

Tablex-Pro

Pharmaceutical Metal Detector

Service Training Manual



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Contents

List of Figures.....	v
Important Information	
Legal statement.....	xi
Symbols used in this manual	xi
Aims of this manual	xii
Contacting MT Safeline.....	xii
Amendments to the manual.....	xiii
General safety precautions	xiv
COSSH.....	xiv
Safe handling	xv
Safe operating conditions	xvi
Ensuring reliable operation	xvii
1-Overview	
Introduction.....	1-3
Identification of serial and revision numbers.....	1-4
Using the menu system.....	1-5
Identification of major components.....	1-7
Block diagram	1-8
List of abbreviations.....	1-9
2-Parts Identification	
Module	2-3
Power supply compartment	2-8
3-Removal and Refitting of Parts	
Module, removal and refit	3-3
Filtered interconnect board, removal and refit	3-8
Fan, removal and refit	3-10
User I/O board, removal and refit	3-11

24V Reject supply, removal and refit	3-13
Switched Mode supply, removal and refit	3-13
Safeline Mains Filter, removal and refit	3-14
User I/O, tricolour lamp and reject relays, removal and refit	3-14
Head cable, removal and refit	3-15
4-Connections	
User I/O board layout	4-3
Connecting to the programmable inputs.....	4-9
Connecting to the sensor inputs.....	4-11
Power supply connections inside detector head.....	4-12
DIN rail connections in module compartment	4-13
5-Maintenance Procedures	
Using the menu system.....	5-3
Passcode protected access levels	5-7
Use of Flash Card	5-12
Restoring factory settings	5-14
Software update	5-26
Replacement of transmitter and receiver boards	5-30
Balancing the receiver coil.....	5-42
Setting the powerdrive levels	5-44
Self check	5-47
Auto setup calibration	5-49
Calibrating the touchscreen	5-50
System Test Menu	5-51
Service Menu.....	5-59
Upgrading the Ethernet Adapter firmware	5-64
Useful tips.....	5-68
6-Troubleshooting	
Indicators.....	6-3
Overview of displayed faults and warnings	6-4

Displayed faults and warnings	6-6
Detector triggering problems	6-13
Known issues and their solutions	6-15
Returning equipment	6-16
7-Development and Technical Bulletins	
Introduction	7-3
Technical Bulletins	7-4

List of Figures

Important Information

Figure i Safe handling	xv
------------------------------	----

1-Overview

Figure 1-1 Serial number format	1-4
Figure 1-2 Identification label on detector head end plate	1-4
Figure 1-3 Running mode display	1-6
Figure 1-4 Running mode software and serial number information	1-6
Figure 1-5 Identification of major components	1-7
Figure 1-6 Block diagram	1-8

2-Parts Identification

Figure 2-1 Module, complete	2-3
Figure 2-1 Module front panel assembly	2-4
Figure 2-2 Module stack mounting: parts	2-5
Figure 2-3 Module stack: parts	2-6

3-Removal and Refitting of Parts

Figure 3-1 Removal of module	3-3
Figure 3-2 Removal of stack	3-4
Figure 3-3 Exchange of flash memory card	3-6
Figure 3-4 Module connections	3-7
Figure 3-5 Filtered interconnect board connections	3-9
Figure 3-6 Power supply compartment access	3-11
Figure 3-7 Power supply compartment layout	3-12
Figure 3-8 M20 Head cable gland assembly	3-16
Figure 3-9 DIN rail connections	3-17

4-Connections

Figure 4-1 User I/O board layout	4-3
Figure 4-2 Examples of connections to programmable inputs	4-9
Figure 4-3 Examples of connections to sensor inputs	4-11
Figure 4-4 DIN rail connections	4-13

5-Maintenance Procedures

Figure 5-1 Running mode display	5-4
Figure 5-2 Running mode information displays.....	5-4
Figure 5-3 Condition monitor icon	5-5
Figure 5-4 Condition monitoring display: Healthy	5-5
Figure 5-5 Condition monitoring display: Early warning.....	5-6
Figure 5-6 Condition monitoring display: Fault.....	5-6
Figure 5-7 Login display for Standard Authentication method	5-8
Figure 5-8 Login display for 21CFR and Metrisync Authentication method	5-8
Figure 5-9 Safeline access level security passcode	5-9
Figure 5-10 Safeline access settings	5-10
Figure 5-11 Safeline access level - menu tree.....	5-11
Figure 5-12 Memory overview.....	5-12
Figure 5-13 Exchange of flash memory card	5-13
Figure 5-14 System defaults	5-14
Figure 5-15 Factory defaults	5-14
Figure 5-16 Touchscreen calibration.....	5-15
Figure 5-17 Head settings - page 1.....	5-16
Figure 5-18 Head type	5-16
Figure 5-19 Supplier.....	5-17
Figure 5-20 Head settings - page 2.....	5-18
Figure 5-21 Head frequencies.....	5-18
Figure 5-22 Head settings - page 3.....	5-19
Figure 5-23 Head serial number, coil pitch and width	5-19
Figure 5-24 Frequency calibration - page 1	5-20
Figure 5-25 Frequency calibration - page 2	5-21
Figure 5-26 Frequency calibration - page 3	5-22
Figure 5-27 Self check	5-23
Figure 5-28 Calibration factors.....	5-24
Figure 5-29 Factory vibration	5-25
Figure 5-30 Connecting cable for software download.....	5-26
Figure 5-31 Download utility startup screen	5-27
Figure 5-32 Download utility ready to send	5-28
Figure 5-33 Head assembly	5-30
Figure 5-34 Transmitter and receiver boxes	5-31
Figure 5-35 Transmitter box.....	5-32

Figure 5-36 Transmitter board components	5-33
Figure 5-37 Transmitter board tuning test points	5-35
Figure 5-38 Receiver box.....	5-37
Figure 5-39 Receiver board tuning test points	5-39
Figure 5-40 Balancing using washers	5-43
Figure 5-41 System Test Menu	5-51
Figure 5-42 Soak Test.....	5-52
Figure 5-43 Final Test	5-55
Figure 5-44 Service Menu.....	5-59
Figure 5-45 Performance Verification Menu	5-60
Figure 5-46 Check List	5-62
Figure 5-47 Diagnostic Log	5-62
Figure 5-48 Flash Options.....	5-63
Figure 5-49 LCD Brightness.....	5-63
Figure 5-50 Digi Discover Utility	5-64

6-Troubleshooting

Figure 6-1 Indicators	6-3
Figure 6-2 Overriding a fault display	6-5
Figure 6-3 Self check coil connections.....	6-7
Figure 6-4 Example of Returned Equipment Advice Form.....	6-17

7-Development and Technical Bulletins

Important Information

Legal statement	xi
Symbols used in this manual	xi
Aims of this manual	xii
Contacting MT Safeline	xii
Amendments to the manual	xiii
Amendment Record	xiii
General safety precautions	xiv
COSSH	xiv
Safe handling	xv
Safe operating conditions	xvi
Ensuring reliable operation	xvii

Important Information

Legal statement

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Mettler-Toledo Safeline reserves the right to change the contents or form of this manual at any time without prior notice having been given.

This detector must only be used for the express purposes as advertised by Mettler-Toledo Safeline and as referred to in this and other Mettler-Toledo Safeline approved literature

Symbols used in this manual

The following symbols are used throughout this manual, usually but not always in the right hand column.

Note



This indicates that there is some important information that will help you to understand the instructions more clearly, or add to your understanding of the topic.

Warning



This indicates that there is a danger of personal injury or death to personnel, damage or destruction of the equipment and its surroundings unless the instructions are closely followed.

Electrical Warning



This indicates that there is a danger of electrical shock unless the instructions are closely followed.

Aims of this manual

This manual is intended to help those MT Safeline Representatives who need to:

- Understand the warning, fault and error messages that may occur in the detector.
- Carry out troubleshooting on the detector.
- Carry out troubleshooting on the system.
- Carry out certain modifications to the detector.
- Carry out certain setup procedures on the detector.
- Order spare or replacement parts.
- Return the equipment to MT Safeline

This manual is **NOT** intended as:

- An Instruction manual.
- A Workshop Manual. No detailed technical analysis, either mechanical, electrical or electronic is contained in this manual.
- Commercial information, for example sales literature or publicity information.

MT Safeline technical publications are designed to be backwardly compatible with all previous versions of this model of detector. This means that the later issues of manuals will be fully compatible with older detectors, however the older detectors may not have all of the features of later products.

Contacting MT Safeline

For further information or to order copies of this manual contact MT Safeline at the address shown on the front page of this manual, quoting the document number given at the bottom of each page.

Remember to have your serial number or SR number ready when making a call to MT Safeline Customer Support. The serial number can be obtained by pressing the RECALL button on the module keypad or if the detector module is faulty consult your original order, paperwork or supplier for an SR number.



If you have any comments or suggestions as to the form, content or presentation of this manual then write to MT Safeline Customer Support at the address given on the front page.

Amendments to the manual

MT Safeline have a policy of updating manuals to include new features, correct errors, or incorporate customers' requests. The Amendment Record below is provided for you to record any amendments that you receive.

Amendment Record

If you receive an update for this manual then:

- 1 Inset the update sheet(s) into the manual.
- 2 In the table below:
 - Print the Issue number or description in the '**AMENDMENT**' column.
 - Print your name in the '**INCORPORATED BY**' column.
 - Print the date you updated the manual in the '**DATE**' column.



If you have to insert the new page at the end of the manual, then make sure you clearly mark the original page.

AMENDMENT	INCORPORATED BY	DATE
1 Issue 1.0	MT Safeline	12 April 2010
2		
3		
4		
5		
6		
7		
8		
9		
10		
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17		
18		
19		
20		

General safety precautions

Most companies have a code of practice for their employees which is designed to ensure their safety in the working environment. When new equipment is introduced it is important that operators, maintenance engineers and supervisors are aware of the potential hazards.

The following guidelines must be followed by any person concerned with the operation, installation or handling of the detector to ensure correct operation and to avoid any damage to the detector or to the person concerned.



The equipment should be installed and used only in accordance with the instructions given in the Instruction Manual.



On no account should any of the electrical panels of the detector be opened by anyone other than a qualified electrical engineer. Voltages in excess of 30 volts rms or 50 volts DC can in certain circumstances be lethal.

When working on electrical or electronic equipment always follow current health and safety practices and observe all other applicable regulations.

Always disconnect the power before disassembling this equipment.



For correct operation and to prevent any damage to the equipment, take care to follow the instructions given in this in this manual in section 2. Removal and refitting of parts.

COSHH



The detector does not contain any exposed noxious or dangerous substances.



Failure to comply with these instructions may lead to the protection provided by the equipment becoming impaired.

MT Safeline Ltd will not be liable for incidental or consequential damage if these instructions are not followed.

Safe handling



The metal detector can be damaged if it is moved by the aperture or by the cables. The diagram below shows the correct way to move the detector.

Ensure the metal detector is set to its lowest position before moving the system.

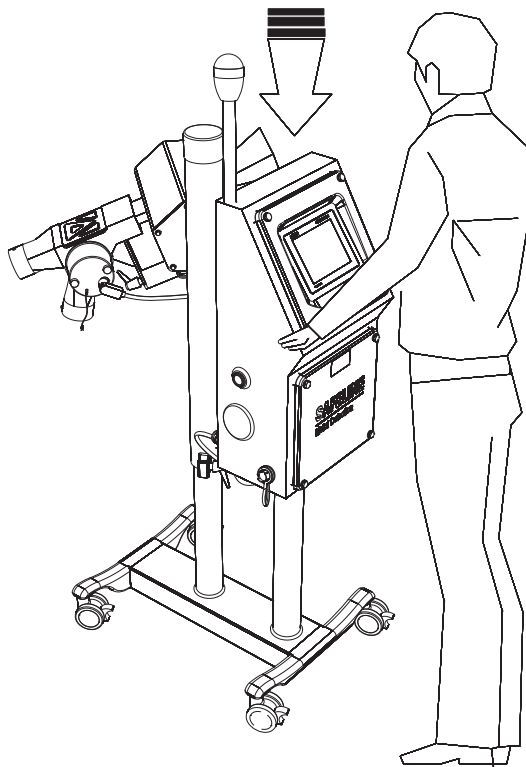


Figure i Safe handling



MT Safeline does not recommend the lifting or supporting of the detector by a person. Always use suitable lifting or supporting apparatus. MT Safeline will accept no liability for personal injury caused by attempting to lift or move the detector without the aid of a mechanical apparatus.



If supporting the detector in a sling or other lifting apparatus always ensure that the detector is securely held and is not likely to unbalance during lifting.

Safe operating conditions

In accordance with EN 61010-1:2001 this equipment has been designed to be safe under the following conditions:

- Indoor use
- Altitude:
up to 2000m
- Storage temperature:
-10°C to +50°C (15°F to 120°F)
- Operating temperature:
-10°C to + 45°C (15°F to 110°F)
- Maximum relative humidity:
93% for temperatures up to 45°C
- For connection to TN (EN60950-1:2001) power distribution systems only. For connections to other power distribution systems please contact your supplier.
- Mains supply voltage fluctuations not to exceed:
+10% / -15% of the nominal voltage
- Transient overvoltages according to INSTALLATION CATEGORY II.
- Pollution degree 2 in accordance with IEC 664

1-Overview

Introduction	1-3
Identification of serial and revision numbers.....	1-4
Information on the detector	1-4
Labels	1-4
Head Label	1-4
Using the menu system.....	1-5
Navigation controls.....	1-5
Information available in Running mode	1-6
Identification of major components.....	1-7
Block diagram	1-8
List of abbreviations.....	1-9

Overview

Introduction

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This detector must only be used for the express purposes as advertised by Mettler-Toledo Safeline and as referred to in this and other Mettler-Toledo Safeline approved literature

Identification of serial and revision numbers

Information on the detector

The serial number can be found in the following locations:

	<i>location</i>
Head	on a label attached to one of the head cables, and also on the identification label attached to the detector head end plate
Module	on a label attached to the module
Power Supply Unit	on a label attached to the power supply

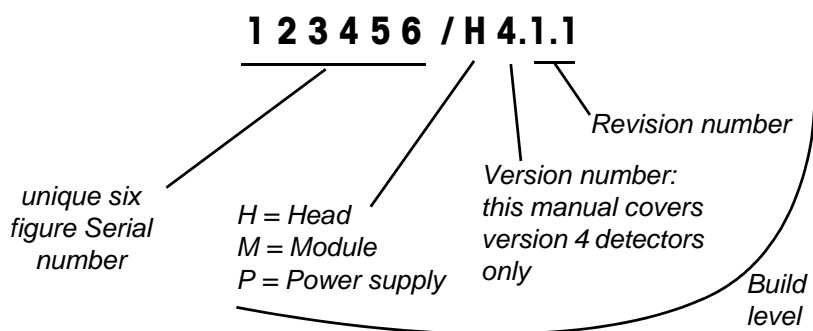


When contacting MT Safeline Customer Support, it is important to have the serial number to hand.

The serial number gives our support staff access to information about the exact specification of your detector, through our Sales and Support Database.

Labels

Serial numbers on the labels include the Build level, as shown here:



The serial number is also stored in the module memory. The following details can be obtained from the control panel display whilst in the normal running mode:

- machine type/model
- serial number
- software issue/version

Figure 1-1 Serial number format

Head Label

The identification label on the detector head end plate gives information about the detector, as in the following example:

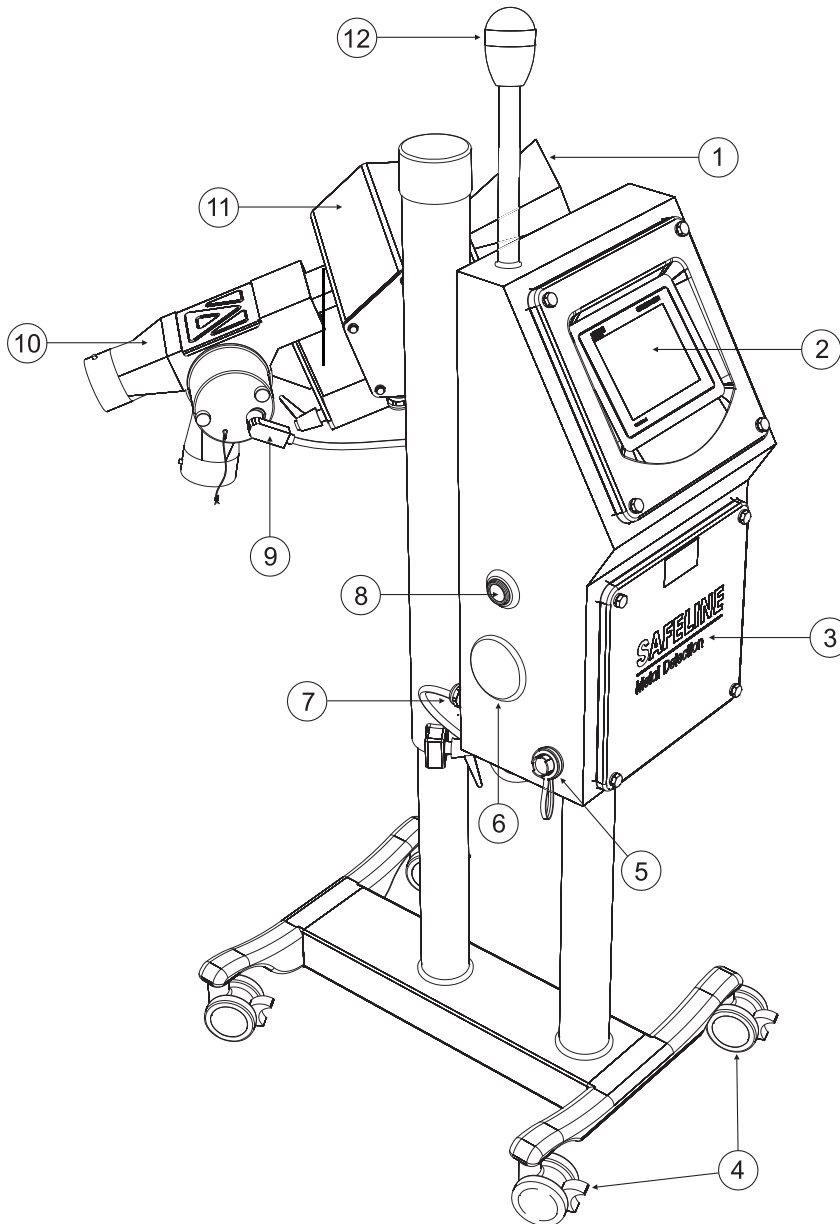
Coil Pitch	35mm
Detector Width	XXXmm (Dependant on aperture size)
Transmitter	DXXX3-1
Receiver	DXX-1

Figure 1-2 Identification label on detector head end plate

Transmitter and Receiver:

Coil type

Identification of major components



Item	Description
1	Product Throughput Chute
2	Touchscreen Display
3	Power Supply
4	Adjustable Castors
5	Ethernet / Printer Port
6	Gateway Antenna
7	Power Lead
8	RCU Reset Button
9	Reject Connector
10	Reject Unit
11	Detector Head
12	Tri-Colour Status Lamp

Figure 1-5 Identification of major components

2-Parts Identification

Module	2-3
Complete modules	2-3
Module front panel assembly: parts	2-4
Module stack: mounting.....	2-5
Module stack: parts.....	2-6
Module compartment: other parts	2-7
Power supply compartment	2-8
Power supply compartment: parts.....	2-9
Head: parts.....	2-9

Parts Identification

Module

Complete modules

Description	Quantity	Part no.
TABLEX-PRO SS MIRROR MODULE	1	5000-022

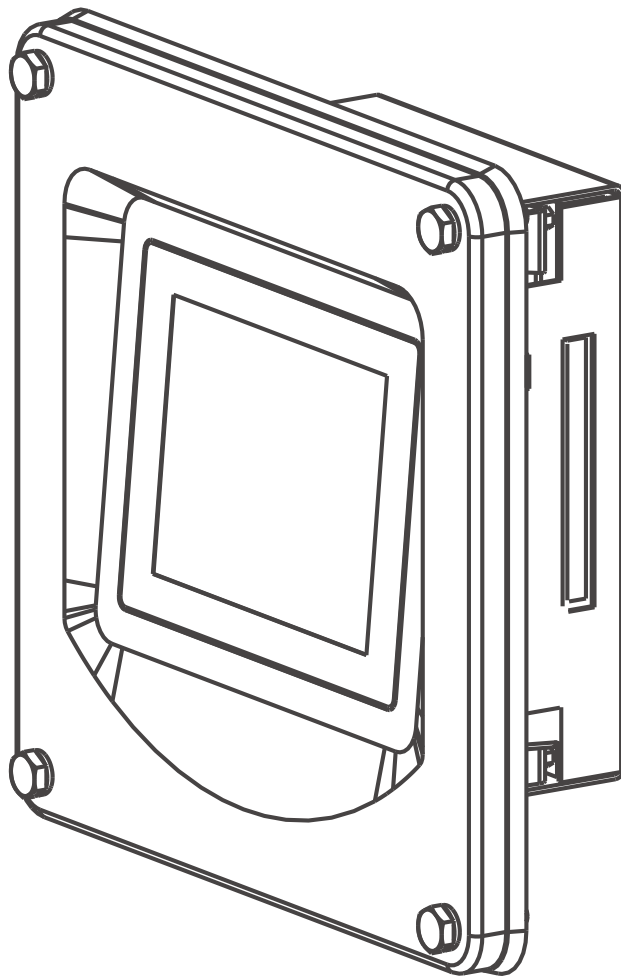


Figure 2-1 Module, complete

Module front panel assembly: parts

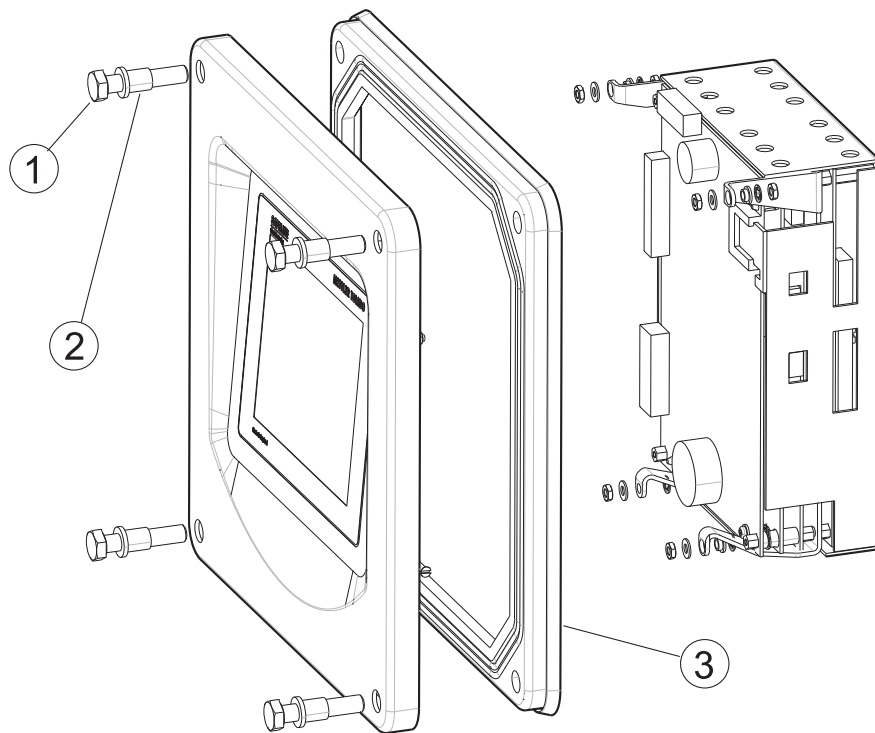


Figure 2-1 Module front panel assembly

Module front panel assembly: parts

Item	Description	Quantity	Part no.
	TABLEX-PRO FRONT PANEL ASSEMBLY (WITHOUT STACK)	1	5000-023
	TABLEX-PRO MODULE STACK ON CHASSIS	1	4500-455
	FLASH MEMORY CARD	1	4615-360
1	M8 X 30MM THIN HEAD STAINLESS STEEL BOLT	4	3204-202
2	M8 X 8MM TOP HAT	4	2140-043
3	MODULE SEAL	1	3118-748

3-Removal and Refitting of Parts

Module, removal and refit	3-3
Tools required	3-3
Removal of module	3-3
Removal of stack from the module	3-4
Refitting the stack to the module	3-5
Exchange of flash memory card.....	3-6
Refitting the module	3-6
Filtered interconnect board, removal and refit	3-8
Tools required	3-8
Removal.....	3-8
Refit.....	3-9
Fan, removal and refit	3-10
Tools required	3-10
Removal.....	3-10
Refit.....	3-10
User I/O board, removal and refit	3-11
Tools required	3-11
Removal.....	3-11
Refit.....	3-12
24V Reject supply, removal and refit	3-13
Removal.....	3-13
Refit.....	3-13
Switched Mode supply, removal and refit	3-13
Removal.....	3-13
Refit.....	3-13
Safeline Mains Filter, removal and refit	3-14
Removal.....	3-14
Refit.....	3-14
User I/O, tricolour lamp and reject relays, removal and refit	3-14

Removal.....	3-14
Refit.....	3-14
Head cable, removal and refit	3-15
Tools required	3-15
Removal.....	3-15
Refit.....	3-15

Removal and Refitting of Parts

Module, removal and refit



Always disconnect the power before disassembling this equipment.

Tools required

- 13mm spanner or nut spinner
- 8mm spanner or nut spinner

Removal of module

- 1 Disconnect the power.
- 2 Remove the four fixing bolts, using the 13mm spanner or nut spinner.
- 3 Carefully withdraw the module part way, taking care not to pull hard on any of the cables.



Be careful not to allow the front surface of the touch screen to become scratched, whilst the module is being removed .

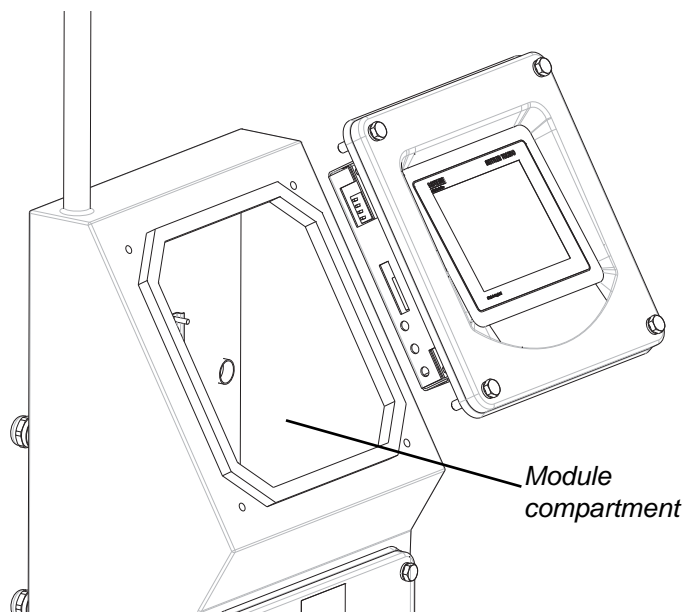


Figure 3-1 Removal of module



When unplugging cables, grip the plug firmly and do not pull on the wires.

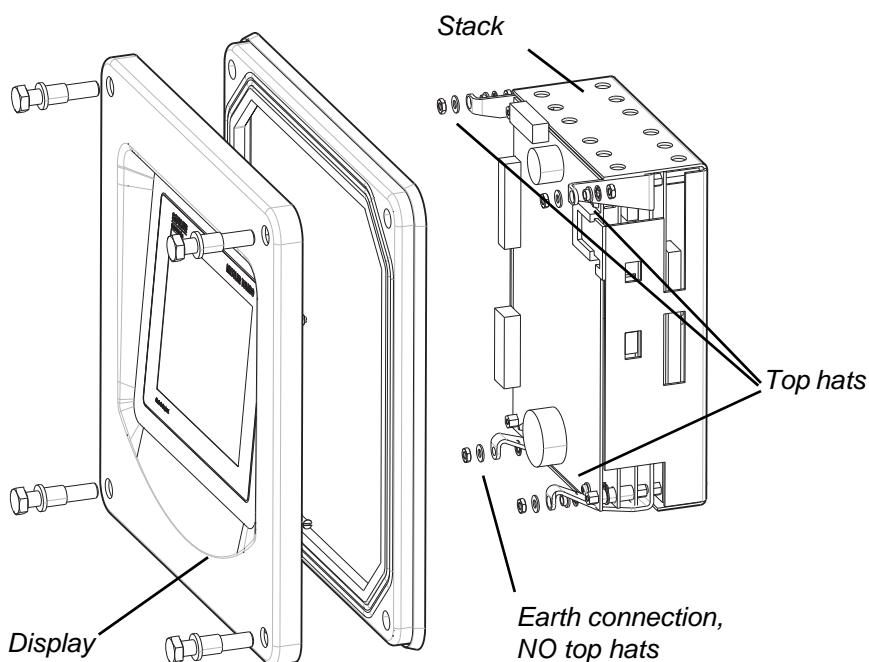
- 4 Disconnect all cables from the module.
- 5 Loosen the nut securing the earth wire to the module, using the 7mm spanner or nut spinner.
- 6 Withdraw the module completely.



Always make a note of the order in which nuts, washers and connection tags are fitted, so that they can be refitted in the correct order.

Removal of stack from the module

- 1 Remove the four nuts securing the stack to the display, using the 7mm spanner or nut spinner.



! Be careful not to allow the front surface of the touch screen to become scratched, whilst the module is being worked on.

! Note that three of the securing nuts have plastic top hats and washers.

The nut that secures the earth connection has metal washers and NO top hat.

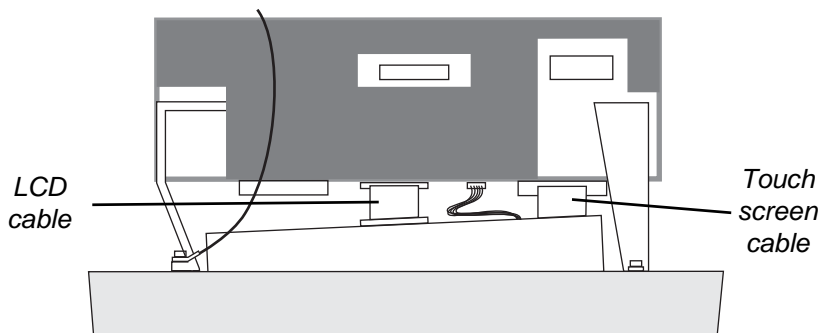
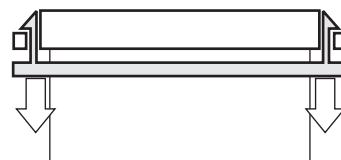


Figure 3-2 Removal of stack

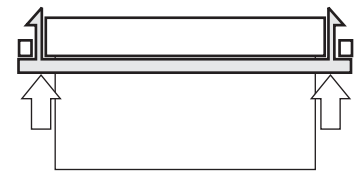
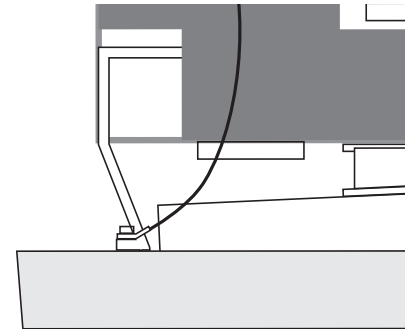
- 2 Disconnect the touch screen cable from the stack.
- 3 Carefully lift off the stack.
- 4 Disconnect the LCD cable (at both ends):
 - Gently pull both sides of the latch to release the cable.
 - Pull the cable out of the connector.



LCD cable latch released

Refitting the stack to the module

- 1** Reconnect the LCD cable at both ends, making sure you close both latches.
- 2** Replace the stack onto the display, taking care to fold the LCD cable neatly into the space between the two.
- 3** Refit the four nuts and washers, making sure that:
 - three have plastic top hats and washers fitted, and the earth bolt has metal washers only, and NO top hat
 - the earth tag is oriented such that it will not get trapped when the module is refitted to the detector head.
- 4** Reconnect the touch screen cable.

*LCD cable latch closed**Earth connection*

4-Connections

User I/O board layout	4-3
Terminal and link descriptions	4-4
Connecting to the programmable inputs.....	4-9
Connecting to the sensor inputs.....	4-11
Power supply connections inside detector head.....	4-12
DIN rail connections in module compartment	4-13

Connections

User I/O board layout

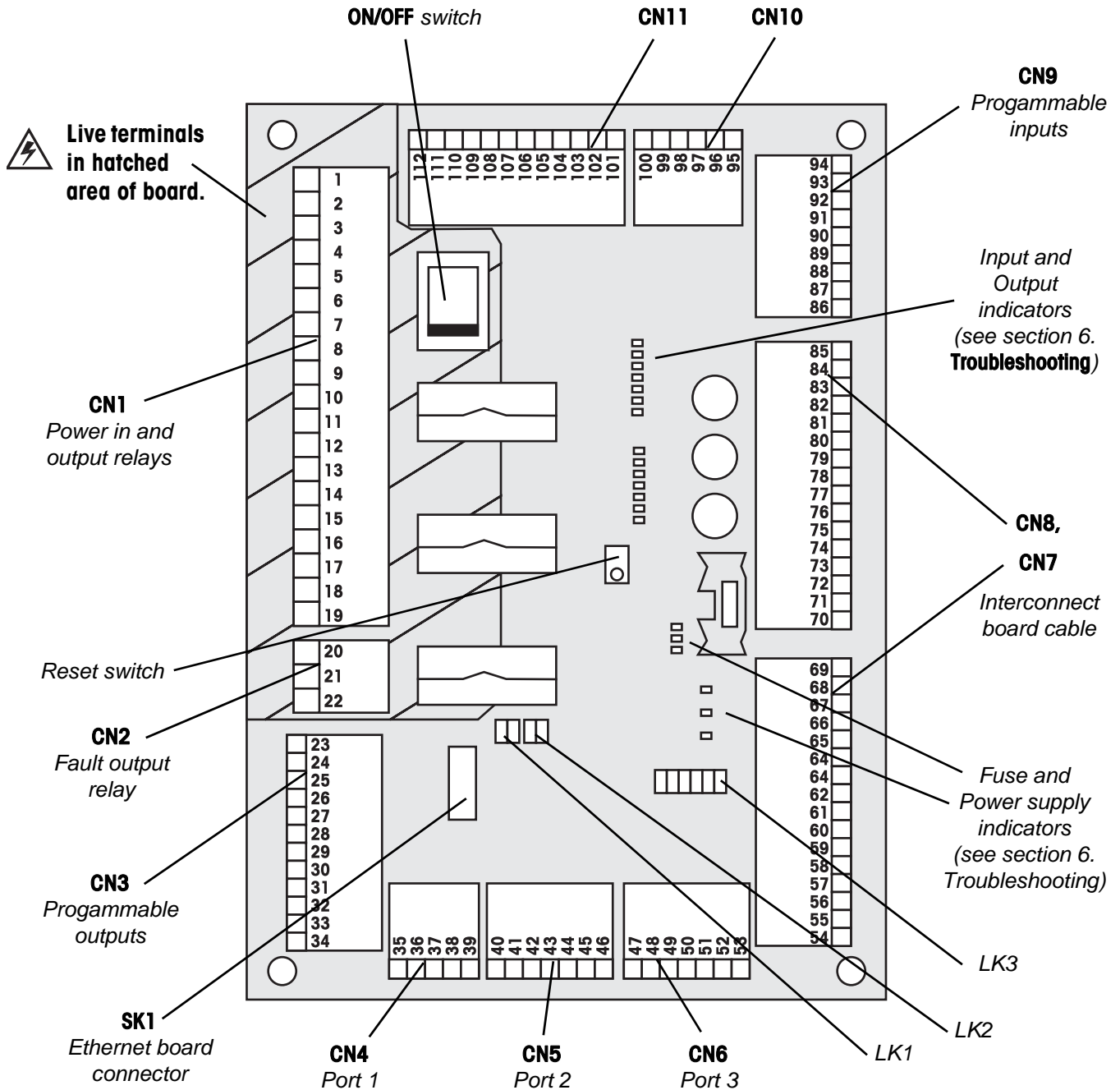


Figure 4-1 User I/O board layout

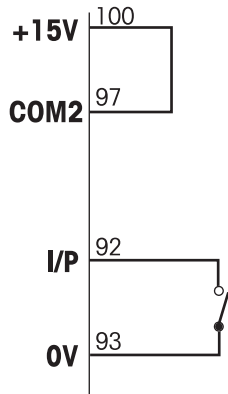
Connecting to the programmable inputs

examples, using programmable input 1

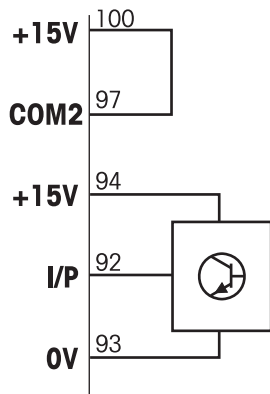


All sensors connected to the programmable inputs must be the same output type, ie PNP or NPN.

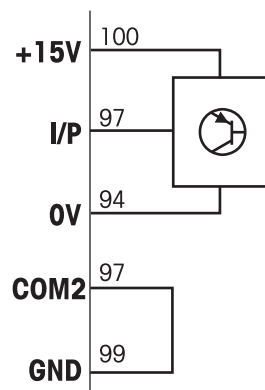
volt-free contacts



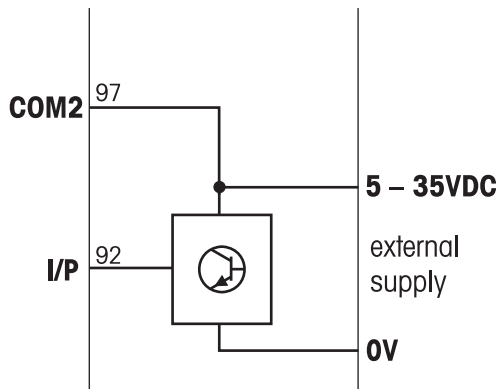
NPN



PNP



NPN isolated



PNP isolated

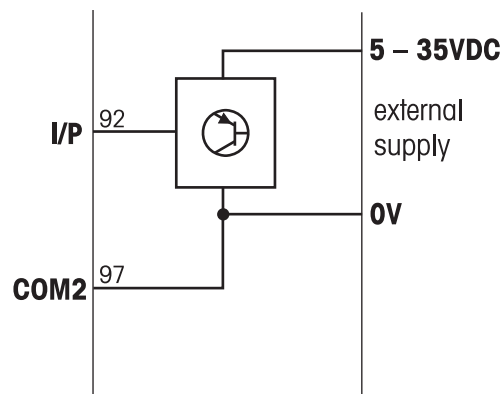


Figure 4-2 Examples of connections to programmable inputs

DIN rail connections in module compartment

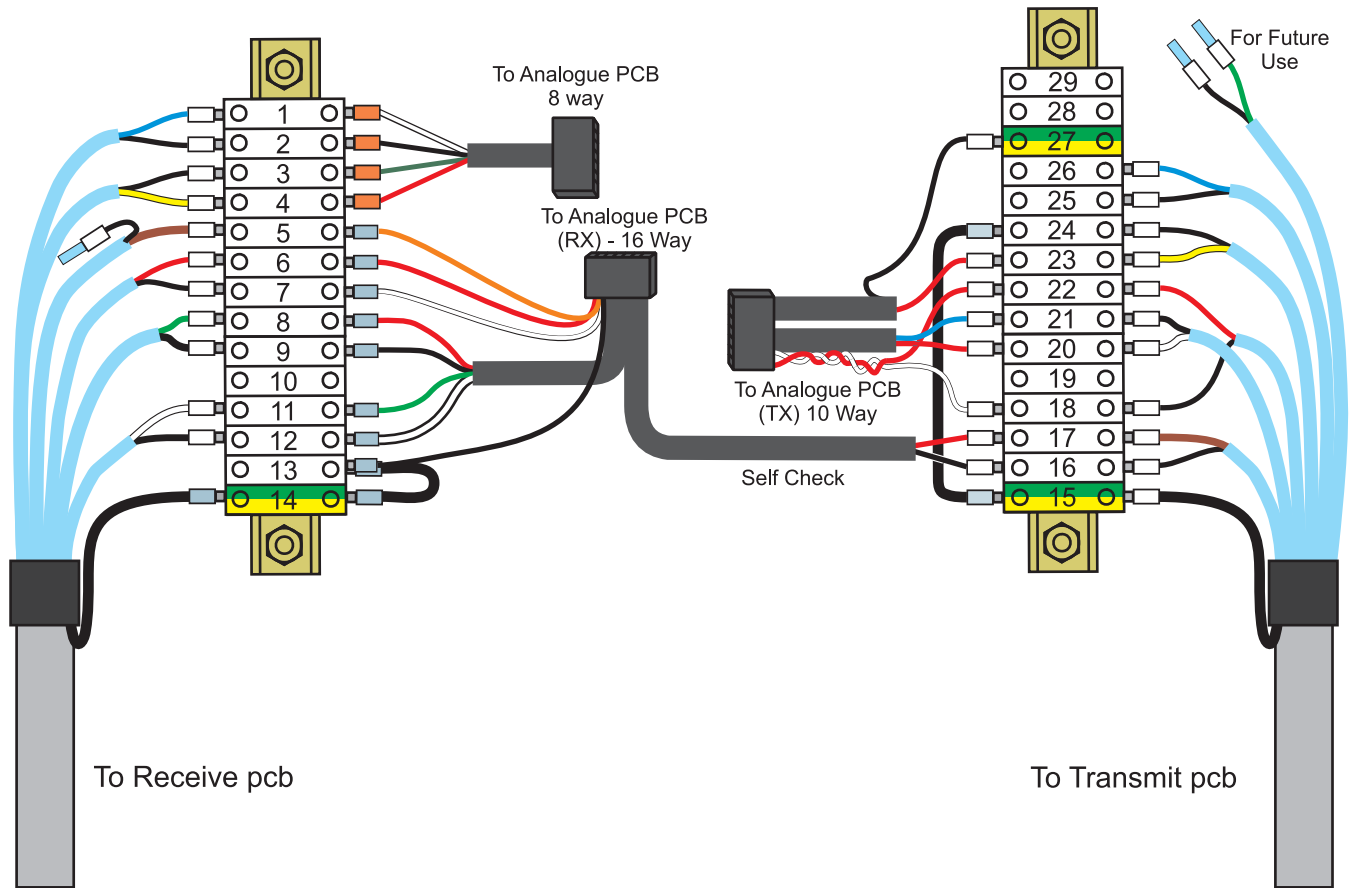


Figure 4-4 DIN rail connections

5-Maintenance Procedures

Using the menu system	5-3
Navigation controls.....	5-3
Information available in Running mode	5-4
Passcode protected access levels	5-7
Standard Authentication.....	5-8
21CFR and Metrisync Authentication.....	5-8
Safeline access level security passcode	5-9
Safeline access level.....	5-10
Factory settings.....	5-10
Safeline access level - menu tree	5-11
Use of Flash Card	5-12
Overview	5-12
Memory usage.....	5-12
Exchange of flash memory card.....	5-13
Restoring factory settings	5-14
Tools required	5-14
Restore factory defaults	5-14
Calibrating the touchscreen.....	5-15
Head settings	5-16
Frequency calibration.....	5-20
Self check.....	5-23
Auto setup calibration.....	5-25
Software update	5-26
Connecting cable	5-26
Setting up the download utility	5-27
Downloading the software update file	5-28
Replacement of transmitter and receiver boards	5-30
Tools required	5-30
Removal of covers.....	5-31
Removal of transmitter board	5-32
Refitting the transmitter board	5-33
Tuning the transmitter board	5-34

Removal of receiver board	5-37
Refitting the receiver board	5-38
Tuning the receiver board.....	5-38
Balancing the receiver coil	5-42
Setting the powerdrive levels	5-44
Setting the Reference phase	5-45
Self check	5-47
Auto setup calibration	5-49
Factory vibration.....	5-49
Calibrating the touchscreen	5-50
System Test Menu	5-51
Soak Test	5-52
Final Test.....	5-55
Service Menu.....	5-59
Performance Verification Alarm	5-60
Check List	5-62
Diagnostic Log	5-62
Flash Options.....	5-63
LCD Brightness	5-63
Upgrading the Ethernet Adapter firmware	5-64
Useful tips.....	5-68
How to display the Installation level passcode.....	5-68

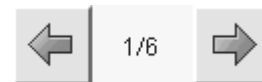
Maintenance Procedures

Using the menu system

Navigation controls

The following controls are used consistently throughout the module display screens, to navigate through the detector's operating and adjustment menus:

Page navigation: Some menus are spread over more than one page. Press the left or right arrows to move between pages.



Return: Some menus have multiple levels. Press to return to a previous level in the menu.



Login or Logout: Press login to access the passcode-protected higher level menus. Press the logout to return to running mode.



log in



log out

Information: Press to access information or help about the current display.



Confirm or Cancel: Press confirm to accept a new setting. Press cancel to escape without changing the setting.



confirm



cancel

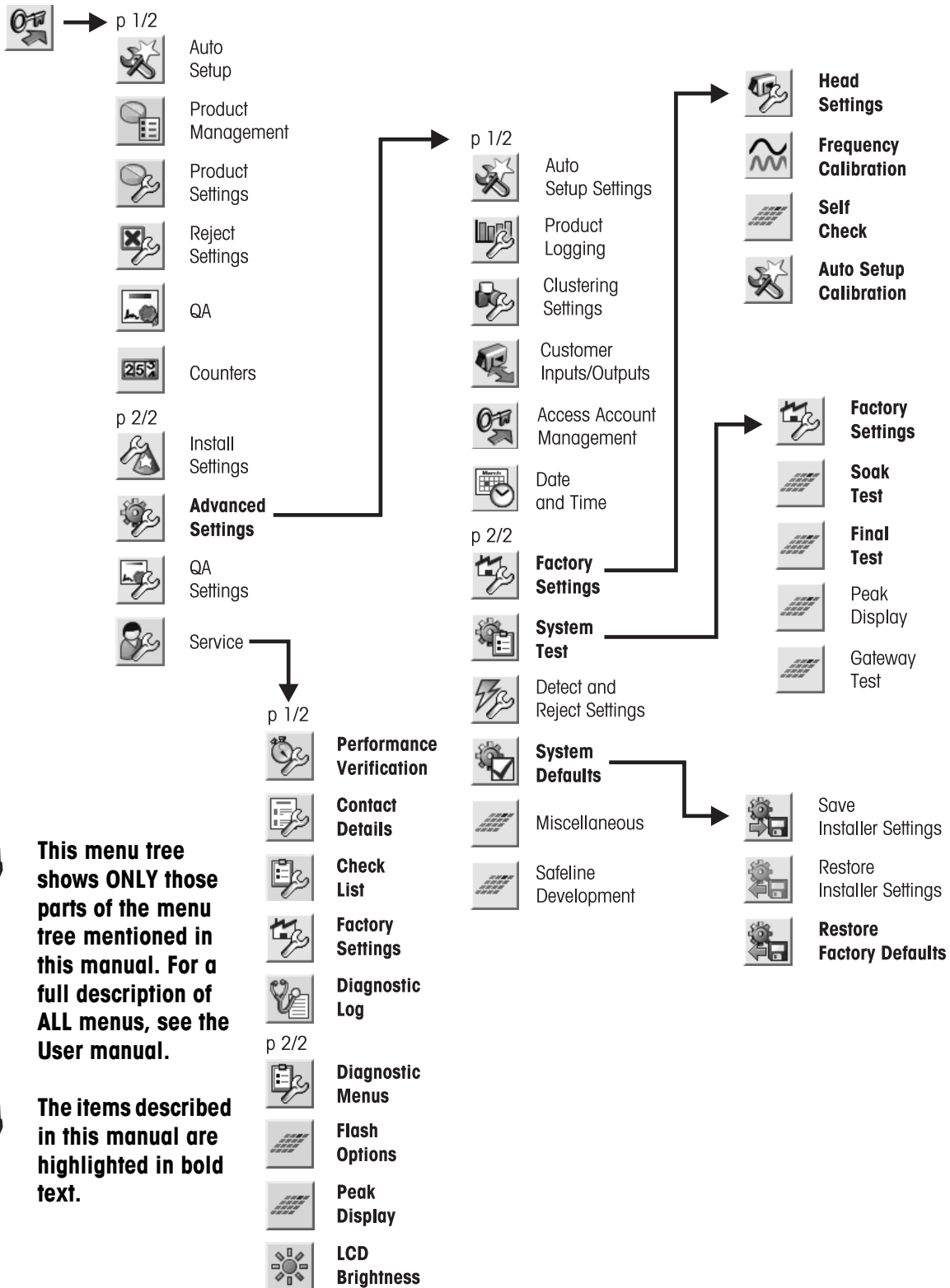


Do not try to operate the touch screen using anything harder than your finger. This could damage the display.



Other controls are described when necessary, on the following pages.

Safeline access level - menu tree



This menu tree shows **ONLY** those parts of the menu tree mentioned in this manual. For a full description of **ALL** menus, see the User manual.



The items described in this manual are **highlighted** in bold text.

Figure 5-11 Safeline access level - menu tree

Use of Flash Card

Overview

System information and running data are stored in the module CPU board in a combination of **ROM**, battery-backed **RAM** and **Flash RAM**. The Flash memory card can be removed and transferred from one module to another.

The diagram below shows how the following data types are stored in the different types of memory.



*In previous versions of detector, a backup of the CPU RAM data was kept in an **EEPROM** mounted on the Interconnect board.*

*In current detectors that backup is now kept on a removeable **Flash memory card**, mounted on the CPU board.*

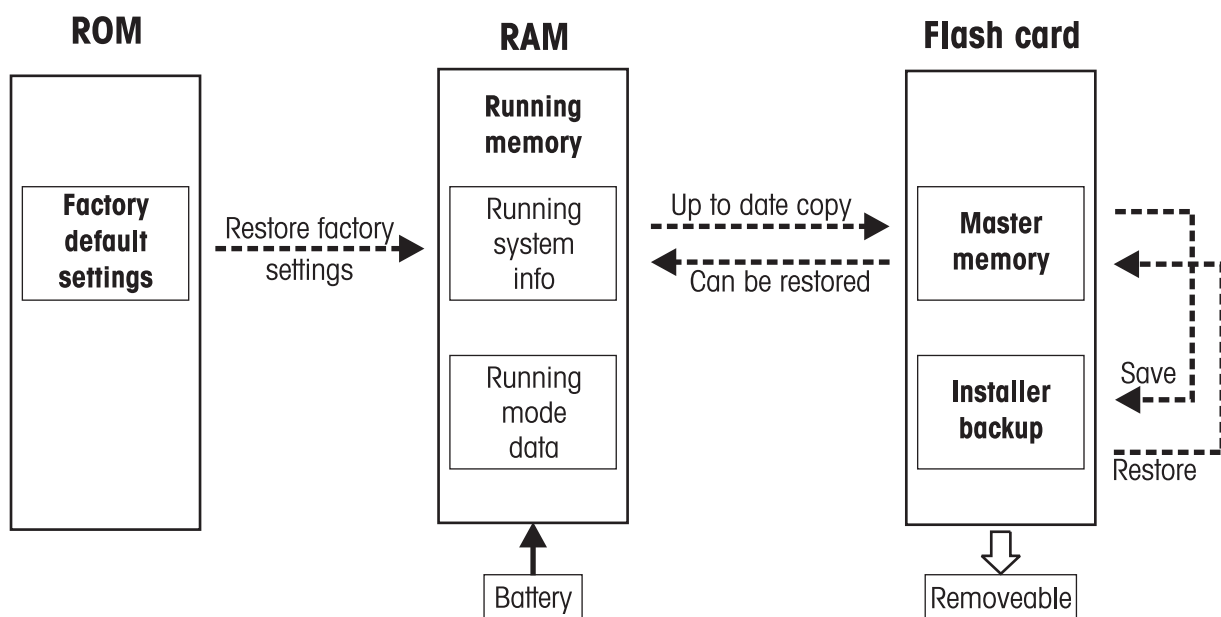


Figure 5-12 Memory overview

Memory usage

Factory default settings:

Used for system initialisation after a software upgrade or major data loss. Settings are copied into Running memory and Master memory. Set during the CPU software design, and cannot be edited.

Running system info:

Current state of all menus settings, but not data. Stored in battery-backed RAM. All changes are copied to the Flash memory card in case of battery failure.

Running mode data:

Data such as Reject counts, Histogram Information, Time and Date, QA running Alarms and Logging Information. Not copied to Flash memory card, so will be lost if module is swapped or battery fails.

Master memory:

Copy of Running system info. Updated every time a menu change is made. Used as a backup if battery fails, or to transfer settings to another module. Does not include Running mode data, some examples of which are listed above.

If, when the detector is switched on, the RAM is found to be faulty, the Running system info is restored from the Master memory. On the other hand, if the Flash memory is found to be faulty, the Running system info is copied to the Master memory.

Installer backup:

Copy of Master memory made when **Save Installer Settings** is selected from the Installation menu. Copied back when **Restore Installer Settings** is selected. Can be used as a customer's 'reset to defaults'.

Exchange of flash memory card

If the module is being exchanged, then the flash memory card should be removed from the old module and installed in the new module, before refit. This will transfer all settings from the old module.

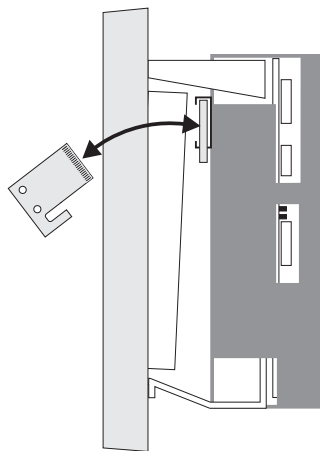





Figure 5-13 Exchange of flash memory card

Another use of the flash memory card is to copy the settings from one detector to another detector, to ensure identical operation.

 *The flash memory card is keyed, so that it cannot be inserted the wrong way round.*

 **Be careful not to break off the key tab.**

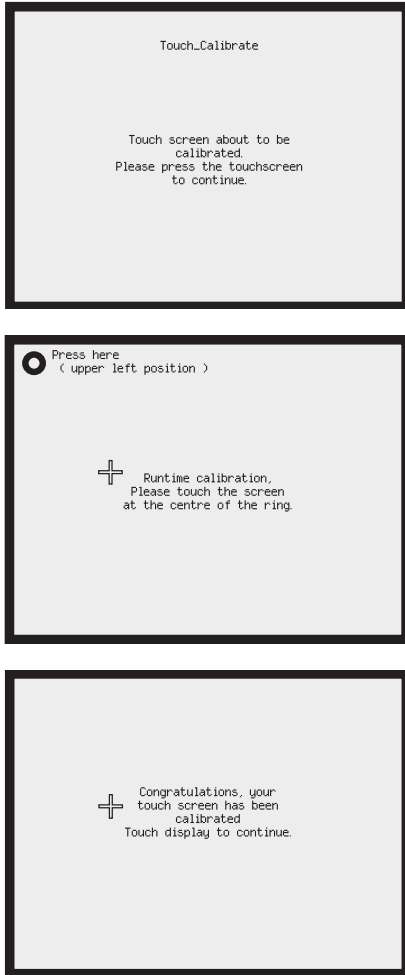
 *If it is found that the contents of the RAM and the flash memory card have become corrupted, then you will need to carry out the **Factory settings** procedure described on the next page.*

 *The format of the data stored in flash memory may change in future versions of the detector software.*

If a newer, incompatible flash card is inserted into an older module, an error message will ensure that no data is lost.

Calibrating the touchscreen

- 3 Follow the instructions on-screen, pressing the touchscreen as directed.



Touchscreen calibration is shown here as part of the procedure to restore factory defaults. However, this can be done at any time:

Switch off the detector, hold a finger against the touchscreen, and switch back on.

Figure 5-16 Touchscreen calibration

- 4 When the calibration is complete, press the touchscreen one more time, and the detector will restart as normal.

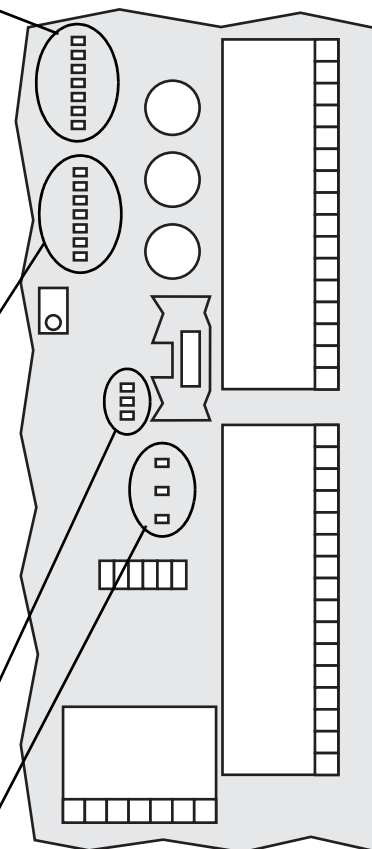
6-Troubleshooting


Indicators	6-3
Overview of displayed faults and warnings	6-4
Early warning.....	6-4
Warning.....	6-4
Fault.....	6-4
Overriding a fault display.....	6-5
Displayed faults and warnings	6-6
Fault messages.....	6-6
Warning messages.....	6-10
Early warning messages.....	6-12
Detector triggering problems	6-13
Known issues and their solutions	6-15
Returning equipment	6-16
Return instructions.....	6-16
Emergency replacement parts (ERP) procedures.....	6-16
Returned Equipment Advice Form.....	6-17

Troubleshooting

Indicators

	<i>Input Indicators - green</i>
<input type="checkbox"/> RCU	Reject Confirmation sensor indicator
<input type="checkbox"/> SPEED	Speed sensor indicator
<input type="checkbox"/> PACK	Pack sensor indicator
<input type="checkbox"/> PROG1	Programmable Input 1 indicator
<input type="checkbox"/> PROG2	Programmable Input 2 indicator
<input type="checkbox"/> PROG3	Programmable Input 3 indicator
<input type="checkbox"/> RESET	Reject Confirmation Fault reset indicator
	<i>Output Indicators - red</i>
<input type="checkbox"/> REJECT	Reject relay drive indicator - normally ON
<input type="checkbox"/> RCU	Reject Confirmation relay drive indicator - normally ON
<input type="checkbox"/> FAULT	Fault relay drive indicator - normally ON
<input type="checkbox"/> PROG1	Programmable Output 1 drive indicator - see note
<input type="checkbox"/> PROG2	Programmable Output 2 drive indicator - see note
<input type="checkbox"/> DETECT	Detect Output drive indicator - normally ON
<input type="checkbox"/> CPU FAULT	CPU fault indicator - normally OFF
	<i>Fuse Indicators - red</i>
<input type="checkbox"/> F1	auto-reset fuse
<input type="checkbox"/> F2	auto-reset fuse
<input type="checkbox"/> D12	normally OFF
	<i>Power supply Indicators - red</i>
<input type="checkbox"/> +6.5V	6.5V output from switch mode supply
<input type="checkbox"/> +15V	+15V output from switch mode supply
<input type="checkbox"/> -15V	-15V output from switch mode supply



 The **Programmable** outputs can be configured for N/O or N/C. This is done in **Advanced Settings** at **Installation access level**.

The **PROG1** and **PROG2** indicators are **OFF** when the contacts are **OPEN**, and **ON** when they are **CLOSED**.

Figure 6-1 Indicators

Overview of displayed faults and warnings

Early warning

An early warning display gives advanced notice that a detector error may be about to occur. The detector can continue to be used, pending arrival of a service engineer.

Early warning			
Message	Fault relay	Reject relay	Programmable output
	inactive	normal	available

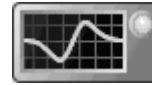


For a full description of all **Early warning, Warning and Fault** conditions, see the following pages.

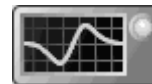
Warning

A warning display indicates that a non-fundamental error has occurred, that does not affect the operation of the detector. The detector can continue to be used, pending arrival of a service engineer.

Warning			
Message	Fault relay	Reject relay	Programmable output
displayed until cleared or acknowledged	active until cleared or acknowledged	normal (with exceptions)	available



Indicator lamp
amber



Indicator lamp
amber

Fault

A fault display indicates that a fundamental error has occurred that prevents the detector from being used. The only controls that will work are the **Condition monitor** and **Information** buttons.

To make **Power drive** and **Out of balance** measurements, use the **Fault condition override**, described on the next page.

Fault			
Message	Fault relay	Reject relay	Programmable output
permanent until cleared	active until cleared	permanent reject (with exceptions)	no



Indicator lamp
red

Returned Equipment Advice Form

SAFELINE Metal Detection CUSTOMER SUPPORT DEPT METTLER TOLEDO SAFELINE LIMITED MONTFORD ST SALFORD M50 2XD ENGLAND		QAD 195
TEL : 00 44 161 848 8636 FAX : 00 44 161 875 1011		MT Safeline Repair Number: R
RETURNED EQUIPMENT ADVICE (R.E.A)		
DETAILS		
AFTER REPAIR EQUIPMENT TO BE DELIVERED TO:		TO BE INVOICED TO:
Date of Issue.	Customer Ref.	Details of Courier to UK.
Value of Equipment	After the repair should the equipment (please cross selection)	
	Be returned to The customer?	Credited on return?
		Returned to Safeline stock?
SPECIAL REQUIREMENTS / REQUESTS		
EQUIPMENT		
Original SR Number	Date of Supply	Warranty Claim <input type="checkbox"/> Yes
DESCRIPTION OF RETURNED GOODS		
Module <input type="checkbox"/> Power supply <input type="checkbox"/> Detector <input type="checkbox"/> Reject device <input type="checkbox"/> Stand <input type="checkbox"/> PCB's <input type="checkbox"/> System parts <input type="checkbox"/>		
Head Serial number	Module Serial number	Power supply serial number
REASON FOR RETURN		
COMMODITY CODES :- METAL DETECTOR PARTS = 8543909590 METAL DETECTORS = 8543899799		
SHIPPERS PLEASE CONTACT METTLER TOLEDO SAFELINE CUSTOMER SUPPORT DEPT. FOR IPR AUTHORISATION NUMBER		

Figure 6-4 Example of Returned Equipment Advice Form

7-Development and Technical Bulletins

Introduction	7-3
Technical Bulletins	7-4
TecBul-0061: E1.4 Ethernet Adapter Firmware Release	7-4
TecBul-0093: F4.4.0 Tablex-PRO/Pharma GF-PRO firmware	7-5
<i>Application Specific Software</i>	<i>7-6</i>
<i>CFR Part 11 Compliance</i>	<i>7-8</i>
<i>Batch and Product Code ID Field</i>	<i>7-11</i>
<i>The Tri-Colour System Status Lamp (Tablex-PRO only)</i>	<i>7-13</i>
<i>Default Running Mode Display</i>	<i>7-14</i>
<i>Detection Mode</i>	<i>7-15</i>
<i>LCD Brightness Control</i>	<i>7-18</i>
<i>Service Menu Additions</i>	<i>7-19</i>
<i>Compatibility</i>	<i>7-20</i>
TecBul-0094: E1.4 Ethernet Adaptor Software Issue	7-21
<i>Issue</i>	<i>7-21</i>
<i>Workaround</i>	<i>7-21</i>
<i>Resolution</i>	<i>7-21</i>

Development and Technical Bulletins

Introduction

Development Bulletins and **Technical Bulletins** are issued from time to time, to complement and update the information given in **Operation and Instruction Manuals** and **Service Training Manuals**.

Bulletins that are relevant to the servicing of this product and were available when this manual was published, are included on the following pages - however, later bulletins may be available.



To find out whether **later Bulletins** are available for this product, contact MT Safeline at the address shown on the front page of this manual, quoting the document number given at the bottom of each page.

Remember to have your serial number or SR number ready when making a call to MT Safeline Customer Support. The serial number can be obtained by pressing the RECALL button on the module keypad or if the detector module is faulty consult your original order, paperwork or supplier for an SR number.

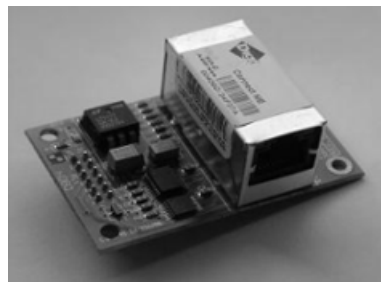
Technical Bulletins

TecBul-0061: E1.4 Ethernet Adapter Firmware Release

Summary

An issue came to our attention regarding the E1.3 release of Ethernet Adapter. On occasion, both the V3 & V4 Ethernet Adapters failed to boot. This is irrespective of protocol or application.

In addition to this, a further issue was identified with the Adapters when configured to operate with an OPC Server.



The ethernet adapter and firmware supplied with the Tablex-Pro detector does not have any known issues.

This technical bulletin is included, in case an older adapter is used with a Tablex-Pro detector.

Issues

During a power cycle, the Ethernet Adapter can on occasion fail to boot.

Tests have shown this to occur 5% of the time, however, this cannot be guaranteed and this may in fact be more frequent.

When configured to operate with an OPC Server, the device would fail to close down any connections following an Ethernet Cable disconnection.

Corrective Action

A new version of firmware E1.4 has now been released.

This firmware shall be available to modify Ethernet Adapters in the field (E1.1 or greater) as and when required.

It is recommended that any OPC Server installations currently using E1.1 or greater are upgraded to E1.4.



See also:

TecBul-0094: E1.4 Ethernet Adaptor Software Issue

TecBul-0093: F4.4.0 Tablex-PRO/Pharma GF-PRO firmware**Purpose**

This Technical Bulletin introduces the new Tablex-PRO/ Pharma GF-PRO firmware F4.4.0. Unlike before only a single variant called F4.4.0 is being released to support ALL languages.

Also this firmware requires the use of the new H8SX/1648 CPU card (MT Safeline Stock Code 4615-408).



This technical bulletin is included, to give an overview of the new features included in the F4.4.0 firmware release.

Overview

This release of the firmware incorporates a number of new features, modifications and functionality.

- Pharmaceutical Functionality
 - Application Specific Software
 - 21CFR Part 11 Compliance
 - Batch ID and Product Field
 - Detection Mode (Boost Mode)
- Default Running Mode Display
- LCD Brightness Control
- Service Menu Changes
- Current Languages Supported:
 - ENGLISH
 - GERMAN
 - FRENCH
 - ITALIAN
 - SPANISH
 - PORTUGUESE
 - POLISH
 - DUTCH
 - SWEDISH
 - DANISH
 - NORWEGIAN
 - FINNISH
 - CZECH
 - TURKISH
 - RUSSIAN
 - SIMPLIFIED CHINESE
 - TRADITIONAL CHINESE
 - THAI
 - SERBIAN
 - KOREAN
 - JAPANESE

Application Specific Software

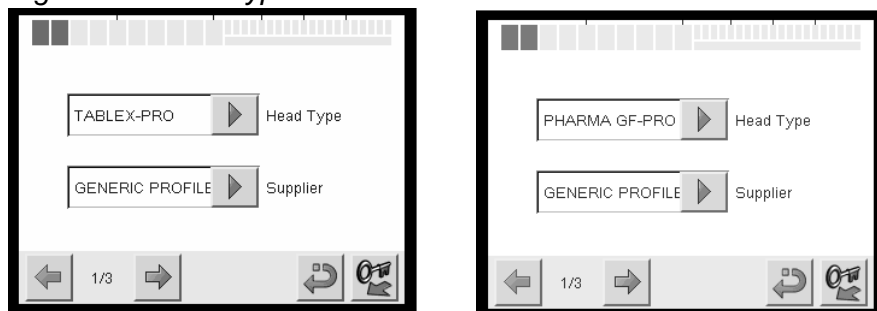
At SAFELINE access level, it is now possible to define the 'Head Type', in addition to the existing options, as "Pharma GF-PRO" and "Tablex-PRO".

Doing so will pre-configure operational settings and hide redundant/ superfluous settings and menus which are not applicable. They are shown in the table below:

Table 1 – Default Pharmaceutical Settings

Setting	Pharmaceutical Default
Vector Diagrams	OUT
Clustering	OUT
Phase Control	IN
Pack Sensor	OUT
Speed Sensor	OUT
Self Check Coil	IN
Phase Log Display	OUT

Figure 1 – Head Type Selection



New icons have been designed and displayed only when the 'Head Type' is configured as either 'Tablex-PRO' or 'Pharma GF-PRO'. All icons that are 'product' related will change to reflect the pharmaceutical theme.

For example:



When 'Head Type' is configured to 'Tablex-PRO', Running Mode page 1 will change to display Tablex-PRO. This will be the same for all "Suppliers" (including SLINC).