The final outlook of the units depends on the different features we offer.
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2 General

2.1 Instructions for Use of this Manual

This manual applies to MESEP® VA digital50/70

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Edition: October 2004, v. 1.2

This manual contains all information required for operation of the equipment.

Prior to the first use of the metal detector, this manual must have been read and understood by all people working at or with the metal separator. Particular attention has to be paid to the Safety Instructions.

The users manual is part of the metal separator and has to be kept in such a way that is always accessible to the authorized personnel. In no case, parts of this manual may be removed. A missing manual or parts of it, especially the section on safety instructions, must be replaced immediately.
Notice:

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2.2 General Safety Instructions

2.2.1 Explanation of the Symbols Used

The following safety symbols are used in this manual. They are to direct the readers attention to the accompanying text.

Danger!

This symbol indicates danger for life and health, or that an important technical fact has to be taken into consideration.

Danger!

This symbol indicates danger for life and health due to electrical voltage.
2.2.1 Basic Safety Measures

- Do not put your hand into the openings of the metal separator. Mechanical forces which may cause heavy injuries occur on switching of the pneumatic gate.

- Prior to any maintenance works, disconnect the equipment from compressed air and power. Make sure that nobody can reconnect compressed air and power during the maintenance works.

- Never put the metal separator into operation without the supplied safety devices. This is of particular significance for the protective grid above the movable components.

- Instantly shut-off the equipment if safety devices are not functioning properly or are damaged.

- In case of failures due to wearing or ageing, their reasons have to be eliminated immediately.

- Schedule sufficient regular maintenance intervals.

- Always observe the safety instructions fixed to the equipment. They help to avoid hazards. In no case, these instructions may be removed.

- Do not put the metal separator into operation if
- not having received complete instruction by the owner,
- you have not studied this manual completely,
- have not understood this manual completely
- Errors in operation may lead to serious damage of health and property.

Danger!

Avoid touching the electronic p. c. board

Prior to wiring the electronic with peripheral equipment, disconnect the unit from compressed air and power supply. This will help you to avoid short circuits.

Static charges must be discharged before starting working.
3 Application and Qualification

3.1 Use for Intended Purpose

The MESEP® VA digital removes metallic contaminations from bulk materials. These materials, for example, can be plastic granules, dry powder, rice or similar products from different industries.

Free-fall metal separation:

The unit is integrated in the existing conveying system. To guarantee reliable separation, the material must not be dropped into the device from a height of more than 600 mm.

During the separation process, it happens that also a minor quantity of the good material is discharged.

To guarantee the units reliable work, a number a secondary and operating conditions have to be observed. This manual deals with those subjects. That is the reason why it is strictly required to study this manual to guarantee perfect and reliable operation.

Metal separators are used everywhere where metallic contamination must be removed from freely falling bulk materials in the product flow. With high sensitivity and reliability, our type 8217 metal separators react to and separate metals like

steel / high-grade steel
iron
aluminium
copper
zinc
brass
nonmagnetic precious metals

Material-coated metallic particles are detected safely separated, as well.

This results in a wide application range for the most different industries:

plastics industry
foodstuff industry
animal feed industry
pharmaceutical industry
semi-finished and finished products industries

etc.

The 8217 type metal separators are used amongst others at places where long equipment running times are required. The high sensitivity of the separators guarantees shortest possible machine downtimes and metal-free final products according to nominal sensitivity. Especially there where the final products cost effectiveness comes from the quantity, the unit pays for itself within short time.

3.2 Examples of Application

Metal separators are used

- at the end of a cyclone separator
- at the end of a downpipe
- at the outlet of a granulating crusher
- at all material dumping places
- as a portable equipment to feed multiple machines (only one unit for more than one machine)

3.3 Operating Principle

The material to be checked flow from a unit hopper, a flanged pipeline or a feeder into the metal separator. The separator includes metal detecting coil, followed by the sorting gate. The sorting gate includes a pneumatic valve.

As long as metallic particles are not detected, the material flows almost vertically through the separator via the OK duct for further processing (fig. 1).

If the ring sensor detects metal, the valve in the sorting gate changes to the NOT OK duct and separates in this way the contaminated material from the good one. The separating time is adjustable (potentiometer on the electronic circuit board) from 200 milliseconds to one second, depending on the metallic participle portion and the flow speed of the material.

3.3 Misuse

It is a misuse to use the MESEP© digital metal separator for other purposes than described in section 3. Especially, the following is prohibited:

- modifying or removing of the metal separators safety devices
- using the metal separator for unapproved purposes
3.4 Owners Duty of Care

The MESEP© digital metal separator was designed and produced according to harmonized digitals. It is in accordance with the latest state of technology, and it provided maximum safety. However, during operation this safety can only be achieved if all required measures had been taken. It is within the owners duty of care to determine these measures, and to check their implementation.

- In particular, the owner must guarantee the following:
  - the metal separator must only be used for its intended purpose (refer to 3.1, APPLICATION AND QUALIFICATION)
  - the metal separator may only be used in properly functioning condition, and particularly its safety devices must be checked regularly for functioning,
  - the operating manual must always be available in legible and complete condition,
  - operation, maintenance and repairs are only be carried out by qualified and authorized personnel,
  - prior to the first putting into operation and then in regular intervals, the personnel must be instructed about labour safety and environmental protection, and has to know this manual and the safety instruction contained therein.
  - all safety and warning instructions fixed to the equipment may not be removed and must be kept in clearly legible condition.

3.5 Function

This section informs about design and function of the metal separator.

The MESEP digital consists of three functional sections:
- keypad (refer to chapter 5.1)
- ring detector with transmitter and receiver coils
- a pneumatic operating separating drum (refer to chapter 5.3)

3.5.1 Keypad

The keypad is at the outer side of the blue control box. By means of it, disturbances are indicated by LEDs, and the sensitivity setup is shown. All important settings are made by key-pressing. The keypad includes among others four vertically arranged LEDs which show the following operation states.

- Green LED OPERATION
the MESEP digital works without problems.

- **Red LED „VALVE FAULT“**

After the last metal detection the separating drum did not reach the end position. The MESEP digital can not separate the detected material. As soon as the separating drum switches perfect again after a further metal detection, the error report goes out automatically.

**Elimination of “VALVE FAULT“**

- Put the reset key
- Check the compressed air supply and compressed air height
- Check separating drum on swinging

- **Red LED RING FAULT**

Indicates a fault of ring coil or evaluation electronics. After elimination of the fault, the LED goes out automatically, and the device is ready for operation again.

**Elimination of “RING FAULT”**

- Remove power conducting matters being trapped in the ring coil.
- Check electrical connections of the circuit board.
- Inspect the metal separator visually.
- Press the reset key.

- **Red LED PRESSURE FAULT**

Indicates a fault of the compressed-air supply. This is an extended function and not implemented in the basic variant.

**Elimination of PRESSURE FAULT**

- Check the compressed-air supply.
Notice: A part of the inscription of the keypad is exchangeable. Cautiously use tweezers to find the small gap at the right side of the keypad. Widen the gap a little and remove the label.

Every unit comes with labels in German, English and French. The unit is supplied with labels in German. The labels in other languages are in the operating manual.

3.5.2 Key Functions

The MESEP digital is set up by four keys. It is not required to adjust potentiometers. Therefore, putting the unit into operation is very simple.

The key functions are as follows:

**TEST**

- Short manipulation effects metal indication. The separating drum switches brief into the ejection position. The function serves to test the metal separator by key-pressing. At the same time, the four LEDs show the currently selected sensitivity value as a LED combination.

- Do holding the key. The separating drum switches into the ejection position as long as the key is being pressed. This enables taking of material samples from the conveying flow. In this way, discharge of a dosing unit or mixer mounted on the metal separator can be performed by key pressing.

**F1+**

Short manipulation shows the currently selected sensitivities for 5 sec. (refer to sensitivity table, chapter 5.2). Longer pressing of F1+ increases the sensitivity unless maximum sensitivity was reached.

**F2-**

Short manipulation shows the currently selected sensitivities for 5 sec. (refer to sensitivity table, chapter 6.3). Longer pressing of F2- reduces the sensitivity unless minimum sensitivity was reached.

**RESET**

This key is used to clear an indicated fault after elimination of its reason.
3.5.3 Selection of Operation Variants

The electronic P.C. board includes four DIP switches. These switches serve to activate or deactivate some basic operation variants. During normal operation, a change of the DIP switch positions is not required.

<table>
<thead>
<tr>
<th></th>
<th>Funktion</th>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIP 1</td>
<td>Working frequency of detector coil</td>
<td>295 kHz</td>
<td>290 kHz</td>
</tr>
<tr>
<td>DIP 2</td>
<td>Valve control</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>DIP 3</td>
<td>Save Reset</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>DIP 4</td>
<td>Key lock</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

**DIP 1**: In the case that two metal separators are operated in close proximity to each other, two different working frequencies must be selected. This helps to avoid that they disturb one another.

**DIP 2**: Switch on or switch off of the valve control.

**DIP 3**: In the ON-Position the fault status signal remains after the first metal detection. Only after pressing of the Reset key the signal is deleted. The metal separator is still working normally after the first metal detection, i.e. after each metal detection, the contaminated material is discharged by means of the separation drum.

In this way it is possible to activate the device in such a manner that after the first metal detection a permanent signal is given out until the operator acknowledges it by pressing the reset key.

**DIP 4**: Locking / unlocking the keyboard
3.6 Sensitivity Table

The currently selected sensitivity is indicated by means of the four horizontally arranged yellow LEDs at the front plate.

**Example:** After pressing of F1+ or F2- buttons the diodes 3 and 4 light for approximately 5 seconds. The actual values of response sensitivity is 2.5 mm. This corresponds to stage 6, i.e. very insensitive.

A metallic particle is discharged only if it is greater or equal the currently selected value.

Hence, the four LEDs serve for fine adjustment of sensitivity and as help for orientation. (Refer to table below.)

As described in chapter 5.1.1, the sensitivity is indicated or changed by pressing F1+ or F2-, if the keys are not locked.

The sensitivities apply to the most insensitive section of the detector which, for this system, is in the centre. The sensitivity increases towards the edge.

<table>
<thead>
<tr>
<th>Sensitivity stage</th>
<th>FE-ST 37 bullet diameter (mm) 50model/70model</th>
<th>X = Led lights</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LED 1</td>
</tr>
<tr>
<td>1 (most sensitive)</td>
<td>from 0.5 / 0,7</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>from 0.6 / 0,8</td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>from 0.7 / 1,1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>from 0.9 / 1,5</td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>from 1.2 / 1,8</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>from 1.6 / 2,5</td>
<td></td>
</tr>
<tr>
<td>7 (most insensitive)</td>
<td>from 2.0 / 3,2</td>
<td></td>
</tr>
</tbody>
</table>

**Notice:**

Being coated with material is insignificant for the detection accuracy.

Nonmagnetic metals influence the ring coil’s magnetic field less than magnetic ones. Hence, reduced response sensitivity has to be expected for such metals.

For non-ferrous metals applies: The FE St37 value from the table multiplied by 1.3 is the approximate response sensitivity of a non-ferrous metal bullet.
For non-magnetic high-grade steel applies: The FE St37 value from the table, multiplied by 1.5, is the approximate response sensitivity of a high-grade steel bullet.

**Notes for the values of sensitivity**

Notice:

The sensitivity values apply to the centre of the detection ring, because, for technical reasons, there is the lowest sensitivity. The measuring method analyses not only height and width, but also the depth of the metallic particle. This leads to a fact which applies to all conventional, metal-separating systems:

*Not the weight, but the size of the particle is decisive for the detection accuracy. The bigger the particle size, the greater is the detection current. The detection current is a reference value for the metal detection.*

Notice: Being coated with material is insignificant for the detection accuracy.

Nonmagnetic metals influence the ring coils magnetic field less than magnetic ones. Hence, reduced response sensitivity has to be expected for such metals.

For non-ferrous metals applies: The FE St37 value from the table, multiplied by 1.3, is the approximate response sensitivity of a non-ferrous metal bullet.

For non-magnetic high-grade steel applies: The FE St37 value from the table, multiplied by 1.5, is the approximate response sensitivity of a high-grade steel bullet.

Far higher sensitivities are achieved by our SHARK® products with digital evaluation electronics and product effect compensation. Please contact us for more detailed information.

### 3.7 The separating drum

The separating drum is arranged in the aluminium enclosure underneath the blue metal ring detector. First by screwing off the blue round cover plate of the enclosure the separating drum becomes visible. The separating drum is designed so that standing or free falling bulk materials are guided alternatively on the Ok or Not ok discharge. If no metal is detected the material flow goes vertical from the inlet through the separating drum to the Ok discharge. The material does not make any diversion.

If metal is detected, the separating drum guides the material flow onto the Not ok discharge.

In order to make sure that also bigger metallic particles have sufficient time to leave the separator drum, the separating time is adapted automatically. In dependence on the size of the metal the separating drum stay longer or shorter in the Not ok position. The advantage of this
activation is the reliable separation of metallic particles of any size. A sticking of the separating unit will be prevented. The material discharge is reduced to a minimum by this new technology.

At the end of this variable time the separating drum switches back again to the Ok position. If there is a new metal detection within the separating event, the separating drum stays in the Not ok position for a longer time.

4 Operating Instructions for the Metal Separators

Smooth and safe operation of the MESEP® VA digital is only possible if the following instructions are observed

4.1 Erection Instructions
- Fix the unit in such a way that screws or other fastening elements cannot get loose unintendedly.
- The unit must not be disassembled for erection. It must be erected as a complete unit.
- In no case, welding current may flow through the metal separator enclosure. This would destroy the metal separator.

4.2 Connection Instructions
- Observe the permissible mains voltage.
- Installation and connection may be executed only by authorized personnel.
- Observe the general installation instructions for erection and operation of electric equipment (VDE 0100).
- Do not perform any works at the switched-on metal separator!
- Protective measures for personnel and equipment have to be in accordance with the local situation and regulations.
- Observe the power-handling capacity of the outlet contacts.
- Provide proper grounding of the metal separator (neutral; avoid end loops; provide shortest connection to main grounding).
4.3 Operation Instructions

- The metal separator should be permanently on. This will provide maximum lifetime of the electronic circuits.

4.4 Failure Protection of the Metal Separator

The metal separators mains inlet is protected against disturbing influences.

Increased operation safety and additional protection against failures is reached applying the following measures:

- Use of mains filters if the mains voltage is affected by connection of large consumers (compensation systems, welding equipment, HF furnaces, solenoid valves etc).
- Protection of inductive loads (solenoid valves, contactors, electromagnets) by RC members. On switching-off of inductive loads, high voltage peaks may occur. These voltage peaks are shortened by RC members.
## 5 Technical Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article number</td>
<td>MESEP VA digital 50</td>
</tr>
<tr>
<td></td>
<td>MESEP VA digital 70</td>
</tr>
<tr>
<td></td>
<td><strong>Optional with connection control</strong></td>
</tr>
<tr>
<td>Operation voltage</td>
<td>85V – 264 V AC</td>
</tr>
<tr>
<td>Mains frequency</td>
<td>47Hz - 440Hz oder DC</td>
</tr>
<tr>
<td>Power drain</td>
<td>&lt; 40 Watts</td>
</tr>
<tr>
<td>Permissible operation temperature</td>
<td>0°C – 60°C</td>
</tr>
<tr>
<td>Permissible product temperature</td>
<td>max. 80°C</td>
</tr>
<tr>
<td>Free passage of the ring detector</td>
<td>Ø 70 mm</td>
</tr>
<tr>
<td>Maximum material throughput</td>
<td>depended on the trickling ability of the bulk material</td>
</tr>
<tr>
<td>And sensitivities</td>
<td><strong>MESEP VA 50 approx... max. &lt;4.500 l/h</strong></td>
</tr>
<tr>
<td></td>
<td>0,5 Ferrous ball in the center of ring FE-St37</td>
</tr>
<tr>
<td></td>
<td><strong>MESEP VA 70 approx. max. &lt;8.800 l/h</strong></td>
</tr>
<tr>
<td></td>
<td>0,7 Ferrous ball in the center of ring FE-St37</td>
</tr>
<tr>
<td>Weight</td>
<td>ca. 20 kg</td>
</tr>
<tr>
<td>Sensitivity ranges</td>
<td>7</td>
</tr>
<tr>
<td>Operation pressure</td>
<td>4-6 bar, filtered, water and oil free</td>
</tr>
<tr>
<td></td>
<td>Coupler with ¼” thread</td>
</tr>
<tr>
<td>Parts in contact with material</td>
<td>laminated paper or aluminium</td>
</tr>
<tr>
<td>Relay contacts</td>
<td>metal detection (floating two-way switch) 250V / 5A</td>
</tr>
<tr>
<td></td>
<td>failure (floating two-way switch) 250V / 5A</td>
</tr>
<tr>
<td>Semi-conductor output signals</td>
<td>metal detection 24V / 20mA, short-circuit resistant</td>
</tr>
<tr>
<td></td>
<td>24V / 100mA, short-circuit resistant</td>
</tr>
</tbody>
</table>
*Connection monitoring* Units with this function have an additional solenoid valve and a return spring in the pneumatic cylinder. In case of compressed-air failure, the return spring brings the sorting gate into the NOT OK position. The second, additional solenoid valve acts only if main voltage is available. If this is the case, the compressed air is connected to the pneumatic cylinder. In case of power failure, the compressed air is disconnected the pneumatic cylinder. In this case, the sorting gate changes to the NOT OK position.

6 Technical Description

This section informs about design and function of the metal separator.

The MESEP® VA digital consists of three functional sections:
- front plate (refer to chapter 6.1)
- ring detector for creation of an electromagnetic field (refer to chapter 6.2)
- pneumatic sorting gate (refer to chapter 6.4)

6.1 Front Plate

The Test Button

Pressing the test button simulates a metal detection. For a short time, the sorting gate must change to the separating position. This can be seen from a position change of the pneumatic cylinder. Am impact sound can be heard.

Never put your hand into a gate opening during this test.

In this way, the button serves for instant function test of the device. However, this is not a reliable sensitivity test. This must be performed using an appropriate test bullet.
6.2 Selection of Operation Variants

The printed circuit board behind the front plate includes a potentiometer. It is used to adjust the separation time after metal detection.

**At supply, the device is adjusted for an average separation time of approx. 1 sec.**

The separation time should be adjusted according to quality and flow speed of the material to be handled.

Once metal was detected, the sorting gate - depending on the potentiometer position - remains in discharge position for 1 to 5.0 sec before being returned to the OK position. (see chapter 8.5)

⚠️

In case of too short separation time (see above) and slowly moving material, it may happen that the sorting gate has returned to the starting position (conveying position) before the detected metallic particle passes the gate. In a case like that, metal separation is not possible.

The longer the separation time is, the more the loss of OK material increases. In case that the factory setting is not the users most favourable one, the best setting has to be determined during operation. Otherwise, the factory setting should be kept.
6.3 Notes for the values of sensitivity

Notice:

The sensitivity values apply to the centre of the detection ring, because, for technical reasons, there is the lowest sensitivity. The measuring method analyses not only height and width, but also the depth of the metallic particle. This leads to a fact which applies to all conventional, analog metal-separating systems:

*Not the weight, but the size of the particle is decisive for the detection accuracy. The bigger the particle size, the greater is the detection current. The detection current is a reference value for the metal detection.*

Notice: Being coated with material is insignificant for the detection accuracy.

Nonmagnetic metals influence the ring coils magnetic field less than magnetic ones. Hence, reduced response sensitivity has to be expected for such metals.

For non-ferrous metals applies: The FE St37 value from the table, multiplied by 1.3, is the approximate response sensitivity of a non-ferrous metal bullet.

For non-magnetic high-grade steel applies: The FE St37 value from the table, multiplied by 1.5, is the approximate response sensitivity of a high-grade steel bullet.

Far higher sensitivities are achieved by our SHARK® products with digital evaluation electronics and product effect compensation. Please contact us for more detailed information.

6.4 Sorting Gate

The gate is designed so that freely falling bulk materials are alternatively let to the OK discharge or NOT OK discharge. If metal is not detected, the material flows almost vertically from the intake through the sorting gate to the OK discharge. At this, the material undergoes a slight deflection.

Once metal was detected, the sorting gate leads the material flow to the NOT OK discharge.

At the end of the separation time, the sorting gates returns to the OK position. If a new metal signal comes during the separation cycle, the sorting gates remains it in the NOT OK position for a longer time.

(retriggering)

6.5 Function and Limitations

The MESEP® VA digital metal separator works according to an analog/digital evaluation principle which is briefly described below.

The ring coil includes
• coil for generation of a high frequency magnetic field
• a following evaluation electronics

If metal or other conductive material move through the ring coil, the magnetic field is influenced. This influence changes the level of the electric current. This process is called electromagnetic induction. By intersection of field lines, energy is drawn off from the magnetic field (an effect called Lenz's law).

The degree of change of the (induced) current is in direct connection with the magnetic and electrical properties of the metallic particle:
• bigger metallic particles induce greater currents than smaller ones;
• magnetic metals (e.g. steel) induce greater currents than non-magnetic ones (e.g. aluminium).

The induced current is measured, and processed and evaluated by electronics. This measuring principle is suitable for all sorts of metal and enables detection inside products or within non-metallic packings.

The products scanned so are in no way affected or modified.

The minimum value for detection of metallic particles is adjusted by the potentiometer. If this value is exceeded, an electronic impulse is sent out. This impulse actuates a gate of a metal separator.

6.5 Product Effects - Disturbing Product Properties

This chapter explains
• what are product effects
• why a metal separator reacts to a product effect

Knowledge of this will help the owner to optimally adjust the metal separator in order to avoid malfunctions.

What is a product effect?

The metal separator reacts to magnetism and electrical conductivity. That is why conducting materials - same as metals - influence the measuring field. The result for the electronics is a measuring signal, similar to that of a metal signal. In this case, the matter is a negative influence to the magnetic field by product effects.

The result is a metal signal from the metal separator, although the product is metal-free.

Remember, for example, how salt can change the electric conductivity of water.
The electrical resistance of distilled water is unlimited, provided that it is pure, distilled water. Distilled water contains neither salts nor minerals.

Dissolved salt changes the electric resistance so much that the solution gets electrically conductive. Similarly, conductive properties can be observed in some plastics due to additives.

Raw materials are more or less conducting. Certain components, like

- salt
- sugar
- minerals
- moisture
- carbon (blackened plastic granules)

change the material’s conducting behaviour. As a result, the magnetic field is constantly influenced. Although the scanned material does not include metallic particles, metal detections be the metal separator may occur. The result are unnecessary rejects.

The product effect is a characteristic values of each material. The reachable sensitivity in practice depends on how much a probably existing product effect can be compensated by the metal separator.

The digital variant of the MESEP® VA digital does not have product effect compensation. In most cases, it is sufficient to reduce the sensitivity to suppress this disturbing effect. The reachable sensitivity, however, is much higher with metal detecting systems with integrated product effect compensation.

(Please contact our main office for the MESEP® SE series).

**Suppression of the product effect with MESEP® VA digital:**

The MESEP® VA digital can suppress the product effect only within certain limits by means of reduction of the response sensitivity. (refer to chapter 3.6).

**Notice:**

The product effect intensity is proportional to the material throughput. Hence, throughput reduction for critical materials results in a reduction of disturbing effects.
7. Transport

7.2 Safety Instructions for Transport and Erection

Danger! To avoid damages to health and equipment during transport and erection of the metal separator, strictly observe the following:

- Transport and erection may only be executed by qualified personnel, observing the relevant safety instructions.

  For the selection of suitable load-bearing elements, consider the following weight:

  Metal separator, depending on size and design, max. approx. 20 kg

- Protruding sharp edges may cause injuries.

- Hanging loads may fall down and cause danger to life; so do not stay below.

- Parts laying loosely above each other may slip and fall down.

- Really read the chapter GENERAL SAFETY INSTRUCTIONS.

8 Instructions for Erection

8.1 Erection Aids

Generally, the following connections of conveying system and MESEP® VA digital have to be made:

1. The material feeder must be connected with the MESEP® VA digital.

2. The material feeder must be connected with the MESEP® VA digital.

3. The NOT OK discharge of the MESEP® VA digital must be connected with the collector tank or a similar system.

4. Eventually existing mixers or dryers are mounted onto the MESEP® VA digital.

The simplify the erection, we offer the following accessories:
8.2 Connectors

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8214-0700</td>
<td>High-grade steel hoppers for metal sensors 8217-xxxx and 8219-xxxx, volume: 35 l</td>
</tr>
<tr>
<td></td>
<td>Material feeder as fixed intake hopper</td>
</tr>
</tbody>
</table>

- Material intake
- NOT OK discharge
- OK discharge (downward)
8.3 sample of application

Metal separator for removal of metallic contaminations from plastic granules during octabine filling.

Prevent mecanical hart shocks. Install the unit solid with your installation frame. Install the unit vertical and not in a sloping position. See the picture above.
8.4 Electrical Connection

The terminal strips are behind application.

<table>
<thead>
<tr>
<th>Fault signal</th>
<th>Metal signal</th>
<th>Mains voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>34 32 31</td>
<td>44 42 41</td>
<td>Fuse 1A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L1 L1 N N PE PE</td>
</tr>
</tbody>
</table>

The terminals of the relays on the power pack circuit board are connected as follows and have the below shown switching conditions during the operation:

Switching conditions of the relays

<table>
<thead>
<tr>
<th>AUS / OFF</th>
<th>Abgleich oder Störung</th>
<th>Betrieb</th>
<th>Metall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stör relais</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metall relais</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>42</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal</td>
<td>Designation</td>
<td>Function</td>
<td>Technical characteristics</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>----------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>1+ 2</td>
<td>digital inlet 1</td>
<td>normally open contact</td>
<td>not available</td>
</tr>
<tr>
<td>3 + 4</td>
<td>digital inlet 2</td>
<td>normally open contact</td>
<td>not available</td>
</tr>
<tr>
<td>5 + 6</td>
<td>compressed-air control</td>
<td>normally open contact</td>
<td>not available</td>
</tr>
<tr>
<td>7</td>
<td>proximity initiator of gate control</td>
<td>PNP inlet</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>+24V</td>
<td>connected by manufacturer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>minus</td>
<td></td>
</tr>
<tr>
<td>10 + 11</td>
<td>SOLENOID VALVE – CONNECTION CONTROL</td>
<td>optionally required</td>
<td>connected by manufacturer</td>
</tr>
<tr>
<td>12 + 13</td>
<td>Solenoid valve – separation drum</td>
<td></td>
<td>connected by manufacturer</td>
</tr>
<tr>
<td>14 + 15</td>
<td>Semi-conductor outlet</td>
<td>+24V outlet</td>
<td>MAX. 20 MA, SHORT-CIRCUIT RESISTANT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>minus</td>
<td></td>
</tr>
<tr>
<td>16 + 17</td>
<td>SOLENOID VALVE – BLOW OUT FUNCTION</td>
<td>optionally required</td>
<td>connected by manufacturer</td>
</tr>
<tr>
<td>18 + 19</td>
<td>RS 232 interface</td>
<td>R2 IN</td>
<td>TERMINAL STRIP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T2 OUT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>T1 OUT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>R1 IN</td>
<td></td>
</tr>
<tr>
<td>23/24/25</td>
<td>analog inlets</td>
<td></td>
<td>not available</td>
</tr>
</tbody>
</table>
## Terminal assignment

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Designation</th>
<th>Function</th>
<th>Technical characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>relay: failure</td>
<td>At relay failure, terminals 31+32 are closed and 31+34 are open</td>
<td>floating two-way switch, max. 250 V / 5 A</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>relay: metal</td>
<td>on metal detection, terminals 41+42 are open and 41+44 are closed</td>
<td>floating two-way switch, max. 250 V / 5 A</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>voltage supply</td>
<td></td>
<td>85V to 265 V</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td></td>
<td>47 Hz- 440 Hz</td>
</tr>
<tr>
<td>PE</td>
<td></td>
<td></td>
<td>DC 110V- 440 V</td>
</tr>
<tr>
<td>fuse</td>
<td></td>
<td></td>
<td>power drain &lt; 50 VA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.5 A, slow-blow, 5x20</td>
</tr>
</tbody>
</table>
8.5 Printed Circuit Board

The MESEP digital includes a blue terminal box in which the printed circuit board is located. It consists of two boards arranged one above the other. The bottom board serves for the power supply. The upper board serves for evaluation of the measured value and excitation of all external components. Inspection or repair can only be performed by the manufacturer. The electronics is service-free and has an independent self test function (in case of fault, a relay is activated. We recommend to connect a signal transducer here in order to instantly detect faults).

The printed circuit board includes four red DIP switches to select different operation variants (refer to chapter 6.2). Furthermore, the board includes three potentiometers. A potentiometer is used to select the separation time. At the MESEP digital in standard design, there is no battery in the battery holder. The connection of the ring detector with the circuit board is soldered and must neither be disconnected nor changed.

- Do not manipulate these two potentiometers!
- Poti P2 entrance filter / right stop, do not adjust!!
- Battery holder is not fit.
- Separation time potentiometer
  - Appr. 1 sec. to left stop
  - Appr. 5 sec. to right stop
- DIP switch
8.6 Factory Setup

- maximum sensitivity (corresponds to Fe bullet 0.5mm for the 50 model / 0.7 mm for the 70 model)
- separating time approx. 1 sec
- input filter set up for maximum detection speed
- working frequency of ring detector is 295 kHz (DIP1 = ON)
- valve control activated (DIP2 = ON)
- metal reset externally deactivated (DIP 3 = OFF)
- key lock deactivated (DIP4 = OFF)
- compressed-air monitoring deactivated (terminals 5 and 6 bridged)
- no battery on the board (not required)

8.7 Quick Reference

The quick reference is located at the inner side of the door of the blue control box. It describes the most important functions and includes a brief sensitivity-table.

Kurzbedienungsanleitung

Empfindlichkeitsstufen:  

<table>
<thead>
<tr>
<th>LED</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7 mm Fe-Kugel Ringmitte</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.9 mm Fe-Kugel Ringmitte</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 mm Fe-Kugel Ringmitte</td>
<td>●</td>
<td></td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>1.5 mm Fe-Kugel Ringmitte</td>
<td>●</td>
<td>●</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>1.8 mm Fe-Kugel Ringmitte</td>
<td>●</td>
<td></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>2.5 mm Fe-Kugel Ringmitte</td>
<td>●</td>
<td></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>3.2 mm Fe-Kugel Ringmitte</td>
<td>●</td>
<td></td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

F1*: Erhöhen der Empfindlichkeit  
Increase the sensitivity

F2: Verringern der Empfindlichkeit  
Decrease the sensitivity

TEST: Gedrückt halten:  
Separator in Schlecht - Stellung  
push the button: flap in bad position

TEST: Kurz drücken:  
Simulation Metallerkennung.Anzeige  
short push: simulation metal detection and indication of sensitivity

RESET: Fehlermeldung Klappe  
failure flap

Bei technischen Fragen:  
Pulsotronic-SKS GmbH & Co. KG  
Tel. 037296/330 100
9. Maintenance

9.1. General Maintenance

The metal separator is a sensitive measuring instrument. Erection and operation are described in this manual. Usually, the metal separator works safely and reliably without requiring further adjustments after commissioning. Necessary replacements of parts of the metal separator or adjustments are decisively depending on the use conditions.

In any case, the laminated-paper tube and the sorting gate should be regularly checked for wearing. In case of handling glass fibre-reinforced materials or heavily abrasive materials, the maintenance intervals should be short. Appropriate maintenance intervals can be fixed up better in the course of operation. In the beginning, daily or weekly inspections are required.

⚠️ Take care of this notes!

The brown laminated paper tube gets thin due to heavy abrasion. Before breakage due to abrasion, the paper must be renewed. It protects the highly sensitive ring coil body against damage. If this advice is not observed, permanent damage may occur to the ring detector, and complete replacement will be required.

Change of the bulk material may required readjustment of the sensitivity. That happens, for example, on changing from non-dyed material to blackened, soot-enriched material if increased rejects not caused by metallic contamination occurs. (refer to chapter 6.5.)
Take care of this notes!

In our factory, we have special tools for adjustments and assembly of the MESEP® VA digital. This enables us to guarantee exact function of the devices in despatch condition.

Any self-performed intervention by the owner lead to a discharge of guaranty rights. In case that damages to or malfunctions of the device are revealed, they should be eliminated by the manufacturer.

At the first glance, a repair often seems to be very simple, but significant things are overlooked. The devices are the result of many years of experience and technical patents which make them valuable and reliable.

Proper repairs and maintenance are the only way to avoid consequential damages.

Single parts can of course be supplied, if requested. Use the drawings in this manual and mark the required parts.

9.1.1 Repairs and Wearing parts - Important Notice

We are always doing our best to improve the technology of our products, and to fulfil our customers’ requirements. So we request you to mark required spare parts in the drawings contained in manuals or catalogues, and to send these to us by fax. Every device has its nameplate, indicating part and serial number. This information would be very helpful for us, too.

So we can more precisely find and offer you the components you may require. Before attempting to carry out a repair be oneself, PULSOTRONIC should be contacted in any case to find out whether it might be more reasonable to have the repair carried out by the manufacturer. If desired, PULSOTRONIC will then furnish a cost forecast. On the other hand, repairs of metal detectors and electronic modules must be carried out by PULSOTRONIC because only proper workmanship is a guaranty to achieve the device-specific sensitivities.

It should also be kept in mind that only repairs carried out by PULSOTRONIC are guaranteed.

Orders

Due to technical progress, older spare parts may differ from newer ones.
9.1.2 Removal of the Laminated-Paper Protective Tube

After removal of the intake flange, the protective tube can be taken out upward. Refix the flange after insertion of a new protective tube.

The laminated-paper protective tube is arranged underneath the unit’s flange and protects the ring coil from mechanical damages. Regular checks, particularly in case of abrasive bulk materials, must be performed.

9.2 Regular Inspections

To guarantee safe operation, it is important to check the metal separator’s function regularly. The metal separator must be checked at least once per week, after every maintenance stop and every time, when any kind of job was performed at the metal separator. Any failure of the metal separator’s function must be eliminated immediately, and machines or products protected by the metal separator have to be taken out of operation.

It is advisable to test the MESEP® VA digital regularly using a specific metal test body and logging the test results. We recommend to obtain suitable metal test bullets from Pulsotronic. These test bullets are encasted in plastic cubes, and the bullet sized is engraved. Test bodies are available for every type of metal separator. The tests should be performed according to a test schedule.
• The metal test bullet should have the smallest detectable diameter. To perform the test, the bullet is sent together with the material through the metal separator to check, whether metal is signalised.

• The test schedule defines when and by whom the metal separator has to be checked. Example: one hour after the beginning of each shift, the shift electrician has to check the metal separator using a test bullet. The test result should logged, indicating date, time and signature. Example: Test bullet 1.5 mm Fe, detected, 24.08.96, 8:30 hrs, signed (name).

• Defective ring coils or electronics can only be performed by the manufacturer. The ring coil is completely coated with synthetic resin, and it is produced and tested in a very complicated process. Subsequently, the coil is connected to the electronics. After that, a function test over several days is performed. Only if all tests were passed successfully, the units are approved and despatched. Hence, repair on spot is impossible. After prior agreement, we will of course provide you with a reserve unit for the repair period.

10 Troubleshooting

Frequent reasons of malfunction are wrong settings and insufficient care of connection. Use this table to find the reason of fault. In many cases, the cause of a malfunction is only a small thing. In case that, however, all attempts are unsuccessful, please note down the unit No. from the nameplate at the frame and contact us.
<table>
<thead>
<tr>
<th>Failure</th>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Irregular, very frequent metal signals</td>
<td>• Check mounting: Screws loose?</td>
<td>• Check screws for tight seat</td>
</tr>
<tr>
<td>• Device responds again and again after metal detection</td>
<td>• Adjusted sensitivity too high?</td>
<td>• Reduce sensitivity</td>
</tr>
<tr>
<td>• Blow-outs and heavy impacts</td>
<td>• Product effects?</td>
<td>• Probably black granules, material conductivity</td>
</tr>
<tr>
<td>• Metal indications at the time of switching of inductive or capacitive</td>
<td>• Heavy metallic contaminations</td>
<td>• Recheck rejects for metallic contamination</td>
</tr>
<tr>
<td>consumers</td>
<td>• Heavy impacts or vibrations</td>
<td>• Check air pressure, 4 to 6 bar</td>
</tr>
<tr>
<td>• No metal indication although metal passes the ring</td>
<td>• Missing interference elimination of external components</td>
<td>• Install pressure reducer</td>
</tr>
<tr>
<td>• Ring failure</td>
<td>• Sensitivity too low</td>
<td>• Eliminate reasons of impacts</td>
</tr>
<tr>
<td>• Gate failure</td>
<td>• Test bullet too small</td>
<td>Refer to 4.4, CONNECTION INSTRUCTIONS, and 4.5.1, FAILURE PROTECTION</td>
</tr>
<tr>
<td>• Compressed-air failure (only for compressed-air sensors)</td>
<td>• Ring dirty</td>
<td>OF THE METAL SEPARATOR</td>
</tr>
<tr>
<td>• No operation indication</td>
<td>• Large metal part lodged in the ring</td>
<td>• Increase sensitivity</td>
</tr>
<tr>
<td></td>
<td>• Sorting gate is blocked or runs heavily</td>
<td>• Use different test bullet</td>
</tr>
<tr>
<td></td>
<td>• Compressed-air failure / pressure too low</td>
<td>• Clean the ring</td>
</tr>
<tr>
<td></td>
<td>• No mains voltage</td>
<td>• Check compressed-air, 4 to 6 bar</td>
</tr>
<tr>
<td></td>
<td>• Fuse (0.5 A, slow-blow) acted</td>
<td>• (refer to chapter 6.1).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check mains voltage</td>
</tr>
<tr>
<td>The fault cannot be eliminated?</td>
<td></td>
<td>• Replace fuse</td>
</tr>
</tbody>
</table>

Please contact Pulsotronic (see Annex, chapter 13)

### 11 Accessories

<table>
<thead>
<tr>
<th>9513-4000</th>
<th>Hopper magnet for metal separators 8210-xxxx, 8211-xxxx, 8212-xxxx, 8217-xxxx and 8219-xxxx</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This hopper magnet is laid into the hopper, and it retains all magnetic matters.</td>
</tr>
<tr>
<td></td>
<td>This helps to perform an iron pre-separation. Not all metallic parts fall through the separator,</td>
</tr>
<tr>
<td></td>
<td>leading thus to material rejects.</td>
</tr>
<tr>
<td></td>
<td>Disadvantage: The magnets must be cleaned in regular intervals.</td>
</tr>
<tr>
<td></td>
<td>Advantages: Less material loss, even magnetic dust particles are retained.</td>
</tr>
</tbody>
</table>
12  **Spare Parts**

Please contact the service department in our headquarter.

13.  **Annex**

In case of technical questions, please contact the MESEP production or MESEP despatch department of our main office.

**Contact:**

Phone: 0049 (0) 3 72 96 / 930 –100 (exchange)

Fax: 0049 (0) 3 72 96 / 930 –180 (exchange)

Internet: [www.pulsotronic-sks.de](http://www.pulsotronic-sks.de)

Mail: [info@pulsotronic-sks.de](mailto:info@pulsotronic-sks.de)