Industrial Metal Detector
THS/21

Operator Manual

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Document	Date	Hardware	Software
FI 028 GB 2K8 v2	17 / 04 / 2008	HV5.0x	THSV50xx - ALMV50xx

SYMBOLS

The equipment is marked with this symbol wherever the user should refer to this manual in order to avoid possible damage. The same symbol appears in the manual at points where warnings or particularly important instructions, essential for safe, correct operation of the device, are given.

The equipment is marked with this symbol in the areas where there is dangerous voltage. Only trained maintenance personnel should carry out work in these areas. The same symbol appears in the manual at points where warnings essential for safe, are given.

This symbol appears in the manual at points where suggestions, additional information or other relevant notes are given.

REVISIONS TABLE

Rev.	Date	Author	Reference	Description
1	05/07/2007	TP2 – Pasquini	-	First emission

WARRANTY TERMS

The warranty on all CEIA products, extended to the period agreed with the Sales Department, is applicable to goods supplied from our factory, and for every constituent part thereof.

Any form of tampering with the device, is strictly forbidden and will invalidate the warranty

INDICE

1 - ISTRUZIONI DI SICUREZZA - AVVERTENZE

1.1 - Warnings

Read this manual carefully before installing, operating or carrying out maintenance on the device. Keep the manual in a safe place for future reference, and in perfect condition. This manual must accompany the device described therein in the case of change of ownership, and until the device is broken up.

The functions accessible to users and behaviour of the system, may differ from what described in this manual, according to the settings made. Contact the system administrator for any questions.

1.1.1 - General warnings

- This equipment complies with the directive 2004/108/EC for industrial applications.
- All personnel operating with or performing operations on the device must have an adequate preparation and shall know the procedures described in this manual.
- Follow the instructions contained in this manual for all operations relating to installation, use and maintenance of the device. CEIA cannot be held responsible for any damage resulting from procedures which are not expressly indicated in this manual, or from any lack of attention, either partial or total, of the procedures described therein.
- This manual must accompany the device described therein in the case of change of ownership, and until the device is broken up.

1.1.2 - Use warnings

- If the device is stored for a long period in temperatures outside the operating range, wait for the temperature of the detector to come back within that range before switching on.
- Whenever there is any suggestion that the level of protection has been reduced, the device should be taken out of service and secured against any possibility of unintentional use, and authorised service technicians should be called. The level of protection is considered to have been reduced when:
  - *the device shows visible signs of wear and tear, especially on parts that ensures the device protections (boxes, gaskets, glands, fixing screws, etc.);*
  - *the Power Supply Box is not correctly closed;*
  - *the ground connections are not compliant;*
  - *the device has suffered mechanical or electrical stress (shocks, bumps, etc..);*

- *the device does not operate correctly, respect on how described in this manual;*
- *the device has been stored for long periods in sub-optimal conditions;*
- *the device has suffered severe stress during transport;*
- *the device came into contact with corrosive substances.*

• Do not supply the device when the Power Supply Box is open. Do not open during use.

1.1.3 – Maintenance warnings

• Perform all maintenance operations following the procedures described in the Maintenance section of this manual.

• The device must be disconnected from all power sources before undergoing any maintenance or cleaning, and before being moved.

• Do not wash the device with liquid detergents or chemical substances. Any cleaning should be done using a slightly-damp, non-abrasive cloth.

• Read the chapter on "Maintenance" carefully before calling the service centre. Whatever the problem, only specialised service personnel authorised to work with CEIA equipment should be called.

1.2 – Correct and Forbidden use of the device

1.2.1 – Correct use of the device

- The THS/21 Metal Detector is an electronic device for the detection of metal masses (magnetic and non-magnetic metals) transiting inside the detection antenna (only magnetic for THS/MN21 model).
- Handle the device with care and without excessive force during installation, use and maintenance.
- The final user is responsible for selecting the appropriate sensitivity for their application. After this selection has been made, and programming has been adjusted accordingly, it is also the final user's responsibility to verify calibration using the test object(s) appropriate to the level of security selected. Additionally, this test should be carried out periodically to ensure no changes have occurred in the equipment.
- The device is fitted with mechanical and electronic protections, described in this manual. Removing or reducing these protections is forbidden.

1.2.2 – Forbidden use of the device

- The THS/21 Metal Detectors are not suitable to be installed or used in environments where could be present, even accidentally, an explosive atmoshpere.
- Electric arc welding shall not be carried out on the detector antenna, on the Control Power Box or on any part of the attached structure.

1.3 – Residual risks

- Before any movement of the detector, take care about the facts that it could be heavy to be handled by only one person. Establish and implement adequate procedures to perform thi s operation. CEIA cannot be held responsible for any damage resulting from incorrect procedures.
- After the maintenance of devices provided with conveyor belt, make sure not to leave any tool (such as screwdrivers) on the belt since they can be hurled on switching the device on.
- Before starting the system, ensure that no one else is working on the machine.

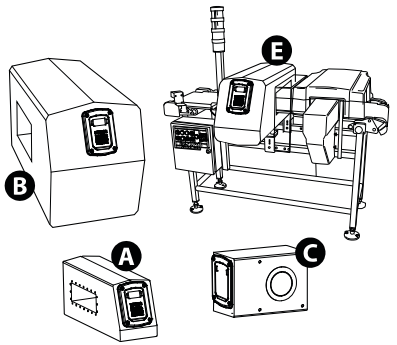
2 - DESCRIPTION

2.1 – Generale description

The THS/21 is an extremely compact metal detector with very high sensitivity, controlled by a microprocessor and designed for industrial use. The device is made up of:

2.1.1 - Antenna

The Metal Detector probe, complete of electronic control board, can have different shapes, depending on THS model.



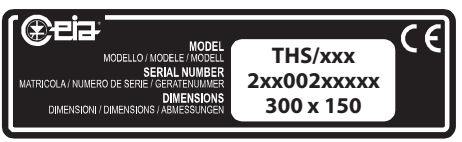
A THS/SL21 for applications in reduced spaces.

B THS/21 standard, THS/MN21 and THS/MS21.

C THS/G21 and THS/GMS21 with circular tunnel and control panel without keyboard, for remote control

E THS/FB21 and THS/MB21, conveyor belt integrated systems.

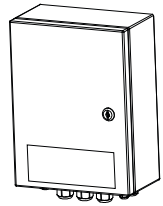
The identification is performed through the label placed on the antenna:



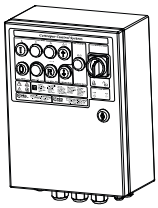
Device identification label

2.1.2 - Control Power Box

The Power Supply Box is housed in a watertight box in stainless steel which is designed to be attached by means of four screws and through which pass the connecting cables. The power supply unit is available in three versions:



Control Power Box, containing the metal detector power supply section and designed to allow connection of external sensors and slave devices.



Conveyor Control System, with the same functions as the Control Power Box, but with the addition of a conveyor belt motor driver/control section.

Control Power Box, with Remote Control Unit (on THS/G21 or other models, upon request).

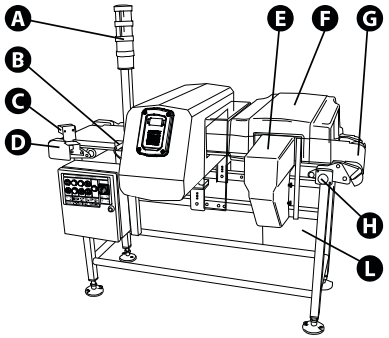
The identification is performed through the label placed on the box.

Device identification label

2.1.3 - Other components

On models fitted with conveyor belt, THS/FB21 and THS/MB21, other components are present, indicated on the following scheme:

- **A** Buzzer/flashing light.
- **B** Photocell.
- **C** Barcode reader.
- **D** Free roller.
- **E** Ejector unit.
- **F** Protection cover for the ejection area.
- **G** Pulling roller.
- **H** Emergency button.
- **L** Set/aside container.



2.2 – Safety devices and warning labels

The THS/21 Metal Detector is fitted with a list of safety features described below, in order to warrant the proper protection level, during the correct use.

IP Protection Degree

All the containers of the system (antenna and supply box) have a protection degree of IP66 - IP69K. This means that they are strongly watertight during operations and cleaning.

Cable Glands

In order to ensure the protection degree, it's mandatory to use cables with characteristics and diameter compliant with the device glands and following the guidelines written in this manual. Insert only one cable for each gland and take care that all of them are streighted in the correct way. Do not remove the caps from unused glands.

Self diagnosis system

An internal self diagnosis system checks constantly the Metal Detector functionality. In case of fault a message is shown on the control display and all alarm indicators are activated together with corresponding relays.

Password

The access to Metal Detector parameters is protected by passwords.

3 - USE OF THE DEVICE

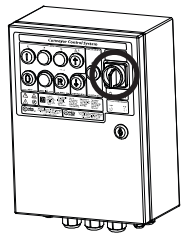
Before starting to use the device, read carefully the **Safety instructions - Warnings** section of this manual.

3.1 – Switching on the Metal Detector

It is strictly forbidden to start up the system if all safety features are not properly functional. Tampering with the safety features is also forbidden, and voids all responsibility of the manufacturer for any damage caused.

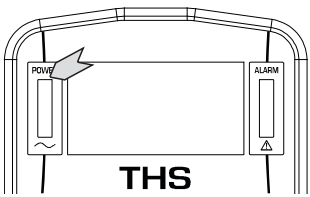
On the **Conveyor Control System** model, the ON/OFF switch is located on the power supply unit cover.

In the case of the **Control Power Box**, an external switch must be provided.

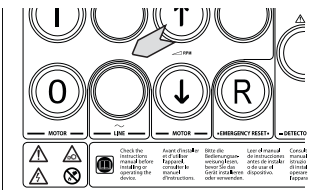


Conveyor Control System

3.1.1 - Signals at power-up



Control Panel



Conveyor Control System

The presence of mains power supply is signalled by the lighting up of the indicator located on the control panel.

When the device is turned on, the display lights up, as do the indicators located on the front of the electronics unit.

IMore specifically, the display shows the CEIA logo, after that the following is displayed:

The first line identifies the model (THS/21 in this case).

The second line identifies the software version of the Metal Detector.

These first two rows, and subsequent, are replaced, if necessary, with any indication for the operator.

In the bottom part of the display there is a bargraph about the signal read by the antenna. The last line indicates the type of programming, specific to one product (in this case PROD01).

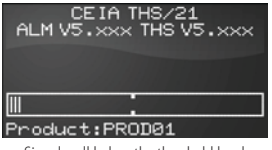
3.1.2 – Signals given during normal use

On models where there is a control panel on both the probe and the power supply unit (because the probe is installed in a position which is inaccessible to the operator), the electronics unit display is disabled (the message "Disabled" appears).

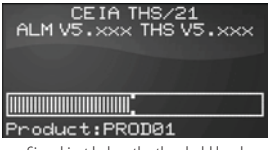
Indication of the received signal

On the fourth line of the display the signal being received is displayed by means of a horizontal illuminating bar.

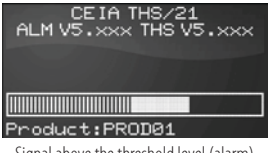
When the signal increases, the bar extends towards the right. The alarm threshold corresponds to the middle of the bar: the sections on the left are vertical bars, those on the right are represented with a white area.



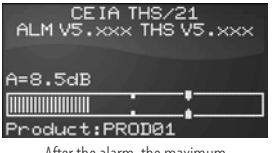
Signal well below the threshold level



Signal just below the threshold level



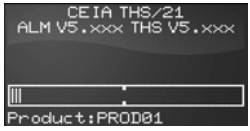
Signal above the threshold level (alarm)



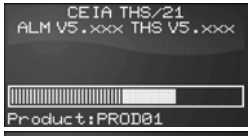
After the alarm, the maximum signal is visualized for a few seconds together with its amplitude in dB

Display messages

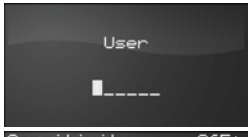
The Metal Detector display shows messages relating to its current mode of operation:



The Metal Detector is in normal operating mode: it will detect metals and activate connected slave devices.

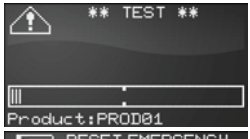


The Metal Detector is in normal operating mode: it has just detected a metal object, uttering the alarm and activates connected slave devices.

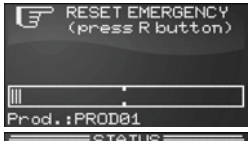


Programming access phase: the metal detector requires to type an user name, and possibly a password. The cursor position indicates where the next character will be typed.

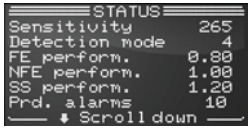
The Metal Detector has been set to programming mode: accessible parameters can be modified.



The Metal Detector requires an operational test to be carried out (see "Periodic test management " section below)



The Metal Detector requires an intervention.



If the ▲ (increase) key is pressed when the display shows normal operation, a list of information relating to the Metal Detector's status is shown.
It is possible to scroll the list of information, using ▲ (increase) and ▼ (decrease) keys.
Press **P** to return to the normal operation display.

3.1.3 – Signals given during Self-diagnosis

The THS/21 Metal Detector has an embedded Self-Diagnosis system.

The message shown on the display are indicated on Installation and Maintenance Manual and in this manual at paragraph 4.3.3.

3.2 - Indicators

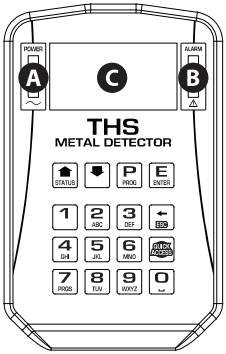
3.2.1 – Optical indicators

The control panel, containing the optical indicators and the metal detector controls, is located on the antenna or on the Control Power Box:

A POWER: a green indicator indicates the presence of power

B ALARM: a red indicator indicates the metal detector alarm (detection of a metal fragment or breakdown)

C Graphic display to show the messages relating to use, programming and self-diagnosis of the device

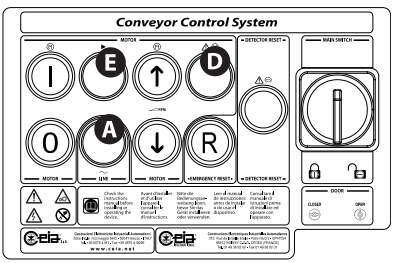


Conveyor Control System

A POWER: a green indicator indicates the presence of power

D MOTOR: a red indicator indicates the conveyor motor alarm (malfunction)

E a green indicator indicates that the conveyor is running.



3.2.2 – Acoustical indicators

In the Power Control Box is included an acoustical indicator that is activated in case of alarm for the detection of metallic fragments, for the signalization of a fault or for the request of an operator intervention.

3.3 – Controls

3.3.1 – Control Panel

The control of the Metal Detector and the setting of the device parameters are performed through the control panel keyboard, as shown below:

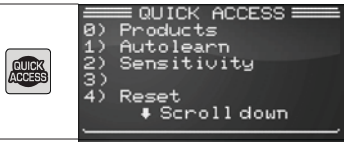
Key	Function
P PROG	Access and exit from the programming phase
	Return back from the submenus to the previous menu
	Exit from the Metal Detector Status visualization
STATUS	Metal Detector Status visualization
STATUS + ↓	Scroll through the sequence of instructions
	Choice of the parameters to be changed
	Modification of the parameter values
E ENTER	Selection of the selected submenu from the main menu
	Confirmation of the data entered
	Reset of some kinds of fault
← ESC	Cancel the last character entered
QUICK ACCESS	Quick access to preset functions
1 . 2 ABC 3 DEF 4 GHI 5 JKL 6 MNO 7 PQRS 8 TUV 9 WXYZ 0 _ -	Modification of the parameter values

3.3.2 - Using the Quick Access key

The System Administrator can program up to 10 functions, so that they are quickly accessible through the Quick Access key and the corresponding number.

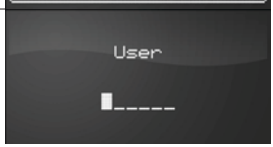
Press the **Quick Access** key.

The display will show the list of the first five functions, programmed by the System Administrator.



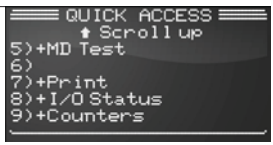
Press the **2** key to access, for example, to the function of **Sensitivity** modification.

If needed by the called function, user name and / or password will be asked.



To see the other five programmed functions, for the keys from 5 to 9, scroll the screen pressing the arrow keys.

The + character beside a function, indicates that it is a link to the corresponding menu.



The list of Quick Access functions represented above is just an example. The list is programmable and provided, as standard, ready to be customized.

For the programming of the list of functions accessible via the Quick Access button, see the Programming manual.

3.3.3 – Conveyor Control System control panel

On the power supply unit Conveyor Control System, the container cover incorporates a motor control panel.

Key	Motor status			
	MM=ON		MM=OFF and UD=ON	
	Motor OFF	Motor ON	Motor OFF	Motor ON
	Manual advance	No function	No function	Increase in speed
	Manual reverse	No function	No function	Decrease in speed

During manual advance/reverse, the Metal Detector is not operative.

The function of manual movement of the motor shall not be enabled on modular belts (THS/MB21).

3.4 – Use of the device

3.4.1 – Sensitivity check with reference sample

It is important to check proper operation (sensitivity and ejection of material) of the metal detector periodically by carrying out a sensitivity test with a reference sample.

See paragraph 4.7.1 for the procedure.

3.4.2 – Normal use

Starting/stopping the conveyor belt

With the correct power supply and with the motor stopped, check that the LED indicators are ON or OFF as shown in the following table:

Indicator		Status
~	Mains voltage	ON
▶	Motor on	OFF
⚠ Ⓜ	Motor malfunction	OFF

- Press the start button Ⓘ to switch on the motor: check that it starts up, and that the "motor on" indicator ▶ comes on.
- To stop the motor press the stop button Ⓞ again: check that it stops, and that the "motor on" indicator ▶ goes off.

Adjustment of the belt speed

The motor speed control keys have different functions according to the value of parameter MM (see Programming section).

The speed of the conveyor belt can be adjusted by:

- *programming the BS parameter on the Metal Detector*
- *simply pushing the keys located on the Conveyor Control System, if parameter MM=OFF and the parameter UD=ON.*

☞ During programming of the Metal Detector, the Conveyor Control System UP and DOWN keys are disabled.
While the Conveyor Control System keys are being used, Metal Detector programming is disabled

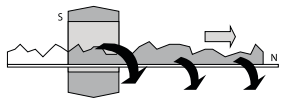
The "Speed" reading indicates the speed set, and varies in real time when the ↑ and ↓ keys are pressed. Any variation in speed is memorised as a parameter specific to the current product type.

Alarm reset

In the case of an alarm, the contaminated product is ejected from the product conveyor according to the type of operation which has been selected:

- in operation with automatic ejection, the belt is not stopped and the contaminated product is sent into a set-aside container which should be emptied periodically by the operator. In this case, the detector resets automatically.
- in operation where the conveyor belt is blocked, the belt is stopped and the contaminated product is positioned in the exit area of the metal detector for manual removal by the operator.

All material between the probe and the stop line must be removed.



In this case, the belt only restarts when the operator pushes the appropriate button. In the case of the Conveyor Control System, this button is incorporated into the control panel:

Action		Indicators and results
RESET	Press the button to reset the Detector alarm	The metal detector alarm indicator goes off
I	Press the button to restart the motor	The motor restarts

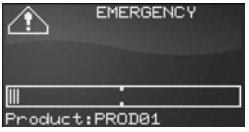
3.4.3 – Stop

If nothing passes through the metal detector for the length of time set by parameter ST (see Programming Manual), the conveyor belt stops automatically.

Emergency button

An extra emergency button is mounted on the conveyor belt to stop it in case of malfunction or danger.

If necessary, the main system switch can also be used for this purpose.



The emergency button has been pressed. Press R to restore the normal functioning.

If the **Stop Time** (ST) parameter is set to a value other than zero, if any product passes in front of the photocell during the number of minutes that you set, the conveyor belt stops by itself, without any signalization.

3.5 - Base functions

For all programming operations, modifications of installation parameters, local and remote control, see the **Programming manual**.

3.5.1 - Access to Programming mode

Programming mode is accessed by pressing key P PROG.

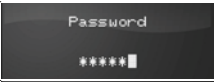
The Metal Detector can request, depending on Administrator's settings, to enter an user name and/or a password. Each kind of operator can access only to specific set of parameters, or menus.

Entering the username

In the following example, the way to digit the username "ADMINI" is shown.

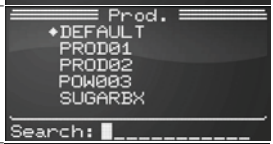
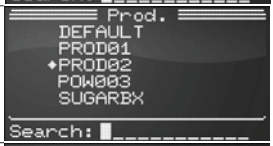
Press P to enter Programming. The cursor blinks in the position of the first character.	P PROG	User _____
Press five times the key "7" to set the "S" as the first character. The cursor moves on.	7 PQRS 7 PQRS 7 PQRS 7 PQRS 7 PQRS	User S____
Press twice the key "8" to set the "T" as the second character.	8 TUV 8 TUV	User ST___
Press three times the key "3" to set the letter "E".	3 DEF 3 DEF 3 DEF	User STE__
Press four times the key "8" to set the letter "V".	8 TUV 8 TUV 8 TUV 8 TUV	User STEV_
Press three times the key "3" to set the letter "E".	3 DEF 3 DEF 3 DEF	User STEVE
Press three times the key "6" to set the letter "N". The cursor disappear.	6 MNO 6 MNO 6 MNO	User STEVEN
Press "Enter" to confirm the username.	E ENTER	User STEVEN

Entering the password

After the user name, a password could be required. As an example we will digit "000004".		
Push "0" to get for the letter "0" as the first character. The cursor moves on	0	
Continue to press 0 until the cursor reaches the last position.	0	
Press once the key 4 to set the number as the last character.	4 GHI	
Press "Enter" to confirm the password.	E ENTER	

3.5.2 - Product selection

Follow the next procedure to select a different product from the list of products, set and programmed by the Administrator or by the Supervisor:

Access as Operator pressing PROG. If requested, insert username and /or password.	P PROG	
Press ENTER. The display will show an alphabetical list of stored products.	E ENTER	
Use the arrow keys to scroll the list up and down.	STATUS ↓	
Press ENTER to confirm the selection of the new product.	E ENTER	
To search easily through the list, digiting some characters on the search string,the listed names are limited to the names that starts with that characters .		

3.5.3 – Sensitivity check with reference sample

It is important to check proper operation (sensitivity and ejection of material) of the metal detector periodically by carrying out a sensitivity test with a reference sample.

Test using a sample defined by the customer

The reference sample is identified at the end of the installation phase based on the customer's specifications; the sensitivity, trajectory and orientation of the sample must be noted if it is not spherical.

This sample should be kept under constant conditions, and is used periodically for the test, which should be carried out under the same conditions as the end-of-installation test.

Test using a CEIA sample

The reference sample is one of the CEIA spherical samples available in various sizes and in three types of metal (ferrous, non-ferrous and stainless steel). The Head of Quality Control shall, for each different product type:

- *perform the product Autolearn procedure, as described on paragraph 3.6.2.*
- *enter the diameter of the sample, as obtained with the autolearn procedure, in the FD parameter (or SD, or ND, depending on the type of metal used).*
- *Set the intervals and the waiting period for carrying out the test, and whether or not the malfunction relay is activated if the test is not performed (see QA Configuration menu).*

Refer to the Programming Manual for the parameter selection.

3.5.4 - Periodic test management

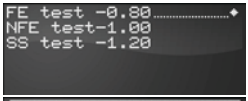
At regular intervals, decided by the Administrator or the Head of the Quality Control, a message requesting a test is displayed (this can also be signalled via an optional lamp).

The check can be carried out either by the Quality-control Operator or the Head of Quality Control.

The periodic request to execute a test can be disabled only by the Administrator or by the Head of Quality Control.

Test procedure

The procedure described below refers to the FE test; the other two tests follow the same procedure.

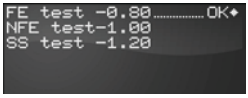


Press E key.

Wait about 3 seconds.

Pass a sample through the probe within 20 seconds. If a photocell is fitted, pass the product through together with the sample.

Test finished with positive outcome: the metal sample has been detected and possibly ejected (check of "ejection confirmation" input).

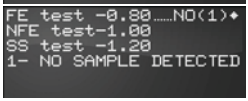


Pressing any key the display shows back the MD test menu, where is also noted the positive outcome of the test.

If the test fails, one of the following messages will be seen:

Sample not detected

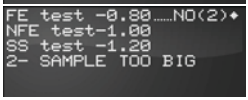
In this case, no transit has been detected for 20 seconds, or the signal from the sample is below the alarm threshold.



The negative outcome is reported also in the test menu.

Sample too big

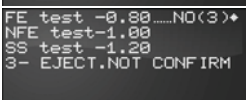
The signal given by the sample is considered too big to perform a valid test and the Metal Detector set itself in fault status.



Pressing any key, the display returns to the MD test menu, where the negative outcome is also shown.

Ejection not confirmed

If the sample is correctly detected, but there is not any confirmation of its ejection, the test fail.



The negative outcome is reported also in the test menu.

Test aborted

If the self-diagnosis system reports any other fault, as, for example, the bin full, the test sequence is aborted and the display shows a message as beside.

It's mandatory to solve the fault, to reset the Metal Detector and to repeat the operation.

In any case, after a failed test, it's mandatory to exit from programming, to reset the Metal Detector and to repeat the operation.

The outcome of the test, whether positive or negative, is always stored in memory.

In the case of abnormal operation, carry out a test using the sample indicated on the **Factory Acceptance Test** enclosed with each unit, after selecting the "default" product.

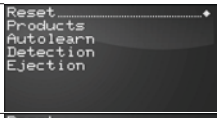
3.6 - Advanced functions

3.6.1 - Creation of a new product

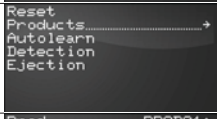
In the following example, the insertion of a new product is shown.

By default, only the Supervisor, the Technician and the Administrator are enabled to creat a new product.

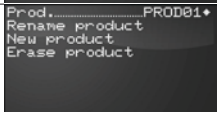
Press P to enter the Programming phase. If requested, insert user name and password.



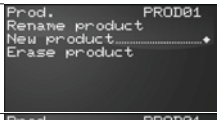
Select the **Products** menu, using the arrow keys, and press ENTER to access the submenu.



All the parameters of the actually selected product will be duplicated in the new one, so select a product with similar characteristics before starting (see paragraph 3.5.2). In case of doubts, select the DEFAULT product.

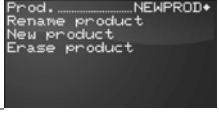


Select the command **New product**, by means of the arrow keys, and press ENTER to activate it.



Insert the name of the new product, by meand of the alphanumeric keyboard.

Pressing ENTER the new product is created and immediately selected.

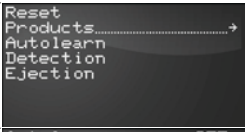


3.6.2 - Procedure for automatic product acquisition

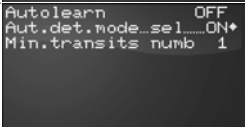
This procedure comprises the automatic acquisition of product characteristics in order to identify the contribution to the received signal due to the metal mass to be detected. The characteristics are acquired progressively by making the product pass through the metal detector several times.

⚠ The procedure must be completed once started.
Do not change any parameter setting during the procedure.

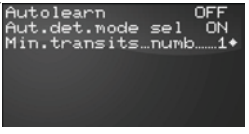
Access as Administrator, Supervisor or Technician and select a product or, if necessary, create a new one using the procedure described on paragraph 3.6.1.



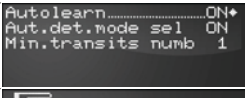
Set **Autolearn > Aut.det.mode sel** to ON to perform an autolearn for all detection modes. Set it to **OFF** to perform it only on the current detection mode. Set it to **ON** if not sure about the correct detection mode of the product.



Set the parameter **Autolearn > Min.transits numb** to a suitable value for the product composition. The value of **1** is suggested for products that have regular shape and composition, higher the product non-uniformity, higher should be the minimum transits to perform a correct autolearn.



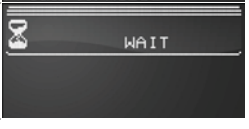
Set the command **Autolearn > Autolearn** to ON. Exit from programming pressing twice the P key and follow the indications on the display.



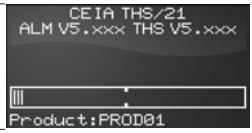
Pass the product through the metal detector each time is requested.

The message **PASS PRODUCT** appears on the display, and the buzzer (if enabled) is activated.

At the end of each transit, the Metal Detector will ask to wait for a few seconds, in order to process the signal. In this phase, the alarm led is blinking.



At the end of the Autolearn procedure, the Metal Detector exits from the autolearn phase and the standard message appears on the display.



Pass some **pure product** through the detector: the device should not set off any alarm.

- *If the detector gives an alarm whenever some of the pure product passes through the probe, repeat the procedure, increasing the number of transits (see point 3.). At the end of this second procedure, the pure product is still giving alarm, decrease the "Sensitivity" parameter until the detector does not give an alarm (this is probably due to non-uniformity of the product).*

Pass **some of the product with the metallic sample**: the detector should give an alarm.

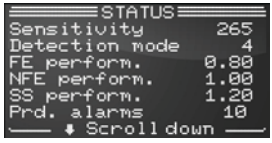
- *If any alarm is given, increase the size of the metallic sample gradually, until locating its minimum dimension that will be detected with at least 6 dB.*

In the case that the size of the metallic samples has been modified, communicate them immediately to the Head of Quality Control or to the Administrator, so as to let them to change their values in the relative menu.

- *If the signal given by the sample is higher than 10 dB, is advisable to decrease the sensitivity, in order to achieve a better immunity to external noises and/or probable non-uniformities of the product, until the signal amplitude will be in the range 5 – 10 dB.*

At the end of the procedure, on the Metal Detector Status screen, will be indicated the minimum detectable diameters.

This indication is purely indicative and it is responsibility of the customer to verify their effective detection.



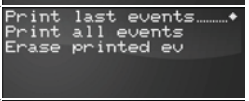
The minimum detected diameters can be different from the indication on Status screen.

3.6.3 - Printing the Events list

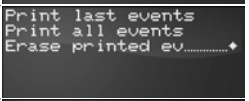
The Last Events list can be easily printed, following the steps illustrated here below:

Access as Administrator or as Head of Quality control and select the **Print** menu.
In the picture beside, the programming menu of the Head of Quality control, is shown.

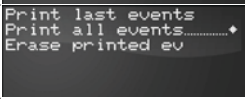
To print all events occurred since the last print, select **Print last events** .



When the print is successfully completed, select the command **Erase printed ev**.



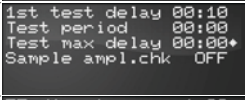
To print all events occurred, select **Print all events** .
The THS stores in memory the last 1000 events.



3.6.4 - Configuration of Quality Control parameters

Access as Administrator or as Head of Quality control and select the **Q-C setup** menu.
In the picture beside, the programming menu of the Head of Quality control, is shown.

All parameters adjustable by the Head of Quality control, are now available. Refers to the Programming Manual for their meaning and use.



Inside the **Test samples** menu, it is possible to set the samples values that will be shown inside reports and prints.

4 - MAINTENANCE

Before starting any maintenance operation, read carefully the Safety instructions - Warnings section of this manual.

Any maintenance or repair of the device while open and energised should be avoided, and in any case should only be carried out by trained personnel who are fully aware of the risks which the operation entails, following the instructions given in the "Maintenance" section.

When the mains is disconnected using the main switch S1 of the Conveyor Control System, the power supply section is deactivated, but the contacts which are connected permanently to the mains, e.g. the relay outputs, remain energised. When the I2 service switch is turned off, most components remain energised.

4.1 – Periodic Maintenance

The following is a list of mainenance operations and their suggested frequency.

Operation	Frequency	Operator	Procedure
Preventive maintenance	At the beginning of each shift	Operator	Visual check of the integrity of the components
	On changing product type		
	Periodically		
Detection check	At the beginning of each shift	Quality Control Operator; Head of Quality Control	Par. 3.6.1
	On changing product type		
	At intervals set by the Head of Quality Control		
Cleaning	At the beginning of each shift	Operator	Par. 4.2.1
	On changing product type		
	Periodically		
Cleaning of the conveyor belt	When needed	Operator	Par. 4.2.2
Conveyour belt tension adjustment (THS/FB)	6 months or when needed	Maintenance personnel	
Locking of terminals used to connect control panels	6 months	Maintenance personnel	
Tightening of the screws	6 months	Maintenance personnel	

The operator must monitor the condition of the system and its suitability for use, and consult the maintenance personnel if necessary.

4.2 – Periodic Maintenance procedures

4.2.1 – External cleaning instructions

Use only products compatible with Stainless Steel (AISI 316), PETG and silicon.

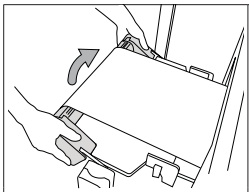
Do NOT use HYDROCHLORIC ACID or its solutions.

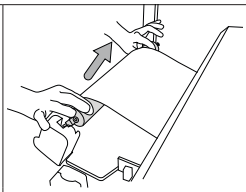
Close the plastic door of the control panel before starting any cleaning procedure.

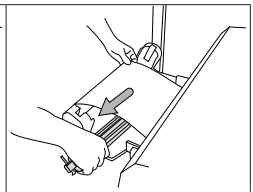
Do NOT use any other cleaning procedure.

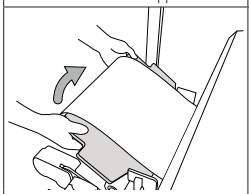
4.2.2 – Cleaning of the conveyor belt (only THS/FB21)

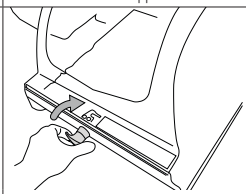
Use only products compatible with Stainless Steel (AISI 316), PETG and silicon.

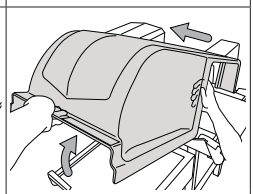

Unlock the belt by raising the free roller support

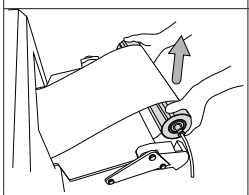

Extract the free roller from the side supports

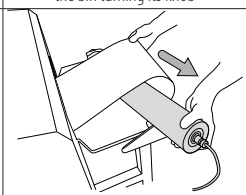

Pull the free roller out of the belt

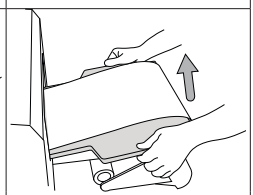

Raise the support plan from its position and pull it out of the belt

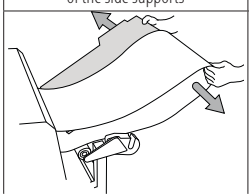

If the THS/FB21 is fitted with an ejection system, unlock the bin turning its knob


Remove the transparent cover


Pull the other roller out of the side supports


Remove the roller from the belt


Raise the support plan from its position


Pull the plan out of the belt, that now is free and ready to be cleaned

Perform the cleaning of the belt on a clean table, free from any metallic fragment that could contaminate it.

Follow this procedure at the contrary to re-assemble the belt.

4.3 - Troubleshooting

4.3.1 - Self-resetting protections

- The ALM card power supply inputs are protected by self-resetting components PTC.
- The MDL inverter card outputs are electronically protected against short circuit between two phases.
- The ALM card inputs are protected against wrong connection up to the voltages present on the card itself, with the exception of the mains voltage.

4.3.2 – Troubleshooting table

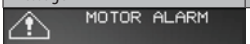
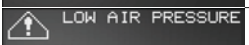
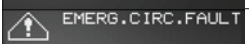
Symptom	Probable cause	Action
Power supply unit or Metal Detector system OFF	No line voltage	Check the presence of the main voltage: If the problem persists, call the Maintenance Service
	Unstable or partial connections	
	Malfunction of the power supply section	
Power supply unit or Metal Detector system alternates between ON and OFF	Malfunction of the power supply section	Switch off, wait a few minutes to let any self-resetting components inside cool down, then switch on the system again: If the problem persists, call the Maintenance Service
Metal detector does not give an alarm in the presence of metal masses of the same type as the reference sample and of equal or greater mass	Wrong detection parameters for the current product	Call the Maintenance Service that will proceed as described in the Intallation and Maintenance Manual.
	SCD card malfunction	
Metal detector gives false alarms with no product in transit	Environmental interference	
	SCD card malfunction	
	Line voltage insufficient or unstable	

4.3.3 - Self-diagnosis

The internal diagnostic system monitors the operational status of the metal detector. If a fault is detected, the following are activated in addition to a message on the display: the illuminating alarm indicators, the buzzer, the fault relay and the flashing light.

Fault status can only be reset by eliminating the cause of the fault.

Message	Probable cause and Action
TEST TIME OUT	**Time-out for pre-programmed test** Carry out the test.
POW. SUPPLY FAULT	**Power-supply section faulty** Contact service technician.
V SUPPLY TOO HIGH	**Power supply voltage too high** Check that the voltage is within the range on the plate
PROBE FAULT(X)	**Antenna connection broken or antenna damaged** Contact service technician. X is a numerical code corresponding to type of fault
NO EJECT.CONFIRM	**Ejection of material not carried out** *(Enabled by the Ejection confirmation parameter)* Check that the ejector is not blocked. When the cause of the fault has been eliminated, press E to reset. If the problem persists, contact service technician
EJECT.SYSTEM JAM	**Ejection system faulty or blocked** Check that the ejector is not blocked. Check the ejector connections. When the cause of the fault has been eliminated, press the E key
NO COMMUNICATION	**Fault in communication between SCD and ALM cards** Contact service technician
SPM NOT DETECTED	**Memory faulty or absent** *(THS system not operative)* - Contact service technician
COMPATIBIL.ERROR	**SCD card incompatible with the antenna** Use compatible SCD card (Contact service technician)
EVENT BUFFER FULL	**Event memory buffer full** Contact the person in charge for Programming and Data Management to print all data and to free the memory.
BIN FULL	**Storage container full** Empty it. Press E key to reset the alarm status
BIN ABSENT	**Storage container not in place** Place it back or check the correct position. Press E key to reset
LOGIN RESTRICTED	**Three attempts to access with the wrong password or User ID have been made**
EMERGENCY	**The emergency button has been pressed** Release the emergency button and press R to reset, if requested

Message	Probable cause and Action
	**Overloading of the belt motor** Remove the cause of overloading and press E key.
	Wrong setting of motor parameters Contact service technician
	**Compressed air pressure too low** Check the compressed air connection. When the cause of the fault has been eliminated, press the E key
	**Photocell malfunction or pack stuck in front of photocell** *(*Enabled via the PHOTO Alarm parameter*)* Check there is no pack stuck in front of the photocell. Check the positions of the photocell and the retroreflector. When the cause of the fault has been eliminated, press the E key to reset.
	**Emergency stop circuit faulty** Check it and repair it if necessary

The system is not designed to signal a pack which is stuck for some reason in front of the photocell. For this reason, when the system can detect whether or not the conveyor belt is moving (i.e. when it is equipped with an encoder or with the Conveyor Control System power supply unit), the self-diagnosis function gives an alarm only if the photocell is in a state of malfunction when the belt is moving.

On systems without encoder or with the Control Power Box, it is the installer's and operator's responsibility to ensure that **material does not remain in front of the photocell when the belt is stopped**: if it does, the photocell will be continuously active even though it is not malfunctioning. If the foregoing situation can not be avoided, it is advisable to disable photocell self-diagnosis (Parameter PA).

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