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1 Introduction

1.1 IMPORTANT: Before you Start

Before you attempt to use the metal detector, and operate the software described in this manual, you must correctly install and setup the metal detector. Refer to the **User Manual** supplied with your metal detector. The User Manual has essential information on safety, installation, electrical power, technical specifications, and integration with other equipment in your premises.



WARNING

Metal detectors, and metal detector conveyor systems, have several hazards.

Familiarise yourself with the safety information in the User Manual before you operate the metal detector.

How to use this manual

This manual is written in a modular structure of "topics". Where possible, each topic that details practical tasks is a stand-alone topic. At the end of each topic is a list of "Related Topics".

At the top of each practical topic you will see the Profile metal detector models and software versions to which the topic applies. For tasks that require login, you will see the "Account Access Level" that is necessary to do the tasks in the topic. In the PDF format of the manual, the Related Topics are clickable links.

Related Topics:

[Everyday Tasks for Operators ▶ Page 26]

[Essential Setup Tasks After Installation ▶ Page 17]

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METTLER-TOLEDO End-User License Agreement for Software (EULA) Version 3.0

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1.3 Software Versions

The Profile Software Operation Manual describes the following versions of software:

- F4.9.4
- F4A.9.4
- F48.2.4

If your Profile Metal Detector has an older version of software, you can purchase an upgrade to the latest software, with the latest features and processing performance.

To enquire about software upgrades, contact METTLER TOLEDO Service. METTLER TOLEDO Service will ask you for the **Serial Number** and the **Version** of the Metal Detector.

To see the **Serial Number** and the **Version**, press the **Information** button on the metal detector:



Use the left and right arrows to scroll through the information screens.

Related Topics:

[Contact details ► Page 12]

1.4 What Software Features are on your Metal Detector?

The software features depend on the **Equipment Type**, the **Head Type**, the **Platform Type**, and the **Version**. However, some of the features, such as Emulation (VNC) and Automatic Test System (ATS), need additional METTLER TOLEDO hardware.

The Profile model name is written in large characters on the main screen of the Metal Detector, for example: **"Profile"**, or **"Profile Advantage"**.

To see the **Head Type** and the **Platform Type** press **Information**:



On the first page of **Information**, see the **Head Type** (for example "RECTANGULAR" or "PIPELINE").

The **Platform Type** is the first part of the **Version** field, for example: "F4", "F4A", or "F48".

The following tables display the main variant features on Profile Metal Detectors. The optional software features common to all Profile Metal Detectors, such as **Condition Monitoring**, and **21CFR Mode** authentication are not included in the table.

If you want to upgrade a Profile LS Metal Detectors to the full Profile specification, or if you want to upgrade the version of software on the Metal Detector, contact METTLER TOLEDO Service.

Platform F4

Equipment Type	Head Type	Standard Auto-Setup	Reduced Test (RT)	Emulation (VNC)	Automatic Test System (ATS)	Pack Rate Monitoring	Reject Confirm RCU
Profile	Rectangular	Yes	Yes	Yes	No	Only with Pack C*	Only with Pack C*
Profile LS	Rectangular	Yes	Yes	Yes	No	Only with Pack C*	Only with Pack C*
Profile	Gravity Fall or Throat	Yes	Yes	Yes	Yes	No	Only with Pack C*

Equipment Type	Head Type	Standard Auto-Setup	Reduced Test (RT)	Emulation (VNC)	Automatic Test System (ATS)	Pack Rate Monitoring	Reject Confirm RCU
Profile	Pipeline	Yes	No	Yes	No	No	Only with Pack C*
Profile Compact	Compact	Yes	Yes	Yes	No	Only with Pack C*	Only with Pack C*
Profile Compact LS	Compact	Yes	Yes	Yes	No	Only with Pack C*	Only with Pack C*
Tablex-PRO	Tablex-PRO	Yes	Yes	Yes	No	No	Only with Pack C*
Pharma GF-PRO	Pharma GF-PRO	Yes	Yes	Yes	No	No	Only with Pack C*

* To see a list of all the features that are available on the metal detector, go to the last page of the **Information** screen. The features that are available are colored green.

Platform F48

Equipment Type	Head Type	Standard Auto-Setup	Reduced Test (RT)	Emulation (VNC)	Automatic Test System (ATS)	Pack-Rate Monitoring	Reject Confirm (RCU)
Profile Advantage	Rectangular	Yes	No	Yes	No	Only with Pack C*	Only with Pack C*
Profile Advantage LS	Rectangular	Yes	No	Yes	No	Yes	Only with Pack C*

Platform F4A

Equipment Type	Head Type	Standard Auto-Setup	Reduced Test (RT)	Emulation (VNC)	Automatic Test System (ATS)	Pack-Rate Monitoring	Reject Confirm (RCU)
Profile ASN	Profile ASN	Yes	No	Yes	No	Yes	Yes

Related Topics:

[Contact details ► Page 12]

1.5 Contact details

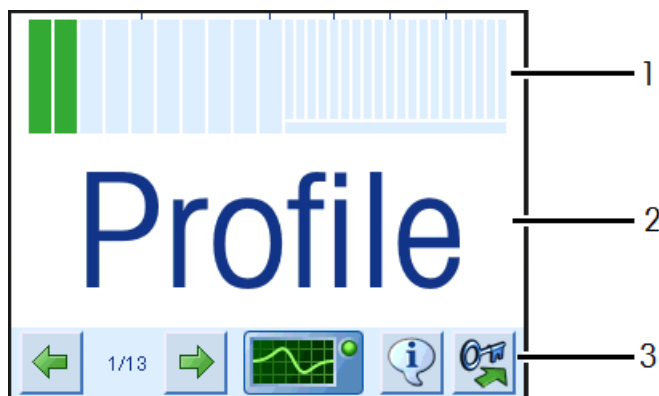
To contact the service representative for your product and your region, go to www.mt.com/contact.

1.6 Understanding the User Interface (UI)





1.6.1 Understanding the User Interface (UI)






Profile Metal Detector	Software Version	Access Level Required
All	All	None





The user interface is divided into three areas:




1	2	3
Bargraph	Main display area	Navigation bar

Screen Component	Explanation
Bargraph 	Green bars on the bargraph show the signal strength of the product passing through the metal detector. Red bars indicate a detection event.
Main display area	When you switch on the metal detector, the main display area shows the model name.
Screen navigator 	The number shows the current screen number and the total number of screens available. Use arrows to view a range of screens about how the metal detector is working. These screens are referred to as the Running Displays . You do not need to log in to see the Running Displays .
Condition Monitoring 	Condition Monitoring has three states: GREEN: HEALTHY AMBER: EARLY WARNING. The metal detector is still working but a fault could develop. RED: FAULT. The metal detector stops working.
Login 	When you log in, the Running Displays are replaced by a menu of the functions available for the level at which you log in. The login levels are User 1 , User 2 , User 3 , QA Operator , QA Setup , and Installer .

Other Keys	Function
	To change numbers, use the left and right keys to choose the digit. Use the up and down keys to increase or decrease the value.
	Display information screens.
	Logout.
	Unlock Bin (optional).
	Return to previous level.

Other Keys	Function
	Select or adjust setting.
	Confirm selection and Store .
	Cancel .
	Stop/Start the conveyor (on Profile ASN only).

Alpha-Numeric Keypad	Explanation
	<p>When you click on editable text fields, an alpha-numeric keypad appears.</p> <p>Use the "é" key to toggle to accented characters of several languages.</p> <p>Use the "a" key to toggle between upper case and lower case characters.</p>



NOTICE

Use your fingers, with or without gloves, to press the keys on the touch screen. Do not use sharp objects.

Related Topics:

[Navigating the User Interface ▶ Page 16]

[Viewing the Bargraph ▶ Page 14]

[Viewing the Running Displays ▶ Page 16]

[Logging In and Out ▶ Page 27]

[Metal Detector Faults, Warnings and Alerts ▶ Page 96]

1.6.2 Viewing the Bargraph

Profile Metal Detector	Software Version	Access Level Required
All	All	None

The bargraph shows the signal strength of the product passing through the metal detector. There are 10 green segments, which show the signal strength of the passing product, and 20 red segments, which illuminate when metal contamination is detected. A red horizontal line, under the red segments, also illuminates when metal is detected.

As the signal strength increases, the segments increase in number from left to right.

When you log in to do a task, the bargraph reduces in height to increase the usable area of the main display.

Understanding The Red Segments

The red segments on the bargraph indicate several conditions.:

1. Product Signal Amplitude

When metal is detected, all the green bars illuminate. A number of red bars temporarily illuminate from left to right depending on the signal strength of the contaminant, as shown in the following figure:



Detection of metal

2. Reject Inhibit

If the last 5 segments are flashing red, it means that the metal detector software is preventing the reject mechanism from activating. The **Reject Inhibit** signal appears during some automated setup routines. You can also manually enable and disable **Reject Inhibit** (at **USER 3 Login**).



Reject Inhibit

3. Conveyor Stopped

If the metal detector is in **HEALTHY** condition, but the conveyor is not running, the 5 red segments shown below (6 segments from the right of the bargraph) start to flash:

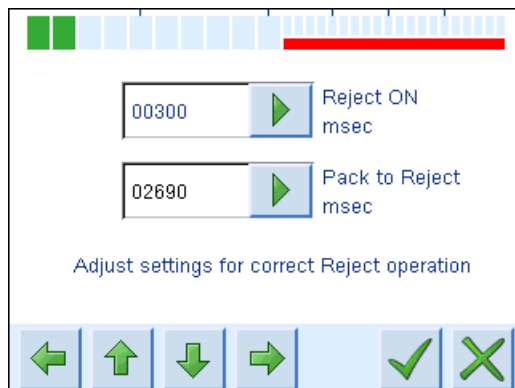


Conveyor Stopped

NOTE: For the **Conveyor Stopped** status to function, one of the programmable inputs must be allocated to **Conveyor Running**.

4. Changing Pack to Reject parameters

For metal detectors on conveyor-belt systems that have **Pack to Reject** parameters set up, a horizontal red bar appears if you edit the parameters. This is useful for fine-tuning the reject settings.



Pack to Reject

Related Topics:

- [Understanding the User Interface (UI) ▶ Page 12]
- [Enabling and Disabling Reject Inhibit (Setup) ▶ Page 39]
- [Managing Reject Settings (Gated) ▶ Page 38]
- [Metal Detector Faults, Warnings and Alerts ▶ Page 96]

1.6.3 Viewing the Running Displays

Profile Metal Detector	Software Version	Access Level Required
All	All	None

If you are not logged in, the metal detector displays the **Running Displays**. You can scroll forward and backwards through the **Running Displays**.

The **Running Displays** will vary according to the metal detector model and the optional functions that are installed on the metal detector. Furthermore, you can enable or disable (hide) some of the **Running Displays**, and what appears on some of the **Running Displays** at the **Installer** level and at the **QA Setup** level.

You can scroll through the **Running Displays** at any time, to see a range of information on how the metal detector is performing.

By default, the **Running Displays** are at screen **1**, which shows the model name of the metal detector. However, the display will change automatically to another display at times when you need to be informed of faults on the metal detector or on the conveyor system, or if the **Performance Test** becomes **Due** and **Overdue**.

Related Topics:

- [Managing the Running Displays ▶ Page 31]
- [Understanding the User Interface (UI) ▶ Page 12]
- [Viewing the Bargraph ▶ Page 14]
- [Logging In and Out ▶ Page 27]
- [Metal Detector Faults, Warnings and Alerts ▶ Page 96]

1.6.4 Navigating the User Interface

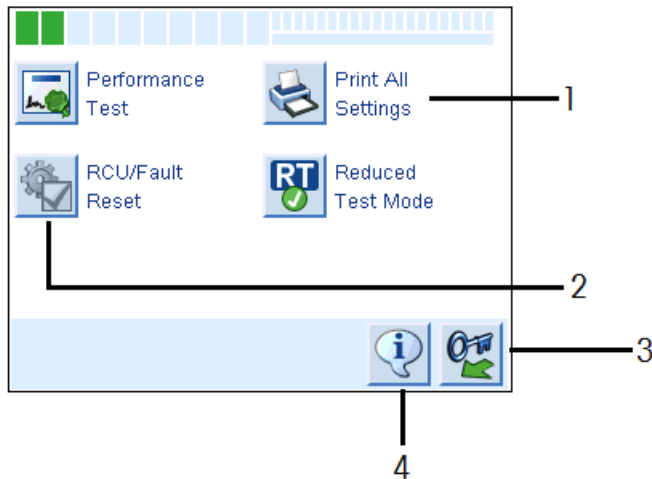
Profile Metal Detector	Software Version	Access Level Required
All	All	None

When you log in, a main menu of buttons appears, determined by your account access level. Clicking on any of these buttons displays fields, or a message, or a further menu with buttons.

The icons in the user menus have written descriptions on them, in your chosen language, to describe their function.

Sometimes you will see that functions are disabled, usually as a result of other settings and options on the metal detector. If a function is not available, it is colored gray, as shown in the following figure (item 2).

When you are in the **Running Displays** or in the main menus, the **Information** button displays the general information about the metal detector. If the **Information** button appears within a function, you can press it to display information that is specific to the function.



Example login screen

1	2	3	4
Button with description	Button with function disabled (colored gray)	Logout button	Information button

Related Topics:

[Understanding the User Interface (UI) ▶ Page 12]

[Logging In and Out ▶ Page 27]

[Setting the User Interface Language ▶ Page 30]

1.6.5 Using the Alpha-Numeric Keypad

Alpha-Numeric Keypad	Explanation
	<p>When you click on editable text fields, an alpha-numeric keypad appears.</p> <p>Use the "é" key to toggle to accented characters of several languages.</p> <p>Use the "a" key to toggle between upper case and lower case characters.</p>

1.7 Essential Setup Tasks After Installation

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer and QA Setup

We encourage customers of metal detectors to purchase the metal detector integrated with a METTLER TOLEDO conveyor/transport system with integrated reject mechanism. METTLER TOLEDO manufactures a standard range of systems, and non-standard systems made-to-order for your factory and its local requirements.

If you purchased the Profile metal detector integrated with a METTLER TOLEDO conveyor system, the basic installer settings (on the **Install Settings** screens) should be correct for your requirements.

If you purchased a Profile metal detector to integrate with your own conveyor system and reject mechanism, you need to work through the tasks in the **Install Settings** screens after you have completed the mechanical and electrical installation. These tasks are:

[Setting the User Interface Language ▶ Page 30]

[Setting the Units of Measurement on the User Interface ▶ Page 31]

[Setting the Date and Time ▶ Page 31]

[Managing Sensors and Speed ▶ Page 41]

[Setting up the QA Manager and the Installer ▶ Page 29]

[Setting up and Managing QA Operators ▶ Page 29]

[Setting up and Managing Users ▶ Page 30]

2 Strategy and Principles

2.1 Your Metal Detection Strategy

The reliable detection of metal contamination in product-inspection environments presents complex scientific, engineering and data-processing challenges.

The standards for metal detection vary from company to company, and from nation to nation. The methods of manufacture of products such as food, drink and pharmaceuticals are constantly changing. And even the ways that products are packaged can change suddenly (sometimes in response to changes in consumer taste or buying habits). A good metal detection strategy must account for all these challenges.

Research-and-development scientists, engineers and software developers at METTLER TOLEDO work as an agile team. We are dedicated to providing trusted solutions that meet your present challenges of metal detection, and to responding quickly to any new challenges you might encounter.

To get the most from the rich suite of software on Profile Metal Detectors, read the METTLER TOLEDO Metal Detection Guide. The guide explains our metal-detection technology in detail. The guide contains advice to help you to build the most effective metal-detection strategy for your production line, including advice on the position of metal detection systems, from the raw-ingredient stage to packaged products.

METTLER TOLEDO Service can visit your site to advise on the best strategy, and to commission or re-commission the metal detector and its associated systems.

Related Topics:

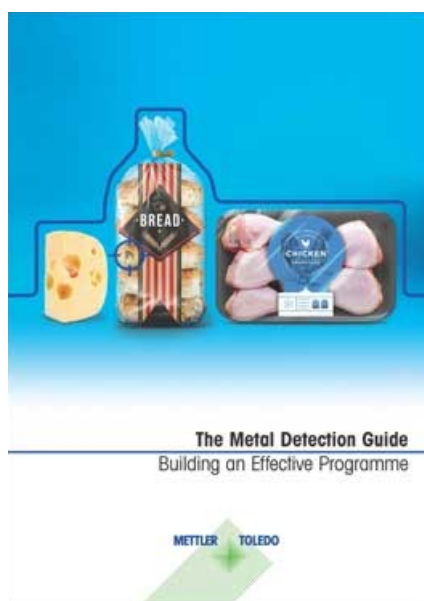
[The METTLER TOLEDO Metal Detection Guide ► Page 19]

[Contact details ► Page 12]

2.1.1 The METTLER TOLEDO Metal Detection Guide

METTLER TOLEDO recommends that system designers, installers, and quality assurance managers study "The Metal Detection Guide - Building an Effective Programme" that accompanies this manual.

The guide will help you to build the most effective metal-detection program for your production line, and it will help you to get the most from the Profile software features explained in this Profile Operation Manual. The guide is updated periodically. You can download the most recent version, in your preferred language, for no charge, at www.mt.com/metalDetection



Also at www.mt.com/metaldetection you can download white papers and multimedia guides that can help your company's production-line designers and quality assurance managers.

2.2 General Considerations for Optimizing Metal Detection

The topics in this chapter explain important fundamentals of metal-detection technology and how to get the most from your Profile metal-detection software. We advise you to read this chapter before you start to set up products to use the metal detector.

- Auto Setup
- [Understanding Phase and Amplitude ▶ Page 20]
- [Understanding Vibration Signals ▶ Page 20]
- [Understanding Product Effect ▶ Page 22]
- [Understanding Choice of Operating Frequency ▶ Page 23]
- [Understanding Programmable Reject Timers ▶ Page 24]
- [Understanding Reject Confirmation ▶ Page 24]

2.2.1 Your products for inspection

Profile metal detectors have an **Auto Setup** feature that allows you to easily set up the metal detector by simply passing the product for inspection through the aperture, and following the **Auto Setup** instructions on the screen. Every new product, and its settings, is memorised in the metal detector, stored under the product name.

Auto Setup calculates the best **sensitivity, phase, and frequency** for the product and for the metal detection standards that you aim to achieve. **Auto Setup** works in conjunction with other metal detector settings and features. Advanced users with a good knowledge of METTLER TOLEDO's metal detection technology, can make fine adjustments to the metal detector's settings.

Whether you use the **Auto Setup**, or advanced manual setup, it is beneficial to understand the principles of metal detection. The following sections of the manual explain what we mean by phase, phase angle, amplitude, sensitivity, reject mechanisms, and operating frequency considerations.

Related Topics:

[Your Metal Detection Strategy ▶ Page 19]

[Setting up Products ▶ Page 50]

2.2.2 Understanding Vibration Signals

Profile metal detectors are designed to minimise the effects of vibration, such as the risk of unwanted signals that could cause a false reject. However, some vibration, including from the transport system, is inevitable.

The signals generated from vibration of the coil system in the metal detector have a characteristic phase angle. The phase angle of the vibration signal is used as a reference. The phase angle of any metal contamination is measured relative to the phase angle created by vibration effects.

Related Topics:

[The METTLER TOLEDO Metal Detection Guide ▶ Page 19] for a detailed explanation of phase.

[Reading the Product Strength Histogram ▶ Page 23]

[Phase Histogram ▶ Page 21]

2.2.3 Understanding Phase and Amplitude

Profile metal detectors use low-power radio-frequency transmit and receive coils. This system can sense tiny disturbances created by metal particles passing through the aperture of the metal detector. The signal generated is characterised by a phase angle and amplitude.

A metal particle passing through the aperture of the detector changes the **phase angle** and **amplitude** expected in the receiving coils.

Phase Angle

Different metals, and different types of product for inspection, produce signals that have a phase angle.

When the metal detector is subject to mechanical vibration, the vibration causes a known phase angle. Any phase angle caused by product passing through the metal detector is discriminated against the phase angle known to be caused by vibration.

Amplitude

The amplitude is the size of the signal received by the metal detector. In general, the larger the metal contaminant, the larger the signal amplitude.

Although a metal particle will create a signal with phase and amplitude, this signal needs to be computed and discriminated against the phase and amplitude expected from the type of product under inspection. The signals from dry products, whether loose or in packs, are easy to distinguish from the signal created by a metal particle. The signals from wet and salty products, and products packaged in metallized film, are more challenging to distinguish from the signals from metal contamination.

Related Topics:

[The METTLER TOLEDO Metal Detection Guide ▶ Page 19] for an explanation of **product effect**

[Phase Control ▶ Page 21]

[Phase Histogram ▶ Page 21]

2.2.3.1 Phase Control

Radio-frequency metal detectors work by looking for changes in the phase angle of the signal generated by the receiver coils. Therefore, the signal phase caused by vibration, and the **Running Product**, must be minimized.

The phase control circuitry discriminates between the wanted signals from metal particles and the unwanted signals from vibration and product effect. Vibration and product effect signals can easily be reduced by adjusting the sensitivity control, however, reducing the sensitivity affects all signals: metallic signals, vibration signals and product signals. Therefore Profile metal detectors enable selective adjustments, including phase control.

The Profile metal detectors can display histograms of phase and product strength on the **Running Displays**. Histograms allow you observe product signal data over a long length of time. They are useful to observe any drift in the product signal phase angle.

Related Topics:

- [The METTLER TOLEDO Metal Detection Guide ▶ Page 19] for a detailed explanation of phase.
- [Reading the Product Strength Histogram ▶ Page 23]
- [Phase Histogram ▶ Page 21]

2.2.3.2 Phase Histogram

Profile Metal Detector:	Software Version:	Minimum Access Level Required:
All	All, but optional upgrade on Profile LS	All users can view the histogram on the Running Displays User 2 or User 3 to reset histogram Installer to set up histogram

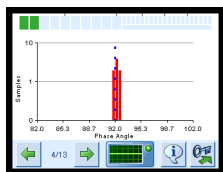
Phase histograms can be useful in diagnostic situations when the product under inspection is in discrete packs. Every time a product passes through the aperture of the metal detector, its phase angle is recorded. This is useful if you need to see if the phase angle of a product changes over time. The histogram can store many packets of data, which allows you to look at trends over a long period of time. You can reset the histogram at **Installer** level.

Analysis of phase histograms is useful when there are trends to certain problems, such as if you notice that the metal detector starts to give false rejects at certain times of day. This can happen if a change in the ambient temperature or humidity, or a change in raw ingredients, causes a change in the phase angle of the product

signal. If you can identify the cause of a drifting phase angle, you can then take measures, such as change the frequency or sensitivity of the metal detector, or increase the frequency of auto-setups. You can contact METTLER TOLEDO Service for advice on the best corrective action.

- **NOTE:** The **Profile Advantage** metal detector, designed for wet products and other products that generate a "product effect", uses multiple-simultaneous-frequency technology that tracks and cancels out any phase-angle changes. Therefore, analysis of phase histograms is rarely necessary on **Profile Advantage**.

The phase histogram is one of the **Running Displays**. You have the option to display or hide it.



Phase histogram.

Displaying or hiding the histogram, and setting the scales

You can hide or display the histogram at **Installer** level, where you can also set the scales of the x and y axes of the histogram, and set the **Sample Rate** of packs. (Note that the setting in the **Sample Rate** packs field affects the scaling of the Phase histogram.)

- 1 Go to **Advanced Settings** on the **Installer** menu, and then go to the **Product Logging** screens.
- 2 Tick **Phase Display** to show the phase histogram in the **Running Displays**.
- 3 Tick **Auto Scaling** if you want the phase angle axis to scale dynamically, or set the set the scale in the **Phase Interval** field.
- 4 In the **Sample Rate** packs field, set the required number of packs (single or multiple) that make up each data sample.

Resetting the histogram

- 1 To reset the histograms, go to the **User 2** or the **User 3** menu and press **Counters**.
- 2 Press **Reset Product Logging**.

Related Topics:

[Reading the Product Strength Histogram ▶ Page 23]

[Understanding Phase and Amplitude ▶ Page 20]

[The METTLER TOLEDO Metal Detection Guide ▶ Page 19] for an explanation of **product effect**

[Contact details ▶ Page 12] for METTLER TOLEDO Service

2.2.4 Understanding Product Effect

Dry products are easier to inspect for metal contamination than wet products. This is because wet products, and products with high salt and moisture content, are conductive. Wet products include fresh meat, poultry, cheese, fruit, vegetables, beverages and fish. They create a "product effect" signal which must be distinguished from the signal created by a metal contaminant. Similarly, certain types of product packaging, such as metallized film, can create a product effect.

For a good understanding of product effect, and the challenges it presents, refer to the [The METTLER TOLEDO Metal Detection Guide ▶ Page 19]. In particular, refer to the sections "Factors Limiting Sensitivity" and "Understanding Challenging Applications for Improved Metal Detection" .

Related Topics:

[Reading the Product Strength Histogram ▶ Page 23]

[Phase Histogram ▶ Page 21]

2.2.4.1 Reading the Product Strength Histogram

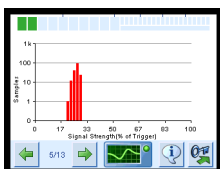
Profile Metal Detector:	Software Version:	Minimum Access Level Required:
All	All, but optional upgrade on Profile LS	All users can view the histogram on the Running Displays User 2 or User 3 to reset histogram Installer to set up histogram

The product strength histograms show the signal strength for the current **Running Product**. The data sampling can be based on the number of packs or on time.

The data can be used to determine the best **Sensitivity**. For example, if the red vertical bars indicating are towards the left of the horizontal axis, it might be possible to increase **Sensitivity**. If the red vertical bars are towards the right of the horizontal axis (towards the 100% mark), this means that the signal strength of the product could trigger false rejects, and it might be necessary to reduce **Sensitivity**.

You can use the product strength histogram with the phase angle histogram to check for trends in the changes of product effect. If you would like advice on how to best analyse the data, and use it to fine tune your metal-detection strategy, you can contact METTLER TOLEDO Service.

The product strength histogram is one of the **Running Displays**. You have the option to display or hide it.



Product strength histogram

Displaying or hiding the histogram, and setting the scales

You can hide or display the histogram at **Installer** level, where you can also set the scales the x and y axes of the histogram, and set the **Sample Rate** packs field. (Note that the setting in the **Sample Rate** packs also affects the scaling of the Phase histogram.)

- 1 Go to **Advanced Settings** on the **Installer** menu, and then go to the **Product Logging** screens.
- 2 In the **Sample Rate** packs field, set the required number of packs (single or multiple) that make up each data sample.

Resetting the histogram

- 1 To reset the histogram, go to the **User 2** or the **User 3** menu and press **Counters**.
- 2 Press **Reset Product Logging**.

Related Topics:

- [Phase Histogram ▶ Page 21]
- [Managing Products for Inspection ▶ Page 50]
- See [The METTLER TOLEDO Metal Detection Guide ▶ Page 19] for an explanation of **product effect**.

2.2.5 Understanding Choice of Operating Frequency

Profile Metal Detector	Software Version	Access Level Required
All	All	None

Profile metal detectors are supplied with several frequency configurations that depend on the type of equipment and options that you purchased. Some models have a single frequency only, some have dual frequency (**LOW** and **HIGH**), and some have triple frequency (**LOW**, **MEDIUM** and **HIGH**), that can be selected in the **Product**

Settings. The Profile Advantage metal detectors use Multi-Simultaneous Frequency technology for optimum sensitivity. On Profile Advantage, you will not see the option to change the frequency band, although you can change **Mode** in **Product Settings**, to vary the operating-frequency group

If you use the recommended **Auto Setup** routine to set up each **Running Product**, the optimum frequency is set automatically. As a general rule, lower frequencies are better if the **Running Product** is wet, and higher frequencies are better if the **Running Product** is dry. The METTLER TOLEDO Metal Detection Guide explains the importance of frequency, and how frequency relates to dry products and wet products (and other products that create a "product effect").

Related Topics:

[The METTLER TOLEDO Metal Detection Guide ▶ Page 19]

[Understanding Product Effect ▶ Page 22]

[Changing Frequency, Sensitivity and Phase ▶ Page 53]

2.2.6 Understanding Programmable Reject Timers

Profile Metal Detector:	Software Version:	
All	All	

Usually, when metal is detected, the contaminated product is automatically rejected by a reject mechanism. The mechanism activated to reject the contaminated product varies from system to system. Examples of reject mechanism are: punch pusher, air blast, flap, diverter arm, and retracting belt. On systems with bagging machines, the reject timer can be used to stop the bagging operation.

For most products, the activation of the reject mechanism requires precise timing. The timing must take into account factors such as the conveyor speed (on conveyors systems), the size and spacing of packs (for discretely packaged products), the height and speed of a falling product (for metal detection in gravity fall applications). The speed of the reject mechanism, reject relay and reject solenoid must be considered, especially for products passing though the metal detector at high throughput.

Programmable reject timers in the metal detector electronics control all the different types of reject mechanism. The timing can be:

- **Immediate.**
- **Delayed:** this is necessary on system conveyors where the reject mechanism is some distance away from the metal detector. For delayed reject, the system conveyor is typically fitted with a speed sensor.
- **Gated:** for products in discrete packs of a known size, the timing of the reject mechanism can be gated, or synchronised. For gated reject, the system conveyor must be fitted with a pack sensor. To simplify the setting up of gated (or synchronised) reject mechanisms, and to ensure accurate reject operation, Profile metal detectors have a semi-automated timer setup routine.

Related Topics:

[Managing Reject Mechanisms ▶ Page 37]

2.2.7 Understanding Reject Confirmation

When a contaminant is detected, Profile metal detectors can integrate in a number of ways with the conveyor system, alarms, reject mechanisms, and reject confirmation.

Connectors on the User Input/Output board of the Profile metal detector can be linked to a Reject Confirmation circuit on your conveyor system, such as the METTLER TOLEDO Reject Confirmation Unit (**RCU**).

Reject confirmation provides feedback to the metal detector to confirm that the reject mechanism has operated correctly, and at the right time, to reject contaminated product.

RCU software is an optional feature on Profile metal detectors. An **RCU Sensor** is an option on METTLER TOLEDO conveyor systems. Contact METTLER TOLEDO Service for details of the reject confirmation options.

Related Topics:

[What Software Features are on your Metal Detector? ▶ Page 11]

[Managing Reject Confirmation Unit (RCU) Sensors ▶ Page 43]

3 Operating the User Interface

3.1 Everyday Tasks for Operators

Profile Metal Detector	Software Version
All	All

There are different levels of access for operators of the metal detector. Before you use the metal detector for the first time, read the topics: [IMPORTANT: Before you Start ▶ Page 5], [Your Account Access Level ▶ Page 26], and [Understanding the User Interface (UI) ▶ Page 12].

The tasks you are required to do on the metal detector will depend on the level of access that you have been given. Your everyday tasks are likely to include product management, performance testing, and handling of products that have metal contamination (according to your company's procedures).

You should have received basic training on the metal detector, and you should have received instructions on your company's standards and procedures for metal detection.

Typical tasks for operators include:

- Changing the product on the metal detector to correspond to the product passing through the metal detector. (This product is known as the **Running Product**.)
- Setting up a new **Running Product** on the metal detector.
- Setting up "clusters" of products.

NOTE: A **Cluster** is a group of different products with similar characteristics that can be grouped. Identifying several products in a single cluster can reduce the need to interrupt the product conveyor in order to change the settings on the metal detector.)

- Adjusting sensitivity.
- Doing a regular performance test.
- Opening the reject bin to remove contaminated product.
- Reacting to warnings, alerts and messages on the metal detector.

These tasks are explained in the following sections of the manual:

[Managing Products for Inspection ▶ Page 50]

[Doing Routine Performance Testing ▶ Page 72]

[Unlocking the Reject Bin ▶ Page 41]

[Changing Frequency, Sensitivity and Phase ▶ Page 53]

[Metal Detector Faults, Warnings and Alerts ▶ Page 96]

3.2 Your Account Access Level

The highest levels of access are **Installer** and **QA Setup**.

When a new metal detector is installed, the installer and the quality assurance manager set up user accounts for all users that need to log in.

On a new metal detector, the Installer and the QA Manager log in to the **Installer** or **QA Setup** screens with default passcodes. The default passcodes should then be changed to secure passcodes.

The Installer and the QA manager set up the access level, passwords, and preferred user-interface language for other users (see the Related Topics at the bottom of this section).

The access levels are:

1. **User 1**
2. **User 2**
3. **User 3**
4. **QA Operator**
5. **QA Setup**
6. **Installer**

NOTE:

If you are not sure what access level you have been given, ask your QA Manager.

The following table shows the typical functions that each level of user – lower than **Installer** and **QA Setup** – can access. The QA Manager can change some of these settings. For instance, it is possible for the QA Manager to restrict the **Performance Testing** function to the **QA Operator** only.

Task	User 1	User 2	User 3	QA Operator
Select Product	x	x	x	
Set up a Product using Auto Setup or Partial Auto Setup		x	x	
Reset Counters		x	x	
Reset Histograms		x	x	
Performance Testing		x	x	x
Modify basic Product Settings		x	x	
Modify Reject Inhibit setting			x	
Create Product, Copy Product, and Delete Product			x	
Select Auto Cluster			x	
Set up Reject timer			x	
RCU/Fault Reset				x
Select Reduced Test Mode			If QA Enabled , see: [Setting up and Managing QA Operators ▶ Page 29]	x
Operate the Automatic Test System (ATS)		If QA Enabled , see: [Setting up and Managing QA Operators ▶ Page 29]	If QA Enabled , see: [Setting up and Managing QA Operators ▶ Page 29]	x
Print All Settings				x

Related Topics:

- [Understanding the User Interface (UI) ▶ Page 12]
- [Logging In and Out ▶ Page 27]
- [Doing Quality Assurance ▶ Page 82]
- [Setting up the QA Manager and the Installer ▶ Page 29]
- [Setting up and Managing Users ▶ Page 30]
- [Setting up and Managing QA Operators ▶ Page 29]

3.3 Logging In and Out

Profile Metal Detector	Software Version
All	All

All users can view the screens on the **Running Displays** without logging in.

All users that log in have an **Account Access Level** that determines which features and settings the user can access. The **Account Access Level**, password, and language of every user is managed by either the Quality Manager (with the **QA Setup** access level) or the **Installer**. Passwords are unique. The software allows no two users to have the same password.

Usually, all users log in by entering a password only. The metal detector automatically associates the password with the name of the user. This information is used in the electronic records available to QA managers and can be printed on shift reports. However, if the metal detector uses the advanced login feature (to comply with **21CFR** standards), the user needs to enter both a **Username** and a **Password**.

The access levels are:

1. **User 1**
2. **User 2**
3. **User 3**
4. **QA Operator**
5. **QA Setup**
6. **Installer**

NOTE:

If you are not sure what access level you have been given, ask your QA Manager.

Logging In

- 1 Press the **Login** button:



- 2 Enter your passcode.

⇒ **Result:** You are presented with the main menu for your access level. See [Your Account Access Level ▶ Page 26].

Logging Out

- Press the **Logout** button:



⇒ **Result:** The user interface returns to the **Running Displays**.

Timing Out

After 5 minutes of inactivity, the metal detectors will automatically log you out.

Related Topics:

- [Your Account Access Level ▶ Page 26]
- [Understanding the User Interface (UI) ▶ Page 12]
- [Setting the User Interface Language ▶ Page 30]
- [Complying with 21CFR11 ▶ Page 82]
- [Setting up the QA Manager and the Installer ▶ Page 29]

4 Setting up Access Accounts and Users

4.1 Setting up the QA Manager and the Installer

Profile Metal Detector	Software Version	Access Level Required
All	All	QA Setup and Installer

It is important to establish which personnel in your company have access to the **Installer** level and the **QA Setup** level. Both the **Installer** and the **QA Setup** levels control the management of other users, the configuration of the metal detector, the metal detector's interaction with the conveyor system, and the metal detector's interaction with external devices.



NOTE: You can only have one **Installer** account and one **QA Setup** account. Therefore you can have only one **Account Username** and **Account Passcode** for the **Installer** account, and only one **Account Username** and **Account Passcode** for the **QA Setup** account.

QA Setup level is typically given to QA managers. **Installer** is typically given to installation and maintenance engineers and factory managers.

The default passcode at the **QA Setup** level is 888888.

The default passcode at **Installer** level is 999999.

When you commission a new metal detector, do as follows:

- 1 Enter the **Installer** menu with the default passcode 999999.
- 2 Press **Access Account Management**.
- 3 Press **Edit Account**.
⇒ At the top of the list you will see **Installer** and **QA Setup**.
- 4 Press **Installer** to highlight it.
- 5 Press **Confirm selection**
- 6 Edit the **Account Passcode** and **Account Username**.
- 7 Select the **Language**.
- 8 Press the Return button: .
- 9 Press **Access Account Management**.
- 10 Press **Edit Account**.
- 11 Press **QA Setup** to highlight it.
- 12 Press **Confirm selection**
- 13 Edit the **Account Passcode** and **Account Username**.
- 14 Select the **Language**.
- 15 Press the Return button: .

Related Topics:

[Setting up and Managing Users ▶ Page 30]

[Setting up and Managing QA Operators ▶ Page 29]

[Understanding the User Interface (UI) ▶ Page 12]

[Logging In and Out ▶ Page 27]

[Doing Quality Assurance ▶ Page 82]

4.2 Setting up and Managing QA Operators

Profile Metal Detector	Software Version	Access Level Required
All	All	QA Setup

- On the **QA Setup** menu, press **Manage QA Operators**:
 - ⇒ You can add or remove a **QA Operator** with the buttons: **Create New Account**, **Edit Account**, and **Delete Account**.
 - ⇒ In the **Create New Account** screens, you can set the **Account Passcode** and the **Language** of the **QA Operator**.
 - ⇒ The **Access Log** displays the events and times of every **QA Operator**.
- ⇒ NOTE: **User 2** and **User 3** personnel appear in the **Edit Account** list. You can select any of these users and then tick **QA Enabled** to give the user **QA Operator** rights.

Related Topics:

[Setting up and Managing Users ▶ Page 30]

[Logging In and Out ▶ Page 27]

[Doing Quality Assurance ▶ Page 82]

4.3 Setting up and Managing Users

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

At **Installer** level, you can create users with the access levels of **User 1**, **User 2**, and **User 3** (you cannot create **QA Operator** accounts).

- 1 Press **Access Account Management**.
- 2 Manage the user accounts as follows:
 - ⇒ Add or remove users with the buttons: **Create New Account**, **Edit Account**, and **Delete Account**.
 - ⇒ In the **Create New Account** screens, set the **Account Passcode** and the **Language** of the user.
 - ⇒ Press **Access Log** if you want to display the events and times of every user who has logged in.
 - ⇒ Tick **Allow Unlock Bin** if you want to allow a user to unlock the reject bin.

Related Topics:

[Setting up and Managing QA Operators ▶ Page 29]

[Doing Quality Assurance ▶ Page 82]

4.4 Managing the General Settings of the Metal Detector

4.4.1 Setting the User Interface Language

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

Changing the Default Language on the User Interface

- 1 On the **Installer** menu, click **Install Settings**.
- 2 Select the preferred default language from the list in the **Language** field.

NOTES:

As an **Installer**, you can set up different languages for individual users when you create or edit the user passcodes. To change the language of a **QA Operator** you need the **QA Setup** access level.

To set up the language for the users and QA operators, see the related topics below:

Related Topics:

[Setting up and Managing Users ▶ Page 30]

[Setting up and Managing QA Operators ▶ Page 29]

4.4.2 Setting the Units of Measurement on the User Interface

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

- 1 On the **Installer** menu, click **Install Settings**.
- 2 In the **Measurement Units** field, select either **METRIC** or **IMPERIAL**.

Related Topics:

[Setting the User Interface Language ▶ Page 30]

[Setting up and Managing Users ▶ Page 30]

[Setting up and Managing QA Operators ▶ Page 29]

4.4.3 Setting the Date and Time

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

- 1 On the **Installer** menu, press **Advanced Settings**.
- 2 Press **Date and Time**.
- 3 Set the **Time**, **Date**, and **Date Format**. To display the **Time** in 24-hour format, tick **24 Hour**.

NOTE:

The metal detector has its own internal clock. Although the clock is battery-backed, it is not synchronized to accurate external clocking (such as the Internet). It might be necessary to occasionally adjust the clock if it drifts. You will need to adjust the clock for daylight saving if you are located in a region of the world that has twice-yearly adjustments.

Related Topics:

[Setting up and Managing Users ▶ Page 30]

[Setting up and Managing QA Operators ▶ Page 29]

4.4.4 Adjusting the Brightness of the User Interface

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

- 1 Press **Advanced Settings**.
- 2 Press **LCD Brightness**.
- 3 Press **Decrease Brightness** or **Increase Brightness** to change the **Brightness Setting**:

Related Topics:

[Managing the General Settings of the Metal Detector ▶ Page 30]

4.4.5 Managing the Running Displays

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

The **Running Displays** can be seen by all users of the metal detector without needing to log in. At **Installer** access level, you can decide the extent of information that is available on the **Running Displays**, as follows:

1 Press **Advanced Settings**.

2 Press **Running Displays**.

⇒ **Result:** You can enable or disable the following screens and information for the **Running Displays**:

Product Name: A screen that displays the current **Running Product**.

Access Log: A screen that displays the **Access Log**.

Peak Hold Log: A screen that displays **Peak Log** of metal-detection events, showing time, date, and size of peak for each detection.

Condition Monitoring: A full-screen that displays **Condition Monitoring** (this is in addition to the **Condition Monitoring** icon, which is permanently displayed at the bottom of the **Running Displays**).

Peak Bar: A temporary marker in the bar graph on a detect event. This can makes the bar graph easier to read as it decreases back to zero.

PackML: A screen that displays the **PackML State** Machine running menu.

OEE: A screen that displays the **OEE** running menu.

Connectivity Status: A screen that shows the **Connectivity Status** of ProdX and Emulation (VNC).

Related Topics:

[Viewing the Running Displays ▶ Page 16]

[Understanding the User Interface (UI) ▶ Page 12]

[Viewing the Bargraph ▶ Page 14]

[Logging In and Out ▶ Page 27]

[Metal Detector Faults, Warnings and Alerts ▶ Page 96]

[Viewing Logs ▶ Page 83]

5 Installation

5.1 How the Software Works with Output Relays

The metal detector has three fixed outputs that drive three independent relays the User Input/Output (I/O) board.

The relays are:

- **Reject Relay:**
The relay operates when metal is detected, under the control of the programmable reject timers of the metal detector. The relay is used to activate a reject mechanism.
- **Reject Confirmation relay:**
The relay operates if the reject confirmation system does not confirm that the contaminated product has entered the reject bin.
- **Fault relay:**
The relay operates if the metal detector enters a fault condition. Typically, the relay is configured to stop a conveyor system. You can program the fault relay to activate or deactivate depending on certain conditions (see the topic [How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]).

Refer to the Profile User Manual supplied with the metal detector to see details of the User Input/Output board and to see the specifications and ratings of the relays, and how to set them to normally open or normally closed.

Related Topics:

[How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]

[Understanding Programmable Reject Timers ▶ Page 24]

The Profile User Manual supplied with your metal detector

5.2 How the Software Works with the Programmable Inputs and Outputs

NOTE: The programmable inputs and outputs are available on metal detectors that have the "**Pack Code E**" option. This option can be added to all Profile metal detectors. To see if Pack Code E is installed on the metal detector, press the **Information** button ⓘ on the Running Display and scroll to the **Options Installed**. Scroll down the **Options Installed** to see if **Extra IO** is colored green in the list. If the **Extra IO** is not available, the metal detector will have one programmable output only.

The inputs and outputs are configured and activated at the **Installer** login level.

Profile metal detectors have 4 programmable inputs and 3 programmable outputs. These inputs and outputs allow the metal detector to interact with your conveyor system and any devices, controllers, and sensors in your factory.

The programmable outputs are: , **Output 2**, and **Output 3**. The inputs are: **Input 1**, **Input 2**, **Input 3**, and **Input 4**.

The inputs and outputs often work in pairs. For example, one of the inputs and one of the outputs are connected to the lock on the reject bin, which means that the input informs the metal detector that the reject bin is unlocked, and an output from metal detector can lock and unlock the reject bin.

NOTES:

- When the input is activated, the message on the screen is sometimes generated (if applicable) from the selected option (such as "**AIR FAIL**").
- The different inputs influence the logic and behaviour of the metal detector in different ways.

Programmable Input List

The following is a list of typical options that you can associate with any of the four programmable **inputs**. The inputs on the User I/O board of the metal detector are all similar transistor-type switches, but the input option you choose from the list should accurately describe the source of the signal (for the reasons explained in the NOTES above).

You can change the **CUSTOM** input to any description.

- **AIR FAIL**
- **CONVEYOR RUNNING**
- **CUSTOM**
- **DETECTOR DISABLE**
- **KEY LOCK SWITCH**: see [Managing the Reject Bin ▶ Page 40]
- **PROD/CLUSTER CHANGE**: see [Managing Products for Inspection ▶ Page 50]
- **REJECT BIN FULL** (or **Tablet Container Full**): see [Managing the Reject Bin ▶ Page 40]
- **REMOTE REJECT INHIBIT**: see [Enabling and Disabling Reject Inhibit (Setup) ▶ Page 39]
- **EXT RCU RESET**: see [Managing Reject Confirmation Unit (RCU) Sensors ▶ Page 43]
- **Bin Unlocked**: see [Unlocking the Reject Bin ▶ Page 41]
- **SENSOR WARNING**: see [Managing Sensors and Speed ▶ Page 41]

Some of the inputs and outputs (including **CUSTOM**), when selected, display further options and parameters, such as **Activate Fault Relay**, **Dead Time**, and **Bin Open Time sec**. When you choose the **CUSTOM** option, the **Activate Fault Relay** option and the **Dead Time** option are available:

- The **Activate Fault Relay** option causes an input or output to switch the fault relay on the User I/O board of the metal detector. The fault relay can be wired to an independent device, or a device on the conveyor system. Typically, **Activate Fault Relay** is used to stop the conveyor system (such as a conveyor belt or a bagging machine).
- **Dead Time** is the period of time allowed for contaminated product to reach and enter the reject bin. During this period, the input signal is ignored.
- **Bin Open Time sec** is the time in seconds that the bin is allowed to remain open or unlocked before a warning appears on the metal detector.

Certain features on the metal detector need to use one or more of the programmable inputs, preventing the user from choosing the list of options. For example, if the metal detector is configured to work with a Reject Confirmation Unit (RCU) on a conveyor system that has a speed sensor, then **INPUT 1** is dedicated for **RCU EXT CLOCK** and cannot be changed by the user.

Programmable Output List

The following is a list of typical programmable outputs. The list is partly dependent on the programmable inputs that you choose.

Example: If you assign a programmable input to **AIR FAIL**, the **AIR FAIL** option appears in the lists of programmable outputs. The metal detector receives an input if there is a failure in the air supply (such as an air supply used to drive a reject mechanism), and the **AIR FAIL** output can be used to switch an independent external device or raise an alarm.

- **AIR FAIL**
- **ATS THRESHOLD**: see [Working with the Automatic Test System (ATS) for Gravity-Fed Metal Detectors ▶ Page 66]
- **BIN UNLOCKED**: see [Managing the Reject Bin ▶ Page 40]
- **DETECTOR ACTIVE**
- **EARLY WARNING**: see [Condition Monitoring ▶ Page 96]
- **METAL DETECT**
- **CUSTOM**
- **MULTIPLE REJECTS**: see [Managing Reject Mechanisms ▶ Page 37]

- **PACK COUNT**: see [Using Pack-Rate Monitoring ▶ Page 46]
- **PV ALARM**: see [Setting the Parameters for Routine Performance Testing ▶ Page 70]
- **QA TEST DUE**: see [Doing Routine Performance Testing ▶ Page 72]
- **QA TEST OVERDUE**: see [Doing Routine Performance Testing ▶ Page 72]
- **QA TEST DUE & OVERDUE**: see [Doing Routine Performance Testing ▶ Page 72]
- **QA TEST FAIL**: see [Doing Routine Performance Testing ▶ Page 72]
- **STATUS CHECK**
- **UNLOCK BIN**: see [Managing the Reject Bin ▶ Page 40]
- **REJECT BIN FULL (or Tablet Container Full)**: see [Managing the Reject Bin ▶ Page 40]
- **WARNING**: see [Metal Detector Faults, Warnings and Alerts ▶ Page 96]
- **WARNING THRESHOLD**: see [Metal Detector Faults, Warnings and Alerts ▶ Page 96]
- **PACK SPACE WARNING**: see [Using Pack-Rate Monitoring ▶ Page 46]
- **CHECK DETECTOR**: see [Metal Detector Faults, Warnings and Alerts ▶ Page 96]
- **RT INACTIVE**: see [Using Reduced Test ▶ Page 58]

Refer to the Profile User Manual supplied with your metal detector to see the locations of the connections for the programmable inputs and outputs, and to see the technical specifications for the inputs and outputs.

Related Topics:

[Managing Communications for the Metal Detector and its Systems ▶ Page 36]

The Profile User Manual supplied with your metal detector

5.3 Managing Inputs

Profile Metal Detector:	Software Version:	Access Level Required:
All	All	Installer

NOTE: Programmable inputs is a "**Pack Code E**" option.

- 1 Press **Advanced Settings**.
- 2 Press **Customer Inputs/Outputs**.
- 3 Press **Configure Inputs** to access and configure **INPUT 1**, **INPUT 2**, **INPUT 3**, and **INPUT 4**.

Related Topics:

[How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]

[Managing Communications for the Metal Detector and its Systems ▶ Page 36]

5.4 Managing Outputs

Profile Metal Detector:	Software Version:	Access Level Required:
All	All	Installer

NOTE: Programmable outputs is a "**Pack Code E**" option.

- 1 Press **Advanced Settings**.
- 2 Press **Customer Inputs/Outputs**.
- 3 Press **Configure Outputs** to access and configure **Output 1**, **Output 2**, and **Output 3**. For most outputs you can enable **Activate Fault Relay** and select a **Pulsed** output signal (between 1 and 3 Hz).

Setting the Outputs to Normally Open or Normally Closed

On the second screen of **Configure Outputs** you can set the **Output State** to either **NORMALLY OPEN** or **NORMALLY CLOSED**.

NOTE: For fail-safe operation in a condition of power failure or removal of power, set the **Output State** to **NORMALLY CLOSED**.

Related Topics:

[How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]

[Managing Communications for the Metal Detector and its Systems ▶ Page 36]

Refer to the Profile User Manual supplied with your metal detector.

5.5 Managing Communications for the Metal Detector and its Systems

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

Refer to the topic [How the Software Works with the Programmable Inputs and Outputs ▶ Page 33] to understand how the metal detector can communicate and interact with the conveyor system and with other equipment in your factory.

For information on how to use and configure the **Network Port** and the **Direct Port**, refer to the topic [Managing the Communication Ports ▶ Page 36] for full specifications of communications data.

Refer to the Profile User Manual supplied with your metal detector to see the locations of the connections for the programmable inputs and outputs, and to see the technical specifications for the inputs and outputs.

Refer to **Communications Protocol** document supplied with the metal detector for details for complete lists of communication data, data types, fault messages, warning messages, OPC tags, and PackML tags and codes.

Related Topics:

[How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]

[Managing Inputs ▶ Page 35]

[Managing Outputs ▶ Page 35]

[Managing the Communication Ports ▶ Page 36]

[The Communications Protocol Document ▶ Page 37]

[Working with PackML ▶ Page 88]

Refer to the User Manual

5.5.1 Managing the Communication Ports

Profile Metal Detector:	Software Version:	Access Level Required:
All	All	Installer

Refer to the Profile User Manual supplied with the metal detector for technical data on the **Network Port** and the **Direct Port**. These serial ports can be set to RS232 or RS422 by changing the position of a jumper link in the User Input/Output board. The factory setting is RS232.

- 1 Press **Advanced Settings**.
- 2 Press **Customer Inputs/Outputs**.
- 3 Press **Comms Settings**. For both ports, you can turn the port **OFF**, or select **RS-422\RS-232**, or **FIELDBUS**. You can select **ETHERNET** on the **Network Port** if the Ethernet adapter hardware is fitted to the metal detector.
 - ⇒ For details of **FIELDBUS** connectivity and setting up, refer to the manual supplied with your METTLER TOLEDO Fieldbus module.

- 4 If you select **RS-422\RS-232** or **ETHERNET**, scroll through the screens to specify the **High Level Timeout** and the **Low Level Timeout**, and the **Event Filter Level**. If you have selected **RS-422\RS-232**, set the correct **Baud Rate** and **Address**.
- ⇒ **High Level Timeout** is the time in milliseconds that the metal detector waits for a response from the client before sending a signal.
 - ⇒ **Low Level Timeout** is the time in milliseconds that the metal detector waits before it repeats an event message when no acknowledgement has been received.
 - ⇒ **Event Filter Level** specifies the level to which metal detector events are filtered. **NONE** means no messages are filtered. **ALL** means that all messages are filtered (apart from messages that are requested by the external client). A **Communications Protocol** document is supplied with new metal detectors that gives precise details of the messages that are filtered out by the **LOW**, **MEDIUM**, and **HIGH** options.
- ⇒ **NOTE: ETHERNET** and **FIELDBUS** need RS-232 communication. If you have set one of the ports to RS422 on the Input/Output board, **ETHERNET** and **FIELDBUS** will not function on that port.

Related Topics:

[How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]

[Managing Communications for the Metal Detector and its Systems ▶ Page 36]

[The Communications Protocol Document ▶ Page 37]

Refer to the METTLER TOLEDO Fieldbus manual for **FIELDBUS** setup.

5.5.1.1 The Communications Protocol Document

The metal detector is supplied with a **Communications Protocol** document. You will need to refer to the **Communications Protocol** document for topics that connect the metal detector to external systems.

The **Communications Protocol** also has complete lists of communication data, data types, fault messages, warning messages, OPC tags, and PackML tags and codes.



The Communications Protocol Document, supplied with your Profile metal detector

5.6 Managing Reject Mechanisms

5.6.1 Managing Reject Settings (Non-Gated)

Profile Metal Detector	Software Version	Access Level Required
All	All	User 3

NOTES:

Metal detectors that have a **Pack Sensor** can be set to **Gated Reject** operation (at the **Installer** menu). If **Gated Reject** operation is selected, you will be prompted with a message to start a semi-automatic setup. For **Gated Reject** operation, see [Managing Reject Settings (Gated) ▶ Page 38].

The **Reject Settings** button is on the **User 3** menu unless the metal detector is set up for product **Clustering**. If the metal detector is set up for product **Clustering**, the **Cluster Settings** button replaces the **Reject Settings** button.

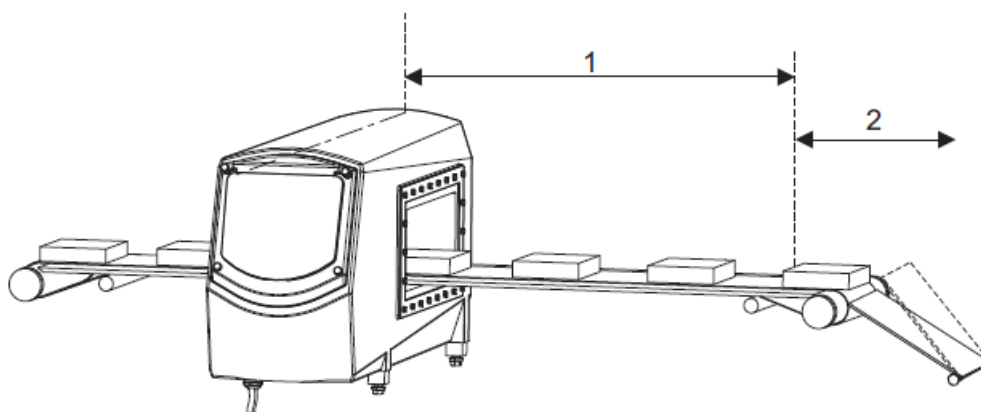
1 Press **Reject Settings**.

⇒ **NOTE:** The **Reject Settings** set the reject timings. The timing unit of measurement can be **msec** or, if the metal detector has a **Speed Sensor**, the unit of measurement can be **Pulses**. The unit of measurement is set at **Installer** level.

2 Enter the value in the **Reject ON** field (in **msec** or **Pulses**). See the figure below.

3 Enter the value in the **Detect To Reject** field (in **msec** or **Pulses**). See the figure below.

⇒ **NOTE:** You can verify this value by passing a metal sample with the product. Adjust the value if necessary.



1	Detect To Reject	2	Reject ON
---	-------------------------	---	------------------

Related Topics:

[Understanding Programmable Reject Timers ▶ Page 24]

[Managing Reject Settings (Gated) ▶ Page 38]

[Setting up the Detector Speed ▶ Page 44]

[Setting up the Speed Sensor ▶ Page 42]

[Using Product Clustering ▶ Page 55]

5.6.2 Managing Reject Settings (Gated)

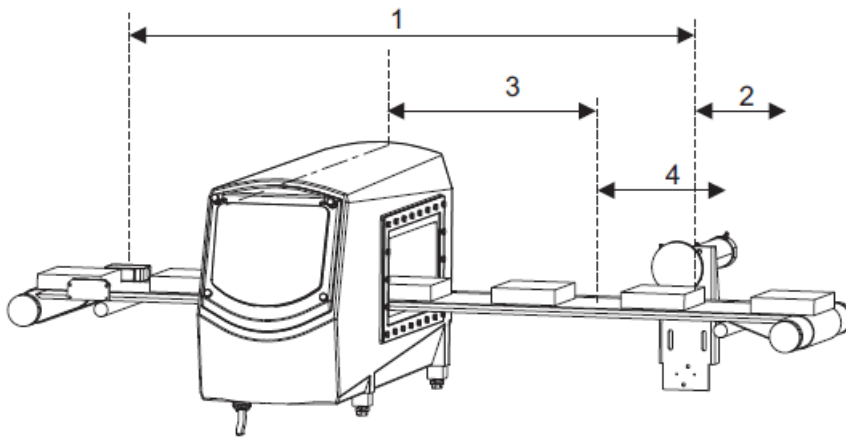
Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series Profile Advantage	All	User 3 to set reject timings Installer to set up speeds and sensors, and to enable Gated Reject

NOTES:

The **Reject Settings** button is on the **User 3** menu unless the metal detector is set up for product **Clustering**. If the metal detector is set up for product **Clustering**, the **Cluster Settings** button replaces the **Reject Settings** button.

Only Metal detectors that have a **Pack Sensor** can be set to **Gated Reject**.

- **Prerequisite:** To set up the **Gated Reject** you need a pack of your **Running Product** and a metal test sample that is large enough to consistently trigger a detection.
- 1 On the **Installer** menu, select **Install Settings**.
 - 2 In the **Install Settings** screens, select **Pack Sensor** and **Gated Reject**.
 - 3 On the **User 3** menu, press **Reject Settings**. (If a screen appears with the message **Gated Reject?**, tick the confirm.)
 - 4 Pass a pack of your **Running Product** with a metal sample (of size and specification to conform to your company's standards for metal detection) at the rear of the pack, as prompted on the screen.
 - ⇒ **Result:** The metal detector does several calculations. The screen displays the **Reject ON** and the **Pack to Reject** fields. The values in these fields are values calculated by the metal detector, based on values for speeds and distances entered in the **Install Settings** screens by the **Installer**.
 - 5 Make sure that the values in the **Reject ON** and the **Pack to Reject** fields are correct. To do this pass your product with the metal sample (that you used in the previous step) at the rear of the pack, and make sure it is rejected from the system conveyor. Then pass your product with the metal sample at the front of the pack, and make sure it is rejected from the system conveyor.



1	Pack to Reject	2	Reject ON
3	Detect to Gate	4	Gate Open

⇒ **Notes:**

During adjustments you make to the settings, the bargraph might show red detect bars.
 The timing unit of the **Pack to Reject** field can be **msec** or **Pulses**. The timing unit is set at **Installer** level.

Related Topics:

- [Understanding Programmable Reject Timers ▶ Page 24]
- [Managing Reject Settings (Gated) ▶ Page 38]
- [Setting up the Detector Speed ▶ Page 44]
- [Setting up the Pack Sensor ▶ Page 41]
- [Setting up the Speed Sensor ▶ Page 42]
- [Using Product Clustering ▶ Page 55]

5.6.3 Enabling and Disabling Reject Inhibit (Setup)

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

NOTES:

The **Reject Inhibit (Setup)** feature disables the reject mechanism when you do a product setup.

The **Reject Inhibit (Setup)** feature makes sure that no products are unnecessarily rejected during a product setup. If you are doing a product set up in a live production environment, you can disable **Reject Inhibit (Setup)** to make sure that any contaminated products are rejected from the production line.

- 1 Press **Advanced Settings**.
- 2 Press **Auto Setup Settings**.
- 3 Tick the **Reject Inhibit (Setup)** checkbox to enable **Reject Inhibit (Setup)**, or remove the tick to disable **Reject Inhibit (Setup)**.

Related Topics:

[Creating and Setting up a Product ▶ Page 51]

5.6.4 Managing the Reject Bin

Profile Metal Detector	Software Version	Access Level Required
All (if configured)	All	QA Setup or Installer

The reject bin usually has an electro-mechanical lock to make sure that rejected products cannot be removed by unauthorised personnel, or put back onto the conveyor system.

The metal detector can interact with the reject bin as follows:

1. You can set up one of the programmable outputs from the metal detector to send an **Unlock Bin** signal to the reject bin.
2. You can set up one of the programmable inputs to receive a **Reject Bin full** signal.
3. You can set up one of the programmable inputs to receive a **Bin Unlocked** signal.

NOTES:

- Management of the reject bin is done at **QA Setup** access level and **Installer** access level.
- If you have not chosen **Unlock Bin** as one of the programmable outputs, the **Unlock Bin** button and the **Allow Unlock Bin** checkbox do not appear on the screens.

Deciding who can unlock the reject bin (QA Setup access level)

- 1 Press **Manage QA Operators**.
- 2 Press **Edit Account**.
- 3 Select any name in the list of personnel.
- 4 Press **Confirm selection**.
- 5 If the person you selected is a **QA Operator**, tick **Allow Unlock Bin**. If the person you selected has **User 2** or **User 3** access, press **QA Enabled**.
 - ⇒ **NOTE:** You can also tick **Allow Unlock Bin** when you create a new **QA Operator** with the **Create New Account** button.

Deciding who can unlock the reject bin (Installer access level)

- 1 Press **Advanced Settings**.
- 2 Press **Access Account Management**.
- 3 Press **Edit Account**.
- 4 Select any name in the list of personnel at **User 2** or **User 3** access level.
 - ⇒ **NOTE:** The **Installer** can only manage the accounts for **User 1**, **User 2** and **User 3**. The **Installer** cannot manage **QA Operator** accounts.
- 5 Press **Confirm selection**.
- 6 Tick **Allow Unlock Bin**.

Related Topics:

[Unlocking the Reject Bin ▶ Page 41]

[How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]

5.6.4.1 Unlocking the Reject Bin

Profile Metal Detector:	Software Version:	Access Level Required:
All	All	QA Operator. (User 2 and User 3 can be given the Unlock Bin button by the QA Setup)

The reject bin usually has an electro-mechanical lock to make sure that rejected products cannot be removed by unauthorised personnel, or put back onto the conveyor system.

- 1 Log in.
- 2 Press **Unlock Bin**.
 - ⇒ The electro-mechanical lock on the reject bin releases to allow you to open the bin. (The lock is released for about 10 seconds, depending on the value set in the programmable output.)
 - ⇒ When you close the bin, it will re-lock after the unlock time (typically 10 seconds) has expired.

Related Topics:

[Managing the Reject Bin ▶ Page 40]

[How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]


5.7 Managing Sensors and Speed

5.7.1 Setting up the Pack Sensor

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series Profile Advantage	All	Installer

The pack sensor (which is usually a light beam) is fitted on the conveyor system near the infeed of the metal detector. For a description of the pack sensor, and how it interacts with the other sensors on the system, refer to your conveyor system manual.

The pack sensor can be used by the metal detector for timing gated rejects, counting packs, signal processing, and pack-rate monitoring.

- 1 On the **Installer** menu, click **Install Settings**. Scroll to the **Pack Sensor** screen.
- 2 Tick **Pack Sensor**.
 - ⇒ **Result:** The **Pack Sensor Distance** and the **Pack Sensor Calibrated** fields appear.
- 3 In the **Pack Sensor Distance** field, enter the exact distance from the pack sensor (the centre of the light beam) to the aperture of the metal detector.
 - ⇒ **NOTE:** You can click the **Information** button  to display a graphic guide of where to take the measurement.
- 4 Tick **Pack Sensor Calibrated** to start the calibration routine. Follow the instructions on the screen.
 - ⇒ **Result:**
If the metal detector has communicated successfully with the **Pack Sensor**, the screen briefly displays the message **Pack Sensor calibration PASSED**, and then returns to the **Pack Sensor** screen.

If the metal detector has failed to communicate correctly with the **Pack Sensor**, the message **Pack Sensor calibration FAILED** appears. If this happens, make sure that the pack sensor is fitted correctly and then repeat the calibration routine.

Related Topics:

[Setting up the Speed Sensor ▶ Page 42]

[Managing Reject Confirmation Unit (RCU) Sensors ▶ Page 43]

[Setting up the Detector Speed ▶ Page 44]

Refer to the Profile User Manual supplied with your metal detector to see the locations of the connections for the programmable inputs and outputs, and to see the technical specifications for the inputs and outputs.

5.7.2 Setting up the Speed Sensor

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series Profile Advantage Profile ASN	All	Installer

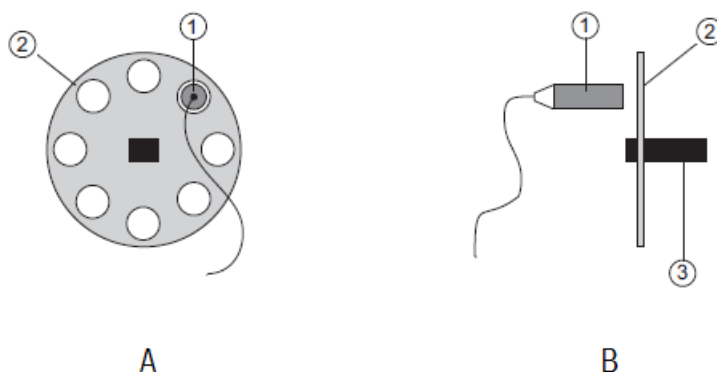
The **Speed Sensor** is either an optical sensor or a rotary encoder configured on the conveyor system to create digital clock pulses. These pulses are sent to the metal detector to provide information on conveyor speed and distance travelled.

On METTLER TOLEDO metal detection conveyor systems the **Speed Sensor** is an optional component.

NOTES:

- If the metal detector is configured to work with a Reject Confirmation Unit (RCU) on a conveyor system that has a speed sensor, then **INPUT 1** is dedicated for **RCU EXT CLOCK** and cannot be changed.
- For systems with an RCU, the **Speed Sensor** and the **RCU EXT CLOCK** must be used in conjunction.
- See the User Manual for the Profile metal detector for instructions on connecting the sensors to the Input/ Outboard of the metal detector.

The following figure shows a typical **Speed Sensor**.



A	Front view	1	Optical sensor
B	Side view	2	Disk
		3	Drive shaft

1 On the **Installer** menu, click **Install Settings**.

2 Scroll to the **Speed Sensor** screen.

3 Tick **Speed Sensor**.

⇒ **Result:** The screen displays the message **Reject Timer Mode will change**.

4 Press **Confirm** .

⇒ NOTES:

METTLER TOLEDO recommends that you use the **Auto** wizard. However, if you know the exact speed of the speed sensor's signal in **pulses/m**, you can manually enter the speed in the **pulses/m** field.

The **Auto** wizard will fail to calibrate the **Speed Sensor** if the **Detector Speed Range** setting is incorrect (see the topic [Setting up the Detector Speed ▶ Page 44]).

5 Press **Auto**. Follow the instructions on the screen.

⇒ **Result:**

If the metal detector successfully calibrates the **Speed Sensor**, the screen will display the message **Speed Sensor Calibration completed successfully** and the correct value is put in the **pulses/m** field.

If the metal detector fails to calibrate **Speed Sensor**, the screen will display a failure message. The most likely reason for failure is that the **Detector Speed Range** setting of the metal detector is incorrect.

Related Topics:

[Setting up the Detector Speed ▶ Page 44]


[Managing Reject Confirmation Unit (RCU) Sensors ▶ Page 43]

Refer to the Profile User Manual supplied with your metal detector to see the locations of the connections for the programmable inputs and outputs, and to see the technical specifications for the inputs and outputs.

5.7.3 Managing Reject Confirmation Unit (RCU) Sensors

Profile Metal Detector	Software Version	Access Level Required
Optional component on all Metal Detectors	All	Installer

NOTES:

- To see if a Reject Confirmation Unit (**RCU**) is fitted to the metal detector system, press the **Information** button  on the **Running Displays** and scroll to the **Options Installed**. If the **RCU** is fitted, you will see "**RCU**" in the **Options Installed** list.
- The **RCU** depends on calculations based on timing, therefore if the metal detection system has a variable speed, a **Speed Sensor** must be fitted.

If the **RCU Sensor** detects a fault with the **RCU**, it causes the metal detector to display **RCU/Fault Reset**, and the **RCU** relay on the Input/Outboard board of the metal detector sends a signal to stop the conveyor system. If a warning beacon is installed, the **RCU** causes it to flash.

The **RCU** is a device on the conveyor system or the gravity-fed system that communicates with the metal detector to confirm that contaminated product has been diverted into the reject bin. An **RCU Sensor**, positioned across the entrance of the reject bin, will raise an alarm if there is an **RCU** fault.

RCU Sensor with Loose Products

For loose products, the **RCU Sensor** confirms that the reject mechanism has reached its full reject position.

RCU Sensor Packaged Products

For packaged products, the **RCU** confirms that the package has entered the reject bin. This is an important requirement if the system uses the **Gated Reject** feature because an **RCU Sensor** signal is required for each reject event.

Setting up the RCU Sensor

- 1 On the **Installer** menu, click **Install Settings**.
- 2 Scroll to the **RCU Sensor** screen.
- 3 Tick **RCU Sensor present**.
⇒ **Result:** The screen displays the **RCU Sensor calibrated** field.
- 4 Tick **RCU Sensor calibrated**.
⇒ **Result:** The screen displays the message: **RCU Sensor Calibrating**. When the calibration is successfully completed, the screen displays the message: **RCU Sensor Calibration PASSED**, and a new field appears on the **RCU Sensor** screen: **RCU Extension Time**.
⇒ **NOTE:** **RCU Extension Time** is used by the RCU. The RCU uses the value in this field to confirm to the metal detector that the reject mechanism has responded at the correct time.

- 5 Calculate the **RCU Extension Time**. Enter the value in **RCU Extension Time**.
- ⇒ **NOTE: RCU Extension Time** will depend on type of conveyor system and the conveyor speed. Allow enough time for the contaminated product to enter the reject bin. And make sure that the time period is short enough for the contaminated product to be recovered in the event of a reject failure. For pusher-type reject devices on a conveyor the **RCU Extension Time** might need to be few seconds. For a y-valve reject device on a gravity fall system the **RCU Extension Time** might be only a few hundred milliseconds.

Related Topics:

[Setting up the Detector Speed ▶ Page 44]

[Condition Monitoring ▶ Page 96]

[How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]

Refer to the Profile User Manual supplied with your metal detector to see the locations of the connections for the programmable inputs and outputs, and to see the technical specifications for the inputs and outputs.

5.7.4 Setting up the Detector Speed

Profile Metal Detector	Software Version	Access Level Required
Profile R/RZ Series	All	Installer
Profile Advantage		
Profile ASN		

Several settings and features of the Profile metal detector depend on the **Detector Speed Range** being correct. And performance is improved if the detector speed, or range of speeds, matches the settings on the metal detector and the actual throughput speed of the system.

In the **Speed** setting, you enter the **Speed** into the metal detector of the conveyor, and select either a **FIXED** or **VARIABLE** speed.

NOTES:

- The **FIXED** option for **Speed Setting** is not available for Profile RB metal detectors.
- Profile ASN has a **CONTROLLED** option for **Speed Setting**. (See [Stopping and Starting the Conveyor from User Interface (Profile ASN only) ▶ Page 44].)

If the conveyor runs at a fixed speed, selecting **FIXED** optimises the accuracy and sensitivity of the metal detector. A **FIXED** conveyor speed is necessary for some metal detector features, such as **Product Logging** that uses pack-based sampling.

Setting up the Detector Speed

- 1 On the **Installer** menu, click **Install Settings**. Scroll to the **Detector Speed Range** screen.
- 2 In the **Detector Speed Range** field select **NOMINAL**, **LOW**, or **HIGH** to correspond to the throughput speed of the metal detector system.

⇒ **NOTE:** The **Operational Range** you select is displayed below the **Detector Speed Range**.
- 3 If you have selected a **Speed Setting** of **FIXED**, enter the speed in the **System Speed** field. You can enter the speed manually, or you can click on **Auto** wizard and follow the instructions on the screen.
- 4 If you have selected a **Speed Setting** of **VARIABLE**, put the typical speed in the **Typical Speed** field.

Related Topics:

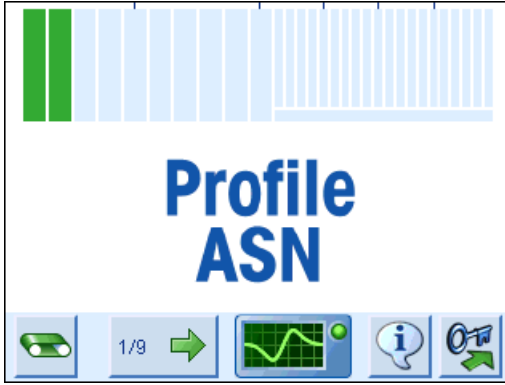
[Setting up the Speed Sensor ▶ Page 42]

[Stopping and Starting the Conveyor from User Interface (Profile ASN only) ▶ Page 44]

5.7.5 Stopping and Starting the Conveyor from User Interface (Profile ASN only)

Profile Metal Detector	Software Version	Access Level Required
Profile ASN	F4A.9.4	Installer

Profile ASN has a **Conveyor Control** key on the bottom left of the user interface. You can use the button to stop or start the conveyor.



Related Topics:

[Stop/Start Options for Conveyor (Profile ASN only) ▶ Page 45]

[The Controlled Conveyor Speed Option (Profile ASN only) ▶ Page 45]

5.7.5.1 Stop/Start Options for Conveyor (Profile ASN only)

Profile Metal Detector	Software Version	Access Level Required
Profile ASN	F4A.9.4	Installer

- 1 Press **Advanced Settings**.
- 2 Press **Conveyor Options**.
- 3 Select any or all of the following conditions for stopping and starting the conveyor:
 - ⇒ **Stop on Fault:** Stops the conveyor when a fault occurs.
 - ⇒ **Stop on Detect:** Stop the conveyor when metal is detected.
 - ⇒ **Run on Power Up:** Start the conveyor automatically on power up.

Related Topics:

[Stopping and Starting the Conveyor from User Interface (Profile ASN only) ▶ Page 44]

[The Controlled Conveyor Speed Option (Profile ASN only) ▶ Page 45]

5.7.5.2 The Controlled Conveyor Speed Option (Profile ASN only)

Profile Metal Detector	Software Version	Access Level Required
Profile ASN	F4A.9.4	Installer

Profile ASN has a **CONTROLLED** option that you can use to control the speed for metal detection. Once set, the value in the **Default Speed** is used for new products, which you can then adjust to suit the product. For more information on creating new products and defining individual product speeds, see [Setting up Products ▶ Page 50].

- 1 On the **Installer** menu, click **Install Settings**. Scroll to the **Detector Speed Range** screen.
- 2 In the **Detector Speed Range** screen select the **Speed Setting** to **CONTROLLED**.
- 3 Set a value in the **Default Speed** field, or press **Auto** to start an auto-calibration routine.
 - ⇒ **Result:** Two calibration options appear: **Manual Conveyor Setup** and **Automatic Conveyor Setup**. For the **Manual Conveyor Setup**, you need a tachometer to measure conveyor speed.

Related Topics:

[Stopping and Starting the Conveyor from User Interface (Profile ASN only) ▶ Page 44]

[The Controlled Conveyor Speed Option (Profile ASN only) ▶ Page 45]

[Setting up Products ▶ Page 50]

5.8 Using Pack-Rate Monitoring

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series (with Software Pack C)	All	Installer
Profile Advantage (with Software Pack C)		
Profile ASN (with Software Pack C)		

Pack Rate Monitoring works with metal detectors that have a **Pack Sensor**, and with discrete packs of **Running Product** that are set up for **Gated Reject**. To setup and enable **Pack Rate Monitoring**, you must use a **Running Product** that is already set up for **Gated Reject**.

When you set up **Pack Rate Monitoring** for a **Running Product**, the timing values automatically adjust when you change the **Running Product**. Therefore it is not necessary set up **Pack Rate Monitoring** every time you change the **Running Product**.

Principle of Operation

When the **Running Product** on a conveyor belt is discrete packs, and metal is detected, the reject mechanism must have enough time to extend and retract without interfering with the following pack. If the packs are too close together, the following problems can occur:

1. There might not be enough time for the reject mechanism to reject the following pack if it too is contaminated.
2. The reject mechanism could move and disorientate the pack following the rejected pack. If a pack becomes disoriented, it could cause problems such as a blockage or stoppage of the conveyor system, or affect downstream processing of the pack.

Pack Rate Monitoring uses the **Pack Sensor** to measure time between discrete packs on the conveyor system, and to measure the length of the packs (from the leading edge to the trailing edge). If **Pack Rate Monitoring** determines there is a problem, it can use either of the following features, depending on the severity of the problem:

1. **Pack Space Warning.**
If the spacing of packs is becoming too small, the metal detector will trigger a **Pack Space Warning**. The metal detector and conveyor system will continue to operate, but you should take action to increase the spacing between packs. Alternatively, **Pack Space Warning** can be set up to operate a programmable output to automatically control upstream equipment to adjust the rate of packs flowing onto the conveyor.
2. **Reject Guard.**
If the metal detector determines that packs have become too close for reliable operation of the reject mechanism, and any of the packs is contaminated, the metal detector stops the conveyor.

Related Topics:

[Selecting the Running Product or Cluster ▶ Page 50]

[Understanding Programmable Reject Timers ▶ Page 24]

[Managing Reject Settings (Gated) ▶ Page 38]

[Setting up the Pack Sensor ▶ Page 41]

[Setting up the Speed Sensor ▶ Page 42]

[How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]

[Calculating and Setting the Optimum Reject Time for Pack-Rate Monitoring ▶ Page 47]

[Activating and Configuring Pack-Rate Monitoring ▶ Page 48]

[Faults and Warnings Generated by Pack-Space Warning ▶ Page 48]

5.8.1 Calculating and Setting the Optimum Reject Time for Pack-Rate Monitoring

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series (with Software Pack C)	All	Installer
Profile Advantage (with Software Pack C)		
Profile ASN (with Software Pack C)		

Before you can set up and test **Pack Rate Monitoring**, you must manually calculate the optimum **Reject Cycle Time**, which is the time (and therefore space) to allow between two packs.

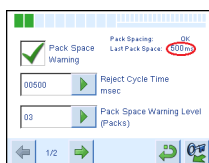
As a minimum:

- The **Reject Cycle Time** must not be less than the time it takes for a complete reject cycle,
- The **Reject Cycle Time** must not be less than the time it takes for the conveyor to travel from the centre of a pack (the reject point) to the leading edge of the following pack.

Prerequisites:

- You will need a few packs of your **Running Product** to calculate the **Reject Cycle Time**.
- The **Running Product** you use must already be set up for **Gated Reject**.

- 1 On **Installer** menu, press **Advanced Settings**.
- 2 Press **Pack Rate Monitoring**.
 - ⇒ **NOTE:** If **Pack Rate Monitoring** is not available for your metal detector type, or you have not purchased the Software Pack C option, the **Pack Rate Monitoring** button is not active and is colored gray.
- 3 Make sure that the **Pack Space Warning** and the **Reject Guard** are disabled (not ticked).
- 4 Estimate a **Pack Spacing** that you are sure is big enough to reject a pack without interfering with the following pack.
 - ⇒ **NOTE:** It is advisable to start with a large **Pack Spacing** and then adjust it downwards after you experiment with the packs. If you start with a small spacing, it could damage the pack following the rejected pack, and spray the contents of the pack onto your body, and the conveyor system, and the surrounding area.
- 5 Press the button **Reject Next 2 Packs**.
 - ⇒ **NOTE:** The **Reject Next 2 Packs** feature is used only for setting up. It causes the next 2 packs that you pass through the metal detector to be rejected (regardless of whether or not they are contaminated). By observing the action of the reject mechanism for 2 consecutive packs, you can determine the best values for the **Reject Cycle Time**.
- 6 With the conveyor belt and reject mechanism switched on, pass two packs through metal detector at the spacing that you estimated, and observe the action of the reject mechanism.
- 7 Repeat step 6 with a smaller spacing between the two packs.
- 8 Repeat step 7 several times, reducing the spacing each time until the reject mechanism becomes close to colliding with the second pack.
- 9 Note the value (in **msec**) recorded on the screen in the non-editable field **Last Pack Space**:



- 10 Enter the value of **Last Pack Space** in the **Reject Cycle Time** field.

Related Topics:

[Using Pack-Rate Monitoring ▶ Page 46]

[Selecting the Running Product or Cluster ▶ Page 50]

[Understanding Programmable Reject Timers ▶ Page 24]

[Managing Reject Settings (Gated) ▶ Page 38]

[Setting up the Pack Sensor ▶ Page 41]

[Setting up the Speed Sensor ▶ Page 42]

[How the Software Works with the Programmable Inputs and Outputs ▶ Page 33]

5.8.2 Activating and Configuring Pack-Rate Monitoring

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series (with Software Pack C)	All	Installer
Profile Advantage (with Software Pack C)		
Profile ASN (with Software Pack C)		

- 1 On **Installer** menu, press **Advanced Settings**.
- 2 Press **Pack Rate Monitoring**.
- 3 Tick **Pack Space Warning** to enable it.
- 4 In the **Pack Space Warning Level (Packs)** field, enter the number of consecutive packs that you will allow to become too close together before the **Pack Space Warning** is triggered. You can enter any value from 1 pack to 10 packs.
- 5 Tick **Reject Guard** to enable it.
 - ⇒ **NOTES:**
 - ⇒ **Reject Guard** uses the value that you set in the **Reject Cycle Time** field.
 - ⇒ If you enable **Reject Guard**, it will operate whether or not you enabled **Pack Space Warning**.
 - ⇒ If you enable **Reject Guard**, you must set one of the programmable inputs to **EXT RCU RESET** in order to clear fault conditions when they occur.
 - ⇒ If you enable **Pack Space Warning**, you can set one of the programmable outputs to **Pack Space Warning**. This output signal could be used to control upstream equipment, such as equipment that can adjust the flow rate of packs onto the conveyor.

Related Topics:

[Using Pack-Rate Monitoring ▶ Page 46]

[Calculating and Setting the Optimum Reject Time for Pack-Rate Monitoring ▶ Page 47]

[Faults and Warnings Generated by Pack-Space Warning ▶ Page 48]

5.8.3 Faults and Warnings Generated by Pack-Space Warning

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series (with Software Pack C)	All	User 3
Profile Advantage (with Software Pack C)		
Profile ASN (with Software Pack C)		

There are two pack-space warning messages:

1. Product spacing too close for reliable rejection:

If the packs on the conveyor start to become closer than you specified (defined in the **Reject Cycle Time**), and you have enabled **Pack Space Warning**, the **Running Displays** will display the message: **Product spacing too close for reliable rejection**. The metal detector and the conveyor system will continue to operate, but you should take action to clear the fault, or make sure that the programmable output clears the fault.

2. Reject Guard Fault Product spacing too close for reliable rejection:

If the packs become too close for reliable rejection, and you have enabled **Reject Guard** the metal detector and the conveyor will stop operating. The **Running Displays** become red, and display the warning **Reject Guard Fault Product spacing too close for reliable rejection**. You must remove the packs from the conveyor. The programmable input **EXT RCU RESET** will clear the warning on the metal detector and restart the metal detector.

Related Topics:

[Using Pack-Rate Monitoring ▶ Page 46]

6 Setting up Products

6.1 Managing Products for Inspection

6.1.1 Selecting the Running Product or Cluster

Profile Metal Detector	Software Version	Access Level Required
All	All	User 1, User 2 or User 3

NOTE:

It is important that the actual **Running Product** (or **Cluster**) under inspection corresponds to the **Running Product** (or **Cluster**) selected on the metal detector. On the **Running Displays**, you can see which **Running Product** (or **Cluster**) is selected.

Select the Running Product (or Cluster) at User 1 Level

- 1 Log in at **User 1** access level.
- 2 Scroll through the list to find the correct **Running Product** (or **Cluster**).
 - ⇒ **NOTE:** If the product is not on the list, inform your manager, who will create and set up the product on the metal detector.
- 3 Press the product name to highlight it.
- 4 Tick to **Confirm selection**.

Select the Running Product (or Cluster) at User 2 Level

- 1 Log in at **User 2** access level.
- 2 Press **Select Product**.
- 3 Scroll through the list to find the correct **Running Product**.
 - ⇒ **NOTES:**
 - ⇒ If the product is not on the list, inform your manager, who will create and set up the product on the metal detector.
 - ⇒ If you have **User 3** access level, you can create and set up new products yourself: [Creating and Setting up a Product ▶ Page 51].
- 4 Press the product name to highlight it.
- 5 Tick to **Confirm selection**.

Select the Running Product (or Cluster) at User 3 Level

- 1 Log in at **User 3** access level.
- 2 Press **Product Management**.
- 3 Press **Select Product**.
- 4 Scroll through the list to find the correct **Running Product**.
 - ⇒ **NOTES:**
 - ⇒ You can create and set up new products. See [Creating and Setting up a Product ▶ Page 51]
- 5 Press the product name to highlight it.
- 6 Tick to **Confirm selection**.

Related Topics:

[Viewing the Running Displays ▶ Page 16]

[Creating and Setting up a Product ▶ Page 51]

[Logging In and Out ▶ Page 27]

[Managing Products for Inspection ▶ Page 50]

[Using Product Clustering ▶ Page 55]

6.1.2 Creating and Setting up a Product

Profile Metal Detector	Software Version	Access Level Required
All except Profile Advantage	All	User 2 (change basic product settings only) User 3

You can name and store up to 100 products in the metal detector.

To create a new product, you can do an auto-setup of the product, or copy an existing product and change its name.

NOTES:

The recommended way to set up a product is to pass it through the aperture of the metal detector, and use the **Auto Setup** feature to calculate the best sensitivity, phase and frequency for the product.

During the **Auto Setup**, the reject mechanism is usually disabled to make sure that no products are unnecessarily rejected during a product setup. However, if you are working in a live production environment, you can switch off reject inhibit enable to make sure that contaminated product is rejected from the production line. See [Enabling and Disabling Reject Inhibit (Setup) ▶ Page 39].

At **Installer** access level, you can adjust the default parameters for **Auto Setup**.

Auto Setup gives you instructions on the screen to pass products. The product must be moving (not stationary). If the products are discrete products, they must be spaced.

Prerequisites:

- You need to have some of the product you want to set up, in the form and quantity that will normally pass through the aperture.
- If a pack sensor is fitted, it must be correctly set up.
- The metal detector speed must be correctly set up.

- 1 Press **Product Management**.
- 2 Press **Create Product**.
- 3 Enter the **Name** of the product.
- 4 Enter a **Product Code**, or leave the field blank. (The **Product Code** is optional.)
- 5 Scroll forward to the next screen.
- 6 Click **Auto Setup**.
 - ⇒ **Result:** The screen changes. Another **Auto Setup** button appears with the **Optimised Setup** button .
- 7 Click **Auto Setup**, and immediately follow the instructions on the screen. The screen will give you instructions when to pass product through the metal detector.
 - ⇒ The metal detector will do an auto setup, and then you will get a message to inform you: **Auto Setup complete**.
- 8 Click **Optimised Setup** and immediately follow the instructions on the screen. The screen will give you instructions when to pass product through the metal detector.
 - ⇒ **Results after Auto Setup and Optimised Setup:** The metal detector has set the best **Frequency** for the product (providing that **Auto Freq Select** is enabled at **Installer** level), and the metal detector has selected the best **Sensitivity**, and **Phase** for the product.
 - ⇒ **NOTE:** On Profile ASN metal detectors there is a **BOOST** checkbox. Ticking the checkbox changes the detection algorithms to a very high level of sensitivity. This is an advanced feature that can be used only where there is no signal from product effect, interference, and vibration. Contact your METTLER TOLEDO representative if you need advice on deciding if the **BOOST** algorithms give you a true advantage in your metal detection strategy.

Related Topics:

[General Considerations for Optimizing Metal Detection ▶ Page 20]

- [Managing Products for Inspection ▶ Page 50]
- [Copying Products ▶ Page 53]
- [Setting up the Speed Sensor ▶ Page 42]
- [Setting up the Detector Speed ▶ Page 44]
- [Enabling and Disabling Reject Inhibit (Setup) ▶ Page 39]
- [Managing the Default Parameters for the Auto Setup ▶ Page 56]

6.1.3 Creating and Setting up a Product (Profile Advantage)

Profile Metal Detector	Software Version	Access Level Required
Profile Advantage	All	User 3

You can name and store up to 100 products in the metal detector.

To create a new product, you can do an auto-setup of the product, or copy an existing product and change its name.

NOTES:

During the **Auto Setup**, the reject mechanism is usually disabled to make sure that no products are unnecessarily rejected during a product setup. However, if you are working in a live production environment, you can switch off reject inhibit enable to make sure that contaminated product is rejected from the production line. See [Enabling and Disabling Reject Inhibit (Setup) ▶ Page 39].

At **Installer** access level, you can adjust the default parameters for **Auto Setup**.

Prerequisites:

- You need some to have some of the product you want to set up, in the form and quantity that will normally pass through the aperture.
- If a pack sensor is fitted, it is correctly set up.
- The metal detector speed is correctly set up.

- 1 Press **Product Management**.
- 2 Press **Create Product**.
- 3 Enter the **Name** of the product.
- 4 Enter a **Product Code**, or leave the field blank. (The **Product Code** is optional.)
- 5 Scroll forward to the next screen.
- 6 Click **Auto Setup**.
 - ⇒ **Result:** The screen changes. Another **Auto Setup** button appears with the button **Partial Setup**.
 - ⇒ **NOTES:** You can choose to do the **Auto Setup** and/or the **Partial Setup**. We recommend that you do the **Auto Setup** followed by the **Partial Setup**.
 - ⇒ The **Auto Setup** automatically calculates the **Mode** for the product. **Partial Setup** works with the **Mode** that you can set manually in **Product Settings**, and works the results of the **Auto Setup**.
- 7 Click **Auto Setup** and/or **Partial Setup**, and follow the instructions on the screen. The screen will give you instructions when to pass product through the metal detector.
 - ⇒ The metal detector will do the setup, and then you will get a message when the set up is complete.

Related Topics:

- [General Considerations for Optimizing Metal Detection ▶ Page 20]
- [Managing Products for Inspection ▶ Page 50]
- [Copying Products ▶ Page 53]
- [Changing Frequency, Sensitivity and Phase ▶ Page 53]
- [Setting up the Speed Sensor ▶ Page 42]
- [Setting up the Detector Speed ▶ Page 44]
- [Enabling and Disabling Reject Inhibit (Setup) ▶ Page 39]

6.1.4 Deleting Products

Profile Metal Detector	Software Version	Access Level Required
All	All	User 3

You can name and store up to 100 products in the metal detector.

You can delete products that are no longer used.

- 1 Press **Product Management**.
 - 2 Press **Delete Product**.
 - 3 Press the product that you want to delete.
 - 4 **Confirm selection**.
- ⇒ **NOTE:** The last remaining product cannot be deleted. There must always be at least one running product.

Related Topics:

[Managing Products for Inspection ▶ Page 50]

6.1.5 Copying Products

Profile Metal Detector	Software Version	Access Level Required
All	All	User 3

You can copy an existing product name, and all the settings and data stored with the product name. You can then give the copied product a new name.

Copying a product is useful if your company processes a product that has different brand names, or has different branding on the packaging, or is destined for different customers. Copying a product is useful for differentiating product data for QA, performance validation, and reporting.

NOTE: Do not use the **Copy Product** feature if there are differences in product packaging that could create a different **product effect**.

- 1 Press **Product Management**.
- 2 Press **Copy Product**.
- 3 Press the product that you want to copy.
- 4 Scroll forward to the next screen.
- 5 Edit the **Name** and (optionally) the **Product Code**.

Related Topics:

[Managing Products for Inspection ▶ Page 50]

[Understanding Product Effect ▶ Page 22]

6.1.6 Changing Frequency, Sensitivity and Phase

Profile Metal Detector	Software Version	Access Level Required
All	All	User 3

METTLER TOLEDO advise you to use the **Auto Setup** and **Optimised Setup** techniques (see [Creating and Setting up a Product ▶ Page 51]), which calculate the best parameters for the **Running Product**.

Advanced users, with a good knowledge and experience of METTLER TOLEDO metal detection-technology can manually change the **Product Settings**, including **Frequency**, **Sensitivity**, and **Phase**.

Optimizing the detection of metal contaminants can be a complex activity that requires knowledge and experience. If you manually fine tune the metal detector for maximum sensitivity, in an attempt to detect extremely small pieces of contaminant, there is a risk of creating a high number of false rejects. Also, note that the characteristics of your products can vary for many reasons, such as a change in raw ingredients, or a change in the ambient temperature, or differing levels of vibration. Some environments are more challenging than others.

You can contact METTLER TOLEDO Service for advice if you think that you could benefit from using advanced techniques and manual fine tuning, or an improvement in metal-detection strategy.

NOTE: If you change **Product Settings** it overwrites the **Auto Setup** and **Optimised Setup** data that is stored with the **Running Product**.

- 1 Press **Product Settings**.
- 2 Set the **Frequency** to **LOW**, **MEDIUM**, or **HIGH**.
 - ⇒ **NOTE:** Some Profile metal detectors operate on only a single frequency, and some have just two frequency settings (**LOW** and **HIGH**).
- 3 Adjust the **Sensitivity** and **Phase**. You can use the **Advanced Settings** button to display further controls to help you with the fine tuning.
 - ⇒ **NOTES for Profile ASN metal detectors:**
 - ⇒ Profile ASN metal detectors have two **Sensitivity** fields: **Sensitivity** and **Sensitivity 2**, representing two channels.
 - ⇒ Adjust **Sensitivity 2** so that the resultant signal is slightly less than the signal for **Sensitivity**. For example, if **Sensitivity** is set to 6 segments, set **Sensitivity 2** to around 5 segments or less.
 - ⇒ Note that when you select the **Sensitivity** the bargraph shows the signal from the **Sensitivity**, and when you select **Sensitivity 2** the bargraph shows the signal from the **Sensitivity 2** channel. In normal operation, the bargraph shows the resultant of **Sensitivity** and **Sensitivity 2**.

Related Topics:

[General Considerations for Optimizing Metal Detection ▶ Page 20]

[Managing Products for Inspection ▶ Page 50]

[Creating and Setting up a Product ▶ Page 51]

[Using the Vector Diagrams for Fine Tuning ▶ Page 54]

6.1.7 Using the Vector Diagrams for Fine Tuning

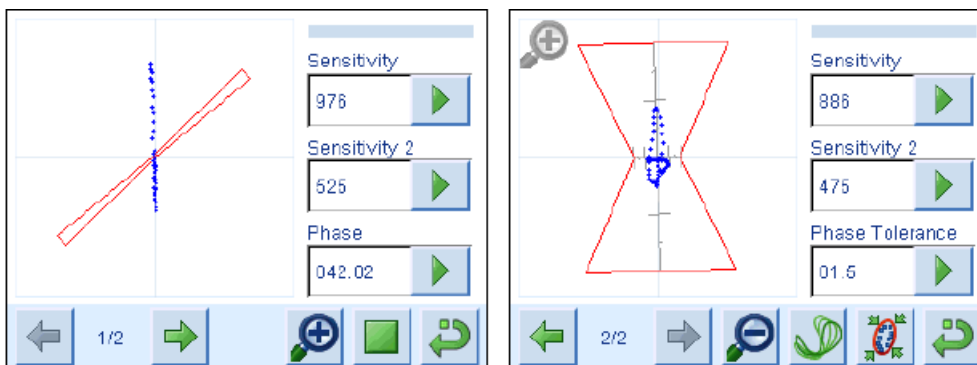
Profile Metal Detector	Software Version	Access Level Required
All	All	User 3

Vector diagrams allow you to see a visual representation of the product signal within a "detection envelope" that is calculated from the **Sensitivity**, **Phase**, and **Phase Tolerance** settings.

This feature can help users with advanced knowledge of metal detection to fine tune wet products. If inconsistency of products is expected following **Auto Setup**, and so it might be beneficial to use the vector diagrams to manually create an optimum setting.

To see the vector diagrams, press **Product Settings** and then press **Advanced Settings**.

You can view the product signal within the detection envelope on a single diagram while you adjust the **Sensitivity** and **Phase** controls.



Vector Diagram. The blue marks are the product signal. The red line is the detection envelope.

NOTE: If the **Optimised Setup** feature was not used when the **Running Product** was created, the detection envelope on the vector diagram will be a circular or oval shape.

The **Sensitivity** and **Sensitivity 2** controls adjust the sensitivity on the two axes. **Sensitivity 2** is in phase with the product signal, and therefore is usually smaller than **Sensitivity**, which is perpendicular to **Sensitivity 2**.

On the screen 1/2, the **Phase** control rotates the product phase angle. On screen 2/2, the phase tolerance adjusts the shape of the envelope.

This advanced technique allows you to use the sensitivity and phase controls to bring the red detection envelope as close as possible to the blue product signal. You can experiment by passing the **Running Product** several times, or by passing several examples of your **Running Product** if there are variations in the product (such as varying size, or varying content of water, salt, or bone). Through experimentation, the vector diagram can help you to achieve optimum sensitivity with an acceptably low level of false rejects. However, for particularly challenging products or environments, METTLER TOLEDO recommends the Profile Advantage series of metal detectors.

Viewing the Vector Diagrams:

- 1 Log in at **User 3** level.
- 2 Press **Product Settings**.
- 3 Press **Advanced Settings**.

Related Topics:

[Managing Products for Inspection ▶ Page 50]

[Creating and Setting up a Product ▶ Page 51]

6.1.8 Using Product Clustering

Profile Metal Detector	Software Version	Access Level Required
All (except the Profile Advantage series)	All	User 3 (Installer to enable or disable Clustering)

Product Clustering allows you to pass multiple types of **Running Product** without changing the product or product settings on the metal detector.

When you set up a **Cluster**, you give it a name. This name appears with the list of product names that can be chosen at **User 1** access level. The cluster names appear above the product names in the list.

Clustering is enabled by default, but it can be disabled at the **Installer** access level (in **Advanced Settings**). If **Clustering** is disabled, the **Clustering** buttons will not appear in the **User 3** menus.

You can use the **Auto Cluster** feature to automatically cluster products stored on the metal detector. **Auto Cluster** will scan all the products stored in the metal detector, to see which can be clustered. **Auto Cluster** then creates the minimum number of clusters. **Auto Cluster** clusters products that have similar characteristics, and that have the same **Frequency** setting and the same **Reject Settings**.

When you have run **Auto Cluster**, you can then use the **View Cluster** button to see which products have been clustered. The **View Cluster** feature also allows you to remove products from a cluster.

NOTE: **Auto Cluster** overwrites all existing clusters.

Using Auto Cluster to set up product Clustering

- 1 Press **Product Management**.
- 2 Press **Auto Cluster**.
 - ⇒ You are prompted with the message **Overwrite existing Clusters?**
- 3 Press to confirm.
 - ⇒ The **View Cluster** list appears. The list shows all the products and, if they have been clustered, their cluster number. If a **Clustering Settings** product cannot be clustered, "NO" appears in the **Cluster** column
- 4 Examine the **View Cluster** list. You can use the **Remove** button to remove any product from a cluster.
- 5 Press to confirm that you want to save the list.)
 - ⇒ **NOTE:** You can subsequently edit the list by pressing **View Cluster** in the **Product Management** menu.

When you have created the clusters, you can change their **Name** from their sequential default names, and you can add a **Product Code** and a **Batch Code**, as follows:

Naming and Editing a Cluster

- 1 On the main **User 3** menu, press **Clustering Settings**.
- 2 Edit the **Name** and, optionally, the **Product Code** and **Batch Code**.
- 3 If you want to select **Reject Inhibit** for the **Cluster**, check the **Reject Inhibit** box.

Related Topics:

[Managing Products for Inspection ▶ Page 50]

[Selecting the Running Product or Cluster ▶ Page 50]

[Enabling and Disabling Reject Inhibit (Setup) ▶ Page 39]

6.1.9 Managing the Default Parameters for the Auto Setup

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

Auto Setup is done at **User 3** and **User 2** access level. There are at least three parameters (depending on the metal detector type) you can set for **Auto Setup**.

- **Auto Setup Level** – which determines the level of **Sensitivity** that Auto Setup uses for calculation.
- **Auto Freq Selection** (except on Profile Advantage and G/T/ST/LZ series metal detectors) – which allows you to enable Auto Setup to automatically change the operating **Frequency** to the optimum **Frequency** for the **Running Product**.
- **Reject Inhibit (Setup)** – which allows you to disable the reject mechanism during auto setup.
- **Optimise For SS** (if available). Ticking **Optimise For SS** adjusts the **Auto Setup** algorithm to optimize for stainless steel detection rather than the default optimization for non-ferrous and ferrous metals.

- **Sensitivity limits** (if available). You can adjust the **Sens Limit** (Low, Medium and High). This advanced feature allows you to fine tune the **Auto Setup** algorithm.

Set the Auto Setup Level to be used for Auto Setup

NOTE: The normal level is a **Sensitivity** of 5, which represents 5/10 green bars on the bar graph. (Bar 11 onwards are red bars, signifying a detection event.) If you set the **Sensitivity** too high, natural variations in the product could cause false rejects. If the **Running Product**, and the environmental conditions, are consistent, it might be possible to use a higher **Sensitivity**.

- 1 Press **Advanced Settings**.
- 2 Press **Auto Setup Settings**.
- 3 Adjust the **Auto Setup Level** to the correct **Sensitivity**.

Enable or Disable Auto Freq Selection in Auto Setup (not applicable for Profile Advantage series metal detectors)

- 1 Press **Advanced Settings**.
- 2 Press **Auto Setup Settings**.
- 3 Tick the **Auto Freq Selection** checkbox to enable **Auto Freq Selection**, or remove the tick to disable **Auto Freq Selection**.

Enable or Disable Reject Inhibit (Setup)

The **Reject Inhibit (Setup)** feature disables the reject mechanism when you do a product setup.

The **Reject Inhibit (Setup)** feature makes sure that no products are unnecessarily rejected during a product setup. If you are doing a product set up in an actual production environment, you can disable **Reject Inhibit (Setup)** to make sure that any contaminated products are rejected from the production line.

- 1 Press **Advanced Settings**.
- 2 Press **Auto Setup Settings**.
- 3 Tick the **Reject Inhibit (Setup)** checkbox to enable **Reject Inhibit (Setup)**, or remove the tick to disable **Reject Inhibit (Setup)**.

Related Topics:

[Creating and Setting up a Product ▶ Page 51]

7 Performance Testing

7.1 Using Reduced Test

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series Profile G/T/ST Series Profile Compact Profile Pharma GF Pro	From F4.9.2, and F48.2.2	Depends on task

The following topics described the **Reduced Test** feature, and explain the setting up and operation of **Reduced Test**:

Related Topics:

[Description of Reduced Test ▶ Page 58]

[Prerequisites for Reduced Test ▶ Page 59]

[Setting up Reduced Test ▶ Page 59]

[Calculating and Setting the Correct Sensitivity for Reduced Test ▶ Page 60]

[Enabling and Activating Reduced Test ▶ Page 63]

[Disabling Reduced Test ▶ Page 64]

[Re-activating Reduced Test when it becomes Inactive ▶ Page 65]

7.1.1 Description of Reduced Test

Reduced Test (RT) is a mode of operation that continuously monitors the status of the metal detector. RT builds on the conditioning monitoring and self-check features of Profile metal detectors.

RT allows you to reduce the frequency of Performance Validation Routines (PVRs), or Performance Tests, yet remain confident that the metal detector complies with your company standards.

RT constantly checks all critical parameters, and monitors the metal detector to make sure its settings are not changed. If the metal detector fails to comply with the parameters of RT, or if the metal detector settings are changed by the user, the metal detector does the following:

- RT becomes inactive, and a warning icon indicates that RT is inactive.
- If you have configured a programmable output to send a signal from the metal detector to an external device, the programmable output is triggered.
- RT sends a message via the serial communications of the metal detector.

To set up RT, you calculate the sensitivity of the metal detector for worst-case detections. You then increase the sensitivity – by a precise value – to create a detection margin to give you full confidence in RT.

Tips:

- RT is suitable only for dry products, with a phase angle of 0 +/- 0.5 degrees, and with no product signal. RT is not suitable for wet products.
- The set up must be done precisely and methodically and must be verified by a number of repeatable tests. The RT settings are then stored and associated with the product (the **Product Name** that you define in **Product Settings**).
- RT is associated with a **Product Name**. You can change the **Running Product** in RT, with no interruption, providing that all the set up, activation and test procedures have been done for the **Running Product**.

Related Topics:

[Using Reduced Test ▶ Page 58]

7.1.2 Prerequisites for Reduced Test

Before you can be confident that Reduced Test (RT) is suitable for your metal detector application, and meets the specifications and standards for your company, make sure that all of the following are true:

- A pre-qualification service and setup was done by a qualified METTLER TOLEDO service engineer. The service engineer made sure that RT is suitable for the products under inspection and for the product-inspection environment of your company.
- The METTLER TOLEDO service engineer gave you a service report and asked you to sign it.
- You intend to use RT for dry products, with a phase angle of 0 +/- 0.5 degrees.
- You intend to use RT for discrete products, not a product cluster.

NOTE: If you select a Cluster in the **Select Product** menu, the RT is disabled and the **Reduced Test Mode** button is hidden from the menus.

- Personnel in your company who set up RT are trained to do so.
- RT is prepared as defined by your company procedures and standards.

Related Topics:

[Using Reduced Test ▶ Page 58]

7.1.3 Setting up Reduced Test

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series	From F4.9.2, and F48.2.2	User 3
Profile G/T/ST Series		
Profile Compact		
Profile Pharma GF Pro		



NOTICE

Before you set up Reduced Test, make sure that all the prerequisites for running Reduced Test are fulfilled: [Prerequisites for Reduced Test ▶ Page 59].

- 1 Do the normal setup of your **Running Product**: [Managing Products for Inspection ▶ Page 50]. Do the setup (automatic or manual) of your **Running Product**. The **Running Product** will be stored with the settings for RT when you activate RT in the section: [Enabling and Activating Reduced Test ▶ Page 63].
- 2 Get the correct sample sizes for ferrous, non-ferrous (brass) and stainless steel that comply with the requirements of your company's detection standards (for example 1 mm ferrous, 1.2 mm non-ferrous, and 1.5 mm stainless steel).
- 3 Pass the product through the metal detector with the correct material samples (in step 2 above) to determine the worst-case sample material.
 - ⇒ **NOTE:** The worst-case material is the material that – when passed with the product – shows the smallest level of detection on the bargraph.
- 4 On the **User 3** menu, press **Product Settings**.
- 5 To adjust the **Sensitivity** in the **Product Settings**, pass the product with the worst-case sample material (in step 3 above) down the center of the aperture if possible, or by following your normal procedure.
- 6 On the screen, use the arrow keys to adjust **Sensitivity** until a minimum of two red bars are displayed on the bargraph peak. (You will need to pass the product with the sample several times to find the correct level of **Sensitivity**.)
- 7 Press the **Clear Bargraph Peak** to clear the peak values from the bargraph:



- 8 Pass the product with the sample again, and make sure that there are two red bars. (If the bargraph does not display two red bars, repeat steps 5 to 7.)

9 Press **Confirm selection** to store the **Sensitivity** and the other **Product Settings**:



Related Topics:

[Using Reduced Test ▶ Page 58]

[Prerequisites for Reduced Test ▶ Page 59]

[Enabling and Activating Reduced Test ▶ Page 63]

7.1.4 Calculating and Setting the Correct Sensitivity for Reduced Test

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series	From F4.9.2, and F48.2.2	User 3
Profile G/T/ST Series		
Profile Compact		
Profile Pharma GF Pro		

In [Setting up Reduced Test ▶ Page 59], you adjusted the **Sensitivity** for two red bars for the worst-case sample material for your company's detection standards for metals. You confirmed the product setting to store the **Sensitivity** with the product **Name**. If the metal detector is a multiple-frequency metal detector, a **Frequency** of **LOW**, **MEDIUM**, or **HIGH** has been selected.

You will increase the sensitivity of the metal detector by a precise amount that you need to calculate: [Doing and Testing the Calculation for Reduced Test ▶ Page 61]. The increase of sensitivity will create a detection margin to give you confidence in RT. Before you can do the calculations, you need to confirm the **Frequency** in **kHz**, as explained in the following section: [Looking up the Frequency in kHz ▶ Page 60].

Related Topics:

[Using Reduced Test ▶ Page 58]

[Setting up Reduced Test ▶ Page 59]

[Doing and Testing the Calculation for Reduced Test ▶ Page 61]

[Looking up the Frequency in kHz ▶ Page 60]

7.1.4.1 Looking up the Frequency in kHz

1 Press **Information**:



2 Look at the value, or values, associated with **Head Type**. A single-frequency metal detector will have one value, and a multi-frequency metal detector will have two or three values. In the example **Information** screen shown below there are three values in kHz: **300**, **600** and **800**.



Information Screen 1

- 3 If the metal detector is a multi-frequency metal detector, use the table shown below to confirm the frequency in kHz for the frequency (**LOW**, **MEDIUM**, or **HIGH**) that you stored with the current **Product Settings** in the section [Setting up Reduced Test ▶ Page 59].

Frequency Reference

Frequency Groups	LOW	MEDIUM	HIGH
100/300	100		300
300/800	300		800
300/600	300		600
100/300/600	100	300	600
100/300/800	100	300	800
300/600/800	300	600	800

Result: You now know that the metal detector is set to run at a frequency of **300kHz**, **600kHz** or **800kHz**. (The metal detector will not be set to less than 300kHz, because the lower frequencies are not suitable for dry products.) Make a note of this frequency. You will need it to do the calculations in the following section: [Doing and Testing the Calculation for Reduced Test ▶ Page 61].

7.1.4.2 Doing and Testing the Calculation for Reduced Test

Use the following tables to calculate the correct margin for the **Frequency** of the metal detector that you noted in the previous section. The two axes on each table show sample sizes (in mm) for your company's detection standards, as explained earlier, in the section: [Setting up Reduced Test ▶ Page 59].

The first table (300 kHz) shows an example of a **Ferrous** sample size of 1.5 mm and a **Non-Ferrous (NFE)** sample size of 2 mm, which give a value of 80. This would mean that you increase the **Sensitivity** by 80.

300kHz		Ferrous								
		0.8	1	1.2	1.5	1.8	2	2.2	2.5	3
NFE	0.8	135	x	x	x	x	x	x	x	x
	1	135	110	x	x	x	x	x	x	x
	1.2	135	110	85	x	x	x	x	x	x
	1.5	135	110	95	60	x	x	x	x	x
	1.8	135	110	95	80	65	x	x	x	x
	2	135	110	95	80	70	70	x	x	x
	2.2	135	110	95	80	75	75	75	x	x
	2.5	135	110	95	80	75	80	80	80	x
	3	135	110	95	80	75	70	90	90	90
	3.5	135	110	95	80	75	70	75	100	100

Table 1 – 300 kHz

600kHz		Ferrous								
		0.8	1	1.2	1.5	1.8	2	2.2	2.5	3
NFE	0.8	95	x	x	x	x	x	x	x	x
	1	95	65	x	x	x	x	x	x	x
	1.2	95	85	65	x	x	x	x	x	x
	1.5	95	85	75	70	x	x	x	x	x
	1.8	95	85	75	80	80	x	x	x	x
	2	95	85	75	85	85	85	x	x	x
	2.2	95	85	75	75	90	90	90	x	x
	2.5	95	85	75	70	100	100	100	100	x
	3	95	85	75	70	100	120	120	120	120
	3.5	95	85	75	70	95	125	125	145	145

Table 2 – 600 kHz

800kHz		Ferrous								
		0.8	1	1.2	1.5	1.8	2	2.2	2.5	3
NFE	0.8	65	x	x	x	x	x	x	x	x
	1	85	65	x	x	x	x	x	x	x
	1.2	85	75	70	x	x	x	x	x	x
	1.5	85	75	80	80	x	x	x	x	x
	1.8	85	75	70	95	95	x	x	x	x
	2	85	75	70	100	100	100	x	x	x
	2.2	85	75	70	110	110	110	110	x	x
	2.5	85	75	70	105	125	125	125	125	x
	3	85	75	70	105	160	160	160	160	160
	3.5	85	75	70	125	180	210	210	210	210

Table 3 – 800 kHz

Tables for Calculating Settings for Sensitivity for RT

- 1 Calculate the sensitivity for the **Frequency** in kHz that you noted in the previous section [Looking up the Frequency in kHz ▶ Page 60].
- 2 Increase the **Sensitivity** in **Product Settings** on the **User 3** menu by the value from the table. Press **Confirm selection** to set the sensitivity.
- 3 Pass your product, **without** a sample, through the metal detector several times to make sure that the operation is stable at the new **Sensitivity**. Make sure there are no false rejects of your product.
- 4 Pass each **Ferrous**, **Non-Ferrous**, and **Stainless Steel** sample, with your product (if possible), several times at the correct sensitivity.
- 5 If the metal detector rejects **all** the samples **every** time the sample is passed through the metal detector, you can be confident that you can now enable Reduced Test: [Enabling and Activating Reduced Test ▶ Page 63].

7.1.5 Enabling and Activating Reduced Test

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series Profile G/T/ST Series Profile Compact Profile Pharma GF Pro	From F4.9.2, and F48.2.2	User 3



NOTICE

Before you activate Reduced Test, make sure you do the setting up: [Setting up Reduced Test ▶ Page 59]. **And make sure you have set the correct levels of sensitivity for the metal detector:** [Calculating and Setting the Correct Sensitivity for Reduced Test ▶ Page 60].

To use Reduced Test (RT), you must **enable** it and then **activate** it. When you activate RT, it stores the RT settings with the **Product Name** in the **User 3** menu.

- 1 On the **QA Operator** menu, press **Reduced Test Mode**:



- 2 On the **QA Operator** menu, tick the checkbox **RT Mode Enabled**:

⇒ **Result: RT Mode Activate** will appear:



- 3 Click **RT Mode Activate**:

⇒ **Result:** One of the following messages appears on the screen:

⇒ **RT Mode cannot be activated due to other conditions.** (If this message appears, check that RT is correctly set up.)

⇒ **Confirm sensitivity and phase settings meet RT Mode requirements as defined in the manual.**

- 4 If you have done the procedures in [Setting up Reduced Test ▶ Page 59] and [Calculating and Setting the Correct Sensitivity for Reduced Test ▶ Page 60] press **confirm**.

⇒ **Result:** A message appears on the screen: **Confirm that the test period is less than the quarantine period.**

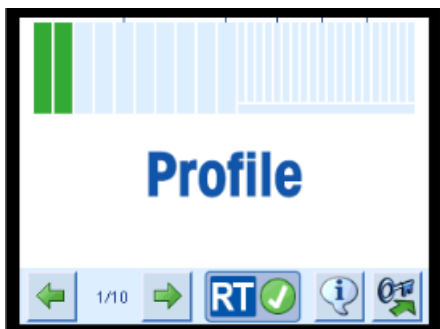
This message is asking you to confirm that the period between your routine tests (such as Performance Validation Routines) of the metal detector is less than your company's quarantine period. (The quarantine period is the minimum amount of time the inspected product remains in the factory before it is shipped.) In other words, this message informs you that the quarantine period defined in your company's quality assurance practices still applies when you enable RT.

- 5 Press **confirm** to confirm that you have understand the messages.

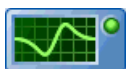
⇒ **Result:** A message appears on the screen: **Changing any operational parameter will make RT Mode inactive.** This message is to remind you that if someone makes changes to any settings, such as for sensitivity or product, RT becomes inactive.

6 Press **confirm** to confirm that you have understand the message.

⇒ **Result:** On the **Running Displays**, the **RT Active** icon appears:



7 On the **Running Displays**, make sure that RT Active icon alternates with the **Condition Monitoring** icon as follows:



On for 3 seconds



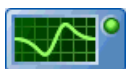
On for 3 seconds

Notes:

- The **RT Active** icon informs you that RT is enabled and that it is operating correctly.
- The metal detector RT settings for the current **Product Name** are stored with the **Product Name**, which means you can enable RT for this product without repeating the RT set up procedures.
- If the **RT Inactive** icon appears, as shown below, you must take corrective action:



On for 6 seconds



On for 3 seconds



NOTICE

If the RT Inactive icon appears, take a correction action: See [Re-activating Reduced Test when it becomes Inactive ▶ Page 65].

Related Topics:

[Using Reduced Test ▶ Page 58]

[Setting up Reduced Test ▶ Page 59]

[Calculating and Setting the Correct Sensitivity for Reduced Test ▶ Page 60]

[Re-activating Reduced Test when it becomes Inactive ▶ Page 65]

7.1.6 Disabling Reduced Test

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series	From F4.9.2, and F48.2.2	User 3
Profile G/T/ST Series		
Profile Compact		
Profile Pharma GF Pro		

Reduced Test (RT) automatically becomes inactive in the following conditions:

- A general fault occurs on the metal detector (such as a **Power Drive Fault**, a **Balance Fault**, a **Self-Check Phase Error**, or a **Self-Check Magnitude Error**).
- The metal detector self-check goes into a state of **Early Warning**.
- Changes are made to a setting on the metal detector since RT was enabled.

When RT automatically becomes inactive, the **RT INACTIVE** icon appears on the **Running Displays**:



The **RT Inactive** warning icon.

If the **RT INACTIVE** icon appears, you must investigate the reason, and then re-activate RT [Re-activating Reduced Test when it becomes Inactive ▶ Page 65], or you must disable RT as follows:

- 1 On the **QA Operator** menu, press **Reduced Test Mode**:



- 2 Press **RT Mode Enabled** remove the tick from the checkbox.

⇒ **Results:**

⇒ RT is disabled.

⇒ The **RT** icon disappears from the **Running Displays**.

Related Topics:

[Using Reduced Test ▶ Page 58]

[Re-activating Reduced Test when it becomes Inactive ▶ Page 65]

7.1.7 Re-activating Reduced Test when it becomes Inactive

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series	From F4.9.2, and F48.2.2	QA Operator (and User 3 if QA Enabled)
Profile G/T/ST Series		
Profile Compact		
Profile Pharma GF Pro		

If you want to re-activate Reduced Test (RT) after the **RT INACTIVE** warning appears, you must first investigate the reasons for the **RT INACTIVE** warning.



The **RT Inactive** warning icon.

The likely reasons for the **RT INACTIVE** warning are as follows:

- The full setup of RT has not been completed. Refer to the chapter: [Enabling and Activating Reduced Test ▶ Page 63].
- Someone has changed the settings on the metal detector since RT was enabled, and the settings for the current **Product Name** no longer match what they were when RT was enabled for that **Product Name**. Refer to the chapter: [Enabling and Activating Reduced Test ▶ Page 63].
- You have chosen a **Product Name** that you have configured for RT, but the last time this product was used with RT, an **RT INACTIVE** warning appeared.
- A general fault occurs on the metal detector (such as a **Power Drive Fault**, a **Balance Fault**, a **Self-Check Phase Error**, or a **Self-Check Magnitude Error**).
- An **Early Warning** event has occurred. Take the correct action (refer to your Profile metal detector manual).

- 1 Investigate the reason for the **RT INACTIVE** warning.

- 2 Take the correct action.

Related Topics:

[Using Reduced Test ▶ Page 58]

[Enabling and Activating Reduced Test ▶ Page 63]

7.2 Working with the Automatic Test System (ATS) for Gravity-Fed Metal Detectors

Profile Metal Detector	Software Version	Access Level Required
Profile G/T/ST Series	From F4.9.2	QA Operator for Routine Performance Testing Installer for Setting up and Calibrating

The Automatic Test System

Vertical metal detectors, such as Profile G, Profile T, and Profile ST can have a high throughput of gravity-fed product passing through the aperture. Routine performance testing can often mean that the metal detector is taken out of operation to do manual tests. Typically, the manual test involves dropping metal test samples through the centre of the aperture. While this method of testing is effective, it can be time consuming, typically requiring two people to carry out the test. Manually testing can also involve working at height or reaching across other equipment.

The Automatic Test System (ATS) is used in conjunction with the metal detector to reduce the time to do performance tests by up to 90%. The system requires only one operator, who can work quickly, accurately, and remotely from the metal detector's aperture, requiring no special safety procedures or interference with adjacent equipment.

How it works

Certified test samples, of three or four types of metal, are held in discrete tubes that run up the inside face of the metal detector aperture. A pneumatic control moves the test samples up the aperture, and then releases them under vacuum, representing metal contamination in free fall.

The ATS Software

Profile metal detectors in the G, T and ST series have the software that is necessary for setting up and calibrating the ATS, and for doing routine performance testing with the ATS. If you want to enquire about installing and commissioning the ATS hardware components to your metal detector, contact METTLER TOLEDO Service.

The Automatic Test System User Manual



WARNING

The Automatic Test System has several hazards.

Familiarise yourself with the safety information in the User Manual before you operate the ATS.

Refer to the Automatic Test System User Manual for information on safety, installation, power supply, communications and technical specifications.

Related Topics:

Automatic Test System (ATS) User Manual

[Installing the Automatic Test System ▶ Page 67]

[Setting up and Calibrating the Automatic Test System with the ATS Setup Wizard ▶ Page 67]

[Operating the Automatic Test System (ATS) ▶ Page 69]

[Contact details ▶ Page 12]

7.2.1 Installing the Automatic Test System



WARNING

Refer to the Automatic Test System User Manual

Before you use the ATS for the first time, you need to configure the metal detector and set up communications between the metal detector and the ATS.

- **NOTE:** If the metal detector is part of an integrated METTLER TOLEDO system, the installation settings are already correct.
- 1 Go to the **Installer** screen.
- 2 Press **Advanced Settings**:
- 3 Press **Customer Inputs/Outputs**:
- 4 Press **Comms Settings**:
- 5 Select the correct input communications port for the metal detector:
 - ⇒ If the ATS is connected to the **Network Port**, set the **Network Port** to ATS.
 - ⇒ If the ATS is connected to the **Direct Port**, set the **Direct Port** port to ATS.
- 6 Scroll backwards to **Configure Outputs**:
- 7 Select the correct output port for the metal detector:
 - ⇒ If the ATS is connected to **Output 1**, set **Output 1** to **ATS THRESHOLD**.
 - ⇒ If the ATS is connected to **Output 2**, set **Output 2** to **ATS THRESHOLD**.
 - ⇒ If the ATS is connected to **Output 3**, set **Output 3** to **ATS THRESHOLD**.
- 8 Scroll forward to **Configure Outputs**. Select the correct **Output State** to **NORMALLY CLOSED** or to **NORMALLY OPEN**, depending on how the output is configured.
- 9 Make sure that the ATS is switched on and make sure that the air supply is connected.

Related Topics:

[Working with the Automatic Test System (ATS) for Gravity-Fed Metal Detectors ▶ Page 66]

[Setting up and Calibrating the Automatic Test System with the ATS Setup Wizard ▶ Page 67]

[Operating the Automatic Test System (ATS) ▶ Page 69]

[Contact details ▶ Page 12]

7.2.2 Setting up and Calibrating the Automatic Test System with the ATS Setup Wizard

Profile Metal Detector	Software Version	Access Level Required
Profile G/T/ST Series	From F4.9.2	Installer

- 1 Press **Advanced Settings** on the **Installer** screen:
- 2 Scroll forward to **ATS Setup**. Press **ATS Setup**:
 - ⇒ **Results:**
 - ⇒ The first (1/2) of two screens appears.
 - ⇒ Screen 1/2 shows the **ATS Setup Wizard** button, and two gray (non-editable) fields: the **Centre Minimum** field and the **Test Threshold** field. These values are the values that were used at the last **ATS Setup**.
 - ⇒ **NOTE:** If you are using **ATS Setup** for the first time, the fields contain default values for **ATS Setup**.
 - ⇒ Screen 2/2 shows the data from the last time **ATS Setup** was done.
- 3 On Screen 1/2, press **ATS Setup Wizard**:
 - ⇒ **Results:**
 - ⇒ The **Confirm Settings** screen appears.

- 4 Make sure that the **Cycles per material** field and the **Centre Minimum** field have the correct values.
 - ⇒ **NOTE: Cycles per material** determines the number of times that each sample propels through its tube. The minimum value is 30, which is also the default value. The **Centre Minimum** field shows the minimum number of bars that trigger a detection for the worst-case sample material in the centre of the aperture. The target detection level is 18 bars (8 red bars), and the minimum acceptable detection level is 14 bars (4 red bars).

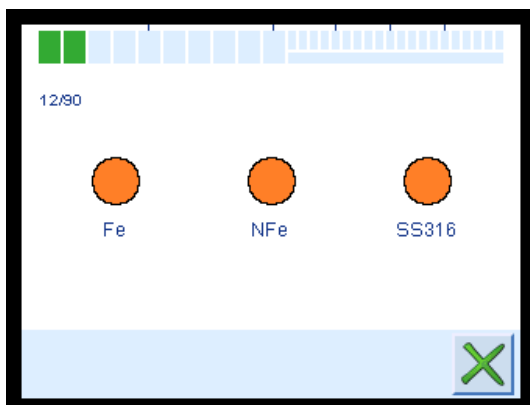


NOTICE

Important

The setting up steps detailed about must be done carefully and correctly in order to you to have confidence in the ATS.

- 5 Press **Confirm selection** to confirm the settings on the screen and to start the setup and calibration sequence:
 - ⇒ The message **Ensure ATS fixture is installed** appears.
- 6 Press **Confirm selection**:
 - ⇒ The ATS propels each of the samples in turn, for a minimum of 30 times for each sample (depending on the value that you set in **Cycles per material**). The metal detector measures the peak signals each time.
 - ⇒ While the setup is operating, the colored indicators on the user interface represent the position of the samples, as shown in the following example:



Screen showing the three-metal tube assembly. The number in the top left corner shows how many cycles have run.

- ⇒ ● The sample is stationary.
 - ⇒ ● The ATS is propelling the sample to the start position at the top of the tube.
 - ⇒ ● The sample is moving downwards and the metal detector is testing it.
- ⇒ **Results if the setup succeeds:**
- ⇒ After the automatic test has run through all the cycles, and if the setup is successful, the message **ATS setup COMPLETE** appears.
- 7 Press **Confirm selection**:
 - ⇒ On the **ATS Setup** screen 1/1, the **Test Threshold** shows the threshold for detection (in number of bars) for the worst-case sample material. This threshold is calculated by a statistical analysis of all the results of the cycles in the automatic setup.
- ⇒ **Results if setup fails:**
- ⇒ If setup fails, the message **ATS setup FAILED** appears. The most probable reasons for failure are as follows:
 - ⇒ The tube assembly is not installed correctly.
 - ⇒ The pneumatic connection or the electrical connection to the ATS was interrupted during the setup.
 - ⇒ **NOTE:** If you cannot identify the cause of a failure, contact METTLER TOLEDO Service.

Related Topics:

[Working with the Automatic Test System (ATS) for Gravity-Fed Metal Detectors ▶ Page 66]

[Installing the Automatic Test System ▶ Page 67]

[Operating the Automatic Test System (ATS) ▶ Page 69]

[Contact details ▶ Page 12]

7.2.3 Operating the Automatic Test System (ATS)

Profile Metal Detector	Software Version	Access Level Required
Profile G/T/ST Series	From F4.9.2	QA Operator

This section describes a three-metal test. The operation of the ATS is the same for the four-metal test but with an additional material test indicator.

You can operate the ATS for the Profile metal detector from an ATS control panel. Refer to the Automatic Test System User Manual if you want to use the ATS control panel rather than the user interface of the metal detector.




NOTE: The Automatic Test System User Manual describes in detail what happens during the ATS operation, and explains what to do if you need to reset the ATS.

- 1 Make sure that the green light on the START button on the control panel is on. This means that the ATS is ready for you to run the tests of the different types of metal.
- 2 On the **QA Operator** menu press **ATS**:



- 3 Press **Start**:



- ⇒ **NOTE:** If the metal detector is setup to allow **Performance Testing** without **QA Login Authentication**, you can start the ATS from the **Running Displays**. Scroll the **Running Displays** until the ATS screen appears.
- ⇒ **Results:**
 - ⇒ The user interface says **Test Running**. While the test is running, the material test indicators show the result of each test. The meaning of the colors is as follows:
 - ⇒  Test for this metal is in progress.
 - ⇒  Test for this metal has passed.
 - ⇒  Test for this metal has failed.
 - ⇒ After a few minutes, at the end of all three (or four) tests, the user interface displays one of the following messages:
 - ⇒ **Test Passed** (with three or four green indicators).
 - ⇒ **Test Failed** (with one or more red indicators).

NOTES:

- If there is a compressed air supply fault in the system, all the material test indicators are red and flashing. When you have cleared the fault, press the **Reset** button on user interface to reset the ATS.
- If the system fails, and you cannot identify the cause, contact METTLER TOLEDO Service.

Related Topics:

[Working with the Automatic Test System (ATS) for Gravity-Fed Metal Detectors ▶ Page 66]

[Installing the Automatic Test System ▶ Page 67]

[Contact details ▶ Page 12]

7.2.3.1 To Repeat a Test in the ATS

On the ATS screen of the User Interface, press **Reset**:



Press **Start**:



7.3 Setting the Parameters for Routine Performance Testing

Profile Metal Detector	Software Version	Access Level Required
All	All	QA Setup

At the **QA Setup** access level, the QA Manager needs to set up the parameters, including test sample sizes, for the routine performance testing. (The performance test itself is done at the **QA Operator** access level).

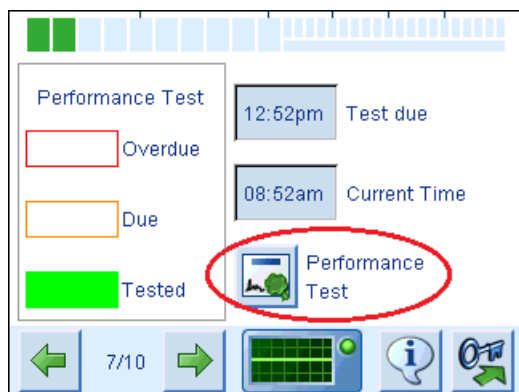
The period of performance tests, and test sample sizes to use during the test, are determined by your company's standards for metal detection.

For dry products, a **Reduced Test Mode** allows you to greatly reduce the frequency of performance testing. Refer to [Using Reduced Test ▶ Page 58].

NOTE: The **Consecutive Test** and **Memory Test** features can be used only on metal detectors in the **Gated Reject** mode.

- 1 On the **QA Setup** main menu, press **Performance Testing**.
- 2 Enter **Line ID** (optional) to identify the product line of the metal detector (this can help to analyse data in QA reports).
- 3 In the **Synchronise Next Test To** field, select **FIRST** or **LAST**
 - ⇒ **FIRST** means that the time interval to the next test is calculated from the time that the last test was **due**.
 - ⇒ **LAST** means that the time interval to the next test is calculated from the time that the last test was actually **done**.
- 4 In the **Test Mode** field, select **OFF**, **TIME**, or **PACKS** (if your system is fitted with a pack sensor).
 - ⇒ **OFF** turns off the schedule for the **Performance Test**.
 - ⇒ If you select **TIME**, enter the values you require for **Test Interval Time** and **Test Overdue Time**.
 - ⇒ If you select **PACKS**, enter the values you require for **Test Interval Count** (that is the number of discrete packs between tests) and the **Test Overdue Count**.
- 5 If you selected a **Test Mode** of **TIME** or **PACKS** in step 4, tick the conditions that will trigger a performance test even if a **Performance Test** is not due. The conditions that you can select are **Test following Product change**, **Test following Settings change**, and **Test following Initialisation**.
 - ⇒ **NOTE:** When one of the conditions triggers a request for a **Performance Test**, the metal detector enters the **Due** state. The **Running Displays** shows the **Performance Test** screen, on which the **Due** or **Overdue** indicators illuminate.
- 6 Select the types of **Performance Test** that the **QA Operator** can do: **Standard Test**, **Consecutive Test**, **Memory Test**, and **Large Metal Test**. (In step 8, you will select one of these tests as the default test that will be demanded on a **Performance Test Due** or **Overdue** event. This default test is colored gray and the tick box is disabled.)
- 7 In the **Retain PVR Test State** field, choose the condition that will keep the PVR test state in the **Due** or **Overdue** condition. You can choose **TEST FAILED/ABORTED**, **TEST ABORTED ONLY**, or **OFF**.
 - ⇒ **NOTES:**
 - ⇒ **TEST FAILED/ABORTED** keeps the PVR State at **Due** or **Overdue** if you select **TEST FAILED** after a test, or if you abort a test. This is the default setting.
 - ⇒ **TEST ABORTED ONLY** keeps the PVR State at **Due** or **Overdue** only if you abort a test.
 - ⇒ **OFF** disables the feature.

- 8 Select the **Primary Test**. The test you select will be the only test that clears the conditions **Due** or **Overdue**.
- 9 Tick (enable) or un-tick (disable) the **QA Login Authentication** checkbox.
 - ⇒ **NOTES:**
 - ⇒ If you enable **QA Login Authentication**, the **QA Operator** must log in to do a **Performance Test**.
 - ⇒ If you disable **QA Login Authentication**, any user can do the **Performance Test** from the **Performance Test** screen on the **Running Displays**. The **Performance Test** appears on the **Running Displays** as shown in the figure:



Performance Test button on the Running Display

- 10 If you enabled **Consecutive Test** in step 6, choose the samples that should be used on each of the three consecutive packs: **Consecutive Test Pack One**, **Consecutive Test Pack Two**, and **Consecutive Test Pack Three**.
- 11 If you enabled **Memory Test** in step 6, choose the samples that should be used on each of the alternating packs, 1, 3, and 5: **Memory Test Pack One**, **Memory Test Pack Three**, and **Memory Test Pack Five**.
 - ⇒ **NOTE:** You must set up the **Test Sample setup** to associate the correct test samples for each **Running Product**. See: [Setting up the Test Samples ▶ Page 71].

Related Topics:

- [Setting up the Test Samples ▶ Page 71]
- [Doing Routine Performance Testing ▶ Page 72]
- [Managing Reject Confirmation Unit (RCU) Sensors ▶ Page 43]
- [Doing a Consecutive Test ▶ Page 73]
- [Doing a Memory Test ▶ Page 74]
- [Using Reduced Test ▶ Page 58]

7.4 Setting up the Test Samples

Profile Metal Detector	Software Version	Access Level Required
All	All	QA Setup

At the **QA Setup** access level, the QA Manager needs to set up the parameters, including test sample sizes, for the routine performance testing. The performance test itself is done at the **QA Operator** access level.

The period of performance tests, and the test sample sizes to use during the test, are determined by your company's standards for metal detection. For dry products, you can use the **Reduced Test Mode** feature to greatly reduce the frequency of performance testing.

- 1 On the **QA Setup** main menu, press **Performance Testing**.
- 2 Press **Test Sample setup**.
 - ⇒ **Result:** A product **Name** field appears, and two screens of samples. You need to set up the correct samples size, in millimetres, for each product. The default value for each sample field is 00.00 mm. If you leave the value at 00.00 mm for any sample, this sample will not be demanded when the **QA Operator** does the **Performance Test**.

- For every product **Name**, enter a size above 00.00 mm for every sample that you want to be included in the **Performance Test** for the product.

Related Topics:

[Creating and Setting up a Product ▶ Page 51]

[Setting the Parameters for Routine Performance Testing ▶ Page 70]

[Doing Routine Performance Testing ▶ Page 72]

[Doing Multi-Pass Routine Performance Testing ▶ Page 77]

[Using Reduced Test ▶ Page 58]

7.5 Doing Routine Performance Testing

Profile Metal Detector	Software Version	Access Level Required
All	All	QA Operator

You must run performance tests regularly, and in accordance with your company's standards and quality assurance procedures. The performance tests confirms that the metal detector is working correctly, and confirms that it has been able to detect and reject contaminated products since the last performance test was done.

NOTE: If your company's quality assurance procedures or metal-detection strategy demand multi-pass routine performance testing (in which you might need to pass 2 or 3 contaminated products through the metal detector at every performance test), the **QA Operator** screen will be set up for **Multi-Pass Testing** (see: [Doing Multi-Pass Routine Performance Testing ▶ Page 77]).

You should run a performance test if the **Running Displays** switches to the **Performance Test** screen and shows flashing indicators for **Due** or **Overdue**.



The period of performance tests, and test sample sizes to use during the test, are determined by your company's standards for metal detection. For dry products, you can use the **Reduced Test Mode** to allow you to greatly reduce the frequency of performance testing.

The sizes of the test samples, for ferrous and non-ferrous, that are required for the **Running Product** are stored in the metal detector by the QA Manager (at **QA Setup** access level). When you do the performance test, instructions on the screen tell you which test samples to use with the **Running Product**.

The performance test applies to the current **Running Product** and the current metal detector settings (such as **Frequency** and **Sensitivity**). The QA Manager determines whether or not a new performance test is necessary after a product change or a change in settings.

NOTES:

- If possible, pass the sample through the centre (worst case) of the aperture.
 - After every test, make sure that any reject device that is associated with the metal detector correctly rejects the test sample.
 - Always pass the test sample through the detector aperture with the current **Running Product**.
- Press **Performance Test**.
 - ⇒ **Result:** Buttons appear for each of the types of **Performance Test** you can do. There will be at least one **Performance Test** type. There could be up to four **Performance Test** types. The number of **Performance Test** types available is set up by the QA Manager at the **QA Setup** access level.
 - ⇒ **NOTE:** For instructions on how to do the **Consecutive Test**, the **Memory Test**, and the **Large Metal Test**, see the **Related Topics** below.

- 2 Press the button for the type of **Performance Test** you need to do.
 - ⇒ **Result:** Buttons appear for the test samples (such as **Ferrous**, **Non-Ferrous Brass** and other metals) that have been set up by the QA Manager for the current **Running Product**.
- 3 Press one of the sample buttons, and follow the instructions on the screen. Make sure that the red bars light up to indicate a detect event as you pass the product with sample through the metal detector.
 - ⇒ **Results:**
 - ⇒ The metal detector makes sure that the sample is detected, and the sample is rejected, and, if a Reject Confirmation Unit (RCU) is fitted, the RCU signals a successful rejection.
 - ⇒ You can press the **Unlock Bin** button  to unlock the reject bin after you have done your tests.
 - ⇒ If the performance test is successful, the **Test Passed** button turns green to enable it: . When the button becomes enabled, it does not necessarily mean the performance test has passed. You must be satisfied that the metal detector and its associated conveyor system and reject mechanism have all functioned correctly, and then you can press the **Test Passed** button.
- 4 If you are satisfied that all the conditions are fulfilled for a successful test, press **Test Passed**. If you decide the test has not fulfilled all the conditions, press **TEST FAILED**.
- 5 If the performance test has passed, and you are satisfied that your conveyor system and any reject mechanism have functioned correctly, press the **Test Passed** button to return to the main **Performance Test** screen.
- 6 Repeat steps 3 to 5 for all the samples on the main **Performance Test** screen.
- 7 Repeat steps 2 to 5 for all the types of **Performance Test** you need to do. See the **Related Topics** for advice on doing the **Consecutive Test**, the **Memory Test** and the **Large Metal Test**.



Important Safety Message

If the Performance Test fails, you must follow your company's procedures and standards according to your metal detection strategy.

When you have determined and rectified the cause of the failure, it might be necessary to re-test all product quarantined since the last performance test. If re-testing of product is not possible, it might be necessary to destroy the product that you cannot be sure is free of metal contamination.

The programmable outputs can be set to **QA TEST FAIL**. This programmable output allows the installation engineer to use the failure event to communicate with external systems or a programmable logic controller. See [How the Software Works with the Programmable Inputs and Outputs ▶ Page 33].

Related Topics:

- [Viewing the Running Displays ▶ Page 16]
- [Selecting the Running Product or Cluster ▶ Page 50]
- [Setting the Parameters for Routine Performance Testing ▶ Page 70]
- [Setting the Parameters for Multi-Pass Routine Performance Testing ▶ Page 76]
- [Doing Multi-Pass Routine Performance Testing ▶ Page 77]
- [Managing Reject Confirmation Unit (RCU) Sensors ▶ Page 43]
- [Doing a Consecutive Test ▶ Page 73]
- [Doing a Memory Test ▶ Page 74]
- [Doing a Large Metal Test ▶ Page 75]
- [Using Reduced Test ▶ Page 58]

7.5.1 Doing a Consecutive Test

Profile Metal Detector:	Software Version:	Access Level Required:
Profile R/RB/RZ Series Profile Advantage	All	QA Operator

The **Consecutive Test** is one of the options of **Performance Test**. **Consecutive Test** is used only in the **Gated Reject** mode.

The **Consecutive Test** expects you to pass three consecutive contaminated packs at the correct pack spacing for your conveyor system and reject mechanism. The metal detector makes sure that a sample contamination is detected on all three packs, and that all three packs are rejected. If a Reject Confirmation Unit (RCU) is fitted, the RCU signals a successful rejection.

When the metal detector has done its checks, and you can verify that all the conditions of the test are fulfilled, you can press the **Test Passed** button to confirm that the conveyor system, the reject mechanism, and the reject bin have all functioned correctly.

▪ **Prerequisites:**

- The metal detector is operating in **Gated Reject** mode.
- The metal detector is **not** operating in **Multi-Pass Testing** mode.
- The parameters for the **Performance Test** and the **Consecutive Test** have been correctly set up at **QA Setup** level.

1 Press **Performance Test**.

⇒ **Result:** Buttons appear for each of the types of **Performance Test** that are enabled at **QA Setup**.

2 Press **Consecutive Test**.


3 Press the **Information** button  to confirm which samples you need to use for each of the 3 packs.


4 To start the test, place the 3 packs on the conveyor system, at the correct spacing, to pass them through the metal detector.

⇒ **Results:**

⇒ When all three packs have passed, the counter on the top left of the screen shows **3/3**.

⇒ The metal detector makes sure that the sample is detected on all three packs, and the sample is rejected, and, if a Reject Confirmation Unit (RCU) is fitted, the RCU signals a successful rejection.

⇒ If the performance test is successful, the **Test Passed** button turns green to enable it: . When the button becomes enabled, it does not necessarily mean the performance test has passed. You must be satisfied that the metal detector and its associated conveyor system and reject mechanism have all functioned correctly, and then you can press the **Test Passed** button.

⇒ The **Unlock Bin** button  is enabled to allow you to retrieve the metal samples and the packs.

5 If you are satisfied that all the conditions are fulfilled for a successful test, press **Test Passed**. If you decide the test has not fulfilled all the conditions, press **TEST FAILED**.

Related Topics:

[Setting the Parameters for Routine Performance Testing ▶ Page 70]

[Doing Routine Performance Testing ▶ Page 72]

[Managing Reject Settings (Gated) ▶ Page 38]

7.5.2 Doing a Memory Test

Profile Metal Detector:	Software Version:	Access Level Required:
Profile R/RB/RZ Series	All	QA Operator
Profile Advantage		

The **Memory Test** is one of the options of **Performance Test**. **Memory Test** is used only in the **Gated Reject** mode.

The **Memory Test** expects you to pass 5 consecutive packs at the correct pack spacing for your conveyor system and reject mechanism. Packs 1, 3, and 5 must have the correct metal sample with them (defined at **QA Setup** level). Packs 2 and 4 must be contamination free. The purpose of the test is to verify that in a sequence of contaminated and uncontaminated packs, the contaminated packs are rejected, and the uncon-

taminated packs are **not** rejected. If a Reject Confirmation Unit (RCU) is fitted, the RCU signals a successful rejection.

When the metal detector has done its checks, and you can verify that all the conditions of the test are fulfilled, you can press the **Test Passed** button to confirm that the conveyor system, the reject mechanism, and the reject bin have all functioned correctly.

▪ **Prerequisites:**

- The metal detector is operating in **Gated Reject** mode.
- The metal detector is **not** operating in **Multi-Pass Testing** mode.
- The parameters for the **Performance Test** and the **Memory Test** have been correctly set up at **QA Setup** level.

1 Press **Performance Test**.

⇒ **Result:** Buttons appear for each of the types of **Performance Test** that are enabled at **QA Setup**.

2 Press **Memory Test**.


3 Press the **Information** button  to confirm which samples you need to use for packs 1, 3, and 5.

4 To start the test, place the 5 packs on the conveyor system, at the correct spacing, to pass them through the metal detector.

⇒ **Results:**

⇒ When all five packs have passed, the counter on the top left of the screen shows **5/5**.

⇒ The metal detector makes sure that the sample is detected on the three contaminated packs, and the sample is rejected, and, if a Reject Confirmation Unit (RCU) is fitted, the RCU signals a successful rejection.

⇒ If the performance test is successful, the **Test Passed** button turns green to enable it: . When the button becomes enabled, it does not necessarily mean the performance test has passed. You must be satisfied that the metal detector and its associated conveyor system and reject mechanism have all functioned correctly, and then you can press the **Test Passed** button.

⇒ The **Unlock Bin** button  is enabled to allow you to retrieve the metal samples and the packs.

5 If you are satisfied that all the conditions are fulfilled for a successful test, press **Test Passed**. If you decide the test has not fulfilled all the conditions, press **TEST FAILED**.

Related Topics:

[Setting the Parameters for Routine Performance Testing ▶ Page 70]

[Doing Routine Performance Testing ▶ Page 72]

[Managing Reject Settings (Gated) ▶ Page 38]


7.5.3 Doing a Large Metal Test

Profile Metal Detector:	Software Version:	Access Level Required:
All	All	QA Operator

The **Large Metal Test** is one of the options of **Performance Test**. Test sample parameters do not need to be set up for a **Large Metal Test**.

The purpose of the **Large Metal Test** is to make sure that the metal detector, system, and reject mechanism respond correctly to a large metal contaminant. The **Large Metal Test** can be done in any reject mode and on any conveyor system configuration.

1 Pass the large metal sample through the aperture of the metal detector.

⇒ If the performance test is successful, the **Test Passed** button turns green to enable it: . When the button becomes enabled, it does not necessarily mean the performance test has passed. You must be satisfied that the metal detector and its associated conveyor system and reject mechanism have all functioned correctly, and then you can press the **Test Passed** button.

- If you are satisfied that all the conditions are fulfilled for a successful test, press **Test Passed**. If you decide the test has not fulfilled all the conditions, press **TEST FAILED**.

Related Topics:

[Setting the Parameters for Routine Performance Testing ▶ Page 70]

[Doing Routine Performance Testing ▶ Page 72]

[Managing Reject Settings (Gated) ▶ Page 38]

7.6 Setting the Parameters for Multi-Pass Routine Performance Testing

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series	All	QA Setup
Profile Advantage		

At the **QA Setup** access level, the QA Manager needs to set up the parameters, including test sample sizes, for the routine performance testing (which is done at the **QA Operator** access level).

The period of performance tests, and test sample sizes to use during the test, are determined by your company's standards for metal detection. Recent versions of software on Profile metal detectors have a **Reduced Test Mode** feature that allows you to greatly reduce the frequency of performance testing.

- On the **QA Setup** main menu, press **Performance Testing**.
- Enter **Line ID** (optional) to identify the product line of the metal detector (this can help to analyse data in QA reports).
- In the **Synchronise Next Test To** field, select **FIRST** or **LAST**
 - ⇒ **FIRST** means that the time interval to the next test is calculated from the time the last test was **due**.
 - ⇒ **LAST** means that the time interval to the next test is calculated from the time the last test was actually **done**.
- In the **Test Mode** field, select **OFF**, **TIME**, or **PACKS** (if your system is fitted with a pack sensor).
 - ⇒ **OFF** turns off the schedule for the **Performance Test**.
 - ⇒ If you select **TIME**, enter the values you require for **Test Interval Time** and **Test Overdue Time**.
 - ⇒ If you select **PACKS**, enter the values you require for **Test Interval Count** (that is the number of discrete packs between tests) and the **Test Overdue Count**.
- If you selected a **Test Mode** of **TIME** or **PACKS** in step 4, tick the conditions that will trigger a performance test even if a **Performance Test** is not due. The conditions that you can select are **Test following Product change**, **Test following Settings change**, and **Test following Initialisation**.
 - ⇒ **NOTE:** When one of the conditions triggers a request for a **Performance Test**, the metal detector enters the **Due** state. The **Running Displays** shows the **Performance Test** screen, on which the **Due** or **Overdue** indicators illuminate.
- In the **Multi-Pass Testing** field, select **ENABLED**.
- In the **Maximum Passes**, select 2 or 3.
- In the **Single Test Threshold** set the (**% of Trigger**) to higher than 100% if you want to add a detection margin higher than the minimum detection signal (of 1 red bar) .
 - ⇒ 1 red bar, the minimum detection signal, is 11 bars on the bargraph, counting from left to right. The (**% of Trigger**) above 100% is calculated from the 11 bars. For example, 200% would require each sample to register a detection signal of 22 bars in order to pass the performance test.
- In the **Retain PVR Test State** field, choose the condition that will keep the PVR test state in the **Due** or **Overdue** condition. You can choose **TEST FAILED/ABORTED**, **TEST ABORTED ONLY**, or **OFF**.
 - ⇒ **NOTES:**
 - ⇒ **TEST FAILED/ABORTED** keeps the PVR State at **Due** or **Overdue** if you select **TEST FAILED** after a test, or if you abort a test. This is the default setting.
 - ⇒ **TEST ABORTED ONLY** keeps the PVR State at **Due** or **Overdue** only if you abort a test.
 - ⇒ **OFF** disables the feature.
- ⇒ **NOTE:** You must set up the **Test Sample setup** to associate the correct test samples for each **Running Product**.

Related Topics:

[Setting up the Test Samples ▶ Page 71]

[Doing Multi-Pass Routine Performance Testing ▶ Page 77]

[Viewing the Test Log for Multi-Pass Testing ▶ Page 81]

[Managing Reject Confirmation Unit (RCU) Sensors ▶ Page 43]

[Doing a Consecutive Test ▶ Page 73]

[Doing a Memory Test ▶ Page 74]

[Using Reduced Test ▶ Page 58]

7.7 Doing Multi-Pass Routine Performance Testing

Profile Metal Detector	Software Version	Access Level Required
All	All	QA Operator

You must run performance tests regularly, and in accordance with your company's standards and quality assurance procedures. The performance tests assure you that the metal detector is working correctly, and assure you that it has been able to detect and reject contaminated products in the period since the last performance test.

You should run a performance test if the **Running Displays** switches to the **Performance Test** screen and shows flashing indicators for **Due** or **Overdue**.

The period of performance tests, and test sample sizes to use during the test, are determined by your company's standards for metal detection. For dry products, the **Reduced Test Mode** allows you to greatly reduce the frequency of performance testing.

The sizes of the test samples, for ferrous and non-ferrous, that are required for the **Running Product** are stored in the metal detector by the QA Manager (at **QA Setup** access level). When you do the performance test, instructions on the screen tell you which test samples to use with the **Running Product**.

The performance test applies to the current **Running Product** and the current metal detector settings (such as **Frequency** and **Sensitivity**). The QA Manager determines whether or not a new performance test is necessary after a product change or a change in settings.

NOTES:

- If possible, pass the sample through the centre (worst case) of the aperture.
 - After every test, make sure that any reject device that is associated with the metal detector correctly rejects the test sample.
- Always pass the test sample through the detector aperture with the current **Running Product**.
- 1 Log in as **QA Operator**.
 - ⇒ **NOTE:** When **Multi-Pass Testing** is **ENABLED**, and you log in at **QA Operator** level, you go directly to the test page **Multi-Pass Testing** instructions.


2 Follow the instructions on the screen.


⇒ **NOTE:** The screen will tell you when to pass the **Running Product**, with the correct test sample for each test.

⇒ **Results:**

⇒ The metal detector makes sure that the sample is detected, and the sample is rejected, and, if a Reject Confirmation Unit (RCU) is fitted, the RCU signals a successful rejection.

⇒ After every test, a results screen appears. (See the following figures, showing examples of results screens.)

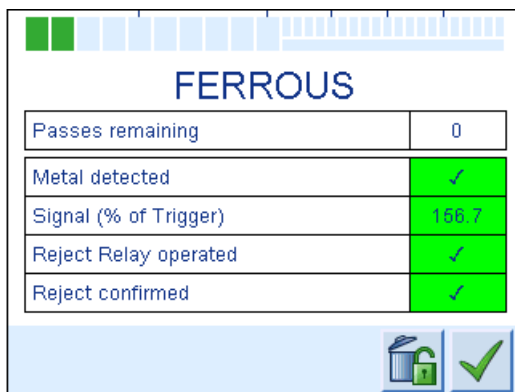
⇒ After every test that is successful, the **Test Passed** button turns green to enable it: . When the button becomes enabled, it does not necessarily mean the performance test has passed. You must be satisfied that the metal detector and its associated conveyor system and reject mechanism have all functioned correctly, and then you can press the **Test Passed** button.




⇒ You can click the **Unlock Bin** icon  to unlock the reject bin after you have done your tests.



⇒ **Example Result Screens:** The figures are examples of results screens that follow each test.

NOTES:

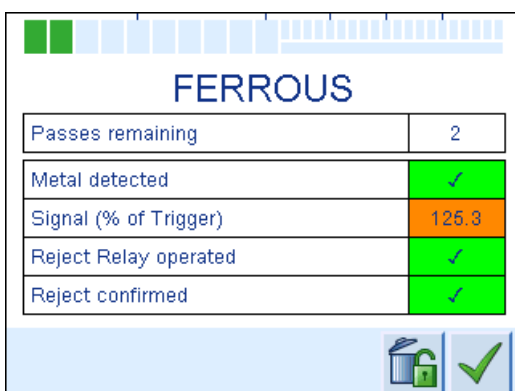
- Green indicates a pass. If the (**% of Trigger**) indicator is green, the test moves on to the next metal type. If the (**% of Trigger**) is orange, multiple passes are required.
- Red indicates a fail.
- If the (**% of Trigger**) indicator is orange, it means that although the metal detector has detected the test sample, the signal strength is less than the detection margin that was set in **QA Setup**. When the indicator is orange, then multiple passes are required. However, if there are 0 passes remaining, then the test is passed, whether green or orange, and moves on to the next metal type.








FERROUS	
Passes remaining	0
Metal detected	
Signal (% of Trigger)	156.7
Reject Relay operated	
Reject confirmed	

Test passed, and signal above detection margin



FERROUS	
Passes remaining	2
Metal detected	
Signal (% of Trigger)	125.3
Reject Relay operated	
Reject confirmed	

Test passed, but the signal is below the detection margin, and so is colored orange

NON-FERROUS	
Passes remaining	0
Metal detected	✓
Signal (% of Trigger)	155.3
Reject Relay operated	x
Reject confirmed	x

Test failed because the reject mechanism did not function correctly



Important Safety Message

If the Performance Test fails, you must follow your company's procedures and standards according to your metal detection strategy.

When you have determined and rectified the cause of the failure, it might be necessary to re-test all product quarantined since the last performance test. If re-testing of product is not possible, it might be necessary to destroy the product that you cannot be sure is free of metal contamination.

Related Topics:

[Viewing the Running Displays ▶ Page 16]

[Selecting the Running Product or Cluster ▶ Page 50]

[Setting the Parameters for Routine Performance Testing ▶ Page 70]

[Setting the Parameters for Multi-Pass Routine Performance Testing ▶ Page 76]

[Doing Multi-Pass Routine Performance Testing ▶ Page 77]

[Managing Reject Confirmation Unit (RCU) Sensors ▶ Page 43]

[Doing a Consecutive Test ▶ Page 73]

[Doing a Memory Test ▶ Page 74]

[Using Reduced Test ▶ Page 58]

7.8 Creating, Viewing and Printing Reports

Profile Metal Detector	Software Version	Minimum Access Level Required
All	All	QA Setup or QA Operator depending on task.

There are three types of reports that you can print onto paper, or send to a device such as a personal computer or USB memory stick. The three types of reports are:

1. Metal detector settings
2. Shift report
3. Performance monitoring report.

For information on connecting your printer, refer to the manual supplied with your printer, and refer to the User Manual supplied with your Profile metal detector.

Related Topics:

[Doing Quality Assurance ▶ Page 82]

[Printing the Metal Detector Settings ▶ Page 80]

[Printing a Shift Report ▶ Page 80]

[Printing a Performance Monitoring Report ▶ Page 81]

7.8.1 Printing the Metal Detector Settings

Profile Metal Detector:	Software Version:	Minimum Access Level Required:
All	All	QA Operator

The current settings of the metal detector can be printed (or sent to another device to be viewed) at any time. The details include:

- **Product Settings** (all the products for inspection)
- **Install Settings** (all the settings made at **Installer** level)
- **QA Settings**

To print, or send, the metal detector settings do the following:

Preconditions:

- At the Quality Assurance Manager level (**QA Setup**) the **Printer Setup** screens contain the correct settings, pointing the data to a printer or another kind of output.
- The printer or output device corresponds with the settings on the **Printer Setup** screens.

- On the **QA Operator** menu, press **Print All Settings**.

⇒ Result:

If the output device is ready, the metal detector settings will be sent to the output device.

If the output device is not ready, you will see the message: **Data Collection Unit not ready**.

Related Topics:

[Creating, Viewing and Printing Reports ▶ Page 79]

7.8.2 Printing a Shift Report

Profile Metal Detector:	Software Version:	Minimum Access Level Required:
All	All	QA Setup to set the report parameters QA Operator to print the report

Shift Reports can be sent to a printer, or other device, **manually**. Alternatively, shift reports can be sent **automatically** at the end of a shift (or other specified period of time).

Set up the Report Parameters:

In the **Shift Reports** screens you can choose the **Shift Start Time**, the **Shift Interval**, the **Reject Relay Operations**, and the **Modified Settings**.

- 1 On the **QA Setup** menu, press **Shift Reports**:



- 2 Set the **Report Mode** to **OFF**, **MANUAL**, or **AUTO**.

⇒ NOTE:

If the **Report Mode** is set to **AUTO**, but no printer or device is set up when the report is due, the data is saved (buffered). When a printer or device is subsequently connected, all the **Shift Reports** that have not yet been printed are transmitted (together with any **Performance Monitoring** tests that are also buffered).




- 3 Set the **Shift Start Time** and set the duration of the shift in the **Shift Interval** field.
- 4 Tick **Reject Relay Operations** if you want the shift report to contain all instances of reject relay activation.
- 5 Tick **Modified Settings** if you want to see if, and where, operators of the metal detector have changed any settings since the last report.

Print the Report:

Preconditions:

- At the Quality Assurance Manager level (**QA Setup**) the **Printer Setup** screens contain the correct settings, pointing the data to a printer or another kind of output.
- The printer or output device corresponds with the settings on the **Printer Setup** screens.

You can print the Shift Report from the **QA Setup** or from the **QA Operator** screen.

To print from the QA Setup screen:	To print from the QA Operator screen:
<p>– Press Print Functions and then press Print Shift Report</p>  	<p>– Press Print Shift Report</p> 

Result:

If the output device is ready, the metal detector settings will be sent to the output device.

If the output device is not ready, you will see the message: **Data Collection Unit not ready**.

Related Topics:

[Creating, Viewing and Printing Reports ▶ Page 79]

7.8.3 Printing a Performance Monitoring Report

Profile Metal Detector:	Software Version:	Minimum Access Level Required:
All	All	QA Manager to set the report parameters QA Operator to print the report

Performance Monitoring Reports are printed automatically after every performance test.

If there is no printer or device available, the Performance Monitoring Reports are saved (buffered). They will be printed or downloaded as soon as a printer or device is made available.

Related Topics:

[Printing a Shift Report ▶ Page 80] (for details about **Printer Setup**, and printing manually).

7.8.4 Viewing the Test Log for Multi-Pass Testing

Profile Metal Detector:	Software Version:	Access Level Required:
All	All	

When **Multi-Pass Testing** is **ENABLED**, you can view a log of its results from the **Running Displays**.

- 1 Go to the **Performance Test** screen on the **Running Displays**.
- 2 Press **View Test Log**.

Clearing the Test Log

To clear the test log, log in at **QA Setup**. Press **Performance Testing** and then press **Clear Test Log**.

Related Topics:

[Creating, Viewing and Printing Reports ▶ Page 79]

[Doing Multi-Pass Routine Performance Testing ▶ Page 77]

7.9 Doing Quality Assurance

Profile Metal Detector	Software Version	Access Level Required
All	All	QA Setup

The **QA Setup** menu gives you access to the QA management features of the metal detector. See the Related Topics for the main **QA Setup** tasks.

Related Topics:

[Setting up and Managing QA Operators ▶ Page 29]

[Setting up the QA Manager and the Installer ▶ Page 29]

[Setting up and Managing Users ▶ Page 30]

[Setting up and Managing QA Operators ▶ Page 29]

[Creating, Viewing and Printing Reports ▶ Page 79]

[Doing Routine Performance Testing ▶ Page 72]

[Complying with 21CFR11 ▶ Page 82]

[Complying with HACCP ▶ Page 82]

7.9.1 Complying with 21CFR11

Profile Metal Detector	Software Version	Access Level Required
All	All	QA Setup

21 CFR Part 11 is the part of Title 21 of the Code of Federal Regulations set by the United States Food and Drug Administration (FDA) for electronic records and electronic signatures (ERES).

21CFR Part 11 is a frequent requirement for customers of METTLER TOLEDO in the pharmaceutical sector, therefore, the "Tablex" series of Profile metal detectors has **21CFR** features enabled as the default. The **21CFR** feature changes the authentication (**Login**) methods for users of the metal detector.

Switching on and off 21CFR

- 1 On **Installer** menu, press **Advanced Settings**.
- 2 Press **Access Account Management**.
- 3 Press **Access Settings**.
- 4 In the **Authentication Method**, choose **21CFR** or **STANDARD**.

Related Topics:

[Managing the General Settings of the Metal Detector ▶ Page 30]

[Doing Quality Assurance ▶ Page 82]

7.9.2 Complying with HACCP

Profile Metal Detector	Software Version	Access Level Required
All	All	QA Setup

To help you meet your reporting requirements for Hazard Analysis and Critical Control Points (HACCP), there is an **Access Log** and a **Peak Log** on the **Running Displays**. You can also print the **Performance Test** and **Shift Reports** (see the related topics for information on printing).

Your metal detector's annual performance verification

HACCP guidelines require regular checking of product inspection equipment to make sure that the required performance level is being maintained for each critical control point. Our qualified engineers can provide the necessary certification to show that we have checked your metal detector and that we can verify that it meets your compliance needs.

Related Topics:

[Managing the General Settings of the Metal Detector ▶ Page 30]

[Doing Quality Assurance ▶ Page 82]

[Printing a Shift Report ▶ Page 80]

[Printing a Performance Monitoring Report ▶ Page 81]

[Logging In and Out ▶ Page 27]

[Contact details ▶ Page 12]

7.9.3 Viewing Logs

Profile Metal Detector	Software Version	Access Level Required
All	All	Various

The metal detector has several types of logs, some of which can be accessed from the **Running Displays**, and some of which require logging in at QA level.

The **Running Displays** have an **Access Log** and a **Peak Log**.

The Peak Log:

The **Peak Log** is a list of metal-detection events, showing time, date, and size of peak for each event.

The peak signal gives an indication of the size of the metal contaminant: the larger the peak signal, the larger the contaminant. The **Peak Log** displays the last 20 detection events, with the most recent event displayed at the top. The **Peak (Bars)** field shows the largest peak signal recorded since the last **Reset Peak**.

NOTES:

- Because the **Peak Log** is on the **Running Displays**, it can be reset and cleared by any user. For quality assurance purposes, use the reporting features. The shift report records all metal detection events within a shift period.
- You can hide the **Peak Log** from the **Running Displays** at **Installer** level.

The Access Log on the Running Displays:

There is an **Access Log** on the **Running Displays** that displays the last 25 login attempts (successful and failed). This **Access Log** displays the users that have logged in, and the time they logged in.

The Access Log on the QA Setup screens:

There is a more detailed **Access Log** in the **QA Setup** screens:

- 1 Log in to **QA Setup**.
- 2 Press **Manage QA Operators**.
- 3 Press **Access Log**.

Related Topics:

[Creating, Viewing and Printing Reports ▶ Page 79]

[Managing the Running Displays ▶ Page 31]

8 Emulation, PackML, OEE

8.1 Using Emulation (VNC)

Profile Metal Detector	Software Version	Access Level Required
All	From F4.9.2, F48.2.2, and F4A.9.2	Depends on task

Related Topics:

[Description of Emulation ▶ Page 84]

[Retrofitting the Emulation Feature ▶ Page 84]

[Using Remote Devices for Emulation ▶ Page 85]

[Connectivity for Emulation ▶ Page 85]

[Setting up Emulation (VNC) ▶ Page 85]

[Using a Programmable Output with Emulation ▶ Page 86]

[Checking Emulation Status ▶ Page 87]

8.1.1 Description of Emulation

Emulation enables you to use a remote device (such as a PC, a laptop PC, or a tablet) to monitor and control a Profile metal detector.

Emulation of the Profile metal detector uses industry-standard Virtual Network Computing (VNC) with the Remote Frame Buffer (RFB) protocol.

To use Emulation, the correct Emulation hardware, firmware, and software need to be incorporated in the metal detector.

All Profile metal detectors that have firmware versions equal or later to F4.9.2, F48.2.2, and F4A.9.2 have emulation firmware incorporated. Emulation hardware is an option that you choose at the time that you order a metal detector from METTLER TOLEDO. Alternatively, Emulation hardware can be retrofitted.

Emulation hardware includes:

- A VNC adapter,
- An external Ethernet port, M12 D-coding,
- An Ethernet cable (quick-release on some metal detectors, and hardwired on ATEX-compliant metal detectors).

You can connect your remote device with the Ethernet cable, or you can use wireless technology.

Tip:

You can set up a number of remote devices for emulation, but you can use only one of your remote devices for emulation at any one time.

Related Topics:

[Using Emulation (VNC) ▶ Page 84]

8.1.2 Retrofitting the Emulation Feature

Emulation hardware can usually be retrofitted to a metal detector by METTLER TOLEDO. Contact METTLER TOLEDO Service for details.

NOTE:

Emulation hardware cannot be retrofitted to ATEX/IECEx-compliant metal detectors of the Profile R/RB/RZ Series.

Related Topics:

[Using Emulation (VNC) ▶ Page 84]

8.1.3 Using Remote Devices for Emulation

To use emulation, you need to download a VNC client on to your remote device. This enables you to use your remote device as if it were the user interface of the metal detector screen.

VNC clients are available for all the common platforms for remote devices, such as Windows, Linux, Mac OS X, Apple iOS, and Android. METTLER TOLEDO have tested emulation with various platforms, but cannot guarantee that it will work with every revision of every platform. If you have difficulty connecting to the version of platform on your device, contact METTLER TOLEDO Service.

VNC clients are available as open source (for no payment) or you can purchase them. Things to consider in choosing a VNC client are your remote device and its platform, and the security requirements for your company network.

Consult the network administrator in your company for advice on choosing the best VNC client for your remote device, and the necessary security and firewall arrangements.

Related Topics:

[Using Emulation (VNC) ▶ Page 84]

8.1.4 Connectivity for Emulation

Connection between the VNC server and VNC client is provided by TCP/IP.

The metal detector is configured with a static IP configuration.

The physical connection is via an Ethernet cable from the Ethernet port of the metal detector to your remote device. There is password protection for communication between your remote device and the metal detector.

The Ethernet port is on the underside of the metal detector, or on the underside of the control panel (for metal detectors have a separate control panel). The 20 m Ethernet cable supplied by METTLER TOLEDO is usually a quick release connection. However, on ATEX-compliant metal detectors (for use in potentially explosive atmospheres) the Ethernet cable is hardwired into the metal detector and it cannot be removed.

You can connect the Ethernet cable to a wireless router. From a wireless router, you can make a wireless connection to your remote device. Consult your company's network administrator for advice on using wireless connection.

Your network administrator will do the following:

- Decide on the best IP configuration,
- Make sure that the connection between your remote device and the metal detector is secure and complies with your company's network security/firewall and Internet security.

Related Topics:

[Using Emulation (VNC) ▶ Page 84]

8.1.5 Setting up Emulation (VNC)

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

If the Emulation hardware is incorporated in the metal detector, **VNC Settings** will be visible on the **Installer** menu.



VNC Settings

NOTE:

If Emulation hardware is not incorporated in the metal detector, **VNC Settings** will not be visible.

- 1 On the **Installer** menu press **Advanced Settings**.
- 2 Scroll forward to **VNC Settings**. Press **VNC Settings**.
 - ⇒ **Result:** In the **VNC Server Port** field is a numerical value. The default value is **05900** because TCP port 5900 is the default port for all VNC clients.
- 3 Make sure the **VNC Server Port** is the correct port number. Edit the number if necessary.
- 4 Enter a password in the **VNC Server Password** field. The password can be up to 8 characters. This is the password you will use to connect your remote device to the metal detector. If you leave the field blank, you can use your remote device without a password.
- 5 Scroll forward to the fields for **IP Address**, **Subnet Mask** and **Default Gateway**. Set up the communications as follows:
 - ⇒ **IP Address:** The default value is 192.168.0.200

The format 192.168.xxx.xxx is the usual **IP Address** for a private network. Your network administrator will give you a different **IP Address** if necessary.
 - ⇒ **Subnet Mask:** The default value is 255.255.255.0
 - ⇒ **Default Gateway:** The default value is 192.168.0.1

 - ⇒ **Result:** If you change any of the **VNC Settings**, you will see a message **Confirm changes to VNC server settings?** when you exit the menu.

6 Confirm.

Related Topics:

[Using Emulation (VNC) ▶ Page 84]

8.1.6 Using a Programmable Output with Emulation

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

The metal detector has a few programmable outputs. You might want to use one of these programmable outputs to trigger an event or message on the remote device that you use for emulation.

If you disconnect or switch off your remote device, or if connection is lost between your remote device and the metal detector, the programmable output can trigger an event or message. This output can inform you that you need to check the metal detector.

Typically, you will need to use a programmable output if your remote device is part of a PLC (Programmable-Logic Controller) that monitors many pieces of equipment in a factory.

METTLER TOLEDO recommends that you use the output called **CHECK DETECTOR** because this output is activated for all the conditions on the metal detector that require your awareness or response.

CHECK DETECTOR makes the output active for the following metal detector events:

- **FAULT**

- **EARLY WARNING**
- **PVR DUE**
- **PVR OVERDUE**
- **PVR DUE & OVERDUE**

To set an output to **CHECK DETECTOR**, do as follows:

- 1 On the screen, go to the **Installer** menu.
- 2 Click on **Advanced Settings**.
- 3 Click on **Customer Inputs/Outputs**.
- 4 Click on **Configure Outputs**.
- 5 Click on one of the outputs (for example **Output 2**:



- 6 Change the value of the **Output** field to **CHECK DETECTOR**.
- 7 Refer to the manual supplied with the metal detector to locate the correct output on the User Input/Output board in the box of the power supply unit, and for details of the electrical contact ratings. Follow the safety instructions in the manual before you remove the lid of the power supply unit.

Related Topics:

[Using Emulation (VNC) ▶ Page 84]

8.1.7 Checking Emulation Status

Profile Metal Detector	Software Version	Access Level Required
All	All	Installer

You can check the status of the connection between the metal detector and the remote device that is connected, or that you expect to be connected.

To check the status, make sure that **Connectivity Status** is on **Running Displays** (scroll through the **Running Displays** to find it).

If **Connectivity Status** is not on the **Running Displays**, do as follows:

- 1 On the screen, go to the **Installer** menu.
- 2 Click on **Advanced Settings**.
- 3 Scroll to the **Running Displays** icon:



- 4 Scroll to **Connectivity Status** and select the checkbox.
 - ⇒ **Results:**
 - ⇒ • The **Connectivity Status** on the Running Screen shows the **VNC Status: Connected** or **VNC Status Not Connected**.
 - ⇒ • The **Connectivity Status** shows the **VNC client address:** (for example, 192.168.0.1).

Related Topics:

[Using Emulation (VNC) ▶ Page 84]

8.2 Working with PackML

Profile Metal Detector	Software Version	
Profile R/RB/RZ Series (with Software Pack C) Profile Advantage (with Software Pack C)	All	

Overview of PackML

PackML (Packaging Machinery Language) is a common technical standard for the many types of machinery used in the packaging industry. The technology helps to quickly integrate machinery from different vendors, and offers a similar look-and-feel of user interface data. PackML also makes Overall Equipment Effectiveness (OEE) of a production line easier to monitor, regulate and improve. For a description of PackML and OEE, see the [The METTLER TOLEDO Metal Detection Guide ▶ Page 19].

PackML standards and developments are controlled by OMAC (The Organization for Machine Automation and Control). METTLER TOLEDO Safeline is a working member of OMAC, helping to develop PackML technology and training for the industry, and sharing experiences of PackML implementation with other members.

The Profile metal detector implementation of PackML (PackML V3.0) works on the concept that the metal detector can only operate in one of five possible PackML states within five possible PackML modes. The metal detector can interpret PackML data, and display it on the user interface. The metal detector can send PackML data via the METTLER TOLEDO Communications Protocol, or industry-standard Fieldbus and Ethernet protocols. METTLER TOLEDO can supply a Fieldbus module to establish full communication between the metal detector and a Programmable Logic Controller (PLC).

Related Topics:

[PackML Modes and States ▶ Page 88]

[Viewing PackML Data on the Running Displays ▶ Page 90]

[Viewing and Resetting PackML Data at Installer Access Level ▶ Page 91]

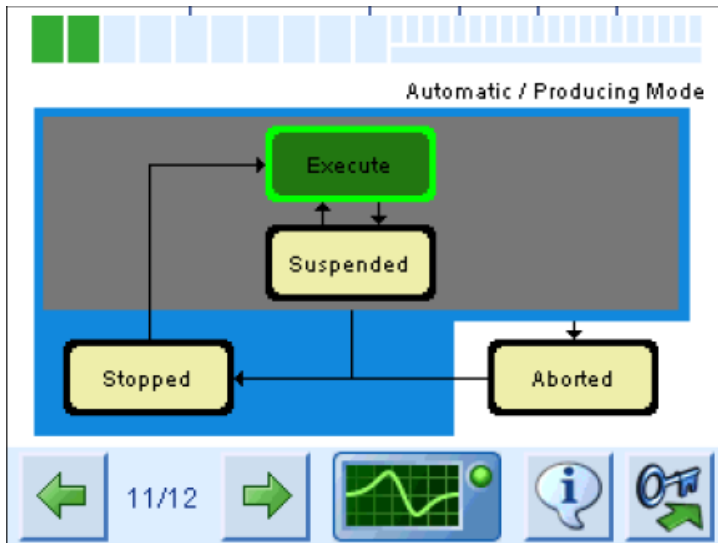
[The Communications Protocol Document ▶ Page 37]

8.2.1 PackML Modes and States

Profile Metal Detector	Software Version	
Profile R/RB/RZ Series (with Software Pack C) Profile Advantage (with Software Pack C)	All	

PackML V3.0 Modes and States

The PackML V3.0 Modes and States are shown on a screen in the **Running Displays**. (**PackML** must be enabled in the **Running Displays** at **Installer** level to make it visible.)



Running Displays showing PackML.

In this example, PackML is in the **Automatic/Producing Mode** and in the **Execute** state.

There are five PackML modes of operation. Each mode has up to five states:

1. Automatic/Producing Mode

The metal detector is currently able to detect and reject metal according to the current configuration. This is the usual mode of operation. This mode has four states:

1. **Execute:** The normal healthy state. Product is passing through the metal detector. If a pack sensor is fitted, it is calibrated.
2. **Suspended:** The metal detector is ready to inspect products, but no product is passing the pack sensor and into the metal detector. When product returns, the metal detector returns to Execute state, unless the **Execute Timeout** period is exceeded.
3. **Stopped:** The conveyor has stopped running.
4. **Aborted:** A fault is present in the **Automatic/Producing Mode**. (See PackML Alarms.)

2. Maintenance Mode

The metal detector is being serviced by a METTLER TOLEDO engineer. This mode has three states:

1. **Execute:** No faults present. The conveyor is configured as a programmable input and is running.
2. **Stopped:** The conveyor has stopped running.
3. **Aborted:** A fault is present in the **Maintenance Mode**. (See PackML Alarms.)

3. Setup Mode

A user is accessing a setup feature on the metal detector that could affect operating parameters and performance. This mode has three states:

1. **Execute:** No faults present. The conveyor is configured as a programmable input and is running.
2. **Stopped:** The conveyor has stopped running.
3. **Aborted:** A fault is present in the **Setup Mode**. (See PackML Alarms.)

4. PVR Mode

A Performance Validation Routing (PVR) is being carried out. This mode has four states:

1. **Execute:** No faults present.
2. **Suspended:** The user has started PVR.
3. **Stopped:** The conveyor has stopped running.

4. **Aborted:** A fault is present in the **PVR Mode**. (See PackML Alarms.)

5. Undefined Mode

The metal detector is initialising after power up. This mode has one state:

1. **Undefined:** The metal detector is initialising. On completion, the metal detector will usually switch to the Automatic/Producing mode.

Related Topics:

[Working with PackML ▶ Page 88]

[Managing the Running Displays ▶ Page 31]

8.2.2 Viewing PackML Data on the Running Displays

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series (with Software Pack C)	All	Installer to set up the Running Displays
Profile Advantage (with Software Pack C)		

In the main mode of PackML (Automatic/Producing Mode) the four states of the mode, and the OEE status, can be displayed on the **Running Displays** as follows:

Displaying PackML and OEE on the Running Displays

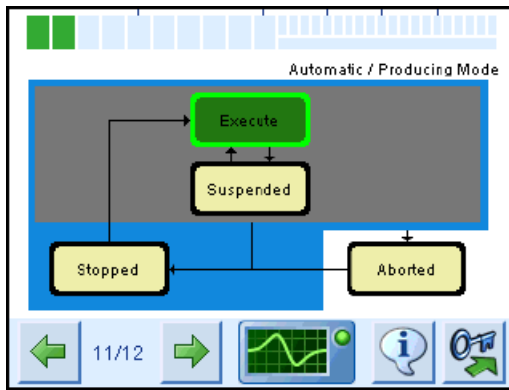
- 1 Log in at **Installer** level.
- 2 Press **Advanced Settings**.
- 3 Press **Running Displays**.
- 4 Tick **PackML V3.0**
- 5 Tick **OEE**

Understanding the PackML Running Displays

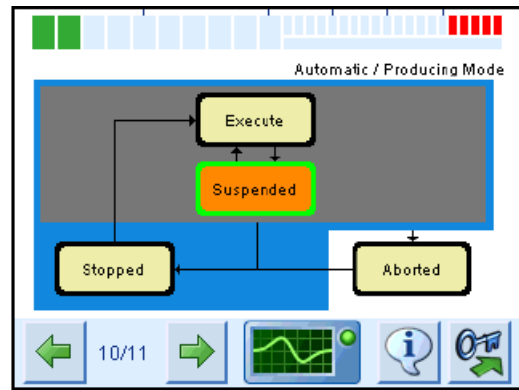
The current **state** of the **Automatic/Producing Mode** is displayed with a green border.

Within the green border, the **state** is colored green, orange, white or red:.

- Green indicates no faults or warnings
- Orange indicates one of the following:
 - There are one or more warnings on the metal detector.
 - A PVR is overdue.
 - The reject inhibit has been activated.
- White appears only in the **Stopped** state when there are no faults or warnings.
- Red appears only in the **Aborted** state. Red means that there are one or more faults on the metal detector that must be investigated.



1.



2.

Example 1 shows an **Execute** state with no faults or warnings.
 Example 2 shows a **Suspended** state with an orange alert.

Related Topics:

[Managing the Running Displays ▶ Page 31]

[Working with PackML ▶ Page 88]

8.2.3 Viewing and Resetting PackML Data at Installer Access Level

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series (with Software Pack C)	All	Installer
Profile Advantage (with Software Pack C)		

- 1 Press **Advanced Settings**.
- 2 Press **PackML V3.0**.
- 3 Press **PackML Counters** to view the recent data for PackML, PackML Mode Timers, and PackML State Timers.
- 4 Press **PackML Alarms** to view the history of the alarms.
- 5 To reset **Reset PackML Counters & Timers**, press **Reset PackML** and then press **Reset PackML Counters & Timers**.
- 6 To reset **Reset PackML Alarms**, press **Reset PackML** and then press **Reset PackML Alarms**.

⇒ For more details, and explanations of the PackML tags and references, see the Related Topics below.

Related Topics:

[Working with PackML ▶ Page 88]

[PackML Counters and Timers ▶ Page 91]

[PackML Modes and States ▶ Page 88]

8.2.3.1 PackML Counters and Timers

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series (with Software Pack C)	All	Installer
Profile Advantage (with Software Pack C)		

- 1 Press **Advanced Settings**.
- 2 Press **PackML V3.0**.

- 3 Press **PackML Counters** to view the recent data for PackML, PackML Mode Timers, and PackML State Timers.

NOTE: To reset the counters and timers, press the **Reset PackML** button.

PackTag Reference	Description	Category
AccTimeSinceReset	The time (in seconds) since the PackML counters were last reset.	PackML Administration (PMLa).
SeqNumber	The total number of changes in PackML state and mode. (A change in mode causes a change in state, therefore a mode change increments the counter by 2.)	PackML Administration (PMLa).
ProdProcessedCount	The number of packages inspected by the metal detector since the PackML timers were reset or the metal detector was last powered up. (If there is no pack sensor is fitted, the value is 0.)	PackML Administration (PMLa).
ProdDefectiveCount	The number of rejects since the PackML timers were reset or the metal detector was last powered up.	PackML Administration (PMLa).
Reason	The reason for the most recent change of mode or state.	PackML Status (PMLs).
ModeCurrentTime	The time (in seconds) in the current mode (since the last mode change).	PackML Administration (PMLa).
ModeCumulativeTimeAuto	The time (in seconds) spent in Automatic/Producing mode.	PackML Administration (PMLa).
ModeCumulativeTimeMaintenance	The time (in seconds) spent in Maintenance mode.	PackML Administration (PMLa).
ModeCumulativeTimePVR	The time (in seconds) spent in PVR mode.	PackML Administration (PMLa).
ModeCumulativeTimeSetup	The time (in seconds) spent in Setup mode.	PackML Administration (PMLa).
StateCurrentTime	The time (in seconds) spent in the current state.	PackML Administration (PMLa).
StateCumulativeTimeAutoExecute	The time (in seconds) spent in the Execute state of the Automatic/Producing mode.	PackML Administration (PMLa).
StateCumulativeTimeAutoSuspended	The time (in seconds) spent in the Suspended state of the Automatic/Producing mode.	PackML Administration (PMLa).
StateCumulativeTimeAutoStopped	The time (in seconds) spent in the Stopped state of the Automatic/Producing mode.	PackML Administration (PMLa).
StateCumulativeTimeAutoAborted	The time (in seconds) spent in the Aborted state of the Automatic/Producing mode.	PackML Administration (PMLa).

Related Topics:

- [Working with PackML ▶ Page 88]
- [PackML Modes and States ▶ Page 88]
- [Changing the PackML Settings ▶ Page 94]

8.2.3.2 Pack ML Alarms and Reasons Codes

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series (with Software Pack C) Profile Advantage (with Software Pack C)	All	Installer

Alarm and reason codes are generated when an internal fault occurs on the metal detector, or when the PackML state changes to Abort or Stopped.

- 1 Press **Advanced Settings**.
- 2 Press **PackML V3.0**.
- 3 Press **PackML Alarms** to view the last 10 PackML alarms and reasons codes.

NOTE: To reset the alarms and reasons codes, press the **Reset PackML** button.

Alarm ID/Reason Code	Alarm Message	Notes
0	Undefined	No alarm.
1300	Device Initialisation Completed	
1301	Device Faults Cleared	
1302	PVR Started	
1303	PVR Sample Completed	A PVR test for a single sample,
1304	PVR Waiting For Test Sample	
1305	PVR Completed	
1306	Conveyor Stopped	
1307	Conveyor Started	
1308	Conveyor Status Unconfigured	Occurs when the conveyor status is driven by its programmable input, and the input is removed or disabled.
1309	Conveyor Status Configured	Occurs when there is initially no conveyor status available and then the user assigns the conveyor running programmable input.
1310	Pack Sensor Fitted	
1311	Pack Sensor Removed	
1312	Product Inspected	A product has been detected the pack sensor (if a pack sensor is fitted).
1313	No Product Infeed	The pack sensor has not detected any product within the execute timeout period.
1320	Configuration Issues	A configuration error. Contact METTLER TOLEDO Service.
1321	Fault Relay Activated	
1322	Fault Relay Deactivated	
1350	F07 (Internal Fault 1)	A software error. Contact METTLER TOLEDO Service.
1351	F08 (Internal Fault 2)	A communication error. Contact METTLER TOLEDO Service.
1352	F05 (Calibration Fault)	Contact METTLER TOLEDO Service.
1353	F02 (Balance Fault)	Contact METTLER TOLEDO Service.
1354	F01 (Power Drive Fault)	Contact METTLER TOLEDO Service.
1355	F03 (Self Check Phase Error)	Contact METTLER TOLEDO Service.
1356	F04 (Self Check Magnitude Error)	Contact METTLER TOLEDO Service.
1357	F09 (Pack Sensor Blocked)	
1358	F06-1 (IO Comms Error 1)	Serial I/O Read/Write error.
1359	F06-2 (IO Comms Error 2)	Serial I/O Monitor error.
1360	F06-3 (IO Comms Error 3)	Reject confirmation relay monitor error.
1361	F06-4 (IO Comms Error 4)	Fault relay monitor error.
1362	F06-5 (IO Comms Error 5)	Reject relay monitor error.
1363	Reserved	
1364	F10 (Reject Check Sensor Blocked)	Blocked for longer than 4 pack lengths.

Alarm ID/Reason Code	Alarm Message	Notes
1365	F11 (Reject Confirmation Sensor Blocked)	Blocked for longer than 4 pack lengths.
1366	F12 (Speed Sensor Fault)	This message is only available when a speed sensor is used with a RCU.
1367	F13 (External RCU Clock Fault)	This message is only available when a speed sensor is used with a RCU.
1368	F14 (Overcurrent Fault)	This message is only available on Profile Select and Profile Advantage metal detectors.
1369	F15 (Bin Unlocked Fault)	
1370	F16 (System CPU Fault)	Reboot the metal detector.
1371	F06-6 (IO Comms Error 6)	Communication failure between the module and User I/O board.
1372	F17 (USB Interface Error)	Reboot the metal detector.
4600	Maintenance Started	
4601	Maintenance Completed	
4602	Setup Started	
4603	Setup Completed	
4604	Local Setup Started	
4605	Local Setup Completed	
4606	Remote Auto Mode Started	
4607	Remote Auto Mode Completed	
4608	Balancing Started	
4609	Balancing Completed	
4610	Reject Inhibit Enabled	
4611	Reject Inhibit Disabled	

Related Topics:

[Working with PackML ▶ Page 88]

[PackML Counters and Timers ▶ Page 91]

[PackML Modes and States ▶ Page 88]

8.2.4 Changing the PackML Settings

Profile Metal Detector	Software Version	Access Level Required
Profile R/RB/RZ Series (with Software Pack C) Profile Advantage (with Software Pack C)	All	Installer

- 1 Press **Advanced Settings**.
- 2 Press **PackML V3.0**.
- 3 Press **PackML Settings**.
- 4 In the **Execute Timeout** field, enter the time in seconds that PackML takes to move from Execute to the Suspended state.
 - ⇒ **NOTES:**
The time is measured from last pack that passed the pack sensor.
The PackTag Reference is "ExecuteTimeout".
- 5 In the **Machine Speed Setpoint** field, enter the maximum number of packages that the per minute that the metal detector can inspect.
 - ⇒ This figure is used to calculate the OEE of the metal detector.
The PackTag Reference is "Mach Speed".

- 6 Check or uncheck the field **Reset PackML Counters on Product Change**.
- ⇒ If you check this field, the PackML counters are reset when the **Running Product** is changed. The PackTag Reference is "ResetCountersOnProductChange".

Related Topics:

[Working with PackML ▶ Page 88]

[PackML Counters and Timers ▶ Page 91]

[PackML Modes and States ▶ Page 88]

[Pack ML Alarms and Reasons Codes ▶ Page 92]

9 Metal Detector Faults, Warnings and Alerts

Profile Metal Detector	Software Version	Access Level Required
All	All	None

The **Condition Monitoring** and the **Running Displays** display the general state of the metal detector (**HEALTHY**, **EARLY WARNING**, or **FAULT**), the conveyor system and the reject bin.

In PackML mode, a special set of states, warnings and alerts are displayed on the **Running Displays**.

Additionally, if a technical fault occurs on the metal detector or the conveyor, and the metal detector is able to determine the fault, specific messages are displayed to help you fix the fault, or to inform you of a faulty component inside the metal detector. The **Communications Protocol** document has a complete list of all the states, warning, and alert messages than can appear on the metal detector.

Related Topics:

[Condition Monitoring ▶ Page 96]

[Managing the Running Displays ▶ Page 31]

[Understanding the User Interface (UI) ▶ Page 12]

[Working with PackML ▶ Page 88]

[The Communications Protocol Document ▶ Page 37]

[Contact details ▶ Page 12]

9.1 Condition Monitoring

Profile Metal Detector	Software Version	Access Level Required
All	All	None

The metal detector constantly self checks many conditions of operation. The optional Reduced Test Mode builds on the standard condition monitoring and self-check features. (See [Using Reduced Test ▶ Page 58].)

The Profile metal detector is reliable and robust, and generally displays a **HEALTHY** condition.

The current state of the metal detector can be seen on the **Condition Monitoring** icon in the navigation bar of the **Running Displays**. Additionally, one of the screens of the **Running Displays** is dedicated to condition monitoring to make the state of the metal detector highly visible.

NOTE: The **Condition Monitoring** icon is always visible on the **Running Displays**, but the **Condition Monitoring** screen on the **Running Displays** can be disabled at **Installer** level.

HEALTHY

If the metal detector conforms to all the self-check conditions, the **Condition Monitoring** icon in the navigation bar of the **Running Displays** shows a moving green pulse:

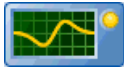


Condition Monitoring icon showing the **HEALTHY** state.

Additionally, the condition monitoring screen in the **Running Displays** shows the message **HEALTHY** on a green background.

EARLY WARNING

If the metal detector starts to approach the parameter limits of a **HEALTHY** condition, it enters the **EARLY WARNING** state. The **Condition Monitoring** icon in the navigation bar of the **Running Displays** shows a moving orange pulse:



Condition Monitoring icon showing the **EARLY WARNING** state.

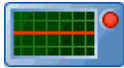
Additionally, one of the screens of the **Running Displays** shows the message **HEALTHY** on an orange background. This screen is displayed continuously to make the **EARLY WARNING** state highly visible.

Although the metal detector will still function in the state of **EARLY WARNING** you should contact METTLER TOLEDO Servicing for advice as soon as possible. Preventative maintenance might be able to stop the metal detector from entering the **FAULT** condition.

FAULT

If a fault occurs in the metal detector or the conveyor system interacting with the metal detector, an alarm is raised and the metal detector enters the **FAULT** condition and stops operating.

The **Condition Monitoring** icon in the navigation bar of the **Running Displays** shows a static red line:



Additionally, one of the **Running Displays** shows a red background with either message **FAULT** or, a message showing you a specific fault, such as **Pack Sensor blocked**. This screen is displayed continuously to make the **FAULT** state highly visible.

If the **FAULT** cannot be identified and cleared, contact METTLER TOLEDO Service.

Related Topics:

[Managing the Running Displays ▶ Page 31]

[Metal Detector Faults, Warnings and Alerts ▶ Page 96]

[Understanding the User Interface (UI) ▶ Page 12]

[Setting up the Pack Sensor ▶ Page 41]

[Using Reduced Test ▶ Page 58]

[Contact details ▶ Page 12]

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We can help you to maximize the benefits and the return on investment of your equipment through its entire lifecycle. We can support you to improve the uptime, compliance, and performance of your equipment and to enhance your expertise.

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