Solartron Metrology
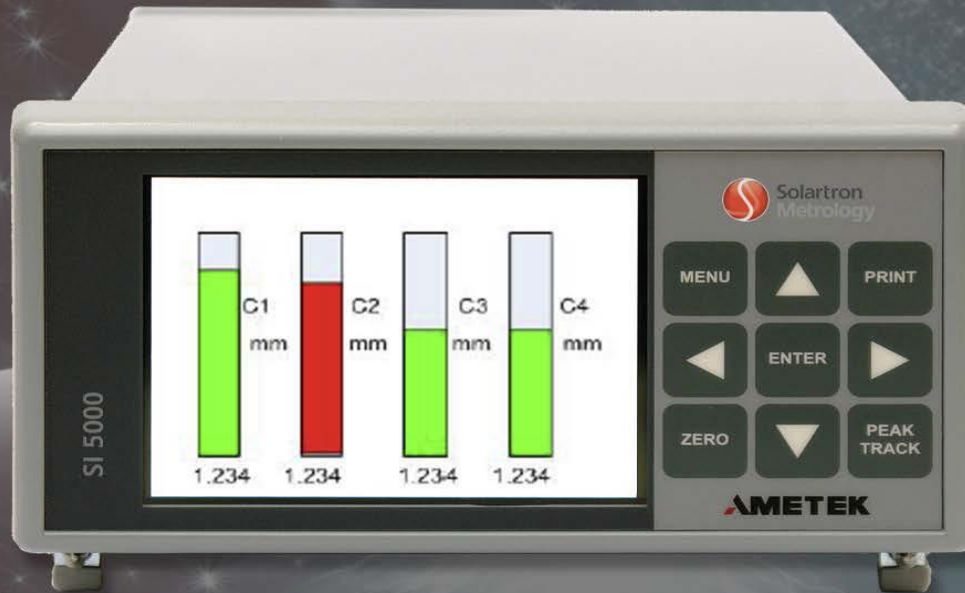
SI 5000
User manual

AMETEK®
ULTRA PRECISION TECHNOLOGIES

GENERAL

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CONTACT INFORMATION
For updated information, troubleshooting guide and to see our full range of products, visit our website:
http://www.solartronmetrology.com

TABLE OF CONTENTS

1   INTRODUCTION

This manual specifically caters for the SI5500 read out with Orbit Interface.

2   SCOPE

The SI5500 read out can interface **up to 31 Orbit Sensors** and communicates through Orbit Serial Protocol (via Orbit Interface). It can interface with Orbit Digital Probes, Linear Encoders and Encoder Input Modules. The readings from the sensors are displayed on the front panel LCD display. SI5500 includes a unique feature of configuring user defined formulas/expressions for each of the measurement channel. A **maximum of 31 measurement channels** are supported. The read out can be configured through a 9-button keypad (3x3). Basic Input Output is provided by discrete lines. A RS232 serial interface is provided for printing the current readings.

3   NAVIGATE THIS DOCUMENT

This is a large document, to aid electronic navigating the document; the following Navigation tip may be useful:
It is often necessary to jump to another item and then go back to where you jumped from.
This can be done in Adobe Reader by using the 'Previous Page View' button:
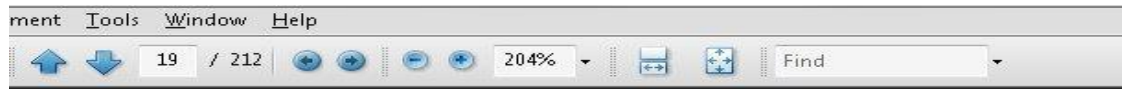
'Previous Page View' Button

Other PDF readers will have a similar 'Previous Page View' option.

4 SAFETY SUMMARY

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** ⚠ Indicates cautionary or other information	**Warnings and Cautions** **Warning:** Do not operate in an explosive atmosphere. **Warning:** this equipment is not intended for safety critical applications **Warning:** Do not operate without covers **Warning:** do not exceed maximum ratings as specified in this document under individual modules. **Caution: Low Voltage** This equipment operates below the SELV and is therefore outside the scope of the Low Voltage Directive **Service and Repair** ⚠ CAUTION: This equipment contains no user serviceable parts. Return to supplier for all service and repair

All of the Products are CE marked and comply with Low Voltage Directive (1997) standards.

5 GLOSSARY OF TERMS AND BASIC SYSTEM INFORMATION

5.1 TERMS ASSOCIATED WITH SI5500 READ OUT

Display

The Liquid Crystal Display mounted on the front panel of the read out providing displayed information

Keypad

The 9-button keypad (3x3) mounted on the front panel of the read out allowing functional and menu navigation

Discrete Inputs

Digital lines into the read out which allows remote control of certain parameters/functionalities

Discrete Outputs

Digital lines output from read out that can be used to drive external loads. These can be with either NPN or PNP configuration

Serial Interface

This is a RS232 bus that is used to print the reading in ASCII format (as defined in this manual).

Digital Probe
This is a standard Solartron product that can be connected to the read out through Orbit Interface.

EIM
Encoder Input Module – A standard Solartron product that is used to interface with rotary encoders and can be read through Orbit Interface.

Linear Encoder (LE)
Highly accurate optical gauge that can be read out through Orbit Interface.

Measurement Mode
This information represents the current measurement mode of the channel. It can take the values of ABS(Absolute), TARE(ZERO), PRE(Preset)
ABS(Absolute) – In this mode the displayed reading is same as the current absolute reading.
TARE(ZERO) – In this mode the displayed reading is referenced to a "Zero" value.
PRE(Preset) – In this mode the displayed reading is referenced to a user defined value.

When zeroing a single channel (Zero Preset All: OFF) only the Computed Measurement Result (eg C1) is zeroed and not the probe to ensure other channels using the same probes are not affected.

When zeroing all channels (Zero Preset All: ON), the probes and measurement results are both zeroed (eg Probes a,b,c and computed measurement C1,C2,C3); For formulae containing Mx and Mn functions (or other formulae that require zeroed probe values) the Zero All method should be used as these functions work directly on the probe values.

Resetting Max / Min values can be included within the zeroing process (Zero Preset All: ON & MxMn), in which case the zeroing takes place as above, as well as all max / mins reset to current values). As well as resetting Max / Min when Preset or Zero used, Max / Min are also reset when ABS is asserted.

Operation Mode
This information represents the mode in which the measurement channel is operating. It can take the values of TRACK, PEAK+, PEAK-.
TRACK – Tracks the current reading of the measurement channel
PEAK+ – Tracks the maximum value of the measurement channel
PEAK- – Tracks the minimum value of the measurement channel

Sensor/Orbit Sensor
This refers to Orbit Digital Sensor from Solartron. It can be one of Digital Probe or Linear Encoder or EIM sensor module.

6 ELECTRICAL INSTALLATION

This section describes how to connect the unit.

I/O Connector
Refer to Discrete Lines
section for pin details and
input/output schematic
details

RS232 COMM Connector
Refer to RS232 section
for pin details

24V DC Input
Connect the DC power
adapter supplied as an
accessory along with the
read out.

Orbit Communication Interface Ports
Connect one end of the RS485 cable to
one of the ports and the other end to
the Orbit network.

Orbit Network Stack
Orbit Digital Probes of up to **31
sensors** can be connected
together.
SI5500 read out supports
interface of DP probes (Spring
Push/Pneumatic), Linear
Encoders and Encoder Input
Modules.
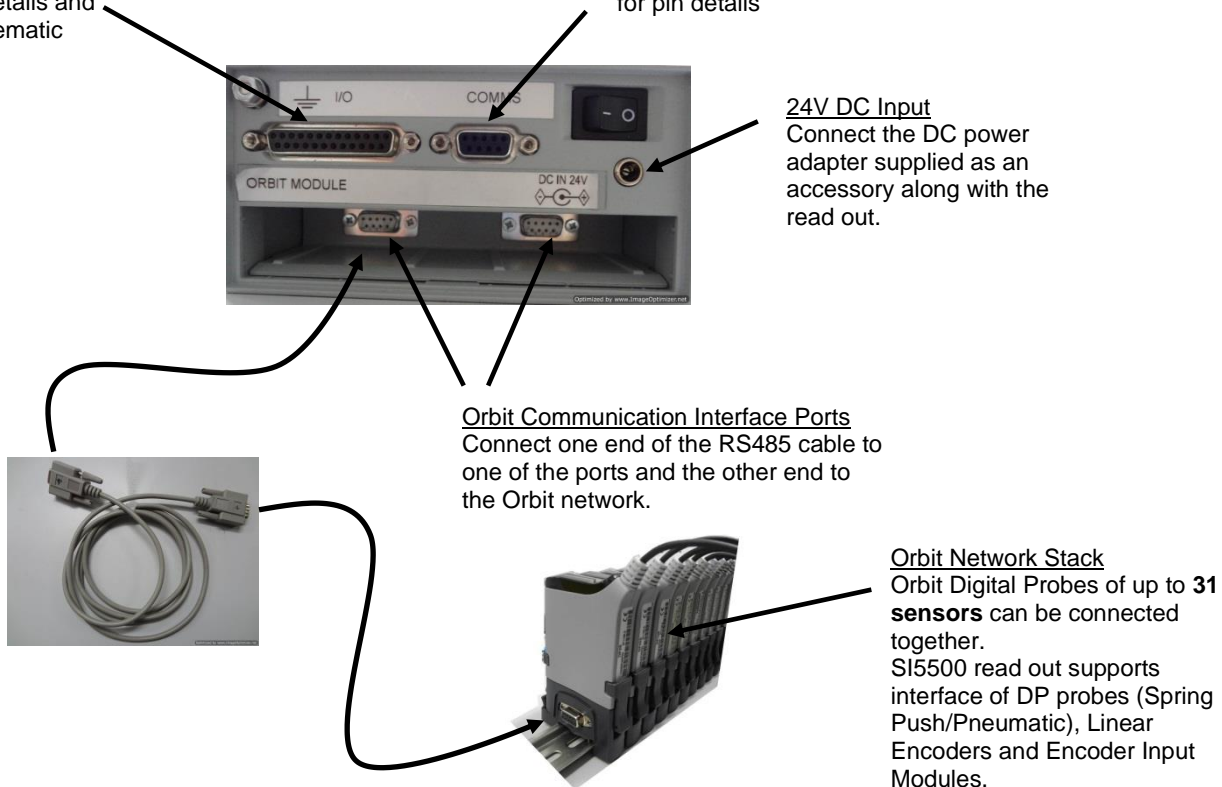
7   DISPLAY AND KEYPAD

SI5500 operates in four modes of display namely: OPERATE SCREEN, MENU SCREEN, GAUGING SCREEN and AUTOSENSE SCREEN

7.1 OPERATE SCREEN

The calculated readings are displayed in this mode. The operate screen can be of Single Channel Bar Display, Dual Channel Bar Display, 4-Channel Bar Display, 8-Channel Bar Display, 16-Channel Bar Display, 8-Channel Text Display, 16-Channel Text Display. User can select the required type of display through "Display Configuration Menu".

In the multi-channel configuration, user can scroll through the required set of channels using ◀ and ▶ arrow keys. The scrolling is not possible in single channel configuration.

- Dual Channel Display Configuration

This mode displays two consecutive channel readings in bar panel mode. The blue cursor on top of the bar indicates the current selected channel. The limits and the formula configured for the measurement channel will be missing on the display. User has to switch to Singe Channel Display Configuration for getting complete information about the measurement channel.
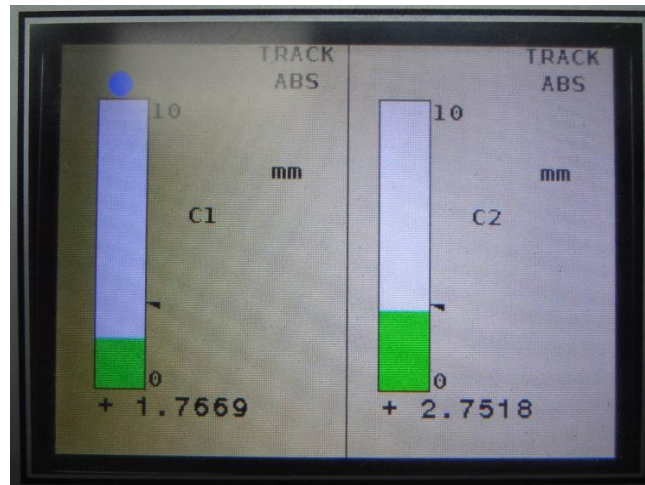
- 4-Channel Display Configuration

This mode displays 4 consecutive channel readings in bar panel mode. The blue cursor on top of the bar indicates the current selected channel. NOTE that the resolution of max/min range values is limited to 3 decimal point resolution due to constraint in the available display area. User can switch over to Single Channel Display Configuration for getting complete information about the measurement channel.
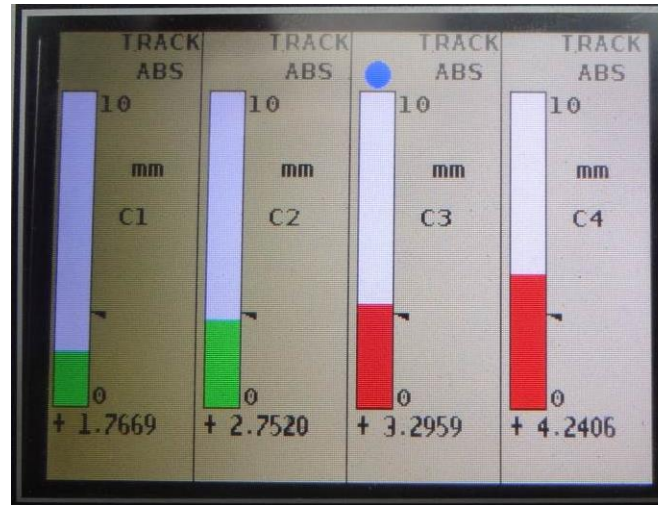
- 8-Channel Display Configuration

This mode displays 8 consecutive channel readings in bar panel mode. The blue cursor on top of the bar indicates the current selected channel. The resolution of max/min range values is limited to 3 decimal points only due to constraint in the available display area. User can switch over to Single Channel Display Configuration for getting complete information about the measurement channel. The measurement mode and channel operation modes are abbreviated as a single text in this mode. Below are the abbreviated values:

- TR_AB – Operation mode is TRACK, Measurement mode is ABS
- TR_ZE – Operation mode is TRACK, Measurement mode is ZERO
- TR_PR – Operation mode is TRACK, Measurement mode is PRESET
- P+_AB – Operation mode is PEAK+, Measurement mode is ABS
- P+_ZE – Operation mode is PEAK+, Measurement mode is ZERO
- P+_PR – Operation mode is PEAK+, Measurement mode is PRESET
- P-_AB – Operation mode is PEAK-, Measurement mode is ABS
- P-_ZE – Operation mode is PEAK-, Measurement mode is ZERO
- P-_PR – Operation mode is PEAK-, Measurement mode is PRESET
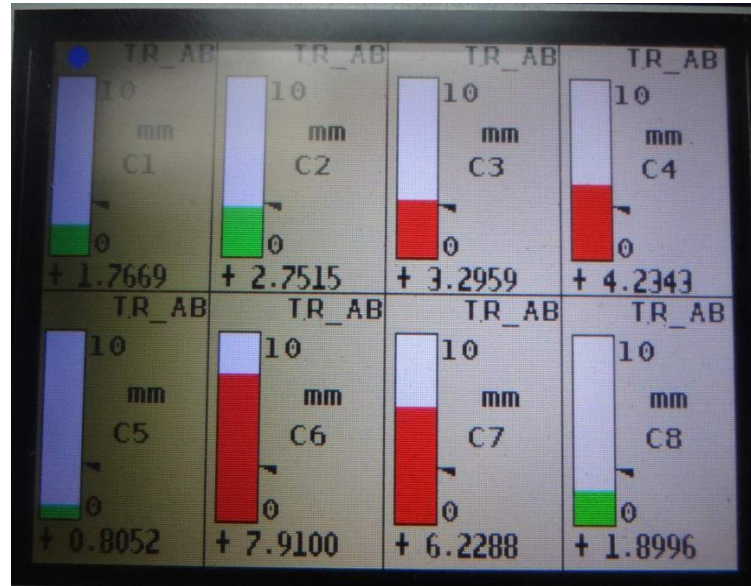
- 16-Channel Bar Display Configuration

This mode displays the 16 consecutive channel readings in bar mode. The blue cursor on top of the bar indicates the current selected channel. NOTE that in this mode the readings and no other information related to the measurement channel is displayed. The reading is indicated only through the bar fill according to the current reading. This mode can be mainly used to find out which channels are out of limits/range. User can switch to Single Channel Configuration for getting the complete information about that channel.
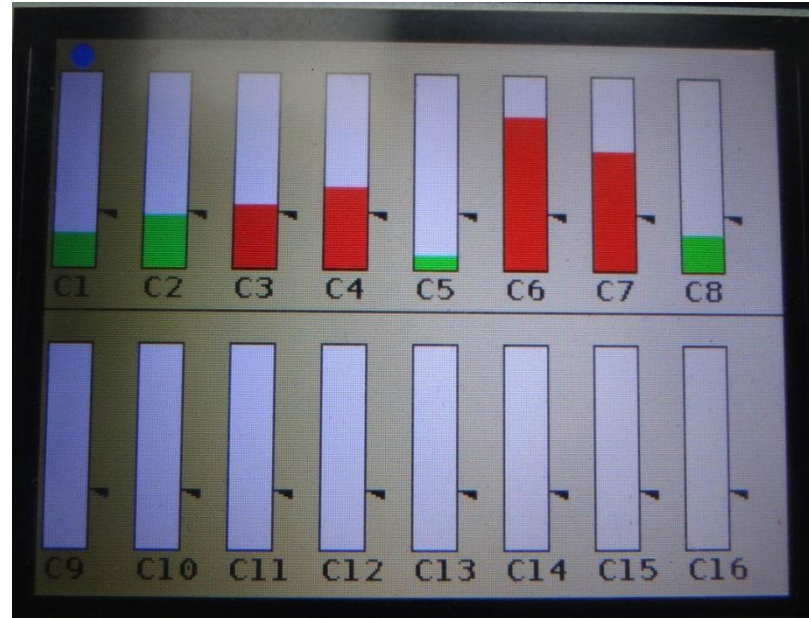
- 8-Channel Text mode configuration

This mode displays the 8 consecutive channel readings in text mode. The blue cursor on left of the channel reading indicates the selected channel. User can switch to Single Channel Configuration for getting the complete information about that channel.

- 16-Channel Text Mode Configuration

This mode displays the 16 consecutive channel readings in text mode. The blue cursor on left of the channel reading indicates the selected channel. User can switch to Single Channel Configuration for getting the complete information about that channel.

- Single channel configuration

This mode displays all the properties of the measurement channel. User can switch to this mode to get all the required information of the selected channel.

Channel Number varies from:
C1 to C31

Configured Expression/Formula

Measurement Mode:
Can take values
TRACK, PEAK+, PEAK-

Operation Mode:
Can take values
ABS, TARE, PRE

Calculated Reading

Units of measure will be the units defined in the Computed Measurement Menu (Section 8.5)

Upper and lower limit values
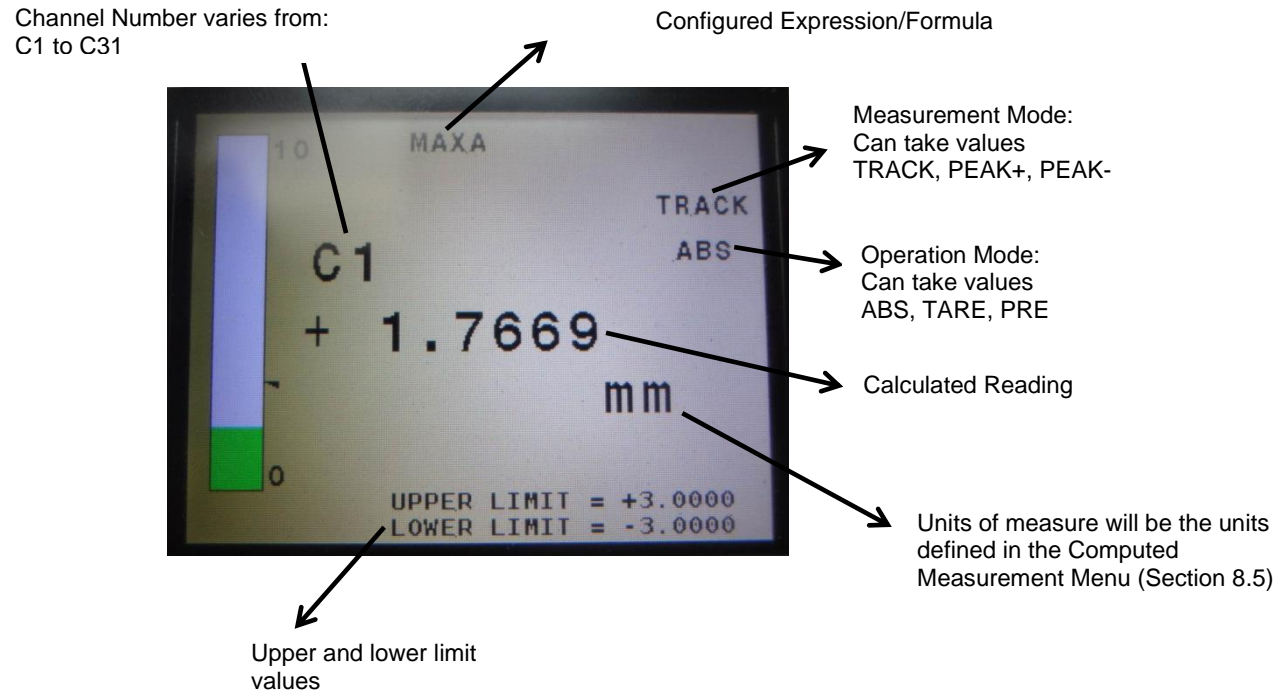
NOTE:
1. If any one of the sensor/multiple sensors used in the formula is in OverRange/UnderRange condition, then an "ERROR" status is displayed in RED color instead of the current reading. The bar will be drawn with full scale in RED color.
2. If any of the sensors is not connected or not notified, then an "ERROR" status will be displayed for all the channels using that particular sensor in their formula. The bar will be drawn with full scale in RED color.
3. **OSError:** This error occurs when one or more Linear Sensors used in the formula for the corresponding channel reports "OverSpeed Error". When this error occurs the bar is drawn with full scale in RED color. To reset this error, select the channel (in case of multi-channel configuration scroll the cursor to that channel) and then press ZERO key. It will reset the error and note that the reading from Linear Sensor is automatically re-zeroed. However it will not re-adjust (or re-Zero) the displayed reading if the channel is in ZERO mode. This operation has to be explicitly performed by the user through ZERO key.

7.2 SWITCHING TO THE SINGLE CHANNEL CONFIGURATION FOR THE SELECTED CHANNEL

To switch to single channel mode from any multi-channel configuration below steps has to be followed:

- Use ◄ and ► arrow keys in the multi-channel configuration to select the required channel.
- Press ENTER key to display the selected channel in single channel configuration mode.
- To go back to the previous multi-channel display configuration, press ENTER key again.

7.3 KEYPAD FUNCTIONALITY IN SINGLE CHANNEL OR MULTI CHANNEL CONFIGURATION

When the current display is of Single Channel or Multi-channel configuration mode, the metrology functions are performed through keypad buttons. The functionality of each key is described in the table below:

KEY	DESCRIPTION
MENU	Switches to Set Up MENU Screen.
▲ Arrow Key	Enables PRESET on the selected channel/on all channel depending on "ZERO/PRESET all" setting in "Display Configuration" menu.
▼ Arrow Key	Performs PEAK RESET on the current channel. Continuous press of more than 1 second will perform PEAK RESET on all the channels.
PRINT Key	Prints the reading according to the mode selected. Refer to the PRINT Options section for information on PRINT options configuration
◄ Arrow Key	Scrolls to the previous channel when the display is in multi-channel configuration. Hold the key for more than 300ms for a continuous scroll to the previous channels. No operation in single channel configuration.
ENTER Key	Switches to single channel configuration for the selected channel from multi-channel configuration. An ENTER key press again will switch back to the multi-channel configuration. NOTE THAT when single channel configuration is selected through "Display Configuration" MENU Screen, there is no functionality for ENTER key.
► Arrow Key	Scrolls to the next channel when display is in multi-channel configuration. Hold the key for more than 300ms for a continuous scroll to the next subsequent channels. No operation in single channel configuration.
ZERO Key	Perform the ZERO operation on the current selected channel or on all channels depending on "ZERO/PRESET all" setting in "Display Configuration" menu.
PEAK/TRACK Key	Changes the operation mode between PEAK+, PEAK- and TRACK on the selected channel.

7.4 GAUGING MODE SCREEN

This screen displays the result when Gauging mode is enabled. Gauging mode is used to check if all the selected number of channels is within limits. The count of channels to be used for gauging mode can be configured through "Advanced Measurement Mode" menu screen.

If all the channels selected for scanning are within limits, then "PASS" status is displayed. If one or more number of channels is outside limits, then "FAIL" status is displayed.

User can select "Scan" option to display the channel in Single Channel Configuration mode. ▲ and ▼ arrow keys can be used to scroll through the different channels. This mode is called as STATIC mode. NOTE THAT PRESET, PEAK/TRACK and PEAK RESET functionalities does not work in STATIC mode. ZERO and PEAK/TRACK key functions similar to that of Single Channel Configuration. To exit STATIC mode, use PEAK/TRACK key.

"Search" option is used to display the channel/channels which are outside limits. If multiple channels are outside limits, then the first channel is displayed in single channel configuration mode for the configured amount of time. After that the display scrolls to the next channel which is out of limits. At the end, the display changes back to the result screen. The delay time for which each of the channels has to be displayed can be configured through "Advanced Measurement Mode" menu screen.
If all the channels are within limits then screen with "No Faults Found" message is displayed for the configured amount of delay time and switches back to the result screen.

"LOAD" option is used to enable the PRESET values for the measurement channels. If "LOAD" option is selected once again, it removes PRESET values.

7.5 AUTOSENSE MODE SCREEN

This screen displays the result when Autosense mode is enabled. Autosense mode is used to automatically select the channel which is within limits. The count of channels to be used for scanning can be set through Autosense Mode menu screen. When a channel is within limits, it is displayed in Single Channel Configuration mode. If none of the channel is within limits, then the status message "Probes Parked" message is displayed.
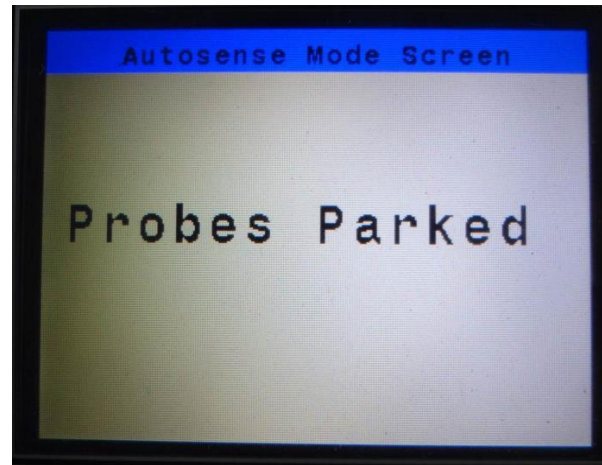
NOTE: When more than one channel is within limits, the first channel is displayed in single channel configuration mode. There is no scrolling possible to switch to the next channel.
The keypad functions the same as for Single Channel Configuration mode.

8 MENU SCREEN

The MENU screens are used to set up/configure the read out. Menu Screen can be activate through MENU key button on the keypad. The current screen is stored and displayed back when MENU Screen mode is exit.

In MENU Screen mode the keypad functionality is as per the table below:

KEY	DESCRIPTION
MENU	Exits MENU Screen mode.
▲ Arrow Key	Scrolls UP. Hold the key for more than 300ms to scroll UP continuously.
▼ Arrow Key	Scrolls DOWN. Hold the key for more than 300ms to scroll DOWN continuously.
PRINT Key	No Operation.
◀ Arrow Key	Scrolls to the right side. Hold the key for more than 300ms to scroll continuously.
ENTER Key	To select the option and also for number editing. Refer to the example below.
▶ Arrow Key	Scrolls to the left side. Hold the key for more than 300ms to scroll continuously.
ZERO Key	Used only in Formula Edit Menu Screen. Will erase the complete formula so that the user can enter the required formula from the beginning.
PEAK/TRACK Key	Used only in Formula Edit Menu Screen. Acts as a backspace key. Erases a single token (operator/operand) in the formula. For e.g. Consider the formula "A+sinB" and the current cursor location is at B. Press of this key will erase "sin" token and retains the remaining tokens in the formula string. The resultant formula string will be "A+B".

Example of editing a number:
There are many menu screens where number/range values are present. Below is the procedure for editing the same.
Consider the number +010.00000.

Key	+	0	1	0	.	0	0	0	0	0	Cursor is at first position. Default position at the start.
ENTER	**+**	0	1	0	.	0	0	0	0	0	ENTER key will start edit mode.
▲	**-**	0	1	0	.	0	0	0	0	0	UP arrow key will change the sign of the number.
▶	-	**0**	1	0	.	0	0	0	0	0	RIGHT arrow key will change the current position to the next digit '0'
▶	-	0	**1**	0	.	0	0	0	0	0	RIGHT arrow key will change the current position to the next digit '1'
▲	-	0	**2**	0	.	0	0	0	0	0	UP arrow key will increment the number.
ENTER	**-**	0	2	0	.	0	0	0	0	0	ENTER key will stop edit mode. The final number (-020.00000) will be saved and used further.

8.1 SETUP MENU

The main SetUp Menu has two pages (Page1 and Page2).

SetUp Menu Page 1

▲
▼

ENTER

Display Configuration
Probes
Computed Measurement
Measurement Mode
Preset/Limits
Next Menu   Exit Menu

SetUp Menu Page 2

▲
▼

ENTER

Input/Output
PRINT Options
Serial Port
Advanced Measurement Mode
Utilities
Back   Exit Menu
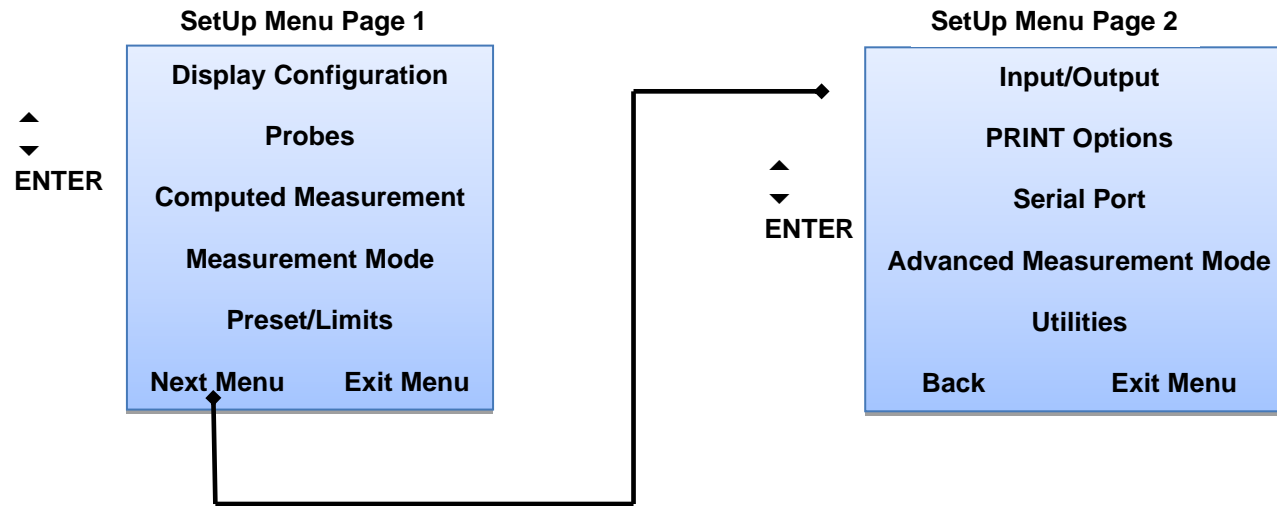
8.2 DISPLAY CONFIGURATION MENU

Display Configuration Menu	OPTIONS
Display Config	1Ch, 2Ch, 4Ch, 8Ch Bar, 8Ch Txt, 16 Ch Bar, 16Ch Txt
Places after DP	1, 2, 3, 4, 5
Bar Offset	+000.00000
Bar AutoRange	OFF, ON
ZERO/PRESET all	OFF, ON
Last Digit Step	1, 2, 3, 4, 5
Next Menu Exit Menu	

"Next Menu" navigates to the "Display Configuration 2" Menu (Section 8.3).

"ZERO/PRESET all" menu option enables the setting of performing ZERO/PRESET operation on single channel or on all channels.

Last Digit Step – Defines the minimum step resolution for the reading displayed. The displayed reading is changed only in multiples of the configured "Last Digit Step" configuration setting. For e.g. If the setting is set to '2' and the reading changes from 7.5264 to 7.5267 the reading on the display is changed to **7.5266** and not **7.5267** since it is not multiple of 2.

NOTE: To disable the "Last Digit Step" functionality, set it to '1'.

8.3 DISPLAY CONFIGURATION MENU 2

Display Configuration Menu 2

OPTIONS

Displacement:		mm, inch, mils
Temperature:		degC, degF
Back **Exit Menu**		

This menu controls the units of measure scaling for the types of input shown (eg converting mm to inches).

The settings in this menu affect available units thoughout the system (see section 8.5 for more details).

8.4 PROBES MENU

Sensor number: Varies from 'A' to 'Z' and from 'a' to 'e'.

Probes Menu – Sensor A   **OPTIONS**

Probe Type	Orbit
Direction	Retract+, Extend-
Range	+123.00000
Probe ID	ABCDEFGHIJ
Resolution	14-bit, 16-bit, 18-bit
Pulses/Rev	12345

Notify   Back   Next Menu

These fields are not user editable- Will be filled automatically according to the sensor Notified.
NOTE: The Pulses/Rev option is valid only for EIM sensor type and will not appear for other Orbit Sensor types. The Resolution and Pulses/Rev options do not appear on start-up and will be visible if a valid probe is notified.

Probes Menu is used for setting up the probes. To Notify a probe follow the below procedure:

- Select the direction type. For Spring-Push probes: it has to be set to "Retract+", for pneumatic probes: it has to be set to "Extend-".
- Select "Notify" option. An on-screen tip will also be displayed on the screen.
- Move the probe tip to get notified.
- After notify command is successful, the "Range", "Probe ID", "Resolution", "Pulses/Rev" parameters gets populated according to the sensor type.

NOTE:

- To Notify the probe tip has to be moved such that the readings change by about 1%. After moving the probe tip, it takes about 500ms to update the data on the display.
- Resolution can be changed only for **DP type probes**. It is also **not possible** to change if a sensor is in **Difference Mode**. Difference mode is started if MAX or MIN or DIFF math formula is applied on the particular probe.

8.5 COMPUTED MEASUREMENT

Computed Measurement Menu   **OPTIONS**

Channel Nr	C1, C2, C3, ……., C31
Expression	MAXA
Units	mm, inch, mils, deg, V, mV, A, mA, degC, degF, bar, hPa, MPa, kPA, mg, Kg, rpm
Uni-/Bi-Polar	Auto, Unipolar, Bipolar
Range	+000.000000
Exit Menu	

User defined formula corresponding to the selected Channel Nr.

This full list of units is limited by the selections in the Display Configuration menu 2 (ie if mm are selected inches and mils will not be available here) .

ENTER Key to edit the formula

Use ◄ and ► arrow keys to move through the formula string.
ZERO key will erase the formula completely and allows to input formula from the beginning.
PEAK/TRACK works as backspace key.

Formula Edit Menu
Expression
MAXA

Opr   Opd   Num   Math   Exit

Use ◄ and ► arrow keys to scroll between the options.

This screen is used to edit/enter the formula for the corresponding channel.

Opr, Opd, Num, Math options provides a pop-up window containing various mathematical operators, trigonometric functions and sensor numbers (used as operands for mathematical or trigonometric functions) defined in the table below.

Opr - +, -, *, /, (,), , Exit

Opd – 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, Exit

Num – 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, Exit

Math – sin, cos, tan, inlog10, inloge, log10, loge, Mx, Mn, MAX, MIN, DIFF, Exit

User has to use ◂ , ▸ , ▾ and ▴ arrow keys to scroll through the options displayed in Opr, Opd, Num, Math pop-up windows. The required option can be selected through ENTER key. The selected option is inserted at the current indexed location in the formula string.

TIP:

1. It is not necessary to exit the pop-up window displayed before opening the new pop-up window. User can scroll to the next required option using ▾ ▴ ▸ and ◂ arrow keys. Whenever the next option is selected before exiting the current pop-up window it is taken care to erase the current pop-up and the new pop-up window will be displayed.

   For eg: If user is in "Opd" pop-up window display and wants to open "Math" pop-up window, it is not necessary to scroll through all the way to "Exit" option, close the window and then select the Math option. Instead user can use ▴ and ▸ arrow key to scroll to "Math" option and select the same to display "Math" operations pop-up window.

2. Flexibility has been provided even to scroll through the formula expression string, without closing the pop-up window displayed. User can use ▴ arrow key to scroll to the formula string and then ◂ and ▸ arrow keys to index to the required position in the formula string.
3. If a measurement channel is not used, leave the formula field blank by erasing the complete formula. This will yield a faster performance.

8.6 MEASUREMENT MODE

Measurement Mode Menu

	OPTIONS
Channel Nr	C1, C2, C3, ……., C31
Measure Mode	TRACK, PEAK+, PEAK-
Reset Mode	Manual, Automatic
Trigger Time(ms)	12345
Trigger Level	+000.000000
Exit Menu	

These options are applicable only for PEAK+ and PEAK- measure mode options. It will be displayed only if the corresponding channel is in PEAK+ or PEAK- measurement mode.
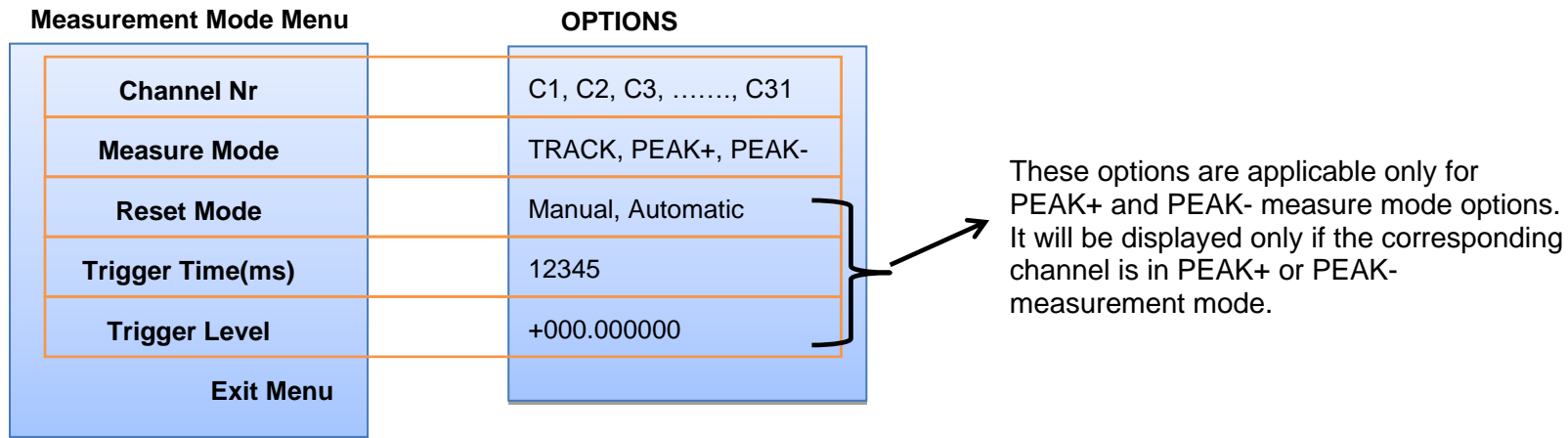
NOTE: Trigger Time has to be a multiple of 20ms

This menu is used to configure the measurement mode of the channel.

If "Reset Mode" is set to Manual option, then the peak value is reset through ▾ arrow key.

If "Reset Mode" is set to Automatic option:

- In PEAK+ mode, peak value is reset to the current reading if it goes **below** the configured trigger level for the configured trigger time period
- In PEAK- mode, peak value is reset to the current reading if it goes **above** the configured trigger level for the configured trigger time period

8.7 PRESET/LIMITS MENU

Preset/Limits Menu

OPTIONS

Preset/Limits Menu	OPTIONS
Channel Nr	C1, C2, C3, ……., C31
Preset	+000.00000
Upper Limit	+003.00000
Lower Limit	-003.00000
Exit Menu	

8.8 INPUT/OUTPUT MENU

Input/Output – Page 1

Logic Outputs		Active LOW, Active HIGH
Out1 <ChNr> <Func>		<C1, C2, C3, …., C31> <OK, Under, Over, None>
Out2 <ChNr> <Func>		<C1, C2, C3, …., C31> <OK, Under, Over, None>
Out3 <ChNr> <Func>		<C1, C2, C3, …., C31> <OK, Under, Over, None>
Out4 <ChNr> <Func>		<C1, C2, C3, …., C31> <OK, Under, Over, None>
Back Next Menu		

Input/Output – Page 2   **OPTIONS**

Out5 <ChNr> <Func>		<C1, C2, C3, …., C31> <OK, Under, Over, None>
Out6 <ChNr> <Func>		<C1, C2, C3, …., C31> <OK, Under, Over, None>
Logic Inputs		Active LOW, Active HIGH
Inputs Config		Config1, Config2
Back Exit Menu		
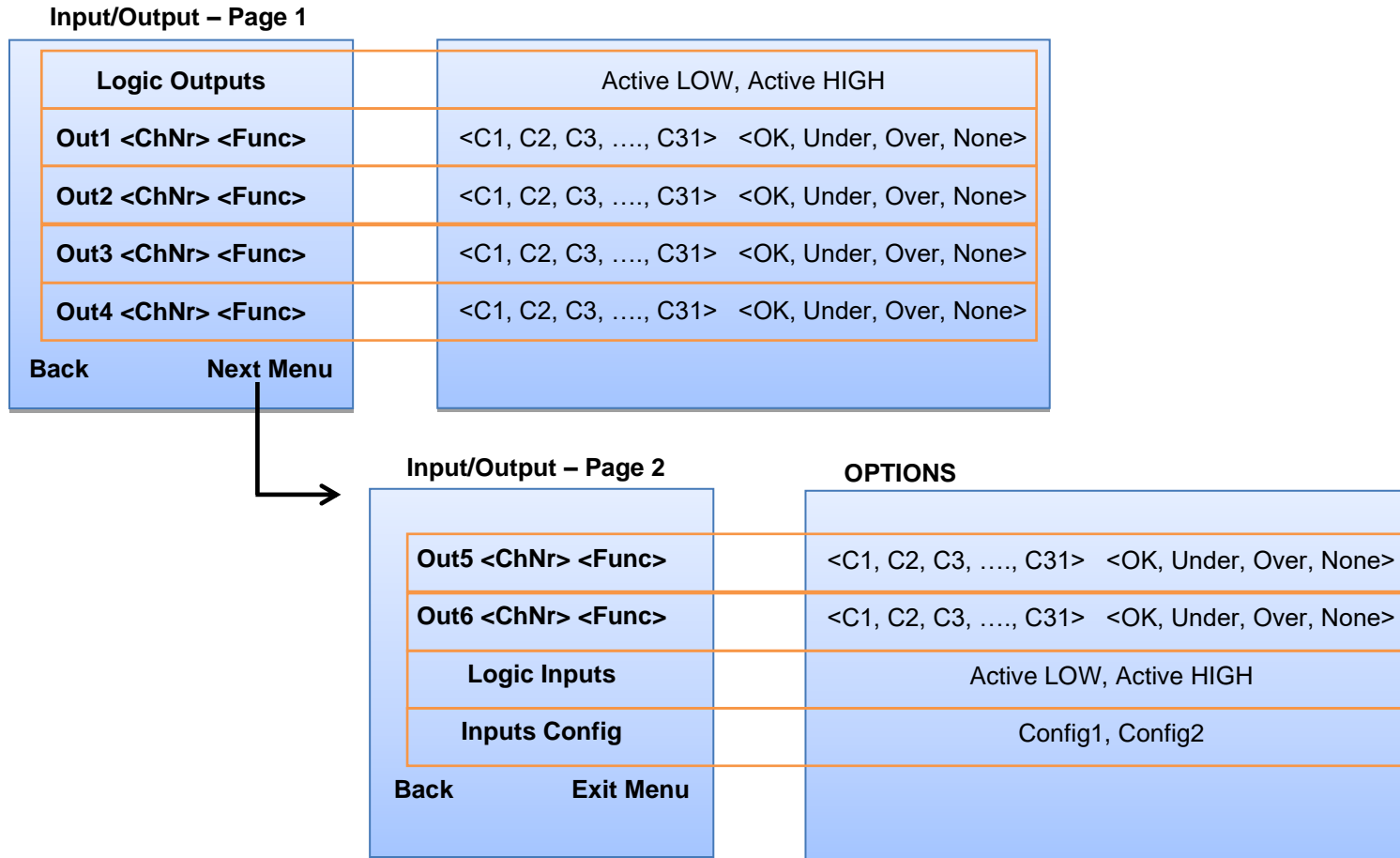
SI5500 supports 6 discrete inputs and 6 discrete outputs. The discrete outputs can be mapped to any channel number through menu screen shown above.
"OK" Control Function: Output is set when the reading for the associated channel is within limits.

"Over" Control Function: Output is set when the reading for the associated channel is above upper limit or above max. range (OverRange condition).
"Under" Control Function: Output is set when the reading for the associated channel is below lower limit or below min. range (UnderRange condition).

TIP: If any output is not used, set it to "None".

Note: Discrete outputs 1-3 have dedicated functionality in 'Gauging Mode' where their specific channel configuration will be ignored.

8.8.1 Pin Details of Discrete Outputs

PIN No.	Description
1	*Out1
14	*Out2
2	*Out3
15	Out4
3	Out5
16	Out6
4	Isolated O/P Common

* In **Gauging mode**, Out1, 2 & 3 will perform as shown below: -

Output	Description
Out1	Asserted if any channels lower limit is exceeded or any channel Errors.
Out2	Asserted if all channels are OK (no limit or errors)
Out3	Asserted if any channels higher limit is exceeded or any channel Errors.

Note: Output invert settings are valid in Gauging mode output.

8.8.2 Pin Details of Discrete Inputs

The functionality of discrete inputs depends on the "Inputs Config" type configured. Below is the table explaining the discrete inputs functionality:

PIN No.	Config1	Config2
17	ZERO Edge Input type. When this input is set active, it will ZERO the current selected channel or all channels according to the ZERO/PRESET all configuration	ZERO Edge Input type. When this input is set active, it will ZERO the current selected channel or all channels according to the ZERO/PRESET all configuration
5	PRESET Edge Input type. When this input is set active, PRESET operation will be performed on the current selected	PRESET Edge Input type. When this input is set active, PRESET operation will be performed on the current selected

	channel or all channels according to the ZERO/PRESET all configuration		channel or all channels according to the ZERO/PRESET all configuration
18	PRINT For Edge Input type – It sends single PRINT data onto RS232 port. For ACTIVE Input – It sends continual PRINT stream of data onto RS232 port.		PRINT For Edge Input type – It sends single PRINT data onto RS232 port. For ACTIVE Input – It sends continual PRINT stream of data onto RS232 port.
6	LOG Starts data logging		LEFT KEYPRESS Edge Input type, When this input is set active a single left key press is triggered).
19	PEAK RESET Edge Input type. Performs complete PEAK RESET on all the channels		Not Used
7	PEAK TOGGLE Edge Input type. Changes the mode of the current selected channel between PEAK+/PEAK-/TRACK. Similar to giving input through PEAK/TRACK key from the keypad		RIGHT KEYPRESS Edge Input type, When this input is set active a single right key press is triggered).
20	Isolated I/P Common		Isolated I/P Common

Discrete Inputs and Outputs Schematic:

External Supply
10V to 24V DC

Load
(up to 500mA)

PINS – 1,14,2,15,3,16

PIN - 4

GND
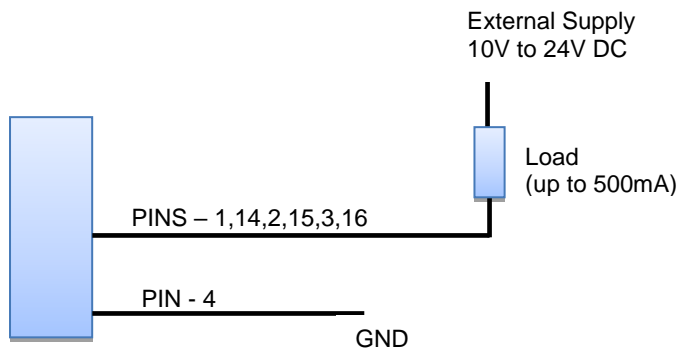
Discrete Outputs Schematic

PINS – 17,5,18,6,19,7

PIN 20
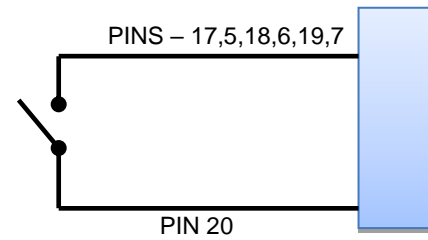
Discrete Inputs Schematic

8.9 PRINT OPTIONS

PRINT OPTIONS Menu

PRINT OPTIONS Menu	OPTIONS
KeyPress	Single, Continuous
Discrete I/P	Single, Continuous
Print Mode	This Reading, Reading+Step, All Readings
Exit Menu	
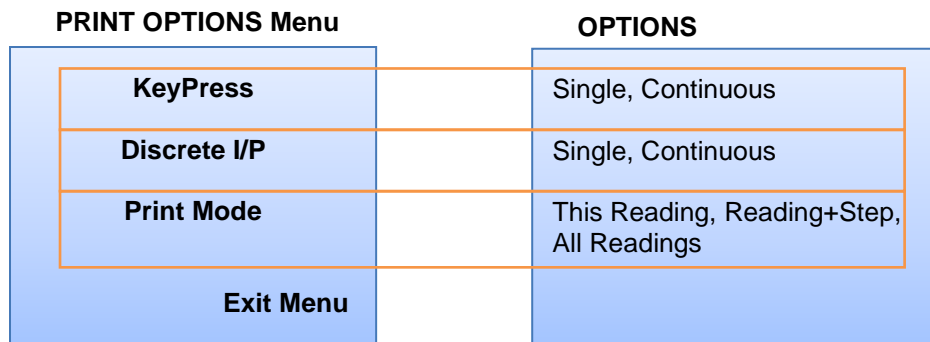
Single PRINT will send the data onto RS232 only once.

Continuous PRINT will send data onto RS232 continuously.

The PRINT key or the discrete input functionality depends on the current mode in which SI5500 is operating. Below table summarizes the same:

Print Mode	OPERATE SCREEN	GAUGING MODE	AUTOSENSE MODE	PEAK MODE
This Reading	Prints Current Readings of all displayed channels	If in SCAN mode i.e. current display is Gauging Mode result Screen, no print occurs. If in STATIC mode i.e. "Scan" option is selected through Gauging Mode result Screen, current displayed channel reading is printed.	Prints Current Reading of the displayed channel within limits. If there is no channel within limits, no information will be printed.	When the unit is in *"acquisition phase"*, the currently stored readings are printed. When the unit is in *"analysis phase"*, the calculated result values are printed.
Reading+Step	Prints Current, max and min readings of all the displayed	If in SCAN mode i.e. current display is Gauging Mode result Screen, the	No Operation.	No Operation.

	channels	display is changed to STATIC mode and the current displayed channel reading is printed. Each PRINT will advance to the next channel and prints the reading. After the last channel selected for scan is printed, the display reverts back to the first channel. If in STATIC, each PRINT will advance to the next channel and prints the reading. After the last channel selected for scan is printed, the display reverts back to the first channel.		
All Readings	Prints Current Reading of all the 31 channels	Prints the current reading of all the channels selected for scanning.	Prints the current reading of all the channels selected for scanning.	All the stored readings and calculated result values are printed. This mode works only when unit is in *"analysis phase"*.

8.9.1 PRINT FORMAT

- <u>Current Readings:</u>

In any mode the current readings of the measurement channels are printed in the format below:

Channel Nr (C1 to C31)			Space	Sign	Reading — Right aligned with DP set throgh "Places after DP" setting in "Display Configuration" menu										Space	Units				Space	Limits	Carriage Return	Line Feed
C	x		:	+										x		m	m				>	\r	\n
C	x	x	:	-								x	.	x		i	n	c	h		<		
											x	.	x	x		d	e	g			=		
										x	.	x	x	x		r	a	d			!		
									x	.	x	x	x	x									
								x	.	x	x	x	x	x									
												x	x										
											x	x	.	x									
										x	x	.	x	x									
									x	x	.	x	x	x									
								x	x	.	x	x	x	x									
							x	x	.	x	x	x	x	x									
											x	x	x										
										x	x	x	.	x									
									x	x	x	.	x	x									
								x	x	x	.	x	x	x									
							x	x	x	.	x	x	x	x									
						x	x	x	.	x	x	x	x	x									

Eg: For channel C1 with reading as +1.34815 with units as inch, within limits																							
C	1		:	+			1	.	3	4	8	1	5		i	n	c	h		=	\r	\n	

Limits	Description
>	Above Upper Limit
<	Below Lower Limit
=	Within limits
!	Probe Error - One of the probe used in the formula is not notified or has under range/over range error

- Current, Max, Min Readings:

In any mode Current, Max, Min readings of the measurement channels are printed in the format below:

The reading format consists of the following fields (left to right):

Channel Nr (C1 to C31)	Space	Sign	Reading — Right aligned with DP set throgh "Places after DP" setting in "Display Configuration" menu	Space	Units	Space	Limits	Space	Sign	Max. Reading — Right aligned with DP set throgh "Places after DP" setting in "Display Configuration" menu	Space	Units	Space	Sign	Max. Reading — Right aligned with DP set throgh "Places after DP" setting in "Display Configuration" menu	Space	Units	Space	Carriage return	Line Feed
C x	:	+	x		m m		> ;		+	x		m m		; +	x		m m		\r	\n
C x x	:	−	..........x.x		i n c h		<		−	..........x.x		i n c h		−	..........x.x		i n c h			
			.........x.x x		d e g		=			.........x.x x		d e g			.........x.x x		d e g			
			........x.x x x		r a d		!			........x.x x x		r a d			........x.x x x		r a d			
			.......x.x x x x							.......x.x x x x					.......x.x x x x					
			......x.x x x x x							......x.x x x x x					......x.x x x x x					
			.........x x							.........x x					.........x x					
			........x x.x							........x x.x					........x x.x					
			.......x x.x x							.......x x.x x					.......x x.x x					
			......x x.x x x							......x x.x x x					......x x.x x x					
			.....x x.x x x x							.....x x.x x x x					.....x x.x x x x					
			....x x.x x x x x							....x x.x x x x x					....x x.x x x x x					
			........x x x							........x x x					........x x x					
			.......x x x.x							.......x x x.x					.......x x x.x					
			......x x x.x x							......x x x.x x					......x x x.x x					
			.....x x x.x x x							.....x x x.x x x					.....x x x.x x x					
			....x x x.x x x x							....x x x.x x x x					....x x x.x x x x					
			...x x x.x x x x x							...x x x.x x x x x					...x x x.x x x x x					

Example: For Channel C12: with current reading as +1.2456, above upper limit, units as mm and with max. & min. readings as +1.8634 & -0.0003 respectively

| C 1 2 | : | + | 1 . 2 4 5 6 | | m m | | > ; | | + | 1 . 8 6 3 4 | | m m | | ; − | 0 . 0 0 0 3 | | m m | | \r | \n |

- ## PEAK Mode Print Format:

The readings in the PEAK mode are printed in the below format:

Reading Nr					Space	Sign	PEAK Reading									Carriage return	Line Feed
P	n	t	x		:	+									x	\r	\n
P	n	t	x	x	:	-						x	.	x			
											x	.	x	x			
										x	.	x	x	x			
									x	.	x	x	x	x			
								x	.	x	x	x	x	x			

Eg: PEAK readings values +7.4982, +10.6290 and +9.1863 are displayed as below																	
P	n	t	1		:	+				7	.	4	9	8	2	\r	\n
P	n	t	2		:	+			1	0	.	6	2	9	0	\r	\n
P	n	t	3		:	+				9	.	1	8	6	3	\r	\n

The calculated result values are printed in the below format:

Result Type							Space	Sign	Result value								Carriage return	Line Feed
M	a	x	:			:		+							x		\r	\n
M	i	n	:			:		-						x	.	x		
R	a	n	g	e		:							x	.	x	x		
A	v	e	r	a	g	e	:					x	.	x	x	x		

Eg: Max=+7.4982, Min=+7.3716, Range=+0.1266 and Average=+7.3915																		
M	a	x	:			:		+				7	.	4	9	8	2	\r	\n
M	i	n	:			:		+				7	.	3	7	1	6	\r	\n
R	a	n	g	e		:		+				0	.	1	2	6	6	\r	\n
A	v	e	r	a	g	e	:	+				7	.	3	9	1	5	\r	\n

8.10   SERIAL PORT MENU

Serial Port Menu   **OPTIONS**

Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 187500
No of Data Bits	7, 8, 9
No of Stop Bits	0.5, 1, 1.5, 2
Parity	Odd, Even, None
Exit Menu	

Pin diagram of RS232 port:

PIN	Description
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

8.11 ADVANCED MEASUREMENT MODE MENU

Advanced Measurement Mode Menu

	OPTIONS
Advanced Mode	None, Gauging, Autosense, PEAK mode
Exit Menu	

Menu screen when "Advanced Mode" is set to None.
The other menu options get enabled according to the advanced mode selected.

Gauging mode selected

Autosense mode selected

Advanced Measurement Mode Menu

	OPTIONS
Advanced Mode	None, Gauging, Autosense, PEAK mode
No. of Channels	1 to 31
Search Delay	02000
Exit Menu	

Advanced Measurement Mode Menu

	OPTIONS
Advanced Mode	None, Gauging, Autosense, PEAK mode
No. of Channels	1 to 31
Search Delay	
Exit Menu	

To switch OFF the advanced measurement mode and return back to the OPERATE SCREEN mode, select NONE.

8.11.1 PEAK MODE

Advanced Measurement Mode Menu   **OPTIONS**

Advanced Mode	None, Gauging, Autosense, PEAK mode
Channel Nr	1 to 31
No. of Readings	2 to 99

Exit Menu
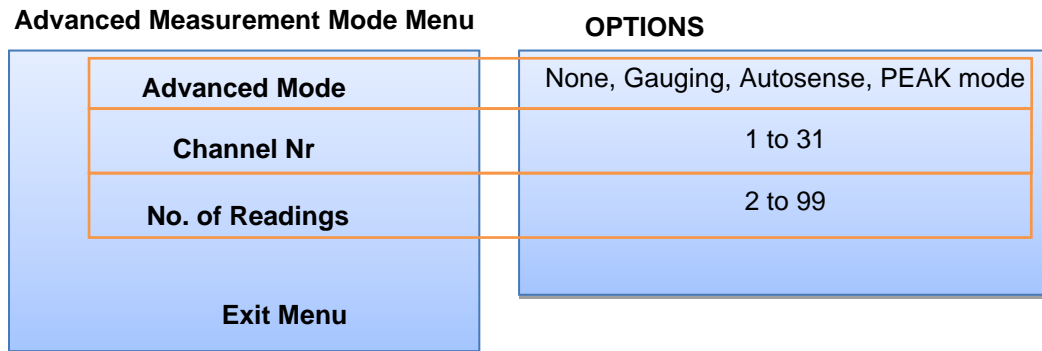
PEAK mode is designed to take up to 99 numbers of PEAK readings as input, analyze the same and display the calculated result values. When PEAK mode is selected, the unit enters into *"acquisition phase"* and the selected channel reading is displayed in single channel mode. User can set the current displayed reading as a PEAK reading through "ENTER" key press. The storage counter displayed on the screen gets incremented after a successful store of the PEAK reading. If an input reading has to be erased, the same can be done by PEAK/TRACK key press. When all the configured number of PEAK readings is input, the unit enters into *"analysis phase"* and the readings are analyzed and below mentioned calculated result values are displayed through a result message pop-up window:

Max: Maximum PEAK reading in all the PEAK readings input

Min: Minimum PEAK reading in all the PEAK readings input

Range: (Max – Min)

Avg: Sum of all readings/Number of readings input

When the result message pop-up window is exit, all the current readings are erased and the unit is ready to take next set of input readings.

User can print the stored PEAK readings and the calculated result values according to the PRINT mode settings configured. Refer to PRINT Options section for further details.

8.12 UTILITIES MENU

Utilities Menu

- **Restore Factory Settings**
- **Password Settings**
- **Logging Settings**
- **Screen Settings**
- **About**
- **Exit Menu**

This option reset all the configuration data to default values. All the probes notified information are lost and has to be notified once again.

A pop-up message indicating "FACTORY SETTINGS   RESTORED. System Resetting..." will be displayed. The unit will automatically reset and come up with default settings.

Password Settings Menu

Password Settings Menu	OPTIONS
Password Enable	OFF, ON
Password Value	1234
Lock function	Lock Menu, Lock All, Button Lock
Exit Menu	

Lock Menu – Will lock the MENU key. A valid password has to be entered whenever MENU screens has to be opened. No password is required for other key press functionalities.

Lock All – A valid password has to be entered for MENU key press. All the other keys will be disabled and does not function.

Button Lock – Will lock all the keys. A valid password authentication is required for any key press.

8.12.1 LOGGING SETTINGS

Logging Settings – Page 1

OPTIONS

Mode	Standard, Start on I/P, Trig. on I/P
Interval(ms)	0001000
Duration(ms)	0040000
Channel Count	1 to 31

Back   **Next Menu**

Logging Settings – Page 2

Opens a pop-up window to choose the Log Page

OPTIONS

Start Logging

Stop Logging

Print Summary

Print Log

Save Log

Back   **Next Menu**

Log Page	Current, Page1, Page2, Page3, Page4, Page5, Page6, Page7, Page8
OK **Exit**	

Opens a pop-up window to choose the Log Page

OPTIONS

Log Page	Page1, Page2, Page3, Page4, Page5, Page6, Page7, Page8
OK **Exit**	

This menu screen allows user to configure the required logging settings. The required number of channels for logging can be selected through "Channel Count" option. NOTE THAT the "Duration" and "Interval" time values have to be multiple of 20ms. User can log up to 8 sets of data onto

FLASH through selecting one of Page1 to Page8. Each "Page" is of 512KB in size and can hold up to 4K readings from each measurement channel when all the 31 channels are selected for logging. The number of readings can increase if less than 31 channels are selected for logging. The "Start Logging" option will start logging the data onto RAM and not onto FLASH. User has to save the data onto FLASH through "Save Log" option. "Print Log" and "Print Summary" options send the data through RS232 port.

Log Mode Options:

Standard – This mode is time triggered logging mode. In this mode the logging can be started/stopped through Start Logging/Stop Logging menu options. The logging is automatically switched OFF after the configured duration time is elapsed.

Start on I/P – This mode is similar to "Standard" mode except that the logging can be started through LOG digital input only. Logging cannot be started through "Start Logging" menu option in this mode. Logging can be stopped through "Stop Logging" menu option or it is switched OFF after the configured duration time is elapsed in this mode. Refer to Pin Details of Discrete Inputs section for digital inputs pin diagram.

Trig. on I/P – In this mode a snapshot of the current readings are logged whenever there is an active input on LOG digital input pin. User has to start logging through "Start Logging" menu option before logging of current readings can happen. Logging can be stopped through "Stop Logging" menu option only and automatic logging switch-OFF is not present in this mode. Refer to Pin Details of Discrete Inputs section for digital inputs pin diagram.

Log Page Select Options:

Current – Selects the log data stored in RAM. This option is not available in "Save Log" option.

Page1 to Page8 – Selects the log data set stored in the selected FLASH page.

Log Summary printed will contain the below information per channel:

Number of Readings: Number of readings logged per channel

Max Reading of Ch: Maximum reading

Min Reading of Ch: Minimum reading

Limit> Ch: Number of readings above the upper limit

Limit< Ch: Number of readings below the lower limit

Mean Ch: Mean of the readings

StdDev Ch: Standard Deviation of the readings

8.12.2 SCREEN SETTINGS

Screen Settings   **OPTIONS**

Contrast	0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100
Exit Menu	
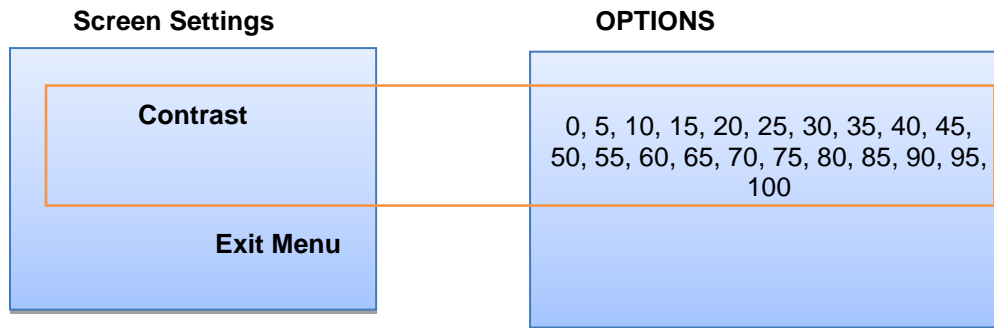
LCD screen contrast setting can be adjusted with the provided contrast levels options.

8.12.3 ABOUT

SI5500 Orbit Digital Display

Firmware Version
VXxxVXxx

Exit Menu
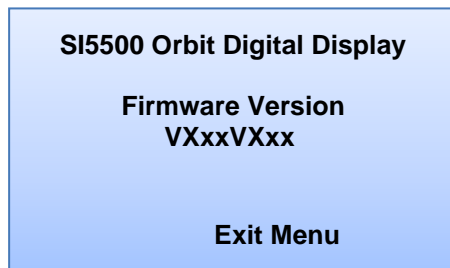
About Menu screen display firmware version of both MICRO1 and MICRO2. It is displayed in the format <MICRO1 Ver><MICRO2 Ver>.

9 SETTING UP PROBES

- After making the connections as explained in ELECTRICAL INSTALLATION section, go to SetUp Menu Page-1 through MENU Key and then select "Probes" option to enter the Probes Menu.
- In "Probes" menu, select the direction as Retract+ for Spring-Push type probe and as Extend- for Pneumatic type probe and select NOTIFY. The NOTIFY screen will be displayed with an on-screen tip.
- In the NOTIFY screen, NOTIFY option will no longer be available instead Cancel option will be available. The probe tip should be moved in such a way that the readings change by more than 1%.
- After the NOTIFY procedure is completed, all the parameters are populated according to the probe type. Move to the next probe through "Next Menu".
- Follow the same procedure to NOTIFY all the connected probes. This completes the probes setting-up procedure. The formula for individual measurement channel can be configured through computed measurement section.

SetUp Menu Page 1

Display Configuration
Probes
Computed Measurement
Measurement Mode
Preset/Limits
Next Menu   Exit Menu

ENTER

Probes Menu – Sensor A

Probe Type	Orbit
Direction	Retract+
Range	
Probe ID	
Notify Back Next Menu	

Probes Menu – Sensor A

Probe Type	Orbit
Direction	Retract+
Range	
Probe ID	
Move the Probe Tip or Select Cancel to end Notify	
Cancel Back Next Menu	

NOTIFY SCREEN

Probes Menu – Sensor A

Probe Type	Orbit
Direction	Retract+
Range	+10.00000
Probe ID	110FC49P05
Resolution	18-bit
Notify Back Next Menu	

<< On Completion of NOTIFY process >>

<< Move to the Next Probe >>

9.1 SETUP STEPS BEFORE STARTING MEASUREMENT

After setting up the probes as described in <u>Setting up probes</u> section, the probe readings has to be reset to a known initial value before starting the measurement. Below procedure has to be followed **in the same order as mentioned** before starting the measurement:

- Perform a PEAK reset on all the probes - Exit from menu screen and set the display in OPERATE screen mode to display the current readings. Hold DOWN key for 1sec to perform the PEAK reset on all the probes. Alternatively, the operation can also be performed through a discrete input. Refer to <u>Input/Output Menu</u> section for configuration and pin details of discrete inputs. This step will clear all the previously tracked PEAK+ or PEAK- or run-out values.
  NOTE: It takes 0.5sec to perform a PEAK reset on the probe if it is configured in *"Difference mode"* for tracking MAX/MIN/finding run-out. Wait for the required time according to the number of sensors configured in *"Difference mode"*.

- Perform a ZERO operation - This operation will set the current reading of all the channels to Zero. Press ZERO key to perform this operation. Alternatively, the operation can also be performed through a discrete input. Refer to <u>Input/Output Menu</u> section for configuration and pin details of discrete inputs. Enable ZERO/Preset all setting through <u>Display Configuration Menu</u> to perform ZERO operation on all the channels at once.

- Instead of ZERO operation, PRESET operation can be performed according to the user requirements. Press UP arrow key to add pre-defined PRESET values. Alternatively, the operation can also be performed through a discrete input. Refer to <u>Input/Output Menu</u> section for configuration and pin details of discrete inputs. Enable ZERO/Preset all setting through <u>Display Configuration Menu</u> to perform PRESET operation on all the channels at once.

- User can start taking the measurements now.

10 SERIAL COMMANDS

SI5500 supports two serial PRINT commands and basic zeroing/presetting commands named below:

- <u>SI5500 Zero Preset and Absolute Commands:</u>

These commands are used to Zero the readings, apply a preset, or return a measurement to absolute mode
Command Bytes – '^' 'S'<zero command>< channel number> <pad with ' '>
    The zero command can be 'Z' for Zero, 'R' for Preset, 'A' for Absolute.
    The channel number is an ascii string from "0" to "30".
    Pad with ' '(0x20/space character) to make the command 13 characters long including the "^S???" characters.
Eg:
To Zero channel 0:
    '^','S','Z','0', <pad with 9 spaces to 13 characters>
To Preset channel 1:
    '^','S','R','1', <pad with 9 spaces to 13 characters>
To reset channel 15 to Absolute (clearing zero or preset):
    '^','S','A','1','5', <pad with 8 spaces to 13 characters>

- <u>SI5500 PRINT Command:</u>
This command is used to get the details of a single measurement channel or for all the measurement channels in complete format.

Command bytes – '^' 'P' 'S' <channel number>. Channel number varies from 0 to 30. If set to 0xFF, details of all the channels are printed.

Print Data Format –

Channel Nr (C1 to C31)	Space	Sign	Reading — Right aligned with DP set through "Places after DP" setting in "Display Configuration" menu	Space	Units	Space	Limits	Space	Sign	Lower Limit — Right aligned with DP set through "Places after DP" setting in "Display Configuration" menu	Space	Sign	Upper Limit — Right aligned with DP set through "Places after DP" setting in "Display Configuration" menu	Space	Mode	Space	User defined formula (Upto 100 chars)	Space	Carriage return	Line Feed
C x		+	x		m m		>		+	x		+	x		A B S				\r	\n
C x x		-	x . x		i n c h		<		-	x . x		-	x . x		T A R E					
			x . x x				=			x . x x			x . x x		P R E					
			x . x x x				!			x . x x x			x . x x x							
			x . x x x x							x . x x x x			x . x x x x							
			x . x x x x x							x . x x x x x			x . x x x x x							
			x x							x x			x x							
			x x . x							x x . x			x x . x							
			x x . x x							x x . x x			x x . x x							
			x x . x x x							x x . x x x			x x . x x x							
			x x . x x x x							x x . x x x x			x x . x x x x							
			x x . x x x x x							x x . x x x x x			x x . x x x x x							
			x x x							x x x			x x x							
			x x x . x							x x x . x			x x x . x							
			x x x . x x							x x x . x x			x x x . x x							
			x x x . x x x							x x x . x x x			x x x . x x x							
			x x x . x x x x							x x x . x x x x			x x x . x x x x							
			x x x . x x x x x							x x x . x x x x x			x x x . x x x x x							

Limits	Description
>	Above Upper Limit
<	Below Lower Limit
=	Within Limits
!	Error - One of the probe used in the formula is not notified or has under range/over range error

Mode	Description
ABS	Normal mode
TARE	ZERO operation enabled
PRE	PRESET Enabled

Eg: For channel C1 with reading as +1.34815 with units as mm, within limits, Lower limit as -3.0000, Upper Limit as +3.0000, ABS mode and Formula as (A+B)

| C 1 | | + | 1 . 3 4 8 1 5 | | m m | | = | | - | 3 . 0 0 0 0 0 | | + | 3 . 0 0 0 0 0 | | A B S | | (A + B) | | \r | \n |

- SI5500 Truncated PRINT Command:

This command is used to get the details of a single measurement channel or for all the measurement channels in truncated format.

Command bytes – '^' 'P' 'T' <channel number>. Channel number varies from 0 to 30. If set to 0xFF, details of all the channels are printed.

Print Data Format –

Channel Nr (C1 to C31)			:	Space	Sign	Reading — Right aligned with DP set throgh "Places after DP" setting in "Display Configuration" menu									Space	Units				Space	Carriage Return	Line Feed
C	x		:		+									x		m	m				\r	\n
C	x	x	:		-							x	.	x		i	n	c	h			
											x	.	x	x		d	e	g				
										x	.	x	x	x		r	a	d				
									x	.	x	x	x	x								
								x	.	x	x	x	x	x								
													x	x								
											x	x	.	x								
										x	x	.	x	x								
									x	x	.	x	x	x								
								x	x	.	x	x	x	x								
							x	x	.	x	x	x	x	x								
												x	x	x								
										x	x	x	.	x								
									x	x	x	.	x	x								
								x	x	x	.	x	x	x								
							x	x	x	.	x	x	x	x								
						x	x	x	.	x	x	x	x	x								

Eg: For channel C1 with reading as +1.34815 with units as inch, within limits																						
C	1		:		+			1	.	3	4	8	1	5		i	n	c	h		\r	\n

- SI5500 Module Print In Units Command:

This command is used to get the details of a single Orbit Module along with its orbit error status (**note this is a modules raw, unzeroed reading and not a channel reading**).

Command bytes – '^' 'P' 'm' <Module number>. Module number varies from 0 to 30. If set to 0xFF, details of all the channels are printed.

Print Data Format –

Channel Nr (C1 to C31)		Space	Sign	Reading – Right aligned with DP set through "Places after DP" setting in "Display Configuration" menu									Space	Module Error			Space	Carriage Return	Line Feed
C	x		:		+								x				0		\r	\n
C	x	x	:		-					x	.	x			1	2				
									x	.	x	x			1	3				
								x	.	x	x	x		2	5	5				
							x	.	x	x	x	x								
						x	.	x	x	x	x	x								
											x	x								
									x	x	.	x								
								x	x	.	x	x								
							x	x	.	x	x	x								
						x	x	.	x	x	x	x								
					x	x	.	x	x	x	x	x								
										x	x	x								
								x	x	x	.	x								
							x	x	x	.	x	x								
						x	x	x	.	x	x	x								
					x	x	x	.	x	x	x	x								
				x	x	x	.	x	x	x	x	x								

Eg: For channel P1 with reading as +1.34815 in range.																				
C	1		:		+			1	.	3	4	8	1	5			0		\r	\n

- <u>SI5500 Module Print In Counts Command:</u>

This command is used to get the details of a single Orbit Module along with its orbit error status (**note this is a modules raw, unzeroed reading and not a channel reading**).

Command bytes – '^' 'P' 'M' <Module number>. Module number varies from 0 to 30. If set to 0xFF, details of all the channels are printed.

Print Data Format –

Channel Nr (C1 to C31)			Space	Reading Right aligned in counts in the current probe resolution.									Space	Module Error			Space	Carriage Return	Line Feed
C	x		:									x				0		\r	\n
C	x	x	:								x	x			1	2			
										x	x	x			1	3			
									x	x	x	x		2	5	5			
								x	x	x	x	x							
							x	x	x	x	x	x							

Eg: For channel P1 with reading as 10% of the stroke in range.																			
C	1		:							1	6	3	8				0		\r	\n

11 MEASUREMENT AND TIMING INFORMATION

Parameter	Update Rate/Value	Remarks
Data Reading rate from the Orbit Sensors	Every 20ms	This also depends on how many channels use MAX or MIN or DIFF operators in their formula. If we have more channels using these operators, then the data read rate can become slower (can become greater than 20ms).
Data Refresh on the LCD display	30ms after reading the data from the Orbit Sensors	This depends on the complexity of the formula used for the measurement channels. If the complexity is less (less measurement channels are used or less trigonometric functions are used), then the update rate can be faster (can become less than 30ms).
Response to digital input	Within 100ms from the time of setting the input	
Digital Output Update	Within 10ms from the time of reading the data from the Orbit Sensors	
Resolution	18-bit when not in Difference mode 14-bit when in Difference mode User can change resolution through Probes Menu.	If MAX or MIN or DIFF operations have to be performed on an Orbit Digital Sensor then it is operated in Difference mode. This is applicable only if the operations are performed on a single sensor and not on a sub-expression involving multiple sensors. For e.g. The resolution is lowered to 14-bit if the formula contains MAX(A) and is not applicable if it contains MAX(A+B).

12 RETURN OF GOODS

Devices returned for service/repair/calibration should be shipped prepaid to your distributor or, if purchased directly from Solartron Metrology, to the relevant Sales Office.

The shipping container should be marked:
'For the Attention of the Customer Services Department'

The following information should accompany the device(s):

1. Contact details of company/person returning device, including return shipping instructions.

2. A statement of service required.

3. Description of the device fault and the circumstances of the failure, including application environment and length of time in service.

Alternatively there is a returns form available on our web site, follow the link to "Service Repair and Recalibration".

Please note:
A standard assessment charge is applicable on all non-warranty devices returned for repair.
Customer damage and any device found, upon inspection, to have no fault will be considered non-warranty.

Please contact the Sales Office or Distributor for warranty terms, service options and standard charges.

Adherence to these procedures will expedite handling of the returned device and will prevent unnecessary additional charges for inspection and testing to determine the condition.

Solartron Metrology reserves the right to repair or replace goods returned under warranty.

All repairs are guaranteed for 3 months (unless other-wise stated).

Solartron Metrology reserves the right to make changes without further notice to any products herein to improve reliability, function or design.
Solartron Metrology does not assume any liability arising out of the application or use of any product or circuit described herein, neither does it convey any licence under patent rights nor the rights of others.