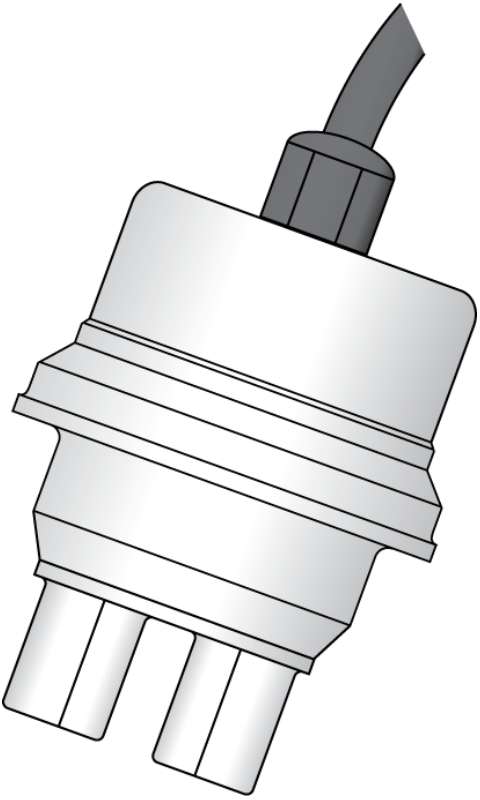
MXD70 SERIES

Multi-parameter Monitor



Suspended Solids / Turbidity Setup and Operating Guide

Preface

Product warranty

Both the MXD70 Suspended Solids Input Card and MXD70 Turbidity Input Card have a warranty against defects in materials and workmanship for three years from the date of shipment. During this period Quadbeam Technologies will, at its own discretion, either repair or replace products that prove to be defective. The associated software is provided 'as is' without warranty. Sensor warranty is 12 months from date of shipment.

Limitation of warranty

The foregoing warranty does not cover damage caused by accidental misuse, abuse, neglect, misapplication or modification.

No warranty of fitness for a particular purpose is offered. The user assumes the entire risk of using the product. Any liability of Quadbeam Technologies is limited exclusively to the replacement of defective materials or workmanship.

Disclaimer

Quadbeam Technologies Ltd reserves the right to make changes to this manual or the instrument without notice, as part of our policy of continued developments and improvements.

All care has been taken to ensure accuracy of information contained in this manual. However, we cannot accept responsibility for any errors or damages resulting from errors or inaccuracies of information herein.

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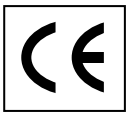
Manufacturing Standards



Electromagnetic compatibility

This instrument has been designed to comply with the standards and regulations set down by the European EMC Directive 2004/108/EC using BS EN 613-1: 2013

Safety

This instrument has been designed to comply with the standards and regulations set down by the European Low Voltage Directive 2006/95/EC using BS EN 61010-1: 2010

Quality

This instrument has been manufactured under the following quality standard:

ISO 9001:2008. Certificate No: FM 13843

Note: The standards referred to in the design and construction of Quadbeam Technologies products are those prevailing at the time of product launch. As the standards are altered from time to time, we reserve the right to include design modifications that are deemed necessary to comply with the new or revised regulations.

Contents

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Suspended Solids Input Card Specification

Supported Sensor Types	Quadbeam S Series.
Sensor Input	Proportional probe signal from 0 to 16000
Linearization	The incoming probe signal can be converted to standard engineering units using one of two user definable linearization curves consisting of up to 10 points.
Sensor Cable Length	Up to 100 meters
Display Units	User selectable from, %, NTU, FTU, mg/l, g/l, ppm, ppt, EBC, OD In ranges of 0-10.00, 0-100.0, 0 – 9.999, 99.99, 999.9 and 9999 (ranges available vary depending on which units have been selected).
Repeatability	±10 Probe input signal.
Repeatability	± 0.1% of range.
Calibration Timer	Inbuilt calibration count down timer which will trigger an alarm when calibration interval has expired.
Sensor Input filter	Adjustable filter that averages the sensor input over a user selectable time (1 – 32 Seconds).

Turbidity Input Card Specification

Supported Sensor Types	Quadbeam T Series.
Sensor Input	Proportional probe signal from 0 to 32000
Linearization	The incoming probe signal can be converted to standard engineering units using one of two user definable linearization curves consisting of up to 10 points.
Sensor Cable Length	Up to 100 meters
Display Units	User selectable from, %, NTU, FTU, mg/l, g/l, ppm, ppt, EBC, OD In ranges of 0-10.00, 0-100.0, 0 – 9.999, 99.99, 999.9 and 9999 (ranges available vary depending on which units have been selected).
Repeatability	±10 Probe input signal.
Repeatability	± 0.1% of range.
Calibration Timer	Inbuilt calibration count down timer which will trigger an alarm when calibration interval has expired.
Sensor Input filter	Adjustable filter that averages the sensor input over a user selectable time (1 – 32 Seconds).

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Installation and Choice of Suspended Solids / Turbidity Sensors

Quadbeam Sensors incorporate engineering improvements to eliminate water ingress and also withstand the rapid temperature cycling (from 10^{0}C to 80^{0}C) which occurs during CIP cleaning cycles. By design, Quadbeam™ sensors automatically compensate for component ageing, sensor fouling and daylight interference.

The Quadbeam alternating light principle is based on a fundamental method of suspended solids measurement by shining a light of known intensity a fixed distance through a medium at a photocell detector. Suspended solids in the medium attenuate some of the light. The detector current gives a measure of the attenuation that corresponds to the suspended solids and turbidity measurement.

The Quadbeam alternating light principle compensates for variations in light intensity and detector sensitivity and detector sensitivity by using two detectors and two light sources switched on and off alternatively. The resulting probe signal can then be converted to appropriate engineering units by using the instruments linearisation curve (see page 14).

However some factors are far too complicated to be modelled or compensated for (e.g. bubbles, refraction effects due to elevated temperatures etc.) and must be minimised at the monitoring point.

The sensors are available with different sensitivity levels and measuring ranges by changing the distances between the light sources and detectors. Sensors with shorter path lengths can measure higher concentrations and have larger measuring ranges where as sensors with longer path lengths are more sensitive to small changes in suspended solids concentration.

S Series Suspended Solids Sensors

The S Series of suspended solids sensors are available as immersion or hygienic style sensors and both are capable of operating in temperatures up to 85^{0}C.

The immersion sensors are designed for continuous on-line monitoring of suspended solids in industrial and municipal water and waste water treatment plants, mining and refining operations.
Applications include: Effluent monitoring in clarifier overflow weirs, Final effluent monitoring, Mixed liquor suspended solids, Product loss in milk processing plants, Return activated sludge, Sludge blanket detection, White water solids concentration.

The hygienic style sensors are designed for installation directly into food product lines where CIP cleaning is used. The one piece Polypropylene construction with a surface finish of better than 0.9µm Ra eliminates bacteria traps. The sensors have an industry standard triclover connection.
Applications include: Milk fat measurement in the dairy industry, Percentage solids measurement in fruit and vegetable juices, Product breakthrough on plate heat exchanges, Solids content in whey.

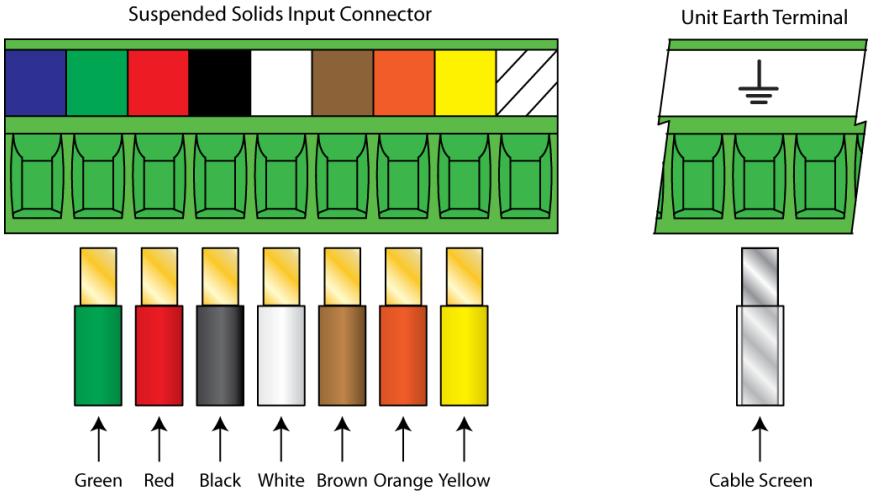
High temperature immersion and hygienic versions of the S series of suspended solids sensors are available. These sensors are manufactured from PVDF with a maximum working temperature of 105^{0}C.

T Series Turbidity Sensors

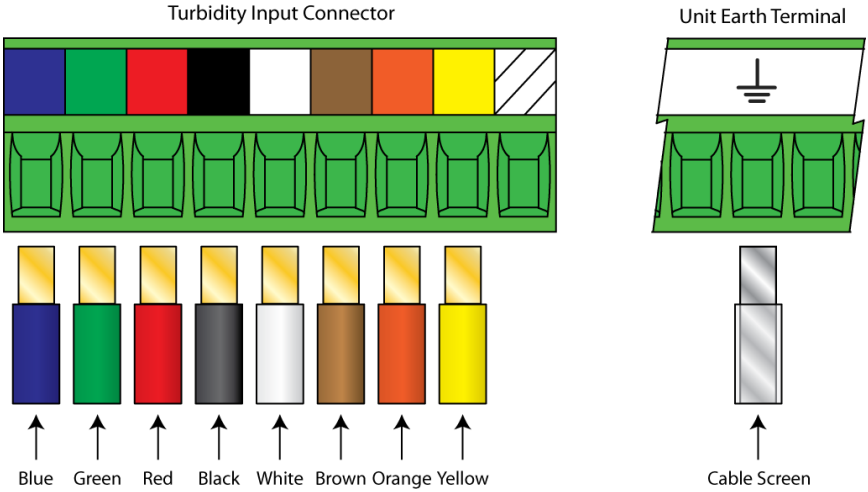
The T series of sensors are a new generation of Quadbeam turbidity process sensors, which combine both light attenuation and 90 degree scattered light measurements in a ratiometric sensor with digital communication. This technique vastly increases the sensitivity compared to sensors using just light attenuation. The T series of sensors are designed to meet the international standards for turbidity measurement – ISO 27027 and are capable of operating in temperatures up to 80^{0}C.

Applications include: Monitoring of clarifier overflow weirs, Final outlet of effluent from DAF plants, Raw water inlet measurements in water treatment plants, Surface water monitoring, Solids loading in rivers and streams, Product breakthrough on plate heat exchangers, Percentage solids in fruit and vegetable juices.

MXD73 – Panel Mount Termination Information

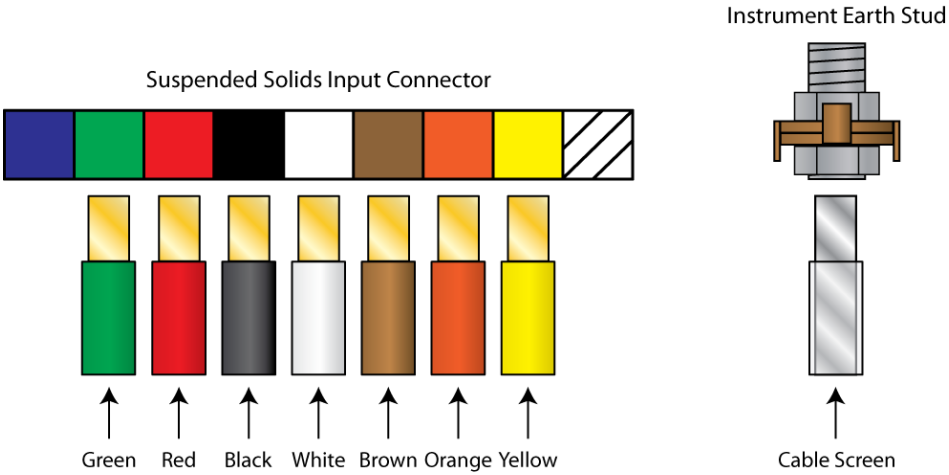


Suspended Solids Input Connection Details

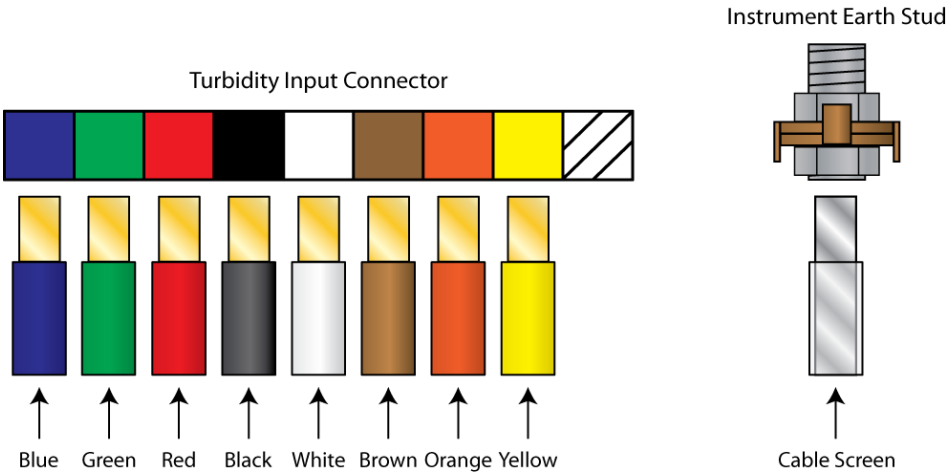


Turbidity Input Connection Details

MXD75 – Surface Mount Termination Information



Suspended Solids Input Connection Details

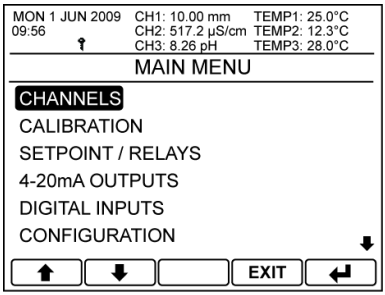


Turbidity Input Connection Details

Suspended Solids / Turbidity Input Channel Setup

The Channels Setup menu contains the basic configurations for the sensor's input.

The default security access code is 1000



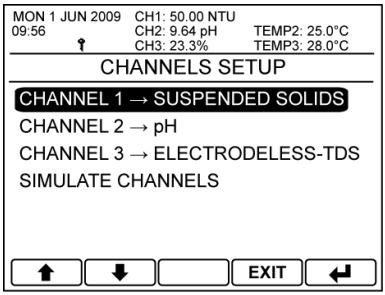
Main Menu

From the front screen press the menu button to show the main menu options and select Channels.

⬆/⬇ – Select Option

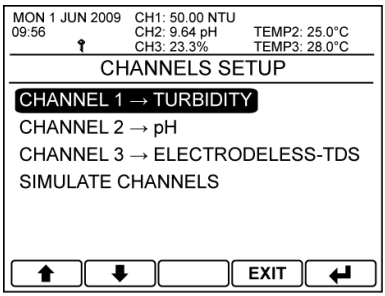
EXIT – Return to Front Screen

↵ – Enter Option



Select Channel

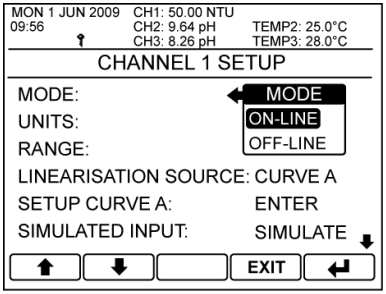
Depending on the installed card select either the Suspended Solids or Turbidity input channel you wish to edit.



⬆/⬇ – Select Option

EXIT – Return to Main Menu

↵ – Enter Option



Mode

Selecting off-line causes any setpoints associated with this channel to de-energise. Also causes any current outputs associated to hold their current value, useful for when commissioning or calibrating the instrument.

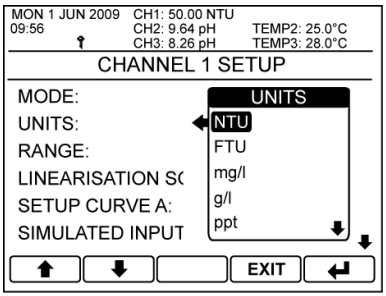
When the unit is placed in an off-line state "off-line" will appear in the channel messages section on the front screen.

If a "Cannot Edit Digital Input Has Control" message appears, then an associated digital input is currently controlling the on-line / off-line state of the channel.

⬆/⬇ – Select Option

EXIT – Cancel

↵ – Save Selection



Units

The channel can be setup to display the reading with the following units: NTU, FTU, mg/l, g/l, ppm, ppt, EBC, OD and %.

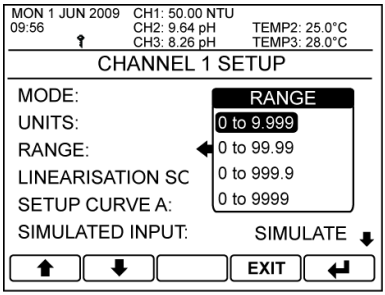
The relationship between these units and the incoming probe signal is determined by the linearisation curve data (see page 14) and range setting (see next item). They provide a qualitative rather than quantitative representation of the solids present in the sample for display purposes and setpoint / current output processing.

Optionally the instrument can be configured to work only with the raw probe units by setting the units to PS.

⬆/⬇ – Select Option

EXIT – Cancel

↵ – Save Selection



Range

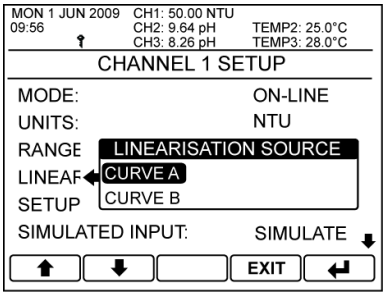
The range for the display can be set by selecting the decimal point position giving 9.999, 99.99, 999.9 and 9999. These again are for display and setpoint / current output purposes only.

Note. The ranges for the "%" units also include 100.0 and 10.00.

⬆/⬇ – Select Option

EXIT – Cancel

↵ – Save Selection



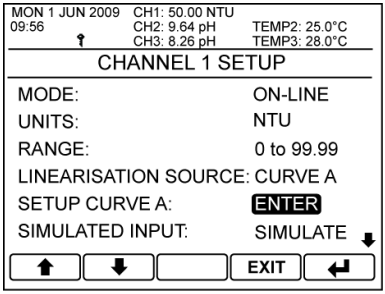
Linearisation Source

Select which of the two user defined curves A or B are used for calculation of the displayed reading.

⬆/⬇ – Select Option

EXIT – Cancel

↵ – Save Selection



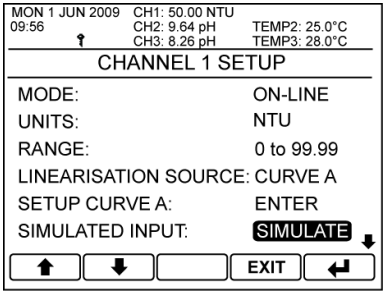
Setup Curve A / B

Enter the setup curve submenu. See page 14 for further information on setting up the linearisation curve.

⬆/⬇ – Select Option

EXIT – Return to Select Setup Channel

↵ – Enter Option



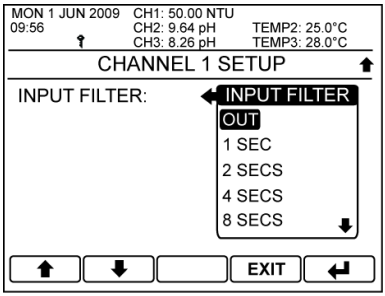
Simulated Input

See Simulated Channels section of the Setpoints, Current Outputs, Digital Inputs Configuration Guide for more information.

⬆/⬇ – Select Option

EXIT – Return to Select Setup Channel

↵ – Enter Option



Input Filtering (Averaging)

When very noisy environments are encountered, this function will allow the user to filter the sensor readings by taking a running average over the time period selected (from 1 to 32 seconds).

⬆/⬇ – Select Option

EXIT – Cancel

↵ – Save Selection

CIP Input

When assigned to a suspended solids channel the MXD70 series digital inputs feature a CIP function. This CIP input indicates to the instrument that a CIP event is in progress so that the sensor can be disabled so not to cause overstressing of the probe. For further information about setting the CIP input please consult the Setpoints, Current Outputs and Digital Input Configuration Guide.

Linearisation Curve Setup

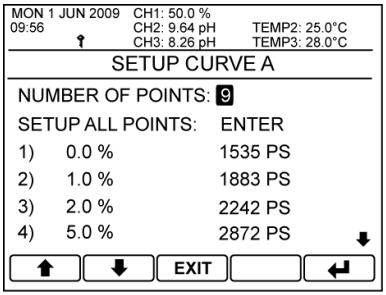
With many solutions the rate of infra-red absorption is non linear as the solids concentration increases. The purpose of this function is to take the probe signal values from several samples and convert this non-linearity to a straight line output. In many cases this is the only calibration procedure required.

It is recommended that the user should first prepare or obtain from the process a sample, which is as close as possible to the maximum range of suspended solids for which the instrument is to be configured. This will be your 100% point. For a two point linearisation curve the lower point is usually water. Where you want to enter more than two points, dilute your process sample to correspond with, for example, 25%, 50% and 75%. Up to10 points can be entered, with the more points that are used the more precise the conversion will be.

The MXD70 provides two methods, automatic and manual, for entering the curve data into the instrument.

Automatic Curve Entry

Automatic Curve Entry allows the user to set the number of points used in the curve. Then for each point define the engineering value and equate it to a live reading taken from the sensor placed in the desired sample. Note that the points can be sampled in any order as they are sorted into ascending probe signal values from within the software.



Number Of Points

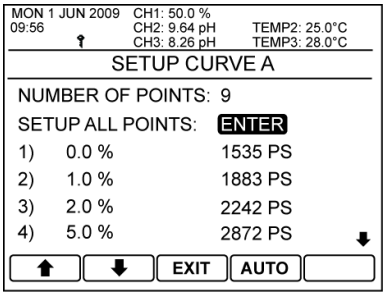
Set the number of points used to define the linearisation curve. The instrument will ignore any points whose equivalent probe signal value is set to zero.

The curve can use between 2 – 10 points.

⬆/⬇ – Select Option

EXIT – Return to Channel Setup

↵ – Enter Option



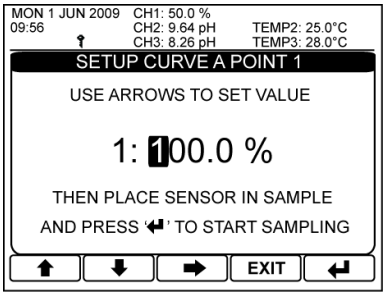
Setup All Points

Enter here to start the automatic linearisation routine and setup all curve points.

⬆/⬇ – Select Option

EXIT – Return to Channel Setup

AUTO – Enter Routine



Setup Curve Point

Enter the equivalent engineering value for this point. Units and scale depend upon the settings in the channel setup menu.

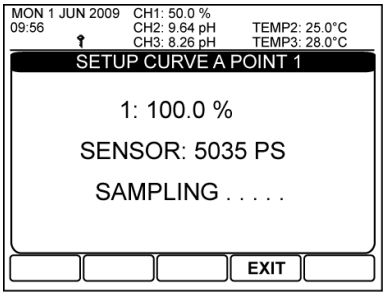
The sensor must be placed in the required sample before pressing the enter button.

⬆/⬇ – Increase / Decrease Digit

➡ – Select Next Digit

EXIT – Exit Setup Routine

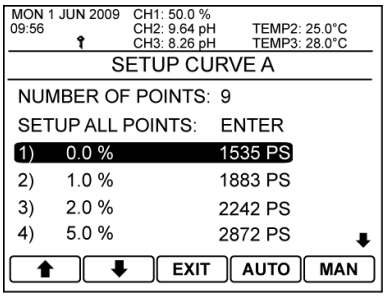
↵ – Save Value and start sampling



Sensor Sampling

After each point has been set the instrument will sample the sensor and store the observed reading as the equivalent sensor value for that point. Once this value has been stored the instrument will automatically proceed to the next point to be entered.

EXIT – Exit Setup Routine



Auto Setup Individual Curve Point

If the user requires to automatically setup an individual point in the curve, they can select it from the available list and press the Auto button.

⬆/⬇ – Select point

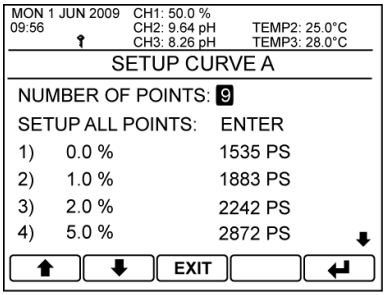
EXIT – Return to Channel Setup

AUTO – Begin Auto Routine For This Point

MAN – Begin Manual Routine For This Point

Manual Curve Entry

Manual Curve Entry also allows the user to set the number of points used in the curve. Then for each point the user can define the engineering value and then equate it to a known probe reading previously obtained. Note that the points can be entered in any order as they are sorted into ascending probe signal values from within the software.



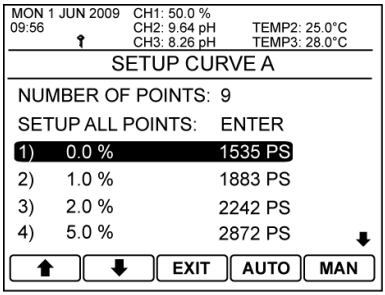
Number Of Points

Set the number of points used to define the linearisation curve. The instrument will ignore any points whose equivalent probe signal value is set to zero. The curve can use between 2 – 10 points.

⬆/⬇ – Select Option

EXIT – Return to Channel Setup

↵ – Enter Option



Manually Setup Individual Curve Point

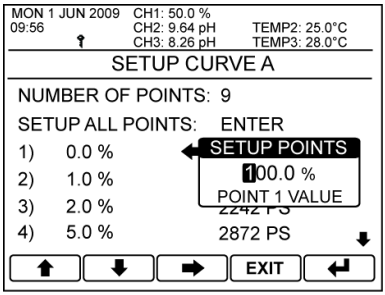
If the user requires to manually setup an individual point in the curve, they can select it from the available list and press the Man button.

⬆/⬇ – Select point

EXIT – Return to Channel Setup

AUTO – Begin Auto Routine For This Point

MAN – Begin Manual Routine For This Point



Enter Curve Point Data

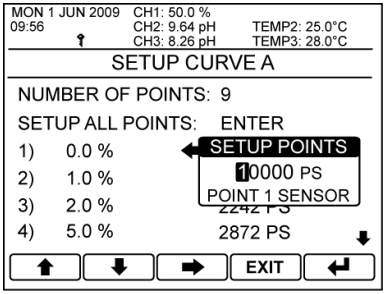
Enter the equivalent engineering value for this point. Units and scale depend upon the settings in the channel setup menu.

⬆/⬇ – Increase / Decrease Digit

➡ – Select Next Digit

EXIT – Exit Setup Routine

↵ – Save Value



After entering the engineering value the instrument will automatically ask for the equivalent probe reading to be manually entered.

⬆/⬇ – Increase / Decrease Digit

➡ – Select Next Digit

EXIT – Exit Setup Routine

↵ – Save Value

Calibration

Calibration Procedures

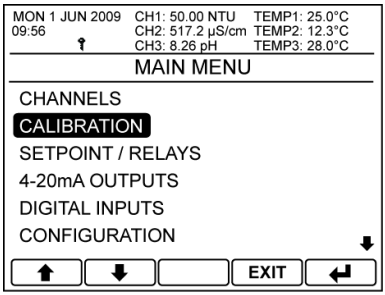
When trying to calibrate an instrument to measure suspended solids it is often difficult to keep the solids in suspension long enough for an accurate calibration to be made. The use of a magnetic stirrer in many cases will improve this.

In the linearisation setup menu the probe signals should have been entered from the prepared samples and the output will now be linear with percent solids. In many cases this is all that is required.

When the instrument is installed into the process the indicated readings can be verified by sample analysis in the laboratory. The readings produced from the laboratory may not correlate with the instrument readings. This is more likely in liquids, which have large particles, which separate out easily. For example: yeast, waste water, or white water in the paper industry. To correct for any discrepancies the instrument allows for both a Sensor Zero Adjustment and Sensor Span Adjustment.

Calibration Menu

The default security access code is 1000



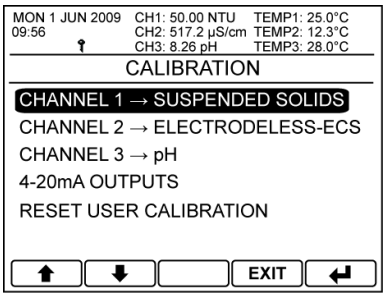
Main Menu

From the front screen press the menu button to show the main menu options and select Calibration.

⬆/⬇ – Select Option

EXIT – Return to Front Screen

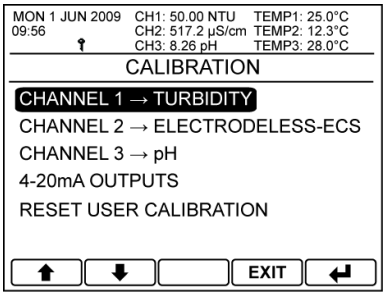
↵ – Enter Option



Select Channel

Depending on the installed card select either the Suspended Solids or Turbidity input channel you wish to calibrate.

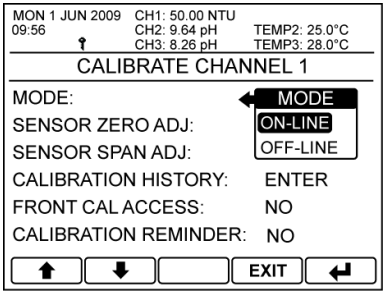
Note. Calibration is not available when units set to PS.



⬆/⬇ – Select Option

EXIT – Return to Main Menu

↵ – Enter Option



Mode

Selecting off-line causes any setpoints associated with this channel to de-energise. Also causes any current outputs associated to hold their current value, useful for when commissioning or calibrating the instrument.

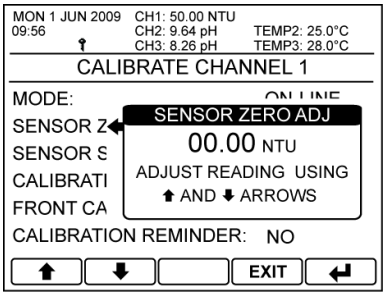
When the unit is placed in an off-line state "off-line" will appear in the channel messages section on the front screen.

If a "Cannot Edit Digital Input Has Control" message appears, then an associated digital input is currently controlling the on-line / off-line state of the channel.

⬆/⬇ – Select Option

EXIT – Cancel

↵ – Save Selection



Sensor Zero Adjustment

The sensor zero adjustment will either add or subtract a bias value to the zero point, which will shift the entire curve by this value. The slope of the curve is unchanged.

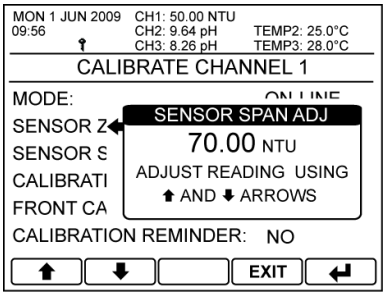
The current sensor reading can be seen in the pop-up window and is adjusted by pressing the up and down arrows. When the reading is correct press the enter button to store the adjustment.

The amount of zero offset adjustment currently being applied to the sensor is shown in the channel's calibration menu.

⬆/⬇ – Adjust the Reading Up or Down

EXIT – Cancel

↵ – Save Adjustment



Sensor Span Adjustment

If the zero point of the measuring point is correct but the highest calibration point is incorrect then the sensor span adjustment will shift the end point of the curve up or down. This changes the slope of the output curve.

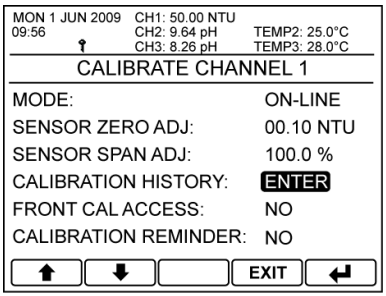
The current sensor reading can be seen in the pop-up window and is adjusted by pressing the up and down arrows. When the reading is correct press the enter button to store the adjustment.

The amount of slope adjustment currently being applied to the sensor is shown in the channels calibration menu as a %. Where 100% equals no adjustment, a slope of greater than 100% equals a steeper slope and a slope of less than 100% equals a shallower slope.

↑/↓ – Adjust the Reading Up or Down

EXIT – Cancel

↵ – Save Adjustment

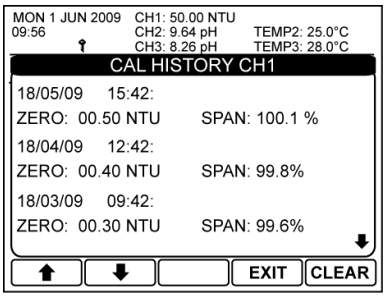


Enter Calibration History

The MXD70 series has a calibration history feature which allows the user to review the record of sensor calibrations.

To enter the calibration history menu press enter.

↵ – Enter Calibration History



Calibration History

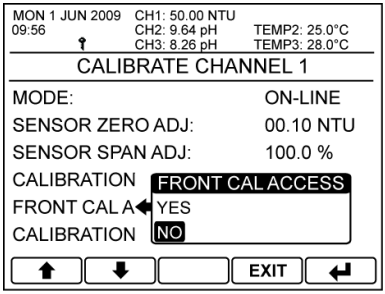
The calibration history page provides a record of all Offset and Slope calibrations carried out.

The data includes the date and time of the calibration, the calculated Zero Offset and the calculated Span Slope.

↑/↓ – Move To Next Page Up or Down

EXIT – Return To Calibration Menu

CLEAR – Clear All of the Calibration History



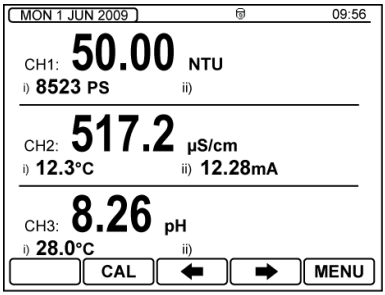
Front Screen Calibration Access Enable

When enabled front calibration access allows direct entry into the calibration menu from the front screen. It also disables the security access system within the calibration menu enabling the calibration functions without having to enter the security access code.

⬆/⬇ – Select Option

EXIT – Cancel

↵ – Save Selection



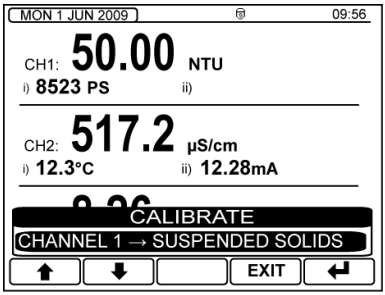
Front Screen Calibration Access

When the calibration access is enabled press the "CAL" button to bring up the pop-up to select which channel to calibrate.

CAL – Enter Calibrate Channel Select Menu

⬅/➡ – Scroll Around Menus

Menu – Access Main Menu



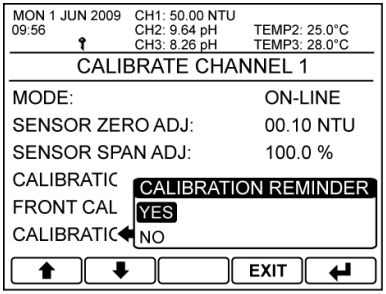
Select Channel to Calibrate

From the pop-up select the channel the user wishes to calibrate. Only channels whose front calibration access has been enabled will appear.

⬆/⬇ – Select Option

EXIT – Cancel

↵ – Enter Menu



Calibration Reminder

By enabling the calibration reminder the user can configure a calibration interval, which when expired will activate an alarm and channel message on the front screen.

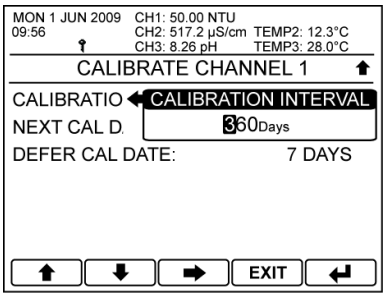
If the interval has expired and the alarm has activated, then on the completion of a successful sensor calibration, the alarm will clear and the next cal date will be automatically incremented by calibration interval.

If the user completes a successful sensor calibration before the calibration interval has expired, then the instrument will ask the user whether they wish to update the next cal due date by the calibration interval.

⬆/⬇ – Select Option

EXIT – Cancel

↵ – Save Selection



Calibration Interval

Sets the interval time for the calibration alarm.

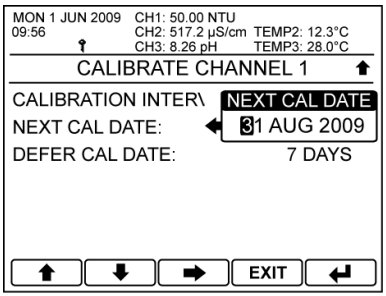
The Next Cal Date will update to show the date of the next calibration alarm.

⬆/⬇ – Increase / Decrease Digit

➡ – Select Next Digit

EXIT – Cancel

↵ – Save Value



Next Calibration Date

Sets the exact date of the next calibration alarm.

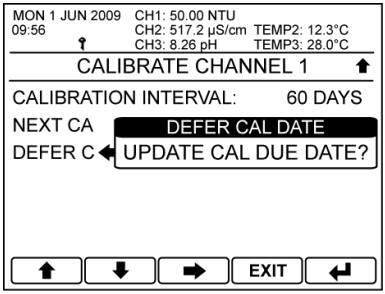
The Calibration Interval will update to show the number of days to the next calibration date.

⬆/⬇ – Increase / Decrease Digit or Text

➡ – Select Next Item

EXIT – Cancel

↵ – Save Entry



Defer Calibration Date

Turns off the alarm and increases the calibration interval by an extra 7 days.

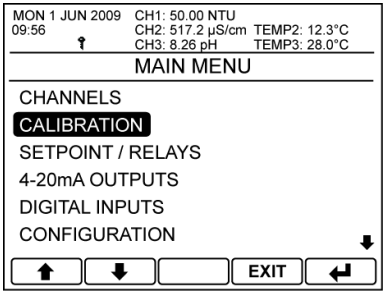
Only appears once the calibration interval has expired.

YES – Increase Interval

NO – Cancel

Resetting the User Calibration

If required the user can reset the user calibrations to their default states.



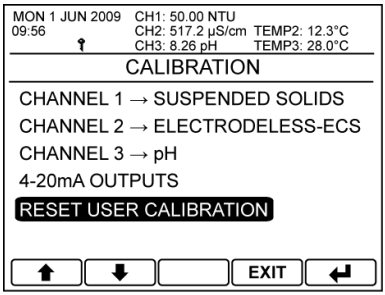
Main Menu

From the front screen press the menu button to show the main menu options and select Calibration.

⬆/⬇ – Select Option

EXIT – Return to Front Screen

↵ – Enter Option



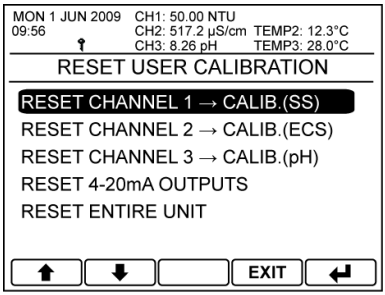
Calibration

Select Reset User Calibration.

⬆/⬇ – Select Option

EXIT – Return to Main Menu

↵ – Enter Option



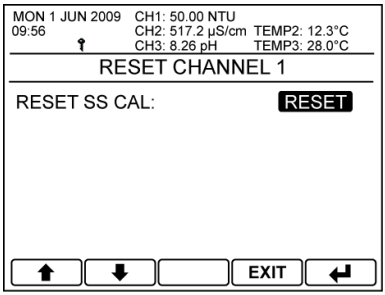
Reset User Calibration

Select the required Suspended Solids or Turbidity input channel.

⬆/⬇ – Select Option

EXIT – Return to Calibration

↵ – Enter Option



Reset Channel User Calibration

Select to reset the channels user calibration.

⬆/⬇ – Select Option

EXIT – Return to Reset User Calibration

↵ – Enter Option

Blank

Appendix A – Example Dairy Readings

The table below lists example sensor readings when immersed in milk and cream. These are only guidelines and it is recommended that you enter values using samples from your own process.

Example No.1: Whole Milk (4% Fat) using a S20 series sensor

100% Water	Probe Signal = 1535
1% Milk	Probe Signal = 1883
2% Milk	Probe Signal = 2242
5% Milk	Probe Signal = 2872
10% Milk	Probe Signal = 3294
25% Milk	Probe Signal = 3911
50% Milk	Probe Signal = 4525
100% Milk	Probe Signal = 5035

Example No.2: Cream (40% Fat) using a S10 series sensor

100% Water	Probe Signal = 1510
100% Milk (4% Fat)	Probe Signal = 4074
50% Cream (20% Fat)	Probe Signal = 4919
100% cream (40 % Fat)	Probe Signal = 5244

Blank

Appendix B – Instrument Configuration

Instrument Configuration

Instrument Type		Serial Number		Software Version	
Power Supply Type					
Channel 1 Input Card Type		Serial Number			
Channel 2 Input Card Type		Serial Number			
Channel 3 Input Card Type		Serial Number			
Output Expansion Card Type		Serial Number			
Software Expansion		Unlock Code			
Software Expansion		Unlock Code			

Instrument Settings

Security Access Code					
Language					
Front Screen Ch1 Shown		Front Screen Ch1 Secondary Reading i)		Front Screen Ch1 Secondary Reading ii)	
Front Screen Ch2 Shown		Front Screen Ch2 Secondary Reading i)		Front Screen Ch2 Secondary Reading ii)	
Front Screen Ch3 Shown		Front Screen Ch3 Secondary Reading i)		Front Screen Ch3 Secondary Reading ii)	
Front Screen Ch1 Label					
Front Screen Ch2 Label					
Front Screen Ch3 Label					
4-20mA Output Slot 1		4-20mA Output Slot 2			
Menu Header i)		Menu Header ii)		Menu Header iii)	
Menu Header iv)		Menu Header v)		Menu Header vi)	

Channel Setup (available options vary with card type and configuration)

	Channel 1	Channel 2	Channel 3
Mode: Online / Offline			
Description			
Units			
Sensor / Probe Type			
Cell Constant			
Range			
Linearisation Source			
TDS Factor			
Membrane Correction Factor			
Bias Voltage			
mA Input: Loop Mode			
mA Input: Input Mode			
Set 0mA Input			
Set 4mA Input			
Set 20mA Input			
Temperature Input Sensor			
Temperature Units			
Temperature Compensation: In/Out			
Temperature Compensation Slope			
Temperature Compensation: Auto / Manual			
Fixed Temperature Input			
Input Salinity			
Pressure Compensation: Auto / Manual			
Pressure Mode: Input / 24V Loop			
Pressure Units			
Pressure 4mA Input			
Pressure 20mA Input			
Fixed Pressure Input			
Cable Compensation			
Input Filter			

Curve Setup (available options vary with card type and configuration)

	Channel 1		Channel 2		Channel 3	
Curve A						
No. of points						
Input Range						
Custom Units						
Custom Range						
Point 1						
Point 2						
Point 3						
Point 4						
Point 5						
Point 6						
Point 7						
Point 8						
Point 9						
Point 10						
Curve B						
No. of points						
Input Range						
Custom Units						
Custom Range						
Point 1						
Point 2						
Point 3						
Point 4						
Point 5						
Point 6						
Point 7						
Point 8						
Point 9						
Point 10						

Channel Calibration Setup (available options vary with card type and configuration)

	Channel 1	Channel 2	Channel 3
Mode: Online / Offline			
Calibration Principle			
Calibration Manual Temp Input			
Calibration Units			
Calibration Manual Pressure Input			
Span Cal Point			
Enable Auto Span Cal			
Offset Value			
Slope Value			
Temperature Offset			
Sensor Condition			
Front Calibration Access			
Calibration Reminder			
Calibration Interval			

Setpoints Setup (available options vary with card type and configuration)

	Setpoint 1	Setpoint 2	Setpoint 3	Setpoint 4	Setpoint 5	Setpoint 6
Channel						
Input Source						
Trigger						
High Value						
Low Value						
USP Pre-Trigger						
Mode						
Cycle Time						
Proportional Band						
Delay						
Hysteresis						
Dose Alarm						
Dose Alarm Time						
Initial Charge						
Charge Time						
Charge Access						
Alarm Mode						
Clean Duration						
Clean Interval						
Clean Mode						
Clean Recovery						
Clean Delay						

Current Output Setup (available options vary with card type and configuration)

	Current Output A	Current Output B	Current Output C	Current Output D	Current Output E	Current Output F
Channel						
Input Source						
Output 0 – 20mA / 4 - 20mA						
Zero						
Span						
On Error						

Digital Inputs (available options vary with card type and configuration)

	Digital Input 1	Digital Input 2	Digital Input 3	Digital Input 4	Digital Input 5	Digital Input 6	Digital Input 7	Digital Input 8
Channel								
Function								
Range Change								
Switch Store								
Cleaning Setpoint								
Polarity								
4-20 Output Level								

Service Alarms

	Channel 1	Channel 2	Channel 3
Service Reminder			
Service Interval			
Next Service Date			

Appendix C – Error Messages

Internal Error Messages

E001	**UNIT**	**Processor RAM Read/Write Error** Try switching the unit off and then on again. If the message persists, consult with your supplier, as this unit may require to be returned for repair.
E002	**UNIT**	**External RAM Read/Write Error** Try switching the unit off and then on again. If the message persists, consult with your supplier, as this unit may require to be returned for repair.
E003	**UNIT**	**Internal Setup Checksum Error** The instrument configuration has for some reason become corrupted. Try switching the unit off and then on again. If the message persists, Reset Whole unit from the Reset Unit Settings option in the Save/Restore menu or consult with your supplier, as this unit may require a repair.
E004	**UNIT**	**Output Card Setup Checksum Error** Try switching the unit off and then on again. If the message persists, consult with your supplier, as this unit may require to be returned for repair.
E005	**UNIT**	**Internal Outputs Setup Checksum Error** Try switching the unit off and then on again. If the message persists, consult with your supplier, as this unit may require to be returned for repair.
E006	**UNIT**	**For Future Use**
E007	**UNIT**	**Unit Setup Checksum Error** The instrument configuration has for some reason become corrupted. Try switching the unit off and then on again. If the message persists Reset the whole unit from the Load Default Settings option in the Save/Restore menu or consult with your supplier, as this unit may require a repair.
E008	**UNIT**	**Unit Store A Checksum Error** The data in Unit Store A has been corrupted. Save the current setup back to Unit Store A in the Save/Restore menu.
E009	**UNIT**	**Unit Store B Checksum Error** The data in Unit Store B has been corrupted. Save the current setup back to Unit Store B in the Save/Restore menu.
E010 to E013	**UNIT**	**Maths Error** There has been an internal maths calculation failure. As such, it should not appear if the software is functioning properly. The error message should clear after approx. 5 seconds. If the error continues to be displayed consult with your supplier, as this unit may require to be returned for repair.
E014	**UNIT**	**Contrast Chip Error** The Contrast Chip is not operating correctly. Try switching the unit off and then on again. If the message persists, consult with your supplier, as this unit may require to be returned for repair.
E015	**UNIT**	**Unit SD Card Checksum Error** The SD Card store from which the entire unit was restored from has become corrupted. Check the unit's settings and then save the settings again to the SD card store.
E016	**UNIT**	**SD CARD FULL** The SD card has become full. To continue use, either replace with a blank SD card or remove existing files from SD card

Input Channel Errors

E030 **E080** **E130**	**CH1** **CH2** **CH3**	**Input Card Checksum Error** Try switching the unit off and then on again. If the message persists, consult with your supplier, as the channel's input card may require to be returned for repair.
E031 **E081** **E131**	**CH1** **CH2** **CH3**	**Setup Checksum Error** The current channel's configuration has for some reason become corrupted. Try switching the unit off and then on again. If the message persists reset the current channel from the Reset Unit Settings option in the Save/Restore menu or consult with your supplier, as the channel's input card may require to be returned for repair.
E032 **E082** **E132**	**CH1** **CH2** **CH3**	**Store A Checksum Error** The data in the channel's Store A has become corrupted. Check the channel's current setup. Then save the setup back to channel's Store A in the Save/Restore menu.
E033 **E083** **E133**	**CH1** **CH2** **CH3**	**Store B Checksum Error** The data in the channel's Store B has become corrupted. Check the channel's current setup. Then save the setup back to channel's Store B in the Save/Restore menu.
E034 **E084** **E134**	**CH1** **CH2** **CH3**	**Factory Cal Checksum Error** Try switching the unit off and then on again. If the message persists, consult with your supplier, as the channel's input card may require to be returned for repair.
E035 **E085** **E135**	**CH1** **CH2** **CH3**	**User Cal Checksum Error** The Channel's User Cal has for some reason become corrupted. Try switching the unit off and then on again. If the message persists Reset the Channel from the Reset User Calibration option in the Calibration menu or consult with your supplier, as the channel's input card may require to be returned for repair.
E036 **E086** **E136**	**CH1** **CH2** **CH3**	**Sensor Cal Out Of Spec** The last Sensor Calibration was out of specification, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E037 **E087** **E137**	**CH1** **CH2** **CH3**	**Sensor Zero Cal Out Of Spec** The last Sensor Zero Calibration was out of specification, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E038 **E088** **E138**	**CH1** **CH2** **CH3**	**Sensor Span Cal Out Of Spec** The last Sensor Span Calibration was out of specification, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E039 **E089** **E139**	**CH1** **CH2** **CH3**	**No Signal** No Sensor connected or there is 'zero' detector current. The probe sensor units (PSU) will be set to 16000 or 32000 if turbidity. If this message persists, please consult with your supplier.
E040 **E090** **E140**	**CH1** **CH2** **CH3**	**Signal Overload** The gain step is equal to 0 and the A/D output is over 255. This cannot happen in a liquid but could happen if the sensor is in full sunlight. The probe sensor units (PSU) will be set to 16000 or 32000 if turbidity. If this message persists, please consult with your supplier.

E041 **E091** **E141**	**CH1** **CH2** **CH3**	**Partial Depletion** Large difference between the detectors, i.e. one very dirty. This alarm will come up if there is a difference of 3:1 between the detectors. Remove sensor and clean sensor fingers. The probe sensor units (PSU) will be set to 16000 or 32000 if turbidity. If this message persists, please consult with your supplier.
E042 **E092** **E142**	**CH1** **CH2** **CH3**	**Full Depletion** Attenuation too high or the real probe signal goes above 14000. The probe sensor units (PSU) will be set to 16000. If this message persists, please consult with your supplier.
E043 **E093** **E143**	**CH1** **CH2** **CH3**	**Sensor User Offset At Limit** The last Sensor Offset Calibration was out of limits, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E044 **E094** **E144**	**CH1** **CH2** **CH3**	**Sensor User Slope At Limit** The last Sensor Slope Calibration was out of limits, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E045 **E095** **E145**	**CH1** **CH2** **CH3**	**Sensor User Slope < Spec** The last Sensor Slope Calibration was less than the recommended specification, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E046 **E096** **E146**	**CH1** **CH2** **CH3**	**Sensor User Slope > Spec** The last Sensor Slope Calibration was greater than the recommended specification, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E047 **E097** **E147**	**CH1** **CH2** **CH3**	**Sensor Open Circuit** The sensor input is at open circuit, check sensor condition and connections. If the message persists please consult with your supplier.
E048 **E098** **E148**	**CH1** **CH2** **CH3**	**Sensor Short Circuit** The sensor input is at short circuit, check sensor condition and connections. If the message persists please consult with your supplier.
E049 **E099** **E149**	**CH1** **CH2** **CH3**	**Sensor Positive Saturation** The sensor input is greater than the maximum measurable input level, Check Sensor condition and connections. If the message persists please consult with your supplier.
E050 **E100** **E150**	**CH1** **CH2** **CH3**	**Sensor Negative Saturation** The sensor input is less than the minimum measurable input level, Check Sensor condition and connections. If the message persists please consult with your supplier.
E051 **E101** **E151**	**CH1** **CH2** **CH3**	**Sensor Input Over Range** The sensor reading is greater than the specified upper limit, check channel settings, Sensor condition and connections. If the message persists please consult with your supplier.
E052 **E102** **E152**	**CH1** **CH2** **CH3**	**Sensor Input Under Range** The sensor reading is less than the specified limit, check channel settings, Sensor condition and connections. If the message persists please consult with your supplier.

E053 **E103** **E153**	**CH1** **CH2** **CH3**	**Temp Sensor Fault** The temperature sensor is reading open or closed circuit, due in most cases to a damaged sensing element or incorrect wiring. Check that the temperature sensor is set to the correct type in the channel setup menu. Under this condition, the unit will default to the fixed temperature setting for compensation purposes. If the message persists please consult with your supplier.
E054 **E104** **E154**	**CH1** **CH2** **CH3**	**Temp Input Over Range** The temperature sensor reading is greater than the specified upper limit, check channel settings, Sensor condition and connections. If the message persists please consult with your supplier.
E055 **E105** **E155**	**CH1** **CH2** **CH3**	**Temp Input Under Range** The temperature reading is less than the specified limit, check channel settings, Sensor condition and connections. If the message persists please consult with your supplier.
E056 **E106** **E156**	**CH1** **CH2** **CH3**	**Temp Comp Outside Limits** The temperature reading is less than 0.0C or greater than 150.0C, leading to an error in compensation.
E057 **E107** **E157**	**CH1** **CH2** **CH3**	**Polar Zero Cal At Limit** The last Polargraphic Zero Calibration was out of limits, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E058 **E108** **E158**	**CH1** **CH2** **CH3**	**Polar Span Cal At Limit** The last Polargraphic Span Calibration was out of limits, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E059 **E109** **E159**	**CH1** **CH2** **CH3**	**Galvanic Zero Cal At Limit** The last Galvanic Zero Calibration was out of limits, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E060 **E110** **E160**	**CH1** **CH2** **CH3**	**Galvanic Span Cal At Limit** The last Galvanic Span Calibration was out of limits, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E061 **E111** **E161**	**CH1** **CH2** **CH3**	**Pressure Sensor Over Range** The pressure sensor reading is greater than the specified limit for the probe.
E062 **E112** **E162**	**CH1** **CH2** **CH3**	**Pressure Sensor Under Range** The pressure sensor reading is less than the specified limit for the probe.
E063 **E113** **E163**	**CH1** **CH2** **CH3**	**Pressure Above 20mA** The pressure sensor input is greater than 20mA, check sensor condition and connections. If the message persists please consult with your supplier.
E064 **E114** **E164**	**CH1** **CH2** **CH3**	**Pressure Below 4mA** The pressure sensor input is less than 4mA, check sensor condition and connections. If the message persists please consult with your supplier.
E065 **E115** **E165**	**CH1** **CH2** **CH3**	**AUX mA Input Above 20mA** The sensor input is greater than 20mA, check sensor condition and connections. If the message persists please consult with your supplier.

E066 **E116** **E166**	**CH1** **CH2** **CH3**	**AUX mA Input Below 4mA** The sensor input is less than 4mA, check sensor condition and connections. If the message persists please consult with your supplier.
E067 **E117** **E167**	**CH1** **CH2** **CH3**	**Sensor 0mV Cal Out of Spec** The pH 0mV calibration for this channel is outside recommended specifications.
E068 **E118** **E168**	**CH1** **CH2** **CH3**	**Calibration Due** The time since the last calibration was performed on this channel has exceeded the time set in the calibration menu.
E069 **E119** **E169**	**CH1** **CH2** **CH3**	**Planned Service Due** The Planned Service interval for this unit has expired. Please contact Quadbeam Techonlogies at the details below: Quadbeam Technologies ltd PO Box 1142 Pukekohe Auckland 2340 New Zealand Tel. +64 (0) 9 238 4609 Email helpdesk@quadbeam.co.nz NB. Quadbeam Technologies overseas users should contact their local distributor.
E070 **E120** **E170**	**CH1** **CH2** **CH3**	**SD Card Checksum Error** The SD Card store from which this channel was restored from has become corrupted. Check the channel's settings and then save the settings again to the SD card store.
E071 **E121** **E171**	**CH1** **CH2** **CH3**	**Gain Error** The sensor gain has been exceeded. If this message persists, please consult with your supplier.
E072 **E122** **E172**	**CH1** **CH2** **CH3**	**Invalid Linearisation Curve** A minimum of 2 linearisation points are required. Please check linearisation curve settings in the channel setup menu for this channel.
E073 **E123** **E173**	**CH1** **CH2** **CH3**	**Linearisation Over-Range** The linearisation result is greater than 9999 (or 100.0% when using %).
E074 **E124** **E174**	**CH1** **CH2** **CH3**	**Linearisation Under-Range** The linearisation result is less than 0.
E075 **E125** **E175**	**CH1** **CH2** **CH3**	**Curve Low Limit** The incoming probe signal is less than the lowest point in the linearisation curve.
E076 **E126** **E176**	**CH1** **CH2** **CH3**	**Curve High Limit** The incoming probe signal is greater than the highest point in the linearization curve.
E077 **E127** **E177**	**CH1** **CH2** **CH3**	**Custom Error** Contact your supplier for details.

Setpoint Errors

E180	**SP1**	**Dose Alarm Error**
E190	**SP2**	The Setpoint has been dosing for longer than the Dose Alarm time as defined in the setpoint menu.
E200	**SP3**	
E210	**SP4**	
E220	**SP5**	
E230	**SP6**	
E181 to E184	**SP1**	**For Future Use**
E191 to E194	**SP2**	
E201 to E204	**SP3**	
E211 to E214	**SP4**	
E221 to E224	**SP5**	
E231 to E234	**SP6**	
E185	**SP1**	**Store A Checksum Error**
E195	**SP2**	The Store A Save for the Channel associated with this Setpoint has become corrupted. Check the setpoint's settings in the setpoint menu and then save the settings again in the Channel's Store A in the Save/Restore menu.
E205	**SP3**	
E215	**SP4**	
E225	**SP5**	
E235	**SP6**	
E186	**SP1**	**Store B Checksum Error**
E196	**SP2**	The Store B Save for the Channel associated with this Setpoint has become corrupted. Check the setpoint's settings in the setpoint menu and then save the settings again in the Channel's Store B in the Save/Restore menu.
E206	**SP3**	
E216	**SP4**	
E226	**SP5**	
E236	**SP6**	
E187	**SP1**	**Setup Checksum Error**
E197	**SP2**	The Setup for this Setpoint has become corrupted. Check and correct the setpoint settings and turn the unit off and on again. If the message persists please consult with your supplier.
E207	**SP3**	
E217	**SP4**	
E227	**SP5**	
E237	**SP6**	
E188	**SP1**	**SD Card Checksum Error**
E198	**SP2**	The SD Card store from which this Setpoint was restored from has become corrupted. Check the setpoint's settings in the setpoint menu and then save the settings again to the SD card store.
E208	**SP3**	
E218	**SP4**	
E228	**SP5**	
E238	**SP6**	

Current Output Errors

E240	**A**	**Current OP Hardware Fault**
E250	**B**	The current output circuit has detected an error in the current output loop; this is most commonly due to either a broken loop or too large a load resistor.
E260	**C**	
E270	**D**	
E280	**E**	
E290	**F**	
E241	**A**	**Sensor IP<Current OP Zero**
E251	**B**	The sensor input level is below that set for the current output zero.
E261	**C**	
E271	**D**	
E281	**E**	
E291	**F**	
E242	**A**	**Sensor IP>Current OP Span**
E252	**B**	The sensor input level is above that set for the current output span.
E262	**C**	
E272	**D**	
E282	**E**	
E292	**F**	
E243	**A**	**Sensor IP<Current OP Span**
E253	**B**	The sensor input level is below that set for the current output Span.
E263	**C**	
E273	**D**	
E283	**E**	
E293	**F**	
E244	**A**	**Sensor IP>Current OP Zero**
E254	**B**	The sensor input level is above that set for the current output Zero.
E264	**C**	
E274	**D**	
E284	**E**	
E294	**F**	
	A	**Store A Checksum Error**
E255	**B**	The Store A Save for the channel associated with this current output has become corrupted. Check the current output's settings in the current output menu and then save the settings again in the Channel's Store A in the Save/Restore menu.
E265	**C**	
E275	**D**	
E285	**E**	
E295	**F**	
E246	**A**	**Store B Checksum Error**
E256	**B**	The Store B Save for the channel associated with this current output has become corrupted. Check the current output's settings in the current output menu and then save the settings again in the Channel's Store B in the Save/Restore menu.
E266	**C**	
E276	**D**	
E286	**E**	
E296	**F**	

E245	**A**	**Store A Checksum Error**
E255	**B**	The Store A Save for the channel associated with this current output has become corrupted. Check the current output's settings in the current output menu and then save the settings again in the Channel's Store A in the Save/Restore menu.
E265	**C**	
E275	**D**	
E285	**E**	
E295	**F**	
E246	**A**	**Store B Checksum Error**
E256	**B**	The Store B Save for the channel associated with this current output has become corrupted. Check the current output's settings in the current output menu and then save the settings again in the Channel's Store B in the Save/Restore menu.
E266	**C**	
E276	**D**	
E286	**E**	
E296	**F**	

Digital Input Errors

E301	**DIG 1**	**Store A Checksum Error**
E306	**DIG 2**	The Store A Save for the channel associated with this digital input has become corrupted. Check the digital input's settings in the digital input menu and then save the settings again in the Channel's Store A in the Save/Restore menu.
E311	**DIG 3**	
E316	**DIG 4**	
E321	**DIG 5**	
E326	**DIG 6**	
E331	**DIG 7**	
E336	**DIG 8**	
E302	**DIG 1**	**Store B Checksum Error**
E307	**DIG 2**	The Store B Save for the channel associated with this digital input has become corrupted. Check the digital input's settings in the digital input menu and then save the settings again in the Channel's Store B in the Save/Restore menu.
E312	**DIG 3**	
E317	**DIG 4**	
E322	**DIG 5**	
E327	**DIG 6**	
E332	**DIG 7**	
E337	**DIG 8**	
E303	**DIG 1**	**Setup Checksum Error**
E308	**DIG 2**	The Setup for this Digital Input has become corrupted. Check and correct the digital inputs settings and turn the unit off and on again. If the message persists please consult with your supplier.
E313	**DIG 3**	
E318	**DIG 4**	
E323	**DIG 5**	
E328	**DIG 6**	
E333	**DIG 7**	
E338	**DIG 8**	
E304	**DIG 1**	**SD Card Checksum Error**
E309	**DIG 2**	The SD Card store from which this Digital Input was restored from has become corrupted. Check the Digital Input's settings in the digital input menu and then save the settings again to the SD card store.
E314	**DIG 3**	
E319	**DIG 4**	
E324	**DIG 5**	
E329	**DIG 6**	
E334	**DIG 7**	
E339	**DIG 8**	

Communication Errors

E340 **E342** **E344**	**CH1** **CH2** **CH3**	**Comms Failure** The Channel's Input Card is not responding. Try switching the unit off and then on again. If the message persists, consult with your supplier, as the channel's input card may require to be returned for repair.
E341 **E343** **E345**	**CH1** **CH2** **CH3**	**Comms Error** The Channel's Input Card is not Operating Correctly. Try switching the unit off and then on again. If the message persists, consult with your supplier, as the channel's input card may require to be returned for repair.
E346	**UNIT**	**Output Comms Failure** The Basic Internal Outputs are not responding. Try switching the unit off and then on again. If the message persists, consult with your supplier, as the unit may require to be returned for repair.
E347	**UNIT**	**Output Comms Error** The Basic Internal Outputs are not Operating Correctly. Try switching the unit off and then on again. If the message persists, consult with your supplier, as the unit may require to be returned for repair.
E348	**OP**	**Output Option Comms Failure** The Output Option Card is not responding. Try switching the unit off and then on again. If the message persists, consult with your supplier, as the Output Option card may require to be returned for repair.
E349	**OP**	**Output Option Comms Error** The Output Option Card is not Operating Correctly. Try switching the unit off and then on again. If the message persists, consult with your supplier, as the Output Option Card may require to be returned for repair.

Calculation Errors

E400	**C1**	**Calculation Over Range**
E411	**C2**	The Calculation reading is greater than the specified upper limit, check channel settings, calculation configuration, sensor condition and connections. If the message persists please consult with your supplier.
E401	**C1**	**Calculation Under Range**
E411	**C2**	The Calculation reading is less than the specified lower limit, check channel settings, calculation configuration, sensor condition and connections. If the message persists please consult with your supplier.
E402	**C1**	**Calculation Setup Checksum**
E412	**C2**	The Setup for this Calculation has become corrupted. Check and correct the calculation settings and turn the unit off and on again. If the message persists please consult with your supplier.
E403	**C1**	**Calculation Store A Checksum**
E413	**C2**	The Store A Save for the channel associated with this calculation has become corrupted. Check the calculation's settings in the calculation menu and then save the settings again in the Channel's Store A in the Save/Restore menu.
E404	**C1**	**Calculation Store B Checksum**
E414	**C2**	The Store B Save for the channel associated with this calculation has become corrupted. Check the calculation's settings in the calculation menu and then save the settings again in the Channel's Store B in the Save/Restore menu.
E405	**C1**	**Calculation SD Card Checksum**
E415	**C2**	The SD Card store from which this Calculation was restored from has become corrupted. Check the Calculation's settings in the Calculation menu and then save the settings again to the SD card store.

Modbus Errors

E420	**UNIT**	**Modbus Setup Checksum** The Modbus setup has become corrupted. Check and correct the Modbus settings and turn the unit off and on again. If the message persists please consult with your supplier.
E421	**UNIT**	**Modbus Store A Checksum** The Store A Save for the Modbus Configuration has become corrupted. Check the Modbus settings in the Modbus menu and then save the settings again into Store A in the Save/Restore menu.
E422	**UNIT**	**Modbus Store B Checksum** The Store B Save for the Modbus Configuration has become corrupted. Check the Modbus settings in the Modbus menu and then save the settings again into Store B in the Save/Restore menu.
E423	**UNIT**	**Modbus SD Card Checksum** The SD Card store from which the Modbus configuration was restored from has become corrupted. Check the Modbus settings in the Modbus menu and then save the settings again to the SD card store.

Fault Finding

NOTE: THERE ARE NO USER SERVICEABLE PARTS INSIDE THE UNIT

The MXD70 Series has been designed to include a wide range of self diagnostic tests, some of which are performed at switch on, and some on a continuous basis. This guide aims to provide a route to diagnosing and correcting any faults that may occur during normal operation. The table shown previously in this section gives a list that the MXD70 series generates, along with their probable causes. If after these checks the fault has not been cleared contact Quadbeam Technologies. Please have as much of the following information available as possible in any communication with Quadbeam Technologies, to enable quick diagnosis and correction of the problem.

- Serial number of the instrument, input and output cards.
- The approximate date of purchase.
- The software version number.
- Details of the program settings and application.
- Electrical environment and supply details.
- Circumstances under which the fault occurred.
- The nature of the fault or faults.
- Any error messages that are displayed.
- The transmitter type, cable length and type.
- Current output configuration.
- Relay connection configuration.

It is often worthwhile to check the measurement by an independent method, for example using a handheld meter.

The Instrument Appears Dead
Check that power is available to the unit. Using a voltmeter, set to AC or DC, check the power supply voltage at the connector. The design of the MXD70 Series allows the unit to accept from 85 to 250V AC or DC; an alternative option allows operation from 18 to 32V AC or DC, check the connection label for voltage specification. Check that the power cable is securely and correctly attached. There are no user serviceable fuses fitted within this unit.

The Access Code Does Not Work
It is probable that the access code has either been changed or the operator does not recall the code correctly. Contact Quadbeam Technologies or your local distributor should this problem arise.

The Input Reading Is Constantly Over-range, Under-range or Incorrect
- Ensure that the probe input is correctly connected (see Installation Section) and that the transmitter is not faulty or damaged.
- Check that linearisation curve has been correctly entered within the Channel Setup menu (see page 14).
- Check the probe for fouling or damage.
- Check the raw probe signal reading in a high and low sample. If the probe signal is not reading as expected contact a service engineer for guidance.
- Try resetting the offset and slope calibration (see page 22) and re-calibrate the probe in high and low samples.
- Where extension cables have been used, try connecting the sensor directly to the instrument.

The sensor Reading is Incorrect

- Ensure the sensor is mounted properly, that there is at least 25mm (1") of clearance around the head of the probe.
- Establish that the sensor is specified to work within the range that is being monitored.

Current Output Is Incorrect or Noisy

- Check that the unit is "On-Line" (see page 10)
- Check that the maximum load for the current loop has not been exceeded. (750Ω).
- Check that the terminals have been wired correctly.
- Check that the cable screen is attached to Earth at one end and that the cable does not pass too close to a power cable.
- Check that he current output has been configured properly.

Relays Appear to Malfunction

- Check that the unit is "On-Line" (see page 10)
- Check that the set point configuration is correct (see Setpoints, Current Outputs and Digital Input Configuration Guide)
- If the relays are vibrating or "chattering" as they pass the set point, check the hysteresis setting and increase if necessary.
- Ensure that the relays are connected properly (see MXD73 Installation guide or MXD75 Installation guide) and that the voltage/current levels are not exceeding 5A @ 30V DC or 5A @ 250V AC.
- Check that the instrument input cables are not picking up excessive noise.

Guarantee and Service

Products manufactured by Quadbeam Technologies Ltd are guaranteed against faulty workmanship and materials for a period of three years from the date of despatch, except for finished goods not of Quadbeam Technologies manufacture, which are subject to a separate agreement.

Goods for attention under guarantee (unless otherwise agreed) must be returned to the factory carriage paid and, if accepted for free repair, will be returned to the customer's address free of charge. Arrangements can also be made for repair on site, in which case a charge may be made for the engineer's time and expenses.

If any services other than those covered by the guarantee are required, please contact Quadbeam Technologies direct.

N.B. Overseas users should contact their Quadbeam Technologies nominated representative. Special arrangements will be made in individual cases for goods returned from overseas.

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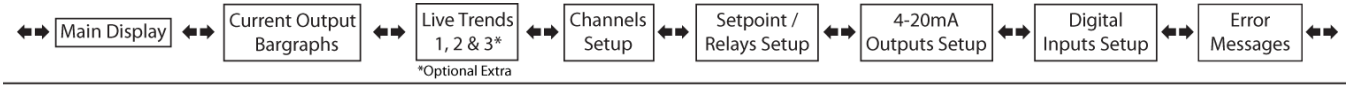

Suspended Solids / Turbidity Channel Setup - Suspended Solids / Turbidity Calibration