MM-414

Installation, Operation and Maintenance Instructions

CONTROL UNIT MODEL FFG

ERIEZ MAGNETICS HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506–1402 U.S.A.
WORLD AUTHORITY IN ADVANCED TECHNOLOGY FOR MAGNETIC, VIBRATORY and INSPECTION APPLICATIONS

Introduction

The texts and illustrations in this instruction manual are for the exclusive purpose of explaining how to operate and handle the FFG control unit. 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 the prior permission of the manufacturer. Nor may 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.

Table of Contents

ERIEZ CONTROL UNIT MODEL FFG

General Information

FIELD OF APPLICATION

The FFG control unit is used in combination with Eriez metal detectors and separators in the plastics, wood, food, chemical, and in the pharmaceutical industry. These systems inspect bulk materials for magnetic and non-magnetic metal contaminations. Of course, they also are suitable for similar applications in other branches of industry.

APPLICATION REASONS

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

SYSTEM IDENTIFICATION

The information in this instruction manual only applies to the FFG control unit. A label with the respective data is attached to 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.

OVERALL VIEW

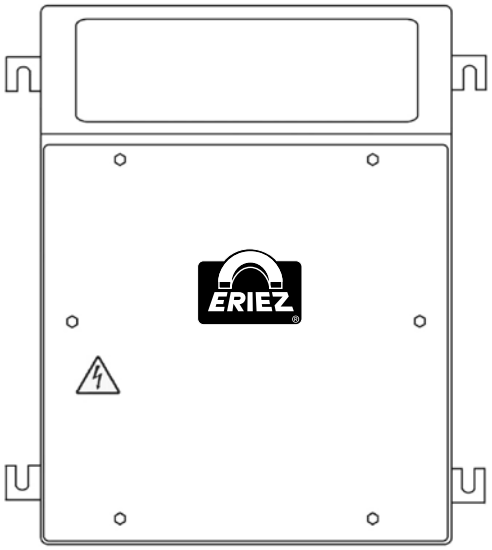


FIGURE 1
FFG control unit

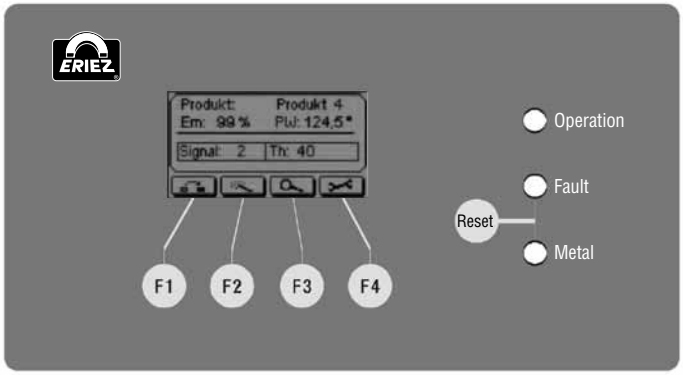
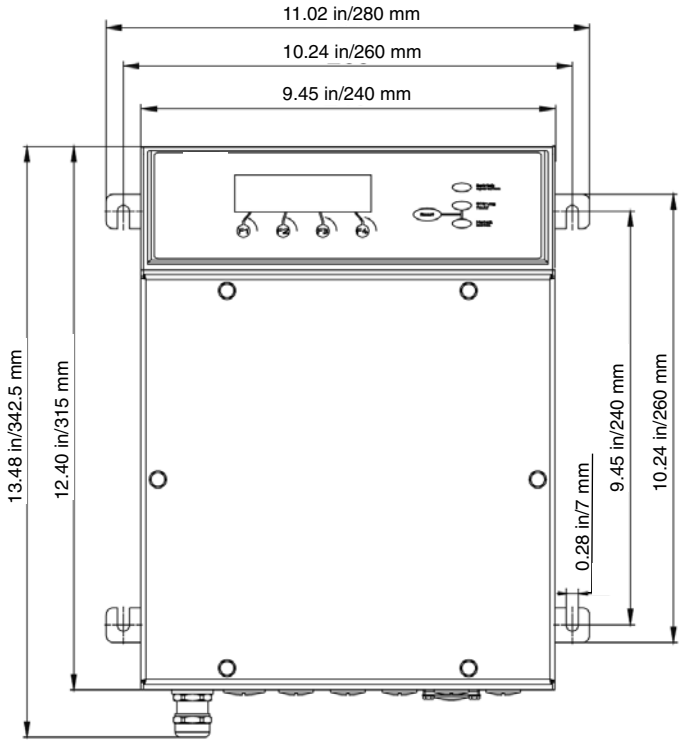
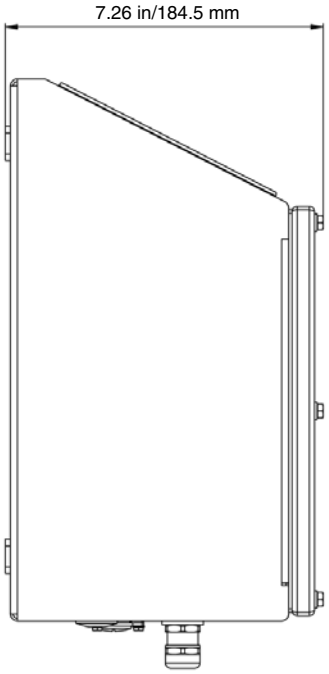


FIGURE 2
8-line graphic display

Dimensions and Technical Data





STANDARD DESIGN

Performance data

- Multiprocessor electronics with modern digital signal processing via DSP technology.
- Crystal stable search frequency (optional with multi-frequency technology) for highest sensitivity for all types of metal and high stability.
- Multi-product memory for 240 products.
- Self-learn system for compensation of product conductivity.
- Quick-learn system for automatic product changes without disrupting the production process.
- Product tracking for automatic compensation adjustment to slight product changes (i.e. recipes, dampness, defrosting).
- Product tracking for automatic compensation adjustment to slight product changes (i.e. recipes, dampness, defrosting).
- CE certified.

Operating

8-line graphic display:

- Multi lingual menu with clear text including four buttons for data entry plus reset button.
- Password protected for product change, product learning, parameter configuration and service menu.
- Three bright, colored LEDs for “Operation”, “Fault” and “Metal”.

Dimensions and Technical Data *(cont.)*

HACCP/GMP

- Password protected system log file for 1,500 data entries for complete monitoring of alerts, product changes, previous tests, etc. for quality assurance according to HACCP and ISO 9000.
- Menu controlled validations system for regular checkups of all system functions and detection accuracy.

Housing
Stainless steel 1.4301 (AISI 304), glass bead blasted.

Type of protection
IP 65.

Ambient conditions
14°F to 122°F (-10° C to +50° C), 25% to 85% rH, no condensation.

Storage and shipping conditions:
14°F to 122°F (-10° C to +50° C), 25% to 85% rH, no condensation.

Weight
Approx 13.23 lbs. (6.0 kg).

Operating voltage
100-240 VAC (±10%), 50/60 Hz.

Current input
Approx 250 mA/115 VAC, approx 120 mA/230 VAC.

Fuse
1.6 A, slow-blowing.

Mains cable
5.9 ft (1.8 m) with safety plug.

Switch inputs
2 switch inputs for proximity switches.
1 switch input each for sensor barrier, “Reset”, “Bypass”, “Manual Reject”, fill level indicator, air pressure monitoring Additional switch inputs for special functions and options included.

Switch outputs
2 switch outputs 24V DC for magnetic valves and 2 additional switch outputs 24V DC, max. total current load 500mA.
3 switch outputs 24DC “Operation”, “Metal”, and “Fault” i.e. for signal lamp and alarm horn.
2 potential-free relay switch outputs (max. 250 VAC/3A) for “Metal”.
1 potential-free relay switch output (max. 250 VAC/3A) for “Fault”.

Scanning sensitivity
See data sheet of the selected detection coil or complete device.

Self monitoring
Detection coil and outputs.

Options

- Multi-frequency technology for sensitivity optimization.
- Duo (for few different products).
- Quattro (for many different products).
- Serial interface RS232 with plug (IP65, 4-pole).
- Serial interface RS485 with plug (IP65, 4-pole).
- Ethernet interface (TCP/IP 100 Mbit/s, IP 65, RJ45).
- WLAN interface (802.11 b/g) with integrated aerial.
- Profibus.
- UL/CSA certificate.
- US-power cable.

Special versions

- Explosion-proof version ATEX.
- Higher degree of protection.

ENVIRONMENTAL CONDITIONS FOR OPERATION, STORAGE, AND TRANSPORT

The environment of the control unit should be free of any chemical vapours such as softeners, chlorine, or similar substances. The control unit must not be exposed to direct sunlight or to other environmental influences (rain, snow, storm). For ambient temperature conditions for operation, storage, and transportation 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.

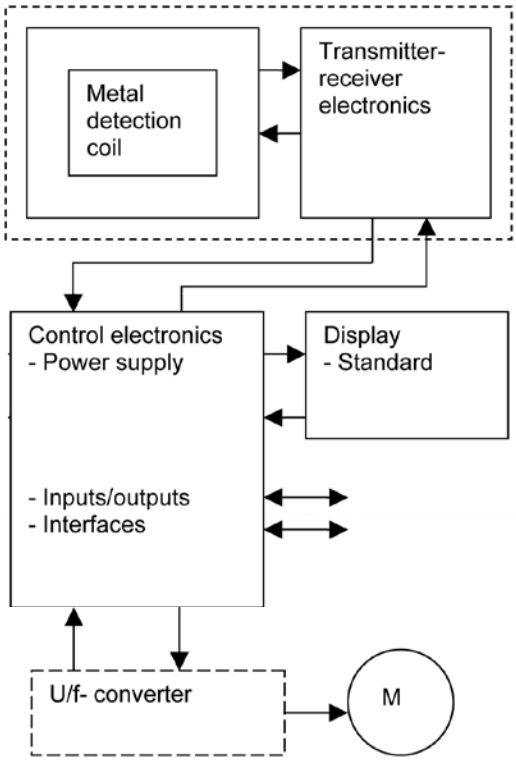
Result:

Idling: < 70 dB(A).
Activated: < 90 dB(A).

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

Design & Method of Operation

FUNCTIONAL PRINCIPLE



The metal detector works with the so-called “balanced coil” principle:

The transmitter winding in the search coil creates a high-frequency electromagnetic field, which is received by symmetrical placed receiver windings. The windings are connected against each other; when undisturbed, the system is in balance. An electrically conductible object within the detection area disrupts this balance and the electronic creates a switch signal.

A “teach in process” allows to suppress the conductivity of the product itself. Deviations from the taught-in product are usually caused by metal contaminants, which are detected by the device with high precision. The metal detector is equipped with comprehensive test and analysis software to ensure fault-free operation and retracing of product errors.

Interfaces allow simple operation as well as connection to a data management system.

IMPORTANT INFORMATION

For reasons of the employed technology it is not possible to guarantee 100% metal detection.

Design & Method of Operation *(cont.)*

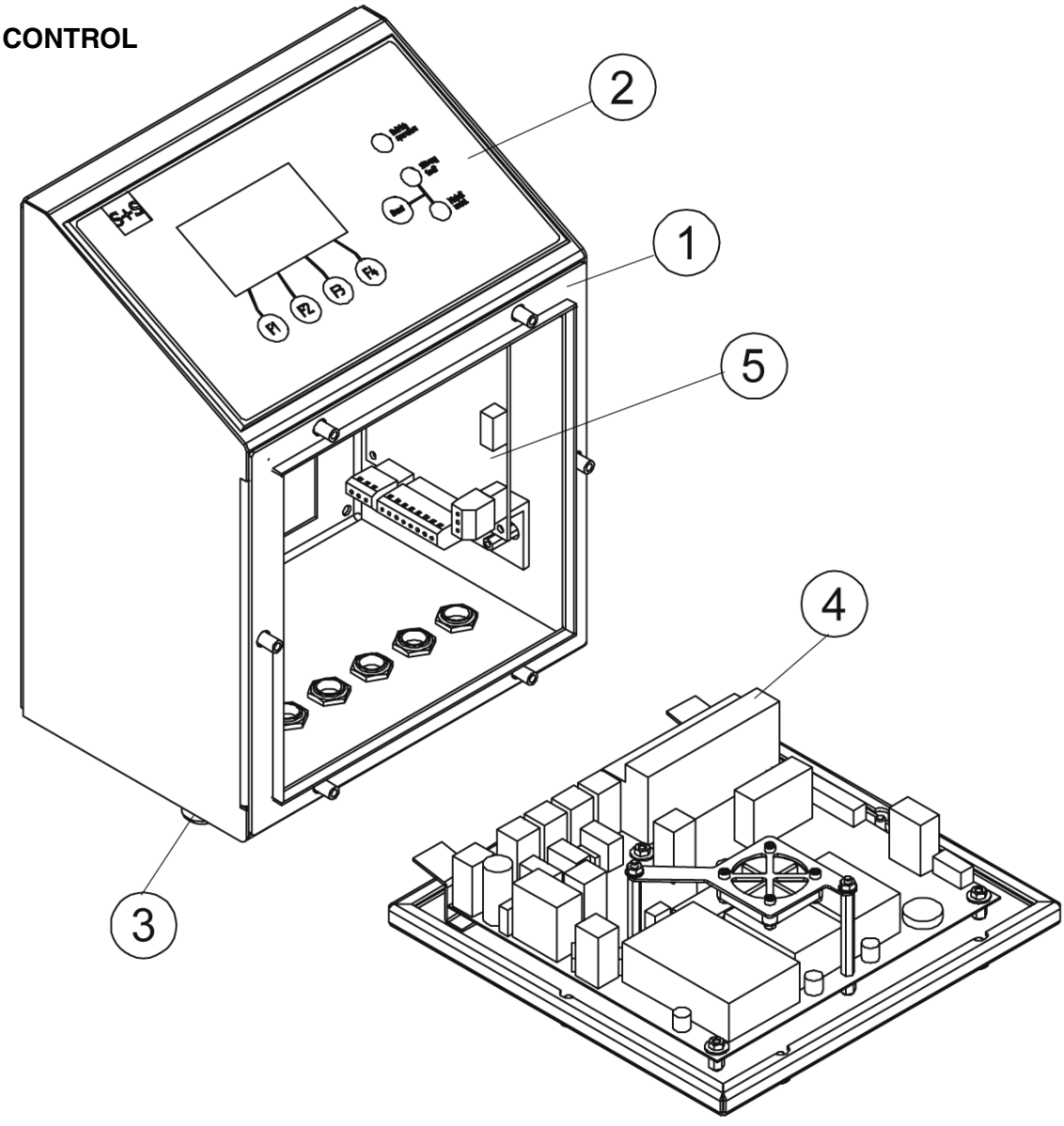
BASIC ELEMENTS:

① Housing
② Operating module (LCD graphic display)
③ Cable glands
④ Control electronics board STE-M
⑤ Evaluation electronics board AWE-M

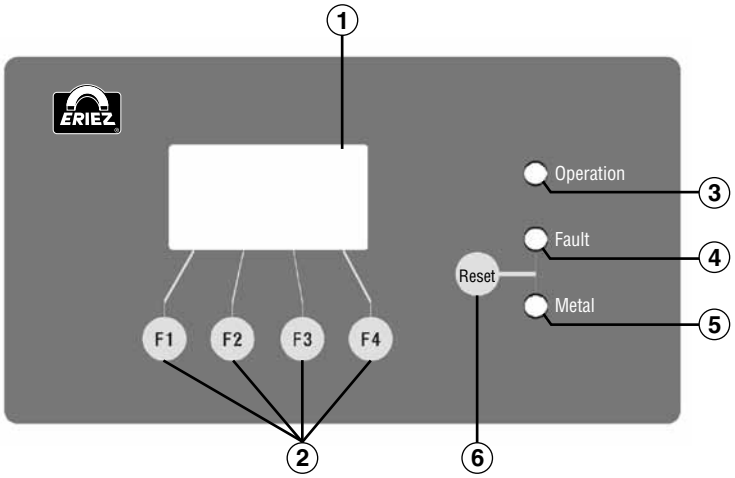
ACCESSORIES/OPTIONS

⑥ Multi-frequency technology for sensitivity optimization
   a. Duo (for few different products)
   b. Quattro (for many different products)
⑦ Serial interface RS232 with plug (IP65, 4-pole)
⑧ Serial interface RS485 with plug (IP65, 4-pole)
⑨ Ethernet interface (TCP/IP 100 Mbit/s, IP65, RJ45
⑩ WLAN interface (802.11 b/g) with integrated aerial

ERIEZ FFG CONTROL



OPERATING MODULE WITH LCD GRAPHIC DISPLAY



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

LED “Operation” (green)
Illuminated when device is ready.
Requires:

- Power supply.
- Outlets activated in “Outlet (Options)” menu.
- Bypass function not activated.

The operation indicator LED is turned off during the teach-in process!

The green LED flashes:

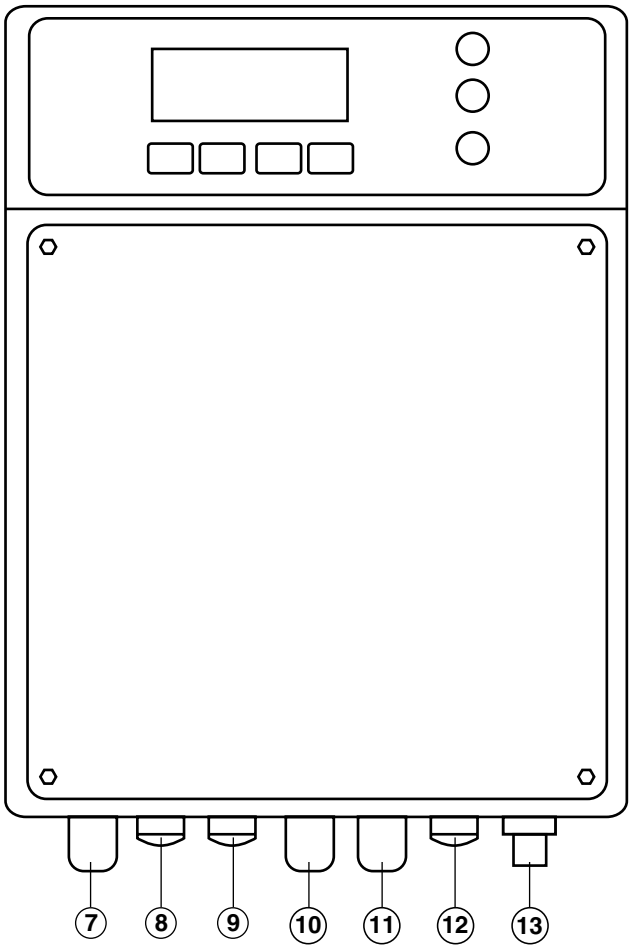
- As a warning (e.g. when the battery is too low).
- When requesting an audit (audit check).

LED “Fault” (red)
In case of a fault/error, the red LED flashes.

LED “Metal” (yellow)
The LED is not activated straight after detection but parallel to the activation of solenoid valve MV1 after a delay for the rejection time.

The LED is illuminated during manual rejection.

CABLE GLANDS

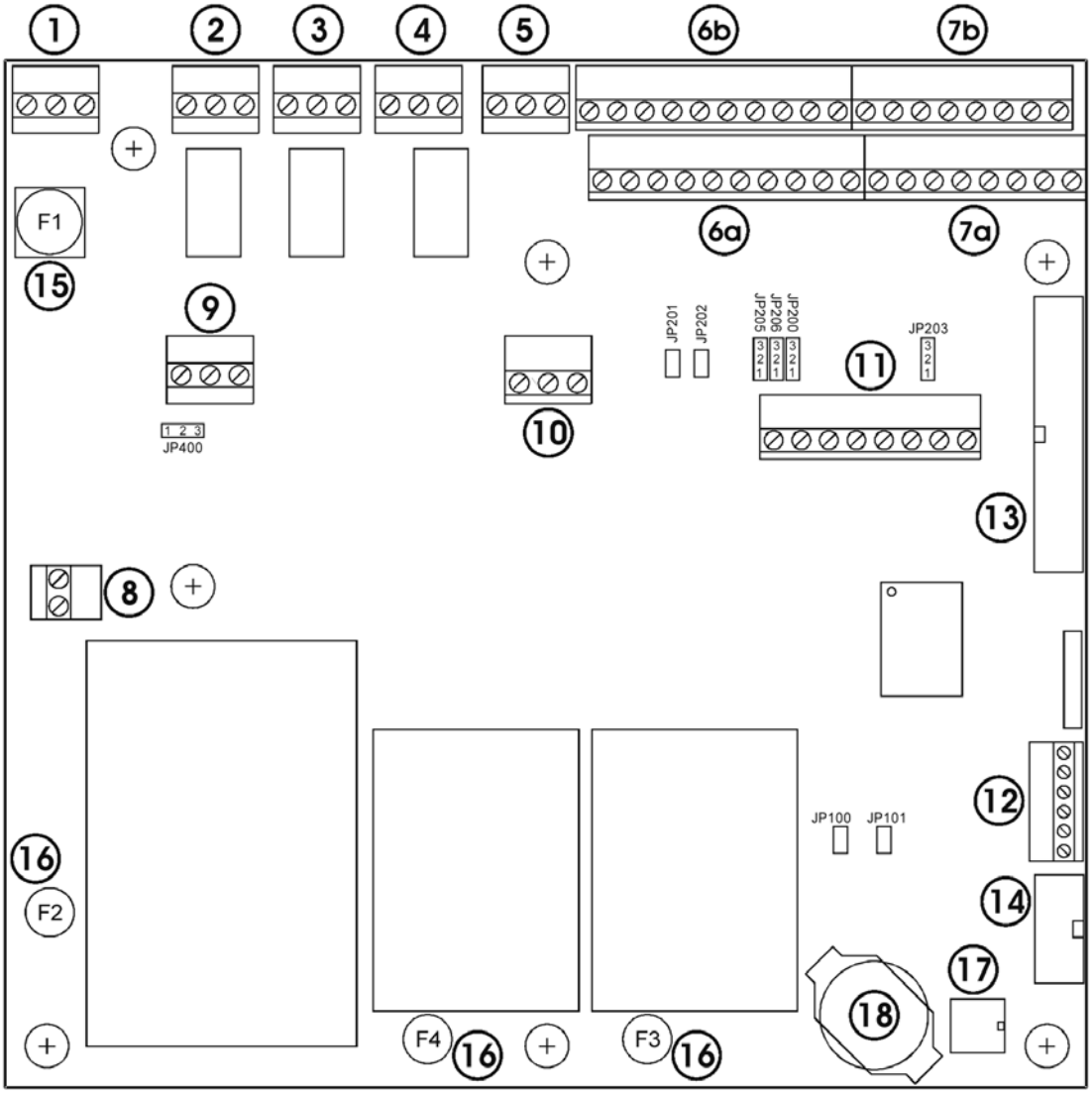


⑦ Cable gland for the mains cable
⑧ Cable gland for free use
⑨ Cable gland for free use
⑩ “Receiver” cable gland for connecting the detector coil (when coil is removed)
⑪ “Transmitter” cable gland for connecting the detector coil (when coil is removed)
⑫ Cable gland for free use
⑬ Cable gland for free use (or connection of the serial interface option)

Design & Method of Operation *(cont.)*

ERIEZ FFG-CONTROLLER BOARD STE

STE version, article number 44006482 (used as from August 2010).



Jumper	Position	Comment
JP101	Unpopulated	HW-Reset
JP400	1-2	MV 24V intern (default)
	2-3	MV 24V via ST15 (plug 9)
JP203	2-3	Default
JP200/JP205/JP206	1-2	UART2=RS232 (default)
	2-3	UART2=RS485
JP201/JP202	Plugged	Exclusion RS485 (default)

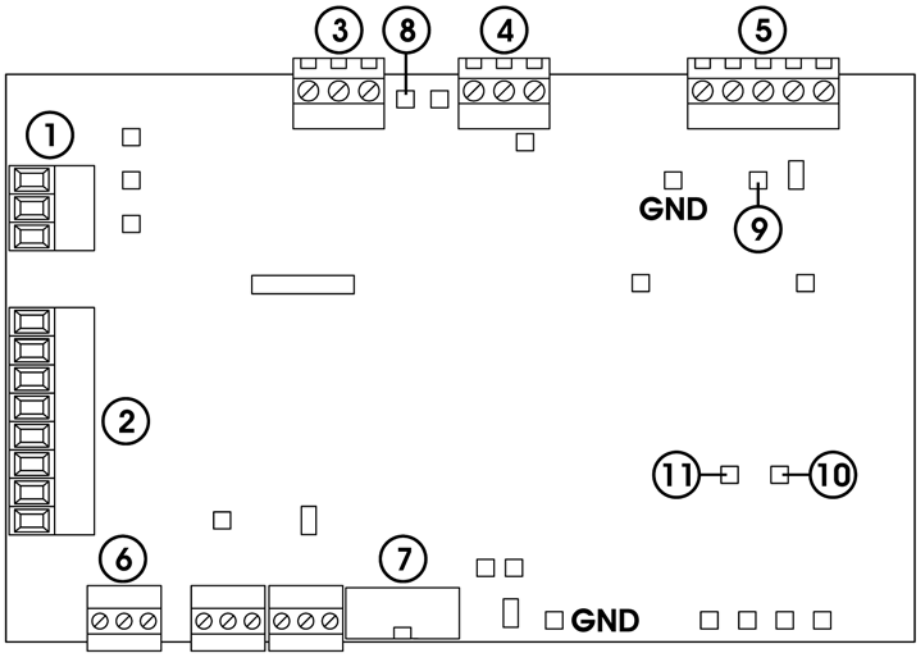
Fuse	Description	Type
F1	Mains supply	1, 6A slow-burning 1500A @ 250VAC 5x20mm
F2	Mains supply IC1	1, 6A slow-burning 35A @ 250VAC TR5
F3	Mains supply IC2	1, 6A slow-burning 35A @ 250VAC TR5
F4	Mains supply IC3	1, 6A slow-burning 35A @ 250VAC TR5

Connectors:	1. “Mains”: Mains supply
	2. “Fault”: Potential-free change-over-contact
	3. “Metal 2”: Potential-free change-over-contact
	4. “Metal 1”: Potential-free change-over-contact
	5. “24V Output 1-2”: 24V switching output
	6. a. 24 Inputs b. Connection detection coil/sensor electronic
	7. a. 24 Inputs b. Serial interface RS485/RS232
	8. “Mains out”: Mains connection for additional ACDC module 2 pole (L/N)
	9. “24V External”: Input for external 24V supply
	10. “24V output 3-4”: 24V switch outputs
	11. Serial interface/frequency converter/GAD
	12. “DC-output”: output voltages 24V, 5V and Vx
	13. Ribbon cable connector for control panel
	14. Ribbon cable connector for programming plug
 Elements connected to mains voltage:	1. “Mains”: connector
	2. “Mains out” connector
	15. Mains fuse total
	16. Mains fuse single
 Elements connected to external voltage:	2. “Fault”: connector
	3. “Metal 2”: connector
	4. “Metal 1”: connector
Memory devices:	17. Device and product data memory
	18. Data battery for Logbook

Design & Method of Operation *(cont.)*

ERIEZ FFG-EVALUATION ELECTRONICS BOARD AWE

AWE version, article number 44006482 (used as from August 2010).



Connectors:	1. STE RS485: Interface RS485 to the controller board
	2. Power supply: power supply from the controller board
	3. Transmitter: output signal to the detector coil
	4. Relay output: control signal to the detector coil (multi-/quattro)
	5. Receiver: input signal from the receiver
	6. UART1: connection flasher
	7. Ribbon cable connection for programming plug
Test points:	GND common ground for all signals
	8. Transmitter sine wave signal (45..50Vss) feeding the transmitter coil
	9. Receiver signal from the receiver coils
	10. Metal signal branch S
	11. Metal signal branch A

Safety

Our equipment conforms to 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!

INTENDED USE

The equipment is intended for use in the following fields of application and only in combination with a corresponding detection coil: free-fall applications. The equipment can be used in the plastics, food, animal feed, recycling and chemical industry. Basically, it is possible to also use the system in other applications than the intended use stated herein, but such applications always require the prior consultation and approval of Eriez.

SAFETY SIGNS

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 (i.e. at the metal relay) also may be energized. There is danger of electric shocks due to the presence of mains voltage. Connection symbols: "Mains" (1) "Metal 1/2" (3/4) and "Fault" (2)

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 control unit Eriez FFG may only be operated in the intended purpose. The cover of the electronic housing must be closed during operation. Entered moisture has to be removed! All fixed warning signs on the equipment may not be removed and have to be in a well recognizable condition. The operating instructions always have to be in a legible condition and completely available. Prior to commissioning always make sure that the applicable accident prevention regulations are observed. If the control unit is not mounted at the detection coil, it must be properly and firmly fastened by means of the four screws. The operator must make sure that the equipment is mounted at an ergonomic height for operation. The operator may only appoint qualified personnel for operation, maintenance and repair work. People with cardiac pacemaker should not permanently stay in the area of the detection coil. If potentially explosive materials are examined, the pertinent regulations must be observed.

SAFETY INFORMATION FOR OPERATION, MAINTENANCE AND CLEANING

Because of energized components in the electronics housing there is a risk of injuries due to electric shock or burns. During operation the cover of the electronics housing must be kept closed. Only qualified personnel may operate and clean the equipment. If the electronics housing must be opened for maintenance or cleaning purposes, remove any dirt and moisture from the electronics housing, so that no larger amounts may get into the interior. Always disconnect the power supply and any connected external circuits before opening the cover. Any moisture that has penetrated into the interior must be removed from the electronics housing.

If any maintenance work must be performed in energized condition, i.e. battery replacement, such work may only be performed by a qualified electrician under strict observation of the attached warning labels and with due regard to standard approved rules of electrical engineering.

Safety *(cont.)*

SAFETY INFORMATION FOR COMMISSIONING

To avoid any injuries due to energized parts in the electronics housing, the information in Mechanical Mounting and Connection of the Equipment must always be observed.

SAFETY INFORMATION FOR STORAGE AND TRANSPORT

Always observe the information in the Notes on Stable Standing Requirements section to avoid any transport damage and personal injuries.

NOTES ON RESIDUAL RISKS

Electrical circuits may still be live even after having been isolated from the mains. Switch off immediately if a fault occurs.

NOTES ON STABLE STANDING REQUIREMENTS

To avoid any loss of stable standing, the information for transport, commissioning and operation must always be observed. Always make sure that the fastening screws of the control unit are tight during operation. When storing or transporting the control unit, place it on the closed rear panel of the housing.

CONSEQUENCES OF UNAUTHORIZED MODIFICATION

Unauthorized modification or repair will invalidate all manufacturer declarations and guarantees.

IMPROPER USE

For other applications as enumerated in the Intended Use section, the control unit Eriez FFG intended for – that is regarded as inadmissible operation. Improper use also includes operating the equipment with excessive mechanical, static or dynamic loads (i.e. heavy machine parts or strong vibration). It is furthermore not permitted to inspect any aggressive materials such as materials containing lyes, acids and solvents, or materials that react to electromagnetic fields, or living persons or animals, and to operate the system in a hazardous area.

Commissioning

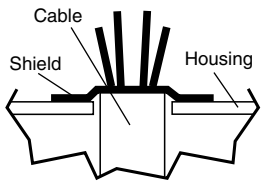
MECHANICAL INSTALLATION

- Ensure stable and non-vibrating installation. Do not install the system in an explosion proof zone.
- Do not install the detection coil and the electronic unit in the vicinity of interference fields (large electric motors and frequency converters.) The distance depends on the power consumption of the motor or of the frequency converter.
- Mount the control cabinet by using the provided bores, i.e. at a wall or frame (dimensions are shown in the outline drawings). Pay attention to good stability, as the weight of the control unit is approx. 13.22 lbs (6 kg).
- Never install the electronic unit in other switchgear cabinets, because this may lead to interference effects (i.e. from contactor controls).
- Cable lengths may only be modified after consultation with Eriez. Use only original cables. Lay the connecting cable in fixed installation apart from other cables (i.e. fix it with nailing clips or lay it in a cable duct).
- If several metal detector systems are used, the distance of the detection coils must not be less than 6.56' (2 m). If these coils stand side by side. If the coils are arranged opposite to each other, the distance must not be less than 32.81' (10 m). These values apply to large systems, for smaller systems, the distances may be reduced to 19.69" (50 cm). If, for reasons of space, these distances cannot be observed, please contact Eriez service!
- Do not install the equipment in such a way that operation of the mains cut-off switch is hindered in any way!

CONNECTION OF THE EQUIPMENT

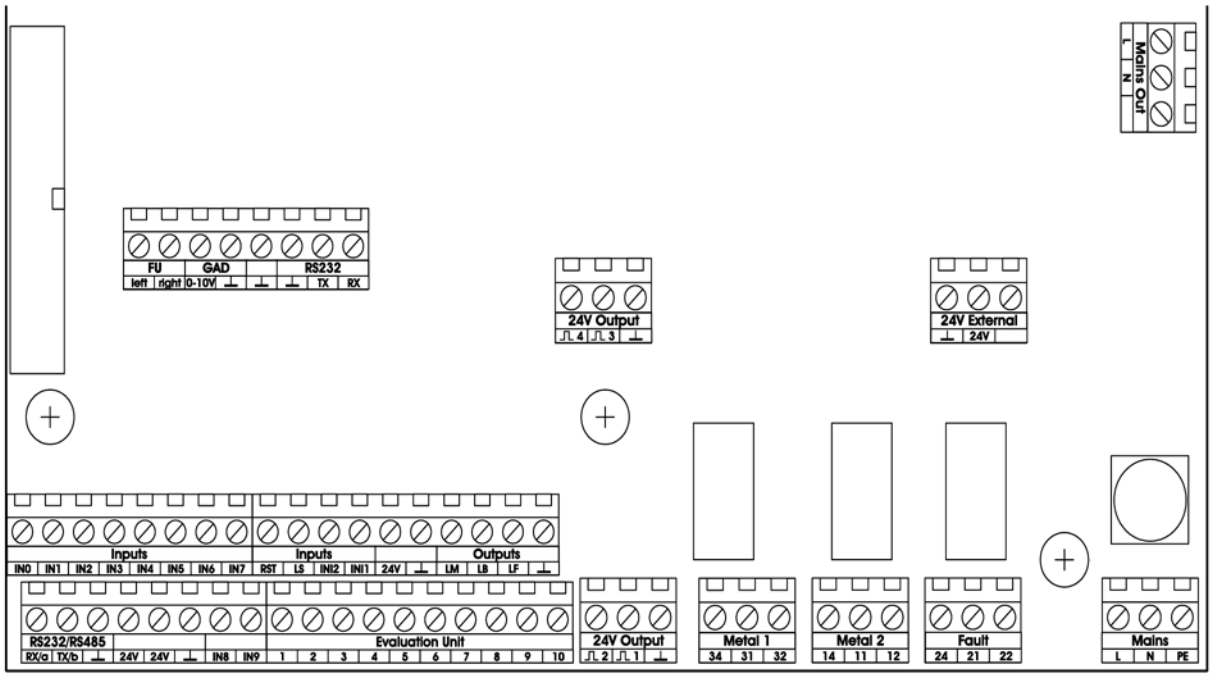
IMPORTANT INFORMATION

In order to meet CE conformity all cables outside of the housing have to be shielded. The shields must be grounded immediately after the cable gland.



The terminals “Mains” and “Evaluation Unit” are already factory reconnected. According to the delivered option several connectors may be used.

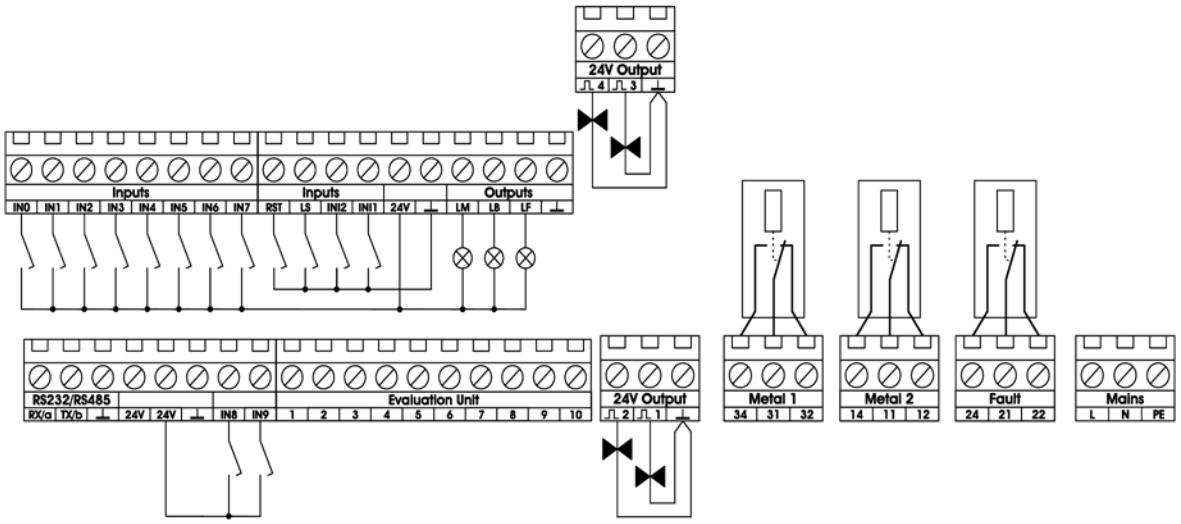
CONNECTOR ASSIGNMENTS ON THE CONTROLLER BOARD



ELECTRICAL CONNECTION

Signal	Connection	Function
"Mains out"	Output mains voltage	Supply for external ACDC module
"Fault"	Potential-free relay contact	Normal operation: contact 21 and 24 closed In case of a fault: contact 21 and 22 closed
"Metal 1"	Potential-free relay contact	Normal operation: contact 31 and 32 closed In case of metal detection: contact 31 and 34 closed
"Metal 2"	Potential-free relay contact	Normal operation: contact 11 and 12 closed In case of metal detection: contact 11 and 14 closed
"24V External"	Connection input 24V	24V input for external solenoid valve supply
"24V output"	24VDC switching output	Low-active = yes: Normal operation: 0VDC to ⊥ In case of metal detection: 24VDC to ⊥ Low-active = no Normal operation: 24VDC to ⊥ In case of metal detection: 0VDC to ⊥
"⊥"	Ground (GND)	Power supply for proximity switches and light barriers Ground reference for the inputs IN1, IN2, LS and RST
"Outputs"	24VDC switching outputs wired to +24VDC	LM: Metal lamp lights on metal detection LB: Operation lamp Activated for operation and audit request (flashing) LF: Fault lamp Lights in case of errors
"24V"	24VDC power supply	Power supply for light barriers and proximity switches Signal reference for outputs LF, LB and LM Signal reference for inputs IN0..IN9
"Inputs"	24VDC switching inputs to ⊥	IN1 1. Proximity switch input for distance measurement/diverter flap (NPN) IN2 2. Proximity switch input for distance measurement/diverter flap (NPN) LS Start autotest RST External reset input IN0-IN Switch inputs for special functions and options
"FU"	Connection frequency converter	Left Direction select frequency converter left Right Direction select frequency converter right
"GAD"	Connection speed specification	0-10V Analogue signal for frequency converter

Commissioning *(cont.)*



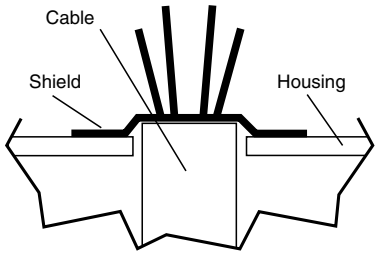
ELECTRICAL PERFORMANCE

Potential-free relay contacts	250VAC/3A 120VDC/3A
24VDC outputs	Entire max. current load: 500mA
Inputs: IN1/IN12/ LS/RST	Connection of make contacts against ⊥, resp. NPN outputs
Inputs: IN0..IN9	Connection of make contacts against +24 V, resp. PNP outputs

ELECTRICAL CONNECTION OF THE EQUIPMENT

IMPORTANT INFORMATION

Maximum cable length for external components, switches and sensors is 49.21' (15 m). Only shielded cables should be used. The shields must be attached directly to the electronics housing.



MAINS SUPPLY VIA SAFETY SOCKET

1. Connect the cable with mains plug to an existing socket.
2. After approximately 5 seconds the machine is ready for operation.

MAINS SUPPLY VIA CONNECTION BOX

WARNING

The following procedures should only be undertaken by qualified personnel. Before removing cover plates, make sure the equipment is isolated from mains or external voltage.

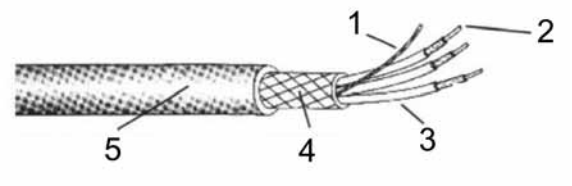
IMPORTANT INFORMATION

Do not remove either the mains cable or the protective gland as these are essential parts of the EMC configuration. The main cable is a special EMC protected cable and should not be replaced by any other cable.

DANGER

If the mains plug is removed, a terminal box and a suitable mains disconnector switch with corresponding labelling/marking must be installed! This disconnector switch must be easily accessible and must disconnect all poles from the mains.

1. Remove mains plug.
2. Strip 1.97" (5 cm) length of insulation from cable and 0.39" (1 cm) from leads and attach cable cores.

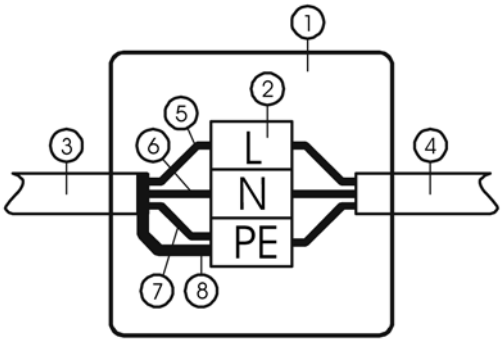


① Shield
② Conductor
③ PVC-insulator
④ Insulation
⑤ PVC Covering

3. Feed cable into connection box according to diagram below.

⚠ WARNING
Make sure that the mains supply is switched off.

⚠ WARNING
Use a suitable shutdown unit (i.e. emergency switch).



① Terminal box
② 3 pin terminal
③ Control unit mains cable
④ Mains supply
⑤ Conductor L (brown) to terminal L
⑥ Conductor N (blue) to terminal N
⑦ Conductor PE (yellow/green) to terminal PE
⑧ Shield to terminal PE

! IMPORTANT INFORMATION
Connect the shield to PE.

4. Close the terminal box.
5. The unit is ready for operation approximately 5 seconds after switching it on.

NOTE: The mains cable has a wire cross-section of 0.75 mm². The mains supply fuse protection should be set accordingly. On the controller board STE are alternating mains fuses welded.

Menu/Operation

This chapter starts with a short manual and cross references in order to familiarize the reader with the most important settings. Following this, all setup menus are described. As an orientation guide, the menu structure can be folded out.

GENERAL OPERATION

The electronic can be operated with 4 buttons, which have different functions depending on the chosen menu. The most common symbols are described as follows:

Symbol	Function	Comment/Example
	Change product	
	Teach-in product	
	(Product-) parameters	
	Setup/settings	
	Scroll down	
	Scroll up	
	Back	
	Enter/select	
	Tabulator/next	
	Change selection	☑ <-> ☐ or Autom. Manual
	Cancel	
	Decrease value	
	Increase value	

Menu/Operation *(cont.)*

QUICK START
LANGUAGE SELECTION

1. Turn on device; operating mask is displayed (See Operating Mask section).
2. Press F4 button.
3. Press F1 until you reach the item marked with "*)" (Spräche *) (language*).
4. Press F4 to select the menu item.
5. Select language and confirm with F4 (See Menu/Operation - Language).
6. Exit with F3.

Please note: For the FFG control unit there are two language versions with the following languages.

Language version 1

- German
- English
- French
- Spanish
- Italian
- Swedish
- Finnish
- Dutch
- Danish
- Japanese

Language version 2

- German
- English
- Czech
- Polish
- Russian
- Greek
- Turkish

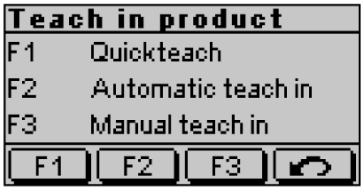
TEACH-IN OF A NEW PRODUCT

IMPORTANT INFORMATION

Please ensure that only products without metal contaminants (metal free products) are conveyed.

Starting from operating mask, press F2.

Menu “Teach-in product” is displayed. Select “Automatic tech-in” with F2.

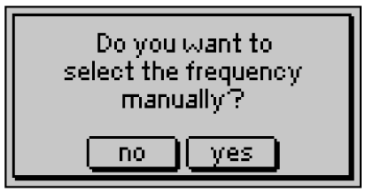


In the product list, “**NEW** xxx” is selected. Confirm with F4 or exit menu with F3.

The suggested standard name “Productxxx” can now be changed. Select letters and numbers with F1 and F2. F3 jumps to the next letter. Confirm name with F4.

Conveying speed can be selected with F1 [-] and F2 [+]. Confirm with F4 [✓] or exit menu with F3 [X] without saving any changes. The figures in brackets show the optimal speed range for the selected settings.

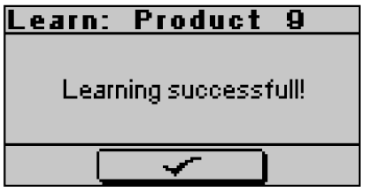
For multi-frequency systems, the search frequency can be selected. Press F3 “Yes” to do so. Continue with F2 “No” without changes to the search frequency.



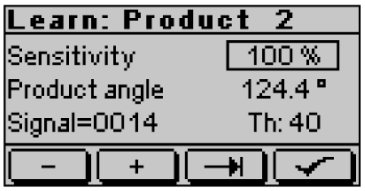
Press F2 [↻] to switch between available search frequencies. Confirm changes with F4 [✓] or exit menu with F3 [X] without saving any changes.

Follow the on-screen instructions and convey the product several times, repeat the process if asked to do so. Close with F2/F3 [✓].

The display will illustrate if learning was successful. Close automatic learning with F2/F3 [✓].

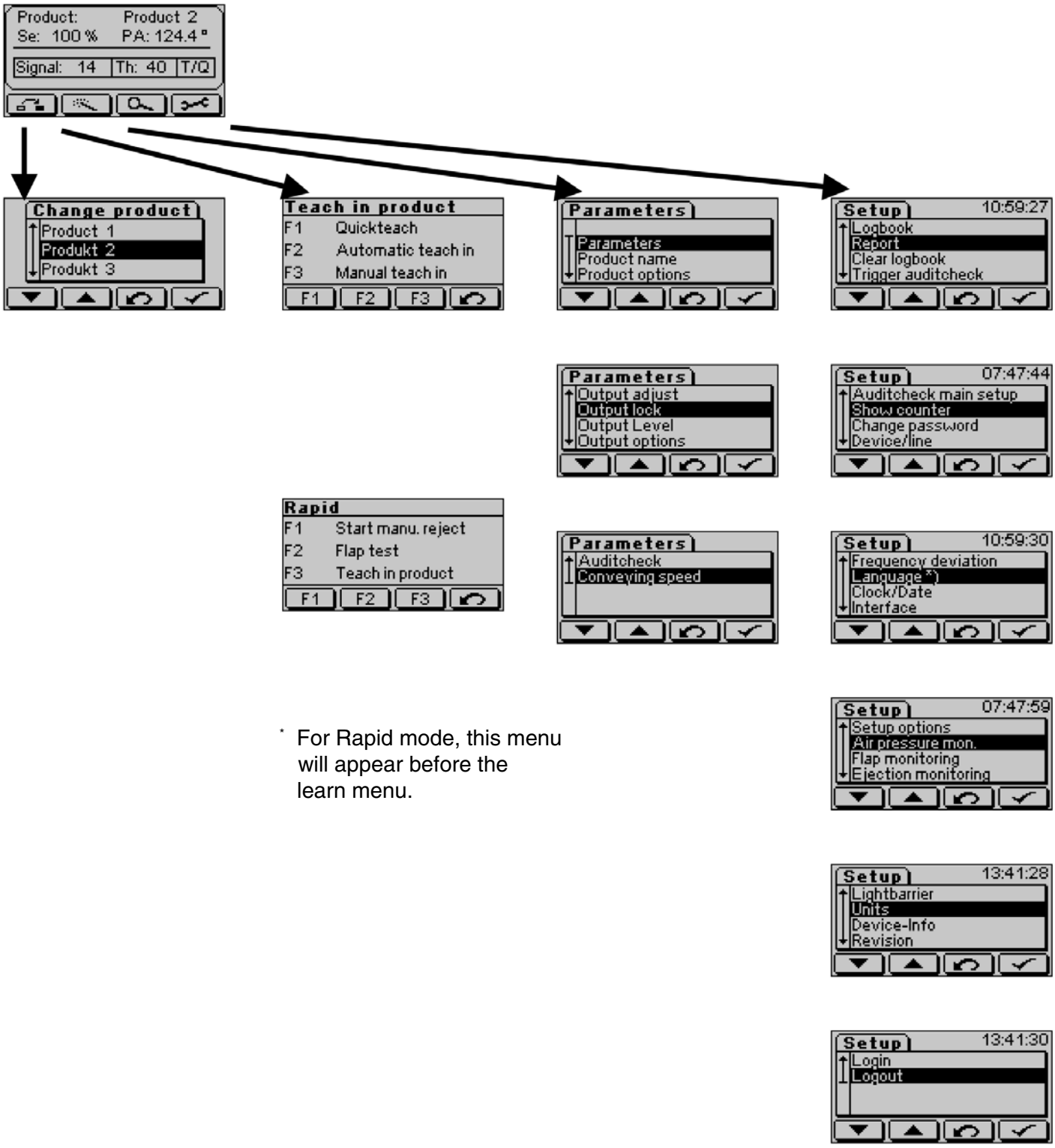


The automatically calculated values for “Sensitivity” and “Product angle” can be manually optimized with F1 [-] and F2 [+]. The threshold “Th” (typ. 40) can be adjusted separately. Press F3 [→|] to go to the next value. The signal display illustrates how recent changes affect the system’s performance. **FFG is now optimized for the product and the environment. Test the device with a test sphere.**



Menu/Operation *(cont.)*

MENU STRUCTURE



* For Rapid mode, this menu will appear before the learn menu.

MENU STRUCTURE

Change product

Teach-in product

- Quick teach
- Automatic teach-in
- Manual teach-in
- Start manual reject
- Flap test
- Teach-in product

Parameters

- Parameters
- Product name
- Product options
- Output adjust
- Output lock
- Output Level
- Output options
- Audit check
- Conveying speed

Setup

- Logbook
- Report[4]
- Clear logbook[3]
- Trigger audit check (when audit check is activated)
- Audit check main setup[2]
- Show counter
- Change password[2]
- Device/Line[2]
- Frequency deviation[2]
- Language
- Clock/Date[2]
- Interface[2]
- Setup options[2]
- Air pressure monitoring[1]
- Flap monitoring1
- Ejection monitoring[1]
- Light barrier[1]
- Units[2]
- Device-Info
- Revision
- Login
- Logout

[1] When function is activated and announced in setup level 2.

[2] When announced in setup level 1.

[3] If logged in setup level 1 or 2.

[4] If “Printer portable” function is activated.

OPERATING MASK

Displayed in normal operation mode.
Displayed information:

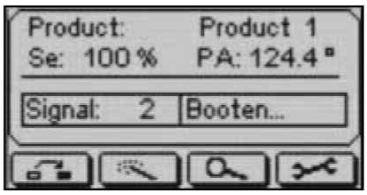
- Current product name (top right)
- Se: Sensitivity (0 - 100%)
- PA: Product angle (0° - 180°)
- Signal: Current signal of the detector
- Th: Threshold for metal detection (standard: 40)
- T/Q: Displays, if tracking (T) and/or quicklearn (Q) are activated

The bottom line displays the function of the operation buttons F1 to F4 and can vary depending on the menu. In the operating mask, the buttons have the following functions:
Operating mask:

- F1: Change product
- F2: Teach-in product
- F3: Parameters
- F4: Setup

Different displays

While booting the system, the display shows for 2 seconds **Booten…** In the main menu.

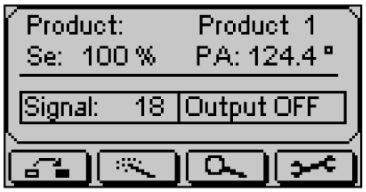


When metal is detected but not yet rejected (i.e. because of light barrier synchronisation (see Menu/Operation - Light Barrier)), the display shows **DETECTED**.

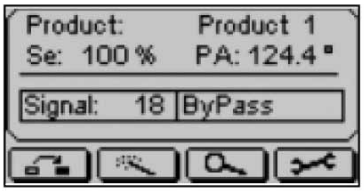
Menu/Operation *(cont.)*

On synchronization of the light barrier but before rejection of the product, the display shows **Sync**.

If the outputs are disabled via menu settings, the display will illustrate this by showing **Output OFF**. In addition, the green operating light is off and a log entry is created.

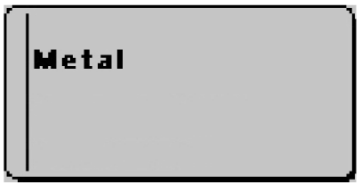


If metal detection is deactivated over the digital bypass, the display shows **ByPass**. In addition, the green operating light is off as well and a log entry is created.



Should an error occur, the following mask is displayed, the red error light flashes and a log entry is created. The picture shows a light barrier error as an example. The error message can be reset by pressing the RESET button, once the cause of the error is corrected.

On detection of metal, the mask on the left is displayed, the yellow metal light comes on and a log entry is created.



CHANGE PRODUCT

FFG can save up to 240 different products and their corresponding parameters. This functionality enables quick product changes.

Starting from operating mask, press F1. "Change product" menu is displayed. Select product from the list with F1 and F2 and confirm with F4. The display automatically changes back to operating mask. Go back to operating mask without product change with F3.

IMPORTANT INFORMATION

Product A and B (for multi-frequency systems A1 to A4 and B1 to B4) are pre-set and are only used to test the device. These pre-set products are of no value for operating with actual products.

IMPORTANT INFORMATION

If the current product is selected again and confirmed with F4 , a batch change is selected; i.e. the corresponding counters for metal and error are reset to "0" for the new product batch.

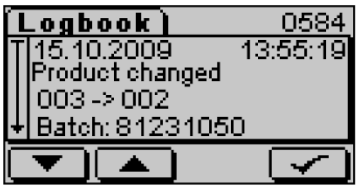
If the option "batch number" (Setup Options) is activated; it can be entered for a product or batch change. A batch number different to "0" will be saved in the log file.

For consistent batch monitoring, please ensure that "net on" or the learning of a new product is followed by a manual batch change for the entered product. Only then a batch number can be logged.

CHANGE PRODUCT *(cont.)*

Enter numbers with F1 and F2 . Press F3 to move to the next digit. Confirm batch number with F4 and exit menu.

The following logbook entries are possible:
Product change with batch number.



Batch change with batch number.

Product change without batch number.

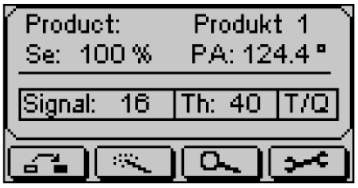
Batch change without batch number

TEACH-IN PRODUCT
QUICK TEACH

This function is used to set up the device quickly for a new product. All product parameters (selection of reject unit, conveying speed, etc.) are copied from the current product and don't have to be re-entered.

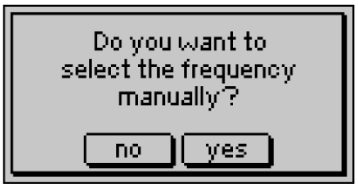
IMPORTANT INFORMATION
Ensure that only metal-free products are being used.

Starting from operating mask, press F2 .



Menu "Teach in product" is displayed. Select "Quick teach" with F1.

For multi-frequency devices, the search frequency can be select by pressing FE "yes". Exit with F2 "no" without changing the current search frequency.

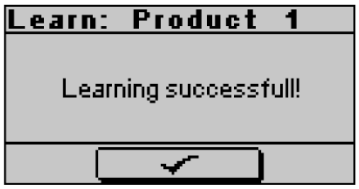


Select a search frequency with F2 . Confirm changes with F4 or exit menu with F3 without saving any changes.

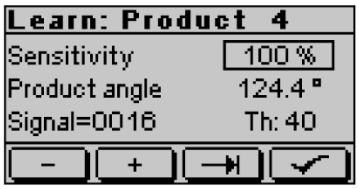
Menu/Operation *(cont.)*

Follow instructions on the display and convey the product several times; repeat the process if asked to do so. Finish with ✓ .

The display will illustrate if learning was successful. Finish automatic learning with F2/F3 ✓ .

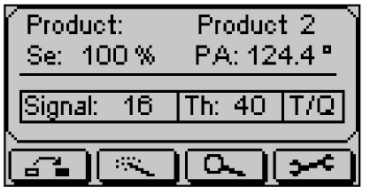


The automatically calculated values for “Sensitivity” and “Product angle” can be manually optimized with F1 − and F2 +. F3 →| switches between “Sensitivity” and “Product angle”. The threshold “Th” can be adjusted separately. Confirm with F4 ✓ and switch to operating mask. The signal display illustrates how recent changes affect the system’s performance. **FFG is now optimized for the product and the environment. Test the device with a test sphere.**



AUTOMATIC TEACH-IN

Starting from operating mask, press F2 .



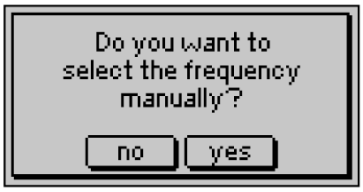
Menu “Teach-in product” is displayed. Select “Automatic tech-in” with F2.

In the product list, “**NEW** xxx” is selected. Confirm with F4 ✓ or exit menu with F3 ×.

The suggested standard name “Productxxx” can now be changed. Letters and numbers can be entered with F1 ▼ and F2 ▲. F3 →| jumps to the next letter. Confirm name with F4 ✓.

Conveying speed can be selected with F1 − and F2 +. Confirm with F4 ✓ or exit menu with F3 × without saving any changes. The figures in brackets show the optimal speed range for the selected settings.

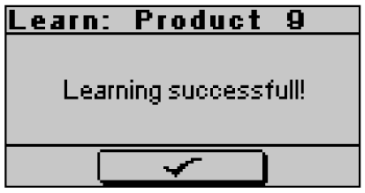
For multi-frequency systems, the search frequency can be selected. Press F3 “Yes” to do so. Continue with F2 “No” without changes to the search frequency.



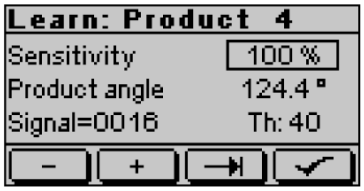
Press F2 to switch between available search frequencies. Confirm changes with F4 or exit menu with F3 without saving any changes.

Follow the on-screen instructions and convey the product several times. Repeat the process if asked to do so. Finish with F2/F3 .

The display will illustrate if learning was successful. Finish automatic learning with F2/F3 .



The automatically calculated values for “Sensitivity” and “Product angle” can be manually optimized with F1 and F2 . F3 switches between “Sensitivity” and “Product angle”. The threshold “Th” can be adjusted separately. Confirm with F4 and switch to operating mask. The signal display illustrates how recent changes affect the system’s performance. **FFG is now optimized for the product and the environment. Test the device with a test sphere.**

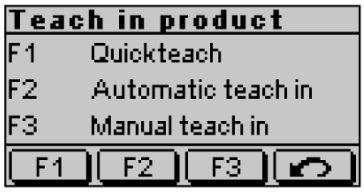


MANUAL TEACH-IN

IMPORTANT INFORMATION
Ensure that only metal-free products are being used.

Starting from operating mask, press F2 .

Menu “Teach-in product” is displayed. Select “Manual teach-in” with F2.



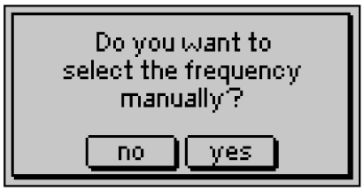
In the product list, “**NEW** xxx” is selected. Confirm with F4 or exit menu with F3 .

The suggested standard name “Productxxx” can now be changed. Letters and numbers can be entered with F1 and F2 . F3 jumps to the next letter. Confirm name with F4 .

Menu/Operation *(cont.)*

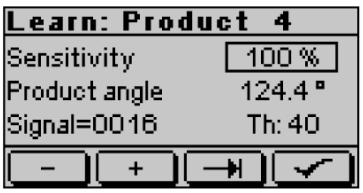
Conveying speed can be selected with F1 [-] and F2 [+]. Confirm with F4 [✓] or exit menu with F3 [X] without saving any changes. The figures in brackets show the optimal speed range for the selected settings.

For multi-frequency systems, the search frequency can be selected. Press F3 “Yes” to do so. Continue with F2 “No” without changes to the search frequency.



Press F2 [↻] to switch between available search frequencies. Confirm changes with F4 [✓] or exit menu with F3 [X] without saving any changes.

“Sensitivity” and “Product angle” can be manually optimized with F1 and F2. F3 switches between “Sensitivity” and “Product angle”. The threshold “Th” can be adjusted separately. Confirm with F4 and switch to operating mask. The signal display illustrates how recent changes affect the system’s performance. **Test the device with a test sphere.**



RAPID ADDITIONAL SETUP MENU

In Rapid mode, an additional menu will appear before the learn menu. Specific tasks can be carried out in this menu.

F1 starts manual reject. Solenoid valves MV1 and MV2 are activated. The yellow “metal” LED lights up and the display shows “stop reject”.

F2 flap test (similar to “real” metal incident). Valves and relays are activated (duration and delay are considered), yellow “metal” LED lights up.

F3 triggers “Teach in product” menu.

PARAMETERS

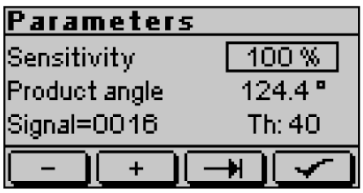
Starting from operating mask, select parameter menu with F3 [🔑]. Select parameter with F1 [▼]/F2 [▲] and confirm with F4 [✓]. Leave the sub-menu with F3 [↶] to the next higher menu level

IMPORTANT INFORMATION

Changes in this menu are only applied for the current product.

Menu “Parameters” is displayed. Select “Parameter” by pressing F4 [✓].

Select “Sensitivity”, “Product angle” and “Threshold” with F1 [-] and F2 [+] manually. Change between “Sensitivity”, “Product angle” and “Threshold” with F3 [→|]. Confirm with F4 [✓]. The signal display illustrates how recent changes affect the system’s performance.



CHANGE PRODUCT NAME

Select “Change product name” with F4 [✓].

Letters and numbers can be entered with F1 [▼] and F2 [▲]. F3 jumps to the next. Confirm name with F4 [✓].

PRODUCT OPTIONS

Select “Product options” with F4 [✓].

Select options with F1 [▼]. Check or uncheck selected options with F2 [↻]. Exit menu with F3 [✗] without saving any changes. Save changes with F4 [✓].

Quicklearn: This option automatically compensates sudden changes of product attributes (i.e. changes in recipe). The new product angle will be saved and log file created.

Tracking: This option automatically compensates slow changes of product attributes (such as changes in temperature). Changes of the product angle are temporary and are not saved.

Stop & Go mode: This option is necessary when products might stop within the detection coil (i.e. caused by conveyor stops).

OUTPUT ADJUST

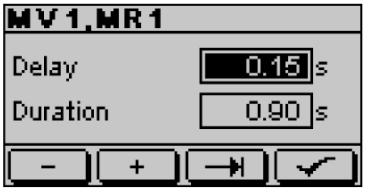
Select “Output adjust” with F4 [✓].

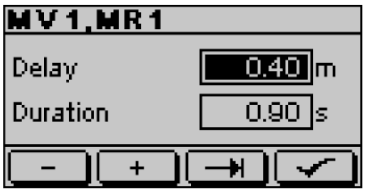
A delay of 0 to 60 seconds can be selected in steps of 50ms. In operation mode “conveyor with controller”, the delay for solenoid valve 1 can be selected in steps of 0.01m. The duration of 0.05s to 60s can be selected in steps of 50ms. This is not required in case outputs are set to “manual reset” or “self holding”.

Values are selected with F1 [-]/F2 [+] .
F3 [→|] switches between delay and duration.
To confirm and jump to the next menu page, press F4 [✓].

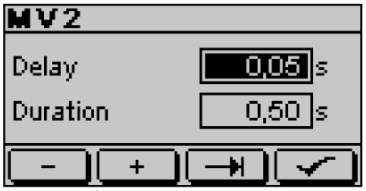
Menu/Operation *(cont.)*

MV1 (24VDC output for solenoid valve 1) and MR1 (relay metal 1): Delay (in s or m) and duration for output signal for MV1. In conveyor mode, “manual reset” also determines time and distance to conveyor stop.

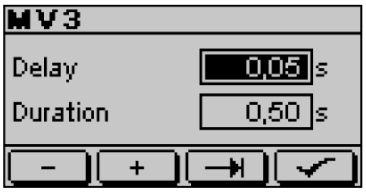




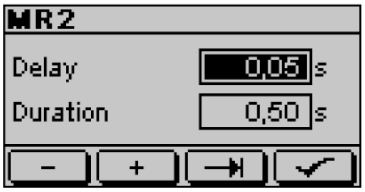
MV2 (24VDC output for solenoid valve 2): Delay and duration for output signal for MV2. Not applicable in “FlipFlop”-mode.



MV3 (output for solenoid valve 3): Delay and duration for output signal for MV3. Not applicable in all configurations!

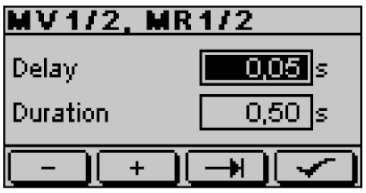


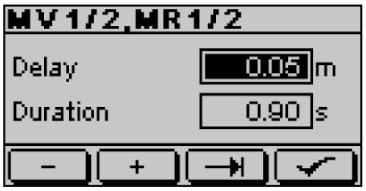
MR2 (relay metal 2): Delay and holding period of metal relay MR2.



If the outputs are not marked as independent (See Change Password – Outputs (Options)), MV1/2 and MR1/2 are setup together. In operation mode “conveyor with controlling”, delay is selected in steps of 0.01m. Duration is not applicable for “manual reset”.

MV1/2, MR1/2 delay (in s or m) and duration of output signals MV1/2 und MR1/2. In conveyor mode, “manual reset” also determines time and distance to conveyor stop.





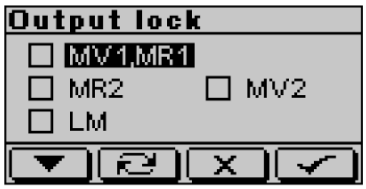
OUTPUT LOCK

Output lock means that the outputs are activated after the selected delay upon metal detection but not automatically reset. To reset them, press the “Reset” button. The option is selectable for MV1/MR1, MV2 and MR2 as well as for output LM (lamp metal). Output locks for the two solenoid valves MV1 and MV2 are set up in “Reset mode” (See Change Password).

PLEASE NOTE: In reset mode “manual”, all outlets are set to “self holding”; the menu is not applicable.

Select “Output lock” with F4 ✓.

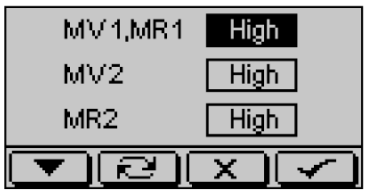
Select output with F1 . Activate or deactivate option with F2 . Exit menu without any changes with F3 . Confirm changes and exit menu with F4 .



OUTPUT LEVEL

Select “Output level” with F4 .

Select output with F1 . Change between “Low”, “High” and “Inactive” with F2 . Exit menu without any changes with F3 . Confirm changes and exit menu with F4 . If the outputs are **not** marked as independent (See Change Password – Outputs (Options)), MV1/2 and MR1/2 are setup together.

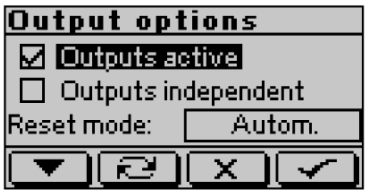


Select output with F1 . Change between “Low”, “High” and “Inactive” with F2 . Exit menu without any changes with F3 . Confirm changes and exit menu with F4 .

OUTPUT OPTIONS

Select “Output options” with F4 .

Select option with F1 . Switch between options with F2 . Exit menu without any changes with F3 . Confirm changes and continue to the next option menu with F4 .



Outputs active: Inactive outputs are not activated upon metal detection; no log entry is created. The operating mask displays “Output OFF”.

Outputs independent: Choose whether or not MV1/2 and MR1/2 are set up independently or together.

Reset mode: Manual or automatic (time-controlled) resetting of solenoid valve outputs.

Menu/Operation *(cont.)*

FlipFlop: Activation of a pusher unit with alternate rejects to left and right. (requires MV1 and MV2).

Metal at fault: When an error occurs, metal detection is triggered and out-puts are activated. Activation is triggered immediately, regardless of selected delay.

Stop at fault: Conveyor will stop in case of an error.

AUDIT CHECK
Select “Audit check” with F4 ✓.

Switch between alarm modes with F2 ⟳. Exit menu with F3 ✕ without saving any changes. Confirm changes and continue to next menu with F4 ✓.

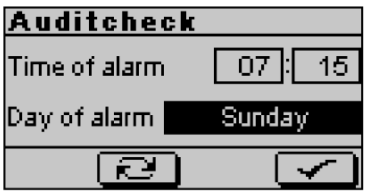
Alarm mode

- Off (no request for audit check).
- Every hour (starting on the hour).
- Every day (alarm time is selected in the next menu).
- Every week (alarm time and day is selected in the next menu).
- Extern (audit check is started via an external signal).
- Interval (start time and time interval are selected in the next menu).
- With every product change (from current product) after 1 minute at the earliest an audit check is started; the check is repeated within a selectable time interval. The next menu also offers the option to select a delay time.

PLEASE NOTE: For all modes (except “Off”) an audit check may also be started manually by selecting “Trigger audit check” in the setup menu. The audit check only starts when the device displays the operating mask or the log file. In all other cases, the device will try to start an audit check 5 minutes later.

Select alarm time and/or time interval with F1 −, F2 + and F3 →| and confirm with F4 ✓. (Daily at …)

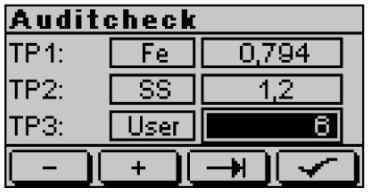
(Weekly at... on...)



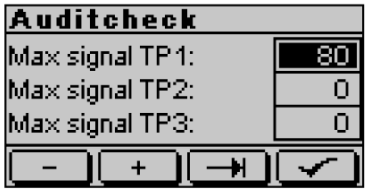
(From ... every …)

(In case of product change delayed by … every …)

Select test sample and size/ID with F1 [-] , F2 [+] and F3 and confirm with F4 [✓] . Up to 3 test samples can be entered. Customer specific test materials can be entered by selecting “User”.



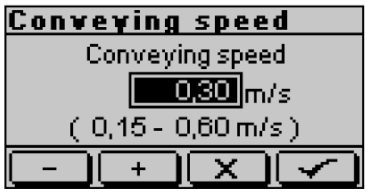
The maximal signal value for the selected test sample can be entered with F1 [-] , F2 [+] and F3 [→|]. This helps to prevent, that large test samples (i.e. hammer, keys) trigger the audit check. By selecting 0 for a test sample, the function is disabled. Confirm with F4 [✓].



CONVEYING SPEED

Select “Conveying speed” with F4 [✓].

Enter conveying speed with F1 [-] and F2 [+] , confirm with F4 [✓] or cancel without any changes with F3 [→|]. The figures in brackets show the optimal speed range for the selected settings.



Depending on selected velocity unit, values are displayed in m/s, m/min, ft/s or ft/min.

SETUP

Starting from operating mask, select setup menu with F4 [✂]. Select menu option with F1 [▼]/F2 [▲] and confirm with F4 [✓]. Leave the sub-menu with F3 [↶] to the next higher menu level

IMPORTANT INFORMATION

Changes in this menu are only applied for the current product.

LOGBOOK

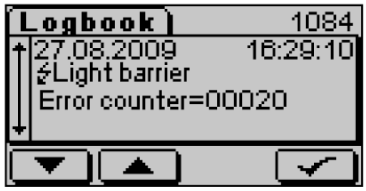
Select “Logbook” with F4 [✓].

Scroll through the saved incidents with F1 [▼] and F2 [▲] . All incidents are in chronological order and displayed with date and time. Leave “Logbook” with F4 [✓]. The logbook contains 1,500 entries which are permanently saved (battery-buffered).

Menu/Operation *(cont.)*

The following information is available:

- Running number of the entry.
- Date and time of the incident.
- Message (error messages are marked with a).
- Optional: 2 lines of additional information (depending on entry).



WARNING

Older entries are deleted without notification when the maximum number of entries is reached.

The following messages and information are displayed in the logbook:

Type	Incident	Additional Information	Comment
Metal	Metal	Global metal counter Metal signal	
Info	Mains on/off		
Warning	Product change	Old product number Product data group	
	Change of product data	Current product number Product data group	For learning, product angle and sensitivity are also displayed
	Charge change	Charge number	
	Outputs on/off		
	Quick learn	Angle	
	Test requirements		
	Test start	User ID	
	Metal incident	Metal signal	Active during test
	Test result	Test number (1..3) Test sample (i.e. V2A 1.0) Test result	
	Test result	Overall result	
	Time/data settings		
	Change of system data	System data group	
	EEPROM Grundinit		
	Bypass active		
	Reset error		
Warning	Battery low		
	Logbook nearly full		When a number of less than 50 free entries is reached for the first time
Error	Receiver too high	Error counter (global)	
	Transmitter over-temperature	Error counter (global)	
	Watchdog AWE	Error counter (global)	
	Communication AWE	Error counter (global)	
	Flap position	Error counter (global)	
	Air pressure	Error counter (global)	
	Conveyor belt control	Error counter (global)	
	Reject container full	Error counter (global)	
	Reject control	Error counter (global)	
	Light barrier	Error counter (global)	
	EEPROM	Error counter (global)	
	Test result	Error counter (global)	
	Tester timeout	Error counter (global)	
	Hardware AWE	Error counter (global)	Additional error information 3: Short-circuit relay output AWE 4: Initialization error
	Metal burst	Error counter (global)	
	External error	Error counter (global)	

REPORT

This menu item is only available if “Printer portable” was selected as the interface protocol for COM2.

Select “Report” with F4 .

Select the desired report type with F4 ✓.
The following reports are available:

- Intermediate report
- Archive report
- Audit report
- Product statistics
- Batch statistics
- Device protocol

PLEASE NOTE: The report is output through the serial COM2 interface in formatted form. A maximum of 42 characters is output per line. Each line ends with LF (linefeed, ASCII 0Ah). Every report can be directly printed with the EM report printer (option).

The following languages are supported:

- German
- English
- French
- Spanish
- Italian
- Swedish
- Finnish
- Dutch
- Danish
- Czech
- Polish

With Czech and Polish it may be that individual special characters are not correctly represented.

EXAMPLES:
Intermediate protocol
All entries are output to the printer in chronological order. The number in brackets shows the current number of logbook entries. Logbook entries will be kept.

```
++++++++++++++++++++++++++++++++++++++++++++
     Report: Intermediate (0024)
          04.03.2010, 14:37:35
--------------------------------------------
Device:                   Detector 1
Line:                     Line     1
--------------------------------------------
04.03. 14:23:34  Power OFF
04.03. 14:23:41  Power ON
04.03. 14:24:25  Product changed
   002 -> 001
04.03. 14:24:30  Metal
   Signal=0615   Counter=00001
04.03. 14:24:37  Metal
   Signal=0624   Counter=00002
04.03. 14:24:46  Product changed
   001 -> 003
04.03. 14:24:55  Metal
   Signal=0050   Counter=00003
04.03. 14:25:05  Metal
   Signal=0050   Counter=00004
04.03. 14:25:12  !Level
   Error counter=00001
04.03. 14:27:32  Product data changed
  Product: 003   -> ParamGroup: 001
04.03. 14:28:25  Test requested
04.03. 14:28:35  Test started
   UserID: 11000200
04.03. 14:29:00  Test metal
   Signal=0312
04.03. 14:29:07  Test result
   TP 1: Fe1,5   -> Test Ok
04.03. 14:29:13  Test metal
   Signal=0161
04.03. 14:29:17  Test result
   TP 2: V2A1,8   -> Test Ok
04.03. 14:29:17  Test end
   -> Test Ok
04.03. 14:31:04  Metal
   Signal=2000   Counter=00005
04.03. 14:31:07  ! Eject control
   Error counter=00002
04.03. 14:31:08  Metal
   Signal=2000   Counter=00006
04.03. 14:31:10  Metal
   Signal=2000   Counter=00007
04.03. 14:31:17  Metal
   Signal=2000   Counter=00008
04.03. 14:36:23  Batch changed
04.03. 14:36:35  Metal
   Signal=0150   Counter=00009
04.03. 14:36:42  Metal
   Signal=0153   Counter=00010
++++++++++++++++++++++++++++++++++++++++++++
```

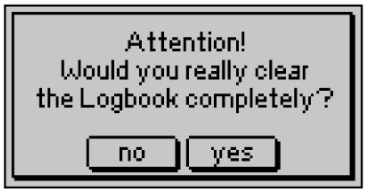
Menu/Operation *(cont.)*

Archive protocol
As with the intermediate report, all entries are output in chronological order. The number in brackets shows the number of the current printout for seamless reporting.

```
++++++++++++++++++++++++++++++++++++++++++
     Report: Archive  (0005)
          04.03.2010, 14:42:21
------------------------------------------
Device:                   Detector 1
Line:                     Line     1
------------------------------------------
04.03. 14:23:34  Power OFF
04.03. 14:23:41  Power ON
04.03. 14:24:25  Product changed
   002 -> 001
04.03. 14:24:30  Metal
   Signal=0615   Counter=00001
04.03. 14:24:37  Metal
   Signal=0624   Counter=00002
04.03. 14:24:46  Product changed
   001 -> 003
04.03. 14:24:55  Metal
   Signal=0050   Counter=00003
04.03. 14:25:05  Metal
   Signal=0050   Counter=00004
04.03. 14:25:12  !Level
  Error counter =00001
04.03. 14:27:32  Product data changed
  Product: 003   -> ParamGroup: 001
04.03. 14:28:25  Test requested
04.03. 14:28:35  Test started
   UserID: 11000200
04.03. 14:29:00  Test metal
   Signal=0312
04.03. 14:29:07  Test result
   TP 1: Fe1,5   -> Test Ok
04.03. 14:29:13  Test metal
   Signal=0161
04.03. 14:29:17  Test result
   TP 2: V2A1,8   -> Test Ok
04.03. 14:29:17  Test end
   -> Test Ok
04.03. 14:31:04  Metal
   Signal=2000   Counter=00005
04.03. 14:31:07  !Eject control
   Error counter=00002
04.03. 14:31:08  Metal
   Signal=2000   Counter=00006
04.03. 14:31:10  Metal
   Signal=2000   Counter=00007
04.03. 14:31:17  Metal
   Signal=2000   Counter=00008
04.03. 14:36:23  Batch changed
04.03. 14:36:35  Metal
   Signal=0150   Counter=00009
04.03. 14:36:42  Metal
   Signal=0153   Counter=00010
++++++++++++++++++++++++++++++++++++++++++
```

Attention: After the output all the logbook entries will be permanently deleted. For safety reasons a corresponding confirmation prompt will therefore be displayed before outputting is started:

Press F2 “No” to cancel the process, the logbook will be kept. Press F3 “Yes” to confirm the process, the logbook will be cleared. If a password has been specified for clearing the logbook, this password must then be entered.



Audit report
The audit report in a clearly structured form shows all the events in connection with the last audit check.

```
++++++++++++++++++++++++++++++++++++++++++
     Report: audit
          04.03.2010, 14:37:53
------------------------------------------
Device:                   Detector 1
Line:                     Line     1
------------------------------------------
003  Product  3:    100%, 125,1°
------------------------------------------
04.03. 14:28:25  Test requested
04.03. 14:28:35  Test started
   UserID: 11000200
04.03. 14:29:00  Test metal
   Signal=0312
04.03. 14:29:07  Test result
   TP 1: Fe1,5   -> Test Ok
04.03. 14:29:13  Test metal
   Signal=0161
04.03. 14:29:17  Test result
   TP 2: V2A1,8   -> Test Ok
04.03. 14:29:17  Test end
   -> Test Ok
++++++++++++++++++++++++++++++++++++++++++
```

Product statistics
The product statistics show the time of the last product change. The number of errors and metal signals since this change are also displayed.

```
++++++++++++++++++++++++++++++++++++++++++
     Report: Product
          04.03.2010, 14:38:01
------------------------------------------
Device:                   Detector 1
Line:                     Line     1
------------------------------------------
003  Product  3:    100%, 125,1°
------------------------------------------
04.03. 14:24:46  Product changed
   001 -> 003
Metal counter:            00008
Error counter:            00002
++++++++++++++++++++++++++++++++++++++++++
```

Batch statistics
The batch statistics show the time of the last batch change. The number of errors and metal signals since this change are also displayed.

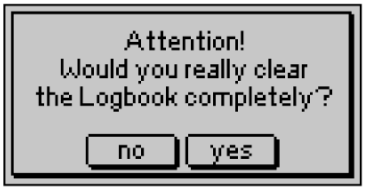
```
++++++++++++++++++++++++++++++++++++++++++
     Report: Batch
          04.03.2010, 14:38:22
------------------------------------------
Device:                    Detector 1
Line:                      Line     1
------------------------------------------
003  Product  3:    100%, 125,1°
------------------------------------------
04.03. 14:36:23  Batch changed
Metal counter:             00002
Error counter:             00000
++++++++++++++++++++++++++++++++++++++++++
```

Device report
The device report provides information about essential system settings. It shows a list of all the teach product events and displays the total number of metal signals and errors since start-up.

```
++++++++++++++++++++++++++++++++++++++++++
     Report: Device
          04.03.2010, 14:42:57
------------------------------------------
Device:                    Detector 1
Line:                      Line     1
------------------------------------------
STE            SW: V1.09       HW: 03
AWE            SW: V1.22       HW: 01
------------------------------------------
Coil number:             125
Frequency 1:  289 kHz
Frequency deviation:       1
------------------------------------------
Metal counter:             00010
Error counter:             00002
------------------------------------------
Code 'Change product':     0000
Code 'Teach product':      0000
Code 'Paramters':          0000
Code 'Setup':              0000
Code 'Clear logbook':      0000
------------------------------------------
001  Product  1:    100%, 122,2°
002  Product  2:    100%, 125,1°
003  Product  3:    100%, 125,1°
004  Product  4:    100%, 122,2°
005  Product  5:    100%, 125,1°
006  Product  6:     99%,  14,5°
007  Product  7:    100%,   7,7°
008  Product  8:    100%,  14,5°
009  Product  9:    100%,  13,6°
010  Product 10:    100%,  14,0°
++++++++++++++++++++++++++++++++++++++++++
```

CLEAR LOGBOOK
Select “Clear logbook” with F4  .

Deleting the logbook requires confirmation. Cancel with F2 “no” and retain logbook. Delete logbook with F3 “yes”. If a password was created for the logbook, it has to be entered to confirm the process.



TRIGGER AUDIT CHECK (ONLY WHEN AUDIT CHECK ACTIVATED)
Start audit check regardless of selected audit time with F4  . **The detailed procedure for audit checks can be found in Carrying Out a Performance Validation. (Device test).**

AUDIT CHECK MAIN SETUP
The “audit check basic setup” sets the general performance of the device for testing (in contrast to the “audit check” settings in the parameter menu).

Select “Audit check main setup” with F4  .

Menu/Operation *(cont.)*

Select option with F1 ▼. Activate or deactivate with F2 ↻. Cancel without changes with F3 ✕. Confirm and continue to the next menu with F4 ✓.

Error if test not OK: An error message is generated upon a faulty test.

Reject during test: Defines whether outputs are activated during the test.

Autotest device: For deactivating the automatic test device that is factor-preset.

Enter time for test start with F1 −, F2 + and confirm with F4 ✓. Cancel without changes with F3 ✕. Sets the time until test must be started.

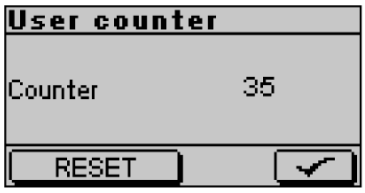
SHOW COUNTER

Select “Show counter” with F4 ✓.

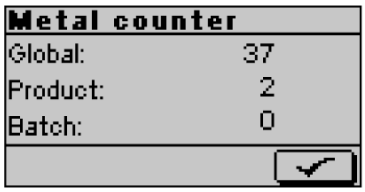
Select “User counter” with F4 ✓.

Available counters:

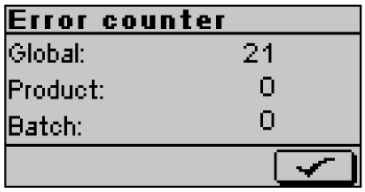
User counter. Sums up all metal incidents regardless of product of batch changes until reset by user.



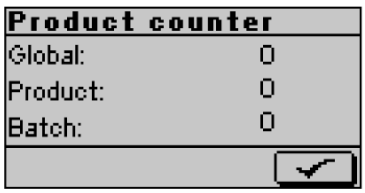
Metal counter. Sums up all metal incidents.



Error counter. Sums up all error incidents.

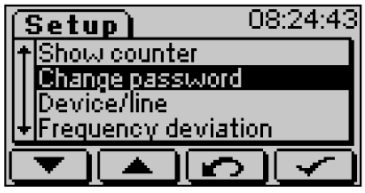


Product counter. (Only in combination with trigger light barrier). Sums up all conveyed products.
Global. All incidents since launch of device.
Product. All incidents since selection of current product.
Batch. All incidents since start of current charge.



CHANGE PASSWORD

Select “Change password” with F4 ✓.



Available passwords:

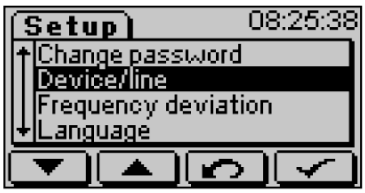
- for change product
- for learn product
- for parameters
- for setup
- for clear logbook

Enter password with F1 ▼, F2 ▲ and F3 →| and confirm with F4 ✓.

A password assigned previously has to be entered before a new one can be assigned.

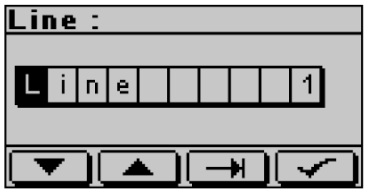
DEVICE/LINE

The names entered appear on print outs of protocols and in the data management system (Insight-Log.NET and Insight.NET).



Enter device name with F1 ▼, F2 ▲ and F3 →| and confirm with F4 ✓.

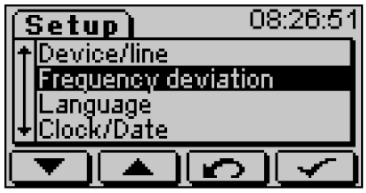
Enter line name with F1 ▼, F2 ▲ and F3 →| and confirm with F4 ✓.



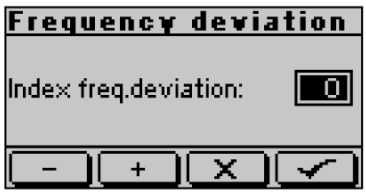
FREQUENCY DEVIATION

When several Eriez metal detectors or metal separators with the same search frequency are used near each other, an interference in the signal can occur. To prevent this, a frequency deviation can be selected. Changes of pre-installed values should only be made after consulting Eriez.

Select “Frequency deviation” with F4 ✓.



Enter with F1 -, F2 + and F3 →| and confirm with F4 ✓. Confirm without changes with F3 ✗. The maximum approved range has been defined by Eriez in final clearance.



Menu/Operation *(cont.)*

LANGUAGE

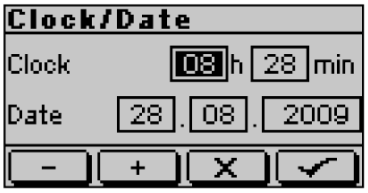
Select “Language” with F4 [✓].

Select language and confirm with F4 [✓]. Exit “Setup” menu with F3 [↶].

CLOCK/DATE

Select “Clock/Date” with F4 [✓].

Change digits with F1 [-]/F2 [+]. Press F4 [✓] to jump to the next value; after setting the year, save changes and exit the menu with F4 [✓]. Cancel without changes with F3 [X].



INTERFACE

IMPORTANT HINT

Changes that are made in this menu will only become effective after the control unit is restarted.

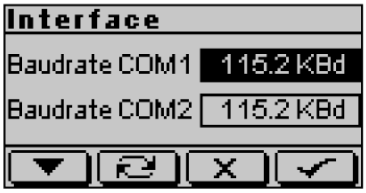
Select “Interface” with F4 [✓].

Select interface COM2 (plug 7b) or COM1 (plug 11) with F1 [▼]. Select baud rate with F2 [⟲]. Confirm with F4 [✓] or exit without changes with F3 [X].

Available baud rates:

- 115.2 kBaud
- 19.2 kBaud
- 57.6 kBaud
- 9.6 kBaud
- 38.4 kBaud

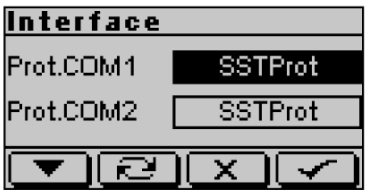
The other interface parameters cannot be changed. They are set to 8N1 (8 data bit, no parity, 1 stop bit). In addition to that, no flow control is applied.



Select device address with F1 [-]/F2 [+]. Exit without changes with F3 [X]. Confirm with F4 [✓].

The address is needed for addressing the device via interface. This parameter has no impact when the serial interface RS232, Ethernet or WLAN are used. It merely has to be different to 0. For the bus-compatible interface RS485 distinct addresses have to be assigned in the network.
Value range: 0 (off), 1...254

Select interface COM2 (plug 7b) or COM1 (plug 11) F1 [▼]. Select protocol with F2 [↻]. Confirm with F4 [✓] or cancel without changes with F3 [X].



The following selection can be made for COM1:

- Off
- SSTProt[1] [2]

The following additional selections are available for COM2:

- Printer online[3]
- Printer portable[3]
- Insight2-Prot[2]

[1] Eriez standard interface protocol

[2] Specifications on request

[3] In combination with EM report printer, baud rate 115.2 kBaud

PLEASE NOTE: If the “Printer online” option is selected, all the newly added logbook entries are output through the serial COM2 interface. Entries are output in formatted form with a maximum of 42 characters per line. Each line ends with LF (linefeed, ASCII 0Ah).

IMPORTANT INFORMATION

The system does not check whether an operational output device (e.g. printer) is connected at the interface.

IMPORTANT INFORMATION

If events occur faster than they can be printed, some events will be skipped. Such skipped entries can be recognized by the way of the metal and error counters (see below). If necessary, a full sequence of events without gaps can be printed subsequently by selecting the “Printer portable” mode.

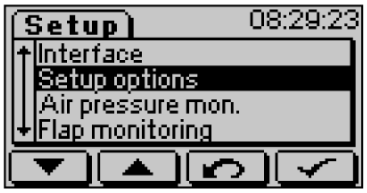
Possible output:

```
04.03. 14:23:34  Power OFF
04.03. 14:23:41  Power ON
04.03. 14:24:25  Product changed
   002 -> 001
04.03. 14:24:30  Metal
   Signal=0615   Counter=00001
04.03. 14:24:37  Metal
   Signal=0624   Counter=00002
04.03. 14:24:46  Product changed
   001 -> 003
04.03. 14:24:55  Metal
   Signal=0050   Counter=00003
04.03. 14:25:05  Metal
   Signal=0050   Counter=00004
04.03. 14:25:12  !Level
  Error counter =00001
04.03. 14:27:32  Product data changed
  Product: 003   -> ParamGroup: 001
04.03. 14:28:25  Test requested
04.03. 14:28:35  Test started
   UserID: 11000200
04.03. 14:29:00  Test metal
   Signal=0312
04.03. 14:29:07  Test result
   TP 1: Fe1,5   -> Test Ok
04.03. 14:29:13  Test metal
   Signal=0161
04.03. 14:29:17  Test result
   TP 2: V2A1,8   -> Test Ok
04.03. 14:29:17  Test end
   -> Test Ok
04.03. 14:31:04  Metal
   Signal=2000   Counter=00005
04.03. 14:31:07  ! Eject control
   Error counter=00002
04.03. 14:31:08  Metal
   Signal=2000   Counter=00006
04.03. 14:31:10  Metal
   Signal=2000   Counter=00007
04.03. 14:31:17  Metal
   Signal=2000   Counter=00008
04.03. 14:36:23  Batch changed
04.03. 14:36:35  Metal
   Signal=0150   Counter=00009
```

Menu/Operation *(cont.)*

SETUP OPTIONS

Select “Setup options” with F4 ✓.

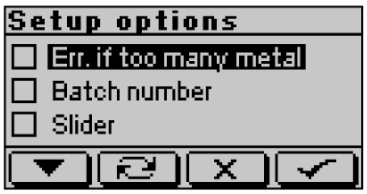


Select setup option with F1 ▼ and activate with F2 ↻. Exit menu without changes with F3 ✕. Confirm changes and exit menu with F4 ✓.

Error if too much metal: In case of 10 or more metal detections within 5 minutes an error message is created.

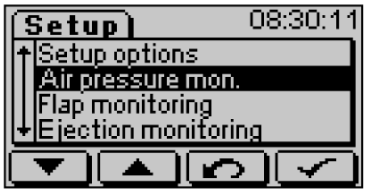
Batch number (currently not available): A batch number must be entered for any product or batch change. A log file will be created.

Slider: A signal bar replaces the signal value display on the operating mask.

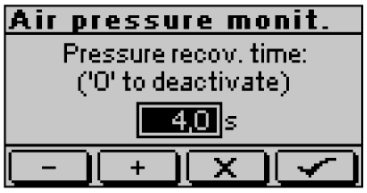


AIR PRESSURE MONITORING (OPTION)

Select “Air pressure monitoring” with F4 ✓.

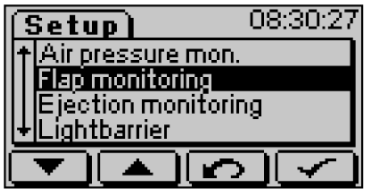


The air pressure can be monitored. 0.0s deactivates the monitoring. A value different to 0 sets the maximum time, in which the air pressure can drop below the limit set in the pressure controller without creating an error message. The value can be varied in steps of 0.5s up to a maximum of 5.0s. Changing the factory pre-set value is usually not required.



FLAP MONITORING (OPTION)

Select “Flap monitoring” with F4 ✓.



Flap monitoring can be configured in this menu. 0.0s deactivates the monitoring. Values different than 0 set the time, which the flap may not extend when switching from normal position to reject position and vice versa. The value can be varied in steps of 0.2s up to a maximum of 20.0s. Changing the factory pre-set value is usually not required.

EJECTION MONITORING (OPTION)

Select “Ejection monitoring” with F4 ✓.

Available settings are:

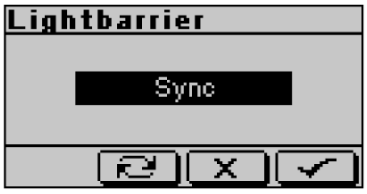
- Inactive.
- Ejection monitoring shows that the product has been ejected.
- Filling level monitoring shows if the collecting tray still has enough capacity.
- Ejection and filling level monitoring. Monitors ejection and filling level.

LIGHT BARRIER (OPTION)

Select “Light barrier” with F4 .

Configuration of light barrier settings. Available settings are:

- None.
- Sync Products containing metal contaminants are ejected.
- Inverse Non-metallic products are ejected.



UNITS

Select “Units” with F4 .

Country specific conveyor speed display and time and date formats can be configured here. Formats for conveyor speed:

- m/s
- m/min
- ft/s
- ft/min
- t/h

Formats for date and time:

- dd.mm.yyyy, hh:mm:ss
- yyyy-mm-dd, hh:mm:ss
- mm/dd/yyyy, hh:mm am/pm

DEVICE-INFO

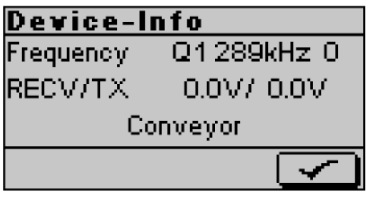
Select “Device-Info” with F4 .

Current search frequency, frequency configuration (S: single, D: dual, Q: quattro) and frequency deviation are displayed. Two voltage values are displayed which may help with a quick diagnosis during service. Must values:

- RECV = 1,500 mV
- TX = 42,000 mV

Current operation mode is displayed

- Conveyor
- Conveyor with controlling
- Rapid (free fall systems)
- GF (vacuum and pressure pipeline systems)
- Liquiscan (pumped products)

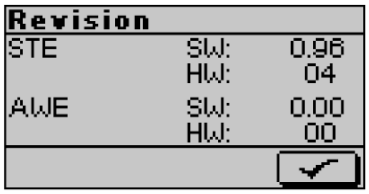


Menu/Operation *(cont.)*

REVISION

Select “Revision” with F4 ✓.

Version number of the installed hardware and software components of STE and AWE are displayed. Exit menu with F4 ✓.



LOGIN

The menu options “sign in” and “sign out” lead to protected setup levels. These levels are usually not used for normal operation, hence why they are not displayed. There are currently **three** service/setup levels.

Level 0 -> “Standard”

The following options are available:

- Logbook
- Report[1]
- Clear logbook
- Trigger audit check[1]
- Show counter
- Language
- Device-Info
- Revision
- Login

Level 1 -> “Setup level” via code “3080”

The following options are available:

- Logbook
- Report[1]
- Clear logbook
- Trigger audit check[1]
- Audit check main setup
- Show counter
- Change password
- Device/Line
- Frequency deviation
- Language
- Clock/Date
- Interface
- Setup options
- Units
- Device-Info
- Revision
- Login
- Logout

Level 2 -> “IO-Level” via code “2606”

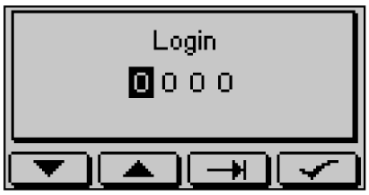
The following options are available:

- Logbook
- Report[1]
- Clear logbook
- Trigger audit check[1]
- Show counter
- Language
- Air pressure monitoring[1]
- Flap monitoring[1]
- Ejection monitoring[1]
- Light barrier[1]
- Device-Info
- Revision
- Login
- Logout

[1] if function is activated

Select “Login” with F4 .

Enter login code with F1 , F2 and F3 and confirm with F4. To exit the menu, sign out (see Menu/Operation - Logout) or restart the device.



LOGOUT

Select “Logout” with F4 . Changes to operating mask and deactivates the entered code.

Interfaces (option)

The optional interfaces for the FFG control unit solely have the purpose of connecting the control unit with the outside world. Various data protocols can be used to transfer a great variety of information. Settings at the control unit also can be made through these interfaces.

Basically the FFG control unit can be connected to PC systems, suitable report printers, SPCs, or other automation systems.

SERIAL INTERFACES

IMPORTANT INFORMATION

The RS232 and the RS484 interfaces at the ST7b connector cannot be used simultaneously.

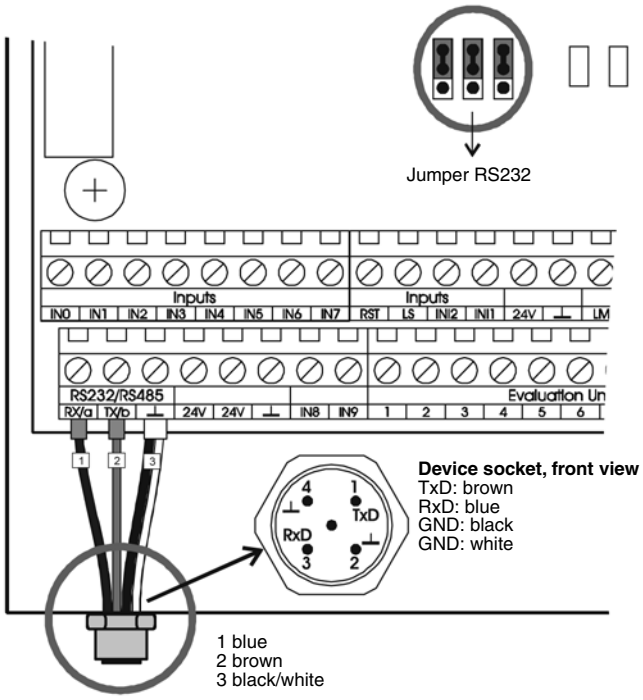
RS232

The electrical specification complies with the RS232-C standard (point-to-point connection).

The following signals are led out:

- TxD Transmit data
- RxD Receive data
- GND Signal ground

Signals for hardware flow control are not provided. The interface is led out at a 4-pole socket at the bottom of the housing. The corresponding mating plug is supplied with the system. The hardware of the RS232 interface is activated if the jumper is set as shown in the drawing.



Information for connecting a PC

The 9-pole Sub-D socket of the PC (suitable RS232-USB converters also are possible) must be connected with the system socket as follows:

PC	FFG
• Pin 2 (Rx)	• Pin 1 (TxD)
• Pin 3 (Tx)	• Pin 3 (RxD)
• Pin 5 (GND)	• Pin 2 (GND)

Note on report printer connection

A suitable adaptor cable is required for connecting the EM report printer.

Interfaces (option) *(cont.)*

Cable lengths
Possible cable lengths depend on the baud rate that is used and on the cables. The values below are general guide values:

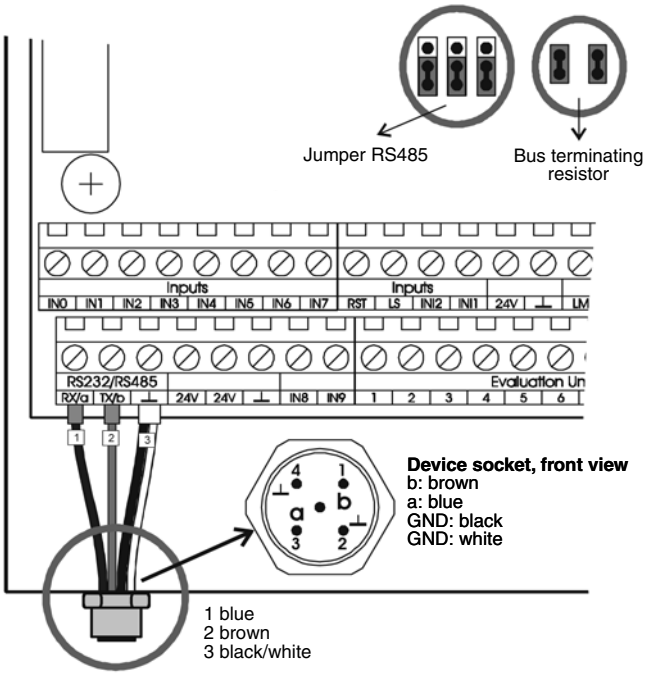
Max. Baud rate	Max. cable length
• 115.2 kBaud	• app. 9.84' (3 m)
• 56,7 kBaud	• app. 16.4' (5 m)
• 19,2 kBaud	• app. 160.04' (50 m)

RS485
The RS485 interface is designed as a two-wire bus (differential transmission) and operates in half-duplex mode (transmit or receive). Up to 32 devices can be connected to the bus, with a cable length of approx. 1000m.

The following signals are led out:

- a - data line
- b - data line
- Signal ground (GND)

The GND signals are not necessary for bus operation, but they improve the communication behavior in case of long cables. The interface is led out at a 4-pole socket at the bottom of the housing. The corresponding mating plug is supplied with the system. The hardware of the RS485 interface is activated if the jumper is set as shown in the drawing RS485.



The line ends of the bus system must be properly terminated. As a rule, this is done by the two devices at the respective bus ends.The bus terminating resistors are integrated on the FFG STE board and can be activated with the corresponding jumpers.

IMPORTANT INFORMATION
Devices that are connected in the middle of the bus must not be terminated.

IMPORTANT INFORMATION
As a rule the connector assignment of the RS485 interface is not standardized. Please observe the respective manufacturer's documentation when you connect different devices.

IMPORTANT INFORMATION
Normally the 9-pole Sub-D socket of a PC is not compatible with the RS485 interface specification. Any direct connection may destroy or damage the PC and/or system hardware. Corresponding expansion cards (i.e. Moxa) are available on request.

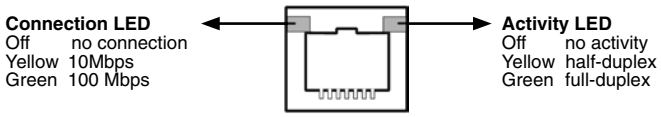
Ethernet Interface (LAN-TCP/IP)

The Ethernet interface is implemented by way of an additional module that is wired as the RS232 interface. The RS232 interface (COM2) must be configured to 115.2 kBaud.

Interface specifications

- Ethernet protocol acc. to IEEE 802.3
- RJ45 Ethernet 10BASE-T or 100BASE-TX (auto-sensing)

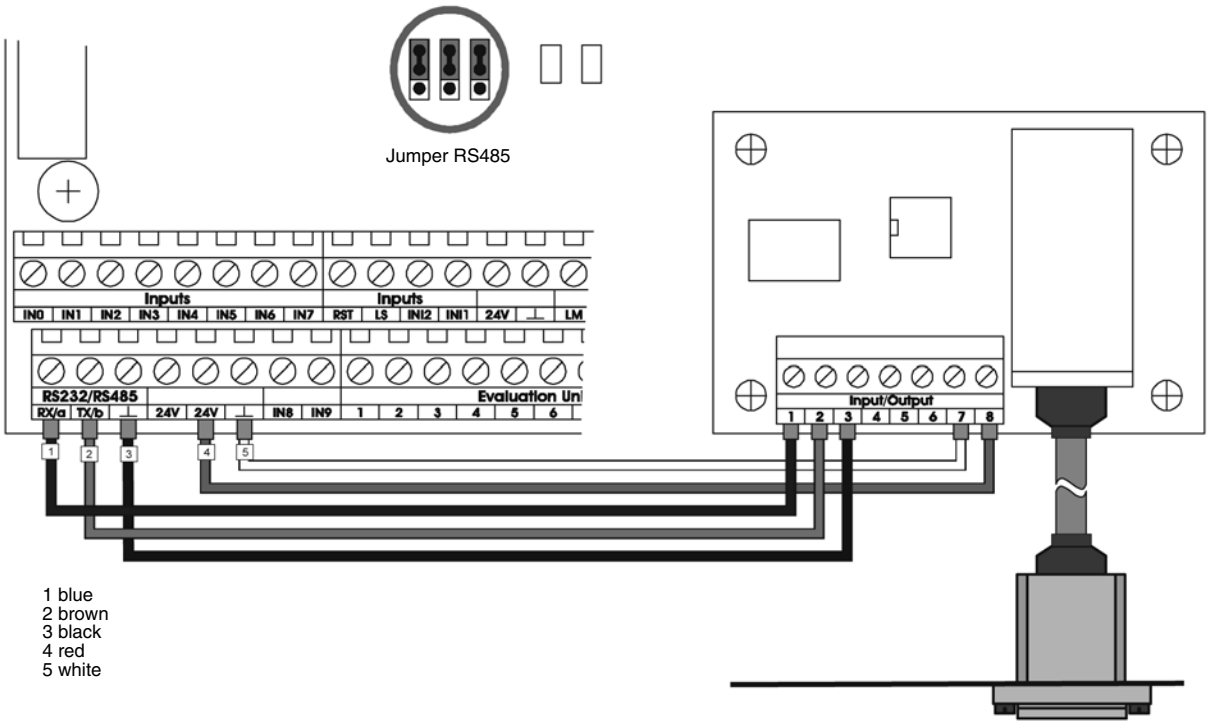
FRONT VIEW OF THE ADDITIONAL ETHERNET MODULE



As a standard every device has the IP address **172.16.1.20** (netmask 255.255.0.0). Information about configuring of the IP address can be found on the CD that is supplied with the interface.

NETWORK CONNECTOR AT THE SYSTEM: The network connector is of IP65 compliant design. If the network cable is removed, the supplied sealing cap must be attached to maintain the protection rating. Any conventional network cable can be used (see note). The protection rating, however, can only be maintained if a suitable plug is used (plug available on request!)

Note on network cables:
For 100Base-TX (standard in PC technology) at least an unshielded CAT-5 cable (UTP - *Unshielded Twisted Pair*) should be used. The maximum length is approx. 100 m.



WLAN Interface (WLAN-TCP/IP)

The WLAN interface also is implemented by way of an additional module that is wired as the RS232 interface. The RS232 interface (COM2) must be configured to 115.2 kBaud.

Interface specifications

- Wireless 802.11b/g (54 MBps - 1 MBps with auto-fallback)
- Frequency range: 2.412 -2.484 GHz
- Output power 14dBm +1.5/-1.0 dBm
- Encryption 64/128-bit WEP / WPA
- WLAN short rod antenna 2.4GHz (26 mm)
- Range (depending on environmental conditions) approx. 20 m – 100 m

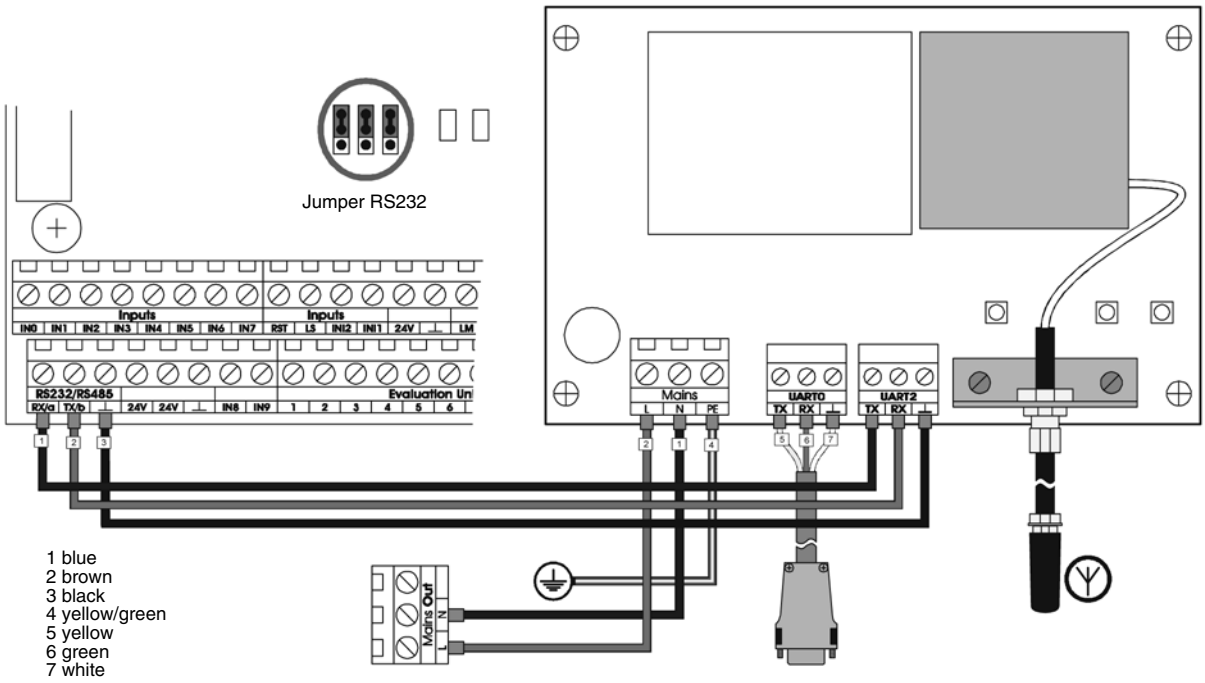
Information about configuring this module can be found on the CD that is supplied with the interface. If the radio interface should not be available, the WLAN module can be configured through the serial interface UART0 of the module. Further information can be found on the CD.

Standard settings:

IP address	172.16.1.21
Netmask	255.255.0.0
MAC address (fix)	00:20:4A:xx:xx:xx
Topology	AdHoc network
Network name (SSID)	SeSoTec
Channel	11
Authentication	open/none
Encryption	WEP64
Key (HEX)	07-E3-A1-E7-4A

WiPort web configuration:

User name	admin
Password	password



The Use of the FFG for Quality Assurance

To meet the demands of Total Quality Management and the HACCP concept, the FFG device is equipped with a permanent logbook of up to 1,500 entries and several counters for product, error and metal incidents. It is also equipped with interfaces to connect to a subordinate quality management system.

A critical element of the HACCP system is the regular monitoring of “critical control points” (CCPs). FFG devices offer various configurable possibilities to carry out such tests securely and accurately.

To ensure that tests are reproducible, Eriez offers a large number of different test samples to match different applications. Available sizes range from 0.008" to 0.39 (0.2 mm to 10 mm), depending on the material.

GENERAL PROCEDURE
The procedure depends largely on the quality requirements of individual companies. The following outline should therefore be seen as a general guideline.

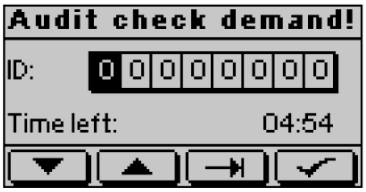
IMPORTANT INFORMATION
Tests are usually carried out together with the product. Most audit check settings are therefore product specific and are assigned to a particular product.

1. Learn product (see Teach-in Product).
2. Convey product together with test samples. Select smallest test sample, which can be detected and meets quality requirements. Up to 3 test samples can be appointed.
3. Set basic settings for the current product in the parameter menu “Audit check” (see Audit Check).
   - Alarm mode (time, Interval, external, …).
   - Start time or interval (depending on mode).
   - Test sample (defined under point 2).
   - Optional: maximum test signal for up to 3 test samples.
4. If several FFG devices are used and connected to a subordinate system, a distinct allocation with a significant identifier should be chosen in the setup menu “Device/line” (see Device/line).
5. Date and time should be set correctly (see setup menu “Time/date” under Clock/date).

Depending on the quality requirements within the company, additional settings for the audit check can be configured. They can be found in the setup menu under “Audit check basic setup” (see Audit Check).

- “Error when test unsuccessful”
  In case of a faulty test (faulty result or execution) an error message is displayed. Certain configurations (such as “stop when error”) can mean that this stops the conveyor; applied to a FFG metal detector, the setting “metal when error” would mean the device switches to “Reject”.
- “Time to start test”
  The time set here is the time to complete the test. If the test is not completed, this will lead, in combination with the previous option, to an error.

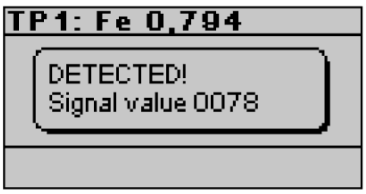
CARRYING OUT A PERFORMANCE VALIDATION
When reaching the testing time (triggered manually or externally) the user will be required to enter the 8-digit user identification number and to perform the test. The green operation LED will flash on the front panel. The digital “LB” output will also toggle with a frequency of approx. 1Hz. In the illustrated example, the user has 5 minutes to start the test.



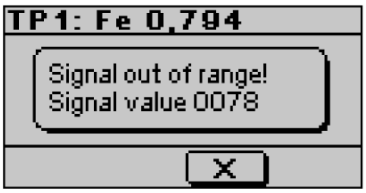
He is requested to convey the test sample. The procedure can be cancelled should the test sample not be detected.

The Use of the FFG for Quality Assurance *(cont.)*

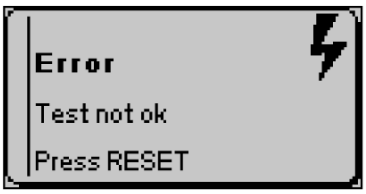
Upon successful detection of the test sample and when the defined test signal is not exceeded, the user can accept the result or reject it, i.e. if the metal incident was caused by fault.



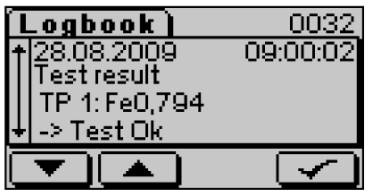
If the signal exceeds the configured value, the user can only reject the result.

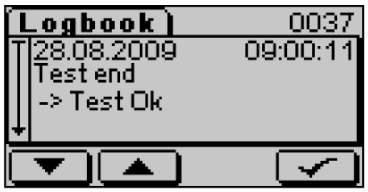


Steps 2 and 3 are now repeated for all defined tests samples. The error message on the left will appear, should one of the tests be unsuccessful or was not started on time and the device has been configured accordingly. The red fault LED will flash. The output “LF” will be deactivated.



The following logbook entries are created:





CONNECTION

The Eriez autotest device is connected to the FFG control unit by way of the solenoid valve outputs MV3 and MV4.

- MV4 triggers the test device.
- MV3 functions as a feedback contact informing the control unit about metal detection.

CONFIGURATION OF THE AUTOTEST DEVICE

The autotest device can be configured in the Service menu - Auditcheck main setup.

Error if test not OK. An error message is generated if a test is not OK.
Eject during test. Defines whether outputs are activated during the test.
Autotest device.
As a factory-presetting, the autotest device is activated; it can be deactivated with this menu item.

Time to do test. Defines the time up to which the test must be started. (this setting has no meaning for the autotest!)

AUDITCHECK CONFIGURATION

⚠ WARNING

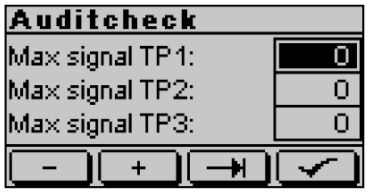
Auditcheck settings are product-specific and must be configured separately for every product. When new products are learned, the settings of the starting product are adopted.

For information on general settings please refer to Audit Check in the operating instructions. All the alarm modes are possible. Furthermore, the autotest also can be started manually from the menu.

Alarm modes

- Off (no request to perform auditcheck).
- Every hour (starting from the next full hour).
- Every day (the alarm time can be set in the next menu).
- Every week (the alarm day and time can be set in the next menu).
- External (the auditcheck is started by way of an external signal).
- Interval (the starting time and interval length can be set in the next menu).
- With every product change (from this product) an auditcheck will start after 15 seconds at the earliest and will be repeated in a selectable interval.

It is not necessary to make any settings for the test pieces when using the autotest device. The FFG control unit automatically selects test piece TT1 with the ID “User 31”.



RUNNING AN AUDITCHECK

The auditcheck is performed automatically. The result will be recorded in the logbook. At the start of the test “99999999” will be displayed as user ID. If the first test should not be successful within a time of 10 s, the control unit automatically tries to repeat the test. If the above-mentioned time elapses without a successful test, the auditcheck, depending on the configuration, will be terminated with an information entry in the logbook or with an error message.

Errors and Error Remedying

⚠ WARNING

If you should have any questions, or if there should be any malfunctions, please contact the manufacturer.

⚠ WARNING

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

Service telephone: (814) 835-6000

ERROR MESSAGES

Error messages are indicated by a flashing red “Fault” LED at the control panel, by a corresponding error message that appears on the display, and by a release of the fault relay (see Design and Method of Operation-Functional Principle). If the system is configured correspondingly, it also indicates a metal alarm.

Error and Error Remedying *(cont.)*

COMMUNICATION AWE

This message appears if communication between control electronics board and evaluation electronics board (see spare parts view-part number 4) is interrupted and data can no longer be exchanged.

Possible causes	Remedy
Data communication cable between evaluation electronics board and control electronics board is broken.	Check cable and connectors with ohmmeter. Replace cable, if necessary
Interface module broken.	Replace evaluation electronics board and control electronics board

RECEIVER VOLTAGE TOO HIGH

This message appears if the RF voltage at the receiver is too high.

Possible causes	Remedy
Big metal part (i.e. aluminium ladder, screwdriver, hammer, bracelets) directly beside or in the detection coil.	Check the detector head and the surrounding. Sometimes metal parts can be found inside or underneath the belt.
Improper installation of the search coil.	See Op. Man Detection coil: “Installation” If detector head DLS is used, check on loose centering pins or fastening bolts.

AIR PRESSURE

Possible causes	Remedy
Appears on display if the air pressure monitor responds or the connection to the sensor is interrupted.	Extend the air pressure recovery time. Check the air pressure. Minimum value 2 bars. Increase, if necessary. Check the cable to the air pressure monitor. Switch off power and open housing. Check with ducter at connector 6a (24V) and 7a terminal i2 (see Eriez FFG-Controller Board STE). With connected compressed air : < 20 Ω. Without compressed air connected: open. If not, replace sensor and/or cable.

EJECT CONTROL

Possible causes	Remedy
Appears, after rejection, if no signal was sent by light barrier. Causes: Product was not rejected and was not detected by the light barrier. Sensor connecting cable broken	Adjust delay time and reject duration time properly. If the error repeats, check sensor and/or connection cable.

REJECT BOX FULL

Possible causes	Remedy
Appears, if the light barrier is blocked by products. A short circuit in the connection cable causes the same error message.	Empty the reject box. If reject box is empty and the error message is not resettable, check the connection cable.

DIVERTER POSITION

Possible causes	Remedy
Appears during reject operation of the diverter, if signal timing is not correct, diverter is broken. Diverter too slow. Forward and return time set too short. Connection to the sensors defective.	Fix the diverter mechanics. Check diverter if tight or wedged pieces. Check air pressure (min. 5 bars). **CAUTION! DANGER OF ACCIDENT! DISCONNECT AIR SUPPLY!** Prolong the time settings. Check cable and sensors.

TRANSMITTER OVER TEMPERATURE

Possible causes	Remedy
Evaluation electronics board defective.	Replace the evaluation electronics board.
Coil or transmitter connection board defective.	Contact Eriez service.
Improper installation of the detection coil	(See instruction manual of the detection coil: “Installation”). With type DLS detection coil, check whether the centering sleeves or fastening screws are loose.

WATCHDOG AWE

Possible causes	Remedy
Software error of the evaluation electronics board.	If this occurs several times, contact Eriez service.

CONVEYOR BELT CONTROL

Possible causes	Remedy
Motor overload (thermal contact). Error message E35 at the display of the frequency converter.	• Let the motor cool down. • Check the conveyor belt for possible mechanical influences. • Reset the error message at the frequency converter.
Other frequency converter error. Error messages E01 – E60 (see frequency converter manual).	As described in the frequency converter manual.

LIGHT BARRIER

Possible causes	Remedy
After a metal signal the synchronization light barrier was not interrupted within the set time. For example, this may be due to an unwanted conveyor stop or to a defective connection cable.	If this error is permanently repeated: Check the connection cable.

EEPROM

Possible causes	Remedy
System and product data memory defective.	Replace the control electronics board.

TEST RESULT

Possible causes	Remedy
An error occurred while the system test (see Audit Check) was performed.	Repeat the system test, check the test piece. If this occurs several times, check the system and product settings.

TEST TIMEOUT

Possible causes	Remedy
The system test was not performed within the specified time frame.	

HARDWARE AWE

Possible causes	Remedy
Error info 3. Short-circuit relay output AWE.	Check output 4 of the AWE (relay output) for correct polarity or short-circuit.
Error info 4. Initialization error at the evaluation electronics board.	Replace the evaluation electronics board.

Error and Error Remedying *(cont.)*

METAL BURST

Possible causes	Remedy
Accumulation of metal events (if configured correspondingly). More than 10 metal events within 5min.	

EXTERNAL ERROR

Possible causes	Remedy
Error signal at the external error input (IN8) of the control electronics board	Check and remedy the external cause of the error 62.

UNDEFINABLE ACTIVATION OF THE SWITCHING OUTPUTS

Possible causes	Remedy
Improper installation of the search coil.	See operational manual detector coil: “Mounting”.
With conveyor systems: Open and close electric circuits at the frame of the conveyor system, i.e. due to: • loose guide plates. • loose screw connections at frame parts. Changing contact resistance at the bearings of the tensioning and deflection pulleys or the drive pulley. Individual locations of the conveyor belt are conductive: • Metallic impurities (welding spatter, metal chips, abraded matter...). • Belt junction causes metal alarms.	Check and tighten all screw connections. If necessary, weld frame parts. Insulate at one side cross struts, tension and deflection rollers. Remove residues from the conveyor belt. If necessary, replace the conveyor belt
With round coils: Mechanical contact between scanning pipe and search coil.	A gap of at minimum 10 mm has to be kept between scanning pipe and detector coil.
Sensitivity too high.	Repeat product teach in procedure. Reduce sensitivity manually.
Metal particles hard to identify due to corrosion or encapsulation.	Check carefully the processed material if necessary inspect again.
Loose contact at the coil cables.	Check the connections.
High electrostatic charging of the material (possibly audible clicking sound at the detection coil).	Avoid static charging by additional grounding measures. (Contact Eriez service!) Use of deionizing equipment.

REPLACING THE BACKUP BATTERY

DANGER

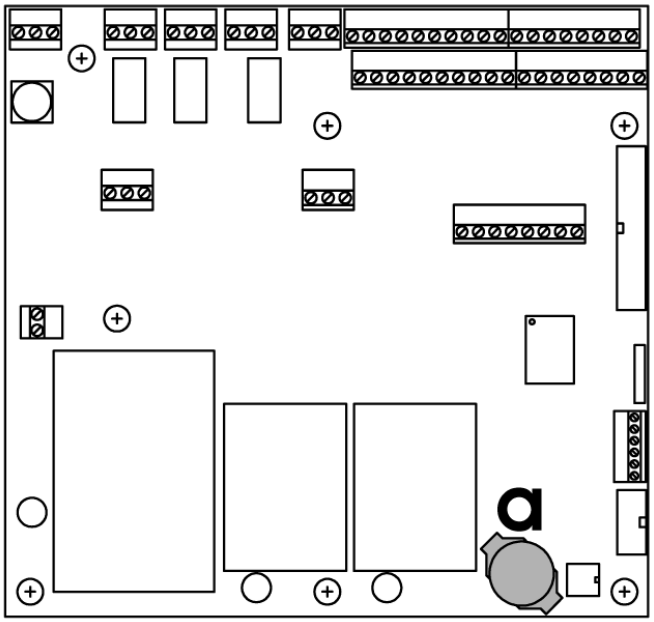
Because of energized components in the electronics housing, there is a risk of injuries due to electric shock or burns. Therefore, such work may only be performed by a qualified electrician under strict observation of the attached warning labels and with due regard to standard approved rules of electrical engineering.

1. As a precaution, make a backup copy of the logbook entries.
2. **Do not** turn off the power supply to avoid any loss of data.
3. Open the cover of the electronics housing.

PROCEDURE-REPLACING THE BACKUP BATTERY:

Button cell CR2032 (for STE article number 44006482):

1. Carefully remove the old backup battery (a) from its holder.
2. Insert the new backup battery.
3. Always observe the correct polarity (positive pole on top)!
4. Close the cover of the electronics housing again.
5. Check whether the date and time settings are still correct, and whether the logbook entries are still there.



IMPORTANT HINT

If the backup battery is not replaced in time, the following data will be lost: Date, time, and all the entries in the logbook.

Error and Error Remedying *(cont.)*

REPLACEMENT OF ELECTRONIC BOARDS

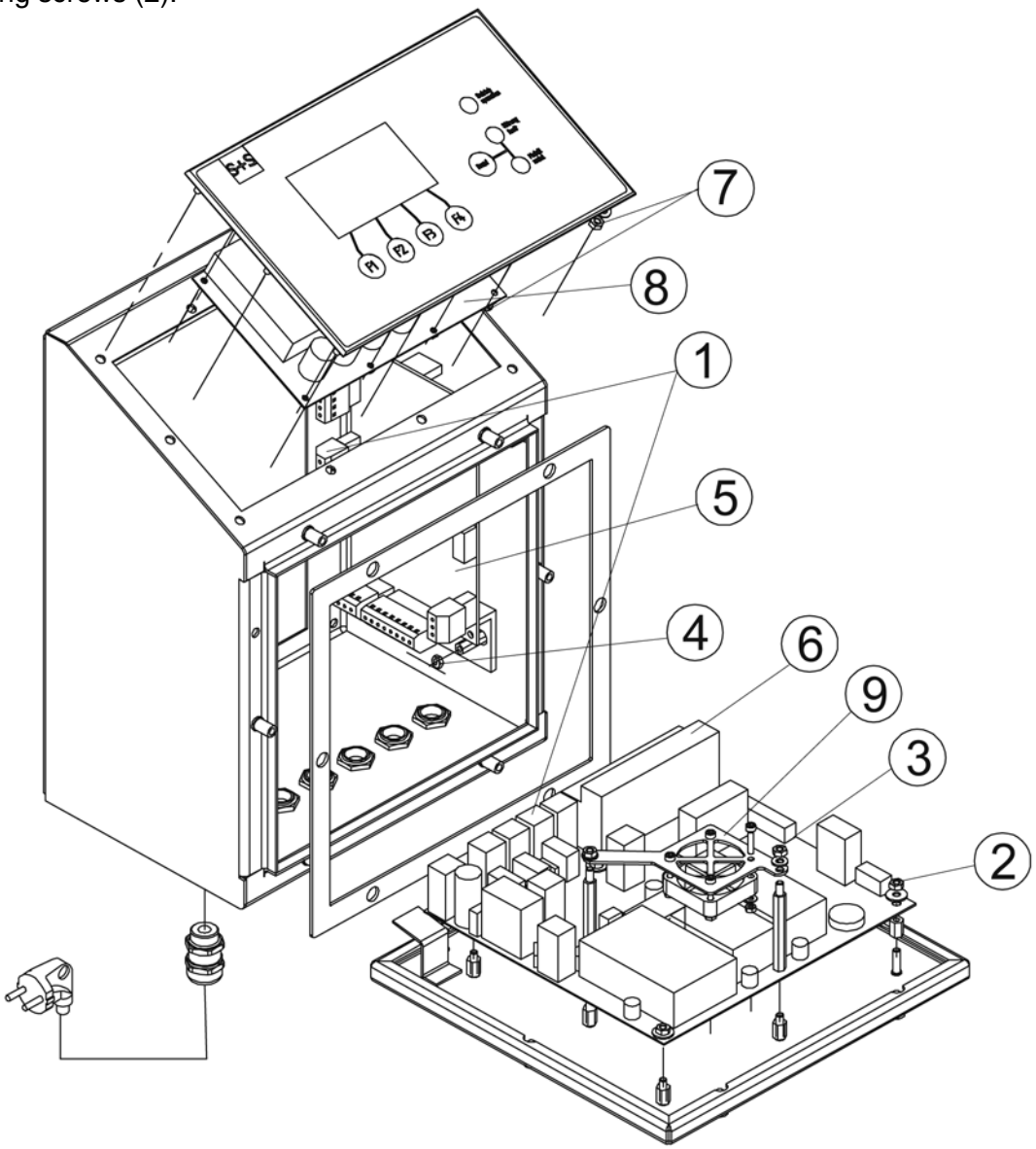
The Control-Unit FFG consists of the following three boards: **Control electronics board** (3), **evaluation electronics board** (5) and **display board** (8).

REPLACING THE CONTROL ELECTRONICS BOARD

1. Disconnect voltage supply and external circuits and open the cover at the electronics housing.
2. Remove connectors (1) and (6) and remove the fastening screws (2).
3. Remove the fan (9).
4. Take out the control electronics board (3).
5. Install the new board in reverse order, but do not connect mains power supply!

IMPORTANT HINT

The data memory is located on the STE controller board. The memory contains all device and product parameter settings. If this memory device is transferred to a new board, no new settings must be performed.



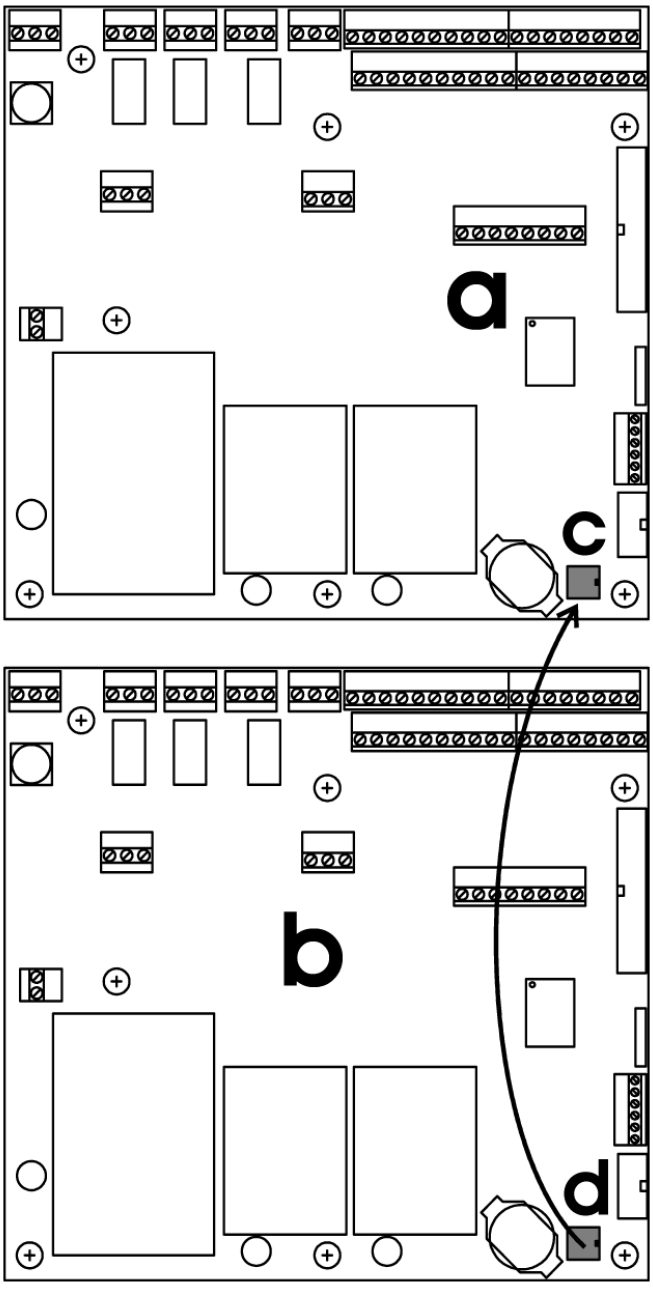
REPLACEMENT OF THE DATA MEMORY:
STE article number 44006482
a: New controller board

b: Old controller board

c, d: Device and program memory

Instruction:

1. Remove data memory device (c) from the board.
2. Remove data memory (d) from the old board (b) and plug it carefully into the new board (a).
3. Check that the marking on the memory device points to the right.
4. Switch on power supply. The new board runs with the “old” adjustments.



IMPORTANT HINT
Date, time and recorded events in the logbook are not transferred when changing the Data memory device.

REPLACING THE EVALUATION ELECTRONICS BOARD

1. Disconnect voltage supply and external circuits and open the cover at the electronics housing.
2. Remove the used connectors (1) and (6) and remove the fastening screws (4).
3. Take out the evaluation electronics board (5).
4. Install the new board in reverse order!

REPLACING THE DISPLAY BOARD

1. Disconnect voltage supply and external circuits and open the cover at the electronics housing.
2. Remove the used connectors (6) and remove the fastening screws (7).
3. Take out the display board (8).
4. Install the new board in reverse order!

Maintenance and Cleaning

WARNING
Prior to cleaning, turn off the system with the master switch and disconnect the system from the mains voltage.

MAINTENANCE
The FFG control unit is maintenance-free, yet it is still appropriate to inspect the equipment in regular intervals:

- Are all the fastening screws tight?
- Is the housing seal in perfect condition, and does it provide proper sealing?
- Also, check all the cables for possible damage (i.e. at the cable sheath).

Maintenance and Cleaning *(cont.)*

CLEANING
HINTS FOR CLEANING

- 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.
- 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 agents that may attack the materials used.

CLEANING INSTRUCTIONS

For cleaning purposes we recommend that you use warm water with approved cleaning agents for the respective application, and a soft, lint-free cloth. Once every week, the coil shaft should be thoroughly cleaned, removing any dirt accumulations and deposits. After cleaning, wipe up any remaining drops of water with a dry, non-fibrous cloth until the coil shaft is dry. From time to time, apply oil to the stainless steel framework (i.e. Nirostol 55 cleaning and maintenance oil which meets food industry standards).

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 (i.e. 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 that 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.

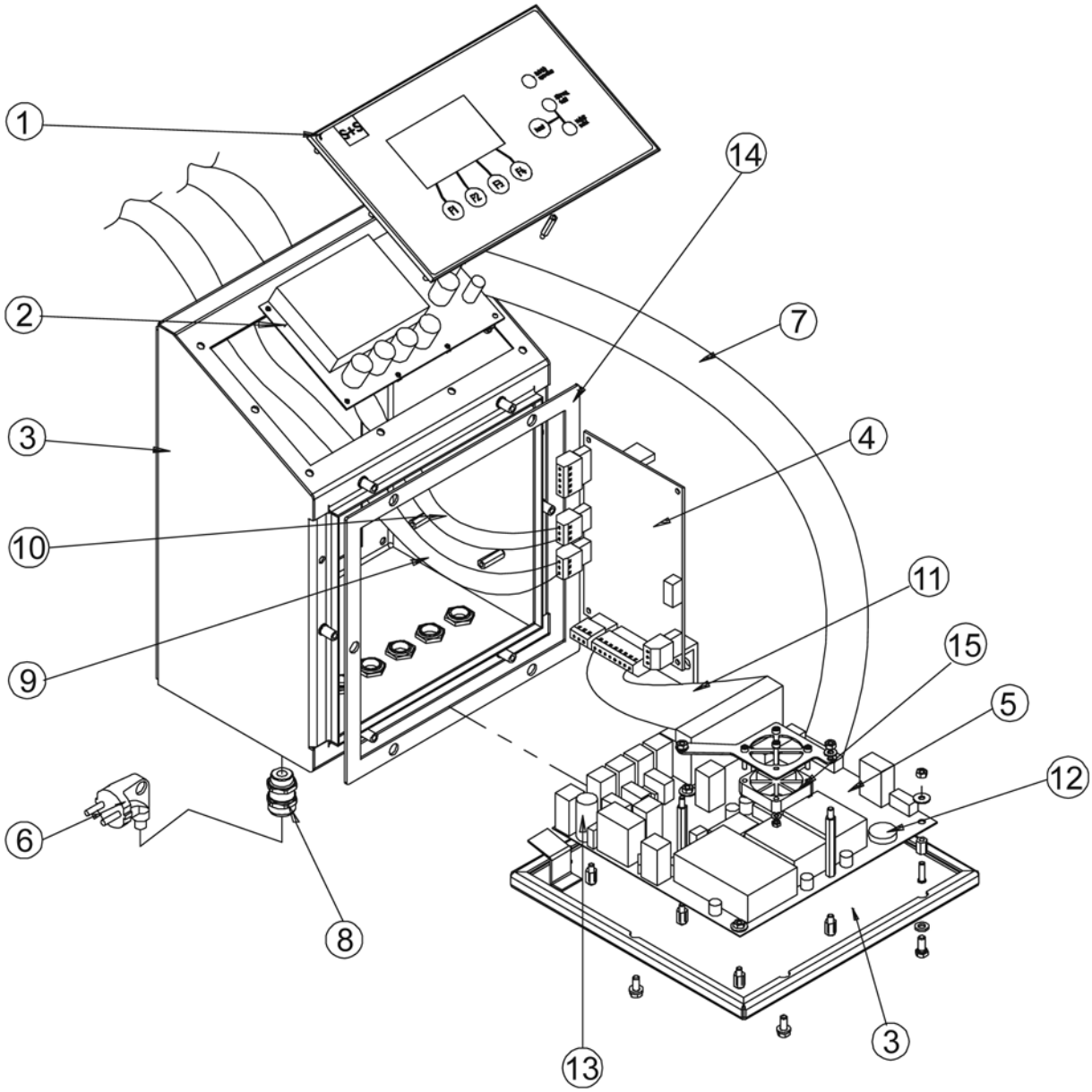
Spare Parts

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

IMPORTANT INFORMATION

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

SPARE PARTS VIEW



Spare Parts *(cont.)*

SPARE PARTS LIST

Part Number	Description	Part Number	Material	Art. Number	Sp/ Con*	Goods Number
1	Display cover FFG			33010416	Sp	85381000
2	Display board FFG			44001078	Sp	85340090
3	Electronics housing FFG mounted to the detector head (incl. cover), bead blasted		1.4301	44003910	Sp	73269098
3	Electronics housing FFG remote (incl. cover), bead blasted		1.4301	33002708	Sp	73269098
4	Evaluation electronics board FFG AWE			44006482	Sp	85340090
5	Control electronics board FFG STE			44006482	Sp	85340090
6a	Mains cable standard			04015479	Sp	85444290
6b	Mains cable US version			33002438	Sp	85444290
7	Flat cable for display			44005994	Sp	85444290
8	Threaded joint M16x1.5			33001010	Sp	74199900
9	Receiver cable			44005410	Sp	85444290
10	Transmitter cable			04015444	Sp	85444290
11	Connection cable AWE-STE			44005966	Sp	85444290
12	Button cell (CR 2032, LITHIUM 3V)			33011070	Sp	85444290
13	Main fuse			47090930	Sp	85444290
14	Seal		NBR	33009700	Sp	84799080
15	Fan (EBM Papst, type 414FH)			77010666	Sp	84145939

*Sp/Con= spare part/consumable

ACCESSORIES

Description	Part Number	Material	Art. Number	Sp/ Con*	Goods Number
Portable printer EM “Custom Engineering”			77010665		85340090
Paper roll for printer EM			77010668		
InsightLog.NET Central Data Management			44006118		
Interface cable RS232 for printer/length 3.28' (1 meter)			44006236		85444290
Interface cable RS232 for PC			44001060**		85444290
Interface cable RS485 for PC/INSIGHT			44001038**		85444290
LAN XPORT			33002438		85444290
WIPORT			44005994		85444290

**Art. No. = Please state cable length!

Shipping, Preservation, Waste Disposal, Transport, Storage

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

Shipping, Preservation, Waste Disposal, Transport, Storage *(cont.)*

⚠ 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

Note: Some safety warning labels or guarding may have been removed before photographing this equipment.

World Authority in Advanced Technology for Magnetic, Vibratory and Inspection Applications
Headquarters: 2200 Asbury Road, Erie, PA 16506-1402 U.S.A.
Telephone: 814/835-6000 • 800/345-4946 • Fax: 814/838-4960 • International Fax: 814/833-3348
Web Site: http://www.eriez.com e-mail: eriez@eriez.com
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