

MXD70 SERIES

Multi-parameter Monitor

mA

Auxiliary mA Input
Setup and Operating
Guide

Preface

Product warranty

The MXD70 Auxiliary mA Input Card has 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.

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 61326-1: 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.

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Auxiliary mA Input Card Specification

Measurement Input	0 to 24mA input, fully isolated from instrument supply.
Loop Modes	<p>mA Input – Standard mA input from transmitter, 100Ω input impedance, max loop voltage 35V.</p> <p>Loop Powered – The input card will supply 24V to power the current loop.</p> <p>3 Wire – The input card can supply an alternative 24V 30mA Max output via the “24V” pin to power a 3 wire transmitter.</p>
Input Mode	<p>0 – 20 mA (Linear)</p> <p>4 – 20 mA (Linear)</p> <p>2 Custom Curves (Non-Linear)</p>
Display Ranges	<p>-9999 to +9999</p> <p>0 to 999.9</p> <p>0 to 99.99</p> <p>0 to 9.999</p>
Custom Units	Maximum of 5 Alphanumeric Characters.
Error States	<p>Input under 4mA (when using 4-20mA Input)</p> <p>Input over 20mA</p>
Accuracy	±0.1% of reading.
Linearity	± 0.1% of range.
Repeatability	± 0.1% of range.
Calibration Methods	<p>Reading Offset Calibration.</p> <p>Automatic 2 Point 0/4mA and 20mA Calibration.</p>
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 (10sec – 5mins).

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Specification

Installation

The MXD70 series Auxiliary mA Input Card allows the user to read the current output of a variety of loop powered and self powered transmitters.

Self Powered Transmitters

For self powered transmitters the current input of the input card is isolated from the instrument's power supply thus allowing the input to be connected in series with other devices on the loop if the loop is fed from a single ended transmitter.

Loop Powered Transmitters

For loop powered transmitters the following information may need to be considered:

Loop Voltage Drops

One of a current input instruments most important specification is the total resistance or burden it presents to the connected transmitter's output driver. Most transmitters' data sheets specify the maximum loop resistance the transmitter can drive while still providing a full scale 20mA output (the worst case level with regards to burden).

Therefore knowing the input impedance of the MXD70 Auxiliary mA Input Card and assuming the maximum current developed in the loop will be 20mA. By using ohms law the maximum voltage drop of the current input is as follows:

$$\text{Current Input Maximum Voltage Drop} = 100\Omega \times 0.020\text{A} = 2 \text{ Volts}$$

Transmitter Ratings

The maximum power dissipation of the transmitter can be calculated by combining all the voltage drops in the loop with the minimum operating voltage of the transmitter, take this number away from the current loop operating voltage and then multiply it by the maximum loop current. If the power dissipation is too high then the user will need to externally power the current loop with a lower voltage.

Wiring Resistance

In addition to any voltage drop caused by the transmitter and the current input circuit the user will also have to take into account any voltage losses caused by the wiring resistance. This voltage loss can be calculated by multiplying the combined resistance to and from the transmitter by the maximum current flowing through the wire. This figure along with the voltage dropped by the transmitter and current input circuit will define the minimum operating voltage of the loop.

$$V_{\min} = V_{T\min} + V_{CI\text{Pmax}} + (0.02 \times R_{\text{Wiring}})$$

Where: V_{\min} = Loop minimum supply voltage

$V_{T\min}$ = Transmitter minimum operating voltage

$V_{CI\text{Pmax}}$ = Current Input Maximum Voltage Drop

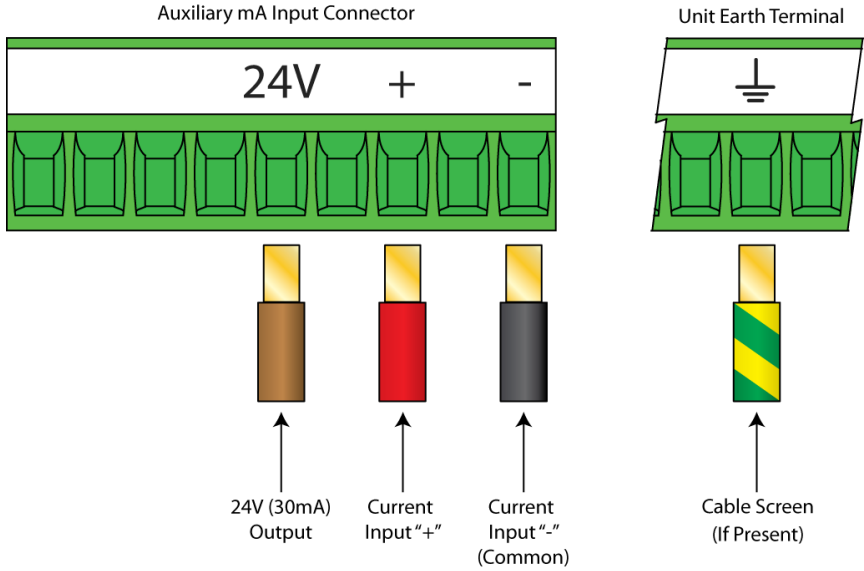
R_{Wiring} = Wiring resistance = $2 \times \text{Distance} \times \text{Cable Resistance}$ (typically 0.035Ω/m)

3 Wire Transmitters

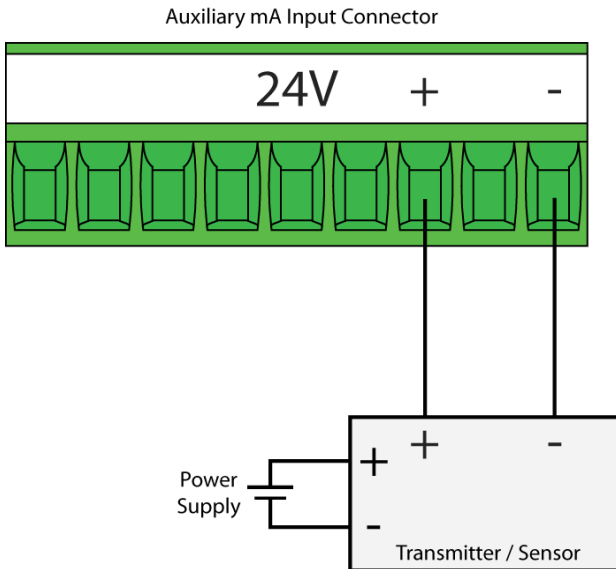
For low powered 3 wire transmitters the input card can supply a 24V 30mA output via the 24V connection, thus allowing for the removal of an additional external power supply to the transmitter.

MXD73 – Panel Mount Termination Information

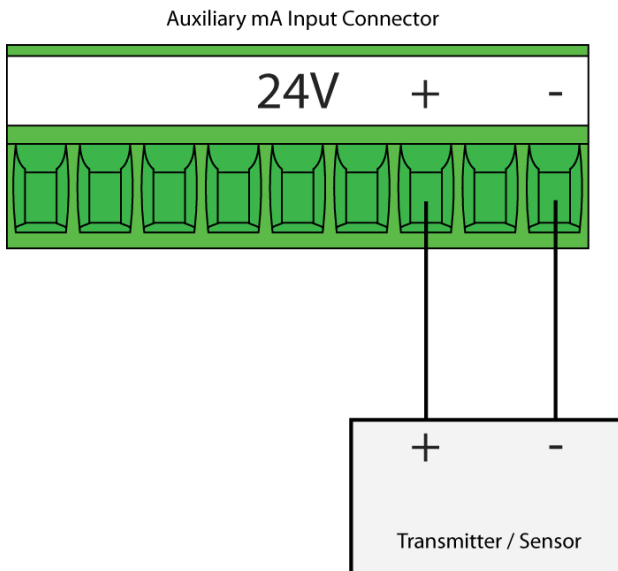
Installation



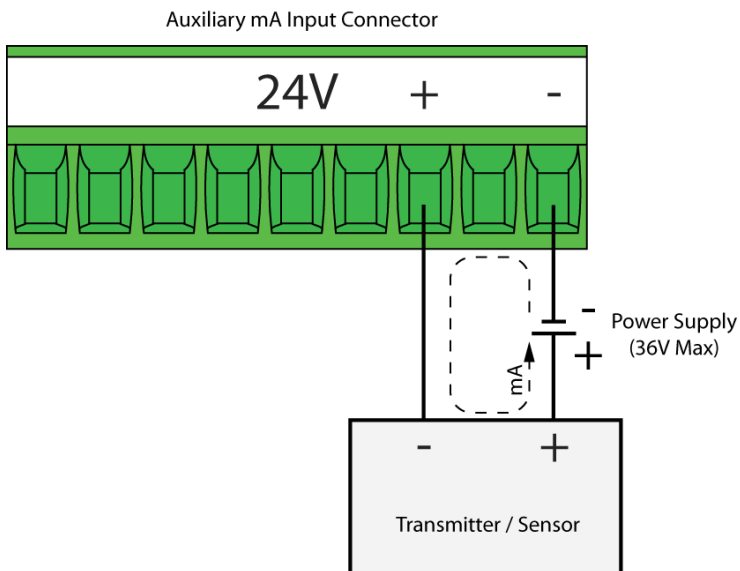
Auxiliary mA Input Connection Details



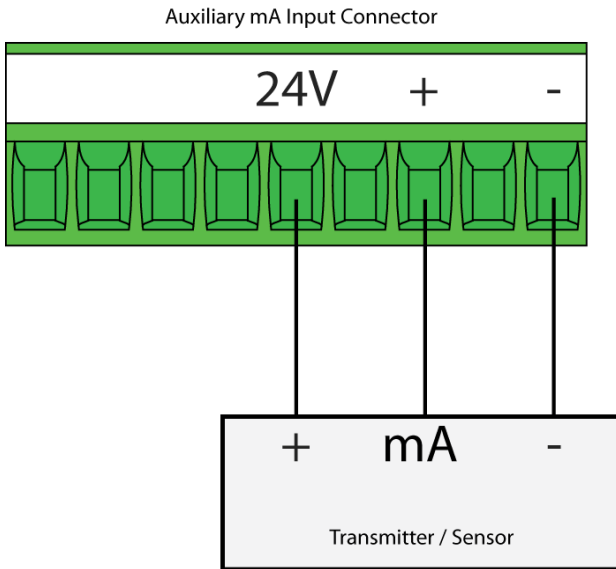
Locally Powered Transmitter Loop Connection Details
Loop Mode Set to "mA Input"



Internally Powered Loop Connection Details
Loop Mode Set to "24V Loop"
(MXD70 powers the loop with 24V)

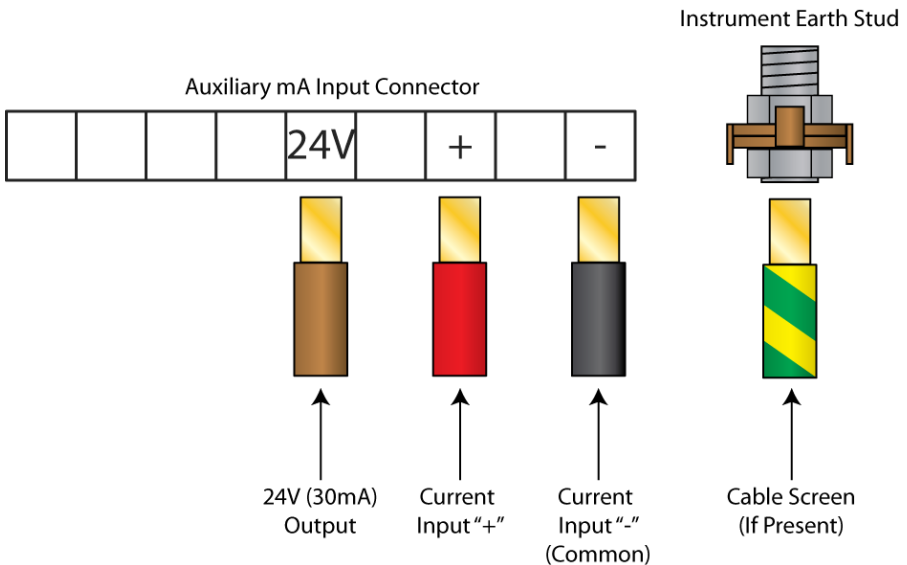


Externally Powered Loop Connection Details
Loop Mode Set to "mA Input"

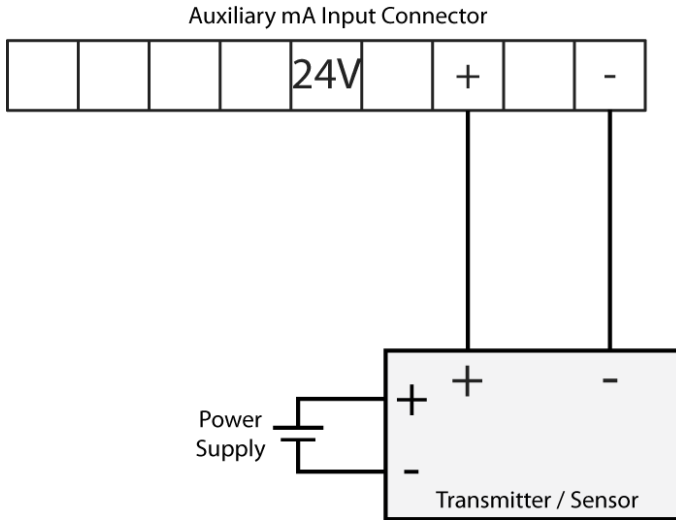


3 Wire Transmitter Loop Connection Details
(NB. The 24V Can Supply 30mA Max)
Loop Mode Set to "mA Input"

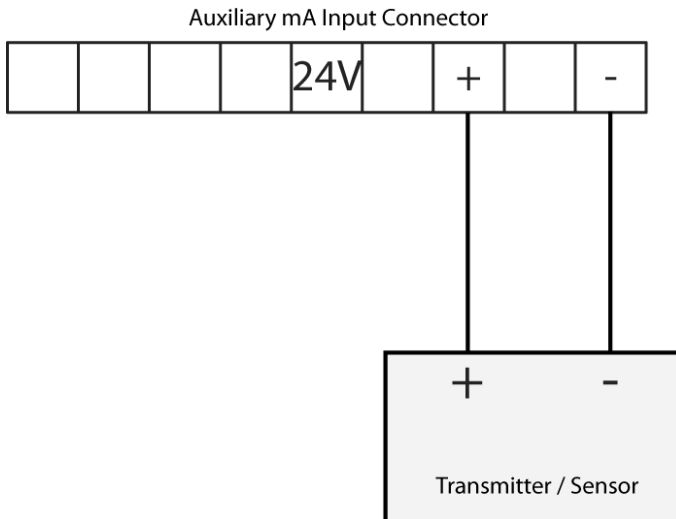
MXD75 – Surface Mount Termination Information



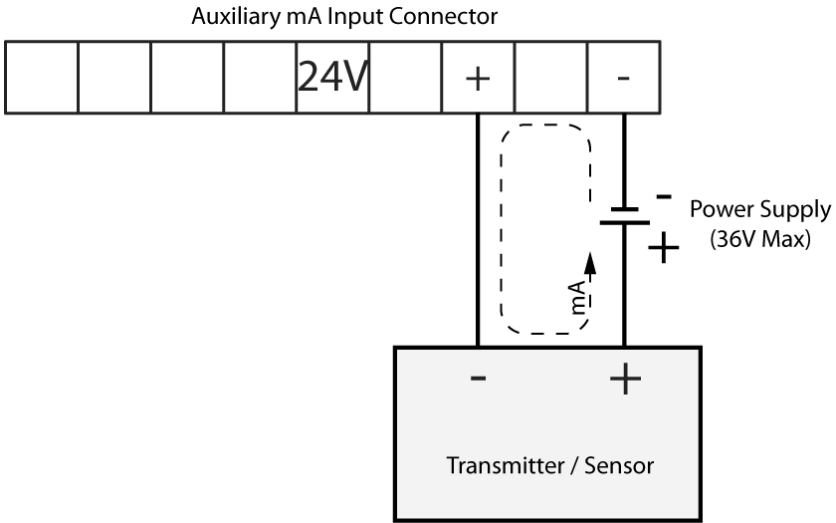
Auxiliary mA Input Connection Details



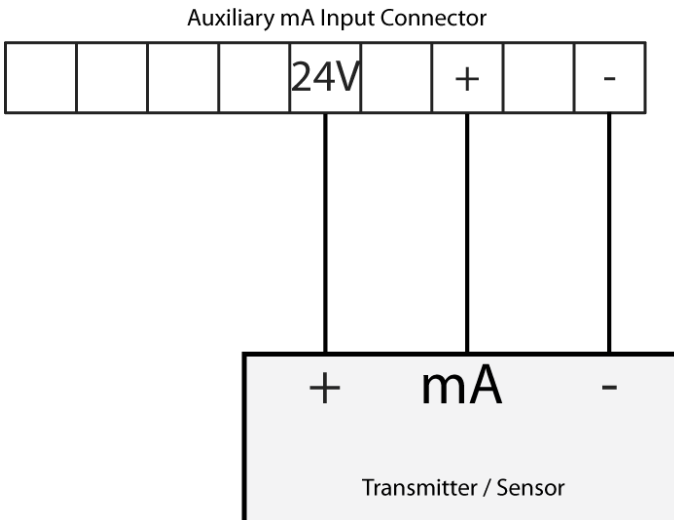
Self Powered Transmitter Loop Connection Details
Loop Mode Set to "mA Input"



Internally Powered Loop Connection Details
Loop Mode Set to "24V Loop"
(MXD70 powers the loop with 24V)



Externally Powered Loop Connection Details
Loop Mode Set to "mA Input"

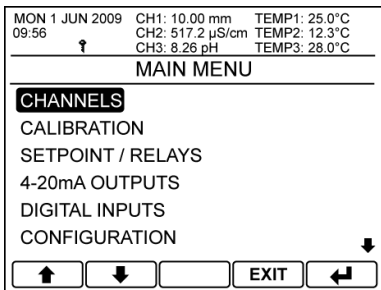


3 Wire Transmitter Loop Connection Details
(NB. The 24V Can Supply 30mA Max)
Loop Mode Set to "mA Input"

Auxiliary mA Input Channel Setup

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

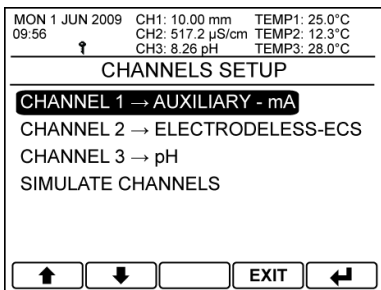
The default security access code is **1000**



Main Menu

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

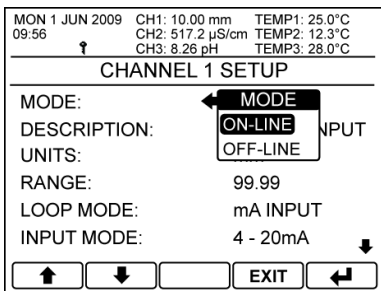
- ↑/↓ – Select Option
- EXIT – Return to Front Screen
- ↶ – Enter Option



Select Channel

Select the Auxiliary mA 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

MON 1 JUN 2009 09:56 CH1: 10.00 mm TEMP1: 25.0°C
 CH2: 517.2 µS/cm TEMP2: 12.3°C
 CH3: 8.26 pH TEMP3: 28.0°C

CHANNEL 1 SETUP

MODE: ON-LINE

DESCRIPTION: **AUX mA INPUT**

LOOP MODE: mA INPUT

INPUT MODE: 4 - 20mA

↑ ↓ → EXIT ←

Description

Change the menu description of the Auxiliary mA Input Card. Improves the ease of use throughout the instrument.

Limited to 15 characters, though in some menus only the first 5 characters will be displayed.

- ↑/↓ – Change Character
- – Select Next Character
- EXIT** – Cancel
- ↩ – Save Selection

Channel Setup

MON 1 JUN 2009 09:56 CH1: 10.00 mm TEMP1: 25.0°C
 CH2: 517.2 µS/cm TEMP2: 12.3°C
 CH3: 8.26 pH TEMP3: 28.0°C

CHANNEL 1 SETUP

MODE: ON-LINE

DESCRIPTION: **CUSTOM UNITS** mA INPUT

UNITS: **A A A A A**

RANGE: A A A A A

LOOP MODE: mA INPUT

INPUT MODE: 4 - 20mA

↑ ↓ → A,a,1,µ ←

Units

Set the operating units of the scaled input using a maximum of 5 characters.

Note: If you hold down the “A,a,1,µ” Button for approximately 5 seconds the unit will automatically set the character to “blank”.

Only the first two characters of the units are displayed in the menu header.

Available characters:

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	a	b	c	d
e	f	g	h	i	j	k	l	m	n
o	p	q	r	s	t	u	v	w	x
y	z	1	2	3	4	5	6	7	8
9	0	µ		#	%	()	+	-
.	/	:	=	\	^	Σ	Ω	π	°
±	²	³	⁰	β					

- ↑/↓ – Change Character
- – Select Next Character
- A,a,1,µ** – Jump To Next Character Subset
- ↩ – Save Selection

MON 1 JUN 2009 09:56 CH1: 10.00 mm TEMP1: 25.0°C
 CH2: 517.2 µS/cm TEMP2: 12.3°C
 CH3: 8.26 pH TEMP3: 28.0°C

CHANNEL 1 SETUP

MODE: ON-LINE

DESCRIPTION: RANGE INPUT

UNITS: 9.999

RANGE: 99.99

LOOP MODE: 9999.9

INPUT MODE: 99999

↑ ↓ [] EXIT ↵

Range

Select the operating range over which the input is scaled.

Note only the "9999" range allows signed values.

↑/↓ – Select Option

EXIT – Cancel

↵ – Save Selection

MON 1 JUN 2009 09:56 CH1: 10.00 mm TEMP1: 25.0°C
 CH2: 517.2 µS/cm TEMP2: 12.3°C
 CH3: 8.26 pH TEMP3: 28.0°C

CHANNEL 1 SETUP

MODE: ON-LINE

DESCRIPTION: AUX mA INPUT

UNITS: mm

RANGE: LOOP MODE

LOOP MODE: mA INPUT

INPUT MODE: 24V LOOP

↑ ↓ [] EXIT ↵

Loop Mode

The input channel has the ability to support both direct mA input and 24V looped powered systems by setting this parameter.

Note. For direct input configuration the input resistance is 100Ω.

↑/↓ – Select Option

EXIT – Cancel

↵ – Save Selection

MON 1 JUL 2013 09:56 CH1: 10.00 mm TEMP1: 25.0°C
 CH2: 517.2 µS/cm TEMP2: 12.3°C
 CH3: 8.26 pH TEMP3: 28.0°C

CHANNEL 1 SETUP

MODE: ON-LINE

DESCRIPTION: INPUT MODE

UNITS: 4 - 20mA

RANGE: 0 - 20mA

LOOP MODE: Curve A

INPUT MODE: Curve B

↑ ↓ [] EXIT ↵

Input Mode

The input can be configured so that the incoming current is scaled across a 4 – 20mA, 0 – 20mA or linearized across desired points entered in to one of the two available custom curves.

If 4-20mA is selected and the input current falls below 4mA, a channel error is generated.

If a curve is chosen and the input falls below the lowest or highest entered mA input point, a channel error will be generated.

↑/↓ – Select Option

EXIT – Cancel

↵ – Save Selection

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 μ S/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CHANNEL 1 SETUP		
SET 0mA INPUT:	(0mA)	
SET 20mA INPUT:	00.00mm	
SIMULATED INPUT:		
INPUT FILTER:	OUT	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="→"/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>		

Set 0mA Input

Enter the displayed value equivalent to a 0mA input.

Note. Only available when input mode is set to 0mA – 20mA input.

- ↑/↓ – Increase / Decrease Digit
- – Select Next Digit
- EXIT – Cancel
- ↩ – Save Value

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 μ S/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CHANNEL 1 SETUP		
MODE:	ON-LINE	
UNITS:	mm	
RANGE:	99.99	
LOOP MODE:	mA INPUT	
INPUT MODE:	(4mA)	
SET 4mA INPUT:	00.00mm	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="→"/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>		

Set 4mA Input

Enter the displayed value equivalent to a 4mA input.

Note. Only available when input mode is set to 4mA – 20mA input.

- ↑/↓ – Increase / Decrease Digit
- – Select Next Digit
- EXIT – Cancel
- ↩ – Save Value

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 μ S/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CHANNEL 1 SETUP		
SET 4mA INPUT:	4.00 mm	
SET 20mA INPUT:	(20mA)	
SIMULATED INPUT:	20.00mm	
INPUT FILTER:		
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="→"/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>		

Set 20mA Input

Enter the displayed value equivalent to a 20mA input.

Note. Only available when input mode is set to 4mA – 20mA input.

- ↑/↓ – Increase / Decrease Digit
- – Select Next Digit
- EXIT – Cancel
- ↩ – Save Value

Channel Setup

MON 1 JUL 2013 09:56 CH1: 10.00 mm CH2: 517.2 μS/cm CH3: 8.26 pH TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C

CHANNEL 1 SETUP

SETUP CURVE A: **ENTER**

SIMULATED INPUT: SIMULATE

INPUT FILTER: OUT

↑ ↓ [] EXIT ↩

MON 1 JUL 2013 09:56 CH1: 0.556mm CH2: 9.64 pH CH3: 8.26 pH TEMP1: 0.501mA TEMP2: 25.0°C TEMP3: 28.0°C

SETUP CURVE A

NUMBER OF POINTS: **9**

SETUP POINTS: ENTER

1) 0.00mA	0.000mm
2) 1.00mA	1.111mm
3) 2.00mA	2.222mm
4) 5.00mA	3.333mm

↑ ↓ [] EXIT ↩

Setup Custom Curve

The Auxiliary mA input provides the user with the facility to enter a custom relationship between the incoming mA measurement and the displayed value.

To enter the relationship, first set the input mode to “Curve A”, or “Curve B”. Then select the “Setup Curve X” menu.

The new screen provides the following options.

- Number of points – Define the number of data entry points which make up the custom curve (Maximum of 10)
- Setup Points – Automatically define the points one after another.
- Data Points – Alternatively the user can edit a single point by selecting it in the menu.
- Reset Curve – Reset all points back to zero

↑/↓ – Increase / Decrease Digit

➡ – Select Next Digit

EXIT – Cancel

↩ – Save Value

MON 1 JUN 2009 09:56 CH1: 10.00 mm CH2: 517.2 μS/cm CH3: 8.26 pH TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C

CHANNEL 1 SETUP

SET 4mA INPUT: 4.00 mm

SET 20mA INPUT: 20.00 mm

SIMULATED INPUT: **SIMULATE**

INPUT FILTER: OUT

↑ ↓ [] EXIT ↩

Simulated Input

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

↑/↓ – Select Option

EXIT – Return to Main Menu

↩ – Enter Option

MON 1 JUN 2009 09:56 CH1: 10.00 mm CH2: 517.2 μS/cm CH3: 8.26 pH TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C

CHANNEL 1 SETUP

SET 4mA INPUT: **INPUT FILTER**

SET 20mA INPUT: **OUT**

SIMULATED INPUT: 10 SECS

INPUT FILTER: 20 SECS

40 SECS

1 MIN

↑ ↓ [] EXIT ↩

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 10 seconds to 5 minutes).

↑/↓ – Select Option

EXIT – Return to Main Menu

↩ – Enter Option

BLANK**Channel Setup**

Calibration

Calibration Procedures

The user is provided with two methods of calibrating the Auxiliary mA Input Card.

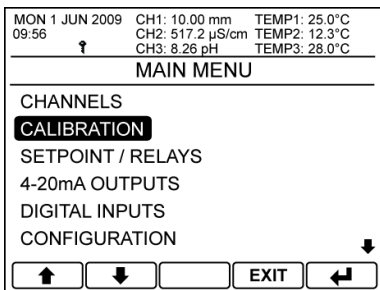
- 2 Point Calibration – Selected by entering the “Aux mA Input Cal” menu item in the calibration menu. This allows the user to calibrate a fixed mA input of 0mA, 4mA, or 20mA against a known current source. Available calibration values depend upon the “Input Mode” menu setting in the channel setup menu.
- Solution Calibration – Selected by entering the “Sensor Solution Cal” menu item in the calibration menu, this allows the user to adjust the scaled reading to match a known input. The amount of offset applied is shown in the “Offset value” menu item and is effective across the full scale of the current input.

Calibration Menu

The calibration menu provides the facility to adjust the sensor inputs to the system in which it is operating.

The default security access code is 1000

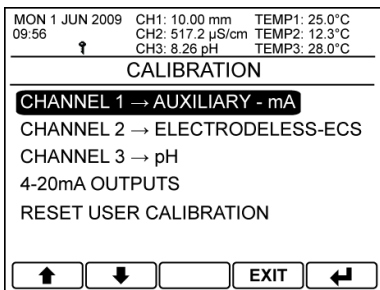
Channel Calibration



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

Select the Auxiliary mA input channel you wish to edit.

- ↑/↓ – Select Option
- EXIT – Return to Main Menu
- ← – Enter Option

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 µS/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
MODE:	← MODE	
AUX mA INPUT CAL:	ON-LINE	
SENSOR SOLUTION CAL:	OFF-LINE	
SENSOR OFFSET:	+0.00mm	
FRONT CAL ACCESS:	NO	
CALIBRATION REMINDER:	NO	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input style="width: 40px; height: 20px;" type="button" value=" "/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>		

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

Channel Calibration

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 µS/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
MODE:	ON-LINE	
AUX mA INPUT CAL:	ENTER	
SENSOR SOLUTION CAL:	ENTER	
SENSOR OFFSET:	+0.00mm	
FRONT CAL ACCESS:	100.0%	
CALIBRATION REMINDER:	ENTER	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input style="width: 40px; height: 20px;" type="button" value=" "/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>		

Auxiliary mA Input Calibration

Enter the Auxiliary mA Input Calibration routine.

Allows the user to calibrate the mA input to a known current source.

↑/↓ – Select Option

EXIT – Return to Select Calibration Channel

↩ – Enter pH Auto Calibration

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 µS/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
MODE:	AUX mA IP CALIBRATION	
AUX mA INPUT CAL:	← SET IP to 0mA	
SENSOR SOLUTION CAL:	SENSOR 5	
SENSOR OFFSET:	+0.00mm	
FRONT CAL ACCESS:	NO	
CALIBRATION REMINDER:	NO	
<input type="button" value="PREV"/> <input type="button" value="SKIP"/> <input style="width: 40px; height: 20px;" type="button" value=" "/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>		

0 mA Input Calibration

Set the known current input to 0mA and press enter to initiate a calibration.

Only available when the input mode is set to 0 – 20mA in the channel setup menu.

PREV – Go to Previous Calibration Point

SKIP – Skip to Next Calibration Point

EXIT – Exit Calibration Without Saving

↩ – Initiate Calibration

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 µS/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
MODE:	AUX mA IP CALIBRATION	
AUX mA IN	← SET IP TO 4mA	
SENSOR S	SENSOR OFFSET: +0.00mm	
FRONT CAL ACCESS:	NO	
CALIBRATION REMINDER:	NO	
<input type="button" value="PREV"/> <input type="button" value="SKIP"/> <input type="button" value="EXIT"/> <input type="button" value="↵"/>		

4 mA Input Calibration

Set the known current input to 4mA and press enter to initiate a calibration.

Only available when the input mode is set to 4 – 20mA in the channel setup menu.

- PREV** – Go to Previous Calibration Point
- SKIP** – Skip to Next Calibration Point
- EXIT** – Exit Calibration Without Saving
- ↵** – Initiate Calibration

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 µS/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
MODE:	AUX mA IP CALIBRATION	
AUX mA IN	← SET IP TO 20mA	
SENSOR S	SENSOR OFFSET: +0.00mm	
FRONT CAL ACCESS:	NO	
CALIBRATION REMINDER:	NO	
<input type="button" value="PREV"/> <input type="button" value="SKIP"/> <input type="button" value="EXIT"/> <input type="button" value="↵"/>		

20 mA Input Calibration

Set the known current input to 20mA and press enter to initiate a calibration.

Only available when the input mode is set to 4 – 20mA in the channel setup menu.

- PREV** – Go to Previous Calibration Point
- SKIP** – Skip to Next Calibration Point
- EXIT** – Exit Calibration Without Saving
- ↵** – Initiate Calibration

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 µS/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
MODE:	SENSOR SOLUTION CAL	
AUX mA IN	0.10 mm	
SENSOR S	← ADJUST READING USING	
SENSOF	↑ AND ↓ ARROWS	
FRONT CA	CALIBRATION REMINDER: NO	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="EXIT"/> <input type="button" value="↵"/>		

Sensor Solution Calibration

The Sensor Solution calibration enables the user to adjust the sensor reading to match a known input.

The current 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 calibration.

- ↑/↓** – Adjust the Reading Up or Down
- EXIT** – Cancel
- ↵** – Save Calibration

Channel Calibration

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 μ S/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
MODE:	ON-LINE	
AUX mA INPUT CAL:	ENTER	
SENSOR SOLUTION CAL:	ENTER	
SENSOR OFFSET:	+0.10mm	
FRONT CAL ACCESS:	NO	
CALIBRATION REMINDER:	NO ↓	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>		

Sensor Offset Value

Displays the Sensor Offset currently being used by the instrument.

Cannot be edited.

Changed by using sensor solution calibration.

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 μ S/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
MODE:	ON-LINE	
AUX mA INPUT CAL:	ENTER	
SENSOR SOLUT	FRONT CAL ACCESS	
SENSOR OFF:	YES	
FRONT CAL ACC:	NO	
CALIBRATION REMINDER:	NO	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>		

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

MON 1 JUN 2009	09:56
CH1: 10.00 mm	
i) 12.00 mA(IP)	ii)
CH2: 517.2 μ S/cm	
i) 12.3°C	ii) 12.28mA
CH3: 8.26 pH	
i) 28.0°C	ii)
<input type="button" value="CAL"/> <input type="button" value="←"/> <input type="button" value="→"/> <input type="button" value="MENU"/>	

Front Screen Calibration Access

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

CAL – Enter Calibrate Channel Select Menu

←/→ – Scroll Around Menus

Menu – Access Main Menu

MON 1 JUN 2009	09:56
CH1: 10.00 mm	
i) 12.00 mA(IP)	ii)
CH2: 517.2 μ S/cm	
i) 12.3°C	ii) 12.28mA
CALIBRATE CHANNEL 1 → AUXILIARY - mA	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>	

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

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 µS/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
MODE:	ON-LINE	
AUX mA INPUT CAL:	ENTER	
SENSOR SOLUTION CAL:	ENTER	
SENSOR	CALIBRATION REMINDER	
FRONT CAL	YES	
CALIBRATION	NO	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>		

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 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

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 µS/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
CALIBRATION	CALIBRATION INTERVAL	
NEXT CAL D.	060Days	
DEFER CAL DATE:	7 DAYS	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="→"/> <input type="button" value="EXIT"/> <input type="button" value="↩"/>		

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

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 µS/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
CALIBRATION INTERV	NEXT CAL DATE	
NEXT CAL DATE:	31 AUG 2009	
DEFER CAL DATE:	7 DAYS	
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="→"/> <input type="button" value="EXIT"/> <input type="button" 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

MON 1 JUN 2009 09:56	CH1: 10.00 mm CH2: 517.2 μ S/cm CH3: 8.26 pH	TEMP1: 25.0°C TEMP2: 12.3°C TEMP3: 28.0°C
CALIBRATE CHANNEL 1		
CALIBRATION INTERVAL: 60 DAYS		
NEXT CA	DEFER CAL DATE	
DEFER C	UPDATE CAL DUE DATE?	
<input type="text"/>	<input type="text"/>	<input type="text"/>
	YES	NO

Defer Calibration Date

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

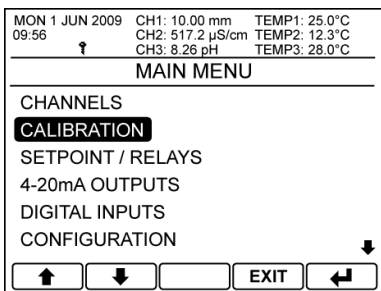
Only appears once the calibration interval has expired.

YES – Increase Interval

NO – Cancel

Resetting the User Calibration

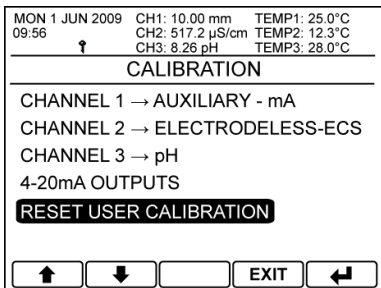
If required the user can reset the user calibrations to their default states.



Main Menu

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

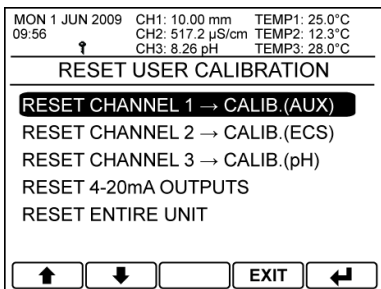
- Select Option
- EXIT** – Return to Front Screen
- Enter Option



Calibration

Select Reset User Calibration.

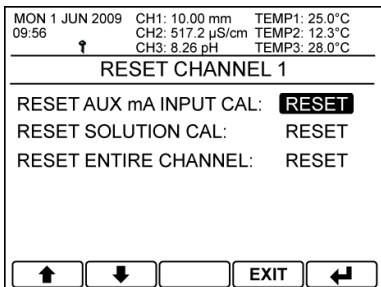
- Select Option
- EXIT** – Return to Main Menu
- Enter Option



Reset User Calibration

Select the required Auxiliary mA input channel.

- Select Option
- EXIT** – Return to Calibration
- Enter Option



Reset Channel User Calibration

Select whether to reset the sensor calibration, solution calibration or reset all of the channel's user calibrations.

- Select Option
- EXIT** – Return to Reset User Calibration
- Enter Option

Channel Calibration

Blank

Appendix A - 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)

Channel	Current Output A	Current Output B	Current Output C	Current Output D	Current Output E	Current Output F
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 B - 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

Faults

Input Channel Errors

E030	CH1	Input Card Checksum Error
E080	CH2	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.
E130	CH3	
E031	CH1	Setup Checksum Error
E081	CH2	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.
E131	CH3	
E032	CH1	Store A Checksum Error
E082	CH2	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.
E132	CH3	
E033	CH1	Store B Checksum Error
E083	CH2	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.
E133	CH3	
E034	CH1	Factory Cal Checksum Error
E084	CH2	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.
E134	CH3	
E035	CH1	User Cal Checksum Error
E085	CH2	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.
E135	CH3	
E036	CH1	Sensor Cal Out Of Spec
E086	CH2	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.
E136	CH3	
E037	CH1	Sensor Zero Cal Out Of Spec
E087	CH2	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.
E137	CH3	
E038	CH1	Sensor Span Cal Out Of Spec
E088	CH2	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.
E138	CH3	
E039	CH1	No Signal
E089	CH2	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.
E139	CH3	
E040	CH1	Signal Overload
E090	CH2	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.
E140	CH3	

E041	CH1	Partial Depletion
E091	CH2	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.
E141	CH3	
E042	CH1	
E092	CH2	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.
E142	CH3	
E043	CH1	
E093	CH2	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.
E143	CH3	
E044	CH1	
E094	CH2	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.
E144	CH3	
E045	CH1	
E095	CH2	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.
E145	CH3	
E046	CH1	
E096	CH2	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.
E146	CH3	
E047	CH1	
E097	CH2	The sensor input is at open circuit, check sensor condition and connections. If the message persists please consult with your supplier.
E147	CH3	
E048	CH1	
E098	CH2	The sensor input is at short circuit, check sensor condition and connections. If the message persists please consult with your supplier.
E148	CH3	
E049	CH1	
E099	CH2	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.
E149	CH3	
E050	CH1	
E100	CH2	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.
E150	CH3	
E051	CH1	
E101	CH2	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.
E151	CH3	
E052	CH1	
E102	CH2	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.
E152	CH3	

E053	CH1	Temp Sensor Fault
E103	CH2	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.
E153	CH3	
E054	CH1	
E104	CH2	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.
E154	CH3	
E055	CH1	
E105	CH2	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.
E155	CH3	
E056	CH1	
E106	CH2	The temperature reading is less than 0.0C or greater than 150.0C, leading to an error in compensation.
E156	CH3	
E057	CH1	
E107	CH2	The last Polarographic Zero Calibration was out of limits, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E157	CH3	
E058	CH1	
E108	CH2	The last Polarographic Span Calibration was out of limits, check sensor condition and connections and repeat calibration. If the message persists please consult with your supplier.
E158	CH3	
E059	CH1	
E109	CH2	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.
E159	CH3	
E060	CH1	
E110	CH2	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.
E160	CH3	
E061	CH1	
E111	CH2	The pressure sensor reading is greater than the specified limit for the probe.
E161	CH3	
E062	CH1	
E112	CH2	The pressure sensor reading is less than the specified limit for the probe.
E162	CH3	
E063	CH1	
E113	CH2	The pressure sensor input is greater than 20mA, check sensor condition and connections. If the message persists please consult with your supplier.
E163	CH3	
E064	CH1	
E114	CH2	The pressure sensor input is less than 4mA, check sensor condition and connections. If the message persists please consult with your supplier.
E164	CH3	
E065	CH1	
E115	CH2	The sensor input is greater than 20mA, check sensor condition and connections. If the message persists please consult with your supplier.
E165	CH3	

Faults

E066	CH1	AUX mA Input Below 4mA
E116	CH2	The sensor input is less than 4mA, check sensor condition and connections. If the message persists please consult with your supplier.
E166	CH3	
E067	CH1	Sensor 0mV Cal Out of Spec
E117	CH2	The pH 0mV calibration for this channel is outside recommended specifications.
E167	CH3	
E068	CH1	Calibration Due
E118	CH2	The time since the last calibration was performed on this channel has exceeded the time set in the calibration menu.
E168	CH3	
E069	CH1	Planned Service Due
E119	CH2	The Planned Service interval for this unit has expired. Please contact Quadbeam Technologies at the details below:
E169	CH3	
<p>Quadbeam Technologies Ltd P.O. Box 1142 Pukekohe Auckland 2340 New Zealand Tel. +64 (0)9 276 4434 Email helpdesk@quadbeam.co.nz</p>		
<p>NB. Quadbeam Technologies overseas users should contact their local distributor</p>		
E070	CH1	SD Card Checksum Error
E120	CH2	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.
E170	CH3	
E071	CH1	Gain Error
E121	CH2	The sensor gain has been exceeded. If this message persists, please consult with your supplier.
E171	CH3	
E072	CH1	Invalid Linearisation Curve
E122	CH2	A minimum of 2 linearisation points are required. Please check linearisation curve settings in the channel setup menu for this channel.
E172	CH3	
E073	CH1	Linearisation Over-Range
E123	CH2	The linearisation result is greater than 9999 (or 100.0% when using %).
E173	CH3	
E074	CH1	Linearisation Under-Range
E124	CH2	The linearisation result is less than 0.
E174	CH3	
E075	CH1	Curve Low Limit
E125	CH2	The incoming probe signal is less than the lowest point in the linearisation curve.
E175	CH3	
E076	CH1	Curve High Limit
E126	CH2	The incoming probe signal is greater than the highest point in the linearization curve.
E176	CH3	
E077	CH1	Custom Error
E127	CH2	Contact your supplier for details.
E177	CH3	

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	
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	
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	
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	
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	
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	
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	
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	
E254	B	The sensor input level is above that set for the current output Zero.
E264	C	
E274	D	
E284	E	
E294	F	
	A	
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	
	A	
E246	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.
E256	C	
E266	D	
E276	E	
E286	F	
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
E311	DIG 3	save the settings again in the Channel's Store A in the Save/Restore menu.
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
E312	DIG 3	save the settings again in the Channel's Store B in the Save/Restore menu.
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
E313	DIG 3	please consult with your supplier.
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
E314	DIG 3	save the settings again to the SD card store.
E319	DIG 4	
E324	DIG 5	
E329	DIG 6	
E334	DIG 7	
E339	DIG 8	

Communication Errors

E340	CH1	Comms Failure
E342	CH2	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.
E344	CH3	
E341	CH1	Comms Error
E343	CH2	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.
E345	CH3	
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
E410	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.
- 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 transmitter input is correctly connected (see Installation Section) and that the transmitter is not faulty or damaged.
- Check that loop mode is correctly set within the Channel Setup menu (see page 15).
- Check that Input mode is correctly set within the Channel Setup menu (see page 15).
- Check that the input scaling has been configured correctly (see Auxiliary mA Input Channel Setup, page 13).
- Check that no error messages are being displayed.
- Check the instrument calibration using a mA simulator, Adjust the channel calibration if necessary (see Calibration Section).
- Use another instrument to check the transmitter.

Current Output Is Incorrect or Noisy

- Check that the maximum load for the current loop has not been exceeded. (750 Ω).
- 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 the current output has been configured properly.

Relays Appear to Malfunction

- Check that the unit is "On-Line" (see page 13)
- 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.

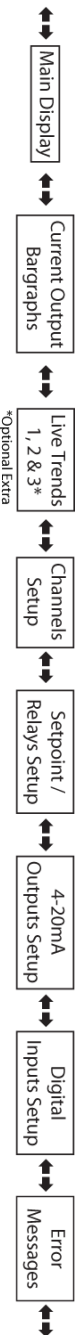
Goods for attention under guarantee (unless otherwise agreed) must be returned to the factory carriage paid and, if accepted for free repair, will be returned to the customer's address free of charge. Arrangements can also be made for repair on site, in which case a charge may be made for the engineer's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

Menu

Main Menu

- Channels
- Calibration
- Setpoint / Relays
- 4-20mA Outputs
- Digital Inputs
- Configuration
- Access Code Management
- Save / Restore
- Errors



Channels Setup

- Channel 1
- Channel 2
- Channel 3
- Simulate Channels



Channel Setup

- Mode
- Description
- Units
- Range
- Loop Mode
- Input Mode
- Set 0mA Input
- Set 4mA Input
- Set 20mA Input
- Input Filter
- Simulated Input



Menu

Main Menu

- Channels
- Calibration**
- Setpoint / Relays
- 4-20mA Outputs
- Digital Inputs
- Configuration
- Access Code Management
- Save / Restore
- Errors



Calibration

- Channel 1
- Channel 2
- Channel 3
- 4-20mA Outputs
- Reset User Calibration



Calibrate Channel

- Mode
- Aux mA Input Cal
- Sensor Solution Cal
- Offset Value
- Front Cal Access
- Calibration Reminder
- Calibration Interval
- Next Cal Date
- Defer Cal Date

Calibrate 4-20mA Outputs

- 4-20mA Output A
- 4-20mA Output B
- 4-20mA Output C
- 4-20mA Output D
- 4-20mA Output E
- 4-20mA Output F

Reset User Calibration

- Reset Channel 1
- Reset Channel 2
- Reset Channel 3
- Reset 4-20mA Outputs
- Reset Entire Unit



Reset Channel

- Reset Sensor Cal
- Reset Solution Cal

4-20mA Outputs

- Reset
- 4-20mA Output A
- 4-20mA Output B
- 4-20mA Output C
- 4-20mA Output D
- 4-20mA Output E
- 4-20mA Output F
- All 4-20mA Outputs