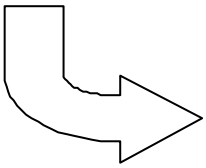
If you do not wish to operate the machine with any further products,
you can skip the next point.

## 11. “Create product”

You can save different products (product memory). The detection threshold, the separation parameters, the frequency and the result of the product learning procedure are saved together with the product name. In order to now make settings for a new product, you must create a new product.

See chapter **Adjustment→Operating level 2→Product memory**

Repeat the items **‘Start complete production line’** to **‘Create product’** until you have set all products that are to be examined with the metal detector.



**You have adjusted your metal detector optimally**
All further adjustment options serve to adapt the metal detector to the production sequence and to realise application-related functions / evaluations.

An overview of all functions of the metal detector can be found in the chapter entitled **Adjustments**.

# 4 Assembly

*Please note when assembling your detector the following assembly instructions in order to ensure perfect operation.*

## 4.1 Installation guidelines

### Electronics

**Connect the metal detector to a clean, constant voltage power supply.**

Voltage fluctuations can cause false tripping. Therefore, a constant voltage transformer (AC line conditioner) is recommended. In order to check if false tripping is caused by voltage fluctuations you can temporarily supply the metal detector with a UPS (Uninterruptible Power Supply, direct, independent power supply as used for Computers). Please, do not forget to plug off the input cable of the UPS to separate it from the AC line.

**Run the transmitter and receiver cables to the metal detector separately from live wires.**

The detector cables can catch noise, especially when they are close to motor lines or high power cables. To improve the screening of the cables, solid metal conduits with a good ground connection (best welded) are recommended. Please do not connect protective hoses to the metal detector or, if do you connect flexible protective hoses to the electronics housing, at least use plastic screw connections.

**Do not disconnect the metal detector from the power if possible.**

A constant power supply allows higher detection threshold settings and prolongs the service lives of the electronic components. Please remember that the electronics re-regulate and recalibrate themselves after an interruption in the power supply. This procedure takes approximately 30 seconds. No metal will be detected during this period.

**When welding at the construction where the metal detector is mounted, disconnect the metal detector from the power supply and do not use the control panel mounting surface as a ground.**
Warding near the metal detector will lead to false trippings.

**Vibration less using of the control panel**
Mount the control panel on a vibration free surface. Vibration can cause premature electronic component failure.

**All cables must be shielded.**
The shield must be connected face-to-face on the housing; ideally by means of an EMC screw.

## Detector general

**Be careful when you have more than one metal detector in operation!**

If several metal detectors are installed in immediate proximity, they might Interfere with each other when running at the same detection frequency (frequency overlaps).If we know in advance that you have more than one detector in operation, we do already adjust the detectors to different frequencies. Should there be frequency overlaps, you can adjust one detector to side frequency.

See chapter **Adjustments→Operating level 2→Frequency→Side frequency**

Please observe the required minimum distances. For closed tunnel detectors type C, CI and CR: minimum distance = 10 x LH (LW for type CR), if the detectors are installed parallel in one row. For divisible tunnel detectors type D and single surface detectors type S: minimum distance= 15 x LH (SB for type S), if the detectors are installed parallel in one row. The minimum distances may be lower if you work with different frequencies. Please consult our sales or application department.

LH = Aperture Height LW = Aperture Width SB = Detector breadth

**Do not install the detection coil inside a strong electromagnetic field. (Especially if in the direct surroundings of the seeker head there are strong load variations at other electronic devices).**

Interferences can trigger faults. Specifically, fields lying exactly within the operating frequency of the detector can lead to frequency overlapping and hence to false tripping.

**Pay attention to the metal free zone (MFZ) of the metal detector.**

Do fixed; non-moving metal parts outside the metal-free zone have little influence on the metal detector's function. Metal parts changing their distance to the detector (levers, swivel arms…), however, might cause problems within the metal free zone, please use electrically non-conductive material only, e.g. wood or plastics. Please keep in mind that the use of a plastics slide plate may promote the formation static charges.

See chapter **Assembly→Tips for Set-up**

**Vibration less using of the detector coil (all, except "VT" type).**

Higher sensitivities can be attained and maintained if the operating conditions are optic mal. Ensure the coil is mounted to a structure that is stationery at all times.

**Eliminate loose metal to metal connections near or within the detection field.**

Intermittent metal contact from components such as roller axles, bolted structural connections of the conveyor frame, loose grids from access platforms or broken welds can cause false reject signals, especially at high sensitivity settings. In order to avoid creating intermittent magnetic loop contacts, please isolate metal parts from one another or weld them together. Bolted ground connections will not solve this problem.

See chapter **Introduction→General notes on metal detection**

**Pay attention to the maximum installation batter of the search head**

You can take the maximum installation batter from the datasheet. For larger batter, please contact the manufacturer before installing the unit.

**Please clean the conveyor belt (of belt conveyors) regularly.**
Metal impurities cause fault detections. Please make sure the belt runs centrically on the rollers and nothing rubs on the belt.

**Pay attention to an electrical insulated installation.**
The coil feet of the detector provide for electrical isolation. Please do not remove them.

**Do not use anti-electrostatic (or electrically conductive) belt material.**
Anti-electrostatic belts are conductive and cause an effect similar to metal in the metal detector.
Depending on the relevant application, a conveyor belt appropriate for the metal detector must be chosen.
The conveyor belt should have a so-called finger coupling. Furthermore, glue containing metal particles must not be used for connecting the belt.

**Do not touch the sensor/coil surface of the detector.**
Mechanical contacts may cause detection errors. Keep the surface free of debris.

**The frame must be manufactured with appropriate stability.**
Loose attached parts, in particular loose transverse connecting parts such as bracing struts, bolted discharge plates; cover plates etc. can cause considerable interference. Screwed connections should be dispensed with entirely in this area if possible – welding is better. Insulate the parts on one side wherever screwed connections are absolutely necessary.

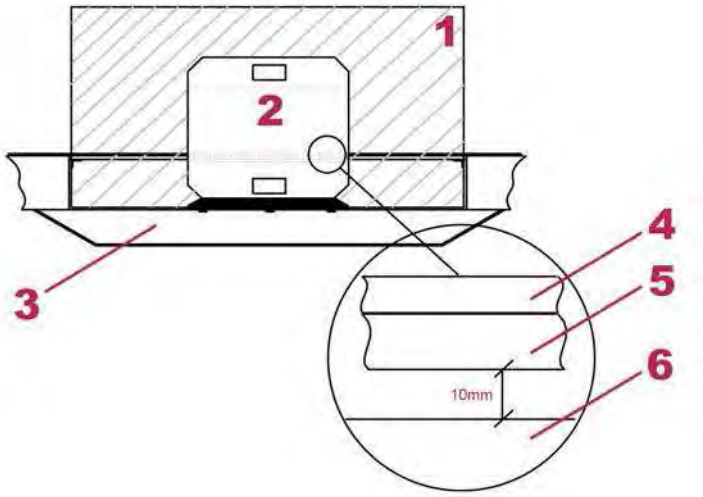
**Power rolls, deflection rollers and snub pulleys are also possible sources of interference, as the electrical contact is submitted to large variations caused by damaged or bad bearings.**
The same applies to swivelling belt strippers. These parts should always be insulated on one side. **Please**
**note:** Bridging bad contacts with earth band or wire will **not help!**

See chapter **Introduction→General notes on metal detection**

**When welding at the construction where the metal detector is mounted, disconnect the metal detector from the power supply and do not use the control panel mounting surface as a ground.**
Welding in the surroundings of the detector will trigger faults.

## *4.2 Tips for set-up*

### General




**1.** Metal free zone
**2.** Metal detector
**3.** Belt frame
**4.** Conveyor belt
**5.** Sliding plate
**6.** Sensor surface

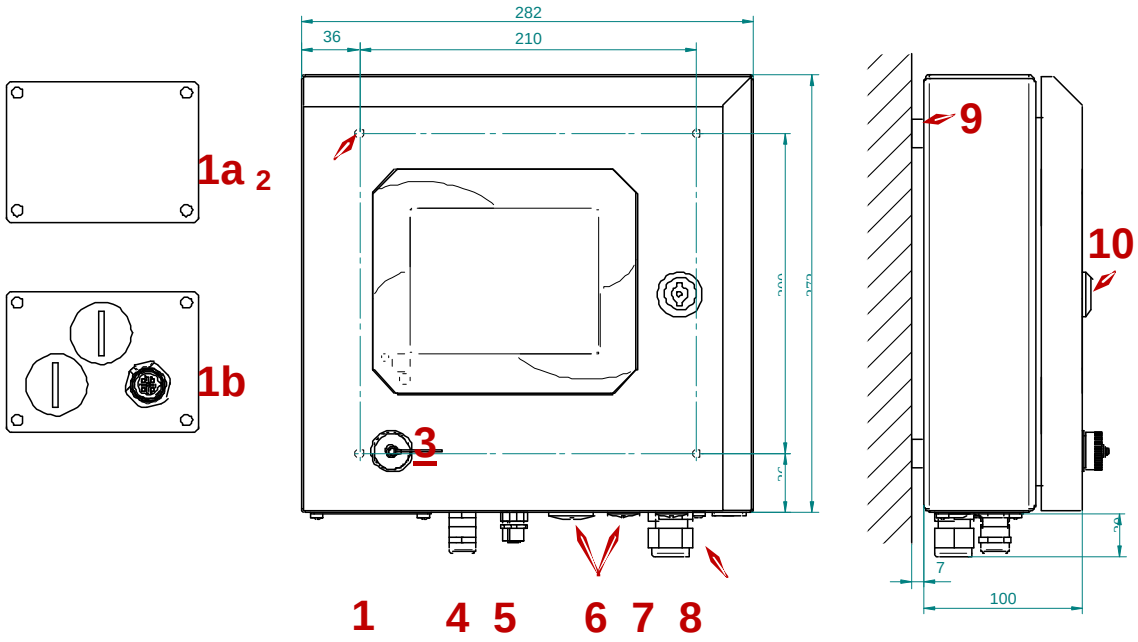
**The product, conveyor belt and sliding plate must not touch the sensor surfaces.**
The sliding plate must be dimensioned such that there is no contact with the lower sensor surface even when the belt is fully loaded (this also applies to the conveyor belt when the belt is fed back into the coil).

Distance: approx. 10 mm. It is advisable to use Duroplex in order to prevent the accumulation of static charges.

The proper choice of conveyor belt, suitable for metal detectors, depends on its use. The conveyor belt should have a so-called “finger coupling”. Also, the belt coupling must not be fixed with glues containing metal.

**If the construction space of the conveyor belt allows, you may choose a longer metal-free zone.**

## Electronic housing AMD 07




1. **Adaptor plate designs:**
   - **1a** Standard
   - **1b** Option
     1x M12 4-pin connector
     D- coded ((networking)
     2x M20x1,5
2. 4 Mounting bores □ 5,2
3. USB A socket, for:
   - software updates
   - reading out printing logs
   - backing up and copying device and product settings (USB stick)
4. Coil connection (Sensor-Unit, M16)
5. Optional interface:
   e.g. networking,
   Separate operating unit
   (M12 8-pole A-coded socket)
6. Free, 1x M25x1.5 and 2x M16x1.5
7. Mains connection (M20 screw connection)
8. Socket M12 4-pole A-coded
9. Isolation
10. Lock (double-bit key 3 mm)

Opening and closing the electronic cabinet

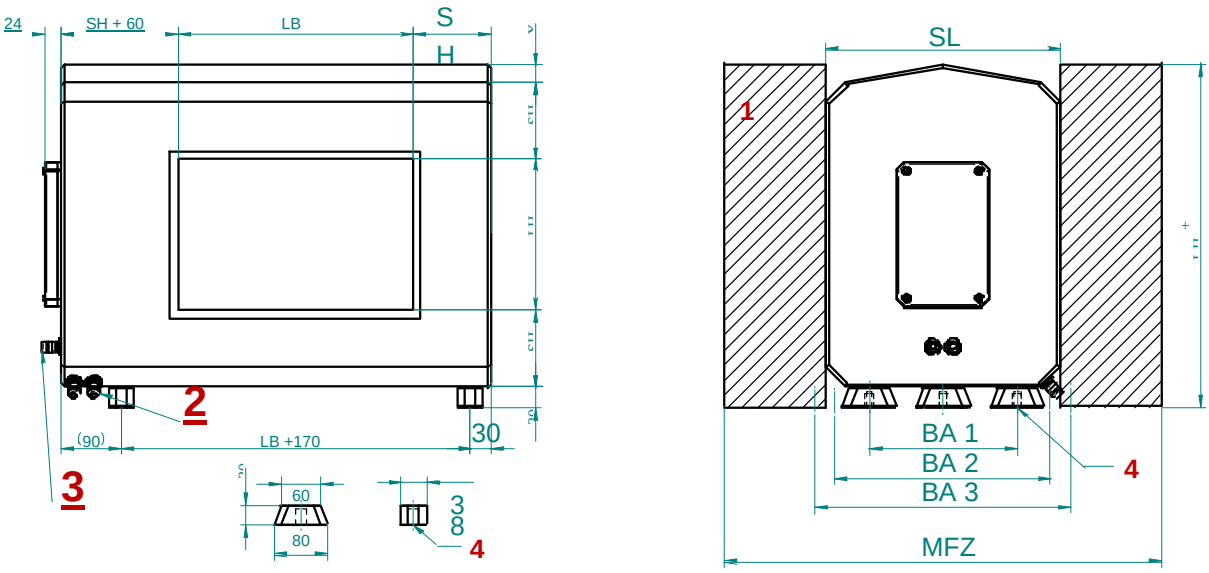
Before opening the electronic cabins, you must stop the conveyor, disconnect the mains plug, check for external voltage at the switch outputs and ensure that the device cannot be switched on again!

See chapter **Introduction→Safety**


The electronic cabinet can be opened or closed using a two-way key. Make sure that no cables are trapped when closing the electronic cabins.

1. Open (turn to the left))
2. Close (turn to the right)

# Detector C-Coil




1. Metal-free-zone
   MFZ (non moving metal) = SL + LH[1)]
   MFZ (moving metal) = SL + 3,5 x LH[1)]
2. Access line Ø9 (Version 2)
3. Access line Ø9 (Version 1)
4. **Mounting foot**: Thread reach: max. = 18 mm
   Thread M12

1) The metal detector has to be positioned centrically within the “metal-free-zone“. The calculated values can be used for orientation (minimum values can of course be exceeded!) but must be confirmed by us for the respective project.

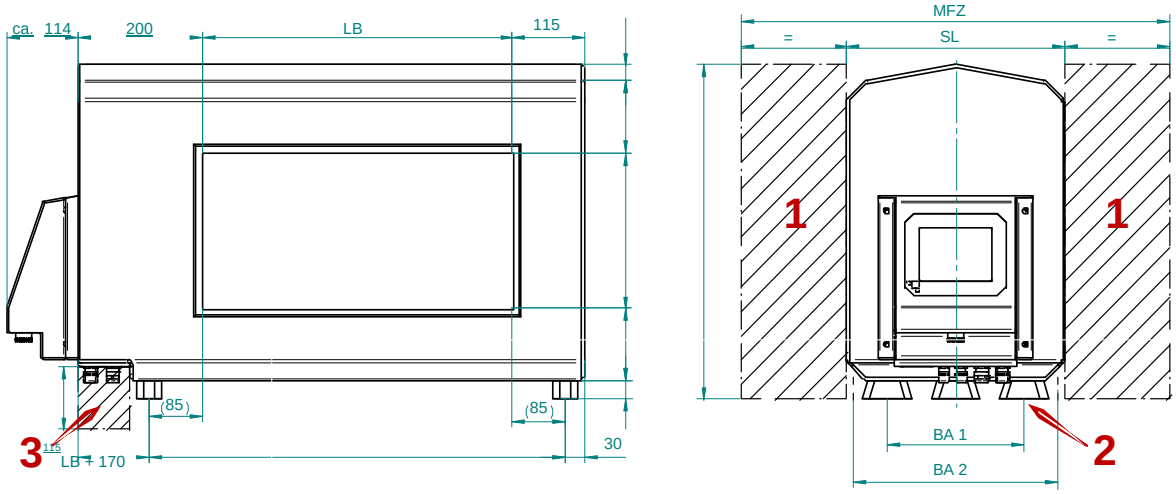
**LB** (Aperture width)

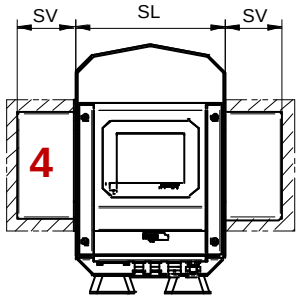
| Aperture height | Detector length | Top / Bottom thickness | Distance between threaded bore holes | | | Number of threaded bore holes for each detector | Measure |
|---|---|---|---|---|---|---|---|
| LH | SL | SH | BA 1 | BA 2 | BA 3 | A | X |
| 50 – 150 | 260 | 115 | 130 | - | - | 4 | 18 |
| 175 – 200 | 300 | 115 | 170 | - | - | 4 | 22 |
| 225 – 250 | 350 | 115 | 220 | - | - | 6 | 26 |
| 275 – 300 | 400 | 115 | 230 | - | - | 6 | 27 |
| 325 – 350 | 450 | 115 | 280 | - | - | 6 | 31 |
| 375 – 400 | 500 | 115 | 110 | 330 | - | 8 | 36 |
| 425 – 450 | 550 | 115 | 190 | 380 | - | 10 | 40 |
| 475 – 500 | 600 | 115 | 215 | 430 | - | 10 | 44 |
| 550 – 600 | 650 | 115 | 240 | 480 | - | 10 | 49 |
| 650 – 700 | 700 | 150 | 265 | 530 | - | 10 | - |
| 750 – 800 | 800 | 150 | 150 | 390 | 630 | 12 | - |
| 850 – 900 | 900 | 150 | 150 | 440 | 730 | 12 | - |
| 950 – 1000 | 1000 | 150 | 280 | 560 | 830 | 14 | - |
| LH > 1000 | 1200 | 150 | 340 | 690 | 1030 | 14 | - |

Dimensions in mm

## Detector CI-Coil

Dimensional: CI coil




1. Metal-Free-zone
   MFZ (non moving metal) = SL + LH[1)]
   MFZ (moving metal) = SL + 3,5 x LH[1)]
2. **Mounting foot:**
   Thread reach: max. = 18 mm
   Thread M12
3. Keep free for cable exits
4. Shaft extension (optional)

1) The metal detector has to be positioned centrically within the „metal-free-zone“. The calculated values can be used for orientation (minimum values can of course be exceeded!) but must be confirmed by us for the respective project.

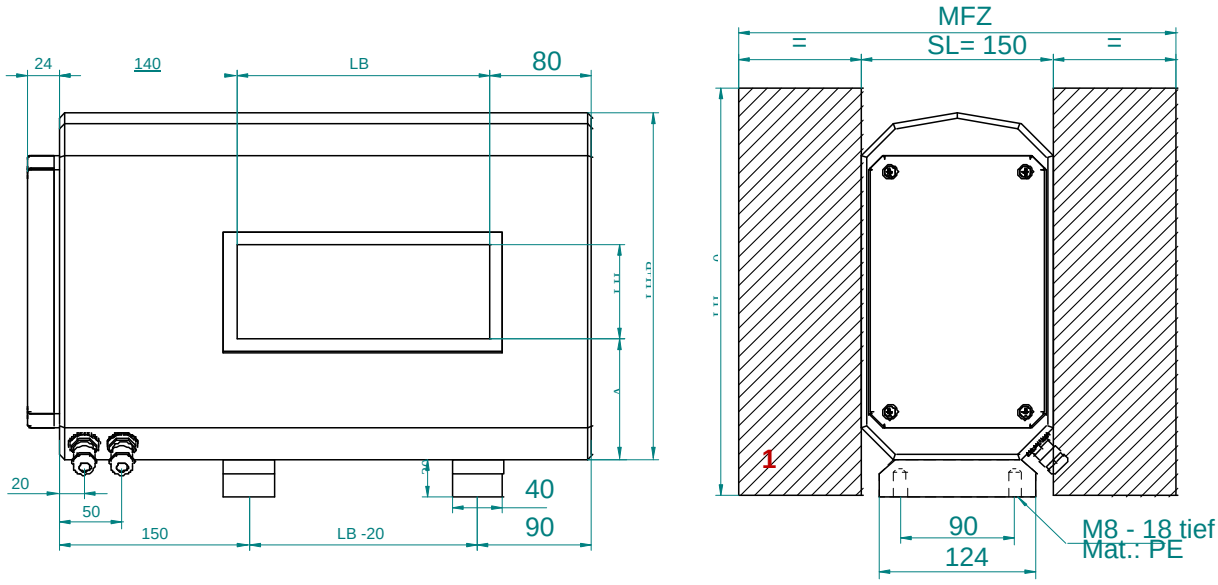
**LB** (Aperture width)

| LH<br>Aperture height | SL<br>Coil-length | SV<br>Shielding extension (optional) | SH<br>Top / Bottom thickness | BA 1 | BA 2<br>Distance between threaded bore holes | A<br>Number of threaded bore holes for each detector | X<br>Measure |
|---|---|---|---|---|---|---|---|
| 50 | 260 | 100 | 150 | 130 | - | 4 | 18 |
| 75 | 260 | 100 | 130 | 130 | - | 4 | 18 |
| 100 - 150 | 260 | 100 | 115 | 130 | - | 4 | 18 |
| 175 - 200 | 300 | 100 | 115 | 170 | - | 4 | 22 |
| 225 - 250 | 350 | 150 | 115 | 220 | - | 6 | 26 |
| 275 - 300 | 400 | 150 | 115 | 230 | - | 6 | 27 |
| 325 - 350 | 450 | 200 | 115 | 280 | - | 6 | 31 |
| 375 - 400 | 500 | 200 | 115 | 110 | 330 | 8 | 36 |
| 425 - 450 | 550 | 200 | 115 | 190 | 380 | 10 | 40 |
| 475 - 500 | 600 | 200 | 115 | 215 | 430 | 10 | 44 |
| 550 - 600 | 650 | 200 | 115 | 240 | 480 | 10 | 49 |

Dimensions in mm

# Detector SlimLine-Coil

## Dimension




**1.** Metal-Free-zone
MFZ (non moving metal) = SL + LH[1)]
MFZ (moving metal) = SL + 3,5 x LH[1)]

**1)** The metal detector has to be positioned centrically within the „metal-free-zone“. The calculated values can be used for orientation (minimum values can of course be exceeded!) but must be confirmed by us for the respective project.

Measure A and B
LH ≥ 100 mm; A = 80 mm ; B=170
LH = 75 mm; A = 95 mm ; B=200

Dimensions in mm.

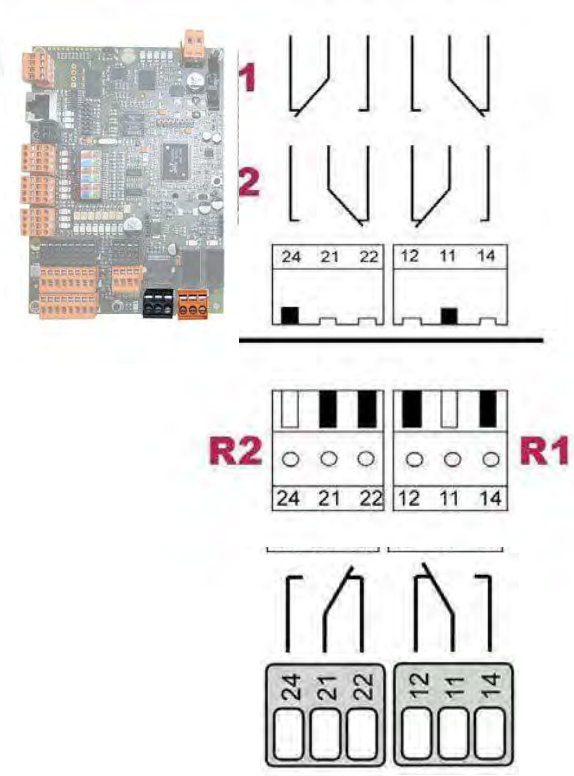
## 4.3 Connection

Having mounted your metal detector according to the directions provided on the above pages you now can connect it:
See too chapter **Technology→Plug configuration**

## Relay

Potential-free relay change-over contacts
Contact rating: V~ 250V AC Imax 3A

### Relay 1




Factory default (if not agreed upon otherwise) **Relay 1 (R1)** is the metal relay. The metal relay switches by default when metal is detected in the detector.

De-energised condition:
Contacts 11 and 12 closed

### Relay 2 (connection recommended)

Additionally to the optical display you can read the operational status via a potential-free contact.

Factory default (if not agreed upon otherwise) is **Relay 2 (R2)** is a stand-by relay.

If the control detect an **„error“** the **„stand-by relay“** switches at once. The switching process of the stand-by-relay you can use for switching a warning system or to interrupt the product flow through the metal detector.

De-energised condition:
Contacts 21 and 22 closed

**Factory default:**

| | After power on | Normal state | On metal | On warnings | On error |
|---|---|---|---|---|---|
| Relay 1 | OFF (2) | OFF (2) | EIN (1) | HOLD | HOLD |
| Relay 2 | OFF (2) | ON (1) | HOLD | OFF (2) | OFF (2) |

HOLD: The current switching state of the relay is being held

## Supply voltage

Connect the supply voltage only after you have integrated all connections. Otherwise there will be error messages.

**The supply voltage has to lie within the following bounds:**

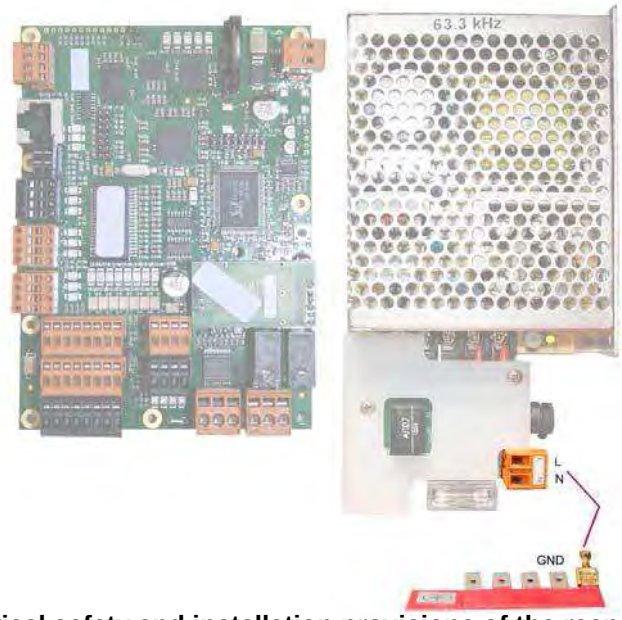
**100 to**
**50 / 60 Hz**

**Power protection: max. 10 A**

***Special version:*** *Operating voltage: 20 to 36 V DC*

**Please note:**
For the mains plug of the customised version, the electronics and, if present, the frame must be included in the earth potential! The metal detector (coil) is to be set up isolated, as usual.
See chapter **Introduction→General notes on metal detection→Electrostatic discharges**

If you do not use the mains plug of the shipped package, you have to configure the mains connector as follows:




- **The electrical safety and installation provisions of the respective country must be observed.**
- **The mains voltage must be separable, i.e. it must be possible at any time to separate the device from the electrical power system.**
- **The applied power connection/mains socket must be in visible near of the device and be well accessible.**
- **Repair and maintenance work on the board may only be carried out by trained and authorized personnel!**
- **Improper adjustments can impair or even prevent your metal detector from operating!**

# 5 Operation

## 5.1 General

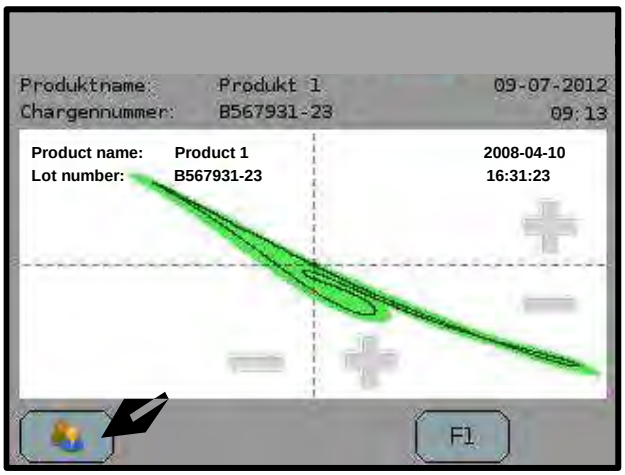
Your metal detector is operated using the operating unit on the electronics casing. All information necessary for operation are displayed on the screen.

> The protective films must be removed from the display following commissioning.
> This ensures optimum operation.

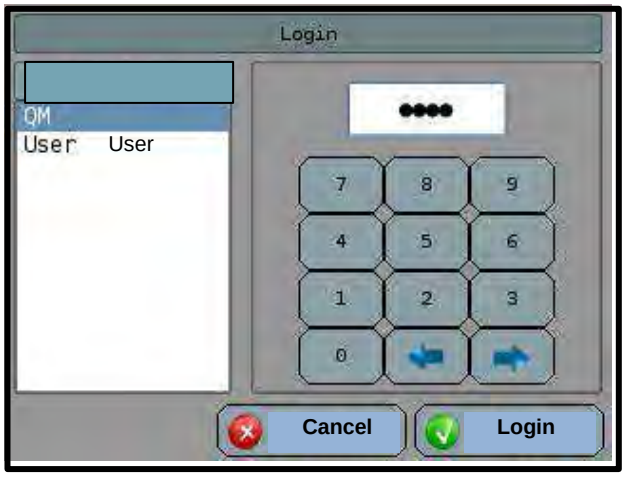
## 5.2 Touch Screen Display operation

The touch-sensitive display screen (Touch Screen) allows direct operation of all important functions by applying light pressure with a finger. Helpful graphics enhance feedback and make the metal detectors fun to use.

### Login




In order to guarantee constant detection accuracy during operation, changes to the settings of your metal detector may only be made with authorised access. Login is accessed via the button.




Select a user name. After entering the 4-digit code number, you must confirm with 'Login'. After that the operating levels are released.

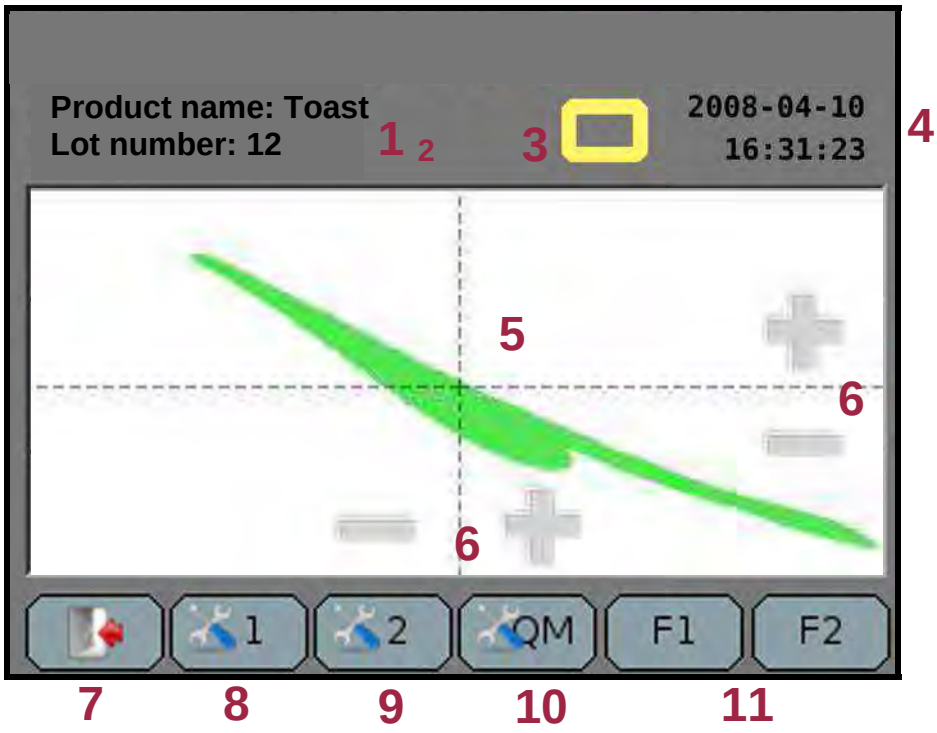
The code numbers for the standard users can be found under **'Access codes'**.

See chapter **Appendix→Access codes**

## Main Menu

The operating levels are accessed from the main menu. In accordance with the instructions in the chapter **'Commissioning'**, you can adjust the metal detector optimally to suit your production environment.

See chapter I **Commissioning**




**1. Product name:** Name of the currently selected product (Product memory)

See chapter **Adjustment→Operating level 2→Product memory**

**2. Lot number:** e.g. in order to distinguish between different customer orders

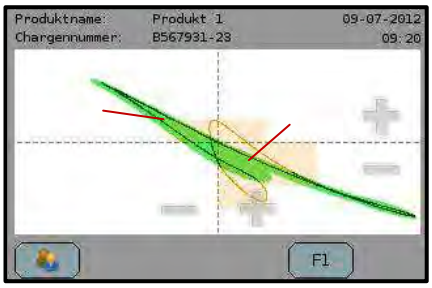
**3. Signal:** Visual display for displaying events

| | |
|---|---|
| | Normal state: no metal detected |
| | Metal detected, during ejection delay |
| | During metal ejection |

**4. Date, Time and User:** Current date, current time and logged-in user

**5. ImagePHASE:**

Display for showing the
With imagePHASE you can achieve high detection accuracy through the optimum identification of the product.
The imagePHASE makes use of the effect that the measuring signal must move within certain limits (envelope) The envelope (**1**) identifies the product to be examined. If the measuring signal (**2**) lies outside the envelope, a metal alarm is triggered




The learned envelope of the product always remains visible. The measuring signal is slowly faded out after a certain time. Measured values inside the envelope are displayed in a different colour to those outside the envelope. Since it is often difficult in the border area to determine whether the measuring signal lies outside the envelope, these areas are additionally highlighted in colour.

**Please note!** An unstable and strongly oscillating signal, which touches the metal switching thresholds, could have the following reasons:

- Peripheral interference

*Solution:* Localise and remove source of interference or reduce sensitivity setting

see chapter **Adjustment→Operating level 1→Detection level**

- Strong “Product effect“

*Solution:* Carry out “product learning“

See chapter **Adjustment→Operating level 2→Learn product**

**6. Zoom** Only the display of the image is changed with the + and – signs; the evaluation is not changed by this.
The image is returned to its original form with the square button.

**7. Login:** User selection / Log off / Back button

**8. Operating level 1:** Access operating level 1

**9. Operating level 2:** Access operating level 2

**10. Operating level QM:** Access to ‘QM’ level (quality management)

**11. Direct selection keys F1and F2:** **F1 =** menu item **Learn product**
**F2 =** menu item **Detection level**

# 6 Adjustment

## 6.1 General

The metal detector is factory-preset. Normally there should be no or only minor changes required. Note that adjusting the settings in an improper way can impair or prevent your metal detector from functioning.
On the following page, you will find an overview of all menu items. Depending on the application, some menu items may be de-activated and will therefore not be visible on the display. These menu items are marked as "**(optional)**".

**Changes may only be carried out by trained and authorized personnel.**

## *6.2 Overview operating levels*

Operating level 1

- **Detection level**
- **Choose product**
- **Batch number**
- **Reject counter**
- **Test reject unit 1**
- **Start detector test**
- **Change password**

Operating level 2

- **Learn Product**
- **Product memory**
  - New
  - Copy
  - Edit
  - Delete
- **Reject counter**
- **Reject parameter relays 1**
  - Position
  - Period
  - Reset mode
  - Mechanical delay
- **Reject parameter active 1**
  - Position
  - Period
  - Reset mode
  - Mechanical delay
- **Conveying speed**
- **Detection**
- **Frequency**
  - Transmitter frequency
  - Side frequency
- **USB**
  - Software Update
  - Protocol
  - Device settings
- **System info**
  - Version info
  - Measured values
- **Clock setup**
- **Language**
- **Display**
  - Information on main view
  - Display calibration
  - Signal fade-out time
- **Restore factory settings**

Operating level QM (Quality management)

- **User Manager**
- **Password expires**
- **Password expires in (optional)**
- **Protocol**
- **Reports**
- **Detector test**
  - After power on
  - Test cycle
  - Test timeout
  - Code input required
  - Test piece learning
  - Test piece count
  - Test piece confirm
  - Metal data capture time
- **Contamination level**
  - Interval
  - Detections

## *6.3 Operating level 1*

### Detection level

Unless agreed otherwise, the detection threshold of the metal detector is factory preset to an optimum value.
The factory presets represent the best possible compromise between the maximum achievable detection
accuracy and the least possible susceptibility to interference. The data sheet sensitivities are achieved with detection level settings of between 20 and 10. Adjust the setting until your reference metal part, which you want to detect with the system, causes a signal deflection that lies above the trigger level. During subsequent operation, metal parts of the same size and larger will be separated out – but not smaller ones. If you do not have a suitable metal part, you can obtain standardised test bodies from the manufacturer.

**Please note!**
**The lower the** detection level **is set, the higher the detection sensitivity will be, but the susceptibility to false triggering will also be higher**
In order to optimise the detection threshold setting you should proceed as follows:
**1)** Convey a metal part that should only just be detected. (Standardised test bodies can be obtain from the manufacturer)

**2a) Metal detection**
Raise the detection level in small steps until the metal part is not quite detected any longer, then reduce the detection level setting by a safety margin of 10%.

**2b) No metal detection**
Lower the detection level in small steps until the metal part is only just detected, then reduce the detection level setting by a further safety margin of 10%.

### Choose product

You can choose between all parameter sets stored under **Product memory**. The product list can be sorted according to product number (1-9) or product name (A-Z).

See chapter **Adjustment→Operating level**

**2→Product memory**

### Batch number

A charge text can be entered and the charge can be started or ended here. For example, different customer orders can be recorded separately from one another in reports via the batch number.

See chapter **Adjustment→Operating level QM→Reports**

### Reject counter

The menu item **Reject counter** shows the number of metal messages issued by your metal detection device.
On operating level 2 the metal counter can be restored to zero.

Choose **Operating level 2 → Reject counter**

## Test reject unit 1 (optional)

The menu item **Test reject Unit 1** is integrated only in machines equipped with an reject unit.

On actuating the menu item a test triggering is initiated.

After the test ejection has taken place, a message appears on the display. The message informs you about the measured response times when switching the ejection mechanism on and off.

**Please note:**

- A function test of the reject mechanism must be carried out once per day
- The **Test reject Unit** function is disabled for reasons of safety if the system is in an error condition.

## Start detector test

You can start the detector test manually here. You can set the time duration (test timeout) in which you must perform the detector test and additional configurations in the detector test menu item. The detector test is ended when the detector test window is closed.

See chapter **Adjustment→Operating level QM→Detector test**

## Change password

In this menu item the password of the currently logged-in user can be changed. The current password must be entered first, and then a new one can be assigned.

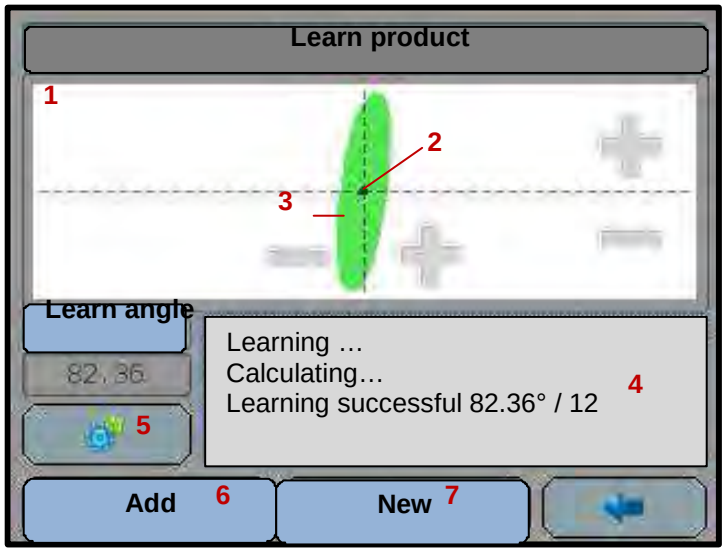
## 6.4 *Operating level 2*

### Learn Product

The learning process is necessary if when **metal-free** products are transported, the message **'metal'** occurs. The metal detector is adjusted such that the influence of the product is suppressed.

**Note!**
During the learning process only metal-free products may be transported!

**(1)** Signal processing display area: imagePHASE




New (automatic learning procedure)

The automatic learning procedure depends on the set **'Learning mode'**.
See chapter **Adjustment→Operating level 2→Learn product→Adjustment→Learning Mode**

The start takes place by pressing **'New' (7).** Convey **only** metal-free product during the test runs. During learning, the measuring signal (**2**) is recorded and the envelope of the product (**3**) is determined. The number of product passes varies depending on the product and the product properties. Depending on the selected learning mode, several product passes may be necessary in order to successfully learn the product. With dry products 3 product passes are often enough, while difficult products require more product passes.
The display (**4**) informs you that the learning process has been successfully completed.
Add (**6**) Analogous to the 'New' button (**7**), except that the previously learnt product is retained.

## 6.5 Settings (5)

Learning mode

The length of the recording phase is controlled here. The **'Trigger'** learning mode is recommended for metal detectors with product light barriers.

| | |
|---|---|
| **User** | The start and end of the recording phase is controlled via the 'New' and 'Finished' buttons. The user decides when the learning process should be ended by pressing a button. |
| **Auto** | The recording phase is started by pressing the NEW button and ends automatically upon the expiry of an adjustable time.<br>see chapter **Adjustment → Operating level 2 → Learn Product → Adjustment → Learning duration**<br>During learning it may be the case that the measuring signal (2) has to be adapted to the display window (1). The recording phase then starts again from the beginning. |
| **Trigger** | This learning mode is possible only with metal detectors with product light barriers.<br>The recording phase is started by pressing the 'New' button and ends automatically as soon as the set number of products has passed the light barrier.<br>see chapter **Adjustment → Operating level 2 → Learn Product → Adjustment → Number of products**<br>During learning it may be the case that the measuring signal (2) has to be adapted to the display window (1). The recording phase then starts again from the beginning. |

### Learning timer (optional)

This menu option is visible only in the **'Auto'** learning mode.

The duration of the recording phase (mm:ss:zzz) varies depending on the product and product properties.

The learning duration must be long enough for the product to be completely recorded. Standard: 5s

### Product quantity (optional)

This menu option is visible only in the **'Trigger'** learning mode.

The number of product passes varies depending on the product and the product properties. With dry products 3 product runs are often enough, while difficult products require more passes. Standard: 5

### Stretching Image

So that slight product fluctuations do not lead to false triggering, the envelope is slightly enlarged at the edges. It is assumed that the product fluctuations mainly take effect in the direction of the learning angle. For this reason an ellipse is used to enlarge the envelope. The small radius of the ellipse corresponds to the 'Detection level', while the large radius corresponds to the 'Detection level' multiplied by the 'Stretching Image'. The orientation of the ellipse corresponds to the learning angle. Standard: 5

See chapter **Adjustment→Operating level 1→Detection level**

-

## Product memory (Create product)

The **name**, **detection threshold**,**ejection time**, **ejection delay**, **learning angle** and **frequency** for a particular product are linked together in the **Product memory**. Changing the product therefore also results in a change of the detection threshold, ejection time, ejection delay, learning angle and frequency. The product list can be sorted according to product number (1-9) or product name (A-Z).

| | |
|---|---|
| New | Adds a new product memory on the basis of the currently selected product memory. |
| Copy | Copies the values linked with the product memory from one product memory to another. |
| Edit | Changes the name of the selected product memory. |
| Delete | Deletes the product memory selected on the left. |

## Reject counter

Select **'Reset'** in order to set the metal counter to zero

See chapter **Adjustment→Operating level 1→Reject counter**

## Reject parameters relais 1/active 1

Position (switching delay)

The number set here represents the time delay between detection of the metal part in the detector coil and output at the outputs. The metal delay can be adjusted independently of the **Reset mode**.

See chapter **Settings→Operating level 2→Reject parameters→Reset mode**

The rejection delay can be set between 0 (OFF) and 30 seconds.

In the case of pre-adjusted machines with a rotary encoder or defined speed, the position is entered in millimetres (mm).

Period

Period is the time, within which the rejection mechanism remains in the scrap rejection position once metal has been detected.

The period can be chosen from 0.1 to 30 seconds.

You can find the optimal setting, by starting with an absolutely safe period, and reducing the value step by step. The first time that the metal part is not rejected, you increase the value, adding a further safety leeway.

## 6.6 Reset mode

Depending on you application, you can reset a metal detection either **automatically** or **manually.** If no particular requests have been given by the customer, the metal detectors will be supplied with reset mode „**automatic**“.

- **Reset mode automatic:**

Time-controlled metal notification is set for automatic ejection of metal-contaminated products. You may set the delay and duration of the metal notification in the menu “**Operating level 2  Reject parameter**”

- **Reset mode manual:**

With this reset mode, you can only delay the metal signal, e.g. to remove the metal part from the opening.
The machine is restarted by resetting the metal detector at the display or with an external **reset button.**

## 6.7 Mechanical delay

This is the set time between the electrical actuation of the ejection mechanism (output at the outputs) and the ejection diverter meeting the product (ejection). Hence, the mechanical delay due to an ejection system is eliminated.

The mechanical delay can be set between 0 and 500 milliseconds (ms).

### Conveying speed

By means of exact matching to the maximum conveyor speed, external high-frequency influences on the measurement signal can be eliminated. The set value is dependent on the actual conveyor speed of the unit.
Set the maximum conveyor speed of your conveyor system as the set value.

By adjusting the minimum conveyor speed, low frequency influences on the measurement signal can be cancelled out. The set value should only be changed if the actual conveyor speed is lower than the preset value.

**Please note:**

If the maximum conveyor speed is set lower than the actual product speed, sensitivity losses will occur.

If you do not know the exact speed of your conveyor system, it is preferable to set the maximum conveyor speed higher than the actual production speed. On no account should it be set lower.
If the minimum conveyor speed is set higher than the actual product speed, sensitivity losses will occur.
If you do not know the exact speed of your conveyor system, it is preferable to set the minimum conveyor speed lower than the actual production speed. On no account should it be set higher.

### Detection

In this menu option you can activate or deactivate the metal detection and ejection procedure of the detector.

# Frequency

## Transmitter frequency

The menu item **select transmitter frequency** is only available for **Multi-mode** machines.

You can choose between two factory-pre-et frequencies, **high** and **low**.

**Attention:**
If the product exhibits a high product effect, or when conveying packaging containing aluminium, you should select a low frequency as a general rule. Analogous to this, you should select a high frequency if the product effect is low.

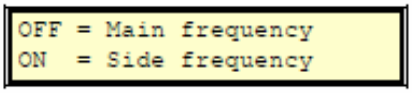
Please note, that the transmitter frequency is connected to the product (parameters).

**Difference between selecting transmitter frequency – secondary frequency:**
Using the optional transmitter frequency selector for multi mode machines, you can, depending on product characteristics, choose between the factory pre-set frequencies **high** and **low** (e.g. 62.5 kHz and 500 kHz).
The secondary frequency selector only allows the machine to switch to a secondary frequency (e.g. 63.5 kHz for 62.5 kHz main frequency). If you operate more than one metal detector in the same production environment, you should indicate this when ordering. The different main and secondary frequencies of the metal detectors can then be adjusted optimally to each other in the factory. Please note the indications for setting the secondary frequency with multi mode machines.

See chapter **Adjustment→Operating level 2→Frequency→Secondary frequency**

Side frequency

If the metal detector is exposed to strong interference in the factory-pre-set main frequency, and normal operation is impossible, you can change to a secondary frequency.




# USB

## Software Update

The current software is replaced by a new version. To do this, select the new software version on the left.
After a few minutes the device will start with the new software.

## Protocol

The evaluation electronics continuously record all occurring metal events and errors together with the date and time. You have the option to export the protocol with the help of the USB connection.

You can select via a button whether the database is to be exported as a text file (file extension .txt) or as ‘comma separated values’ (file extension .csv)

| ID | Type | Timestamp | Number | Unit | Text | Batchnumber | Productnumber | Productname | User |
|---|---|---|---|---|---|---|---|---|---|
| 1 | notice | 11.10.2012 14:46 | 901 | 1 | Device on: 2012-10-11 14:46:58 | 2012-01 | 1 | Product 1 | QM |
| 2 | notice | 11.10.2012 14:50 | 911 | 1 | Logged-in user: QM | 2012-01 | 1 | Product 1 | QM |
| 3 | notice | 11.10.2012 16:24 | 913 | 1 | Detection threshold changed from 80 to 75 | 2012-01 | 1 | Product 1 | QM |
| 4 | notice | 11.10.2012 17:02 | 900 | 1 | Metal 865 59.8° | 2012-01 | 1 | Product 1 | QM |
| 5 | notice | 11.10.2012 18:36 | 912 | 1 | Load product -> product 2 | ——— | 2 | Product 2 | QM |

## 6.8 Device settings

**Save device settings**
The settings can be saved internally or on a connected USB stick.

**Load device settings**
The settings can be restored using the internally stored files or using the files on a connected USB device.

### Systeminfo

Version info

The **software version** and further important data are displayed under
Please make a note of the information in case you need it for service enquiries:

| | Display Unit | Sensor Unit | Control Unit |
|---|---|---|---|
| **Serial number:** | | | |
| **Component:** | | | |
| **Software:** | | | |
| **Core:** | | | |

Measured values

Under the menu item **Measured values** you can call up internal parameters from the metal detection circuitry. These measured values are intended for service and diagnosis purposes.

**Sensor Unit**

| Measured value designation | Measured value | Meaning |
|---|---|---|
| TX_CHECK_SIN_A | 12.4V | Transmitter voltage A |
| TX_CHECK_SIN_B | 12.2V | Transmitter voltage B |
| TX_CHECK_LOAD | 0.51V | Transmitter load |
| +24V | 24.00V | Supply voltage +24VD |
| +15V | 15.00V | Supply voltage +15V |
| -15V | -15.00V | Supply voltage -15V |
| +3.3V | 3.3V | Supply voltage +3.3V |
| +1.2V | 1.2V | Supply voltage +1.2VA |
| +12V | 12V | Supply voltage +12V |
| -12V | -12V | Supply voltage -12V |
| Temperature SU | 40.29 °C | Internal temperature sensor (sensor unit) |
| Temperature ext | -55.00 °C | External temperature sensor (optional) |
| RX Ampl | -0.059 mV | Receiver voltage on amplitude branch |
| RX Pha | -0.004 mV | Receiver voltage on phase branch |
| signal 0.00/0.00 ° | | Signal |
| sig. angle | 0.00/0.00 ° | Signal angle |
| comp. angle | 90.00 ° | Compensation angle (learning angle) |
| noise level | 11 sample | Noise level measurement (5000 samples long) |

**Control Unit**

| Measured value designation | Measured value | Meaning |
|---|---|---|
| +24V ext | 24.00V | Supply voltage +24VD |
| +24V | 24.00V | Supply voltage +24V |
| +3.3V | 3.3V | Supply voltage +3.3V |
| +1.8V | 1.8V | Supply voltage +1.8V |
| +1.2V | 1.2V | Supply voltage +1.2VA |
| A1 cable break | 1.2V | Cable monitor |
| A2 cable break | 3.0V | Cable monitor |
| A3 cable break | 1.2V | Cable monitor |
| A4 cable break | 3.0V | Cable monitor |
| BAT Voltage | 3.0V | Battery voltage |
| Temperature CU | 40.29 °C | Internal temperature sensor (control unit) |
| Temperature ext | -55.00 °C | External temperature sensor (optional) |
| Speed [m/s] | 1.00 m/s | |

**Display Unit**

| Measured value designation | Measured value | Meaning |
|---|---|---|
| +24V | 24.00V | Supply voltage +24V |
| +10V | 10 V | Supply voltage +10V |
| +5V | 5V | Supply voltage +5V |
| +3.3V | 3.3V | Supply voltage +3.3V |
| +2.5V | 2.5V | Supply voltage +2.5V |
| +1.8V LAN CORE | 1.8V | Supply voltage LAN CORE +1.8V |
| +1.8V LAN PLL | 1.8V | Supply voltage LAN PLL +1.8V |
| +1.2V | 1.2V | Supply voltage +1.2V |
| Temperature DU | 37.00 °C | Internal temperature sensor (control unit) |

## Clock setup

You can set the **date** and **clock.** After confirming the seconds setting the **clock** starts running.

## Language

Select the language you would like for the text output on the display and confirm with **OK**.

## Display

Information on main view

| | |
|---|---|
| No view: | No display of messages and signals on the main screen |
| Messages: | Displays the last messages |
| Signal view: | Displays the measuring signal and the “detection level” |

## 6.9 *Display calibration*

Sometimes the touch screen display may not react as usual. If a button is ignored when touched, or if an adjacent button is actuated instead, the display must be recalibrated.

Several calibration points are displayed at various points on the screen. These must be touched as precisely as possible with the finger or a fine, but not pointed or sharp object. Subsequently the calibration is finished and you are taken to the main menu.

Signal fade-out time

The measuring signal is hide out slowly in accordance with the hideout time ‘Persistence’ set here.

### Restore factory setting

You can restore the factory settings of the electronic circuitry with **‘Load’**.

**CAUTION!**

Loading the factory settings will cause all previous settings to be overwritten!

## 6.10 Operating level QM

### User Manager

#### New

The Name/Access code tab is accessed via ‘New’. Enter your user name and a 4-digit access code via the keyboard. On the Rights tab, select the levels accessible to the user and whether the respective user may abort a detector test or whether he may confirm a failed detector test (Reset detector test). The user is created with ‘Save’.

See chapter **Adjustment→Operating level QM→Detector test→Code entry required**

#### Edit

Select the user and click on ‘Edit’.

#### Delete

Select the user and click on ‘Delete’.

### Password expires

If ‘yes’, each user will be requested to change his password after the expiry of the indicated number of days (standard: 42 days).

See chapter **Adjustment→Operating level QM→Password expires in**

### Password expires in (days) (optional)

This menu item is displayed only if ‘password expires’ has been confirmed with ‘yes’. The password can be valid for a period of 1 to 365 days.

See chapter **Adjustment→Operating level QM→Password expires**

### Protocol

The evaluation electronics continuously record all occurring metal events and errors together with the date and time. You have the option to export the protocol with the help of the USB connection.

You can select via a button whether the database is to be exported as a text file (file extension .txt) or as
‘comma separated values’ (file extension .csv).

*Example of a csv export:*

| ID | Type | Timestamp | Number | Unit | Text | Batchnumber | Productnumber | Productname | User |
|---|---|---|---|---|---|---|---|---|---|
| 1 | notice | 11.10.2012 14:46 | 901 | 1 | Device on: 2012-10-11 14:46:58 | 2012-01 | 1 | Product 1 | QM |
| 2 | notice | 11.10.2012 14:50 | 911 | 1 | Logged-in user: QM | 2012-01 | 1 | Product 1 | QM |
| 3 | notice | 11.10.2012 16:24 | 913 | 1 | Detection threshold changed from 80 to 75 | 2012-01 | 1 | Product 1 | QM |
| 4 | notice | 11.10.2012 17:02 | 900 | 1 | Metal 865 59.8° | 2012-01 | 1 | Product 1 | QM |
| 5 | notice | 11.10.2012 18:36 | 912 | 1 | Load product -> product 2 | ——— | 2 | Product 2 | QM |

## Reports

Under **Reports** you can filter the protocol messages **according to product, characteristic or time**.

With **Export** the current report is saved to a connected USB data storage device in the same way as in the menu item ‘Protocol’.

See chapter **Adjustment→Operating level QM→Protocol**

## Detector test

There are several options regarding when the detector test is to take place. It is possible to carry out the detector test after each system start-up and / or after the expiration of a defined time interval during production.

### Process of the detector test:

The process of the detector test after switching on is identical to the detector test during production.

The warning **„Please start detector test“** must be confirmed with **„OK“** to start the test duration. Feed one reference standard through the detector during the test period. (You can order standardised reference norms from the manufacturer.) If a metal signal is triggered, the detector is operating correctly.

If no metal signal is detected during this testing phase, or if the metal signal is outside the signal or angle tolerance range, the error message “**Detector test failed**” is displayed. Start the detector test manually to carry out additional tests.

See chapter **Adjustment→Operating level 1→Start detector test**

Please contact our service department if your metal detector does not detect the metal several times in a row.

See **Errors and Problems→Service**

After power on

You can now adjust if and when you want to perform a detector test after system start-up.

| | |
|---|---|
| max.: | 10 min. after power on (600 s) |
| Factory setting: | OFF (0 s.) |

Test cycle

Enter the time interval, when, after expiring, the detector test is to be repeated.

| | |
|---|---|
| max. test cycle: | 24 hrs. |
| Factory setting: | OFF (0 s.) |

Test timeout

In the following mask, you can set the test duration within which the detector test must be carried out.

| | |
|---|---|
| max. test duration: | 60 min. |
| Factory setting: | 5 s |

## Code input required

Code Input required specifies whether a detector test can always be aborted (OFF) or whether a login with an appropriate user is required (ON) in order to abort. The same applies to the confirmation of the timeout error message ("Detector test failed: Timeout"). This prevents a failed detector test from being reset by unauthorised persons.

See chapter **Adjustment→Operating level QM→User administration**

## Test piece learning (optional)

When 'learning', the plant waits for a test body to be introduced into the detector. After metal has been detected, the values for the test body are displayed and saved with 'OK' in order to be compared to the results of the automatic test with signal tolerance and angle tolerance activated.

It is possible by actuating the test body number to give this test body a name. After that the name of the test body will be used when requesting a test body to be placed. e.g. 'Please place ferrite'. Result: '1 ferrite: 222/63'

If no test body has been configured, the test bodies are distinguished by test body number.

| | | |
|---|---|---|
| Signal tolerance | The selected value indicates the maximum amount by which the metal signal generated by the detector may deviate from the learnt setpoint value. | OFF (0%) to 50%<br>Factory setting: OFF |
| Angle tolerance | Analogous to signal tolerance | OFF (0°) to 50°<br>Factory setting: OFF |

## Test piece count

Number of test bodies required for the detector test. (Standard: 3 test bodies)

## Test piece confirm

If this option is activated with **'YES'**, the user must confirm each placement of a test body before placing it by actuating the corresponding button 'Test body ready'; only then is the test body detection activated.

Metal data capture time

The separation mechanism can be configured so that no separation takes place during a detector test.

**CAUTION!**

If **Metal data capture time** is set to **'NO'**, then no separation takes place. This means that any metal parts present in the product stream during the test will also not be separated!

## Contamination level

Here, you can make adjustments for monitoring the contamination level of the product flow. The degree of contamination is defined by the **number of detections** per **measurement interval**. If the preset criteria have been reached in the system, warning message is issued.

See chapter **Errors and problems→Error messages and hints**

### Intervall

The adjustment in minutes and seconds is executed separately.

| | |
|---|---|
| Max. measurement interval: | 30 min. |
| Factory setting: | OFF (0 min.) |

Detections

The number of detections in the previously set measurement interval.

| | |
|---|---|
| Min. number of detections: | 2 |
| Max. number of detections: | 50 |
| Factorysetting: | 3 Detections |

# 7 Maintenance and cleaning

*Works at the device may only be carried out by trained and authorized personnel.*

## 7.1 Maintenance

### Electronics

- All electronic components are maintenance-free.

### Electrical

- Regularly check the connectors of all wires of the metal separator, as well as the wires themselves for damage of any kind.
- Damaged and defective components must be replaced.

### Detector

- Please check regularly whether all installation supports of your metal detector are still firmly attached.
- Check regularly whether all interconnecting cables and screw are firmly attached.

## 7.2 Cleaning

### General

Before cleaning your metal detector, check the permitted protection type

See chapter **Technology→Technical data**

In order to guarantee operation free of malfunctions, apart from maintenance, cleaning is also necessary in regular intervals. It is recommended to carry out maintenance and cleaning work at the same time.

Cleaning includes removing dust and dirt from all surfaces, gaps and inside the machine.

**Please note:**

- All casings must be closed.
- All covers must be fitted.
- The sensor surface must fundamentally be kept free from contamination, and in particular from metallic and conducting contaminants.
- None of the electronic cabinets and lids may be cleaned with a high-pressure cleaner.
- Work on the appliance may only be carried out by trained and authorised personnel.
- Observe the corresponding notes and product data sheets provided by the cleaning agent manufacturer for
  - use of the cleaning agents
  - disposal of the cleaning agents in accordance with regulations
  - personal protective equipment

### Display

The screen may only be cleaned with a slightly moist, soft cloth. For moistening the cloth use a screen cleaning agent, for example an antistatic foam cleaner.

- Do not use corrosive cleaning agents, chemicals, scouring agents or hard objects that could scratch or damage the screen
- Do not clean the display screen with a high-pressure cleaner!
- Do not immerse the screen in water!

Displays with an attached splash protector may be cleaned with a water jet according to the protection class.

The transparent splash protector guards the display against water that is directed towards the display.

# 8 Errors and Problems

## 8.1 General

The analysis electronics monitors all components necessary for proper functioning. If one measured parameter is outside the valid range, the malfunction is displayed as text.

Once an error message appears, the potential-free contact

**Relay 2** (standard configuration, hereinafter referred to as **standby relay**) switches at the same time.

See chapter **Technology→Plug configuration**

The machine is now in error mode.

Certain error messages do not disappear automatically once the source of the error has been remedied.

Error messages can either be acknowledged or cancelled. In both cases, the error message disappears, to change the settings of the electronics, if necessary:

If the error message is acknowledged, the machine goes back into normal mode (standby relay switches to normal mode). If the cause for the error is still present, the machine switches back into the error mode after a short period, and the error message is repeated.

If an error message is cancelled, the machine remains in error mode (standby relay remains in error mode).
After a short time period, the error message is repeated.

**Please note:** The machine switches back to normal mode only once the error has been remedied and the message acknowledged.

Notifications behave analogous to error messages, with the only difference that the machine does not switch to error mode when they appear (standby relay remains in normal mode).

## 8.2 Control unit messages

### 1-001 Notice: “Metal“

The metal detector has identified a metal part.

Once the metal part has been removed, each metal notification on the display must be acknowledged by pressing “**OK**”.

### 1-002 Error: “Reject unit: Sensor faulty“

Sensor normal position supplies a wrong signal

Check the functions of your separation device. If operating normally, the cause of the error message could also be a damaged initiator/sensor or a damaged initiator/sensor connection cable.

### 1-003 Error: “Reject unit: Separation faulty“

After separating items the separation device did not return to its normal position.

Check the functions of your separation device. If operating normally, the cause of the error message could also be a damaged initiator/sensor or a damaged initiator/sensor connection cable.

### 1-004 Error: “Reject unit: Sensor faulty“

Sensor separation position supplies a wrong signal

Check the functions of your separation device. If operating normally, the cause of the error message could also be a damaged initiator/sensor or a damaged initiator/sensor connection cable.

### 1-005 Error: “Reject unit: separation faulty“

The separation position of the separation device was not reached following a metal signal:

Check the functions of your separation device. If operating normally, the cause of the error message could also be a damaged initiator/sensor or a damaged initiator/sensor connection cable.

### 1-006 Error: “Reject unit: separation faulty“

The separation device has not reached its separating position within the required time-period after detecting metal.

Check the functions of your separation device. If operating normally, the cause of the error message could also be a damaged initiator/sensor or a damaged initiator/sensor connection cable.

### 1-007 Error: “Reject unit: separation faulty“

The separation device has not reached its initial position within the required time-period.

Check the function of your separating device. If it works normally, the cause of the error message may also be a damaged initiator or a damaged initiator/sensor connection cable. Check the initiator/sensor function and, if need be, check the cable connection of the initiator/sensor.

## 1-008 Notice: “Test Reject: Activation position sensor, activation time [ms]”

After the test separation has taken place, a message appears on the display. The message informs you about the measured activation time of the separation diverter.

## 1-009 Notice: “Test Reject: Reset position sensor %s, reset time [ms]”

After the test separation has taken place, a message appears on the display. The message informs you about
the measured reset time of the separation diverter.

## 1-010 Error: “Reject unit: Collecting container full”

The collector bin for ejected material is full.

**Empty the collector bin and confirm the notification by pressing the “OK” key. The Cumulative reject time is re-set automatically.**

**Please note:**
**If the collector bin is not yet full, or its contents have already spilled over, the Cumulative reject time setting is incorrect.**

## 1-011 Error: “Pressure monitoring”

There is not enough pressure in order to operate the separation device.

Check the pressurized-air supply.

**Note!**
This error message appears even it the plant is optionally equipped with a compressed air shutoff valve and is shut off (also during emergency shutdown).

## 1-012 Error: “Product jam or check light barrier”

Check the function of the light barrier.

## 1-013 Error: “Encoder monitoring”

No signal from the rotary encoder. Check the function of the rotary encoder.

## 1-014 Error: “Contamination level”

When checking the contamination degree of a product flow, a warning is sent when the set criteria are reached (number of metal occurrences per time interval).

## 1-015 Error: “Reject unit: rejection failure”

Check the function of your separation unit.

## 1-016 Error: “Reject unit: no reject unit configured”

Please configure a switching output as a reject unit. Contact the service department.

If the message is ignored and no switching output is changed to a separation unit, no separations will be counted (menu item: reject counter). The display is limited to 5 messages (power-on procedures).

See chapter **Adjustment→Operating level 1→Reject counter**

## 1-017 – 1-018: “Reserved”

## 1-019 Error: “System monitoring: 24 V external voltage”

The voltage is not within the tolerance range. Contact the service department.

## 1-020 Error: “System monitoring: 24 V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 1-021 Error: “System monitoring: 5 V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 1-022 Error: “System monitoring: 3.3V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 1-023 Error: “System monitoring: 1.8V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 1-024 Error: “System monitoring: 1.2V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 1-025 Warning: “System monitoring: Battery voltage too low”

The battery voltage is too low. The battery must be replaced.

## 1-026 Warning: “mesuNET: No connection to the server”

The log data (mesuNET) buffered on the unit concerned exceeds a size of 3 KB (approx. 40 messages).

Check the Link0 LED. Check the connection.

## 1-027 Error: “mesuNET: No connection to server – loss of data”

The log data (mesuNET) buffered on the unit concerned exceeds a size of 100 KB (approx. 1300 messages).
In this case no further data will be buffered.

Check the Link0 LED. Check the connection.

## 8.3 Sensor unit messages

### 2-001 Error: “System monitoring: Transmitter overloaded”

The power stage of the transmitter is overloaded.

Examine the transmitter cable for short-circuits and check the connections and contacts in the transmitter connection box.

### 2-002 Error: “System monitoring: Transmitter disconnected”

The power stage of the transmitter is not loaded.

Examine the transmitter cable for short-circuits and check the connections and contacts in the transmitter connection box.

### 2-003 Error: “System monitoring: 24VD voltage”

The voltage is not within the tolerance range. Contact the service department.

### 2-004 Error: “System monitoring: +15V voltage”

The voltage is not within the tolerance range. Contact the service department.

### 2-005 Error: “System monitoring: -15V voltage”

The voltage is not within the tolerance range. Contact the service department.

### 2-006 Error: “System monitoring: 3.3VA voltage”

The voltage is not within the tolerance range. Contact the service department.

### 2-007 Error: “System monitoring: 1.2VD voltage”

The voltage is not within the tolerance range. Contact the service department.

### 2-008 Error: “System monitoring: +8V voltage”

The voltage is not within the tolerance range. Contact the service department.

### 2-009 Error: “System monitoring: -8V voltage”

The voltage is not within the tolerance range. Contact the service department.

### 2-010 Error: “System monitoring: +12V voltage”

The voltage is not within the tolerance range. Contact the service department.

### 2-011 Error: “System monitoring: -12V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 2-012 Error: “System monitoring: receiver voltage too high”

The receiver voltage lies outside the tolerances. Is there a large metal part in or immediately in front of the detector coil.

Check the connections and contacts in the receiver terminal box.

## 2-013 Error: “System monitoring: Max board temperature reached”

The temperature of the circuitry is too high. Check the fan or the ambient temperature.

## 2-014 Warning: “Detection inactive”

The metal detection and ejection procedure of the detector has been deactivated.

## 2-015 Notice: “Detection active”

The metal detection and ejection procedure of the detector has been activated.

## 2-016 Warning: “mesuNET: no connection to the server”

The log data (mesuNET) buffered on the unit concerned exceeds a size of 3 KB (approx. 40 messages).

Check the Link0 and Link1 LEDs. Check the connection.

## 2-017 Error: “mesuNET: no connection to server – loss of data”

The log data (mesuNET) buffered on the unit concerned exceeds a size of 100 KB (approx. 1300 messages).

In this case no further data will be buffered.

Check the Link0 and Link1 LEDs. Check the connection.

## 2-018 Error: “Error while calculation”

Please learn the product again.

## 3-001 Error: “No connection to control unit”

Check the Link2 LED. Check the cable connection.

## 3-002 Error: “No connection to sensor unit”

Check the Link1 LED. Check the cable connection.

## 3-003 Error: “No connection for signal tracer”

Check the Link1 LED. Check the cable connection.

## 3-004 Error: ”System monitoring: 24V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 3-005 Error: “System monitoring: 10V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 3-006 Error: “System monitoring: 5V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 3-007 Error: “System monitoring: 3.3V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 3-008 Error: “System monitoring: 2.5V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 3-009 Error: “System monitoring: 1.8V voltage Lan Core”

The voltage is not within the tolerance range. Contact the service department.

## 3-010 Error: “System monitoring: 1.8V voltage Lan Pll”

The voltage is not within the tolerance range. Contact the service department.

## 3-011 Error: “System monitoring: 1.2V voltage”

The voltage is not within the tolerance range. Contact the service department.

## 3-012: reserved

## 3-013 Warning: “mesuNET: No connection to the server”

The log data (mesuNET) buffered on the unit concerned exceeds a size of 3 KB (approx. 40 messages).

Check the Link0 -LED. Check the connection.

## 3-014 Error: “mesuNET: No connection to the server –loss of data“

The log data (mesuNET) buffered on the unit concerned exceeds a size of 100 KB (approx. 1300 messages). In this case no further data will be buffered.

Check the Link0 -LED. Check the connection.

## 3-015 Error: “Detector test failed: timeout”

**No** metal signal was detected over the duration of the detector test.

See chapter **Adjustment→Operating level QM→Detector test**

## 3-016 Error: “Detector test failed: Tolerance”

This message appears if the result of the comparison of the determined test body and the learned test body (with assigned tolerances) is negative.

## 3-017 Warning: “Password expired”

Please assign a new password.

See chapter **Adjustment→Operating level 1→Change password**

## 3-018 Notice: “Protocol size near maximum”

The size of the log database exceeds 19500 entries. Please backup and delete logs. The log database is limited to 20000 entries.

See chapter **Settings→Operating level QM→Protocol**

## 3-019 Warning: “Protocol size at maximum”

The size of the log database has reached 20000. 1000 old entries will be deleted.
The log database is limited to 20000 entries.

See chapter **Settings →Operating level QM →Protocol**

## 8.4 *Mains supply*

If the display no longer lights up, you should check the mains voltage LED on the PCB (see picture below).

Net-LED / Main supply-LED dark?

**1. Step: Check the mains supply!**

Range of the mains supply:

Continuously: 100 to 240 V AC
50 / 60 Hz

Power protection: max.10 A

*Customized version:*

*Operating voltage:20 to 36V DC*

**2. Step: Check the device fuse!**

In order to protect the evaluation electronics a time-lag 1.25 A fuse has to be used.

- Fuse o.k.

  Mains supply not o.k.
  *Measures:*
  - Check the voltage actually connected to the **mains supply**. Does the voltage meet the requirements?
  - Contact our service department

  see chapter **Errors and problems Service**

- Fuse defective

  Replace the device fuse with a spare fuse located on the electronics board. (1.25 A, 5x20 mm according to DIN)

1. Main supply LED
2. Device fuse, 1.25 A, 5x20 mm according to DIN
3. Spare time-lag fuse, 1.25 A, 5x20 mm according to DIN, internal

## *8.5 Service*

Our trained personnel will be glad to help you removing errors and problem at your metal detector. Please find the contact person responsible for you on the type plate on the seeker head. The type plate is on the backside of the electronic control box cover and on the outside of the metal detector.
Before contacting our service department, please fill-in the following form thoroughly. This will help our service technicians to find the error.

# 9 Technology



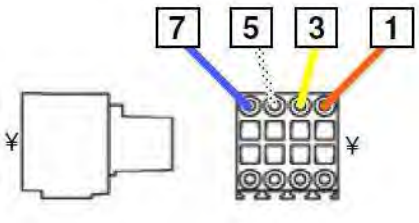
## 9.1 Technical data

| | |
|---|---|
| | 100 to 240 V AC<br>50 or 60Hz |
| **Operating voltage:** | *20 to 36 V DC* |
| *Special version:* | max. 75 W |
| **Power consumption:** | |
| **Device fuse:** | 1,25 A time-lag, 5x20 mm according to DIN |
| **Mains protection:** | max. 10 A |
| **Protective system:** | IP 54<br>Coil-CI at IP 66 |
| **Temperature range:** | |
| Operating: | -10° to +50° C |
| Storage/Transportation: | -10° to +60° C |
| **Humidity:** | up to 100 % without condensation water |
| **Ejection time:** | adjustable from 0,1 s to 30 s |
| **Mains connection:** | ca. 1,8 m cable with safety plug<br>(US-version with US-standard plug) |
| **Lacquering:** | Structural lacquer RAL 3027 or customized lacquer (as desired)<br>Stainless Steel version, sand-blasted |
| **Material:** | |
| Electronics casing box: | Steel sheet 1,5 mm painted,<br>(optional Stainless Steel polished, grain 240),<br>Stainless steel version, sand-blasted<br>Weight incl. Electronics ca. 6 kg |

## 9.2 *Plug configuration*

### Ethernet interface for networking

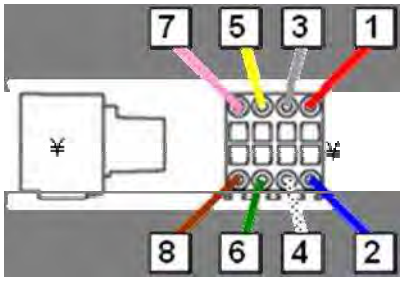
Connection to customer network (e.g. mesuNET)
Industrial Ethernet, M12, 4 pole, D-coded




| Pin | signal | Colour code |
|---|---|---|
| 1 | TX- | orange |
| 3 | TX+ | yellow |
| 5 | RX- | white |
| 7 | RX+ | blue |

### Connection Sensor Unit

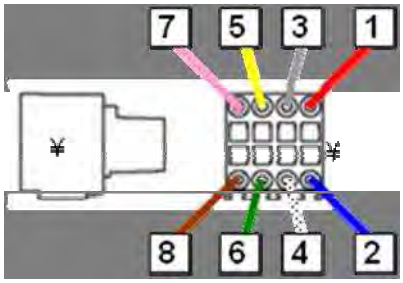
Only for separate sensor and control unit.




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

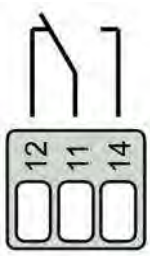
### Connection Display-Unit

Used by the factory.




| Pin | signal | Colour code |
|---|---|---|
| 1 | TX- | red |
| 2 | GND | blue |
| 3 | TX+ | green |
| 4 | GND | white |
| 5 | RX- | yellow |
| 6 | 24V | green |
| 7 | RX+ | pink |
| 8 | 24V | brown |

## Relay 1 (switches when metal is detected)



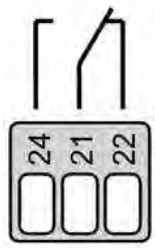

Contacts 12, 11, 14

Potential-free changeover

Dead state: Contacts 11 and 12 closed

Contact load: U~ 250V Imax 3A

## Relay 2 (switches when an error is detected)




Contacts 24, 21, 22

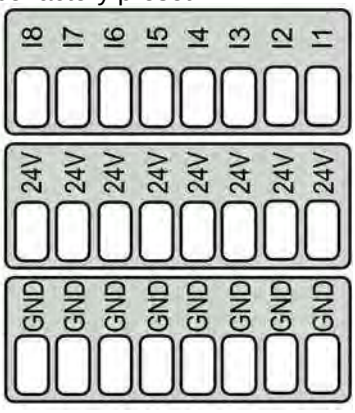
Potential-free changeover

Dead state: Contacts 21 and 22 closed

Contact load: U~ 250V Imax 3A

## Switching inputs / switching outputs

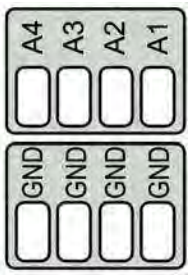
User-specific inputs are configured via the switching inputs and user-specific outputs are configured via the switching outputs. Depending on the application, different switching inputs / switching outputs can be factory preset.




24V DC Switching inputs (Standard configuration)

| | |
|---|---|
| **I1** | Initiator normal position (Ejection mechanism 1) |
| **I2** | Shaft encoder (speed measurement) |
| **I3** | Compressed air monitor ( Pressure monitoring ) |
| **I4** | Trigger – light barrier (In) |
| **I5** | Initiator reject position (Separation unit 1) |
| **I6** | Separation unit 1 test |
| **I7** | Reset-callipers ( external ) |
| **I8** | MD Offline |

24V DC Switch exits (Standard configuration)



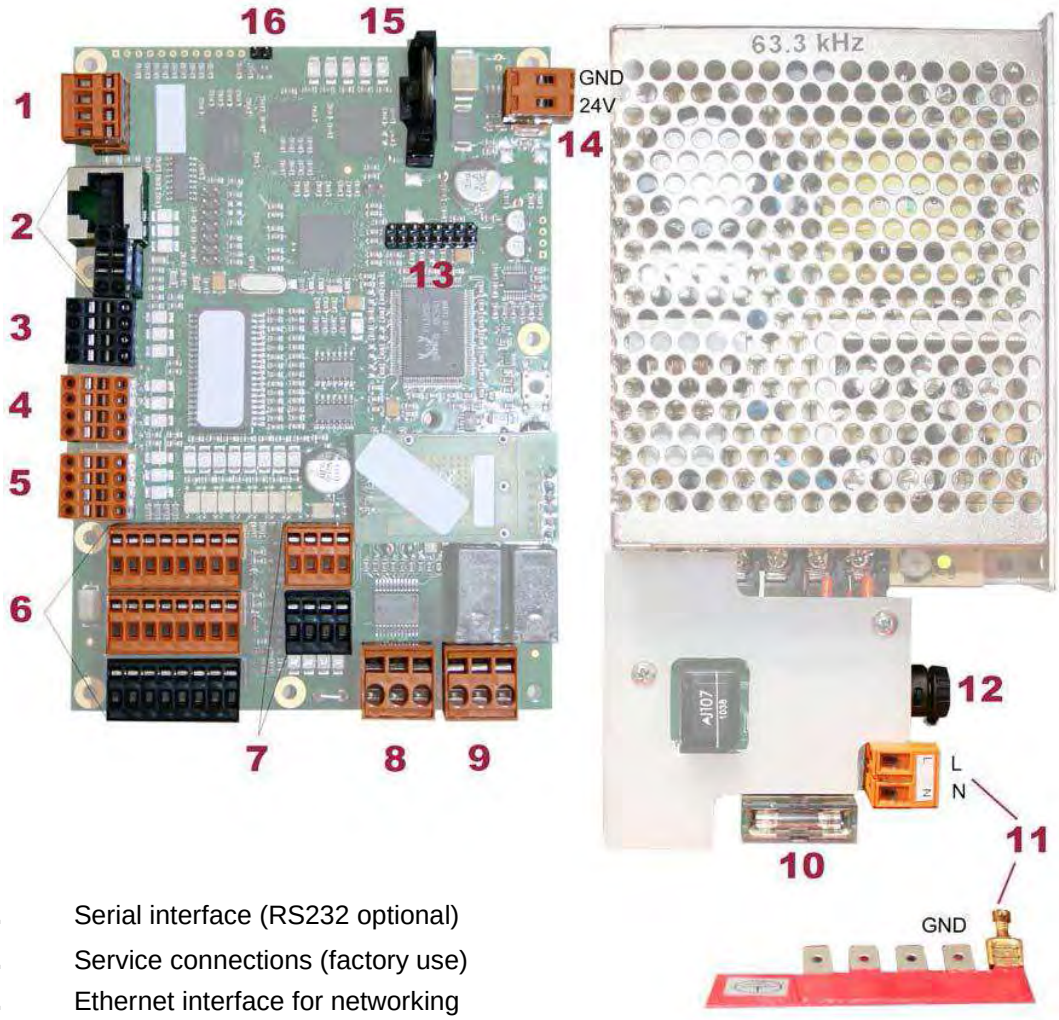

| | |
|---|---|
| **A1** | Magnetic valve(Ejection mechanism) |
| **A2** | Ready (device ready, 24 V DC) |
| **A3** | free |
| **A4** | free |

**Max. total current load of all inputs and outputs ≤ 300mA !**

## 9.3 *Key plan*

### Electronics in the electronic housing

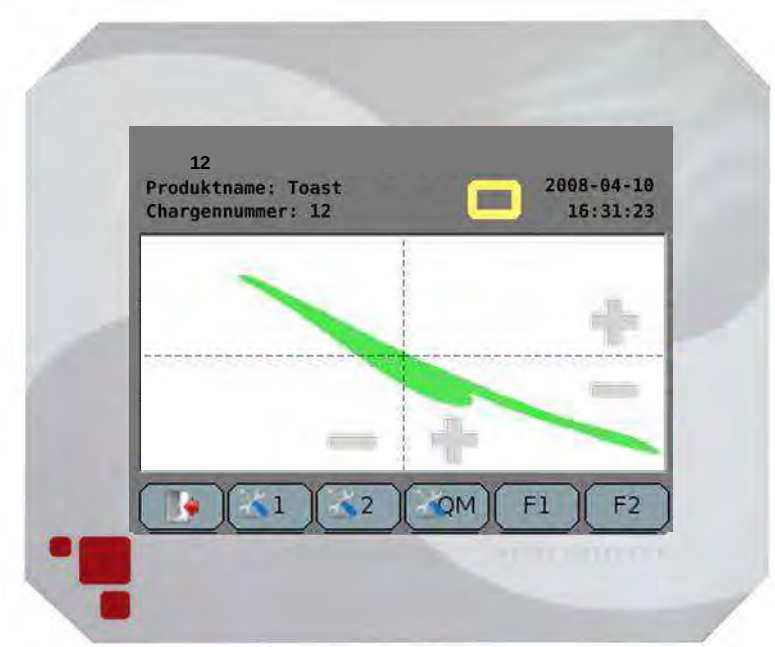
**Control Unit** **Power Unit**



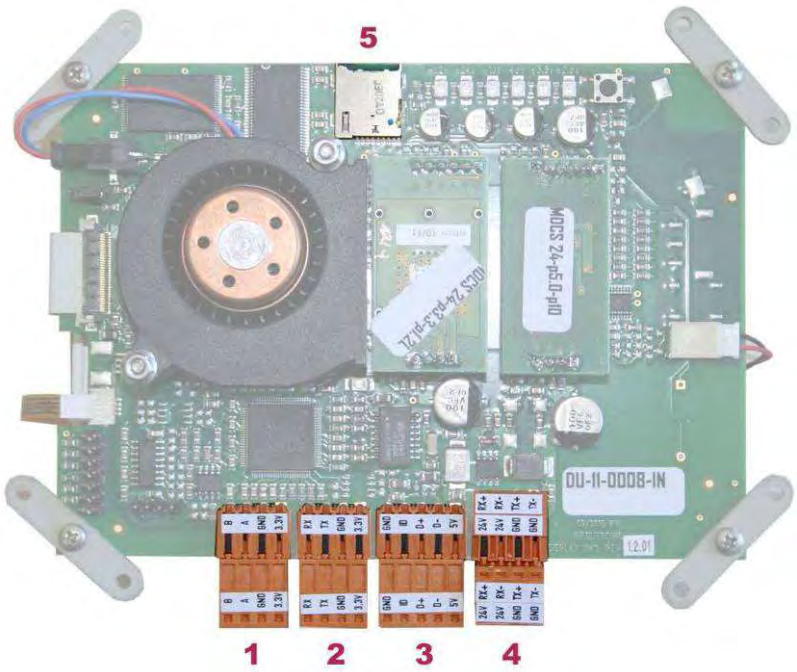

1. Serial interface (RS232 optional)
2. Service connections (factory use)
3. Ethernet interface for networking (e.g. mesuNET)
4. Sensor unit connection (only in case of separate sensor and control unit)
5. Display unit connection
6. 24 V DC inputs
7. 24 V DC active outputs
8. Relay 2 (switches by default on error)
9. Relay 1 (switches by default when metal is detected)
10. Spare time-lag fuse 1.25 A, 5x20 mm according to DIN
11. Mains supply
12. Device time-lag fuse 1.25 A, 5x20 mm according to DIN
13. Extension plug
14. 24V DC Mains supply
15. Battery
16. Connection temperature sensor, external

## Touch Screen Display

Front




Back




1. Serial interface (RS 485)
2. Serial interface (RS 232)
3. Connector USB
4. Control unit connector
5. micro-SD card reader

# *10* Spare parts

## *10.1 Danger due to non-original spare parts!*

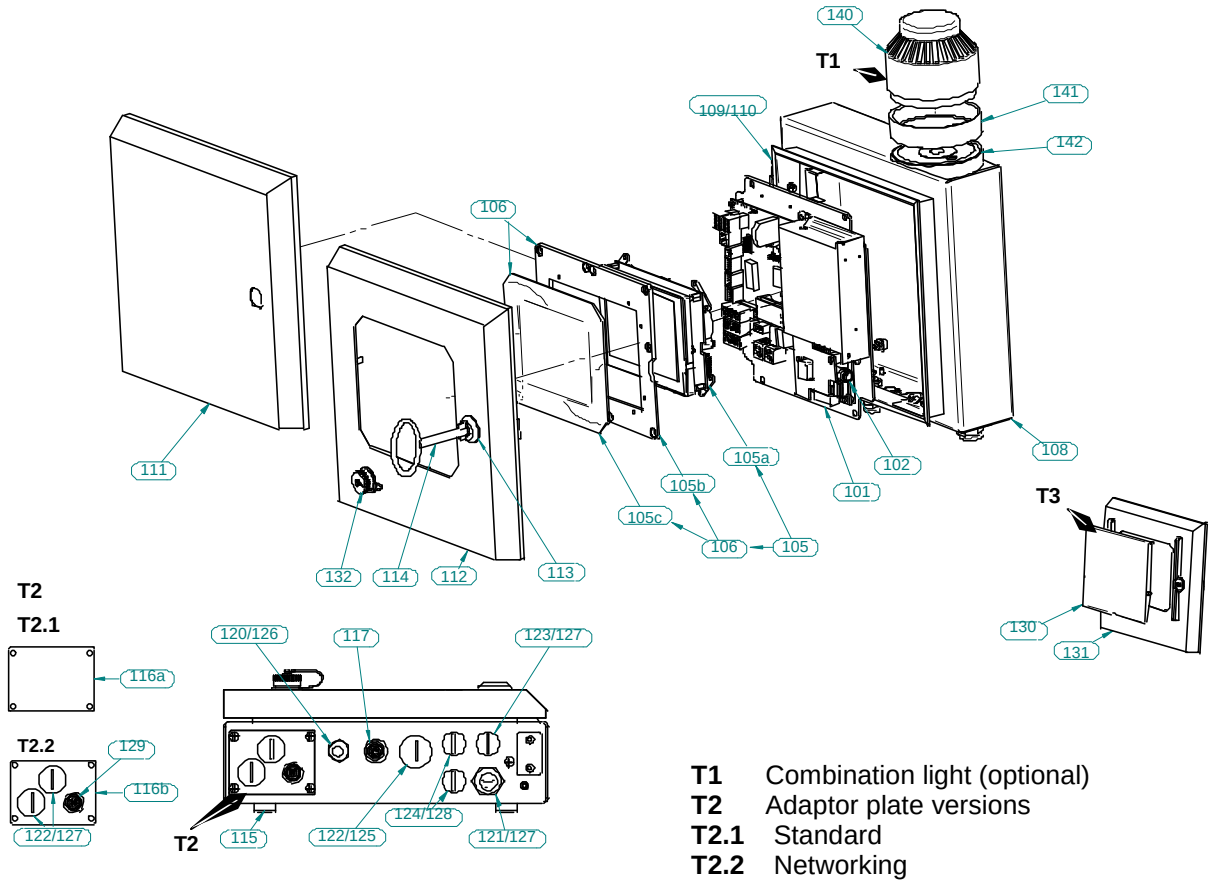
- **All wearing parts are excluded from the warranty (i.e. moved parts and/or parts in contact with the product)!**
- **Only original spare parts made by the manufacturer may be used.**
- **The warranty will become null and void in the case of non-compliance!**

Wrong or faulty spare parts can lead to damage, malfunctions or total failure and can impair safety (danger of injury).

Please note that various spare parts are specially manufactured for a specific customer or machine and therefore have a longer delivery time.

Spare parts can be obtained through agencies or directly from the metal detector manufacturer.

## *10.2 Electronics housing AMD07*



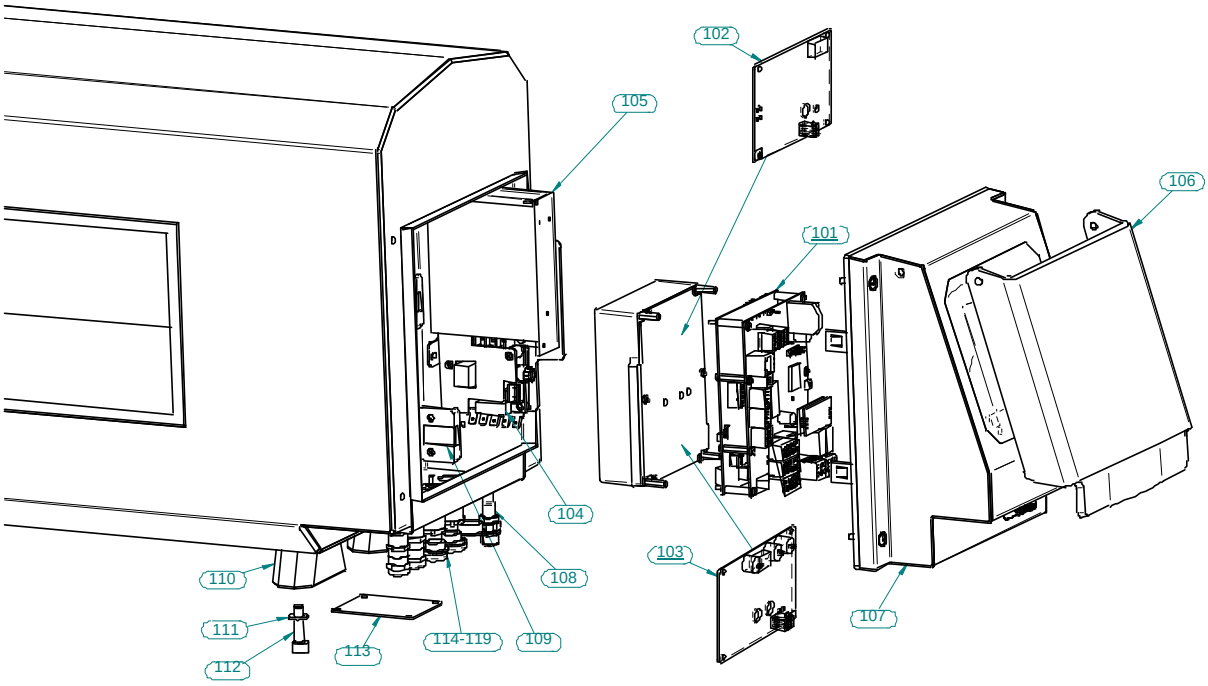

**T1** Combination light (optional)
**T2** Adaptor plate versions
**T2.1** Standard
**T2.2** Networking
**T3** Splash guard, stainless steel or clear PC (optional)

| Ref.-No. | Spare part | Item.-No | Comment |
|---|---|---|---|
| 101 | Control unit with power unit on mounting plate | 351035 | State serial number |
| 102 | Spare fuse 1,25A slow, 5x20 mm acc. DIN | 200616 | |
| 105 | Display unit (complete)[1)] | 351091 | State serial number |
| 105a | Display unit on PCB (circuit board) | 400129 | State serial number |
| 105b | Baseplate forfoil[1)] | 260760 | |
| 105c | Foil for Display-Unit[1)] | 303807 | |
| 106 | Foil for Display-Unit on baseplate (complete)[1)] | 351073 | |
| 108a | Cover bottom, (painted) | 250649 | State colour |
| 108b | Cover bottom (Stainless Steel) | 250650 | |
| 109a | Hinge with hinge pin, zinc. | 301532 | |
| 109b | Hinge with hinge pin, Stainless Steel | 301824 | |
| 110 | Fixing disc (Stainless Steel) | 301530 | |
| 111a | Cover closed (painted) | 250817 | State colour |
| 111b | Cover closed (Stainless Steel) | 250818 | |
| 112a | Lid for Display-Unit (painted and assembled) | * | not shown |
| 112b | Lid for Display-Unit (painted) | * | State colour |
| 112c | Lid for Display-Unit (Stainless Steel) und assembled) | 351095 | not show |
| 112d | Lid for Display-Unit (Stainless Steel | 260503 | |
| 113 | Closure with locking latch, black | 301536 | |
| 114 | Two-Way-Key | 300152 | |
| 115 | Insulating socket M 5 (1 set = 4 pieces) | 350241 | |
| 116a | Adapting plate "Standard" with seal | 350247 | |
| 116b | Adapting plate with seal | 260052/301571 | |
| 117 | Built-in socket M12, 8-pin A-coded | 200624 | |
| 120 | Screwed cable gland EMV M 16 x 1,5 brass Clamping area 5-9mm | 301653 | |
| 121 | Screwed cable gland M 20 x 1,5 polyamide Clamping area 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 | Counter nut M 25 x 1,5 polyamide | 300 614 | |
| 126 | Counter nut EMV M 20 x 1,5 brass | 301655 | |
| 127 | Counter nut M 20 x 1,5 polyamide | 300613 | |
| 128 | Counter nut M 16 x 1,5 polyamide | 300612 | |
| 129 | Built-in socket M12, 4-pin D-coded | 200625 | |
| 130a | Splash protection cover PC | 350311 | |
| 130b | Splash protection cover, Stainless Steel | 350676 | |
| 131 | Cover for splash protection | * | |
| 132 | USB Socket (complete) | 351114 | |
| 140 | Combination light | 200155 | State serial number |
| 141 | Base (low) for combination light | 200159 | |
| 142 | Holder for combination light | 380113 | |

*** When spare parts are requested, please state serial number, acknowledgement number and detector type!!!**

1) **Warning: Changing the membrane front plate is very complicated. Please contact our customer service.**

## *10.3 CI-Coil BA 24 with AMD07*

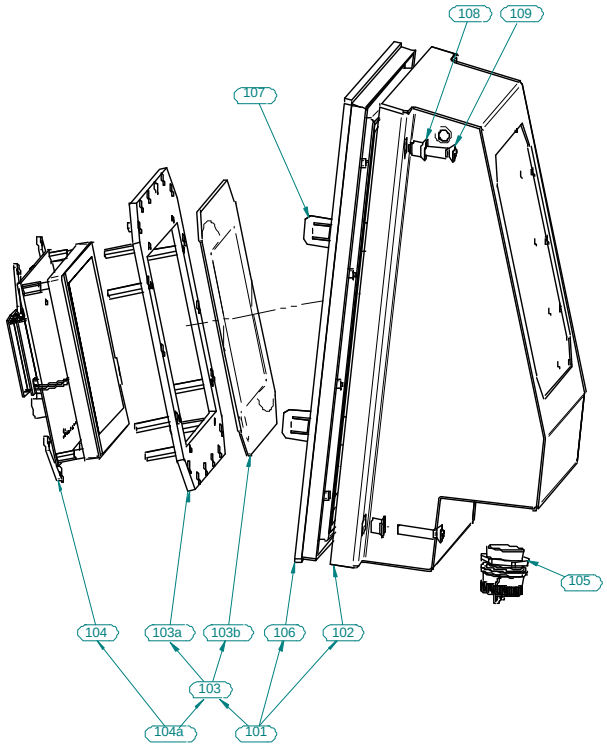



| Ref.-No. | Spare part | Item.-No | Comment |
|---|---|---|---|
| 101 | Sensor and control unit | 350886 | State the detector serial no |
| 102 | TX unit | 400115 | State the detector serial no |
| 103 | RXunit [1)] | 400116 | State the detector serial no |
| 104 | Spare fuse 315mA slow, 5x20 mm acc. DIN | 200616 | |
| 105 | Power-Unit (complete). | 350885 | |
| 106 | Protective cover | 351108 | |
| 107 | Display-Unit (complete) | 350888 | See drawing XXX 350888 E |
| 108 | M12 Socket 4-pol. D-coded (Service-interface) | 200626 | State the detector serial no |
| 109 | Hinge retainer | 303368 | |
| 110 | Detectorfoot | 301714 | |
| 111 | Washer DIN 125 – A 8,4 - Stainless Steel | 301290 | |
| 112 | Cylinder screw DIN 912 – M8x30-Stainless Steel | 301718 | |
| 113 | Adapting plate, Standard" with seal | 350247 | |
| 114 | Screwed cable gland M16 x 1,5 | 300609 | Polyamide |
| 115 | Screwed cable gland M20 x 1,5 | 301306 | Polyamide |
| 116 | Screw plug M16 x 1,5 | 301018 | Polyamide |
| 117 | Screw plug M20 x 1,5 | 300984 | Polyamide |
| 118 | Counter nut M16 x 1,5 | 300612 | Polyamide |
| 119 | Counter nut M20 x 1,5 | 300613 | Polyamide |

1) **Exchange only after consulting the Service Dept.**

*** * When spare parts are requested, please state serial number, acknowledgement number and detector type!!!**

## *10.4 Display cover for Display Unit*

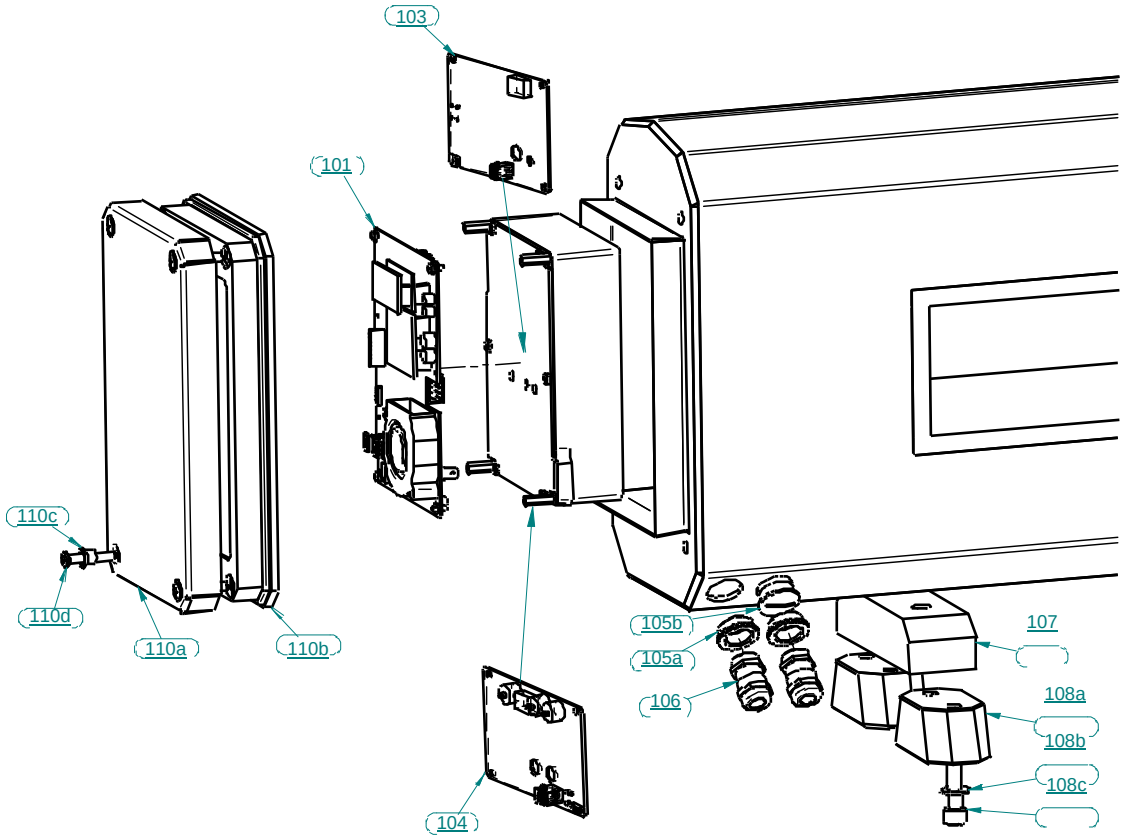



| Ref.-No. | Spare part | Item.-No | Comment |
|---|---|---|---|
| 101 | Cover (Consists of item 102 and mounted items 106 and 103) | 351093 | State serial number |
| 102 | Cover (with plastic insert) | 351092 | |
| 103 | Display unit retaining frame (complete)[1)] | 351098 | |
| 103a | Display unit retaining frame[1)] | 260742 | |
| 103b | Front membrane for display unit[1)] | 303807 | |
| 104 | Display-Unit | 400129 | State serial number |
| 104a | Display unit with holding frame and membrane front panel[1)] | 351094 | |
| 105 | USB Socket (complete) | 351114 | |
| 106 | Seal[1)] | 303601 | |
| 107 | Hinge | 301722 | |
| 108 | Sealing insert | 302637 | |

*** When spare parts are requested, please state serial number, acknowledgement number and detector type!!!**

1) **Warning:** Changing the membrane front plate is very complicated. Please contact our customer service.

## *10.5 SlimLine / C- Coil AMD07*




| Ref.-No. | Spare part | Item.-No | Comment |
|---|---|---|---|
| 101 | Sensor-Unit | * | State serial number |
| 103 | TX unit | * | State serial number |
| 104 | RXunit[1)] | * | State serial number |
| 105a | Reducer M20x1,5 to M16x1,5 | 301687 | |
| 105b | Blanking plug M20 x 1,5 - MS | 300616 | |
| 106 | Screwed cable gland M 16 x 1,5 - MS (EMV) | 301653 | |
| 107 | Retaining strip for SlimLine | 380157 | |
| 108a | Coil base for C Coil | 301714 | |
| 108b | Washer DIN 125 – A 8,4 VA | 301290 | |
| 108c | Cylinder screw DIN 912 M8x30 - VA | 301718 | |
| 110 | Cover (complete) | 350870 | |
| 110a | Cover | 260509 | |
| 110b | Seal | 303438 | |
| 110c | Sealing insert M5 | 302637 | |
| 110d | Raised countersunk head screw with cross slot M5x30 A2 | 303564 | |

1) **Exchange only after consulting the Service Dept.**

*** When spare parts are requested, please state serial number, acknowledgement number and detector type!!!**

# 11 Appendix

## 11.1 Access codes

**Please keep this number in a safe place and do not give it to unauthorized persons!**

These access codes are preset in the factory for the users:

| | |
|---|---|
| **QM** | **2077** |
| **User** | **2314** |