

# Installation, Operation and Maintenance Instructions



## MODEL FF5 METAL SEPARATOR

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WORLD AUTHORITY IN ADVANCED TECHNOLOGY FOR MAGNETIC, VIBRATORY and INSPECTION APPLICATIONS

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# Introduction

The texts and illustrations in this instruction manual are for the exclusive purpose of explaining how to operate and handle the metal separator. The manufacturer accepts no responsibility for damage resulting from the use or misuse of this equipment. All appropriate safety rules and regulations for the use of this equipment must be adhered to. If you have any questions with regard to the installation and operation of this equipment please do not hesitate to contact us.

This instruction manual must not be copied, saved on computer or otherwise reproduced without prior permission of the manufacturer. Nor should any extract of this instruction manual be similarly reproduced.



## **CAUTION**

**Safety labels must be affixed to this product.  
Should the safety label(s) be damaged, dislodged  
or removed, contact Eriez for replacement.**

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# General Information

## FIELDS OF APPLICATIONS

The metal separators of the Eriez product line FF5 are designed for use in the food, chemical and pharmaceutical industries. The FF5 metal separator rejects ferrous and nonferrous metallic impurities automatically in free fall conveying systems for bulk material without interrupting production.







## APPLICATION REASONS

- Product liability
- ISO 9000
- TQM (Total Quality Management)
- Protection of machines and operators

## SYSTEM IDENTIFICATION

The information in this instruction manual only applies to the FF5 metal separator. A label with the respective data is attached at every system.

## SYMBOLS USED

Symbol	Signal Word	Meaning
	Danger	Warning: Possibility of severe or even fatal personal injuries.
	Danger	The lightning symbol is an explicit warning that there is danger from electric current.
	Warning	Warning: Possibility of minor personal injuries or property damage.
	Caution	Warning: Possibility of defects or destruction of the equipment.
	Important Information	Indicates important information for the function.
	Important Hint	Indicates an important hint for the function.

## IMPORTANT FUNCTIONAL NOTES

The metal separator is designed and built to provide optimum detection and separation of metal contaminants.

However, it is important to be aware of the circumstances in which metal detection may be compromised when conveying and processing bulk materials.

- Accumulation of metal residues.
- Accumulation of metal particles in a batch of bulk material. This may occur with ground or shredded material if a larger piece has been ground.
- Turbulence in the reject unit and reject flap reaction time.
- If there is an accumulation of metal particles, the flap cannot react to the control signals without delay, this occurs when recycled or reground material is processed, even when blended with virgin material.
- Conveying rate or fall velocity too high or too low.
- Type, size, and position of the metal contamination.

## IMPORTANT INFORMATION

**For these reasons no general guarantee can be given that the unit will operate with 100% accuracy.**

For bulk materials containing a high proportion of metal contaminants, it is recommended that two separators are connected one after the other and additional permanent magnets are installed in free-fall pipes or hoppers.

Suitable magnet systems are also available for pre-separation in vacuum and pressure pipes. Contact your local Eriez representative for further information on these products.

# Design & Method of Operation

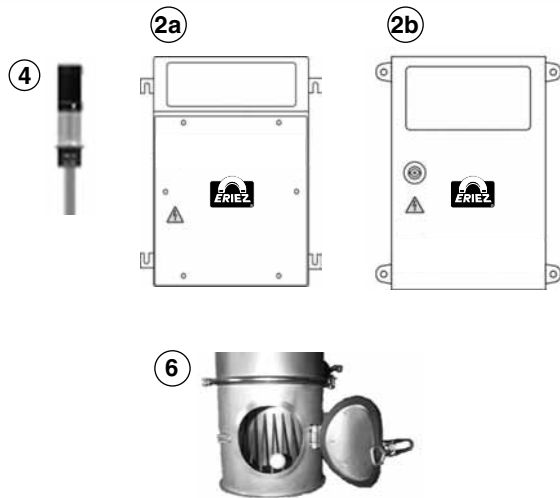
## FUNCTIONAL AND CONTROL ELEMENTS

### BASIC ELEMENTS:

- ① Metal detector
- ② Control unit G (2a) or S (2b)
- ③ Base frame with detection coil, scanning pipe and separation unit

### ACCESSORIES/OPTIONS

- ④ Signaling device (audible alarm, visual alarm or combination alarm)
- ⑤ Intermediate pipe for larger fall heights
- ⑥ Manual test facility
- ⑦ Easy clean option
- ⑧ Filter control valve (not shown)
- ⑨ Counter (detection counter) in a separate housing (not shown)
- ⑩ Button for manual ejection in a separate housing (not shown)
- ⑪ Button for functional test (not shown)
- ⑫ Test samples (not shown)
- ⑬ Compressed-air monitor in electronics housing (not shown)
- ⑭ Monitor system for separation unit (not shown)
- ⑮ Cable set for remote control unit 9.84', 19.68', 32.80' (3m, 6m, 10m) (49.21' (15m) only with Control Unit S) (not shown)
- ⑯ Bulk material temperatures of up to 284°F (140°C) (not shown)
- ⑰ Enhanced wear protection (not shown)



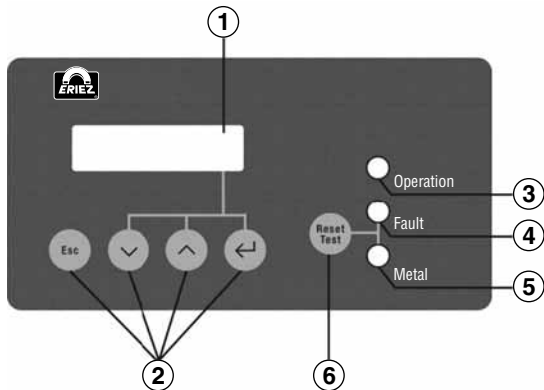
# Design & Method of Operation (cont.)

## CONTROL ELEMENTS/CONTROL UNITS

The FF5 metal separator can be equipped with two different control units.

### CONTROL UNIT S

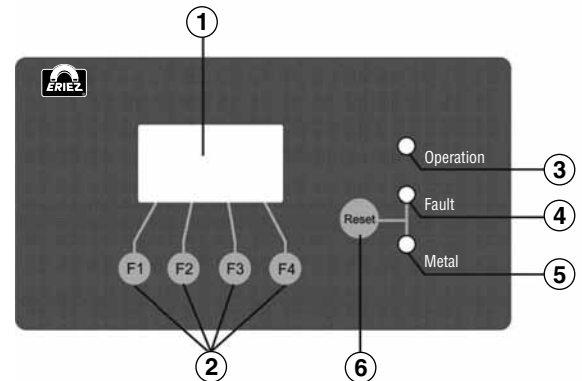
Used mainly in food and plastics industry; designed with 28 product memory.



- ① LCD-display: double spaced, 32-digit display
- ② Operator keys: ESC, UP, DOWN and enter
- ③ Green lamp: Operation
- ④ Red lamp: Fault
- ⑤ Yellow lamp: Metal
- ⑥ Function key: Reset/Test

### CONTROL UNIT G

Used mainly for food and pharmaceutical industry applications. Designed with 200 product memory.



- ① LCD display
- ② Function keys F1 - F4
- ③ LED: Operation (green)
- ④ LED: Fault (red)
- ⑤ LED: Metal (yellow)
- ⑥ Resetting of the metal and alarm

### FUNCTIONAL PRINCIPLE

The material to be inspected is fed through the unit in dosed free fall.

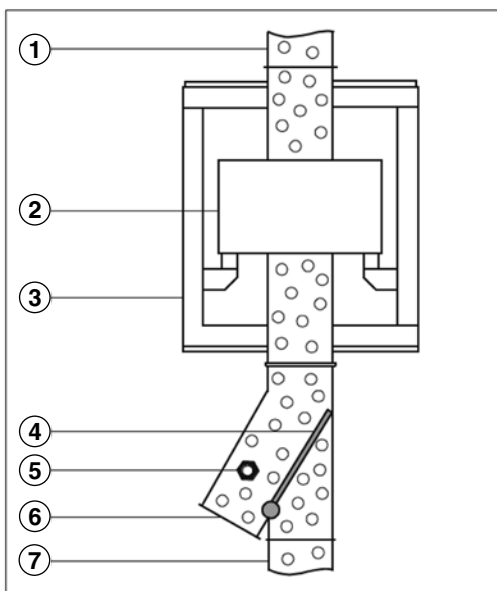
- Good product (no metal impurities): The material passes through the metal detector and continues vertically through the good product outlet. No separation event occurs.
- Bad product (metal impurities present): The metal is detected by the metal detector. The control unit triggers the electromagnetic valve of the pneumatic cylinder, which drives the diverter flap. The metal contaminated material is diverted to the reject outlet. The material loss can be calculated by throughput (lb/s) x reject duration.

#### Example:

Throughput: 600 lb/h = 0.17 lb/s

Reject duration: 0.5 sec

Material loss = 0.17 lb/s x 0.5 sec = 0.085 lbs



Note: The diverter is shown in reject position.

- |                  |                   |
|------------------|-------------------|
| ① Inlet          | ⑤ Metal impurity  |
| ② Detection coil | ⑥ Reject outlet   |
| ③ Frame          | ⑦ Material outlet |
| ④ Diverter flap  |                   |

### FUNCTIONAL AND PERFORMANCE CHARACTERISTICS

- The metal separator is designed for the demands of the food, chemical and pharmaceutical industries.
- Ferrous and nonferrous metals (i.e. stainless steel, aluminium) will be separated corresponding to the adjusted sensitivity.
- Moist, saline and fat containing food as well as agglomerates and emulsifying agents cause false metal alarms due to their electrical conductivity characteristics. The FF5 control unit compensates this so called “product effect” and provides highest sensitivity to metallic impurities.
- The tubular diverter shows no edges, thus back drafts and clogging of bad pourable bulk (i.e. spices, powder, flour, starch) as well as incrustation and moulding are avoided.

- The round reject mechanism helps to avoid material deposits and thus reduces the risk of crusting and mould formation.
- The diverter unit is designed for quick mounting and dismounting for easy and timesaving cleaning.
- Two different control units allow the optimum device configuration according to the application.

### DIMENSIONS AND TECHNICAL DATA, NOMINAL WIDTH 80-250

Technical data sheet, see annex.

### SUPPLY CONNECTIONS

Technical data sheet, see annex.

### ENVIRONMENTAL CONDITIONS FOR OPERATION, STORAGE, AND TRANSPORT

The environment of the metal separator should be dry, dust-free, free of vibrations, of other influencing magnetic fields, of chemical vapors such as softeners, chlorine and similar substances. The metal separation unit must not be exposed to direct sunlight or to other environmental influences. For ambient temperature conditions for operation, storage, and transport, please refer to the technical data sheet in the annex.

### NOISE LEVELS

Sound pressure level measurements (in acc. with DIN 45 635).

Peak value of sound pressure level at a distance of 3.28' (1m) from the machine surface and 5.25' (1.60m) above the floor, LpA, 3.28' (1m), max.

#### Result:

Idling: < 70 dB(A)

Activated: < 90 dB(A)

Option signal horn or signal combination

Activated: < 105 dB(A)

**We reserve the right to change the contents due to product innovation or technical improvement.**

# Safety

The manufacturer equipment conforms with all official technical safety regulations. However, as a manufacturer, we believe it is our duty to make you aware of the following information.

## WARNING

The following safety and danger notes are intended for your protection, for the protection of third parties, and for the protection of the equipment. The safety notes; therefore, should always be observed! Please also observe the chapter on safety in the operating instructions of the control unit!




## INTENDED USE

The equipment is designed for the use in gravity feed conveying systems for the food, chemical and pharmaceutical industry, as well as other industries with similar applications. Feeding and outlets for the material to be inspected have to be installed carefully. For the free fall height please refer to the respective data sheet on S and G control units. The free falling height may differ for special or customized designs. Inlets and outlets should be connected to funnels, hoppers, pipes etc. to avoid injuries of hands during operation. No chemically aggressive bulk material should be fed through the equipment. Ensure that the installation area is free from steam, plasticizers or other materials that may damage the PVC cable sheathing. If there is a high proportion of metal contaminants or the bulk materials being inspected are abrasive, it is likely that any surfaces in contact with the product (e.g. scanning pipe) will show signs of wear and tear (e.g. reject flap, pneumatic cylinder etc). In this case, it is important that surfaces in contact with the product (i.e. scanning pipe, adaptors, reject device, drive unit etc.) are checked at regular weekly or monthly intervals. Worn parts must be replaced immediately to ensure the machine functions properly. Please note that any preventative measures which may have been taken at the time of construction will merely delay the onset of wear and tear but will not eliminate it completely. The metal separator may only be operated with a corresponding S and G control unit.

## SAFETY SIGNS

Warning signs attached at the system:

The purpose of these symbols is to draw the attention of the system operator to the text of the respective safety notes.

Symbol	Signal Word	Location	Meaning
	Mains voltage	Cover of the electronics housing	This symbol indicates that mains voltage is used in the electronics housing, and that any connected external circuits (e.g. at the metal relay) also may be energized. There is danger of electric shocks due to the presence of mains voltage.
	Danger of crushing	Normal outlet, reject outlet	This symbol refers to risks for the hands on account of the pneumatically operated diverter flap.
		In the pneumatics housing	This symbol indicates that there is danger of crushing your fingers due to the movement of the pneumatic cylinder.
Option: High temperature version			
	Burn hazard	Pipes	This symbol indicates that at the pipes there is danger of burning due to the high product temperature.

## DANGERS ARISING FROM NON-COMPLIANCE WITH SAFETY NOTES

Any non-observance of safety notes constitutes a danger for life and health.

## SAFETY INFORMATION FOR OPERATORS

The FF5 metal separator may only be operated in the intended purpose and in a perfect functioning condition. All the covers have to be closed during operation. When the reject flap is operating, there is danger of crushing your fingers. With passage openings larger than 3.14" (80mm) it is possible to reach into the danger spot. Therefore, a pipe of 1.64' (0.5m) must be flanged at the inlet, and pipes of 2.95' (0.9m) at the outlets, or other measures must be taken to prevent any reaching into the reject mechanism. If the product temperature is higher than 140°F



(60°C) there is danger of burning at parts in contact with the product. It is recommended to use a kind of enclosure or another measure to prevent touching of the danger spots. All the safety and warning signs on the system must not be removed and must be kept in well recognizable condition. The Installation, Operation and Maintenance Instructions should always be readily available. The owner may only appoint qualified personnel for operation, maintenance and repair work. During work on the pneumatic or the electric section, power supply and compressed air supply must be interrupted or disconnected.

 **EMITTED INTERFERENCE**

Test report according to the provisions of: BGV B11:2001-06  
Regulations of the professional association for safety and health at work.

Accident prevention regulations for electromagnetic fields.

E DIN VDE 0848-3-1: 05-2002

Safety in electrical, magnetic, and electromagnetic fields, part 3-1: Protection of persons with active implants in the frequency range of 0Hz to 300 GHz.

Persons and wearers of medical implants such as cardiac pacemakers may only be near the equipment when it is turned off.

 **SAFETY INFORMATION FOR COMMISSIONING, OPERATION, MAINTENANCE AND CLEANING**

The pneumatics housing is closed by a screwable cover. Due to the movement of the cylinder, there is danger of finger injuries in the pneumatics housing.

Always disconnect the compressed air supply and vent the air hoses before opening the cover of the pneumatics housing. Compressed air connection may only be established again when the cover has been successfully closed again. During operation, the cover of the pneumatics housing must always be kept closed.

When the reject flap is operating there is danger of crushing between reject flap and conveyor pipe. During operation, all the protective devices that prevent any reaching into the inlet, normal outlet, or reject outlet must always be attached.

The reject unit must be firmly connected to the conveyor pipe. Always disconnect the compressed air supply and vent the air hoses before removing the reject unit or the protective devices from the conveyor pipe for maintenance or cleaning purposes. Compressed air connection may only be established again when the protective devices have been attached and the reject unit has been successfully mounted to the conveyor pipe again.

 **WARNING**

If the reject unit should be removed from the conveyor pipe for maintenance or cleaning purposes, always observe the following information relating to the own weight of the reject unit. Always first support the reject unit with suitable lifting means, and only then loosen the fastening screws at the clamping ring.

 **BURN HAZARD**

In case of product temperatures of more than 140°F (60°C) there is danger of burning at parts in contact with the product. During operation, suitable protective facilities must be attached that prevent any touching of the danger spots. The product flow must be interrupted before any maintenance or cleaning work is started. Any such work may only be performed after the parts in contact with the product have cooled down.

 **SIGNALING DEVICE OPTION**

Always make sure that the electronics unit is not energized with mains or external voltage before exchanging signaling elements!



 **SAFETY INFORMATION FOR INSTALLATION AND DISMANTLING**

In case of incorrect installation, the weight of the machine may lead to personal injuries. Always use suitable lifting means to transport the machine to the intended place, and screw it to a wall, ceiling, or frame using the four fastening screws. Only remove the lifting means after all four fastening screws have been tightened. Dismantling is done in reverse order.

## Safety (cont.)

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### NOTES OF RESIDUAL RISKS

Possibly installed compressed air tanks can still contain pressure in spite of interruption of compressed air supply. (Where appropriate, vent!)



### NOTES ON STABLE STANDING REQUIREMENTS

To avoid any loss of stable standing, the information for transport, commissioning and operation must always be observed. If the metal separator is not mounted at a wall, it is to be stored in lying condition.



### CONSEQUENCES OF UNAUTHORIZED MODIFICATION

In case of unauthorized modification or repair work all the declarations and guarantees given by the manufacturer will become void.



### INADMISSIBLE OPERATION

The FF5 metal separator is not intended for any other applications than previously mentioned. Any other applications will be regarded as inadmissible operation. Inadmissible is the operation out of the specifications given in the technical data and the operation under high mechanical static or dynamic loads (i.e. heavy system parts or strong vibrations). Also inadmissible is the examination of aggressive materials such as materials containing alkaline solutions, acids and solvents of materials that are sensitive to electromagnetic fields, and of living people and animals.

The standard version of the metal separator must not be operated in explosive areas. Operation in explosive areas only is permissible with the special Atex version of the metal separator, which is dealt with separately. Contact the factory for details.

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## Installation Advice

### MOUNTING

- Use only the provided bore holes to fasten the device. See operating instructions.
- The place of installation has to be as stable as possible.



- Please be sure to abide by the stated fall height of 19.69" (500 mm).
- In case of strong vibrations, connect the device via flexible collars.
- The contaminated bulk material (Reject) must flow without disturbance into a close, de-aerated container (no backlog).
- The fitting position is vertical. Angular installation can lead to erosion in parts of the detection pipe.
- Detection and separation unit are separated for the FF5 Metal Separator. Advantage: Should the free-fall height exceed the defined limits, the Jacob pipe work at point five enables height adjustment. For adjustment of the pipe work, please contact Eriez.
- The separation unit is turnable and can be adjusted to the position of the reject container.
- Outdoor protection: The metal detector must be protected from rain, snow, sun, and other weather effects if installed outdoors.

### PRODUCT TO BE INSPECTED

- The bulk material has to pass the metal separator in free-fall. Please prevent backlogs.
- No pressure to be used for material feed.
- Products with product effects (conductivity of bulk material e.g. caused by dampness) can affect the sensitivity, depending on the intensity. Pre-analysis of material samples in our laboratory can inform you in time.
- Depending on intensity, the product effect and required sensitivity, the control units S and G can be used.
- Maximum bulk material temperature 176°F (80°C). For higher material temperatures, suitable machinery options are available.

### AMBIENCE

- The equipment meets the CE-guidelines, which includes particularly the EMC standards. This standard, EN 61000-6-2, sets the intensity of magnetic stray fields to 30 A/m. Do not mount the equipment close to electromagnetic noise sources like electric motors, power supplies for electric motors, and power frequency converter drives.
- Avoid big moving metallic parts close to the detector head like chain drives, rollers, or even a fork lift.

- When using two or more detectors in one room or hall, detection performance might be influenced.
- Ambient temperature 14°F to 122°F (-10°C to 50°C).

## ELECTRIC INSTALLATION

- Static: To prevent detection faults, please be sure to ground the device on the designated spots (see manual).
- The control unit is not to be integrated into other switchboards as this might cause technical failure.
- When running connection cables, please be sure to separate them from other cables and use tubes or cable trenches.
- Connection tables (special cables) between detection coil and evaluation electronic must only be changed in agreement with Eriez.
- For all cables leading outside, only use screened cables. Screens are to be connected directly to the cable connection of the housing.
- Mains cable and cable connections must not be removed – component of the EMV concept. Should the mains plug not be required, a joint box is to be used.
- Do not run actuation feeders and control cables near the device.
- Operational voltage, protection type and further technical data (see data sheet).
- For different mains voltage, a suitable transformer (external housing) is to be used.

## PNEUMATIC CONNECTION

- Air pressure 87-116 PSI (6-8 bar).
- Filtered compressed air, free from water and oil.
- Air pressure connection, pneumatic hose .24"/.31"(6/8mm).
- Air pressure usage, depending on type of device, between .11 and .71 gals (0.4 and 2.7 liters) per switching operation.

## IMPORTANT INFORMATION ON MACHINERY USE

The metal separator offers highest security for detection and rejection of metal contamination. The device was designed for the control of bulk material and **not** for sorting purposes.

In case of a high amount of metal contamination within the bulk material, the number of metal detections increases, which might cause the reject flap, actuation, etc. to abrade. The loss of “good material” increases accordingly.

Even in case of successful metal detection, metal contamination might not be rejected due to the following:

- Occurring metal herds: Aggregation of numerous metal particles in a charge of bulk material. Often found during grinding and milling of bulk material when a larger metal piece was crushed.

The following numerous detections and switching cause swirls in the separation unit.

- Reaction time of pneumatic cylinders (to operate detection flap) in case of numerous, quickly following detections
- Backlog in metal separator (separation flap hits product column)
- Conveyer pipe highly filled
- Conveying or fall speed too fast

Due to these circumstances, a guarantee for 100% metal separation in all cases cannot be given.

For bulk material with high metal contamination, two solutions have proven to be most effective:

- Pre-separation of metal with the use of a Magnetic Grate In-Housing.
- The use of two or more free-fall metal separators to a cascade

Please also refer to our storage, installation, and activation directives in the manuals.

## Installation

### MECHANICAL INSTALLATION



#### WARNING

**Only connect the compressed air supply when all the covers have been closed, all the required protective measures have been taken, and the machine has been properly installed in the conveyor line.**

It is important to pay attention to the following items:

- **Free fall height** of the fed product should not exceed the given value in the technical data sheet.
- Solid and vibration-free mounting.
- Avoid electromagnetic interferences in the surrounding of the detector, i.e. caused by electrical motors, frequency converters, high voltage line etc.

## Installation (cont.)

- Install carefully the cables of the pneumatic valve and detector head. Do not bend the cable and do not damage the PVC insulation.
- In-house mounting and operation.
- Apertures of more than 3.15" (80mm) must be connected to an inlet pipe of 1.64' (0.5m) and outlet pipes of 2.95' (0.9m) (or other preventative measures must be taken) to prevent anyone reaching inside.

**NOTE:** It is recommended to place a lockable opening to the pipe in front of the detector (inlet). This opening allows putting in test samples for performance checks of the equipment.

### CONNECTIONS

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#### WARNING

**Electrical work should only be carried out by qualified personnel. Before removing cover plates make sure the equipment is isolated from mains or external voltage.**

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- Ground the frame of the metal separator at the grounding terminal.
- Check the cable connection to the pneumatic valve and detector head.
- Connect air supply.
- Check the air pressure. Adjust to 87 PSI (6 bars). If necessary.

**NOTE:** A safe metal reject is only guaranteed if air pressure is held above 73 PSI (5 bars).

For electrical power connection, see manual for the control unit.

### SETTING OF THE OPERATIONAL PARAMETERS

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#### WARNING

**Close the cover of the control unit and of the pneumatic housing.**

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After correct installation and connection of power supply voltage (110 VAC or 240 VAC; 50/60Hz) and compressed air 87 PSI (6 bars) supply, check the reject mechanism manually by activating the pneumatic valve (S control, test button; Control G, use menu command).



Activate the conveying and adjust the metal detector so (see operating instructions of the respective control unit) that no malfunctions occur.

If appropriate, eliminate reasons for malfunction. Convey a suitable test sample, e.g. a plastic ball with included metal part of the desired size, which should be rejected. If necessary, adjust the reject duration time.

### ERRORS AND FAULT RECTIFICATION

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#### WARNING

**If products should get jammed, disconnect the system from the mains supply and turn off the compressed air supply and vent the air hoses. The jammed products can then be removed without danger.**



#### WARNING

**If you should have any questions, or if there should be any malfunctions, please contact Eriez Manufacturing.**



#### WARNING

**If you have any questions, please state the equipment type and serial number!**

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## Maintenance

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#### WARNING

**Prior to any maintenance and cleaning work, disconnect the device from the mains supply and turn off the compressed air supply and vent the air hoses. Always observe the safety information.**



#### IMPORTANT INFORMATION

**If there is a high proportion of metal contaminants or the bulk materials being inspected are abrasive, it is likely that any surfaces in contact with the product will show signs of wear and tear (i.e. reject flap, pneumatic cylinder etc).**

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### GENERAL NOTES

In appropriate periods of time (e.g. every week or month):

- Perform a visual inspection of all the parts in contact with the product, such as scanning pipe, transitions, reject mechanism, and drive elements.

- Replace worn parts to ensure proper function.
- Check all the screws and nuts for tightness, and tighten them if necessary.

### CLEANING ADVICE

Please ensure you follow the instructions below.

- Specific machine components must be cleaned with specific substances. Please use the correct materials and clean at regular intervals as suggested.
- Prior to any cleaning work, disconnect all the supply lines and the compressed air supply.
- If the building is being cleaned, ensure the machines are covered up.

The following must not be used for cleaning:

- Sharp, hard or pointed objects
- Water or steam jet appliances
- Compressed air
- Hazardous and solvent-containing materials

### CLEANING INSTRUCTIONS

- Cleaning the metal separator  
We recommend cleaning the “food” area with a soft, lint-free cloth using warm water and the appropriate cleaning agent. After cleaning wipe up any remaining water with a dry, lint-free cloth. From time to time treat the stainless steel body with a maintenance oil such as e.g. Nirostol 55 (food-compliant polishing and maintenance oil).
- Cleaning the separation unit  
First remove the cover of the pneumatic housing to clean the interior. If the flap has to be removed for maintenance, repair or cleaning work, first dismount the entire diverter unit. Remove, the spring locked bolt between lever and pneumatic cylinder. Unscrew the center bolts in the shaft pieces left and right side and remove the shaft pieces. The diverter flap can be pulled out at the inlet. The reject flap then can be cleaned following the above-mentioned recommendations. The reassembling is done in reverse order.

Condensate in the maintenance unit of the compressed air line must be drained in regular intervals.

### CARE ADVICE FOR STAINLESS STEEL

Only high-quality stainless steel is used in the systems. To prevent rust on the high grade steel parts, do not use substances containing chloride (i.e. cleaning or

disinfecting products) or operate the machine in an atmosphere containing chloride. If this is unavoidable, the steel parts must be thoroughly rubbed down immediately afterwards with cleaning oil e.g. Nirostol 55 cleaning and maintenance oil (which meets food industry standards).

### IMPORTANT INFORMATION FOR STAINLESS STEEL MODELS

Stainless steel models are extremely weatherproof and are, therefore, able to withstand most environmental conditions. However, even stainless steel can be susceptible to a slight film of rust. These deposits are caused by contact corrosion and can be removed by following the instructions below:

- Use a stainless steel cleaner. In principle, any stainless steel cleaner may be used. Please ensure you read the instructions prior to use.
- Use only cleaning agents that are halogen-free (i.e. without chlorides and fluorides), and salt and hydrofluoric acid free.
- After each cleaning, rinse the machine thoroughly with tap water.
- Do not use the following: non-alloy materials or substances, abrasive cloths, cleaning agents containing salt or hydrofluoric acid, chrome, silver or brass cleaners.

### PERFORMANCE CHECK

Check performance by pressing the test button on the control unit (optional on G control unit) or by selecting the respective menu item in the G control unit. This check should be carried out daily but at least every 14 days. Switching operation can also be carried out by introducing a test piece into the conveyor pipe in front of the metal detector.

## Spare Parts

If you should have any questions, please give equipment type and serial number!

### ! IMPORTANT INFORMATION

**Spare parts and wearing parts must always be obtained from the manufacturer of a supplier that is certified by the manufacturer.**

Contact Eriez for assistance.

Model FF5 Metal Separator



# Shipping, Preservation, Waste Disposal, Transport, Storage

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## SHIPPING, PRESERVATION, WASTE DISPOSAL

### WARNING

Choose packing that is suitable for the type and size of unit, taking into account whether the shipment is for export by sea or airfreight, or for national or international road transport. The packing material must protect the goods from all damage under normal transport conditions.

### WARNING

Depending on the size, weight and nature of the goods, packing in cardboard boxes, boxed pallets etc. is only suitable for road transport. Use reinforced cardboard, corrugated cardboard, blister packing and shredded paper to fill and protect the goods.

Electrostatic sensitive components (electronic boards, electronic modules, etc.) must be packed in antistatic foil or foil bags prior to packing! (This is essential!) Stick additional warning labels on the outside of the packaging (i.e. "Attention, electronic equipment, do not drop," etc.) The packing should be sealed with adhesive tape and, where the weight exceeds 110 lbs (50 kg) additionally with wrapping tape.

### WARNING

When packing for international road transport use the instructions above (see paragraph 2). Larger and heavier shipments must also be protected as for export in wooden crates. Care must be taken to ensure that the goods inside the packing are protected against corrosion. Any parts that will corrode easily must be wrapped in oil paper or corrosion-protective foil. Care must be taken to prevent the components from moving around within the packaging.

### WARNING

International air freight shipments must be packed in wooden crates or on export pallets. Care must be taken that the goods are secure and well protected inside the packing. Any parts liable to corrode must be wrapped in oil paper, protective foil or sprayed with anti-corrosion spray.

### WARNING

Sea freight must be packed in seaworthy export crates. These crates can be obtained from specialist suppliers. The crates must be lined with oil paper to make them resistant to sea water and prevent corrosion. In addition, the goods must be protected against corrosion by use of a spray or be wrapped in protective foil. Care must be taken to ensure that the goods cannot move around inside the crate. After packing, the sea freight crates must be properly closed. The sea crates must also be fastened externally with securing tapes. During loading, care must be taken not to damage the external packaging. The carrier must certify that the shipment has been accepted and loaded correctly by detailing this on the bill of lading, loading list, etc.





### WARNING

Waste disposal: Observe the national waste disposal regulations.

## TRANSPORT

### WARNING

- In order to avoid injury or damage to the unit, it must be handled properly. In addition to following the instructions below, general health and safety, good practice, and specific accident prevention guidelines should be observed.
- For correct handling and storage, comply with the following symbols:

Symbol	Signal Word
	Protect against moisture
	Careful: glass
	Up
	Center of gravity




### WARNING

- Do not compress the side walls of the unit or any attached parts by pulling obliquely on ropes or chains.
- Only remove handling safeguards once all installation work has been completed.
- When handling in a loading area, make sure the unit cannot topple over or slip.
- Damage caused during transportation must always be reported to the manufacturer.

## STORAGE

### WARNING

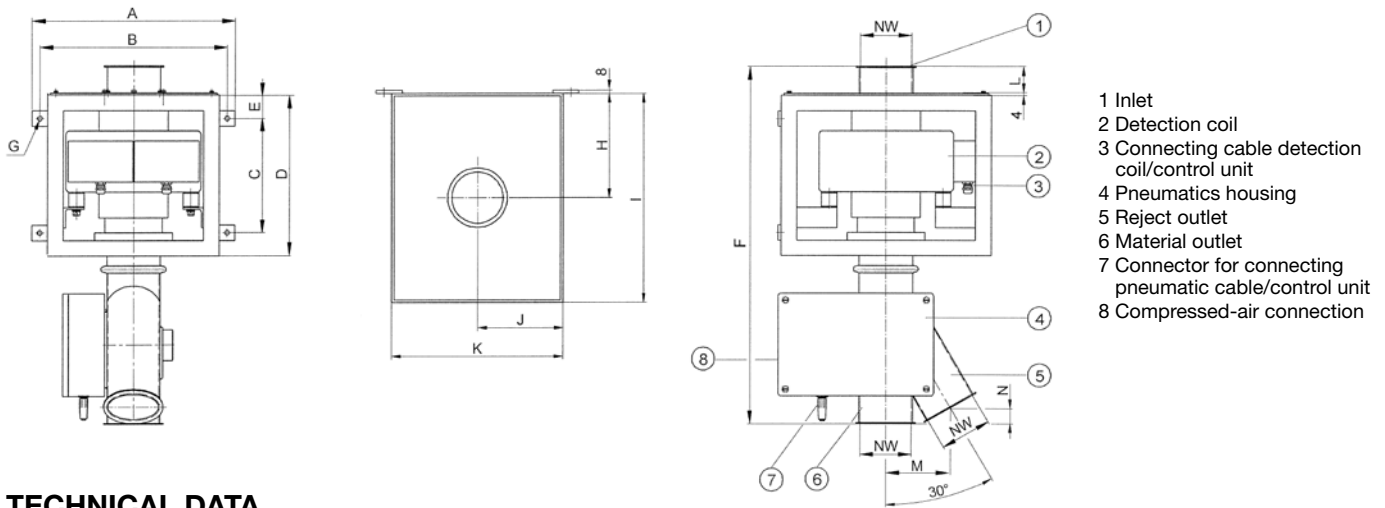
- If possible, the unit should be stored in a closed room until final installation.
- If the unit is stored in the open, it must be covered with tarpaulins and open underneath to allow condensation to drain off.
- Avoid any high temperature fluctuations. It is possible that condensed water that has formed in the packing cannot properly drain and may corrode equipment surfaces. If a formation of condensed water cannot be avoided, suitable desiccants (i.e. in the form of bags) must be placed in the packing.
- If the unit has been packed for transportation by sea, the packaging must not be damaged or opened during transit and storage.
- For storage temperature and permissible air humidity, please refer to the technical data sheet.
- For correct storage, comply with all storage and handling symbols:

Symbol	Signal Word
	Protect against moisture
	Careful: glass
	Up

# Annex

## TECHNICAL DATA SHEET FF5S

### DIMENSIONS



### TECHNICAL DATA

Type	Nominal Passage Ø NW System Jacob	Maximum Scanning Sensitivity <sup>1</sup> Ø Fe-Ball	Maximum Throughput <sup>2</sup>	Weight Lbs/Kg
Model FF5S-80	3.15 in/80mm	0.57mm	282 cu ft/hr / 8000l/h	143/65
Model FF5S-100	3.94 in/100mm	0.71mm	424 cu ft/hr / 12000l/h	143/65
Model FF5S-120	4.72 in/120mm	0.76mm	565 cu ft/hr / 16000l/h	143/65
Model FF5S-150	5.91 in/150mm	0.97mm	883 cu ft/hr / 25000l/h	243/110
Model FF5S-200	7.87 in/200mm	1.19mm	1554 cu ft/hr / 44000l/h	287/130
Model FF5S-250	9.84 in/250mm	1.51mm	2436 cu ft/hr / 69000l/h	353/160

#### Dimensions in inches

Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Model FF5S-80	15.35	14.17	7.68	11.22	1.77	23.86	.35	8.46	17.17	6.50	12.99	2.01	4.25	.91
Model FF5S-100	15.35	14.17	8.78	12.32	1.77	27.36	.35	7.99	16.18	6.50	12.99	2.01	4.88	1.18
Model FF5S-120	15.35	14.17	9.37	12.91	1.77	29.49	.35	8.46	17.17	6.50	12.99	2.01	5.83	1.65
Model FF5S-150	18.50	17.32	14.76	18.31	1.77	37.28	.43	9.45	19.21	8.07	16.14	2.01	6.89	2.01
Model FF5S-200	22.44	21.26	17.72	23.62	2.95	45.83	.43	10.43	21.18	9.65	19.29	1.46	8.98	2.68
Model FF5S-250	25.20	24.02	25.59	31.50	2.95	57.60	.43	12.60	25.51	11.02	22.05	1.65	10.71	2.95

#### Dimensions in millimeters

Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Model FF5S-80	390	360	195	285	45	606	9	215	436	165	330	51	app. 108	app. 23
Model FF5S-100	390	360	223	313	45	695	9	203	411	165	330	51	app. 124	app. 30
Model FF5S-120	390	360	238	328	45	749	9	215	436	165	330	51	app. 148	app. 42
Model FF5S-150	470	440	375	465	45	947	11	240	488	205	410	51	app. 175	app. 51
Model FF5S-200	570	540	450	600	75	1183	11	265	538	245	490	37	app. 228	app. 68
Model FF5S-250	640	610	650	800	75	1463	11	320	648	280	560	42	app. 272	app. 75

Larger types on request

<sup>1</sup> The stated detection sensitivity (ferrous ball Ø in mm) applies for nonconductive products at the standard operation frequency and refers to the center of the aperture (most disadvantageous position). Products that show intrinsic conductivity due to moisture content, electrolytes or other conductive contents may reduce the sensitivity, as well as variations of product temperature, environmental effects (mechanical shocks and vibrations, electromagnetic noise) or the set product angle. The detectable size of metal particles depends on their nature, shape and position while passing through the metal detector.

<sup>2</sup> The stated throughput rate is based on free flowing granules. The shape of the particles and flow characteristic of the bulk material determine the throughput rate, which can vary. Upstream installed magnet separators may also reduce the throughput rate due to reduction of the cross section.

Subject to change without notice!





## CONDITIONS OF USE

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Use:	For the inspection of gravity feed bulk materials in food, chemical and pharmaceutical processing lines as well as other industries with similar applications.
Bulk material characteristics:	Appropriate for powder and fine-grained bulk material (i.e. condiments, grain, powder).
Drop height of bulk material <sup>1</sup> :	Maximum 19.69 in/500mm above equipment top edge
Material flow:	Free falling, no back draft of material permissible
Bulk material temperature:	14°F – 176°F/-10°C to 80°C
Ambient temperature:	14°F – 122°F/-10°C to 50°C
Permissible maximum pressure: in the conveying pipe line	Maximum 7.25 PSI (0.5 bar)

<sup>1</sup>The permissible drop height refers to standard overall heights. Larger drop heights also cause larger overall heights.

## SCOPE OF DELIVERY/STANDARD DESIGN

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Scope of delivery:	Compact unit with integrated metal detector, pipe type diverter unit and remote control unit; Inlet and outlets designed according to the “Jacob” system.
Mechanical design:	Frame, detection coil and control enclosure: stainless steel 1.4301 (AISI 304), glass bead blasted Separation unit: stainless steel 1.4301 (AISI 304) Scanning pipe: PP (antistatic design see options/accessories) Parts in touch with material: stainless steel 1.4301 (AISI 304), PP, NBR Connecting cable (pneumatic/control unit): standard length 9.84 ft (3m), pluggable Connecting cable (coil/control unit): standard length 9.84 ft (3m), pluggable Compressed-air connection: 73-116 PSI (5-8 bar); .24-.31 in (6-8mm) tube connection Compressed-air consumption: approx 0.5-3.0 liter/switch operation (depending on the size of the unit)
Electrical design:	Operating voltage: 100-240 VAC (±10%) 50/60 Hz Current consumption: max. 800 mA Type of protection: IP 65 Reject duration (metal impulse): adjustable from 0.5 to 30 sec Self monitoring: detection coil and outputs Performance validation: test button “Reset/Test”

## OPTIONS/ACCESSORIES

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- Visual alarm
  - Failure indication
  - Failure and metal indication
- Audible alarm
  - Failure indication
  - Failure and metal indication
- Combination alarm (visual alarm and audible alarm)
  - Failure indication
  - Failure and metal indication
- Digital counter
- Compressed-air monitor
- Monitor system for diverter
- Button for manual rejection
- Antistatic coated scanning pipe
- Drop height above 19.69 in/500 mm
- Cable set for remote control unit
  - Length 20 ft/6m
  - Length 33 ft/10m
  - Length 49 ft/15m
- Interfaces
  - RS232
  - RS485
  - Ethernet
  - WLAN
- Air pressure regulator with filter
- Manual testing device
- Test samples
- UL/CSA certificate

## SPECIAL VERSIONS

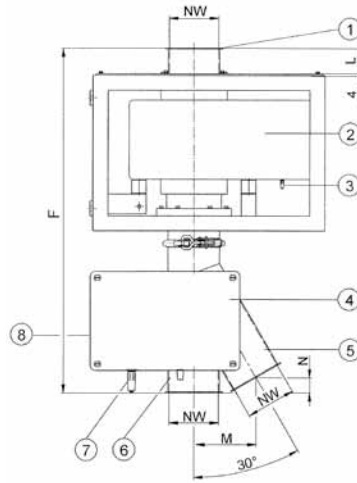
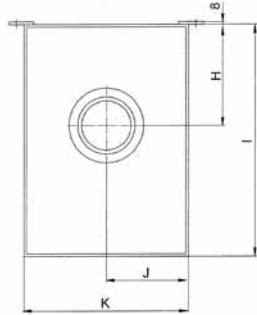
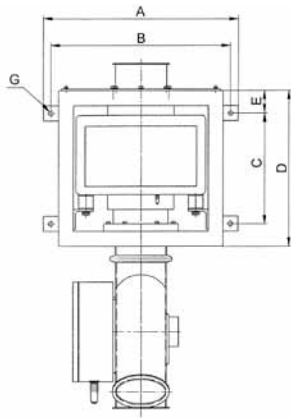
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- ATEX explosion-proof version
- Pharmaceutical version on request
- Low wear version for highly abrasive bulk material
- Pipe transition pieces with flanges
- Different temperature range for environment and product on request

# Annex (cont.)

## TECHNICAL DATA SHEET FF5G

### DIMENSIONS



- 1 Inlet
- 2 Detection coil
- 3 Connecting cable detection coil/control unit
- 4 Pneumatics housing
- 5 Reject outlet
- 6 Material outlet
- 7 Connector for connecting pneumatic cable/control unit
- 8 Compressed-air connection

### TECHNICAL DATA

Type	Nominal Passage Ø NW System Jacob	Maximum Scanning Sensitivity <sup>1</sup> Ø Fe-Ball	Maximum Throughput <sup>2</sup>	Weight Lbs/Kg
Model FF5G-80	3.15 in/80mm	0.45mm	282 cu ft/hr / 8000l/h	165/75
Model FF5G-100	3.94 in/100mm	0.57mm	424 cu ft/hr / 12000l/h	165/75
Model FF5G-120	4.72 in/120mm	0.60mm	565 cu ft/hr / 16000l/h	165/75
Model FF5G-150	5.91 in/150mm	0.77mm	883 cu ft/hr / 25000l/h	276/125
Model FF5G-200	7.87 in/200mm	0.95mm	1554 cu ft/hr / 44000l/h	320/145
Model FF5G-250	9.84 in/250mm	1.20mm	2436 cu ft/hr / 69000l/h	419/190

#### Dimensions in inches

Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Model FF5G-80	15.35	14.17	7.99	11.54	2.17	24.21	.35	8.70	19.53	6.50	12.99	2.01	4.25	.91
Model FF5G-100	15.35	14.17	9.37	12.32	1.77	27.36	.35	7.99	18.54	6.50	12.99	2.01	4.88	1.18
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Model FF5G-250	25.20	24.02	25.59	31.50	2.95	57.60	.43	12.60	27.87	11.02	22.05	1.65	10.71	2.95

#### Dimensions in millimeters

Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Model FF5G-80	390	360	203	293	55	615	9	221	496	165	330	51	app. 108	app. 23
Model FF5G-100	390	360	223	313	45	695	9	202.5	471	165	330	51	app. 124	app. 30
Model FF5G-120	390	360	238	328	45	749	9	215	496	165	330	51	app. 148	app. 43
Model FF5G-150	470	440	375	465	45	947	11	240	540	205	410	51	app. 175	app. 51
Model FF5G-200	570	540	450	600	75	1183	11	265	590	245	490	37	app. 228	app. 68
Model FF5G-250	640	610	650	800	75	1482	11	320	708	280	560	42	app. 272	app. 75

Larger types on request

<sup>1</sup> The stated detection sensitivity (ferrous ball Ø in mm) applies for nonconductive products at the standard operation frequency and refers to the center of the aperture (most disadvantageous position). Products that show intrinsic conductivity due to moisture content, electrolytes or other conductive contents may reduce the sensitivity, as well as variations of product temperature, environmental effects (mechanical shocks and vibrations, electromagnetic noise) or the set product angle. The detectable size of metal particles depends on their nature, shape and position while passing through the metal detector.

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Material flow:	Free falling, no back draft of material permissible
Bulk material temperature:	14°F – 176°F/-10°C to +80°C
Ambient temperature:	14°F – 122°F/-10°C to +50°C
Permissible maximum pressure: in the conveying pipe line	Maximum 7.25 PSI (0.5 bar)

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Electrical design:	Operating voltage: 100-240 VAC (±10%) selectable 50/60 Hz Current consumption: max. 800 mA Type of protection: IP 65 Reject duration (metal impulse): adjustable from 0.2 to 10 sec Self monitoring: detection coil and outputs Input: for functional test (make contact)

## OPTIONS/ACCESSORIES

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- Visual alarm
  - Failure indication
  - Failure and metal indication
- Audible alarm
  - Failure indication
  - Failure and metal indication
- Combination alarm (visual alarm and audible alarm)
  - Failure indication
  - Failure and metal indication
- Digital counter
- Compressed-air monitor
- Monitor system for diverter
- Button for functional test
- Button for manual rejection
- Antistatic coated scanning pipe
- Drop height above 19.69 in/500 mm
- Cable set for remote control unit
  - Length 20 ft/6m
  - Length 33 ft/10m
- Interfaces
  - RS232
  - RS485
  - Ethernet
  - WLAN
  - Profi Bus
- Air pressure regulator with filter
- Manual testing device
- Test samples
- Multifrequency technology (optimization of sensitivity)
  - Dual (used with few but very different products)
  - Quattro (used with many different products)
- UL/CSA certificate

## SPECIAL VERSIONS

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- ATEX explosion-proof version
- Pharmaceutical version on request
- Low wear version for highly abrasive bulk material
- Pipe transition pieces with flanges
- Different temperature range for environment and product on request



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