Solartron Metrology

SI3100 & SI3200 Digital Display



The SI3100 & SI3200 are a member of the SI3000 Readout Family. All members of the family are marked SI3000 on the front panel.

user and installation manual

XMETEK® ULTRA PRECISION TECHNOLOGIES

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2.0 Safety Information

Terms in this Manual

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

Symbols in this Manual

This symbol indicates where applicable cautionary or other information is to be found.

Service Safety

This equipment has been designed and tested to meet the requirements of the Low Voltage Directive (1997) and has been supplied in a safe condition. This manual contains information and warnings that must be followed by the user to ensure safe operation and to retain the apparatus in a safe condition.

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Power Source

24 V +/-10% DC 0.625 A

2.0 Safety Information (cont.)

WARNINGS:

Do not operate in an explosive atmosphere

Do not remove covers or panels

To avoid personal injury, do not remove covers and panels. Do not operate the equipment without the covers and panels fitted. There are no internal adjustments required during commissioning of the equipment.

Grounding the Equipment

The unit is supplied by 24 VDC and therefore does not require an earth grounding cable to avoid electric shock. However it is recommended that the unit is properly grounded to a known good earth via the bolt at the rear of the SI3100 to meet the full specification and EMC requirements.

3.0 Service and Repair

This equipment contains no user serviceable parts.

This equipment must be returned to your Solartron dealer for any service and repair.

The SI3100 is designed to be maintenance free. Contact with solvents should be avoided. Any attempt to dismantle the SI3100 will invalidate the warranty.

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The SI3100 is a precision instrument and should be handled with care.

4.0 Bench Mounted or Installed into a Panel

4.1 Bench Mounted with associated Solartron Probe



4.0 Bench Mounted or Installed into a Panel (cont.)

4.2 Panel Mounting

- Ensure that there is sufficient space behind the relevant instrument panel for the SI3100 and its cabling (refer to section 4.3 for dimensions).

- Cut out the panel aperture to the dimensions shown.
- Working from behind the panel, with the box fully located, fit the side brackets to the studs and slide them forward toward the panel until they lock into place.
- Screw the brackets to the panel.

CAUTION: Do not over tighten the screws as this may damage the case of the instrument.

WARNING: On installing or removing the SI3100, you must be aware of any hazardous equipment or materials in the vicinity. Make sure that any equipment into which the SI3100 system is to be installed is switched off and made safe.

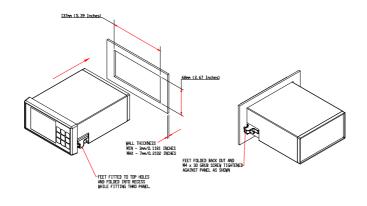
CAUTION: Avoid installing the SI3100 close to switch gear, contactors or motor starters.

CAUTION: Do not place other signal and power supply wiring in the same loom as the SI3100 wiring.

CAUTION: Use screened cables for all leads, with the screen earthed at one end only.

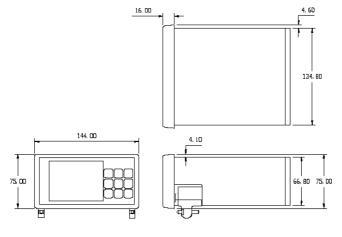
4.0 Bench Mounted or Installed into a Panel (cont.)

4.3 Panel Dimensions



4.0 Bench Mounted or Installed into a Panel (cont.)

4.4 Assembly Dimensions



5.0 Display Panel

5.1 Layout of Front Panel



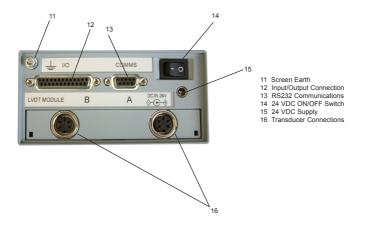
- 1 Liquid Crystal Operator Colour Display
- 2 Return to Setup Menu
- 3 Scroll Up (Moves cursor around screen)
- 4 Print Option
- 5 Enter

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- 6 Scroll Right (select option)
- 7 Track, Peak+, Peak-, Diff
- 8 Scroll Down (Moves cursor around screen)
- 9 Zero (ABS/TARE)
- 10 Scroll Left (select option)

5.0 Display Panel (cont.)

5.2 Layout of Rear Panel



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5.0 Display Panel (cont.)

5.3 Overview of Features

Transducers	SI3300 Series 4-20	T g up LVDT enter se) mA or DC inputs (.±10 V)	al choice of measure	ment units)							
Measurements and Display	The SI3300 and SI	3500 series can dia national information		rement mode the	, (A+B)/2, (A-B)/2 an sensor information A	· /	possible to						
Limits	Upper and lower limits are set for each individual measurement channel (A and B) and for a combinational measurement (e.g. A+B) The SI3000 series has 6 isolated limit outputs which are allocated in accordance to the measurement mode. The product is available with 2 output options: NPN type isolated outputs or PNP type isolated outputs. See section 8.1 for schematic.												
		Lower	Good	Upper	Lower	Good	Upper						
	A	Active	Active	Active	Off	Off	Off						
	В	Off	Off	Off	Active	Active	Active						
	A+B etc Active Active Active Active Active Active Active												
	If the measurement is within limit, then the good limit output is set, otherwise the upper or lower limit outputs are set to indicate a reading out of limit.												

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5.0 Display Panel (cont.)

5.3 Overview of Features (cont.)

Functions	The SI3000 series has the following functions a	vailable from the font panel keypad or co	ntrollable from the RS232 and some discrete									
	inputs.											
	Zero: Allows a reading to be set to zero (display	shows TARE) all measurements are the	n referenced to the zero position.									
	Print: Allows measured data to be printed via th	e RS232 port.										
	Peak/Track Allows the readout to be switched from track mode to peak+ or peak In peak mode the displayed value will only change											
	if it is greater than (peak+) or less than (peak-) the current displayed value.											
	Menu (keypad only) accesses menu screens for set up.											
	The SI3300 and SI3500 series have the following additional functions:											
	Preset: Allows a preset value to be added to the	e displayed reading only - does not chan	ge the analogue outputs. Enable preset from									
	the preset menu and activate with the up arrow	key.										
	Log Mode: The readout can log and store data	Log Mode: The readout can log and store data in three modes										
	Normal logging which will store a number of readings at a predefined interval. Setup and start from logging menu screen											
	Trigger start which will store a number of readings at a predefined interval, once the start logging input is triggered.											
	Log on Trigger which will store a reading every time the logging input is triggered, this mode is started from the logging menu.											
Inputs	4 discrete inputs, Zero, Change from track to peak+ to peak-, print, and log.											
Analogue Outputs		Analogue Output 1	Analogue Output 2									
	A	A	Off (null)									
	В	Off (null)	В									
	A+B etc.	A+B etc.	A+B etc.									
	Dual Display (SI3500 and SI3300 only) A B											
	Each analogue output can be independently set for 4-20 mA or a DC voltage (0-5 V, 0-10 V, ±5 V and ±10 V											

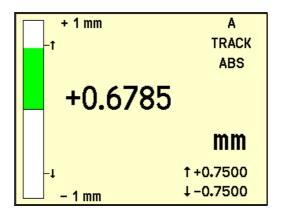
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6.0 Operating Screen

Display seen directly after powering up

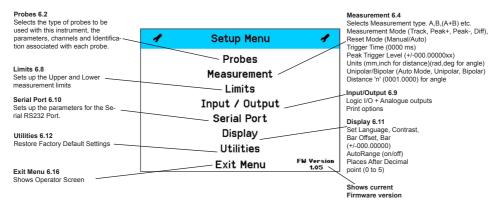
Note: This screen will vary depending on the Operator Screen displayed prior to powering down

Press MENU go to 6.1



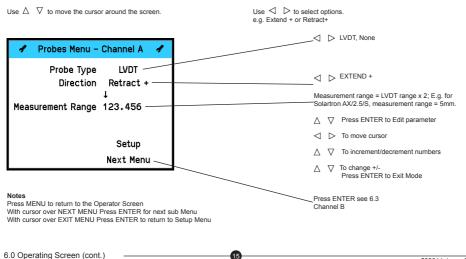
6.1 MENUS and SETUPS

Scroll up or down using the $\ \ \bigtriangledown \ \ \bigtriangledown \$ keys to the required sub menu PRESS (ENTER)

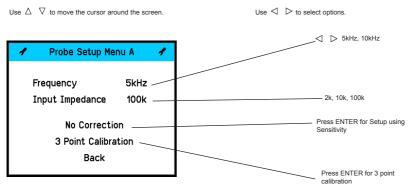


6.0 Operating Screen (cont.)

6 2 Probes Channel A



6.2.1 Probes Channel A



6.2.2 Sensitivity Setup

Use △ ▽ to move the cursor around the screen. Use △ ▷ to select options. Use △ ▷ to select options. Enter Probe Sensitivity (mV/V/mm) ↓ Nom Sensitivity 123.456 Live Reading +0.57850 Finish

6.2.3 3 Point Calibration

Use Δ ∇ to move the cursor around the screen.

Use \triangleleft \triangleright to select options.

a) Find the transducer's zero (null). Press "Next" when ready.

b) Move the transducer to fully out (extended) position. Press "Next" when ready.

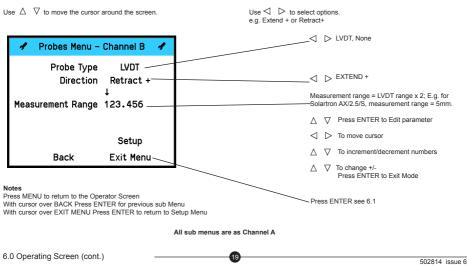
c) Move the transducer to zero (mid /null) position. Press "Next" when ready.

d) Move the transducer to fully in (retracted) position. Press "Finish" when ready.



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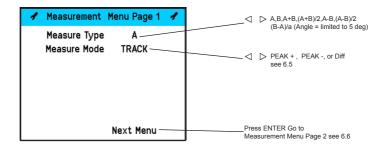
6.3 Probes Channel B



6.4 Measurement Menu Page 1

Use \triangle ∇ to move the cursor around the screen.

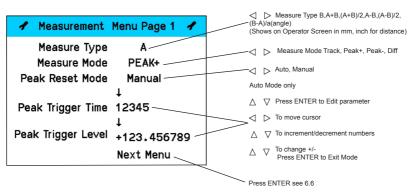
Use \triangleleft \triangleright to select options.



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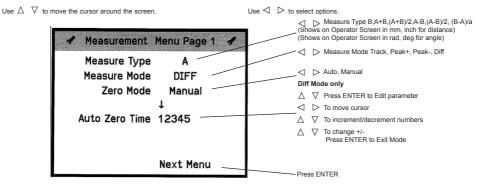
6.5 Measurement Menu Page 1

Use Δ ∇ to move the cursor around the screen.

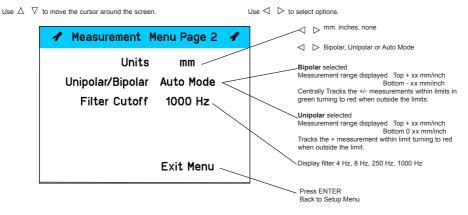


Use \triangleleft \triangleright to select options.

6.5.1 Measurement Menu Page 1



6.6 Measurement Menu Page 2



6.7 Measurement (Angle) Menu Page 2

Use Δ ∇ to move the cursor around the screen.

🖌 Measurement Menu Page 2 🥑 Sipolar, Unipolar or Auto Mode Bipolar selected Units deg Measurement range displayed Top + xx rad/deg Bottom - xx rad/deg Unipolar/Bipolar Auto Mode Centrally Tracks the +/- measurements within limits in green turning to red when outside the limits. Unipolar selected Measurement range displayed Top + xx rad/deg Distance 'a' +0001.0000 Bottom 0 xx rad/deg as used in (B-A)/a Tracks the + measurement within limit turning to red when outside the limit. Exit Menu Auto Mode only Press ENTER > To move cursor Back to Setup Menu √ To change +/-Press ENTER to Exit Mode

Use \triangleleft \triangleright to select options.

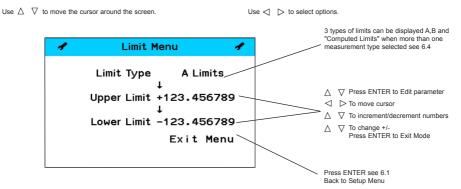
6.0 Operating Screen (cont.)

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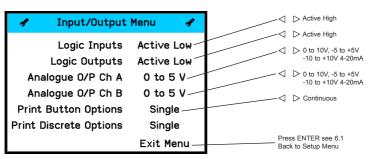
Λ

6.8 Limit Menu



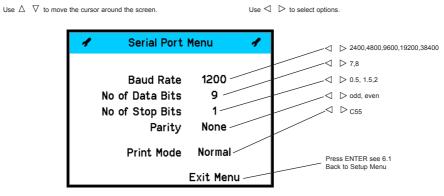
6.9 Input/Output Menu

Use \triangle ∇ to move the cursor around the screen.



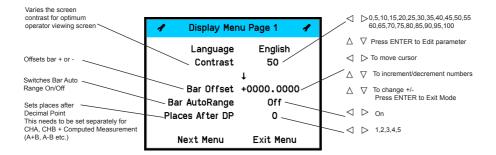
Use <1 ▷ to select options.

6.10 Serial Port Menu

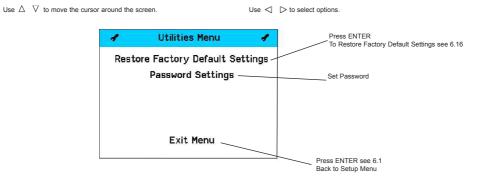


6.11 Display Menu

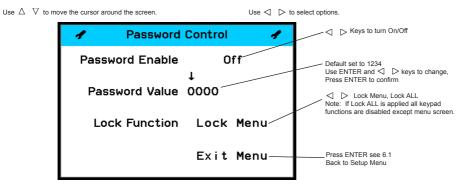




6.12 Utilities Menu

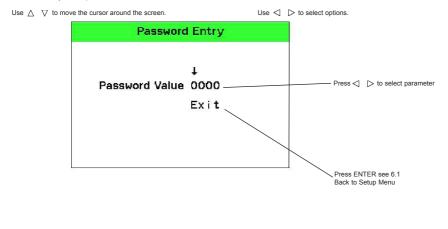


6.13 Password Menu



6.14 Password Entry

Note: Only seen if password enabled

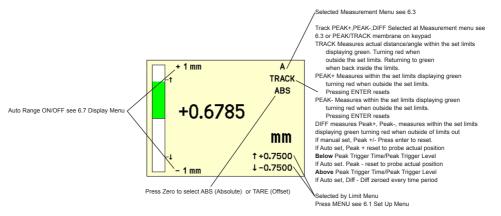


6.15 Utilities Menu (Factory Default Restore)

The following is displayed for 3 seconds, the unit automatically defaults to factory setting and returns to the Operator Screen.



6.16 Operator Screen



7.0 RS232 User Input Commands

The unit shall respond to the following RS232 User Input Commands

Command	Command Sequence	Number of Parameter Bytes	Description
Print	'^"O'	0	Print Mode = Normal : Standard print Print Mode = C55 : C55 compatible print (Print Mode option is located in the 'serial port' menu)
Extended Print	'^"P'	1	Print in SI3100 Format
Get Detail	'^"E'	2	Return Details about the SI3100 ABS or TARE, Measurement Type, Unit of Measure, Limit Values
Set Unit	'^"S'	11	Set Various SI3100 Settings Limits, Stroke, Measurement Type, Measurement Mode, Zero, Start/Stop Continuous Print, Set Print Button Mode, Notify, Peak Reset, Discrete Inputs Active Hi/ Lo, Discrete Outputs Active Hi/Lo

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Detailed Command specification with full parameter details follows on the next pages.

7.1 RS232 User Command Details

In the following table sp is used to mean an Ascii space (Dec 32 Hex 20) Shaded cells mean they are not used for the command shown

Command	Total No of Chars						Cha	racter	Numl	ber				
		1	2	3	4	5	6	7	8	9	10	11	12	13
	1	1	1	1										
Print	2	^	0	1										
Extended Print														
Current Measurement	3	^	Р	0										
Channel A	3	^	Р	1										
Channel B	3	^	Р	2					i					
	1				i —				1					
GetDetail	1		1	1	İ 🗌	1			İ	1			1	
Get Abs or Tare	4	^	E	A	0	1								
Get Measurement	4		F	м	0				1					
Mode			-		-									
Get Unit of Measure	4	^	E	U	0									
Get Current Mode LL	4	^	E	L	0									
Get Current Mode UL	4	^	E	L	1									
Get Computed LL	4	^	E	L	2									
Get Computed UL	4	^	E	L	3									
Get Channel A LL	4	^	E	L	4									
Get Channel A UL	4	^	E	L	5				i					
Get Channel B LL	4	^	E	L	6									
Get Channel B UL	4	^	E	L	7									
Get Computed Stroke	4	^	E	S	0									
Get Channel A Stroke	4	^	E	S	1				i i					
Get Channel B Stroke	4	^	E	S	2				i i					

7.1 RS232 User Command Details (cont.)

In the following table sp is used to mean an Ascii space (Dec 32 Hex 20)

Command	Total No of Chars						Cha	racter	Numbe	r				
		1	2	3	4	5	6	7	8	9	10	11	12	13
SetUnit														
Set Limits														
Set Ch A UL	13	^	S	L	A	U	1		2	3	4	sp	sp	sp
Set Ch A LL	13	^	S	L	A	L	0		7	8	9	sp	sp	sp
Set Ch B UL	13	^	S	L	В	U	1		2	3	4	sp	sp	sp
Set Ch B LL	13	^	S	L	В	L	0		7	8	9	sp	sp	sp
Set Computed UL	13	^	S	L	С	U	1		2	3	4	sp	sp	sp
Set Computed LL	13	^	S	L	С	L	0		7	8	9	sp	sp	sp
Set Measurement Type														
A	13	^	S	M	0	sp	sp	sp	sp	sp	sp	sp	sp	sp
В	13	^	S	M	1	sp	sp	sp	sp	sp	sp	sp	sp	sp
A+B	13	^	S	M	2	sp	sp	sp	sp	sp	sp	sp	sp	sp
(A+B)/2	13	^	S	M	3	sp	sp	sp	sp	sp	sp	sp	sp	sp
A-B	13	^	S	M	4	sp	sp	sp	sp	sp	sp	sp	sp	sp
(A-B)/2	13	^	S	M	5	sp	sp	sp	sp	sp	sp	sp	sp	sp
(B-A)a (angle)	13	^	S	M	6	sp	sp	sp	sp	sp	sp	sp	sp	sp

7.1 RS232 User Command Details (cont.)

Command	Total No of Chars						Cha	racter I	Numbe	r				
		1	2	3	4	5	6	7	8	9	10	11	12	13
SetUnit				1										
Set Measurement Mode														
Track	13	^	S	0	N	sp	sp	sp	sp	sp	sp	sp	sp	sp
Peak+	13	^	S	0	+	sp	sp	sp	sp	sp	sp	sp	sp	sp
Peak-	13	^	S	0	-	sp	sp	sp	sp	sp	sp	sp	sp	sp
DIff	13	^	S	0	D	sp	sp	sp	sp	sp	sp	sp	sp	sp
Zero	13	^	S	Z	sp	sp	sp	sp	sp	sp	sp	sp	sp	sp
Peak Reset	13	^	S	P	E	A	K	R	E	S	E	T	sp	sp
Start Continuous Print	13	^	S	P	R		N	Т	С	0	N	T	sp	sp
Stop Continuous Print	13	^	S	P	R		N	Т	S	Т	0	P	sp	sp
Set Print Key Single Mode	13	^	S	P	R		N	T	M	0	D	E	S	sp
Set Print Key Cont Mode	13	^	S	Р	R	1	N	Т	M	0	D	E	С	sp
Set I/O Logic State														
Logic Inputs Active Low	13	^	S	1	-	1	N	Р	-	L	0	sp	sp	sp
Logic Inputs Active High	13	^	S	1	-	1	N	Р	-	Н	1	sp	sp	sp
Logic Outputs Active Low	13	^	S	1	-	0	U	Т	-	L	0	sp	sp	sp
Logic Outputs Active High	13	^	S	1	-	0	U	Т	-	Н	1	sp	sp	sp
Notify														
Notify Probe Channel A	13	^	S	N	0	Т	İ I	F	Y	-	С	н	A	sp
Notify Probe Channel B	13	^	S	N	Õ	Ť	İ I	F	Ý	-	Č	H	B	sp
Stop Notify	13	^	S	N	0	Т	1	F	Y	Н	A	L	Т	sp

7.2 RS232 Output Formats

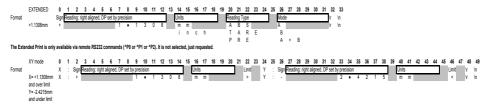
PRINT OU	JTPUT FORMATS	\$																							
	C55 Compatible	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
Format		Sign	Read	ding: r	ight a	ligned	, DP	set b	y pree	cision				Units					Limit	\n	\ r				
Example	+0.00017mm	+				0	•	0	0	0	1	7		m	m			-	=	\n	\r				
	-0.0017mm	-				0	٠	0	0	1	7			m	m				=	\n	\r				
	-0.017mm					0	٠	0	1	7				m	m				=	\n	\r				
	NORMAL	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Format		Sign	Read	ding: r	ight a	ligned	, DP	set b	y pre	cision						Units	5					Limit		\r	\n
	+1.1308mm	+							1	٠	1	3	0	8		m	m				-	=		\r	\n
	-1.1308inch	-							1	•	1	3	0	8		i	n	с	h			=		\r	\n
	-1.1308	-							1	•	1	3	0	8								=		\r	\n
	-1.13mm	-									1	•	1	3		m	m							\r	\n

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Note. XY print is not available when C55 'Print Mode' is selected. In this case only the selected channel will be printed.

Where: =space \r = CR \n = LF

7.2 RS232 Output Formats



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Note. XY print is not available when C55 'Print Mode' is selected. In this case only the selected channel will be printed.

Where: =space Vr = CR Vn = LF

8.0 Interface Connections

8.1 I/O CONNECTOR (Mounted on I/O Board)

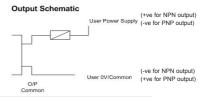
25 WAY D TYPE SOCKET, FIXED TO REAR PANEL

PIN	DESCRIPTION	DETAIL
1	CH1 OVER RANGE	
14	CH1 IN RANGE	
2	CH1 UNDER RANGE	
15	CH2 OVER RANGE	
3	CH2 IN RANGE	
16	CH2 UNDER RANGE	
4	Isolated O/P Common	
17	'Zero key' Isolated I/P	
5	'Print key' Isolated I/P	
18	'Reset key' Isolated I/P	
6	'Peak key' Isolated I/P	
19	Spare 1 Isolated I/P	
7	Spare 2 Isolated I/P	
20	Isolated I/P Common	
8	Not Used	
21	Not Used	
9	Not Used	
22	Not Used	
10	Not Used	
23	CH1 Analogue O/P Common	CH1 O/P Return
11	CH1 Analogue O/P	CH1 Analogue O/P
24	CH2 Analogue O/P Common	CH2 O/P Return
12	CH2 Analogue O/P	CH2 Analogue O/P
25	Not Used	
13	Not Used	

Input Schematic



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ANALOGUE OUT	PUT SPECIFICATION
Update interval	1.25mS
Bandwidth	500Hz
Rise time	70mS
Accuracy	0.1% FSO

8.0 Interface Connections

8.0 Interface Connections (cont.)

8.2 COMMS CONNECTOR

9 WAY D TYPE PCB SOCKET, FIXED TO REAR PANEL

PIN	RS232 CONFIGURATION
1	Not Used
2	RS232 Tx
3	RS232 Rx
4	Not Used
5	RS232 GND
6	Not Used
7	Not Used
8	Not Used
9	Not Used

8.3 POWER CONNECTOR (Mounted on rear panel)

2.5 mm Chassis Mounted DC skt

PIN	DESCRIPTION	DETAIL	DC IN 24V
1	+24V DC Power IN(centre pin)	Power for Instrument routed through a switch	l AA
2	POWER RETURN		

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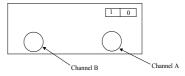
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8.0 Interface Connections (cont.)

8.4 LVDT Inputs

Two 5 way 270° D.I.N. sockets mounted on rear panel (Connections shown for each channel)	
PIN	DESCRIPTION
1	Primary +
2	Primary -
3	Not used
4	Secondary +
5	Secondary -

Channel A = Mains Switch End



9.0 Technical Specification

MAIN INSTRUMENT	
Display Type	Colour LCD with integral backlight.
Display Length (mm)	±ABCD.EFGH
Display Length (inches)	±ABCD.EFGHJ
Resolution - Display	0.05µm or 0.000005"
Analogue Display	Solid Vertical bar
Keypad	9 key membrane keypad (Print, Zero, Peak/Track, Enter, Menu and navigation keys)
Temperature	Storage temperature range: -20°C to +85°C, Operating temperature range: 0°C to +50°C
IP Rating	Front panel: IP65, Case: IP51
POWER SUPPLY	
Voltage	+24V DC ±10%
Power	5 Watts maximum at 24V DC
(Universal 100-240V AC Input 24V DC PSU supplied with unit)	
MECHANICAL	
Weight	1.1kg excluding transducers
Dimensions	See drawing
ELECTRICAL CONNECTIONS (Rear Panel)	
DC Power	2.5mm DC Socket (Ctr pin +24V, Outer Return)
Input	2 x LVDT 5 way 270° D.I.N. socket
Serial Comms (RS232)	9 way D type socket
Input/Output	25 way D type socket
Digital Inputs	4 off switch activated with common isolated return
Digital Outputs	6 off isolated outputs with common isolated return, programmable ACTIVE HI or LO Each pin can supply 500mA @ up to 40V
Analogue Outputs	1 for Channel A, 1 for Channel B, Independent Channel Range selection of : 0 to 5V, 0 to 10V, ± 5V, ± 10V, 4 to 20 mA - Accuracy 0.1% FSO

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9.0 Technical Specification