



- **0.0001° Resolution**
- **Up to 2 arc-second Accuracy**
- **Frequency Range 47Hz to 20 kHz**
- **Fully Programmable**
- **Continuous CW or CCW rotation to 100,000°/sec**
- **Built-in reference Generator**

The model 5300 is a laboratory-grade instrument capable of simulating a synchro or resolver. As such, the 5300 may be used as a standard for calibrating or testing automatic test equipment (ATE), or used to measure angle position indicators (API) and synchro-to-digital converters. The output parameters can be varied and modulated over a wide range as determined by the operator. The 5300 is self-contained and can be remotely controlled by a computer via the interface connector on the rear panel. The 5300 has provision for sensing its applied output at the load and comparing it to its set output. In this manner, the 5300 can automatically compensate for differences due to line losses.

The model 5300 may also use an external reference waveform. The external inputs utilize protected autoranging technology that make connection and setup safe, easy, and efficient. The outputs completely isolate the load in the event of an overload.

The model 5300 is self-calibrating. On command the instrument checks its calibration, and if an error is detected, the unit immediately generates a digital error correction factor. Self-calibration not only compensates for errors due to changes in voltage and frequency settings, but also those due to temperatures and long-term drifts.

### Benefits:

- Unmatched Accuracy- of up to 2 arc-seconds is maintained through built-in automatic calibration which reduces costly, periodic lab calibrations
- Fully integrated design includes power reference oscillator, digital modulator and reference to output phase shifter
- Wide Frequency range of up to 20kHz prevents obsolescence, due to higher frequency requirements
- Low output impedance and remote sensing assure high voltage accuracy
- Floating output stages and isolated power supplies allow for low common-mode errors
- Allows for a wide variety of dynamic characteristics are simulated by continuous or cyclical angular modulation
- Built-in digitally generated reference with precise variable phase shift to outputs which simulate real servos
- Ease of use through front panel controls and IEEE programmable interface

### Typical Applications

- **True resolver/synchro standard** – for calibration/metrology labs, engineering design, ATE & Production Test environments. The 5300 can be used to calibrate the most accurate Angle Position Indicators (API) or Synchro/Resolver-to-Digital Converters.
- **Simulation** – of a variety of static or continuous Resolver/Synchro rotation from slow roll to fast slew rates
- **Calibration & Testing** – of high accuracy Resolver/Synchro to digital converters for static or dynamic characteristics such as tracking rate and bandwidth

Specifications:

Model 5300 Specifications

**SPECIFICATION**

<b>Reference Input</b>	<b>Synchro</b>	<b>Resolver</b>
Operating frequency range	47 Hz to 1.2 kHz	360 Hz to 20 kHz
Voltage Range:		
47 Hz to 1.2 kHz	2 to 115 V <sub>RMS</sub>	
>1.2 kHz to 20 kHz	—	2 to 26 V <sub>RMS</sub>
Input impedance	200K $\Omega$ minimum	
<b>Reference Output</b>		
Voltage range vs Frequency:		
47 Hz to 1.2 kHz	2 to 115 V <sub>RMS</sub>	
>1.2 kHz to 20 kHz	2 to 26 V <sub>RMS</sub>	
Output impedance	< 5 $\Omega$	
Voltage Accuracy	$\pm 3$ % of setting	
Voltage resolution	3 digits	
Output current:		
2 to 26 V <sub>RMS</sub>	100 mA <sub>RMS</sub> max	
>26 to 115 V <sub>RMS</sub>	25 mA <sub>RMS</sub> max	
DC Offset	2 mV maximum	
Phase shift range	0 to $\pm 180^\circ$ to 0.001 $^\circ$ resolution	
Phase shift accuracy:		
47 to 2 kHz	$\pm 0.5^\circ$	
>2 kHz to 20 kHz	$\pm 5^\circ$	
<b>Outputs (isolated)</b>		
Voltage Accuracy	2% of setting	
Voltage resolution	1% of setting minimum	
DC Offset	5 mV maximum	
Voltage range (line-to-line)	1 to 90 V <sub>RMS</sub>	

Model 5300 Specifications

**SPECIFICATION**

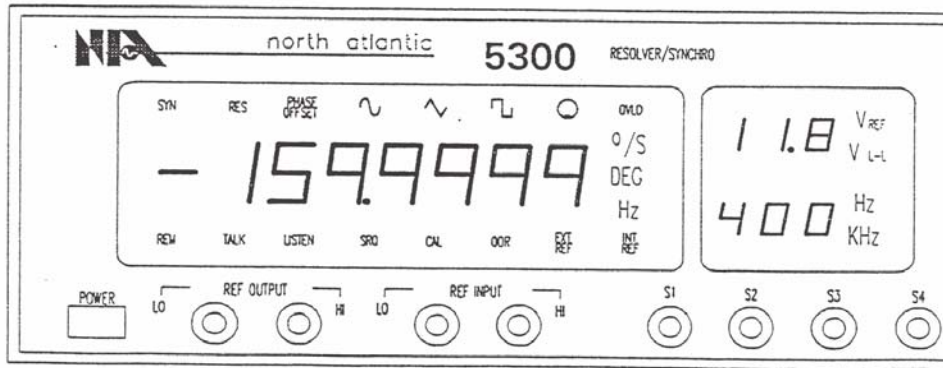
Angular accuracy vs. Frequency <sup>(a)</sup> :		<b>VALUE</b>	
<b>SYNCHRO MODE</b>	6-11.8 V <sub>L-L</sub>	>11.8 - 50 V <sub>L-L</sub>	>50 - 90 V <sub>L-L</sub>
47-360 Hz	-----	±3 arc-sec	±3 arc-sec
>360-600 Hz	±2 arc-sec <sup>(d)</sup>	±2 arc-sec <sup>(d)</sup>	±2 arc-sec <sup>(d)</sup>
>600-800 Hz	±2 arc-sec <sup>(d)</sup>	±3 arc-sec	±4 arc-sec
>800-1200 Hz	±2 arc-sec <sup>(d)</sup>	±4 arc-sec	±5 arc-sec
>1200-20,000 Hz	-----	-----	-----
<b>RESOLVER MODE</b>	6-26 V <sub>L-L</sub>	>26 - 90 V <sub>L-L</sub>	
47-360 Hz	-----	-----	
>360-600 Hz	±2 arc-sec <sup>(d)</sup>	±2 arc-sec <sup>(d)</sup>	
>600-800 Hz	±2 arc-sec <sup>(d)</sup>	±2 arc-sec	
>800-1200 Hz	±2 arc-sec <sup>(d)</sup>	±5 arc-sec	
>1200-10,000 Hz	±2 - 15 arc-sec <sup>(b)(d)</sup>	-----	
>10,000-20,000 Hz	±15 - 60 arc-sec <sup>(b)(d)</sup>	-----	
Angular Accuracy vs load (remote sensing capability):			
47 Hz to 2 kHz	±2 arc-sec/VA	±1.5 arc-sec/VA	
>2 kHz to 4 kHz	—	±3 arc-sec/VA	
>4 kHz to 10 kHz	—	±6 arc-sec/VA	
>10 kHz to 20 kHz	—	±12 arc-sec/VA	
Angular resolution	0.0001° (0.36 arc-sec)		
Angular accuracy vs temperature	±0.2 arc-sec/°C maximum		
Output current (minimum) <sup>(c)</sup> :			
2 to 11.8 V <sub>RMS</sub>	330mA <sub>RMS</sub>		
>11.8 to 26 V <sub>RMS</sub>	150mA <sub>RMS</sub>		
>26 to 90 V <sub>RMS</sub>	33mA <sub>RMS</sub>		
Output impedance (maximum):			
47 to 1.2 kHz	0.5 Ω		
>1.2 kHz to 10 kHz	—	< 0.40 Ω	
>10 kHz to 20 kHz	—	< 1.0 Ω	
Radius (sinusoidal) accuracy	±0.005 % typical		

**SPECIFICATION**

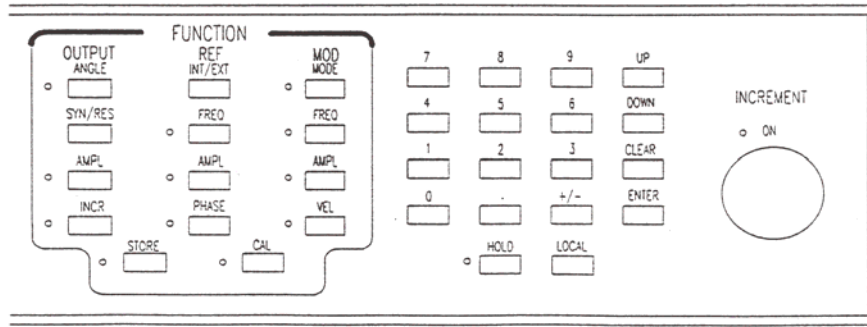
<b>Dynamic angular modulation</b>	
Continuous (CW or CCW)	To 100,000°/sec (278 rps)
Cyclical	Sine, triangle or square wave to 1 kHz or between preset angles
Incremental	Successive equal angles on command
<b>Other</b>	
Front panel control	Push buttons; additional rotary control for manual angular positioning
Remote control	IEEE-488
Temperature	0° C to 50° C operating, -40° C to 71° C storage per MIL-T-28800E, Type III, Class 6, Style E
Dimensions	19" (48.3 cm) W x 3.5" (8.9 cm) H x 18 7/16" (48.8 cm) D, bench or rack mounting
Weight	35lbs
Power	115/220 VAC ±10%, 47 to 440 Hz, 115 VA

- <sup>(a)</sup> Applies over the full voltage range unless otherwise indicated and includes resolution uncertainty
- <sup>(b)</sup> Accuracy varies logarithmically with frequency
- <sup>(c)</sup> 0° to 70° inductive load; outputs are overload and short-circuit protected
- <sup>(d)</sup> Accuracy de-rates logarithmically from the 6-volt rating to the 1 V rating with a 50% increase in specification at 1 V

### Front Panel Indicators



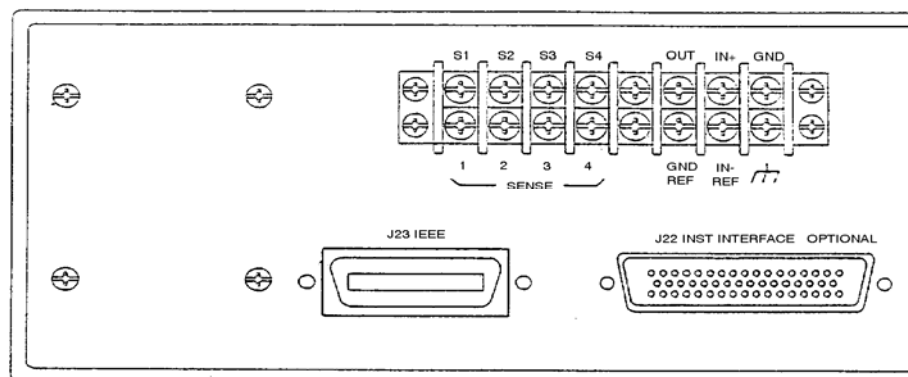
### Front Panel Controls



### Front Panel Terminal Connections

SIGNAL	FUNCTION
S1	Synchro/Resolver S1
S2	Synchro/Resolver S2
S3	Synchro/Resolver S3
S4	Resolver S4
REF INPUT - HI	External Reference input +
REF INPUT - LO	External Reference input -
REF OUTPUT - HI	Internal Reference output +
REF OUTPUT - LO	Internal Reference ground

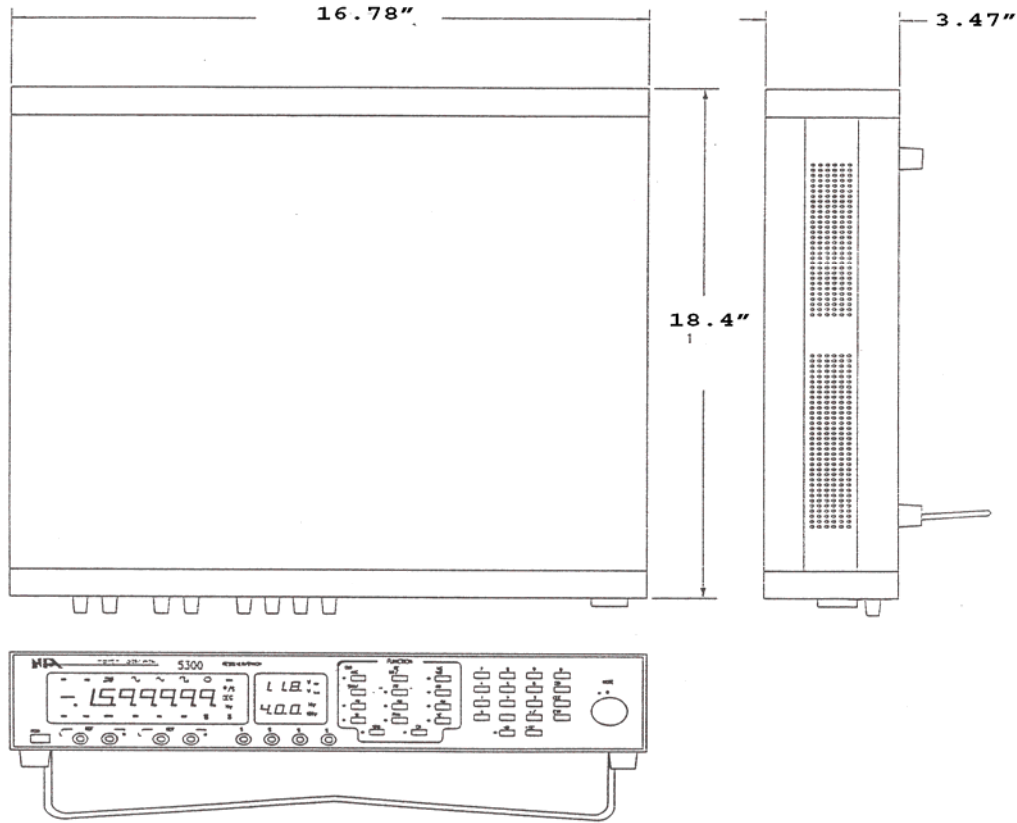
## Rear Panel Diagram



## Rear Panel Terminal Block Connections

SIGNAL	FUNCTION
S1	Synchro/Resolver S1
S2	Synchro/Resolver S2
S3	Synchro/Resolver S3
S4	Resolver S4
SENSE1	Remote sense for S1
SENSE2	Remote sense for S2
SENSE3	Remote sense for S3
SENSE4	Remote sense for S4
REF IN+	External Reference input +
REF IN -	External Reference input -
REF	Internal Reference output
REF GND	Internal Reference ground
AGND	Analog Ground
CHASSIS	Chassis Ground

### 5300 Outline Diagram



### Tools and Equipment Supplied When Ordering a Model 5300

DESCRIPTION	NAI MODEL/PART NUMBER
Resolver/Synchro Standard	Model 5300
Line cord	870165
Installation & Operation manual	OM-I-6006
115 V line fuse (2 A slo-blo)	800935
230 V line fuse (1 A slo-blo)	800118
Rack mounting handles (2)	210079