5330A Operations Manual

SYNCHRO/RESOLVER SIMULATOR

TWO SYNCHRO/RESOLVER OUTPUTS (UP TO 6 VA) PLUS OPTIONAL 6 VA REFERENCE SUPPLY

GENERAL

This Operations Manual contains a general description, specifications, installation & operating instructions, as well as maintenance and calibration verification information for the North Atlantic Industries (NAI) Model 5330A Synchro/Resolver Simulator.

The 5330A is a replacement for all standard variations of the legacy 5310 & 5330 (see P/N).

For special versions (P/N = 5310 – Sxxxx or 5330 - Sxxxx), contact factory to determine compatibility.

FEATURES

- Up to two channels
- Optional reference supply
- 47 Hz to 10 KHz
- Up to 6 VA power output per channel
- Output protection
- Dynamic Modes
- Ethernet, IEEE-488, USB & Parallel ports
- Replaces NAI 5310/5330

DESCRIPTION

This second generation Simulator, Model 5330A, represents a major step forward by using digital technology to produce Synchro and Resolver outputs. The use of an intelligent DSP design eliminates push buttons and allows all programming to be done either via an integrated touch-screen, jog-wheel, or a mouse interface. In addition, IEEE-488, USB, and Ethernet interfaces have been added to extend remote operation capabilities.

The angle outputs can be set for one of two display modes: 0-360º or ±180°. A wide (47Hz to 10KHz) frequency range is standard. The versatility of this device has been substantially increased by incorporating dynamic modes that enable user to test servo systems under various simulated stringent field conditions.

a. Each channel can be set to simulate a rotating component in either clockwise or counter-clockwise direction.
b. Each channel can be set to produce either Step, Sine wave, Ramp, or Saw tooth outputs.

Improved flexibility is provided by two **fully independent** outputs that can be combined to operate as a two-speed output. The gear ratio, for the two-speed mode, is programmable from 2:1 to 255:1. When used in conjunction with North Atlantic Industries Model 8810A Angle Position Indicator, the Instrument pair can perform the classic "Dummy Gun Director" functions.
The 5330A can generate output voltages from 1.0 to 90 V_{L-L} and accept reference voltages from 2 to 115 V_{RMS}, over a frequency range of 47Hz to 10KHz and can, therefore, handle most known Synchro/Resolver simulation requirements.

Optional Reference: This design can also incorporate a 6 VA programmable reference generator that is used for standalone applications (See P/N).

SPECIFICATIONS

SYNCHRO OR RESOLVER

Number of channels:	One or two (see part number)
Mode:	Synchro/Resolver, programmable. Two outputs can be combined to act as a single 2 speed simulator (ratio is programmable from 2 to 255)
Resolution:	0.001°
Accuracy:	
(Resolver) No load: (2-28 VL-L)	±0.003° 360Hz to 2,000Hz. Add 0.003°/VA; 2.2 VA max. inductive
(Resolver) No load: (28-90 VL-L)	±0.003° 360Hz to 1,000Hz. Add 0.003°/VA; 2.2 VA max. inductive
(Resolver) No load: (2-28 VL-L)	±0.015° >2,000Hz to 10,000Hz. at 10,000Hz & 20 KΩ min. load. Accuracy degrades as a linear function of frequency from 1kHz to 10 kHz
(Synchro) No load: (11.8/90 VL-L)	±0.005° >100Hz to 800Hz Add 0.003°/VA; 6.0 VA max. inductive
(Synchro) No load: (11.8/90 VL-L)	±0.012° 47Hz to 100Hz Add 0.003°/VA; 6.0 VA max. inductive
Settling time: (180° step)	<100µs to 26 V_{L-L} ; < 250µs at 90 V_{L-L}
Output voltage:	1-90V_{L-L} programmable for radiometric or fixed. (Fixed means output V_{L-L} is independent of reference voltage)
Output Protection:	Over-current and over-temperature
Reference Input:	2-115 Vrms; 47 Hz to 10 KHz
Reference Input Impedance:	>36,000 ohms
Phase offset:	±179.9°

Dynamic Motions:
Continuous, constant rate CW & CCW with programmable start/stop angles.

Angular Rate:	±0.01 to ±6,480 °/sec. @ 47 to 60 Hz; ±0.01 to ±99,720 °/sec. @ > 360 Hz;
Resolution:	0.001°/sec. @ 47 to 60 Hz; 0.01°/sec. @ > 360 Hz;
Rate accuracy:	± 1%
Stop angle:	0-359.99° or ±179.99 (depends on display option)

Sinusoidal / Ramp / Step function / Saw tooth:

Amplitude:	0° to ± 90° centered around datum angle of 0°-359.99°
Frequency:	0.0001 Hz to 999.999 Hz
Resolution:	0.0001 Hz to 99.9999 Hz 0.001 Hz from 100 to 999.999 Hz

REFERENCE GENERATOR, (SEE PART NUMBER)

Voltage:	2V to 115 VRMS. Programmable with a resolution of 0.1 V
Accuracy:	±3% of setting
Frequency:	47 Hz – 10 KHz. Programmable with 0.1 Hz steps • 2.0 to 9.9 VRMS; 47 Hz to 10 KHz frequency range • 10.0 to 27.9 VRMS; 47 Hz to 4 KHz frequency range • 28.0 to 115.0 VRMS; 47 Hz to 800 Hz frequency range
Harmonic Content:	2.0% maximum
Output Drive:	6 VA (maximum @ 115 VRMS, 26 VRMS or 11.8 VRMS)
Output Protection:	Over-current and over-temperature
Frequency accuracy:	The greater of ±0.1% of frequency programmed or ±1 Hz

GENERAL

Communication Interfaces:	Ethernet, USB, and IEEE-488,
Temperature Range:	0 - 50°C operating; 0 to +70°C storage
Input Power:	85 VRMS to 265 VRMS, 47 to 440 Hz
Weight:	<6 lbs.(2.72 Kg)
Dimensions:	12.5" L (31.75 cm) x 9.5" W (24.13 cm) x 3.5" H (8.89 cm)

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Safety Summary

WARNINGS

This symbol is intended to alert the presence of un-insulated dangerous voltage and shock hazard if misuse or improper handling.

This symbol is intended to alert the presence of important information in the literature accompanying this device. All information should be read carefully to avoid misuse and potential harm to the user and/or device.

GENERAL SAFETY NOTICES

The following general safety notices supplement the specific warnings and cautions appearing elsewhere in the manual. They are recommended precautions that must be understood and applied during operation and maintenance of the instrument covered herein.

REPAIR 

DO NOT ATTEMPT REPAIR. Under no circumstances should repair of energized instrument be attempted. All repairs to this instrument must be accomplished at the Factory.

HIGH VOLTAGE 

HIGH VOLTAGE is used in the operation of this equipment.
DEATH ON CONTACT may result if personnel fail to observe safety precautions. Learn the areas containing high voltage on this equipment. Be careful not to contact high-voltage connections when installing, operating or maintaining this instrument.

INPUT POWER ALWAYS ON 

The design of the model 5330A is such that AC input power is continuously supplied to the power supply independent of the front panel ON/OFF Switch. The primary means of disconnect is pulling the line cord from the instrument

Interfaces, Communication

The 5330A includes several different interfaces that include Ethernet, USB, & IEEE-488 and a 78 pin interface connector. When a replacement for the legacy 5330 is required, conversion cable (07-0022) must be ordered as a separate item. When a replacement for the legacy 5310 is required the 78 pin connector is replaced with a 50 pin connector that mimics the previously supplied units. Pin out data, for the various configurations, is shown below.
Detailed programming commands**/**information is included in **"5330A Programmer's Reference Guide".** The Ethernet and the USB connectors are industry standard.

5330A J1 CONNECTOR, PIN DESIGNATIONS
HDL78SL; Mate 78 pin male (See Accessories)

Pin	Designation	Pin	Designation	Pin	Designation	Pin	Designation	Pin	Designation
13	RHI-OUT	32	RHI-SENSE OUT	40	CHASSIS GND	59	S2-OUT CH1	78	S4-OUT CH1
14	S1-SENSE CH2	34	S3-SENSE CH2	52	RLO -OUT	71	RLO-OUT SENSE		
15	S1-OUT CH2	35	S3-OUT CH2	53	S4-SENSE CH2	73	S2 SENSE CH2		
16	RHI-IN CH2	36	RLO-IN CH2	54	S4-OUT CH2	74	S2-OUT CH2		
19	S3-SENSE CH1	38	S1-SENSE CH1	56	RHI-IN CH1	76	RLO IN CH1		
20	S3-OUT-CH1	39	S1-OUT CH1	58	S2 SENSE CH1	77	S4-SENSE CH1		

Note: Do not connect to any non-designated pins

5330 J1 CONNECTOR, PIN DESIGNATIONS (See P/N)
DE9PP; Mate DE9S or equivalent

Pin	Designation	Pin	Designation	Pin	Designation	Pin	Designation
3	S1-OUT CH1	5	RLO IN CH1	7	S4-OUT CH1	9	RHI -115V CH1 IN
4	S2-OUT CH1	6	RHI - 26V CH1 IN	8	S3-OUT-CH1		

Note: Do not connect to any non-designated pins

5330 J3 CONNECTOR, PIN DESIGNATIONS
DD50P; Mate DD50S or equivalent

Pin	Designation	Pin	Designation	Pin	Designation	Pin	Designation
3	CHASSIS GND	19	S4-OUT CH1	34	S1-OUT CH1	37	RHI -115V CH1 IN
18	S2-OUT CH1	20	RLO IN CH1	35	S3-OUT-CH1	38	RHI - 26V CH1 IN

Note: Do not connect to any non-designated pins

5310 J1 CONNECTOR, PIN DESIGNATIONS (See P/N)
DD50P; Mate DD50S or equivalent

Pin	Designation	Pin	Designation	Pin	Designation	Pin	Designation
1	SYN-RSL-SEL	16	BCD 40° / BIN 22.5°	31	BCD 4° / BIN 1.406°	41	LL1
4	CHASSIS GND	17	BCD 200° / BIN 180°	32	BCD 20° / BIN 11.25°	42	LL2
6	STROBE	18	S2-OUT CH1	33	BCD 100° / BIN 90°	45	BCD 0.01° / BIN 0.0014°
9	DIGITAL GROUND	19	S4-OUT CH1	34	S1-OUT CH1	46	BCD 0.08° / BIN 0.011°
12	BCD .04° / BIN 0.005°	20	RLO IN CH1	35	S3-OUT-CH1	47	BCD 0.4° / BIN 0.088°
13	BCD 0.2° / BIN 0.044°	28	BCD 0.02° / BIN 0.0027°	37	RHI -115V CH1 IN	48	BCD 2° / BIN 0.703°
14	BCD 1° / BIN 0.352°	29	BCD 0.1° / BIN 0.022°	38	RHI - 26V CH1 IN	49	BCD 10° / BIN 5.625°
15	BCD 8° / BIN 2.813°	30	BCD 0.8° / BIN 0.176°	40	REF LEVEL SELECT	50	BCD 80° / BIN 45°

Note: Do not connect to any non-designated pins

J2 CONNECTOR, IEEE- 488 PIN DESIGNATIONS
Standard IEEE Interface Connector

Pin	Designation	Pin	Designation
1	DIO1	13	DIO5
2	DIO2	14	DIO6
3	DIO3	15	DIO7
4	DIO4	16	DIO8
5	EOI	17	REN
6	DAV	18	Gnd., DAV
7	NRFD	19	Gnd., NRFD
8	NDAC	20	Gnd., NDAC
9	IFC	21	Gnd., IFC
10	SRQ	22	Gnd., SRQ
11	ATN	23	Gnd., ATN
12	Shield	24	Gnd., Logic

J3 CONNECTOR:

- USB-A (USB 2.0) Rear Connector, for communications only
- Ethernet (10/100/1000 Base-TX)

J4 CONNECTOR:

- USB-A Front Panel Connector for Optical Mouse only

Controls & Indicators, General Description

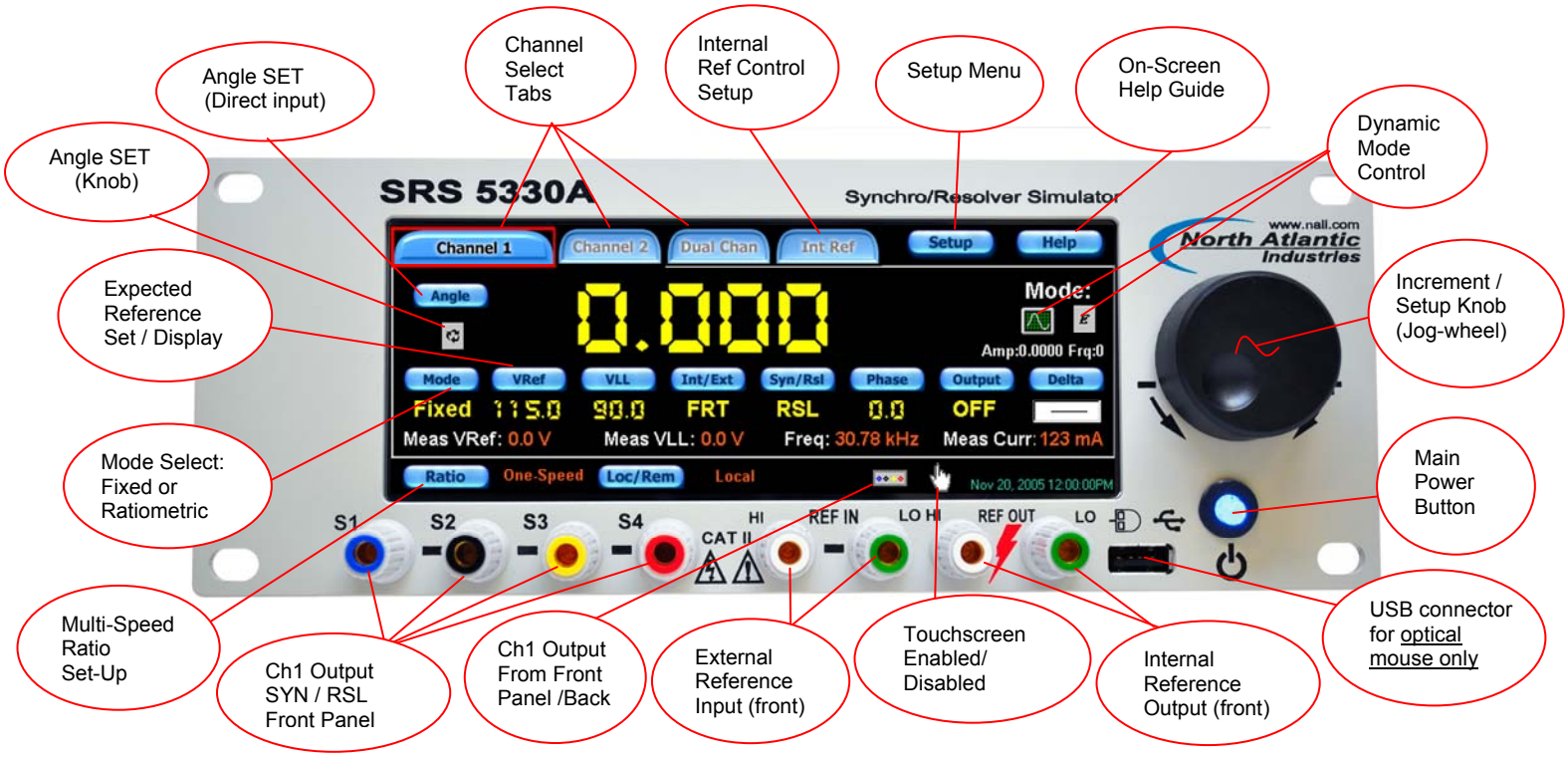


Figure 1 – Front Panel Controls & Connections

Figure 2 – Indicators on the front panel main display of the 5330A

Channel Selection

To select channel 1, channel 2 or dual channel configuration, press corresponding tab by using either the touch screen, mouse or increment/setup knob. Below figures show each channel select button along with the corresponding channel display. Selected configuration is highlighted.

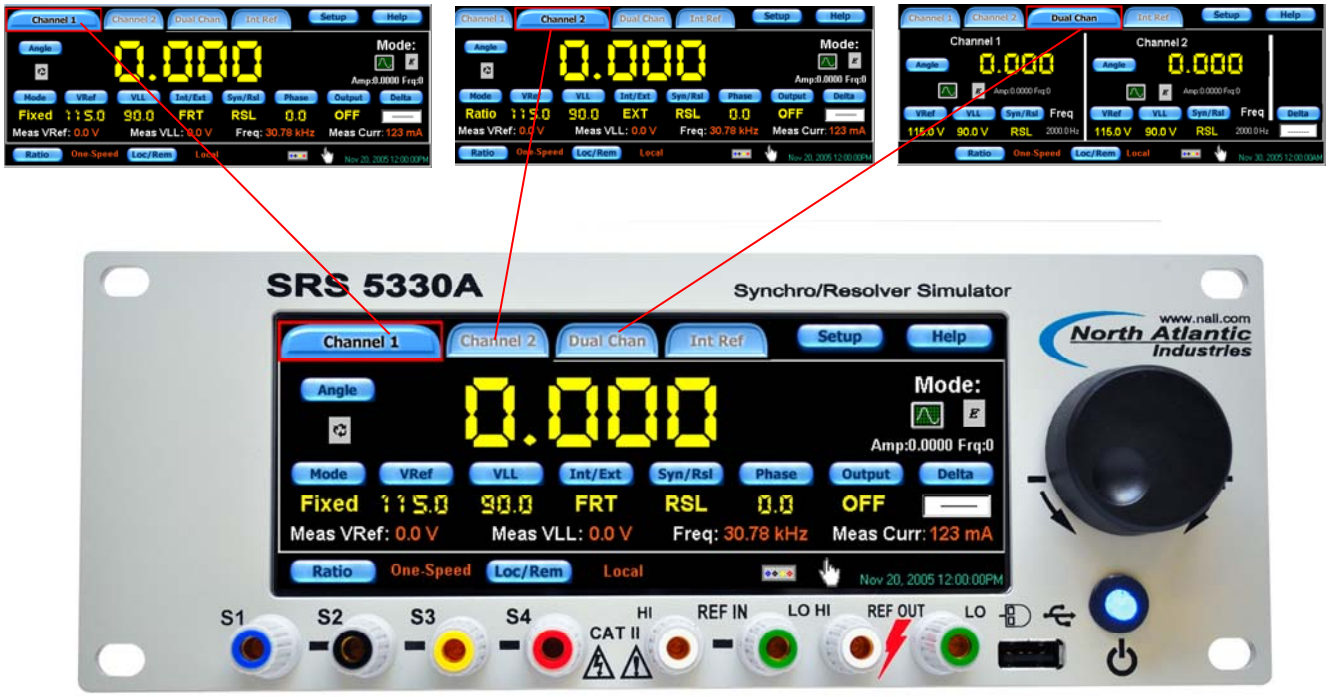


Figure 3 – Channel Selection

Synchro/Resolver Mode Select

On any channel screen, toggle the *Syn/Rsl* 

button to select either Synchro or Resolver format. The selected format will be displayed below the button.

Figure 4 – Synchro / Resolver Mode Select

VLL (Voltage Line-to-Line) Output Select

Each channel must be set to a desired output voltage (VLL). When the 

button is pressed, enter the desired output voltage (VLL) for each channel. Then specify either "FIXED" or "RATIOMETRIC" mode. (See next illustration)

Figure 5 – VLL Output select & Fixed/Ratiometric mode

Fixed/Ratiometric (Voltage output mode select)

Each channel can be set for "FIXED" or "RATIOMETRIC" output. When the 

button is pressed, the output mode will toggle between "FIXED" and "RATIOMETRIC". When set for "FIXED", the output voltage (VLL) will remain constant at the set VLL voltage. When set for "RATIOMETRIC", the output signal voltage (VLL) will vary directly with changes in the applied reference voltage.

ANGLE set

Each channel can be programmed to various angles. When the 

button is pressed, enter the desired angle using the touch screen, mouse, or incremental knob.

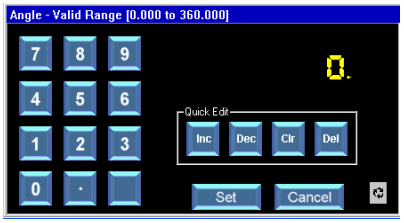
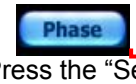


Figure 6 - Angle Set

Alternatively, when the "ANGLE SET" icon  is pressed, the unit will respond to the "Increment / Setup" knob and will step the output angle according to the value set up in the "Delta screen" panel.

PHASE Offset

Each channel can be programmed to a specific phase shift between the output and the reference. Typically, this is utilized to closely match the phase difference exhibited by a true Synchro.

When the 

button is pressed, enter the required phase shift between the output signal and reference source. Press the "Set" button to complete.

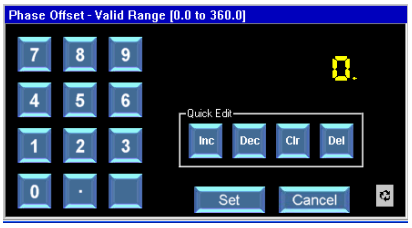


Figure 7 – Phase Offset Control

Channel Output, Enable

To turn the output amplifiers “ON”/“OFF”, press the Output button. The output button will toggle the outputs “ON” or “OFF”.

Figure 8 – Output Enable

INT/EXT (Reference Source Select)

Each channel must be programmed to accept a REFERENCE signal from either the external or the optional internal.

When the Int/Ext button is pressed, for CH. 1, the Reference Source is selectable between “INT” (Optional Internal Reference as source), “FRT” (External reference source through the front panel) or “BCK” (External reference source through the J1 connector. For CH. 2, the Reference Source is selectable between “INT” (Optional Internal Reference as source) or “EXT” (external reference source). NOTE: CH. 2 External reference source is only applicable through the J1 connector.

VREF (External Reference Voltage Set)

When an external reference is specified, the anticipated VREF must be entered by pressing the VREF VRef button and entering the appropriate voltage. This needs to be done in order to let the Simulator set a transformation ratio (or proportion between REF voltage input and output voltage VLL) when the “RATIOMETRIC” output mode is selected.

Internal Reference Setup

If internal reference option is installed in the 5330A, press the Internal Ref *Internal Ref* button that will bring up the sub-screens for controlling the reference:

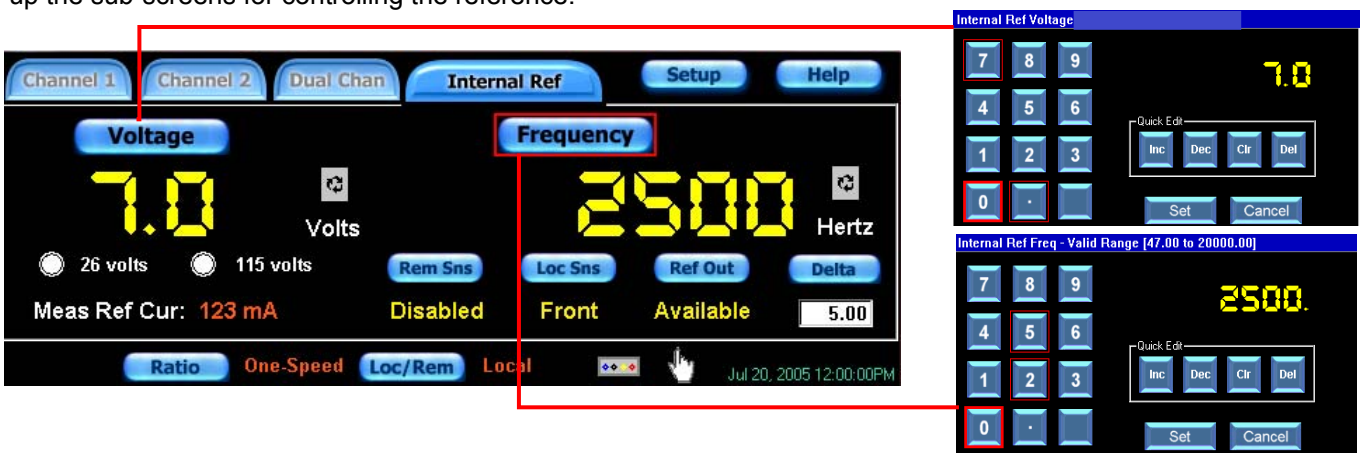


Figure 9 – Internal Reference Setup

Set the internal reference generator voltage and frequency parameters, using the setup screens shown above. When done, press any of the channel buttons or any other function to exit this setup menu.

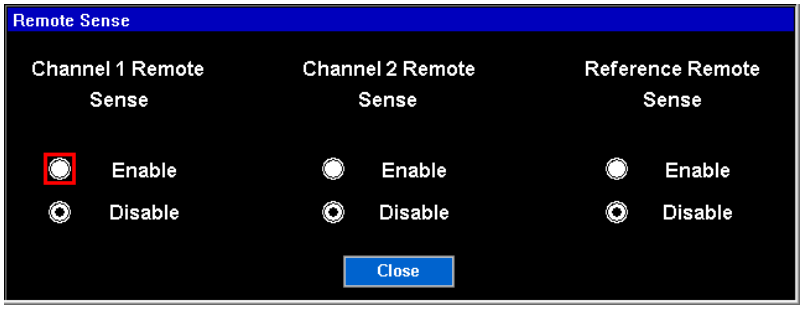
To enable output of the optional on-board reference source, insure the “Ref Out Signal:” displays “Available”.

The Remote Sense button can be “Enabled” or “Disabled”. The Remote Sense setting is applicable only when the Local Sense is configured to the “Back”.

The Local Sense button can be configured for the “Front” or the “Back”. When the Local Sense is configured for the “Front” the Remote Sense setting is ignored.

Remote Sense Setup

This screen allows for the remote sensing of each SIM channel and the reference supply.

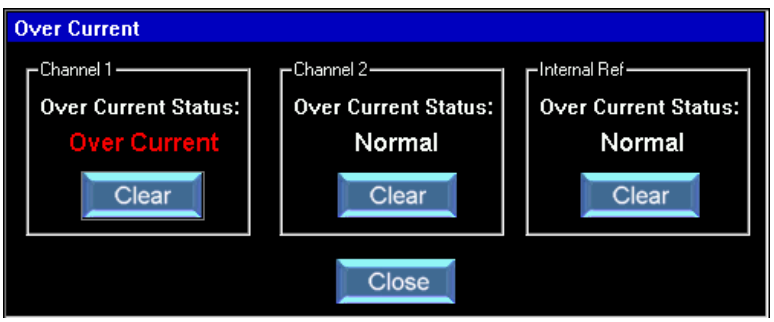


Remote Sense Screen

Over Current

An “Over Current” occurs when either the reference or one of the SIM channels is overloaded. When an overload is detected, the D/S will stop driving temporarily and will attempt to turn on every second for approximately 10 seconds, and if an over current is still present, the output will be disconnected and the corresponding tab will start to blink red.

To reset this condition, once the cause of the over current has been resolved, press the tab that is blinking red and the following “Over Current” screen will appear; press corresponding “Clear” button.



Over Current Screen

DELTA Screen Panel

The Delta Screen Panel sets the parameters for the "Increment/Setup" knob. When the 

button is pressed, the "Delta Screen" panel will become visible. Enter the desired values. The entered values represent the resolution that the knob will control for the particular function selected. For this example, assume that the "ANGLE SET" icon was pressed and set to 5 degrees. The "Increment/Setup" control knob, when turned clockwise, will increase the output angle in 5 degree increments and when turned counterclockwise, will decrease the output angle in 5 degree increments

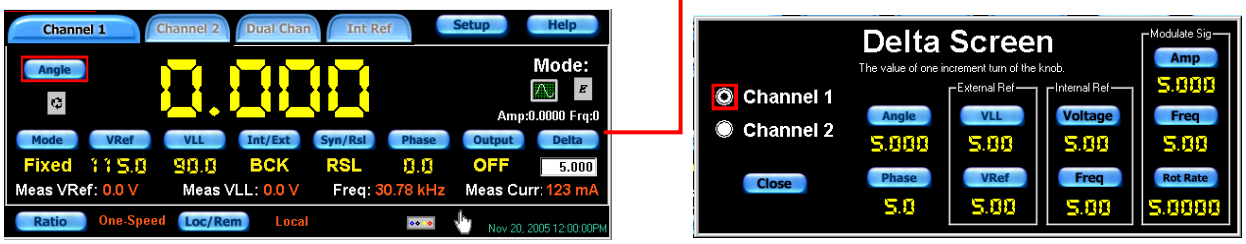


Figure 10 – Delta Screen Panel

Ratio (Multi-Speed) Mode

Two outputs of the 5330A can be combined with a ratio of 2 to 255.

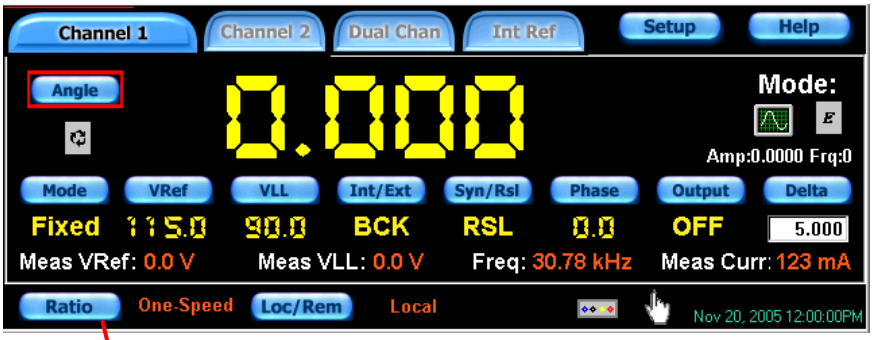


Figure 11 – Ratio (Multi-Speed) Mode

Select the Ratio button 

to enter the ratio menu and select the required ratio

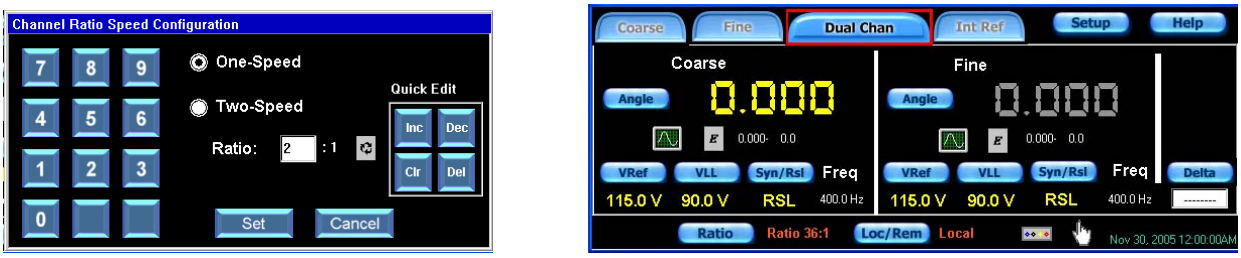
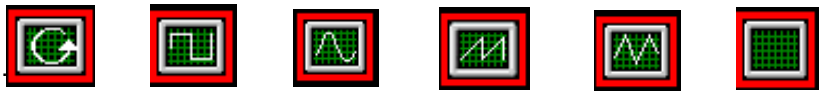


Figure 12 – Ratio Select

Refer to the above left menu display. Assume that two-speed is selected with a ratio of 2:1 (Value may be entered via keypad or the 'Quick Edit' Increment/Decrement buttons. Values may also be cleared or deleted using the quick edit keypad. Once value is selected, hit "Set" button and unit will return to the channel display. Now refer to the display on the right and note that the ratio that you have set is displayed next to the Ratio button. Also note that the channel select tabs at the top have changed from Channel 1 to Coarse, and from Channel 2 to Fine. Channel 2 controls are now "locked out" and the display will be "grayed". Channel 1 will output the "coarse" signal and channel 2 will output the "fine" signal. Any commanded angle will now set Ch.1 (coarse) and Ch.2 (fine) will automatically be set to the commanded angle multiplied by the programmed ratio.

DYNAMIC Mode Control Panel

A specific dynamic mode can be selected by toggling the Dynamic Control button until the desired format is displayed on the face of that button. Then, press the parameter control button E to get the parameter sub screens.



Rotation Step Sine Ramp Saw tooth No function

For example:

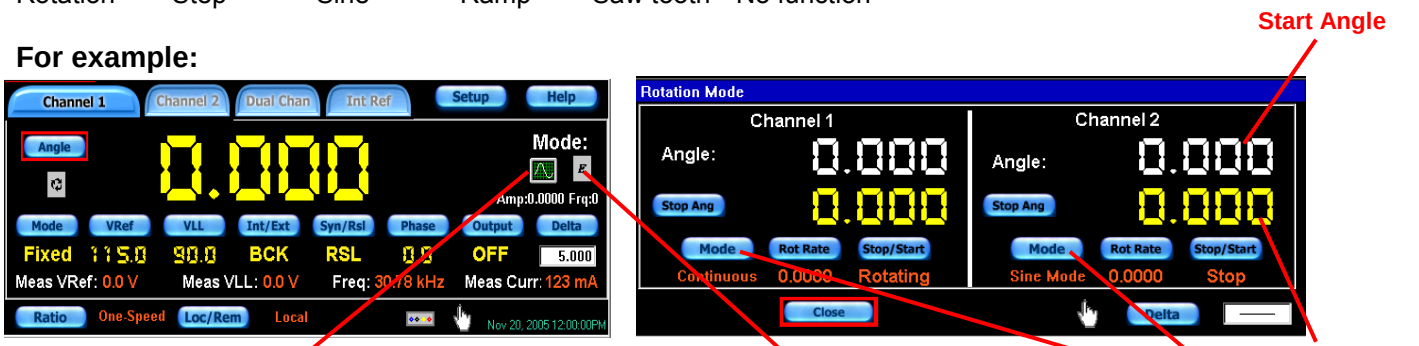


Figure 13 – Rotation Mode

When the MODE rotation icon is selected, pressing the parameter button E will bring forth the rotation mode sub screen that can be programmed for either continuous or start/stop rotation by toggling the buttons Mode

When continuous rotation is selected, toggling the Stop/Start will cause the selected to rotate until stopped.
When Start/Stop rotation is selected, the output will start rotating from the 'Start Angle" until it reaches the programmed "Stop Angle". When completed, the "Stop/Start" will display "Stop".

PROGRAMMING

Remote programming / Legacy 5330/5310 support (refer to 5330AA Programmer's Reference Guide)

Compatibility to 5330/5310 SRSs

The 5330A will provide language compatibility to the following 5330/5310 systems:

- 5330 Native
- 5310 Native (BCD)
- 5310 Native (Binary)

This unit may be remotely controlled through a USB, Ethernet, IEEE-488 port or the J1 parallel connector.

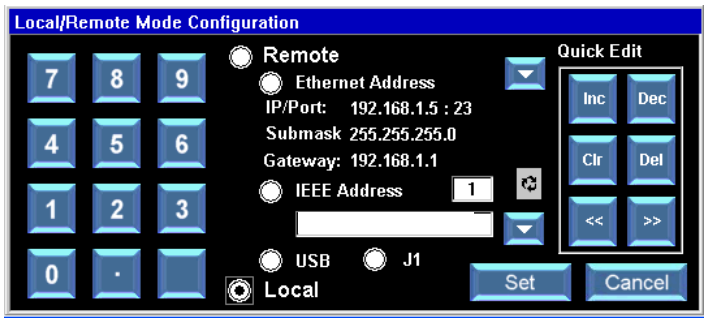
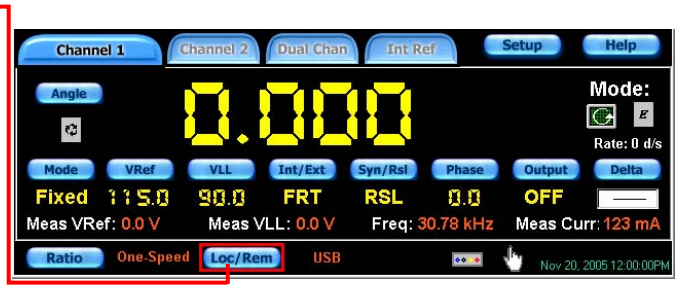


Figure 14 – Remote Operation

Press the Loc/Rem button on any of the Channel Displays, to enter the remote configuration menu as shown above. Select ***remote*** button, and then the desired port or J1.

USB Port Selection

Selection of the USB port is accomplished by simply pressing the USB button. Once entered, hit 'set' button and unit will return to main display.

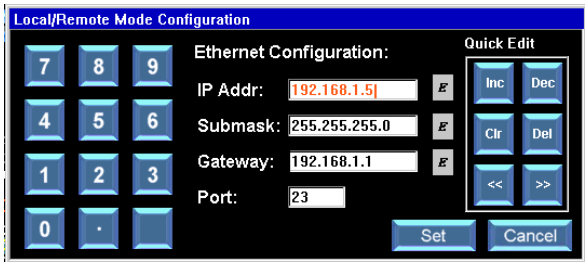


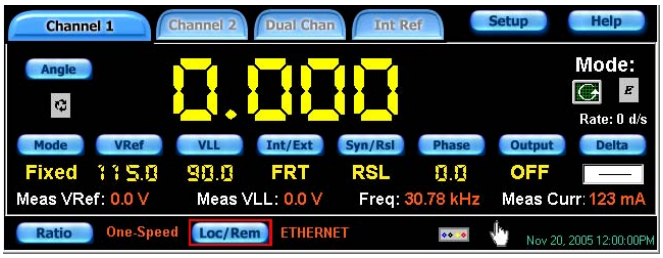
Note: the USB is now displayed next to the *Loc/Rem* button

Figure 15 – USB Port Selection

Ethernet Port Selection

Selection of the Ethernet port is accomplished by pressing the Ethernet address button and then adding a valid IP address, Submask and Gateway address for your Ethernet network. The Ethernet Port used by the 5330A is always Port 23. When completed, hit 'set' button and unit goes back to main display



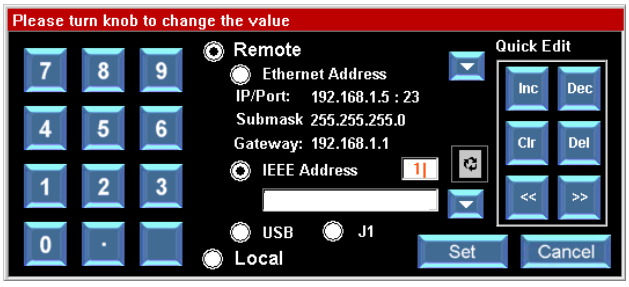


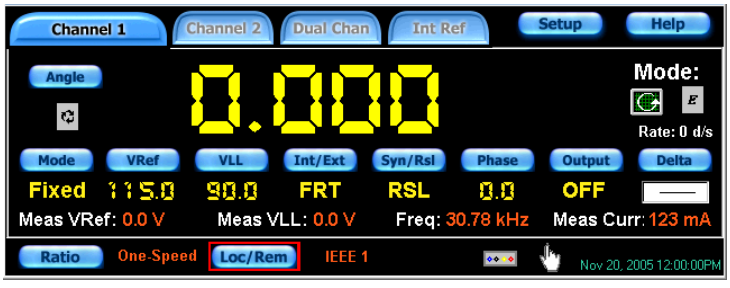
Note: ETHERNET is now displayed next to the Loc/Rem button

Figure 16 – Ethernet Port Selection

IEEE-488 Port Selection

Selection of the IEEE-488 port is accomplished by pressing the **IEEE-488** address button and then adding a valid address. When completed, hit 'set' button and unit goes back to main display





Note: IEEE is now displayed next to the *Loc/Rem* button

Figure 17 – IEEE-488 Port Selection

Setup Menus

The 5330A setup menu accesses features of the Simulator that allows the user to easily configure it through the front panel.

The setup menu is accessed by pressing the *Setup* button 

at the top of the main display screen. As shown by the screen below, there are ten choices in the setup menu. The section below describes each setup menu option.

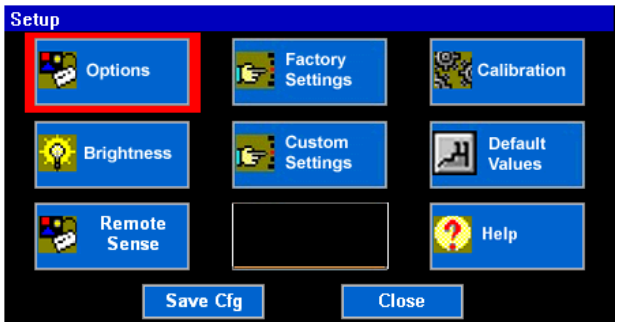


Figure 18 – Setup Menus

A sample of the **Options Menu** is shown below. This menu allows configuration of the following:

- Angle Display may be configured for the following parameters
  - 0 to 359.9999 degrees
  - -179.9999 to 179.9999 degrees
- Channel 1 Input may be configured for the following parameters
  - Front Panel Output
  - Back Connector Output (J1)
- Touch screen
  - Enabled
  - Disabled (re-enable using the Increment /Setup knob or mouse to select Options menu)
- Auto Save
  - Enabled – 5330A will automatically save the 5330A configuration parameters when the user powers down the Instrument
  - Disabled
- Date/Time Settings enable configuration of the following parameters:
  - Time Display Format either AM/PM or Military
  - Date Display Format either Text Date or Numeric Only Date
  - Setting of Time and Date

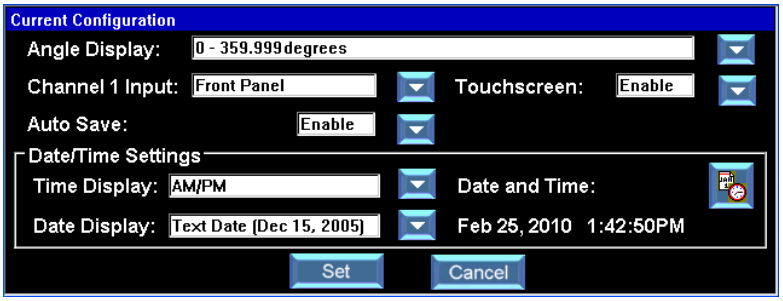


Figure 19 – Options Menu

The **Factory Settings** screen is shown below. This screen contains 4 sets of parameters that are configured at the factory. These parameters include the settings for reference source, reference voltage, reference frequency and Synchro/Resolver configuration. The pre-set parameter is chosen by simply selecting the button on the left, followed by the Load Load button. Once completed, the Simulator will return to the main display screen and the values are stored until changed.

Figure 20 – Factory Setting

The **Custom Settings** screen, shown below, will save up to 9 parameter settings. This is accomplished by saving those that are currently on the main screens. Select the button to the left of the numbers 1 – 9 followed by pressing the Save Current 'Save Current' button. To use the previously saved parameters select the button on the left, followed by the Load 'Load' button.

Figure 21 – Custom Settings

The **Brightness Control** screen is shown below. Front panel backlight brightness is adjustable from 20% to 100%

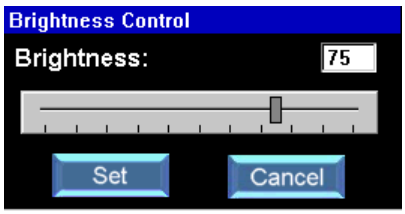


Figure 22 – Brightness Control

The **Calibration Menu,** shown below**,** contains a calibration routine for the Touch screen display and a calibration routine for the Instrument.
The "Touchscreen Calibration" will give prompts to the user to touch the screen at various places in order to correctly center the screen. At the end, "Calibration Complete" will be displayed.
The "Unit Calibration" will perform a full, 'off-line' self-calibration that does not require user intervention or external equipment; duration is approximately 25 minutes.

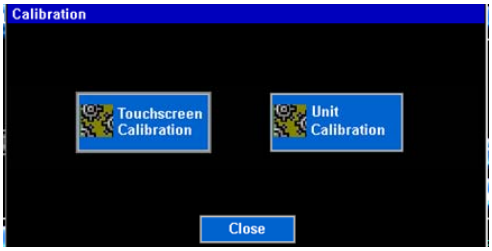


Figure 23 – Calibration Menu

Shown below are examples of the **Help Menu** screens. The help menu gives things such as specification summaries, descriptions of available buttons and descriptions of available functions. The Help Menu screen shows the unit's serial number, date code, MAC address, model information and firmware revision.

Figure 24 – Help Menus

Default Values screen enables user to restore the 5330A factory settings.

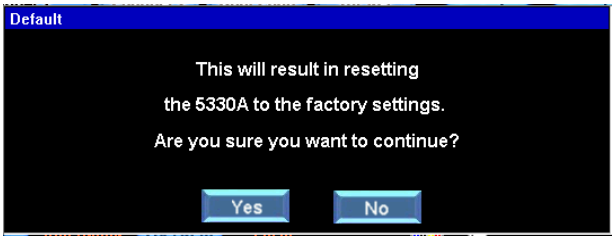
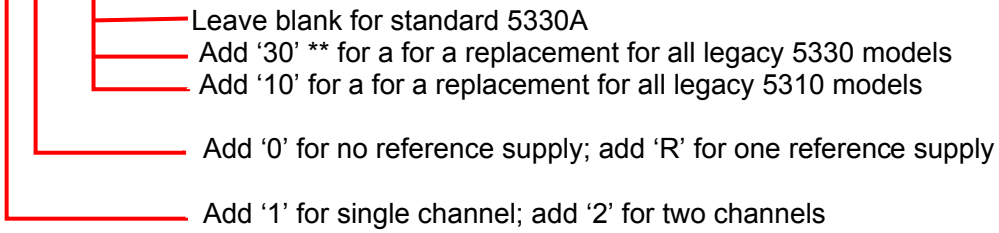


Figure 25 – Default Values

ORDERING INFORMATION

Part number: 5330A - * * - *



**Note: To mimic the connector pin-out of the 5330, a separate conversion cable (P/N 07-0022) must be ordered.

Accessories:

Included with the 5330A is an accessory kit NAI part number 5330A-ACCESSORY-KIT.
Kit includes the following items:

5330A- Accessory Kit	NAI P/N	5310 Accessory Kit	NAI P/N	5330 Accessory Kit	NAI P/N
78 Pin Mating connector	09-0001	50 Pin Mating connector	05-0053	Conversion cable	07-0022
Shell	P/O 09-0001	Shell	05-0060		
Fuse, 5 x 20mm, 2A, slow-blow (2)	99-0146	Fuse, 5 x 20mm, 2A, slow-blow (2)	99-0146	Fuse, 5 x 20mm, 2A, slow-blow (2)	99-0146
Line Cord	202-0002	Line Cord	202-0002	Line Cord	202-0002
Two spare fan filters	111-0005	Two spare fan filters	111-0005	Two spare fan filters	111-0005

Optional Mounting Accessory

The 5330A can be ordered with mounting adapters for one unit in a standard 19-inch equipment rack. The table below describes full rack mounting accessory:

Type of Mount	Description	NAI P/N
Full Rack Mounting	Mounts one unit in a 19-inch rack	783893

INSTALLATION AND MAINTENANCE

UNPACKING AND INSPECTION

This instrument has been thoroughly tested, inspected, and evaluated at the factory before shipment. Care has been taken in the design of the wrapping and packaging material to insure that no damage results from mishandling.

Inspect the instrument externally. Check the front panel for signs of damage to the switches, knobs, terminal jacks and display. Check the power switch and thumbwheel for smooth operation. Switch buttons should be secure. Check the condition of the connectors and fuse on the back panel. Check covers for damage and loose screws. If the instrument passes this inspection, install it and place it in operation. If damage is found, please contact NAI customer service through the NAI web-site, www.naii.com or call (631)-567-1100.

SHIPPING 

The original shipping containers, along with their appropriate blocking and isolating material are the preferred method of packing. Any other suitably strong container may be used provided the product is wrapped in a sealed plastic bag and surrounded with an appropriate amount of shock absorbing material to cushion firmly, preventing movement inside the container. Special attention should be paid to protection of the front panel touch screen display and terminal jacks.

INSTALLATION 

Rack Mounting Instructions:

The Model 5330A may be mounted in a standard 19-inch equipment with a full rack mounting adapter, NAI p/n 783893. It requires no special cooling equipment. Mount the unit so that air flows freely around it, particularly the rear panel used to transmit the power supply heat to the ambient air. Connect cables, turn on power switch and wait for unit to initialize.

Bench Installation:

For bench top use, the 5330A has Tilt stand and (4) rubber feet. Select an appropriate area that permits access to front and rear panels of SRS. Place SRS on bench, connect cables, turn on power switch and wait for unit to initialize

MAINTENANCE 

Input AC Power Fuse(s):

Fuses are contained within the AC Input Connector. Insure AC Power cord is disconnected. Replacement of the fuses is accomplished by removing the fuse holder located within the AC Input Connector (external, rear panel of unit). Replace with fuses equivalent to factory installed specifications. Reference the Mechanical Outline.

Repair

DO NOT ATTEMPT REPAIRS. All repairs to this instrument must be accomplished at the Factory.

High Voltage is used in the operation of this equipment.

DEATH ON CONTACT may result if personnel fail to observe safety precautions. Be careful not to contact high-voltage connections when installing, operating or maintaining this instrument.

Input Power Always On

AC input power is continuously supplied to the power supply independent of the front panel ON/OFF Switch. The primary means of disconnect is to remove the line cord from the instrument

Rear Panel Cooling Fan Filter

The unit is equipped with a cooling fan installed on the rear panel of the unit. The Fan Filter Assembly is user accessible and the Fan Filter has been mounted for easy removal for cleaning and/or replacement. Periodic inspection (duration varies upon unit environmental use) of the condition of the filter is recommended to insure proper air flow circulation and reduction of contaminants. If filter is clogged or deteriorated, cleaning and/or replacement is recommended. The Fan Filter is held in place by a filter shroud insert. Before any maintenance is performed, insure that the power cord has been disconnected from the unit. The filter shroud can be removed (no special tools required) by gentling pulling and disconnecting from the shroud assembly (insert is held in place by molded retainers in the shroud). The filter can be accessed at this point for maintenance. Two spare replacement filters are supplied in the accessory kit.

Figure 26 – Maintenance; Cooling Fan Filter

CALIBRATION

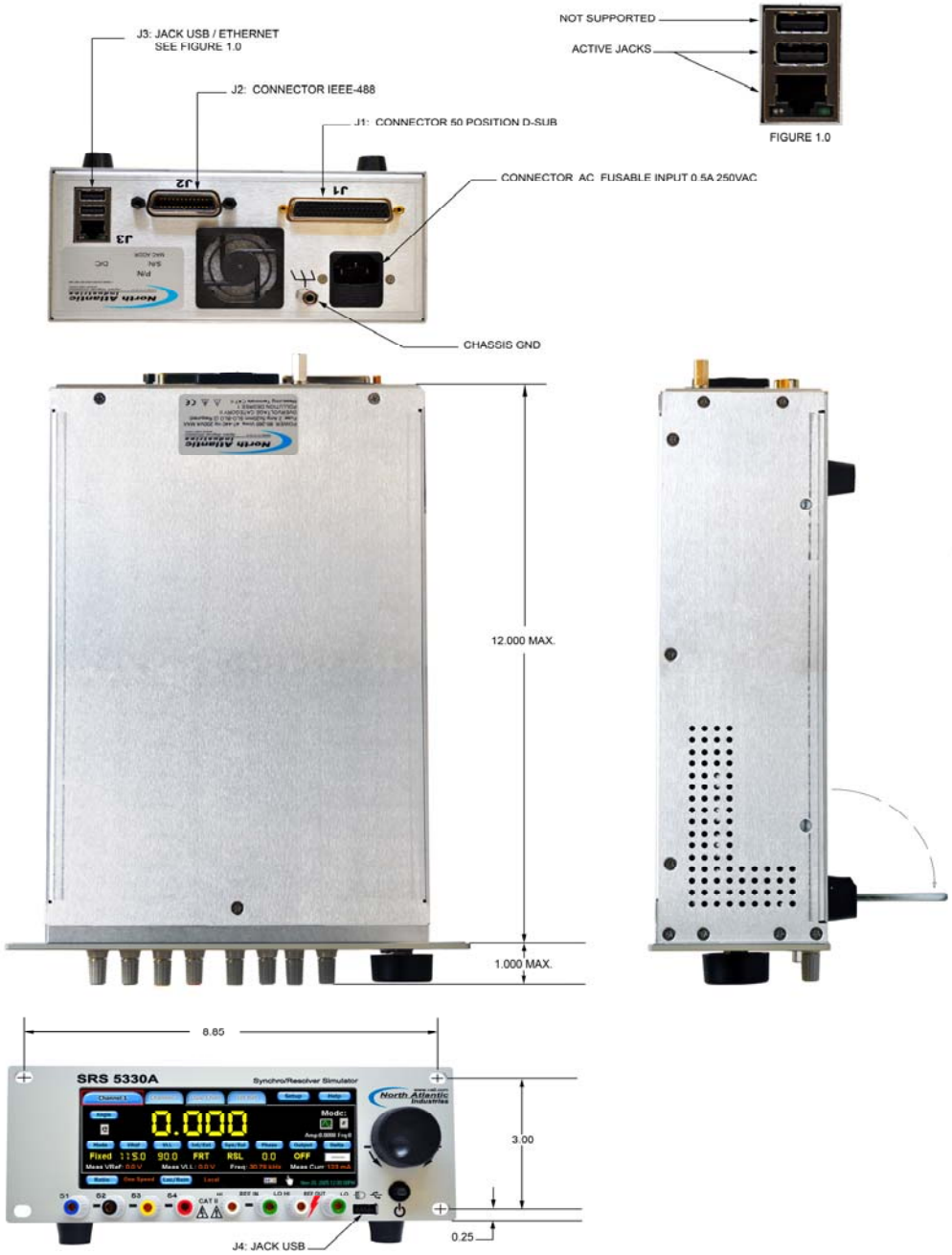
Self-calibration

The unit is self-calibrating. When unit is turned on it will automatically initiate self-calibration. After warm-up of 15 minutes, unit will again automatically calibrate the channel or channels being used. Once calibrated, unit will monitor usage. Should frequency or voltage of output signal change/commanded by more than 12.5%, unit will automatically recalibrate the channel in use. Calibration takes about 2 seconds.

Calibration Verification

The model 5330A should have its calibration verified on an annual basis. Factory Calibration service is available on request. If the instrument fails to meet its accuracy, it must be repaired. Repairs can only be done at the Factory.

MECHANICAL OUTLINE, MODEL 5330A



J3 CONNECTOR:

- USB-A (USB 2.0) Rear Connector, for communications only
- Ethernet (10/100/1000 Base-TX)

J4 CONNECTOR:

- USB-A Front Panel Connector for Optical Mouse only

SUPPLEMENTAL INFORMATION FOR UNITS SOLD WITHIN THE EUROPEAN UNION

General

Information contained within the following paragraphs supplements and in some cases supersedes information contained throughout this Manual. Where there is a conflict between information contained in these paragraphs and information contained elsewhere in the manual, these paragraphs take precedence for units sold within the European Union.

Specifications

Add to the list of specifications the following information:

Environmental	
Temperature, Operating	0° to 50° C, standard
Temperature, Non-operating	-20° to 60° C
Relative Humidity	95% non-condensing
Altitude	3050 Meters Operating, 12,000 Meters non-operating
Over voltage/Installation Category	Category II
Pollution Degree	Degree 1
Fuses Qty: (2)	Type: 2 A Slow Blow

Line Cord

The model 5330A is normally shipped with a UL approved detachable line cord. This line cord does not meet the safety requirements of the EU and should be discarded and replaced with an EU approved type.

Installation and Mains Input

The model 5330A is designed for bench top or permanent rack-mount installation. An IEC-320 appliance coupler is provided for mains power input. Safety (earth) ground is provided through this power input and the detachable line cord provides the required means of disconnection.

The design of the model 5330A is such that AC power is continuously supplied to the power supply independent of the front panel ON/OFF Switch. The primary means of disconnect is pulling the line cord from the instrument. This requires that the line cord must be kept accessible for disconnect. For rack mount installations, an external power disconnect switch must be provided to insure safety compliance.

Safety Grounding

For safety the unit must be connected to Safety (Earth) ground either through the power line cord or through the Ground stud located at the rear of the unit.

Improper Usage

If the model 5330A is installed or used in a manner not specified, safety may be impaired.

Technical Assistance

Contact your local Sales Representative for any technical assistance. Alternatively, contact the Factory at:

North Atlantic Industries
110 Wilbur Place
Bohemia, NY 11716 USA
Telephone: (631) 567-1100
Fax: (631) 567-1823
Web site: www.naii.com

DECLARATION OF CONFORMITY

We **NORTH ATLANTIC INDUSTRIES, INC.**
110 WILBUR PLACE,
BOHEMIA, NY 11716-2416

declare under our sole responsibility that the following products

5330A Series

To which this declaration relates is in conformity with the following standard(s) or other normative document(s):

EMISSIONS PER EN 61326:1997/A1:1998/A2:2001

CISPR16:1999	Class A, Conducted Emissions
CISPR16:1999	Class A, Radiated Emissions
IEC 61000-3-2:2000	Harmonics
IEC 61000-3-3:1994	Flicker

IMMUNITY PER EN 61326:1997/A1:1998/A2:2001

IEC 1000-4-2:1995	Electrostatic Discharge
IEC 1000-4-3:1995	Radiated Immunity
IEC 1000-4-4:1995	EFT/Burst, Power and I/O Leads
IEC 1000-4-5:1995	Surge Immunity, Power Leads
IEC 1000-4-6:1996	Conducted Immunity, Power and I/O Leads
IEC 1000-4-11:1994	Voltage Dips and Interrupts

SAFETY PER EN 61010-1:2001

IEC 61010-1:2001	Safety

Following the provisions of COUNCIL DIRECTIVE 89/336/EEC
73/23/EEC

Place Bohemia NY, USA

(original on file)
(Signature)

Date _____

(Full Name)
Quality Manager
(Position)

REVISION HISTORY

Revision	Description of Change	Engineer	Date
A	Preliminary Release	FH	4/8/10
A1	Initial Release	FH	4/12/10
A2	Revised Accuracy spec, added J1, pin 40, revised part number note.	FH	5/20/10
A3	Updated with screens and features available in Rev 107.5.2.2.107	GC	2/23/11
A4	Per ECO C01429	RS	7/12/11